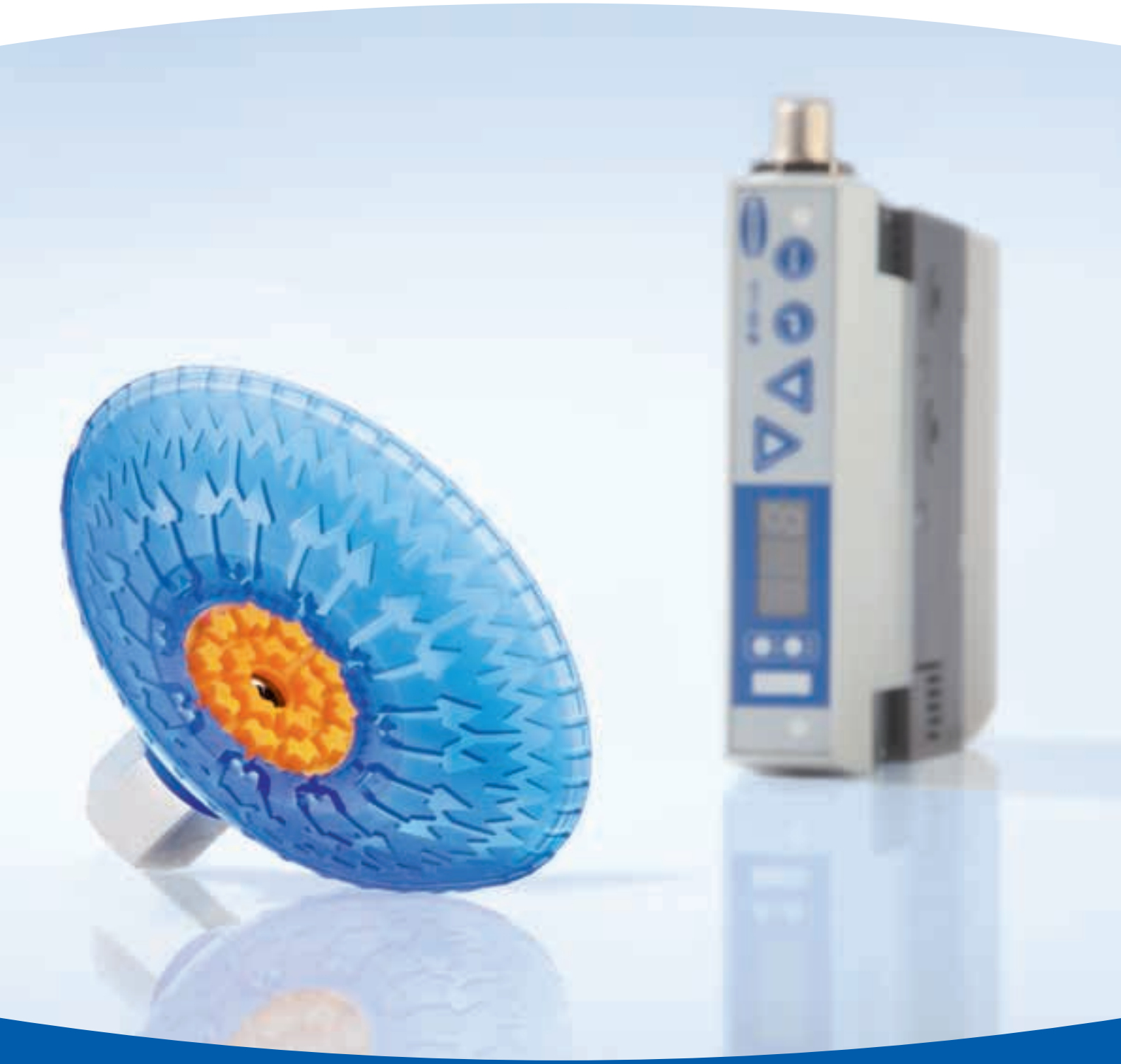
Innovative Vacuum for Automation

SCHMALZ



Vacuum Components

Catalog 2012 / 2013

Schmalz Online Shop
www.schmalz.com

Complete product range
Easy and secure ordering
Comprehensive services

Your personal online shop account
- Quick checking of prices and availability
- Order history – all orders visible at a glance, complete with status
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- Tracking – see where your order is at any time

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Consistent customer orientation and groundbreaking innovations, excellent quality and comprehensive consulting competence make Schmalz the world's leading partner for vacuum technology in automation, handling and clamping applications.

Dr. Dipl.-Ing. Kurt Schmalz

Dipl.-Ing. Wolfgang Schmalz

Our Purpose

We are committed to maintaining a fair partnership with our customers and suppliers: one that is beneficial for all parties.

Schmalz is a family-run company, and we focus on long-term objectives. Our company philosophy is based on the principle of sustainability: economic success combined with ecological and social engagement. This ensures that we remain self-sufficient and affords us the necessary creative freedom.

Our sustainability principle as well as our lean and efficient processes keep us permanently competitive and reassure our customers that we are the right choice for a long-term partnership. Our customers associate Schmalz with innovative products and services, advanced technology that is available worldwide, as well as unsurpassed application knowledge.

Convincing customers requires enthusiastic employees, who develop excellent innovative products and market these in accordance with customers' requirements and profitability. The Schmalz employees derive their motivation for their above-average efforts and loyalty from a modern corporate culture and share in the economic success of our company.

Our company's readiness and capacity for change is important to us personally. We have, for example, already positioned ourselves successfully for the future by founding our own subsidiary companies in the most important international growth markets.

You will profit from a partnership which ensures long-term and real advantages over your competitors – rely on Schmalz's world of vacuum technology.

Dr. Dipl.-Ing. Kurt Schmalz
Managing Director

Dipl.-Ing. Wolfgang Schmalz
Managing Director

Dynamic Growth is our Passion

Founded:	1910 by Johannes Schmalz
Market importance:	Leading global supplier of vacuum technology in the areas of automation, handling and clamping technology
Business areas:	Vacuum components Vacuum gripping systems Vacuum handling systems Vacuum clamping systems
Employees:	More than 650 worldwide, 13 % trainees (DE)
Innovation indicators:	About 350 industrial rights chartered and granted 7 % of turnover spent on research and development
Subsidiaries abroad:	In 15 countries worldwide
Sales partners:	In over 40 countries worldwide
Turnover quota:	Around 50 % Germany Around 50 % International
Certifications:	DIN ISO 9001 (quality management) since 1994 DIN ISO 14001 (environmental management) since 1997

International Sales Network

Expertise in 50 countries

Together with customers, the Schmalz system consultants design an appropriate vacuum system for the individual application. Whether you are looking for a vacuum solution for automation technology, handling technology or clamping technology, Schmalz is the right partner.

The sales network, with local field representatives, international subsidiaries and trade partners, ensures quick and competent information and advice.

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Efficiency and Sustainability

Schmalz value creation

The constantly increasing demand in resources and energy of people and business leads to more and more bottlenecks and increasing costs in material procurement. For this reason, it is necessary to deal with materials and resources in an efficient manner for reasons of economy and sustainability.

Process-Optimized

These points are very important to Schmalz. Therefore the company has organized its processes to gain added value. The added-value system pursues aims such as lowest production and process costs, shortest processing times, low stocks and at the same time highest quality. The added-value system, together with the company's modern workplaces, is the basis for efficient production and its ability to compete over the long term.

At Schmalz state-of-the-art production and logistic concepts determine most of the everyday tasks in manufacturing. For example, Schmalz uses the one-piece flow concept whenever it is possible and makes sense to do so. With this concept, the vacuum specialist can avoid large lot sizes, thus saving material and warehouse space. The manufacturing processes were changed over to piece-by-piece assembly. A second product is not manufactured until the first product is completely assembled and tested.

The "milk run" concept in conjunction with kanban warehousing makes material available to the employees as required and at the right time. Both of these systems ensure that material is refilled only in the quantity in which it was consumed.

These innovative process optimizations provide lean processes and economical materials handling.

Quality Management

At Schmalz, the customer stands at the center. The goal is to meet the customers' demands and deliver products in a quality, that it is expected by the customer.

The processes and procedures at Schmalz are based on the extensive know-how, many years of experience, most modern concepts and international standards. Since 1994 the quality management system of the vacuum specialist has regularly been certified to DIN ISO 9001.

Computer Aided Quality (CAQ) software informs the employees of the company constantly on the current quality level, so that Schmalz can react quickly to changes. Modern manufacturing concepts provide for early fault detection and troubleshooting. "Continuous improvement" is part in everyday life and develops employees, companies and products continuously. This reduces the company's level of error in longterm.

Suppliers are also an important part of the overall system. Schmalz demands the same quality standard from suppliers as it demands of itself. Continuous supplier development contributes to the overall success of the company.

Efficient Products

In the development and manufacturing of its products, Schmalz puts great emphasis on efficiency in terms of energy consumption and recyclability. Apart from the functionality, aspects such as a long service life, high efficiency and good recyclability are taken into consideration. Therefore Schmalz has developed vacuum generators with an integrated air-saving function, lifting devices with a wireless remote control and suction pads with separable elastomer part and nipple, just to name a few.

Sustainability in Practice

Schmalz has made the principle of sustainable development one of its corporate objectives. Only sustainable growth allows Schmalz to protect its corporate interests. Since Schmalz is thinking in the long-term, the company aligns its corporate strategy in such a way that economics, ecology and social commitment complete each other. This means Schmalz is able to finance its own growth in order to ensure secure jobs and actively realize our social and ecological responsibility.

The special importance of “sustainability” is reflected in the corporate principles. The company management and employees are required to think and practice business with environmental awareness. As a positive energy company, Schmalz generates more energy from renewable sources then the company consumes itself. It is the firm opinion of the vacuum specialist that economic success goes hand-in-hand with the awareness of ecological and social responsibility.

Schmalz’ exceptional dedication has gained wide recognition and has been rewarded with numerous awards.

Business Areas

Vacuum Components and Gripping Systems

Vacuum components and vacuum gripping systems from Schmalz permit decisive productivity improvements in automated processes. Be it in mechanical engineering or in the robot industry – Schmalz customers in all areas of automation technology profit from our qualified system consultancy services and our groundbreaking, innovative solutions. The range of workpieces which can be handled with vacuum extends from easily damaged, small parts such as electronic chips or CDs to furniture elements or heavy sheets of steel.

Our specialists' expertise guarantees efficient and economical solutions for the automation of a process; from the individual components, to the complex gripping system, all the way through to the particular customer-specific application.

Vacuum Components
- Vacuum suction pads
- Special grippers
- Mounting elements
- Vacuum generators
- Valve technology
- Switches and system monitoring
- Filters and connections

Vacuum Gripping Systems
- Fully configured systems for industrial robots and portals, delivered ready for connection

Business Areas

Vacuum Handling Systems

Vacuum handling systems from Schmalz rationalize and simplify production processes by facilitating easy and efficient workpiece handling. They feature functionality, safety and ergonomic operation in processes such as the loading and unloading of machines.

Vacuum Tube Lifter Jumbo

Vacuum tube lifters Jumbo are ideal for the frequent and rapid lifting and moving of cardboard boxes, sacks, barrels, and numerous other applications weighing up to 300 kg.

Vacuum Lifting Devices VacuMaster

Vacuum lifting devices VacuMaster are the ideal tool for the ergonomic and safe handling of loads weighing up to several tons.

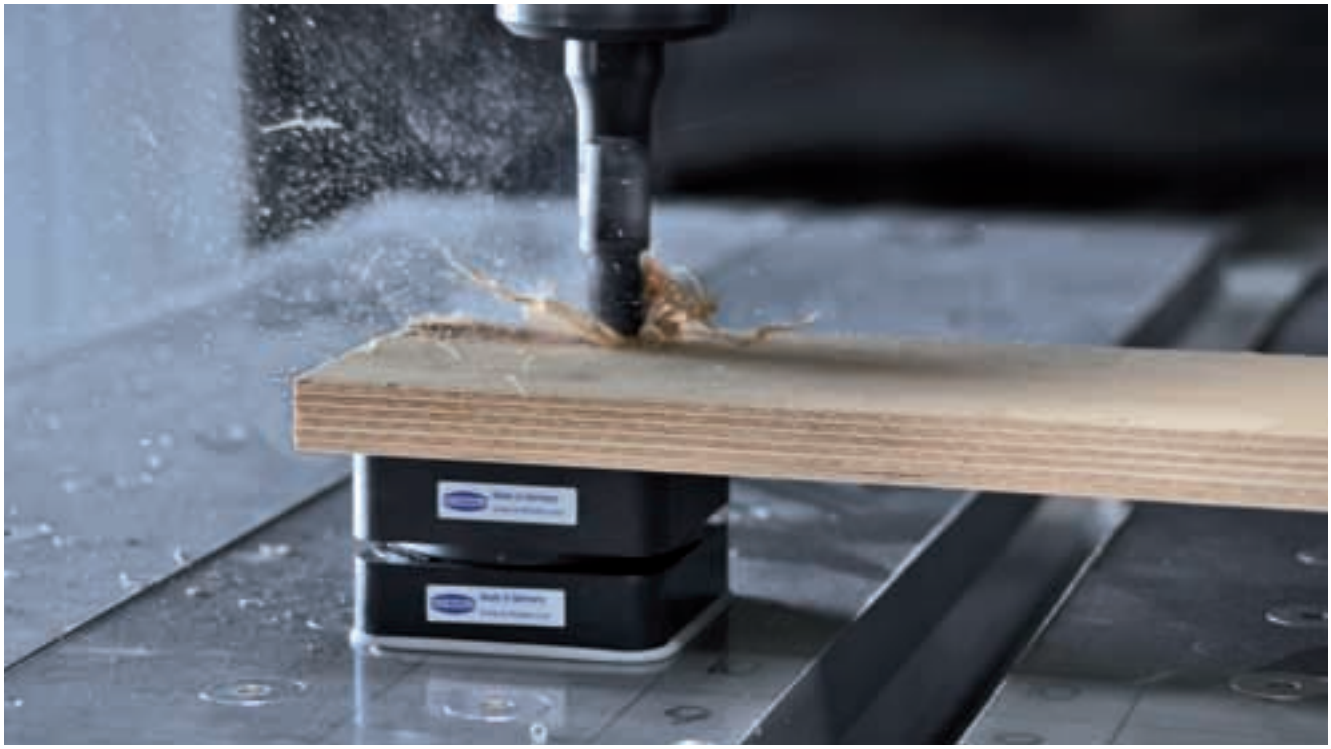
Cranes and Crane Systems

Various working ranges, load classes and aluminum or steel crane rails facilitate their use in a variety of applications.

Workshop Equipment

Workshop equipment provides invaluable support in trade and industrial production processes; in the wood and solar energy industries, for example.

Business Areas



Vacuum Clamping Systems

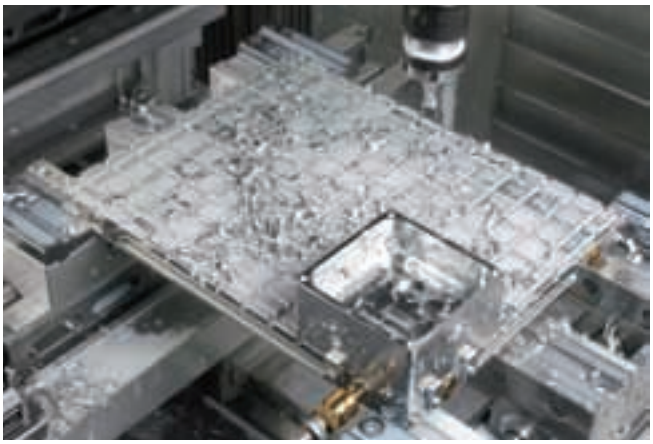
Schmalz vacuum clamping technology enhances the efficiency in production processes for CNC machine tools. Innovative ideas, numerous national and international trade mark rights, system diversity and customer focus have made Schmalz to the world market leader in the area of vacuum clamping technology.

We are the system supplier to the internationally leading manufacturers, who equip their CNC machining centres as standard with Schmalz clamping systems, thus ensuring maximum productivity for their customers.

Clamping Solutions for the Wood Industry
- Profitability through shorten set-up times

Clamping Solutions for the Metal Industry
- Precise and secure

Modernising
- Retrofitting for consisting machines
- Set-up reduced by up to 80 percent



Industry Solutions

Worldwide at home in many industries

In all areas of automation technology, Schmalz customers benefit from expert systems consulting and ground-breaking, innovative solutions. Schmalz vacuum components include everything they need to develop a fully operational vacuum system.

The wide product range of vacuum components corresponds to the specific requirements of a wide variety of industry sectors. The focus is on the industries described below. In the catalog, the industry-specific suitability of each product is indicated using symbols. The index at the end of the catalog can assist in finding appropriate items for your industry sector.

Metal sheets/automotive

Fast cycle times and high operational reliability

- Special suction pads for highly dynamic metal sheet handling, even with oiled metal sheets or fragile components
- Vacuum generator with integrated system monitoring, condition monitoring and IO-Link technology for increasing process reliability and improving energy efficiency
- Optimized mounting elements for the requirements of the automotive industry

Wood

Handling of workpieces with a variety of surfaces under difficult operating conditions

- Suction pads for handling and separating workpieces the “suck-through” effect
- Comprehensive range of filters for protecting vacuum systems from contamination
- Large area vacuum gripping systems for moving wooden sheets, furniture parts, pallets or entire layers of boards

Packaging

Packaging of goods and handling of packaged products with minimal cycle times

- Complete suction pad offering with a large variety of materials and geometries for a wide range of packaging and products
- Large range of vacuum generators for various process requirements
- Modular system VEE for quick and cost-efficient assembly of vacuum end effectors
- Vacuum layer gripping systems for palletizing and order picking of packaged products

Plastics

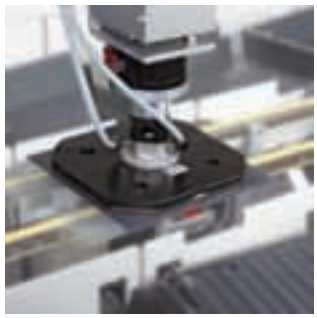
Removal of hot plastic parts leaving very few marks

- Special materials of the suction pads with temperature resistance requirements, requirements relating to the ability to paint or varnish the workpiece and requirements that very few marks be left on the workpiece
- Vacuum generator minimized in size for highly dynamic handling

Solar

Extremely fast, accurate and gentle handling

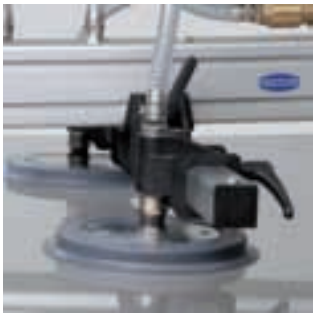
- Wafer grippers for careful, fast and accurate handling of photovoltaic components
- Suction pads in various materials and geometries
- Special grippers for low-contact and gentle handling



Glass

Mark-free and secure gripping

- Suction pads especially for handling flat, smooth and thin workpieces
- Special suction plates made from special materials for use in areas with high UV and ozone levels



Composite

Handling of porous composite materials

- Special grippers with integrated vacuum generation and high volume flow for secure gripping even in case of porous materials such as carbon composites
- Various suction pad geometries and materials provide for adjustment to a variety of applications
- Needle grippers for handling of bending and unstable materials, as well materials to which it is difficult to apply suction

Battery

Handling of electrodes, separators and battery cells without causing any damage

- Special grippers for lithium ion batteries
- Ideal marking behavior confirmed in contamination tests of the FRAUNHOFER IPA
- Careful, fast and accurate handling of battery components and cells

CD/DVD

Clean and flexible vacuum handling

- Complete suction pad range in a wide variety of materials for all processing steps in CD/DVD production
- Vacuum generator with integrated system monitoring for increasing process reliability
- Small vacuum components minimized in size for highly dynamic handling

Overview of Section 2

Vacuum Knowledge

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Seminars and training
Schmalz offers customized training, seminars and courses at the Schmalz Academy. Customers benefit from our comprehensive expertise and all our years of experience as vacuum specialists.
You will find more details in the chapter "Services".

Overview of a Vacuum System

Vacuum systems are used as grippers in automated applications. Customers benefit from the comprehensive component program of Schmalz, the vacuum specialist, when designing a vacuum system.

Filters and connectors

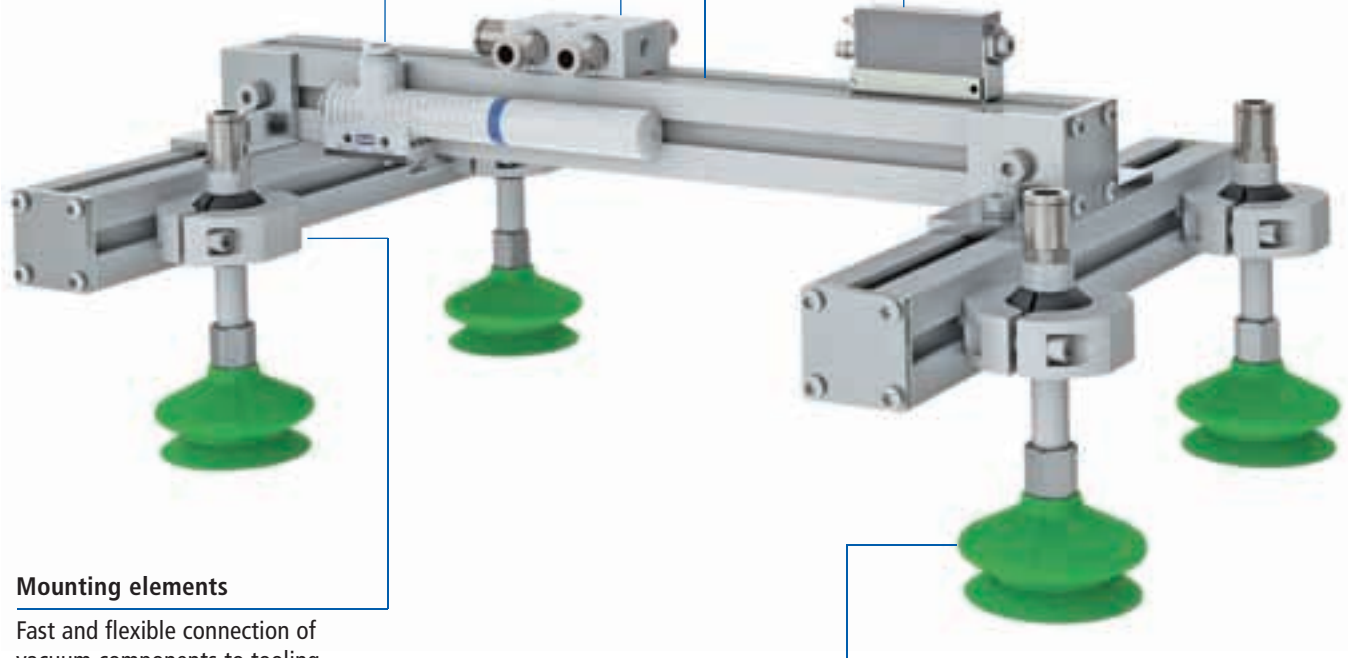
Filters protect the vacuum generator; hoses and connectors connect the components

Vacuum generators

Centralized or decentralized vacuum generation by means of ejectors, pumps or blowers

Switches and system monitoring

Measuring and control components ensure safe operation of the vacuum system



Mounting elements

Fast and flexible connection of vacuum components to tooling systems

Vacuum suction pads or special grippers

Interface between vacuum system and workpiece

Valve technology

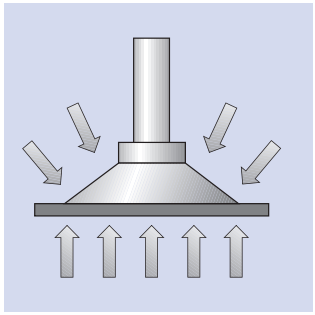
Valves are used to control the vacuum as well as the compressed air (decentralized or centralized)

Vacuum gripping systems

Complete solutions, such as large-area gripping systems, layer grippers or vacuum spiders, are customized to meet customer needs

Vacuum Suction Pads

Vacuum suction pads are the link between the workpiece and the handling system. They consist of the suction pad (elastomer part) and a connecting element.



Suction pads are used to grip and move workpieces in a plant or on a robot. A suction pad does not attach itself to the surface of a workpiece. Instead, the ambient air pressure (atmospheric pressure) presses the suction pad against the workpiece as soon as the ambient pressure is greater than the pressure between the suction pad and the workpiece.

This pressure difference is achieved by connecting the suction pad to a vacuum generator, which evacuates the air from the space between the pad and the workpiece. If the suction pad is in contact with the surface of the workpiece, no air can enter it from the sides and a vacuum is generated.

The holding force of the suction pads increases proportionally with the difference between the ambient pressure and the pressure inside the pad.

The holding force of a suction pad is calculated with the formula:

$F = \Delta p \times A$

F = Holding force
Δp = Difference between ambient pressure and pressure of the system
A = Effective suction area (the effective area of a suction pad under vacuum)

This means the holding force is proportional to the pressure difference and the suction area. The greater the difference between ambient pressure and pressure in the suction pad or the larger the effective suction area, the greater the holding force. The force can vary depending on a change of the pressure difference and area parameters.

Suction Pad Shapes

Suction pads from Schmalz can be divided into universal suction pads and suction pads for special applications. Universal suction pads cover a wide range of requirements. Suction pads for special applications were developed to meet the requirements of individual industries. They may be characterized by special properties, such as the handling of thin-walled and greasy body panels in the sheet metal industry or of porous and structured workpieces in the wood industry.

The following shapes are generally distinguished:

- Flat suction pads
- Bellows suction pads

Each suction pad shape offers advantages that are reinforced and optimized by the combination with a suitable material. The available suction pad materials are described in detail in the section "Suction pad materials".

Flat Suction Pads

Flat suction pads are particularly suited for handling workpieces with flat or slightly curved surface. Flat suction pads can be evacuated quickly due to their flat shape and low inner volume, therefore they can grip the workpiece in a very short time and can withstand the forces which result from fast movement of the object during handling.

Advantages of flat suction pads

- Large variety of different suction pad materials and shapes (round, oval, steep or flat leveling sealing lip)
- Flat shape and low inner volume result in minimum evacuation times
- Good stability of the suction pad allows for high shear forces and positioning accuracy while workpieces are picked up

Typical areas of application

- Handling of smooth to lightly rough workpieces, such as sheet metal plates, cardboard, glass plates, plastic parts and wooden boards
- In automated processes with short cycle times

Bellows Suction Pads

Bellows suction pads are used when it is necessary to compensate for varying workpiece heights, to handle parts with uneven surfaces or fragile parts. The bellows make this suction pad especially flexible and adaptable.

Advantages of bellows suction pads

- Good adaptation to uneven surfaces
- Lift effect while picking up
- Compensation of differences in height
- Fragile workpieces are picked up gently

Typical areas of application

- Handling of curved or uneven workpieces, such as body panels, tubes, cardboard, etc.
- Handling of fragile workpieces, such as electronic components, injection molded plastic parts, etc.
- Handling of non-rigid or flexible workpieces, such as packaged or shrink wrapped products

Both types of suction pads are available in a wide range of shapes and sizes. You will find more information on basic data and applications for the individual series in the chapter "Vacuum Suction Pads".

Suction Pad Materials

Application and ambient conditions are important for the selection of the right suction pad and the appropriate material. Abrasion resistance, oil resistance and food safety are often required of a suction pad. These requirements can be met by selecting the appropriate material.

Schmalz develops its suction pad materials in-house with new materials being developed, tested and optimized in our own Plastics Competence Center.

Material Overview

Description	**Abbreviation**	**NBR**	**NBR-AS**	**SI**	**SI-AS**	**NK**	**HT1**
	Chemical designation / trade name	**Nitrile caoutchuc** (AS = antistatic)		**Silicone caoutchuc** (AS = antistatic)		**Natural rubber**	**High temperature material**
	Color / coding	black, gray, blue, light blue	black with blue dot	white (translucid), green	black with red dot	gray, light brown, black	blue
Chemical resistance	**General weathering resistance**	●●	●●	●●●	●●●	●●	●●●
	Ozone resistance	●	●	●●●●	●●●●	●●	●●●●
	Oil resistance	●●●●	●●●●	●●	●●	●	●●●●
	Fuel resistance	●●	●●	●	●	●	●●
	Alcohol resistance, ethanol 96%	●●●●	●●●	●●●●	●●●	●●●●	●●●●
	Solvents resistance	●●	●●	●●	●●	●	●●
	General resistance to acids	●	●	●	●	●●	●
	Steam resistance	●●	●●	●●	●●	●	●●●
Mechanical characteristics	**Wear resistance**	●●	●●	●	●	●●	●●●
	Resistance to permanent deformation	●●	●●	●●	●●	●●●	●●
	Tensile strength	●●	●●	●	●	●●	●●
	Specific resistance in [Ω x cm]	–	≤ 10^7	–	≤ 10^7	–	–
	Shore hardness to DIN ISO 7619	40 to 90 ± 5	55 ± 5	30 to 85 ± 5**	55 ± 5	30 to 90 ± 5	60 ± 5
Temperature resistance*	**Short-term in °C (< 30 sec.)**	-30° to +120°	-30° to +120°	-50° to +220°	-35° to +220°	-35° to +120°	-25° to +170°
	Longer-term in °C	-10° to +70°	-10° to +70°	-30° to +180°	-20° to +180°	-25° to +80°	-10° to +140°
Further characteristics	**Target industry**	Universal	Universal	Packaging, CD/DVD	Packaging, CD/DVD, Electronics	Wood, Packaging	Plastics, Glass
	Food grade according to CFR 21 §177.2600 FDA			✓			
	Leaving few marks						✓
	Absence of PWIS (paint-wetting impairment substances)	NBR-60, NBR-45			✓		✓

* Approximate value: depends on ambient temperature, application force, recovery time and wall thickness of suction pad
** After-bake of silicone 4 h/200 °C = ~+5 Shore A
*** With slight oil wetting
**** Varies, for technical reasons, for foam rubber

●●●● Exellent ●●● Very good ●● Good ● Poor to satisfactory

Material Overview

ED	PU	VU1	PVC	FPM	CR	EPDM	EPDM-MOS	ECO
Elastodur	**Polyurethane**	**Vulkollan**	**Polyvinyl chloride**	**Fluor-caoutchuc**	**Chloroprene**	**Ethylene-propylene-caoutchuc**	**Foam rubber made of Ethy-lene-propy-lene-caoutchuc**	**Epichlor**
green, blue	blue, dark green	dark green	blue (translucid)	black with white dot	black, gray	black, gray	black, gray	black
●●●	●●●	●●●	●●	●●●●	●●●	●●●●	●●●●	●●●
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–	–	–	–	–	–	–	–	–
60 to 85 ± 5	55 ± 5	72 ± 5	50 ± 5	65 ± 5	20 – 60	55 ± 5	~15****	60 ± 5
-40° to +100°	-40° to +130°	-40° to +100°	-30° to +65°	-10° to +250°	-40° to +100°	-35° to +130°	-35° to +100°	-25° to +160°
-25° to +80°	-30° to +100°	-40° to +80°	-15° to +50°	-10° to +200°	-20° to +70°	-25° to +100°	-25° to +70°	-25° to +130°
Packaging, Metal	Packaging	Metal, Packaging, Glass, Wood	Packaging, CD/DVD	Glass, Solar, Met al	Metal, Wood	Glass	Metal, Wood	Metal
				✓				
ED-85, ED-60								

Storage and Cleaning of Suction Pads

Observe the following information regarding storage and cleaning for the sensitive elastomer part of the suction pad:
Store suction pads in a cool place (between 0 °C and 15 °C, max. 25 °C) that is dark, dry, low in dust and offers protection from the weather, ozone and drafts, as well as stress. The effects of ozone, light (especially UV), heat, oxygen, humidity, as well as mechanical influences, can reduce the service life of the suction pad.

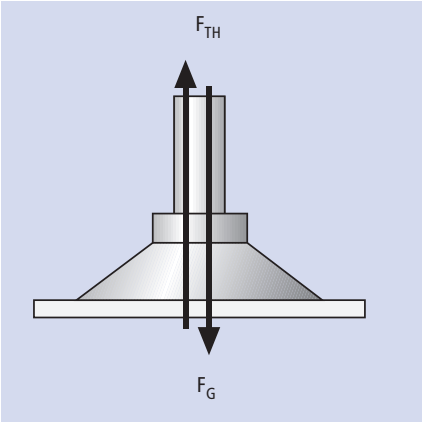
Clean suction pads with soap and warm water, and dry them at room temperature.

Technical Data of Suction Pads

Certain calculations are required for the selection of individual components when designing a vacuum system. The specified values are based on a vacuum level of -0.6 bar as well as a dry or lubricated workpiece surface. They are given without a safety factor. Depending on the operating conditions, one should keep in mind reductions that may occur due to friction or if a vacuum level is not reached (e.g. due to porous workpieces).

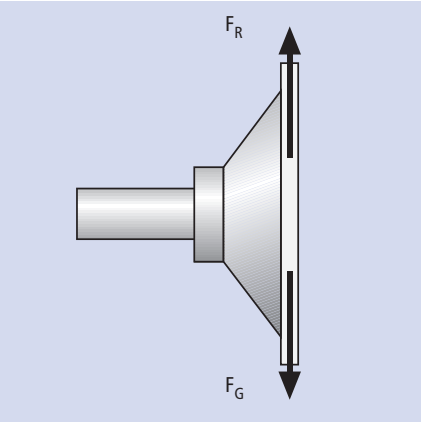
The most important technical data of the suction pads are explained below.

Theoretical suction force



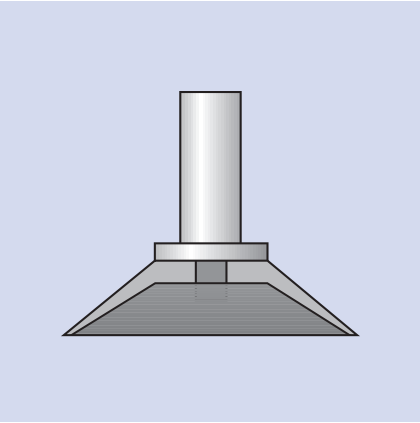
The theoretical suction force is the force acting perpendicular to the surface.
The specifications in the catalog are calculated values in newtons.

Shear force



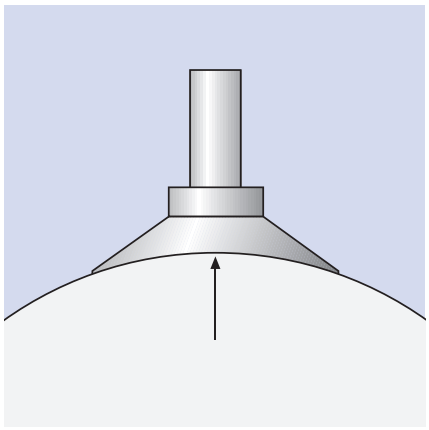
The shear force is the force acting tangentially to the surface. The specifications in the catalog are measured values in newtons.

Inner volume



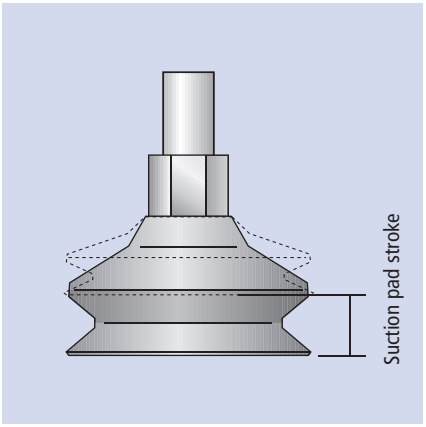
The inner volume indicates the volume of a body that has to be evacuated to pick up a workpiece. It is used to determine the total volume of the gripper system and is included when calculating evacuation times.

Minimum radius of curvature of the workpiece



Indicates the radius up to which the workpiece can be gripped securely with the respective suction pad.

Suction pad stroke



Refers to the suction pad's stroke (z) that occurs during evacuation of the suction pad.

Design of the Suction Pad

The design of the suction pad always depends on the actual application For this reason, various physical values must be calculated and determined before the correct suction pad can be selected.

Later in this chapter the design of a vacuum system is described in more detail based on a calculation example.

Friction coefficient

The friction coefficient "μ" describes the relationship between friction force and normal force. It is not possible to specify generally valid values of the friction coefficient between the suction pad and the workpiece. It has to be determined correctly through trials with the condition of the workpiece surface (rough/dry/moist/oily) or the properties of the suction pad (shape/sealing lip/sealing edge/suction pad material/Shore hardness) having a major influence.

Table of typical values Workpiece surface	Friction coefficient approx. μ
Glass, stone, plastic (dry)	approx. 0.5
Sandpaper (dry)	1.1
Moist or oily surface	0.1 – 0.4

Calculation of the holding forces

The calculation of holding forces can only be about theoretical values. In practical applications, many factors, such as the size and shape of the suction pad, the surface finish and the rigidity of the workpiece (deformation) play a decisive role. That is the reason why we recommend a safety factor (S) of at least 2. The German accident prevention regulation, UVV, prescribes a binding safety factor of 1.5. When swiveling workpieces during the handling task, a safety factor of 2.5 or higher has to be used, in order to cope with the resulting turning forces.

The holding force of a suction pad is the product of:

$$F = \Delta p \times A$$

F = Holding force (without safety factor, purely static)
Δp = Difference between ambient pressure and pressure of the systemk
A = Effective suction area (the effective area of a suction pad under vacuum)

Diameter of the suction pad

The holding force of a suction pad depends on its effective diameter. The condition of the workpiece and the number of suction pads are also crucial for the holding force that a vacuum system can generate.

The required diameter can be determined with the aid of the following formula:

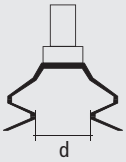
For horizontal pick-up:

$$d = 1.12 \times \sqrt{\frac{m \times S}{P_U \times n}}$$

For vertical pick-up:

$$d = 1.12 \times \sqrt{\frac{m \times S}{P_U \times n \times \mu}}$$

d = Suction pad diameter in cm
(with double lip ≈ internal diameter, with bellows suction pad = inner diameter of sealing lip)



m = Weight of the workpiece in kg
P_U = Vacuum in bar
n = Number of suction pads
μ = Friction coefficient
S = Safety factor

Calculation example for horizontal pick-up:

$$d = 1.12 \times \sqrt{\frac{50\ kg \times 2}{0.4\ bar \times 4}}$$

d = 8.85 cm

Plastic sheet:	m = 50 kg
Vacuum:	P_U = – 0.4 bar
Number of suction pads:	n = 4
Measured friction coefficient:	μ = 0.5
Safety factor:	S = 2

A sensible selection is the suction pad PFYN 95 with a nominal diameter of 95 mm.

Calculation example for vertical pick-up:

$$d = 1.12 \times \sqrt{\frac{50\ kg \times 2}{0.4\ bar \times 4 \times 0.5}}$$

d = 12.5 cm

Plastic sheet:	m = 50 kg
Vacuum:	P_U = – 0.4 bar
Number of suction pads:	n = 4
Measured friction coefficient:	μ = 0.5
Safety factor:	S = 2

A sensible selection is the suction pad PFYN 150 with a nominal diameter of 150 mm.

Suction rate or required volume flow [$\dot{V}$]

The volume flow that generates the vacuum is important for the suction force. The workpiece material is the principal factor for the required volume flow.
The table shows typical values for the volume flow or suction rate depending on the diameter of the suction pad with smooth and air-tight surface.

Typical value (with smooth, air-tight surfaces)

Suction pad Ø	Suction area A	Volume flow $\dot{V}$	
	[cm^2]	[m^3/h]	[l/min]
up to 60 mm	28	0.5	8.3
up to 120 mm	113	1.0	16.6
up to 215 mm	363	2.0	33.3
up to 450 mm	1,540	4.0	66.6

Important:
Conduct suction trials for porous parts.

Special Grippers

Special grippers are used in applications in which regular suction pads cannot be used. Special grippers are used to handle wafers, films, paper, fragile workpieces or textile fiber composites. They serve as a connection element between the workpiece and the handling system just like the suction pad.

Schmalz separates special grippers into the following series:

- Floating suction pads
- Magnetic grippers
- Needle grippers
- Wafer grippers
- Composite grippers

Floating Suction Pads

Floating suction pads are pneumatically operated special grippers with integrated vacuum generation. They operate on the Bernoulli principle and work as a low-contact system. The workpiece "floats" on an air cushion at the gripper surface. This makes the floating suction pad ideally suited for the handling of very sensitive products. The high volume flow can compensate for leakage, when handling porous workpieces.

Advantages of floating suction pads:

- Low-contact handling
- High volume flow
- Safe separation of thin, porous workpieces
- Integrated vacuum generation

Typical areas of application:

- Handling of fiber composites, paper, film, wood veneer, printed circuit boards, wafers and solar cells
- Separation of thin, porous workpieces

Magnetic Grippers

Magnetic grippers provide safe gripping of ferromagnetic workpieces by using the magnetic field of an integrated permanent magnet. The magnet is moved with compressed air to activate and deactivate gripping. Magnetic grippers are operated with pneumatic valves. The gripper does not require a voltage source for this purpose.

Advantages of magnetic grippers:
- Safe gripping with a permanent magnet is possible without voltage source
- Control of permanent magnet with compressed air and vacuum

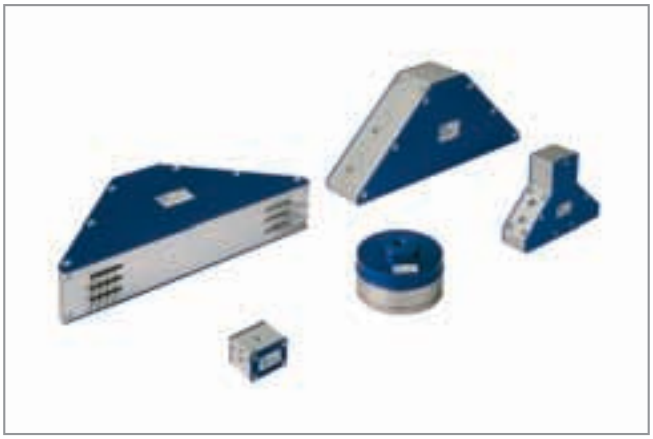
Typical areas of application:
- Handling of ferromagnetic workpieces
- Handling of blanks and perforated plates as well as sheet metal parts with drilled holes/breakouts or complex shapes
- Support of vacuum gripping system in highly dynamic handling of sheet metal parts

Needle Grippers

The needles are pressed into the workpiece and herewith the gripping process is realized. The needles are ejected pneumatically. The needles are extended at an angle to ensure reliable gripping of the workpieces. Once the gripping process is complete, the needles are retracted either through spring force or pneumatically.

Advantages of needle grippers:
- Safe handling of non-rigid materials or materials with an unstable shape
- Different shapes for unique operating conditions
- Selectable needle diameters and adjustable strokes

Typical areas of application:
- Handling of porous and/or non-rigid workpieces, such as textiles, insulating and foam materials, fiber composites such as carbon and glass fiber, fleece or felts, carpets, filters, fabric, styrofoam as well as metal foams



Wafer Grippers

Wafer grippers are ideally suited for the handling of sensitive parts, especially photovoltaic components such as wafers and cells. The wafer gripper is equipped with an integrated vacuum generator. The high volume flow and the moderate vacuum level allow gentle handling of workpieces.

Advantages of wafer grippers:
- Extremely fast and accurate handling; implements cycle times of less than one second
- High volume flow with low air consumption
- Integrated vacuum generation, including blow-off function
- Many accessories for perfect matching to different process steps in photovoltaics industry

Typical areas of application:
- Handling of photovoltaics components also under cleanroom conditions
- Handling of fragile workpieces
- Handling of porous, permeable workpieces

Composite Grippers

Composite grippers are mainly used for handling fragile workpieces. They are operated pneumatically and have an integrated vacuum generator.

Due to their high volume flow and the moderate vacuum level, composite grippers are ideally suited for handling fragile components.

Advantages of composite grippers
- Secure gripping, even with porous materials or partial coverage
- Short cycle times and accurate positioning
- Integrated vacuum generation, including blow-off function
- High volume flow

Typical areas of application
- Handling of fiber composites, such as carbon fiber reinforced composites
- Handling of electrodes, separators and battery cells
- Handling of extremely thin, sensitive components
- Handling of porous, permeable workpieces
- Handling of blank circuit boards

Mounting Elements

Schmalz offers a broad product range of mounting elements to integrate grippers (suction pads or special grippers) into gripping systems.

The following mounting elements can basically be distinguished:
- Vacuum end effectors
- Sections, crossbeams and connectors
- Holders and adapters
- Spring plunger
- Jointed mountings

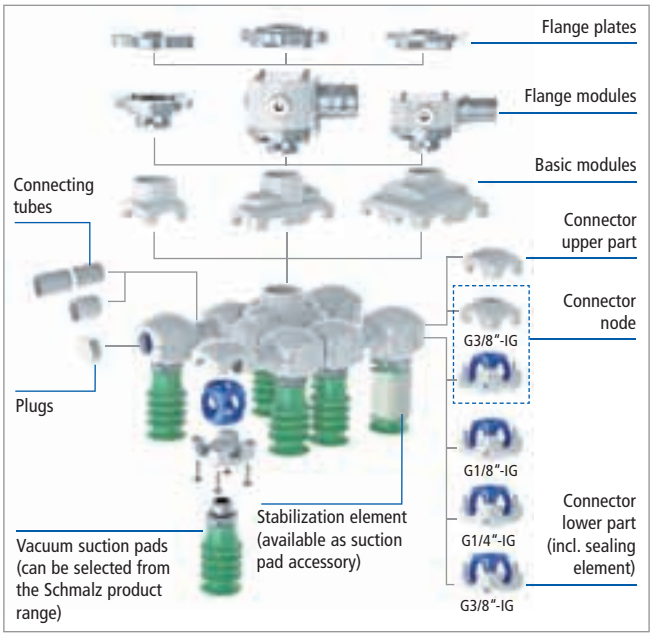
Products from Schmalz are listed in the chapter "Mounting Elements".

Vacuum End Effectors

The Schmalz modular system for vacuum end effectors (VEE) allows fast, flexible configuration of end effectors for different processes.

A wide selection of combinations of vacuum feed and zones, connection elements and suction pad connections is available to create the matching end effector.

Vacuum end effectors can be combined with many suction pads from the Schmalz product range (see chapter "Vacuum Suction Pads")



Vacuum Knowledge

The Vacuum System and its Components

Sections, crossbeams and connectors
These elements are used to build the basic structure of a vacuum gripping system. To reduce the number of hoses, you can build the sections as vacuum distributors with end covers and sealing frames.

Holders and adapters
The suction pads are attached to the basic structure or the traverse with holders and adapters. Different types of aluminum sections or square and round tubes are available.

Spring plungers
Spring plungers are used to compensate height differences of workpieces. They also cushion the impact of the suction pad and allow handling of fragile workpieces.

Jointed mountings
Jointed mountings provide a better adaption of the suction pad to the workpiece due to the design of Flexolink FLK and ball joint KGL that can be swiveled in all directions.

Suction pads
(chapter "Vacuum Suction Pads" or "Special Grippers")

Vacuum Generators

Vacuum generators provide the vacuum level that is required for the handling task. The vacuum is created either pneumatically or electrically.

Pneumatic vacuum generators implement short cycle times and can be integrated directly into the system due to their compact and lightweight design.

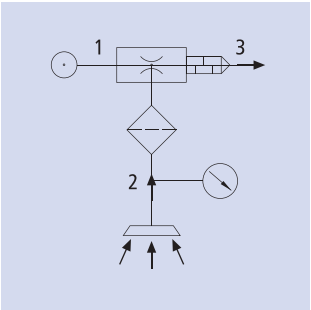
Electrical vacuum generators are used in applications when compressed air is not available or when very high suction capacities are required.

Pneumatic vacuum generators
- Ejectors

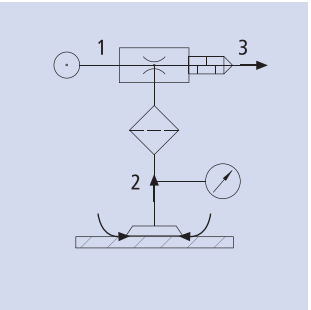
Electrical vacuum generators
- Pumps
- Vacuum Blowers

Important:
The nominal suction rate of all vacuum generators is given in l/min or m^3/h. The values are based on an ambient pressure of 1,013 mbar (sea level) and an ambient temperature of 20 °C.

The maximum suction rate therefore indicates the volume flow that the vacuum generator evacuates from the environment (free flow).



Free pick flow

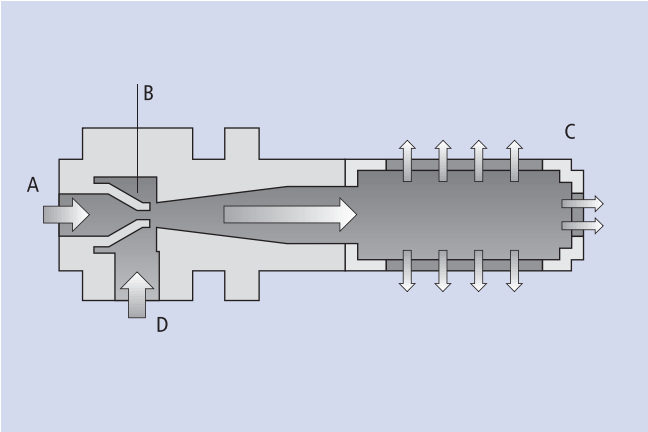


Additional suction while workpiece is picked up

Vacuum Ejectors

Ejectors work on the Venturi principle. They are divided into single-stage and multi-stage ejectors depending on the number of nozzle pairs.

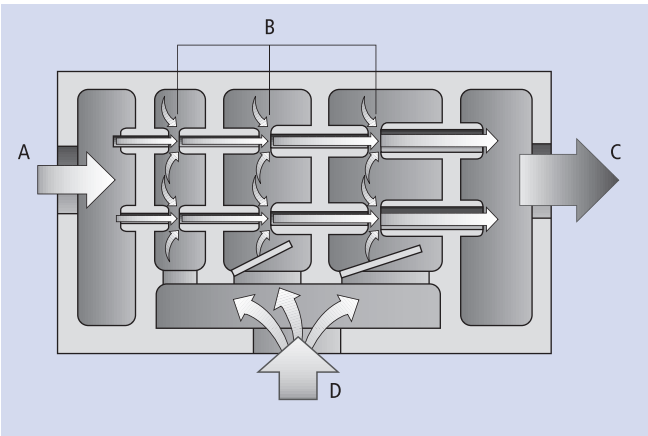
The compressed air is supplied through the connection (A) to the single-stage ejectors. It flows through the Venturi nozzle (B). The air is accelerated and compressed during this process. After passing through the nozzle, the accelerated air expands once again and a vacuum is created. Air is drawn in this way through the vacuum connection (D). The air that was drawn in and the compressed air escape through the silencer (C).



Principle of operation of a single-stage ejector

The Schmalz basic ejectors, inline ejectors and compact ejectors are based on the single-stage Venturi principle.

In addition to the single-stage Venturi principle, there are ejectors in which the vacuum is created by several Venturi nozzles arranged in a row. Compressed air is supplied to the ejector through connection (A). It passes through several Venturi nozzles (B) arranged in a row. A vacuum is created and the air is drawn in through the vacuum connection (D). The suction volumes of the individual nozzles add up to form a total suction rate $\dot{V}_D$. The air that was drawn in and the compressed air escape through the silencer (C).



Principle of operation of a multi-stage ejector

Compared to single-stage ejectors, multi-stage ejectors create a much higher suction rate in the lower vacuum range using the same amount of compressed air.

The Schmalz multi-stage ejectors are based on the multi-stage Venturi principle.

Advantages of ejectors

- Compact shape
- Low weight
- Fast vacuum generation
- No flexible parts, resulting in low maintenance and low wear
- Choose an installation position
- No heat generation

Typical areas of application

- Industrial robot applications in all industries, such as feeder applications in the automotive industry

We distinguish between three basic types of ejectors:

Basic- and inline ejectors

- Vacuum generators without valve control and system monitoring with high maximum vacuum level (85% vacuum)
- Used mainly to handle air-tight workpieces

Multi-stage ejectors

- Vacuum generators with several nozzle chambers arranged in a row with a very high suction rate.
- Used mainly for handling porous workpieces, such as cardboard, chipboards, OSB or MDF sheets

Compact ejectors

- Vacuum generators with integrated valve technology and system monitoring, SCPi/SMPi and SXPi/SXMPi series are equipped with IO-Link technology
- Control of pick-up and blow-off feasible without external valves
- Optional with integrated air-saving regulation
- Used in fully automatic handling systems (e.g. sheet metal processing, automotive industry, robot applications)

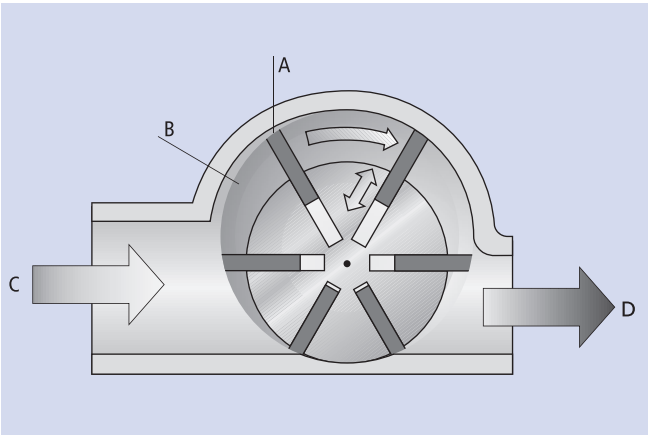
Vacuum Pumps

Vacuum pumps include an eccentrically mounted impeller with lamellas (A) which are pressed against the walls of the housing by centrifugal force and thus provide a seal. As the impeller rotates, the size of each chamber (B) varies. As the chamber becomes larger, the air in it expands and the pressure drops, resulting in a partial vacuum. The air is drawn in through the inlet (C), compressed, and ejected through the outlet (D).

Due to their high compression factor, pumps generate a very high vacuum and, according to the type, have a very high suction capacity.

Advantages of vacuum pumps
- High vacuum with high evacuation volume
- Central vacuum generation

Typical areas of application
- As central vacuum generation in gantry handling systems
- In manual vacuum handling systems
- In packaging machines



Functional principle vacuum pump

Vacuum Knowledge

The Vacuum System and its Components

We distinguish between three basic types of vacuum pumps:

Dry-running pumps

- Universal vacuum pumps requiring little maintenance
- Used mainly as central vacuum generator in large gripping systems for handling air-tight workpieces

Oil-lubricated pumps

- Vacuum pump with extremely high vacuum level (up to 95% vacuum)
- Used in handling systems with an emphasis on low noise and low maintenance as well as high vacuum, for handling air-tight workpieces

Water-ring pumps

- Vacuum pump requiring little maintenance with internal water cooling for handling air-tight workpieces
- Used especially in areas with high demands on ambient air (e.g. packaging in the food industry)

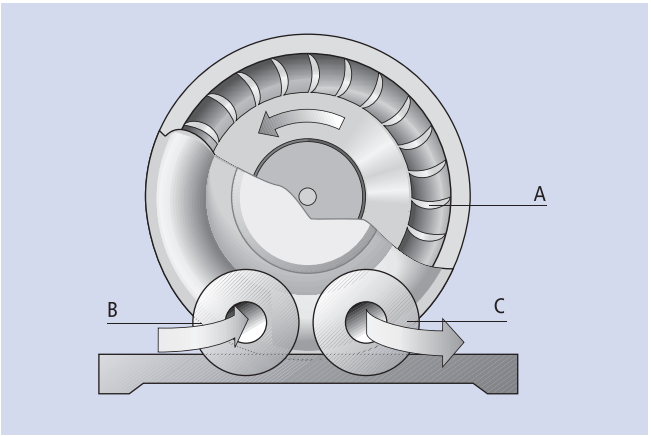
Vacuum Blowers

The blades (A) transport, accelerate and compress the air on the momentum principle. The air is dragged by the blades in this case. A vacuum is created at the suction end (B) this way. The compressed air (exhaust air) escapes through the outlet opening (C).

Blowers provide a very high suction rate due to the large air channel volume and specially shaped blades.

Advantages of vacuum blowers
- Enormous suction rate
- High leakage compensation
- Evacuation of large volumes in a short time

Typical areas of application
- Handling of porous workpieces, such as cardboard, insulation material, chipboards or bags



Functional principle vacuum blower

We distinguish between two basic types of vacuum blowers:

Vacuum blowers

- Vacuum blowers are either directly driven or frequency-regulated.
- Used especially for handling porous workpieces (chipboards, bags, etc.).
- Frequency-controlled blowers can be customized by controlling the motor speed and respectively the suction rate.

Vacuum blowers with reversing

- Vacuum blower with electro-pneumatic reversing for control of suction, blowing and neutral position.
- Used for handling air-tight workpieces that are picked up and deposited quickly.

Vacuum Units

Vacuum units are complete solutions with ejector, monitoring and control. The vacuum unit is used as a purely pneumatic vacuum supply with internal control. The vacuum unit turns off automatically due to the pneumatic control when the set vacuum value is reached while picking up a workpiece.

Advantages of vacuum units
- Universal applications
- High suction rate
- Minimum compressed air consumption

Typical areas of application
- "Stand-alone solution", for example, for clamping and handling tasks

Valve Technology

Valves are used to control vacuum as well as compressed air. They can increase process safety in vacuum gripping systems.

The following functional principles can be distinguished:
- Solenoid valves for vacuum and compressed air
- Check valves and flow resistors; sensing valves
- Manual valves for vacuum and compressed air

Solenoid Valves

Solenoid valves are used to control the flow of vacuum and compressed air. The valves themselves are controlled with the aid of electrical signals. Solenoid valves are available in various nominal sizes, permitting selection of a valve which precisely matches the customer-specific requirements. They are available with direct control as well as with pneumatic pilot operation.

Check Valves, Flow Resistors and Sensing Valves

Check valves and flow resistors, as well as sensing valves, increase the process safety and efficiency in a vacuum system.

Check valves interrupt the flow as soon as a certain volume flow has been reached. This will turn off any suction pads in the gripper system that may not be covered completely. The system vacuum will remain intact.

Flow resistors reduce the flow cross-section in the vacuum system and are mainly used in gripper systems for handling porous workpieces. By reducing the flow cross-section, the system vacuum remains intact even if the suction pads are not covered.

Sensing valves open the suction channel with a spring-mounted plunger when a workpiece is present at the suction pad. When the suction pad is occupied (= workpiece present), the line for the vacuum is opened. Sensing valves do not protect the system from partially occupied suction pads.

Non-Return Valves

Non-return valves seal the vacuum system against leakage, for example, in the event of a vacuum failure caused by a power outage. Thus, gripped workpieces are prevented from falling off the gripping system.

Manual Valves

Manual valves are used for manual activation or deactivation of vacuum or compressed air circuits or of individual suction pads in lifting equipment. The valves are available as 2/2-way or 3/2-way valves.

Switches and System Monitoring

Devices for system monitoring are important for the safe operation of a vacuum system. Schmalz offers measuring as well as control components for this purpose.

We distinguish between the following components for system monitoring and control:
- Vacuum switches
- Pressure switches
- Combined vacuum/pressure switches
- Connection cable and adapter for vacuum switches
- Measuring and control components
- Warning devices

Components for system monitoring are used in all areas of automated handling applications, for example, in feeder systems in the automotive industry, in the plastics industry, as well as in other applications in order to increase process safety.

Vacuum Switches

Vacuum switches are available in mechanical and electronic types. In the mechanical versions, the existing vacuum is measured by using a membrane and a microswitch (electromechanical design), or a valve (pneumatic design) is activated. In the electronic version, the vacuum is measured by a piezoresistive sensor and a switching signal (analog or digital) is output.

Vacuum switches are used in the measuring range from -1 to 0 bar. There are the following types of vacuum switches:

Mechanical vacuum switches VS-V-PM and VS-V-EM-ST
Mechanical vacuum switches are characterized by their sturdy design and their universal operating principle. You can use the electro-mechanical design (EM) to switch DC or AC. The pneumatic design (PM), on the other hand, does not require electrical connections. It works purely with pneumatics. You can set the switching points (with fixed hysteresis) to adapt these switches individually to the process parameters.

Electronic vacuum switches
Electronic vacuum switches have a high switching accuracy and repeatability with a very compact design. Vacuum switches with digital display (VS-V-D-… and VS-V-W-D-… version) offer a high level of convenience, because the switching points and hysteresis are fully programmable using a foil keypad. To program the switching point in a process rather quickly and simply, use vacuum switches with teach button (VS-V-AH/AV-T version). You can program the switching points with this version using a key in a matter of seconds. Vacuum switches with analog and digital output (VS-V and VS-V-A-… versions) and vacuum switches in miniature form (VS-V-SA/SD) round off the program.

Pressure Switches

Electronic pressure switches are used in the measuring range from 0 to 10 bar. Pressure switches with digital display (VS-P10-D/ VS-P10-W-D) are easy to operate. The switching points and hysteresis are fully programmable using a foil keypad. They are used when there are high requirements for switching accuracy and repeatability as well as implementation of short switching times. Pressure switches with teach button (VS-P10AH/AV-T-PNP (-S)) are particularly suited to program switching points quickly and easily. Pressure switches with analog and digital output (VS-P1 version) can also be used as pressure sensors due to their two outputs.

Combined Vacuum/Pressure Switches

Combined vacuum/pressure switches (VS-P) are used in the measuring range from -1 to 10 bar. The switching accuracy is reduced by the large measuring range. They are available with two switching outputs (digital and analog) and can also be used as a vacuum sensor or a pressure sensor for this reason.

Connections and Adapters for Vacuum Switches

Matching connection cables and adapters are available for the different types of switches. The cables and connectors are adapted to meet the customer-specific requirements and local standards.

Measuring and Control Components

Vacuum regulators can be adjusted mechanically. They guarantee a precise setting with high repeatability. Vacuum regulators compensate for pressure differences of vacuum generators caused by their design.

Pressure-reduction valves are used to set a specific output pressure when the pressure on the input end (input pressure) is higher than necessary.

Manometers measure and display the vacuum in analog form. They can be used for all vacuum applications because of their standardized dimensions and connections.

Warning Devices

Warning devices are used for monitoring and warning in the event of a vacuum failure or a power failure. They sound an acoustic warning signal with 100 dB. The switching point can be set from -1 to 0 bar and provides flexible use at different vacuum levels.

Filters and Connectors

Vacuum systems are protected by the use of filters. The filters protect the vacuum generator from contamination. Suction pads and vacuum generator are connected with each other by hoses and connectors.

Schmalz offers the following products:
- Vacuum filters
- Vacuum distributors
- Hoses and connectors

Vacuum Filters

Filters are used to protect the vacuum generator or the valve in dusty environments. The filters are installed in the system between the suction pad and the vacuum generator or the valve.

Vacuum filters are often installed as central filter in the system. The vacuum filters have a degree of separation of almost 100%.

Vacuum cup filters are installed as decentralized filters directly in the vacuum line at the suction pad. Vacuum cup filters are used with light to medium contamination.

Inline filters are installed as decentralized filters directly in the vacuum line at the suction pad. Inline filters are used with small flows and light contamination.

Vacuum Distributor

The vacuum distributors can be used with centralized or decentralized vacuum generation. In systems with decentralized vacuum generation, compressed air is distributed to the individual ejectors by the distributor. In systems with centralized vacuum generation, the vacuum is distributed from the vacuum generator to the individual suction pads by the distributor.

Hoses and Connectors

Schmalz offers all hoses and connections that are needed to set up a functioning vacuum system. The products range from vacuum hoses to plug-in screw unions and sealing rings, all the way to hose clamps.

Definition of Vacuum

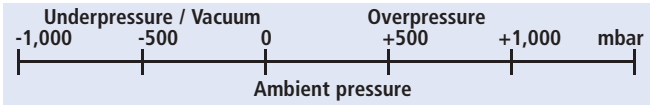
Vacuum is the term for air pressures which lie below normal atmospheric pressure. The ambient pressure is 1,013 mbar at sea level and decreases with elevation.

The form of the vacuum depends on the application in vacuum technology. A relatively small vacuum, the low vacuum, is sufficient for vacuum handling.

The pressure of the low vacuum ranges from 1 mbar to 1,013 mbar (ambient pressure at sea level).

Specification as relative value

In vacuum technology, the vacuum is specified as a relative value which means the vacuum is specified in relation to the ambient pressure. Such vacuum values always have a negative sign, because the ambient pressure is used as the reference point, which is defined as 0 mbar.



Specification as absolute value

In science, a vacuum is specified as an absolute value. The reference point is absolute zero, which means space void of air (e.g. outer space). This means the vacuum value is always positive.

The following table shows the comparison values between absolute and relative pressure.

Vacuum/pressure conversion table

Absolute pressure [mbar]	Relative vacuum	bar	N/cm²	kPa	atm, kp/cm²	mm H_2O	Torr; mm Hg	in Hg
900	10%	-0.101	-1.01	-10.1	-0.103	-1,030	-76	-3
800	20%	-0.203	-2.03	-20.3	-0.207	-2,070	-152	-6
700	30%	-0.304	-3.04	-30,4	-0.31	-3,100	-228	-9
600	40%	-0.405	-4.05	-40.5	-0.413	-4,130	-304	-12
500	50%	-0.507	-5.07	-50.7	-0.517	-5,170	-380	-15
400	60%	-0.608	-6.08	-60.8	-0.62	-6,200	-456	-18
300	70%	-0.709	-7.09	-70.9	-0.723	-7,230	-532	-21
200	80%	-0.811	-8.11	-81.1	-0.827	-8,270	-608	-24
100	90%	-0.912	-9.12	-91.2	-0.93	-9,300	-684	-27

At the end of this chapter you will find additional conversion and unit tables.

Measurement Units for Vacuum Data

The units pascal [Pa], kilopascal [kPa], bar [bar] and millibar [mbar] are most widely used in vacuum technology as units for pressure. The units are converted as follows:

0.001 bar = 0.1 kPa = 1 mbar = 100 Pa

In this catalog, all absolute pressure values are given in bar or mbar, all relative values in %. The % value is typical for a relative indication of the efficiency of a vacuum generator. Other units are used internationally. Some of them are included in the following table.

Vacuum/pressure conversion table

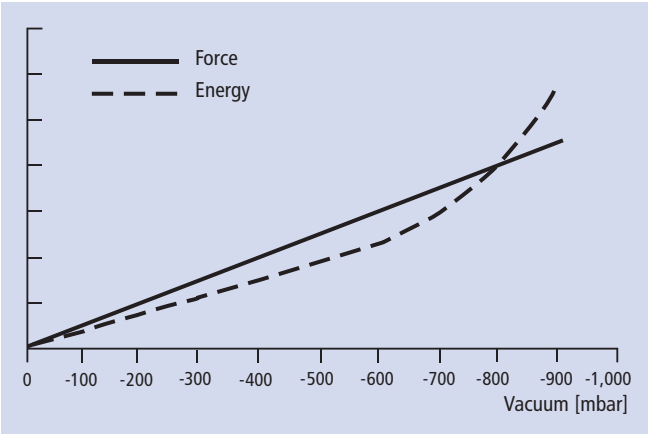
	bar	N/cm^2	kPa	atm, kp/cm^2	mm H_2O	Torr; mm Hg	in Hg
bar	1.00000	10.00000	100.0000	1.01970	10,197.00	750.0600	29.5400
N/cm^2	0.10000	1.00000	10.0000	0.10190	1,019.70	75.0060	2.9540
kPa	0.01000	0.10000	1.0000	0.01020	101.97	7.5006	0.2954
atm, kp/cm^2	0.98070	9.80700	98.0700	1.00000	10,332.00	735.5600	28.9700
mm H_2O	0.00010	0.00100	0.0100	0.00000	1.00	0.0740	0.0030
Torr; mm Hg	0.00133	0.01333	0.1333	0.00136	13.60	1.0000	0.0394
in Hg	0.03380	0.33850	3.8850	0.03446	345.40	25.2500	1.0000

At the end of this chapter you will find additional conversion and unit tables.

Energy Required for Vacuum Generation

The energy required for vacuum generation increases disproportionately to the attained vacuum. Increasing the vacuum from -600 mbar to -900 mbar, for example, increases the holding force by a factor of 1.5, but the evacuation time and the energy needed to achieve this vacuum value increases by a factor of 3.

This means that only the vacuum required should be generated in the working area to keep the energy expenditure and the operating costs at a minimum.



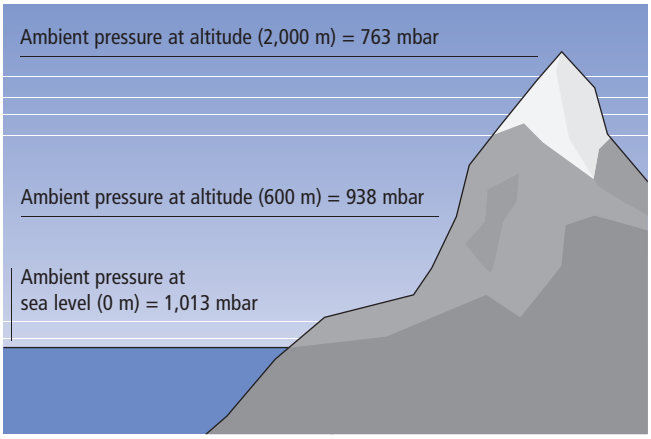
Common working areas

- for air-tight surface (e.g. metal, plastics, etc.): -600 to -800 mbar vacuum
- for porous materials (e.g. cardboard boxes, particle boards, MDF sheets, etc.): -200 to -400 mbar vacuum; in this range the necessary holding force is generated by increasing the suction rate and the suction area.

Important:
In this catalog, the holding forces of the suction pads are always specified at an efficient vacuum level of -600 mbar.

The Atmosphere and its Effects on Vacuum Technology

The air pressure (ambient pressure) depends on the elevation of the location as well as the temperature at that site. As shown in the diagram, the air pressure at sea level is 1,013 mbar. At an elevation of 600 m (location of the J. Schmalz GmbH in Glatten, Germany) air pressure is reduced to 938 mbar. At a height of 2,000 m, the air pressure is only 763 mbar.



This pressure loss also has an effect on working with a vacuum. The pressure drop with increasing height also reduces the maximum pressure difference that can be attained and therefore the maximum holding force. Per 100 m increase in elevation, the air pressure drops by about 12.5 mbar.

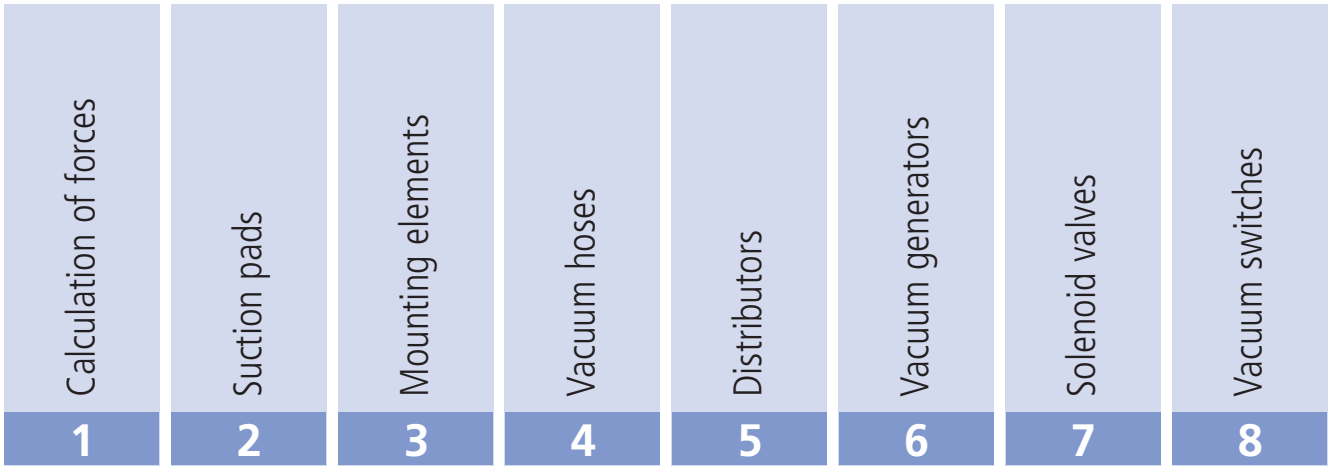
A vacuum generator that generates an 80% vacuum, achieves a vacuum value of -810 mbar at sea level (ambient pressure = 1,013 mbar); at 2,000 m (ambient pressure = 763 mbar) a vacuum generator only achieves -610 mbar. The possible holding force of a vacuum suction pad drops proportionally to the vacuum value that can be attained. This means the application at sea level presents the best case scenario.

Important:
All data in this catalog refer to an ambient pressure of 1,013 mbar and an ambient temperature of 20 °C.

System Design – Calculation Example

Approach to System Design

The implementation from theory to practice is shown with a system design based on an example.
The Schmalz Calculator offers helpful support during the system design and is available for free download at www.schmalz.com.



Flowchart for system design

The following calculations are based on this application:

Workpiece

Material:	Steel sheets, stacked on a pallet	
Surface:	Smooth, level, dry	
Dimensions:	Length:	max. 2,500 mm
	Width:	max. 1,250 mm
	Thickness:	max. 2.5 mm
	Weight:	approx. 60 kg

Handling system

Used system:	Gantry handling system	
Existing compressed air:	8 bar	
Control voltage:	DC 24 V	
Working sequence:	Horizontal Pick & Place A steel sheet is picked up from a pallet, lifted, transported horizontally and deposited in a machining center.	
Max. acceleration:	X, Y axis:	5 m/s^2
	Z axis:	5 m/s^2
Cycle time:	30 s	
Scheduled time:	for pick-up:	< 1s
	for releasing:	< 1s

Weight Calculation of a Workpiece

It is important to determine the weight (m) of the workpiece to continue with additional calculations. It is calculated based on the following formula:

$$m = L \times B \times H \times \rho$$

m = Weight [kg]
L = Length [m]
B = Width [m]
H = Height [m]
ρ = Density [kg/m³]

Our example:
m = 2.5 m x 1.25 m x 0.0025 m x 7,850 kg/m³
m = 61.33 kg

Theoretical Holding Force of a Suction Pad

The suction pads not only have to be able to carry the weight of the workpiece but must also be capable of handling the acceleration forces. These may never be neglected in a fully automated process.

To calculate the theoretical holding force, we show and describe the three most important and most frequently occurring load cases (handling sequences).

Important:
For the following, simplified representations of the load cases the calculation must be based on the worst load case with the highest, theoretical holding force. This is the only way to ensure that the suction pad grips the workpiece safely during the entire handling process.

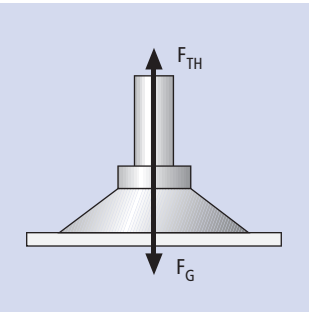
The safety factor is a minimum value of 1.5 for smooth and dense workpieces. A safety factor of 2.0 or greater must be used for critical, diverse or varied, porous or rough workpieces. If factors such as acceleration or friction coefficient are not known or cannot be determined precisely, a value of 2.0 or higher should also be used.

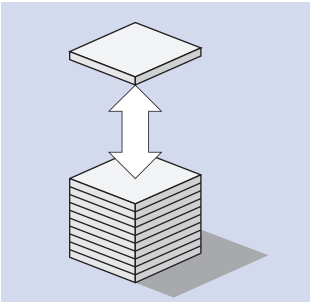
Load case I – Suction pad horizontal, direction of force vertical

The workpiece (in this case the steel sheet with the dimensions 2.5 x 1.25 m) is lifted from a pallet. The workpiece is lifted with an acceleration of 5 m/s² (no transverse movement).

$$F_{TH} = m \times (g + a) \times S$$

F_{TH} = theoretical holding force [N]
m = Weight [kg]
g = Gravity [9.81 m/s²]
a = Acceleration [m/s²] of the system
S = Safety factor (minimum value 1.5 times safety; for critical, diverse or varied or porous materials or rough surfaces 2.0 or even higher)





Our example:
F_{TH} = 61.33 kg x (9.81 m/s² + 5 m/s²) x 1,5
F_{TH} = 1,363 N

The suction pads land on a workpiece vertically that is to be lifted up.

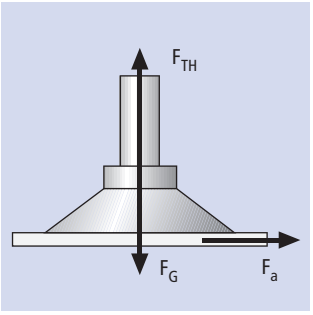
Load case II – Suction pad horizontal, direction of force horizontal

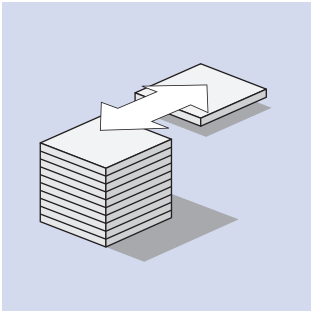
The workpiece (in this case the steel sheet with the dimensions 2.5 x 1.25 m) is lifted up vertically and transported horizontally. The acceleration is 5 m/s².

F_{TH} = m x (g + a/μ) x S

F_{TH} = theoretical holding force [N]
F_a = Acceleration force = m · a
m = Weight [kg]
g = Gravity [9.81 m/s²]
a = Acceleration [m/s²] of the system (keep in mind Emergency Stop situations!)
μ = Friction coefficient = 0.1 for oily surfaces
= 0.2 to 0.3 for wet surfaces
= 0.5 for wood, metal, glass, stone etc.
= 0.6 for rough surfaces
Caution! The specified values for friction coefficient are averaged and must be checked for the individual workpiece!
S = Safety (minimum value 1.5 times safety, for critical, diverse or varied or porous materials or rough surfaces 2.0 or even higher)

Our example:
F_{TH} = 61.33 kg x (9.81 m/s² + 5 m/s² /0.5) x 1.5
F_{TH} = 1,822 N





The suction pads land on a workpiece horizontally that is to be moved to the side.

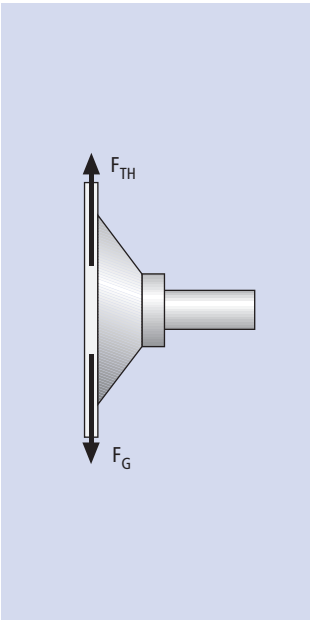
Load case III – Suction pad vertical, direction of force vertical

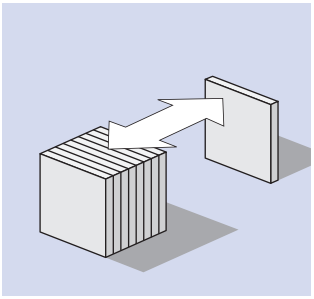
Description of load case: The workpiece (in this case the steel sheet with the dimensions 2.5 x 1.25 m) is picked up from a pallet and moved with a rotary motion at an acceleration of 5 m/s².

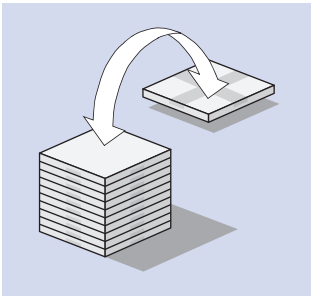
F_{TH} = (m/μ) x (g + a) x S

F_{TH} = theoretical holding force [N]
m = Weight [kg]
g = Gravity [9.81 m/s²]
a = Acceleration [m/s²] of the plant (keep in mind Emergency Stop situations!)
μ = Friction coefficient= 0.1 for oily surfaces
= 0.2 to 0.3 for wet surfaces
= 0.5 for wood, metal, glass, stone etc.
= 0.6 for rough surfaces
S = Safety (minimum value 2.0 times safety, for critical, diverse or varied or porous materials or rough surfaces even higher)

Our example:
F_{TH} = (61.33 kg /0.5) x (9.81 m/s² + 5 m/s²) x 2
F_{TH} = 3,633 N







Comparison:
For our scenario, the workpiece is lifted off a pallet, moved to the side and placed on a machining center. The rotary motion from load case III is not needed in this application, therefore one only needs to consider the result from load case II.

The result in this case is a maximum theoretical holding force (F_{TH}) of 1,822 N. This theoretical holding force acts on the suction pad during horizontal transport of the workpiece. The following calculations are based on this value to safely solve the task.

Suction Pad Selection

The calculated theoretical holding force corresponds to the force that the suction pads must create to safely handle the workpiece. To select the suction pads, one must also take the ambient conditions and the application into consideration.
The selection of the suction pads usually takes place based on the following criteria:

Application: The operating conditions on site are crucial for the selection of the suction pad, such as multi-shift operation, service life, chemically aggressive environment, temperature.

Material: Suction pads made of different materials are available to meet the requirements, such as those particularly suited for smooth or rough surfaces, oily or very fragile workpieces, anti-static suction pads for electronic components, suction pads leaving few marks for fragile plastic parts, etc. The selection of the suitable suction pad material for handling of workpieces is described in a comprehensive table in the chapter "Vacuum Suction Pads".

Surface: Depending on the condition of the surface, we recommend suction pads in specific shapes. You can select from flat or bellows suction pads with different sealing lips and sealing edges in different shapes and geometries. An overview of the different suction pads and the specific advantages of the individual suction pad types is included in the chapter "Vacuum Suction Pads".

For this example we choose:
Flat suction pad of the type PFYN made of Perbunan NBR
This suction pad is a cost-efficient solution for handling smooth, level workpieces. Data for this type is available on the respective pages in the chapter "Vacuum Suction Pads".

To solve the example, the calculated theoretical holding force can be applied by one suction pad or distributed among several suction pads. The number of suctions pads used depends on the respective application.

For the steel sheet (2,500 x 1,250 mm) from the present case, one would usually use six or eight suction pads. The most important criterion for the number of suction pads in this example, is the flexing of the steel sheet during transport. Depending on the number of used suction pads, the required diameter of these suction pads changes.

Calculation of suction force F_S [N] for individual suction pad

$$F_S = F_{TH} / n$$

F_S = Suction force
F_{TH} = Theoretical holding force
n = Number of suction pads

Our example: $F_S = 1{,}822\ N / 6$
$F_S = 304\ N$
According to the technical data for the suction pad PFYN, one needs 6 x PFYN 95 NBR with a diameter of 95 mm and a suction force of 350 N each.

$F_S = 1{,}822\ N / 8$
$F_S = 228\ N$
According to the technical data for the suction pad PFYN, one needs 8 x PFYN 80 NBR with a diameter of 80 mm and a suction force of 260 N each.

For this example we choose:
Six suction pads of type PFYN 95 NBR
With a sheet thickness of 2.5 mm, six suction pads ensure a secure sheet pick.

Important:
- The suction force of the individual suction pads is listed in the table "Technical data" for the respective suction pad in the chapter "Vacuum Suction Pads".
- The suction force of the suction pad must exceed the calculated theoretical holding force.

Mounting Element Selection

The mounting of the suction pads is usually selected according to customer requirements. But there may be compelling reasons for a particular type of mounting:

Uneven or inclined surfaces
The suction pad must be able to adapt to the incline:
> Joint mounting

Different heights/thicknesses
To compensate for height difference, one needs a spring-supported mounting:
> Spring plunger

In this case, the steel sheets are stacked on a pallet. If the sheets are larger than the pallet, one must assume that the ends of the sheets are hanging down. This means the suction pads must be able to compensate for height differences and inclines.

For this example we choose:
Joint Flexolink FLK 1/4" – 1/4" female thread
Optimum flexibility of suction pads for inclined workpiece surfaces.

Spring plunger FSTE 1/4" – 75 stroke
Greatest stroke because of sheets hanging down from pallet, 1/4" thread for connection to selected joint mounting Flexolink FLK.

Note:
Make sure when you select the mounting elements that these can be screwed onto the suction pads, which means the threads have to match. This also ensures maintaining the carrying capacities. The different mounting options and technical data are listed in the chapter "Mounting Elements".

Vacuum Hose Selection

The vacuum hoses are selected to match the size of the volume flows as well as the size of the suction pads. The table "Technical data" includes a recommendation for a hose cross section on the respective page of the suction pad and the ejector. The different hoses are listed in the chapter "Filters and Connectors".

For this example we choose:
Vacuum hose VSL 8/6 with an internal diameter of 6 mm
See table "Technical data" for the suction pad of type PFYN 95 NBR used in this example.

Vacuum Knowledge

System Design – Calculation Example

Distributor Selection

The distributor has to match the used hose diameter and the number of suction pads.

Example:
The hose VSL 8/6 has an outside diameter of 8 mm and an internal diameter of 6 mm. Six suction pads are used.

For this example we choose:
Plug-in screw unions STV-GE G1/4-AG 8 for the hose VSL 8/6 with outside diameter 8 mm and internal diameter 6 mm as well as 1/4" thread matching the female thread of the distributor.

Plug-in screw union STV-GE G3/8-AG 8 fits the spring plunger.

Distributor VTR G3/8-IG 9xG1/4 with one input (3/8" thread) and nine outputs (1/4" thread).

Three **sealing screws VRS-SB G1/4-AG** to close the three open outputs.

Vacuum Generator Selection

The selection of the matching vacuum generator (ejector, pump or blower) is determined by several factors:

- Type of workpieces: porous, air-tight
- Energy supply options: a lower case electricity, compressed air
- Restrictions for size and weight
- Maintaining cycle times
  Short cycle times: Ejector
  Long transport distances: Pump or blower

Selection table for generator type by application

	materials		cycle times		power supply		transport path	
	air-tight	porous	very short <0,5sec	short >0,5sec	compr. air	electricity	short	long
Ejector	X		X		X		X	(X)*
Pump	X			X		X		X
Blower		X		X		X		X

*Only with automatic air-saver (LSP) and air-tight materials

For this example we choose:
Ejector to generate vacuum.
Because the workpiece in this case is air-tight, you can create a simple and lightweight structure while implementing short pick-up and release times.

Suction rate of vacuum generator

The diameter of the suction pad determines the suction rate that a vacuum generator has to apply to evacuate the suction pad. The suitable suction rate is described in the table "Technical data" of the respective vacuum generator.
Based on experience and measurements with system designs, we recommend a selection based on the following table:

Suction capacity as a function of suction-pad diameter

Suction-pad Ø	Suction capacity V_S	
Up to 60 mm	0.5 m^3/h	8.3 l/min
Up to 120 mm	1.0 m^3/h	16.6 l/min
Up to 215 mm	2.0 m^3/h	33.3 l/min
Up to 450 mm	4.0 m^3/h	66.6 l/min

Note:
The specified values apply regardless of the type of vacuum generation. The recommended suction ratio applies per suction pad and only for smooth, air-tight surfaces. For porous, permeable workpieces we recommend conducting a corresponding suction trial with the original workpiece.

Calculation of the suction rate V [m^3/h, l/min], that the vacuum generator has to apply

$V = n \times V_S$

n = Number of suction pads
V_S = Required suction rate for an individual suction pad [m^3/h, l/min]

Example: **V = 6 x 16,6 l/min**
V = 99.6 l/min

For this example we choose:
Compact ejector SCPi 20 with a suction rate of 140 l/min.
The compact ejector offers valves for control of the "suction" and "blow off" functions as well as system monitoring for ensuring process safety during handling. The compact ejector SCPi is also equipped with IO-Link Technology. It makes the various diagnostic functions visible and usable on the control level. This increases system availability and makes automation processes even more efficient.

Valve Technology Selection

In this case we are using a compact ejector with integrated valve technology. In other cases we need solenoid valves to switch the function "Vacuum on/off". They are usually used when pumps or blowers are used as vacuum generators.

The selection of the valves is based on the following criteria:
- Suction rate of vacuum generator
- Control voltage
- Operating principle of the valve (NO/NC)

The nominal flow of the solenoid valve may not be less than the suction ratio of the vacuum generator.

Calculation of the nominal size of the valve:

$V_V = V_{VE}$

V_V = Nominal flow of valve [m^3/h, l/min]
V_{VE} = Existing suction rate of vacuum generator [m^3/h, l/min]

The nominal flow is listed in the "Technical data" of the respective valve and the suction rate is listed in the "Technical data" of the respective vacuum generator.

Example: V_V = 116 l/min = 7 m^3/h

For this example we choose:
The used compact ejector of type SCPi 20 is equipped with solenoid valves which eliminates the need for separate valves.
A solenoid valve of type EMV-10 with a nominal flow of 20 m^3/h would also be sufficient for the function Suction ON/OFF.

Vacuum Switch Selection

Vacuum switches and manometers are usually selected based on the existing requirements regarding functionality and switching frequency.

The following functions are available:
- Adjustable switching point
- Hysteresis fixed or adjustable
- Signal output digital and/or analog
- Function LED
- Display with input keyboard
- Vacuum connection M5-IG, M8-AG, flange or tube insert
- Supply and signal connection with cable or M8 plug

The available versions with their respective technical data are explained in the chapter "Switches and System Monitoring".

For this example we choose:
The used compact ejector of the type SCPi 20 is equipped with an integrated system monitoring (digital output signals). There is no need for an additional vacuum switch.

You can use vacuum switches or manometers for vacuum generators without system monitoring.

Calculation of Evacuation Times

The entire volume that has to be evacuated is required to calculate the efficiency of the vacuum system.

$$V_G = V_1 + V_2 + V_3 + V_4 + V_5 + \ldots$$

V_G = Volume to be evacuated [m^3]
V_1 = Volume of suction pads [m^3]
V_2 = Volume of mounting elements [m^3]
V_3 = Volume of vacuum hoses [m^3]
V_4 = Volume of distributor [m^3]
V_5 = Volume of prefilter (if necessary) [m^3]
V_6 = Volume of solenoid valve (if necessary) [m^3]
…

Example:
$V_G = 6 \times 32\ cm^3 + 6 \times 9.5\ cm^3 + 6 \times 43\ cm^3 + 1 \times 38.5\ cm^3$
$V_G = 546\ cm^3 = 0.000546\ m^3$

Calculation of evacuation time t [h]

$$t = (V_G \times \ln (P_a/P_e) \times 1.3)/V$$

V_G = Volume to be evacuated [m^3]
In = Natural logarithm
P_a = Absolute start pressure [1,013 mbar]
P_e = Absolute final pressure [mbar]
V = Suction rate of vacuum generator [m^3/h]

60% = 400 mbar absolute

Example:
$t = (0.000546\ m^3 \times \ln (1{,}013\ mbar / 400\ mbar) \times 1.3) / 6.95\ m^3$
$t = 0.0000949\ h = 0.34\ sec$

The evacuation time of the entire system is 0.34 seconds. The system is cost-optimized and efficient, shorter cycle times are possible.

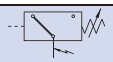
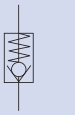
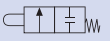
Test with Original Parts

A complete and energy-efficient vacuum system has been assembled from the Schmalz vacuum components. You should still conduct tests with original sample workpieces. The theoretical system design gives you a feeling for the size of the system. Schmalz has its own test center in which we conduct practical tests.
We will be glad to assist you with our expertise and many years of experience, from planning all the way to commissioning of your vacuum system. A comprehensive range of trainings and seminars rounds off our program.

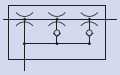
Symbols in Vacuum Technology

Circuit diagrams and function charts are used in vacuum technology to visualize vacuum systems. These diagrams/charts include symbols for certain components or modules. The following overview represents the most important and common symbols of vacuum components from Schmalz.

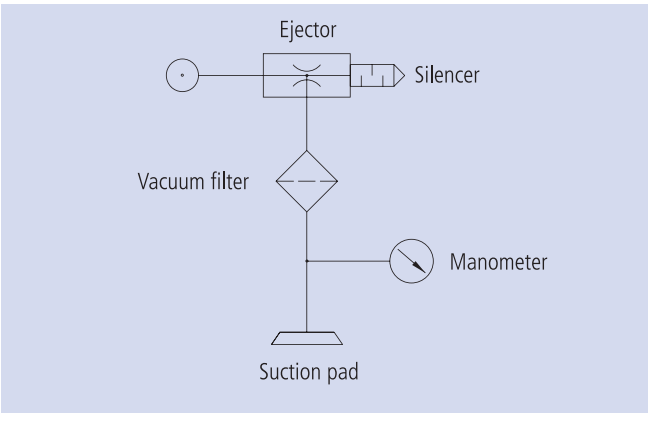
	Valve (general)
	Ball cock, two-way
	Ball cock, three-way
	Manual slide valve, three-way
	Solenoid valve, 3/2-way
	Solenoid valve, 3/2-way, pneumatic pilot operation
	Filter
	Manometer

	Vacuum/pressure switch
	Check valve
	Pressure-limiter valve
	Non-return valve
	Sensing valve
	Flow resistor

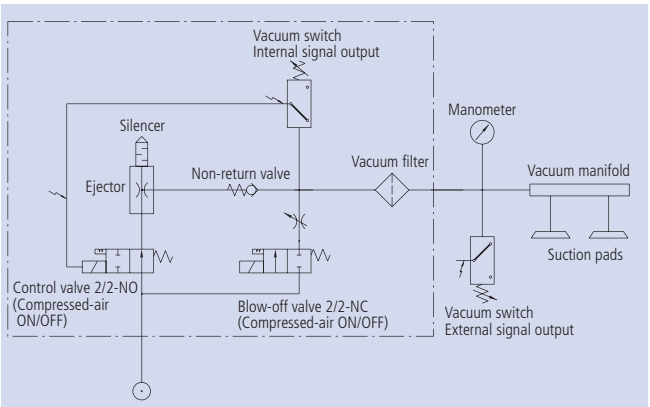
	Special suction pad
	Flat suction pad with single lip
	Flat suction pad with double lip
	Flat suction pad with sealing profile
	Bellows suction pad
	Spring plunger
	Flexolink, ball joint
	Sealing cord
	Adapter nipple

	Ejector, single-stage
	Ejector, multi-stage
	Silencer
	Vacuum blower
	Vacuum pump
	Vacuum regulator
	Hose
	Reservoir

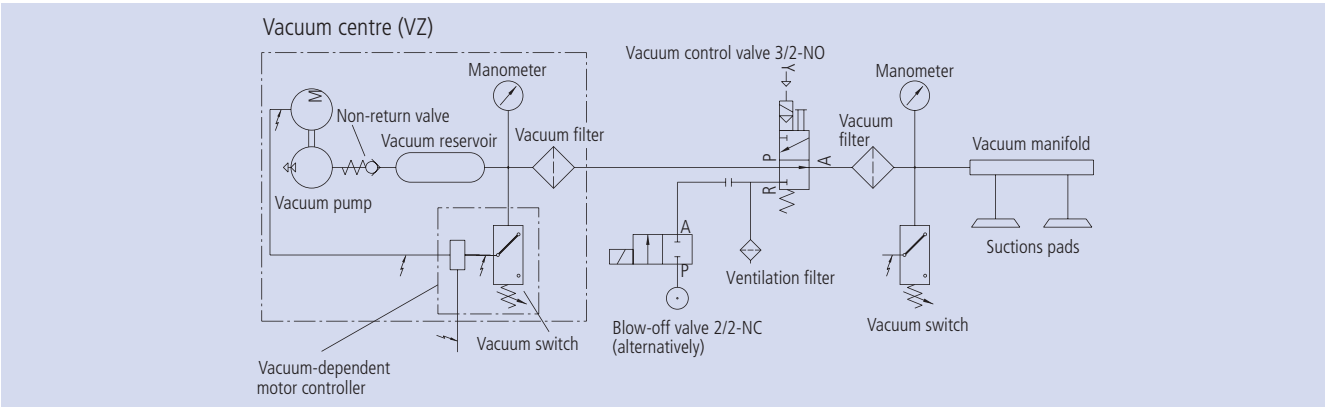
Circuit diagrams for all relevant vacuum components are available in the operating instructions online at www.schmalz.com/operating-instructions. Examples of vacuum circuit diagrams:



Example: Vacuum circuit with basic ejector



Example: Vacuum circuit with controlled compact ejector



Example: Vacuum circuit with vacuum center and vacuum-controlled motor circuit

Units and Symbols

Dimensions and volume

Parameter	Symbol	Unit in Schmalz catalog
Length	l	mm, m
Width	b	mm, m
Height	h	mm, m
Diameter	d	mm, m
Volume	V	m^3, l

Weight

Parameter	Symbol	Unit in Schmalz catalog
Mass	m	g, kg
Density	ρ	kg/m^3

Force

Parameter	Symbol	Unit in Schmalz catalog
Force	F	N, kg x m/s^2
Theoretical holding force	F_{TH}	N
Acceleration	F_a	N
Tear-off force	F_A	N
Weight	G	N
Friction coefficient	μ	-

Time

Parameter	Symbol	Unit in Schmalz catalog
Duration, evacuation time	t	ms, s, min, h
Speed	v	m/s
Acceleration	a, g	m/s^2, *g*

Temperature

Parameter	Symbol	Unit in Schmalz catalog
Temperature	t	°C

Electrical and magnetic values

Parameter	Symbol	Unit in Schmalz catalog
Voltage	U	V
Strength of current	I	A

Vacuum values

Parameter	Symbol	Unit in Schmalz catalog
Pressure, absolute	p	mbar, bar
Pressure difference	Δp	mbar, bar
Initial pressure	P_a	mbar, bar
Final pressure	P_e	mbar, bar
Negative pressure / vacuum	P_u	mbar, bar
Suction rate	V	l/min, m^3/h
Required suction rate	V_s	l/min, m^3/h
Nominal flow of solenoid valve	V_v	l/min, m^3/h
Present suction rate of vacuum generator	V_{ve}	l/min, m^3/h
Total volume to be evacuated	V_g	m^3, l

Other information

Parameter	Symbol	Unit in Schmalz catalog
Safety factor	S	-
Quantity of suction pads	n	-
Natural logarithm	ln	-
Noise level / sound pressure level	L_p	dB

Vacuum Knowledge

Units and Conversion Tables

Conversion tables

Length

	m	ft	in
1 m	1.000	3.281	39.370
1 ft (foot)	0.305	1.000	12.000
1 in (inch)	0.025	0.083	1.000

Mass

	kg	lb	oz
1 kg	1	2.20	35.27
1 lb (pound)	0.45	1	16
1 oz (ounce)	0.03	0.06	1

Temperature

	K	°C	°F
1 Kelvin	1	-272.15	-457.87
1 °Celsius	274.15	1	33.8
1 °Fahrenheit	255.93	-17.22	1

Suction rate

	m^3/s	l/s	m^3/h	l/min
m^3/s	1	1,000	3,600	60,000
l/s	10^{-3}	1	3.6	60
m^3/h	2.78×10^{-4}	0.278	1	16.67
l/min	1.67×10^{-5}	1.67×10^{-2}	0.06	1

Pressure

	bar	N/cm^2	kPa	mbar
1 bar	1	10	100	10^3
1 N/cm^2	0.1	1	10	100
1 kPa	0.01	0.1	1	10
1 mbar	10^{-3}	0.01	0.1	1

Volume

	m^3	cm^3	l
m^3	1	1×10^6	1,000
cm^3	1×10^{-6}	1	1×10^{-3}
l	1×10^{-3}	1,000	1

Vacuum ranges

	Absolute pressure in mbar	Mean free path of atoms*
Low vacuum	1,000 – 1	68 nm – 0,1 mm
Medium vacuum	$1 – 10^{-3}$	0.1 mm – 100 mm
High vacuum	$10^{-3} – 10^{-7}$	100 mm – 1 km
Ultra high vacuum	$< 10^{-7}$	> 1 km

*The number density of molecules for a temperature of 20 °C

Thread

Thread designation	External diameter in mm	Bead wire diameter	Pitch in mm
Metric ISO thread			
M3	3.00	2.5	0.50
M4	4.00	3.2	0.70
M5	5.00	4.1	0.80
M6	6.00	4.9	1.00
M8	8.00	6.6	1.25
M10	10.00	8.4	1.50
M12	12.00	10.1	1.75
Metric ISO fine thread		12.5	1.50
M14x1.5	14.00	14.9	1.00
M16x1	16.00	18.4	1.50
M20x1.5	20.00	28.4	1.50
M30x1.5	30.00		
Pipe thread			
G⅛	9.73	8.5	0.91
G¼	13.16	11.4	1.34
G⅜	16.66	14.9	1.34
G½	21,00	18.6	1.81
G¾	26.44	24.1	1.81
G1	33.25	30.3	2.31
G1¼	41.91	39.0	2.31
G1½	47.80	44.8	2.31
G2	59.61	56.6	2.31
G2½	75.18	72.2	2.31

Abrasion resistance
The abrasion resistance refers to the resistance of suction pads (elastomer part) against mechanical stress, especially friction. It is determined by the material properties of the suction pad as well as its shape.

Absolute pressure
The absolute pressure refers to the absolute zero point, or a space completely empty of molecules. In an absolute vacuum there is a pressure of 0 bar. A relative vacuum of -600 mbar corresponds to an absolute pressure of 400 mbar.

Air-saving function
Air-saving function refers to the ejector's air-saving function during the handling procedure. Once the ejector reaches a particular vacuum value, the evacuation process is interrupted. If the vacuum drops below a defined value, the ejector starts evacuating again. The air-saving function can therefore increase the energy and economic efficiency of a vacuum system.

Ambient pressure (atmospheric pressure)
Ambient pressure refers to the hydrostatic pressure that exists at any given point. Ambient pressure is also known as atmospheric pressure. The standard atmospheric pressure at sea level is 1,013 mbar. The ambient pressure drops with increasing altitude. At an altitude of 600 m (the location of J. Schmalz GmbH in Glatten, Germany) the ambient pressure is reduced to 938 mbar. The ambient pressure has a direct influence on the maximum vacuum value that can be reached.

Bernoulli's principle
Bernoulli's principle describes the drop in pressure of a fluid when it passes from a narrow section to a much wider section. In practice, this happens in the form of a direct transition into an open space. To prevent the vacuum collapsing, the fluid is diverted to the side.

Centralized vacuum system
In a centralized vacuum system, the vacuum is generated with a central vacuum source for more than one suction pads.

Check valve
The check valve is the valve that automatically monitors volume flow. If the volume flow exceeds a defined value, the valve closes automatically; for example, when suction pads are not being used.

Control pressure range
The control pressure range is the range between the lowest and highest permissible control pressures.

Cycle time
The cycle time refers to the time taken for a repetitive process to complete one cycle.

Decentralized vacuum system
In a decentralized vacuum system, a vacuum is generated directly at each individual vacuum suction pad. Positioning vacuum generation directly at the suction pad allows for short pick-up and depositing times.

Evacuation time
The evacuation time refers to the time it takes to evacuate a certain volume to reach a required vacuum value.

Flow resistance
Flow resistance refers to a reduced flow cross-section in a vacuum line. The resistance reduces the volume flow that can pass through a line.

Friction coefficient
The friction coefficient [µ] refers to the relationship between friction force and normal force (contact force between suction pad and workpiece). The friction coefficient is not specified by an unit.

High vacuum
A high vacuum describes any vacuum in which there is an absolute pressure of 10^{-7} to 10^{-3} mbar. High vacuums are used, for example, in electron tubes and particle accelerators.

Holding force
Holding force refers to the force that can be exerted by a suction pad to grip a workpiece. It is calculated by multiplying the pressure difference by the effective suction area of the suction pad ($F = \Delta p \times A$). The holding force of a suction pad is thus influenced by underpressure and the suction area. It is a theoretical value, specified without safety factors. It is usual to state the holding force of a suction pad with a relative vacuum of 60%.

Hysteresis
Hysteresis refers to a pressure difference between two switching points, and thus defines the state of the output signal. The respective output signal changes when either the upper or lower limit value of the hysteresis is reached. Using the example of a vacuum switch: when the vacuum reaches a specified value, the signal changes to "ON". If the vacuum drops below a defined value, the signal switches to "OFF". Hysteresis is mainly used to control the air-saving function of ejectors.

Idle position of NC valve
The idle position of an NC valve refers to the position of the valve when it is not actuated, i.e. "closed" (normally closed).

Vacuum Glossary

Idle position of NO valve
The idle position of an NO valve refers to the position of the valve when it is not actuated, i.e. "open" (normally open).

Inner volume
The inner volume indicates the volume of the body that has to be evacuated during a suction procedure. For example, the inner volume of a suction pad has an effect on the evacuation time.

Leakage
Leakage refers to a leak within the vacuum system. This can be caused by missing or faulty sealing elements, or by the porosity of the workpiece being processed.

Load case
Load case refers to the handling task, or the process of handling a workpiece.
Load case I – Suction pad horizontal, direction of force vertical
Load case II – Suction pad horizontal, direction of force horizontal
Load case III – Suction pad vertical, direction of force vertical

Low vacuum
A low vacuum describes any vacuum in which there is an absolute pressure of 1 mbar up to atmospheric pressure (1,013 mbar). Examples of applications for a low vacuum include light bulbs and vacuum cleaners. Vacuum handling technology also uses values in the low vacuum range because these can be generated economically to create high suction power and short cycle times.

Medium vacuum
A medium vacuum describes any vacuum in which there is an absolute pressure between 0.001 mbar and 1 mbar. Medium vacuums are used, for example, in low-pressure gas-filled lights.

Nominal flow
Nominal flow refers to the maximum flow through a certain diameter (nominal diameter). The nominal flow is given in l/min or m^3/h.

Normal force
Normal force is the force component acting perpendicular to a surface. Every force acting on a surface can be divided into normal force and shear force (see "Shear force"). Based on the normal force, the friction force can be calculated using the friction coefficient for a material pairing. The result indicates the friction force between two surfaces, for example between a suction pad and a workpiece. Normal force is measured in Newton [N].

NPN – Switching output
NPN switching output refers to the configuration of a switching output in cases where the load is connected to the positive pole of the operating voltage source. The output transistor of the vacuum switch connects the active device through to the operating voltage, allowing current to flow through the consuming device.

Minimum radius of curvature
The minimum radius of curvature refers to the smallest radius that a suction pad can securely grip. For round suction pads, this refers to a sphere, while for oval suction pads it refers to a cylinder.

Operating temperature
The operating temperature is the temperature range in which a product can be deployed or run.

Overpressure resistance
Overpressure resistance refers to the maximum pressure that a body (for example, a reservoir or vacuum filter) can resist.

PNP Switching output
PNP switching output refers to the configuration of a switching output in cases where the load has a permanent connection to the operating voltage source. The output transistor of the vacuum switch connects the active device to the positive pole, allowing current to flow through the consuming device.

Recovery time
The recovery time is the period in which the product is not being used or is not subject to significant work loads. The product can recover during this time.

Reference pressure
Reference pressure is the pressure referred to by a sensor. Vacuum switches, for example, have a connection for reference air.

Relative pressure
Relative pressure refers to the value of pressure in relation to the prevalent ambient pressure. The vacuum is given using negative values. Relative pressure has a pressure of 0 mbar as a reference point. An absolute pressure of 400 mbar corresponds to a relative pressure of -600 mbar. In the field of vacuum handling, it is also common to state the values in percentages:
-600 mbar corresponds to a vacuum of 60%.

Reversing valve
A reversing valve is a type of changeover valve used in a blower. The valve supplies the system alternately with overpressure and underpressure. The valve thus controls the suction, blow-off and neutral setting in the vacuum system.

Shear force
Shear force is the force acting tangentially to a surface and indicates how much friction can be transferred between the suction pad and workpiece. Shear force is given in Newton [N].

Shore hardness
Shore hardness refers to the hardness of elastomers and plastics. It is a standardized material property for the hardness of materials.

Standard liter
A standard liter is the measurement of a gas occupying a liter at 20 °C and 1,013 mbar (standard state).

Standard pressure
Standard pressure is the pressure in the atmosphere under standard conditions. In both technology and the natural sciences, this is 1,013 mbar at 0°C. The values in the Schmalz catalog refer to a temperature of 20 °C

Standard temperature
Standard temperature is the temperature under standard conditions. The values in the Schmalz catalog refer to a temperature of 20 °C.

Suction force
See "Holding force"

Suction pad stroke
The suction pad stroke refers to the stroke effect that is created by the suction pad when picking up a workpiece. The stroke value indicates the maximum contraction of the suction pad.

Suction power
See "Suction rate"

Suction rate
Suction rate refers to the suction power of a vacuum generator. This value indicates the volume that can be evacuated by a vacuum generator in a certain time. The suction rate is given in l/min or m^3/h.

Switching point
The switching point refers to a point at which a switch changes the state of the output signal. If, for example, a programmed vacuum value is reached on a vacuum switch, the output signal switches to "ON" and there is voltage at the switch output. The initial position of the signal can be set to either NC (opener) or NO (closer).

Vacuum
A vacuum is a pressure range lower than that of the ambient pressure. The vacuum value is divided into various classes; refer to "High Vacuum", "Medium Vacuum" and "Low Vacuum".

Ventilation time
The ventilation time refers to the time it takes to dissipate vacuum in a system. This defines the time it takes to release a workpiece. The ventilation of a suction pad can take place either atmospherically or actively by a compressed air pulse (active blow off).

Venturi principle
The Venturi principle describes the correlation between dynamic and static air pressure when air flows through a tube. At the narrowest section, the dynamic pressure is at a maximum, while the static pressure is at a minimum. Since the same volume is flowing through the tube, the velocity increases in proportion to the cross sections. Because of this differential pressure, a vacuum can be created and air can be drawn in by using Venturi nozzles with a side inlet port. Vacuum generators based on this principle are called ejectors.

Volume flow
Volume flow refers to the volume of a medium that flows through a cross section within a certain amount of time. Volume flow is given in l/min or m^3/h.

Workpiece temperature
The workpiece temperature is the temperature of a processed workpiece. This temperature can influence the selection of a suitable suction pad material.

Vacuum Suction Pads

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Selection Aid Page

Selection by Diameter 72

Checklist for Selection of Vacuum Suction Pads 75

Material Overview 76

Vacuum Suction Pads (Universal)

Flat Suction Pads (Round)

Flat Suction Pads PFYN 80

- Diameter: 1 to 200 mm
- Material: FPM, HT1, NBR, PU, SI
- Antistatic and non-marking variants
- Connection nipple plugged into elastomer part

Round universal suction pad available in various materials for a wide range of requirements; especially for workpieces with even, smooth surfaces.

Flat Suction Pads PFYN VU1 89

- Diameter: 15 to 95 mm
- Material: VU1
- Connection nipple plugged into elastomer part

Extremely wear-resistant Vulkollan suction pad for high loads and a long service life in multi-shift operation.

Suction Plates SPU 94

- Diameter: 100 to 400 mm
- Material: NBR, SI
- Support plate made of aluminum

Round suction plate for smooth and slightly rough workpieces; optionally with peeling insert for separation of sheets, with sensing valve or with steep sealing lip.

Suction Plates SPK 98

- Diameter: 55 to 250 mm
- Material sealing lip: EPDM
- Support plate made of aluminum

Round suction plate with adaptable sealing edge for rough and textured workpieces.

Flat Suction Pads (Oval)

Flat Suction Pads SGON 101

- Dimensions: 4 x 2 to 90 x 30 mm
- Material: HT1, NBR, SI
- Pads of the size 24 x 8 and larger are additionally secured with a two-ear clamp to prevent rotation

Oval flat suction pad with maximum suction force particularly on narrow, elongated workpieces such as sections and pipes, for example.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Suction Plates SPLO

106

- Dimensions: 60 x 20 to 370 x 80 mm
- Material: NBR
- Support plate vulcanized to elastomer part

Oval flat suction pad with aluminum support plate for narrow, elongated workpieces such as sections and pipes, for example.

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds)

110

- Diameter: 11 to 78 mm
- Material: HT1, NBR, NK, SI
- Connection nipple plugged into elastomer part

Round universal suction pad with 1.5 folds, available in various materials for a wide range of requirements.

Bellows Suction Pads FSGA VU1 (1.5 Folds)

115

- Diameter: 30 to 110 mm
- Material: VU1
- Connection nipple plugged into elastomer part

Extremely wear-resistant Vulkollan bellows suction pad with 1.5 folds for high loads and long service life in multi-shift operation.

Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

120

- Diameter: 110 and 150 mm
- Material: NBR, SI
- Support plate screwed to elastomer part

Round suction pad with 1.5 folds and large diameter for large, heavy, but fragile workpieces; with attached connection plate.

Bellows Suction Pads FSGPL (1.5 Folds)

123

- Diameter: 150 to 250 mm
- Material: NBR
- Support plate vulcanized to elastomer part

Round suction pad with 1.5 folds, large diameter, very soft sealing lip and supports on the underside; with vulcanize-bonded steel support plate.

Bellows Suction Pads FSG (2.5 Folds)

126

- Diameter: 5 to 88 mm
- Material: HT1, NBR, NK, SI
- Connection nipple plugged into elastomer part

Round universal suction pad with 2.5 folds, available in various materials for a wide range of requirements.

Bellows Suction Pads FSG VU1 (2.5 Folds)

132

- Diameter: 30 to 85 mm
- Material: VU1
- Connection nipple plugged into elastomer part

Extremely wear-resistant Vulkollan suction pad with 2.5 folds for high loads and long service life in multi-shift operation; with optional oil groove.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Bellows Suction Pads FSGB (3.5 Folds)

135

- Diameter: 25 mm
- Material: NBR, SI
- Connection nipple plugged into elastomer part

Round universal suction pad with 3.5 folds for optimal damping effect and the highest suction pad stroke for fragile workpieces.

Bellows Suction Pads (Oval)

Bellows Suction Pads FSGAO (1.5 Folds)

138

- Dimensions: 95 x 40 to 140 x 65 mm
- Material: VU1
- Connection plate screwed to elastomer part

Extremely wear-resistant Vulkollan bellows suction pad with 2.5 folds for high loads and long service life in multi-shift operation.

Vacuum Suction Pads for Special Applications

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAXM

141

- Diameter: 30 to 115 mm
- Material: ED
- Connection nipple modular

High-speed bell-shaped suction pad with highest absorption of lateral and holding forces thanks to its optimal internal structure and high suction pad stroke.

Flat Suction Pads SAF

148

- Diameter: 30 to 125 mm
- Material: NBR
- Connection nipple vulcanized to elastomer part

Round flat suction pad with low internal volume and very high horizontal and vertical holding forces even with oiled workpieces.

Bellows Suction Pads SAB (1.5 Folds)

152

- Diameter: 22 to 125 mm
- Material: NBR
- Connection nipple vulcanized to elastomer part

Round suction pad with 1.5 folds for extremely curved and thin-walled sheet metal; very high horizontal and vertical holding forces and high suction pad stroke.

Flat Suction Pads SAOF (Oval)

156

- Dimensions: 50 x 16 to 140 x 70 mm
- Material: NBR
- Connection nipple vulcanized to elastomer part

Oval suction pad with low inner volume for elongated sheet metal such as sections, pipes or ribbing; very high horizontal and vertical holding forces.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Bellows Suction Pads SAOB (Oval, 1.5 Folds)

160

- Dimensions: 60 x 30 to 140 x 70 mm
- Material: NBR
- Connection nipple vulcanized to elastomer part

Oval suction pad with 1.5 folds for elongated, curved, thin-walled sheet metal such as pipes or ribbing; very high horizontal and vertical holding forces and high suction pad stroke.

Bell-Shaped Suction Pads SAOG (Oval)

164

- Dimensions: 60 x 20 to 95 x 40 mm
- Material: NBR
- Connection nipple vulcanized to elastomer part

Oval bell-shaped suction pad for elongated, thin-walled sheet metal; very good adjustment to convex curves.

Bell-Shaped Suction Pads SGGN

168

- Diameter: 85 to 115 mm
- Material: NBR, VU1
- Connection nipple plugged into elastomer part or vulcanized to elastomer part

Extremely wear-resistant bell-shaped suction pad for high loads and long service life, especially for concave or convex workpieces.

Suction Pads for Handling Wood

Flat Suction Pads SHFN

171

- Diameter: 50 to 85 mm
- Material: NK
- Connection nipple plugged into elastomer part or support plate vulcanized to elastomer part

Round suction pad with internal sealing edge for sealing on rough, slightly textured surfaces.

Suction Plates SHF

176

- Diameter: 125 to 210 mm
- Material: NK
- Supporting plate securely clipped to elastomer part

Round suction pad with large diameter and internal, double sealing edge for sealing on rough, slightly textured surfaces.

Suction Plates SPC

179

- Diameter: 160 to 400 mm
- Material: NBR
- Supporting plate securely clipped to elastomer part

Round suction pad with double sealing edge and compressed air connection for handling and separation of workpieces that are porous and subject to through-suction.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Suction Pads for Packaging

Flat Suction Pads SPF 182

- Diameter: 20 to 50 mm
- Material: ED
- Connection nipple modular

Round flat suction pad with support ribs, reinforced basic body, low internal volume and flexible sealing lip for handling rigid packaging.

Bellows Suction Pads SPB1 (1.5 Folds) 186

- Diameter: 10 to 60 mm
- Material: ED
- Connection nipple modular

Round bellows suction pad with 1.5 folds, reinforced basic body, damping effect and large suction stroke for handling rigid packaging.

Bellows Suction Pads SPOB1 (Oval, 1.5 Folds) 191

- Dimensions: 60x20 to 100x40 mm
- Material: ED
- Connection nipple modular

Oval bellows suction pad with 1.5 folds, reinforced basic body, damping effect and large suction stroke for handling rigid packaging.

Bellows Suction Pads SPB4 (4.5 Folds) 194

- Diameter: 20 to 50 mm
- Material: SI (suitable for applications in the food industry)

Round bellows suction pad with 4.5 folds with reinforced basic body and soft sealing lip for handling unstable packaging; FDA-compliant silicone.

Bellows Suction Pads FGA PVC (1.5 Folds) 198

- Diameter: 13 to 22 mm
- Material: PVC

Round bellows suction pad with 1.5 folds for non-rigid and unstable outer packaging.

Bellows Suction Pads FG PVC (2.5 Folds) 202

- Diameter: 18 to 50 mm
- Material: PVC

Round bellows suction pad with 2.5 folds with high suction pad stroke and damping effect for non-rigid and unstable outer packaging.

Bellows Suction Pads FSGB-R (Rectangular) 206

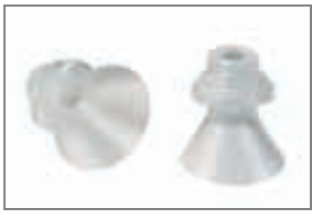
- Dimensions: 52x25 to 80x50 mm
- Material: NK, SI
- Connection plate screwed to elastomer part

Rectangular bellows suction pad with 2.5 and 3.5 folds for square, non-rigid and unstable outer packaging.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance



Chocolate Suction Pads SPG

210

PACKAGING

- Diameter: 33 mm
- Material: SI (suitable for applications in the food industry)

Bell-shaped chocolate suction pad for handling round, oval or even square chocolate candies in conjunction with picker robots; FDA-compliant silicone.

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGN 25 K to SGN 40 K

213

PACKAGING PLASTICS

- Diameter: 25 to 40 mm
- Material: NBR
- Connection nipple plugged into elastomer part

Round suction pad with special sealing lip for careful and crease-free handling of films and paper.

Flat Suction Pads SGPN

216

PACKAGING PLASTICS GLASS SOLAR COMPOSITE

- Diameter: 15 to 40 mm
- Material: HT1, NK, SI
- Connection nipple plugged into elastomer part

Round suction pad with flat, elongated sealing lip and inner support for handling of films, paper or wafers without sucking in or damaging the workpiece.

Flat Suction Pads SGS

221

PACKAGING PLASTICS

- Diameter: 27 mm
- Material: NK

Round suction pad with soft sealing lip and special suction pad neck for direct mounting without connection nipple for crease-free handling of films and paper.

Vacuum Lifting Cylinders HS

224

UNIVERSAL

- Body of aluminium with integrated lifting cylinder
- Connection thread M5 and G1/8" for suction pads

Vacuum-actuated automatic lifting cylinder for fast separation of films and paper.

Suction Pads for Handling Glass

Suction Plates SGF

226

GLASS SOLAR

- Diameter: 125 to 400 mm
- Material: EPDM

Round suction plate for handling of flat, smooth workpieces, such as glass and plastic sheets. Also used for the handling of plate glass (float glass) and solar modules.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Suction Pads for Handling CDs/DVDs

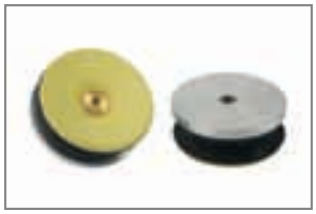
Suction Pads SGR and SGH 229

CD/DVD

- Diameter: 17 to 36 mm
- Material: SI
- Different sizes and shapes

Ring shaped suction pad with maximum suction force with minimal space requirements on common optical storage media such as CDs, DVDs or Blu-ray DVDs.

Suction Pads for High-Temperature Applications



Suction Plates for High-Temperature SPL-HT FPM-F 233

METAL GLASS

- Diameter: 90 to 190 mm
- Material: FPM, coated with felt
- Withstands temperatures up to 400 °C

Suction pad with felt coating for temperature resistance and no marks on the workpiece.

Suction Plates for High-Temperature SPL-HT 236

METAL GLASS

- Diameter: 35 to 140 mm
- Material: Special woven silicate material
- Withstands temperatures up to 600 °C

Suction pad with replaceable seal and stainless steel basic body for high temperature resistance.

Suction Pads for Different Industries

Flat Suction Pads SGN 6.3 to SGN 25 238

UNIVERSAL

- Diameter: 6.3 to 25 mm
- Material: NBR, SI
- Connection nipple plugged into elastomer part

Suction pad with extra-long shaft for handling fragile workpieces with uneven surfaces.

Flat Suction Pads SGN 20 to SGN 100 241

UNIVERSAL

- Diameter: 20 to 100 mm
- Material: NBR
- Connection nipple vulcanized to elastomer part

Suction pad with studded underside for dynamic handling of smooth workpieces.

Flat Suction Pads SGN 45 243

UNIVERSAL

- Diameter: 45 mm
- Material: ECO, SI
- Connection nipple plugged into elastomer part

Suction pad for handling in areas with high chemical resistance requirements.

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Flat Suction Pads SGN 120

246

- Diameter: 120 mm
- Material: ECO
- Connection nipple vulcanized to elastomer part

Suction pad with extremely flat elongated sealing lip for handling flat workpieces of differing widths.

Flat Suction Pads SGAN

248

- Diameter: 7 to 16 mm
- Material: SI, PU
- Connection nipple plugged into elastomer part

Suction pad with soft sealing lip for handling fragile workpieces such as CDs, veneers, wafers and solar cells even in multi-shift operation with short cycle times.

Sealing Profiles

Sealing Profiles DI-MOS

251

- Diameter: 6 to 12 mm
- Cross-sections: 8 x 1 to 25 x 20 mm

Sealing profiles with various dimensions for producing individual suction plates.

Sealing Profiles DI-PROF

255

- Cross-sections: 21 x 11 to 53 x 32 mm

Sealing profiles made from two components for individual production of suction plates for extremely rough and textured surfaces.

Accessories Vacuum Suction Pads

Filter Discs FD

258

- Diameter: 16 to 55 mm
- For suction pad type: FGA, FG

The filter plate stops the tool from being sucked in to the suction pad.

Suction Pad Covers SU

261

- Diameter: 120 to 280 mm
- For suction pads and suction plates

Suction pad cover for handling delicate, flat and smooth workpieces (non-marking).

Overview of Section 3

Vacuum Suction Pads

Everything at a Glance

Sealing Rings DR-MOS SI

264

- Diameter: 20 to 88 mm
- For suction pad type: FGA, FG

Sealing ring made from special foam for optimally sealing structured surfaces.

Vacuum Suction Pads

Selection Aid by Diameter

Vacuum Suction Pads (Round)

Diameter	Type	Application	Designation	Page
1		Universal	PFYN	80
1.5		Universal	PFYN	80
2		Universal	PFYN	80
3.5		Universal	PFYN	80
5		Universal	PFYN	80
	2.5	Universal	FSG	126
6		Universal	PFYN	80
6.3		Miscellaneous	SGN	238
7	2.5	Universal	FSG	126
		Miscellaneous	SGAN	248
8		Universal	PFYN	80
		Miscellaneous	SGN	238
9	2.5	Universal	FSG	126
		Miscellaneous	SGAN	248
10		Universal	PFYN	80
		Miscellaneous	SGN	238
	1.5	Packaging	SPB1	186
11	1.5	Universal	FSGA	110
12	2.5	Universal	FSG	126
13		Miscellaneous	SGAN	248
	1.5	Packaging	FGA PVC	198
14	1.5	Universal	FSGA	110
	2.5	Universal	FSG	126
15		Universal	PFYN	80
		Universal	PFYN VU 1	89
		Films & paper	SGPN	216
	1.5	Packaging	SPB1	186
16	1.5	Universal	FSGA	110
		Miscellaneous	SGN	238
		Miscellaneous	SGAN	248
17		CD/DVD	SGH	229
18	2.5	Universal	FSG	126
	2.5	Packaging	FG PVC	202
19	1.5	Packaging	FGA PVC	198
20		Universal	PFYN	80
	1.5	Universal	FSGA	110
	2.5	Universal	FSG	126
		Miscellaneous	SGN	238
		Films & paper	SGPN	216
	1.5	Packaging	SPB1	186
	4.5	Packaging	SPB4	194
		Packaging	SPF	182
22	1.5	Universal	FSGA	110
	1.5	Sheet metal	SAB	152
	1.5	Packaging	FGA PVC	198
23	2.5	Packaging	FG PVC	202
24		Films & paper	SGPN	216
		CD/DVD	SGR	229
25		Universal	PFYN	80
	1.5	Universal	FSGA	110
	2.5	Universal	FSG	126

Diameter	Type	Application	Designation	Page
25	3.5	Universal	FSGB	135
		Miscellaneous	SGN	238
		Films & paper	SGN (K)	213
	1.5	Packaging	SPB1	186
		Packaging	SPF	182
27		Films & paper	SGS	221
30		Universal	PFYN	80
		Universal	PFYN VU 1	89
	1.5	Universal	FSGA VU 1	115
	2.5	Universal	FSG VU 1	132
		Miscellaneous	SGN	238
		Sheet metal	SAF	148
	1.5	Sheet metal	SAB	152
		Sheet metal	SAXM	141
		Films & paper	SGPN	216
	1.5	Packaging	SPB1	186
	4.5	Packaging	SPB4	194
		Packaging	SPF	182
31		CD/DVD	SGR	229
32	2.5	Universal	FSG	126
	2.5	Packaging	FG PVC	202
33	1.5	Universal	FSGA	110
		CD/DVD	SGR	229
		CD/DVD	SGH	229
		Packaging	SPG	210
34		Films & paper	SGPN	216
35		Universal	PFYN	80
		Films & paper	SGPN	216
		High-temperature	SPL-HT	236
36		CD/DVD	SGH	229
40		Universal	PFYN	80
	1.5	Universal	FSGA VU 1	115
		Sheet metal	SAF	148
	1.5	Sheet metal	SAB	152
		Sheet metal	SAXM	141
		Films & paper	SGPN	216
		Films & paper	SGN (K)	213
	1.5	Packaging	SPB1	186
	2.5	Packaging	FG PVC	202
	4.5	Packaging	SPB4	194
		Packaging	SPF	182
42	2.5	Universal	FSG	126
43	1.5	Universal	FSGA	110
45		Miscellaneous	SGN	238
50		Universal	PFYN	80
		Universal	PFYN VU 1	89
		Miscellaneous	SGN	241
		Universal	FSGA VU 1	115
	1.5	Sheet metal	SAF	148
	1.5	Sheet metal	SAB	152
		Sheet metal	SAXM	141

Flat suction pads Bell-shaped suction pads 1.5 Bellows suction pads (1.5/2.5/3.5/4.5 folds)

Vacuum Suction Pads

Selection Aid by Diameter

Vacuum Suction Pads (Round)

Diameter	Type	Application	Designation	Page
50		Wood	SHFN	171
	1.5	Packaging	SPB1	202
	2.5	Packaging	FG PVC	186
	4.5	Packaging	SPB4	194
		Packaging	SPF	182
52	2.5	Universal	FSG	126
53	1.5	Universal	FSGA	110
55		Universal	SPK	98
60		Universal	PFYN	80
		Universal	PFYN VU 1	89
	2.5	Universal	FSGA VU 1	115
	1.5	Universal	FSG VU 1	132
		Sheet metal	SAF	148
	1.5	Sheet metal	SAB	152
		Sheet metal	SAXM	141
		High-temperature	SPL-HT	236
	1.5	Packaging	SPB1	186
62	2.5	Universal	FSG	126
63	1.5	Universal	FSGA	110
70		Wood	SHFN	171
78	1.5	Universal	FSGA	110
80		Universal	PFYN	80
		Universal	PFYN VU 1	89
		Universal	SPK	98
		Miscellaneous	SGN	241
		Sheet metal	SAF	148
	1.5	Sheet metal	SAB	152
		Sheet metal	SAXM	141
85	1.5	Universal	FSGA VU 1	115
	2.5	Universal	FSG VU 1	132
		Sheet metal	SGGN	168
		Wood	SHFN	171
88	2.5	Universal	FSG	126
90		High-temperature	SPL-HT	236
		High-temperature	SPL FPM-F	233
95		Universal	PFYN	80
		Universal	PFYN VU 1	89
100		Universal	SPU	94
		Miscellaneous	SGN	241
		Sheet metal	SAF	148
	1.5	Sheet metal	SAB	152
		Sheet metal	SAXM	141
110		Universal	SPK	98
	1.5	Universal	FSGA	120
	1.5	Universal	FSGA VU 1	115
115		Sheet metal	SGGN	168
		Sheet metal	SAXM	141
120		Universal	PFYN	80
		Miscellaneous	SGN	241
125		Universal	SPU	94
		Sheet metal	SAF	148

Diameter	Type	Application	Designation	Page
125	1.5	Sheet metal	SAB	152
		Wood	SHF	176
		Glass	SGF	226
140		High-temperature	SPL-HT	236
150		Universal	PFYN	80
	1.5	Universal	FSGA	120
	1.5	Universal	FSGPL	123
160		Universal	SPU	94
		Universal	SPK	98
		Wood	SHF	176
		Wood	SPC	179
190		High-temperature	SPL FPM-F	233
200		Universal	PFYN	80
		Universal	SPK	98
	1.5	Universal	FSGPL	123
		Glass	SGF	226
210		Universal	SPU	94
		Wood	SHF	176
		Wood	SPC	179
250		Universal	SPU	94
		Universal	SPK	98
	1.5	Universal	FSGPL	123
		Wood	SPC	179
300		Universal	SPU	94
		Glass	SGF	226
360		Universal	SPU	94
400		Universal	SPU	94
		Glass	SGF	226

Flat suction pads Bell-shaped suction pads 1.5 Bellows suction pads (1.5/2.5/3.5/4.5 folds)

Vacuum Suction Pads

Selection Aid by Diameter

Vacuum Suction Pads (Oval, Rectangular)

L x W	Type	Application	Designation	Page
4 x 2		Universal	SGON	101
7 x 3.5		Universal	SGON	101
12 x 4		Universal	SGON	101
15 x 5		Universal	SGON	101
18 x 6		Universal	SGON	101
24 x 8		Universal	SGON	101
30 x 10		Universal	SGON	101
45 x 15		Universal	SGON	101
50 x 16		Sheet metal	SAOF	156
52 x 25	2.5	Packaging	FSGB-R	206
60 x 20		Universal	SGON	101
		Universal	SPLO	106
		Sheet metal	SAOG	164
	1.5	Packaging	SPOB1	191
60 x 23		Sheet metal	SAOF	156
60 x 29	2.5	Packaging	FSGB-R	206
60 x 30	1.5	Sheet metal	SAOB	160
75 x 25		Universal	SGON	101
80 x 30		Sheet metal	SAOG	164
	3.5	Packaging	FSGB-R	206
80 x 40		Sheet metal	SAOF	156
	1.5	Sheet metal	SAOB	160
	3.5	Packaging	FSGB-R	206
80 x 50	3.5	Packaging	FSGB-R	206
90 x 30		Universal	SGON	101
		Sheet metal	SAOF	156
95 x 40	1.5	Sheet metal	FSGAO	138
		Sheet metal	SAOG	164
100 x 30		Universal	SPLO	106
100 x 32		Universal	SPLO	106
100 x 40	1.5	Packaging	SPOB1	191
100 x 50		Universal	SAOF	156
110 x 55	1.5	Sheet metal	SAOB	160
120 x 60		Universal	SAOF	156
140 x 65	1.5	Sheet metal	FSGAO	138
140 x 70		Universal	SAOF	156
	1.5	Sheet metal	SAOB	160
150 x 55		Universal	SPLO	106
200 x 30		Universal	SPLO	106
200 x 55		Universal	SPLO	106
250 x 55		Universal	SPLO	106
300 x 30		Universal	SPLO	106
300 x 55		Universal	SPLO	106
300 x 100		Universal	SPLO	106
370 x 80		Universal	SPLO	106

Flat suction pads Bell-shaped suction pads 1.5 Bellows suction pads (1.5/2.5/3.5/4.5 folds)

Checklist for Selection of Vacuum Suction Pads

What are the dimensions and weight of the workpiece?	These are important for calculation of the suction force and the number of suction pads (see the technical information).
What is the surface finish of the workpiece (rough, structured, smooth)?	This determines the type of suction pad (material, shape, dimensions).
Could the workpiece be dirty? If so, what kind of dirt?	This is important for the dimensioning of the suction pad (see the technical information) and for the design of the dust filter.
What is the maximum temperature of the workpiece?	The temperature is important for selection of the suction pad material. Special materials may be necessary for temperatures higher than 70 °C (see materials table).
Is precise positioning for picking up or placing of the workpiece required?	This determines the type, version and shape of the suction pad.
What cycle times are used?	This is important for the dimensioning and plays a part in the calculations (suction force of the pad etc.). See the technical information.
What is the maximum acceleration during handling?	This may affect the dimensioning and plays a part in the calculations (suction force, moment of inertia etc.). See the technical information.
What type of handling is needed (moving, slewing, turning over)?	This is required for calculation of the suction force and for design of the system.
Which environmental effects do exist?	These are important for selection of the suction pad material (resistance to ozone and other chemicals, silicone free etc.).

Vacuum Suction Pads

Material of the Suction Pad

Material Overview

Description	**Abbreviation**	**NBR**	**NBR-AS**	**SI**	**SI-AS**	**NK**	**HT1**
	Chemical designation / trade name	**Nitrile caoutchuc** (AS = antistatic)		**Silicone caoutchuc** (AS = antistatic)		**Natural rubber**	**High temperature material**
	Color / coding	black, gray, blue, light blue	black with blue dot	white (translucid), green	black with red dot	gray, light brown, black	blue
Chemical resistance	**General weathering resistance**	●●	●●	●●●	●●●	●●	●●●
	Ozone resistance	●	●	●●●●	●●●●	●●	●●●●
	Oil resistance	●●●●	●●●●	●●	●●	●	●●●●
	Fuel resistance	●●	●●	●	●	●	●●
	Alcohol resistance, ethanol 96%	●●●●	●●●	●●●●	●●●	●●●●	●●●●
	Solvents resistance	●●	●●	●●	●●	●	●●
	General resistance to acids	●	●	●	●	●●	●
	Steam resistance	●●	●●	●●	●●	●	●●●
Mechanical characteristics	**Wear resistance**	●●	●●	●	●	●●	●●●
	Resistance to permanent deformation	●●	●●	●●	●●	●●●	●●
	Tensile strength	●●	●●	●	●	●●	●●
	Specific resistance in [Ω x cm]	–	≤ 10^7	–	≤ 10^7	–	–
	Shore hardness to DIN ISO 7619	40 to 90 ± 5	55 ± 5	30 to 85 ± 5**	55 ± 5	30 to 90 ± 5	60 ± 5
Temperature resistance*	**Short-term in °C (< 30 sec.)**	-30° to +120°	-30° to +120°	-50° to +220°	-35° to +220°	-35° to +120°	-25° to +170°
	Longer-term in °C	-10° to +70°	-10° to +70°	-30° to +180°	-20° to +180°	-25° to +80°	-10° to +140°
Further characteristics	**Target industry**	Universal	Universal	Packaging, CD/DVD	Packaging, CD/DVD, Electronics	Wood, Packaging	Plastics, Glass
	Food grade according to CFR 21 §177.2600 FDA			✓			
	Leaving few marks						✓
	Absence of PWIS (paint-wetting impairment substances)	NBR-60, NBR-45			✓		✓

* Approximate value: depends on ambient temperature, application force, recovery time and wall thickness of suction pad
** After-bake of silicone 4 h/200 °C = ~+5 Shore A
*** With slight oil wetting
**** Varies, for technical reasons, for foam rubber

●●●● Exellent ●●● Very good ●● Good ● Poor to satisfactory

Vacuum Suction Pads

Material of the Suction Pad

Material Overview

ED	PU	VU1	PVC	FPM	CR	EPDM	EPDM-MOS	ECO
Elastodur	**Polyurethane**	**Vulkollan**	**Polyvinyl chloride**	**Fluor-caoutchuc**	**Chloroprene**	**Ethylene-propylene-caoutchuc**	**Foam rubber made of Ethy-lene-propy-lene-caoutchuc**	**Epichlor**
green, blue	blue, dark green	dark green	blue (translucid)	black with white dot	black, gray	black, gray	black, gray	black
●●●	●●●	●●●	●●	●●●●	●●●	●●●●	●●●●	●●●
●●●	●●●	●●●	●●●	●●●●	●●●	●●●●	●●●●	●●●
●●●	●●●	●●●	●●●	●●●●	●●●	●●***	●●***	●●●●
●●	●●	●●	●	●●●●	●	●	●	●●
●●●	●●●●	●●●●	●	●●	●●●●	●●●●	●●●●	●
●	●	●	●	●●●	●●	●●	●●	●●●
●	●	●	●●	●●●	●●	●●●	●●●	●
●	●	●	●●●	●●	●●	●●●	●●●	●●
●●● (●)	●●●●	●●●●	●●●	●	●●	●●	●	●●
●	●	●●	●	●●	●●	●●	●●	●●●
●●● (●)	●●●	●●●●	●●	●●	●●	●●	●	●●
–	–	–	–	–	–	–	–	–
60 to 85 ± 5	55 ± 5 10.01.01.00135	72 ± 5	50 ± 5	65 ± 5	20 – 60	55 ± 5	~15****	60 ± 5
-40° to +100°	-40° to +130°	-40° to +100°	-30° to +65°	-10° to +250°	-40° to +100°	-35° to +130°	-35° to +100°	-25° to +160°
-25° to +80°	-30° to +100°	-40° to +80°	-15° to +50°	-10° to +200°	-20° to +70°	-25° to +100°	-25° to +70°	-25° to +130°
Packaging, Metal	Packaging	Metal, Packaging, Glass, Wood	Packaging, CD/DVD	Glass, Solar, Metal	Metal, Wood	Glass	Metal, Wood	Metal
				✓				
ED-85, ED-60								

Material of the Suction Pad

An Interview with our Material Expert

Coarse wooden boards, heavy cardboard boxes, smooth freezer bags and highly sensitive solar cells – the handling of wide-ranging workpieces as part of a variety of processes represents a great challenge for the material experts at Schmalz. In addition to universally applicable suction pads, they also develop highly specialized industry-specific suction pads. The structural design and properties of the material are key.

Dipl.-Ing. Volker Moll
Material expert in the elastomer and suction pads team

The elastomer and suction pads team is responsible for developing suction pads at Schmalz. Why is it so important to develop own suction pad materials?

Moll: "By developing our own suction pad materials, we can guarantee their quality and ensure that all of our suction pads meet every last demand of the process concerned in terms of design, structure and the materials used. This is only possible with the support of our own materials development team, qualified elastomer engineers, a well-equipped test lab and close collaboration with our customers. Selecting and combining each ingredient of the elastomers allows us to tailor the materials exactly so that they have the right properties for their application. In this way, we have an edge over our competitors thanks to the long service life of our universal suction pads."

How are the suction pads tested?

Moll: "The suction pads are tested for their resistance to abrasion, wear, weathering, ozone and steam, and to assess whether they contain paint-wetting impairment substances. Additional tests determine the electrical resistance, temperature resistance, mark formation and fatigue behavior of the pads. The suitability of the suction pads for handling food products is ensured by carefully selecting the component materials and treating them properly before use. The lab also conducts long-term and endurance tests in which the suction pads are used under conditions that reflect their intended application as closely as possible. Our knowledge of materials is always being expanded by in-depth damage analyses."

Which material is suitable for which application?

Moll: "In order to cover a large number of applications, a broad range of materials is key. In addition to universally applicable suction pads, we also manufacture many suction pads from materials that have been specially developed for a target industry."

How can I choose the right material for my application?

Moll: "In order to choose the right material, it is important to know the characteristics and parameters of the particular handling task. As well as the chemical and mechanical requirements, other important aspects include contact with food products, for example. Some materials are suitable for universal application. We always recommend carrying out suction tests. In general, I can recommend the following materials for certain applications."

Application	Our material expert recommends:
Cardboard boxes	Elastodur ED-65
Bags	Silicone SI, polyvinyl chloride PVC
Foils and paper	Natural rubber NK
Oily workpieces, metal	Nitrile rubber NBR, high-temperature material HT1, Vulkollan VU1, Elastodur ED-85
Hot workpieces	High-temperature material HT1, silicone SI, fluorine rubber FPM
Plastics	High-temperature material HT1
Food products (direct contact)	Silicone SI
Wood	Natural rubber NK
Wafers/solar cells	High-temperature material HT1, silicone SI, fluorine rubber FPM
Electronic components	Antistatic silicone SI-AS, antistatic nitrile rubber NBR-AS
Batteries	Fluorine rubber FPM
Glass	Ethylene propylene rubber EPDM

We would be happy to provide more information in person; you can find the right contact person in our "Contact" section.

Vacuum Suction Pads

Accessories

Vacuum Suction Pads Accessories

Spring Plungers (FSTE/FSTA/FSTI/FSTF)
Are used for spring-mounting of suction pads, particularly in fully automatic systems, to ensure that the pads can be placed carefully, even on easily damaged workpieces. Spring plungers also compensate for varying workpiece heights.

Further information in Section "Mounting Elements".

Adapter Nipples (ANW/AN)
Are used for rigid mounting of suction pads on, for example, a cross-beam or for mounting with a spring plunger. The vacuum connection is on the side.

Further information in Section "Mounting Elements".

Ball Joints and Flexolink (KGL/FLK)
Are screwed onto the suction pads to permit a certain amount of flexibility. They permit optimum adaptation of the pad to uneven workpieces.

Further information in Section "Mounting Elements".

Sealing Rings (DR)
Robust sealing rings with excellent sealing properties.

Further information in Section "Filters and Connections".

Sensing Valves (TV)
Can be screwed into many suction pads with screw nipples. They sense whether a workpiece is in contact with the pad and open the vacuum line only if this is so.

Further information in Section "Valve Technology".

Flow Resistors (SW)
Reduce the cross-sectional area of the vacuum and thus help to maintain the system vacuum if one or more suction pads are not in contact with the workpiece. The vacuum line is not fully closed. They are particularly suitable for the handling of porous workpieces.

Further information in Section "Valve Technology".

Check Valves (SVK/SVKG/SVV/SVN)
Continuously measure the rate of flow of air through themselves. If one or more suction pads are not in contact with the workpiece, or if the workpiece is pulled away, they close in order to maintain the vacuum in the rest of the system. Type SVN is even suitable for use on porous workpieces.

Further information in Section "Valve Technology".

Flat Suction Pads (Round)

Flat Suction Pads PFYN

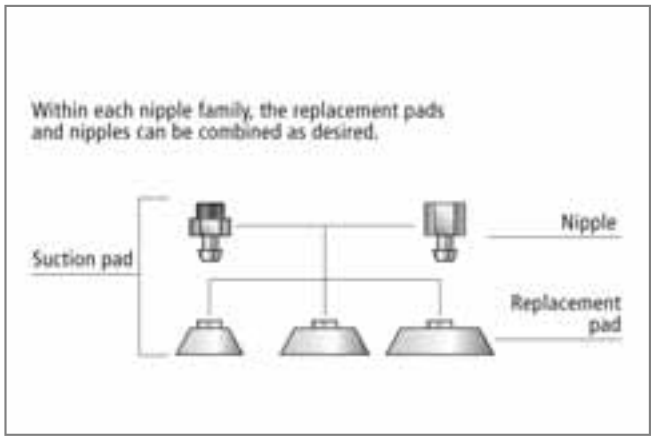
Suction area (Ø) from 1 mm to 200 mm

Suitability for Industry-Specific Applications

Flat suction pads PFYN

Applications

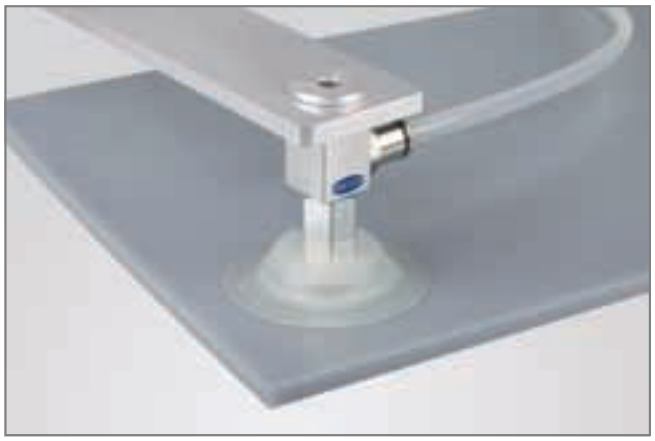
- Round, flat suction pad for handling of flat workpieces with smooth or slightly rough surfaces
- Handling of hot workpieces (HT1, SI)
- Low-marking and antistatic handling of sensitive workpieces (HT1 and AS versions)



System design flat suction pads PFYN

Design

- Robust, wear-resistant suction pad PFYN with single sealing lip, consisting of suction pad PFG and connection nipple
- Nipple plugged in on pads up to 50 mm in diameter
- Nipple screwed into a metal inlay (vulcanized to the pad) on pads with a diameter of 60 mm or more



Flat suction pads PFYN being used for handling plastic boards

Our Highlights...	Your Benefits...
• Different materials	> Suction pads for a wide range of applications (high temperatures, antistatic, low-marking, resistance to chemicals)
• Wide range of diameters	> Wide range of versions for different sizes and types of workpieces
• Optimum shape	> High suction forces with small dimensions
• Low internal volume	> For very short cycle times
• Supports on the bottom	> No permanent deformation of thin-walled workpieces

Flat Suction Pads (Round)

Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

Designation Code Flat Suction Pads PFYN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example PFYN 20 NBR-55 G1/8-AG:			
PFYN	**20**	**NBR-55**	**G1/8-AG**
PFYN	1 to 200	FPM-65 (mark-free) HT1-60 NBR-55 NBR-AS-55 (antistatic) PU-55 SI-55 SI-AS-55 (antistatic)	M3-AG (AG = male (M)) M5-AG M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG G1/2-IG

Ordering Data Flat Suction Pads PFYN

Suction pad PFYN (elastomer part + connection nipple) is delivered unassembled (diameters of 120 mm and more are assembled). The delivery consists of:

- Suction pad of type PFG – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad PFG, connection nipple SA-NIP

Flat Suction Pads (Round)

Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

Flat Suction Pads PFYN

Type	Suction pad material * / hardness in Shore A						
	Fluoro-caoutchuc FPM 65±5ShA	High temp. material HT1 60±5ShA	Perbunan NBR 55±5ShA	Perbunan NBR-antistat. 55±5ShA	Polyurethane PU 55±5ShA	Silicone SI 55±5ShA	Silicone SI-antistat. 55±5ShA
PFYN 1 M3-AG	-	-	10.01.01.00274	10.01.01.10375	-	10.01.01.00280	-
PFYN 1.5 M3-AG	-	-	10.01.01.00275	10.01.01.10376	-	10.01.01.00281	-
PFYN 2 M3-AG	-	-	10.01.01.00276	10.01.01.10377	-	10.01.01.00282	10.01.01.10391
PFYN 3.5 M3-AG	10.01.01.00295	-	10.01.01.00277	10.01.01.10378	-	10.01.01.00283	10.01.01.10392
PFYN 5 M5-AG	10.01.01.00179	10.01.01.11130	10.01.01.00137	10.01.01.10379	-	10.01.01.00151	10.01.01.10393
PFYN 5 M5-IG	10.01.01.00123	10.01.01.11144	10.01.01.00081	10.01.01.10345	-	10.01.01.00095	10.01.01.10357
PFYN 6 M5-AG	10.01.01.00180	10.01.01.11131	10.01.01.00138	10.01.01.10380	-	10.01.01.00152	10.01.01.10394
PFYN 6 M5-IG	10.01.01.00124	10.01.01.11145	10.01.01.00082	10.01.01.10346	-	10.01.01.00096	10.01.01.10358
PFYN 8 M5-AG	10.01.01.00181	10.01.01.11132	10.01.01.00139	10.01.01.10381	10.01.01.00167	10.01.01.00153	10.01.01.10395
PFYN 8 M5-IG	10.01.01.00125	10.01.01.11146	10.01.01.00083	10.01.01.10347	10.01.01.00111	10.01.01.00097	10.01.01.10359
PFYN 10 M5-AG	10.01.01.00182	10.01.01.11133	10.01.01.00140	10.01.01.10382	10.01.01.00168	10.01.01.00154	10.01.01.10396
PFYN 10 M5-IG	10.01.01.00126	10.01.01.11147	10.01.01.00084	10.01.01.10348	10.01.01.00112	10.01.01.00098	10.01.01.10360
PFYN 10 G1/8-AG	10.01.01.00297	10.01.01.11134	10.01.01.00279	10.01.01.10383	10.01.01.00291	10.01.01.00285	10.01.01.10397
PFYN 10 G1/8-IG	10.01.01.00273	10.01.01.11148	10.01.01.00255	10.01.01.10349	10.01.01.00267	10.01.01.00261	10.01.01.10361
PFYN 15 G1/8-AG	10.01.01.00183	10.01.01.11135	10.01.01.00141	10.01.01.10384	10.01.01.00169	10.01.01.00155	10.01.01.10398
PFYN 15 G1/8-IG	10.01.01.00127	10.01.01.11149	10.01.01.00085	10.01.01.10350	10.01.01.00113	10.01.01.00099	10.01.01.10362
PFYN 20 G1/8-AG	10.01.01.00184	10.01.01.11136	10.01.01.00142	10.01.01.10385	10.01.01.00170	10.01.01.00156	-
PFYN 20 G1/8-IG	10.01.01.00128	10.01.01.11150	10.01.01.00086	10.01.01.10351	10.01.01.00114	10.01.01.00100	-
PFYN 25 G1/8-AG	10.01.01.00185	10.01.01.11137	10.01.01.00143	10.01.01.10386	10.01.01.00171	10.01.01.00157	-
PFYN 25 G1/8-IG	10.01.01.00129	10.01.01.11151	10.01.01.00087	10.01.01.10352	10.01.01.00115	10.01.01.00101	-
PFYN 30 G1/8-AG	10.01.01.00186	10.01.01.11138	10.01.01.00144	10.01.01.10387	10.01.01.00172	10.01.01.00158	-
PFYN 30 G1/8-IG	10.01.01.00130	10.01.01.11152	10.01.01.00088	10.01.01.10353	10.01.01.00116	10.01.01.00102	-
PFYN 35 G1/8-AG	10.01.01.00187	10.01.01.11139	10.01.01.00145	10.01.01.10388	10.01.01.00173	10.01.01.00159	-
PFYN 35 G1/8-IG	10.01.01.00131	10.01.01.11153	10.01.01.00089	10.01.01.10354	10.01.01.00117	10.01.01.00103	-
PFYN 40 G1/8-AG	10.01.01.00188	10.01.01.11140	10.01.01.00146	10.01.01.10389	10.01.01.00174	10.01.01.00160	-
PFYN 40 G1/8-IG	10.01.01.00132	10.01.01.11154	10.01.01.00090	10.01.01.10355	10.01.01.00118	10.01.01.00104	-
PFYN 50 G1/8-AG	10.01.01.00189	10.01.01.11141	10.01.01.00147	10.01.01.10390	10.01.01.00175	10.01.01.00161	-
PFYN 50 G1/8-IG	10.01.01.00133	10.01.01.11155	10.01.01.00091	10.01.01.10356	10.01.01.00119	10.01.01.00105	-
PFYN 60 G1/4-AG	10.01.01.00190	10.01.01.11142	10.01.01.00148	-	10.01.01.00176	10.01.01.00162	-
PFYN 60 G1/4-IG	10.01.01.00134	10.01.01.11156	10.01.01.00092	-	10.01.01.00120	10.01.01.00106	-
PFYN 80 G1/4-AG	10.01.01.00191	10.01.01.11143	10.01.01.00149	-	10.01.01.00177	10.01.01.00163	-
PFYN 80 G1/4-IG	10.01.01.00135	10.01.01.11157	10.01.01.00093	-	10.01.01.00121	10.01.01.00107	-
PFYN 95 G1/4-AG	10.01.01.00192	-	10.01.01.00150	-	10.01.01.00178	10.01.01.00164	-
PFYN 95 G1/4-IG	10.01.01.00136	-	10.01.01.00094	-	10.01.01.00122	10.01.01.00108	-
PFYN 120 G1/2-IG	10.01.01.12052	-	10.01.01.00337	-	-	10.01.01.00338	-
PFYN 150 G1/2-IG	-	-	10.01.01.00339	-	-	10.01.01.00340	-
PFYN 200 G1/2-IG	-	-	10.01.01.00341	-	-	10.01.01.00342	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Flat Suction Pads (Round)

Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

Ordering Data Spare Parts Suction Pads

Type	Suction pad material * / hardness in Shore A						
	Fluorocaoutchuc FPM 65±5ShA	High temp material HT1 60±5ShA	Perbunan NBR 55±5ShA	Perbunan NBR-antistat. 55±5ShA	Polyurethane PU 55±5ShA	Silicone SI 55±5ShA	Silicone SI-antistat. 55±5ShA
PFG 1	-	-	10.01.01.00001	10.01.01.10335	-	10.01.01.00021	-
PFG 1.5	-	-	10.01.01.00002	10.01.01.10336	-	10.01.01.00022	-
PFG 2	-	-	10.01.01.00003	10.01.01.10063	-	10.01.01.00023	10.01.01.10050
PFG 3.5	10.01.01.00064	-	10.01.01.00004	10.01.01.10042	-	10.01.01.00024	10.01.01.00752
PFG 5	10.01.01.00067	10.01.01.11158	10.01.01.00007	10.01.01.10064	-	10.01.01.00027	10.01.01.10051
PFG 6	10.01.01.00068	10.01.01.11159	10.01.01.00008	10.01.01.10065	-	10.01.01.00028	10.01.01.00626
PFG 8	10.01.01.00069	10.01.01.11160	10.01.01.00009	10.01.01.10043	10.01.01.00049	10.01.01.00029	10.01.01.00647
PFG 10	10.01.01.00070	10.01.01.11161	10.01.01.00010	10.01.01.10066	10.01.01.00050	10.01.01.00030	10.01.01.00701
PFG 15	10.01.01.00071	10.01.01.11162	10.01.01.00011	10.01.01.10067	10.01.01.00051	10.01.01.00031	10.01.01.00627
PFG 20	10.01.01.00072	10.01.01.11163	10.01.01.00012	10.01.01.10337	10.01.01.00052	10.01.01.00032	-
PFG 25	10.01.01.00073	10.01.01.11164	10.01.01.00013	10.01.01.10338	10.01.01.00053	10.01.01.00033	-
PFG 30	10.01.01.00074	10.01.01.11165	10.01.01.00014	10.01.01.10339	10.01.01.00054	10.01.01.00034	-
PFG 35	10.01.01.00075	10.01.01.11166	10.01.01.00015	10.01.01.10340	10.01.01.00055	10.01.01.00035	-
PFG 40	10.01.01.00076	10.01.01.11167	10.01.01.00016	10.01.01.10341	10.01.01.00056	10.01.01.00036	-
PFG 50	10.01.01.00077	10.01.01.11168	10.01.01.00017	10.01.01.10342	10.01.01.00057	10.01.01.00037	-
PFG 60	10.01.01.00078	10.01.01.11169	10.01.01.00018	-	10.01.01.00058	10.01.01.00038	-
PFG 80	10.01.01.00079	10.01.01.11170	10.01.01.00019	-	10.01.01.00059	10.01.01.00039	-
PFG 95	10.01.01.00080	-	10.01.01.00020	-	10.01.01.00060	10.01.01.00040	-
PFG 120	10.01.01.00389	-	10.01.01.00331	-	-	10.01.01.00332	-
PFG 150	-	-	10.01.01.00333	-	-	10.01.01.00334	-
PFG 200	-	-	10.01.01.00335	-	-	10.01.01.00336	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pad Nipples

Type	Suction pad nipples [AG]		Suction pad nipples [IG]	
PFYN 1 M3	SA-NIP N001 M3-AG	10.01.01.00315	-	-
PFYN 1.5 M3	SA-NIP N002 M3-AG	10.01.01.00314	-	-
PFYN 2 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-
PFYN 3.5 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-
PFYN 5 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 6 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 8 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 10 M5	SA-NIP N004 M5-AG	10.01.01.03526	SA-NIP N004 M5-IG	10.01.01.03518
PFYN 10 G1/8	SA-NIP N004 G1/8-AG	10.01.01.03528	SA-NIP N004 G1/8-IG	10.01.01.03520
PFYN 15 G1/8	SA-NIP N005 G1/8-AG	10.01.01.03529	SA-NIP N005 G1/8-IG	10.01.01.03521
PFYN 20 G1/8	SA-NIP N006 G1/8-AG	10.01.01.03530	SA-NIP N006 G1/8-IG	10.01.01.03522
PFYN 25 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 30 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 35 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 40 G1/8	SA-NIP N007 G1/8-AG	10.01.01.03531	SA-NIP N007 G1/8-IG	10.01.01.03523
PFYN 50 G1/8	SA-NIP N008 G1/8-AG	10.01.01.03532	SA-NIP N008 G1/8-IG	10.01.01.03524
PFYN 60 G1/4	SA-NIP N009 G1/4-AG	10.01.01.10097	SA-NIP N009 G1/4-IG	10.01.01.10096
PFYN 80 G1/4	SA-NIP N009 G1/4-AG	10.01.01.10097	SA-NIP N009 G1/4-IG	10.01.01.10096
PFYN 95 G1/4	SA-NIP N009 G1/4-AG	10.01.01.10097	SA-NIP N009 G1/4-IG	10.01.01.10096
PFYN 120 G1/2	-	-	SA-NIP N010 G1/2-IG	10.01.01.00796
PFYN 150 G1/2	-	-	SA-NIP N010 G1/2-IG	10.01.01.00796
PFYN 200 G1/2	-	-	SA-NIP N010 G1/2-IG	10.01.01.00796

Flat Suction Pads (Round)

Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

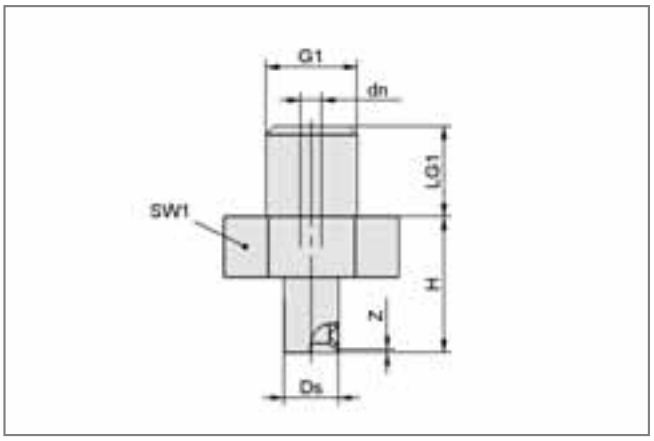
Technical Data Flat Suction Pads PFYN

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
PFYN 1	0.03	0.001	2	2	N 001
PFYN 1.5	0.06	0.001	2	2	N 002
PFYN 2	0.12	0.001	2	2	N 003
PFYN 3.5	0.42	0.002	8	2	N 003
PFYN 5	0.75	0.005	8	2	N 004
PFYN 6	1.20	0.008	8	2	N 004
PFYN 8	2.30	0.030	10	2	N 004
PFYN 10	4.00	0.070	13	2	N 004
PFYN 15	9.00	0.400	13	4	N 005
PFYN 20	15.50	0.800	20	4	N 006
PFYN 25	26.50	1.300	25	4	N 007
PFYN 30	34.00	1.300	40	4	N 007
PFYN 35	44.00	2.700	50	4	N 007
PFYN 40	57.70	3.800	50	4	N 007
PFYN 50	91.00	7.000	75	4	N 008
PFYN 60	125.00	10.000	100	6	N 009
PFYN 80	260.00	25.000	150	6	N 009
PFYN 95	350.00	35.000	200	6	N 009
PFYN 120	540.00	77.800	300	9	N 010
PFYN 150	842.00	176.300	300	9	N 010
PFYN 200	1498.00	427.000	400	9	N 010

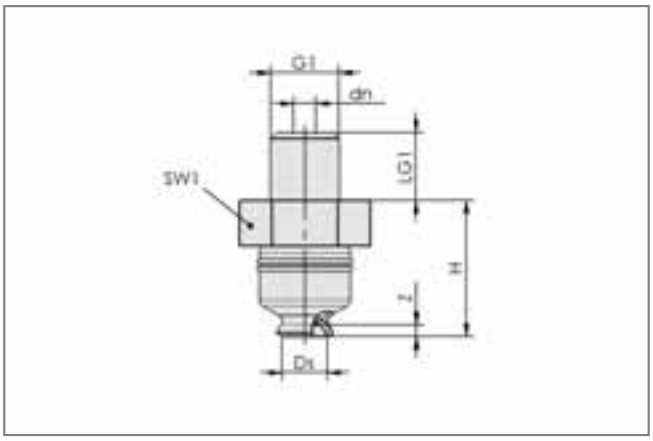
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads PFYN



PFYN 1 to 1.5 AG



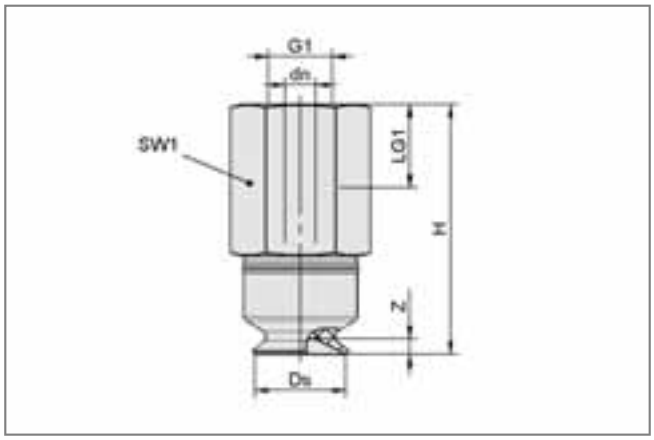
PFYN 2 to 10 AG

Flat Suction Pads (Round)

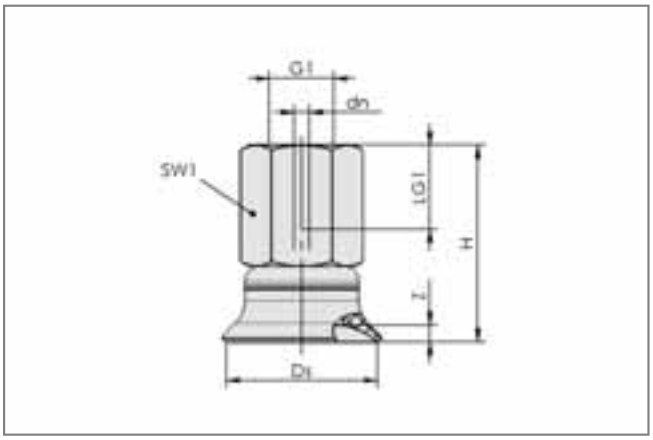
Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

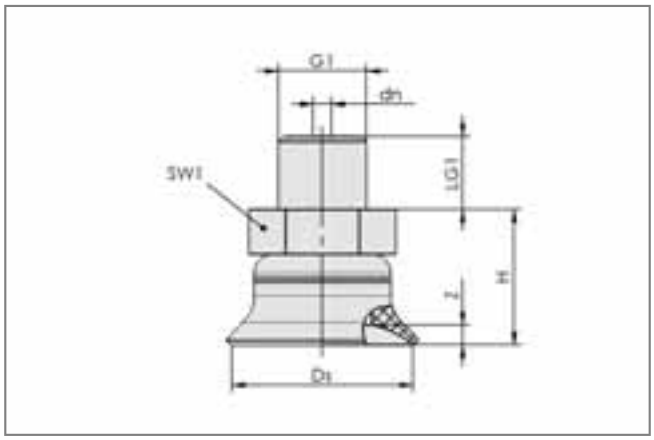
Design Data Flat Suction Pads PFYN



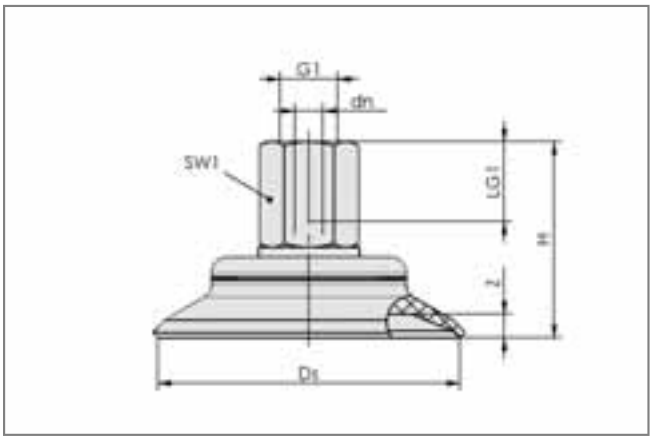
PFYN 5 to 10 AG



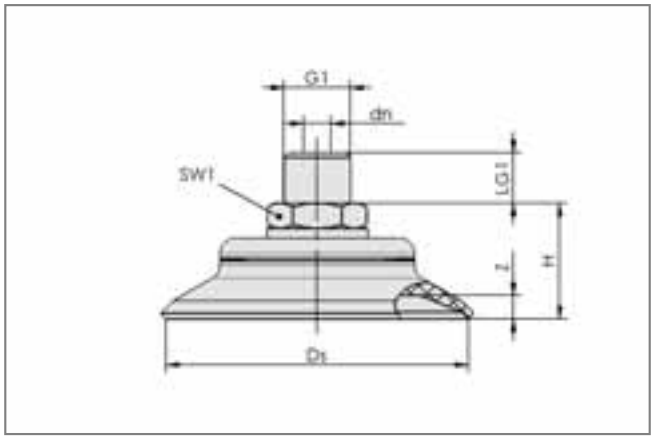
PFYN 15 to 50 IG



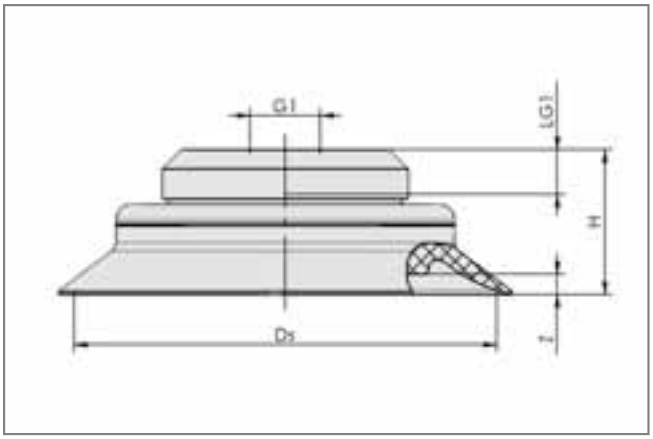
PFYN 15 to 50 AG



PFYN 60 to 95 IG



PFYN 60 to 95 AG



PFYN 120 to 200 IG

Flat Suction Pads (Round)

Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

Design Data Flat Suction Pads PFYN

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
PFYN 1 M3-AG	0.4	1.0	M3-M	3.6	3.0	5	0.1
PFYN 1.5 M3-AG	0.7	1.5	M3-M	4.5	3.0	5	0.1
PFYN 2 M3-AG	1.0	2.0	M3-M	6.0	3.0	5	0.5
PFYN 3.5 M3-AG	1.0	3.5	M3-M	6.0	3.0	5	0.5
PFYN 5 M5-AG	2.0	5.0	M5-M	11.5	4.5	8	0.9
PFYN 5 M5-IG	2.0	5.0	M5-F	16.5	5.5	8	0.9
PFYN 6 M5-AG	2.0	6.0	M5-M	11.5	4.5	8	1.0
PFYN 6 M5-IG	2.0	6.0	M5-F	16.5	5.5	8	1.0
PFYN 8 M5-AG	2.0	8.0	M5-M	12.0	4.5	8	1.4
PFYN 8 M5-IG	2.0	8.0	M5-F	17.0	5.5	8	1.4
PFYN 10 M5-AG	2.0	10.0	M5-M	12.5	4.5	8	1.3
PFYN 10 M5-IG	2.0	10.0	M5-F	17.5	5.5	8	1.3
PFYN 10 G1/8-AG	2.0	10.0	G1/8"-M	12.5	8.0	14	1.3
PFYN 10 G1/8-IG	2.0	10.0	G1/8"-F	23.5	9.0	14	1.3
PFYN 15 G1/8-AG	2.0	15.0	G1/8"-M	13.0	8.0	14	1.9
PFYN 15 G1/8-IG	2.0	15.0	G1/8"-F	24.0	9.0	14	1.9
PFYN 20 G1/8-AG	2.0	20.0	G1/8"-M	15.0	8.0	14	2.3
PFYN 20 G1/8-IG	2.0	20.0	G1/8"-F	26.0	9.0	14	2.3
PFYN 25 G1/8-AG	2.4	25.0	G1/8"-M	19.0	8.0	14	3.0
PFYN 25 G1/8-IG	2.4	25.0	G1/8"-F	30.0	9.0	14	3.0
PFYN 30 G1/8-AG	2.4	28.8	G1/8"-M	17.0	8.0	14	2.0
PFYN 30 G1/8-IG	2.4	28.8	G1/8"-F	28.0	9.0	14	2.0
PFYN 35 G1/8-AG	2.4	35.0	G1/8"-M	19.0	8.0	14	3.0
PFYN 35 G1/8-IG	2.4	35.0	G1/8"-F	30.0	9.0	14	3.0
PFYN 40 G1/8-AG	2.4	40.0	G1/8"-M	19.0	8.0	14	3.5
PFYN 40 G1/8-IG	2.4	40.0	G1/8"-F	30.0	9.0	14	3.5
PFYN 50 G1/8-AG	2.4	50.0	G1/8"-M	20.0	8.0	14	4.0
PFYN 50 G1/8-IG	2.4	50.0	G1/8"-F	31.0	9.0	14	4.0
PFYN 60 G1/4-AG	5.5	60.0	G1/4"-M	23.0	10.0	17	5.0
PFYN 60 G1/4-IG	5.5	60.0	G1/4"-F	39.0	11.0	17	5.0
PFYN 80 G1/4-AG	5.5	80.0	G1/4"-M	25.0	10.0	17	6.0
PFYN 80 G1/4-IG	5.5	80.0	G1/4"-F	41.0	11.0	17	6.0
PFYN 95 G1/4-AG	5.5	95.0	G1/4"-M	25.5	10.0	17	6.0
PFYN 95 G1/4-IG	5.5	95.0	G1/4"-F	41.5	11.0	17	6.0
PFYN 120 G1/2-IG	-	120.0	G1/2"-F	36.5	13.0	-	6.0
PFYN 150 G1/2-IG	-	147.5	G1/2"-F	45.5	13.0	-	9.0
PFYN 200 G1/2-IG	-	193.0	G1/2"-F	50.5	13.0	-	13.0

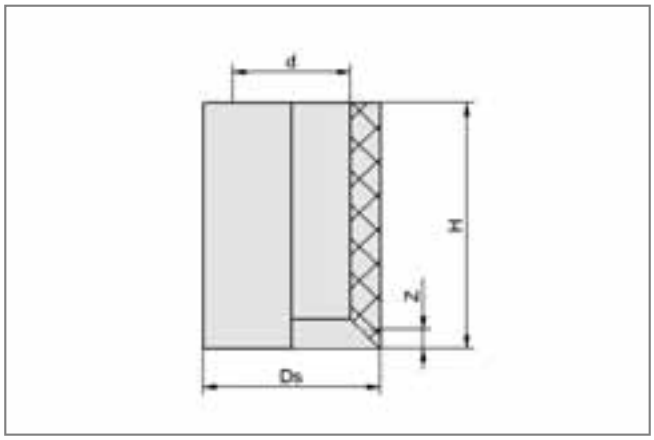
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Flat Suction Pads (Round)

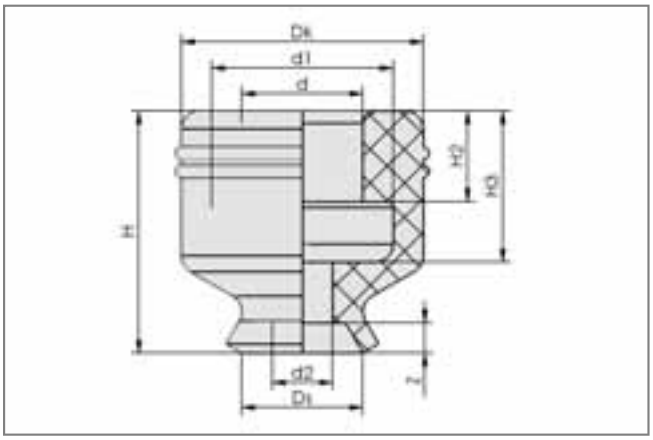
Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

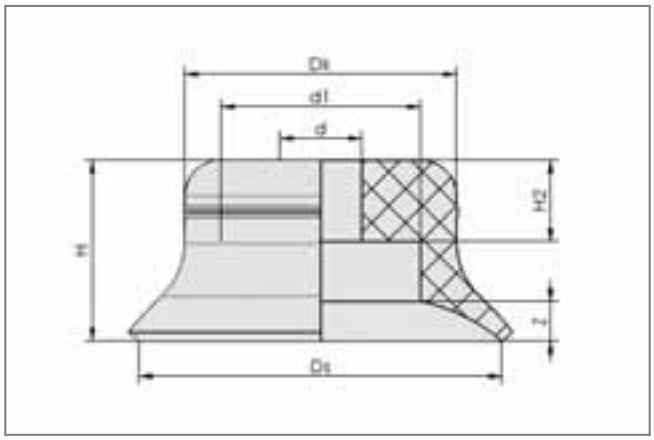
Design Data Flat Suction Pads PFG - Spare Parts for PFYN



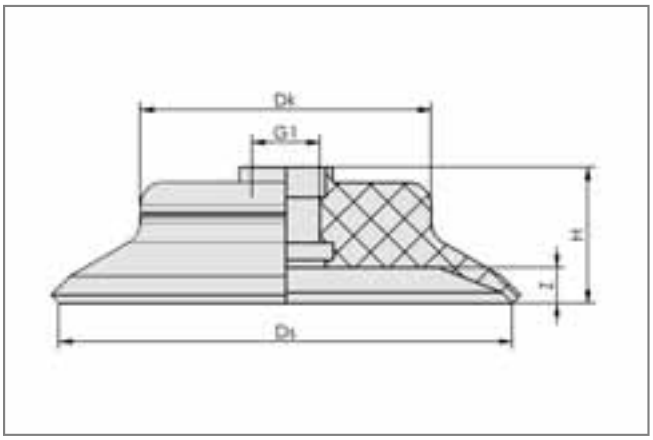
PFG 1 to 1.5



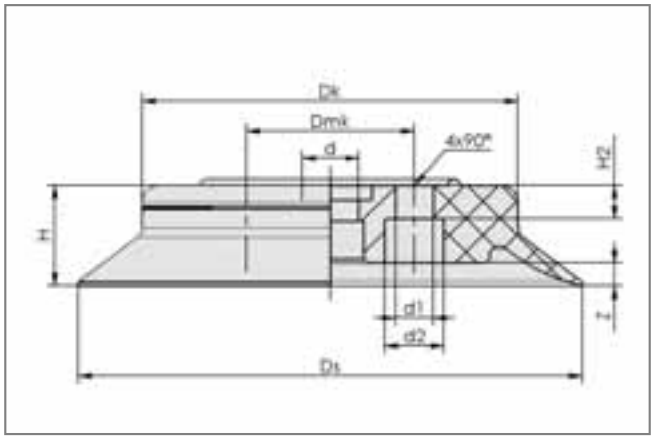
PFG 2 to 10



PFG 15 to PFG 50



PFG 60 to PFG 95



PFG 120 to 200

Flat Suction Pads (Round)

Flat Suction Pads PFYN

Suction area (Ø) from 1 mm to 200 mm

Design Data Flat Suction Pads PFG - Spare Parts for PFYN

Type	Dimensions in mm*										
	d	d1	d2	Dk	Dmk	Ds	G1	H	H2	H3	Z (Stroke)
PFG 1	0.8	-	-	-	-	1.0	-	1.6	-	-	0.1
PFG 1.5	1.2	-	-	-	-	1.5	-	2.5	-	-	0.1
PFG 2	2.0	3.0	1.0	4.0	-	2.0	-	4.0	1.5	2.5	0.5
PFG 3.5	2.0	3.0	1.0	4.0	-	3.5	-	4.0	1.5	2.5	0.5
PFG 5	4.0	6.0	1.5	7.5	-	5.0	-	6.5	2.0	4.0	0.9
PFG 6	4.0	6.0	2.0	7.5	-	6.0	-	6.5	2.0	4.0	1.0
PFG 8	4.0	6.0	2.0	8.0	-	8.0	-	7.0	2.0	4.0	1.4
PFG 10	4.0	6.0	2.0	8.5	-	10.0	-	7.5	2.0	4.0	1.3
PFG 15	4.5	7.8	-	12.0	-	15.0	-	8.0	2.6	-	1.9
PFG 20	4.5	11.0	-	15.0	-	20.0	-	10.0	4.5	-	2.3
PFG 25	6.0	11.0	-	16.0	-	25.0	-	14.0	7.0	-	3.0
PFG 30	6.0	11.0	-	14.5	-	28.8	-	12.0	7.0	-	2.0
PFG 35	6.0	11.0	-	20.5	-	35.0	-	14.0	7.0	-	3.0
PFG 40	6.0	11.0	-	24.0	-	40.0	-	14.0	7.0	-	3.5
PFG 50	8.0	20.0	-	28.5	-	50.0	-	15.0	7.2	-	4.0
PFG 60	-	-	-	38.5	-	60.0	M10x1.25-F	18.0	-	-	5.0
PFG 80	-	-	-	52.0	-	80.0	M10x1.25-F	18.0	-	-	6.0
PFG 95	-	-	-	68.0	-	95.0	M10x1.25-F	19.0	-	-	6.0
PFG 120	13.5	7.0	14.5	90.0	40	120.0	-	23.5	8.5	-	6.0
PFG 150	13.5	7.0	14.5	104.5	40	147.5	-	31.0	11.0	-	9.0
PFG 200	13.5	7.0	13.5	142.5	40	193.0	-	37.0	11.0	-	13.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Flat Suction Pads (Round)

Flat Suction Pads PFYN VU1

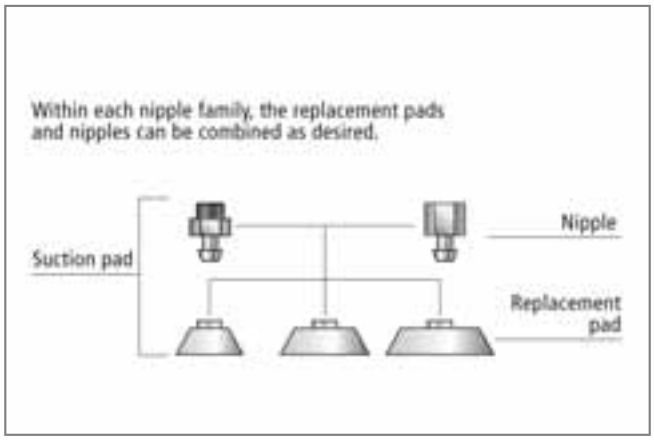
Suction area (Ø) from 15 mm to 95 mm

Suitability for Industry-Specific Applications

Flat suction pads PFYN VU1

Applications

- Round, flat suction pad for applications in multi-shift operations with very shortcycle times
- Handling of oily metal sheets (automobile production), cardboard and sheets of wood
- Handling of extremely abrasive workpieces such as rough cardboard sheets



System design flat suction pads PFYN VU1

Design

- Robust, wear-resistant suction pad PFYN with single sealing lip, consisting of suction pad PFG, made of Vulkollan VU1, and connection nipple
- Suction pad with positive connection to nipple which withstands even very high loading

Flat suction pads PFYN VU1 being used for handling large sheet metal parts

Our Highlights...

- Material Vulkollan VU1, very resistant to tearing
- Good resistance to chemicals
- Very low wear, about 10- 12 mm³ to DIN 53516
- Supports on the bottom
- Temperature resistance: -40 °C to +80 °C, short-term resistance up to +100 °C

Your Benefits...

> Extremely wear-resistant suction pad for very high loads and a long lifetime

> Unaffected by oil (handling of sheet metal)

> Lifetime up to 20 times higher, compared to standard NBR

> No permanent deformation of thin-walled workpieces

> Suitable for use at very low and high temperatures

Flat Suction Pads (Round)

Flat Suction Pads PFYN VU1

Suction area (Ø) from 15 mm to 95 mm

Designation Code Flat Suction Pads PFYN VU1

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example PFYN 80 VU1-72 G1/4-IG:			
PFYN	**80**	**VU1-72**	**G1/4-IG**
PFYN	15 to 95	VU1-72	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG

Ordering data Flat Suction Pads PFYN VU1

Suction pad PFYN VU1 (elastomer part + connection nipple) is delivered assembled. The assembly consists of:
- Suction pad of type PFG VU 1 – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad PFG VU1, connection nipple SA-NIP

Flat Suction Pads PFYN VU1

Type*	Connection			
	G1/4"-M	G1/4"-F	G1/8"-M	G1/8"-F
PFYN 15 VU1-72	-	-	10.01.01.00556	10.01.01.00557
PFYN 30 VU1-72	-	-	10.01.01.00550	10.01.01.00558
PFYN 50 VU1-72	10.01.01.00521	10.01.01.00547	-	-
PFYN 60 VU1-72	10.01.01.00608	10.01.01.00609	-	-
PFYN 80 VU1-72	10.01.01.00522	10.01.01.00524	-	-
PFYN 95 VU1-72	10.01.01.00523	10.01.01.00525	-	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads

Type*	Flat suction pad (round)	
PFYN 15 VU1-72	PFG 15 VU1-72 N005	10.01.01.00555
PFYN 30 VU1-72	PFG 30 VU1-72 N007	10.01.01.00549
PFYN 50 VU1-72	PFG 50 VU1-72 N011	10.01.01.00424
PFYN 60 VU1-72	PFG 60 VU1-72 N011	10.01.01.00606
PFYN 80 VU1-72	PFG 80 VU1-72 N012	10.01.01.00426
PFYN 95 VU1-72	PFG 95 VU1-72 N012	10.01.01.00430

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Flat Suction Pads (Round)

Flat Suction Pads PFYN VU1

Suction area (Ø) from 15 mm to 95 mm

Ordering Data Spare Parts Connection Nipples

Type	Suction pad connection nipple	
PFYN 15 VU1-72 G1/8-AG	SA-NIP N005 G1/8-AG DN200	10.01.01.03529
PFYN 15 VU1-72 G1/8-IG	SA-NIP N005 G1/8-IG DN200	10.01.01.03521
PFYN 30 VU1-72 G1/8-AG	SA-NIP N007 G1/8-AG DN240	10.01.01.03531
PFYN 30 VU1-72 G1/8-IG	SA-NIP N007 G1/8-IG DN350	10.01.01.03523
PFYN 50 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
PFYN 50 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
PFYN 60 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
PFYN 60 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
PFYN 80 VU1-72 G1/4-AG	SA-NIP N012 G1/4-AG DN500	10.01.01.10664
PFYN 80 VU1-72 G1/4-IG	SA-NIP N012 G1/4-IG DN600	10.01.01.00528
PFYN 95 VU1-72 G1/4-AG	SA-NIP N012 G1/4-AG DN500	10.01.01.10664
PFYN 95 VU1-72 G1/4-IG	SA-NIP N012 G1/4-IG DN600	10.01.01.00528

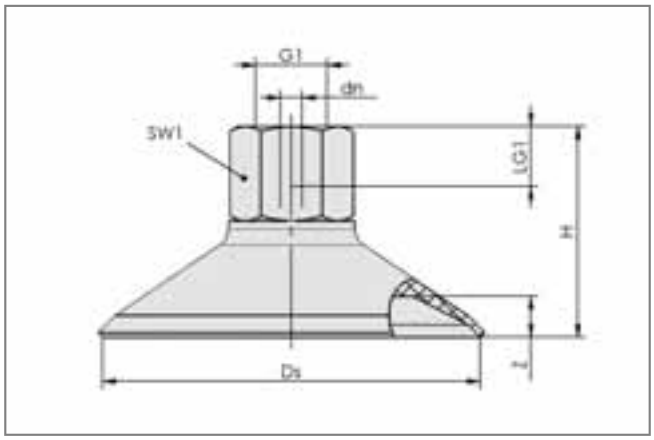
Technical Data Flat Suction Pads PFYN VU1

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
PFYN 15 VU1-72	8.5	0.5	13	4	N 005
PFYN 30 VU1-72	32.0	1.7	30	4	N 007
PFYN 50 VU1-72	95.0	6.0	75	6	N 011
PFYN 60 VU1-72	130.0	15.0	75	6	N 011
PFYN 80 VU1-72	260.0	30.0	100	6	N 012
PFYN 95 VU1-72	350.0	42.0	140	6	N 012

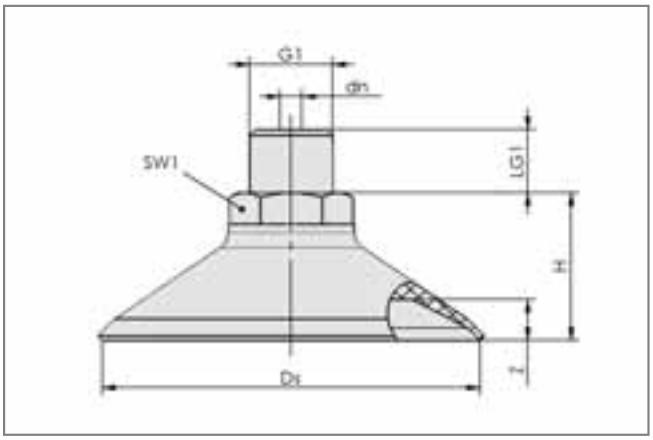
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads PFYN VU1



PFYN 15 to 95 VU1 IG



PFYN 15 to 95 VU1 AG

Flat Suction Pads (Round)

Flat Suction Pads PFYN VU1

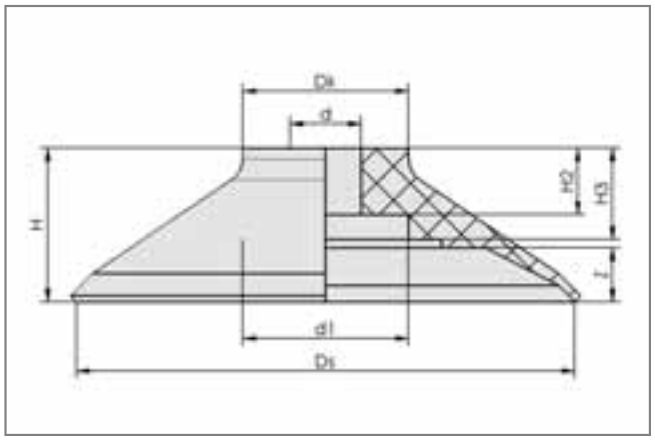
Suction area (Ø) from 15 mm to 95 mm

Design Data Flat Suction Pads PFYN VU1

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
PFYN 15 VU1-72 G1/8-AG	2.0	14.5	G1/8"-M	14.5	8	14	1.5
PFYN 15 VU1-72 G1/8-IG	2.0	14.5	G1/8"-F	25.5	9	14	1.5
PFYN 30 VU1-72 G1/8-AG	2.0	30.0	G1/8"-M	18.0	8	14	3.0
PFYN 30 VU1-72 G1/8-IG	2.0	30.0	G1/8"-F	29.0	9	14	3.0
PFYN 50 VU1-72 G1/4-AG	3.5	50.0	G1/4"-M	22.0	10	17	4.5
PFYN 50 VU1-72 G1/4-IG	3.5	50.0	G1/4"-F	32.0	12	17	4.5
PFYN 60 VU1-72 G1/4-AG	3.5	60.0	G1/4"-M	23.5	10	17	6.0
PFYN 60 VU1-72 G1/4-IG	3.5	60.0	G1/4"-F	33.5	12	17	6.0
PFYN 80 VU1-72 G1/4-AG	6.0	80.0	G1/4"-M	30.0	10	22	6.0
PFYN 80 VU1-72 G1/4-IG	6.0	80.0	G1/4"-F	40.0	12	22	6.0
PFYN 95 VU1-72 G1/4-AG	6.0	95.0	G1/4"-M	30.0	10	22	6.0
PFYN 95 VU1-72 G1/4-IG	6.0	95.0	G1/4"-F	40.0	12	22	6.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Flat Suction Pads PFG VU1 - Spare Parts for PFYN VU1



PFG VU1

Type	Dimensions in mm*							
	d	d1	Dk	Ds	H	H2	H3	Z (Stroke)
PFG 15 VU1-72	4.5	8.5	11.5	14.5	9.5	2.5	4.5	1.5
PFG 30 VU1-72	6.0	11.0	16.0	30.0	13.0	7.0	7.0	3.0
PFG 50 VU1-72	8.0	13.0	18.0	50.0	17.0	8.0	11.0	4.5
PFG 60 VU1-72	8.0	20.0	20.0	60.0	18.5	8.0	11.0	6.0
PFG 80 VU1-72	12.0	25.0	25.0	80.0	25.0	12.0	17.5	6.0
PFG 95 VU1-72	12.0	25.0	31.0	95.0	25.0	12.0	16.5	6.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Flat Suction Pads (Round)

Overview of the Modular System SPU–SPK–SPC

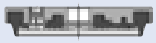
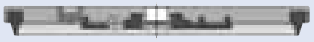
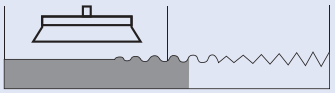
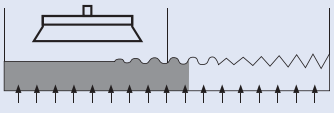
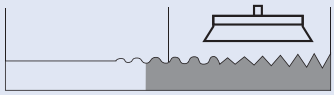
Suction Plates

The suction plates of the series SPU, SPC and SPK for a complete modular system of suction pads which are fully interchangeable. Each type has its own special properties which makes it particularly suitable for certain applications.

Suction Plates SPU:
For all smooth and flat workpieces (such as glass); also suitable for slightly rough or scaly surfaces (such as wood or sheet metal).

Suction Plates SPC:
For all smooth but porous workpieces (such as MDF, hardboard, various recycled materials).

Suction Plates SPK:
Optimum adaptation to very structured surfaces (such as ornamental glass, aluminium checker plate) and very rough surfaces (such as broken natural stone).

	Suction Plates SPU – Universal sealing lip U	Suction Plates SPC* – Combined sealing lip C	Suction Plates SPK – Sealing edge K
G 1/4"	SPU 100		SPK 55
G 1/4"	SPU 125		SPK 80
G 1/2"	SPU 160	SPC 160	SPK 110 
G 1/2"	SPU 210	SPC 210	SPK 160
G 1/2"	SPU 250	SPC 250	SPK 200
G 1/2"	SPU 300		SPK 250 
G 1/2"	SPU 400		
Workpieces	smooth rough very structured 	smooth rough very structured  + very porous	smooth rough very structured 

*The suction plate SPC is particularly suitable for the handling of wooden workpieces and can be found in the chapter "Suction Pads for Handling Wood".

Flat Suction Pads (Round)

Suction Plates SPU

Suction area (Ø) from 100 mm to 400 mm

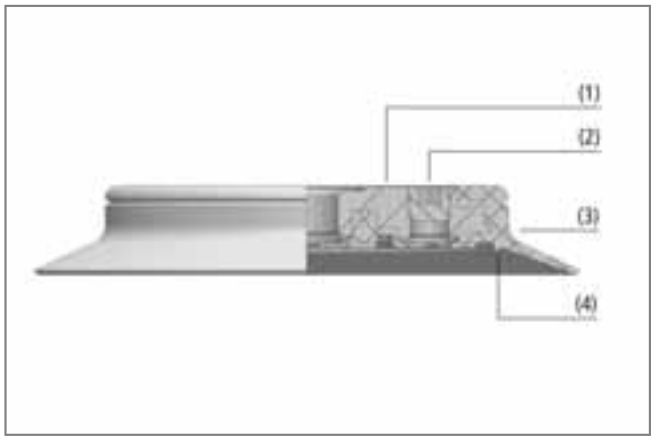
UNIVERSAL

Suitability for Industry-Specific Applications

Suction plates SPU

Applications

- Round suction plate for handling of smooth, flat workpieces
- Series SPU B with thicker sealing lip: handling of workpieces with a slightly rough surface, such as wood or scaly metal sheets
- Series SPU AE with integrated peeling insert: handling of thin metal sheets (approx. 1.0 - 2.5 mm); overcomes the self-adhesion between the sheets
- Series SPU TV with sensing valve: deactivation of unused suction pads to prevent the entry of unwanted air



System design suction plates SPU

Design

- Suction cup SPU consisting of sealing ring (3) and aluminum support plate (1)
- Sealing ring clipped securely onto support plate with positive locking
- Internal sealing edge (4) for better sealing on slightly rough surfaces
- Side vacuum connector (2) normally sealed with a plug (glued into position for extra safety)
- Series SPU TV: sensing valve already installed
- Series SPU AE: peeling insert on the bottom side already installed
- When worn, the seal can be replaced separately

Suction plates SPU being used for handling coated chipboards

Our Highlights...

- Supports on the bottom
- Low internal volume
- Wide range of diameters
- Optimum shape

Your Benefits...

> No permanent deformation of thin-walled workpieces
> Very short cycle times
> Wide range of versions for many different workpieces
> High suction force in spite of small dimensions

Flat Suction Pads (Round)

Suction Plates SPU

Suction area (Ø) from 100 mm to 400 mm

Designation Code Suction Plates SPU

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example SPU 160 NBR-55 G1/2-IG TV:				
SPU	**160**	**NBR-55**	**G1/2-IG**	**TV**
SPU	100 to 400	NBR-55 SI-60	G1/4-IG (IG = female (F)) G1/2-IG	AE peeling insert B steep sealing lip TV sensing valve

Ordering Data Suction Plates SPU

Suction plate SPU (sealing ring + support plate) is delivered assembled. The assembly consists of:
- Sealing ring of type DR-SPU – elastomer part, available in various diameters
- Aluminium support plate, available with various threads
- Optional product addition: sensing valve, steep sealing lip, peeling insert

Available spare parts: sealing ring DR-SPU, sensing valve

Suction Plates SPU

Type	Suction pad material * / hardness in Shore A	
	Perbunan NBR 55±5ShA	Silicone SI 60±5ShA
SPU 100 G1/4-IG	10.01.01.01107	10.01.01.01108
SPU 125 G1/4-IG	10.01.01.01102	10.01.01.01103
SPU 125 G1/4-IG TV	10.01.01.01157	10.01.01.01158
SPU 125 G1/4-IG AE	10.01.01.01159	10.01.01.01160
SPU 160 G1/2-IG	10.01.01.01116	10.01.01.01117
SPU 160 G1/2-IG TV	10.01.01.01153	10.01.01.01154
SPU 160 G1/2-IG AE	10.01.01.01155	10.01.01.01156
SPU 210 G1/2-IG	10.01.01.01092	10.01.01.01093
SPU 210 G1/2-IG B	10.01.01.10552	-
SPU 210 G1/2-IG TV	10.01.01.01149	10.01.01.01150
SPU 210 G1/2-IG AE	10.01.01.01151	10.01.01.01152
SPU 250 G1/2-IG	10.01.01.01097	10.01.01.01098
SPU 250 G1/2-IG B	10.01.01.10589	-
SPU 250 G1/2-IG TV	10.01.01.01209	10.01.01.01210
SPU 300 G1/2-IG	10.01.01.01134	10.01.01.01135
SPU 360 G1/2-IG B	10.01.01.10588	-
SPU 400 G1/2-IG	10.01.01.01138	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Flat Suction Pads (Round)

Suction Plates SPU

Suction area (Ø) from 100 mm to 400 mm

Ordering Data Spare Parts Suction Pads

Type	Suction pad material * / hardness in Shore A	
	Perbunan NBR 55±5ShA	Silicone SI 60±5ShA
DR-SPU 100	10.01.01.01104	10.01.01.01105
DR-SPU 125	10.01.01.01099	10.01.01.01100
DR-SPU 160	10.01.01.01111	10.01.01.01112
DR-SPU 210	10.01.01.01089	10.01.01.01090
DR-SPU 210 B	10.01.01.10502	-
DR-SPU 250	10.01.01.01094	10.01.01.01095
DR-SPU 250 B	10.01.01.10579	-
DR-SPU 300	10.01.01.01131	10.01.01.01132
DR-SPU 360 B	10.01.01.10584	-
DR-SPU 400	10.01.01.01136	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Sensing Valve

Type	Sensing valve
SPU 125 G1/4-IG TV	10.05.10.00061
SPU 160 G1/2-IG TV	10.05.10.00061
SPU 210 G1/2-IG TV	10.05.10.00061
SPU 250 G1/2-IG TV	10.05.10.00038

Technical Data Suction Plates SPU

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SPU 100 G1/4-IG	425	185	40	130	9
SPU 125 G1/4-IG	660	365	70	220	9
SPU 125 G1/4-IG TV	660	365	70	220	9
SPU 125 G1/4-IG AE	660	365	60	-	9
SPU 160 G1/2-IG	1090	600	123	350	12
SPU 160 G1/2-IG TV	1090	600	123	350	9
SPU 160 G1/2-IG AE	1090	600	110	-	12
SPU 210 G1/2-IG	1870	1250	226	750	12
SPU 210 G1/2-IG B	1870	1190	301	750	12
SPU 210 G1/2-IG TV	1870	1250	226	750	9
SPU 210 G1/2-IG AE	1870	1250	205	-	12
SPU 250 G1/2-IG	2650	1940	332	2200	12
SPU 250 G1/2-IG B	2650	1940	488	1500	12
SPU 250 G1/2-IG TV	2650	1940	332	-	12
SPU 300 G1/2-IG	3810	3010	492	3500	12
SPU 360 G1/2-IG B	5500	4730	1170	3000	12
SPU 400 G1/2-IG	6780	5870	907	6500	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**Suction force referred to the sealing-edge diameter d2

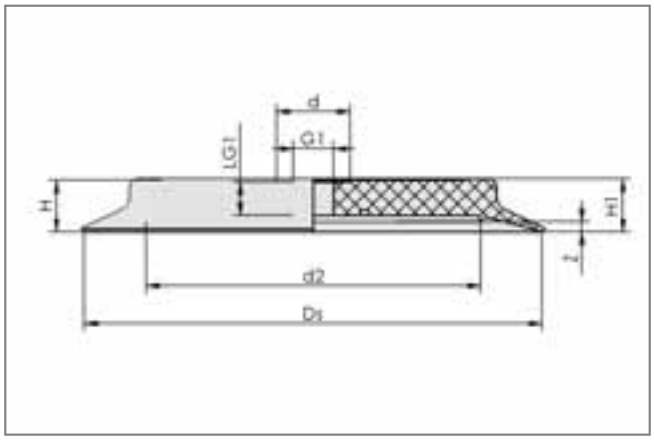
***The recommended hose diameter refers to a hose length of approx. 2 m

Flat Suction Pads (Round)

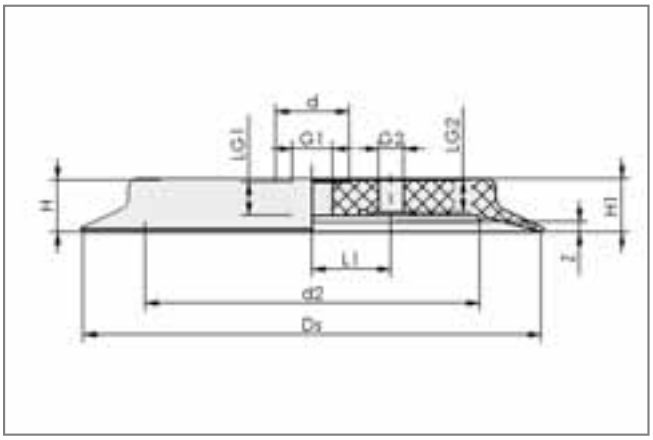
Suction Plates SPU

Suction area (Ø) from 100 mm to 400 mm

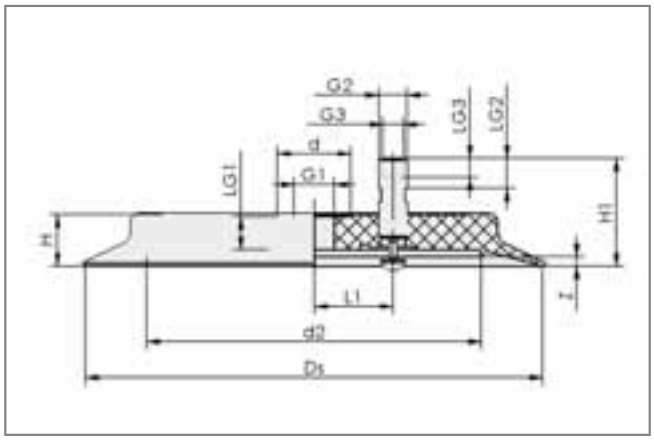
Design Data Suction Plates SPU



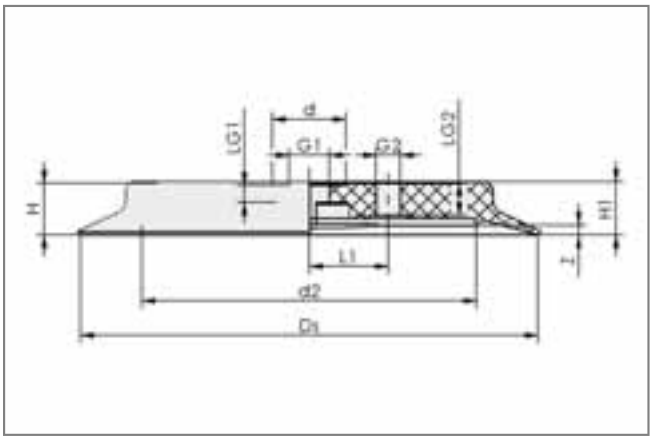
SPU 100



SPU 125 to 400



SPU 125 to 250 TV



SPU 125 to 210 AE

Type	Dimensions in mm*												
	d	d2	Ds	G1	G2	G3	H	H1	L1	LG1	LG2	LG3	Z (Stroke)
SPU 100 G1/4-IG	22	60	100	G1/4"-F	-	-	25.0	26.0	-	13.0	-	-	7
SPU 125 G1/4-IG	22	83	125	G1/4"-F	G1/4"-F	-	25.0	26.0	22.0	13.0	14	-	7
SPU 125 G1/4-IG TV	22	83	125	G1/4"-F	G1/4"-M	G1/8"-F	25.0	62.0	22.0	13.0	36	7	7
SPU 125 G1/4-IG AE	22	83	125	G1/4"-F	G1/4"-F	-	25.0	26.0	22.0	13.0	14	-	7
SPU 160 G1/2-IG	34	113	160	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	7
SPU 160 G1/2-IG TV	34	113	160	G1/2"-F	G1/4"-M	G1/8"-F	25.0	62.0	36.5	13.5	18	10	7
SPU 160 G1/2-IG AE	34	113	160	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	7
SPU 210 G1/2-IG	34	163	210	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	5
SPU 210 G1/2-IG B	34	159	210	G1/2"-F	G1/4"-F	-	29.0	29.5	36.5	13.5	15	-	10
SPU 210 G1/2-IG TV	34	163	210	G1/2"-F	G1/4"-M	G1/8"-F	25.0	62.0	36.5	13.5	38	10	5
SPU 210 G1/2-IG AE	34	163	210	G1/2"-F	G1/4"-F	-	25.0	26.5	36.5	13.5	15	-	5
SPU 250 G1/2-IG	34	203	250	G1/2"-F	G1/2"-F	-	25.0	26.5	76.0	13.5	15	-	7
SPU 250 G1/2-IG B	34	203	250	G1/2"-F	G1/2"-F	-	29.0	30.0	76.0	13.5	15	-	11
SPU 250 G1/2-IG TV	34	203	250	G1/2"-F	G1/2"-M	G3/8"-F	25.0	65.5	76.0	13.5	39	12	7
SPU 300 G1/2-IG	34	253	300	G1/2"-F	G1/2"-F	-	25.0	26.5	76.0	13.5	15	-	6
SPU 360 G1/2-IG B	-	309	360	G1/2"-F	G1/2"-F	-	35.0	35.5	86.0	17.0	17	-	12
SPU 400 G1/2-IG	-	349	400	G1/2"-F	G1/2"-F	-	28.5	29.0	86.0	15.5	17	-	6

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Flat Suction Pads (Round)

Suction Plates SPK

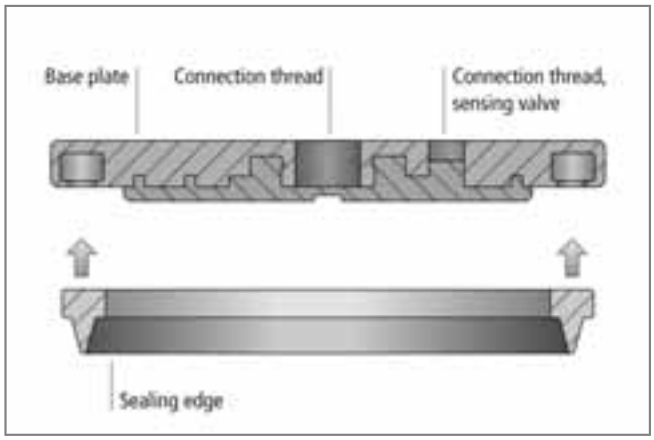
Suction area (Ø) from 55 mm to 250 mm

Suitability for Industry-Specific Applications

Suction plates SPK

Applications

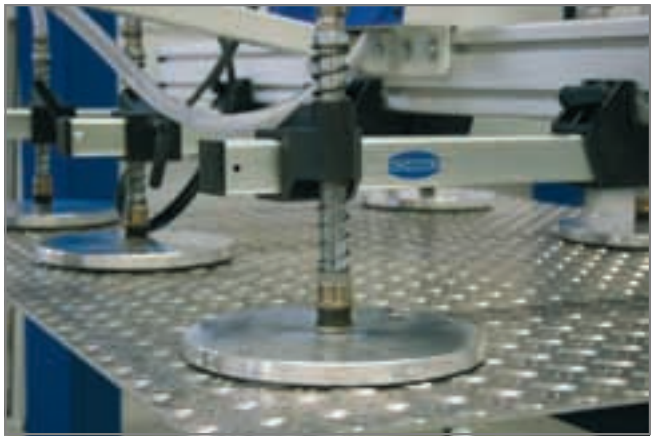
- Round suction plate for handling of objects with very rough or structured surfaces (such as ornamental glass, checker plate, broken natural stone, etc.)
- Deactivation of unused suction plates by sensing valves (accessory)



System design suction plates SPK

Design

- Robust and wear-resistant suction plate SPK, consisting of flexible MOS sealing ring made of EPDM and aluminium base plate
- Sealing ring without seams
- Sealing ring is securely clipped into the base plate
- When worn, the sealing ring can be replaced separately
- Lower side of base plate with elastomer insert to prevent damage to workpieces
- Threaded hole for vacuum connection or sensing valve (off-center) sealed with a plug in the factory
- Sensing valve can be ordered as an accessory and is easily mounted, use medium-strength locking compound



Suction plates SPK being used for handling corrugated sheet metal

Our Highlights...

- Sealing lip made of flexible EPDM
- Sealing ring clipped securely into the mounting plate
- Support on the bottom
- Low intrinsic volume
- Wide range of different diameters

Your Benefits...

> Optimal adaptation to structured surfaces
> Quick replacement of the sealing element
> No permanent deformation of thin-walled workpieces
> Very short cycle times
> Wide range of pads for handling different workpieces

Flat Suction Pads (Round)

Suction Plates SPK

Suction area (Ø) from 55 mm to 250 mm

Designation Code Suction Plates SPK

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPK 110 MOS-15 G1/2-IG:			
SPK	**110**	**MOS-15**	**G1/2-IG**
SPK	55 to 250	MOS-15	G1/4-IG (IG = female (F)) G1/2-IG

Ordering Data Suction Plates SPK

Suction plate SPK (sealing ring + support plate) is delivered assembled. The assembly consists of:
- Sealing ring of type DR-SPK – elastomer part, available in various diameters
- Aluminium support plate, available with various threads

Available spare parts: sealing ring DR-SPK
Available accessories: sensing valve

Suction Plates SPK

Type	Part Number
SPK 55 MOS-15 G1/4-IG	10.01.01.12060
SPK 80 MOS-15 G1/4-IG	10.01.01.12061
SPK 110 MOS-15 G1/2-IG	10.01.01.12062
SPK 160 MOS-15 G1/2-IG	10.01.01.12063
SPK 200 MOS-15 G1/2-IG	10.01.01.12064
SPK 250 MOS-15 G1/2-IG	10.01.01.12065

Ordering Data Spare Parts And Accessories Suction Plates SPK

Type	Sealing ring DR-SPK	Sensing valve
SPK 55 MOS-15 G1/4-IG	10.01.01.12072	-
SPK 80 MOS-15 G1/4-IG	10.01.01.12073	10.05.10.00061
SPK 110 MOS-15 G1/2-IG	10.01.01.12074	10.05.10.00061
SPK 160 MOS-15 G1/2-IG	10.01.01.12075	10.05.10.00061
SPK 200 MOS-15 G1/2-IG	10.01.01.12076	10.05.10.00038
SPK 250 MOS-15 G1/2-IG	10.01.01.12077	10.05.10.00038

Technical Data Suction Plates SPK

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
SPK 55 MOS-15 G1/4-IG	121	15	250	9
SPK 80 MOS-15 G1/4-IG	256	32	300	9
SPK 110 MOS-15 G1/2-IG	471	67	-	12
SPK 160 MOS-15 G1/2-IG	1060	128	-	12
SPK 200 MOS-15 G1/2-IG	1700	198	-	12
SPK 250 MOS-15 G1/2-IG	2714	305	-	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

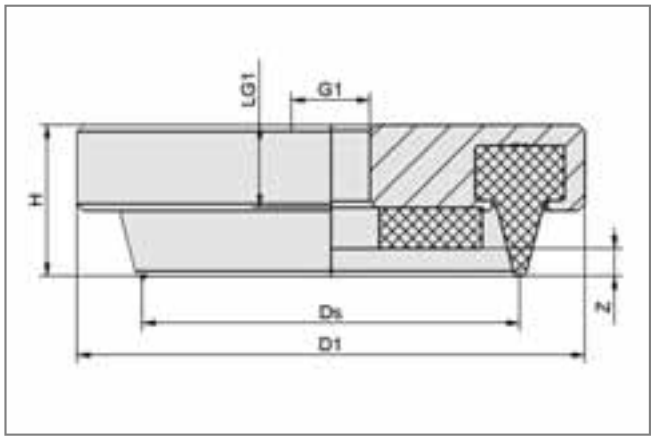
**The recommended hose diameter refers to a hose length of approx. 2 m

Flat Suction Pads (Round)

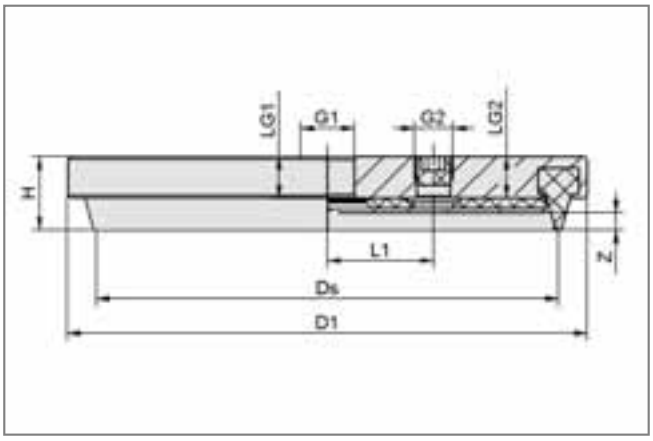
Suction Plates SPK

Suction area (Ø) from 55 mm to 250 mm

Design Data Suction Plates SPK



SPK 55



SPK 80 to 250

Type	Dimensions in mm*								
	D1	Ds	G1	G2**	H	L1	LG1	LG2	Z (Stroke)
SPK 55 MOS-15 G1/4-IG	70	55	G1/4"-F	-	22.0	-	11.5	-	4
SPK 80 MOS-15 G1/4-IG	95	80	G1/4"-F	G1/4"-F	22.0	22.0	11.5	11.5	4
SPK 110 MOS-15 G1/2-IG	130	110	G1/2"-F	G1/4"-F	25.5	36.5	14.5	14.5	6
SPK 160 MOS-15 G1/2-IG	179	159	G1/2"-F	G1/4"-F	25.5	36.5	14.5	14.5	6
SPK 200 MOS-15 G1/2-IG	219	199	G1/2"-F	G1/2"-F	25.5	76.0	14.5	14.5	6
SPK 250 MOS-15 G1/2-IG	269	249	G1/2"-F	G1/2"-F	25.5	76.0	14.5	14.5	6

*Acceptable dimensional tolerances for rubber sealings concerning to DIN 3302 - M4

**A plug is fitted in this connection in the factory

Flat Suction Pads (Oval)

Flat Suction Pads SGON

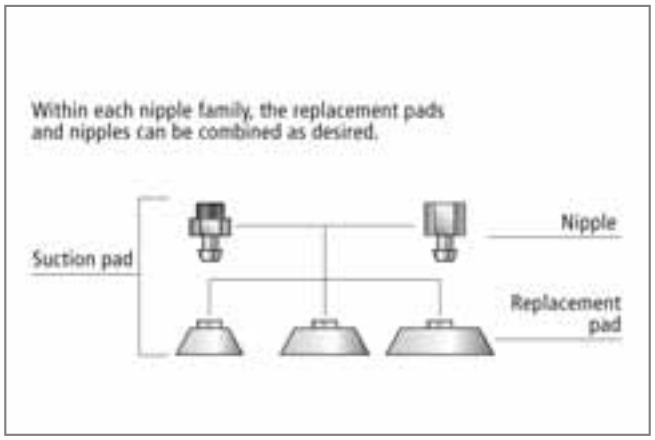
Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Suitability for Industry-Specific Applications

Flat suction pads SGON

Applications

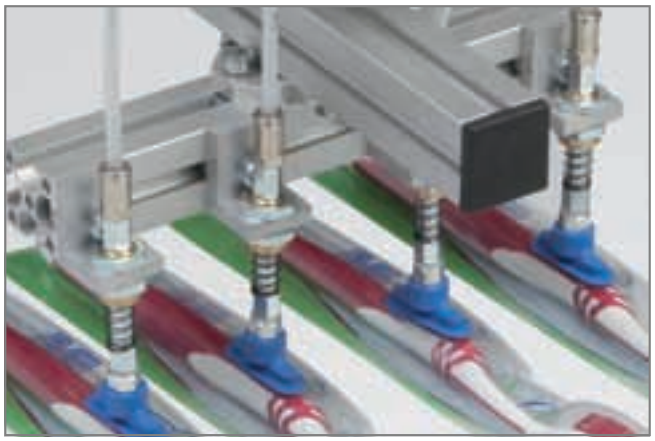
- Oval and flat suction pad for handling of narrow workpieces, including curved objects, such as sections, pipes, packaging materials
- Handling of frame elements, such as doors and windows
- Considerably higher suction force than round, flat suction pads when handling narrow workpieces



System design flat suction pads SGON

Design

- Robust, wear-resistant suction pad SGON with single sealing lip, consisting of suction pad SGO and connection nipple
- Nipple plugged into pad
- Pads of the size 24x8 mm and larger are additionally secured with a two-ear clamp to prevent rotation



Flat suction pads SGON being used for handling blister packaging

Our Highlights...

- Oval, flat suction pad
- Pads of the size 24x8 mm and larger additionally secured with a two-ear clamp
- Optimum shape
- Supports on the bottom

Your Benefits...

> For long (sections, pipes) or flat workpieces with bars

> Protection against unwanted rotation during use

> High suction force in spite of small dimensions

> No permanent deformation of thin-walled workpieces

Flat Suction Pads (Oval)

Flat Suction Pads SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Designation Code Flat Suction Pads SGON

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SGON 30x10 SI-60 G1/8-IG:			
SGON	**30x10**	**SI-60**	**G1/8-IG**
SGON	4x2 to 90x30	HT1-60 NBR-60 NBR-70 NBR-AS-60 (antistatic) SI-60 SI-70	M3-AG (AG = male (M)) M5-AG M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG

Ordering Data Flat Suction Pads SGON

Suction pad SGON (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type SGO – elastomer part, available in various dimensions (LxW) and materials
- Connection nipple of type SA-NIP – available with various threads
- Pads of the size 24 x 8 mm and larger are delivered with a two-ear clamp

Available spare parts: suction pad SGO, connection nipple SA-NIP, two-ear clamp

Flat Suction Pads SGON

Type	Suction pad material * / hardness in Shore A					
	High temp material HT1 60±5ShA	Perbunan NBR 60±5ShA	Perbunan NBR 70±5ShA	Perbunan NBR-antistat. 60±5ShA	Silicone SI 60±5ShA	Silicone SI 70±5ShA
SGON 4x2 AG	10.01.05.00404	10.01.01.00564	-	-	10.01.01.00565	-
SGON 7x3.5 AG	10.01.05.00405	10.01.01.00489	-	10.01.05.00228	10.01.01.00567	-
SGON 12x4 AG	-	10.01.05.00236	-	10.01.05.00238	-	10.01.01.00221
SGON 15x5 AG	10.01.05.00407	10.01.05.00106	-	10.01.05.00229	10.01.05.00120	-
SGON 15x5 IG	10.01.05.00418	10.01.05.00105	-	-	10.01.05.00119	-
SGON 18x6 AG	10.01.05.00408	10.01.05.00104	-	10.01.05.00230	10.01.05.00118	-
SGON 18x6 IG	10.01.05.00419	10.01.05.00103	-	-	10.01.05.00117	-
SGON 24x8 AG	10.01.05.00409	10.01.05.00102	-	10.01.05.00231	10.01.05.00088	-
SGON 24x8 IG	10.01.05.00420	10.01.05.00101	-	-	10.01.05.00087	-
SGON 30x10 AG	10.01.05.00410	10.01.05.00100	-	-	10.01.05.00116	-
SGON 30x10 IG	10.01.05.00421	10.01.05.00099	-	-	10.01.05.00115	-
SGON 45x15 AG	10.01.05.00411	10.01.05.00098	-	-	10.01.05.00114	-
SGON 45x15 IG	10.01.05.00422	10.01.05.00097	-	-	10.01.05.00113	-
SGON 60x20 AG	10.01.05.00412	10.01.05.00096	-	-	10.01.05.00112	-
SGON 60x20 IG	10.01.05.00423	10.01.05.00095	-	-	10.01.05.00111	-
SGON 75x25 AG	10.01.05.00413	10.01.05.00094	-	-	10.01.05.00110	-
SGON 75x25 IG	10.01.05.00424	10.01.05.00093	-	-	10.01.05.00109	-
SGON 90x30 AG	-	-	10.01.05.00092	-	-	10.01.05.00108
SGON 90x30 IG	-	-	10.01.05.00091	-	-	10.01.05.00107

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Flat Suction Pads (Oval)

Flat Suction Pads SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Ordering Data Spare Parts Suction Pads

Type	Suction pad material * / hardness in Shore A					
	High temp material HT1 60±5ShA	Perbunan NBR 60±5ShA	Perbunan NBR 70±5ShA	Perbunan NBR-antistat. 60±5ShA	Silicone SI 60±5ShA	Silicone SI 70±5ShA
SGO 4x2	10.01.05.00426	10.01.01.00456	-	-	10.01.01.00463	-
SGO 7x3.5	10.01.05.00427	10.01.01.00488	-	10.01.05.00224	10.01.01.00464	-
SGO 12x4	-	10.01.05.00235	-	10.01.05.00237	-	10.01.01.00222
SGO 15x5	10.01.05.00429	10.01.05.00071	-	10.01.05.00225	10.01.05.00079	-
SGO 18x6	10.01.05.00430	10.01.05.00072	-	10.01.05.00226	10.01.05.00080	-
SGO 24x8	10.01.05.00437	10.01.05.00151	-	10.01.05.00739	10.01.05.00157	-
SGO 30x10	10.01.05.00438	10.01.05.00152	-	-	10.01.05.00158	-
SGO 45x15	10.01.05.00439	10.01.05.00153	-	-	10.01.05.00159	-
SGO 60x20	10.01.05.00440	10.01.05.00154	-	-	10.01.05.00160	-
SGO 75x25	10.01.05.00441	10.01.05.00155	-	-	10.01.05.00161	-
SGO 90x30	-	-	10.01.05.00156	-	-	10.01.05.00162

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pad Nipples

Type	Suction pad nipples [AG]		Suction pad nipples [IG]		two-ear clamp*	
SGON 4x2 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-	-	-
SGON 7x3.5 M3	SA-NIP N003 M3-AG	10.01.01.00316	-	-	-	-
SGON 12x4 M5	SA-NIP N020 M5-AG	10.01.01.00312	-	-	-	-
SGON 15x5 M5	SA-NIP N021 M5-AG	10.01.05.00126	SA-NIP N021 M5-IG	10.01.05.00125	-	-
SGON 18x6 M5	SA-NIP N021 M5-AG	10.01.05.00126	SA-NIP N021 M5-IG	10.01.05.00125	-	-
SGON 24x8 G1/8	SA-NIP N022 G1/8-AG	10.01.05.00124	SA-NIP N022 G1/8-IG	10.01.05.00123	ZOKL 11-13	10.07.10.00032
SGON 30x10 G1/8	SA-NIP N022 G1/8-AG	10.01.05.00124	SA-NIP N022 G1/8-IG	10.01.05.00123	ZOKL 11-13	10.07.10.00032
SGON 45x15 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033
SGON 60x20 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033
SGON 75x25 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033
SGON 90x30 G1/4	SA-NIP N023 G1/4-AG	10.01.05.00122	SA-NIP N023 G1/4-IG	10.01.05.00121	ZOKL 15-18	10.07.10.00033

*In the case of replacement pad SGO, the two-ear terminal is included

Technical Data Flat Suction Pads SGON

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
SGON 4x2	0.42	0.004	1	2	N 003
SGON 7x3.5	1.00	0.019	3	2	N 003
SGON 12x4	1.80	0.048	3	2	N 020
SGON 15x5	3.10	0.036	4	2	N 021
SGON 18x6	4.50	0.058	4	2	N 021
SGON 24x8	8.00	0.138	8	4	N 022
SGON 30x10	12.20	0.280	8	4	N 022
SGON 45x15	28.20	0.980	10	6	N 023
SGON 60x20	50.10	2.300	20	6	N 023
SGON 75x25	78.30	4.700	30	6	N 023
SGON 90x30	112.60	8.500	35	6	N 023

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

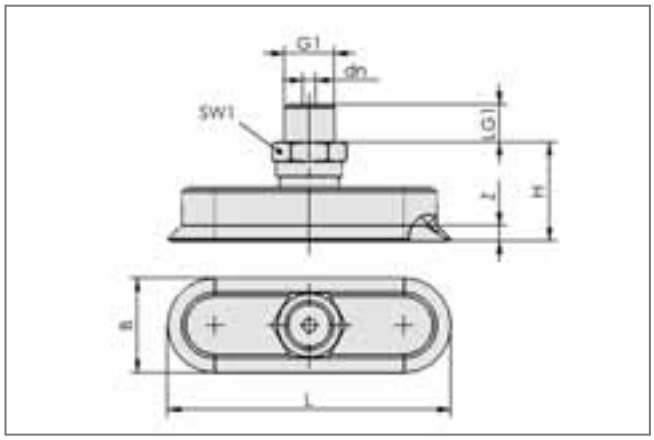
**The recommended hose diameter refers to a hose length of approx. 2 m

Flat Suction Pads (Oval)

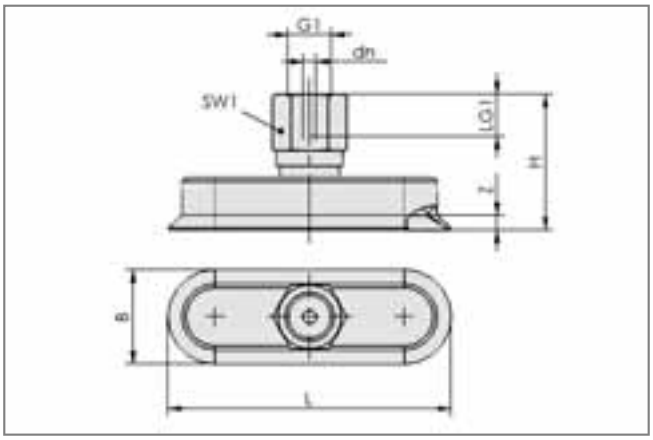
Flat Suction Pads SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Design Data Flat Suction Pads SGON



SGON 4x2 to 90x30 AG



SGON 15x5 to 90x30 IG

Type	Dimensions in mm*							
	B	dn	G1	H	L	LG1	SW1	Z (Stroke)
SGON 4x2 AG	2.0	1.0	M3-M	8	4	3.0	5	0.5
SGON 7x3.5 AG	3.5	1.0	M3-M	8	7	3.0	5	0.8
SGON 12x4 AG	4.0	1.8	M5-M	18	12	4.5	8	0.5
SGON 15x5 AG	5.0	2.0	M5-M	17	15	5.0	8	0.7
SGON 15x5 IG	5.0	2.0	M5-F	22	15	5.5	8	0.7
SGON 18x6 AG	6.0	2.0	M5-M	17	18	5.0	8	0.8
SGON 18x6 IG	6.0	2.0	M5-F	22	18	5.5	8	0.8
SGON 24x8 AG	8.0	3.5	G1/8"-M	17	24	8.0	14	1.0
SGON 24x8 IG	8.0	3.5	G1/8"-F	25	24	9.0	14	1.0
SGON 30x10 AG	10.0	3.5	G1/8"-M	17	30	8.0	14	1.5
SGON 30x10 IG	10.0	3.5	G1/8"-F	25	30	9.0	14	1.5
SGON 45x15 AG	15.0	3.5	G1/4"-M	26	45	10.0	17	2.0
SGON 45x15 IG	15.0	3.5	G1/4"-F	36	45	12.0	17	2.0
SGON 60x20 AG	20.0	3.5	G1/4"-M	26	60	10.0	17	2.5
SGON 60x20 IG	20.0	3.5	G1/4"-F	36	60	12.0	17	2.5
SGON 75x25 AG	25.0	3.5	G1/4"-M	26	75	10.0	17	2.8
SGON 75x25 IG	25.0	3.5	G1/4"-F	36	75	12.0	17	2.8
SGON 90x30 AG	30.0	3.5	G1/4"-M	26	90	10.0	17	3.5
SGON 90x30 IG	30.0	3.5	G1/4"-F	36	90	12.0	17	3.5

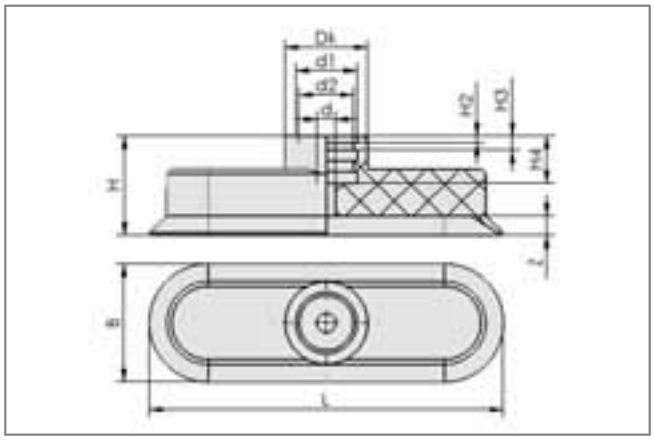
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Flat Suction Pads (Oval)

Flat Suction Pads SGON

Suction area (LxW) from 4 x 2 mm to 90 x 30 mm

Design Data Flat Suction Pads SGO - Spare Parts for SGON



SGO 4x2 to 90x30

Type	Dimensions in mm*										
	B	d	d1	d2	Dk	H	H2	H3	H4	L	Z (Stroke)
SGO 4x2	2.0	1.2	3	2.4	6.0	6	2.4	3.4	-	4	0.5
SGO 7x3.5	3.5	1.5	3	2.4	6.0	6	2.4	3.4	-	7	0.8
SGO 12x4	4.0	3.5	4	-	8.0	15	9.5	-	-	12	0.5
SGO 15x5	5.0	2.8	6	4.5	8.5	12	1.0	3.0	5.5	15	0.7
SGO 18x6	6.0	3.2	6	4.5	8.5	12	1.0	3.0	5.5	18	0.8
SGO 24x8	8.0	1.5	7	5.5	11.5	12	1.0	3.0	5.5	24	1.0
SGO 30x10	10.0	2.5	7	5.5	11.5	12	1.0	3.0	5.5	30	1.5
SGO 45x15	15.0	3.0	13	11.5	15.5	21	1.5	3.0	10.0	45	2.0
SGO 60x20	20.0	4.0	13	11.5	15.5	21	1.5	3.0	10.0	60	2.5
SGO 75x25	25.0	4.0	13	11.5	17.5	21	1.5	3.0	10.0	75	2.8
SGO 90x30	30.0	4.0	13	11.5	17.5	21	1.5	3.0	10.0	90	3.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Flat Suction Pads (Oval)

Suction Plates SPLO

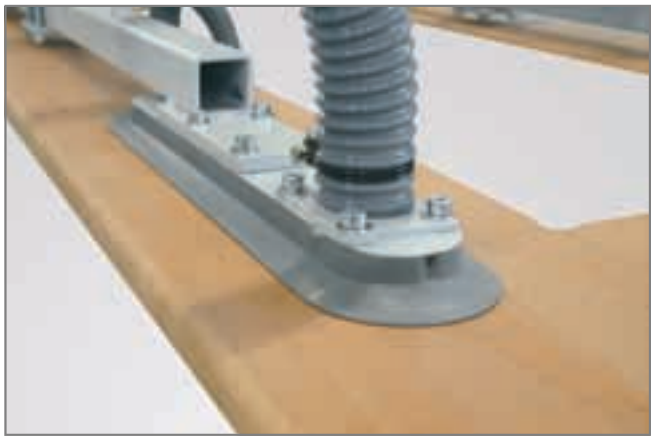
Suction area (LxW) from 60 x 20 mm to 370 x 80 mm

Suitability for Industry-Specific Applications

Suction plates SPLO

Applications

- Oval suction plate for handling of long, narrow workpieces such as sections or door and window frames
- With long, narrow workpieces considerably higher suction force than with round, flat suction pads
- SPLO 100x32-TV and SPLO 300x100-TV available with sensing valve to detect presence of workpieces
- SPLO 100x30 to SPLO 300x100 with long sealing lip for handling very curved workpieces



Suction plates SPLO mounted on a manually guided vacuum lifting device

Design

- Robust and wear-resistant suction plate with single sealing lip
- Sealing lip vulcanized to support plate
- SPLO 100x32-TV and SPLO 300x100-TV with sensing valve
- Sealing lip made of NBR for minimum marking of workpieces

Suction plates SPLO being used for handling wooden doors

Our Highlights...	Your Benefits...
• Oval, flat suction plate	> Handling of long, narrow workpieces, also curved workpieces (such as sections)
• Support plate made of steel/ aluminum with sealing lip vulcanized to it	> Capable of handling heavy loads; flexible mounting facilities
• Sealing lip made of NBR	> Little marking, even of sensitive surfaces
• Various sizes and shapes	> Wide range of pads for many different workpieces
• Supports on the bottom	> No permanent deformation of thin-walled workpieces

Flat Suction Pads (Oval)

Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm

Designation Code Suction Plates SPLO

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread	Product addition
Example SPLO 60x20 NBR-55 G1/8-IG:				
SPLO	**60x20**	**NBR-55**	**G1/8-IG**	
SPLO	60x20 to 370x80	NBR-50 NBR-55	G1/8-IG (IG = female (F)) G1/4-IG	TV sensing valve

Ordering Data Suction Plates SPLO

Suction plate SPLO, available in various diameters and optional with sensing valve, is delivered with support plate vulcanized to elastomer part.

Suction Plates SPLO

Type*	Part Number
SPLO 60x20 NBR-55 G1/8-IG	10.01.05.00001
SPLO 100x32 NBR-50 G1/4-IG	10.01.05.00002
SPLO 100x32 NBR-50 TV	10.01.05.00003
SPLO 100x30 NBR-50	10.01.05.00182
SPLO 200x30 NBR-50	10.01.05.00183
SPLO 300x30 NBR-55	10.01.05.00184
SPLO 150x55 NBR-50	10.01.05.00046
SPLO 200x55 NBR-50	10.01.05.00004
SPLO 250x55 NBR-50	10.01.05.00186
SPLO 300x55 NBR-50	10.01.05.00187
SPLO 300x100 NBR-50	10.01.05.00050
SPLO 300x100 NBR-50 TV	10.01.05.00188
SPLO 370x80 NBR-50	10.01.05.00006

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Suction Plates SPLO

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)
SPLO 60x20 NBR-55 G1/8-IG	50	3	15
SPLO 100x32 NBR-50 G1/4-IG	134	10	50
SPLO 100x32 NBR-50 TV	134	10	50
SPLO 100x30 NBR-50	126	13	25
SPLO 200x30 NBR-50	260	26	30
SPLO 300x30 NBR-55	400	39	30
SPLO 150x55 NBR-50	340	60	75
SPLO 200x55 NBR-50	465	80	50
SPLO 250x55 NBR-50	590	100	50
SPLO 300x55 NBR-50	710	120	50
SPLO 300x100 NBR-50	1250	165	175
SPLO 300x100 NBR-50 TV	1250	165	175
SPLO 370x80 NBR-50	1270	240	100

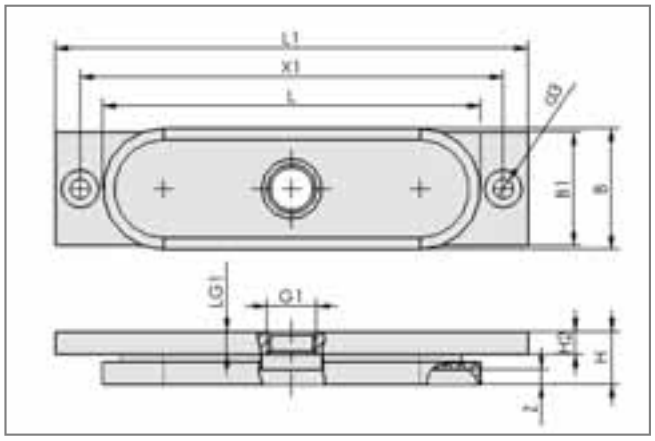
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

Flat Suction Pads (Oval)

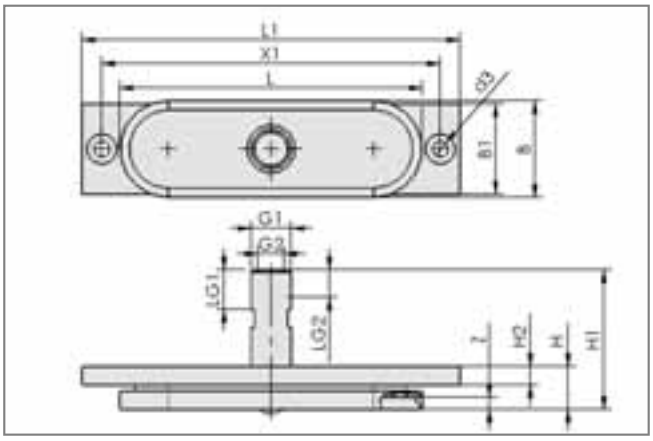
Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm

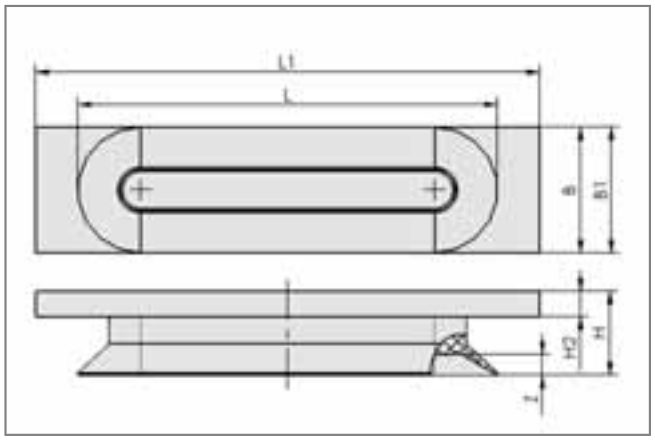
Design Data Suction Plates SPLO



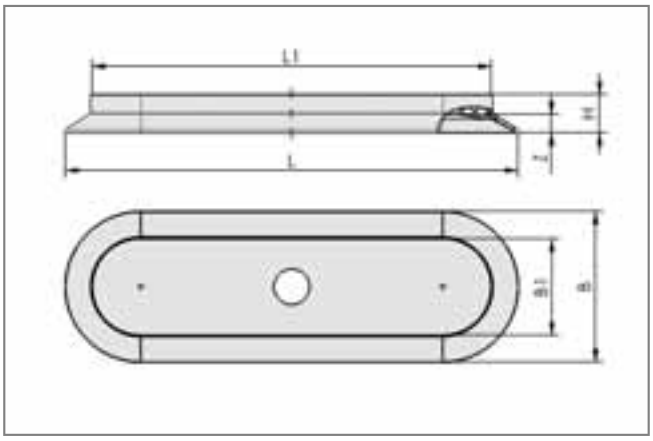
SPLO 60x20 to 100x32



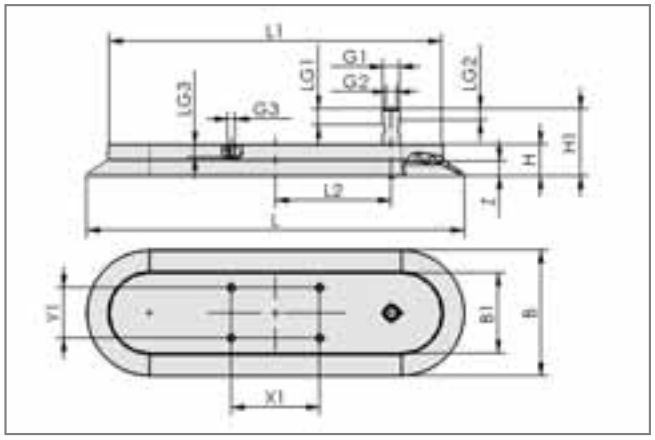
SPLO 100x32 TV



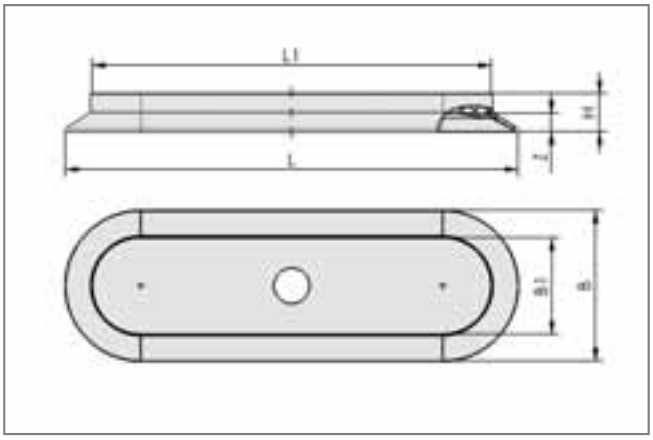
SPLO 100x30, 200x30 and 300x30



SPLO 150x55, 200x55, 250x55, 300x55 and 370x80



SPLO 300x100 TV



SPLO 300x100

Flat Suction Pads (Oval)

Suction Plates SPLO

Suction area (LxW) from 60 x 20 mm to 370 x 80 mm

Design Data Suction Plates SPLO

Type	Dimensions in mm*																	
	B	B1	d3	G1	G2	G3	H	H1	H2	L	L1	L2	LG1	LG2	LG3	X1	Y1	Z
SPLO 60x20 NBR-55 G1/8-IG	20	20	4.5	G1/8"-F	-	-	12.5	-	6	60	75	-	6	-	-	65	-	1
SPLO 100x32 NBR-50 G1/4-IG	32	30	5.3	G1/4"-F	-	-	14.0	-	6	100	126	-	6	-	-	112	-	2
SPLO 100x32 NBR-50 TV	32	30	5.3	G1/4"-M	G1/8"-F	-	14.0	46.0	6	100	126	-	13	9	-	112	-	2
SPLO 100x30 NBR-50	29	30	-	-	-	-	20.0	-	6	99	120	-	-	-	-	-	-	5
SPLO 200x30 NBR-50	30	30	-	-	-	-	20.0	-	6	201	220	-	-	-	-	-	-	5
SPLO 300x30 NBR-55	30	30	-	-	-	-	20.0	-	6	300	320	-	-	-	-	-	-	5
SPLO 150x55 NBR-50	55	32	-	-	-	-	19.4	-	-	150	125	-	-	-	-	-	-	8
SPLO 200x55 NBR-50	53	31	-	-	-	-	22.0	-	-	200	178	-	-	-	-	-	-	8
SPLO 250x55 NBR-50	51	32	-	-	-	-	22.0	-	-	246	225	-	-	-	-	-	-	8
SPLO 300x55 NBR-50	54	31	-	-	-	-	21.0	-	-	299	274	-	-	-	-	-	-	8
SPLO 300x100 NBR-50	101	68	-	-	-	-	25.0	-	-	300	267	-	-	-	-	-	-	9
SPLO 300x100 NBR-50 TV	101	68	-	G1/4"-M	G1/8"-F	M6-F	25.0	53.5	-	300	267	92	13	10	9	70	40	9
SPLO 370x80 NBR-50	81	54	-	-	-	-	26.0	-	-	374	347	-	-	-	-	-	-	8

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds)

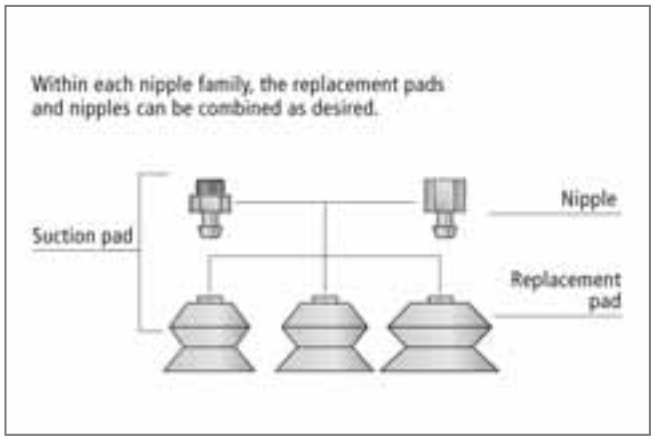
Suction area (Ø) from 11 mm to 78 mm

Suitability for Industry-Specific Applications

Bellows suction pads FSGA (1.5 folds)

Applications

- Round, bellows suction pad with 1.5 folds for handling of extremely sensitive workpieces (optimum damping effect due to folds and smooth sealing lip)
- Handling of workpieces with uneven surfaces, such as pipes (folds permit optimal adaptation to concave and convex surfaces)



System design bellows suction pads FSGA (1.5 folds)

Design

- Robust, wear-resistant suction pad FSGA with single sealing lip, consisting of suction pad FGA with 1.5 folds and connection nipple
- All nipples plugged in
- Suction pads with a diameter of 25 mm or more with supports on the bottom

Bellows suction pads FSGA being used for handling cardboard boxes

Our Highlights...	Your Benefits...
• Wide range of diameters and materials	> For a wide range of different workpieces
• Soft, tapered sealing lip	> Very good adaptation to curved or uneven workpiece surfaces
• 1.5 folds	> High suction force and optimum damping effect during placement on workpieces
• Very stiff top fold	> Good resistance to horizontal forces at high acceleration values
• Supports on the bottom (diameter > 25 mm)	> No permanent deformation of thin-walled workpieces

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

Designation Code Bellows Suction Pads FSGA (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGA 14 HT1-60 G1/8-IG:			
FSGA	**14**	**HT1-60**	**G1/8-IG**
FSGA	11 to 78	HT1-60 NBR-55 NK-45 SI-55	M5-AG (AG = male (M)) G1/8-AG G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG

Ordering Data Bellows Suction Pads FSGA (1.5 Folds)

Suction pad FSGA (elastomer part + connection nipple) is delivered unassembled (diameters of 33 mm and more are assembled). The delivery consists of:

- Suction pad of type FGA – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad FGA, connection nipple SA-NIP

Bellows Suction Pads FSGA (1.5 Folds)

Type	Suction pad material * / hardness in Shore A			
	High temp material HT1 60±5ShA	Natural Rubber NK 45±5ShA	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FSGA 11 G1/8-AG	10.01.06.01226	10.01.06.00408	10.01.06.00075	10.01.06.00085
FSGA 11 G1/8-IG	10.01.06.01232	10.01.06.00407	10.01.06.00061	10.01.06.00068
FSGA 11 M5-AG	10.01.06.01227	10.01.06.00406	10.01.06.00076	10.01.06.00086
FSGA 14 G1/8-AG	10.01.06.00932	10.01.06.00387	10.01.06.00381	10.01.06.00384
FSGA 14 G1/8-IG	10.01.06.00948	10.01.06.00386	10.01.06.00380	10.01.06.00383
FSGA 14 M5-AG	10.01.06.00933	10.01.06.00385	10.01.06.00379	10.01.06.00382
FSGA 16 G1/8-AG	10.01.06.01228	10.01.06.00411	10.01.06.00077	10.01.06.00087
FSGA 16 G1/8-IG	10.01.06.01233	10.01.06.00410	10.01.06.00062	10.01.06.00069
FSGA 16 M5-AG	10.01.06.01229	10.01.06.00409	10.01.06.00078	10.01.06.00088
FSGA 20 G1/8-AG	10.01.06.00936	10.01.06.00396	10.01.06.00390	10.01.06.00393
FSGA 20 G1/8-IG	10.01.06.00952	10.01.06.00395	10.01.06.00389	10.01.06.00392
FSGA 20 M5-AG	10.01.06.00937	10.01.06.00394	10.01.06.00388	10.01.06.00391
FSGA 22 G1/8-AG	10.01.06.01230	10.01.06.00414	10.01.06.00079	10.01.06.00089
FSGA 22 G1/8-IG	10.01.06.01234	10.01.06.00413	10.01.06.00063	10.01.06.00070
FSGA 22 M5-AG	10.01.06.01231	10.01.06.00412	10.01.06.00080	10.01.06.00090
FSGA 25 G1/8-AG	10.01.06.00940	10.01.06.00405	10.01.06.00399	10.01.06.00402
FSGA 25 G1/8-IG	10.01.06.00956	10.01.06.00404	10.01.06.00398	10.01.06.00401
FSGA 33 G1/4-AG	10.01.06.00941	10.01.06.00330	10.01.06.00081	10.01.06.00091
FSGA 33 G1/4-IG	10.01.06.00957	10.01.06.00415	10.01.06.00064	10.01.06.00071
FSGA 43 G1/4-AG	10.01.06.00942	10.01.06.00418	10.01.06.00082	10.01.06.00092
FSGA 43 G1/4-IG	10.01.06.00958	10.01.06.00417	10.01.06.00065	10.01.06.00072
FSGA 53 G1/4-AG	10.01.06.00943	10.01.06.00326	10.01.06.00083	10.01.06.00093
FSGA 53 G1/4-IG	10.01.06.00977	10.01.06.00419	10.01.06.00066	10.01.06.00073
FSGA 63 G1/4-AG	10.01.06.02476	10.01.06.00687	10.01.06.00685	10.01.06.00686
FSGA 63 G1/4-IG	10.01.06.02477	10.01.06.00693	10.01.06.00691	10.01.06.00692
FSGA 78 G1/4-AG	10.01.06.02478	10.01.06.00340	10.01.06.00084	10.01.06.00094
FSGA 78 G1/4-IG	10.01.06.02479	10.01.06.00421	10.01.06.00067	10.01.06.00074

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

Ordering Data Spare Parts Suction Pads

Type	Dimensions in mm High temp material HT1 60±5ShA	Natural Rubber NK 45±5ShA	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FGA 11	10.01.06.01247	10.01.06.00423	10.01.06.00095	10.01.06.00098
FGA 14	10.01.06.00868	10.01.06.00372	10.01.06.00370	10.01.06.00371
FGA 16	10.01.06.01248	10.01.06.00424	10.01.06.00096	10.01.06.00099
FGA 20	10.01.06.00870	10.01.06.00375	10.01.06.00373	10.01.06.00374
FGA 22	10.01.06.01249	10.01.06.00425	10.01.06.00097	10.01.06.00100
FGA 25	10.01.06.00872	10.01.06.00378	10.01.06.00376	10.01.06.00377
FGA 33	10.01.06.00873	10.01.06.00426	10.01.06.00130	10.01.06.00126
FGA 43	10.01.06.00874	10.01.06.00427	10.01.06.00131	10.01.06.00127
FGA 53	10.01.06.00875	10.01.06.00428	10.01.06.00132	10.01.06.00128
FGA 63	10.01.06.02473	10.01.06.00690	10.01.06.00688	10.01.06.00689
FGA 78	10.01.06.02474	10.01.06.00429	10.01.06.00133	10.01.06.00129

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pad Nipples

Type	Suction pad nipples [AG]		Suction pad nipples [IG]	
FSGA 11 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 11 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 16 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 16 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 22 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSGA 22 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSGA 33 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 43 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 53 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 63 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSGA 78 G1/4	SA-NIP N019 G1/4-AG	10.01.06.01959	SA-NIP N019 G1/4-IG	10.01.06.01960

Technical Data Bellows Suction Pads FSGA (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***	Nipple family
FSGA 11	0.95	3.8	0.225	10	4	N 016
FSGA 14	1.20	5.0	0.420	13	4	N 016
FSGA 16	2.30	6.7	0.750	20	4	N 016
FSGA 20	4.70	10.7	1.150	30	4	N 016
FSGA 22	5.70	15.2	1.400	25	4	N 016
FSGA 25	5.30	17.3	3.150	20	4	N 016
FSGA 33	13.60	39.6	4.750	40	6	N 018
FSGA 43	22.80	64.5	9.250	60	6	N 018
FSGA 53	51.30	95.0	26.250	75	6	N 018
FSGA 63	85.00	135.0	39.000	75	6	N 018
FSGA 78	137.40	218.0	76.000	70	6	N 019

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The pull-off force of the versions made of natural rubber is reduced by about 40%

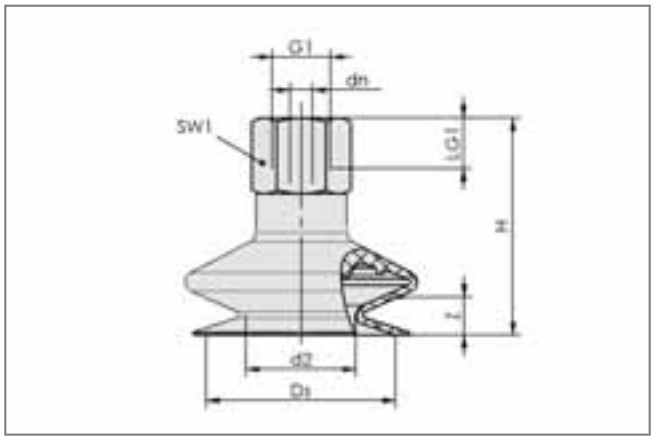
***The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Round)

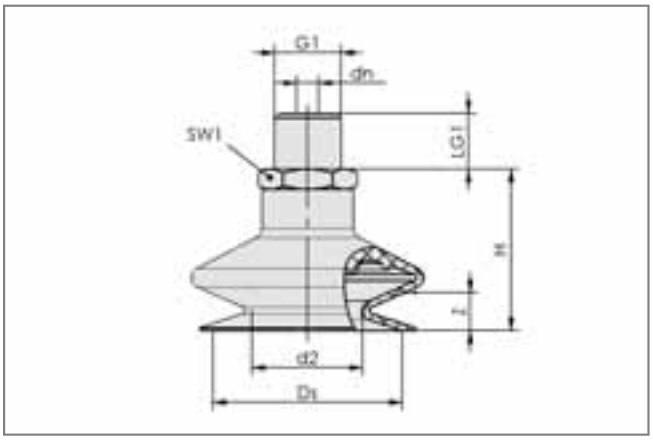
Bellows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

Design Data Bellows Suction Pads FSGA (1.5 Folds)



FSGA 11 to 78 IG



FSGA 11 to 78 AG

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
FSGA 11 G1/8-AG	5.1	3.5	10.4	G1/8"-M	22.0	7.5	14	4
FSGA 11 G1/8-IG	5.1	3.5	10.4	G1/8"-F	28.0	8.0	14	4
FSGA 11 M5-AG	5.1	2.5	10.4	M5-M	21.0	5.0	7	4
FSGA 14 G1/8-AG	5.0	3.5	12.8	G1/8"-M	21.5	7.5	14	5
FSGA 14 G1/8-IG	5.0	3.5	12.8	G1/8"-F	27.5	8.0	14	5
FSGA 14 M5-AG	5.0	2.5	12.8	M5-M	20.5	5.0	7	5
FSGA 16 G1/8-AG	8.4	3.5	15.6	G1/8"-M	25.2	7.5	14	7
FSGA 16 G1/8-IG	8.4	3.5	15.6	G1/8"-F	31.2	8.0	14	7
FSGA 16 M5-AG	8.4	2.5	15.6	M5-M	24.2	5.0	7	7
FSGA 20 G1/8-AG	11.0	3.5	18.1	G1/8"-M	21.2	7.5	14	5
FSGA 20 G1/8-IG	11.0	3.5	18.1	G1/8"-F	27.2	8.0	14	5
FSGA 20 M5-AG	11.0	2.5	18.1	M5-M	20.2	5.0	7	5
FSGA 22 G1/8-AG	11.7	3.5	21.5	G1/8"-M	25.0	7.5	14	6
FSGA 22 G1/8-IG	11.7	3.5	21.5	G1/8"-F	31.0	8.0	14	6
FSGA 22 M5-AG	11.7	2.5	21.5	M5-M	24.0	5.0	7	6
FSGA 25 G1/8-AG	9.9	3.5	22.5	G1/8"-M	29.0	7.5	14	9
FSGA 25 G1/8-IG	9.9	3.5	22.5	G1/8"-F	35.0	8.0	14	9
FSGA 33 G1/4-AG	17.0	4.4	30.0	G1/4"-M	31.0	11.0	17	9
FSGA 33 G1/4-IG	17.0	4.4	30.0	G1/4"-F	42.0	12.0	17	9
FSGA 43 G1/4-AG	21.9	4.4	38.0	G1/4"-M	31.6	11.0	17	10
FSGA 43 G1/4-IG	21.9	4.4	38.0	G1/4"-F	42.6	12.0	17	10
FSGA 53 G1/4-AG	33.0	4.4	50.0	G1/4"-M	38.0	11.0	17	12
FSGA 53 G1/4-IG	33.0	4.4	50.0	G1/4"-F	49.0	12.0	17	12
FSGA 63 G1/4-AG	44.5	4.4	60.0	G1/4"-M	38.0	11.0	17	14
FSGA 63 G1/4-IG	44.5	4.4	60.0	G1/4"-F	49.0	12.0	17	14
FSGA 78 G1/4-AG	54.0	8.2	74.0	G1/4"-M	53.0	11.0	21	14
FSGA 78 G1/4-IG	54.0	8.2	74.0	G1/4"-F	62.0	12.0	21	14

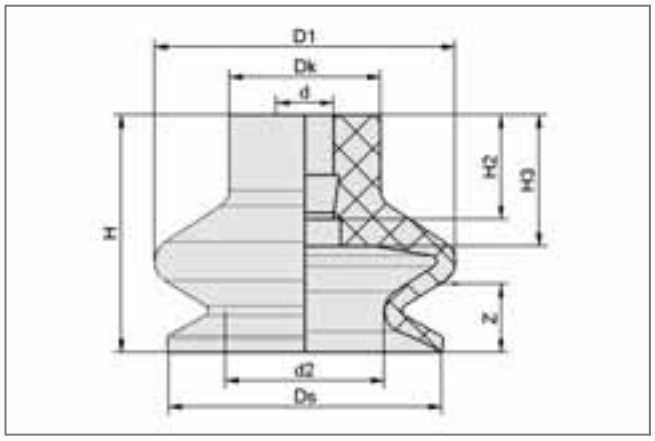
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

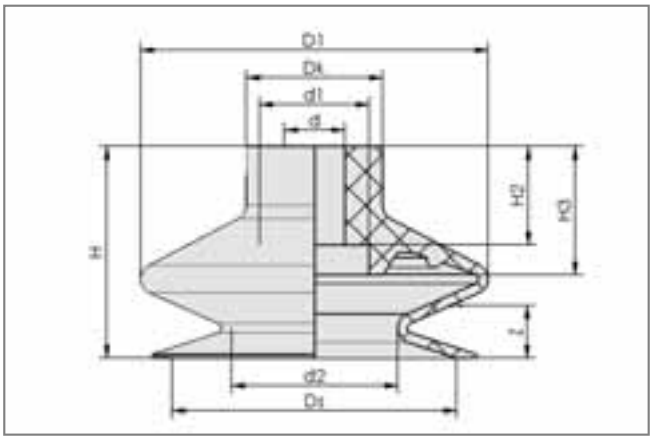
Bellows Suction Pads FSGA (1.5 Folds)

Suction area (Ø) from 11 mm to 78 mm

Design Data Bellows Suction Pads FGA - Spare Parts for FSGA



FGA 11 to 25



FGA 33 to 78

Type	Dimensions in mm*									
	d	d1	d2	D1	Dk	Ds	H	H2	H3	Z (Stroke)
FGA 11	4.5	-	5.1	12.0	10	10.4	16.0	6.9	9.3	4
FGA 14	4.5	-	5.0	13.7	10	12.8	15.5	6.9	8.5	5
FGA 16	4.5	-	8.4	17.0	10	15.6	19.2	6.9	9.3	7
FGA 20	4.5	-	11.0	19.9	10	18.1	15.2	6.9	8.7	5
FGA 22	4.5	-	11.7	24.2	10	21.5	19.0	6.9	9.1	6
FGA 25	4.5	-	9.9	25.0	10	22.5	23.0	6.9	8.9	9
FGA 33	8.0	16.0	17.0	36.0	18	30.0	27.0	13.0	14.0	9
FGA 43	8.0	14.5	21.9	45.9	18	38.0	27.6	13.0	17.1	10
FGA 53	8.0	14.5	33.0	58.6	18	50.0	34.0	13.0	19.0	12
FGA 63	8.0	14.5	44.5	67.0	18	60.0	34.0	13.0	18.8	14
FGA 78	11.8	21.8	54.0	83.0	25	74.0	47.0	19.7	31.4	14

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA VU1 (1.5 Folds)

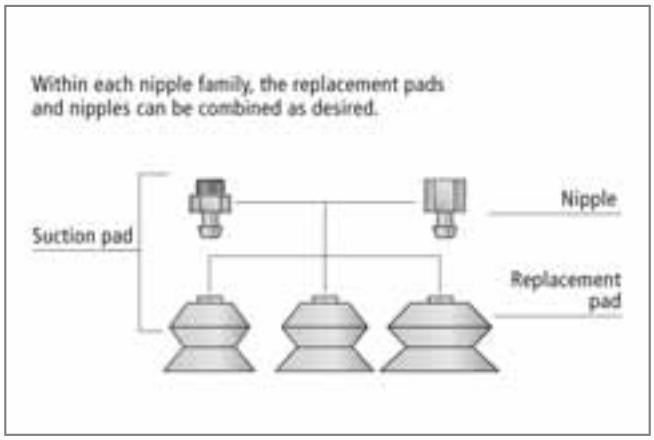
Suction area (Ø) from 30 mm to 110 mm

Suitability for Industry-Specific Applications

Bellows suction pads FSGA VU1 (1.5 folds)

Applications

- Round bellows suction pad with 1.5 folds for hard use in multi-shift operations with very short cycle times
- Handling of workpieces with very abrasive surfaces such as rough cardboard sheets
- Suction pad with special slot: for handling oily metal sheets (better resistance to lateral forces)
- Suction pad without special slot: for handling cardboard, wood and similar materials



System design bellows suction pads FSGA VU1 (1.5 folds)

Design

- Robust, wear-resistant suction pad FSGA with single sealing lip, consisting of suction pad FGA (Vulkollan VU1) with 1.5 folds and connection nipple
- Suction pad connected positively to nipple; no turning even when handling heavy loads
- Suction pads with supports on the bottom

Bellows suction pads FSGA VU1 being used for handling cardboard boxes

Our Highlights...

- Material Vulkollan VU1 with high resistance to tearing
- Good resistance to chemicals
- Minimum abrasion: approx. 10 - 12 mm³ to DIN 53516
- Supports on the bottom
- Very stiff top fold

Your Benefits...

> Very wear-resistant suction pad for very high loads and a long lifetime

> Unaffected by oil (handling of sheet metal)

> Lifetime up to 20 times higher compared to standard NBR

> No permanent deformation of thin-walled workpieces

> Good resistance to horizontal forces at high acceleration forces

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA VU1 (1.5 Folds)

Suction area (Ø) from 30 mm to 110 mm

Designation Code Bellows Suction Pads FSGA VU1 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example FSGA 60 VU1-72 G1/4-IG:				
FSGA	**60**	**VU1-72**	**G1/4-IG**	
FSGA	30 to 110	VU1-72	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/2-IG	ON oil slot

Ordering Data Bellows Suction Pads FSGA VU1 (1.5 Folds)

Suction pad FSGA VU1 (elastomer part + connection nipple) is delivered assembled. The assembly consists of:
- Suction pad of type FGA VU1 – elastomer part, available in various diameters, optional with oil groove
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad FGA VU1, connection nipple SA-NIP

Bellows Suction Pads FSGA VU1 (1.5 Folds)

Type*	Connection		
	G1/2"-F	G1/4"-M	G1/4"-F
FSGA 30 VU1-72	-	10.01.06.00197	10.01.06.00169
FSGA 40 VU1-72 ON	-	10.01.06.00306	10.01.06.00299
FSGA 50 VU1-72 ON	-	10.01.06.00307	10.01.06.00300
FSGA 60 VU1-72	-	10.01.06.00242	10.01.06.00240
FSGA 60 VU1-72 ON	-	10.01.06.00198	10.01.06.00172
FSGA 85 VU1-72	-	10.01.06.00243	10.01.06.00241
FSGA 85 VU1-72 ON	-	10.01.06.00199	10.01.06.00170
FSGA 110 VU1-72 ON	10.01.06.00497	-	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA VU1 (1.5 Folds)

Suction area (Ø) from 30 mm to 110 mm

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	Bellows suction pad (round)
FGA 30 VU1-72	10.01.06.00177
FGA 40 VU1-72 ON	10.01.06.00301
FGA 50 VU1-72 ON	10.01.06.00302
FGA 60 VU1-72	10.01.06.00178
FGA 60 VU1-72 ON	10.01.06.00207
FGA 85 VU1-72	10.01.06.00179
FGA 85 VU1-72 ON	10.01.06.00190
FGA 110 VU1-72 ON	10.01.06.00492

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
FSGA 30 VU1-72 G1/4-AG	SA-NIP N013 G1/4-AG DN350	10.01.06.00183
FSGA 30 VU1-72 G1/4-IG	SA-NIP N013 G1/4-IG DN350	10.01.06.00180
FSGA 40 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
FSGA 40 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
FSGA 50 VU1-72 G1/4-AG	SA-NIP N011 G1/4-AG DN350	10.01.01.10663
FSGA 50 VU1-72 G1/4-IG	SA-NIP N011 G1/4-IG DN350	10.01.01.00412
FSGA 60 VU1-72 G1/4-AG	SA-NIP N014 G1/4-AG DN600	10.01.06.00184
FSGA 60 VU1-72 G1/4-IG	SA-NIP N014 G1/4-IG DN600	10.01.06.00181
FSGA 85 VU1-72 G1/4-AG	SA-NIP N015 G1/4-AG DN600	10.01.06.00185
FSGA 85 VU1-72 G1/4-IG	SA-NIP N015 G1/4-IG DN600	10.01.06.00182
FSGA 110 VU1-72 G1/2-IG	SA-NIP N037 G1/2-IG	10.01.06.00593

Technical Data Bellows Suction Pads FSGA VU1 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
FSGA 30 VU1-72	13.5	32	4.2	25	6	N 013
FSGA 40 VU1-72	33.0	56	11.3	30	6	N 011
FSGA 50 VU1-72	52.0	88	22.6	40	6	N 011
FSGA 60 VU1-72	75.0	120	31.0	50	6	N 014
FSGA 85 VU1-72	140.0	250	78.0	80	6	N 015
FSGA 110 VU1-72	295.0	420	350.0	100	9	N 037

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

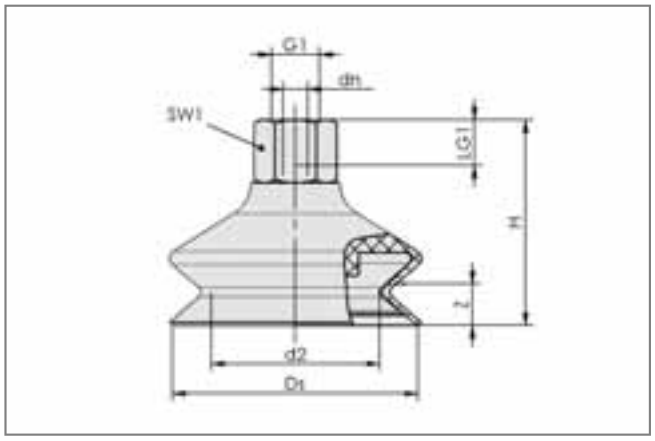
**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Round)

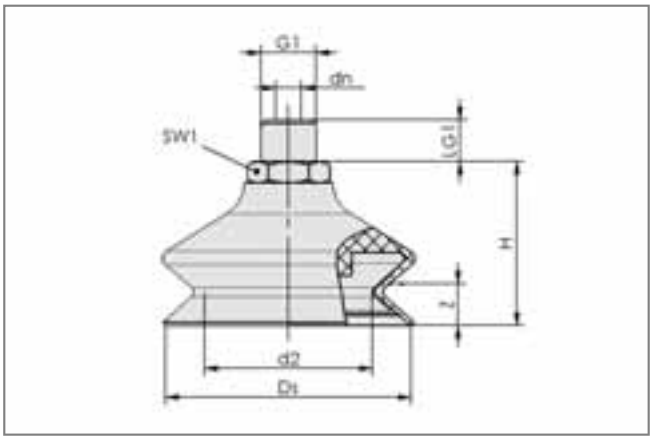
Bellows Suction Pads FSGA VU1 (1.5 Folds)

Suction area (Ø) from 30 mm to 110 mm

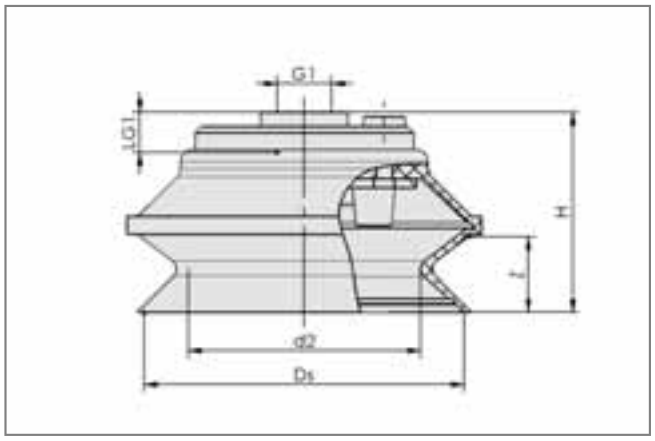
Design Data Bellows Suction Pads FSGA VU1 (1.5 Folds)



FSGA 30 to 85 VU1 IG



FSGA 30 to 85 VU1 AG



FSGA 110 VU1 IG

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
FSGA 30 VU1-72 G1/4-AG	17.0	3.5	29	G1/4"-M	32.0	10	17	8.5
FSGA 30 VU1-72 G1/4-IG	17.0	3.5	29	G1/4"-F	42.0	12	17	8.5
FSGA 40 VU1-72 G1/4-AG	26.8	3.5	38	G1/4"-M	31.0	10	17	12.8
FSGA 40 VU1-72 G1/4-IG	26.8	3.5	38	G1/4"-F	41.0	12	17	12.8
FSGA 50 VU1-72 G1/4-AG	33.5	3.5	47	G1/4"-M	37.5	10	17	14.5
FSGA 50 VU1-72 G1/4-IG	33.5	3.5	47	G1/4"-F	47.5	12	17	14.5
FSGA 60 VU1-72 G1/4-AG	41.0	6.0	59	G1/4"-M	39.0	10	17	12.5
FSGA 60 VU1-72 G1/4-IG	41.0	6.0	59	G1/4"-F	49.0	12	17	12.5
FSGA 85 VU1-72 G1/4-AG	55.0	6.0	84	G1/4"-M	52.0	10	22	15.0
FSGA 85 VU1-72 G1/4-IG	55.0	6.0	84	G1/4"-F	62.0	12	22	15.0
FSGA 110 VU1-72 G1/2-IG	80.0	-	110	G1/2"-F	69.0	14	-	30.0

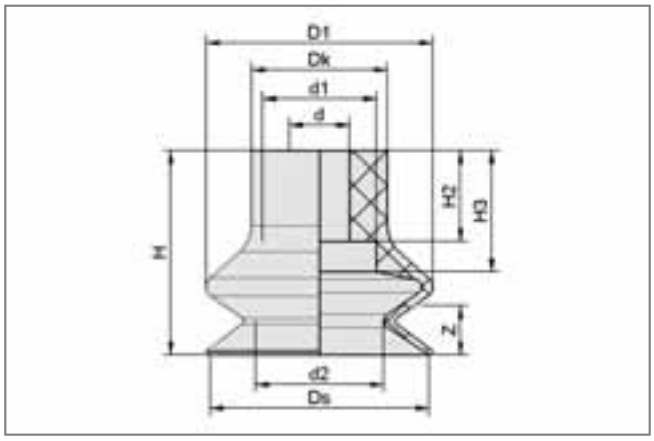
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

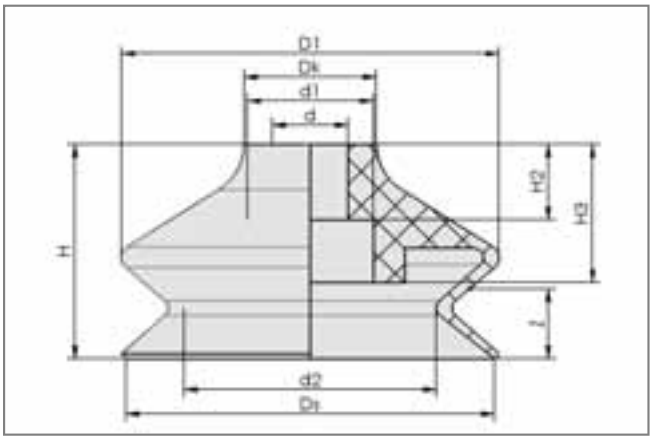
Bellows Suction Pads FSGA VU1 (1.5 Folds)

Suction area (Ø) from 30 mm to 110 mm

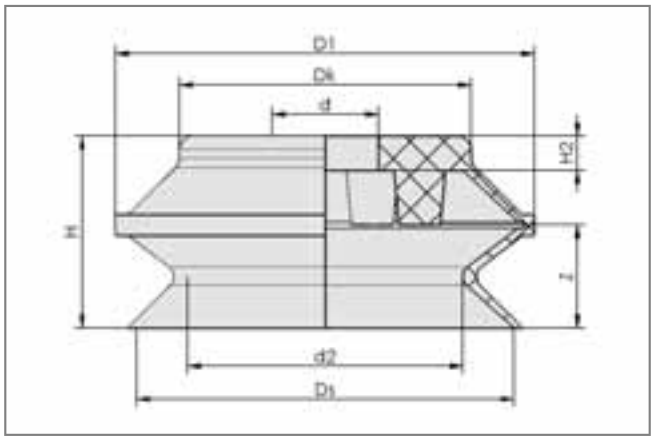
Design Data Bellows Suction Pads FGA VU1



FGA 30 VU1



FGA 40 to 85 VU1



FGA 110 VU1

Type	Dimensions in mm*									
	d	d1	d2	D1	Dk	Ds	H	H2	H3	Z (Stroke)
FGA 30 VU1-72	8	15.0	17.0	30	18.0	29	27.0	12	16.0	8.5
FGA 40 VU1-72	8	13.6	26.8	40	14.0	38	27.0	8	11.5	12.8
FGA 50 VU1-72	8	13.6	33.5	50	17.5	47	32.5	8	18.0	14.5
FGA 60 VU1-72	12	20.0	41.0	60	21.0	59	34.0	12	22.0	12.5
FGA 85 VU1-72	12	25.0	55.0	85	25.0	84	47.0	20	32.0	15.0
FGA 110 VU1-72	30	-	80.0	120	85.0	110	56.0	10	-	30.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

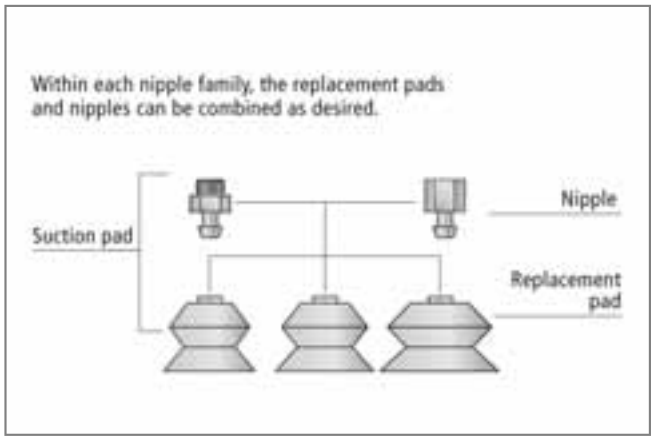
Suction area (Ø) 110 mm and 150 mm

Suitability for Industry-Specific Applications

Bellows suction pads FSGA (1.5 folds) from Ø110 mm

Applications

- Round bellows suction pad with 1.5 folds for handling of cardboard, sheet metal and wood
- Handling of large and heavy workpieces which are easily damaged (optimal adaptation to convex surfaces)



System design bellows suction pads (1.5 folds) from Ø110 mm

Design

- Robust and hard-wearing suction pad FSGA with single sealing lip, consisting of suction pad FGA with 1.5 folds and connection plate
- Connection plate screwed to suction pad FGA. Suction pad FGA can be replaced separately when worn
- Suction pads with supports on the bottom

Bellows suction pads FSGA from Ø 110 mm being used for handling pressed wooden boards

Our Highlights...	Your Benefits...
• Large diameter	> Handling of large, heavy workpieces which are easily damaged
• Soft, tapered sealing lip	> Very good adaptation to curved workpiece surfaces
• 1.5 folds	> High suction force and optimum damping effect during placement on workpiece
• Very stiff top fold	> Good resistance to horizontal forces at high acceleration values
• Supports on the bottom	> No permanent deformation of thin-walled workpieces

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

Suction area (Ø) 110 mm and 150 mm

Designation Code Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGA 110 NBR-70 G1/2-IG:			
FSGA	**110**	**NBR-70**	**G1/2-IG**
FSGA	110	NBR-70	G1/2-IG (IG = female (F))
	150	SI-55	

Ordering Data Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

Suction pad FSGA (elastomer part + connection nipple) is delivered assembled. The assembly consists of:
- Suction pad of type FGA – elastomer part, available in the diameters 110 mm and 150 mm and various materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad FGA, connection nipple SA-NIP

Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

Type	Suction pad material * / hardness in Shore A	
	Perbunan NBR 70±5ShA	Silicone SI 55±5ShA
FSGA 110 G1/2-IG	10.01.06.00118	10.01.06.00119
FSGA 150 G1/2-IG	10.01.06.00120	10.01.06.00121

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads and Suction Pad Nipples

Type*	Perbunan NBR 70±5ShA	Silicone SI 55±5ShA
FGA 110	10.01.06.00114	10.01.06.00115
FGA 150	10.01.06.00116	10.01.06.00117

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Suction pad connection nipple	
FSGA 110 G1/2-IG	SA-NIP N010 G1/2-IG	10.01.01.00796
FSGA 150 G1/2-IG	SA-NIP N010 G1/2-IG	10.01.01.00796

Technical Data Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
FSGA 110 G1/2-IG	280	570	330	85	12	N 010
FSGA 150 G1/2-IG	570	1000	800	250	12	N 010

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

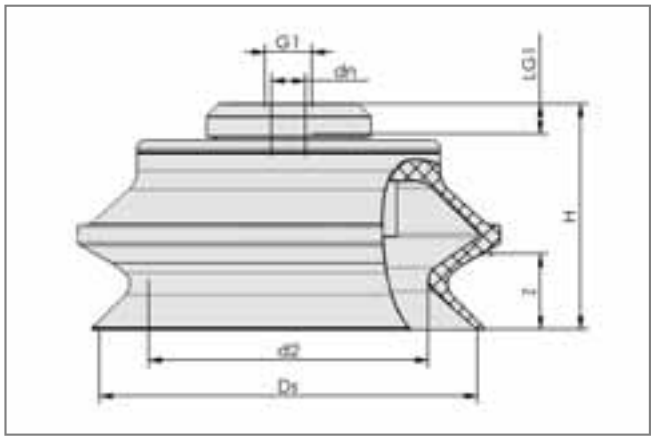
**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Round)

Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

Suction area (Ø) 110 mm and 150 mm

Design Data Bellows Suction Pads FSGA (1.5 Folds) from Ø110 mm

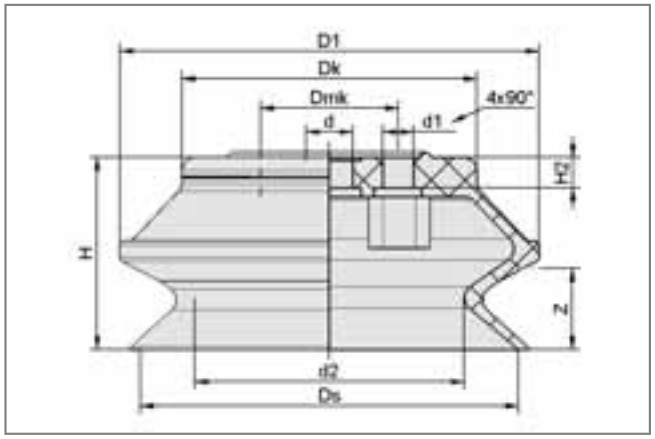


FSGA 110 to 150

Type	Dimensions in mm*						
	d2	dn	Ds	G1	H	LG1	Z (Stroke)
FSGA 110 G1/2-IG	80	13.5	111	G1/2"-F	69.5	13	29.0
FSGA 150 G1/2-IG	111	13.5	150	G1/2"-F	89.5	13	37.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Bellows Suction Pads FGA (1.5 Folds) from Ø 110 mm



FGA 110 to 150

Type	Dimensions in mm*									
	d	d1	d2	D1	Dmk	Dk	Ds	H	H2	Z (Stroke)
FGA 110	13.5	7	80	123	40	86	111	55	8	29.0
FGA 150	13.5	7	111	168	40	120	150	74	6	37.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

Bellows Suction Pads FSGPL (1.5 Folds)

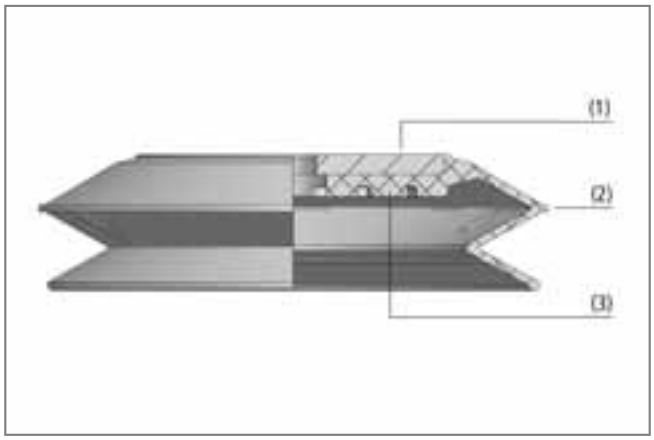
Suction area (Ø) from 150 mm to 250 mm

Suitability for Industry-Specific Applications

Bellows suction pads FSGPL (1.5 folds)

Applications

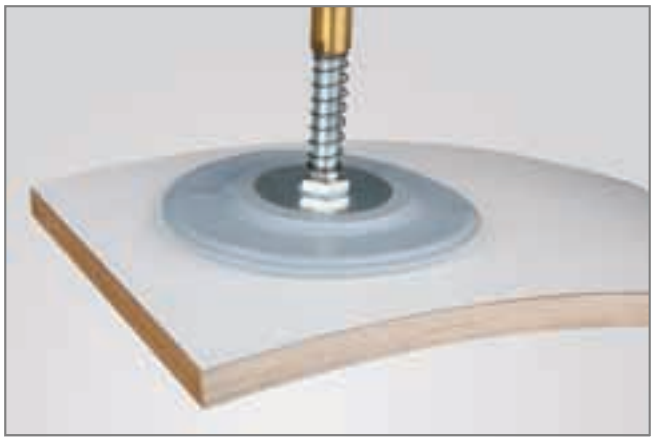
- Round, bellows suction pad with 1.5 folds for handling of cardboard, sheet metal, wood, glass and ceramics
- Handling of workpieces with uneven surfaces (optimal adaptation due to smooth sealing lip)



System design bellows suction pads FSGPL (1.5 folds)

Design

- Suction pad FSGPL with 1.5 folds (2) and vulcanized mounting plate (1)
- Steel mounting plate with female thread
- Lower side of mounting plate covered with an elastomer coating (3)
- Optionally available without threaded hole



Bellows suction pads FSGPL being used for handling coated wood

Our Highlights...

- Large diameter
- Very soft, tapered sealing lip
- 1.5 folds
- Elastomer supports on the bottom

Your Benefits...

> For use with large, heavy but also sensitive workpieces

> Good adaptation to curved workpiece surfaces

> High suction force and damping effect during placement on workpiece

> No permanent deformation or breakage of easily damaged workpieces

Bellows Suction Pads (Round)

Bellows Suction Pads FSGPL (1.5 Folds)

Suction area (Ø) from 150 mm to 250 mm

Designation Code Bellows Suction Pads FSGPL (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGPL 200 NBR-55 G1/2-IG:			
FSGPL	**200**	**NBR-55**	**G1/2-IG**
FSGPL	150 200 250	NBR-55	G1/2-IG (IG = female (F))

Ordering Data Bellows Suction Pads FSGPL (1.5 Folds)

Suction pad FSGPL, available in various diameters, is delivered with support plate vulcanized to elastomer part.

Bellows Suction Pads FSGPL (1.5 Folds)

Type*	Part Number
FSGPL 150 NBR-55 G1/2-IG	10.01.06.00101
FSGPL 200 NBR-55 G1/2-IG	10.01.06.00102
FSGPL 250 NBR-55 G1/2-IG	10.01.06.00103

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Bellows Suction Pads FSGPL (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
FSGPL 150 NBR-55 G1/2-IG	370	500	490	250	12
FSGPL 200 NBR-55 G1/2-IG	850	950	790	350	12
FSGPL 250 NBR-55 G1/2-IG	1610	2000	1590	500	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

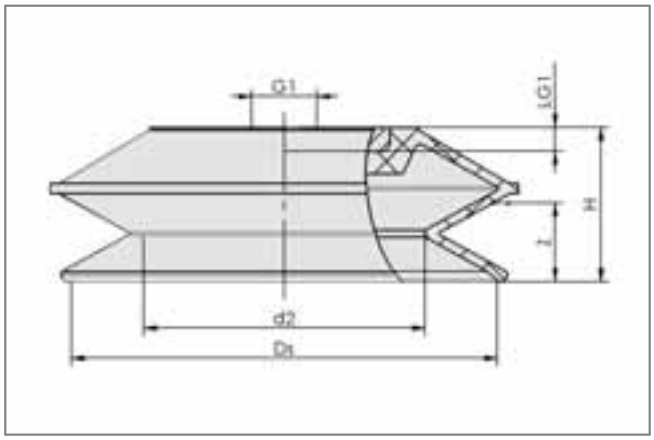
**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Round)

Bellows Suction Pads FSGPL (1.5 Folds)

Suction area (Ø) from 150 mm to 250 mm

Design Data Bellows Suction Pads FSGPL (1.5 Folds)



FSGPL 150 to 250

Type	Dimensions in mm*					
	d2	Ds	G1**	H	LG1	Z (Stroke)
FSGPL 150 NBR-55 G1/2-IG	93.0	143.5	G1/2"-F	51	8	35.7
FSGPL 200 NBR-55 G1/2-IG	137.0	191.0	G1/2"-F	54	8	37.2
FSGPL 250 NBR-55 G1/2-IG	186.0	239.3	G1/2"-F	60	8	43.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**Mounting plate optionally available without drilled holes

Bellows Suction Pads (Round)

Bellows Suction Pads FSG (2.5 Folds)

Suction area (Ø) from 5 mm to 88 mm

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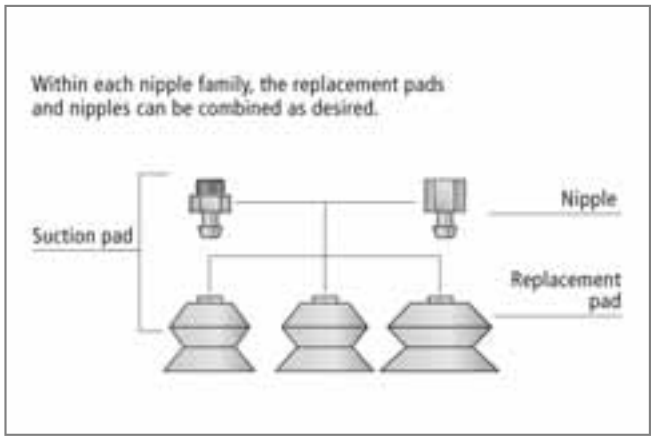
Suitability for Industry-Specific Applications

Bellows suction pads FSG (2.5 folds)

Applications

- Round, bellows suction pad with 2.5 folds for handling of extremely sensitive workpieces (optimum damping effect)
- Handling of workpieces with extremely uneven surfaces, such as pipes (optimal adaptation to concave and convex surfaces)
- Internal support (from diameter 52 mm) prevents workpiece from being pulled in
- Special design of the folds permits use in systems with very short cycle times



System design bellows suction pads FSG (2.5 folds)

Design

- Robust, wear-resistant suction pad FSG with single sealing lip, consisting of suction pad FG with 2.5 folds and connection nipple
- All nipples plugged in
- Suction pads with a diameter of 52 mm or more with supports on the bottom

Bellows suction pads FSG being used for handling hot plastic parts

Our Highlights...	Your Benefits...
• Wide range of diameters and materials	> Wide range of workpiece shapes and sizes
• 2.5 folds	> High suction force and optimum damping effect during placement on workpieces
• Soft, flexible folds	> Very high stroke of suction pad
• Soft, tapered sealing lip	> Very good adaptation to curved workpiece surfaces
• Supports on the bottom (diameter from 52 mm)	> No permanent deformation of thin-walled workpieces

Bellows Suction Pads (Round)

Bellows Suction Pads FSG (2.5 Folds)

Suction area (Ø) from 5 mm to 88 mm

Designation Code Bellows Suction Pads FSG (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSG 18 SI-55 G1/8-IG:			
FSG	**18**	**SI-55**	**G1/8-IG**
FSG	5 to 88	HT1-60 NBR-55 NK-45 SI-55	M5-AG (AG = male (M)) M5-IG (IG = female (F)) G1/8-AG G1/8-IG G1/4-AG G1/4-IG

Ordering Data Bellows Suction Pads FSG (2.5 Folds)

Suction pad FSG (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type FG – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad FG, connection nipple SA-NIP

Bellows Suction Pads (Round)

Bellows Suction Pads FSG (2.5 Folds)

Suction area (Ø) from 5 mm to 88 mm

Bellows Suction Pads FSG (2.5 Folds)

Type	Suction pad material * / hardness in Shore A			
	High temp material HT1 60±5ShA	Natural Rubber NK 45±5ShA	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FSG 5 M5-AG	10.01.06.01235	-	10.01.06.00663	10.01.06.00665
FSG 5 M5-IG	10.01.06.01242	-	10.01.06.00662	10.01.06.00664
FSG 7 G1/8-AG	10.01.06.01236	-	10.01.06.00020	10.01.06.00034
FSG 7 G1/8-IG	10.01.06.01243	-	10.01.06.00001	10.01.06.00010
FSG 7 M5-AG	10.01.06.01237	-	10.01.06.00021	10.01.06.00035
FSG 9 G1/8-AG	10.01.06.00962	10.01.06.00432	10.01.06.00022	10.01.06.00036
FSG 9 G1/8-IG	10.01.06.00978	10.01.06.00431	10.01.06.00002	10.01.06.00011
FSG 9 M5-AG	10.01.06.00963	10.01.06.00430	10.01.06.00023	10.01.06.00037
FSG 12 G1/8-AG	10.01.06.01238	10.01.06.00564	10.01.06.00562	10.01.06.00563
FSG 12 G1/8-IG	10.01.06.01244	10.01.06.00561	10.01.06.00559	10.01.06.00560
FSG 12 M5-AG	10.01.06.01255	10.01.06.00567	10.01.06.00565	10.01.06.00566
FSG 14 G1/8-AG	10.01.06.00966	10.01.06.00435	10.01.06.00024	10.01.06.00038
FSG 14 G1/8-IG	10.01.06.00982	10.01.06.00434	10.01.06.00003	10.01.06.00012
FSG 14 M5-AG	10.01.06.00967	10.01.06.00433	10.01.06.00025	10.01.06.00039
FSG 18 G1/8-AG	10.01.06.00968	10.01.06.00438	10.01.06.00026	10.01.06.00040
FSG 18 G1/8-IG	10.01.06.00984	10.01.06.00437	10.01.06.00004	10.01.06.00013
FSG 18 M5-AG	10.01.06.00969	10.01.06.00436	10.01.06.00027	10.01.06.00041
FSG 20 G1/8-AG	10.01.06.01239	10.01.06.00441	10.01.06.00028	10.01.06.00042
FSG 20 G1/8-IG	10.01.06.01245	10.01.06.00440	10.01.06.00005	10.01.06.00014
FSG 20 M5-AG	10.01.06.01240	10.01.06.00439	10.01.06.00029	10.01.06.00043
FSG 25 G1/8-AG	10.01.06.00972	10.01.06.00443	10.01.06.00334	10.01.06.00337
FSG 25 G1/8-IG	10.01.06.00988	10.01.06.00442	10.01.06.00333	10.01.06.00336
FSG 32 G1/4-AG	10.01.06.01241	10.01.06.00445	10.01.06.00030	10.01.06.00044
FSG 32 G1/4-IG	10.01.06.01246	10.01.06.00444	10.01.06.00006	10.01.06.00015
FSG 42 G1/4-AG	10.01.06.00974	10.01.06.00447	10.01.06.00031	10.01.06.00045
FSG 42 G1/4-IG	10.01.06.00990	10.01.06.00446	10.01.06.00007	10.01.06.00016
FSG 52 G1/4-AG	10.01.06.02387	10.01.06.02385	10.01.06.00582	10.01.06.00586
FSG 52 G1/4-IG	10.01.06.02388	10.01.06.02386	10.01.06.00584	10.01.06.00587
FSG 62 G1/4-AG	10.01.06.02480	10.01.06.00449	10.01.06.00032	10.01.06.00046
FSG 62 G1/4-IG	10.01.06.02481	10.01.06.00448	10.01.06.00008	10.01.06.00017
FSG 88 G1/4-AG	-	10.01.06.00451	10.01.06.00033	10.01.06.00047
FSG 88 G1/4-IG	-	10.01.06.00450	10.01.06.00009	10.01.06.00018

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads

Type	Suction pad material * / hardness in Shore A			
	High temp material HT1 60±5ShA	Natural Rubber NK 45±5ShA	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FG 5	10.01.06.01250	-	10.01.06.00640	10.01.06.00642
FG 7	10.01.06.01251	-	10.01.06.00050	10.01.06.00055
FG 9	10.01.06.00878	10.01.06.00452	10.01.06.00051	10.01.06.00056
FG 12	10.01.06.01252	10.01.06.00558	10.01.06.00557	10.01.06.00549
FG 14	10.01.06.00880	10.01.06.00453	10.01.06.00052	10.01.06.00057
FG 18	10.01.06.00881	10.01.06.00454	10.01.06.00053	10.01.06.00058
FG 20	10.01.06.01253	10.01.06.00455	10.01.06.00054	10.01.06.00059
FG 25	10.01.06.00883	10.01.06.00456	10.01.06.00335	10.01.06.00338
FG 32	10.01.06.01254	10.01.06.00457	10.01.06.00140	10.01.06.00144
FG 42	10.01.06.00885	10.01.06.00458	10.01.06.00141	10.01.06.00145
FG 52	10.01.06.02365	10.01.06.02382	10.01.06.00583	10.01.06.00585
FG 62	10.01.06.02475	10.01.06.00459	10.01.06.00142	10.01.06.00146
FG 88	-	10.01.06.00460	10.01.06.00143	10.01.06.00147

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Bellows Suction Pads (Round)

Bellows Suction Pads FSG (2.5 Folds)

Suction area (Ø) from 5 mm to 88 mm

Ordering Data Spare Parts Suction Pad Nipples

Type	Suction pad nipples [AG]		Suction pad nipples [IG]	
FSG 5 M5	SA-NIP N017 M5-AG	10.01.06.00314	SA-NIP N017 M5-IG	10.01.06.00313
FSG 7 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 7 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 9 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 9 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 12 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 12 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 14 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 14 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 18 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 18 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 20 M5	SA-NIP N016 M5-AG	10.01.06.00123	-	-
FSG 20 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 25 G1/8	SA-NIP N016 G1/8-AG	10.01.06.05735	SA-NIP N016 G1/8-IG	10.01.06.05731
FSG 32 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 42 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 52 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 62 G1/4	SA-NIP N018 G1/4-AG	10.01.06.01065	SA-NIP N018 G1/4-IG	10.01.06.01066
FSG 88 G1/4	SA-NIP N019 G1/4-AG	10.01.06.01959	SA-NIP N019 G1/4-IG	10.01.06.01960

Technical Data Bellows Suction Pads FSG (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***	Nipple family
FSG 5	0.1	0.8	0.033	8	2	N 017
FSG 7	0.1	0.9	0.043	8	4	N 016
FSG 9	0.7	2.3	0.150	10	4	N 016
FSG 12	0.9	3.5	0.600	13	4	N 016
FSG 14	1.2	5.7	0.975	15	4	N 016
FSG 18	2.3	8.5	1.350	20	4	N 016
FSG 20	3.8	12.1	2.000	30	4	N 016
FSG 25	4.5	19.0	5.400	30	4	N 016
FSG 32	12.0	36.9	10.000	35	6	N 018
FSG 42	13.6	44.0	19.500	75	6	N 018
FSG 52	27.0	96.0	62.000	75	6	N 018
FSG 62	39.6	137.0	72.500	75	6	N 018
FSG 88	45.2	286.0	165.000	100	9	N 019

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The pull-off force of the versions made of natural rubber is reduced by about 40%

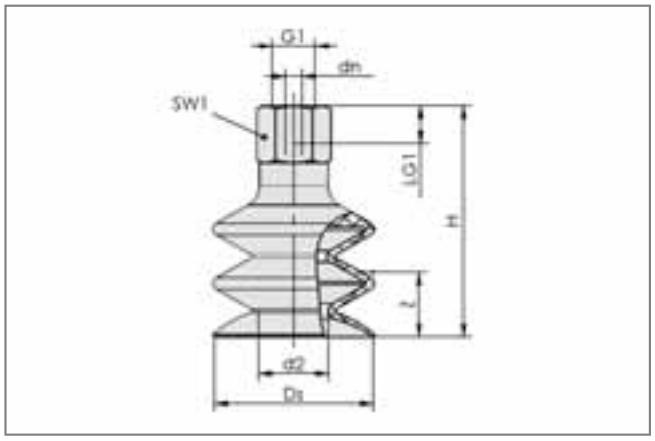
***The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Round)

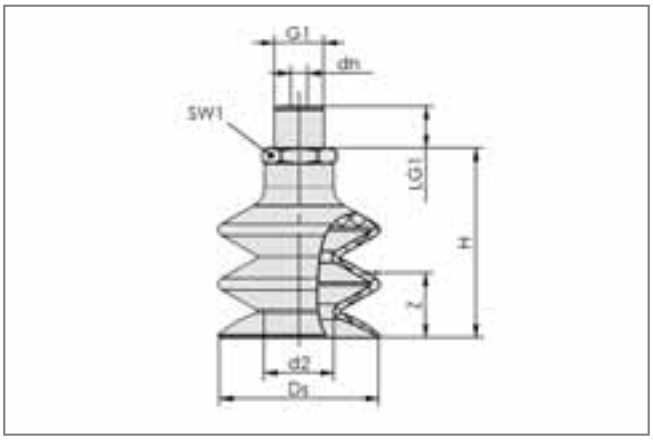
Bellows Suction Pads FSG (2.5 Folds)

Suction area (Ø) from 5 mm to 88 mm

Design Data Bellows Suction Pads FSG (2.5 Folds)



FSG 5 to 88 IG



FSG 5 to 88 AG

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
FSG 5 M5-AG	2.6	2.0	5.0	M5-M	19.0	5.0	8	3
FSG 5 M5-IG	2.6	2.0	5.0	M5-F	24.0	5.5	8	3
FSG 7 G1/8-AG	1.8	3.5	5.9	G1/8"-M	20.0	7.5	14	3
FSG 7 G1/8-IG	1.8	3.5	5.9	G1/8"-F	26.0	8.5	14	3
FSG 7 M5-AG	1.8	2.5	5.9	M5-M	19.0	5.0	7	3
FSG 9 G1/8-AG	4.1	3.5	9.0	G1/8"-M	21.0	7.5	14	3
FSG 9 G1/8-IG	4.1	3.5	9.0	G1/8"-F	27.0	8.5	14	3
FSG 9 M5-AG	4.1	2.5	9.0	M5-M	20.0	5.0	7	3
FSG 12 G1/8-AG	5.0	3.5	12.0	G1/8"-M	27.0	7.5	14	7
FSG 12 G1/8-IG	5.0	3.5	12.0	G1/8"-F	33.0	8.5	14	7
FSG 12 M5-AG	5.0	2.5	12.0	M5-M	26.0	5.0	7	7
FSG 14 G1/8-AG	5.4	3.5	14.5	G1/8"-M	28.0	7.5	14	9
FSG 14 G1/8-IG	5.4	3.5	14.5	G1/8"-F	34.0	8.5	14	9
FSG 14 M5-AG	5.4	2.5	14.5	M5-M	27.0	5.0	7	9
FSG 18 G1/8-AG	8.0	3.5	17.2	G1/8"-M	28.0	7.5	14	9
FSG 18 G1/8-IG	8.0	3.5	17.2	G1/8"-F	34.0	8.5	14	9
FSG 18 M5-AG	8.0	2.5	17.2	M5-M	27.0	5.0	7	9
FSG 20 G1/8-AG	10.5	3.5	20.0	G1/8"-M	28.0	7.5	14	9
FSG 20 G1/8-IG	10.5	3.5	20.0	G1/8"-F	34.0	8.5	14	9
FSG 20 M5-AG	10.5	2.5	20.0	M5-M	27.0	5.0	7	9
FSG 25 G1/8-AG	10.0	3.5	23.0	G1/8"-M	40.0	7.5	14	18
FSG 25 G1/8-IG	10.0	3.5	23.0	G1/8"-F	46.0	8.5	14	18
FSG 32 G1/4-AG	16.0	4.4	32.0	G1/4"-M	41.5	11.0	17	15
FSG 32 G1/4-IG	16.0	4.4	32.0	G1/4"-F	52.5	12.0	17	15
FSG 42 G1/4-AG	17.8	4.4	42.6	G1/4"-M	50.0	11.0	17	20
FSG 42 G1/4-IG	17.8	4.4	42.6	G1/4"-F	61.0	12.0	17	20
FSG 52 G1/4-AG	24.6	4.4	52.5	G1/4"-M	53.0	11.0	17	25
FSG 52 G1/4-IG	24.6	4.4	52.5	G1/4"-F	64.0	12.0	17	25
FSG 62 G1/4-AG	29.5	4.4	62.2	G1/4"-M	59.0	11.0	17	29
FSG 62 G1/4-IG	29.5	4.4	62.2	G1/4"-F	70.0	12.0	17	29
FSG 88 G1/4-AG	33.0	8.0	89.0	G1/4"-M	92.0	11.0	21	34
FSG 88 G1/4-IG	33.0	8.0	89.0	G1/4"-F	103.0	12.0	21	34

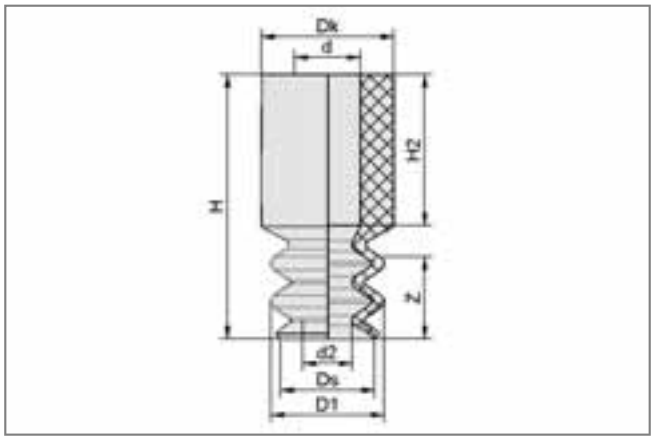
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

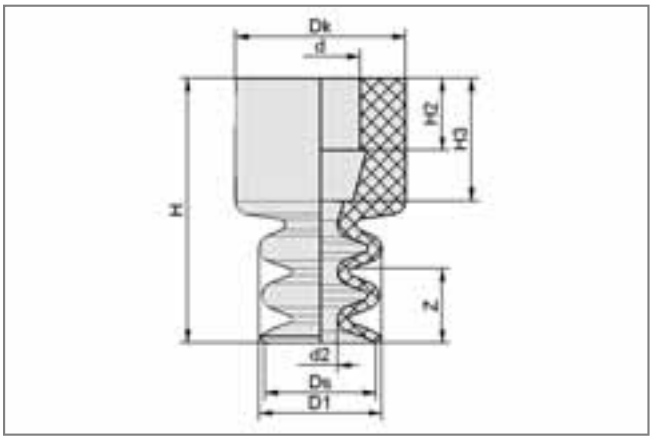
Bellows Suction Pads FSG (2.5 Folds)

Suction area (Ø) from 5 mm to 88 mm

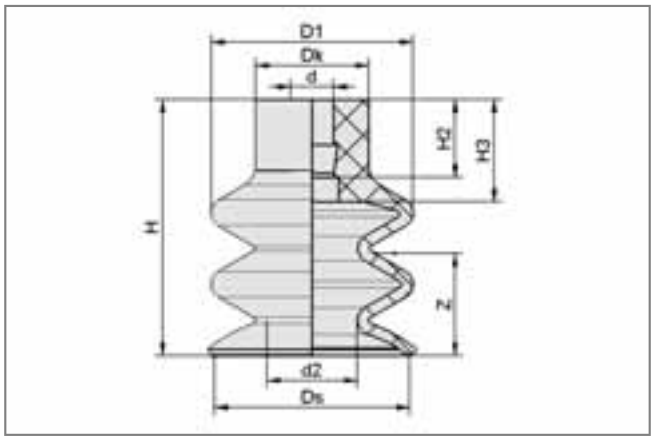
Design Data Bellows Suction Pads FG (2.5 Folds) - Spare Parts



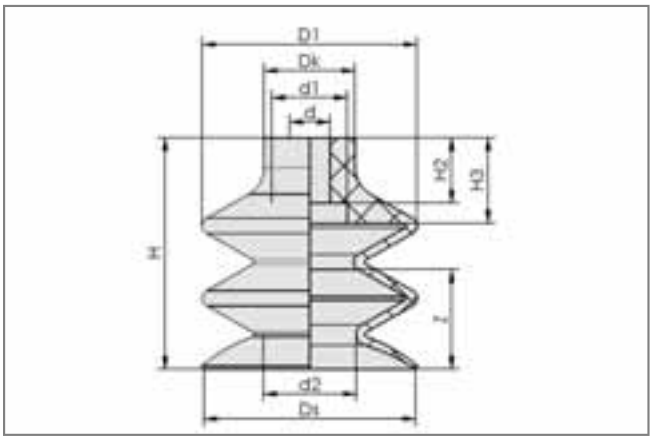
FG 5



FG 7 to 9



FG 12 to 25



FG 32 to 88

Type	Dimensions in mm*									
	d	d1	d2	D1	Dk	Ds	H	H2	H3	Z (Stroke)
FG 5	3.5	-	2.6	6.0	7	5.0	14.0	8.0	-	2
FG 7	4.5	-	1.8	6.5	9	5.9	14.0	6.5	-	3
FG 9	4.5	-	4.1	8.9	9	9.0	15.0	8.2	-	3
FG 12	4.5	-	5.0	12.0	10	12.0	21.0	6.9	9.0	6
FG 14	4.5	-	5.4	13.9	10	14.5	22.8	6.9	9.0	9
FG 18	4.5	-	8.0	17.8	10	17.2	22.6	6.9	9.0	9
FG 20	4.5	-	10.5	20.0	10	20.0	22.1	6.9	9.0	9
FG 25	4.5	-	10.0	25.0	10	23.0	34.0	6.9	9.0	18
FG 32	8.0	15	16.0	32.6	18	32.0	37.5	13.0	17.0	15
FG 42	8.0	15	17.8	43.5	18	42.6	46.0	13.0	17.0	20
FG 52	8.0	-	24.6	52.0	18	52.5	48.7	13.0	-	25
FG 62	8.0	-	29.5	62.0	18	62.2	54.0	13.0	-	29
FG 88	11.7	25	33.0	88.2	25	89.0	86.5	19.7	26.0	34

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

Bellows Suction Pads FSG VU1 (2.5 Folds)

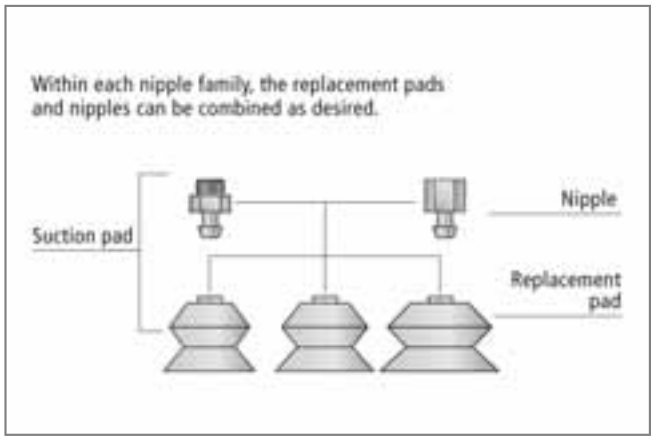
Suction area (Ø) from 30 mm to 85 mm

Suitability for Industry-Specific Applications

Bellows suction pads FSG VU1 (2.5 folds)

Applications

- Round bellows suction pad with 2.5 folds for hard use in multi-shift operations with very short cycle times
- Handling of workpieces with very abrasive surfaces
- Suction pad with special groove: for handling oily metal sheets (better handling of lateral forces)
- Suction pad without special groove: for handling cardboard, wood and similar materials



System design bellows suction pads FSG VU1 (2.5 folds)

Design

- Robust and wear-resistant suction pad FSG with single sealing lip, consisting of suction pad FG (Vulkollan VU1) with 2.5 folds and connection nipple
- Suction pad positively connected to nipple to prevent turning, even when lifting heavy loads

Bellows suction pads FSG VU1 being used for handling corrugated cardboard

Our Highlights...

- Material Vulkollan VU1 with high resistance to tearing
- Good resistance to chemicals
- Minimum abrasion, approx. 10 - 12 mm³ to DIN 53516
- Supports on the bottom
- Very stiff top fold

Your Benefits...

> Very wear-resistant suction pad for very high loading and a long lifetime

> Unaffected by oil (handling of sheet metal)

> Lifetime up to 20 times longer compared to standard NBR

> No permanent deformation of thin-walled workpieces

> Good resistance to horizontal forces at high acceleration values

Bellows Suction Pads (Round)

Bellows Suction Pads FSG VU1 (2.5 Folds)

Suction area (Ø) from 30 mm to 85 mm

Designation Code Bellows Suction Pads FSG VU1 (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example FSG 60 VU1-72 G1/4-AG:				
FSG	**60**	**VU1-72**	**G1/4-AG**	
FSG	30 60 85	VU1-72	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F))	ON oil slot

Ordering Data Bellows Suction Pads FSG VU1 (2.5 Folds)

Suction pad FSG VU1 (elastomer part + connection nipple) is delivered assembled. The assembly consists of:
- Suction pad of type FG VU1 – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad FG VU1, connection nipple SA-NIP

Bellows Suction Pads FSG VU1 (2.5 Folds)

Type*	Connection G1/4"-M	G1/4"-F
FSG 30 VU1-72	10.01.06.00200	10.01.06.00166
FSG 60 VU1-72	10.01.06.00238	10.01.06.00236
FSG 60 VU1-72 ON	10.01.06.00201	10.01.06.00171
FSG 85 VU1-72	10.01.06.00239	10.01.06.00237
FSG 85 VU1-72 ON	10.01.06.00202	10.01.06.00167

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	Bellows suction pad (round)
FG 30 VU1-72	10.01.06.00173
FG 60 VU1-72	10.01.06.00174
FG 60 VU1-72 ON	10.01.06.00208
FG 85 VU1-72	10.01.06.00175
FG 85 VU1-72 ON	10.01.06.00209

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
FSG 30 VU1-72 G1/4-AG	SA-NIP N013 G1/4-AG DN350	10.01.06.00183
FSG 30 VU1-72 G1/4-IG	SA-NIP N013 G1/4-IG DN350	10.01.06.00180
FSG 60 VU1-72 G1/4-AG	SA-NIP N014 G1/4-AG DN600	10.01.06.00184
FSG 60 VU1-72 G1/4-IG	SA-NIP N014 G1/4-IG DN600	10.01.06.00181
FSG 85 VU1-72 G1/4-AG	SA-NIP N015 G1/4-AG DN600	10.01.06.00185
FSG 85 VU1-72 G1/4-IG	SA-NIP N015 G1/4-IG DN600	10.01.06.00182

Technical Data Bellows Suction Pads FSG VU1 (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
FSG 30 VU1-72	13.5	32	9	25	6	N 013
FSG 60 VU1-72	61.0	100	61	50	6	N 014
FSG 85 VU1-72	120.0	250	195	60	6	N 015

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

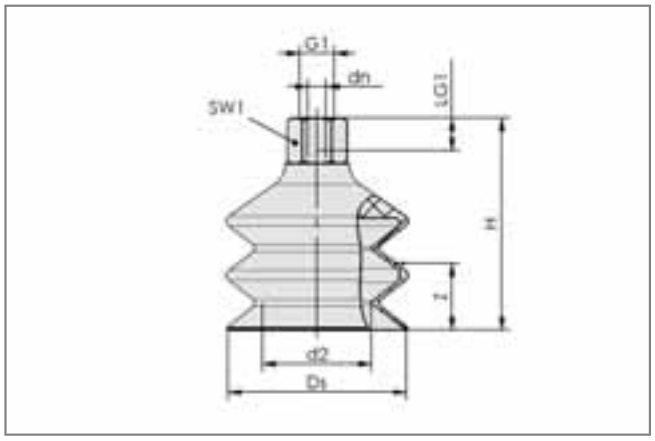
**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Round)

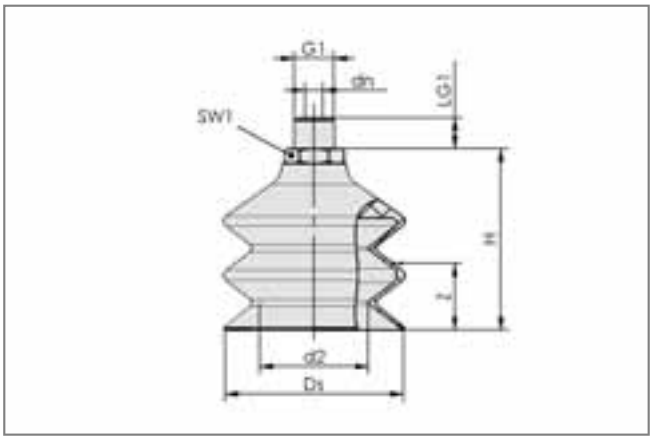
Bellows Suction Pads FSG VU1 (2.5 Folds)

Suction area (Ø) from 30 mm to 85 mm

Design Data Bellows Suction Pads FSG VU1 (2.5 Folds)



FSG 30 to 85 VU1 IG

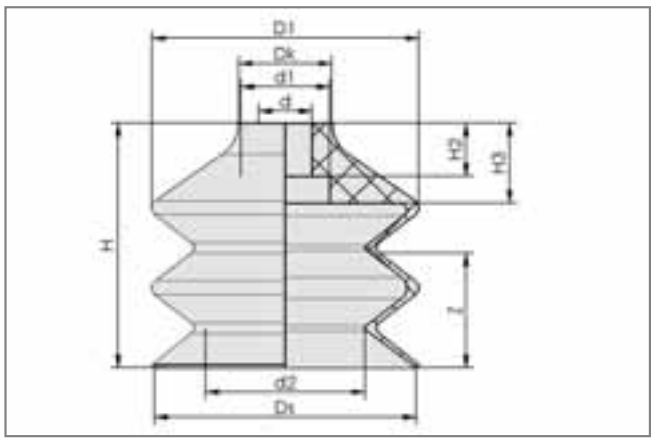


FSG 30 to 85 VU1 AG

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
FSG 30 VU1-72 G1/4-AG	15	3.5	29.0	G1/4"-M	45	10	17	15
FSG 30 VU1-72 G1/4-IG	15	3.5	29.0	G1/4"-F	55	12	17	15
FSG 60 VU1-72 G1/4-AG	36	6.0	59.0	G1/4"-M	60	10	17	30
FSG 60 VU1-72 G1/4-IG	36	6.0	59.0	G1/4"-F	70	12	17	30
FSG 85 VU1-72 G1/4-AG	51	6.0	80.2	G1/4"-M	90	10	22	38
FSG 85 VU1-72 G1/4-IG	51	6.0	80.2	G1/4"-F	100	12	22	38

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Bellows Suction Pads FG VU1 - Spare Parts for FSG VU1



FG 30 to 85 VU1

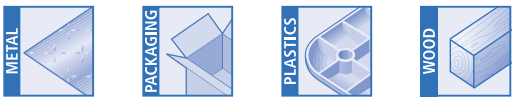
Type	Dimensions in mm*									
	d	d1	d2	D1	Dk	Ds	H	H2	H3	Z (Stroke)
FG 30 VU1-72	8	15	15	30	18	29.0	40	12	16	15
FG 60 VU1-72	12	20	36	60	21	59.0	55	12	18	30
FG 85 VU1-72	12	25	51	85	25	80.2	85	20	27	38

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Round)

Bellows Suction Pads FSGB (3.5 Folds)

Suction area (Ø) 25 mm

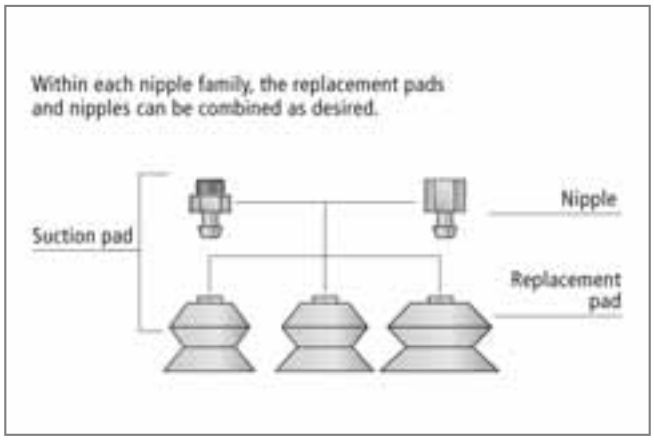


Suitability for Industry-Specific Applications

Bellows suction pads FSGB (3.5 folds)

Applications

- Round, bellows suction pad with 3.5 folds for handling of easily damaged workpieces due to optimum damping effect, big stroke and smooth sealing lip
- Handling of very uneven workpieces, such as pipes (folds permit optimal adaptation to convex surfaces)
- Handling of workpieces which have to be lifted as carefully as possible (suction pad has very long stroke)



System design bellows suction pads FSGB (3.5 folds)

Design

- Robust, wear-resistant suction pad FSGB with single sealing lip, consisting of suction pad FGB with 3.5 folds and connection nipple
- Nipple is plugged into suction pad

Bellows suction pads FSGB being used for handling pipes

Our Highlights...

- 3.5 folds
- Soft, tapered sealing lip
- Soft, flexible folds

Your Benefits...

> High suction force and extremely good damping effect during placement on easily damaged workpieces

> Very good adaptation to curved workpiece surfaces

> Very long suction pad stroke; excellent compensation for varying workpiece heights

Bellows Suction Pads (Round)

Bellows Suction Pads FSGB (3.5 Folds)

Suction area (Ø) 25 mm

Designation Code Bellows Suction Pads FSGB (3.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example FSGB 25 SI-55 G1/8-IG:			
FSGB	**25**	**SI-55**	**G1/8-IG**
FSGB	25	NBR-55 SI-55	G1/8-AG(AG = male (M)) G1/8-IG (IG = female (F))

Ordering Data Bellows Suction Pads FSGB (3.5 Folds)

Suction pad FSGB (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type FGB – elastomer part, available in various materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad FGB, connection nipple SA-NIP

Bellows Suction Pads FSGB (3.5 Folds)

Type	Suction pad material * / hardness in Shore A	
	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FSGB 25 G1/8-AG	10.01.06.00112	10.01.06.00113
FSGB 25 G1/8-IG	10.01.06.00110	10.01.06.00111

*Additional material specifications at beginning of the section "Vacuum suction pads"

Ordering Data Spare Parts Suction Pads and Connection Nipples

Type*	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
FGB 25	10.01.06.00109	10.01.06.00108

*Additional material specifications at beginning of the section "Vacuum suction pads"

Type	Suction pad connection nipple	
FSGB 25 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
FSGB 25 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731

Technical Data Bellows Suction Pads FSGB (3.5 Folds)

Type	Suction force [N]*	Pull-off force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
FSGB 25	5	20	7.5	25	4	N 016

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor.

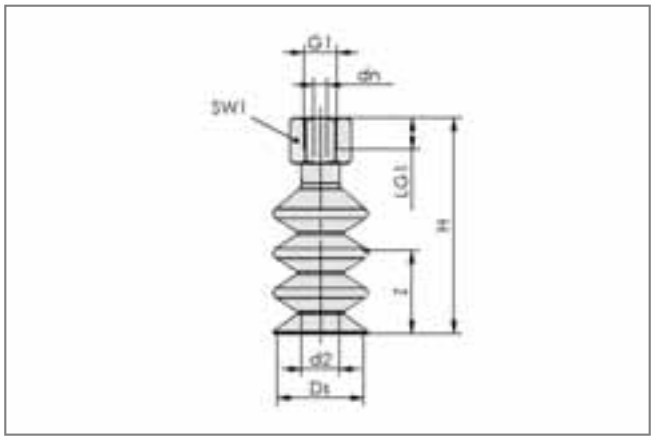
**The recommended hose diameter refers to a hose length of approx. 2 m.

Bellows Suction Pads (Round)

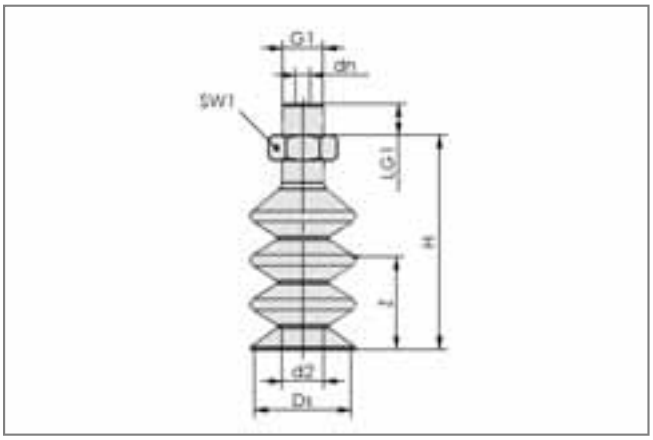
Bellows Suction Pads FSGB (3.5 Folds)

Suction area (Ø) 25 mm

Design Data Bellows Suction Pads FSGB (3.5 Folds)



FSGB 25 IG

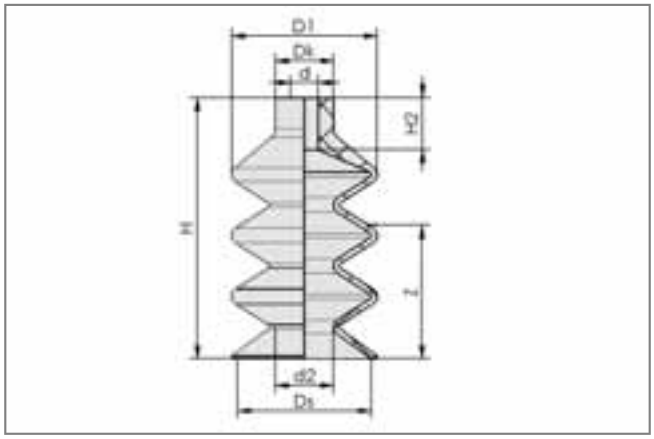


FSGB 25 AG

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
FSGB 25 G1/8-AG	10	3.5	23	G1/8"-M	51	7.5	14	22
FSGB 25 G1/8-IG	10	3.5	23	G1/8"-F	57	8.5	14	22

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Bellows Suction Pads FGB - Spare Parts for FSGB



FGB 25

Type	Dimensions in mm*						
	d	d2	D1	Dk	Ds	H	H2	Z (Stroke)
FGB 25	5	10	25	10	23	43	9	22

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Bellows Suction Pads (Oval)

Bellows Suction Pads FSGAO (1.5 Folds)

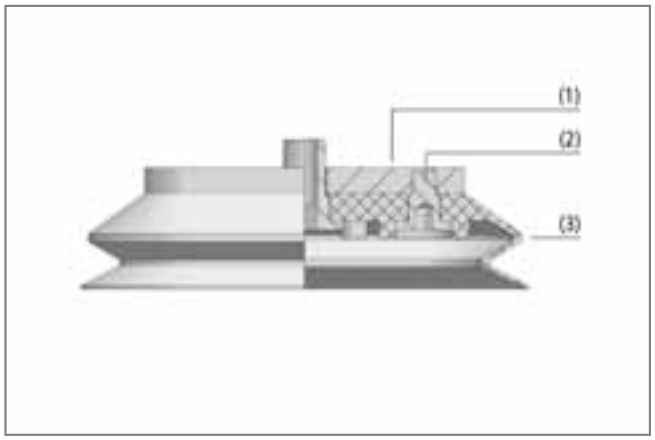
Suction area (LxW) from 95 x 40 mm to 140 x 65 mm

Suitability for Industry-Specific Applications

Bellows suction pads FSGAO (1.5 folds)

Applications

- Oval bellows suction pad with 1.5 folds for use in multi-shift operations with very short cycle times
- Handling of oily and narrow, curved metal sheet
- Handling of cardboard, wood and similar materials under rough operating conditions
- Handling of workpieces with extremely abrasive surfaces such as rough cardboard sheets



System design bellows suction pads FSGAO (1.5 folds)

Design

- Suction pad FSGAO, consisting of suction pad FGAO (Vulkollan VU1) with 1.5 folds (3) and connection plate (1)
- Connection plate screwed (2) to suction pad and capable of handling very heavy loads
- The suction pad can be replaced separately when worn

Bellows suction pads FSGAO being used for handling metal beams

Our Highlights...

- Material Vulkollan VU1 with high resistance to tearing
- Good resistance to chemicals
- Minimum abrasion: approx. 10 - 12 mm³ to DIN 53516
- 1.5 folds

Your Benefits...

> Very wear-resistant suction pad for heavy loads and a long lifetime

> Unaffected by oil (handling of sheet-metal parts)

> Up to lifetime 20 times longer compared with standard NBR

> High suction force and optimum damping effected during placement on the workpiece

Bellows Suction Pads (Oval)

Bellows Suction Pads FSGAO (1.5 Folds)

Suction area (LxW) from 95 x 40 mm to 140 x 65 mm

Designation Code Bellows Suction Pads FSGAO (1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example FSGAO 95x40 VU1-72 G1/8-AG:			
FSGAO	**95x40**	**VU1-72**	**G1/8-AG**
FSGAO	95x40 140x65	VU1-72	G1/8-AG (AG = male (M)) G1/4-AG

Ordering Data Bellows Suction Pads FSGAO (1.5 Folds)

Suction pad FSGAO (elastomer part + support plate) is delivered assembled. The assembly consists of:
- Suction pad of type FGAO – elastomer part, available in various dimensions (LxW)
- Aluminium support plate

Available spare parts: suction pad FGAO

Bellows Suction Pads FSGAO (1.5 Folds)

Type*	Part Number
FSGAO 95x40 VU1-72 G1/8-AG	10.01.06.00503
FSGAO 140x65 VU1-72 G1/4-AG	10.01.06.00498

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads

Type*	Article No.
FGAO 95x40 VU1-72 N038	10.01.06.00499
FGAO 140x65 VU1-72 N039	10.01.06.00468

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Bellows Suction Pads FSGAO (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
FSGAO 95x40 VU1-72 G1/8-AG	95	110	31	20	9	N 038
FSGAO 140x65 VU1-72 G1/4-AG	225	255	89	30	9	N 039

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor.

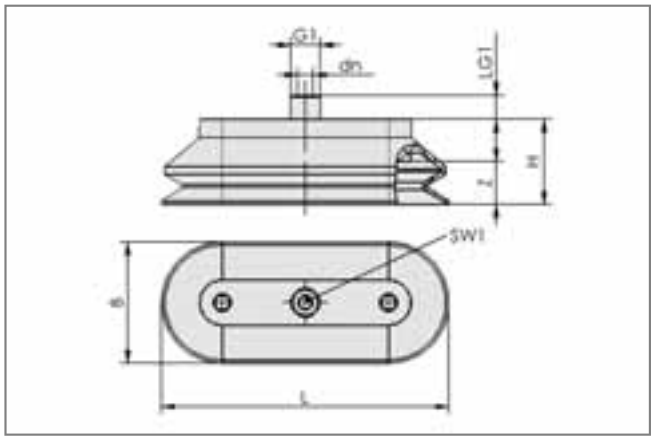
**The recommended hose diameter refers to a hose length of approx. 2 m

Bellows Suction Pads (Oval)

Bellows Suction Pads FSGAO (1.5 Folds)

Suction area (LxW) from 95 x 40 mm to 140 x 65 mm

Design Data Bellows Suction Pads FSGAO (1.5 Folds)

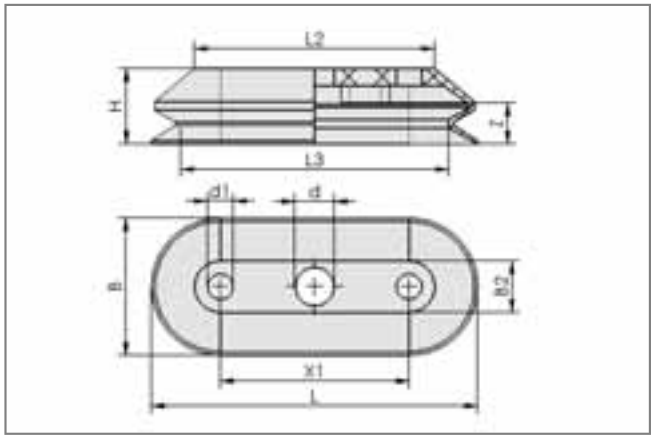


FSGAO 95x40 to 140x65 VU1

Type	Dimensions in mm*							
	B	dn	G1	H	L	LG1	SW1	Z (Stroke)
FSGAO 95x40 VU1-72 G1/8-AG	40	5	G1/8"-M	28	95	8	4	12
FSGAO 140x65 VU1-72 G1/4-AG	65	8	G1/4"-M	38	140	10	8	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Bellows Suction Pads FGAO - Spare Parts for FSGAO



FGAO 95x40 to 140x65 VU1

Type	Dimensions in mm*									
	B	B2	d	d1	H	L	L2	L3	X1	Z (Stroke)
FGAO 95x40 VU1-72 N038	40	15	11.5	7.5	23.5	95	70	78	55	12
FGAO 140x65 VU1-72 N039	65	25	15.5	9.5	30.0	140	100	111	75	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAXM

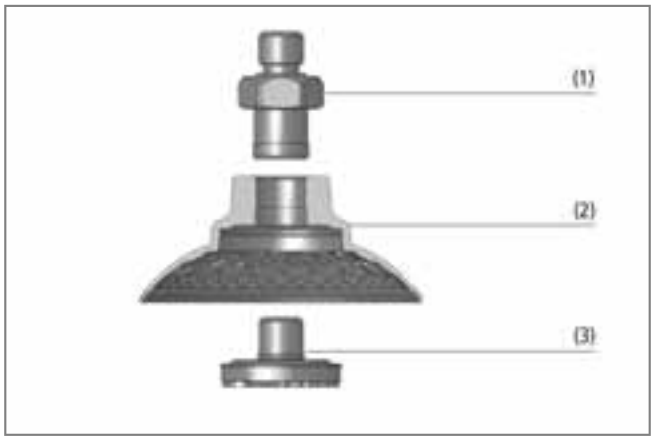
Suction area (Ø) from 30 mm to 115 mm

Suitability for Industry-Specific Applications

Bell-shaped suction pads SAXM

Applications

- High-speed suction pads with demands for highest holding and shear forces for fast handling of sheet metal and car body parts
- Handling of workpieces with oily surfaces
- Loading and unloading CNC metal and laser cutting machines
- Handling of blanks at destackers
- Handling of workpieces with convex surfaces



System design bell-shaped suction pads SAXM

Design

- Round bell-shaped suction pad (2) with flexible sealing lip, optimum internal structure, special oil groove and inner support
- Wear-resistant material Elastodur of suction pad (ED-85) and friction disc (ED-65)
- Two-part Schmalz connector (SC) consisting of connector upper part (1) and lower part including a friction disc (3)
- Connector upper part with protection against lose
- Connection elements with male thread have an integrated seal on the thread
- Available as mounted suction pad or as individual parts

Bell-shaped suction pads SAXM for handling formed sheet metal parts

Our Highlights...	Your Benefits...
• Significantly increased stroke of suction pad	> Very good adjustment to different workpiece outlines
• Optimum internal structure	> Highest transmission of holding forces and adaptation of shear forces, especially on oily sheet metal
• Large-area, structured inner support	> Avoidance of deep-drawing, even with thin sheets
• Innovative material ED	> Highly wear-resistant, resistant to the effects of ozone and aggressive draw oils
• Environmental friendly, modular design	> Minimum costs, quick replacement of individual components, 100% recyclable

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAXM

Suction area (Ø) from 30 mm to 115 mm

Designation Code Bell-Shaped Suction Pads SAXM

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAXM 30 ED-85 G1/4-IG:			
SAXM	**30**	**ED-85**	**G1/4-IG**
SAXM	30 to 115	ED-85	G1/4-IG (IG = female (F)) G3/8-IG M10x1.5-AG (AG =male (M)) M14x1.5-AG RA rectangular adapter

Ordering Data Bell-Shaped Suction Pads SAXM

Bell-shaped suction pad SAXM (elastomer part + connection element) is delivered assembled. As an alternative the individual parts can also be ordered separately. To do this, the following ordering steps are required:

- Bell-shaped suction pad of type SAXM (step 1) – elastomer part, available in various diameters
- Connector upper part (step 2) – available with various threads
- Connector lower part (step 3) – including molded friction disc

Bell-shaped Suction Pad SAXM (Assembled)

Type*	Connection				
	G1/4"-F	G3/8"-F	M10x1.5-M	M14x1.5-M	Rectangular adapter
SAXM 30 ED-85...	10.01.19.00014	10.01.19.00015	10.01.19.00016	10.01.19.00017	10.01.19.00018
SAXM 40 ED-85...	10.01.19.00019	10.01.19.00020	10.01.19.00021	10.01.19.00022	10.01.19.00023
SAXM 50 ED-85...	10.01.19.00024	10.01.19.00025	10.01.19.00026	10.01.19.00027	10.01.19.00028
SAXM 60 ED-85...	10.01.19.00029	10.01.19.00030	10.01.19.00031	10.01.19.00032	10.01.19.00033
SAXM 80 ED-85...	10.01.19.00034	10.01.19.00035	10.01.19.00036	10.01.19.00037	10.01.19.00038
SAXM 100 ED-85...	10.01.19.00039	10.01.19.00040	10.01.19.00041	10.01.19.00042	10.01.19.00043
SAXM 115 ED-85...	10.01.19.00044	10.01.19.00045	10.01.19.00046	10.01.19.00047	10.01.19.00048

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 1: Bell-shaped Suction Pad SAXM (Single Component)

Type*	Part Number
SAXM 30 ED-85	10.01.19.00004
SAXM 40 ED-85	10.01.19.00005
SAXM 50 ED-85	10.01.19.00006
SAXM 60 ED-85	10.01.19.00007
SAXM 80 ED-85	10.01.19.00008
SAXM 100 ED-85	10.01.19.00009
SAXM 115 ED-85	10.01.19.00010

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAXM

Suction area (Ø) from 30 mm to 115 mm

Step 2: Connector Upper Part (Single Component)

Type	SAXM 30	SAXM 40	SAXM 50	SAXM 60	SAXM 80	SAXM 100	SAXM 115
SC-A 045 G1/4-AG	10.01.06.02818	10.01.06.02818	-	-	-	-	-
SC-A 055 G1/4-AG	-	-	10.01.06.02821	10.01.06.02821	10.01.06.02821	-	-
SC-A 065 G1/4-AG	-	-	-	-	-	10.01.06.02824	10.01.06.02824
SC-A 045 G1/4-IG	10.01.06.02736	10.01.06.02736	-	-	-	-	-
SC-A 055 G1/4-IG	-	-	10.01.06.02742	10.01.06.02742	10.01.06.02742	-	-
SC-A 065 G1/4-IG	-	-	-	-	-	10.01.06.02774	10.01.06.02774
SC-A 045 G3/8-AG	10.01.06.02807	10.01.06.02807	-	-	-	-	-
SC-A 055 G3/8-AG	-	-	10.01.06.02809	10.01.06.02809	10.01.06.02809	-	-
SC-A 065 G3/8-AG	-	-	-	-	-	10.01.06.02810	10.01.06.02810
SC-A 045 G3/8-IG	10.01.06.02737	10.01.06.02737	-	-	-	-	-
SC-A 055 G3/8-IG	-	-	10.01.06.02743	10.01.06.02743	10.01.06.02743	-	-
SC-A 065 G3/8-IG	-	-	-	-	-	10.01.06.02648	10.01.06.02648
SC-A 045 M10x1.5-AG	10.01.06.02819	10.01.06.02819	-	-	-	-	-
SC-A 055 M10x1.5-AG	-	-	10.01.06.02822	10.01.06.02822	10.01.06.02822	-	-
SC-A 065 M10x1.5-AG	-	-	-	-	-	10.01.06.02825	10.01.06.02825
SC-A 045 M14x1.5-AG	10.01.06.02820	10.01.06.02820	-	-	-	-	-
SC-A 055 M14x1.5-AG	-	-	10.01.06.02823	10.01.06.02823	10.01.06.02823	-	-
SC-A 065 M14x1.5-AG	-	-	-	-	-	10.01.06.02826	10.01.06.02826
SC-A 045 RA	10.01.06.02813	10.01.06.02813	-	-	-	-	-
SC-A 055 RA	-	-	10.01.06.02815	10.01.06.02815	10.01.06.02815	-	-
SC-A 065 RA	-	-	-	-	-	10.01.06.02817	10.01.06.02817

Step 3: Connector Lower Part (Single Component)

Type	SAXM 30	SAXM 40	SAXM 50	SAXM 60	SAXM 80	SAXM 100	SAXM 115
SC-FDC 045	10.01.06.02803	10.01.06.02803	-	-	-	-	-
SC-FDC 055	-	-	10.01.06.02804	10.01.06.02804	10.01.06.02804	-	-
SC-FDC 065	-	-	-	-	-	10.01.06.02805	10.01.06.02805

Technical Data Bell-Shaped Suction Pads SAXM

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAXM 30 ED-85	39	32	41	3.4	18	5
SAXM 40 ED-85	69	38	71	7.1	25	5
SAXM 50 ED-85	109	58	110	14.4	25	6
SAXM 60 ED-85	154	85	155	24.2	30	6
SAXM 80 ED-85	270	150	269	51.9	33	6
SAXM 100 ED-85	412	230	414	95.5	40	6
SAXM 115 ED-85	549	320	584	141.5	50	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

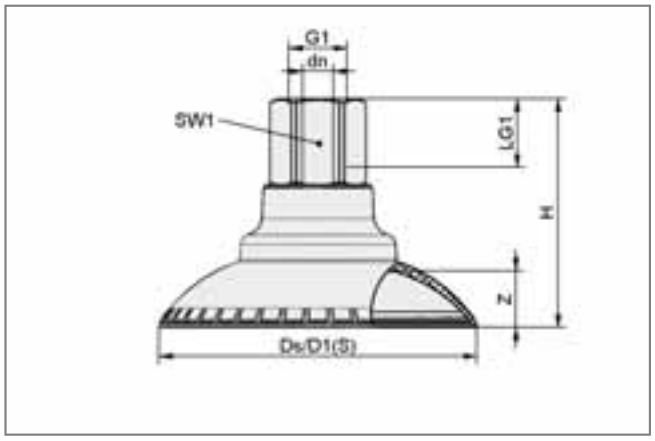
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

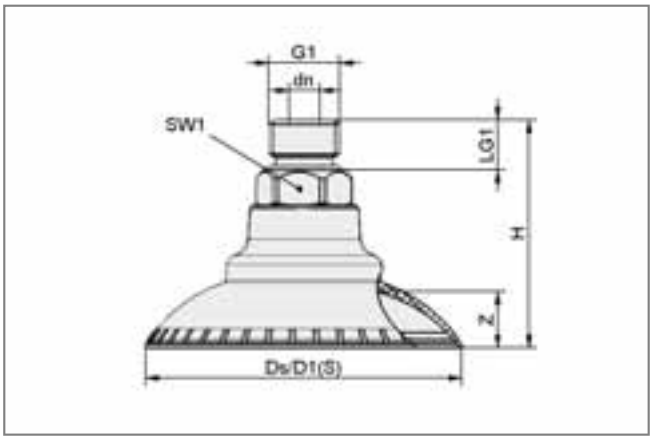
Bell-Shaped Suction Pads SAXM

Suction area (Ø) from 30 mm to 115 mm

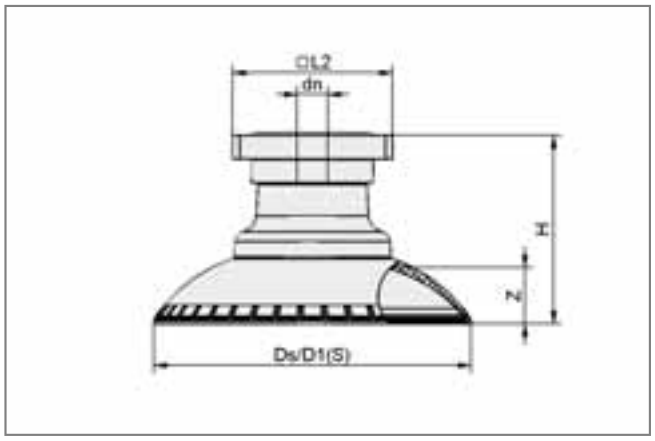
Design Data Bell-Shaped Suction Pads SAXM (Assembled)



SAXM 30 to 115 IG



SAXM 30 to 115 AG



SAXM 30 to 115 RA

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAXM

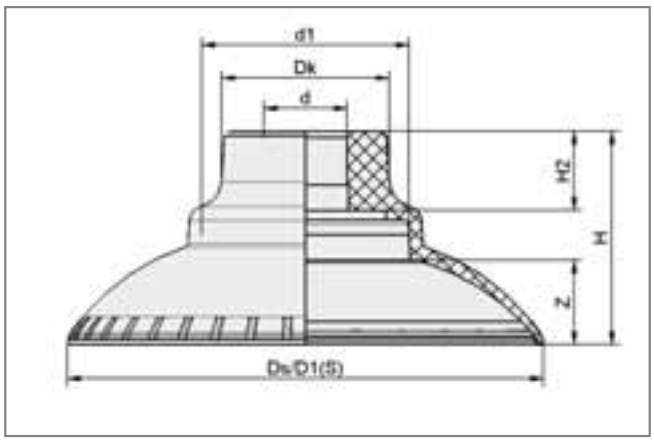
Suction area (Ø) from 30 mm to 115 mm

Type	Dimensions in mm*								
	dn	Ds	D1 (S)**	G1	H	LG1	L2	SW1	Z (Stroke)
SAXM 30 ED-85 G1/4-IG	5	33.0	35.2	G1/4"-F	35	12	-	17	4.3
SAXM 30 ED-85 G3/8-IG	5	33.0	35.2	G3/8"-F	35	12	-	22	4.3
SAXM 30 ED-85 M10x1.5-AG	5	33.0	35.2	M10x1.5-M	35	10	-	17	4.3
SAXM 30 ED-85 M14x1.5-AG	5	33.0	35.2	M14x1.5-M	35	10	-	17	4.3
SAXM 30 ED-85 RA	5	33.0	35.2	Rectangular adapter	27	-	32	-	4.3
SAXM 40 ED-85 G1/4-IG	5	42.5	45.4	G1/4"-F	38	12	-	17	6.9
SAXM 40 ED-85 G3/8-IG	5	42.5	45.4	G3/8"-F	38	12	-	22	6.9
SAXM 40 ED-85 M10x1.5-AG	5	42.5	45.4	M10x1.5-M	37	10	-	17	6.9
SAXM 40 ED-85 M14x1.5-AG	5	42.5	45.4	M14x1.5-M	37	10	-	17	6.9
SAXM 40 ED-85 RA	5	42.5	45.4	Rectangular adapter	30	-	32	-	6.9
SAXM 50 ED-85 G1/4-IG	6	53.0	58.4	G1/4"-F	43	12	-	17	8.4
SAXM 50 ED-85 G3/8-IG	6	53.0	58.4	G3/8"-F	43	12	-	22	8.4
SAXM 50 ED-85 M10x1.5-AG	6	53.0	58.4	M10x1.5-M	43	10	-	17	8.4
SAXM 50 ED-85 M14x1.5-AG	6	53.0	58.4	M14x1.5-M	43	10	-	17	8.4
SAXM 50 ED-85 RA	6	53.0	58.4	Rectangular adapter	35	-	32	-	8.4
SAXM 60 ED-85 G1/4-IG	6	63.0	69.7	G1/4"-F	45	12	-	17	10.9
SAXM 60 ED-85 G3/8-IG	6	63.0	69.7	G3/8"-F	45	12	-	22	10.9
SAXM 60 ED-85 M10x1.5-AG	6	63.0	69.7	M10x1.5-M	45	10	-	17	10.9
SAXM 60 ED-85 M14x1.5-AG	6	63.0	69.7	M14x1.5-M	45	10	-	17	10.9
SAXM 60 ED-85 RA	6	63.0	69.7	Rectangular adapter	38	-	32	-	10.9
SAXM 80 ED-85 G1/4-IG	6	83.0	92.2	G1/4"-F	48	12	-	17	13.9
SAXM 80 ED-85 G3/8-IG	6	83.0	92.2	G3/8"-F	48	12	-	22	13.9
SAXM 80 ED-85 M10x1.5-AG	6	83.0	92.2	M10x1.5-M	48	10	-	17	13.9
SAXM 80 ED-85 M14x1.5-AG	6	83.0	92.2	M14x1.5-M	48	10	-	17	13.9
SAXM 80 ED-85 RA	6	83.0	92.2	Rectangular adapter	41	-	32	-	13.9
SAXM 100 ED-85 G1/4-IG	6	102.4	111.1	G1/4"-F	57	12	-	22	17.1
SAXM 100 ED-85 G3/8-IG	6	102.4	111.1	G3/8"-F	57	12	-	22	17.1
SAXM 100 ED-85 M10x1.5-AG	6	102.4	111.1	M10x1.5-M	57	12	-	22	17.1
SAXM 100 ED-85 M14x1.5-AG	6	102.4	111.1	M14x1.5-M	57	12	-	22	17.1
SAXM 100 ED-85 RA	6	102.4	111.1	Rectangular adapter	49	-	32	-	17.1
SAXM 115 ED-85 G1/4-IG	6	118.0	129.4	G1/4"-F	60	12	-	22	20.0
SAXM 115 ED-85 G3/8-IG	6	118.0	129.4	G3/8"-F	60	12	-	22	20.0
SAXM 115 ED-85 M10x1.5-AG	6	118.0	129.4	M10x1.5-M	60	12	-	22	20.0
SAXM 115 ED-85 M14x1.5-AG	6	118.0	129.4	M14x1.5-M	60	12	-	22	20.0
SAXM 115 ED-85 RA	6	118.0	129.4	Rectangular adapter	52	-	32	-	20.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**D1 is the external dimension of the suction pad when it is pressed against the workpiece by the vacuum

Design Data Bell-Shaped Suction Pad SAXM (Single Component)



SAXM 30 to 115

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAXM

Suction area (Ø) from 30 mm to 115 mm

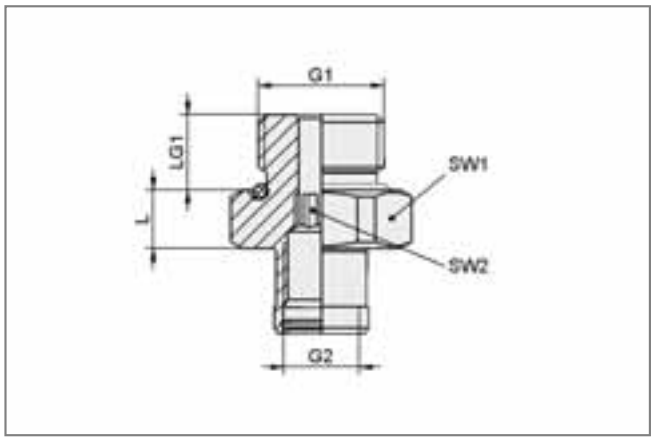
Design Data Bell-Shaped Suction Pad SAXM (Single Component)

Type	Dimensions in mm*							
	d	d1	Dk	Ds	D1 (S)**	H	H2	Z (Stroke)
SAXM 30 ED-85	9.7	15.6	19.2	30	35.2	18	7.0	4.3
SAXM 40 ED-85	9.7	15.6	19.2	40	45.4	21	7.0	6.9
SAXM 50 ED-85	11.8	27.6	22.2	50	58.4	26	10.5	8.4
SAXM 60 ED-85	11.8	27.6	22.2	60	69.7	28	10.5	10.9
SAXM 80 ED-85	11.8	27.6	22.0	80	92.2	31	10.5	13.9
SAXM 100 ED-85	14.0	39.6	25.6	100	111.1	39	14.3	17.1
SAXM 115 ED-85	14.0	39.6	28.9	115	129.4	42	14.3	20.0

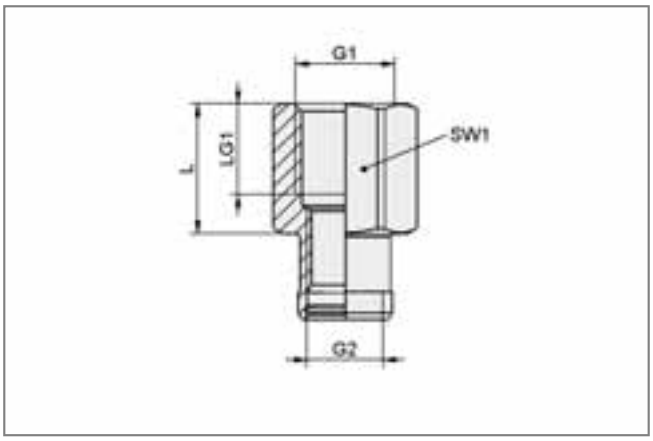
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**D1 is the external dimension of the suction pad when it is pressed against the workpiece by the vacuum

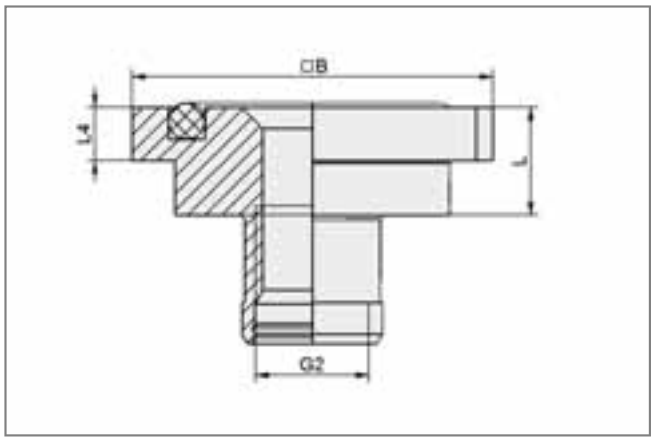
Design Data Connector Upper Part (Single Component)



SC-A...AG



SC-A...IG



SC-A...RA

Suction Pads for Handling Sheet Metal

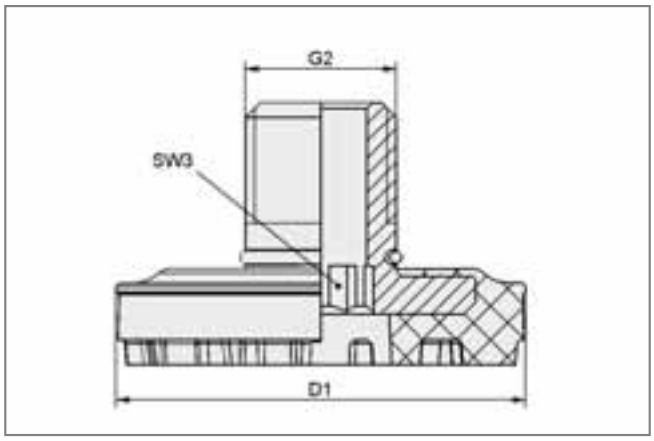
Bell-Shaped Suction Pads SAXM

Suction area (Ø) from 30 mm to 115 mm

Design Data Connector Upper Part (Single Component)

Type	Dimensions in mm							
	B	G1	G2	L	L4	LG1	SW1	SW2
SC-A 045 G1/4-AG	-	G1/4"-M	M8x1-F	7.2	-	10	17	5
SC-A 055 G1/4-AG	-	G1/4"-M	M10x1-F	7.2	-	10	17	6
SC-A 065 G1/4-AG	-	G1/4"-M	M10x1-F	8.0	-	10	22	6
SC-A 045 G1/4-IG	-	G1/4"-F	M8x1-F	17.2	-	12	17	-
SC-A 055 G1/4-IG	-	G1/4"-F	M10x1-F	17.2	-	12	17	-
SC-A 065 G1/4-IG	-	G1/4"-F	M10x1-F	18.0	-	12	22	-
SC-A 045 G3/8-AG	-	G3/8"-M	M8x1-F	7.7	-	10	22	5
SC-A 055 G3/8-AG	-	G3/8"-M	M10x1-F	7.7	-	10	22	6
SC-A 065 G3/8-AG	-	G3/8"-M	M10x1-F	8.0	-	10	22	6
SC-A 045 G3/8-IG	-	G3/8"-F	M8x1-F	17.2	-	12	17	-
SC-A 055 G3/8-IG	-	G3/8"-F	M10x1-F	17.2	-	12	22	-
SC-A 065 G3/8-IG	-	G3/8"-F	M10x1-F	18.0	-	12	22	-
SC-A 045 M10x1.5-AG	-	M10x1.5-M	M8x1-F	7.2	-	10	17	4
SC-A 055 M10x1.5-AG	-	M10x1.5-M	M10x1-F	7.2	-	10	17	4
SC-A 065 M10x1.5-AG	-	M10x1.5-M	M10x1-F	8.0	-	10	22	4
SC-A 045 M14x1.5-AG	-	M14x1.5-M	M8x1-F	7.2	-	10	17	5
SC-A 055 M14x1.5-AG	-	M14x1.5-M	M10x1-F	7.2	-	10	17	6
SC-A 065 M14x1.5-AG	-	M14x1.5-M	M10x1-F	8.0	-	10	22	6
SC-A 045 RA	31.8	-	M8x1-F	9.5	4.7	-	-	-
SC-A 055 RA	31.8	-	M10x1-F	9.5	4.7	-	-	-
SC-A 065 RA	31.8	-	M10x1-F	9.5	4.7	-	-	-

Design Data Connector Lower Part (Single Component)



SC-FDC 045...065

Type	Dimensions in mm		
	D1	G2	SW3
SC-FDC 045	15	M8x1-M	5
SC-FDC 055	28	M10x1-M	6
SC-FDC 065	39	M10x1-M	6

Suction Pads for Handling Sheet Metal

Flat Suction Pads SAF

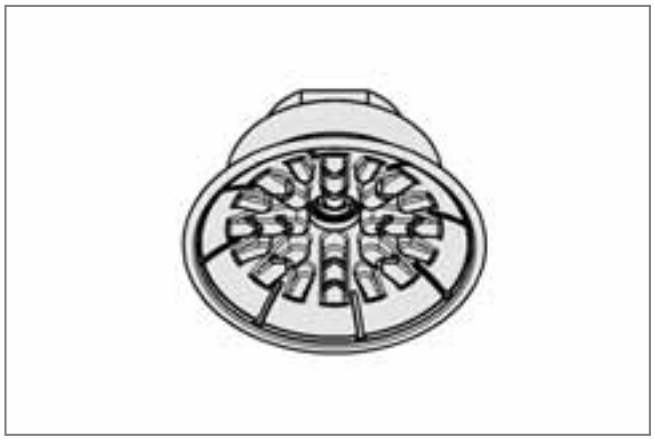
Suction area (Ø) from 30 mm to 125 mm

Suitability for Industry-Specific Applications

Flat suction pads SAF

Applications

- Round, flat suction pad for dynamic handling of metal sheets with very short cycle times
- Handling of thin steel sheets and aluminum sheets without deformation
- For use in feeder systems for press lines in the automobile industry
- Special slot on the bottom prevents oily sheets from slipping, permitting precise positioning in stamping presses etc.



System design flat suction pads SAF

Design

- Robust and wear-resistant suction pad SAF made of NBR with single sealing lip, special slot and inner support
- Suction pad SAF vulcanized to the connection nipple (very high strength)
- Suction pad available with various connection types
- Available in two material hardness values (45 Shore, 60 Shore)

Flat suction pads SAF being used for handling sheet metal parts

Our Highlights...	Your Benefits...
• Wide range of diameters	> For a wide range of workpiece sizes and shapes
• Large-area structured inner support	> No deep-drawing of the workpiece; capable of handling high lateral forces, even on oily metal sheets
• Soft and flexible sealing lip	> Excellent sealing, even on slightly curved surfaces
• Various material hardness values	> Optimum adaptation to varying workpieces
• Nipple vulcanized to the suction pad	> Prevention of machine damages and downtimes as the result of lost suction pads

Suction Pads for Handling Sheet Metal

Flat Suction Pads SAF

Suction area (Ø) from 30 mm to 125 mm

Designation Code Flat Suction Pads SAF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAF 80 NBR-60 G3/8-IG:			
SAF	**80**	**NBR-60**	**G3/8-IG**
SAF	30 to 125	NBR-45 NBR-60	G1/4-AG(AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Flat Suction Pads SAF

Suction pad SAF, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Pads SAF

Type*	Connection					
	G1/4"-M	G1/4"-F	G3/8"-F	M10x1.5-M	M14x1.5-M	Rectangular adapter
SAF 30 NBR-60	10.01.01.10646	10.01.01.10506	10.01.01.10705	10.01.01.10713	10.01.01.10730	10.01.01.10790
SAF 30 NBR-45	10.01.01.11421	10.01.01.11400	10.01.01.11420	10.01.01.11425	10.01.01.11426	10.01.01.11423
SAF 40 NBR-60	10.01.01.10647	10.01.01.10508	10.01.01.10708	10.01.01.10716	10.01.01.10733	10.01.01.10793
SAF 40 NBR-45	10.01.01.11430	10.01.01.11401	10.01.01.11431	10.01.01.11435	10.01.01.11436	10.01.01.11433
SAF 50 NBR-60	10.01.01.10635	10.01.01.10688	10.01.01.10510	10.01.01.10719	10.01.01.10736	10.01.01.10796
SAF 50 NBR-45	10.01.01.11440	10.01.01.11441	10.01.01.11402	10.01.01.11444	10.01.01.11445	10.01.01.11442
SAF 60 NBR-60	10.01.01.10622	10.01.01.10689	10.01.01.10512	10.01.01.10721	10.01.01.10739	10.01.01.10799
SAF 60 NBR-45	10.01.01.11450	10.01.01.11451	10.01.01.11403	10.01.01.11454	10.01.01.11455	10.01.01.11452
SAF 80 NBR-60	10.01.01.10623	10.01.01.10690	10.01.01.10514	10.01.01.10724	10.01.01.10742	10.01.01.10802
SAF 80 NBR-45	10.01.01.11460	10.01.01.11461	10.01.01.11404	10.01.01.11466	10.01.01.11467	10.01.01.11464
SAF 100 NBR-60	10.01.01.10624	10.01.01.10691	10.01.01.10516	10.01.01.10726	10.01.01.10745	10.01.01.10805
SAF 100 NBR-45	10.01.01.11470	10.01.01.11471	10.01.01.11405	10.01.01.11476	10.01.01.11477	10.01.01.11474
SAF 125 NBR-60	10.01.01.10666	10.01.01.10692	10.01.01.10518	10.01.01.10728	10.01.01.10748	10.01.01.10808
SAF 125 NBR-45	10.01.01.11480	10.01.01.11481	10.01.01.11406	10.01.01.11485	10.01.01.11486	10.01.01.11483

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Flat Suction Pads SAF

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAF 30	38	30	28	1.7	40	4
SAF 40	69	52	50	3.8	50	4
SAF 50	100	80	76	7.0	65	4
SAF 60	150	105	85	13.0	75	6
SAF 80	272	205	180	36.0	100	6
SAF 100	430	310	300	58.0	135	6
SAF 125	660	475	400	115.0	165	9

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

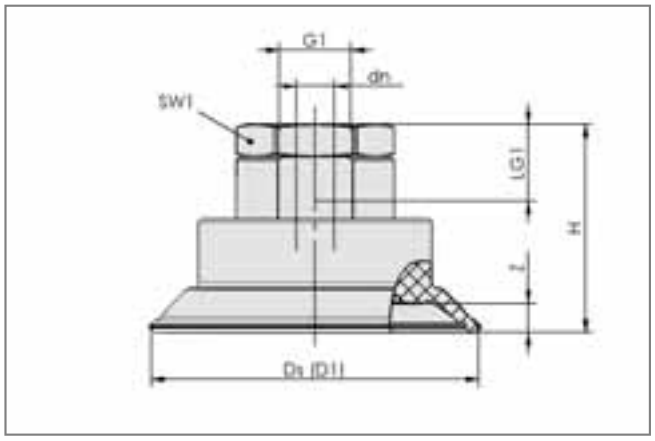
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

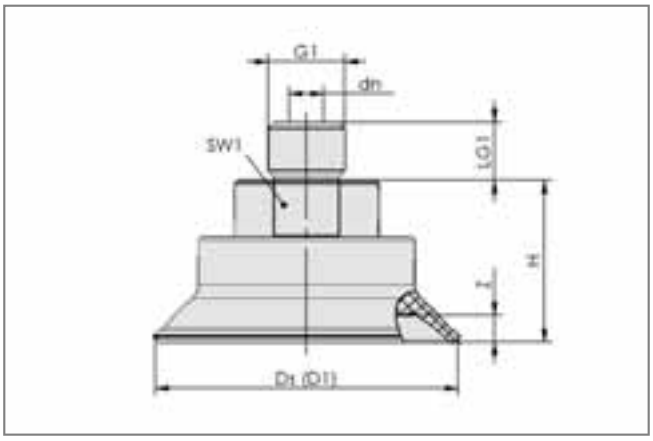
Flat Suction Pads SAF

Suction area (Ø) from 30 mm to 125 mm

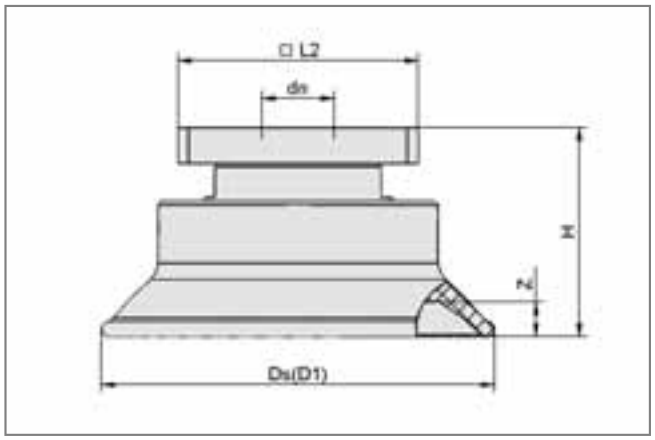
Design Data Flat Suction Pads SAF



SAF 30 to 125 IG



SAF 30 to 125 AG



SAF 30 to 125 RA (rectangular adapter)

Suction Pads for Handling Sheet Metal

Flat Suction Pads SAF

Suction area (Ø) from 30 mm to 125 mm

Design Data Flat Suction Pads SAF

Type	Dimensions in mm*								
	D1**	dn	Ds	G1	H	LG1	L2	SW1	Z (Stroke)
SAF 30 G1/4-AG	34	4	32	G1/4"-M	20.0	10	-	17	3.0
SAF 30 G1/4-IG	34	4	32	G1/4"-F	20.0	12	-	17	3.0
SAF 30 G3/8-IG	34	4	32	G3/8"-F	36.0	9	-	22	3.0
SAF 30 M10x1.5-AG	34	4	32	M10x1.5-M	20.0	12	-	17	3.0
SAF 30 M14x1.5-AG	34	4	32	M14x1.5-M	22.0	12	-	17	3.0
SAF 30 RA	34	4	32	-	23.2	-	32	-	3.0
SAF 40 G1/4-AG	46	4	42	G1/4"-M	22.0	10	-	17	4.0
SAF 40 G1/4-IG	46	4	42	G1/4"-F	22.0	12	-	17	4.0
SAF 40 G3/8-IG	46	4	42	G3/8"-F	38.0	9	-	22	4.0
SAF 40 M10x1.5-AG	46	4	42	M10x1.5-M	22.0	12	-	17	4.0
SAF 40 M14x1.5-AG	46	4	42	M14x1.5-M	22.0	12	-	17	4.0
SAF 40 RA	46	4	42	-	25.0	-	32	-	4.0
SAF 50 G1/4-AG	56	6	52	G1/4"-M	28.0	10	-	22	5.0
SAF 50 G1/4-IG	56	6	52	G1/4"-F	33.0	15	-	22	5.0
SAF 50 G3/8-IG	56	6	52	G3/8"-F	28.0	15	-	22	5.0
SAF 50 M10x1.5-AG	56	4	52	M10x1.5-M	28.0	12	-	22	5.0
SAF 50 M14x1.5-AG	56	6	52	M14x1.5-M	28.0	12	-	22	5.0
SAF 50 RA	56	6	52	-	27.5	-	32	-	5.0
SAF 60 G1/4-AG	67	6	63	G1/4"-M	31.0	10	-	22	6.0
SAF 60 G1/4-IG	67	6	63	G1/4"-F	36.0	15	-	22	6.0
SAF 60 G3/8-IG	67	6	63	G3/8"-F	31.0	15	-	22	6.0
SAF 60 M10x1.5-AG	67	4	63	M10x1.5-M	31.0	12	-	22	6.0
SAF 60 M14x1.5-AG	67	6	63	M14x1.5-M	31.0	12	-	22	6.0
SAF 60 RA	67	6	63	-	30.5	-	32	-	6.0
SAF 80 G1/4-AG	89	6	83	G1/4"-M	35.0	10	-	22	7.6
SAF 80 G1/4-IG	89	6	83	G1/4"-F	40.0	20	-	22	7.6
SAF 80 G3/8-IG	89	6	83	G3/8"-F	35.0	15	-	22	7.6
SAF 80 M10x1.5-AG	89	4	83	M10x1.5-M	35.0	12	-	22	7.6
SAF 80 M14x1.5-AG	89	6	83	M14x1.5-M	35.0	12	-	22	7.6
SAF 80 RA	89	6	83	-	34.5	-	32	-	7.6
SAF 100 G1/4-AG	110	6	103	G1/4"-M	36.0	10	-	22	9.5
SAF 100 G1/4-IG	110	6	103	G1/4"-F	41.0	20	-	22	9.5
SAF 100 G3/8-IG	110	6	103	G3/8"-F	36.0	15	-	22	9.5
SAF 100 M10x1.5-AG	110	4	103	M10x1.5-M	36.0	12	-	22	9.5
SAF 100 M14x1.5-AG	110	6	103	M14x1.5-M	36.0	12	-	22	9.5
SAF 100 RA	110	6	103	-	35.5	-	32	-	9.5
SAF 125 G1/4-AG	135	6	128	G1/4"-M	43.0	10	-	22	12.5
SAF 125 G1/4-IG	135	6	128	G1/4"-F	48.0	20	-	22	12.5
SAF 125 G3/8-IG	135	9	128	G3/8"-F	43.0	15	-	22	12.5
SAF 125 M10x1.5-AG	135	4	128	M10x1.5-M	43.0	12	-	22	12.5
SAF 125 M14x1.5-AG	135	6	128	M14x1.5-M	43.0	12	-	22	12.5
SAF 125 RA	135	9	128	-	42.5	-	32	-	12.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**D1 is the external dimension of the suction pad when it is pressed against the workpiece by the vacuum

Suction Pads for Handling Sheet Metal

Bellows Suction Pads SAB (1.5 Folds)

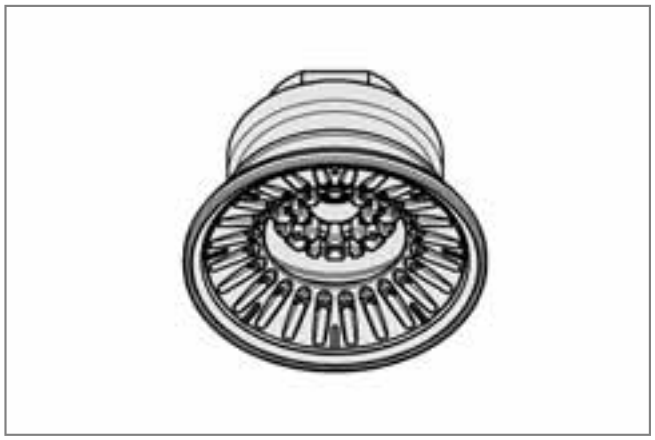
Suction area (Ø) from 22 mm to 125 mm

Suitability for Industry-Specific Applications

Bellows suction pads SAB (1.5 folds)

Applications

- Round, bellows suction pad with 1.5 folds for dynamic handling of metal sheets (short cycle times)
- Handling of thin steel sheets and aluminum sheets without deformation
- Handling of pre-shaped metal sheet parts, since bellows shape permits optimum adaptation
- For use e.g. in feeder systems for press lines in the automobile industry
- Special slot on the bottom of the pad prevents the oily metal sheets from slipping and permits precise positioning in punching presses etc.



System design bellows suction pads SAB (1.5 folds)

Design

- Robust and wear-resistant suction pad SAB with 1.5 folds, made of NBR, special slot and inner support
- Suction pad SAB vulcanized to the connection nipple (very high strength)
- Suction pads available with various connection types

Bellows suction pads SAB being used for handling car bodywork parts

Our Highlights...	Your Benefits...
• Wide range of diameters	> For a wide range of workpiece sizes and shapes
• 1.5 folds	> Optimum adaptation and sealing to curved workpieces, very good damping
• Stiff top fold	> Good resistance to horizontal forces and lateral acceleration
• Large, structured inner support	> No deep-drawing of the workpiece; capable of handling high lateral forces even on oily metal sheets
• Nipple vulcanized to pad	> Prevention of machine damage and downtimes due to lost suction pads

Suction Pads for Handling Sheet Metal

Bellows Suction Pads SAB (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm

Designation Code Bellows Suction Pads SAB (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SAB 30 NBR-60 G1/4-AG:			
SAB	**30**	**NBR-60**	**G1/4-AG**
SAB	22 to 125	NBR-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Bellows Suction Pads SAB (1.5 Folds)

Suction pad SAB, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bellows Suction Pads SAB (1.5 Folds)

Type*	Connection					
	G1/4"-M	G1/4"-F	G3/8"-F	M10x1.5-M	M14x1.5-M	Rectangular adapter
SAB 22 NBR-60	10.01.06.01653	10.01.06.01533	10.01.06.01650	10.01.06.01654	10.01.06.01655	10.01.06.01663
SAB 30 NBR-60	10.01.06.01197	10.01.06.01196	10.01.06.01198	10.01.06.01200	10.01.06.01201	10.01.06.01203
SAB 40 NBR-60	10.01.06.00803	10.01.06.00670	10.01.06.00924	10.01.06.00994	10.01.06.01006	10.01.06.01054
SAB 50 NBR-60	10.01.06.00804	10.01.06.00851	10.01.06.00672	10.01.06.00996	10.01.06.01008	10.01.06.01055
SAB 60 NBR-60	10.01.06.00805	10.01.06.00852	10.01.06.00674	10.01.06.00998	10.01.06.01010	10.01.06.01056
SAB 80 NBR-60	10.01.06.00806	10.01.06.00850	10.01.06.00676	10.01.06.01000	10.01.06.01012	10.01.06.01057
SAB 100 NBR-60	10.01.06.00807	10.01.06.00853	10.01.06.00678	10.01.06.01002	10.01.06.01014	10.01.06.01058
SAB 125 NBR-60	10.01.06.00825	10.01.06.00854	10.01.06.00680	10.01.06.01004	10.01.06.01016	10.01.06.01059

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Bellows Suction Pads SAB (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAB 22 NBR-60	16	24	18	6	1.5	20	4
SAB 30 NBR-60	22	33	30	13	5.9	40	4
SAB 40 NBR-60	38	59	36	33	7.0	40	4
SAB 50 NBR-60	53	87	55	52	11.5	50	4
SAB 60 NBR-60	82	130	82	77	24.0	65	6
SAB 80 NBR-60	135	221	145	140	56.5	75	6
SAB 100 NBR-60	190	357	220	214	92.5	90	6
SAB 125 NBR-60	250	558	352	335	191.0	140	9

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

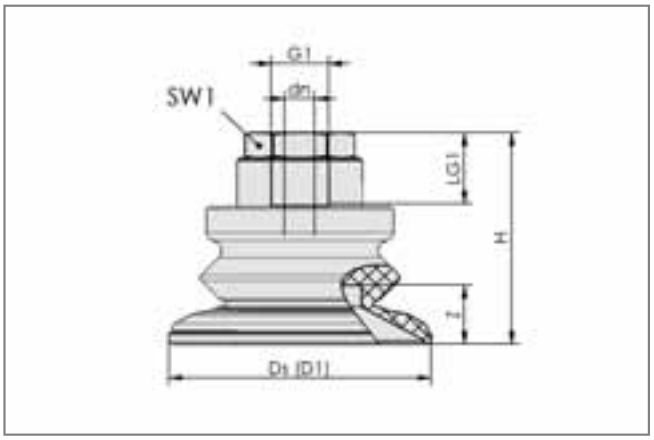
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

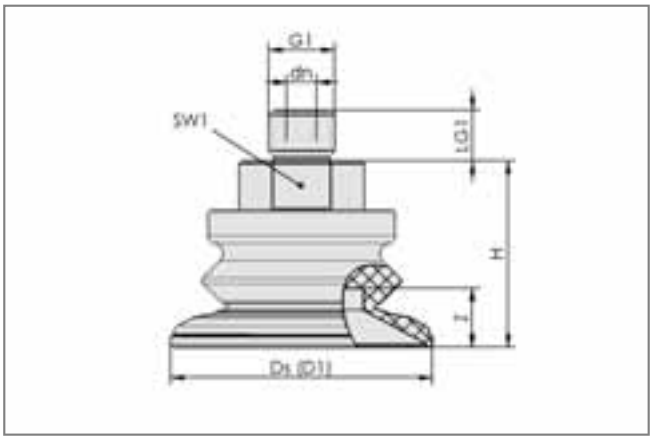
Bellows Suction Pads SAB (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm

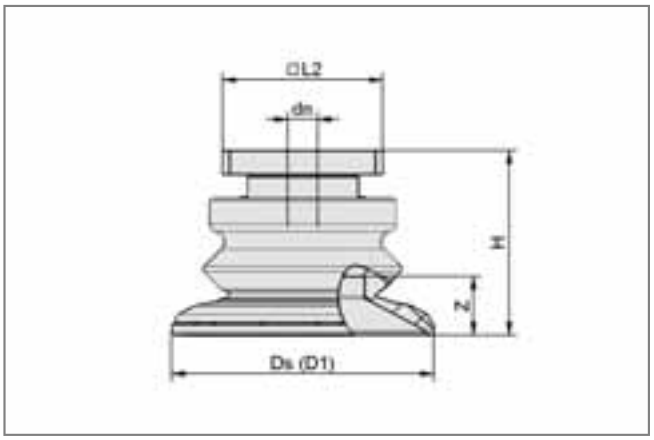
Design Data Bellows Suction Pads SAB (1.5 Folds)



SAB 22 to 125 IG (female)



SAB 22 to 125 AG (male)



SAB 22 to 125 RA (rectangular adapter)

Suction Pads for Handling Sheet Metal

Bellows Suction Pads SAB (1.5 Folds)

Suction area (Ø) from 22 mm to 125 mm

Design Data Bellows Suction Pads SAB (1.5 Folds)

Type	Dimensions in mm*								
	D1**	dn	Ds	G1	H	LG1	L2	SW1	Z (Stroke)
SAB 22 NBR-60 G1/4-AG	22	3.5	21	G1/4"-M	25.0	10.0	-	16	5.8
SAB 22 NBR-60 G1/4-IG	22	3.5	21	G1/4"-F	25.0	12.0	-	16	5.8
SAB 22 NBR-60 G3/8-IG	22	3.5	21	G3/8"-F	41.0	9.5	-	22	5.8
SAB 22 NBR-60 M10x1.5-AG	22	3.5	21	M10x1.5-M	25.0	12.0	-	16	5.8
SAB 22 NBR-60 M14x1.5-AG	22	3.5	21	M14x1.5-M	25.0	12.0	-	16	5.8
SAB 22 NBR-60 RA	22	3.5	21	-	28.2	-	32	-	5.8
SAB 30 NBR-60 G1/4-AG	34	4.0	32	G1/4"-M	28.0	10.0	-	17	9.0
SAB 30 NBR-60 G1/4-IG	34	4.0	32	G1/4"-F	28.0	12.0	-	17	9.0
SAB 30 NBR-60 G3/8-IG	34	4.0	32	G3/8"-F	44.0	9.5	-	22	9.0
SAB 30 NBR-60 M10x1.5-AG	34	4.0	32	M10x1.5-M	28.0	12.0	-	17	9.0
SAB 30 NBR-60 M14x1.5-AG	34	4.0	32	M14x1.5-M	28.0	12.0	-	17	9.0
SAB 30 NBR-60 RA	34	4.0	32	-	31.2	-	32	-	9.0
SAB 40 NBR-60 G1/4-AG	45	4.0	42	G1/4"-M	29.0	10.0	-	17	10.0
SAB 40 NBR-60 G1/4-IG	45	4.0	42	G1/4"-F	29.0	12.0	-	17	10.0
SAB 40 NBR-60 G3/8-IG	45	4.0	42	G3/8"-F	44.0	9.5	-	22	10.0
SAB 40 NBR-60 M10x1.5-AG	45	4.0	42	M10x1.5-M	29.0	12.0	-	17	10.0
SAB 40 NBR-60 M14x1.5-AG	45	4.0	42	M14x1.5-M	29.0	12.0	-	17	10.0
SAB 40 NBR-60 RA	45	4.0	42	-	31.2	-	32	-	10.0
SAB 50 NBR-60 G1/4-AG	56	6.0	52	G1/4"-M	37.0	10.0	-	22	11.5
SAB 50 NBR-60 G1/4-IG	56	6.0	52	G1/4"-F	42.0	20.0	-	22	11.5
SAB 50 NBR-60 G3/8-IG	56	6.0	52	G3/8"-F	37.0	15.0	-	22	11.5
SAB 50 NBR-60 M10x1.5-AG	56	4.0	52	M10x1.5-M	37.0	12.0	-	22	11.5
SAB 50 NBR-60 M14x1.5-AG	56	6.0	52	M14x1.5-M	37.0	12.0	-	22	11.5
SAB 50 NBR-60 RA	56	6.0	52	-	36.5	-	32	-	11.5
SAB 60 NBR-60 G1/4-AG	67	6.0	63	G1/4"-M	41.5	10.0	-	22	14.5
SAB 60 NBR-60 G1/4-IG	67	6.0	63	G1/4"-F	46.5	20.0	-	22	14.5
SAB 60 NBR-60 G3/8-IG	67	6.0	63	G3/8"-F	41.5	15.0	-	22	14.5
SAB 60 NBR-60 M10x1.5-AG	67	4.0	63	M10x1.5-M	41.5	12.0	-	22	14.5
SAB 60 NBR-60 M14x1.5-AG	67	6.0	63	M14x1.5-M	41.5	12.0	-	22	14.5
SAB 60 NBR-60 RA	67	6.0	63	-	41.0	-	32	-	14.5
SAB 80 NBR-60 G1/4-AG	89	6.0	83	G1/4"-M	50.0	10.0	-	22	22.0
SAB 80 NBR-60 G1/4-IG	89	6.0	83	G1/4"-F	55.0	20.0	-	22	22.0
SAB 80 NBR-60 G3/8-IG	89	6.0	83	G3/8"-F	50.0	15.0	-	22	22.0
SAB 80 NBR-60 M10x1.5-AG	89	4.0	83	M10x1.5-M	50.0	12.0	-	22	22.0
SAB 80 NBR-60 M14x1.5-AG	89	6.0	83	M14x1.5-M	50.0	12.0	-	22	22.0
SAB 80 NBR-60 RA	89	6.0	83	-	49.5	-	32	-	22.0
SAB 100 NBR-60 G1/4-AG	110	6.0	103	G1/4"-M	57.0	10.0	-	22	26.0
SAB 100 NBR-60 G1/4-IG	110	6.0	103	G1/4"-F	62.0	20.0	-	22	26.0
SAB 100 NBR-60 G3/8-IG	110	6.0	103	G3/8"-F	57.0	15.0	-	22	26.0
SAB 100 NBR-60 M10x1.5-AG	110	4.0	103	M10x1.5-M	57.0	12.0	-	22	26.0
SAB 100 NBR-60 M14x1.5-AG	110	6.0	103	M14x1.5-M	57.0	12.0	-	22	26.0
SAB 100 NBR-60 RA	110	6.0	103	-	56.5	-	32	-	26.0
SAB 125 NBR-60 G1/4-AG	135	6.0	128	G1/4"-M	68.0	10.0	-	22	32.0
SAB 125 NBR-60 G1/4-IG	135	6.0	128	G1/4"-F	73.0	20.0	-	22	32.0
SAB 125 NBR-60 G3/8-IG	135	9.0	128	G3/8"-F	68.0	15.0	-	22	32.0
SAB 125 NBR-60 M10x1.5-AG	135	4.0	128	M10x1.5-M	68.0	12.0	-	22	32.0
SAB 125 NBR-60 M14x1.5-AG	135	6.0	128	M14x1.5-M	68.0	12.0	-	22	32.0
SAB 125 NBR-60 RA	135	6.0	128	-	67.5	-	32	-	32.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**D1 is the external dimension of the suction pad when it is pressed against the workpiece by the vacuum

Suction Pads for Handling Sheet Metal

Flat Suction Pads SAOF (Oval)

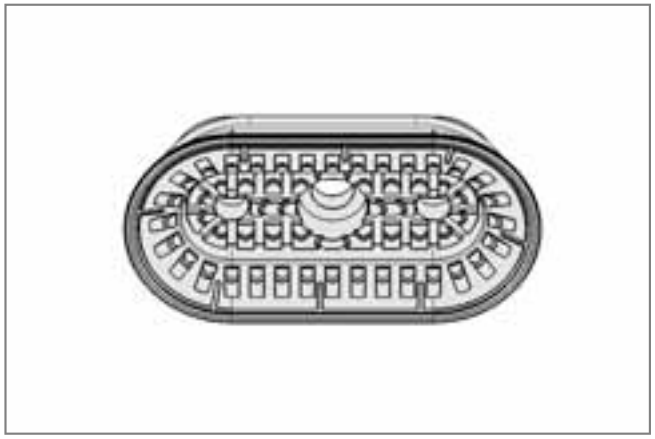
Suction area (LxW) from 50 x 16 mm to 140 x 70 mm

Suitability for Industry-Specific Applications

Flat suction pads SAOF (oval)

Applications

- Oval, flat suction pad for dynamic handling of metal sheets with short cycle times
- Handling of thin steel sheets and aluminum sheets without deformation or deep-drawing
- For use e.g. in feeder systems for press lines in the automobile industry
- Handling of long, narrow metal sheet parts, e.g. reinforcing ribs and plates
- Slot on the bottom prevents oily sheets from slipping and permits precise positioning in stamping presses etc.
- Handling metal sheet parts with small curvature radii



System design flat suction pads SAOF (oval)

Design

- Robust, wear-resistant oval suction pad SAOF made of NBR with single sealing lip, special slot and inner support
- Connection nipple glued to the suction pad with a reinforcing element (very high strength)
- Suction pad available with various connection types
- Available in two material hardness values (45 Shore, 60 Shore)

Flat suction pads SAOF being used for handling pressed sheet-metal parts

Our Highlights...	Your Benefits...
• Wide range of sizes	> For a wide range of workpiece sizes and shapes
• Large, structured inner support	> No deep-drawing of the workpiece; capable of handling high lateral forces, even on oily metal sheets
• Flat, oval suction pad	> Handling of long, narrow workpieces (sections, tubes) or flat workpieces with bars
• Soft and flexible sealing lip	> Good sealing, even on slightly curved surfaces
• Nipple vulcanized to suction pad	> Prevention of machine damage and downtimes as the result of lost suction pads

Suction Pads for Handling Sheet Metal

Flat Suction Pads SAOF (Oval)

Suction area (LxW) from 50 x 16 mm to 140 x 70 mm

Designation Code Flat Suction Pads SAOF (Oval)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOF 80x40 NBR-60 G1/4-IG:			
SAOF	**80x40**	**NBR-60**	**G1/4-IG**
SAOF	50x16 to 140x70	NBR-45 NBR-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Flat Suction Pads SAOF (Oval)

Suction pad SAOF, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Pads SAOF (Oval)

Type*	Connection G1/4"-M	G1/4"-F	G3/8"-F	M10x1.5-M	M14x1.5-M	Rectangular adapter
SAOF 50x16 NBR-60	10.01.05.00521	10.01.05.00511	10.01.05.00518	10.01.05.00527	10.01.05.00530	10.01.05.00515
SAOF 50x16 NBR-45	10.01.05.00550	10.01.05.00551	10.01.05.00553	10.01.05.00555	10.01.05.00556	10.01.05.00554
SAOF 60x23 NBR-60	10.01.05.00376	10.01.05.00367	10.01.05.00370	10.01.05.00382	10.01.05.00385	10.01.05.00373
SAOF 60x23 NBR-45	10.01.05.00559	10.01.05.00560	10.01.05.00562	10.01.05.00564	10.01.05.00565	10.01.05.00563
SAOF 90x30 NBR-60	10.01.05.00311	10.01.05.00266	10.01.05.00290	10.01.05.00326	10.01.05.00341	10.01.05.00296
SAOF 90x30 NBR-45	10.01.05.00568	10.01.05.00569	10.01.05.00570	10.01.05.00572	10.01.05.00573	10.01.05.00571
SAOF 80x40 NBR-60	10.01.05.00314	10.01.05.00269	10.01.05.00293	10.01.05.00329	10.01.05.00344	10.01.05.00299
SAOF 80x40 NBR-45	10.01.05.00577	10.01.05.00578	10.01.05.00579	10.01.05.00581	10.01.05.00582	10.01.05.00580
SAOF 100x50 NBR-60	10.01.05.00317	10.01.05.00281	10.01.05.00272	10.01.05.00332	10.01.05.00347	10.01.05.00302
SAOF 100x50 NBR-45	10.01.05.00586	10.01.05.00587	10.01.05.00588	10.01.05.00590	10.01.05.00591	10.01.05.00589
SAOF 120x60 NBR-60	10.01.05.00320	10.01.05.00284	10.01.05.00275	10.01.05.00335	10.01.05.00350	10.01.05.00305
SAOF 120x60 NBR-45	10.01.05.00594	10.01.05.00595	10.01.05.00596	10.01.05.00598	10.01.05.00599	10.01.05.00597
SAOF 140x70 NBR-60	10.01.05.00323	10.01.05.00287	10.01.05.00278	10.01.05.00338	10.01.05.00353	10.01.05.00308
SAOF 140x70 NBR-45	10.01.05.00603	10.01.05.00604	10.01.05.00605	10.01.05.00607	10.01.05.00608	10.01.05.00606

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Flat Suction Pads SAOF (Oval)

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOF 50x16	31	24	12	2.0	8	4
SAOF 60x23	57	37	33	3.0	20	4
SAOF 90x30	122	96	64	7.0	40	4
SAOF 80x40	140	110	100	10.7	50	4
SAOF 100x50	217	181	121	20.0	75	6
SAOF 120x60	312	254	170	35.0	75	6
SAOF 140x70	425	344	230	52.0	90	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

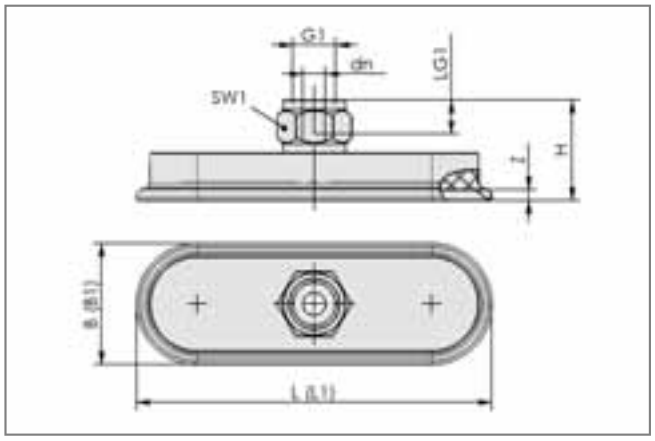
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

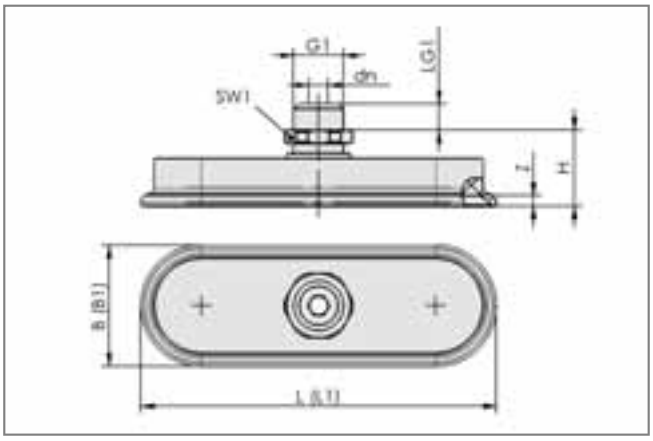
Flat Suction Pads SAOF (Oval)

Suction area (LxW) from 50 x 16 mm to 140 x 70 mm

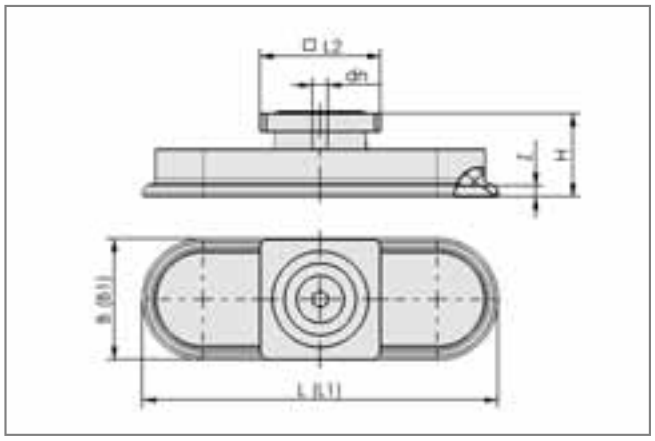
Design Data Flat Suction Pads SAOF (Oval)



SAOF 50x16 to 140x70 IG



SAOF 50x16 to 140x70 AG



SAOF 50x16 to 140x70 RA (rectangular adapter)

Suction Pads for Handling Sheet Metal

Flat Suction Pads SAOF (Oval)

Suction area (LxW) from 50 x 16 mm to 140 x 70 mm

Design Data Flat Suction Pads SAOF (Oval)

Type	Dimensions in mm*										
	B	B1**	dn	G1	H	L	L1**	L2	LG1	SW1	Z (Stroke)
SAOF 50x16 G1/4-AG	16	18	5	G1/4"-M	26	50	51.5	-	8	17	3
SAOF 50x16 G1/4-IG	16	18	6	G1/4"-F	33	50	51.5	-	8	17	3
SAOF 50x16 G3/8-IG	16	18	6	G3/8"-F	34	50	51.5	-	9	22	3
SAOF 50x16 M10x1.5-AG	16	18	4	M10x1.5-M	26	50	51.5	-	10	16	3
SAOF 50x16 M14x1.5-AG	16	18	5	M14x1.5-M	28	50	51.5	-	10	22	3
SAOF 50x16 RA	16	18	4	-	29	50	51.5	32	-	-	3
SAOF 60x23 G1/4-AG	23	25	5	G1/4"-M	18	62	64.0	-	8	17	3
SAOF 60x23 G1/4-IG	23	25	6	G1/4"-F	26	62	64.0	-	8	17	3
SAOF 60x23 G3/8-IG	23	25	6	G3/8"-F	26	62	64.0	-	9	22	3
SAOF 60x23 M10x1.5-AG	23	25	4	M10x1.5-M	18	62	64.0	-	10	16	3
SAOF 60x23 M14x1.5-AG	23	25	5	M14x1.5-M	20	62	64.0	-	10	22	3
SAOF 60x23 RA	23	25	4	-	21	62	64.0	32	-	-	3
SAOF 90x30 G1/4-AG	32	34	5	G1/4"-M	19	92	94.0	-	8	17	3
SAOF 90x30 G1/4-IG	32	34	6	G1/4"-F	26	92	94.0	-	8	17	3
SAOF 90x30 G3/8-IG	32	34	6	G3/8"-F	27	92	94.0	-	9	22	3
SAOF 90x30 M10x1.5-AG	32	34	4	M10x1.5-M	19	92	94.0	-	10	17	3
SAOF 90x30 M14x1.5-AG	32	34	5	M14x1.5-M	21	92	94.0	-	10	22	3
SAOF 90x30 RA	32	34	4	-	22	92	94.0	32	-	-	3
SAOF 80x40 G1/4-AG	40	43	5	G1/4"-M	20	82	85.0	-	8	17	4
SAOF 80x40 G1/4-IG	40	43	6	G1/4"-F	28	82	85.0	-	8	17	4
SAOF 80x40 G3/8-IG	40	43	6	G3/8"-F	28	82	85.0	-	9	22	4
SAOF 80x40 M10x1.5-AG	40	43	4	M10x1.5-M	20	82	85.0	-	10	17	4
SAOF 80x40 M14x1.5-AG	40	43	5	M14x1.5-M	22	82	85.0	-	10	22	4
SAOF 80x40 RA	40	43	4	-	23	82	85.0	32	-	-	4
SAOF 100x50 G1/4-AG	50	54	6	G1/4"-M	22	102	106.0	-	8	17	5
SAOF 100x50 G1/4-IG	50	54	8	G1/4"-F	30	102	106.0	-	8	17	5
SAOF 100x50 G3/8-IG	50	54	8	G3/8"-F	31	102	106.0	-	9	22	5
SAOF 100x50 M10x1.5-AG	50	54	4	M10x1.5-M	22	102	106.0	-	10	17	5
SAOF 100x50 M14x1.5-AG	50	54	6	M14x1.5-M	24	102	106.0	-	10	22	5
SAOF 100x50 RA	50	54	6	-	25	102	106.0	32	-	-	5
SAOF 120x60 G1/4-AG	60	65	6	G1/4"-M	24	123	128.0	-	8	17	6
SAOF 120x60 G1/4-IG	60	65	8	G1/4"-F	32	123	128.0	-	8	17	6
SAOF 120x60 G3/8-IG	60	65	8	G3/8"-F	33	123	128.0	-	9	22	6
SAOF 120x60 M10x1.5-AG	60	65	4	M10x1.5-M	24	123	128.0	-	10	17	6
SAOF 120x60 M14x1.5-AG	60	65	6	M14x1.5-M	26	123	128.0	-	10	22	6
SAOF 120x60 RA	60	65	6	-	27	123	128.0	32	-	-	6
SAOF 140x70 G1/4-AG	70	76	6	G1/4"-M	25	143	149.0	-	8	17	7
SAOF 140x70 G1/4-IG	70	76	8	G1/4"-F	33	143	149.0	-	8	17	7
SAOF 140x70 G3/8-IG	70	76	8	G3/8"-F	34	143	149.0	-	9	22	7
SAOF 140x70 M10x1.5-AG	70	76	4	M10x1.5-M	25	143	149.0	-	10	17	7
SAOF 140x70 M14x1.5-AG	70	76	6	M14x1.5-M	27	143	149.0	-	10	22	7
SAOF 140x70 RA	70	76	6	-	28	143	149.0	32	-	-	7

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**D1 is the external dimension of the suction pad when it is pressed against the workpiece by the vacuum

Suction Pads for Handling Sheet Metal

Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

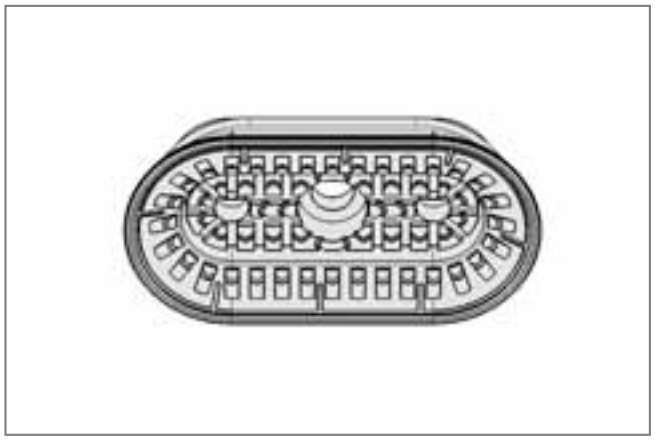
METAL

Suitability for Industry-Specific Applications

Bellows suction pads SAOB (oval, 1.5 folds)

Applications

- Oval bellows suction pad with 1.5 folds for dynamic handling of long, narrow workpieces e.g. reinforcing ribs and plates
- Handling of thin steel sheets and aluminum sheets without deformation or deep-drawing
- For use e.g. in feeder systems for press lines in the automobile industry
- Slot on the bottom prevents the oily sheets from slipping and permits precise positioning in stamping presses etc.



System design bellows suction pads SAOB (oval, 1.5 folds)

Design

- Robust, wear-resistant oval suction pad SAOB with 1.5 folds made of NBR, single sealing lip, special slot and inner support
- Connection nipple glued to the suction pad with a reinforcing element (very high strength)
- Suction pads available with various connection types

Bellows suction pads SAOB being used for handling car bodywork components

Our Highlights...	Your Benefits...
• 1.5 folds	> For long, narrow workpieces and for stamped bodywork components
• Large, structured inner support	> No deep-drawing of the workpiece and handling of very high lateral forces, even with oily metal sheets
• Wide range of sizes	> For a wide range of workpiece sizes and shapes
• Stiff top fold	> Resistance to lateral forces and high horizontal accelerations
• Soft and flexible sealing lip	> Good sealing, even on slightly curved surfaces

Suction Pads for Handling Sheet Metal

Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

Designation Code Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread	
Example SAOB 60x30 NBR-60 RA:				
SAOB	**60x30**	**NBR-60**	**RA**	
SAOB	60x30 80x40 110x55 140x70	NBR-60	G1/4-AG G1/4-IG G3/8-IG M10-AG M14x1.5-AG RA	(AG = male (M)) (IG = female (F)) rectangular adapter

Ordering Data Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Suction pad SAOB, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Type*	Connection G1/4"-M	G1/4"-F	G3/8"-F	M10x1.5-M	M14x1.5-M	Rectangular adapter
SAOB 60x30 NBR-60	10.01.06.00916	10.01.06.00891	10.01.06.00904	10.01.06.01024	10.01.06.01032	10.01.06.00908
SAOB 80x40 NBR-60	10.01.06.00918	10.01.06.00893	10.01.06.00906	10.01.06.01026	10.01.06.01034	10.01.06.00910
SAOB 110x55 NBR-60	10.01.06.00920	10.01.06.00900	10.01.06.00895	10.01.06.01028	10.01.06.01036	10.01.06.00912
SAOB 140x70 NBR-60	10.01.06.00922	10.01.06.00902	10.01.06.00897	10.01.06.01030	10.01.06.01038	10.01.06.00914

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOB 60x30 NBR-60	38	55	57	52	9.6	30	4
SAOB 80x40 NBR-60	65	100	100	95	20.6	40	6
SAOB 110x55 NBR-60	110	185	180	161	50.8	50	6
SAOB 140x70 NBR-60	165	258	287	255	100.4	70	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

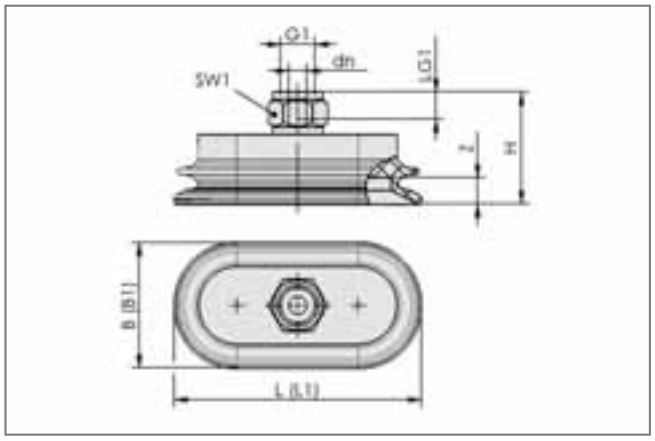
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

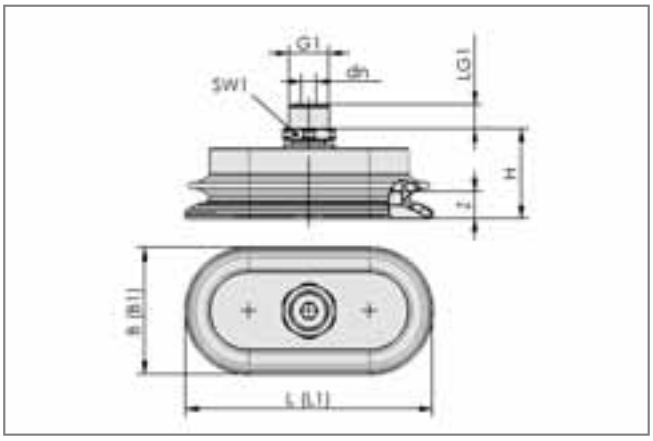
Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

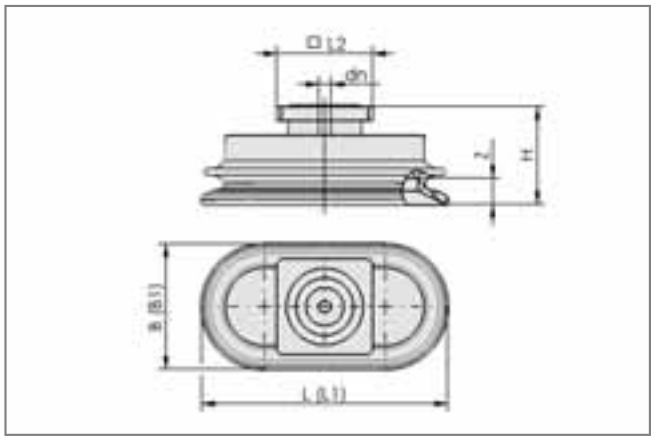
Design Data Bellows Suction Pads SAOB (Oval, 1.5 Folds)



SAOB 60x30 to 140x70 IG



SAOB 60x30 to 140x70 AG



SAOB 60x30 to 140x70 RA (rectangular adapter)

Suction Pads for Handling Sheet Metal

Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Suction area (LxW) from 60 x 30 mm to 140 x 70 mm

Design Data Bellows Suction Pads SAOB (Oval, 1.5 Folds)

Type	Dimensions in mm*										
	B	B1**	dn	G1	H	L	L1**	L2	LG1	SW1	Z (Stroke)
SAOB 60x30 NBR-60 G1/4-AG	32	33	5	G1/4"-M	27.0	62	63	-	8	17	7.0
SAOB 60x30 NBR-60 G1/4-IG	32	33	6	G1/4"-F	34.5	62	63	-	8	17	7.0
SAOB 60x30 NBR-60 G3/8-IG	32	33	6	G3/8"-F	35.0	62	63	-	9	22	7.0
SAOB 60x30 NBR-60 M10x1.5-AG	32	33	4	M10x1.5-M	27.0	62	63	-	10	17	7.0
SAOB 60x30 NBR-60 M14x1.5-AG	32	33	5	M14x1.5-M	29.0	62	63	-	10	22	7.0
SAOB 60x30 NBR-60 RA	32	33	4	-	30.0	62	63	32	-	-	7.0
SAOB 80x40 NBR-60 G1/4-AG	42	43	5	G1/4"-M	29.7	82	83	-	8	17	9.0
SAOB 80x40 NBR-60 G1/4-IG	42	43	6	G1/4"-F	37.2	82	83	-	8	17	9.0
SAOB 80x40 NBR-60 G3/8-IG	42	43	6	G3/8"-F	37.7	82	83	-	9	22	9.0
SAOB 80x40 NBR-60 M10x1.5-AG	42	43	4	M10x1.5-M	29.7	82	83	-	10	17	9.0
SAOB 80x40 NBR-60 M14x1.5-AG	42	43	5	M14x1.5-M	31.7	82	83	-	10	22	9.0
SAOB 80x40 NBR-60 RA	42	43	4	-	32.7	82	83	32	-	-	9.0
SAOB 110x55 NBR-60 G1/4-AG	57	59	6	G1/4"-M	35.5	112	114	-	8	17	13.0
SAOB 110x55 NBR-60 G1/4-IG	57	59	8	G1/4"-F	43.0	112	114	-	8	17	13.0
SAOB 110x55 NBR-60 G3/8-IG	57	59	8	G3/8"-F	43.5	112	114	-	9	22	13.0
SAOB 110x55 NBR-60 M10x1.5-AG	57	59	4	M10x1.5-M	35.5	112	114	-	10	17	13.0
SAOB 110x55 NBR-60 M14x1.5-AG	57	59	6	M14x1.5-M	37.5	112	114	-	10	22	13.0
SAOB 110x55 NBR-60 RA	57	59	6	-	38.5	112	114	32	-	-	13.0
SAOB 140x70 NBR-60 G1/4-AG	72	75	6	G1/4"-M	39.5	143	146	-	8	17	16.5
SAOB 140x70 NBR-60 G1/4-IG	72	75	8	G1/4"-F	47.0	143	146	-	8	17	16.5
SAOB 140x70 NBR-60 G3/8-IG	72	75	8	G3/8"-F	47.5	143	146	-	9	22	16.5
SAOB 140x70 NBR-60 M10x1.5-AG	72	75	4	M10x1.5-M	39.5	143	146	-	10	17	16.5
SAOB 140x70 NBR-60 M14x1.5-AG	72	75	6	M14x1.5-M	41.5	143	146	-	10	22	16.5
SAOB 140x70 NBR-60 RA	72	75	6	-	42.5	143	146	32	-	-	16.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**D1 is the external dimension of the suction pad when it is pressed against the workpiece by the vacuum

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAOG (Oval)

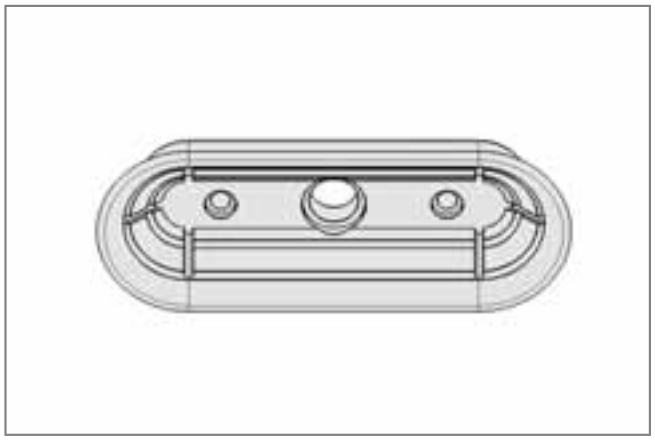
Suction area (LxW) from 60x20 mm to 95x40 mm

Suitability for Industry-Specific Applications

Bell-shaped suction pads SAOG (oval)

Applications

- Oval bell-shaped suction pad for handling of long, oiled workpieces with extremely small curved radii
- Very dynamic handling of metal sheets (short cycle times)
- Inner support for deformation-free handling of thin steel sheets and aluminum sheets or deep-drawing
- Usage in feeder systems for press lines in the automobile industry
- Slot lot on the bottom prevents oily sheets from slipping; permits precise positioning in stamping presses etc.



System design bell-shaped suction pads SAOG (oval)

Design

- Oval, bell-shaped suction pad with single sealing lip, special slot and inner support
- Suction pads made of NBR material, hardness 45 Shore

Bell-shaped suction pads SAOG being used for handling very curved sheet metal parts

Our Highlights...

- Oval, bell-shape
- Material NBR, material hardness 45 Shore
- Wide range of connection elements

Your Benefits...

> Optimum adaptation to narrow, very curved workpieces

> Adaptation to workpieces with small curved radii

> Mounting on all common load cross-beams and feeder systems possible

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAOG (Oval)

Suction area (LxW) from 60x20 mm to 95x40 mm

Designation Code Bell-Shaped Suction Pads SAOG (Oval)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example SAOG 60x20 NBR-45 RA:			
SAOG	**60x20**	**NBR-45**	**RA**
SAOG	60x20 80x30 95x40	NBR-45	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G3/8-AG G3/8-IG M10-AG M14x1.5-AG RA rectangular adapter

Ordering Data Bell-Shaped Suction Pads SAOG (Oval)

Suction pad SAOG, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Bell-Shaped Suction Pads SAOG (Oval)

Type*	Connection G1/4"-M	G1/4"-F	G3/8"-M	G3/8"-F	M10x1.5-M	M14x1.5-M	Rectangular adapter
SAOG 60x20 NBR-45	10.01.01.11755	10.01.01.11754	10.01.01.11758	10.01.01.11757	10.01.01.11760	10.01.01.11761	10.01.01.11762
SAOG 80x30 NBR-45	10.01.01.11659	10.01.01.11649	10.01.01.11651	10.01.01.11614	10.01.01.11653	10.01.01.11655	10.01.01.11668
SAOG 95x40 NBR-45	10.01.01.11660	10.01.01.11650	10.01.01.11652	10.01.01.11615	10.01.01.11654	10.01.01.11656	10.01.01.11669

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Bell-Shaped Suction Pads SAOG (Oval)

Type	Suction force [N]*	Lateral force [N]**	Lateral force oily surface [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SAOG 60x20 NBR-45	56	35	10	4.5	8	4
SAOG 80x30 NBR-45	105	65	45	13.2	20	4
SAOG 95x40 NBR-45	165	97	68	26.9	25	4

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The specified lateral forces are values measured at a vacuum of -0.6 bar with a dry or oily, smooth, flat workpiece surface. Depending on the workpiece surface and its quality, the actual values may deviate from these values.

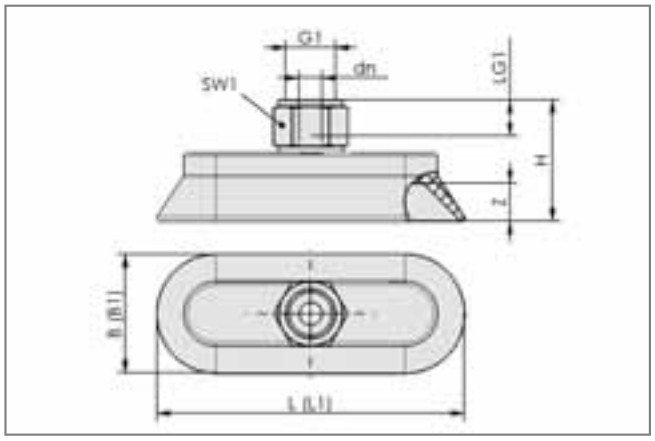
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

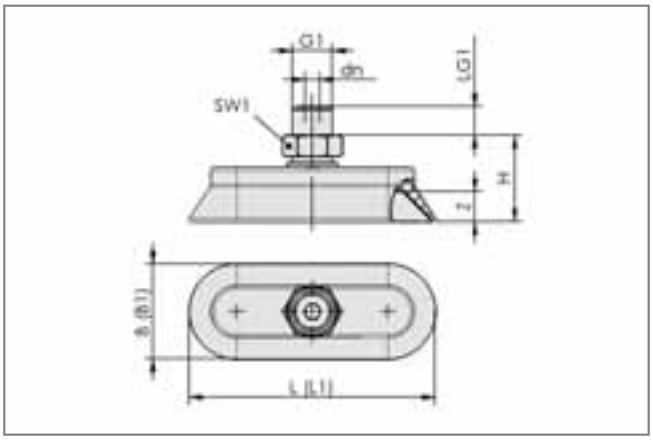
Bell-Shaped Suction Pads SAOG (Oval)

Suction area (LxW) from 60x20 mm to 95x40 mm

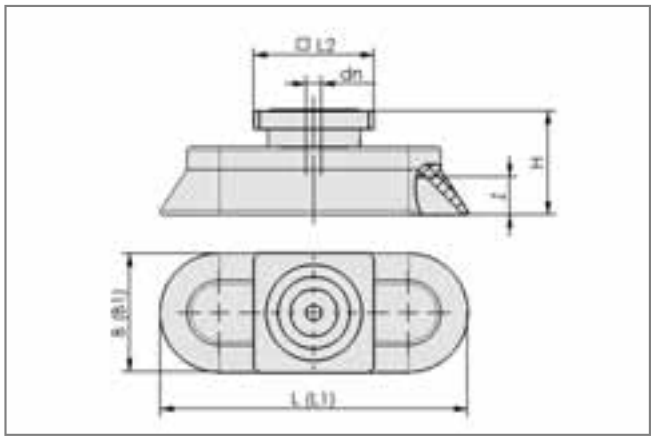
Design Data Bell-Shaped Suction Pads SAOG (Oval)



SAOG 60x20 to 95x40 IG



SAOG 60x20 to 95x40 AG



SAOG 60x20 to 95x40 RA (rectangular adapter)

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SAOG (Oval)

Suction area (LxW) from 60x20 mm to 95x40 mm

Design Data Bell-Shaped Suction Pads SAOG (Oval)

Type	Dimensions in mm*										
	B	B1**	dn	G1	H	L	L1**	L2	LG1	SW1	Z (Stroke)
SAOG 60x20 NBR-45 G1/4-AG	21.5	26	5.0	G1/4"-M	24.5	61.5	66	-	10.5	17	4.5
SAOG 60x20 NBR-45 G1/4-IG	21.5	26	6.0	G1/4"-F	29.0	61.5	66	-	8.0	17	4.5
SAOG 60x20 NBR-45 G3/8-AG	21.5	26	5.0	G3/8"-M	21.0	61.5	66	-	8.0	22	4.5
SAOG 60x20 NBR-45 G3/8-IG	21.5	26	6.0	G3/8"-F	29.5	61.5	66	-	9.0	22	4.5
SAOG 60x20 NBR-45 M10x1.5-AG	21.5	26	4.0	M10x1.5-M	21.5	61.5	66	-	10.0	16	4.5
SAOG 60x20 NBR-45 M14x1.5-AG	21.5	26	5.0	M14x1.5-M	23.5	61.5	66	-	10.0	22	4.5
SAOG 60x20 NBR-45 RA	21.5	26	4.0	-	24.5	61.5	66	31.8	-	-	4.5
SAOG 80x30 NBR-45 G1/4-AG	31.3	36	5.0	G1/4"-M	27.5	81.3	86	-	10.5	17	5.5
SAOG 80x30 NBR-45 G1/4-IG	31.3	36	6.0	G1/4"-F	32.0	81.3	86	-	8.0	17	5.5
SAOG 80x30 NBR-45 G3/8-AG	31.3	36	5.0	G3/8"-M	24.0	81.3	86	-	8.0	22	5.5
SAOG 80x30 NBR-45 G3/8-IG	31.3	36	6.0	G3/8"-F	32.5	81.3	86	-	9.0	22	5.5
SAOG 80x30 NBR-45 M10x1.5-AG	31.3	36	4.0	M10x1.5-M	24.5	81.3	86	-	10.0	16	5.5
SAOG 80x30 NBR-45 M14x1.5-AG	31.3	36	5.2	M14x1.5-M	26.5	81.3	86	-	10.0	22	5.5
SAOG 80x30 NBR-45 RA	31.3	36	4.0	-	27.5	81.3	86	31.8	-	-	5.5
SAOG 95x40 NBR-45 G1/4-AG	41.3	46	5.0	G1/4"-M	30.5	96.5	102	-	10.5	17	6.0
SAOG 95x40 NBR-45 G1/4-IG	41.3	46	6.0	G1/4"-F	35.0	96.5	102	-	8.0	17	6.0
SAOG 95x40 NBR-45 G3/8-AG	41.3	46	5.0	G3/8"-M	27.0	96.5	102	-	8.0	22	6.0
SAOG 95x40 NBR-45 G3/8-IG	41.3	46	6.0	G3/8"-F	35.5	96.5	102	-	9.0	22	6.0
SAOG 95x40 NBR-45 M10x1.5-AG	41.3	46	4.0	M10x1.5-M	27.5	96.5	102	-	10.0	16	6.0
SAOG 95x40 NBR-45 M14x1.5-AG	41.3	46	5.2	M14x1.5-M	29.5	96.5	102	-	10.0	22	6.0
SAOG 95x40 NBR-45 RA	41.3	46	4.0	-	30.5	96.5	102	31.8	-	-	6.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**L1 and D1 are the external dimensions of the suction pad when it is pressed against the workpiece by the vacuum

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SGGN

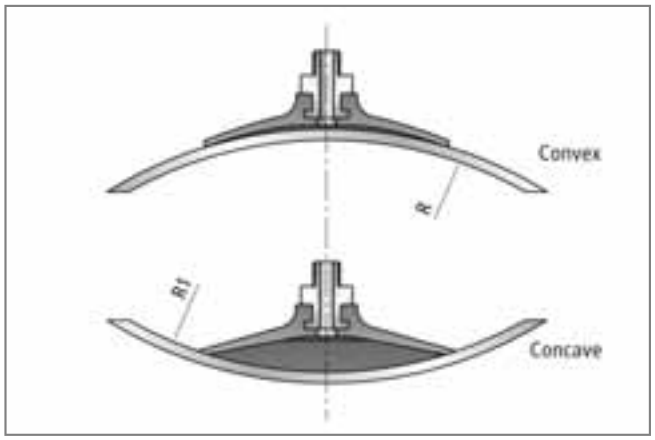
Suction area (Ø) from 85 mm to 115 mm

Suitability for Industry-Specific Applications

Bell-shaped suction pads SGGN

Applications

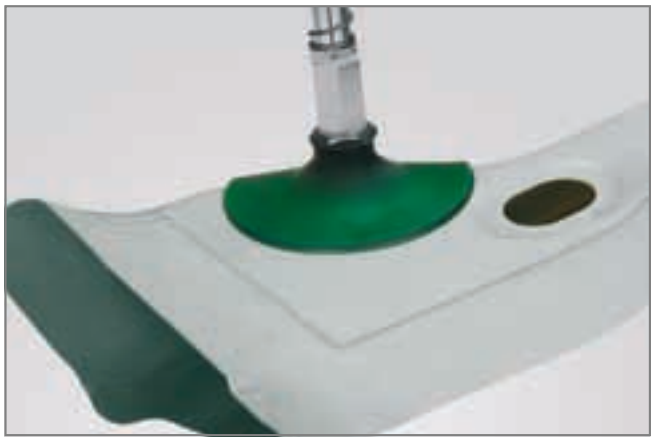
- Round, bell-shaped suction pad for handling of concave or convex workpieces
- Loading of presses with bodywork components in the automobile industry



System design bell-shaped suction pads SGGN

Design

- Robust, wear-resistant bell-shaped suction pad SGGN with single sealing lip, consisting of suction pad SGG and connection nipple
- Type SGGN 85: nipple plugged in
- Type SGGN 115: nipple vulcanized into position



Bell-shaped suction pads SGGN for handling formed sheet metal parts

Our Highlights...

- Special material: Vulkollan VU1
- Bell-shape and long, flexible sealing lip
- Optimum shape

Your Benefits...

> Extreme wear-resistance; lifetime 20 times higher compared to standard NBR

> Handling of convex or concave workpieces, such as car bodywork components

> Multi-shift operations with very short cycle times

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SGGN

Suction area (Ø) from 85 mm to 115 mm

Designation Code Bell-Shaped Suction Pads SGGN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGGN 85 VU1-72 G1/4-AG:			
SGGN	**85**	**VU1-72**	**G1/4-AG**
SGGN	85 115	NBR-60 VU1-72	G1/4-AG (AG = male (M))

Ordering Data Bell-Shaped Suction Pads SGGN

Suction pad SGGN (elastomer part + connection nipple) is delivered assembled; diameter 85 mm with connection nipple plugged in, diameter 115 mm with connection nipple vulcanized to elastomer part.

Available spare parts (diameter 85 mm): suction pad SGG, connection nipple SA-NIP

Bell-Shaped Suction Pads SGGN

Type	Suction pad material * / hardness in Shore A	
	Perbunan NBR 60±5ShA	Vulkollan VU1 72±5ShA
SGGN 85 G1/4-AG	-	10.01.01.00835
SGGN 115 G1/4-AG	10.01.01.00628	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type	Bell suction pad (round)	
SGGN 85 G1/4-AG	SGG 85 VU1-72 N036	10.01.01.00707
SGGN 115 G1/4-AG*	-	-

*No replacement suction pads are available because the nipple is vulcanised to the pad

Type	Suction pad connection nipple	
SGGN 85 G1/4-AG	SA-NIP N036 G1/4-AG DN500	10.01.01.00836
SGGN 115 G1/4-AG	-	-

Technical Data Bell-Shaped Suction Pads SGGN

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Min. Curve radius [mm] (concave)	Recom. internal hose diameter d [mm]**	Nipple family
SGGN 85 G1/4-AG	200	56.0	100	350	6	N 036
SGGN 115 G1/4-AG	350	114.1	200	250	6	-

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor.

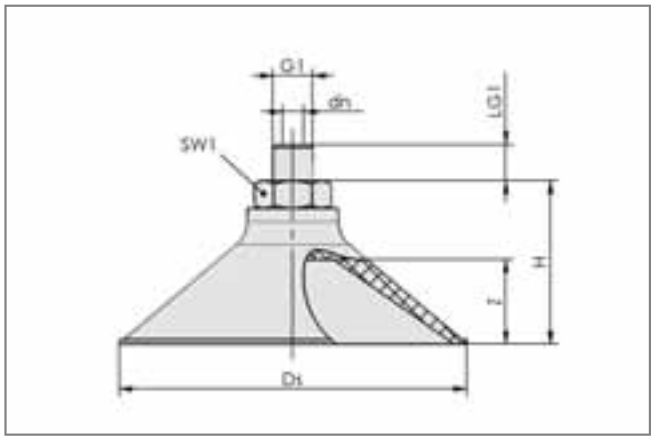
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Sheet Metal

Bell-Shaped Suction Pads SGGN

Suction area (Ø) from 85 mm to 115 mm

Design Data Bell-Shaped Suction Pads SGGN

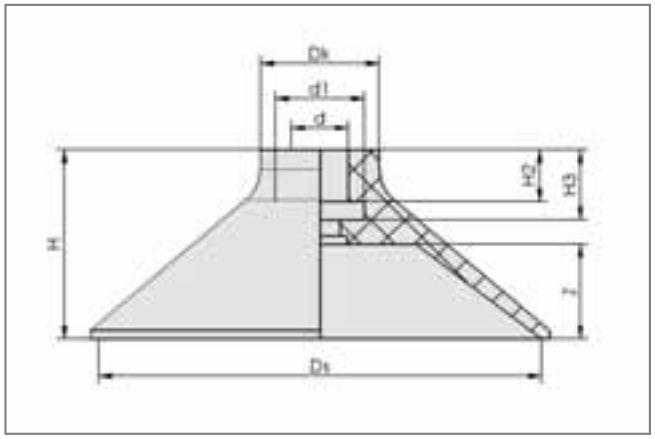


SGGN 85 to 115

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
SGGN 85 G1/4-AG	5	85	G1/4"-M	38	12	22	16
SGGN 115 G1/4-AG	7	115	G1/4"-M	54	12	22	13

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Bell-Shaped Suction Pads SGG



SGG 85

Type	Dimensions in mm*							
	d	d1	Dk	Ds	H	H2	H3	Z (Stroke)
SGG 85	10	16	22	82	35	10	13	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Handling Wood

Flat Suction Pads SHFN

Suction area (Ø) from 50 mm to 85 mm

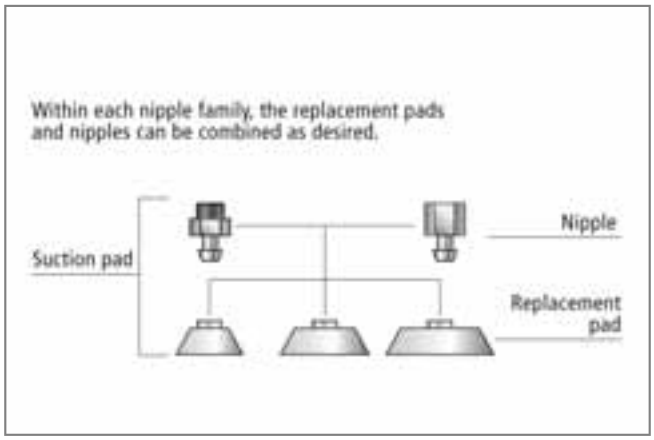
WOOD

Suitability for Industry-Specific Applications

Flat suction pads SHFN

Applications

- Round, flat suction pad for handling of furniture parts, parquet flooring, laminated and unlaminated chipboard, etc.
- Version with vulcanized insert, for vacuum systems in rough operating conditions, where the suction pads are not always fully covered or may be placed directly on the edge of the workpiece
- Handling of objects with very rough surfaces with sealing ring made of special foam



System design flat suction pads SHFN

Design

- Adaptable suction pad SHFN, consisting of pad SHF and connection nipple
- Nipple plugged into pad; version SHFN...E with nipple screwed into vulcanized insert
- Ribs on the upper surface of the pad for higher stability on the version without vulcanized insert
- Optionally available with sealing ring made of special foam and/or with sensing valve
- Individual deactivation of unused suction pads with optional sensing valve to prevent entry of air

Flat suction pads SHFN being used for handling chipboards

Our Highlights...	Your Benefits...
• Soft sealing lip	> Optimal adaptation to uneven workpiece surfaces
• Sealing lip with inner sealing edge	> Very good sealing on rough and smooth surfaces
• Specifically structured lower surface of pad	> Suitable for highly dynamic operations and short cycle times
• Version SHFN...E with insert	> Increased stability in rough operating conditions
• Dirt filter (optionally)	> Usage in dusty surroundings
• Sealing ring made of special foam (optionally)	> Suitable for workpieces with very rough surfaces

Suction Pads for Handling Wood

Flat Suction Pads SHFN

Suction area (Ø) from 50 mm to 85 mm

Designation Code Flat Suction Pads SHFN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Type of construction	Product addition
Example SHFN 50 NK-45 G1/4-AG:					
SHFN	**50**	**NK-45**	**G1/4-AG**		
SHFN	50 70 85	NK-45	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F))	- pluggable metal inlay E vulcanized metal inlay	MOS sealing ring, made of special foam TV sensing valve

Ordering Data Flat Suction Pads SHFN

Suction pad SHFN (elastomer part + connection nipple) is delivered assembled. The assembly consists of:
- Suction pad of type SHF – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads
- Optional product addition: sealing ring and sensing valve

Available spare parts: suction pad SHF, connection nipple SA-NIP, sealing ring
Available accessories: sensing valve, filter screen

Flat Suction Pads SHFN

Type*	Connection			
	SHFN G1/4"-AG	SHFN...E G1/4"-AG	SHFN G1/4"-IG	SHFN...E G1/4"-IG
SHFN 50 NK-45	10.01.01.11693	-	10.01.01.11694	-
SHFN 50 NK-45 MOS	10.01.01.11695	-	10.01.01.11696	-
SHFN 50 NK-45 TV	10.01.01.11699	-	-	-
SHFN 50 NK-45 MOS-TV	10.01.01.11700	-	-	-
SHFN 70 NK-45	10.01.01.11689	10.01.01.12197	10.01.01.11690	10.01.01.12216
SHFN 70 NK-45 MOS	10.01.01.11691	10.01.01.12217	10.01.01.11692	10.01.01.12218
SHFN 70 NK-45 TV	10.01.01.11697	10.01.01.12221	-	-
SHFN 70 NK-45 MOS-TV	10.01.01.11698	10.01.01.12222	-	-
SHFN 85 NK-45	10.01.01.11775	10.01.01.12210	10.01.01.11776	10.01.01.12211
SHFN 85 NK-45 MOS	10.01.01.11777	10.01.01.12212	10.01.01.11778	10.01.01.12213
SHFN 85 NK-45 TV	10.01.01.11779	10.01.01.12224	-	-
SHFN 85 NK-45 MOS-TV	10.01.01.11780	10.01.01.12225	-	-

*MOS = additional sealing ring, made of special foam material and glued into position, for optimal sealing on rough surfaces; TV = sensing valve

Suction Pads for Handling Wood

Flat Suction Pads SHFN

Suction area (Ø) from 50 mm to 85 mm

Ordering Data Spare Parts And Accessories Flat Suction Pads SHFN

Type	Flat suction pad (round) SHF	Sealing ring made of special foam material	Suction pad nipples SA-NIP	Sensing valve	Filter screen (round)
SHFN 50 NK-45 G1/4-AG	10.01.01.11687	-	10.01.01.11772	-	10.07.01.00211
SHFN 50 NK-45 G1/4-IG	10.01.01.11687	-	10.01.01.11822	-	10.07.01.00211
SHFN 50 NK-45 G1/4-AG MOS	10.01.01.11688	10.01.06.01679	10.01.01.11772	-	10.07.01.00211
SHFN 50 NK-45 G1/4-IG MOS	10.01.01.11688	10.01.06.01679	10.01.01.11822	-	10.07.01.00211
SHFN 50 NK-45 G1/4-AG TV	10.01.01.11687	-	-	10.05.10.00058	-
SHFN 50 NK-45 G1/4-AG MOS-TV	10.01.01.11688	-	-	10.05.10.00058	-
SHFN 70 NK-45 G1/4-AG	10.01.01.11682	-	10.01.01.11772	-	10.07.01.00211
SHFN 70 NK-45 G1/4-IG	10.01.01.11682	-	10.01.01.11822	-	10.07.01.00211
SHFN 70 NK-45 G1/4-AG E	10.01.01.12165	-	10.01.01.12194	-	10.05.03.00023
SHFN 70 NK-45 G1/4-IG E	10.01.01.12165	-	10.01.01.12192	-	10.05.03.00023
SHFN 70 NK-45 G1/4-AG MOS	10.01.01.11686	10.01.06.01678	10.01.01.11772	-	10.07.01.00211
SHFN 70 NK-45 G1/4-IG MOS	10.01.01.11686	10.01.06.01678	10.01.01.11822	-	10.07.01.00211
SHFN 70 NK-45 G1/4-AG E MOS	10.01.01.12215	10.01.06.01678	10.01.01.12194	-	10.05.03.00023
SHFN 70 NK-45 G1/4-IG E MOS	10.01.01.12215	10.01.06.01678	10.01.01.12192	-	10.05.03.00023
SHFN 70 NK-45 G1/4-AG TV	10.01.01.11682	-	-	10.05.10.00058	-
SHFN 70 NK-45 G1/4-AG E TV	10.01.01.12165	-	-	10.05.10.00065	-
SHFN 70 NK-45 G1/4-AG MOS-TV	10.01.01.11686	-	-	10.05.10.00058	-
SHFN 70 NK-45 G1/4-AG E MOS-TV	10.01.01.12215	10.01.06.01678	-	10.05.10.00065	-
SHFN 85 NK-45 G1/4-AG	10.01.01.11773	-	10.01.01.11772	-	10.07.01.00211
SHFN 85 NK-45 G1/4-IG	10.01.01.11773	-	10.01.01.11822	-	10.07.01.00211
SHFN 85 NK-45 G1/4-AG E	10.01.01.12209	-	10.01.01.12194	-	10.05.03.00023
SHFN 85 NK-45 G1/4-IG E	10.01.01.12209	-	10.01.01.12192	-	10.05.03.00023
SHFN 85 NK-45 G1/4-AG MOS	10.01.01.11774	10.01.06.01720	10.01.01.11772	-	10.07.01.00211
SHFN 85 NK-45 G1/4-IG MOS	10.01.01.11774	10.01.06.01720	10.01.01.11822	-	10.07.01.00211
SHFN 85 NK-45 G1/4-AG E MOS	10.01.01.12223	-	10.01.01.12194	-	10.05.03.00023
SHFN 85 NK-45 G1/4-IG E MOS	10.01.01.12223	-	10.01.01.12192	-	10.05.03.00023
SHFN 85 NK-45 G1/4-AG TV	10.01.01.11773	-	-	10.05.10.00058	-
SHFN 85 NK-45 G1/4-AG E TV	10.01.01.12209	-	-	10.05.10.00065	-
SHFN 85 NK-45 G1/4-AG MOS-TV	10.01.01.11774	10.01.06.01720	-	10.05.10.00058	-
SHFN 85 NK-45 G1/4-AG E MOS-TV	10.01.01.12223	10.01.06.01720	-	10.05.10.00065	-

Technical Data Flat Suction Pads SHFN

Type*	Suction force Ds [N]**	Suction force d2 [N]***	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]****	Nipple family
SHFN 50 NK-45	110	40	95	7.3	41	4	N 041
SHFN 50 NK-45 TV	110	40	95	7.3	41	4	N 041
SHFN 70 NK-45	200	100	145	16.0	95	6	N 041
SHFN 70 NK-45 E	200	100	145	16.0	95	6	N 009
SHFN 70 NK-45 TV	200	100	145	16.0	95	6	N 041
SHFN 70 NK-45 E TV	200	100	145	16.0	95	6	N 009
SHFN 85 NK-45	300	175	210	25.0	176	6	N 041
SHFN 85 NK-45 E	300	175	210	25.0	176	6	N 009
SHFN 85 NK-45 TV	300	175	210	25.0	176	6	N 041
SHFN 85 NK-45 E TV	300	175	210	25.0	176	6	N 009

*Note: For technical data on the sensing valves, see Chapter "Valve Technology"

**The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

***Suction force referred to the sealing-edge diameter d2

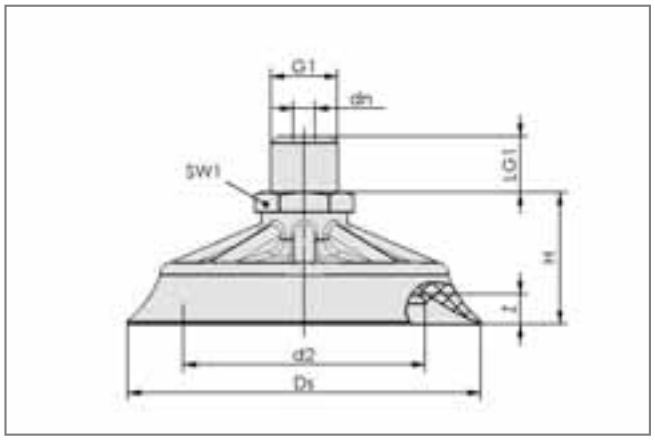
****The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Wood

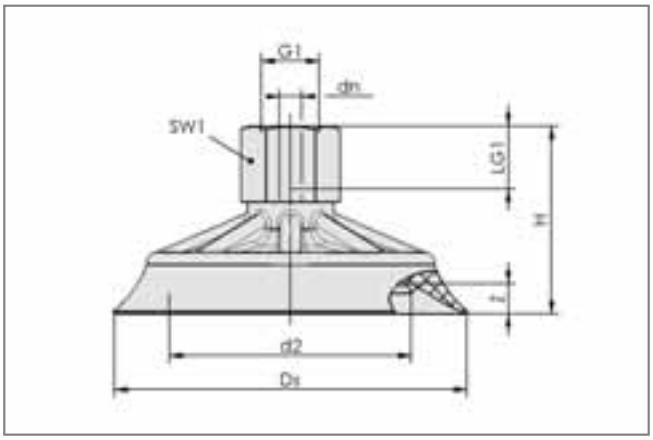
Flat Suction Pads SHFN

Suction area (Ø) from 50 mm to 85 mm

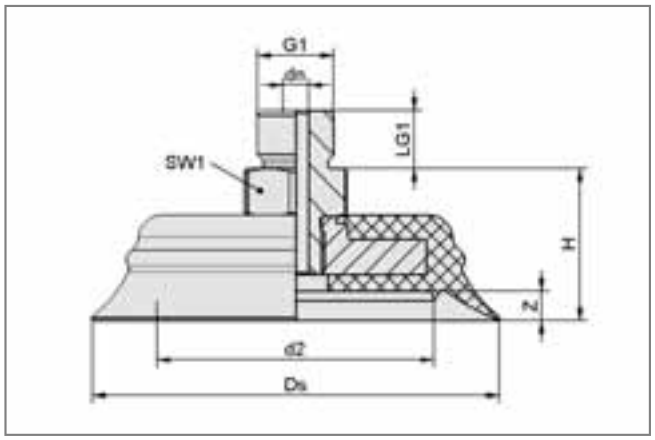
Design Data Flat Suction Pads SHFN



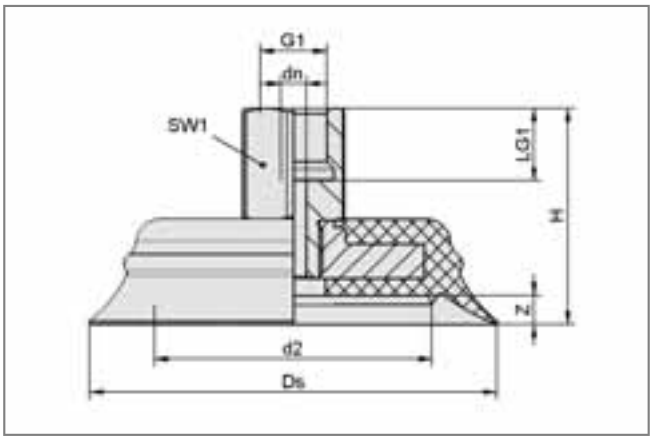
SHFN 50 to 85 NK-45 G1/4-AG (TV)



SHFN 50 to 85 NK-45 G1/4-IG



SHFN 70 to 85 NK-45 G1/4-AG E (TV)



SHFN 70 to 85 NK-45 G1/4-IG E

Type	Dimensions in mm*							
	d2	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
SHFN 50 NK-45 G1/4-AG	30	4.4	52	G1/4"-M	26.2	11	17	3
SHFN 50 NK-45 G1/4-IG	30	4.4	52	G1/4"-F	37.2	11	17	3
SHFN 50 NK-45 G1/4-AG TV	30	4.4	52	G1/4"-M	32.2	11	17	3
SHFN 70 NK-45 G1/4-AG	48	4.4	70	G1/4"-M	26.2	11	17	4
SHFN 70 NK-45 G1/4-AG E	48	4.4	70	G1/4"-M	26.2	10	17	4
SHFN 70 NK-45 G1/4-IG	48	4.4	70	G1/4"-F	37.2	11	17	4
SHFN 70 NK-45 G1/4-IG E	48	4.4	70	G1/4"-F	37.2	12	17	4
SHFN 70 NK-45 G1/4-AG TV	48	4.4	70	G1/4"-M	32.2	11	17	4
SHFN 70 NK-45 G1/4-AG E TV	48	4.4	70	G1/4"-M	33.4	10	17	4
SHFN 85 NK-45 G1/4-AG	62	4.4	85	G1/4"-M	26.2	11	17	4
SHFN 85 NK-45 G1/4-AG E	62	4.4	85	G1/4"-M	26.2	10	17	4
SHFN 85 NK-45 G1/4-IG	62	4.4	85	G1/4"-F	37.2	11	17	4
SHFN 85 NK-45 G1/4-IG E	62	4.4	85	G1/4"-F	37.2	12	17	4
SHFN 85 NK-45 G1/4-AG TV	62	4.4	85	G1/4"-M	32.2	11	17	4
SHFN 85 NK-45 G1/4-AG E TV	62	4.4	85	G1/4"-M	33.4	10	17	4

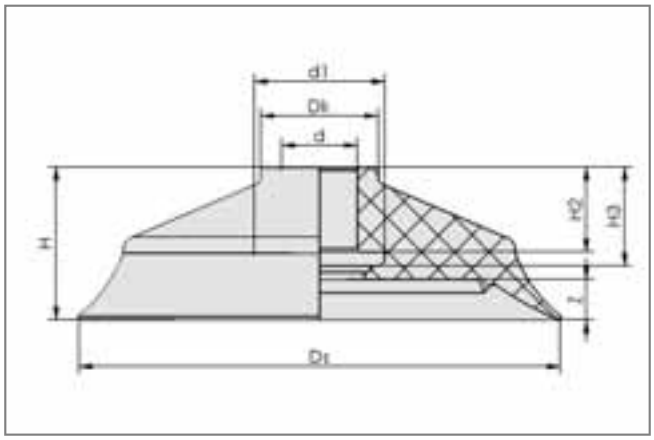
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Handling Wood

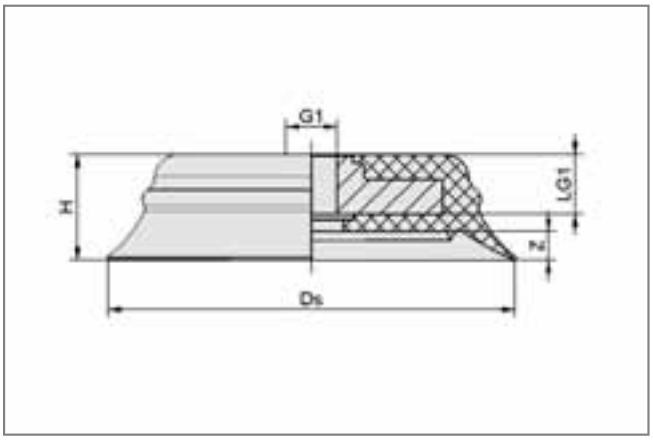
Flat Suction Pads SHFN

Suction area (Ø) from 50 mm to 85 mm

Design Data Flat Suction Pads SHF - Spare Parts for SHFN



SHF 50 to 85



SHF 70 E to 85 E

Type	Dimensions in mm*									
	d	d1	Dk	Ds	G1	H	H2	H3	LG1	Z (Stroke)
SHF 50 NK-45	7.5	17	17	52	-	22.2	12.8	14.3	-	3
SHF 70 NK-45	7.5	17	17	70	-	22.2	12.8	14.3	-	4
SHF 70 NK-45 E	-	-	-	70	M10x1.25-F	18.1	-	-	10	4
SHF 85 NK-45	7.5	17	17	85	-	22.2	12.8	14.3	-	4
SHF 85 NK-45 E	-	-	-	85	M10x1.25-F	18.1	-	-	10	4

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Handling Wood

Suction Plates SHF

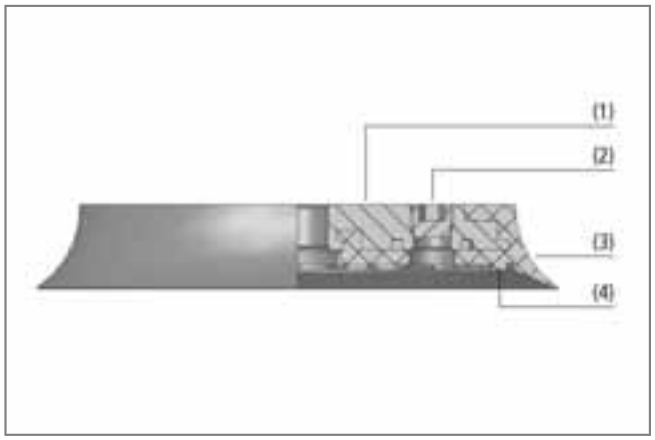
Suction area (Ø) from 125 mm to 210 mm

Suitability for Industry-Specific Applications

Suction plates SHF

Applications

- Round suction plate for handling of sheets, furniture elements, parquet and similar large, flat workpieces
- Handling of wooden parts with rough surfaces



System design suction plates SHF

Design

- Suction plate SHF, consisting of sealing ring (3) and aluminum mounting plate (1)
- Connection (2) on the side, normally sealed with a screw plug (glued into position for extra safety)
- Sealing ring clipped securely to mounting plate (can be changed without tools)
- Double internal sealing edge (4) for better sealing to rough surfaces
- Optional sensing valve can be ordered separately (use medium-strength locking compound for installation)
- Filter screen available optionally

Suction plates SHF being used for handling pressed wooden boards

Our Highlights...

- Soft sealing lip
- Double internal sealing edge
- Specifically structured lower surface
- Modular design

Your Benefits...

> Optimal adaptation to uneven workpiece surfaces

> Very good sealing on rough and smooth surfaces

> Highly dynamic movement and short cycle times

> Gasket can be changed quickly without tools

Suction Pads for Handling Wood

Suction Plates SHF

Suction area (Ø) from 125 mm to 210 mm

Designation Code Suction Plates SHF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SHF 210 NK-45 G1/2-IG:			
SHF	**210**	**NK-45**	**G1/2-IG**
SHF	125 160 210	NK-45	G1/4-IG (IG = female (F)) G1/2-IG

Ordering Data Suction Plates SHF

Suction plate SHF (sealing ring + support plate) is delivered assembled. The assembly consists of:
- Sealing ring of type DR-SHF – elastomer part, available in various diameters
- Aluminium support plate – available with various threads

Available spare parts: sealing ring DR-SHF
Available accessories: sensing valve, filter screen

Suction Plates SHF

Type*	Part Number
SHF 125 NK-45 G1/4-IG	10.01.01.11788
SHF 160 NK-45 G1/2-IG	10.01.01.12025
SHF 210 NK-45 G1/2-IG	10.01.01.11814

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts And Accessories Suction Plates SHF

Type	Sealing ring DR-SHF	Filter screen (center)	Filter screen (outside)	Sensing valve
SHF 125 NK-45 G1/4-IG	10.01.01.11783	10.07.01.00215	10.07.01.00215	10.05.10.00061
SHF 160 NK-45 G1/2-IG	10.01.01.12023	10.07.01.00110	10.07.01.00215	10.05.10.00061
SHF 210 NK-45 G1/2-IG	10.01.01.11809	10.07.01.00110	10.07.01.00215	10.05.10.00061

Technical Data Suction Plates SHF

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]***
SHF 125 G1/4-IG	625	290	72	305	9
SHF 160 G1/2-IG	1025	580	117	500	12
SHF 210 G1/2-IG	1770	1160	224	885	12

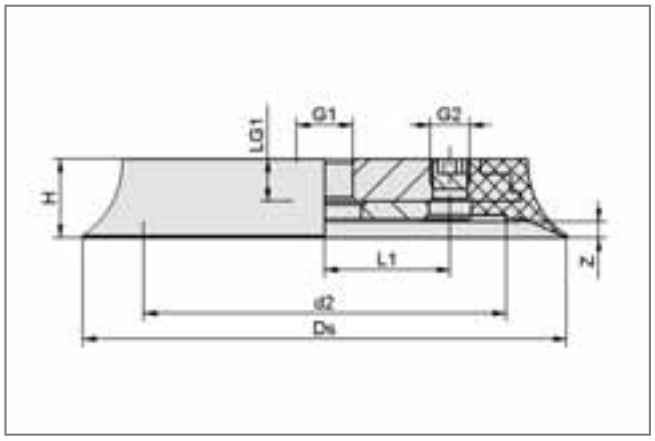
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor
**Suction force referred to the sealing-edge diameter d2
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Wood

Suction Plates SHF

Suction area (Ø) from 125 mm to 210 mm

Design Data Suction Plates SHF



SHF 125 to 210

Type*	Dimensions in mm**							
	d2	Ds	G1	G2***	H	L1	LG1	Z (Stroke)
SHF 125 G1/4-IG	85	125	G1/4"-F	G1/4"-F	26	26.5	14	6
SHF 160 G1/2-IG	120	160	G1/2"-F	G1/4"-F	26	41.4	14	6
SHF 210 G1/2-IG	170	210	G1/2"-F	G1/4"-F	26	52.8	14	6

*The connection dimensions for the sensing valve can be found under "Sensing valves TV/TVN" in Section "Valve technology"

**Acceptable dimensional tolerances for rubber sealings concerning to DIN ISO 3302-1 M3

***A plug is fitted in this connection in the factory

Suction Pads for Handling Wood

Suction Plates SPC

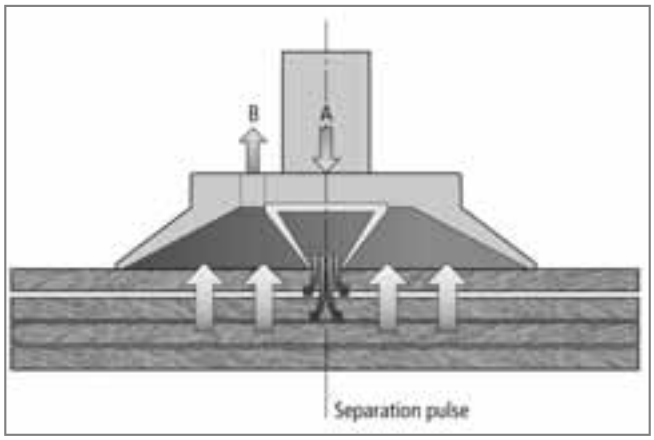
Suction area (Ø) from 160 mm to 250 mm

Suitability for Industry-Specific Applications

Suction plates SPC

Applications

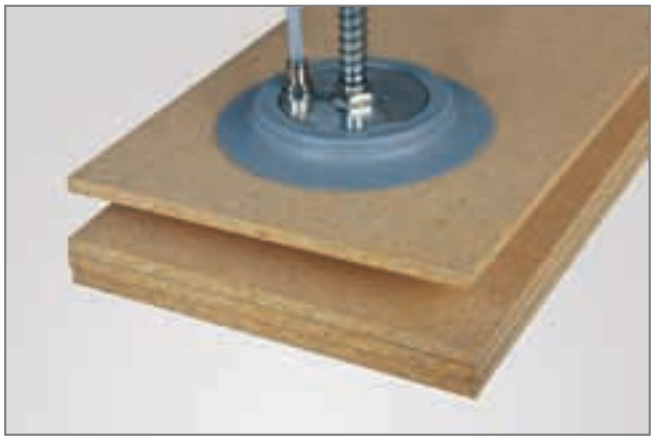
- Round suction plate for handling and separation of flat, porous workpieces, including those with a "suck-through" effect
- Separation of workpieces by injection of a throttled flow of compressed air into a separate area of the suction pad



System design suction plates SPC

Design

- Robust, wear-resistant suction pad SPC with double sealing lip, consisting of two seals (inner and outer) and aluminium support plate
- Seals are clipped securely into the support plate with specially shaped sections
- Inner seal separates the central cell for the flow of compressed air from the vacuum area
- When worn, the seals can be replaced separately; the aluminum supporting plate can be re-used
- The support plate has one threaded hole in the center (for connection of the compressed air A) and a second threaded hole towards the edge (for connection of the vacuum B) for gripping
- Series SPC-TV with sensing valve: deactivation of unused suction pads to prevent the entry of unwanted air



Suction plates SPC being used for seperation of chipboards

Our Highlights...	Your Benefits...
• Double sealing lip	> Special suction pad for flat, porous workpiceces, such as sheets of MDF, hardboard
• Separation function by applying a compressed air pulse	> Prevents porous workpieces from sticking together; overcomes the self-adhesion during unstacking of sheets
• Low internal volume	> Very short cycle times
• Optimum shape	> High suction forces in spite of small dimensions

Suction Pads for Handling Wood

Suction Plates SPC

Suction area (Ø) from 160 mm to 250 mm

Designation Code Suction Plates SPC

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example SPC 160 NBR-55 G1/2-IG TV:				
SPC	**160**	**NBR-55**	**G1/2-IG**	**TV**
SPC	160 210 250	NBR-55	G1/2-IG (IG = female (F))	TV sensing valve

Ordering Data Suction Plates SPC

Suction plate SPC (sealing ring + support plate) is delivered assembled. The assembly consists of:
- Outer and inner sealing ring of type DR-SPC – elastomer part, available in various diameters
- Aluminium support plate – available with various threads
- Optional product range supplement – sensing valve

Available spare parts: sealing ring DR-SPC, sensing valve

Suction Plates SPC

Type*	Part Number
SPC 160 NBR-55 G1/2-IG	10.01.01.01185
SPC 160 NBR-55 G1/2-IG TV	10.01.01.01186
SPC 210 NBR-55 G1/2-IG	10.01.01.01187
SPC 210 NBR-55 G1/2-IG TV	10.01.01.01188
SPC 250 NBR-55 G1/2-IG	10.01.01.01189
SPC 250 NBR-55 G1/2-IG TV	10.01.01.01211

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads And Sensing Valve

Type	Outer sealing ring	Inner sealing ring	Sensing valve
SPC 160 NBR-55 G1/2-IG (-TV)	10.01.01.01190	10.01.01.11371	10.05.10.00061
SPC 210 NBR-55 G1/2-IG (-TV)	10.01.01.01191	10.01.01.11371	10.05.10.00061
SPC 250 NBR-55 G1/2-IG (-TV)	10.01.01.01192	10.01.01.11371	10.05.10.00038

Technical Data Suction Plates SPC

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm³]	Recom. internal hose diameter d [mm]***
SPC 160 NBR-55 G1/2-IG	975	475	98	12
SPC 160 NBR-55 G1/2-IG TV	975	475	98	9
SPC 210 NBR-55 G1/2-IG	1760	1125	202	12
SPC 210 NBR-55 G1/2-IG TV	1760	1125	202	9
SPC 250 NBR-55 G1/2-IG	2540	1815	310	12
SPC 250 NBR-55 G1/2-IG TV	2540	1815	310	12

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**Suction force referred to the sealing-edge diameter d2

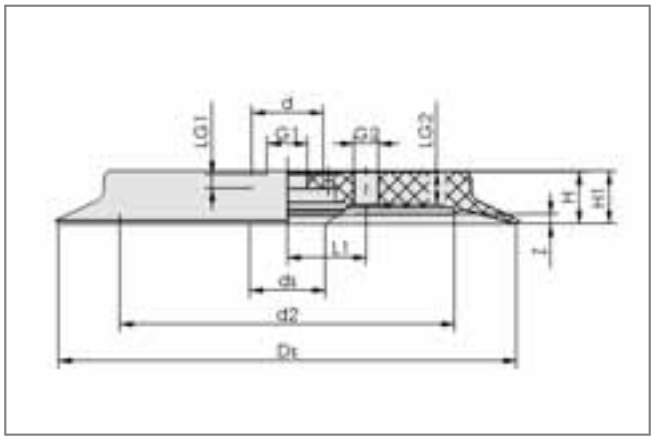
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Wood

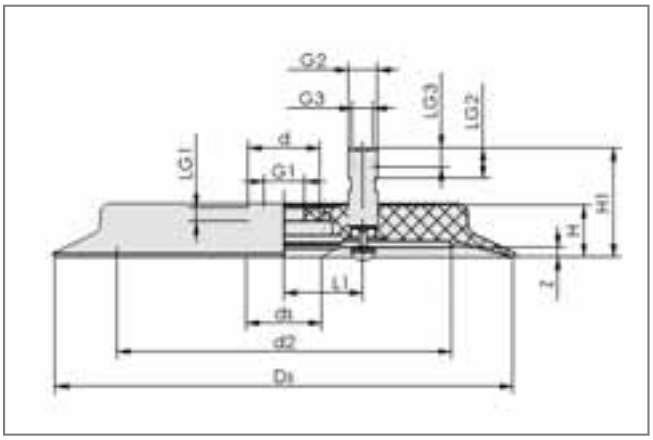
Suction Plates SPC

Suction area (Ø) from 160 mm to 250 mm

Design Data Suction Plates SPC



SPC 160 to 250



SPC 160 to 250 TV

Type	Dimensions in mm*												
	d	d2	Ds	ds	G1	G2	G3	H	H1	L1	LG1	LG2	LG3	Z
SPC 160 NBR-55 G1/2-IG	34	113	160	33.5	G1/2"-F	G1/4"-F	-	25	26.5	36.5	13.5	15	-	7
SPC 160 NBR-55 G1/2-IG TV	34	113	160	33.5	G1/2"-F	G1/4"-M	G1/8"-F	25	62.0	36.5	13.5	18	6	7
SPC 210 NBR-55 G1/2-IG	34	163	210	33.5	G1/2"-F	G1/4"-F	-	23	24.5	36.5	13.5	15	-	5
SPC 210 NBR-55 G1/2-IG TV	34	163	210	33.5	G1/2"-F	G1/4"-M	G1/8"-F	23	62.0	36.5	13.5	18	10	5
SPC 250 NBR-55 G1/2-IG	34	203	250	33.5	G1/2"-F	G1/2"-F	-	25	26.5	76.0	13.5	15	-	7
SPC 250 NBR-55 G1/2-IG TV	34	203	250	33.5	G1/2"-F	G1/2"-M	G1/8"-F	25	67.0	76.0	13.5	16	12	7

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Packaging

Flat Suction Pads SPF

Suction area (Ø) from 20 to 50 mm

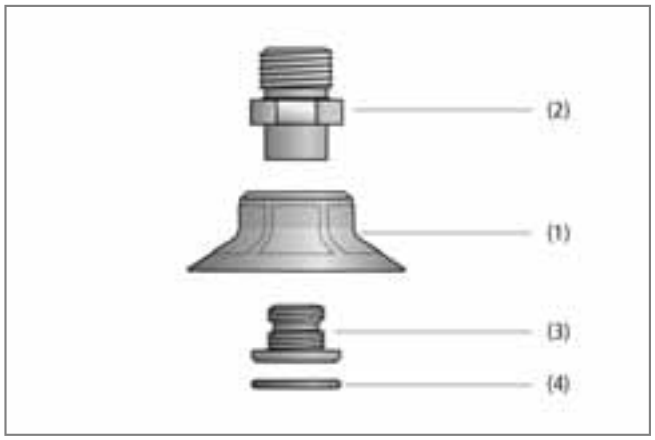
PACKAGING

Suitability for Industry-Specific Applications

Flat suction pads SPF

Applications

- Round, flat suction pad for usage in cardboard box and tray erectors
- Handling of cardboard and rigid packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction pads with excellent sealing and low wear



System design flat suction pads SPF

Design

- Round flat suction pad SPF (1) with soft, flexible sealing lip and supporting ribs on the suction surface
- Made of wear-proof material Elastodur ED-65
- Models with diameter up to 30 mm feature plug-in connection element for quick change of suction pad
- Starting at 40 mm diameter with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Clip-in filter screen (4) as pre-filter (filter pore size 250 µm)
- All connection elements with male thread are equipped with integrated sealing

Flat suction pads SPF being used in packaging machines

Our Highlights...	Your Benefits...
• Flexible, adaptable sealing lip	> Excellent sealing when used on cardboard and rigid packaging
• Robust, reinforced main body	> High intrinsic stability of the suction pad
• Supporting rips on the suction surface	> Maximum effective diameter for high suction force
• Wear-proof and abrasion-proof material Elastodur ED-65	> Very low wear, approx. 3 times higher compared to NBR

Suction Pads for Packaging

Flat Suction Pads SPF

Suction area (Ø) from 20 to 50 mm

Designation Code Flat Suction Pads SPF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example SPF-20 ED-65:		
SPF	**20**	**ED-65**
SPF	20	ED-65
	25	
	30	
	40	
	50	

Ordering Data Flat Suction Pads SPF

Suction pad SPF (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection element + accessories), the following ordering steps are required:

- Suction pad of type SPF (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen

Step 1: Flat Suction Pads SPF

Type*	Part Number
SPF-20 ED-65	10.01.01.12370
SPF-25 ED-65	10.01.01.12371
SPF-30 ED-65	10.01.01.12372
SPF-40 ED-65	10.01.01.12373
SPF-50 ED-65	10.01.01.12374

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Connection Elements Flat Suction Pads SPF

Type	SPF 20	SPF 25	SPF 30	SPF 40	SPF 50
SC 040 G1/8-AG	10.01.06.02490	10.01.06.02490	10.01.06.02490	-	-
SC 040 G1/8-IG	10.01.06.02482	10.01.06.02482	10.01.06.02482	-	-
SC 050 G1/4-AG	-	-	-	10.01.06.02487	10.01.06.02487
SC 050 G1/4-IG	-	-	-	10.01.06.02488	10.01.06.02488

Accessories Flat Suction Pads SPF

Type	Filter screen
SPF-20 ED-65	10.07.01.00309
SPF-25 ED-65	10.07.01.00309
SPF-30 ED-65	10.07.01.00309
SPF-40 ED-65	10.07.01.00308
SPF-50 ED-65	10.07.01.00308

Suction Pads for Packaging

Flat Suction Pads SPF

Suction area (Ø) from 20 to 50 mm

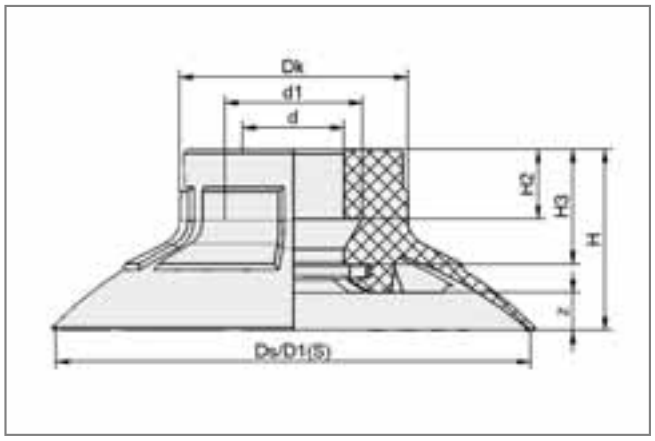
Technical Data Flat Suction Pads SPF

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element SC...
SPF-20 ED-65	16.0	19.2	10.5	1.0	25	4	040
SPF-25 ED-65	22.7	27.1	17.0	1.5	40	4	040
SPF-30 ED-65	29.5	35.3	22.5	2.3	45	6	040
SPF-40 ED-65	49.5	62.5	25.0	5.1	75	6	050
SPF-50 ED-65	74.2	87.4	44.0	7.9	100	6	050

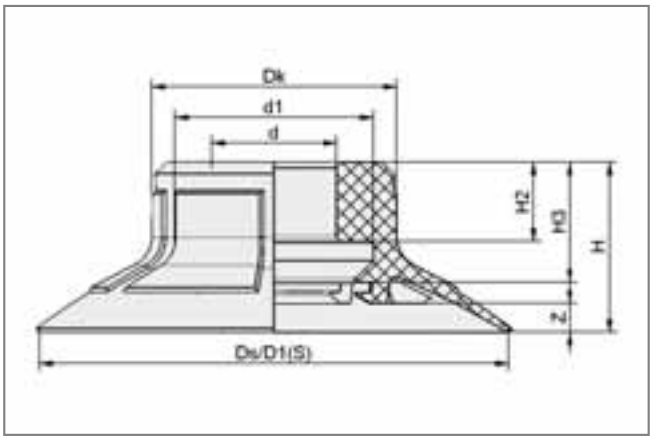
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads SPF



SPF-20...30



SPF-40...50

Type	Dimensions in mm*								
	d	d1	Dk	Ds	D1 (S)	H	H2	H3	Z (Stroke)
SPF-20 ED-65	7.5	10.5	15.1	21.4	23.3	11	4.6	7.1	2.0
SPF-25 ED-65	7.5	10.5	15.1	26.4	28.0	11	4.6	7.1	2.0
SPF-30 ED-65	7.5	10.5	15.1	31.4	33.6	12	4.6	7.6	2.5
SPF-40 ED-65	11.0	17.5	21.6	41.4	43.7	15	7.0	10.6	2.5
SPF-50 ED-65	11.0	17.5	21.6	51.4	53.9	16	7.0	10.6	3.5

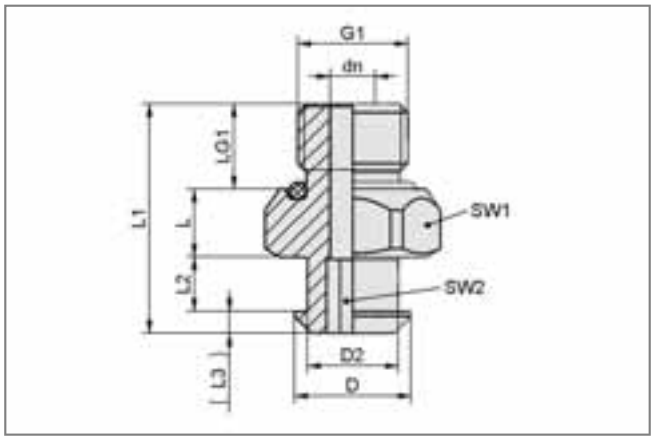
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Packaging

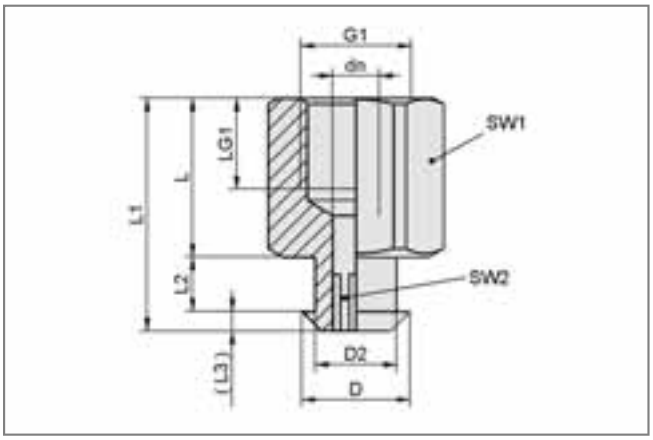
Flat Suction Pads SPF

Suction area (Ø) from 20 to 50 mm

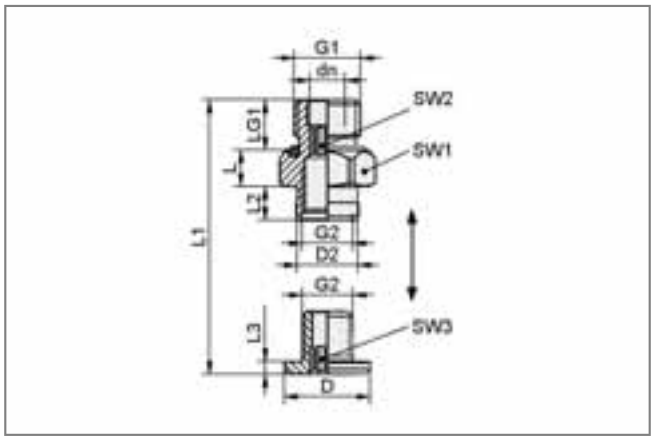
Design Data Connection Elements Flat Suction Pads SPF



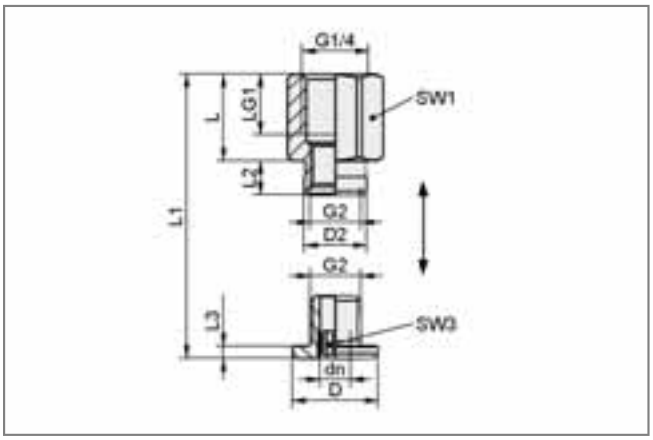
Connection element SC 040 G1/8-M for SPF-20...30



Connection element SC 040 G1/8-F for SPF-20...30



Connection element SC 050 G1/4-M for SPF-40...50



Connection element SC 050 G1/4-F for SPF-40...50

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	25.2	4.8	1.9	7.5	14	4
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	6

Suction Pads for Packaging

Bellows Suction Pads SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 60 mm

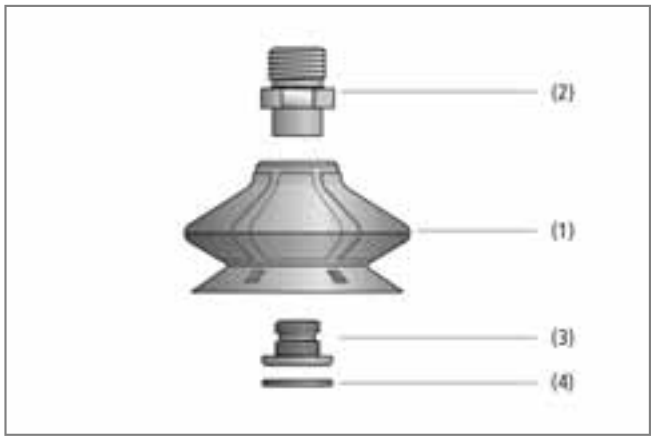
PACKAGING

Suitability for Industry-Specific Applications

Bellows suction pads SPB1 (1.5 folds)

Applications

- Round, bellows suction pad with 1.5 folds for the use in cardboard box and tray erectors
- Handling of cardboard and rigid packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction pads with excellent sealing and low wear



System design bellow-shaped suction pads SPB1 (1.5 folds)

Design

- Round, bellows suction pad SPB1 (1) with 1.5 folds and soft, flexible sealing lip
- Made of wear-proof material Elastodur ED-65
- Models with diameter up to 30 mm feature plug-in connection element
- Starting at 40 mm diameter with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Clip-in filter screen (4) as pre-filter
- All connection elements with male thread are equipped with integrated sealing

Bellows suction pads SPB1 being used in top-loading machines

Our Highlights...	Your Benefits...
• Flexible, adaptable sealing lip	> Excellent sealing performance on cardboard and rigid packaging
• Robust, reinforced main body	> High intrinsic stability in dynamic processes
• Interlocking of sealing-lip and fold due to locking elements	> Form-locking connection to avoid sliding of the suction pad
• Large effective suction surface	> High suction force but small dimensions of the suction pad
• Wear-proof and abrasion-proof material Elastodur ED-65	> Very low wear; approx. 3x the service life of NBR

Suction Pads for Packaging

Bellows Suction Pads SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 60 mm

Designation Code Bellows Suction Pads SPB1 (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example SPB1-30 ED-65:		
SPB1	**30**	**ED-65**
SPB1	10 to 60	ED-65

Ordering Data Bellows Suction Pads SPB1 (1.5 Folds)

Suction pad SPB1 (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection element + accessories), the following ordering steps are required:

- Suction pad of type SPB1 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen

Step 1: Bellows Suction Pads SPB1 (1.5 Folds)

Type*	Part Number
SPB1-10 ED-65	10.01.06.02782
SPB1-15 ED-65	10.01.06.02783
SPB1-20 ED-65	10.01.06.02452
SPB1-25 ED-65	10.01.06.02453
SPB1-30 ED-65	10.01.06.02454
SPB1-40 ED-65	10.01.06.02455
SPB1-50 ED-65	10.01.06.02456
SPB1-60 ED-65	10.01.06.02457

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Connection elements Bellows Suction Pads SPB1 (1.5 Folds)

Type	SPB1-10	SPB1-15	SPB1-20	SPB1-25
SC 030 M5-AG	10.01.06.02802	-	-	-
SC 040 G1/8-AG	-	10.01.06.02490	10.01.06.02490	10.01.06.02490
SC 040 G1/8-IG	-	10.01.06.02482	10.01.06.02482	10.01.06.02482
SC 050 G1/4-AG	-	-	-	-
SC 050 G1/4-IG	-	-	-	-

Type	SPB1-30	SPB1-40	SPB1-50	SPB1-60
SC 030 M5-AG	-	-	-	-
SC 040 G1/8-AG	10.01.06.02490	-	-	-
SC 040 G1/8-IG	10.01.06.02482	-	-	-
SC 050 G1/4-AG	-	10.01.06.02487	10.01.06.02487	10.01.06.02487
SC 050 G1/4-IG	-	10.01.06.02488	10.01.06.02488	10.01.06.02488

Suction Pads for Packaging

Bellows Suction Pads SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 60 mm

Ordering Data Accessories Bellows Suction Pads SPB1 (1.5 Folds)

Type	Filter screen
SPB1-10 ED-65	-
SPB1-15 ED-65	-
SPB1-20 ED-65	10.07.01.00309
SPB1-25 ED-65	10.07.01.00309
SPB1-30 ED-65	10.07.01.00309
SPB1-40 ED-65	10.07.01.00308
SPB1-50 ED-65	10.07.01.00308
SPB1-60 ED-65	10.07.01.00308

Technical Data Bellows Suction Pads SPB1 (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element SC...
SPB1-10 ED-65	1.5	4.0	2.0	0.5	5	4	030
SPB1-15 ED-65	4.3	9.0	5.0	1.5	8	4	040
SPB1-20 ED-65	9.9	16.2	9.8	2.9	20	4	040
SPB1-25 ED-65	14.9	23.4	13.0	5.1	20	4	040
SPB1-30 ED-65	20.7	30.6	15.5	7.8	35	6	040
SPB1-40 ED-65	35.9	46.8	24.8	18.4	70	6	050
SPB1-50 ED-65	54.7	72.7	31.2	30.3	100	6	050
SPB1-60 ED-65	78.0	100.9	49.4	49.5	200	6	050

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

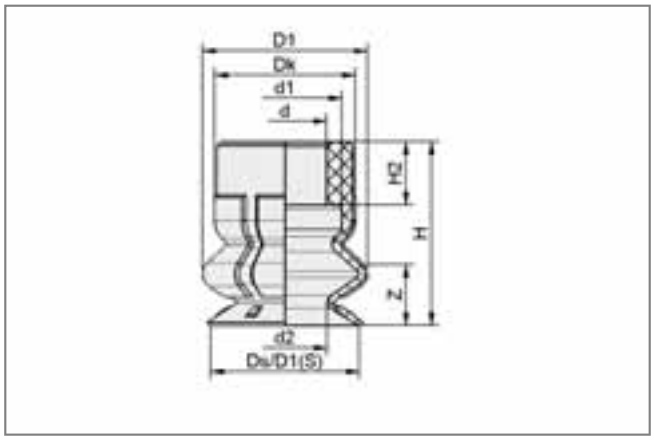
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Packaging

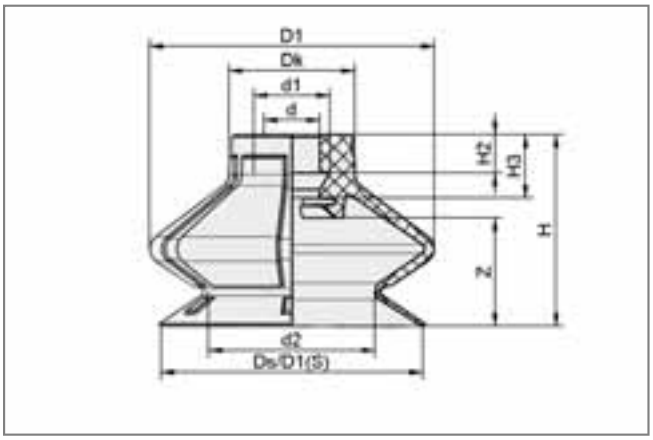
Bellows Suction Pads SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 60 mm

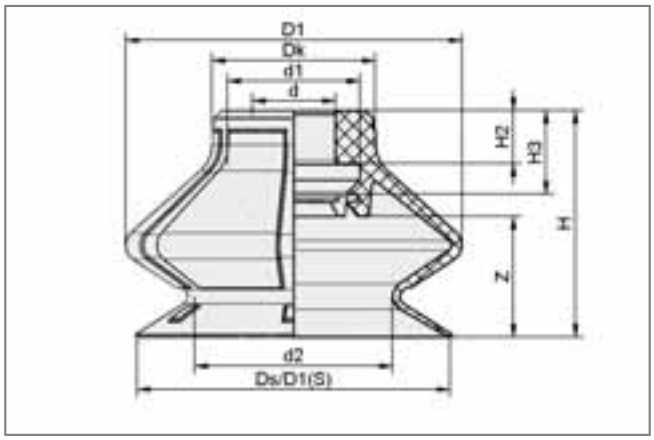
Design Data Bellows Suction Pads SPB1 (1.5 Folds)



SPB1-10...15



SPB1-20...30



SPB1-40...60

Type	Dimensions in mm*										
	d	d1	D1	Dk	d2	Ds	D1 (S)	H	H2	H3	Z
SPB1-10 ED-65	5.5	7.5	11.0	9.4	5.6	9.5	11.3	12	4.2	-	4
SPB1-15 ED-65	7.5	10.5	18.4	15.1	9.5	15.4	19.7	15	4.6	-	6
SPB1-20 ED-65	7.5	10.5	24.6	15.1	13.8	21.4	26.3	18	4.6	7.6	8
SPB1-25 ED-65	7.5	10.5	29.0	15.1	16.9	26.4	31.3	21	4.6	7.6	11
SPB1-30 ED-65	7.5	10.5	34.2	15.1	20.0	31.4	36.7	23	4.6	7.6	13
SPB1-40 ED-65	11.0	17.5	44.6	21.6	26.1	41.4	48.0	30	7.0	11.1	16
SPB1-50 ED-65	11.0	17.5	55.2	21.6	32.3	51.4	58.4	32	7.0	11.1	18
SPB1-60 ED-65	11.0	17.5	65.7	21.6	38.6	61.4	69.6	36	7.0	11.1	22

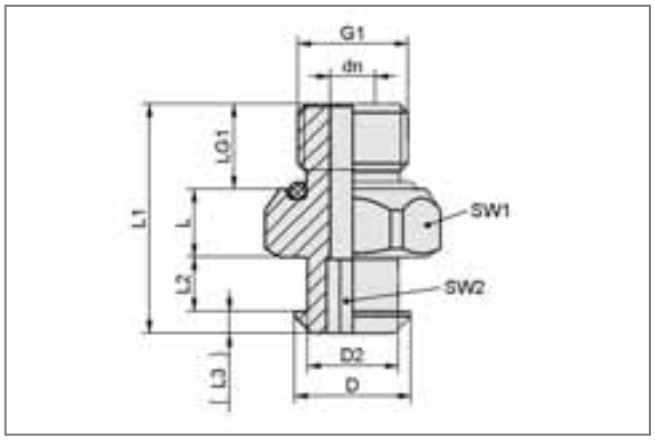
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Packaging

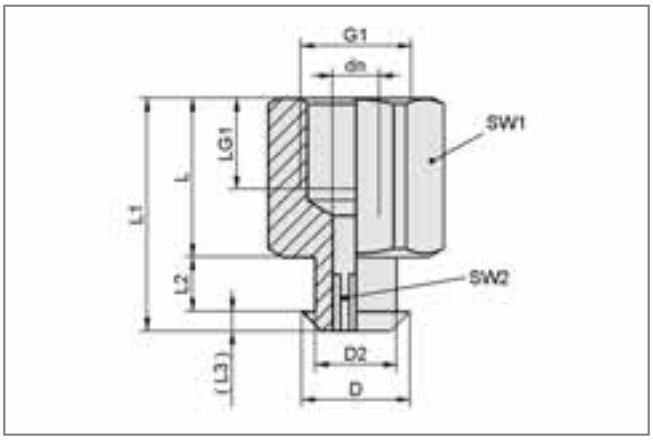
Bellows Suction Pads SPB1 (1.5 Folds)

Suction area (Ø) from 10 mm to 60 mm

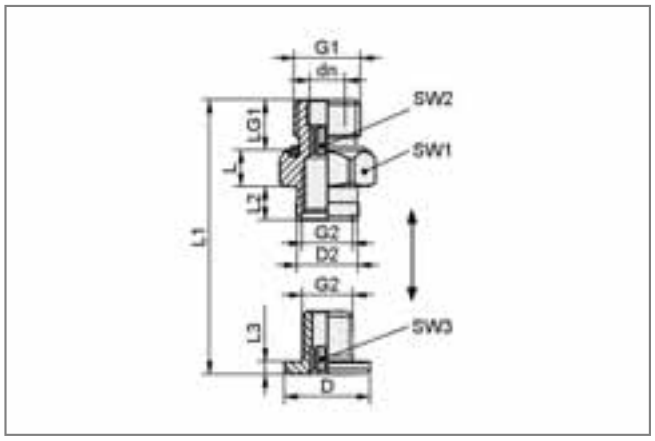
Design Data Connection Elements Bellows Suction Pads SPB1 (1.5 Folds)



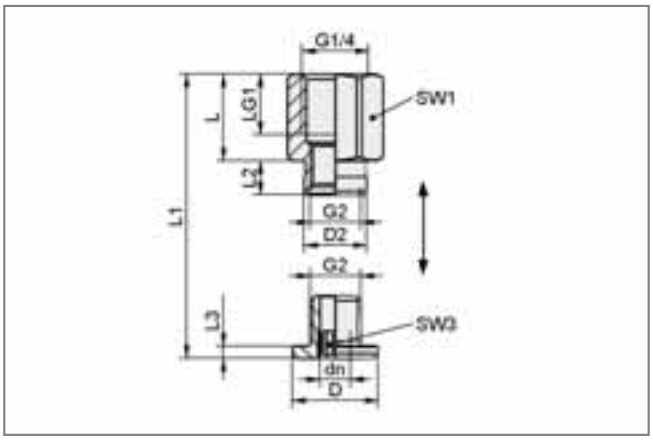
Connection element SC 030/040...AG for SPB1-10...30



Connection element SC 040 G1/8-F for SPB1-20...30



Connection element SC 050 G1/4-M for SPB1-40...60



Connection element SC 050 G1/4-F for SPB1-40...60

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2
SC 030 M5-AG	7.2	6	2	M5-M	5.0	16.8	4.3	1.5	6.0	10	3
SC 040 G1/8-AG	10.3	8	4	G1/8"-M	6.0	25.2	4.8	1.9	7.5	14	4
SC 040 G1/8-IG	10.3	8	4	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4
SC 050 G1/4-AG	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6
SC 050 G1/4-IG	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	6

Suction Pads for Packaging

Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

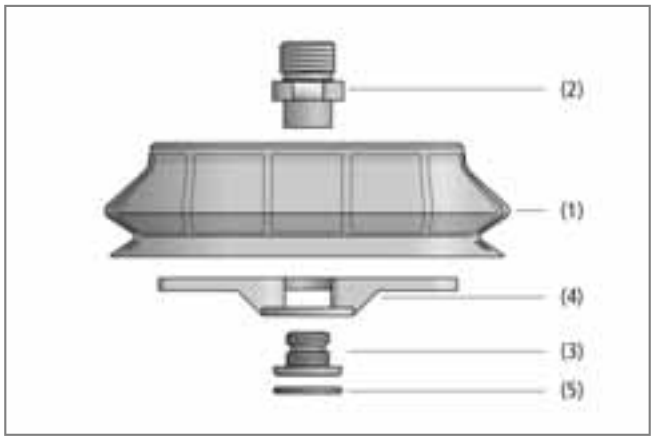
Suction area (LxW) from 60x20 mm to 100x40 mm

Suitability for Industry-Specific Applications

Bellows suction pads SPOB1 (oval, 1.5 folds)

Applications

- Oval, bellows suction pad with 1.5 folds for the use in cardboard box and tray erectors
- Handling of cardboard and rigid or flexible packaging in top-loading and side-loading machines
- Palletizing and depalletizing processes
- Heavy-duty applications that require suction pads with excellent sealing and low wear



System design bellows suction pads SPOB1 (oval, 1.5 folds)

Design

- Oval, bellows suction pad SPOB1 with 1.5 folds and soft, flexible sealing lip
- Made of wear-proof material Elastodur ED-65 with a long service life
- All sizes come with a 2-piece connection element: consisting of machine-side component (2) and suction-side component (3)
- Size 100 mm x 40 mm with additional suction pad insert (4); included in scope of delivery of connection elements; reusable
- Clip-in filter screen (5) as pre-filter (filter pore size 250 µm)

Bellows suction pads SPOB1 being used for handling of cardboard

Our Highlights...

- Oval shape
- Suction pad features robust, reinforced main body
- "Interlocking" of sealing-lip and fold due to locking elements
- Made from wear-proof and abrasion-proof material Elastodur ED-65

Your Benefits...

> Ideal for all oblong workpieces

> High intrinsic stability of the suction pad in dynamic processes

> Form-locking connection to avoid sliding of the suction pad

> Very low wear; approx. 3x the service life of NBR

Suction Pads for Packaging

Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Designation Code Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness
Example SPOB1-60x20 ED-65:		
SPOB1	**60x20**	**ED-65**
SPOB1	60x20 100x40	ED-65

Ordering Data Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Suction pad SPOB1 (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection element + accessories), the following ordering steps are required:

- Suction pad of type SPOB1 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads, includes stabilization plate for model size 100 x 400 mm

Available accessories: filter screen

Step 1: Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Type*	Part Number
SPOB1-60x20 ED-65	10.01.06.02462
SPOB1-100x40 ED-65	10.01.06.02461

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Ordering data Connection elements Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Type	SPOB1-60x20	SPOB1-100x40
SC 040 V01 G1/8-AG	10.01.06.02495	-
SC 040 V01 G1/8-IG	10.01.06.02496	-
SC 050 V10 G1/4-AG	-	10.01.06.02491
SC 050 V10 G1/4-IG	-	10.01.06.02493

Ordering Data Accessories Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Type	Filter screen
SPOB1-60x20 ED-65	10.07.01.00309
SPOB1-100x40 ED-65	10.07.01.00308

Technical Data Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Lateral force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Type Connection element SC...
SPOB1-60x20 ED-65	32.5	39.8	32.2	11.0	25	6	040
SPOB1-100x40 ED-65	111.2	131.4	76.9	60.1	50	6	050

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

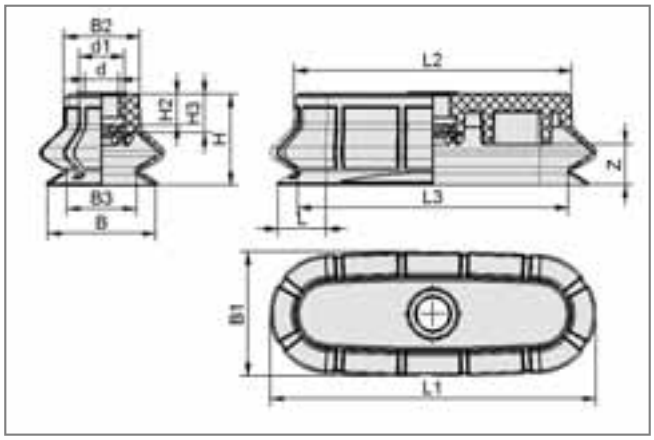
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Packaging

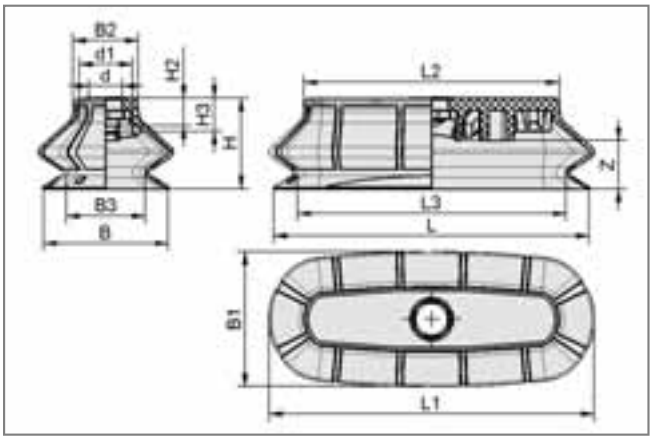
Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)

Suction area (LxW) from 60x20 mm to 100x40 mm

Design Data Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)



SPOB1-60x20

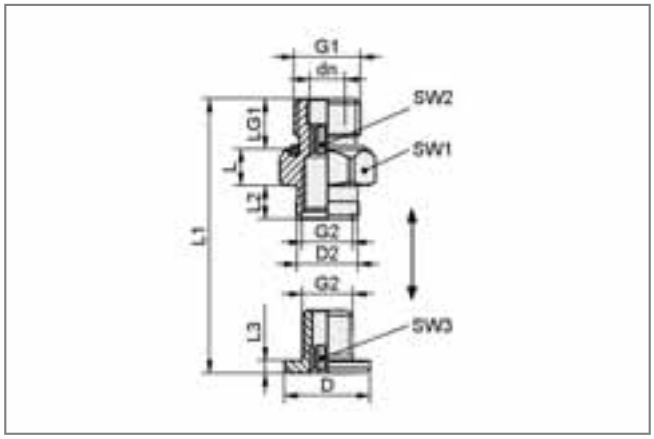


SPOB1-100x40

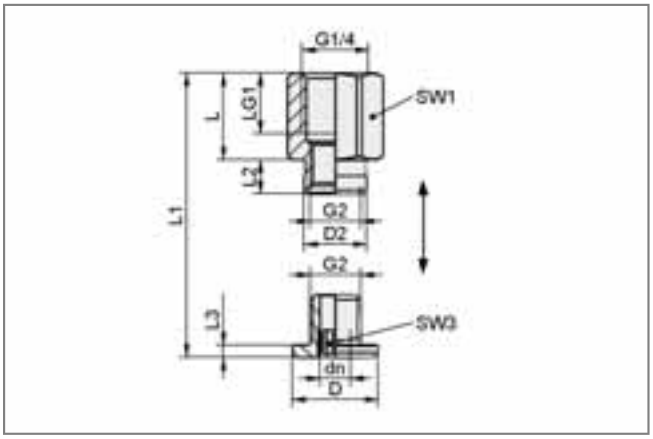
Type	Dimensions in mm*													
	B	B1	B2	B3	d	d1	H	H2	H3	L	L1	L2	L3	Z (Stroke)
SPOB1-60x20 ED-65	21.4	24.6	16.8	12.8	7.3	10.5	18	4.8	7.6	61.4	64.6	55.1	53.4	8
SPOB1-100x40 ED-65	41.4	44.6	21.6	25.9	11.0	17.5	30	9.2	11.1	104.4	107.6	84.6	88.9	16

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Connection Elements Bellows Suction Pads SPOB1 (Oval, 1.5 Folds)



Connection element SC...-M for SPOB1-60x20...100x40



Connection element SC...-F for SPOB1-60x20...100x40

Type	Dimensions in mm										
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1	SW2
SC 040 V01 G1/8-AG*	10.3	8	4	G1/8"-M	6.0	20.3	4.8	2.0	7.5	14	4
SC 040 V01 G1/8-IG*	10.3	8	4	G1/8"-F	14.0	20.8	4.8	2.0	8.0	14	4
SC 050 V10 G1/4-AG**	17.0	12	6	G1/4"-M	7.2	26.5	6.8	2.5	10.0	17	6
SC 050 V10 G1/4-IG**	17.0	12	6	G1/4"-F	17.2	26.5	6.8	2.5	12.0	17	6

*suitable for SPOB1-60x20

**suitable for SPOB1-100x40

Suction Pads for Packaging

Bellows Suction Pads SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

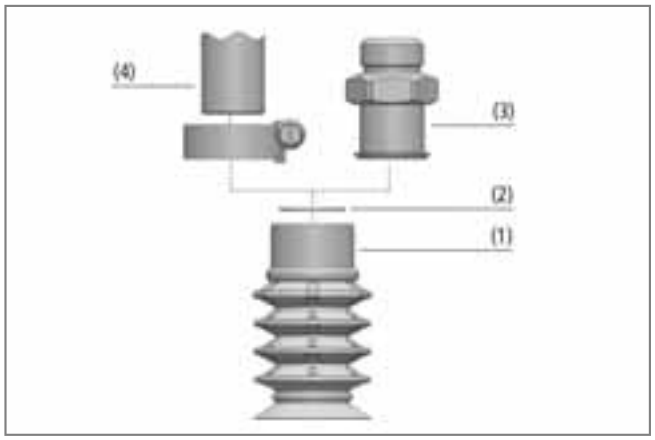
PACKAGING

Suitability for Industry-Specific Applications

Bellows suction pads SPB4 (4.5 folds)

Applications

- Round, bellows suction pad with 4.5 folds for handling of flexible products such as pouches and other plastic film packaging
- Process reliable gripping and handling of solid, powdery and liquid filled pouches
- High-speed packaging processes, particularly in conjunction with parallel kinematic robots



System design bellows suction pads SPB4 (4.5 folds)

Design

- Bellows suction pad SPB4 (1) with 4.5 folds and soft, flexible sealing lip
- Special reinforced bellows for additional stability
- Mounting via Schmalz Connector SC (3). Alternatively direct attachment on 3/8"- or 1/2"-pipe via hose clamp (4)
- All mounting elements with male thread include an integrated sealing ring
- Optional pre-filter (2) (250 µm filter fineness)
- Optional insert disc SPPI for the lower suction fold avoids taping the foil

Bellows suction pads SPB4 being used for handling foil-wrapped products

Our Highlights...

- Thin, steep sealing lip with flow fins
- Functional separation of folds and sealing lip
- Reinforced basic body and folds
- Extra large nominal diameter for high volume flow rates
- Food grade material (FDA conform) Silikone SI

Your Benefits...

> Extraordinary sealing on pouches and other flexible materials

> Compressed bellows have no negative effect on flexibility of sealing lip

> No collapsing when suction pad is stretched under vacuum

> Sized for operation with pumps, blowers and multistage ejectors

> Suitable for applications in the food industry

Suction Pads for Packaging

Bellows Suction Pads SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Designation Code Bellows Suction Pads SPB4 (4.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example SPB4-30 SI-55:		
SPB4	**30**	**SI-55**
SPB4	20	SI-55
	30	
	40	
	50	

Ordering Data Bellows Suction Pads SPB4 (4.5 Folds)

Suction pad SPB4 (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection element + accessories), the following ordering steps are required:
- Suction pad of type SPB4 (step 1) – elastomer part, available in various diameters
- Connection element of type SC (step 2) – available with various threads

Available accessories: filter screen, hose clamp, insert disc

Step 1: Bellows Suction Pads SPB4 (4.5 Folds)

Type*	Part Number
SPB4-20 SI-55	10.01.06.02588
SPB4-30 SI-55	10.01.06.02589
SPB4-40 SI-55	10.01.06.02590
SPB4-50 SI-55	10.01.06.02613

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Ordering data Connection elements Bellows Suction Pads SPB4 (4.5 Folds)

Type	SPB4-20	SPB4-30	SPB4-40	SPB4-50
SC 080 G3/8-AG	10.01.06.02593	10.01.06.02593	-	-
SC 080 G3/8-IG	10.01.06.02594	10.01.06.02594	-	-
SC 090 G1/2-AG	-	-	10.01.06.02595	10.01.06.02595
SC 090 G1/2-IG	-	-	10.01.06.02596	10.01.06.02596

Ordering Data Accessories Bellows Suction Pads SPB4 (4.5 Folds)

Type	Filter screen	Hose clamp	Insert disc SPPI
SPB4-20 SI-55	10.07.01.00320	10.07.10.00002	10.01.06.02915
SPB4-30 SI-55	10.07.01.00320	10.07.10.00002	10.01.06.02855
SPB4-40 SI-55	10.07.01.00321	10.07.10.00003	10.01.06.02856
SPB4-50 SI-55	10.07.01.00321	10.07.10.00003	10.01.06.02916

Suction Pads for Packaging

Bellows Suction Pads SPB4 (4.5 Folds)

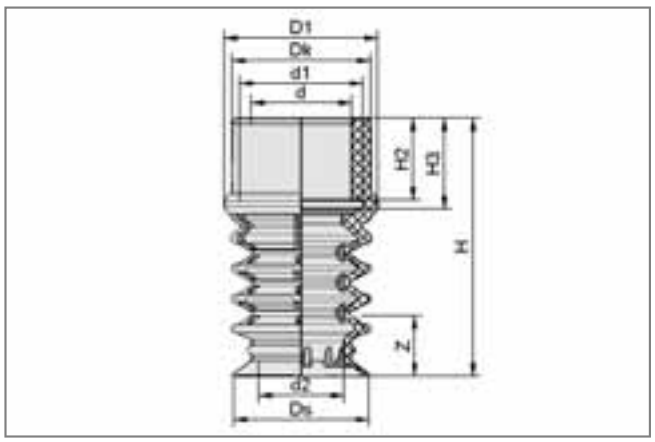
Suction area (Ø) from 20 mm to 50 mm

Technical Data Bellows Suction Pads SPB4 (4.5 Folds)

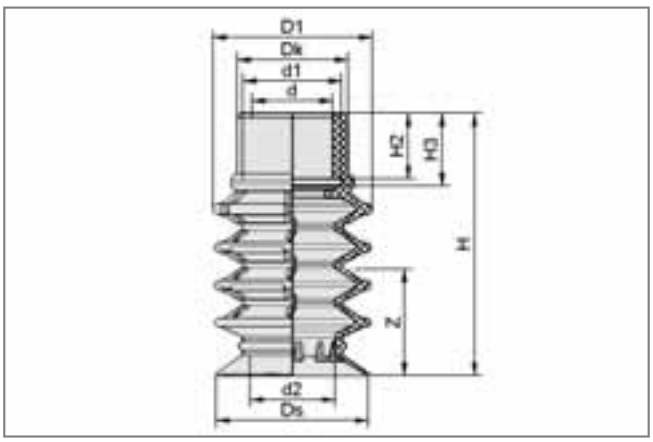
Type	Suction force [N] at -200 mbar*	Suction force [N] at -400 mbar*	Suction force [N] at -600 mbar*	Pull-off force [N] at -200 mbar	Pull-off force [N] at -400 mbar	Volume [cm³]	Type Connection element SC...
SPB4-20 SI-55	2.6	5.3	8	4.9	7	7.9	080
SPB4-30 SI-55	5.3	10.6	16	9.9	13	15.6	080
SPB4-40 SI-55	8.3	16.6	25	14.1	23	35.7	090
SPB4-50 SI-55	16.5	33.0	50	22.0	37	64.5	090

*The specified suction forces are theoretical values with a smooth, dry workpiece surface - they do not include a safety factor

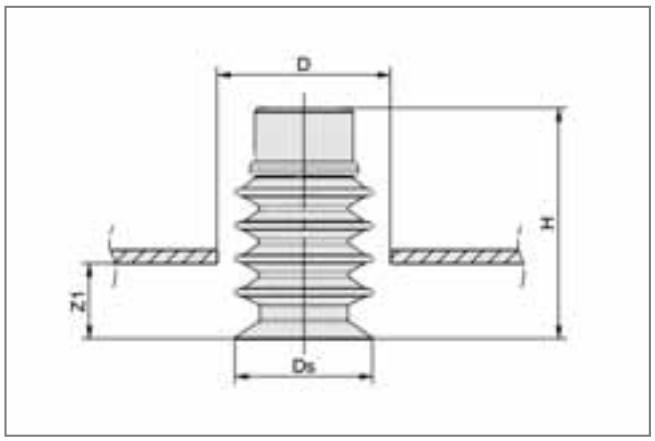
Design Data Bellows Suction Pads SPB4 (4.5 Folds)



SPB4-20



SPB4-30...50



Installation instructions when using a support plate

Type	Dimensions in mm*										
	d	d1	D**	D1	Dk	Ds	H	H2	H3	Z (Stroke)	Z1**
SPB4-20 SI-55	16	19.6	30	24.4	22	21.4	41	13	14.4	10	8
SPB4-30 SI-55	16	19.6	39	31.0	22	30.2	52	13	14.4	20	17
SPB4-40 SI-55	20	24.8	51	41.0	28	40.5	66	14	16.0	27	25
SPB4-50 SI-55	20	24.8	61	51.0	28	50.3	76	14	16.0	37	35

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

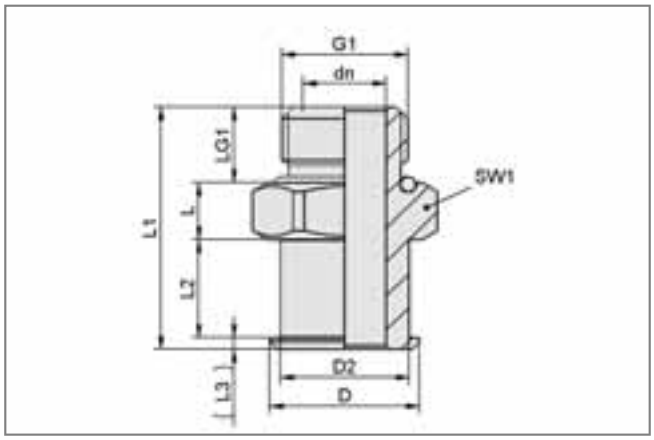
**These parameters ensure that the suction pad seal on the packaging is correct and that the shear force is maximized when using a support plate

Suction Pads for Packaging

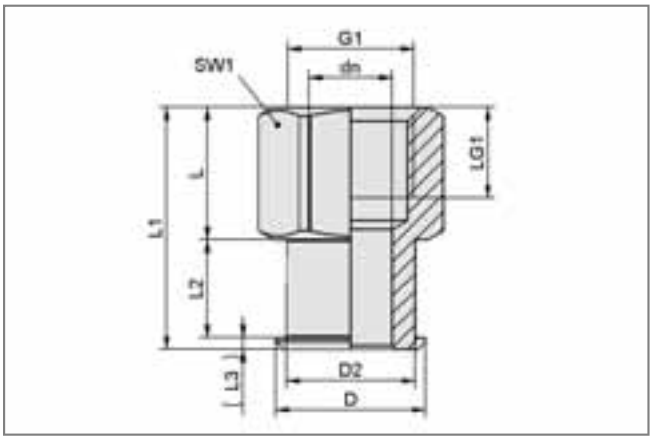
Bellows Suction Pads SPB4 (4.5 Folds)

Suction area (Ø) from 20 mm to 50 mm

Design Data Connection Elements Bellows Suction Pads SPB4 (4.5 Folds)



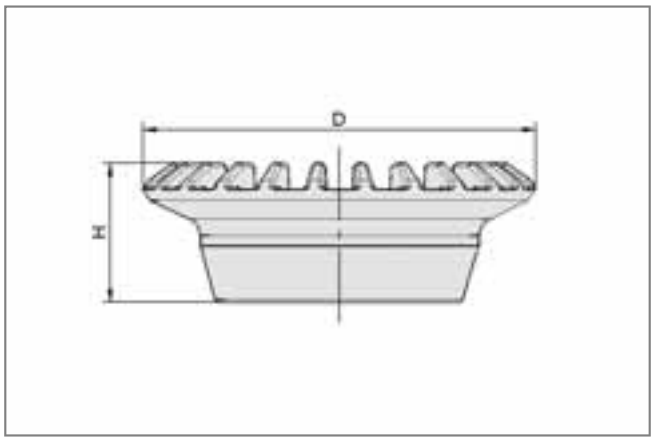
Connection element SC...AG



Connection element SC...IG

Type	Dimensions in mm									
	D	D2	dn	G1	L	L1	L2	L3	LG1	SW1
SC 080 G3/8-AG	19.8	17	11	G3/8"-M	7.5	32	13	1.5	10	22
SC 080 G3/8-IG	19.8	17	11	G3/8"-F	17.5	32	13	1.5	12	22
SC 090 G1/2-AG	25.0	21	15	G1/2"-M	7.8	38	14	2.0	14	27
SC 090 G1/2-IG	25.0	21	15	G1/2"-F	21.6	38	14	2.0	16	27

Design Data Accessories Bellows Suction Pads SPB4



Insert disc SPPI

Type	Dimensions in mm		
	For suction pad type	D	H
SPPI 16	SPB4-20	16	7.5
SPPI 24	SPB4-30	24	9.5
SPPI 32	SPB4-40	32	11.5
SPPI 42	SPB4-50	42	15.0

Suction Pads for Packaging

Bellows Suction Pads FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

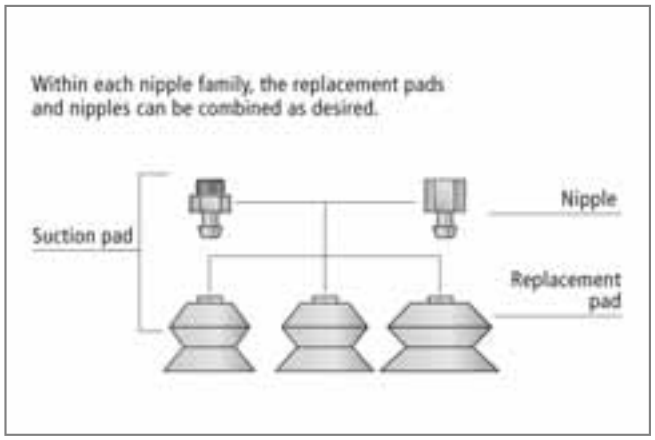
PACKAGING CD / DVD

Suitability for Industry-Specific Applications

Bellows suction pads FGA PVC (1.5 folds)

Applications

- Round, bellows suction pad with 1.5 folds for handling of fragile workpieces thanks to damping effect of corrugations and soft sealing lip
- Usage in box openers and for handling of non-rigid workpieces and soft packaging materials
- Handling tasks in special processes which use chlorinated water, such as rinsing of plastic bags
- Handling of CDs and DVDs



System design bellows suction pads FGA PVC (1.5 folds)

Design

- Robust and wear-resistant suction pad FG with 2.5 folds and single sealing lip
- Very adaptable geometry and soft, flexible material
- Large effective internal diameter

Bellows suction pads FGA PVC being used for handling non-rigid workpieces

Our Highlights...	Your Benefits...
• 1.5 folds	> Good damping when positioning on workpiece
• Large effective internal diameter	> High suction force
• Soft and adaptable sealing lip and bottom corrugation	> Good adaptation to curved or uneven surfaces
• Stiffer upper corrugation	> High stability against horizontal acceleration
• Flexible and adaptable material	> Optimum sealing, even on non-rigid workpieces
• Wear-resistant material PVC	> Long operating lifetime, very wide range of applications

Suction Pads for Packaging

Bellows Suction Pads FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

Designation Code Bellows Suction Pads FGA PVC (1.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example FGA 13 PVC-50:		
FGA	**13**	**PVC-50**
FGA	13	PVC-50
	19	
	22	

Ordering Data Bellows Suction Pads FGA PVC (1.5 Folds)

Suction pad FGA PVC (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection nipple), the following ordering steps are required:

- Suction pad of type FGA PVC (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Bellows Suction Pads FGA PVC (1.5 Folds)

Type	Part Number
FGA 13 PVC-50	10.01.06.01549
FGA 19 PVC-50	10.01.06.01975
FGA 22 PVC-50	10.01.06.01947

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Connection Nipples Bellows Suction Pads FGA PVC (1.5 Folds)

Type	M5-AG	G1/8-AG	G1/8-IG
FGA 13 PVC	-	-	-
FGA 19 PVC	-	-	-
FGA 22 PVC	10.01.06.00123	10.01.06.05735	10.01.06.05731

Technical Data Bellows Suction Pads FGA PVC (1.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
FGA 13 PVC-50	1.7	6	0.5	10	4
FGA 19 PVC-50	5.9	10	1.6	20	4
FGA 22 PVC-50	5.3	16	2.3	20	4

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

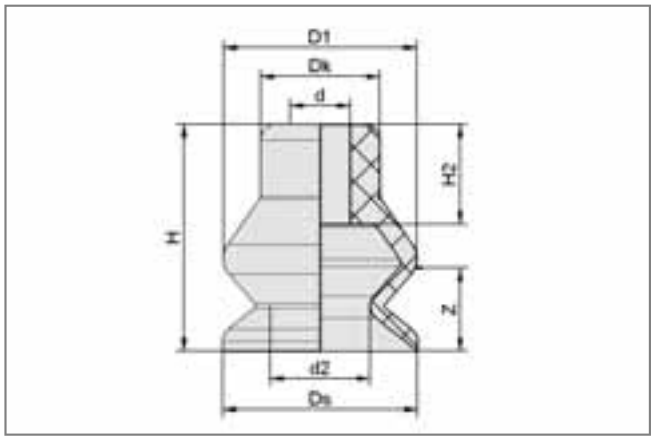
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Packaging

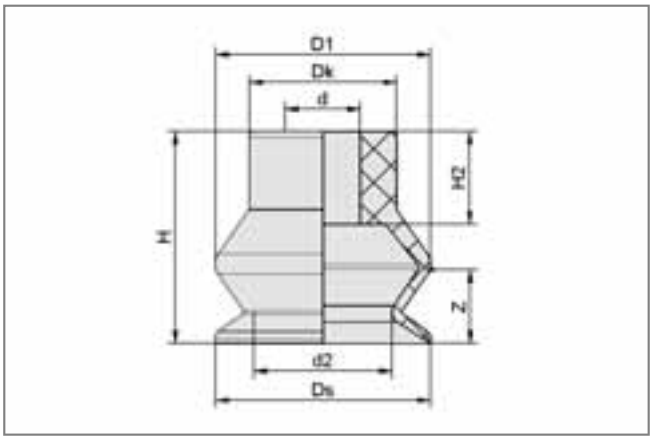
Bellows Suction Pads FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

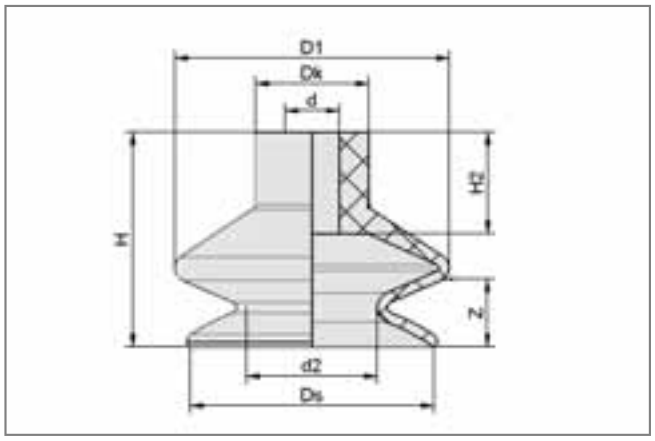
Design Data Bellows Suction Pads FGA PVC (1.5 Folds)



FGA 13 PVC-50



FGA 19 PVC-50



FGA 22 PVC-50

Type	Dimensions in mm*							
	D1	d	d2	Dk	Ds	H	H2	Z (Stroke)
FGA 13 PVC-50	12.8	4.0	6.6	7.9	12.9	15.0	6.6	6
FGA 19 PVC-50	19.0	6.6	12.2	13.0	19.0	18.7	8.2	6
FGA 22 PVC-50	24.2	4.8	11.5	10.0	21.5	19.0	9.0	7

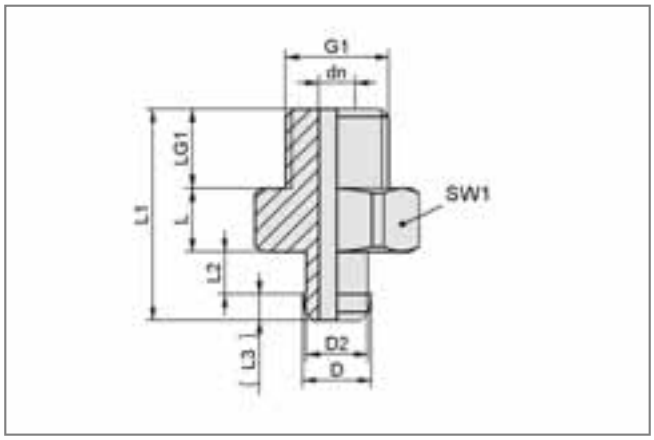
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Packaging

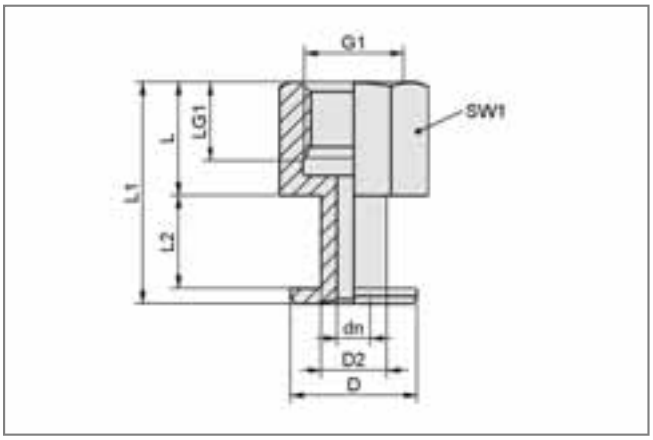
Bellows Suction Pads FGA PVC (1.5 Folds)

Suction area (Ø) from 13 mm to 22 mm

Design Data Connection Elements Bellows Suction Pads FGA PVC (1.5 Folds)



SA-NIP M5-M, G1/8-F



SA-NIP G1/8-IG

Type	Dimensions in mm*									
	D	D2	dn	G1	L	L1	L2	LG1	SW1	SW2
SA-NIP N016 M5-AG DN250	6.5	6	3	M5-M	5.0	16.0	3.5	5.0	7	-
SA-NIP N016 G1/8-AG DN350	6.5	6	4	G1/8"-M	6.0	20.0	4.0	7.5	14	-
SA-NIP N016 G1/8-IG DN350	6.5	6	4	G1/8"-F	12.0	18.5	4.0	8.0	14	-

*Acceptable dimensional tolerances for rubber parts concerning to M3 - DIN 7715

Suction Pads for Packaging

Bellows Suction Pads FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

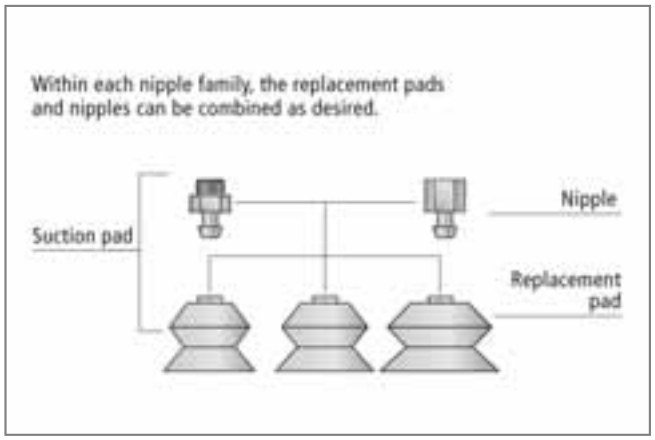
PACKAGING CD / DVD

Suitability for Industry-Specific Applications

Bellows suction pads FG PVC (2.5 folds)

Applications

- Round, bellows suction pad with 2.5 folds for handling of extremely fragile workpieces thanks to damping effect of folds and soft sealing lip
- Usage in box openers and for handling of non-rigid workpieces and soft packaging materials
- Handling tasks in special processes which use chlorinated water, such as rinsing of plastic bags
- Handling of CDs and DVDs



System design bellows suction pads FG PVC (2.5 folds)

Design

- Robust and wear-resistant suction pad FG with 2.5 folds and single sealing lip
- Very adaptable geometry and soft, flexible material
- Large effective internal diameter

Bellows suction pads FG PVC being used for handling small cardboard boxes

Our Highlights...	Your Benefits...
• 2.5 folds	> Good damping when positioning on workpiece
• Large effective internal diameter	> High suction force
• Soft and flexible sealing lip	> Good adaptation to curved or uneven surfaces
• Flexible, adaptable material and soft folds	> Optimum sealing, particularly on non-rigid workpieces
• Wear-resistant material PVC	> Long operating lifetime, very wide range of applications

Suction Pads for Packaging

Bellows Suction Pads FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

Designation Code Bellows Suction Pads FG PVC (2.5 Folds)

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example FG 32 PVC-50:		
FG	**32**	**PVC-50**
FG	18	PVC-50
	23	
	32	
	40	
	50	

Ordering Data Bellows Suction Pads FG PVC (2.5 Folds)

Suction pad FG PVC (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection nipple), the following ordering steps are required:

- Suction pad of type FG PVC (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Bellows Suction Pads FG PVC (2.5 Folds)

Type*	Part Number
FG 18 PVC-50	10.01.06.01941
FG 23 PVC-50	10.01.06.01942
FG 32 PVC-50	10.01.06.01943
FG 40 PVC-50	10.01.06.02468
FG 50 PVC-50	10.01.06.02469

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Connection Nipples Bellows Suction Pads FG PVC (2.5 Folds)

Type	M5-AG	G1/8"-AG	G1/4"-AG	G1/8"-IG	G1/4"-IG
FG 18 PVC	10.01.06.00123	10.01.06.05735	-	10.01.06.05731	-
FG 23 PVC	-	10.01.05.00720	10.01.05.00122	-	10.01.05.00121
FG 32 PVC	-	10.01.06.02249	-	-	-
FG 40 PVC	-	-	-	-	-
FG 50 PVC	-	-	-	-	-

Technical Data Bellows Suction Pads FG PVC (2.5 Folds)

Type	Suction force [N]*	Pull-off force [N]	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
FG 18 PVC-50	3.2	8	1.9	15	4
FG 23 PVC-50	6.6	15	3.4	20	4
FG 32 PVC-50	13.9	24	9.0	30	6
FG 40 PVC-50	21.7	56	15.2	60	6
FG 50 PVC-50	36.6	68	28.4	75	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

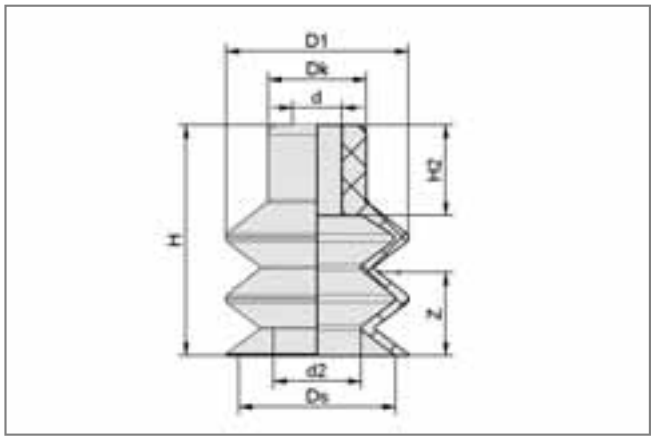
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Packaging

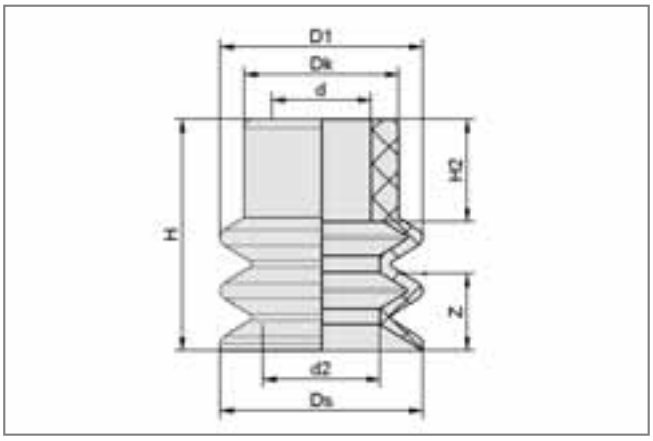
Bellows Suction Pads FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

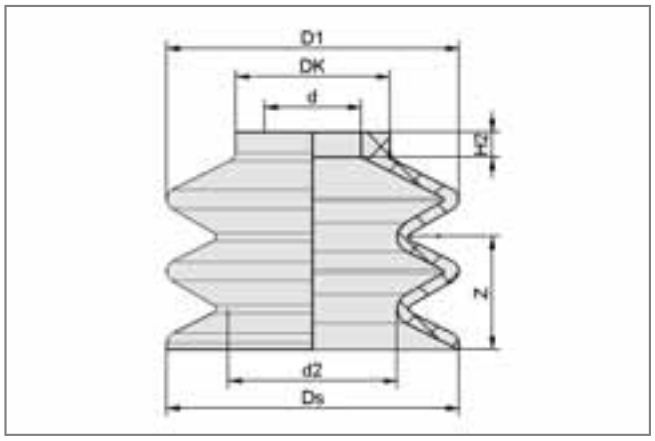
Design Data Bellows Suction Pads FG PVC (2.5 Folds)



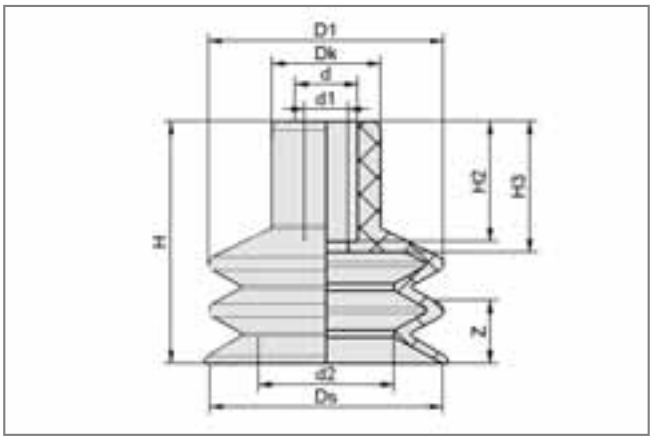
FG 18 PVC-50



FG 23 PVC-50



FG 32 PVC-50



FG 40 to 50 PVC-50

Type	Dimensions in mm*									
	D1	d	d1	d2	Dk	Ds	H	H2	H3	Z (Stroke)
FG 18 PVC-50	18.6	5.0	-	8.9	10	16.0	23.5	9.2	-	9
FG 23 PVC-50	22.3	11.0	-	12.9	17	22.3	25.5	11.3	-	10
FG 32 PVC-50	32.2	10.7	-	18.6	17	32.2	24.0	2.8	-	13
FG 40 PVC-50	40.4	10.8	7.5	23.4	19	40.0	41.7	20.7	22.6	11
FG 50 PVC-50	50.5	10.8	7.5	30.4	19	50.0	47.2	20.7	22.8	15

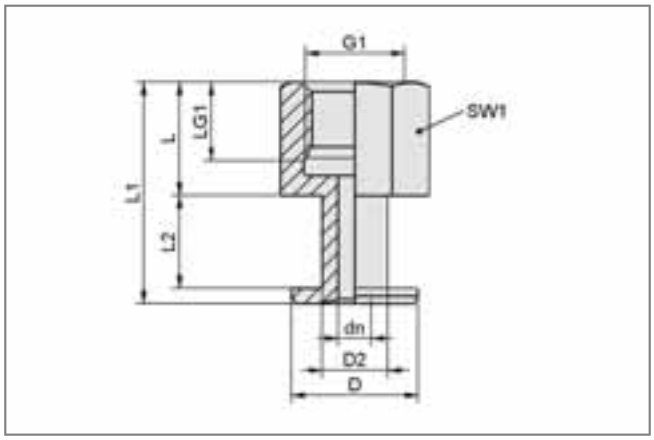
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Packaging

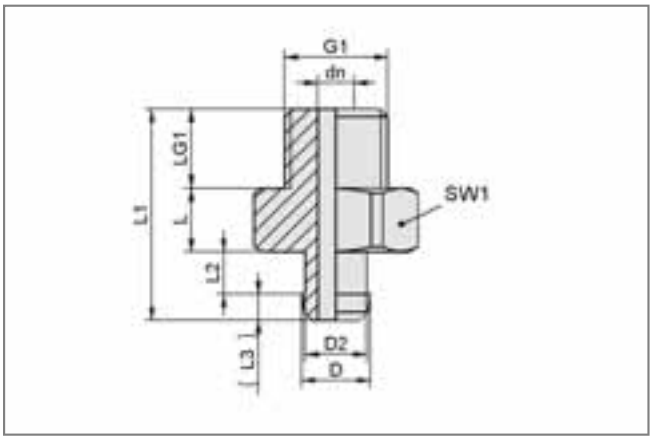
Bellows Suction Pads FG PVC (2.5 Folds)

Suction area (Ø) from 18 mm to 50 mm

Design Data Connection Elements Bellows Suction Pads FG PVC (2.5 Folds)



G1/8"-IG, G1/4"-IG



M5-AG, G1/8"-AG, G1/4"-AG

Type	Dimensions in mm								
	G1	dn	L	L1	LG1	L2	D2	D	SW1
SA-NIP N016 M5-AG DN250	M5-M	2.5	5.0	16.0	5.0	3.5	5.8	6.5	7.0
SA-NIP N016 G1/8-AG DN350	G1/8"-M	3.5	6.0	20.0	7.5	4.0	5.8	6.5	14.0
SA-NIP N023 G1/4-AG DN350	G1/4"-M	3.5	5.0	25.0	10.0	8.0	12.0	13.5	17.0
SA-NIP N016 G1/8-IG DN350	G1/8"-F	3.5	12.0	18.5	8.0	4.0	5.8	6.5	14.0
SA-NIP N023 G1/4-IG DN350	G1/4"-F	3.5	15.0	25.0	12.0	8.0	12.0	13.5	17.0

Suction Pads for Packaging

Bellows Suction Pads FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

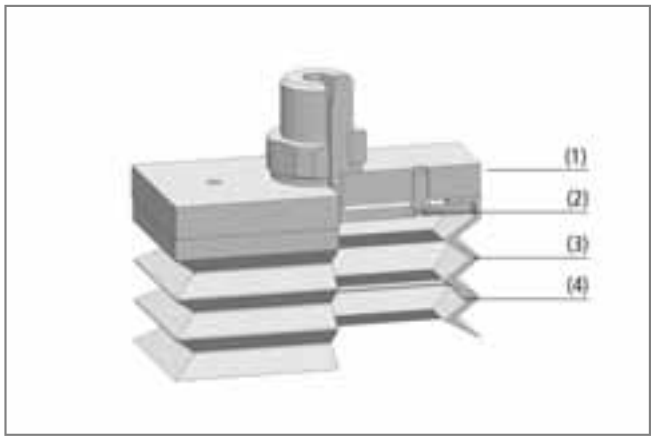
PACKAGING

Suitability for Industry-Specific Applications

Bellows suction pads FSGB-R (rectangular)

Applications

- Rectangular bellows suction pads with 2.5 or 3.5 folds for handling of rectangular packing materials with non-uniform surfaces
- Handling of film-packed products, filled plastic bags; workpieces with folds
- Handling of non-rigid workpieces and flexible outer packing materials which can be deformed during handling
- Use of supporting frame in variable numbers depending on application



System design bellows suction pads FSGB-R

Design

- Rectangular bellows suction pad FSGB-R with single sealing lip, consisting of suction pad FGB-R (3) and connection plates (1)
- FSGB-R 52x25 and FSGB-R 60x29 with 2.5 folds; FSGB-R 80x30, FSGB-R80x40 and FSGB-R 80x50 with 3.5 folds
- Very adaptable geometry and soft, flexible sealing lip
- Suction pad is securely clamped between connection plates; screw connection (2) of the pad side to permit simple, in-situ replacement of pad
- Supporting frames (4) (available as accessories) can optionally be mounted in one or more of the corrugations

Bellows suction pads FSGB-R being used for handling of packing materials

Our Highlights...	Your Benefits...
• Large, rectangular suction surface	> Good gripping of rectangular workpieces
• Soft and flexible folds	> Good adaptation to non-uniform surfaces and non-rigid workpieces
• Soft and adaptable sealing lip	> Sealing on structured surfaces and workpieces with folds
• Supporting frames for mounting in folds (optional)	> Improved stability of the suction pad's folds

Suction Pads for Packaging

Bellows Suction Pads FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

Designation Code Bellows Suction Pads FSGB-R (Rectangular)

Abbreviated designation	Suction area LxW in mm	Material and Shore hardness	Connection thread
Example FSGB-R 60x29 NK-50 G1/8-IG:			
FSGB-R	**60x29**	**NK-50**	**G1/8-IG**
FSGB-R	52x25 60x29 80x30 80x40 80x50	NK-50 SI-50	G1/8-IG (IG = female (F)) G1/4-AG (AG = male (M))

Ordering Data Bellows Suction Pads FSGB-R (Rectangular)

Suction pad FSGB-R (elastomer part + connection plate) is delivered assembled. The assembly consists of:
- Suction pad of type FGB-R – elastomer part, available in various dimensions (LxW) and materials
- Aluminium support plate – available with various threads

Available spare parts: suction pad FGB-R
Available accessories: supporting frames

Bellows Suction Pads FSGB-R (Rectangular)

Type	Suction pad material * / hardness in Shore A	
	Natural Rubber NK 50±5ShA	Silicone SI 50±5ShA
FSGB-R 52x25 G1/4-AG**	10.01.06.02281	10.01.06.02282
FSGB-R 52x25 G1/8-IG**	10.01.06.02287	10.01.06.02288
FSGB-R 60x29 G1/4-AG**	10.01.06.02283	-
FSGB-R 60x29 G1/8-IG**	10.01.06.02289	-
FSGB-R 80x30 G1/4-AG***	-	10.01.06.02284
FSGB-R 80x30 G1/8-IG***	-	10.01.06.02290
FSGB-R 80x40 G1/4-AG***	-	10.01.06.02285
FSGB-R 80x40 G1/8-IG***	-	10.01.06.02291
FSGB-R 80x50 G1/4-AG***	-	10.01.06.02286
FSGB-R 80x50 G1/8-IG***	-	10.01.06.02292

*Additional material specifications at beginning of the section "Vacuum Suction Pads"
**2.5 folds
***3.5 folds

Ordering Data Spare Parts Suction Pads

Type	Suction pad material * / hardness in Shore A	
	Natural Rubber NK 50±5ShA	Silicone SI 50±5ShA
FGB-R 52x25**	10.01.06.01115	10.01.06.01116
FGB-R 60x29**	10.01.06.01117	-
FGB-R 80x30***	-	10.01.06.01112
FGB-R 80x40***	-	10.01.06.01113
FGB-R 80x50***	-	10.01.06.01114

*Additional material specifications at beginning of the section "Vacuum Suction Pads"
**2.5 folds
***3.5 folds

Suction Pads for Packaging

Bellows Suction Pads FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

Ordering Data Accessories Bellows Suction Pads FSGB-R (Rectangular)

Type	Supporting frame
FSGB-R 52x25	10.01.06.02276
FSGB-R 60x29	10.01.06.02277
FSGB-R 80x30	10.01.06.02278
FSGB-R 80x40	10.01.06.02279
FSGB-R 80x50	10.01.06.02280

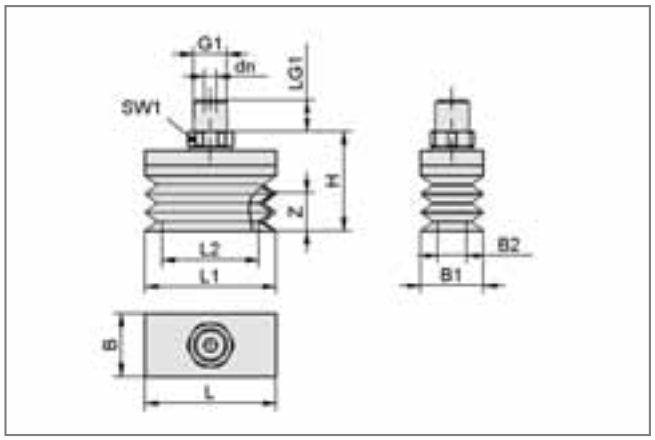
Technical Data Bellows Suction Pads FSGB-R (Rectangular)

Type	Suction force [N]*	Volume [cm³]	Number of folds	Recom. internal hose diameter d [mm]**
FSGB-R 52x25	20	16	2.5	6
FSGB-R 60x29	36	22	2.5	6
FSGB-R 80x30	29	41	3.5	6
FSGB-R 80x40	61	61	3.5	9
FSGB-R 80x50	92	80	3.5	9

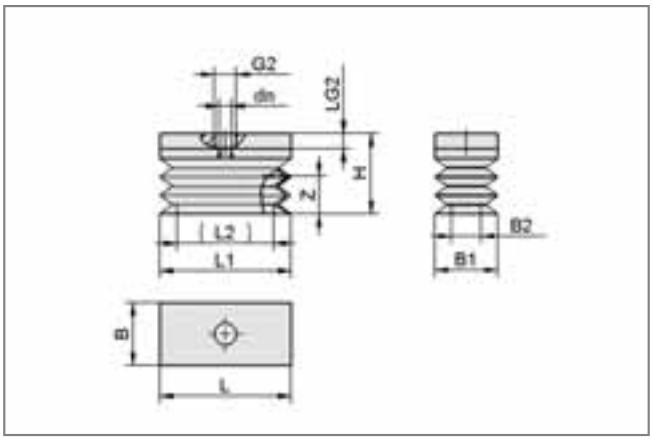
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

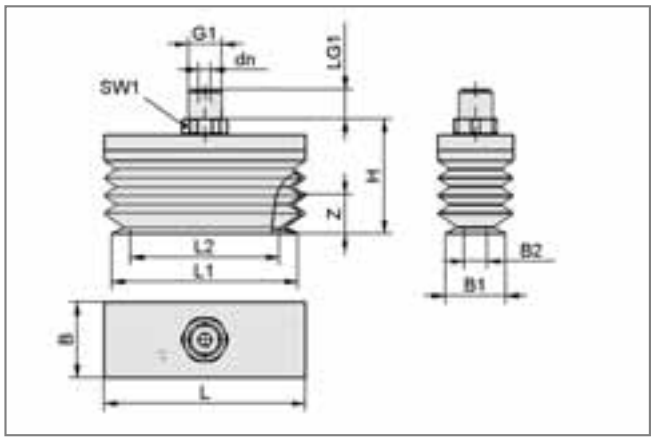
Design Data Bellows Suction Pads FSGB-R (Rectangular)



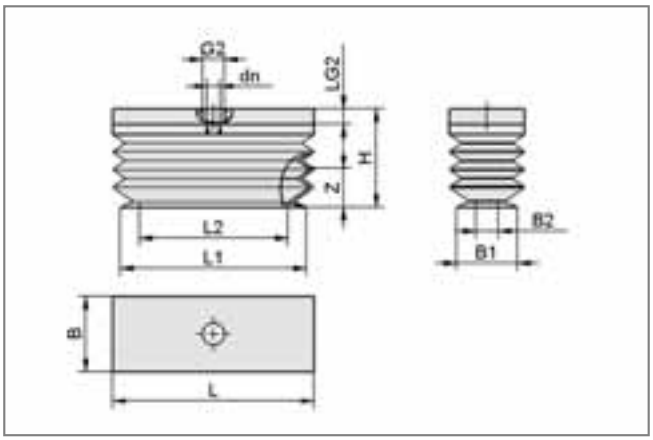
FSGB-R 52x25 to 60x29 AG



FSGB-R 52x25 to 60x29 IG



FSGB-R 80x30 to 80x50 AG



FSGB-R 80x30 to 50x50 IG

Suction Pads for Packaging

Bellows Suction Pads FSGB-R (Rectangular)

Suction area (LxW) from 52x25 mm to 80x50 mm

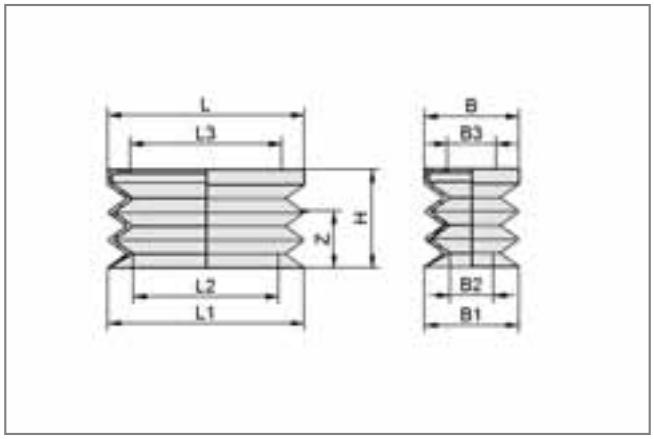
Design Data Bellows Suction Pads FSGB-R (Rectangular)

Type	Dimensions in mm*													
	B	B1	B2	dn	G1	G2	H	L	L1	L2	LG1	LG2	SW1	Z (Stroke) **
FSGB-R 52x25 G1/4-AG	25	25	10	5	G1/4"-M	-	50.0	52	52	37	10.5	-	17	15
FSGB-R 52x25 G1/8-IG	25	25	10	5	-	G1/8"-F	32.0	52	52	37	-	6.0	-	15
FSGB-R 60x29 G1/4-AG	29	29	15	5	G1/4"-M	-	50.0	60	60	45	10.5	-	17	14
FSGB-R 60x29 G1/8-IG	29	29	15	5	-	G1/8"-F	32.0	60	60	45	-	6.0	-	14
FSGB-R 80x30 G1/4-AG	30	24	9	5	G1/4"-M	-	57.0	80	74	59	10.5	-	17	16
FSGB-R 80x30 G1/8-IG	30	24	9	5	-	G1/8"-F	39.0	80	74	59	-	6.0	-	16
FSGB-R 80x40 G1/4-AG	40	34	19	5	G1/4"-M	-	57.0	80	74	59	10.5	-	17	13
FSGB-R 80x40 G1/8-IG	40	34	19	5	-	G1/8"-F	39.0	80	74	59	-	6.0	-	13
FSGB-R 80x50 G1/4-AG	50	44	29	5	G1/4"-M	-	57.0	80	74	59	10.5	-	17	13
FSGB-R 80x50 G1/8-IG	50	44	29	5	-	G1/8"-F	39.0	80	74	59	-	6.0	-	13

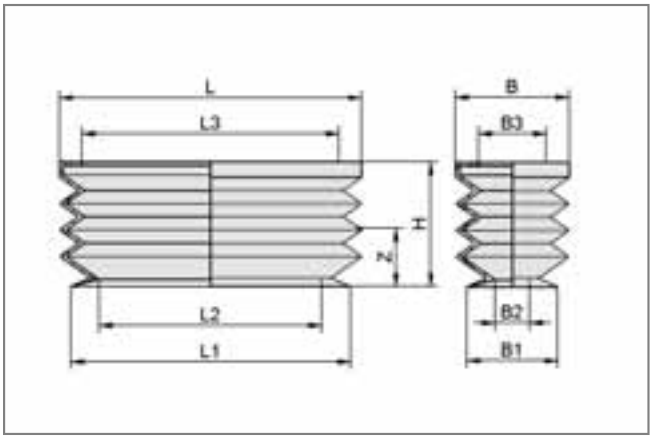
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**The specified stroke is for use with a supporting frame in each fold.

Design Data Bellows Suction Pads FGB-R - Spare Parts for FSGB-R



FGB-R 52x25 to 60x29



FGB-R 80x30 to 80x50

Type	Dimensions in mm*									
	B	B1	B2	B3	H	L	L1	L2	L3	Z (Stroke)**
FGB-R 52x25	25	25	10	13	26	52	52	37	40	15
FGB-R 60x29	29	29	15	17	26	60	60	45	48	14
FGB-R 80x30	30	24	9	18	33	80	74	59	68	16
FGB-R 80x40	40	34	19	28	33	80	74	59	68	13
FGB-R 80x50	50	44	29	38	33	80	74	59	68	13

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

**The specified stroke is for use with a supporting frame in each fold.

Suction Pads for Packaging

Chocolate Suction Pads SPG

Suction area (Ø) 33 mm

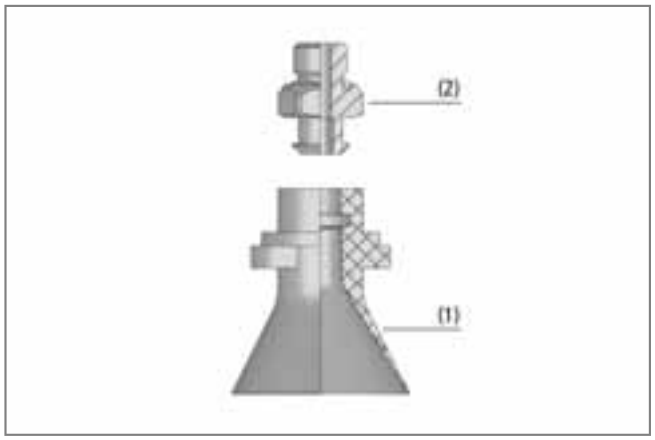
PACKAGING

Suitability for Industry-Specific Applications

Chocolate suction pads SPG

Applications

- Bell-shaped suction pad for dynamic handling and packing of chocolates in combination with picker robots
- Direct handling of round, oval or square chocolates
- Handling of confectionery with structured surfaces or toppings
- Suitable for direct contact with food due to FDA-compliant material silicone
- Handling of round chocolates with maximum diameter of 35 mm and oval/square chocolates with maximum diagonal measurement of 30 mm



System design chocolate suction pads SPG

Design

- Suction pad (1) with extremely thin, soft sealing lip and tapered suction pad geometry
- Optimal sealing lip shape for handling workpieces with structured surfaces
- Use of one-piece insertable connection element (2), with G1/8" male or female thread, for changing the suction pad quickly
- Connection element with male thread has integrated seal

Chocolate suction pads SPG being used for handling chocolates

Our Highlights...	Your Benefits...
• Extremely thin sealing lip	> Good sealing on decorated chocolates
• Tapered sealing lip shape	> Even square chocolates are enclosed by suction pad; dynamic handling possible
• Large nominal flow	> Leakage compensation on highly-structured chocolates
• FDA-compliant material silicone	> Suitable for direct contact with food

Suction Pads for Packaging

Chocolate Suction Pads SPG

Suction area (Ø) 33 mm

Designation Code Chocolate Suction Pads SPG

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example SPG 33 SI-45:		
SPG	**33**	**SI-45**
SPG	33	SI-45

Ordering Data Chocolate Suction Pads SPG

Chocolate suction pad SPG (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection element), the following ordering steps are required:

- Suction pad of type SPG (step 1) – elastomer part
- Connection element of type SC (step 2) – available with various threads

Step 1: Chocolate Suction Pads SPG

Type*	Part Number
SPG 33 SI-45	10.01.19.00002

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Step 2: Connection Elements Chocolate Suction Pad SPG

Type	Part Number
SC 040 G1/8-AG	10.01.06.02490
SC 040 G1/8-IG	10.01.06.02482

Technical Data Chocolate Suction Pads SPG

Type	Volume [cm³]	Recommended internal hose [mm]	Max. diameter of the chocolats [mm]*	Weight of workpiece [g]**
SPG 33 SI-45	7,6	4	35	20

*The suction force and operating vacuum are dependent on the geometry and surface characteristics of the chocolate. We recommend a maximum operating vacuum of -150 mbar.

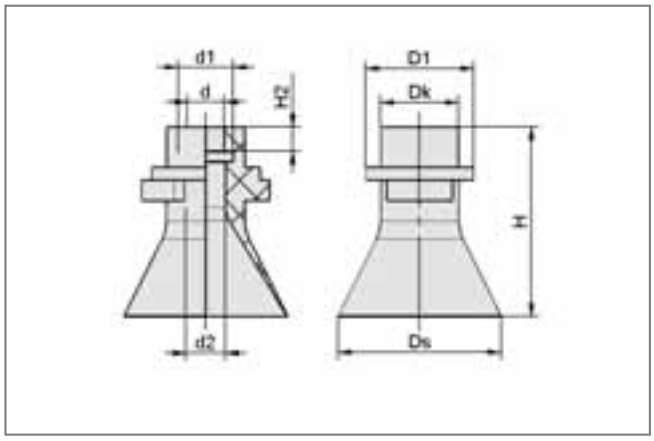
**For handling with high accelerations (up to 10g)

Suction Pads for Packaging

Chocolate Suction Pads SPG

Suction area (Ø) 33 mm

Design Data Chocolate Suction Pads SPG

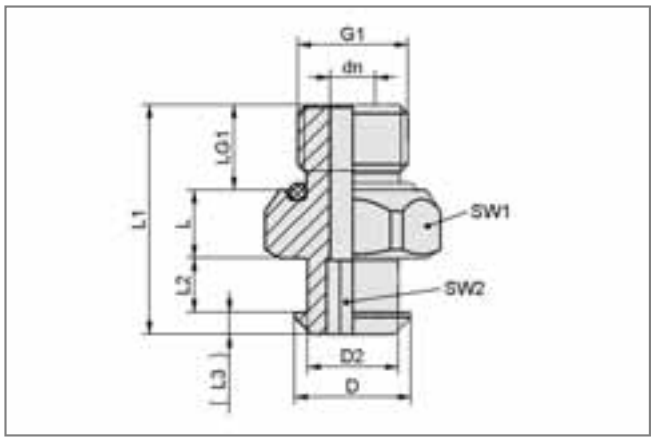


Chocolate suction pad SPG 33

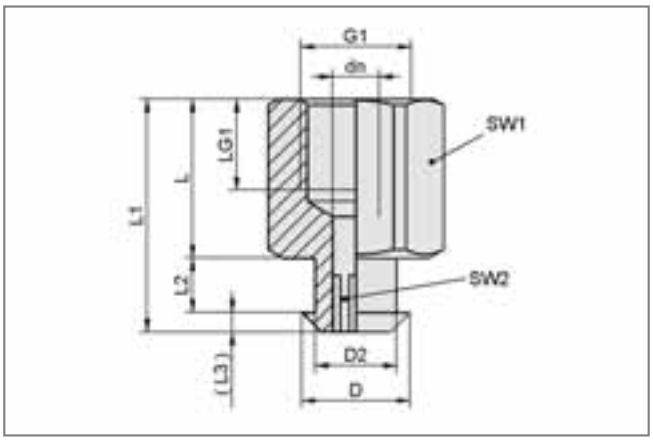
Type	Dimensions in mm*							
	d	d1	d2	Dk	Ds	D1	H	H2
SPG 33 SI-45	7.3	11	7.8	15.5	32.3	21.5	38	4.8

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Connection Elements Chocolate Suction Pad SPG



Connection element SC 040 G1/8-AG



Connection element SC 040 G1/8-IG

Type	Dimensions in mm										
	dn	D	D2	G1	L	L1	L2	L3	LG1	SW1	SW2
SC 040 G1/8-AG	4	10.3	8	G1/8"-M	6.0	25.2	4.8	1.9	7.5	14	4
SC 040 G1/8-IG	4	10.3	8	G1/8"-F	14.0	20.7	4.8	1.9	8.0	14	4

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGN 25 K to SGN 40 K

Suction area (Ø) from 25 mm to 40 mm

PACKAGING PLASTICS

Suitability for Industry-Specific Applications

Flat suction pads SGN 25 K to SGN 40 K

Applications

- Round, flat suction pad for handling of paper, plastic film, parquet blocks, wood veneers and solar cells
- Gentle, crease-resistant handling of plastic film and paper

Design

- Robust, wear-resistant suction pad SGN K with single sealing lip, consisting of suction pad SG K and connection nipple
- Nipple plugged into pad

Our Highlights...

- Specially formed sealing lip
- Optimum combination of shape and material

Your Benefits...

> Particularly suitable for paper and plastic films

> No crinkling when gripping paper and plastic films

Designation Code Flat Suction Pads SGN 25 K to SGN 40 K

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread	Product addition
Example SGN 25 NBR-60 G1/8-IG K:				
SGN	**25**	**NBR-60**	**G1/8-IG**	**K**
SGN	25 40	NBR-60	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F))	K rounded sealing lip

Ordering Data Flat Suction Pads SGN 25 K to SGN 40 K

Suction pad SGN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type SG – elastomer part, available in various diameters
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad SG, connection nipple SA-NIP

Flat Suction Pads SGN 25 K to SGN 40 K

Type*	Connection	
	G1/8"-M	G1/8"-F
SGN 25 NBR-60 K	10.01.01.00208	10.01.01.00206
SGN 40 NBR-60 K	10.01.01.00784	10.01.01.00785

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGN 25 K to SGN 40 K

Suction area (Ø) from 25 mm to 40 mm

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	Flat suction pad (round)	
SGN 25 NBR-60 K	SG 25 NBR-60 N006	10.01.01.00210
SGN 40 NBR-60 K	SG 40 NBR-60 N006	10.01.01.00484

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
SGN 25/40 AG	SA-NIP N006 G1/8-AG DN200	10.01.01.03530
SGN 25/40 IG	SA-NIP N006 G1/8-IG DN200	10.01.01.03522

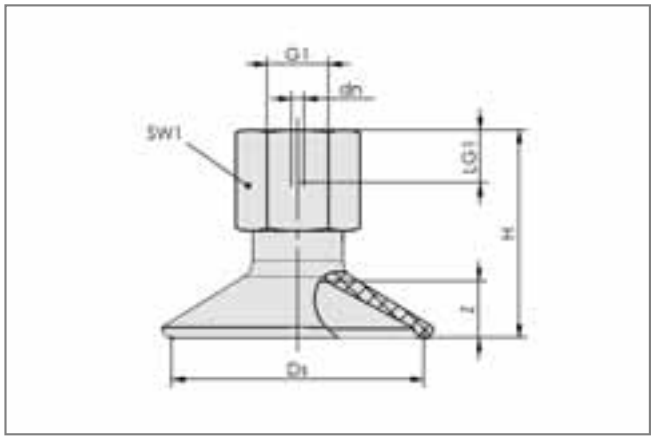
Technical Data Flat Suction Pads SGN 25 K to SGN 40 K

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
SGN 25 NBR-60 K	10	1.4	20	4	N 006
SGN 40 NBR-60 K	45	3.4	45	4	N 006

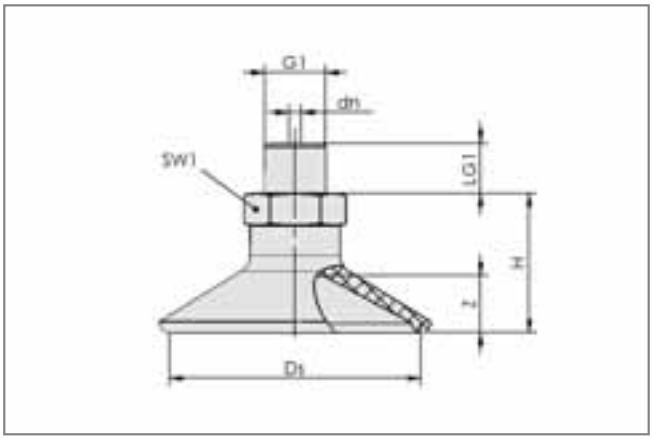
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads SGN 25 K to SGN 40 K



SGN 25 K to 40 K IG



SGN 25 K to 40 K AG

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z
SGN 25 NBR-60 G1/8-AG K	2	25	G1/8"-M	21	8	14	6
SGN 25 NBR-60 G1/8-IG K	2	25	G1/8"-F	32	9	14	6
SGN 40 NBR-60 G1/8-AG K	2	40	G1/8"-M	22	8	14	9
SGN 40 NBR-60 G1/8-IG K	2	40	G1/8"-F	33	9	14	9

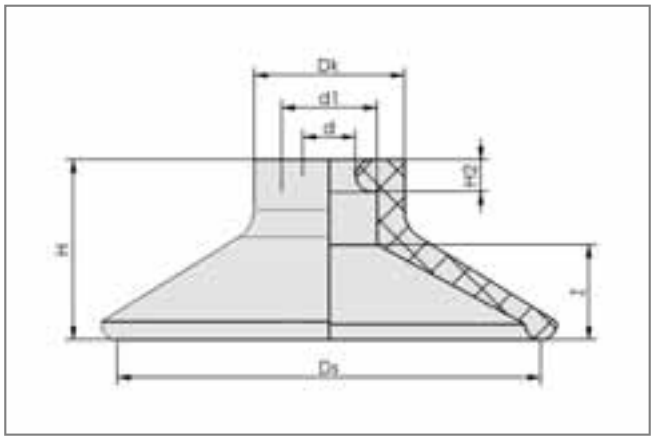
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGN 25 K to SGN 40 K

Suction area (Ø) from 25 mm to 40 mm

Design Data Flat Suction Pads SG 25 K to SG 40 K



SG 25 K to 40 K

Type	Dimensions in mm*						
	d	d1	Dk	Ds	H	H2	Z
SG 25 K	6	8	14	25	16	3	6
SG 40 K	6	8	14	40	17	3	9

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGPN

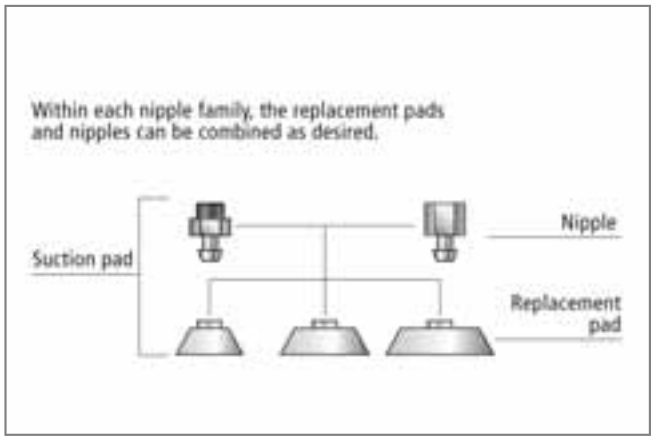
Suction area (Ø) from 15 mm to 40 mm

Suitability for Industry-Specific Applications

Flat suction pads SGPN

Applications

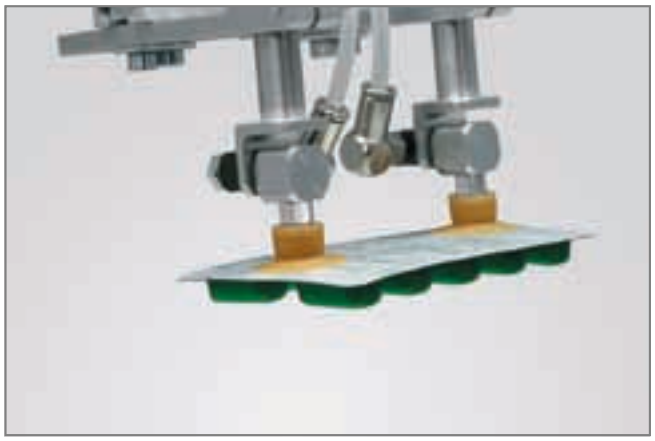
- Round, flat suction pad for handling of wooden veneers, wafers and solar cells
- Handling of various packing material, e. g. plastic films, paper, blister packs
- Gentle handling of plastic films and paper due to flat, long-tapered sealing lip and inner support



System design flat suction pads SGPN

Design

- Robust, wear-resistant suction pad SGPN with single sealing lip, consisting of suction pad SGP and connection nipple
- Nipple plugged into pad



Flat suction pads SGPN being used for handling blister packagings

Our Highlights...

- Flat, long-tapered sealing lip and inner support
- Material: natural rubber NK 40 Shore A
- Material: Silicone SI 50 Shore A
- Material: HT1

Your Benefits...

> No "pulling-in" into the suction pad, i.e. very suitable for plastic film, paper and solar cells

> No crinkling when gripping paper and plastic film

> Resistant to ozone, UV radiation and heat; very suitable for handling tasks in the paper and printing industry

> No marks on the workpiece; even at high temperatures

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

Designation Code Flat Suction Pads SGPN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGPN 20 SI-50 M5-AG:			
SGPN	**20**	**SI-50**	**M5-AG**
SGPN	15 to 40	HT1-60 NK-40 SI-50	M5-AG (AG = male (M)) G1/8-AG G1/8-IG (IG = female (F)) G1/4-AG G1/4-IG

Ordering Data Flat Suction Pads SGPN

Flat suction pad SGPN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type SGP – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad SGP, connection nipple SA-NIP

Flat Suction Pads SGPN

Type*	High temp material HT1 60±5ShA	Natural Rubber NK 40±5ShA	Silicone SI 50±5ShA
SGPN 15 M5-AG	10.01.01.12396	10.01.01.11977	10.01.01.11980
SGPN 15 G1/8-AG	10.01.01.12397	10.01.01.10315	10.01.01.11981
SGPN 15 G1/8-IG	10.01.01.12398	10.01.01.10181	10.01.01.11982
SGPN 20 M5-AG	-	10.01.01.11978	10.01.01.11983
SGPN 20 G1/8-AG	-	10.01.01.10316	10.01.01.11984
SGPN 20 G1/8-IG	-	10.01.01.10180	10.01.01.11985
SGPN 24 M5-AG	10.01.01.12403	10.01.01.11979	10.01.01.11986
SGPN 24 G1/8-AG	10.01.01.12404	10.01.01.10317	10.01.01.11987
SGPN 24 G1/8-IG	10.01.01.12405	10.01.01.10182	10.01.01.11988
SGPN 30 G1/4-AG	10.01.01.12399	10.01.01.00791	10.01.01.11989
SGPN 30 G1/4-IG	10.01.01.12400	10.01.01.00790	10.01.01.11990
SGPN 34 G1/4-AG	-	10.01.01.10831	-
SGPN 34 G1/4-IG	-	10.01.01.10830	-
SGPN 35 G1/4-AG	-	10.01.01.00793	10.01.01.12785
SGPN 35 G1/4-IG	-	10.01.01.00792	10.01.01.12787
SGPN 40 G1/8-AG	-	10.01.01.11739	10.01.01.12773
SGPN 40 G1/4-AG	-	10.01.01.00795	10.01.01.12775
SGPN 40 G1/4-IG	-	10.01.01.00794	10.01.01.12774

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	High temp material HT1 60±5ShA	Natural Rubber NK 40±5ShA	Silicone SI 50±5ShA
SGP 15	10.01.01.12394	10.01.01.10318	10.01.01.10574
SGP 20	-	10.01.01.10319	10.01.01.11571
SGP 24	10.01.01.12402	10.01.01.10320	10.01.01.10577
SGP 30	10.01.01.12395	10.01.01.00787	10.01.01.01064
SGP 34	-	10.01.01.10829	-
SGP 35	-	10.01.01.00788	10.01.01.12784
SGP 40	-	10.01.01.00789	10.01.01.12772

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
SGPN 15 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 15 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 15 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 20 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 20 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 20 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 24 M5-AG	SA-NIP N016 M5-AG DN250	10.01.06.00123
SGPN 24 G1/8-AG	SA-NIP N016 G1/8-AG DN350	10.01.06.05735
SGPN 24 G1/8-IG	SA-NIP N016 G1/8-IG DN350	10.01.06.05731
SGPN 30 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00818
SGPN 30 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00817
SGPN 34 G1/4-AG	SA-NIP N033 G1/4-AG DN550	10.01.01.00818
SGPN 34 G1/4-IG	SA-NIP N033 G1/4-IG DN550	10.01.01.00817
SGPN 35 G1/4-AG	SA-NIP N034 G1/4-AG DN550	10.01.01.00820
SGPN 35 G1/4-IG	SA-NIP N034 G1/4-IG DN550	10.01.01.00819
SGPN 40 G1/8-AG	SA-NIP N035 G1/8-AG DN500	10.01.01.11738
SGPN 40 G1/4-AG	SA-NIP N035 G1/4-AG DN550	10.01.01.00822
SGPN 40 G1/4-IG	SA-NIP N035 G1/4-IG DN550	10.01.01.00821

Technical Data Flat Suction Pads SGPN

Type	Suction force [N]*	Volume [cm³]	Recom. internal hose diameter d [mm]**	Nipple family
SGPN 15	5.5	0.12	2	N 016
SGPN 20	8.5	0.31	2	N 016
SGPN 24	11.0	0.70	4	N 016
SGPN 30	19.0	1.50	4	N 033
SGPN 34	25.0	2.10	4	N 033
SGPN 35	31.0	2.20	4	N 034
SGPN 40	33.0	2.90	4	N 035

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

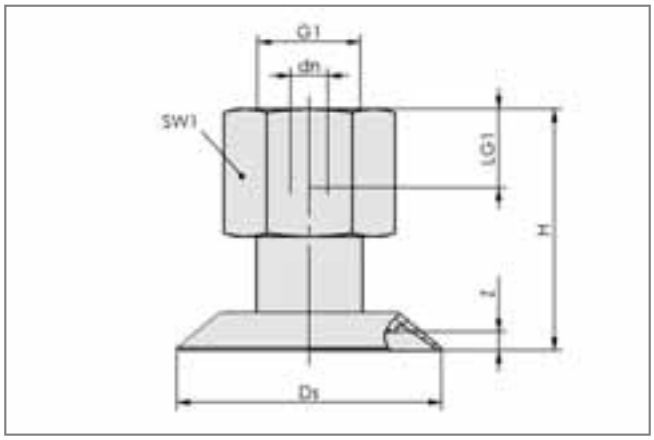
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Plastic Films and Paper

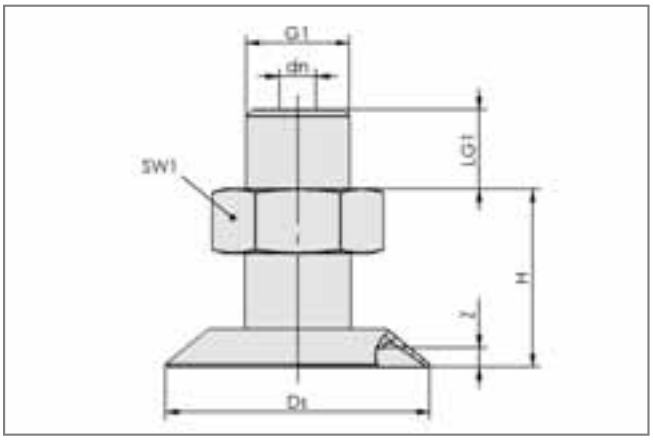
Flat Suction Pads SGPN

Suction area (Ø) from 15 mm to 40 mm

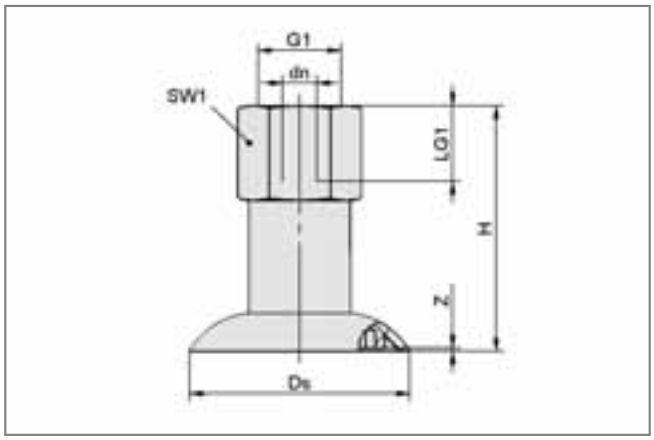
Design Data Flat Suction Pads SGPN



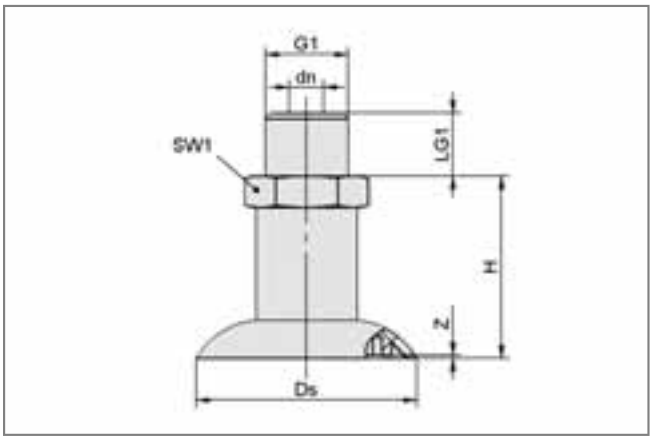
SGPN 15 to 40 IG



SGPN 15 to 40 AG



SGPN 35 IG



SGPN 35 AG

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGPN

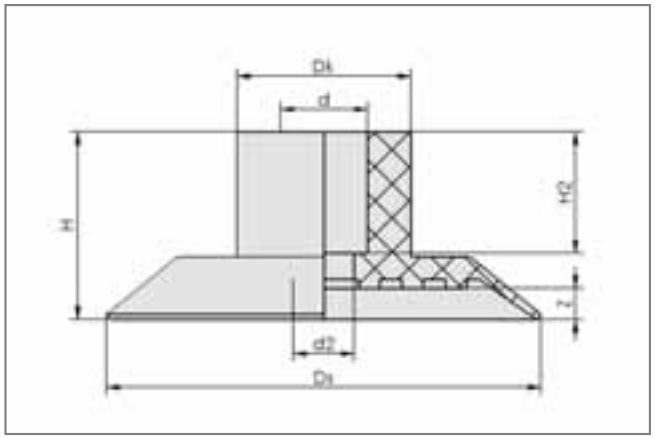
Suction area (Ø) from 15 mm to 40 mm

Design Data Flat Suction Pads SGPN

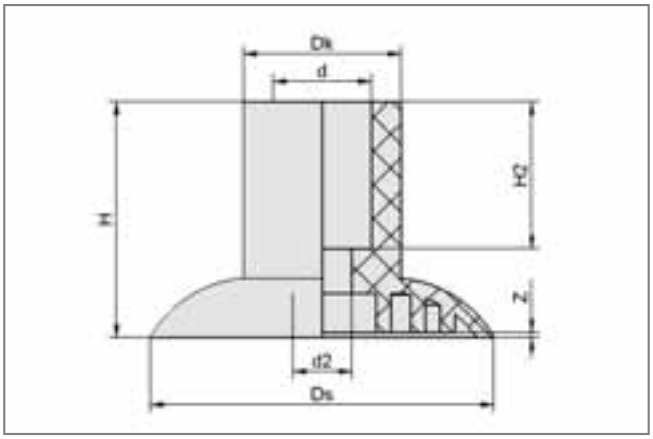
Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z (Stroke)
SGPN 15 M5-AG	2.5	14.5	M5-M	15.0	5.0	7	0.9
SGPN 15 G1/8-AG	3.5	14.5	G1/8"-M	16.0	7.5	14	0.9
SGPN 15 G1/8-IG	3.5	14.5	G1/8"-F	22.0	8.0	14	0.9
SGPN 20 M5-AG	2.5	20.9	M5-M	15.4	5.0	7	1.5
SGPN 20 G1/8-AG	3.5	20.9	G1/8"-M	16.4	7.5	14	1.5
SGPN 20 G1/8-IG	3.5	20.9	G1/8"-F	22.4	8.0	14	1.5
SGPN 24 M5-AG	2.5	24.4	M5-M	15.8	5.0	7	1.7
SGPN 24 G1/8-AG	3.5	24.4	G1/8"-M	16.8	7.5	14	1.7
SGPN 24 G1/8-IG	3.5	24.4	G1/8"-F	22.8	8.0	14	1.7
SGPN 30 G1/4-AG	5.5	30.6	G1/4"-M	27.2	10.0	17	2.0
SGPN 30 G1/4-IG	5.5	30.6	G1/4"-F	37.2	12.0	17	2.0
SGPN 34 G1/4-AG	5.5	34.5	G1/4"-M	28.0	10.0	17	1.4
SGPN 34 G1/4-IG	5.5	34.5	G1/4"-F	38.0	12.0	17	1.4
SGPN 35 G1/4-AG	5.5	35.0	G1/4"-M	28.5	10.0	17	0.5
SGPN 35 G1/4-IG	5.5	35.0	G1/4"-F	38.5	12.0	17	0.5
SGPN 40 G1/8-AG	5.0	40.5	G1/8"-M	25.6	9.0	17	2.3
SGPN 40 G1/4-AG	5.5	40.5	G1/4"-M	25.6	10.0	17	2.3
SGPN 40 G1/4-IG	5.5	40.5	G1/4"-F	35.6	12.0	17	2.3

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Flat Suction Pads SGP - Spare Parts for SGPN



SGP 15 to 40



SGP 35

Type	Dimensions in mm*						
	d	d2	Dk	Ds	H	H2	Z (Stroke)
SGP 15	4.5	3.5	9.0	14.5	10.0	7.2	0.9
SGP 20	4.5	3.5	10.5	20.9	10.4	7.1	1.5
SGP 24	4.5	3.5	10.0	24.4	10.8	7.3	1.7
SGP 30	11.2	6.6	15.6	30.6	22.2	15.7	2.0
SGP 34	11.2	5.8	14.8	34.5	23.0	16.8	1.4
SGP 35	10.0	5.4	16.5	35.0	23.5	14.8	0.5
SGP 40	8.0	5.0	16.0	40.5	20.6	14.5	2.3

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGS

Diameter (Ø) 27 mm

PACKAGING PLASTICS

Suitability for Industry-Specific Applications

Flat suction pads SGS

Applications

- Round, flat suction pad for handling of plastic film, paper, wooden veneers, solar cells and other thin, easily damaged workpieces

Design

- Robust, wear-resistant suction pad SGS 27 NK with single sealing lip, without connection nipple
- Neck of suction pad shaped for direct mounting, e.g. in perforated plate

Our Highlights...

- Flat, tapered sealing lip
- Special mounting moulded into neck of suction pad
- Very soft material (natural rubber NK), material hardness as low as 40 Shore A

Your Benefits...

> Specially designed for handling flat plastic films (for example, opening plastic bags)

> Suitable for direct mounting (insertion into a perforated plate)

> Gripping of plastic films without wrinkling

Designation Code Flat Suction Pads SGS

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness
Example SGS 27 NK-40:		
SGS	**27**	**NK-40**
SGS	27	NK-40 NK-48

Ordering Data Flat Suction Pads SGS

Suction pad SGS (elastomer part) is supplied as an individual part. In order to receive a complete suction pad (elastomer part + connection nipple), the following ordering steps are required:

- Suction pad of type SGS (step 1) – elastomer part, available in various diameters
- Connection nipple of type SA-NIP (step 2) – available with various threads

Step 1: Flat Suction Pads SGS

Type	Suction pad material * / hardness in Shore A	
	Natural Rubber NK 40±5ShA	Natural Rubber NK 48±5ShA
SGS 27 NK	10.01.01.00512	10.01.01.10491

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGS

Diameter (Ø) 27 mm

Step 2: Connection Nipples Flat Suction Pads SGS

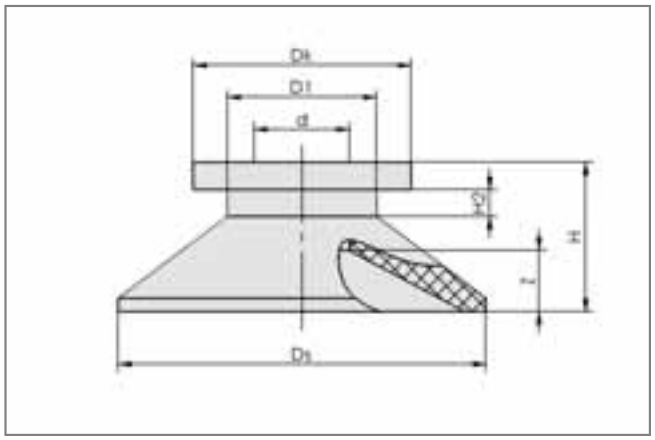
Type	Suction pad connection nipple	
SGS 27 NK	SA-NIP N032 G1/8-AG DN500	10.01.01.00824

Technical Data Flat Suction Pads SGS

Type	Suction force [N]*	Volume [cm³]
SGS 27 NK	20	1.2

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

Design Data Flat Suction Pads SGS



SGS 27 NK

Type	Dimensions in mm*						
	D1	d	Dk	Ds	H	H2	Z (Stroke)
SGS 27 NK	11	7	16	27	11	2	3.5

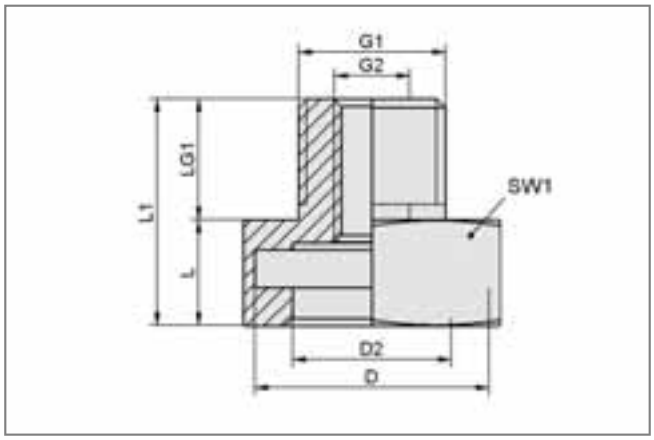
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Plastic Films and Paper

Flat Suction Pads SGS

Diameter (Ø) 27 mm

Design Data Connection Elements Flat Suction Pads SGS



G1/8"-AG

Type	Dimensions in mm							
	G1	dn	L	L1	LG1	D2	D	SW1
SA-NIP N032 G1/8-AG DN500	G1/8"-M	5.0	7.0	15.0	8.0	15.5	10.5	17.0

Suction Pads for Plastic Films and Paper

Vacuum Lifting Cylinders HS

Stroke 15 mm and 30 mm

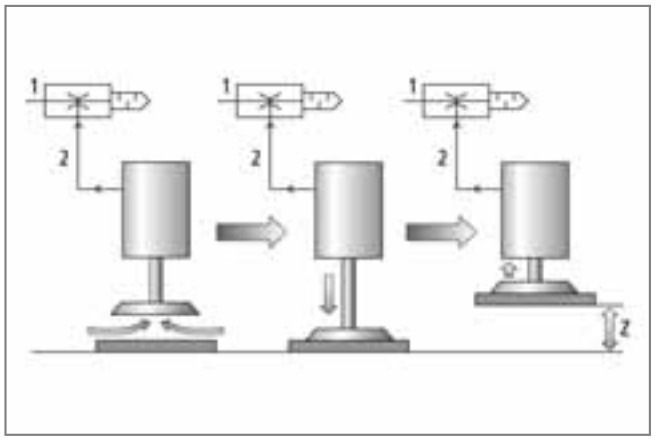
UNIVERSAL

Suitability for Industry-Specific Applications

Vacuum lifting cylinders HS

Applications

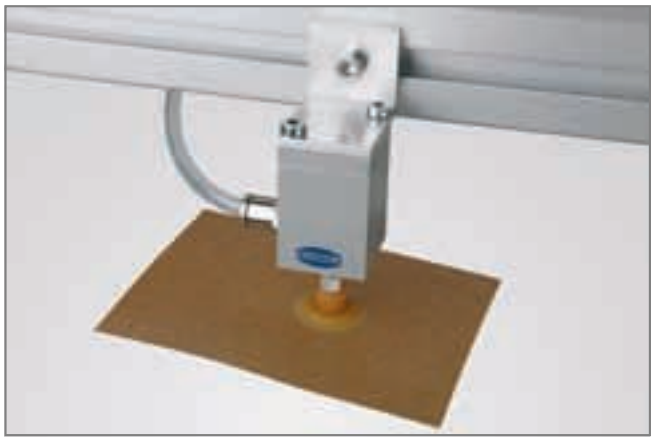
- Vacuum lifting cylinder for handling and separation of paper, veneer and similar thin, porous workpieces when mounted vertically



System design vacuum lifting cylinders HS

Design

- Lifting suction pad consisting of a piston rod and anodized aluminum housing
- In idle position, the piston rod is retracted
- Piston rod is extended, when vacuum is applied
- As soon as the suction pad touches the workpiece, the piston rod is retracted, lifting the workpiece before the "suck-through" effect is generated
- Delivery without suction pad



Vacuum lifting cylinders HS being used for handling adhesive paper

Our Highlights...

- Vacuum-actuated, automatic lifting

Your Benefits...

> Reliable separation of thin, porous workpieces

Suction Pads for Plastic Films and Paper

Vacuum Lifting Cylinders HS

Stroke 15 mm and 30 mm

Designation Code Vacuum Lifting Cylinders HS

Abbreviated designation	Stroke in mm	Spring plunger length in mm	Connection thread
Example HS 15-22 M5-IG:			
HS	**15**	**22**	**M5-IG**
HS	15	22	M5-IG (IG = female (F))
	30	32	G1/8-IG

Ordering Data Vacuum Lifting Cylinders HS

Vacuum lifting cylinder HS is delivered as a ready to connect product with the desired properties. The delivery does not include a suction pad.

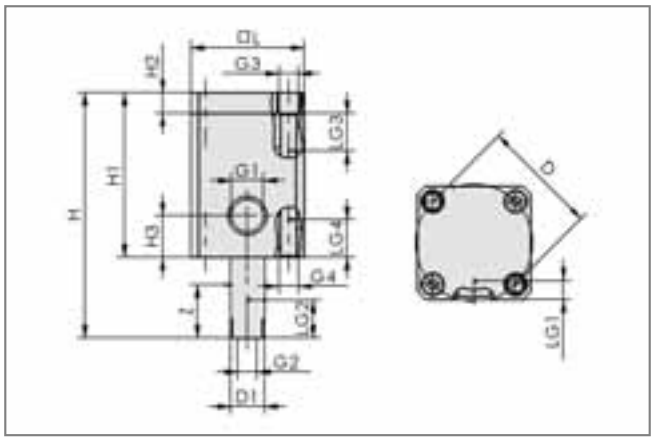
Vacuum Lifting Cylinders HS

Type	Part Number
HS 15-22 M5-IG	10.01.07.00014
HS 30-32 G1/8-IG	10.01.07.00001

Technical Data Vacuum Lifting Cylinders HS

Type	Lifting force (pu = 0.8 bar) [N]	Air consumption [l/min]	Air consumption [m³/h]	Cycle time [s]	Weight [kg]
HS 15-22 M5-IG	3.5	33.3	2	0.8	0.130
HS 30-32 G1/8-IG	9.0	66.7	4	0.8	0.360

Design Data Vacuum Lifting Cylinders HS



HS 15-22 to 30-32

Type	Dimensions in mm															
	D	D1	G1	G2	G3	G4	H	H1	H2	H3	L	LG1	LG2	LG3	LG4	Z (Stroke)
HS 15-22 M5-IG	31	9	G1/8"-F	M5-F	M5-F	M5-F	65.5	43.5	5.5	11	30	5	10	10	10	14
HS 30-32 G1/8-IG	50	14	G1/8"-F	G1/8"-F	M8-F	M8-F	99.0	67.0	10.0	10	50	8	10	12	12	28

Suction Pads for Handling Glass

Suction Plates SGF

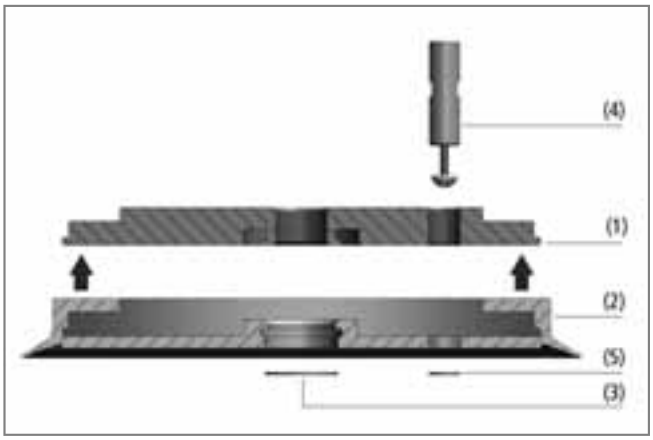
Suction area (Ø) from 125 mm to 400 mm

Suitability for Industry-Specific Applications

Suction plates SGF

Applications

- Handling of flat and smooth workpieces such as glass and plastic sheets where high lateral forces are important e.g. through high accelerations or vertical handling
- Handling of very thin workpieces, such as flat glass (float glass) or coated glass
- Used in glass manufacturing processes where interleavant powder is used
- Handling of solar modules, e.g. in module manufacturing processes



System design suction plates SGF

Design

- Aluminum support plate (1) and sealing ring (2) from EPDM 55 ShA
- Diameters 125 mm and 200 mm: replaceable sealing ring and thin, flat sealing lip
- Diameters 300 mm and 400 mm: vulcanized sealing ring and steep sealing lip
- Central vacuum connection, optionally with clip-in filter screen (3) as pre-filter
- Eccentric connection for sensing valve (4) or filter screen (5), as a standard closed with a plug (secured with adhesive)
- Special designed internal structure for handling glass sheets when interleavant powder is used in the process

Suction plates SGF being used for handling sensitive glass sheets

Our Highlights...	Your Benefits...
• Thin and flat sealing lip (Ø 125 mm and 200 mm)	> Little relative movement during pick-up; this prevents the surface of the workpiece from being damaged
• Steep sealing lip (Ø 300 mm and 400 mm)	> Optimum pick-up characteristics and damping effect when positioning the suction plate
• Low total weight of the suction plate	> High accelerations in automated processes
• Large effective suction area	> High suction and lateral forces in dynamic processes
• Low internal volume and low suction pad stroke	> Short evacuation times for fast processes
• Special material EPDM	> Usage in areas with high UV and ozone levels

Suction Pads for Handling Glass

Suction Plates SGF

Suction area (Ø) from 125 mm to 400 mm

Designation Code Suction Plates SGF

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGF 125 EPDM-55 G1/4-IG:			
SGF	**125**	**EPDM-55**	**G1/4-IG**
SGF	125 200 300 400	EPDM-55	G1/4-IG (IG = female (F)) G1/2-IG

Ordering Data Suction Plates SGF

Suction plate SGF (sealing ring + support plate) is delivered assembled. The assembly consists of:
- Sealing ring of type DR-SGF – elastomer part, available in various diameters
- Aluminium support plate – available with various threads

Available spare parts: sealing ring of type DR-SGF
Available accessories: sensing valve, filter screen

Suction Plates SGF

Type	Part Number
SGF 125 EPDM-55 G1/4-IG	10.01.01.12475
SGF 200 EPDM-55 G1/2-IG	10.01.01.12476
SGF 300 EPDM-55 G1/2-IG	10.01.01.12477
SGF 400 EPDM-55 G1/2-IG	10.01.01.12478

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts And Accessories Suction Plates SGF

Type	Sealing ring DR-SGF	Sensing valve	Filter screen*
SGF 125 EPDM-55 G1/4-IG	10.01.01.12473	10.05.10.00061	10.07.01.00215
SGF 200 EPDM-55 G1/2-IG	10.01.01.12474	10.05.10.00061	10.07.01.00110
SGF 300 EPDM-55 G1/2-IG	-	10.05.10.00061	10.07.01.00110
SGF 400 EPDM-55 G1/2-IG	-	10.05.10.00061	10.07.01.00110

*Filter screen for centered vacuum connection; for eccentric connection use filter screen 10.05.10.00215.

Technical Data Suction Plates SGF

Type	Suction force Ds [N]*	Suction force d2 [N]**	Volume [cm³]	Recom. internal hose diameter d [mm]***
SGF 125 EPDM-55 G1/4-IG	730	410	39	9
SGF 200 EPDM-55 G1/2-IG	1880	1490	134	12
SGF 300 EPDM-55 G1/2-IG	4240	3480	301	12
SGF 400 EPDM-55 G1/2-IG	7530	6520	553	12

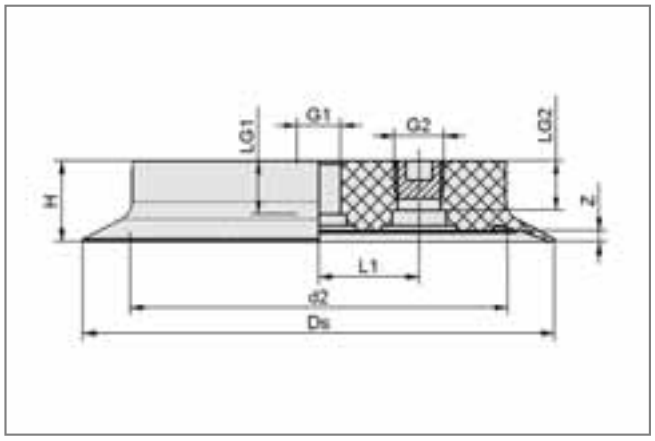
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor
**Suction force referred to the sealing-edge diameter d2
***The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Handling Glass

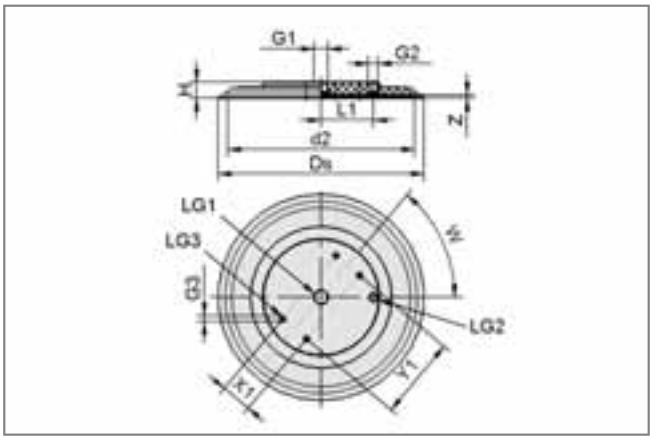
Suction Plates SGF

Suction area (Ø) from 125 mm to 400 mm

Design Data Suction Plates SGF



SGF 125 to 200



SGF 300 to 400

Type	Dimensions in mm*													
	d2	Ds	L1	G1	G2**	G3	H	LG1	LG2	LG3	W [°]	X1	Y1	Z
SGF 125 EPDM-55 G1/4-IG	94.0	125	26.5	G1/4"-F	G1/4"-F	-	21.5	14.0	14.0	-	-	-	-	3.0
SGF 200 EPDM-55 G1/2-IG	178.0	200	52.8	G1/2"-F	G1/4"-F	-	22.1	14.0	14.0	-	-	-	-	3.6
SGF 300 EPDM-55 G1/2-IG	272.3	300	76.0	G1/2"-F	G1/4"-F	M8-F	22.3	14.5	14.5	14.5	50	45	120	4.5
SGF 400 EPDM-55 G1/2-IG	372.3	400	76.0	G1/2"-F	G1/4"-F	M8-F	22.3	14.5	14.5	14.5	50	45	120	4.5

*Acceptable dimensional tolerances for rubber sealings concerning to DIN 3302 - M3

**A plug is mounted to the connection in the factory

Suction Pads for Handling CDs/DVDs

Suction Pads SGR and SGH

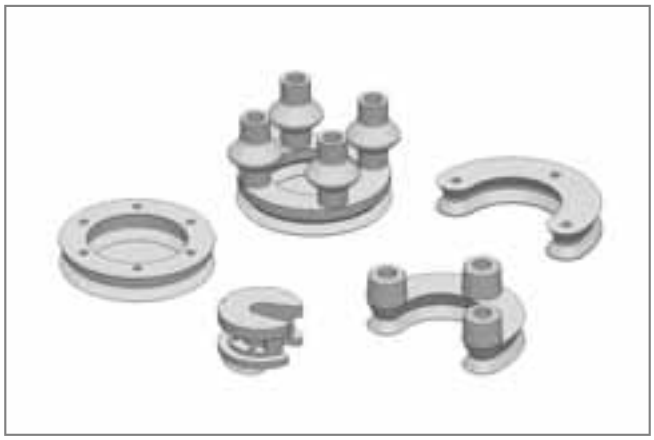
Suction area (Ø) from 17 mm to 36 mm

Suitability for Industry-Specific Applications

Suction pads SGR and SGH

Applications

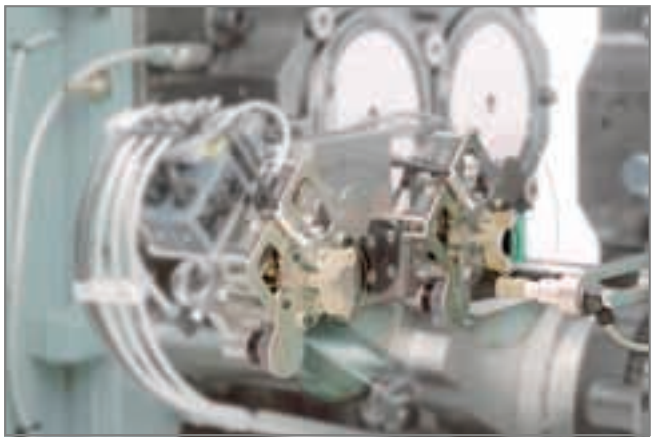
- Suction pads for handling of CDs or DVDs in fast-running, fully automatic systems
- Handling of CDs and DVDs in all processing steps of the production and further processing



System design suction pads SGR and SGH

Design

- Circular suction pad with closed version (SGR) or semi-circular version (SGH)
- Suction pad shaped for direct insertion into various mountings



Suction pads SGH being used for handling CDs

Our Highlights...

- Wide range of different sizes and shapes
- Various diameters
- Full-ring version (SGR)
- Half-ring version (SGH)
- Also available with spring mounting (SGR-G, SGH-G)

Your Benefits...

> Models for various mountings

> Models to match all common CD types

> Full suction force in spite of small size

> Can be moved sideways towards a centering mandrel

> Lifting effect for better cancellation of adhesion forces

Suction Pads for Handling CDs/DVDs

Suction Pads SGR and SGH

Suction area (Ø) from 17 mm to 36 mm

Designation Code Suction Pads SGR and SGH

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Product addition
Example SGR 31 SI-40 G:			
SGR	**31**	**SI-40**	**G**
SGR annular	17	SI-35	G spring-mounted version
SGH semi-annular	24	SI-40	
	31	SI-45	
	33	SI-50	
	36	SI-AS-50 (antistatic)	
		SI-55	
		SI-65	

Ordering Data Suction Pads SGR and SGH

Suction Pad SGR / SGH (elastomer part) is delivered with the desired properties.

Suction Pads SGR and SGH

Type	Suction pad material * / hardness in Shore A						
	Silicone SI 35±5ShA	Silicone SI 40±5ShA	Silicone SI 45±5ShA	Silicone SI 50±5ShA	Silicone SI 55±5ShA	Silicone SI 65±5ShA	Silicone SI-antistat. 50±5ShA
SGH 17	10.01.01.01088	-	-	-	-	-	-
SGR 24	-	10.01.01.00612	-	-	-	-	-
SGR 24 G	-	10.01.01.00773	-	-	-	-	-
SGR 31	-	-	-	-	10.01.01.10006	10.01.01.00615	10.01.01.01080
SGR 31 G	-	10.01.01.01275	-	-	-	-	-
SGR 33	-	10.01.01.01061	10.01.01.10526	-	-	-	10.01.01.10702
SGH 33 G	-	-	-	10.01.01.01063	-	-	-
SGH 36	10.01.01.01062	-	-	-	-	-	-

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Suction Pads SGR and SGH

Type	Suction force [N]*	Weight [g]
SGH 17	11.0	1.1
SGR 24	7.0	1.5
SGR 24 G	7.0	3.7
SGR 31	28.2	1.8
SGR 31 G	19.0	4.1
SGR 33	36.2	4.2
SGH 33 G	23.1	2.1
SGH 36	24.1	1.6

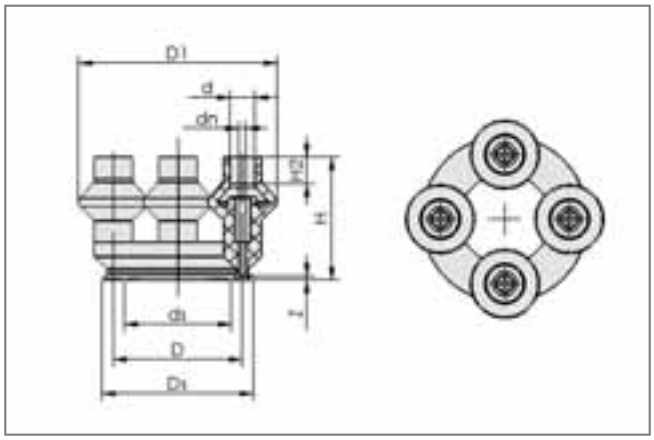
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

Suction Pads for Handling CDs/DVDs

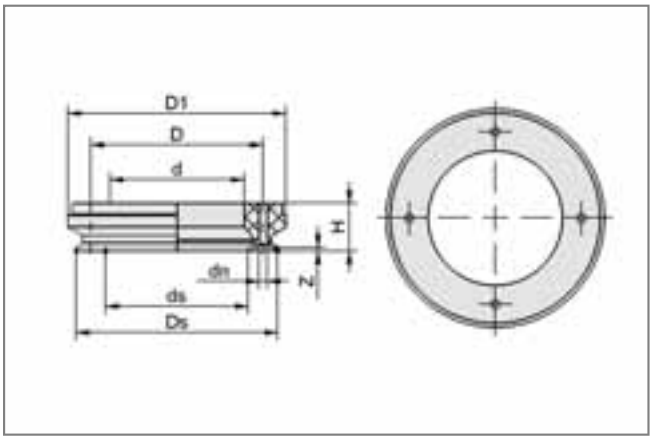
Suction Pads SGR and SGH

Suction area (Ø) from 17 mm to 36 mm

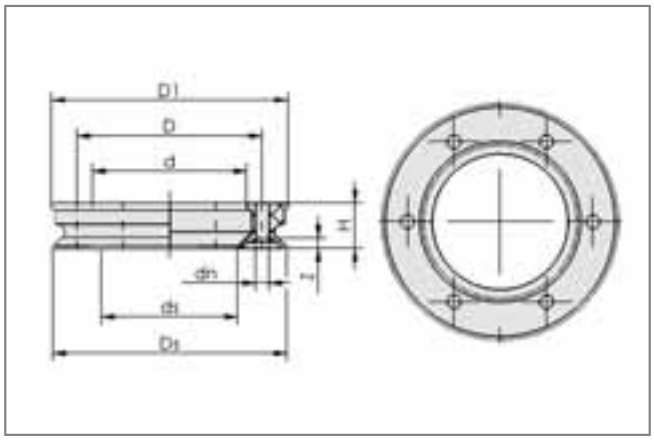
Design Data Suction Pads SGR and SGH



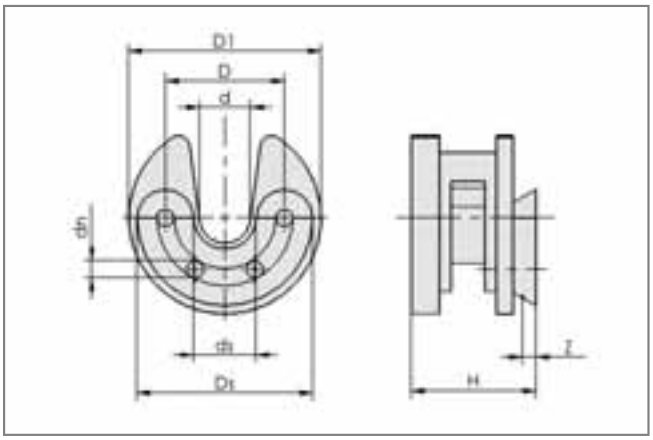
SGR 24 G and 31 G



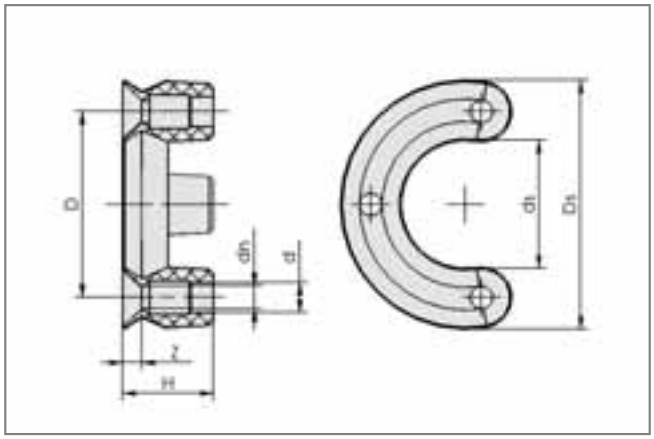
SGR 24



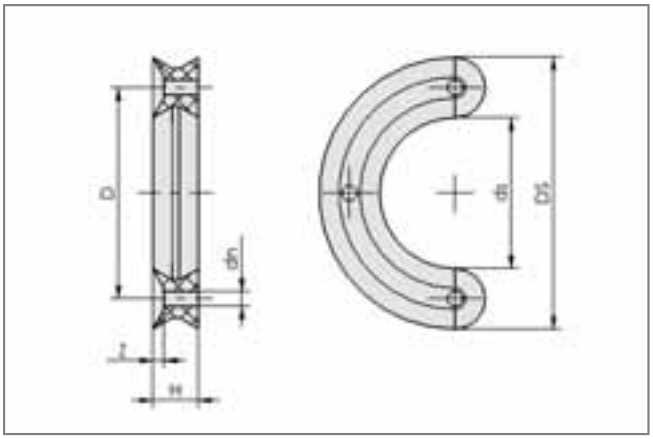
SGR 31 / 33



SGH 17



SGH 33 G



SGH 36

Suction Pads for Handling CDs/DVDs

Suction Pads SGR and SGH

Suction area (Ø) from 17 mm to 36 mm

Design Data Suction Pads SGR and SGH

Type	Dimensions in mm*							
	d	D	D1	dn	ds	Ds	H	Z (Stroke)
SGH 17	4.5	-	17.0	1.5	5.5	15.5	11.0	1.0
SGR 24	16.0	20.5	26.0	1.0	17.0	24.0	5.7	0.8
SGR 24 G	4.0	20.5	31.5	1.2	17.0	24.0	19.5	0.8
SGR 31	20.4	24.5	31.3	1.8	18.0	31.0	6.0	1.4
SGR 31 G	4.0	24.5	35.5	1.8	18.0	31.0	20.5	1.4
SGR 33	16.5	22.0	33.0	3.2	17.9	33.0	8.0	-
SGH 33 G	4.0	25.0	-	3.0	17.4	33.0	12.0	2.5
SGH 36	-	28.0	-	2.0	20.0	36.0	6.0	1.5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for High-Temperature Applications

Suction Plates for High-Temperature SPL-HT FPM-F

Suction area (Ø) 90 mm and 190 mm

Suitability for Industry-Specific Applications

High-temperature suction plates SPL-HT FPM-F

Applications

- Round suction plate for handling of very hot workpieces
- Removing of hot cathode ray tubes from molds
- Handling of hot glass

Design

- Robust and wear-resistant suction plate SPL-HT FPM-F with single sealing lip, consisting of suction plate SPL and large-area metal mounting
- Suction plate screwed to mounting

Our Highlights...

- Special materials fluoro-caoutchuc FPM-F with felt coating
- Suction pad screwed to mounting
- Large-area metal mounting for the suction pad

Your Benefits...

> Very high heat resistance (up to 400 °C for short periods) and little marking of workpieces

> Suction pad can be replaced separately when worn

> Good heat dissipation, short cooling times

Designation Code Suction Plates for High-Temperature SPL-HT FPM-F

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPL-HT 90 FPM-F-65 G1/4-AG:			
SPL-HT	**90**	**FPM-F-65**	**G1/4-AG**
SPL-HT	90	FPM-F-65	G1/4-AG (AG = male (M))
	190		G1/2-AG

Ordering Data Suction Plates for High-Temperature SPL-HT FPM-F

Suction plate SPL-HT FPM-F (elastomer part + mounting) is delivered unassembled. The delivery consists of:
- Suction plate of type SPL-HT FPM-F – elastomer part, available in various diameters
- Mounting – available with various threads

Available spare parts: suction plate SPL-HT FPM-F

Suction Plates for High-Temperature SPL-HT FPM-F

Type*	Part Number
SPL-HT 90 FPM-F-65 G1/4-AG	10.01.01.00551
SPL-HT 190 FPM-F-65 G1/2-AG	10.01.01.00832

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for High-Temperature Applications

Suction Plates for High-Temperature SPL-HT FPM-F

Suction area (Ø) 90 mm and 190 mm

Ordering Data Spare Parts Suction Plates for High-Temperature SPL-HT FPM-F

Type*	Suction plate
SPL-HT 90 FPM-F-65	10.01.01.00553
SPL-HT 190 FPM-F-65	10.01.01.00834

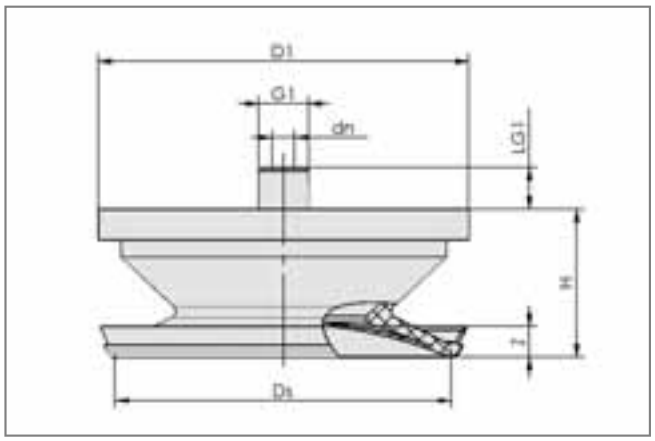
*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Technical Data Suction Plates for High-Temperature SPL-HT FPM-F

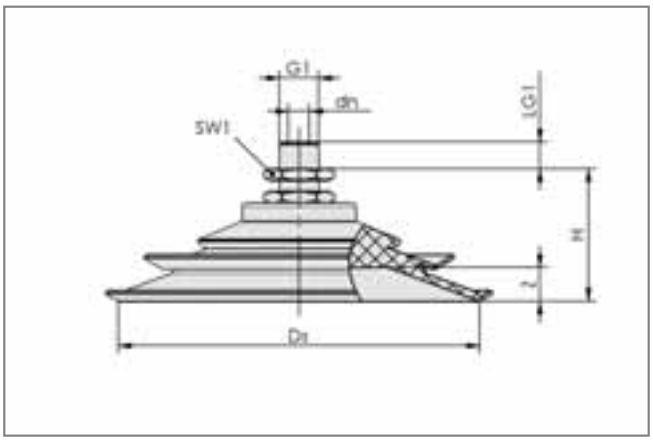
Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Weight [g]
SPL-HT 90 FPM-F-65 G1/4-AG	230	66.5	250	225
SPL-HT 190 FPM-F-65 G1/2-AG	1050	165.0	350	1420

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

Design Data Suction Plates for High-Temperature SPL-HT FPM-F



SPL-HT 90 FPM-F



SPL-HT 190 FPM-F

Type	Dimensions in mm*							
	dn	D1	Ds	G1	H	LG1	SW1	Z (Stroke)
SPL-HT 90 FPM-F-65 G1/4-AG	6	98	90	G1/4"-M	39	11	-	16.5
SPL-HT 190 FPM-F-65 G1/2-AG	10	-	190	G1/2"-M	66	18	32	8.0

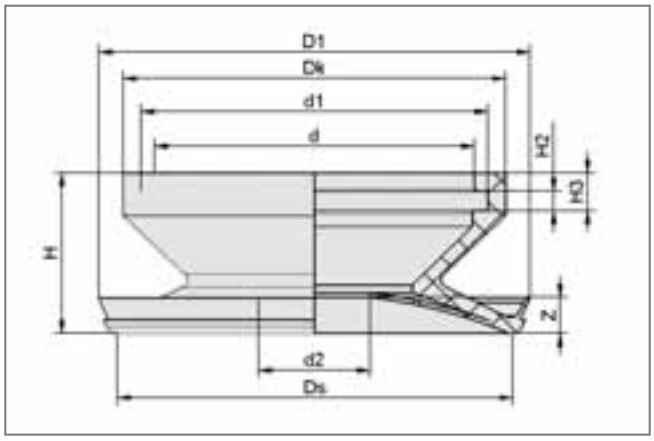
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for High-Temperature Applications

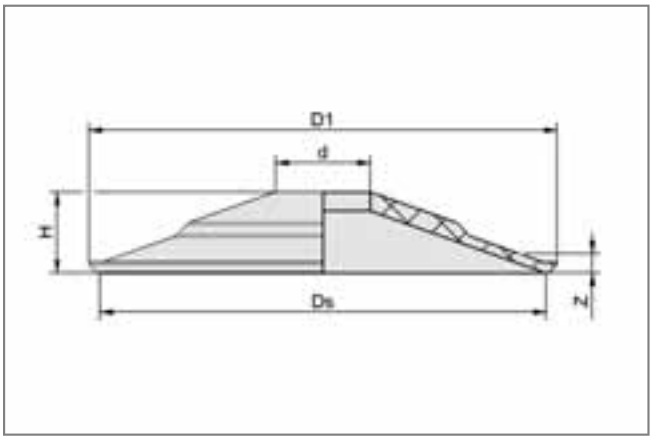
Suction Plates for High-Temperature SPL-HT FPM-F

Suction area (Ø) 90 mm and 190 mm

Design Data Suction Plates for High-Temperature SPL-HT FPM-F



SPL-HT 90 FPM-F



SPL-HT 190 FPM-F

Type*	Dimensions in mm*									
	d	d1	d2	D1	Dk	Ds	H	H2	H3	Z (Stroke)
SPL-HT 90 FPM-F-65	72	78	25	97	86	90	36	4	8.5	16.5
SPL-HT 190 FPM-F-65	25	-	-	205	-	190	17	-	-	8.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for High-Temperature Applications

Suction Plates for High-Temperature SPL-HT

Suction area (Ø) from 35 mm to 140 mm

High-temperature suction plates SPL-HT

Suitability for Industry-Specific Applications

Applications

- Round suction plate for handling of workpieces with smooth surfaces
- Usage in manufacturing of float glass or in tempering processes in the glass industry
- Hot forming in the metal industry

Design

- Robust stainless-steel body
- Seal clamped into the body and quickly replaceable
- Seal made of special textile material for handling hot workpieces

Our Highlights...

- Stainless-steel body; seal made of special textile materials
- Withstanding temperatures of up to 600°C
- Seal quickly and easily replaceable

Your Benefits...

> Very high temperature resistance (even for long periods)

> Safe and gentle gripping of hot workpieces with vacuum

> Seal can be replaced separately when worn or damaged

Designation Code Suction Plates for High-Temperature SPL-HT

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SPL-HT 90 ST G1/4-IG:			
SPL-HT	**90**	**ST**	**G1/4-IG**
SPL-HT	35	ST woven silicate material	G1/8-IG (IG = female (F))
	60		G1/4-IG
	90		G3/8-IG
	140		

Ordering Data Suction Plates for High-Temperature SPL-HT

Suction plate SPL-HT (sealing ring + mounting) is delivered assembled. The assembly consists of:
- Sealing ring of type DR-SPL-HT – available in various diameters
- Stainless-steel mounting – available with various threads

Available spare parts: sealing ring DR-SPL-HT

Suction Pads for High-Temperature Applications

Suction Plates for High-Temperature SPL-HT

Suction area (Ø) from 35 mm to 140 mm

Suction Plates for High-Temperature SPL-HT

Type	Part Number
SPL-HT 35 ST G1/8-IG	10.01.23.00023
SPL-HT 60 ST G1/4-IG	10.01.23.00006
SPL-HT 90 ST G1/4-IG	10.01.23.00007
SPL-HT 140 ST G3/8-IG	10.01.23.00008

Ordering Data Spare Parts Suction Plates for High-Temperature SPL-HT

Type	Sealing ring DR-SPL-HT
SPL-HT 35 ST G1/8-IG	10.01.23.00022
SPL-HT 60 ST G1/4-IG	10.01.23.00001
SPL-HT 90 ST G1/4-IG	10.01.23.00016
SPL-HT 140 ST G3/8-IG	10.01.23.00018

Technical Data Suction Plates for High-Temperature SPL-HT

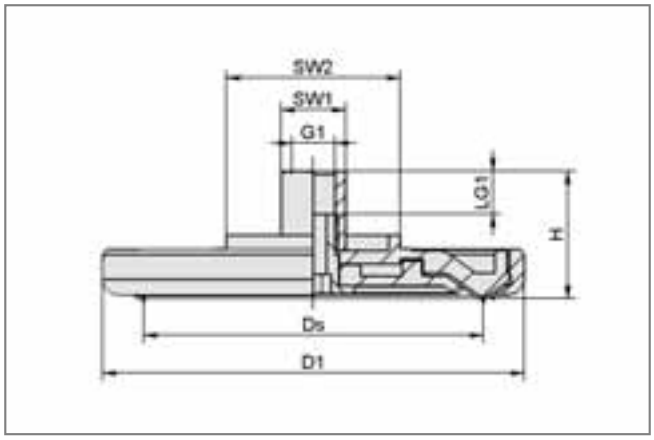
Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Required evacuation rate for pu = -0,7 bar [l/min]**	Weight [g]	Recom. internal hose diameter d [mm]***
SPL-HT 35 ST G1/8-IG	47	4	90	55	225	4
SPL-HT 60 ST G1/4-IG	130	12	440	78	375	6
SPL-HT 90 ST G1/4-IG	320	25	1060	100	675	6
SPL-HT 140 ST G3/8-IG	740	50	1700	120	1390	9

*The suction-force figures are theoretical values at a vacuum of -0.6 bar and with a smooth, flat workpiece surface. They are specified without any safety factor. For the system design the safety factors should be increased at least by the factor 3.

**The recommended suction capacity is based on an average workpiece temperature of about 300°C. We recommend testing with original workpieces.

***The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Suction Plates for High-Temperature SPL-HT



SPL-HT 35-140 ST

Type	Dimensions in mm							
	dn	D1	Ds	G1	H	LG1	SW1	SW2
SPL-HT 35 ST G1/8-IG	5	53	35	G1/8"-F	29	12	14	27
SPL-HT 60 ST G1/4-IG	7	80	58	G1/4"-F	39	12	17	27
SPL-HT 90 ST G1/4-IG	7	112	90	G1/4"-F	39	12	17	46
SPL-HT 140 ST G3/8-IG	8	160	138	G3/8"-F	39	12	22	95

Suction Pads for Different Industries

Flat Suction Pads SGN 6.3 to SGN 25

Suction area (Ø) from 6.3 mm to 25 mm

Suitability for Industry-Specific Applications

Flat suction pads SGN 6.3 to SGN 25

Applications

- Round and flat suction pads for handling of easily damaged workpieces

Design

- Robust and heard-wearing suction pad SGN with single sealing lip, consisting of suction pad SG and connection nipple
- Suction pad with extra-long shaft
- Nipple plugged into the suction pad

Our Highlights...

- Long, slim design
- Long, tapered and elastic sealing lip

Your Benefits...

> Particularly suitable for easily damaged workpieces

> For workpieces with uneven surfaces

Designation Code Flat Suction Pads SGN 6.3 to SGN 25

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGN 10 NBR-55 M5-AG:			
SGN	**10**	**NBR-55**	**M5-AG**
SGN	6.3 to 25	NBR-55 SI-55	M5-AG (AG = male (M)) G1/8-AG

Ordering Data Flat Suction Pads SGN 6.3 to SGN 25

Suction pad SGN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type SG – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad SG, connection nipple SA-NIP

Suction Pads for Different Industries

Flat Suction Pads SGN 6.3 to SGN 25

Suction area (Ø) from 6.3 mm to 25 mm

Flat Suction Pads SGN 6.3 to SGN 25

Type	Suction pad material * / hardness in Shore A	
	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
SGN 6.3 M5-AG	10.01.01.00197	10.01.01.10036
SGN 8 M5-AG	10.01.01.00715	10.01.01.00745
SGN 10 M5-AG	10.01.01.00198	10.01.01.10037
SGN 16 M5-AG	10.01.01.00199	10.01.01.10038
SGN 25 G1/8-AG	10.01.01.00200	10.01.01.10039

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	Perbunan NBR 55±5ShA	Silicone SI 55±5ShA
SG 6.3	10.01.01.00193	10.01.01.00600
SG 8	10.01.01.00713	10.01.01.00744
SG 10	10.01.01.00194	10.01.01.00601
SG 16	10.01.01.00195	10.01.01.00602
SG 25	10.01.01.00196	10.01.01.00603

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
SGN 6.3 M5-AG	SA-NIP N024 M5-AG DN100	10.01.01.00317
SGN 8 M5-AG	SA-NIP N040 M5-AG DN100	10.01.01.00714
SGN 10 M5-AG	SA-NIP N025 M5-AG DN200	10.01.01.00318
SGN 16 M5-AG	SA-NIP N026 M5-AG DN200	10.01.01.00319
SGN 25 G1/8-AG	SA-NIP N027 G1/8-AG DN350	10.01.01.00320

Technical Data Flat Suction Pads SGN 6.3 to SGN 25

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
SGN 6.3 M5-AG	1.5	0.017	8	2	N 024
SGN 8 M5-AG	2.3	0.035	8	2	N 040
SGN 10 M5-AG	4.0	0.065	10	2	N 025
SGN 16 M5-AG	8.0	0.330	15	2	N 026
SGN 25 G1/8-AG	24.0	1.000	20	4	N 027

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

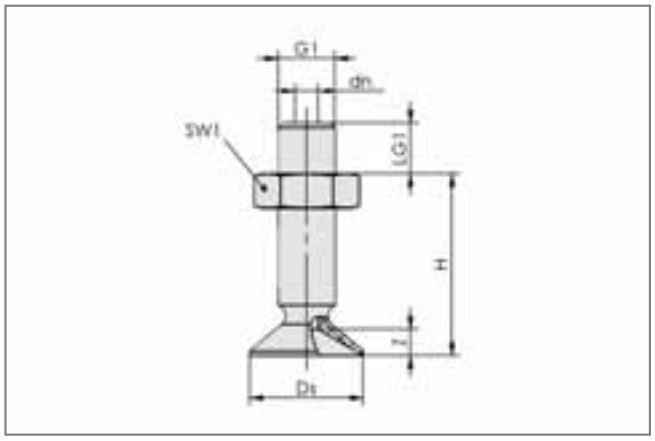
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Different Industries

Flat Suction Pads SGN 6.3 to SGN 25

Suction area (Ø) from 6.3 mm to 25 mm

Design Data SGN 6.3 to SGN 25

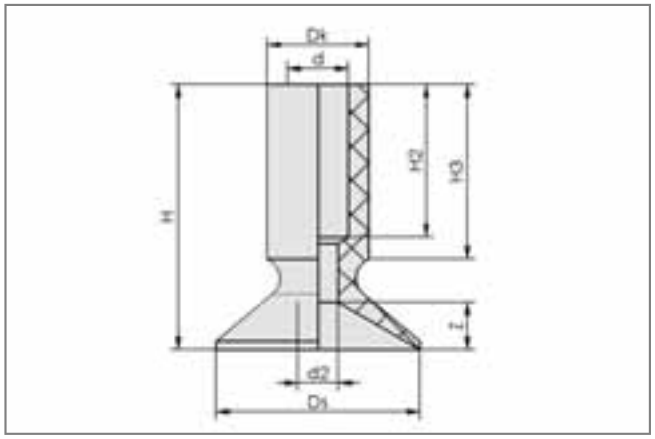


SGN 6.3 to 25 AG

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z
SGN 6.3 M5-AG	1.0	6.3	M5-M	15.0	4.5	8	1.5
SGN 8 M5-AG	1.0	8.0	M5-M	11.5	4.5	8	1.7
SGN 10 M5-AG	2.0	10.0	M5-M	16.0	4.5	8	2.0
SGN 16 M5-AG	2.0	16.0	M5-M	23.0	4.5	8	4.0
SGN 25 G1/8-AG	3.5	25.0	G1/8"-M	35.0	8.0	14	5.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Flat suction pads SG 6.3 to SG 25 - spare parts f. SGN



SG 6.3 to 25

Type	Dimensions in mm*							
	d	d2	Dk	Ds	H	H2	H3	Z
SG 6.3	2	1.0	4	6.3	12.0	8.5	9.5	1.5
SG 8	2	1.5	4	8.0	8.5	4.0	4.8	1.7
SG 10	3	2.0	5	10.0	13.5	8.0	9.0	2.0
SG 16	5	3.0	8	16.0	20.0	12.0	14.0	4.0
SG 25	8	4.0	12	25.0	31.0	18.0	22.0	5.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Different Industries

Flat Suction Pads SGN 20 to SGN 100

Diameter (Ø) from 20 mm to 100 mm

Suitability for Industry-Specific Applications

Flat suction pads SGN 20 to SGN 100

Applications

- Round and flat suction pad for handling of smooth workpieces with very dynamic movements
- Handling under rough operating conditions

Design

- Robust and wear-resistant suction pad SGN with single sealing lip and connection nipple vulcanised into position for handling maximum loads
- Connection nipple available only with a male thread

Our Highlights...

- Robust and wear-resistant suction pad
- Bottom surface of suction pad with molded studs

Your Benefits...

> Used under rough operating conditions

> High suction force and high frictional resistance to lateral forces

Designation Code Flat Suction Pads SGN 20 to SGN 100

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGN 80 NBR-55 G1/4-AG:			
SGN	**80**	**NBR-55**	**G1/4-AG**
SGN	20 30 50 80 100	NBR-55	G1/8-AG (AG = male (M)) G1/4-AG

Ordering Data Flat Suction Pads SGN 20 to SGN 100

Suction pad SGN 20 to SGN 100, available in various diameters, is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Pads SGN 20 to SGN 100

Type*	Part Number
SGN 20 NBR-55 G1/8-AG	10.01.01.00201
SGN 30 NBR-55 G1/8-AG	10.01.01.00202
SGN 50 NBR-55 G1/8-AG	10.01.01.00203
SGN 80 NBR-55 G1/4-AG	10.01.01.00204
SGN 100 NBR-55 G1/4-AG	10.01.01.00205

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Different Industries

Flat Suction Pads SGN 20 to SGN 100

Diameter (Ø) from 20 mm to 100 mm

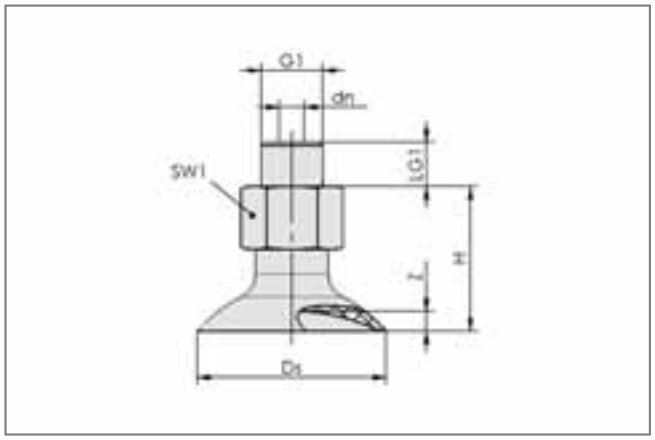
Technical Data Flat Suction Pads SGN 20 to SGN 100

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**
SGN 20 NBR-55 G1/8-AG	20	0.150	25	4
SGN 30 NBR-55 G1/8-AG	35	0.562	40	4
SGN 50 NBR-55 G1/8-AG	90	1.833	210	4
SGN 80 NBR-55 G1/4-AG	220	3.011	300	6
SGN 100 NBR-55 G1/4-AG	340	14.661	450	6

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads SGN 20 to SGN 100



SGN 20 to 100 AG

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z
SGN 20 NBR-55 G1/8-AG	1.5	20	G1/8"-M	18	7	14	2.3
SGN 30 NBR-55 G1/8-AG	4.0	30	G1/8"-M	23	7	14	3.6
SGN 50 NBR-55 G1/8-AG	4.0	50	G1/8"-M	26	7	14	5.0
SGN 80 NBR-55 G1/4-AG	6.0	80	G1/4"-M	38	9	22	5.0
SGN 100 NBR-55 G1/4-AG	6.0	100	G1/4"-M	41	9	22	10.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Different Industries

Flat Suction Pads SGN 45

Diameter (Ø) 45 mm

Suitability for Industry-Specific Applications

Flat suction pads SGN 45

Applications

- Round and flat suction pad for handling of workpieces with uneven surfaces
- Handling of rough parquet blocks and wood strips
- For use in applications which demand very good resistance to chemicals

Design

- Robust and wear-resistant suction pad SGN with single sealing lip, consisting of suction pad SG and connection nipple
- Nipple plugged into the suction pad

Our Highlights...

- Long, tapered and elastic sealing lip
- Special material: Epichlor-H rubber ECO
- Special material: silicone SI

Your Benefits...

> For sensitive workpieces and uneven surfaces

> Very high resistance to chemicals

> Use at particularly high and low temperatures

Designation Code Flat Suction Pads SGN 45

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGN 45 ECO-60 G1/4-AG:			
SGN	**45**	**ECO-60**	**G1/4-AG**
SGN	45	ECO-60 SI-60	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F))

Ordering Data Flat Suction Pads SGN 45

Suction pad SGN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type SG – elastomer part, available in various materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad SG, connection nipple SA-NIP

Flat Suction Pads SGN 45

Type	Suction pad material * / hardness in Shore A	
	Epichlor ECO 60±5ShA	Silicone SI 60±5ShA
SGN 45 G1/4-AG	10.01.01.00217	10.01.01.00218
SGN 45 G1/4-IG	10.01.01.00215	10.01.01.00216

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Different Industries

Flat Suction Pads SGN 45

Diameter (Ø) 45 mm

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	Epichlor ECO 60±5ShA	Silicone SI 60±5ShA
SG 45	10.01.01.00219	10.01.01.00220

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
SGN 45 G1/4-AG	SA-NIP N031 G1/4-AG DN550	10.01.01.00327
SGN 45 G1/4-IG	SA-NIP N031 G1/4-IG DN550	10.01.01.00328

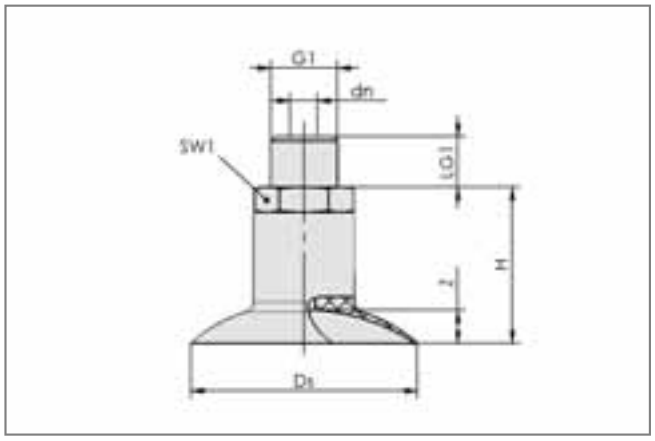
Technical Data Flat Suction Pads SGN 45

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
SGN 45	50	4	50	6	N 031

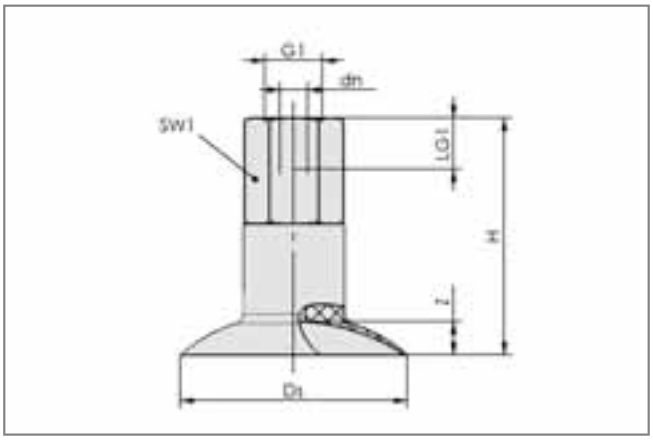
*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

**The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads SGN 45



SGN 45 AG



SGN 45 IG (female)

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z
SGN 45 G1/4-AG	5.5	44	G1/4"-M	31	10	17	5
SGN 45 G1/4-IG	5.5	44	G1/4"-F	47	11	17	5

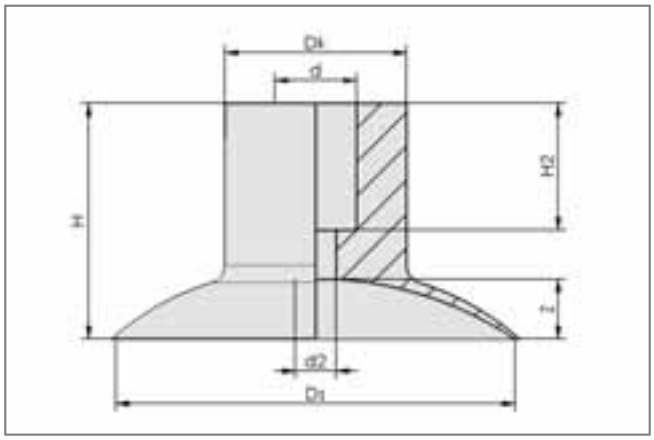
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Different Industries

Flat Suction Pads SGN 45

Diameter (Ø) 45 mm

Design Data Flat Suction Pads SG 45 - Spare Parts for SGN 45



SG 45

Type	Dimensions in mm*						
	d	d2	Dk	Ds	H	H2	Z
SG 45	9	4.5	20	44	26	14	5

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Different Industries

Flat Suction Pads SGN 120

Diameter (Ø) 120 mm

Suitability for Industry-Specific Applications

Flat suction pads SGN 120

Applications

- Round and flat suction pad for handling of flat workpieces
- Handling of workpieces which are considerably narrower than the suction pad, e.g. metal bars, parquet blocks, etc. (minimum width 25 mm)

Design

- Robust and wear-resistant suction pad SGN with single sealing lip, connection nipple vulcanised to pad
- Nipple with male thread

Our Highlights...

- Extremely flat sealing lip
- Special material: Epichlor-H rubber ECO

Your Benefits...

> For workpieces of varying widths, even those narrower than the suction pad diameter

> High resistance to chemicals

Designation Code Flat Suction Pads SGN 120

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGN 120 ECO-60 G1/4-AG:			
SGN	**120**	**ECO-60**	**G1/4-AG**
SGN	120	ECO-60	G1/4-AG (AG = male (M))

Ordering Data Flat Suction Pads SGN 120

Suction pad SGN 120 is delivered with connection nipple vulcanized to elastomer part.

Flat Suction Pads SGN 120

Type*	Part Number
SGN 120 ECO-60 G1/4-AG	10.01.01.00212

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Suction Pads for Different Industries

Flat Suction Pads SGN 120

Diameter (Ø) 120 mm

Technical Data Flat Suction Pads SGN 120

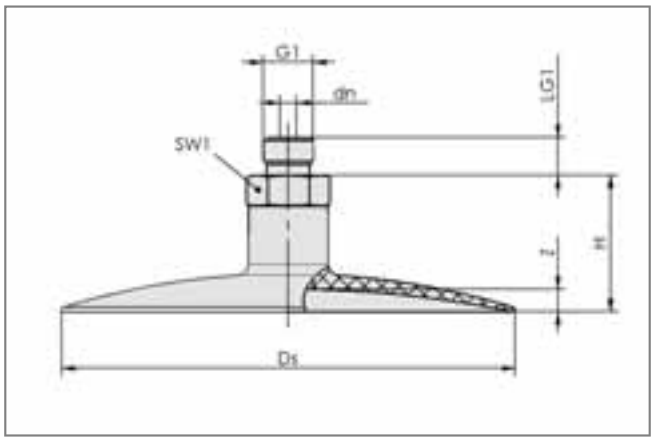
Type*	Suction force [N]**	Volume [cm³]	Recom. internal hose diameter d [mm]***
SGN 120 ECO-60 G1/4-AG	200	2.14	6

*For use with flat workpieces

**The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface et une occupation complète de la ventouse - they do not include a safety factor

***The recommended hose diameter refers to a hose length of approx. 2 m

Design Data Flat Suction Pads SGN 120



SGN 120 AG

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z
SGN 120 ECO-60 G1/4-AG	4.5	120	G1/4"-M	36	10	19	4

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Suction Pads for Different Industries

Flat Suction Pads SGAN

Suction area (Ø) from 7 mm to 16 mm

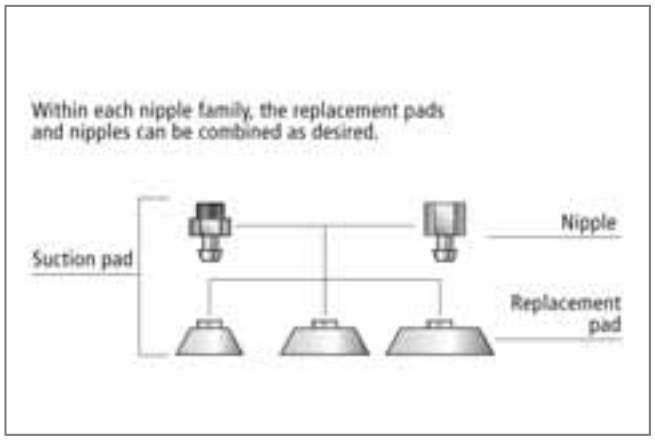
UNIVERSAL

Suitability for Industry-Specific Applications

Flat suction pads SGAN

Applications

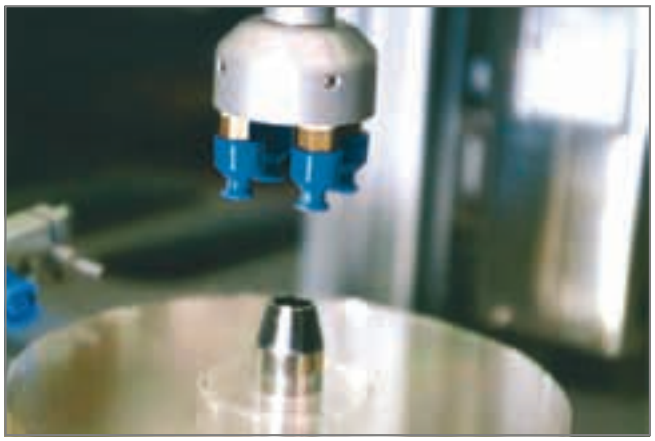
- Round and flat suction pad for handling of CDs and DVDs, wood veneers, wafers and solar cells



System design flat suction pads SGAN

Design

- Robust and wear-resistant suction pad SGAN with single sealing lip, consisting of suction pad SGA and connection nipple
- Connection nipple is plugged in on pads of all sizes



Flat suction pads SGAN being used for handling CDs and DVDs

Our Highlights...

- Soft, flexible sealing lip
- Special material: silicone SI
- Special material: polyurethane PU
- Optimum shape

Your Benefits...

> For sensitive workpieces, such as CDs

> Very suitable for particularly high and low temperatures

> Long lifetime, high resistance to wear

> Particularly suitable for multi-shift operations with very short cycle times

Suction Pads for Different Industries

Flat Suction Pads SGAN

Suction area (Ø) from 7 mm to 16 mm

Designation Code Flat Suction Pads SGAN

Abbreviated designation	Suction area Ø in mm	Material and Shore hardness	Connection thread
Example SGAN 13 PU-60 G1/8-IG:			
SGAN	**13**	**PU-60**	**G1/8-IG**
SGAN	7	PU-60	M5-AG (AG = male (M))
	9	SI-55	M5-IG (IG = female (F))
	13		G1/8-AG
	16		G1/8-IG

Ordering Data Flat Suction Pads SGAN

Suction pad SGAN (elastomer part + connection nipple) is delivered unassembled. The delivery consists of:
- Suction pad of type SGA – elastomer part, available in various diameters and materials
- Connection nipple of type SA-NIP – available with various threads

Available spare parts: suction pad SGA, connection nipple SA-NIP

Flat Suction Pads SGAN

Type	Suction pad material * / hardness in Shore A	
	Polyurethane PU 60±5ShA	Silicone SI 55±5ShA
SGAN 7 M5-AG	10.01.01.00800	10.01.01.00798
SGAN 7 M5-IG	10.01.01.00799	10.01.01.00797
SGAN 9 M5-AG	10.01.01.00804	10.01.01.00802
SGAN 9 M5-IG	10.01.01.00803	10.01.01.00801
SGAN 13 G1/8-AG	10.01.01.00808	10.01.01.00806
SGAN 13 G1/8-IG	10.01.01.00807	10.01.01.00805
SGAN 16 G1/8-AG	10.01.01.00812	10.01.01.00810
SGAN 16 G1/8-IG	10.01.01.00811	10.01.01.00809

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Ordering Data Spare Parts Suction Pads And Connection Nipples

Type*	Polyurethane PU 60±5ShA	Silicone SI 55±5ShA
SGA 7	10.01.01.00570	10.01.01.00347
SGA 9	10.01.01.00569	10.01.01.00348
SGA 13	10.01.01.00571	10.01.01.00349
SGA 16	10.01.01.00572	10.01.01.00452

*Additional material specifications at beginning of the section "Vacuum Suction Pads"

Type	Connection nipple	
SGAN 7 M5-AG	SA-NIP N028 M5-AG DN200	10.01.01.00753
SGAN 7 M5-IG	SA-NIP N028 M5-IG DN200	10.01.01.00813
SGAN 9 M5-AG	SA-NIP N028 M5-AG DN200	10.01.01.00753
SGAN 9 M5-IG	SA-NIP N028 M5-IG DN200	10.01.01.00813
SGAN 13 G1/8-AG	SA-NIP N029 G1/8-AG DN350	10.01.01.00816
SGAN 13 G1/8-IG	SA-NIP N029 G1/8-IG DN350	10.01.01.00815
SGAN 16 G1/8-AG	SA-NIP N029 G1/8-AG DN350	10.01.01.00816
SGAN 16 G1/8-IG	SA-NIP N029 G1/8-IG DN350	10.01.01.00815

Technical Data Flat Suction Pads SGAN

Type	Suction force [N]*	Volume [cm³]	Min. curve radius [mm] (convex)	Recom. internal hose diameter d [mm]**	Nipple family
SGAN 7	1.6	0.033	8	2	N 028
SGAN 9	2.1	0.050	10	2	N 028
SGAN 13	4.7	0.098	13	4	N 029
SGAN 16	6.9	0.137	15	4	N 029

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

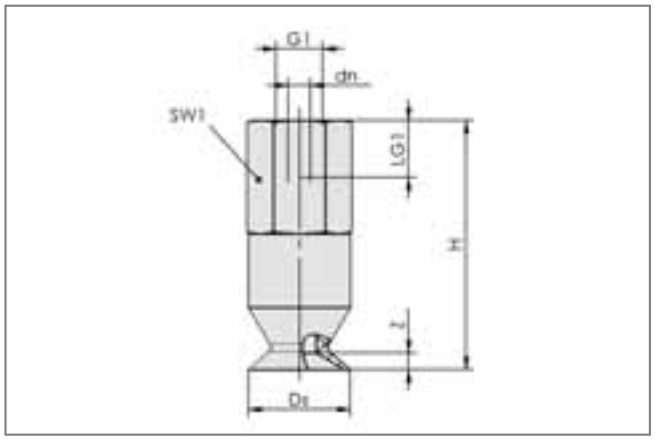
**The recommended hose diameter refers to a hose length of approx. 2 m

Suction Pads for Different Industries

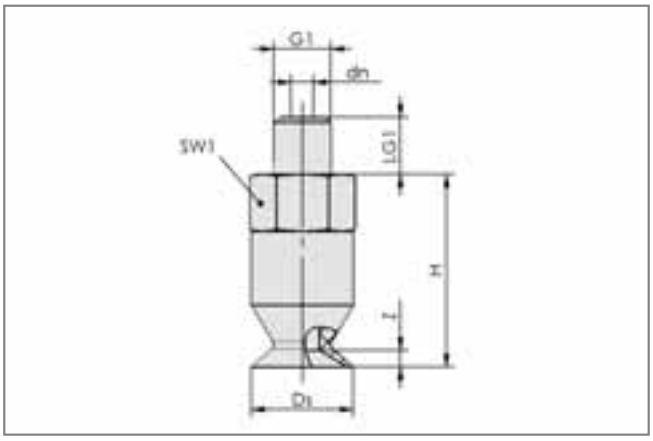
Flat Suction Pads SGAN

Suction area (Ø) from 7 mm to 16 mm

Design Data Flat Suction Pads SGAN



SGAN 7 to 16 IG

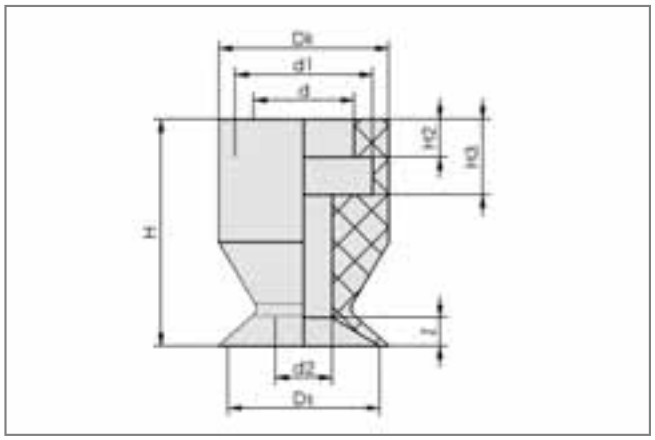


SGAN 7 to 16 AG

Type	Dimensions in mm*						
	dn	Ds	G1	H	LG1	SW1	Z
SGAN 7 M5-AG	2.0	7	M5-M	17	5.0	8	1.0
SGAN 7 M5-IG	2.0	7	M5-F	22	5.5	8	1.0
SGAN 9 M5-AG	2.0	8	M5-M	17	5.0	8	1.5
SGAN 9 M5-IG	2.0	8	M5-F	22	5.5	8	1.5
SGAN 13 G1/8-AG	3.5	12	G1/8"-M	17	8.0	14	2.0
SGAN 13 G1/8-IG	3.5	12	G1/8"-F	25	8.0	14	2.0
SGAN 16 G1/8-AG	3.5	15	G1/8"-M	17	8.0	14	2.0
SGAN 16 G1/8-IG	3.5	15	G1/8"-F	25	8.0	14	2.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Design Data Flat Suction Pads SGA - Spare Parts for SGAN



SGA 7 to 16

Type	Dimensions in mm*							
	d	d1	d2	Dk	Ds	H	H2	H3	Z
SGA 7	5	7	3	9	7	12.0	2.0	4.0	1.0
SGA 9	5	7	3	9	8	12.0	2.0	4.0	1.5
SGA 13	9	12	3	15	12	11.5	1.8	3.6	2.0
SGA 16	9	12	3	16	15	12.0	2.0	4.0	2.0

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Sealing Profiles

Sealing Profiles DI-MOS

Sealing profiles DI-MOS

Suitability for Industry-Specific Applications

Applications

- Sealing profiles for production of special, self-made suction plates
- Adaptation of suction plates to the dimensions of special workpieces
- Handling of chipboard and MDF panels with cut-outs

Design

- Wear-resistant sealing profile made of silicon-free foam rubber MOS in various diameters and cross-sections

Our Highlights...

- Profiled sealing cord in any desired length
- Wide range of diameters and sections

Your Benefits...

> Self-construction of "vacuum grippers" in any desired shape and size to match special workpieces

> Suitable for a wide range of workpiece sizes and shapes

Designation Code Sealing Profiles DI-MOS

Abbreviated designation	Dimensions in mm	Material and Shore hardness*	Product addition
Example DI-MOS 8 1K-MOS-20 SL:			
DI-MOS	**8**	**1K-MOS-20**	**SL**
DI-MOS	6 to 12; 10x6 to 25x20	1K-MOS-20	DL sealing lip HR half-round SL slot

*Average Shore hardness

Ordering Data Sealing Profiles DI-MOS

Sealing profile DI-MOS is delivered in the desired length.
Accounting unit 1 m

Sealing Profiles DI-MOS

Type	Part Number*
DI-MOS 6 1K-MOS-20	10.07.04.00001
DI-MOS 8 1K-MOS-20	10.07.04.00002
DI-MOS 8 1K-MOS-20 SL	10.07.04.00005
DI-MOS 10 1K-MOS-20	10.07.04.00003
DI-MOS 12 1K-MOS-20	10.07.04.00004
DI-MOS 6x8 1K-MOS-20 HR	10.07.04.00014
DI-MOS 8x14 1K-MOS-20 DL	10.07.04.00012
DI-MOS 10x6 1K-MOS-20	10.07.04.00006
DI-MOS 10x20 1K-MOS-20 HR	10.07.04.00010
DI-MOS 11x23 1K-MOS-20 DL	10.07.04.00015
DI-MOS 12x17 1K-MOS-20 HR	10.07.04.00011
DI-MOS 25x20 1K-MOS-20	10.07.04.00007

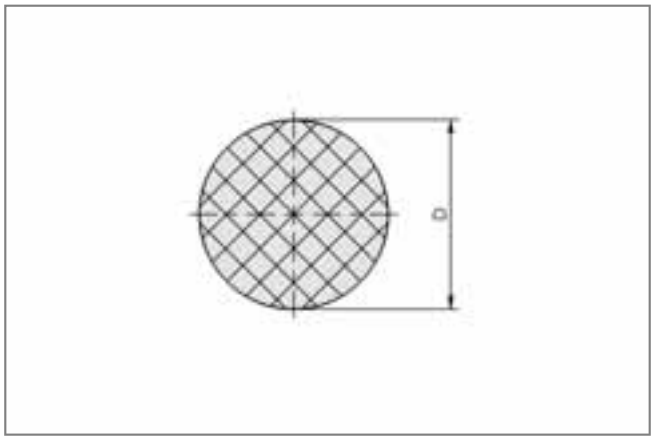
*Accounting unit [1 m]

Technical Data Sealing Profiles DI-MOS

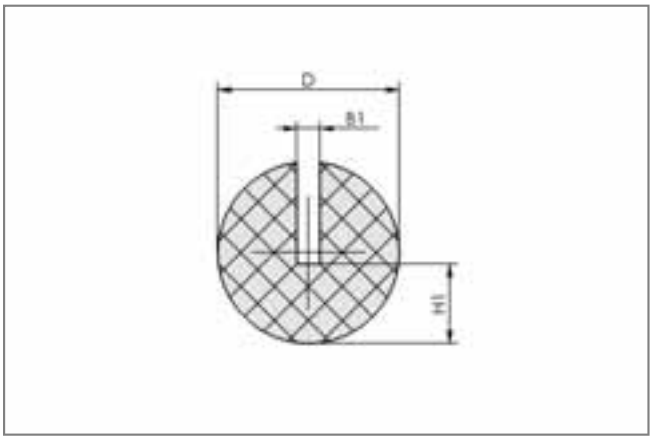
Type	Min. installation radius [mm]	Operating temperature [°C]
DI-MOS 6 1K-MOS-20	-	-25...70
DI-MOS 8 1K-MOS-20	-	-25...70
DI-MOS 8 1K-MOS-20 SL	-	-25...70
DI-MOS 10 1K-MOS-20	-	-25...70
DI-MOS 12 1K-MOS-20	-	-25...70
DI-MOS 6x8 1K-MOS-20 HR	10	-25...60
DI-MOS 8x14 1K-MOS-20 DL	20	-25...60
DI-MOS 10x6 1K-MOS-20	10	-25...70
DI-MOS 10x20 1K-MOS-20 HR	10	-25...70
DI-MOS 11x23 1K-MOS-20 DL	20	-25...70
DI-MOS 12x17 1K-MOS-20 HR	10	-25...70
DI-MOS 25x20 1K-MOS-20	30	-25...70

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

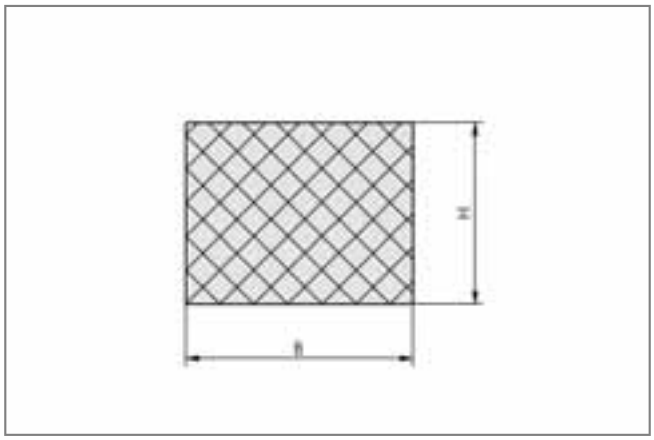
Design Data Sealing Profiles DI-MOS



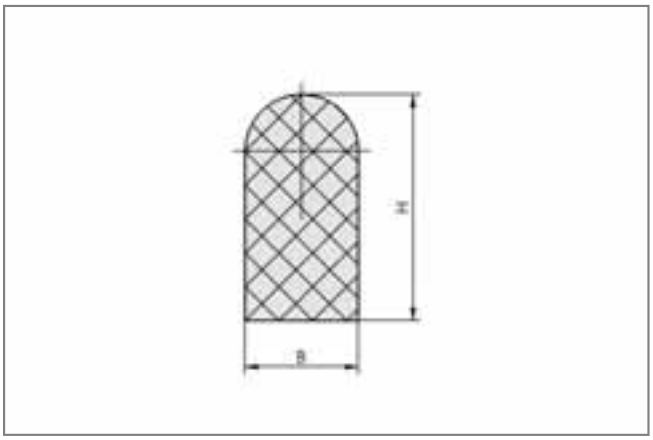
DI-MOS 6 to 12



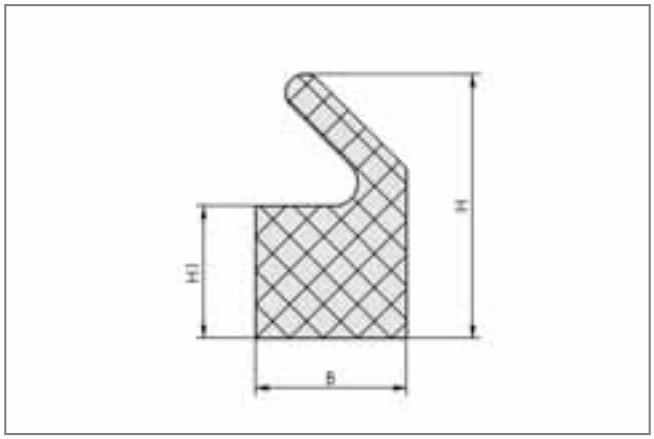
DI-MOS 8 SL



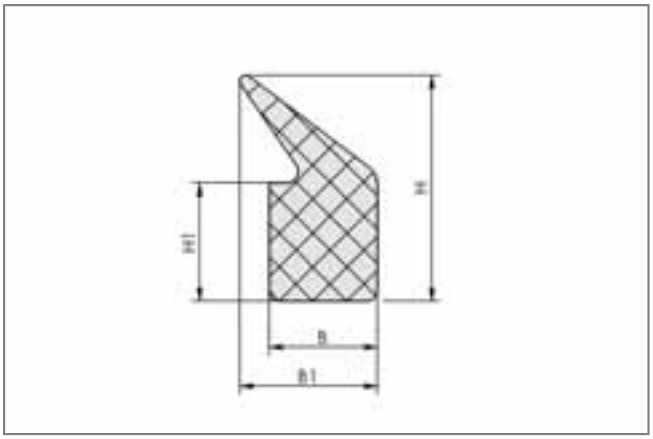
DI-MOS 10x6 and DI-MOS 25x20



DI-MOS 10x20 HR, DI-MOS 12x17 HR, DI-MOS 6x8 HR



DI-MOS 8 x 14 DL



DI-MOS 11 x 23 DL

Design Data Sealing Profiles DI-MOS

Type	Dimensions in mm*					
	B	B1	D	H	H1	Recommended slot width x slot depth
DI-MOS 6 1K-MOS-20	-	-	6	-	-	6.0 x 4.2 + 0.3 mm
DI-MOS 8 1K-MOS-20	-	-	8	-	-	8.0 x 5.6 + 0.3 mm
DI-MOS 8 1K-MOS-20 SL	-	1	8	-	3.5	1100.0 x 145 mm
DI-MOS 10 1K-MOS-20	-	-	10	-	-	10.0 x 7 + 0.3 mm
DI-MOS 12 1K-MOS-20	-	-	12	-	-	12.0 x 8.4 + 0.3 mm
DI-MOS 6x8 1K-MOS-20 HR	6	-	-	8	-	7.0 x 4 mm
DI-MOS 8x14 1K-MOS-20 DL	8	-	-	14	7.0	9.0 x 6.5 mm
DI-MOS 10x6 1K-MOS-20	10	-	-	6	-	11.0 x 3 mm
DI-MOS 10x20 1K-MOS-20 HR	10	-	-	20	-	11.0 x 10 mm
DI-MOS 11x23 1K-MOS-20 DL	11	14	-	23	12.0	12.0 x 11.5 mm
DI-MOS 12x17 1K-MOS-20 HR	12	-	-	17	-	13.0 x 10 mm
DI-MOS 25x20 1K-MOS-20	25	-	-	20	-	26.0 x 10 mm

*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Sealing Profiles

Sealing Profiles DI-PROF

Suitability for Industry-Specific Applications

Sealing profiles DI-PROF

Applications

- Sealing profile made of two component section for production of self-made, individual suction plates
- Sealing profile for rough or structured surfaces
- Handling of sacks, barrels and similar objects with irregular surfaces

Design

- Robust and wear-resistant sealing profiles in various cross-sections
- Profile 2K-MOS-20: sealing strip made of foam rubber, vulcanized to support strip (supporting and sealing section made of Chloroprene CR)
- Profile 2K-SWG-20: sealing strip made of foam rubber, glued to support strip (supporting section NBR, sealing section natural rubber NK)
- High-strength supporting-section material with profile on the sides for plugging into a corresponding mounting plate

Our Highlights...

- Sealing strip in any desired length
- Sealing profile made of two-component section

Your Benefits...

> Self-construction of "vacuum grippers" in any desired shape and size to match specific workpieces

> High-strength support strip with foam rubber seal vulcanised or glued to it, for sealing to very rough or structured surfaces (such as ornamental glass, rough natural stone, concrete blocks, etc.)

Designation Code Sealing Profiles DI-PROF

Abbreviated designation	Dimensions in mm	Material and Shore hardness*
Example DI-PROF 5.5x8 2K-MOS-20:		
DI-PROF	**5.5x8**	**2K-MOS-20**
DI-PROF	5.5x8	2K-MOS-20
	9x9.7	2K-SWG-20
	20x15	
	30x25	

*Average Shore hardness

Ordering Data Sealing Profiles DI-PROF

Sealing profile DI-PROF is delivered in the desired length.
Accounting unit 1 m

Sealing Profiles DI-PROF

Type*	Part Number
DI-PROF 5.5x8 2K-MOS-20	10.01.01.10554
DI-PROF 9x9.7 2K-MOS-20	10.01.01.10527
DI-PROF 20x15 2K-SWG-20	10.07.04.00040
DI-PROF 30x25 2K-SWG-20	10.07.04.00041

*Accounting unit [1m]

Technical Data Sealing Profiles DI-PROF

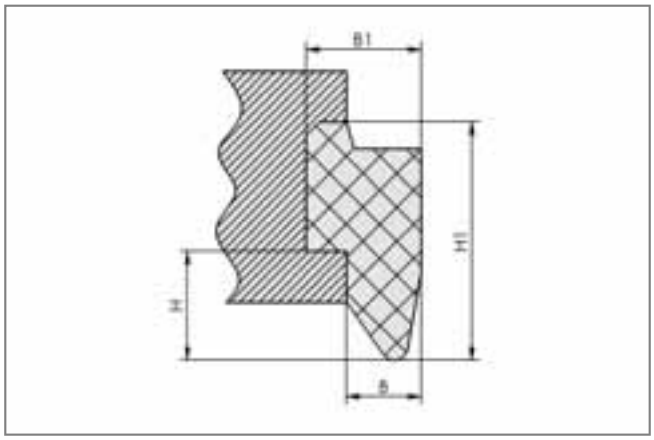
Type	Min. installation radius [mm]	Operating temperature [°C]
DI-PROF 5.5x8 2K-MOS-20	65	-30...90
DI-PROF 9x9.7 2K-MOS-20	85	-30...90
DI-PROF 20x15 2K-SWG-20	120	-35...70
DI-PROF 30x25 2K-SWG-20	200	-35...70

*The specified suction forces are theoretical values at a vacuum of -0.6 bar and with a smooth, dry workpiece surface - they do not include a safety factor

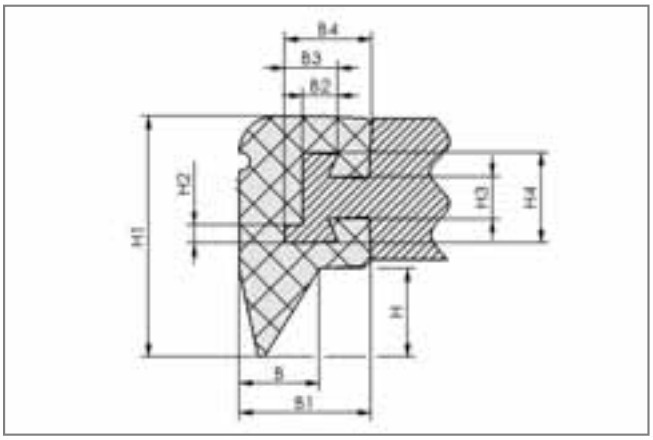
Sealing Profiles

Sealing Profiles DI-PROF

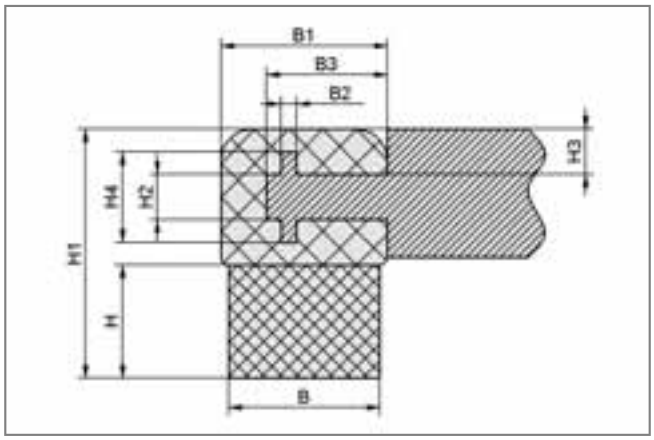
Design Data Sealing Profiles DI-PROF



DI-PROF 5.5x8



DI-PROF 9x9.7



DI-PROF 20x15 and 30x25

Type	Dimensions in mm*									
	B	B1	B2	B3	B4	H	H1	H2	H3	H4
DI-PROF 5.5x8 2K-MOS-20	5.5	8.5	-	-	-	8.0	17.5	-	-	-
DI-PROF 9x9.7 2K-MOS-20	9.0	14.5	3.9	5.9	9.6	9.7	26.5	2	4.7	10
DI-PROF 20x15 2K-SWG-20	20.0	22.0	2.0	16.0	-	15.0	33.0	6	6.0	12
DI-PROF 30x25 2K-SWG-20	30.0	32.0	2.0	24.0	-	25.0	53.0	8	10.0	17

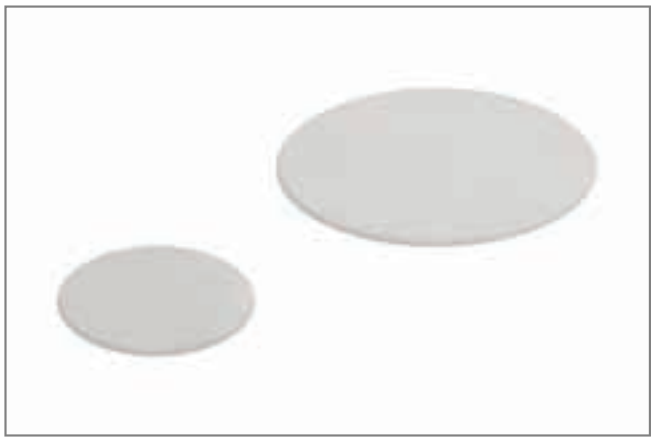
*Acceptable dimensional tolerances for rubber parts concerning to DIN ISO 3302-1 M3

Accessories Vacuum Suction Pads

Filter Discs FD

Diameter (Ø) from 16 mm to 55 mm

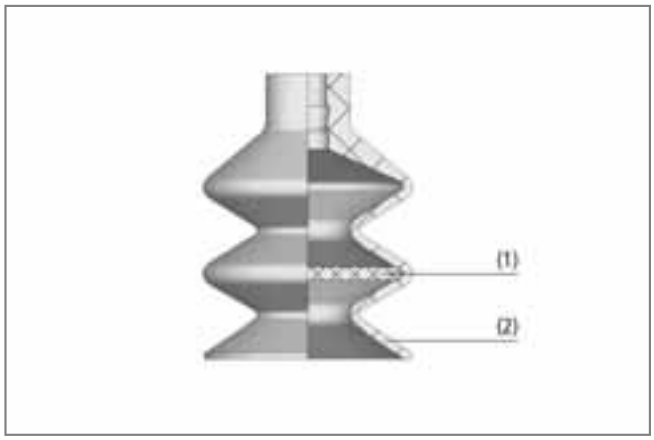
Suitability for Industry-Specific Applications



Filter discs FD

Applications

- Filter disc to protect the vacuum system from dust and dirt, without changing the flow resistance
- Filter disc prevents the workpiece from being pilled into the suction pad



System design filter discs FD

Design

- Filter disc (1) made of porous polyethylene (sinter PE)
- Filtration grade 100 to 120 µm
- Can be placed directly into the suction pad (2)

Bellows suction pads with filter discs FD being used for handling wooden boards

Our Highlights...

- Placed directly in a fold of the suction pad
- Wide variety of diameters
- Stable filter disc

Your Benefits...

> Dirt and dust is filtered out directly at the workpiece

> Wide range of application possibilities for suction pad series FGA and FG

> High intrinsic stability of the suction pad; stops the workpiece from being sucked in

Accessories Vacuum Suction Pads

Filter Discs FD

Diameter (Ø) from 16 mm to 55 mm

Designation Code Filter Discs FD

Abbreviated designation	Diameter in mm	Porosity in µm
Example FD 16 120:		
FD	**16**	**120**
FD	16 to 55	120

Ordering Data Filter Discs FD

Filter discs FD is delivered in the desired diameter.

Filter Discs FD

Type	Part Number
FD 16 120	10.01.06.02565
FD 18 120	10.01.06.02567
FD 22 120	10.01.06.02566
FD 27 120	10.01.06.02571
FD 30 120	10.01.06.02568
FD 34 120	10.01.06.02572
FD 38 120	10.01.06.02569
FD 44 120	10.01.06.02573
FD 55 120	10.01.06.02570

Technical Data Filter Discs FD

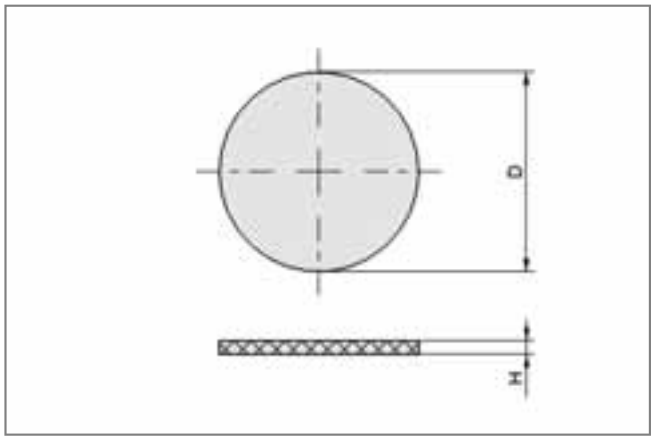
Type	Porosity [µm]	For suction pad type
FD 16 120	120	FG20/FGA20
FD 18 120	120	FG25/FGA25
FD 22 120	120	FGA22
FD 27 120	120	FG32
FD 30 120	120	FGA33
FD 34 120	120	FG42
FD 38 120	120	FGA43
FD 44 120	120	FG52
FD 55 120	120	FGA53

Accessories Vacuum Suction Pads

Filter Discs FD

Diameter (Ø) from 16 mm to 55 mm

Design Data Filter Discs FD



Filter disc FD

Type	Dimensions in mm	
	D	H
FD 16 120	16	1.5
FD 18 120	18	1.5
FD 22 120	22	1.5
FD 27 120	27	1.5
FD 30 120	30	1.5
FD 34 120	34	1.5
FD 38 120	38	1.5
FD 44 120	44	1.5
FD 55 120	55	1.5

Accessories Vacuum Suction Pads

Suction Pad Covers SU

Diameter (Ø) from 120 mm to 280 mm

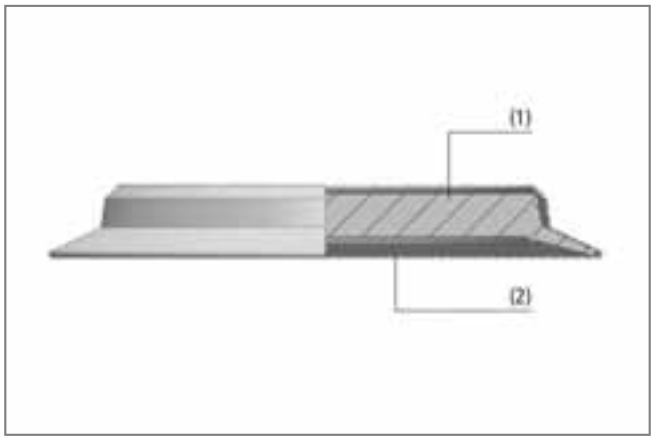
GLASS SOLAR

Suitability for Industry-Specific Applications

Suction pad covers SU

Applications

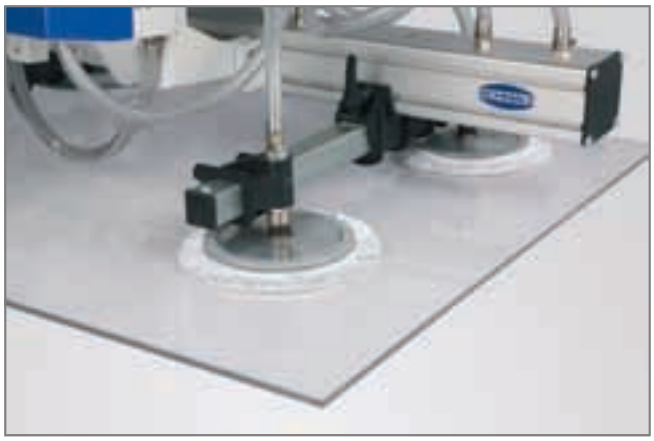
- Suction pad cover for handling sensitive, flat and smooth workpieces (coated, processed or painted) to prevent marks and damage
- For use in manufacturing, processing and transportation, for example in the glass and solar industry
- Used in combination with suction pads and suction plates



System design suction pad covers SU

Design

- Suction pad cover SU is made of a robust fleece material that is highly tear-resistant as well as extremely resistant to chemicals
- The material is abrasion-free and enables gentle handling of workpieces
- The cover (2) can be easily slid over the suction pad or the suction plate (1) and fastened with the integrated rubber band
- With diameters from 120 to 280 mm, the covers are designed to match the corresponding diameter ranges of the suction plates and suction pads



Suction pad covers SU being used for handling sensitive glass sheets

Our Highlights...

- Suction pad cover made of special fleece material (PP/PE)
- Integrated rubber band
- Large range of diameters

Your Benefits...

> No marks on sensitive workpieces (e.g. glass), highly tear-resistant

> Quick and easy installation on suction plates and suction pads

> Installation on flat suction pads, bellow-shaped suction pads and suction plates

Accessories Vacuum Suction Pads

Suction Pad Covers SU

Diameter (Ø) from 120 mm to 280 mm

Designation Code Suction Pad Covers SU

Abbreviated designation	Diameter in mm
Example SU 120:	
SU	120
SU	120 160 210 230 280

Ordering Data Suction Pad Covers SU

Suction pad cover SU is delivered in the desired diameter.

Suction Pad Covers SU

Type	Part Number
SU 120	10.01.01.12437
SU 160	10.01.01.12438
SU 210	10.01.01.12439
SU 230	10.01.01.12440
SU 280	10.01.01.12485

Technical Data Suction Pad Covers SU

Type*	Weight [kg]	Clamping range
SU 120	0.0020	120 - 130 mm
SU 160	0.0040	160 - 180 mm
SU 210	0.0040	210 - 220 mm
SU 230	0.0050	230 - 250 mm
SU 280	0.0090	280 - 320 mm

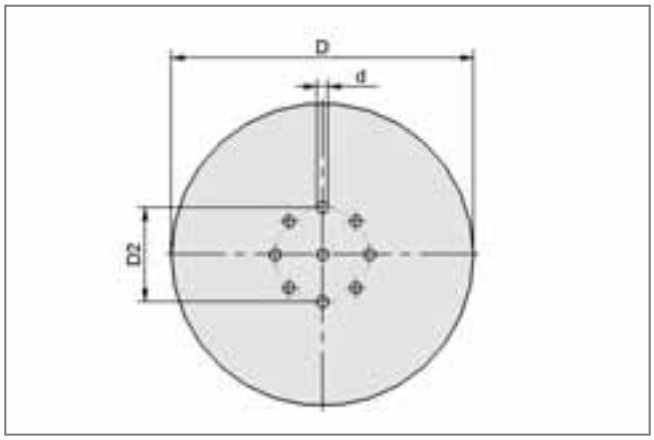
* In vertical applications with a suction plate or pad, the lateral force sinks by up to 70%. The vacuum generator must be able to provide 10% more suction power.

Accessories Vacuum Suction Pads

Suction Pad Covers SU

Diameter (Ø) from 120 mm to 280 mm

Design Data Suction Pad Covers SU



Cover for suction pad SU 120...280

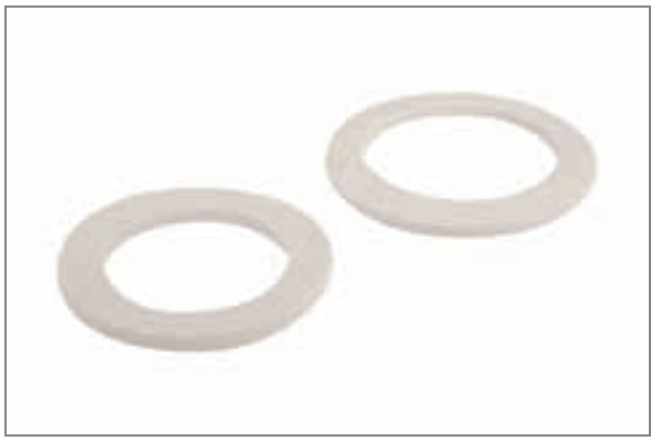
Type	Dimensions in mm		
	d	D	D2
SU 120	6	120	50
SU 160	6	160	50
SU 210	6	210	50
SU 230	6	230	50
SU 280	6	280	50

Accessories Vacuum Suction Pads

Sealing Rings DR-MOS SI

Diameter (Ø) from 20 mm to 88 mm

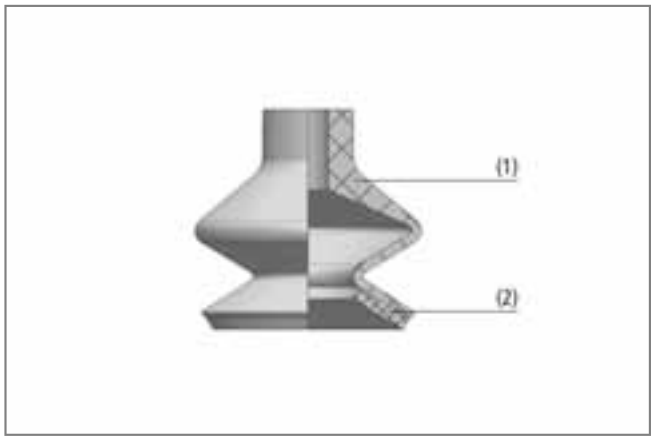
Suitability for Industry-Specific Applications



Sealing rings DR-MOS SI

Applications

- Sealing ring made from special foam for an optimum sealing on structured surfaces
- Used on structured surfaces (studded, rippled or rough) where suction pads hardly seal or cannot seal at all
- Handling of packaging materials and flat or uneven workpieces with structured surfaces such as foil packed products or plastic components
- Can be used as an accessory for suction pad series FG and FGA made from silicone



System design sealing rings DR-MOS SI

Design

- Sealing ring of high-quality silicone foam (2) for gluing onto the silicone suction pad (1)
- Available in a variety of diameters and thicknesses, suitable for standard suction pad series FGA (1.5 folds) and FG (2.5 folds)
- Material connection with silicone adhesive

Standard suction pad with sealing ring DR-MOS SI being used for handling structured plastic parts

Our Highlights...

- Foam rings for gluing onto bellows suction pad
- Available in a variety of diameters and thicknesses
- Silicone adhesive available as accessory

Your Benefits...

> Optimal sealing on structured surfaces

> Wide range of application possibilities for standard suction pad series FGA (1.5 folds) and FG (2.5 folds)

> Secure mounting and connection to the suction pad

Accessories Vacuum Suction Pads

Sealing Rings DR-MOS SI

Diameter (Ø) from 20 mm to 88 mm

Designation Code Sealing Rings DR-MOS SI

Abbreviated designation	Dimensions in mm	Height in mm	Material and Shore hardness
Example DR-MOS 20-10x2 SI:			
DR-MOS	**20-10**	**x2**	**SI**
DR-MOS	20-10 to 88-64 outside - inside	x2 x5	SI silicone

Ordering Data Sealing Rings DR-MOS SI

Sealing profile DR-MOS SI is delivered with the desired characteristics.

Available accessories: silicone adhesive

Sealing Rings DR-MOS SI

Type	Part Number
DR-MOS 20-10x2 SI	10.01.06.02618
DR-MOS 22.5-13x2 SI	10.01.06.02614
DR-MOS 32-19x2 SI	10.01.06.02615
DR-MOS 42-20x5 SI	10.01.06.02616
DR-MOS 52-33x5 SI	10.01.06.02548
DR-MOS 62-42x5 SI	10.01.06.02617
DR-MOS 78-54x5 SI	10.01.06.02619
DR-MOS 88-64x5 SI	10.01.06.02620

Ordering Data Accessories Sealing Rings DR-MOS SI

Type	Part Number
Silicone adhesive (90 ml tube)	27.03.04.00003

Technical Data Sealing Rings DR-MOS SI

Type	For suction pad type*	Sealing material	Temperature resistance [°C]	Colour
DR-MOS 20-10x2 SI	FGA-20	Foam Silicon	180	beige
DR-MOS 22.5-13x2 SI	FGA-22, FGA-25, FG-25	Foam Silicon	180	beige
DR-MOS 32-19x2 SI	FGA-33, FG-32	Foam Silicon	180	beige
DR-MOS 42-20x5 SI	FGA-43, FG-42	Foam Silicon	180	beige
DR-MOS 52-33x5 SI	FGA-53, FG-52	Foam Silicon	180	beige
DR-MOS 62-42x5 SI	FGA-63, FG-62	Foam Silicon	180	beige
DR-MOS 78-54x5 SI	FGA-78	Foam Silicon	180	beige
DR-MOS 88-64x5 SI	FG-88	Foam Silicon	180	beige

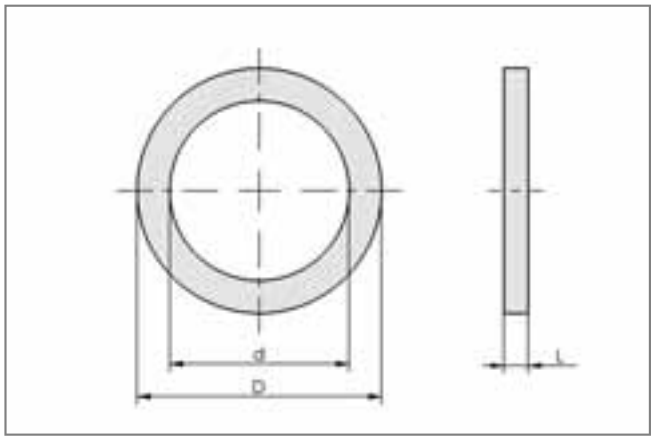
*Suitable for the silicone suction pad types listed

Accessories Vacuum Suction Pads

Sealing Rings DR-MOS SI

Diameter (Ø) from 20 mm to 88 mm

Design Data Sealing Rings DR-MOS SI



DR-MOS SI

Type	Dimensions in mm		
	d	D	L
DR-MOS 20-10x2 SI	10	20.0	2
DR-MOS 22.5-13x2 SI	13	22.5	2
DR-MOS 32-19x2 SI	19	32.0	2
DR-MOS 42-20x5 SI	20	42.0	5
DR-MOS 52-33x5 SI	33	52.0	5
DR-MOS 62-42x5 SI	42	62.0	5
DR-MOS 78-54x5 SI	54	78.0	5
DR-MOS 88-64x5 SI	64	88.0	5

Special Grippers

Overview of Section 4

Special Grippers

Everything at a Glance

Selection Aid

Page

Selection by Workpiece 271

Floating Suction Pads

Floating Suction Pads SBS 272

PACKAGING WOOD SOLAR

- Diameter: 20 to 100 mm
- Holding force: 2.0 to 55.5 N
- Rubber buffer on the bottom side of the suction pad

Floating suction pad for low-contact handling of fragile workpieces such as paper, film, printed circuit boards or wafers and solar cells.

Magnetic Grippers

Magnetic Grippers SGM 276

METAL

- Diameter: 30 to 70 mm
- Holding force: 35 to 290 N

Special gripper with permanent magnet for safe handling of magnetic workpieces such as perforated metal sheets.

Needle Grippers

Needle Grippers SNG-M 280

UNIVERSAL COMPOSITE

- Needle diameter: 0.8 mm
- Number of needles: 4
- Needle stroke: 3.0 mm

Needle gripper with a compact design for materials which are difficult to handle with vacuum.

Needle Grippers SNG-YV 283

UNIVERSAL COMPOSITE

- Needle diameter: 0.8 / 1.2 / 2.0 mm
- Number of needles: 12
- Needle stroke: 0 to 3.5 mm (variable)

Needle gripper with various needle diameters and variable needle stroke for materials which are difficult to handle with vacuum.

Needle Grippers SNG-D / DV 286

UNIVERSAL COMPOSITE

- Needle diameter: 0.8 / 1.2 / 2.0 mm
- Number of needles: 24
- Needle stroke (D): 7.0 mm
- Needle stroke (DV): 0 to 7.0 mm (variable)

Needle gripper with various needle diameters and fixed or variable needle stroke for materials which are difficult to handle with vacuum.

Overview of Section 4

Special Grippers

Everything at a Glance

Needle Grippers SNG-DL

289

- Needle diameter: 1.2 / 2.0 mm
- Number of needles: 24
- Needle stroke: 17,5 mm

Especially large needle gripper with various needle diameters for especially high needle stroke for materials which are difficult to handle with vacuum.

Needle Grippers SNG-R / RV

292

- Needle diameter: 1.2 mm
- Number of needles: 16
- Needle stroke (R): 4.5 mm
- Needle stroke (RV): 0 to 4.5 mm (variable)

Round needle gripper with fixed or variable needle stroke for materials which are difficult to handle with vacuum.

Wafer Grippers

Wafer Grippers SWGm

295

- Dimensions: 125 x 125 mm and 156 x 156 mm
- Selectable base model with axial or sideways exhaust air
- Material suction plate: PEEK

Wafer gripper for extremely quick and gentle handling of wafers and solar cells with maximum process reliability.

Composite Grippers

Composite Grippers SCG

302

- Suction rate: 270 to 650 l/min
- Diameter suction plate: 40 and 60 mm
- Material suction plate: POM

Special gripper with integrated vacuum generation and high flow rate for handling fragile workpieces with unstable shapes.

Special Grippers

Selection Aid

Selection by Workpiece

For workpieces that are difficult or impossible to handle with suction pads, the chapter on "Special Grippers" offers alternatives. There follow some examples of applications to assist selection of the appropriate special grippers:

Workpiece	Schmalz Special Gripper Type	Product Properties
Solar components such as wafers and solar cells	Floating suction pads SBS	• Low-contact handling • Integrated vacuum generation
	Wafer grippers SWGm	• Extremely fast and precise handling • Integrated vacuum generation with high suction rate • Product dimensions especially for wafer sizes 125x125 mm and 156x156 mm
Thin workpieces such as paper and foils	Floating suction pads SBS	• Low-contact handling • Integrated vacuum generation • Absorption of lateral forces by elastomer buffer on the underside • Separation function during destacking
Complex steel parts such as perforated sheets and laser cut metal	Magnetic grippers SGM	• Handling by means of a permanent magnet • Absorption of lateral forces by friction ring
Delicate components such as printed circuit boards	Floating suction pads SBS	• Low-contact handling • Integrated vacuum generation • High leakage compensation
Battery components such as anodes, cathodes and separators	Composite grippers SCG	• Integrated vacuum generation • Higher volume flow for a secure grip on even porous workpieces • Large contact surface for delicate handling
Unstable and porous workpieces such as foam and insulation materials	Needle grippers SNG	• Needle grippers with variable needle stroke that can be adjusted for individual workpiece geometries
Fabrics that are unstable or have a "suck through" effect such as composites	Composite grippers SCG	• Integrated vacuum generation • High volume flow for a secure grip on even porous workpieces • Large contact surface for delicate handling
	Needle grippers SNG	• Needle grippers with variable needle stroke that can be adjusted for individual workpiece geometries

Floating Suction Pads

Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

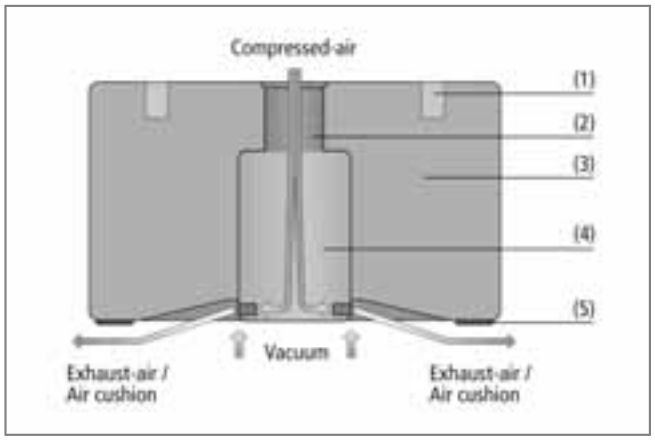
PACKAGING WOOD SOLAR

Suitability for Industry-Specific Applications

Floating suction pads SBS

Applications

- Floating suction pad for handling and separation of extremely thin workpieces without permanent deformation (e.g. film, paper, wood veneer)
- Handling of very porous workpieces (e.g. printed circuit board)
- Handling of highly sensitive workpieces (e.g. wafer, solar cells)



System design floating suction pads SBS

Design

- Connection directly via four mounting threads on the top side (1)
- Vertical compressed-air connections (2)
- Horizontal compressed air connection (closed with a plug)
- Anodized aluminum body with integrated Bernoulli nozzle (3)
- Streaming element (4) in two versions: Standard Flow SF for air-tight workpieces and High Flow HF with higher leakage compensation for porous workpieces
- Mark-free rubber buffer of special material HT1 on the bottom side of the suction pad (5)
- Optional available with central support

Floating suction pads SBS being used for handling thin wood veneer

Our Highlights...	Your Benefits...
• Integrated vacuum generation on the Bernoulli principle	> Operating without ejector
• Suction pad "floats" on an air cushion	> Low-contact handling
• High volume flow rate at a low vacuum	> Very good compensation of leakages
• No air is drawn in through the workpiece	> Reliable separation of thin, porous workpieces
• Elastomer buffer made of HT1 on the bottom side	> Absorption of lateral forces
• Optional with central support	> Sensitive handling of wafer and solar cells

Floating Suction Pads

Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

Designation Code Floating Suction Pads SBS

Abbreviated designation	Diameter in mm	Streaming element	Connection thread mechanical	Product addition
Example SBS 20 SF M5-IG:				
SBS	**20**	**SF**	**M5-IG**	
SBS	20 30 40 60 100	HF high flow SF standard flow	M5-IG (IG = female (F)) G1/8-IG	CS central support

Ordering Data Floating Suction Pads SBS

Floating suction pad SBS is delivered assembled. The assembly consists of:
- Floating suction pad of type SBS – available in various diameters
- Elastomer buffer made of the material HT1
- Optional product addition: central support

Available spare parts: rubber buffer

Floating Suction Pads SBS

Type	Part Number
SBS 20 SF M5-IG	10.01.01.12633
SBS 20 HF M5-IG	10.01.01.12650
SBS 30 SF M5-IG	10.01.01.12636
SBS 30 HF M5-IG	10.01.01.12651
SBS 40 SF G1/8-IG	10.01.01.12638
SBS 40 HF G1/8-IG	10.01.01.12653
SBS 40 SF G1/8-IG CS	10.01.01.12776
SBS 60 SF G1/8-IG	10.01.01.12641
SBS 60 HF G1/8-IG	10.01.01.12655
SBS 60 SF G1/8-IG CS	10.01.01.12777
SBS 100 SF G1/8-IG	10.01.01.12688
SBS 100 HF G1/8-IG	10.01.01.12689

Ordering Data Spare Parts Floating Suction Pads SBS

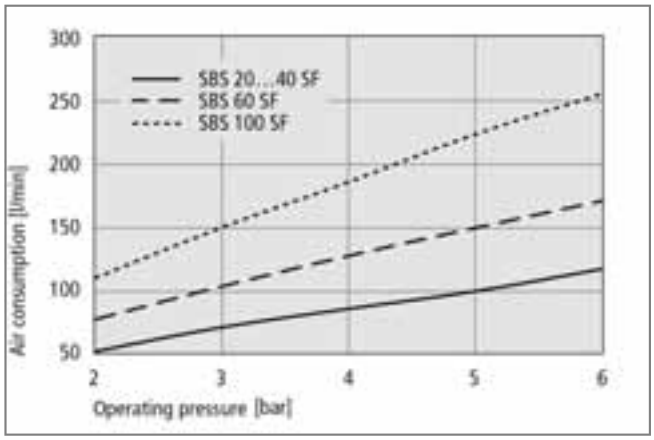
Type	Rubber buffer	Central support
SBS 20 SF M5-IG	10.01.01.12585	-
SBS 20 HF M5-IG	10.01.01.12585	-
SBS 30 SF M5-IG	10.01.01.12585	-
SBS 30 HF M5-IG	10.01.01.12585	-
SBS 40 SF G1/8-IG	10.01.01.11766	-
SBS 40 HF G1/8-IG	10.01.01.11766	-
SBS 40 SF G1/8-IG CS	10.01.01.11766	10.01.01.12780
SBS 60 SF G1/8-IG	10.01.01.11766	-
SBS 60 HF G1/8-IG	10.01.01.11766	-
SBS 40 SF G1/8-IG CS	10.01.01.11766	10.01.01.12780
SBS 100 SF G1/8-IG	10.01.01.11766	-
SBS 100 HF G1/8-IG	10.01.01.11766	-

Floating Suction Pads

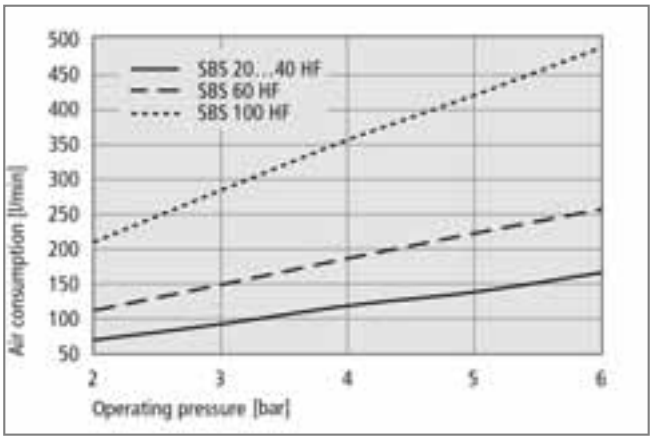
Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

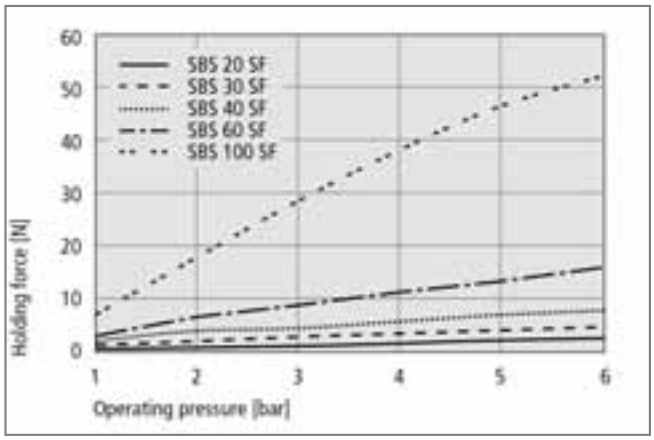
Performance Data Floating Suction Pads SBS



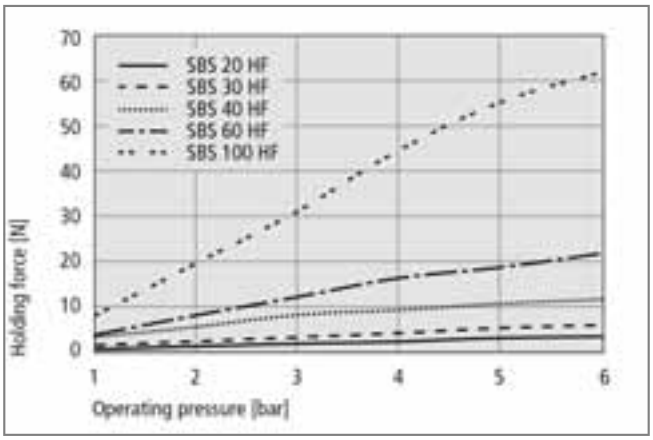
Air consumption SBS 20-100 SF



Air consumption SBS 20-100 HF



Holding force SBS 20-100 SF



Holding force SBS 20-100 HF

Technical Data Floating Suction Pads SBS

Type	Holding force [N]*	Air consumption [l/min]*	Operating pressure [bar]	Weight [g]
SBS 20 SF M5-IG	2.0	100	1...6	12
SBS 20 HF M5-IG	3.0	140	1...6	12
SBS 30 SF M5-IG	4.0	100	1...6	31
SBS 30 HF M5-IG	5.0	140	1...6	31
SBS 40 SF G1/8-IG	6.5	100	1...6	51
SBS 40 HF G1/8-IG	10.5	190	1...6	51
SBS 40 SF G1/8-IG CS	6.5	100	1...6	53
SBS 60 SF G1/8-IG	13.0	150	1...6	118
SBS 60 HF G1/8-IG	18.5	225	1...6	118
SBS 60 SF G1/8-IG CS	13.0	150	1...6	120
SBS 100 SF G1/8-IG	46.0	225	1...6	295
SBS 100 HF G1/8-IG	55.5	420	1...6	295

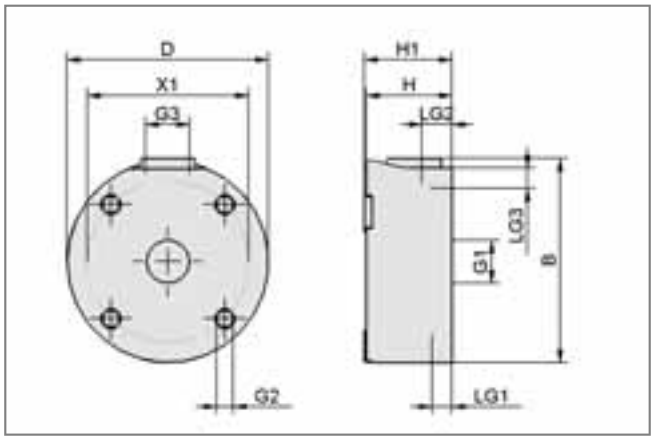
*The specified values are valid for an operating pressure of 5 bar

Floating Suction Pads

Floating Suction Pads SBS

Diameter (Ø) from 20 mm to 100 mm

Design Data Floating Suction Pads SBS



SBS 20 to 100

Type	Dimensions in mm										
	B	D	G1	G2	G3	H	H1	LG1	LG2	LG3	X1
SBS 20 SF M5-IG	21.7	20	M5-F	M3-F	M5-F	17	17.4	5	6	6	15
SBS 20 HF M5-IG	21.7	20	M5-F	M3-F	M5-F	17	17.4	5	6	6	15
SBS 30 SF M5-IG	31.5	30	M5-F	M4-F	M5-F	17	17.4	5	6	6	22
SBS 30 HF M5-IG	31.5	30	M5-F	M4-F	M5-F	17	17.4	5	6	6	22
SBS 40 SF G1/8-IG	40.5	40	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	32
SBS 40 HF G1/8-IG	40.5	40	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	32
SBS 40 SF G1/8-IG CS	40.5	40	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	32
SBS 60 SF G1/8-IG	61.1	60	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	45
SBS 60 HF G1/8-IG	61.1	60	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	45
SBS 60 SF G1/8-IG CS	61.1	60	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	45
SBS 100 SF G1/8-IG	100.5	100	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	75
SBS 100 HF G1/8-IG	100.5	100	G1/8"-F	M4-F	G1/8"-F	17	17.4	5	6	6	75

Magnetic Grippers

Magnetic Grippers SGM

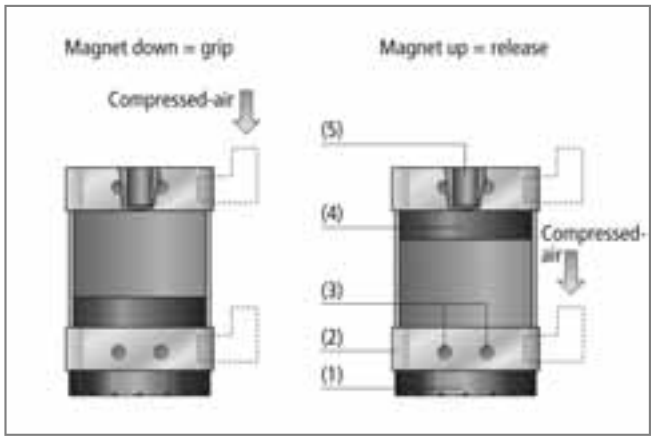
Suction area (Ø) from 30 mm to 70 mm

Suitability for Industry-Specific Applications

Magnetic grippers SGM

Applications

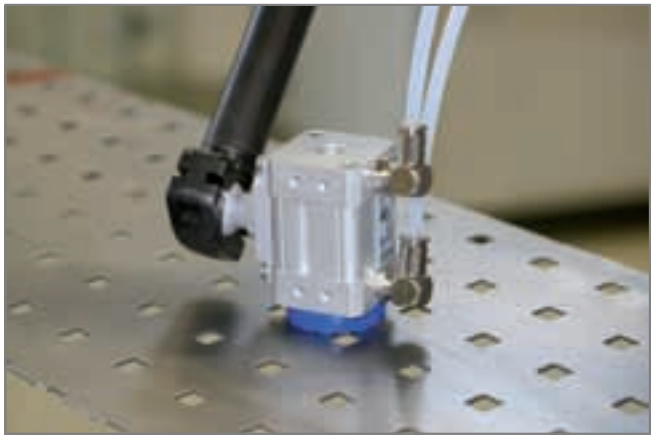
- Magnetic gripper for handling of perforated metal sheets, complex laser-cut workpieces and metal sheets with holes and apertures
- Handling of ferromagnetic workpieces



System design magnetic grippers SGM

Design

- Robust aluminum housing (2) with permanent magnet (4)
- Clip-on, easy to replace friction ring (1)
- Bistable design: the magnet settings "grip" and "release" are maintained in event of power loss
- Standard connection threads (5) in top cover
- Mounting threads (3) for holder systems HTS on 3 sides
- The holder system HTS offers several options for mounting a gripper onto the gripping apparatus; HTS...D version for interlocking and mounting two grippers
- SGM-S with piston control for sensor recognition of piston position of the magnetic gripper



Magnetic grippers SGM being used for handling perforated metal sheets

Our Highlights...	Your Benefits...
• Safe gripping by a permanent magnet	> No electric power required
• Compact and lightweight design	> Minimal space requirements, low total weight
• Easily replaceable friction ring	> High shear forces can be achieved
• Optional side connection for tooling	> Flexible mounting options
• Option to interlock two magnetic grippers (HTS...D)	> Optimal for oblong workpieces
• Piston control (optional, PNP version with IO-Link)	> Recognition of piston position via Hall effect sensor

Magnetic Grippers

Magnetic Grippers SGM

Suction area (Ø) from 30 mm to 70 mm

Designation Code Magnetic Grippers SGM

Abbreviated designation	Product addition	Diameter in mm	Connection mecanical	Switching function sensor
Example SGM-S 30 G1/8-IG PNP:				
SGM-S	**S**	**30**	**G1/8-IG**	**PNP**
SGM	S with piston control	30 40 50 70	G1/8-IG (IG = female (F)) G1/4-IG	NPN switches to minus PNP switches to plus

Ordering Data Magnetic Grippers SGM

Magnet gripper SGM is delivered assembled. The assembly consists of:
- Gripper of type SGM – available in various diameters
- Friction ring made of the material PU
- Optional product addition: piston control (type SGM-S)

Available spare parts: friction ring
Available accessories: holder system

Magnetic Grippers SGM

Type*	Part Number
SGM 30 G1/8-IG	10.01.17.00162
SGM 40 G1/4-IG	10.01.17.00163
SGM 50 G1/4-IG	10.01.17.00164
SGM 70 G1/4-IG	10.01.17.00165
SGM-S 30 G1/8-IG PNP	10.01.17.00200
SGM-S 40 G1/4-IG PNP	10.01.17.00201
SGM-S 50 G1/4-IG PNP	10.01.17.00202
SGM-S 70 G1/4-IG PNP	10.01.17.00203
SGM-S 30 G1/8-IG NPN	10.01.17.00216
SGM-S 40 G1/4-IG NPN	10.01.17.00217
SGM-S 50 G1/4-IG NPN	10.01.17.00218
SGM-S 70 G1/4-IG NPN	10.01.17.00219

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts Magnetic Grippers SGM

Type	Friction ring
SGM 30 / SGM-S 30	10.01.17.00136
SGM 40 / SGM-S 40	10.01.17.00137
SGM 50 / SGM-S 50	10.01.17.00138
SGM 70 / SGM-S 70	10.01.17.00139

Ordering Data Accessories Holder System (single) Magnetic Grippers SGM

Type	Holder System HTS-A2*	Holder System HTS-A3*
SGM 30 / SGM-S 30	10.01.17.00169	10.01.17.00170
SGM 40 / SGM-S 40	10.01.17.00169	10.01.17.00170
SGM 50 / SGM-S 50	10.01.17.00172	10.01.17.00173
SGM 70 / SGM-S 70	10.01.17.00172	10.01.17.00173

*Mounting screws included

Magnetic Grippers

Magnetic Grippers SGM

Suction area (Ø) from 30 mm to 70 mm

Ordering Data Accessories Holder System (double) Magnetic Grippers SGM

Type	Holder System HTS-A2 D*	Holder System HTS-A3 D*
SGM 30 / SGM-S 30	10.01.17.00175	10.01.17.00176
SGM 40 / SGM-S 40	10.01.17.00175	10.01.17.00176
SGM 50 / SGM-S 50	10.01.17.00178	10.01.17.00179
SGM 70 / SGM-S 70	10.01.17.00178	10.01.17.00179

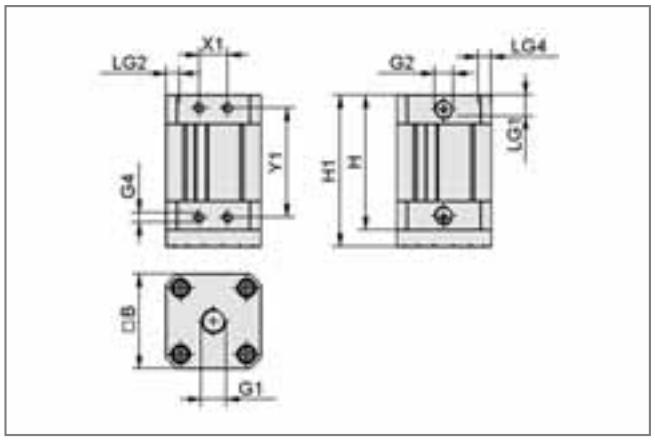
*Mounting screws included

Technical Data Magnetic Grippers SGM

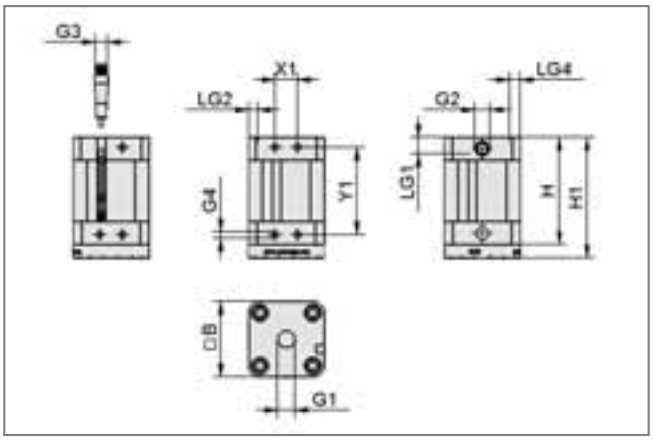
Type	Holding force [N]*	Remaining force [N]	Operating pressure [bar]	Control pressure range [bar]	Installation position	Principle of operation	Operating temperature [°C]	Weight [g]
SGM 30 / SGM-S 30	35	0.3	3.5...6	-0.6	Any	Bistable	5...70	130
SGM 40 / SGM-S 40	100	0.3	3.5...6	-0.6	Any	Bistable	5...70	240
SGM 50 / SGM-S 50	180	0.3	3.5...6	-0.6	Any	Bistable	5...70	440
SGM 70 / SGM-S 70	290	0.3	3.5...6	-0.6	Any	Bistable	5...70	715

*Note: The value given is a statistical value with no safety factor; based on a plate with a thickness of 2 mm. For system configurations with magnetic grippers SGM, a safety factor of S = 3 must be applied.

Design Data Magnetic Grippers SGM



SGM 30 to 70



SGM-S 30 to 70

Type	Dimensions in mm											
	B*	G1	G2	G3	G4	H	H1	LG1	LG2	LG4	X1	Y1
SGM 30 G1/8-IG	30.0	G1/8"-F	G1/8"-F	-	M4-F	61.4	70.2	7	6	5	12	46
SGM 40 G1/4-IG	40.6	G1/4"-F	G1/8"-F	-	M4-F	61.4	70.2	11	6	7	12	46
SGM 50 G1/4-IG	50.6	G1/4"-F	G1/8"-F	-	M5-F	71.4	80.2	11	6	7	15	58
SGM 70 G1/4-IG	68.7	G1/4"-F	G1/8"-F	-	M5-F	71.4	80.2	11	6	8	15	58
SGM-S 30 G1/8-IG PNP	30.0	G1/8"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	7	6	5	12	46
SGM-S 40 G1/4-IG PNP	40.6	G1/4"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	11	6	7	12	46
SGM-S 50 G1/4-IG PNP	50.6	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	7	15	58
SGM-S 70 G1/4-IG PNP	68.7	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	8	15	58
SGM-S 30 G1/8-IG NPN	30.0	G1/8"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	7	6	5	12	46
SGM-S 40 G1/4-IG NPN	40.6	G1/4"-F	G1/8"-F	M12x1-M	M4-F	61.4	70.2	11	6	7	12	46
SGM-S 50 G1/4-IG NPN	50.6	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	7	15	58
SGM-S 70 G1/4-IG NPN	68.7	G1/4"-F	G1/8"-F	M12x1-M	M5-F	71.4	80.2	11	6	8	15	58

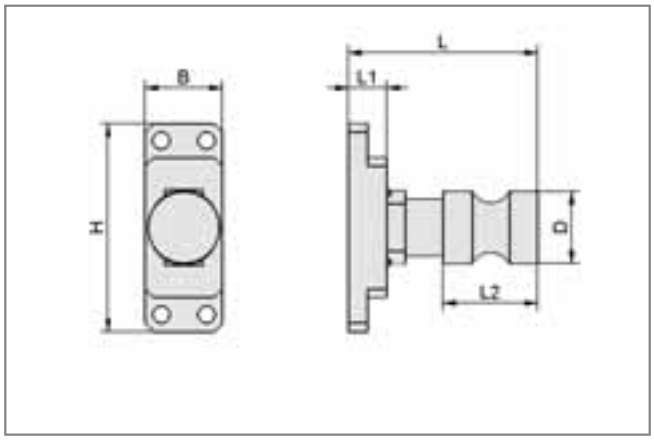
*Contact surface of the grippers (round) corresponds to dimension B

Magnetic Grippers

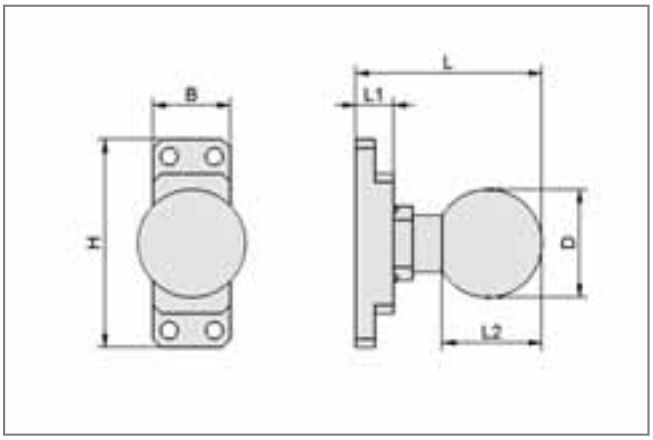
Magnetic Grippers SGM

Suction area (Ø) from 30 mm to 70 mm

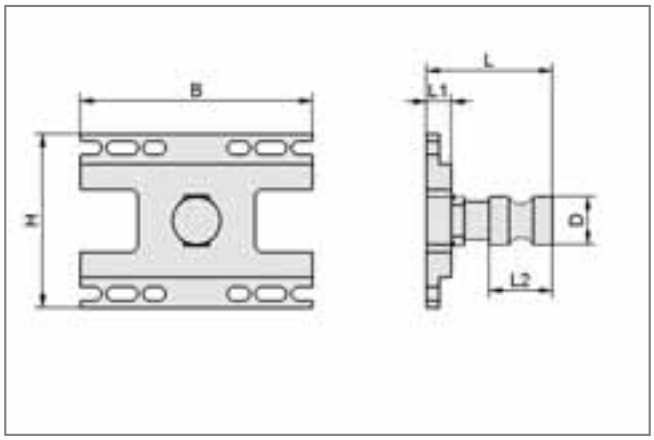
Design Data Accessories Magnetic Grippers SGM



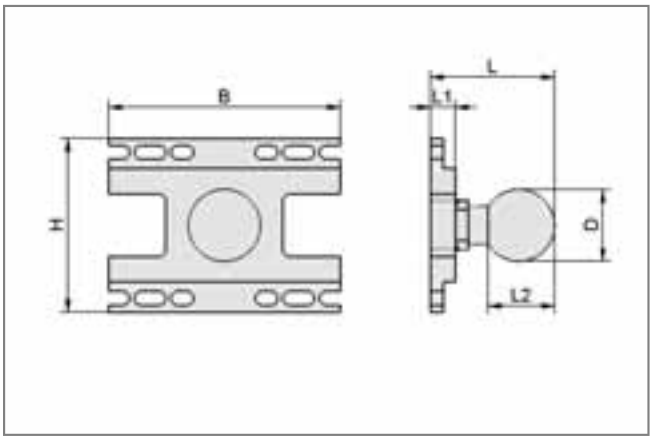
HTS-A2



HTS-A3



HTS-A2 D



HTS-A3 D

Design Data Accessories Holder System Magnetic Grippers SGM

Type	Dimensions in mm					
	B	D	H	L	L1	L2
HTS-A2 SGM 30/40*	20.5	19.0	55	50.2	9.9	25.0
HTS-A3 SGM 30/40*	20.5	28.5	55	49.4	9.9	26.4
HTS-A2 SGM 50/70**	26.0	19.0	69	49.9	9.9	25.0
HTS-A3 SGM 50/70**	26.0	28.5	69	49.2	9.9	26.4
HTS-A2 D SGM 30/40***	59.0	19.0	59	50.0	9.9	25.0
HTS-A3 D SGM 30/40***	59.0	28.5	59	49.3	9.9	26.4
HTS-A2 D SGM 50/70****	92.0	19.0	69	50.0	9.9	25.0
HTS-A3 D SGM 50/70****	92.0	28.5	69	49.3	9.9	26.4

*suitable for 1 SGM 30 or 1 SGM 40
**suitable for 1 SGM 50 or 1 SGM 70
***suitable for 2 SGM 30 or 2 SGM 40
****suitable for 2 SGM 50 or 2 SGM 70

Needle Grippers

Needle Grippers SNG-M

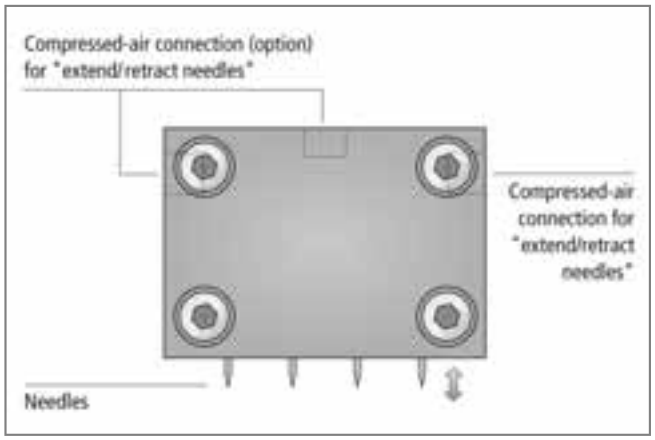
Number of needles 4

Suitability for Industry-Specific Applications

Needle grippers SNG-M

Applications

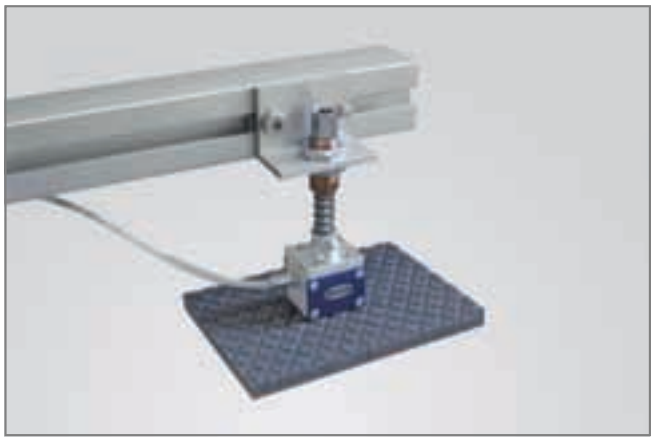
- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite textiles, fleece, filters, woven fibreglass or carbon-fibre, woven aramide, foam materials, etc.



System design needle grippers SNG-M

Design

- Robust aluminum housing
- 4 needles
- Activated by compressed air, needles retracted by springs
- Insertion angle 30°



Needle grippers SNG-M being used for handling structured foam materials

Our Highlights...

- Very small size
- Needles retracted by springs
- Synchronised extension of the needles
- Optionally available with adapter flange plate

Your Benefits...

> Optimal for installation in restricted spaces

> Only one control signal

> Safe handling of the workpieces

> Perfect adaptation to other mounting components

Needle Grippers

Needle Grippers SNG-M

Number of needles 4

Designation Code Needle Grippers SNG-M

Abbreviated designation	Number of needles	Needle diameter in mm
Example SNG-M 4 0.8:		
SNG-M	**4**	**0.8**
SNG-M	4	0.8

Ordering Data Needle Grippers SNG-M

Needle gripper SNG-M is delivered assembled. The assembly consists of:
- Gripper of type SNG-M

Available spare parts: needle piston
Available accessories: mounting plate

Needle Grippers SNG-M

Type*	Part Number
SNG-M 4 0.8	10.01.29.00001

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts And Accessories Needle Grippers SNG-M

Type	Needle piston*
SNG-M 4 0.8	10.01.29.00094

*Set of 4 needles with guide pistons and springs

Type	Mounting plate*
SNG-M 4 0.8	10.01.29.00093

*complete with mounting screws

Technical Data Needle Grippers SNG-M

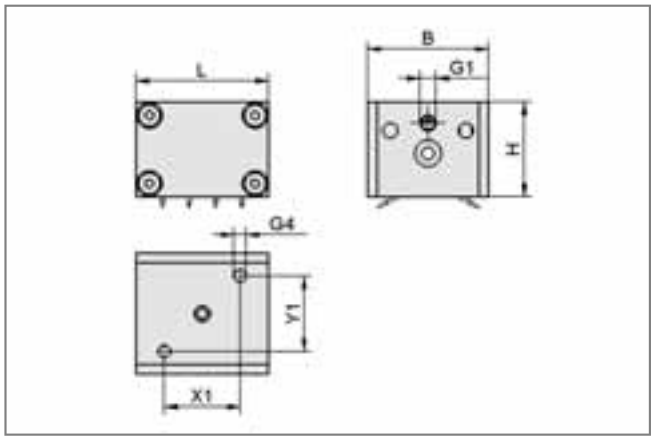
Type	Number of needles	Needle diameter [mm]	Stroke [mm]	Operating pressure [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-M 4 0.8	4	0.8	3 mm	4...6	5...60	Any	80

Needle Grippers

Needle Grippers SNG-M

Number of needles 4

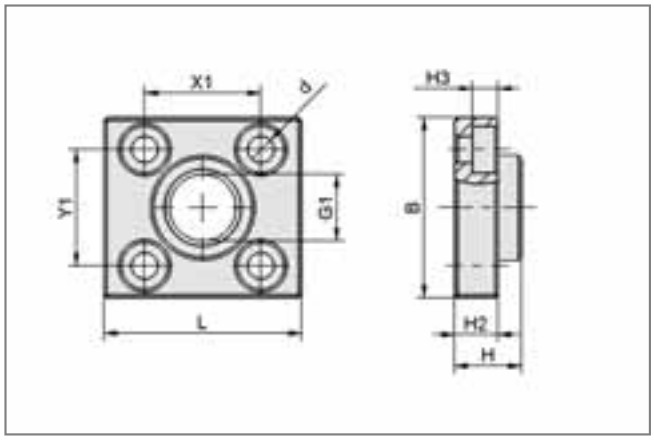
Design Data Needle Grippers SNG-M



SNG-M 4 0.8

Type	Dimensions in mm						
	B	G1	G4	H	L	X1	Y1
SNG-M 4 0.8	32	M5-F	M4-F	25	35	20	20

Design Data Accessories Needle Grippers SNG-M



BEF-PL SNG

Type	Dimensions in mm								
	B	d	G1	H	H2	H3	L	X1	Y1
Mounting plate BEF-PL SNG	31	4.5	G1/4"-F	11.5	7.5	4.4	34	20	20

Needle Grippers

Needle Grippers SNG-YV

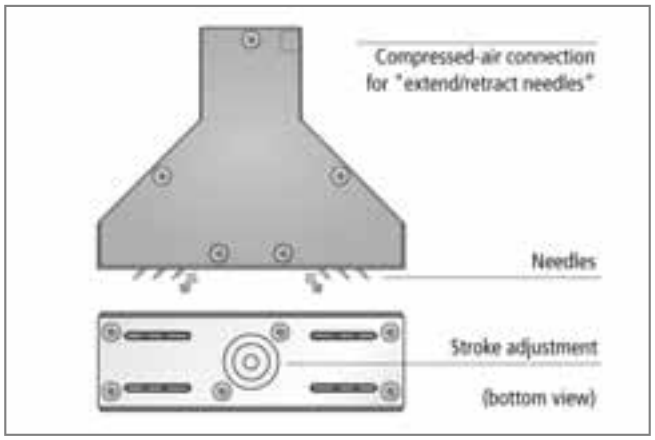
Number of needles 12

Suitability for Industry-Specific Applications

Needle grippers SNG-YV

Applications

- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite textiles, fleece, felt, carpets, metal foam, insulating mats, foam materials, etc.



System design needle grippers SNG-YV

Design

- Robust aluminum housing
- 12 needles
- Needles extended by compressed air and retracted by springs
- Insertion angle 45°

Needle grippers SNG-YV being used for handling metal foams

Our Highlights...

- Variable needle stroke
- Different needle diameters
- Single-acting pneumatic cylinder
- Synchronised extension of the needles
- Optionally available with adapter flange plate

Your Benefits...

> Individual adaptation to workpieces of different sizes and shapes

> Specific design for individual applications

> Simple control

> Safe handling of the workpieces

> Perfect adaptation to other mounting components

Needle Grippers

Needle Grippers SNG-YV

Number of needles 12

Designation Code Needle Grippers SNG-YV

Abbreviated designation	Number of needles	Needle diameter in mm	Product addition
Example SNG-Y 12 1.2 V:			
SNG-Y	**12**	**1.2**	**V**
SNG-Y	12	0.8 1.2 2.0	V variable needle stroke

Ordering Data Needle Grippers SNG-YV

Needle gripper SNG-YV is delivered assembled. The assembly consists of:
- Gripper of type SNG-YV – available with various needle diameters and variable needle stroke

Available spare parts: needle wedge
Available accessories: mounting plate

Needle Grippers SNG-YV

Type*	Part Number
SNG-Y 12 0.8 V	10.01.29.00002
SNG-Y 12 1.2 V	10.01.29.00003
SNG-Y 12 2.0 V	10.01.29.00004

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts And Accessories Needle Grippers SNG-YV

Type	Needle wedge*
SNG-Y 12 0.8 V	10.01.29.00096
SNG-Y 12 1.2 V	10.01.29.00097
SNG-Y 12 2.0 V	10.01.29.00098

*Set of two needle wedges with needles and springs

Type	Mounting plate*
SNG-Y 12 0.8 V	10.01.29.00093
SNG-Y 12 1.2 V	10.01.29.00093
SNG-Y 12 2.0 V	10.01.29.00093

*complete with mounting screws

Technical Data Needle Grippers SNG-YV

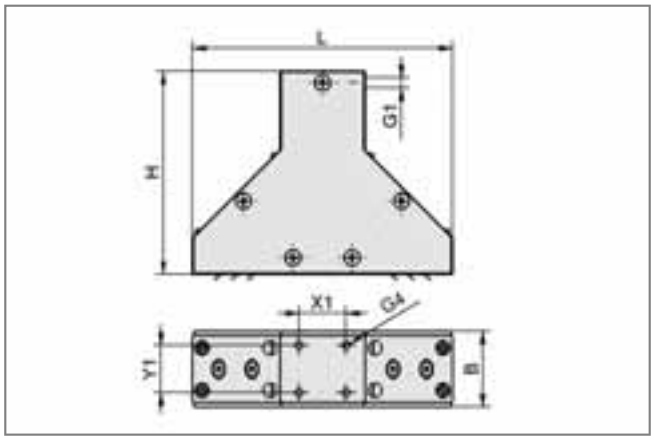
Type	Number of needles	Needle diameter [mm]	Additional function	Stroke [mm]	Operating pressure [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-Y 12 0.8 V	12	0.8	Variable stroke	0..3.5 mm	3...6	5...60	Any	400
SNG-Y 12 1.2 V	12	1.2	Variable stroke	0..3.5 mm	3...6	5...60	Any	400
SNG-Y 12 2.0 V	12	2.0	Variable stroke	0..3.5 mm	3...6	5...60	Any	400

Needle Grippers

Needle Grippers SNG-YV

Number of needles 12

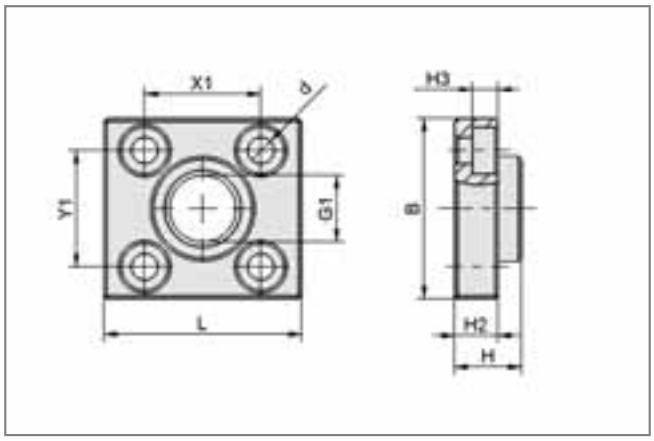
Design Data Needle Grippers SNG-YV



SNG-Y 12 0.8-2.0 V

Type	Dimensions in mm						
	B	G1	G4	H	L	X1	Y1
SNG-Y 12 0.8 V	32	M5-F	M4-F	86	110	20	20
SNG-Y 12 1.2 V	32	M5-F	M4-F	86	110	20	20
SNG-Y 12 2.0 V	32	M5-F	M4-F	86	110	20	20

Design Data Accessories Needle Grippers SNG-YV



BEF-PL SNG

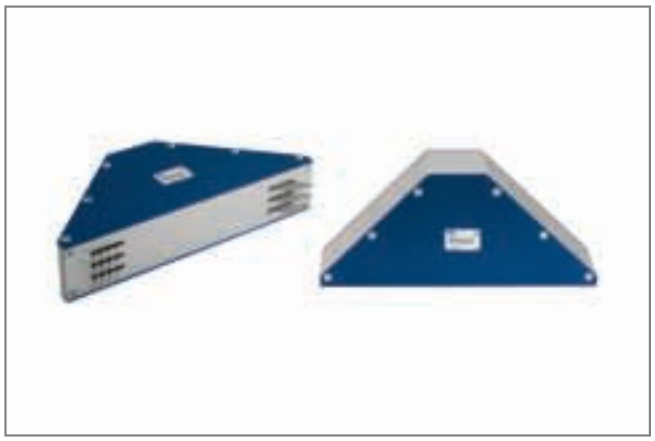
Type	Dimensions in mm								
	B	d	G1	H	H2	H3	L	X1	Y1
Mounting plate BEF-PL SNG	31	4.5	G1/4"-F	11.5	7.5	4.4	34	20	20

Needle Grippers

Needle Grippers SNG-D / DV

Number of needles 24

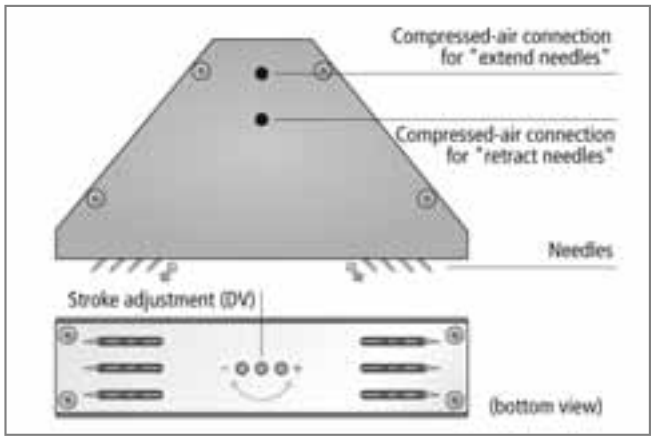
Suitability for Industry-Specific Applications



Needle grippers SNG-D / DV

Applications

- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite textiles, fleece, felt, carpets, metal foam, insulating mats, foam materials, etc.



System design needle grippers SNG-D / DV

Design

- Robust aluminum housing
- 24 needles
- Extension and retraction of the needles controlled by compressed air (2 circuits)
- Insertion angle 45°

Needle grippers SNG-D being used for handling insulating mats

Our Highlights...

- Variable needle stroke (DV version)
- Different needle diameters
- Double-acting pneumatic cylinder
- Synchronised extension of the needles
- Optionally available with adapter flange plate

Your Benefits...

> Individual adjustment for different workpiece sizes and shapes

> Specific designs for individual applications

> Very short cycle times

> Safe handling of the workpieces

> Perfect adaptation to other mounting components

Needle Grippers

Needle Grippers SNG-D / DV

Number of needles 24

Designation Code Needle Grippers SNG-D / DV

Abbreviated designation	Number of needles	Needle diameter in mm	Product addition
Example SNG-D 24 2.0 V:			
SNG-D	**24**	**2.0**	**V**
SNG-D	24	0.8 1.2 2.0	V variable needle stroke

Ordering Data Needle Grippers SNG-D / DV

Needle gripper SNG-D / DV is delivered assembled. The assembly consists of:
- Gripper of type SNG-D / DV – available with various needle diameters
- Optional product addition: variable needle stroke (type SNG-DV)

Available spare parts: needle wedge
Available accessories: mounting plate

Needle Grippers SNG-D / DV

Type*	Part Number
SNG-D 24 0.8	10.01.29.00005
SNG-D 24 1.2	10.01.29.00006
SNG-D 24 2.0	10.01.29.00007
SNG-D 24 0.8 V	10.01.29.00008
SNG-D 24 1.2 V	10.01.29.00009
SNG-D 24 2.0 V	10.01.29.00010

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts and Accessories Needle Grippers SNG-D / DV

Type	Needle wedge*
SNG-D 24 0.8	10.01.29.00099
SNG-D 24 1.2	10.01.29.00100
SNG-D 24 2.0	10.01.29.00101
SNG-D 24 0.8 V	10.01.29.00099
SNG-D 24 1.2 V	10.01.29.00100
SNG-D 24 2.0 V	10.01.29.00101

*Set of two needle wedges

Type	Mounting plate*
SNG-D 24 0.8	10.01.29.00093
SNG-D 24 1.2	10.01.29.00093
SNG-D 24 2.0	10.01.29.00093
SNG-D 24 0.8 V	10.01.29.00093
SNG-D 24 1.2 V	10.01.29.00093
SNG-D 24 2.0 V	10.01.29.00093

*complete with mounting screws

Technical Data Needle Grippers SNG-D / DV

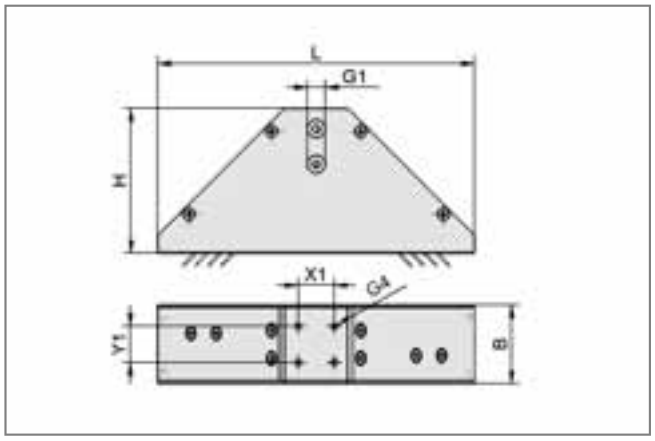
Type	Number of needles	Needle diameter [mm]	Additional function	Stroke [mm]	Operating pressure [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-D 24 0.8	24	0.8	-	7 mm	3...10	5...60	Any	600
SNG-D 24 1.2	24	1.2	-	7 mm	3...10	5...60	Any	600
SNG-D 24 2.0	24	2.0	-	7 mm	3...10	5...60	Any	600
SNG-D 24 0.8 V	24	0.8	Variable stroke	0...7 mm	3...10	5...60	Any	700
SNG-D 24 1.2 V	24	1.2	Variable stroke	0...7 mm	3...10	5...60	Any	700
SNG-D 24 2.0 V	24	2.0	Variable stroke	0...7 mm	3...10	5...60	Any	700

Needle Grippers

Needle Grippers SNG-D / DV

Number of needles 24

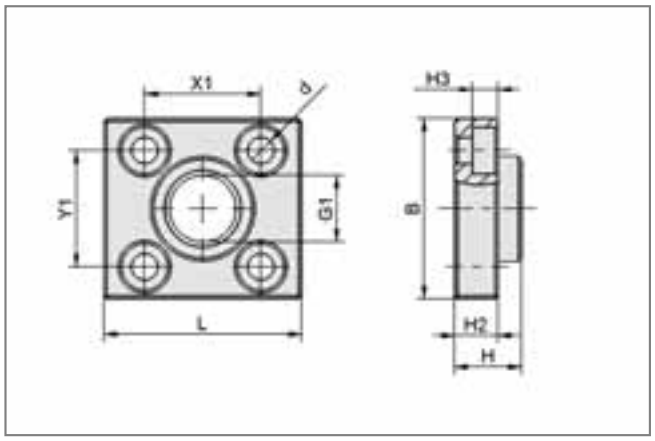
Design Data Needle Grippers SNG-D / DV



SNG-D 24 0.8-2.0 (V)

Type	Dimensions in mm						
	B	G1	G4	H	L	X1	Y1
SNG-D 24 0.8	44	M5-F	M4-F	80.3	176	20	20
SNG-D 24 1.2	44	M5-F	M4-F	80.3	176	20	20
SNG-D 24 2.0	44	M5-F	M4-F	80.3	176	20	20
SNG-D 24 0.8 V	44	M5-F	M4-F	80.3	176	20	20
SNG-D 24 1.2 V	44	M5-F	M4-F	80.3	176	20	20
SNG-D 24 2.0 V	44	M5-F	M4-F	80.3	176	20	20

Design Data Accessories Needle Grippers SNG-D / DV



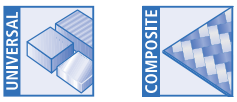
BEF-PL SNG

Type	Dimensions in mm								
	B	d	G1	H	H2	H3	L	X1	Y1
Mounting plate BEF-PL SNG	31	4.5	G1/4"-F	11.5	7.5	4.4	34	20	20

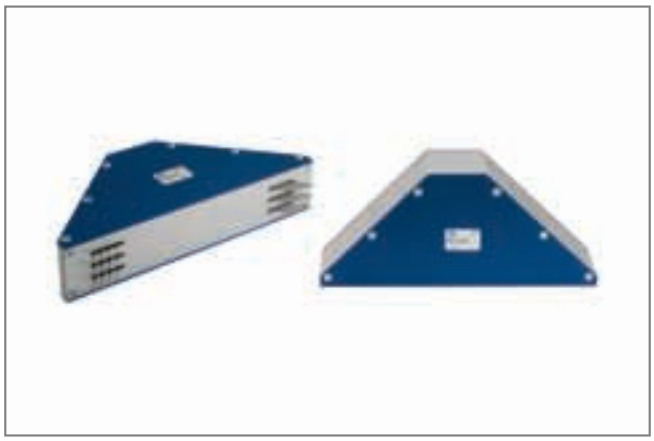
Needle Grippers

Needle Grippers SNG-DL

Number of needles 24



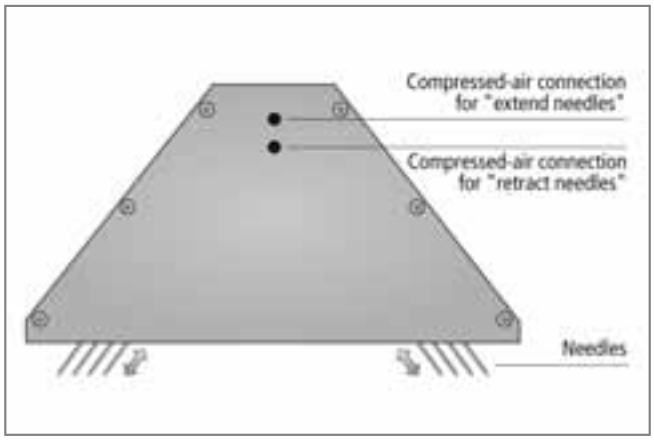
Suitability for Industry-Specific Applications



Needle grippers SNG-DL

Applications

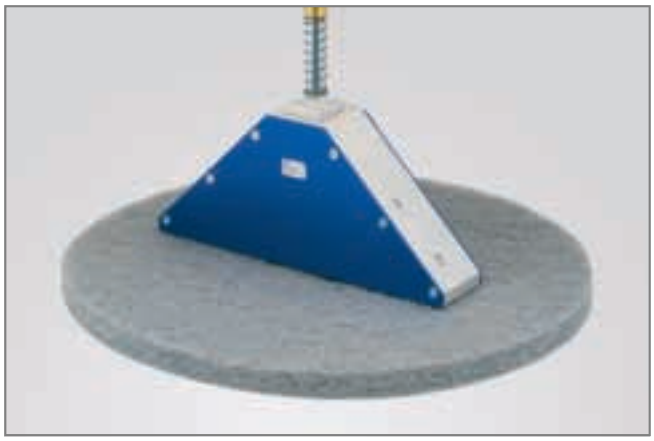
- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite textiles, fleece, felt, carpets, metal foam, insulating mats, foam materials, etc.



System design needle grippers SNG-DL

Design

- Robust aluminum housing
- 24 needles
- Extension and retraction of the needles controlled by compressed air (2 circuits)
- Insertion angle 45°



Needle grippers SNG-DL being used for handling foam

Our Highlights...

- Large version with very long needle stroke
- Different needle diameters
- Double-acting pneumatic cylinder
- Synchronised extension of the needles
- Optionally available with adapter flange plate

Your Benefits...

> Optimal for rough operating conditions and heavy parts

> Specific designs for individual applications

> Very short cycle times

> Safe handling of the workpieces

> Perfect adaptation to other mounting components

Needle Grippers

Needle Grippers SNG-DL

Number of needles 24

Designation Code Needle Grippers SNG-DL

Abbreviated designation	Number of needles	Needle diameter in mm
Example SNG-DL 24 2.0:		
SNG-DL	**24**	**2.0**
SNG-DL	24	1.2
		2.0

Ordering Data Needle Grippers SNG-DL

Needle gripper SNG-DL is delivered assembled. The assembly consists of:
- Gripper of type SNG-DL – available with various needle diameters

Available spare parts: needle wedge
Available accessories: mounting plate

Needle Grippers SNG-DL

Type*	Part Number
SNG-DL 24 1.2	10.01.29.00011
SNG-DL 24 2.0	10.01.29.00012

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts And Accessories Needle Grippers SNG-DL

Type	Needle wedge*
SNG-DL 24 1.2	10.01.29.00102
SNG-DL 24 2.0	10.01.29.00103

*Set of two needle wedges with needles

Type	Mounting plate*
SNG-DL 24 1.2	10.01.29.00093
SNG-DL 24 2.0	10.01.29.00093

*complete with mounting screws

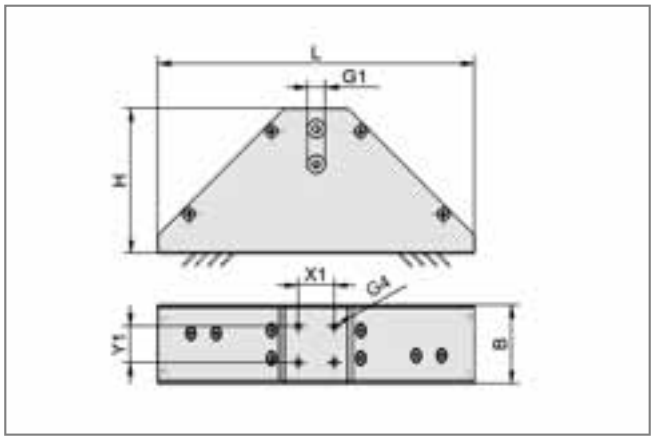
Technical Data Needle Grippers SNG-DL

Type	Number of needles	Needle diameter [mm]	Stroke [mm]	Operating pressure [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-DL 24 1.2	24	1.2	17.5 mm	3...10	5...60	Any	1500
SNG-DL 24 2.0	24	2.0	17.5 mm	3...10	5...60	Any	1500

Needle Grippers SNG-DL

Number of needles 24

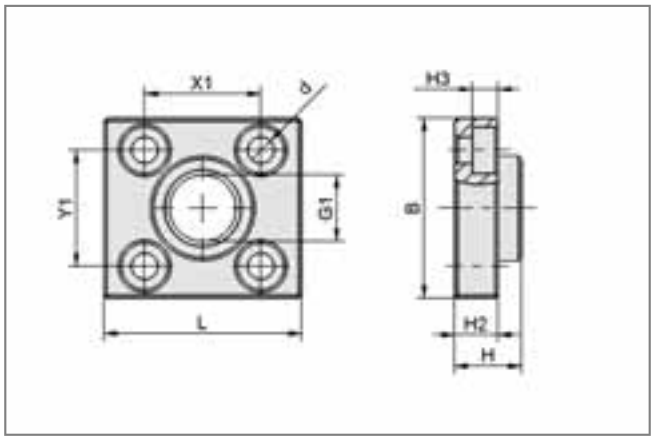
Design Data Needle Grippers SNG-DL



SNG-DL 24 1.2-2.0

Type	Dimensions in mm						
	B	G1	G4	H	L	X1	Y1
SNG-DL 24 1.2	55	M5-F	M4-F	117	264	20	20
SNG-DL 24 2.0	55	M5-F	M4-F	117	264	20	20

Design Data Accessories Needle Grippers SNG-DL



BEF-PL SNG

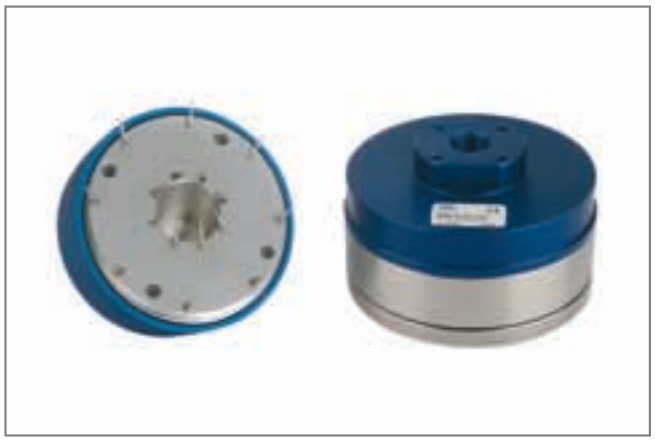
Type	Dimensions in mm								
	B	d	G1	H	H2	H3	L	X1	Y1
Mounting plate BEF-PL SNG	31	4.5	G1/4"-F	11.5	7.5	4.4	34	20	20

Needle Grippers

Needle Grippers SNG-R / RV

Number of needles 16

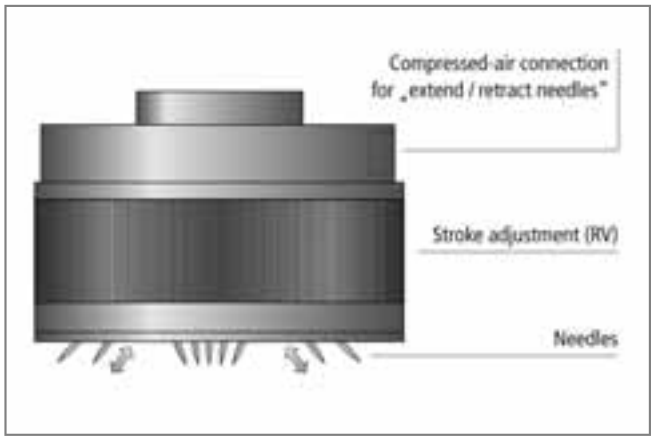
Suitability for Industry-Specific Applications



Needle grippers SNG-R / RV

Applications

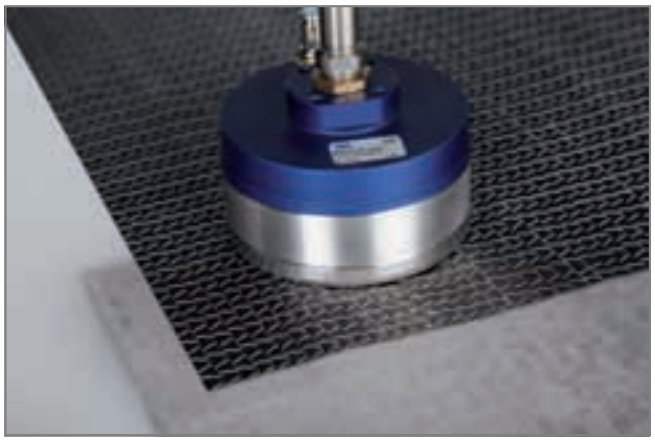
- Needle gripper for handling of flexible, non-rigid components
- Handling of materials which are difficult to grip with vacuum, such as composite textiles, fleece, felt, metal foam, insulating mats, foam materials, filters, etc.



System design needle grippers SNG-R / RV

Design

- Robust aluminum housing
- 16 needles
- Needles extended by compressed air and retracted by springs
- Insertion angle 45°



Needle grippers SNG-RV being used for handling composite textiles

Our Highlights...

- Variable needle stroke (SNG-RV version)
- Intersecting needles
- Needles retracted by springs
- Synchronised extension of the needles
- Integrated mounting thread

Your Benefits...

> Individual adaptation to workpieces of different sizes and shapes

> Optimal for particularly flexible components

> Low control costs

> Safe handling of the workpieces

> Perfect adaptation to other mounting components

Needle Grippers SNG-R / RV

Number of needles 16

Designation Code Needle Grippers SNG-R / RV

Abbreviated designation	Number of needles	Needle diameter in mm	Product addition
Example SNG-R 16 1.2 V:			
SNG-R	**16**	**1.2**	**V**
SNG-R	16	1.2	V variable needle stroke

Ordering Data Needle Grippers SNG-R / RV

Needle gripper SNG-R / RV is delivered assembled. The assembly consists of:
- Gripper of type SNG-R / RV
- Optional product addition: variable needle stroke (type SNG-RV)

Available spare parts: needle piston

Needle Grippers SNG-R / RV

Type*	Part Number
SNG-R 16 1.2	10.01.29.00014
SNG-R 16 1.2 V	10.01.29.00017

*Note: suitable screw in push fittings can be found under "Screw in push fittings" in section "Filters and Connections"

Ordering Data Spare Parts Needle Grippers SNG-R / RV

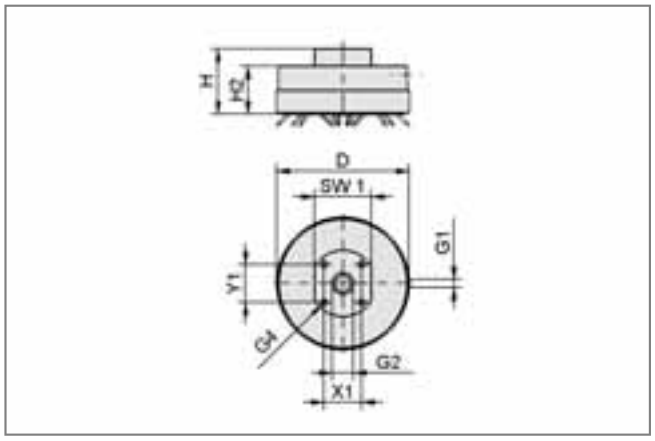
Type	Needle piston*
SNG-R 16 1.2	10.01.29.00095
SNG-R 16 1.2 V	10.01.29.00104

*Set of 16 needles with guide pistons and springs

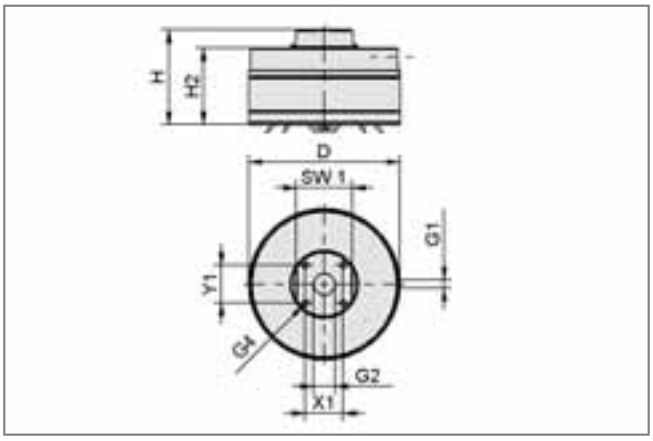
Technical Data Needle Grippers SNG-R / RV

Type	Number of needles	Needle diameter [mm]	Additional function	Stroke [mm]	Operating pressure [bar]	Operating temperature [°C]	Installation position	Weight [g]
SNG-R 16 1.2	16	1.2	-	4.5 mm	4...6	5...60	Any	400
SNG-R 16 1.2 V	16	1.2	Variable stroke	0...4.5 mm	4...6	5...60	Any	600

Design Data Needle Grippers SNG-R / RV



SNG-R 16 1.2



SNG-R 16 1.2 V

Type	Dimensions in mm								
	D	G1	G2	G4	H	H2	SW1	X1	Y1
SNG-R 16 1.2	70	M5-F	G1/4"-F	M4-F	35	26	30	20	20
SNG-R 16 1.2 V	80	M5-F	G1/4"-F	M4-F	50	41	30	20	20

Wafer Grippers

Wafer Grippers SWGm

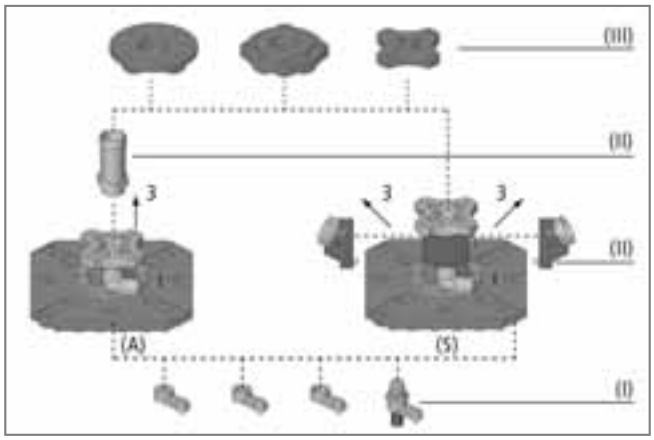
Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Suitability for Industry-Specific Applications

Wafer grippers SWGm

Applications

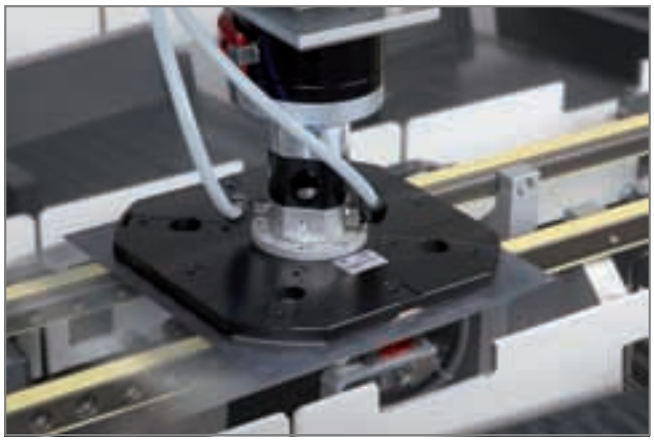
- Wafer gripper for extremely fast and gentle handling of wafers and solar cells in the production processes
- Loading and unloading from stacks and conveyor belts
- Exact positioning during the visual inspection and position measurement allow for on-the-fly breakage detection during the handling process
- Fully or partially automated production of PV cells with maximum process stability, production line uptime, cell efficiency and line output



System design wafer grippers SWGm

Design

- Base model version with discharging exhaust air (3) in axial (A) or lateral (S) direction
- Suction area geometries available in common cell sizes 125 mm and 156 mm (5" and 6")
- Optional component (II) for controlled discharging of exhaust air
- Modular design with accessories for the mounting of sensors and modules for suction and damping (I) and a selection of flange modules (III)
- Minimal overall height through reduced-weight plastic design
- Replaceable contact surfaces



Wafer grippers SWGm being used for handling solar cells

Our Highlights...	Your Benefits...
• Low overall height and operating weight	> High speed, high accuracy handling for cycle times below 1 second
• Optimum allocation and dimension of the suction points	> Less operating cost
• High suction rate even for partial coverage or leakages	> Reliable gripping and handling, even of deformed, broken or perforated wafers
• Exhaust air channels for controlled air discharge	> No contamination of process area
• Quick object release	> Precise positioning and very short cycle times
• Gripper surface made of PEEK (Polyetheretherketone)	> Minimal surface contamination and reduction of blind spots

Wafer Grippers

Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Designation Code Wafer Grippers SWGm

Abbreviated designation	Wafer/cell size in inch	Design	Dimensions in mm	Performance class of ejector	Blow off function	Material suction area
Example **SWGm-5A 115x115x40 1xE100 A PEEK:**						
SWGm	**5**	**A**	**115x115x40**	**1xE100**	**A**	**PEEK**
SWGm	5 6	A axial axhaust air S lateral exhaust air	115x115x40 115x115x65 146x146x40 146x146x65	1xE100	A blow off function	PEEK Poly-ether-ether-keton

Ordering Data Wafer Grippers SWGm

Wafer gripper SWGm is delivered assembled. The assembly consists of:
• Wafer gripper of type SWGm – available in various dimensions, with axial or side exhaust

Available spare parts: suction surface
Available accessories: flange plate, holder, suction-/absorption module, component for discharging exhaust air, exhaust duct, solenoid valves

Wafer Grippers SWGm

Type	Part Number
SWGm-5A 115x115x40 1xE100 A PEEK	10.01.30.00135
SWGm-6A 146x146x40 1xE100 A PEEK	10.01.30.00136
SWGm-5S 115x115x65 1xE100 A PEEK	10.01.30.00137
SWGm-6S 146x146x65 1xE100 A PEEK	10.01.30.00138

Ordering Data Accessories Wafer Grippers SWGm

Type	SWGm-5A	SWGm-6A	SWGm-5S	SWGm-6S
Flange plate FLAN-PL 55x7.5-AB1*	-	-	10.01.30.00015	10.01.30.00015
Flange plate FLAN-PL 63x10.5-AD1**	10.01.30.00016	10.01.30.00016	10.01.30.00016	10.01.30.00016
Flange plate FLAN-PL 63x11.5-UNI***	10.01.30.00017	10.01.30.00017	10.01.30.00017	10.01.30.00017
Holder HTR-UNI SWGm	10.01.30.00117	10.01.30.00117	10.01.30.00117	10.01.30.00117
Holder HTR M8x1-IG SWGm	10.01.30.00118	10.01.30.00118	10.01.30.00118	10.01.30.00118
Holder HTR M12x1-IG SWGm	10.01.30.00119	10.01.30.00119	10.01.30.00119	10.01.30.00119
Suction/damping module SD-MOD 32x16.5x35 FG 9 SWGm	10.01.30.00121	10.01.30.00121	10.01.30.00121	10.01.30.00121
Exhaust set ABL-SET 14 SWG/SCG	-	-	10.01.30.00059	10.01.30.00059
Exhasut duct ABL-FUEHR 19.5x46 SWGm/SCG	10.01.30.00087	10.01.30.00087	-	-
Solenoid valve EMV 1.5 24V-DC 3/2 NC K-3P****	10.05.01.00288	10.05.01.00288	10.05.01.00288	10.05.01.00288
Solenoid valve EMV 2.5 24V-DC 3/2 NC K-3P*****	10.05.01.00289	10.05.01.00289	10.05.01.00289	10.05.01.00289

*Suitable for ABB IRB 360
**Suitable for adept quattro S650
***Suitable for customer-specific solutions (universal flange for postprocessing)
****Suitable for compressed-air connection "Blow off"
*****Suitable for compressed-air connection "Suction"

Wafer Grippers

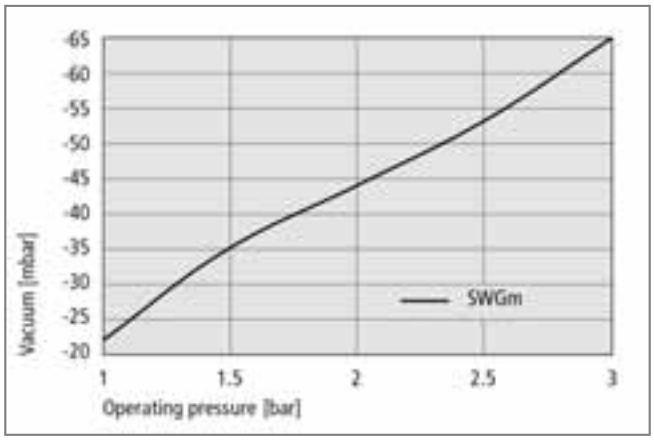
Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

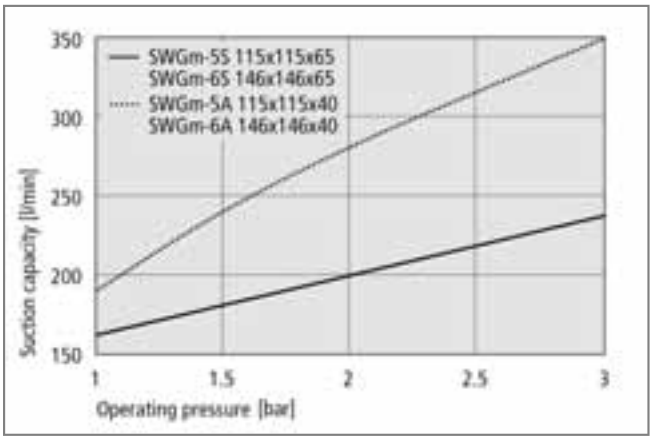
Ordering Data Spare Parts Wafer Grippers SWGm

Type	Suction plate
SWGm-5A 115x115x40 1xE100 A PEEK	10.01.30.00125
SWGm-6A 146x146x40 1xE100 A PEEK	10.01.30.00126
SWGm-5S 115x115x65 1xE100 A PEEK	10.01.30.00125
SWGm-6S 146x146x65 1xE100 A PEEK	10.01.30.00126

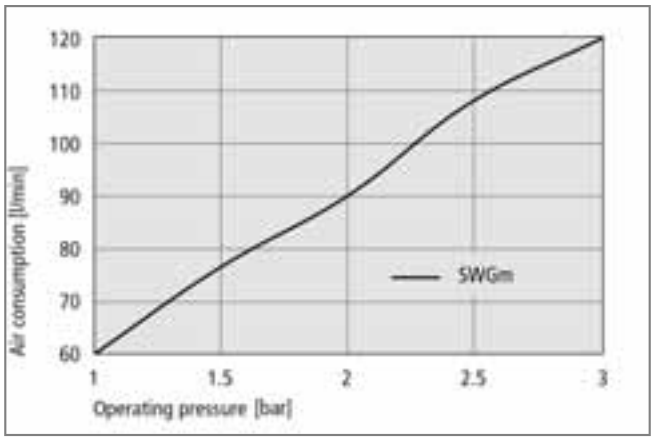
Performance Data Wafer Grippers SWGm



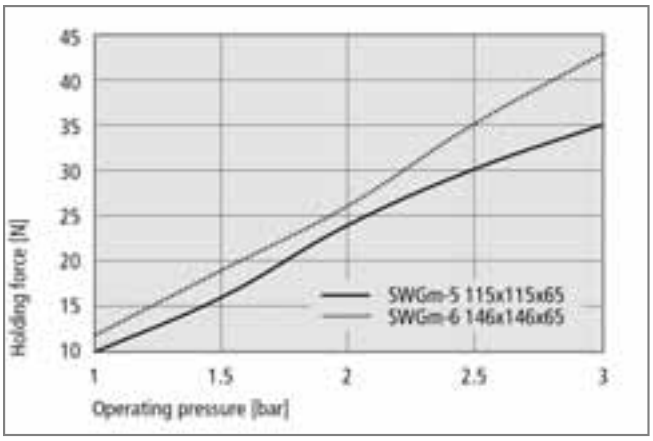
Achievable vacuum at various operating pressures



Suction capacity at various operating pressures



Air consumption at various operating pressures



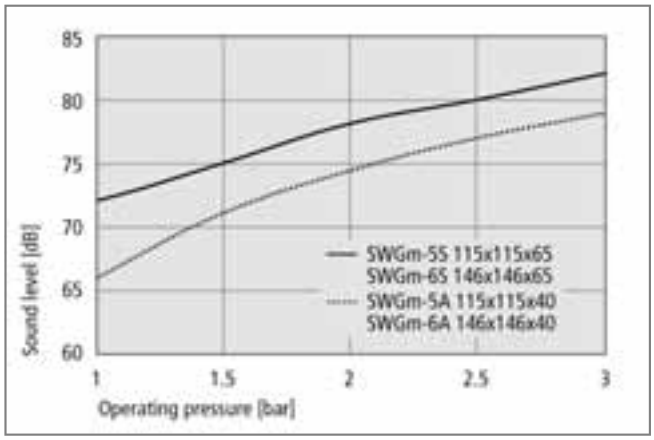
Holding force SWGm-5 and SWGm-6 at various operating pressures

Wafer Grippers

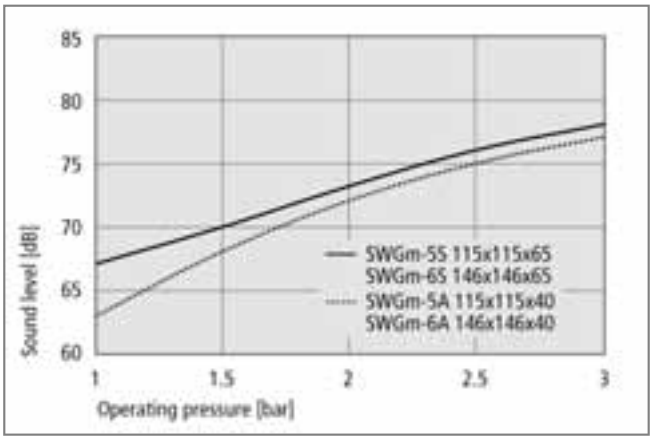
Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Performance Data Wafer Grippers SWGm



Noise level free at various operating pressures

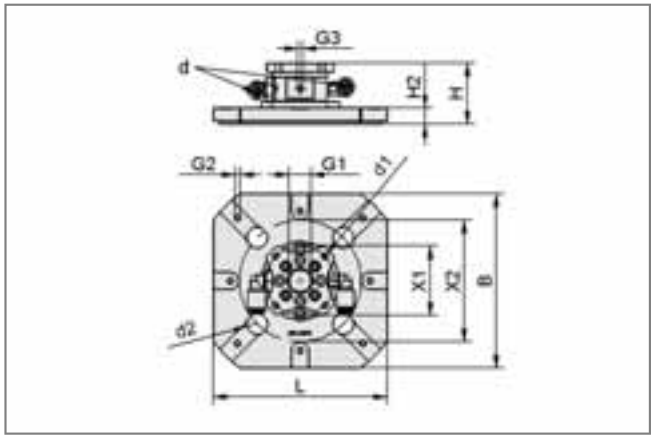


Noise level workp. gripped at various operating pressures

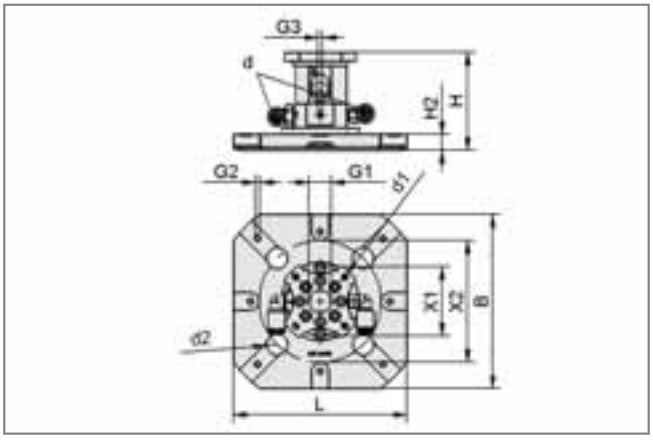
Technical Data Wafer Grippers SWGm

Type	Holding force [N]	Suction rate [l/min]	Air consumption [l/min]	Operating pressure [bar]	Operating temperature [°C]	Weight [g]
SWGm-5A 115x115x40 1xE100 A PEEK	10...35 N	190...350 l/min	60...120 l/min	1...3 bar	5...75 °C	210
SWGm-6A 146x146x40 1xE100 A PEEK	12...43 N	190...350 l/min	60...120 l/min	1...3 bar	5...75 °C	275
SWGm-5S 115x115x65 1xE100 A PEEK	10...35 N	160...235 l/min	60...120 l/min	1...3 bar	5...75 °C	235
SWGm-6S 146x146x65 1xE100 A PEEK	12...43 N	160...235 l/min	60...120 l/min	1...3 bar	5...75 °C	300

Design Data Wafer Grippers SWGm



SWGm-5A... and SWGm-6A...



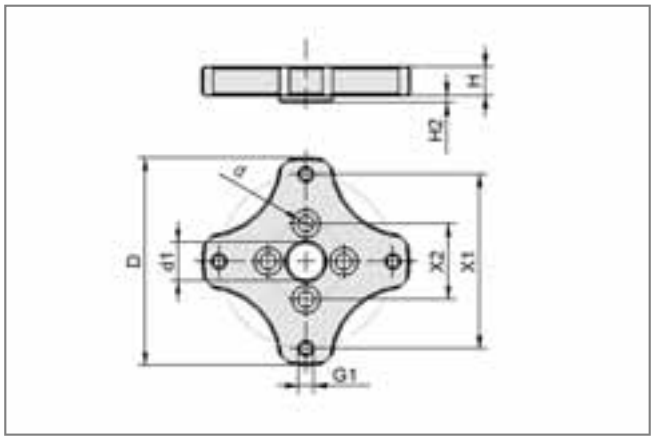
SWGm-5S... and SWGm-6S...

Type	Dimensions in mm											
	B	d	d1	d2	G1	G2	G3	H	H2	L	X1	X2
SWGm-5A 115x115x40 1xE100 A PEEK	115	6	4.1	14	G3/8"-F	M4-F	M4-F	40	10.5	115	46	80.6
SWGm-6A 146x146x40 1xE100 A PEEK	146	6	4.1	14	G3/8"-F	M4-F	M4-F	40	10.5	146	46	110.6
SWGm-5S 115x115x65 1xE100 A PEEK	115	6	4.1	14	G3/8"-F	M4-F	M4-F	65	10.5	115	46	80.6
SWGm-6S 146x146x65 1xE100 A PEEK	146	6	4.1	14	G3/8"-F	M4-F	M4-F	65	10.5	146	46	110.6

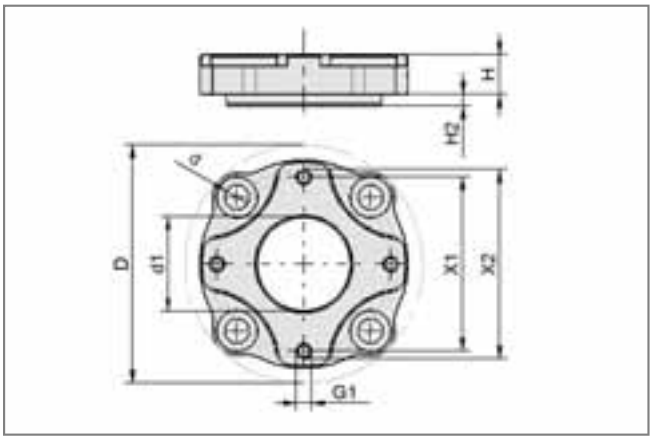
Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

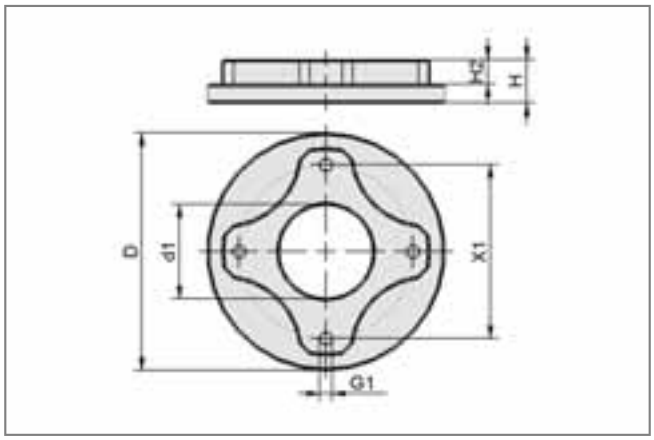
Design Data Accessories Wafer Gripper SWGm



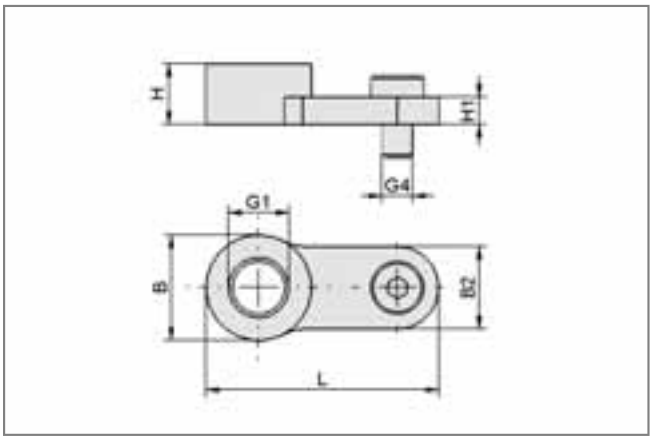
Flange plate FLAN-PL 55x7.5-AB1



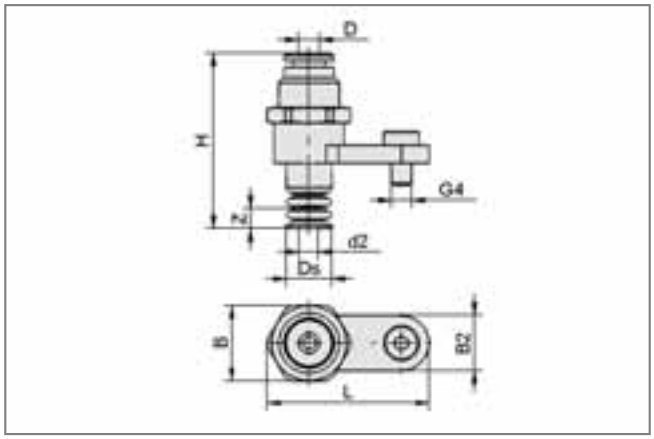
Flange plate FLAN-PL 63x10.5-AD1



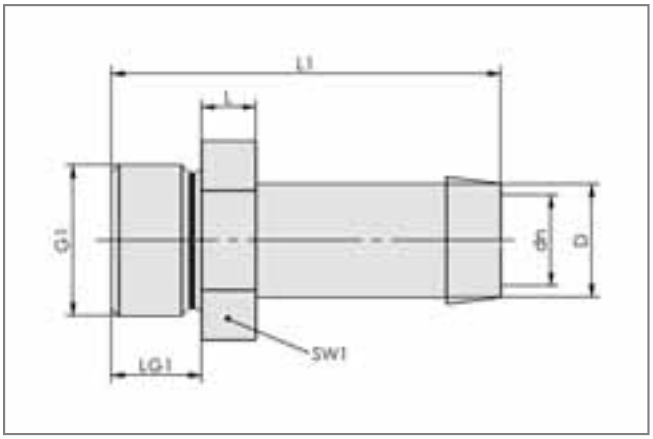
Flange plate FLAN-PL 63x11.5 SWG-UNI



Holder system HTR-UNI SWGm, HTR M8x1-IG SWGm, HTR M12x1-IG SWGm



Suction-/ Absorption module SD-MOD 32x16.5x35 FG 9 SWGm



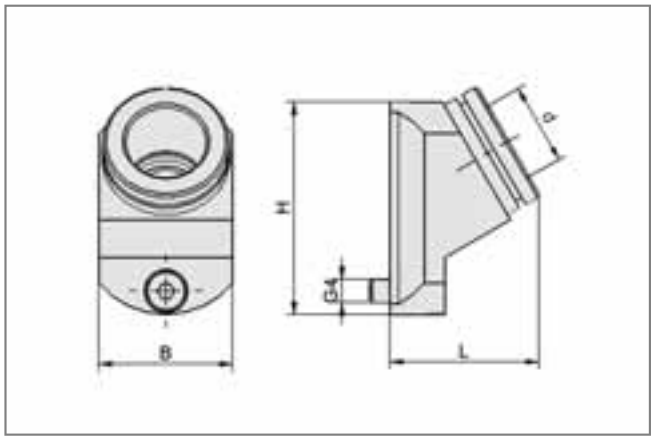
Discharging exhaust air ABL-FUEHR 19.5x46 SWGm/SCG

Wafer Grippers

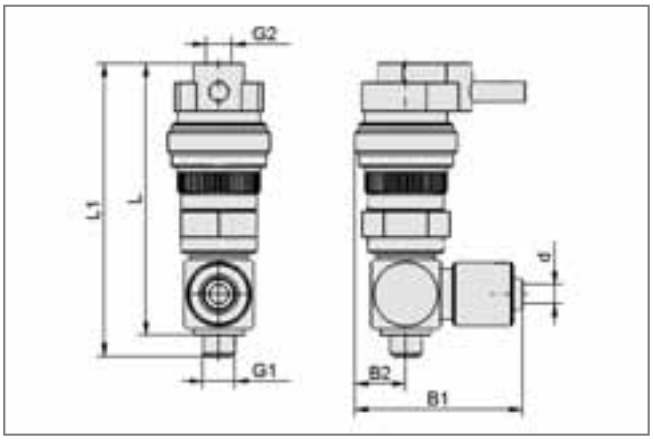
Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Design Data Accessories Wafer Gripper SWGm



Exhaust air set ABL-SET 14 SWG



Solenoid valve EMV

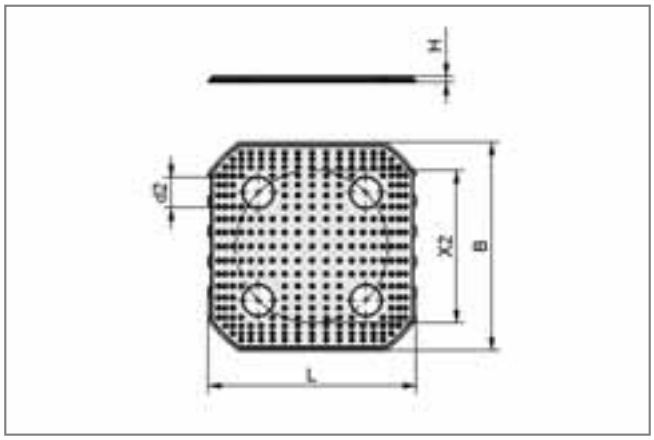
Type	Dimensions in mm										
	B	B1	B2	d	dn	d1	d2	D	Ds	G1	G2
FLAN-PL 55x7.5-AB1	-	-	-	4.3	-	10	-	55.0	-	M4-F	-
FLAN-PL 63x10.5-AD1	-	-	-	6.6	-	25	-	63.0	-	M4-F	-
FLAN-PL 63x11.5-UNI	-	-	-	-	-	25	-	63.0	-	M4-F	-
HTR-UNI SWGm	14	-	11	-	-	-	-	-	-	-	-
HTR M8x1-IG SWGm	14	-	11	-	-	-	-	-	-	M8x1-F	-
HTR M12x1-IG SWGm	14	-	11	-	-	-	-	-	-	M12x1-F	-
SD-MOD 4x 32x15x35 FG 9 SWGm	15	-	11	-	-	-	4.1	4.0	9	-	-
ABL-FUEHR 19.5x46 SWGm/SCG	-	-	-	-	12.5	-	-	19.5	-	G3/8"-M	-
ABL-SET 14 SWG/SCG	23	-	-	14.0	-	-	-	-	-	-	-
EMV 1.5 24V-DC 3/2 NC K-2P	-	26.6	8	4.0	-	-	-	-	-	M5-M	M5-F
EMV 2.5 24V-DC 3/2 NC K-2P	-	31.7	11	4.0	-	-	-	-	-	G1/8"-M	M5-F

Type	Dimensions in mm										
	G4	H	H1	H2	LG1	L	L1	SW1	X1	X2	Z
FLAN-PL 55x7.5-AB1	-	7.5	-	2.0	-	-	-	-	46	20	-
FLAN-PL 63x10.5-AD1	-	10.5	-	3.0	-	-	-	-	46	50	-
FLAN-PL 63x11.5-UNI	-	11.5	-	6.5	-	-	-	-	46	-	-
HTR-UNI SWGm	M4-M	8.0	3.6	-	-	30.9	-	-	-	-	-
HTR M8x1-IG SWGm	M4-M	8.0	3.6	-	-	30.9	-	-	-	-	-
HTR M12x1-IG SWGm	M4-M	8.0	3.6	-	-	30.9	-	-	-	-	-
SD-MOD 4x 32x15x35 FG 9 SWGm	M4-M	35.0	-	-	-	32.0	-	-	-	-	3
ABL-FUEHR 19.5x46 SWGm/SCG	-	-	-	-	7.5	5.0	46.0	19	-	-	-
ABL-SET 14 SWG/SCG	M4-M	36.5	-	-	-	25.5	-	-	-	-	-
EMV 1.5 24V-DC 3/2 NC K-2P	-	-	-	-	-	43.1	46.5	-	-	-	-
EMV 2.5 24V-DC 3/2 NC K-2P	-	-	-	-	-	51.7	56.5	-	-	-	-

Wafer Grippers SWGm

Two suction areas suitable for wafer sizes 125 x 125 mm and 156 x 156 mm

Design Data Spare Parts Wafer Gripper SWGm



Suction plate SAUG-FL SWGm-...

Type	Dimensions in mm				
	B	d2	H	L	X2
SAUG-FL SWGm-5 110x110 PEEK	110	16	3	110	80.6
SAUG-FL SWGm-6 141x141 PEEK	141	16	3	141	110.6

Composite Grippers

Composite Grippers SCG

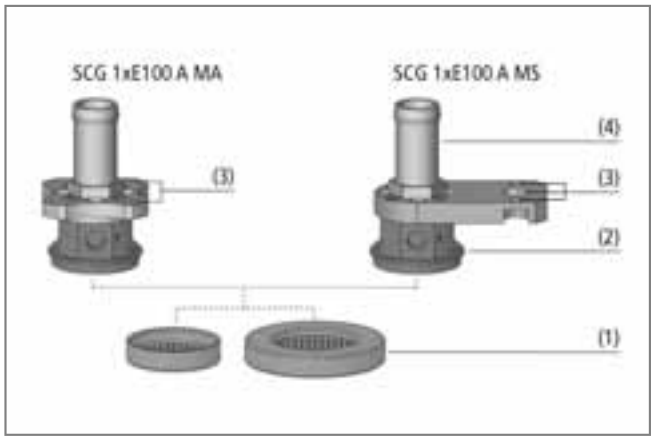
Suction capacity from 270 l/min to 650 l/min

Suitability for Industry-Specific Applications

Composite grippers SCG

Applications

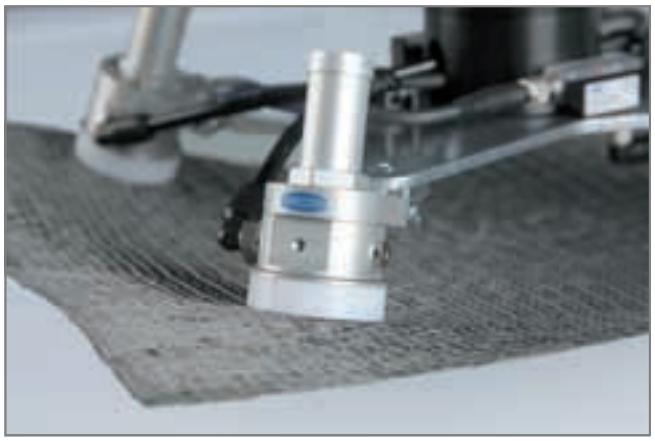
- Gripper for handling of composites
- Handling of non-rigid and flexible workpieces
- Handling of extremely thin, sensitive foils
- Handling of blank circuit boards



System design composite grippers SCG

Design

- Quick-change contact surfaces (1) with various diameters
- Anodised aluminum main body with integrated vacuum generation (2)
- Base model with capability for axial mounting (MA) or sideways mounting (MS) (3)
- Controlled exhaust air (4)
- Two compressed air connections for suction and blow off



Composite grippers SCG being used for handling composites

Our Highlights...

- Suction surface with suction openings placed close to each other
- Integrated vacuum generation
- Very high suction rate
- High suction rate with minimum air consumption
- Controlled air discharge
- Axial or sideways mounting of gripper

Your Benefits...

> Prevents the workpiece from being sucked in or damaged

> Compact, ready-to-connect gripper unit

> Safe gripping, even with porous materials

> Low operating costs

> No contamination of process area

> Flexible mounting possibilities

Composite Grippers

Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min

Designation Code Composite Grippers SCG

Abbreviated designation	Performance class of ejector	Blow off function	Possibility for mounting
Example SCG 1xE100 A MA:			
SCG	**1xE100**	**A**	**MA**
SCG	1xE100	A blow off function	MA mounting axial MS mounting sideways

Ordering Data Composite Grippers SCG

Composite-Gripper SCG is supplied as an individual part (without suction surface). In order to receive a complete gripper the following ordering steps are required:

- Composite-Gripper SCG (step1) – available for axial or sideways mounting
- Suction surface of type SAUG-FL (step 2) – available in various dimensions

Available accessories: Screw in push fitting (right-angle)

Step 1: Composite Grippers SCG

Type	Part Number
SCG 1xE100 A MA	10.01.30.00092
SCG 1xE100 A MS	10.01.30.00170

Step 2: Suction area Composite Grippers SCG

Type	Part Number
SAUG-FL SCG 40 POM	10.01.30.00030
SAUG-FL SCG 60 POM	10.01.30.00031

Ordering Data Accessories Composite Grippers SCG

Type	Part Number
STV-W G1/8-AG 6 KU*	10.08.02.00288
STV-W M5-AG 6 KU**	10.08.02.00296

*Suitable for compressed-air connection "Suction"

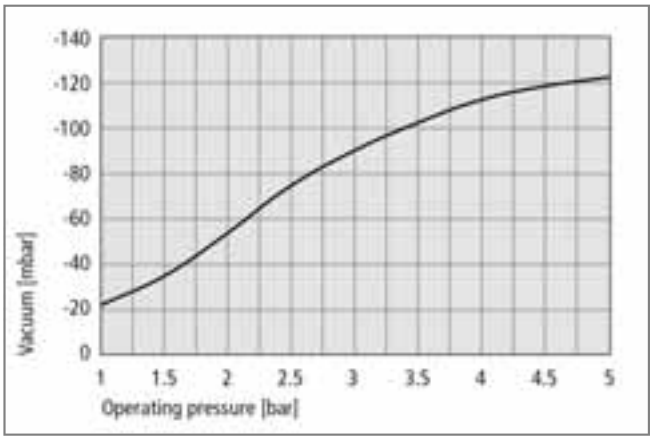
**Suitable for compressed-air connection "Blow off"

Composite Grippers

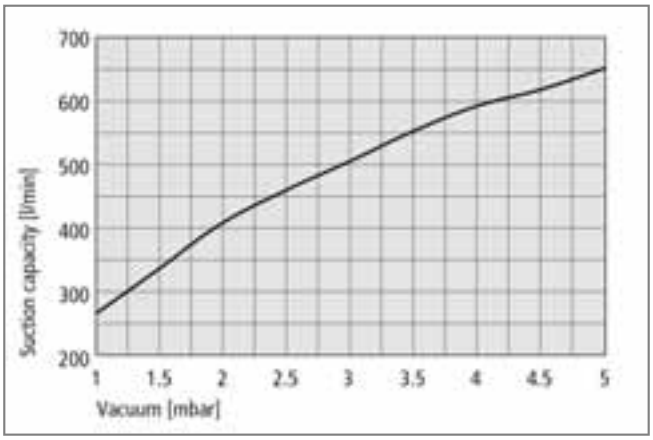
Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min

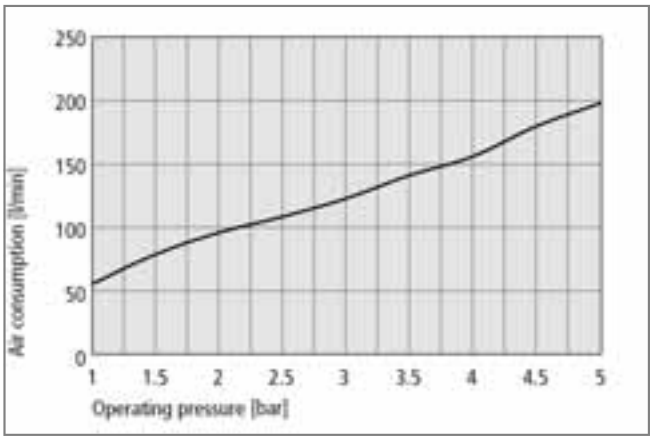
Performance Data Composite Grippers SCG



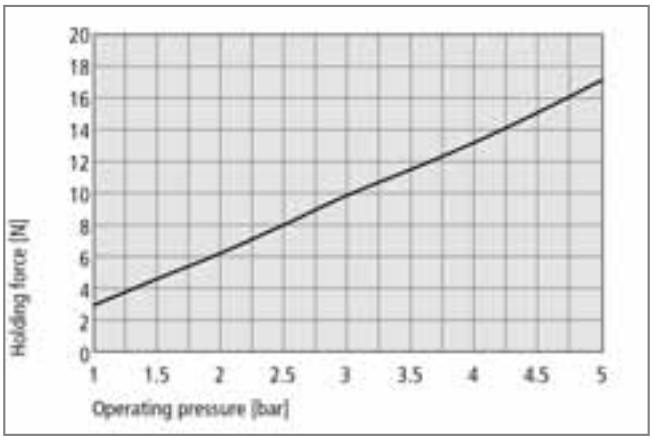
Achievable vacuum at various operating pressures



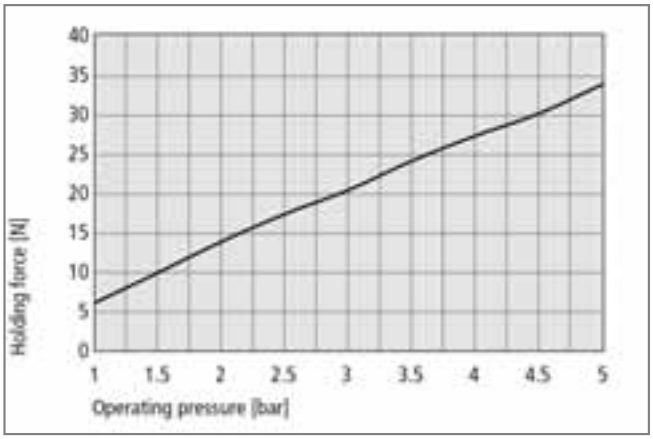
Suction rate at various operating pressures



Air consumption at various operating pressures



Holding force with suction area 40 at various operating pressures



Holding force with suction area 60 at various operating pressures

Composite Grippers

Composite Grippers SCG

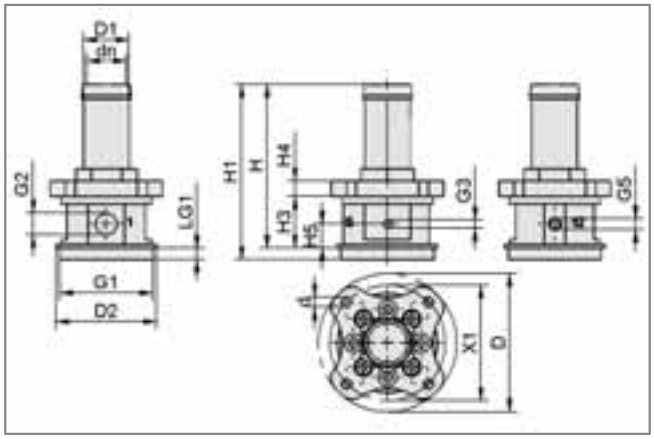
Suction capacity from 270 l/min to 650 l/min

Technical Data Composite Grippers SCG

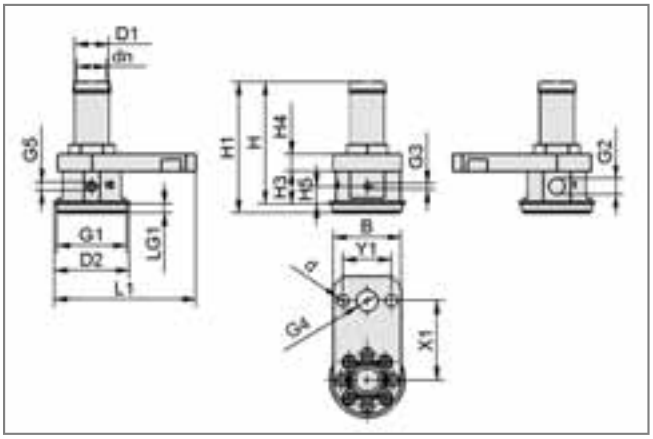
Type	Suction rate [l/min]	Air consumption [l/min]	Operating pressure [bar]*	Operating temperature [°C]	Recom. internal hose diameter, suction [mm]	Recom. internal hose diameter, blow off [mm]	Weight [g]
SCG 1xE100 A MA	270...650 l/min	60...220 l/min	1...5 bar	5...75 °C	4	4	85
SCG 1xE100 A MS	270...650 l/min	60...220 l/min	1...5 bar	5...75 °C	4	4	109

*The specified value can be equal for suction and blow-off. Operating pressures below 1 bar are possible but have to be tested individually.

Design Data Composite Grippers SCG



SCG 1xE100 A MA



SCG 1xE100 A MS

Type	Dimensions in mm									
	B	d	dn	D	D1	D2	G1	G2	G3	G4
SCG 1xE100 A MA	-	4.0	15.8	55	18	39.8	M37x1-M	G1/8"-F	M4-F	-
SCG 1xE100 A MS	36	6.6	15.8	-	18	39.8	M37x1-M	G1/8"-F	M4-F	G1/4"-F

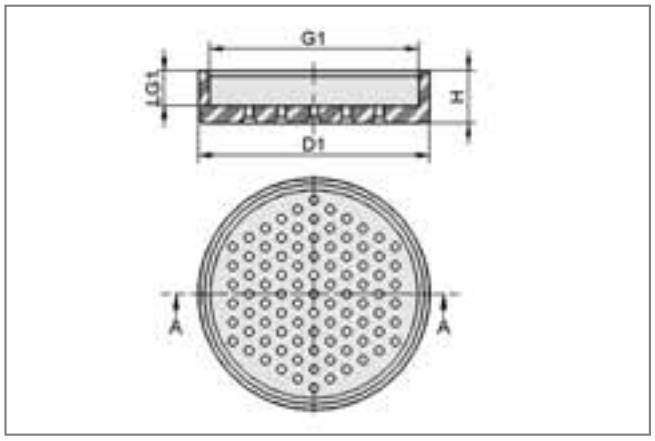
Type	Dimensions in mm									
	G5	H	H1	H3	H4	H4	L1	LG1	Y1	X1
SCG 1xE100 A MA	M5-F	65	69.6	20.6	6	9.5	-	4.5	-	46
SCG 1xE100 A MS	M5-F	65	69.6	17.6	9	9.5	74.9	4.5	25.5	42

Composite Grippers

Composite Grippers SCG

Suction capacity from 270 l/min to 650 l/min

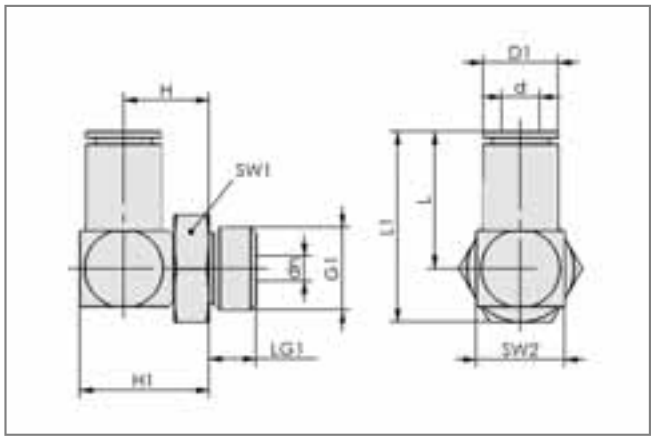
Design Data Suction Area for Composite Gripper SCG



Suction area SAUG-FL

Type	Dimensions in mm				
	D1	G1	H	LG1	Weight [g]
SAUG-FL SCG 40 POM	40	M37x1-F	9.5	6.5	6.5
SAUG-FL SCG 60 POM	60	M37x1-F	9.5	6.8	16.0

Design Data Accessories Composite Gripper SCG



Screw in push fitting STV-W

Type	Dimensions in mm										
	d	dn	D1	G1	H	H1	L	L1	LG1	SW1	SW2
STV-W G1/8-AG 6 KU	6	4	11.5	G1/8"-M	12.5	16.5	20.8	27.5	6	13	8
STV-W M5-AG 6 KU	6	4	11.5	M5-M	13.0	16.5	20.8	25.5	4	8	8

Mounting Elements

Overview of Section 5

Mounting Elements

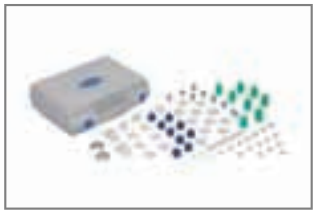
Everything at a Glance

Selection Aid Page

Overview Connection Possibilities 314

Modular System for Vacuum End Effectors 316

Vacuum End Effectors VEE



Starter Set VEE 318

- 120 VEE components
- Including eight suction pads SPB4-30
- Build up to two turnkey VEE configurations

VEE starter set for configuration of two complete vacuum end effectors with 120 individual components and eight vacuum suction pads of type SPB4-30.

Flange Plates FLAN-PL 320

- Material: Anodized aluminum
- For common robot types

Flange plate from the modular system VEE for connecting the end effector to the robot; available for all common robot types or as a universal flange.

Flange Modules VEE-QCM 322

- Vacuum connection: vertical or horizontal
- Nominal flow rate: 20 m³/h or 60 m³/h

Flange module from the modular system VEE with quick-change adapter for connection of the end effector to the flange plate.

Basic Modules VEE-QCF 324

- Material: Polysulfone PSU (FDA-approved material)
- Basic module with 1, 2 or 4 connections

Basic module from the modular system VEE with central vacuum feed-in for connection of the end effector to the flange module, no tools needed; available as a 1-, 2- or 4-connection module.

Connector Upper Shells VEE-CO-U 326

- Material: Polysulfone PSU (FDA-approved material)
- Packaging unit: 4 pieces

Upper shell of the connector from the modular system VEE for assembly of connecting joints; available in closed design or with connection for separate vacuum line.

Overview of Section 5

Mounting Elements

Everything at a Glance

Connector Lower Shells VEE-CO-L

328

PACKAGING

- Material: Polysulfone PSU (FDA-approved material)
- Contains sealing element and securing screws
- Packaging unit: 4 pieces

Lower shell from the modular system VEE for assembly of connecting joints and connection of suction pads; available in closed version or with female thread for suction pads.

Connecting Tubes VEE-TU

331

PACKAGING

- Material: Polysulfone PSU (FDA-approved material)
- Length 17.8 mm or 200 mm
- Integrated vacuum feed
- Packaging unit: 10 (VEE-TU 18x1.5x17.8), 4 (VEE-TU 18x1.5x200)

Connecting tube from the modular system VEE for vacuum distribution and for connecting individual connection joints.

Plugs VEE-PL

333

PACKAGING

- Material: Silicone SI for VEE-PL P and polysulfone PSU (FDA-approved material) for VEE-PL C
- Packaging unit: 10 (VEE-PL C), 4 (VEE-PL P)

Plugs from the modular system VEE for sealing unneeded connections on connecting joints and zoning of the vacuum system.

Jointed Mountings

Flexolink FLK

335

UNIVERSAL

- Connection: G1/4" and G1/2"
- Deflection: max. 12°
- Rubber buffer (vulcanised into position) as a joint

Polydirectional joint mounting made from high-quality steel with vulcanize-bonded rubber buffer for adjusting the suction pad to uneven surfaces; automatic resetting.

Ball Joints KGL

338

UNIVERSAL

- Connection: G1/8" to G1/2"
- Deflection: max. 15°
- Sealed ball-and-socket joint with vacuum-tight seal

Polydirectional ball joint made from galvanized steel or stainless steel, sealed using O-ring, for adjustment of the suction pad to uneven surfaces.

Spring plungers

Spring Plungers FSTE

340

UNIVERSAL

- Connection: M3, M5, G1/8" to G1/2"
- Stroke: 5 to 90 mm
- Integrated vacuum feed

Spring plunger with damping spring for height compensation and careful handling of fragile workpieces.

Overview of Section 5

Mounting Elements

Everything at a Glance

Spring Plungers FSTE-HD

344

- Connection: G1/8" to G1/2"
- Stroke: 15 to 90 mm
- Version Heavy Duty
- Integrated vacuum feed

Spring plunger with special slide bearings and damping spring for height compensation for highly dynamic applications with short cycles.

Spring Plungers FSTA

348

- Connection: G1/4" and G1/2"
- Stroke: 25 to 90 mm
- Integrated vacuum feed

Spring plunger with two damping springs for protection of the connection and protection of the workpiece (by means of the lower damping spring), as well as for even load distribution.

Spring Plungers FSTA-HD

351

- Connection: G1/4" to G1/2"
- Stroke: 25 to 90 mm
- Version Heavy Duty
- Integrated vacuum feed

Spring plunger with special slide bearings and two damping springs for height compensation for highly dynamic applications with fragile workpieces and short cycles, as well as for even load distribution.

Spring Plungers FSTI

354

- Connection: G1/4" and G3/8"
- Stroke: 10 to 50 mm
- Internal damping spring
- Integrated vacuum feed

Spring plunger with internal damping spring and high-quality sliding bearings for handling fragile workpieces, particularly in the automotive industry.

Spring Plungers FSTF

358

- Connection: G1/2"
- Stroke: 50 mm
- Variable mounting facility
- Integrated vacuum feed

Spring plunger with variable mounting system and damping spring for handling wood plates and furniture pieces.

Holders for Suction Pads and Spring Plungers

Adapters for Elbow Connector ANW

361

- Connection: M5 to G1/2"

Adapter for elbow connection with side vacuum connection for direct and space-saving installation of suction pads.

Bulkhead Connectors SVS-GE

364

- Connection: G1/8" to G1/4"

Bulkhead connector for direct and height-adjustable installation of suction pads.

Overview of Section 5

Mounting Elements

Everything at a Glance

Holders for Light-Metal Sections HTR-STA

366

- Mountings for spring plungers FSTE/FSTA from M5 to G1/4"

Steel sheet holder for direct installation on light-alloy sections.

Holders for Square Tubes HTR-STS

368

- Mountings for spring plungers FSTE/FSTA from M5 to G1/2"
- Square sections 30 x 30 mm to 60 x 60 mm

Steel sheet holder for direct installation on square tubes.

Universal Holders HTR-UNI

371

- Connection: G1/4"

Holder for adjustable installation of suction pads; height and incline of the suction pad can be adjusted.

Sections and Connectors

Mounting Sections MO-PROF

375

- Cross-sections: 40 x 40 mm and 40 x 80 mm
- With 1 or 3 chambers

High-strength aluminum section with accessories for constructing your own load beam with integrated vacuum line.

Mounting Elements

Selection Aid

Overview Connection Possibilities

The following overview shows the various connection possibilities offered by the mounting elements from Schmalz and should help you to select the appropriate components for your application. All components of the various product families are grouped together in the overview. The design data and technical data of the mounting elements can be found on the related products pages in this section of the catalogue.

Mounting section (also suitable for mounting of suction pads)

MO-PROF 40x40 1TN

MO-PROF 40x40 3TN

MO-PROF 80x40 2TN

Holders and cross-beam connectors (for spring-mounting of suction pads)

HTR-STA WI

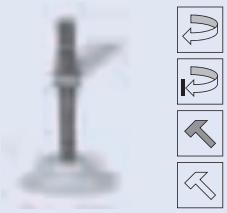
HTR-STA FL

HTR-STS D30

HTR-STS D10/16

Spring plungers

FSTE(-HD)(-VG)



FSTA(-HD)(-VG)

FSTI(-VG)

FSTF(-VG)

Flexible mountings for use with spring plungers

KGL

FLK

Fully rotatable

Available with anti-rotation guard

Heavy-duty (HD) version for short cycle times and rough operating conditions

For standard applications without swivelling of the loads

Flexible in all directions

Mounting Elements

Selection Aid

Mounting section (also suitable for mounting of suction pads)

MO-PROF 40x40 1TN

MO-PROF 40x40 3TN

MO-PROF 80x40 2TN

Holders and cross-beam connectors (for rigid mounting of suction pads)

HTR-UNI

HTR-UNI STB

HTR-UNI STC

ANW/VRS-AN

SVS-GE

Flexible mountings for use with rigid suction pad mountings

KGL

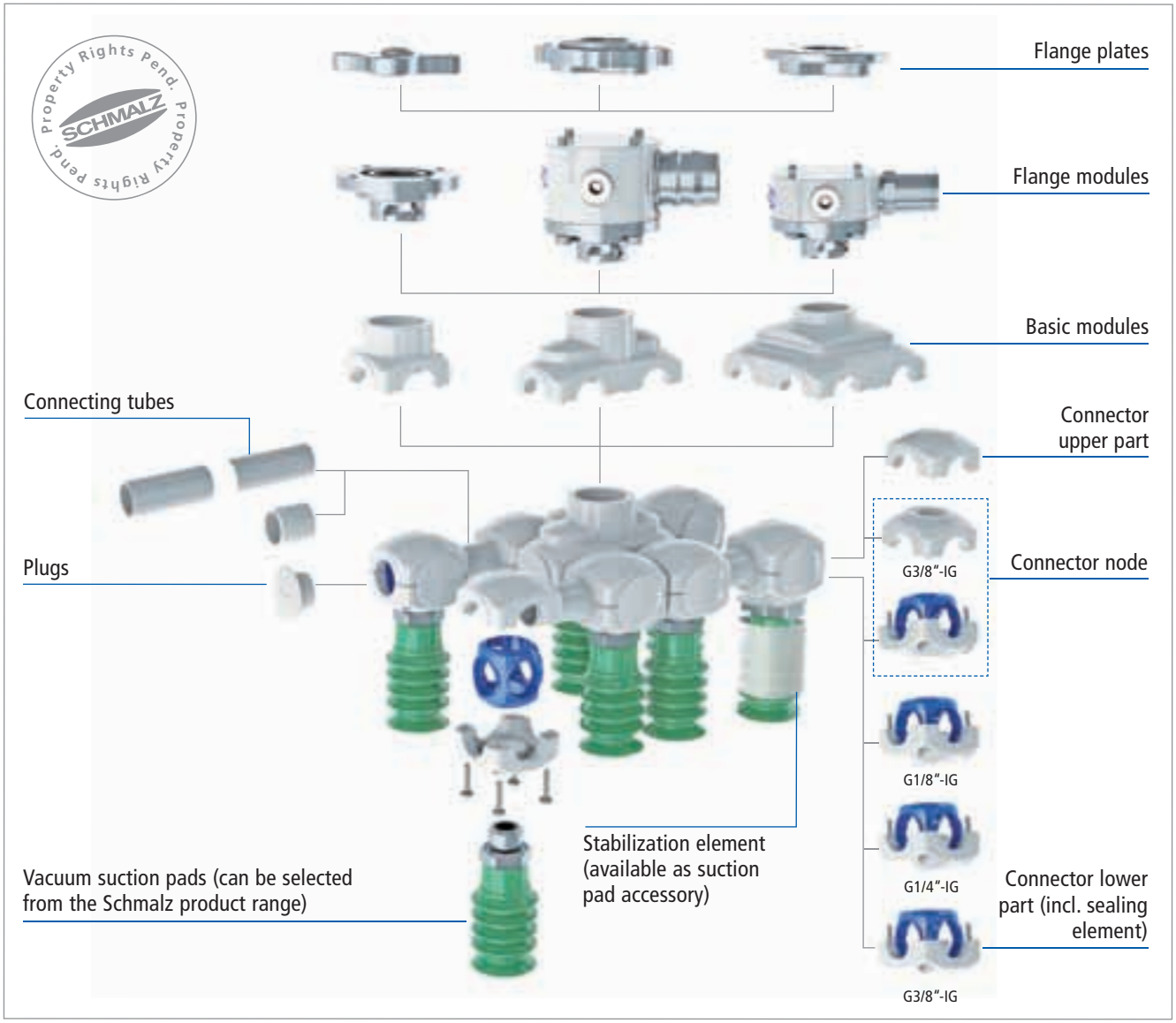
FLK

Mounting Elements

Modular System Vacuum End Effectors VEE

Modular System for Quick and Cost-Efficient Assembly of Vacuum End Effectors

- Flexible modular design with perfectly coordinated parts
- Variable number of suction pads and variable suction pad distances
- Hose-free vacuum distribution
- FDA-compliant polysulfone material (PSU)
- Designed for high-speed applications with accelerations up to 10 *g* (100 m/s^2)
- Minimizes configuration and production time by more than 80%
- Reduces manufacturing costs by up to 75%



Technical Data

Specification	Vacuum end effectors from the VEE modular system
Max. rated flow	60 m³/h
Max. vacuum value	-980 mbar
Overpressure resistance	up to 3 bar
Temperature range	-25 °C to +80 °C
Material	Polysulfone PSU (BfR and FDA approved)
Max. load capacity	2,000 g

Design Data

The modular system VEE allows you to freely configure individual end effectors. This together with the large selection of suction pads for the packaging industry leads to a nearly unlimited number of possible applications.

Specification	Vacuum end effectors from the VEE modular system	
	Minimum configuration (1-connection basic module)	Maximum configuration (4-connection basic module)
Gripper size	38 x 38 mm	300 x 200 mm
Gripper weight[1]	40 g	800 g
Suction pad connection thread	G1/8"-F G1/4"-F G3/8"-F	G1/8"-F G1/4"-F G3/8"-F
Qty. of suction pads	1	12
Workpiece size	15 x 15 mm	400 x 300 mm

[1] without flange module and suction pad

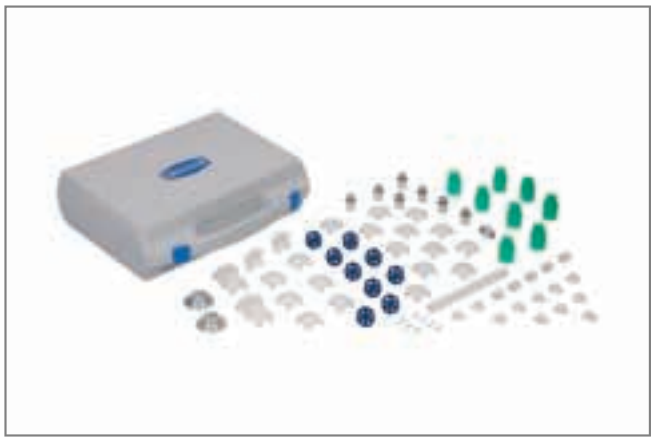
Vacuum End Effectors VEE

Starter Set VEE

Starter set VEE for configurating two complete vacuum end effectors

PACKAGING

Suitability for Industry-Specific Applications



Starter set VEE

Applications

- Starter set for configurating vacuum end effectors for highly dynamic processes
- Complete starter set of the modular system VEE for the configuration of up to two complete grippers

Design

- Consisting of more than 120 parts
- Including 8 vacuum suction pads SPB4-30 for pouches and other flexible packages
- Including manual quick-change adapter with bayonet coupling
- In sturdy plastic case with detailed assembly instructions

Our Highlights...

- Starter set in high-quality suitcase including detailed assembly instructions
- Set consisting of more than 120 individual parts

Your Benefits...

> Simple configuration of a vacuum end effector

> Installation of up to two complete vacuum end effectors

Ordering Data Starter Set VEE

Starter set VEE is delivered in a sturdy plastic case, with detailed assembly instructions. The delivery consists of:
- More than 120 individual parts
- 8 suction pads of type SPB4-30
- Quick-change adapter with bayonet fastener

Starter Set VEE

Type	Part Number
VEE STARTERSET	10.01.36.00030

www.schmalz.com/**vee-starterset**

Starter Set VEE

Starter set VEE for configurating two complete vacuum end effectors

Starter Set VEE

Type*	Designation	Part Number	Quantity
VEE-QCM 20	Flange module	10.01.36.00024	2
VEE-QCF2	Basic module	10.01.36.00009	2
VEE-CO18-U	Connector upper shell	10.01.36.00031	8
VEE-CO18-L**	Connector lower shell	10.01.36.00033	4
VEE-CO18-L-G3/8-IG**	Connector lower shell	10.01.36.00036	8
VEE-TU 18x1.5x200 VEE	Connecting tube	10.01.36.00038	2
VEE-TU 18x1.5x17.8-VEE	Connecting tube	10.01.36.00037	14
VEE-PL C	Plug	10.01.36.00039	20
SC-080-G3/8-AG	Connection element	10.01.06.02593	8
SPB4-30-SI-55	Suction pad for packaging	10.01.06.02589	8

*With assembly instructions and configuration examples

**Contains sealing element and securing screws

Vacuum End Effectors VEE

Flange Plates FLAN-PL

Flange plate for connecting the vacuum end effector VEE to the robot

PACKAGING

Suitability for Industry-Specific Applications

Flange plates FLAN-PL

Applications

- Flange plate for simple and fast connection of the end effector VEE to the robot in conjunction with flange module VEE-QCM

Design

- Robot adapter in 3 different versions for common robot types and as a universal flange
- Flange plate made from anodized aluminum

Our Highlights...

- Available for common robot types and as a universal flange for postprocessing

Your Benefits...

> Flexible connection to various robot systems

Designation Code Flange Plates FLAN-PL

Abbreviated designation	Dimensions in mm	Robot type
Example FLAN-PL 55x7.5-AB1:		
FLAN-PL	**55x7.5**	AB1
FLAN-PL	55x7.5	AB1 ABB IRB 360 Flexpicker
	63x10.5	AD1 ADEPT QUATTRO S650
	63x11.5	UNI universal flange plate

Ordering Data Flange Plates FLAN-PL

Flange plate VEE FLAN-PL is delivered as a ready to connect product, including screws.

Flange Plates FLAN-PL

Type	Part Number
FLAN-PL 55x7.5-AB1*	10.01.30.00015
FLAN-PL 63x10.5-AD1**	10.01.30.00016
FLAN-PL 63x11.5-UNI***	10.01.30.00017

*Suitable for ABB IRB 360

**Suitable for adept quattro S650

***Suitable for customer-specific solutions (universal flange for postprocessing)

Vacuum End Effectors VEE

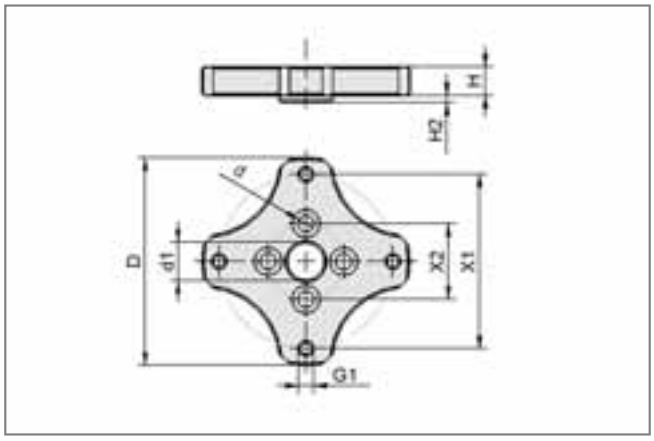
Flange Plates FLAN-PL

Flange plate for connecting the vacuum end effector VEE to the robot

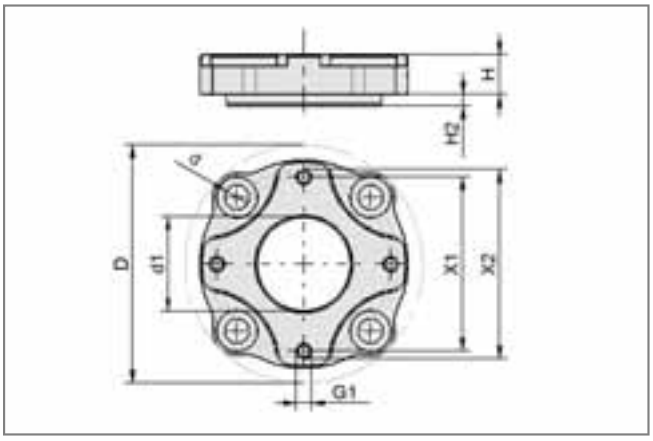
Technical Data Flange Plates FLAN-PL

Type	Weight [g]
FLAN-PL 55x7.5-AB1	37
FLAN-PL 63x10.5-AD1	65
FLAN-PL 63x11.5-UNI	68

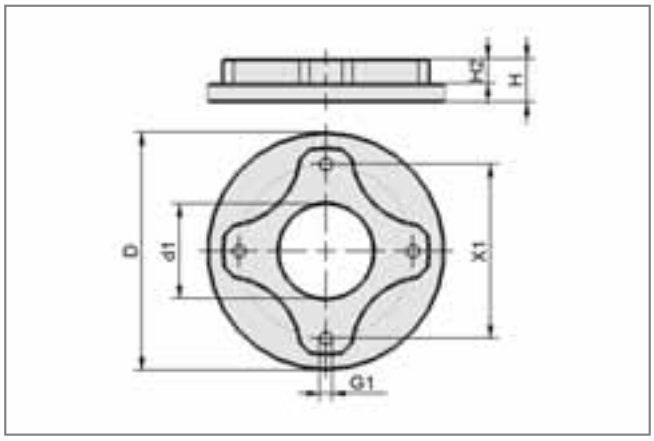
Design Data Flange Plates FLAN-PL



Flange plate FLAN-PL 55x7.5-AB1



Flange plate FLAN-PL 63x10.5-AD1



Flange plate FLAN-PL 63x11.5-UNI

Type	Dimensions in mm							
	d	d1	D	G1	H	H2	X1	X2
FLAN-PL 55x7.5-AB1	4.3	10	55	M4-F	7.5	2.0	46	20
FLAN-PL 63x10.5-AD1	6.6	25	63	M4-F	10.5	3.0	46	50
FLAN-PL 63x11.5-UNI	-	25	63	M4-F	11.5	6.5	46	-

Vacuum End Effectors VEE

Flange Modules VEE-QCM

Flange module for connecting the vacuum end effector VEE to the flange plate

PACKAGING

Suitability for Industry-Specific Applications

Flange modules VEE-QCM

Applications

- Manual quick-change adapter with bayonet fastener including vacuum connection
- Flange module for vertical or horizontal vacuum feed-in

Design

- Vacuum connection, either vertical or horizontal
- Available in 3 variants (max. 20 m³/h or max. 60 m³/h volume flow)
- Bayonet coupling made from food-grade aluminum

Our Highlights...

- Large nominal diameter
- Quick-change adapter with bayonet coupling

Your Benefits...

> Enables operation with side channel blowers or multi-stage ejectors

> Fast change of the gripper, no tools needed

Designation Code Flange Modules VEE-QCM

Abbreviated designation	Overall height in mm
Example VEE-QCM 20:	
VEE-QCM	**20**
VEE-QCM	20
	41
	55

Ordering Data Flange Modules VEE-QCM

Flange module VEE-QCM is delivered as a ready to connect product.

Flange Modules VEE-QCM

Type	Part Number
VEE-QCM 20	10.01.36.00024
VEE-QCM 41	10.01.36.00028
VEE-QCM 55	10.01.36.00025

Vacuum End Effectors VEE

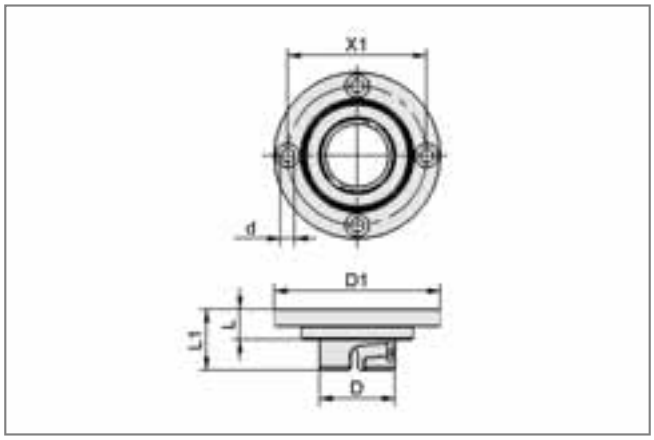
Flange Modules VEE-QCM

Flange module for connecting the vacuum end effector VEE to the flange plate

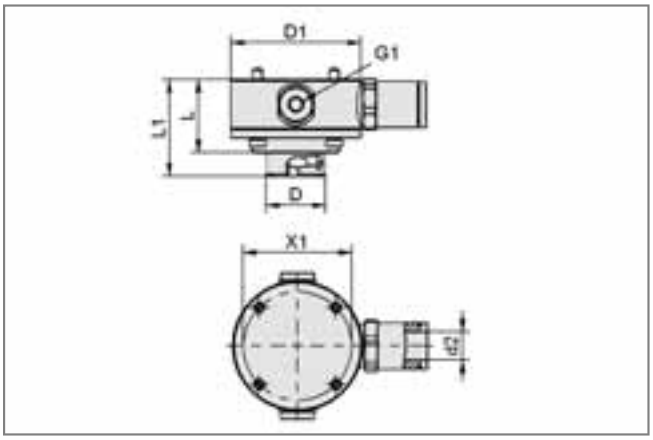
Technical Data Flange Modules VEE-QCM

Type	Max. flow rate [m³/h]	Weight [g]
VEE-QCM 20	60	43
VEE-QCM 41	20	156
VEE-QCM 55	60	163

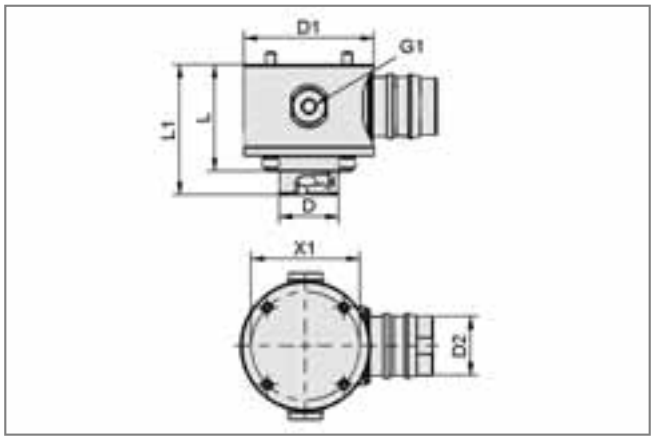
Design Data Flange Modules VEE-QCM



Flange module VEE-QCM 20



Flange module VEE-QCM 41



Flange module VEE-QCM 55

Type	Dimensions in mm								
	d	d2	D	D1	D2	G1	L	L1	X1
VEE-QCM 20	4.5	-	25	54	-	-	12	20	46
VEE-QCM 41	-	12	25	54	-	G1/8"-F	33	41	46
VEE-QCM 55	-	-	25	54	25	G1/8"-F	47	55	46

Vacuum End Effectors VEE

Basic Modules VEE-QCF

Basic module for connecting the vacuum end effector VEE to the flange module

PACKAGING

Suitability for Industry-Specific Applications

Basic modules VEE-QCF

Applications

- Basic component for the build-up of a vacuum end effector VEE
- Connection of the end effector to flange module VEE-QCM with bayonet coupling, no tools needed
- Central vacuum feed-in

Design

- Basic module VEE-QCF made from FDA-compliant material polysulfone (PSU)
- Available with 1, 2 and 4 connections (depending on the desired VEE configuration)

Our Highlights...

- Quick-change adapter with bayonet coupling
- Nominal diameter 60 m³/h
- Module with 1, 2 or 4 connections

Your Benefits...

> Fast change of the gripper, no tools needed

> Suitable for handling porous workpieces

> Individual installation of the end effector for different styles of workpieces

Designation Code Basic Modules VEE-QCF

Abbreviated designation	Basic module	
Example VEE-QCF 1:		
VEE-QCF	**1**	
VEE-QCF	1	basic module with 1 suction cell
	2	basic module with 2 suction cells
	4	basic module with 4 suction cells

Ordering Data Basic Modules VEE-QCF

Basic module VEE-QCF is delivered as a ready to connect product.

Basic Modules VEE-QCF

Type	Part Number
VEE-QCF1	10.01.36.00008
VEE-QCF2	10.01.36.00009
VEE-QCF4	10.01.36.00026

Vacuum End Effectors VEE

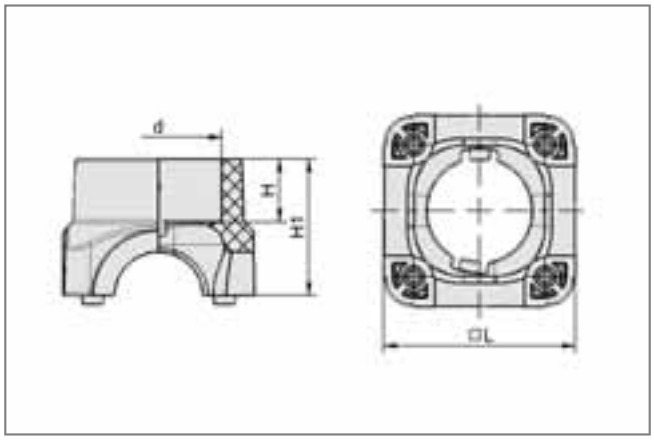
Basic Modules VEE-QCF

Basic module for connecting the vacuum end effector VEE to the flange module

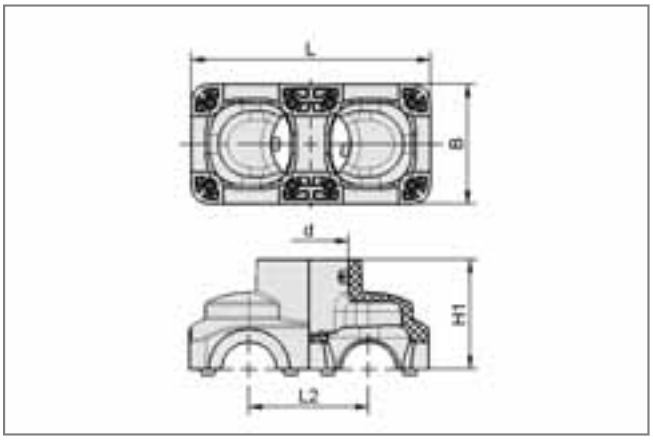
Technical Data Basic Modules VEE-QCF

Type	Material	Weight [g]
VEE-QCF1	Polysulfone PSU	15
VEE-QCF2	Polysulfone PSU	31
VEE-QCF4	Polysulfone PSU	65

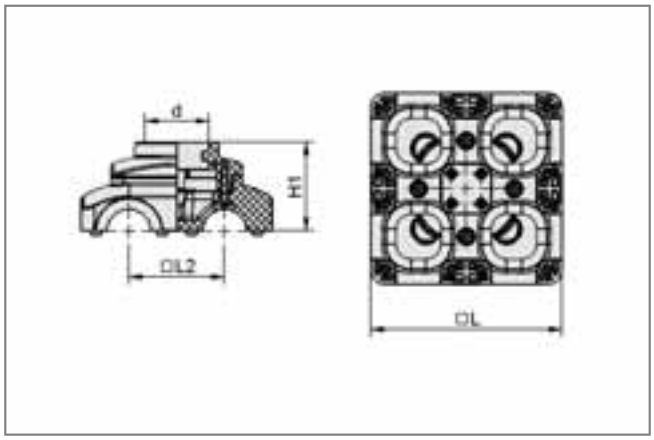
Design Data Basic Modules VEE-QCF



Basic module VEE-QCF1



Basic module VEE-QCF2



Basic module VEE-QCF4

Type	Dimensions in mm					
	B	d	H	H1	L	L2
VEE-QCF1	-	25	12.5	27	38	-
VEE-QCF2	38	18	-	35	76	38
VEE-QCF4	-	25	-	35	76	38

Vacuum End Effectors VEE

Connector Upper Shells VEE-CO-U

Connector upper shell for setting up connector joints

PACKAGING

Suitability for Industry-Specific Applications

Connector upper shells VEE-CO-U

Applications

- Connector upper shell for installation of individual connector nods in conjunction with connector lower shell VEE-CO-L

Design

- As a closed version or as a version with thread for the control of individual vacuum chambers
- Made from FDA-compliant material polysulfone (PSU)
- Packaging unit: 4 pieces

Our Highlights...

- Individual installation of connector joints

Your Benefits...

> Flexible adaptation to various applications

Designation Code Connector Upper Shells VEE-CO-U

Abbreviated designation	Shape	Suitable for pipe diameter in mm	Type	Connection thread
Example VEE-CO18-U G3/8-IG:				
VEE	**CO**	**18**	**U**	**G3/8-IG**
VEE	CO connector	18	U upper shell	- closed G3/8-IG (IG = female (F))

Ordering Data Connector Upper Shells VEE-CO-U

Connector upper shell VEE-CO-U is delivered in packaging units containing 4 pieces.

Connector Upper Shells VEE-CO-U

Type	Part Number	Packaging unit
VEE-CO18-U	10.01.36.00031	4
VEE-CO18-U-G3/8-IG	10.01.36.00032	4

Technical Data Connector Upper Shells VEE-CO-U

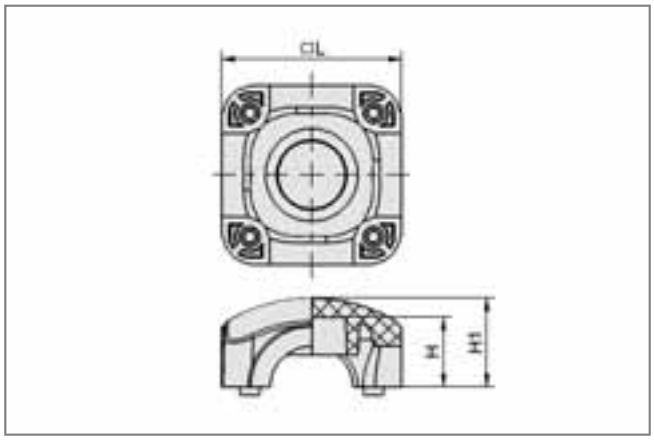
Type	Material	Weight [g]	Grid
VEE-CO18-U	Polysulfone PSU	13	38 x 38 mm
VEE-CO18-U-G3/8-IG	Polysulfone PSU	12	38 x 38 mm

Vacuum End Effectors VEE

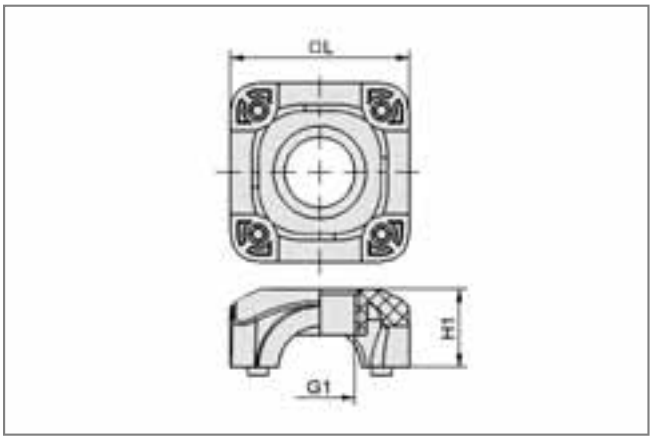
Connector Upper Shells VEE-CO-U

Connector upper shell for setting up connector joints

Design Data Connector Upper Shells VEE-CO-U



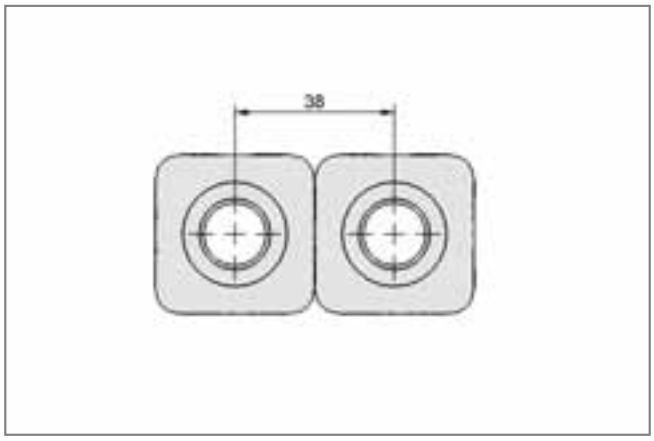
Connector upper shell VEE-CO18-U



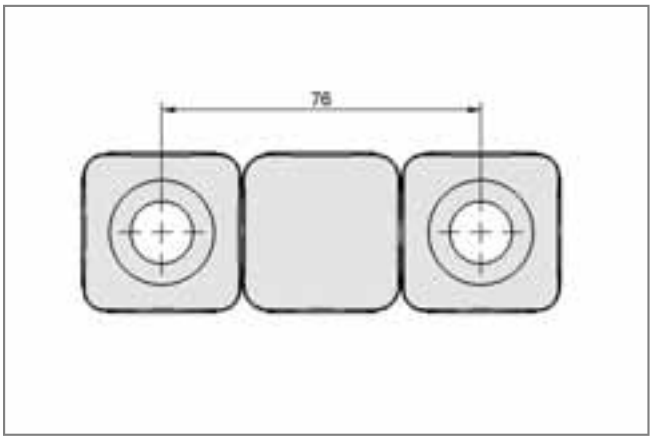
Connector upper shell VEE-CO18-U...F

Type	Dimensions in mm			
	G1	H	H1	L
VEE-CO18-U	-	15	19.0	38
VEE-CO18-U-G3/8-IG	G3/8"-F	-	16.7	38

Grid Connector Upper Shells VEE-CO-U



Minimal grid [mm]



Grid increments [mm], >76 mm variable

Vacuum End Effectors VEE

Connector Lower Shells VEE-CO-L

Connector lower shell for setting up connector joints

PACKAGING

Suitability for Industry-Specific Applications

Connector lower shells VEE-CO-L

Applications

- Connector lower shell for build-up of connector joints with connector upper shell VEE-CO-U or in combination with basic module VEE-QCF
- Direct adaptation of suction pads

Design

- Connector lower shell VEE-CO-L contains sealing element and four screws
- Available closed or with a variety of threads
- Connector lower shell made from FDA-compliant material polysulfone (PSU)
- Packaging unit: 4 pieces

Our Highlights...

- Connection thread matched to the Schmalz product range
- Includes sealing element and screws (FDA-approved material)

Your Benefits...

> Enables direct connection of all Schmalz suction pads

> No additional parts needed

Designation Code Connector Lower Shells VEE-CO-L

Abbreviated designation	Shape	Suitable for pipe diameter in mm	Type	Connection thread
Example VEE-CO18-L G3/8-IG:				
VEE	**CO**	**18**	**L**	**G3/8-IG**
VEE	CO connector	18	L lower shell	- closed G1/8-IG (IG = female (F)) G1/4-IG G3/8-IG

Ordering Data Connector Lower Shells VEE-CO-L

Connector lower shell VEE-CO-L is delivered in packaging units containing 4 pieces. The delivery consists of:
- 4 connector lower shells of the type VEE-CO-L
- 4 sealing elements
- 4 screws for each lower shell

Vacuum End Effectors VEE

Connector Lower Shells VEE-CO-L

Connector lower shell for setting up connector joints

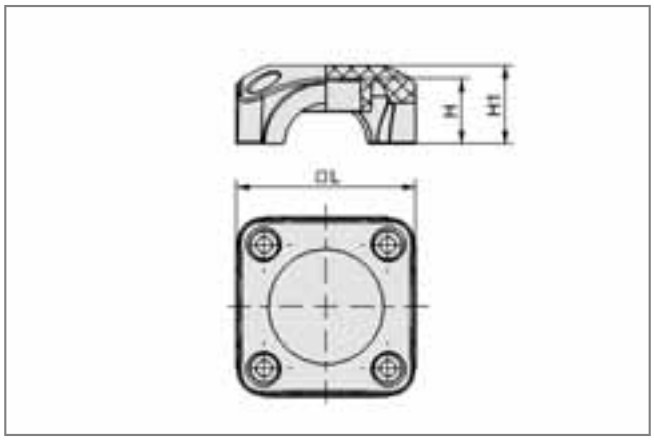
Connector Lower Shells VEE-CO-L

Type	Part Number	Packaging unit
VEE-CO18-L	10.01.36.00033	4
VEE-CO18-L-G1/8-IG	10.01.36.00034	4
VEE-CO18-L-G1/4-IG	10.01.36.00035	4
VEE-CO18-L-G3/8-IG	10.01.36.00036	4

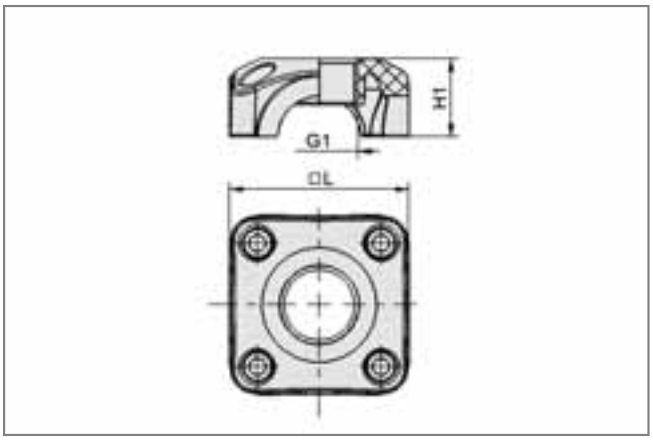
Technical Data Connector Lower Shells VEE-CO-L

Type	Material	Weight [g]	Grid
VEE-CO18-L	Polysulfone PSU/TPE	20	38 x 38 mm
VEE-CO18-L-G1/8-IG	Polysulfone PSU/TPE	19	38 x 38 mm
VEE-CO18-L-G1/4-IG	Polysulfone PSU/TPE	18	38 x 38 mm
VEE-CO18-L-G3/8-IG	Polysulfone PSU/TPE	17	38 x 38 mm

Design Data Connector Lower Shells VEE-CO-L



Connector lower shell VEE-CO-L



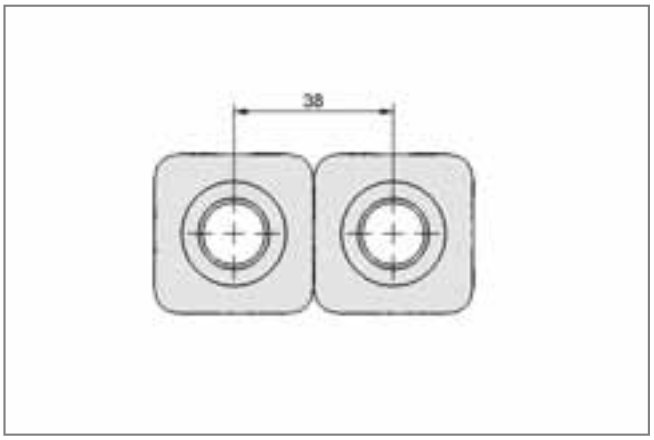
Connector lower shell VEE-CO-L...F

Type	Dimensions in mm			
	G1	H	H1	L
VEE-CO18-L	-	13.8	16.8	38
VEE-CO18-L-G1/8-IG	G1/8"-F	-	16.8	38
VEE-CO18-L-G1/4-IG	G1/4"-F	-	16.8	38
VEE-CO18-L-G3/8-IG	G3/8"-F	-	16.8	38

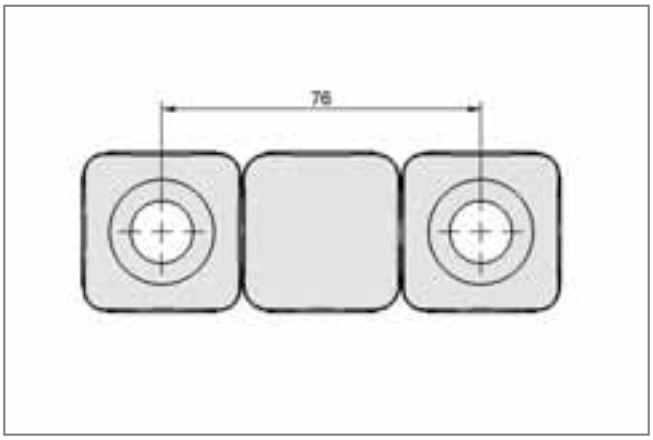
Connector Lower Shells VEE-CO-L

Connector lower shell for setting up connector joints

Grid Connector Lower Shells VEE-CO-L



Minimal grid [mm]



Grid increments [mm], >76 mm variable

Vacuum End Effectors VEE

Connecting Tubes VEE-TU

Connecting tube for connecting individual joint elements

PACKAGING

Suitability for Industry-Specific Applications

Connecting tubes VEE-TU

Applications

- Tube as mechanical and fluidic connection of connector joints

Design

- Connecting tube in two lengths (17.8 mm and 200 mm)
- Connecting tube made from FDA-compliant polysulfone material (PSU)

Our Highlights...

- Integrated vacuum distribution
- Tube with length of 17.8 mm
- Tube with length of 200 mm

Your Benefits...

> Hose-free vacuum distribution and easily cleanable VEE design

> Connection of individual joints with minimal distance

> Connection tubes may be cut to length as needed

Designation Code Connecting Tubes VEE-TU

Abbreviated designation	Shape	Diameter in mm	Thickness in mm	Dimensions in mm	Usage
Example VEE-TU 18x1.5x17.8 VEE:					
VEE	**TU**	**18**	**1.5**	**17.8**	**VEE**
VEE	TU tube	18	1.5	17.8 200	VEE

Ordering Data Connecting Tubes VEE-TU

Connecting tube is delivered in packaging units of 4 (length: 200 mm) or 10 pieces (length: 17.8 mm).

Available accessories: tube scissor, tube trimmer

Connecting Tubes VEE-TU

Type	Part Number	Packaging unit
VEE-TU 18x1.5x17.8	10.01.36.00037	10
VEE-TU 18x1.5x200	10.01.36.00038	4

Vacuum End Effectors VEE

Connecting Tubes VEE-TU

Connecting tube for connecting individual joint elements

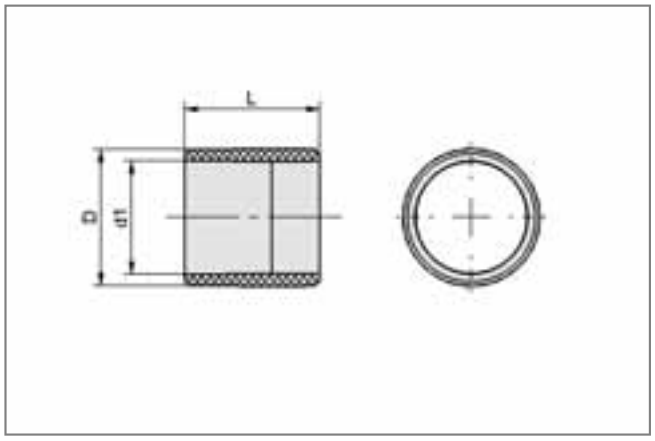
Ordering Data Accessories Connecting Tubes VEE-TU

Type	Designation	Part Number
ROHR-SCHN VEE	Pipe cutting equipment	10.01.36.00042
ROHR-ENTGR VEE	Tubing deburrer	10.01.36.00043

Technical Data Connecting Tubes VEE-TU

Type	Weight [g]
VEE-TU 18x1.5x17.8	1.5
VEE-TU 18x1.5x200	17.0

Design Data Connecting Tubes VEE-TU



Connecting tube VEE-TU

Type	Dimensions in mm		
	d1	D	L
VEE-TU 18x1.5x17.8	15	18	17.8
VEE-TU 18x1.5x200	15	18	200.0

Vacuum End Effectors VEE

Plugs VEE-PL

Plugs for sealing unneeded connections

Suitability for Industry-Specific Applications

Plugs VEE-PL

Applications

- Plugs (VEE-PL P) for sealing of unneeded tube connections
- Plugs in closed design (VEE-PL C) or subdividing the VEE into several suction zones (multi-picking)

Design

- Plugs in closed version (VEE-PL C) made from FDA-compliant polysulfone PSU
- Plugs (VEE-PL P) made from FDA-compliant Silicone SI for subdivision into suction zones
- Packaging unit: 10 pieces (VEE-PL C) / 4 pieces (VEE-PL P)

Our Highlights...

- FDA-compliant materials
- Zoning of vacuum end effectors

Your Benefits...

> Use in the food industry

> Implementation of multi-picking applications

Designation Code Plugs VEE-PL

Abbreviated designation	Shape	Version
Example VEE-PL C:		
VEE	**PL**	**C**
VEE	PL plug	C closed P for partitioning

Ordering Data Plugs VEE-PL

Plug VEE-PL is delivered in packaging units of 4 (VEE-PL P) or 10 pieces (VEE-PL C).

Plugs VEE-PL

Type	Part Number	Packaging unit
VEE-PL C	10.01.36.00039	10
VEE-PL P	10.01.36.00041	4

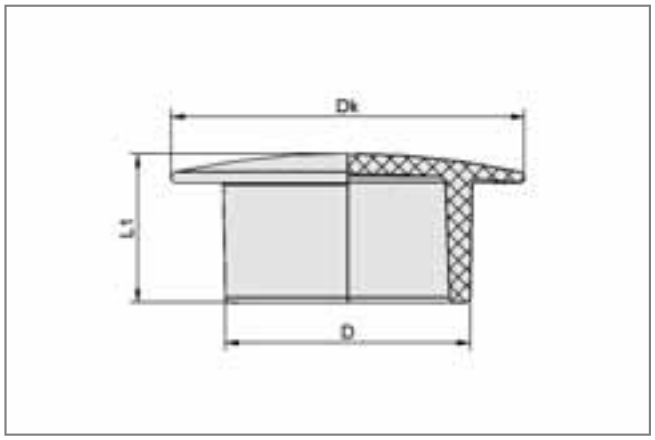
Technical Data Plugs VEE-PL

Type	Material	Max. overpressure resistance [bar]	Weight [g]
VEE-PL C	Polysulfone PSU	3	2
VEE-PL P	Silicone	3	2

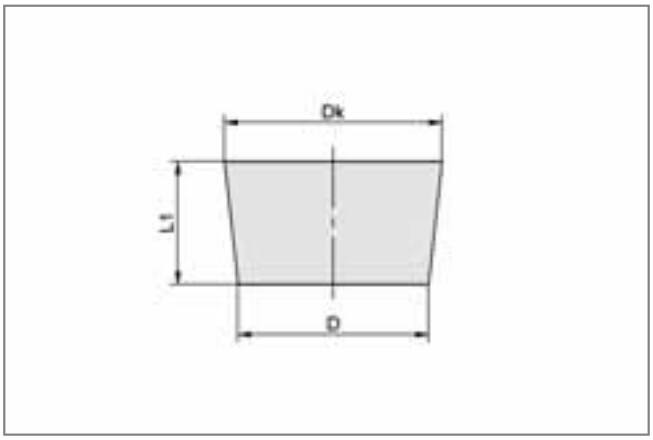
Plugs VEE-PL

Plugs for sealing unneeded connections

Design Data Plugs VEE-PL



Plug VEE-PL C



Plug VEE-PL P

Type	Dimensions in mm		
	D	Dk	L1
VEE-PL C	18	26	10.9
VEE-PL P	14	16	9.0

Jointed Mountings

Flexolink FLK

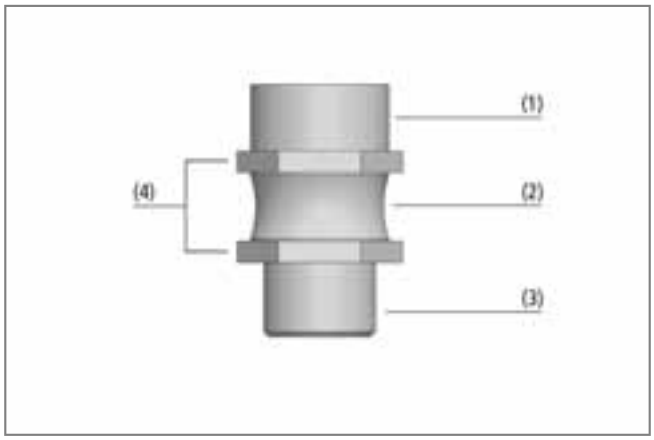
Connection thread from M10x1.25 to G1/2"

Suitability for Industry-Specific Applications

Flexolink FLK

Applications

- Flexolink for handling of workpieces with sloping surfaces with the aid of large-size suction pads or suction plates
- Handling of large sheets of materials (such as wood or sheet metal) which may sag when lifted (Flexolink prevents the sheet from being pulled off due to one-sided forces)
- Can be used together with spring plungers to compensate for differing workpiece heights and uneven surfaces
- Automatic resetting



System design Flexolink FLK

Design

- Flexible mounting made of high-quality steel with a rubber buffer (vulcanized into position) as a joint (2)
- Maximum deflection angle limited by a screw-in stop
- Force is transferred via a shaped metal connection within the joint
- Flats on upper and lower halves for damage-free installation (4)
- Connection thread for top connection (1) and (3) in various sizes
- Deflection (max.) 12°

Flexolink FLK for adaptation to sloping metal sheets

Our Highlights...

- Fully flexible mounting of suction pads and suction plates
- Joint made of rubber and metal
- Low center of flexure
- High-strength connection between rubber and metal parts

Your Benefits...

> Very good adaptation to sloping workpiece surfaces

> Automatic reset function to neutral position

> Reduced wear on suction pads when they are placed on sloping surfaces

> Vacuum-tight design with integrated protection against damage

Jointed Mountings

Flexolink FLK

Connection thread from M10x1.25 to G1/2"

Designation Code Flexolink FLK

Abbreviated designation	Connection thread 1	Connection thread 2	Product addition
Example FLK G1/4-IG M10x1.25-AG:			
FLK	**G1/4-IG**	**M10x1.25-AG**	
FLK	G1/4-AG (AG = male (M)) G1/4-IG (IG = female (F)) G1/2-AG G1/2-IG	M10x1.25-AG (AG = male (M)) G1/4-AG G1/2-AG	V special reinfoced Flexolink

Ordering Data Flexolink FLK

Jointed mounting Flexolink FLK is delivered as a ready to connect product.

Flexolink FLK

Type*	Part Number
FLK G1/4-IG M10x1.25-AG	10.01.03.00206
FLK G1/4-IG G1/4-AG	10.01.03.00178
FLK G1/4-AG G1/4-AG	10.01.03.00152
FLK G1/2-IG G1/2-AG	10.01.03.00175
FLK G1/2-AG G1/2-AG	10.01.03.00153
FLK G1/2-IG G1/2-AG V	10.01.03.00207

*V = Special reinforced Flexolink for use with suction plates SPU 300 and SPU 400

Technical Data Flexolink FLK

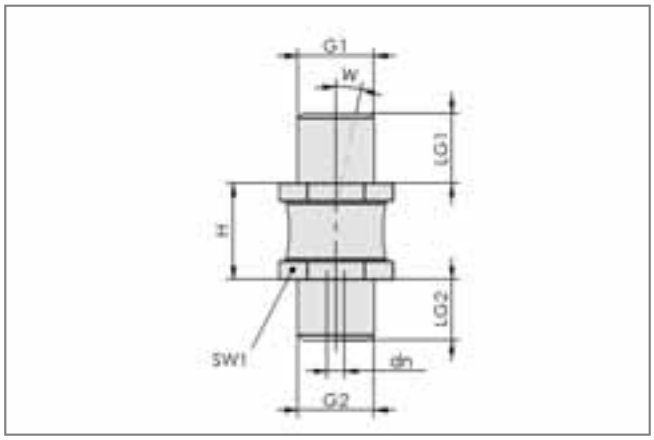
Type	Vertical load [N]	Bending moment [Nm]	Weight [g]
FLK G1/4-IG M10x1.25-AG	500	8	26
FLK G1/4-IG G1/4-AG	750	10	30
FLK G1/4-AG G1/4-AG	750	10	30
FLK G1/2-IG G1/2-AG	3000	50	100
FLK G1/2-AG G1/2-AG	3000	65	100
FLK G1/2-IG G1/2-AG V	4500	65	190

Jointed Mountings

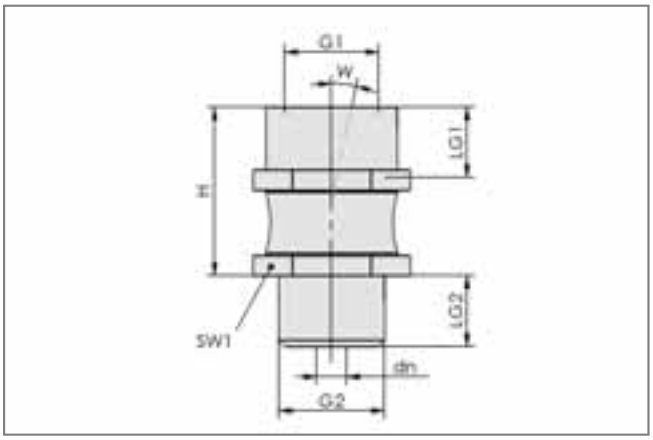
Flexolink FLK

Connection thread from M10x1.25 to G1/2"

Design Data Flexolink FLK



FLK AG-AG



FLK IG-AG

Type	Dimensions in mm							
	dn	G1	G2	H	LG1	LG2	SW1	W [°]
FLK G1/4-IG M10x1.25-AG	2.8	G1/4"-F	M10x1.25-M	27.0	10.5	8	17	12
FLK G1/4-IG G1/4-AG	3.0	G1/4"-F	G1/4"-M	27.0	12.0	12	17	12
FLK G1/4-AG G1/4-AG	3.0	G1/4"-M	G1/4"-M	16.5	10.5	12	17	12
FLK G1/2-IG G1/2-AG	6.0	G1/2"-F	G1/2"-M	33.5	14.0	14	27	12
FLK G1/2-AG G1/2-AG	5.5	G1/2"-M	G1/2"-M	21.0	14.0	14	27	12
FLK G1/2-IG G1/2-AG V	6.0	G1/2"-F	G1/2"-M	53.0	14.0	14	36	8

Jointed Mountings

Ball Joints KGL

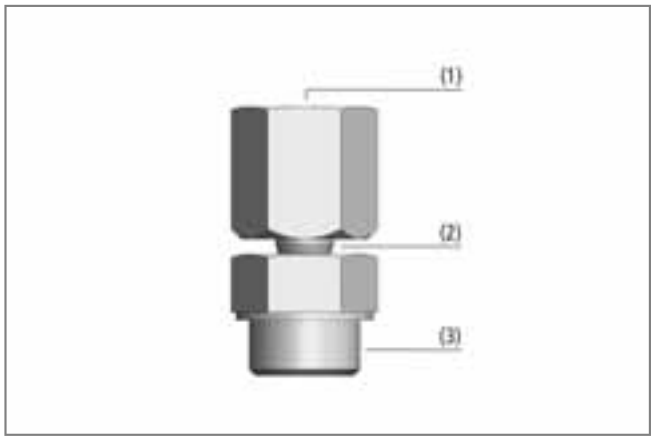
Connection thread from G1/8" to G1/2"

Suitability for Industry-Specific Applications

Ball joints KGL

Applications

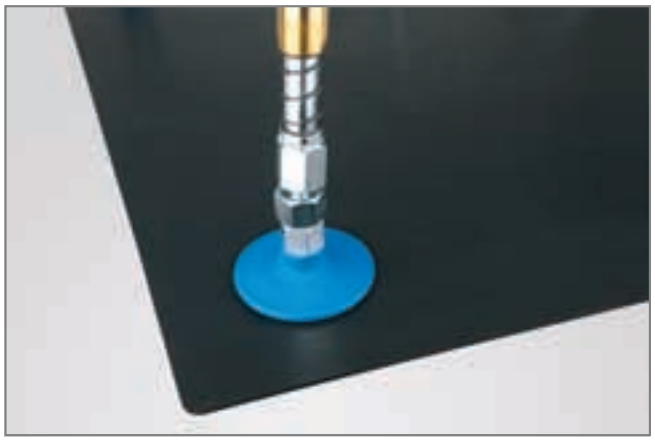
- Ball joint for handling of workpieces with sloping surfaces with the aid of large-size suction pads or suction plates
- Handling of large sheets of materials (such as wood or sheet metal) which may sag when lifted (flexible mounting with KGL prevents premature pulling-off of the sheet due to one-sided forces)
- Can be used together with spring plungers to compensate for differing workpiece heights and uneven surfaces



System design ball joints KGL

Design

- Ball and socket made of galvanized steel (KGL...) or stainless steel (KGL...A2)
- Ball and socket (2) with O-ring seal to prevent vacuum leaks
- Connection thread above (1) and below (3) in various sizes
- Deflection (max.) 15°



Mounting example ball joints KGL

Our Highlights...

- Fully flexible mounting of suction pads and suction plates
- Sealed ball-and-socket joint with vacuum-tight seal
- Low center of flexure

Your Benefits...

> Very good adaptation to workpieces with sloping surfaces

> Safe handling

> Minimum wear on the suction pad when it is placed on a sloping surface

Jointed Mountings

Ball Joints KGL

Connection thread from G1/8" to G1/2"

Designation Code Ball Joints KGL

Abbreviated designation	Connection thread 1	Connection thread 2	Material
Example KGL G1/2-IG G1/2 AG:			
KGL	**G1/2-IG**	**G1/2-AG**	
KGL	G1/8-IG (IG = female (F))	G1/8-AG (AG = male (M))	- galvanised steel
	G1/4-IG	G1/4-AG	A2 stainless steel
	G1/2-IG	G1/2-AG	
		M10x1.25-AG	

Ordering Data Ball Joints KGL

Ball joint KGL is delivered as a ready to connect product.

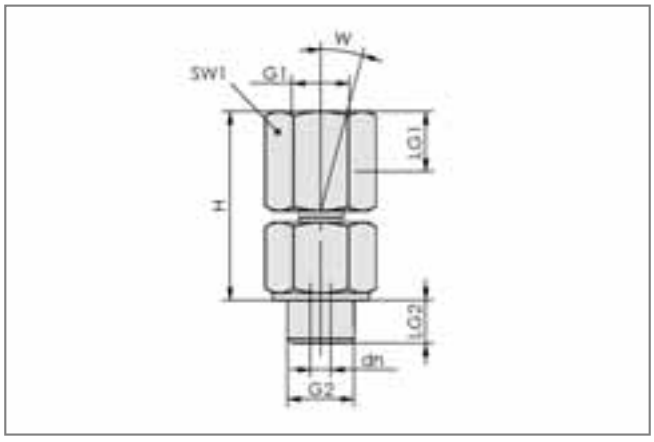
Ball Joints KGL

Type	Part Number
KGL G1/8-IG G1/8-AG A2	10.01.03.00109
KGL G1/4-IG G1/4-AG	10.01.03.00110
KGL G1/4-IG M10x1.25-AG	10.01.03.00137
KGL G1/2-IG G1/2-AG	10.01.03.00111

Technical Data Ball Joints KGL

Type	Vertical load [N]	Weight [g]
KGL G1/8-IG G1/8-AG A2	300	26
KGL G1/4-IG G1/4-AG	1500	67
KGL G1/4-IG M10x1.25-AG	1500	67
KGL G1/2-IG G1/2-AG	2500	116

Design Data Ball Joints KGL



KGL G1/8 to G1/2

Type	Dimensions in mm							
	dn	G1	G2	H	LG1	LG2	SW1	W [°]
KGL G1/8-IG G1/8-AG A2	2.0	G1/8"-F	G1/8"-M	26.5	8.5	7	14	15
KGL G1/4-IG G1/4-AG	3.5	G1/4"-F	G1/4"-M	37.5	12.0	10	19	15
KGL G1/4-IG M10x1.25-AG	3.5	G1/4"-F	M10x1.25-M	37.5	12.0	10	19	15
KGL G1/2-IG G1/2-AG	4.0	G1/2"-F	G1/2"-M	40.0	14.0	12	24	15

Spring plungers

Spring Plungers FSTE

Stroke from 5 mm to 90 mm

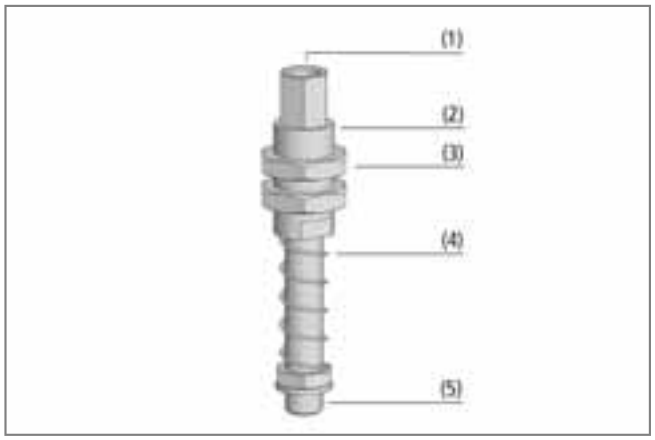
UNIVERSAL

Suitability for Industry-Specific Applications

Spring plungers FSTE

Applications

- Spring plunger for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement



System design spring plungers FSTE

Design

- Spring plunger consisting of a high-strength rod made of galvanized steel, guide sleeve (2) and upper and lower damping springs (4)
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Always female connection thread for suction pads (5) up to size M5, otherwise male thread
- Two lock nuts (3) for attachment

Mounting example spring plungers FSTE

Our Highlights...

- Spring plunger with lower damping spring
- Wide range of connection threads and stroke lengths
- Available with anti-rotation guard

Your Benefits...

> Soft placement of the suction pad on easily damaged workpieces; good compensation for varying workpiece heights

> For a wide range of applications; available for all suction pads of the standard program

> Suitable for use with oval suction pads

Spring plungers

Spring Plungers FSTE

Stroke from 5 mm to 90 mm

Designation Code Spring Plungers FSTE

Abbreviated designation	Suction pad connection	Plunger stroke in mm	Product addition
Example FSTE M3-IG 5 VG:			
FSTE	**M3-IG**	**5**	**VG**
FSTE	M3-IG (IG = female (F)) M5-IG G1/8-AG (AG = male (M)) G1/4-AG G1/2-AG	5 to 90	VG with anti-rotation guard

Ordering Data Spring Plungers FSTE

Spring plunger FSTE is delivered as a ready to connect product.

Spring Plungers FSTE

Type*	Plunger stroke in mm**							
	5	10	15	20	25	50	75	90
FSTE M3	10.01.02.00613	-	-	-	-	-	-	-
FSTE M3 VG	10.01.02.00614	-	-	-	-	-	-	-
FSTE M5	10.01.02.00607	10.01.02.00608	-	10.01.02.00609	-	-	-	-
FSTE M5 VG	10.01.02.00610	10.01.02.00611	-	10.01.02.00612	-	-	-	-
FSTE G1/8	-	-	10.01.02.00602	-	10.01.02.00603	10.01.02.00604	-	-
FSTE G1/8 VG	-	-	10.01.02.00605	-	-	10.01.02.00606	-	-
FSTE G1/4	-	-	-	-	10.01.02.00567	10.01.02.00568	10.01.02.00569	-
FSTE G1/4 VG	-	-	-	-	10.01.02.00570	-	10.01.02.00571	-
FSTE G1/2	-	-	-	-	10.01.02.00574	-	10.01.02.00575	10.01.02.00576

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction pads

**Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Spring plungers

Spring Plungers FSTE

Stroke from 5 mm to 90 mm

Technical Data Spring Plungers FSTE

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTE M3-IG 5	0.596	1.49	2.98	550	47	9	0...80
FSTE M3-IG 5 VG	0.596	1.49	2.98	550	47	9	0...80
FSTE M5-IG 5	0.508	3.30	4.57	1500	132	16	0...80
FSTE M5-IG 5 VG	0.508	3.30	4.57	1500	132	16	0...80
FSTE M5-IG 10	0.323	2.75	4.36	1500	97	19	0...80
FSTE M5-IG 10 VG	0.323	2.75	4.36	1500	97	19	0...80
FSTE M5-IG 20	0.209	1.78	3.87	1500	63	25	0...80
FSTE M5-IG 20 VG	0.209	1.78	3.87	1500	63	25	0...80
FSTE G1/8-AG 15	0.221	3.53	5.19	3700	385	80	0...80
FSTE G1/8-AG 15 VG	0.221	3.53	5.19	3700	385	80	0...80
FSTE G1/8-AG 25	0.143	3.57	5.36	3700	283	90	0...80
FSTE G1/8-AG 50	0.097	2.92	5.34	3700	173	110	0...80
FSTE G1/8-AG 50 VG	0.097	2.92	5.34	3700	173	110	0...80
FSTE G1/4-AG 25	0.711	6.47	15.36	2400	747	145	0...80
FSTE G1/4-AG 25 VG	0.711	6.47	15.36	2400	747	144	0...80
FSTE G1/4-AG 50	0.452	1.40	12.70	2400	466	175	0...80
FSTE G1/4-AG 75	0.262	5.38	15.20	2400	340	190	0...80
FSTE G1/4-AG 75 VG	0.262	5.38	15.20	2400	340	202	0...80
FSTE G1/2-AG 25	3.829	25.64	73.50	4900	1870	400	0...80
FSTE G1/2-AG 75	1.072	37.20	77.40	4900	800	530	0...80
FSTE G1/2-AG 90	1.072	24.38	75.30	4900	730	544	0...80

*Referred to 50% of operating stroke

**Maximum static loading

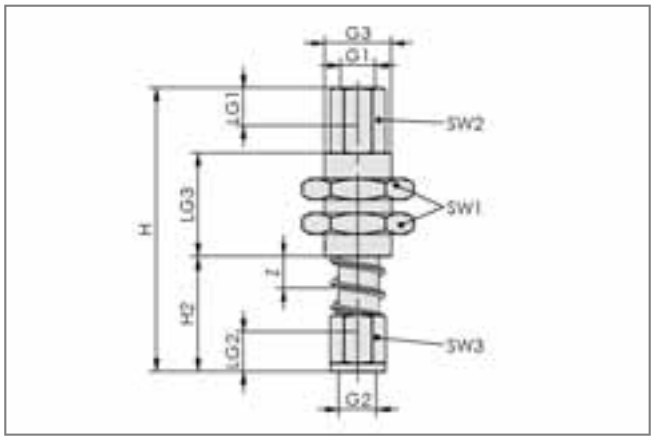
***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

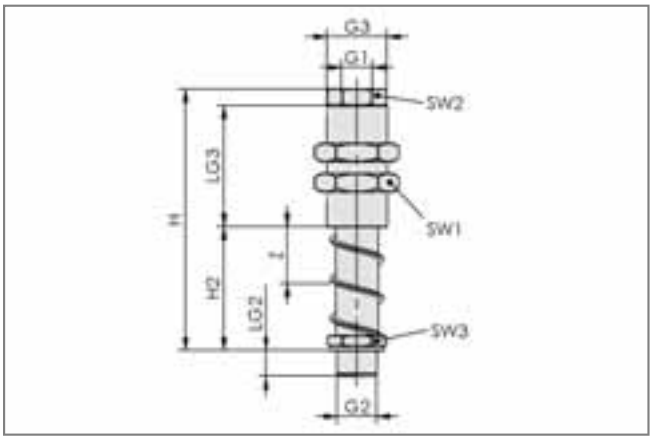
Spring Plungers FSTE

Stroke from 5 mm to 90 mm

Design Data Spring Plungers FSTE



FSTE M3 to M5 (VG)



FSTE G1/8 to G1/2 (VG)

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTE M3-IG 5	M3-F	M3-F	M6x0.75-M	33.5	15.0	3.8	6.0	10	10	5	7	5
FSTE M3-IG 5 VG	M3-F	M3-F	M6x0.75-M	33.5	15.0	3.8	6.0	10	10	5	7	5
FSTE M5-IG 5	M5-F	M5-F	G1/8"-M	41.2	17.0	5.5	6.2	15	14	7	7	5
FSTE M5-IG 5 VG	M5-F	M5-F	G1/8"-M	41.2	17.0	5.5	6.2	15	14	7	7	5
FSTE M5-IG 10	M5-F	M5-F	G1/8"-M	47.2	23.0	5.5	6.2	15	14	7	7	10
FSTE M5-IG 10 VG	M5-F	M5-F	G1/8"-M	47.2	23.0	5.5	6.2	15	14	7	7	10
FSTE M5-IG 20	M5-F	M5-F	G1/8"-M	59.2	35.0	5.5	6.2	15	14	7	7	20
FSTE M5-IG 20 VG	M5-F	M5-F	G1/8"-M	59.2	35.0	5.5	6.2	15	14	7	7	20
FSTE G1/8-AG 15	G1/8"-F	G1/8"-M	M16x1-M	73.5	29.5	8.0	6.5	30	22	12	14	15
FSTE G1/8-AG 15 VG	G1/8"-F	G1/8"-M	M16x1-M	73.5	28.5	8.0	6.5	30	22	12	14	15
FSTE G1/8-AG 25	G1/8"-F	G1/8"-M	M16x1-M	86.5	42.5	8.0	6.5	30	22	12	14	25
FSTE G1/8-AG 50	G1/8"-F	G1/8"-M	M16x1-M	117.5	73.5	8.0	6.5	30	22	12	14	50
FSTE G1/8-AG 50 VG	G1/8"-F	G1/8"-M	M16x1-M	117.5	72.5	8.0	6.5	30	22	12	14	50
FSTE G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	13.0	8.5	40	24	17	17	25
FSTE G1/4-AG 25 VG	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	13.0	8.5	40	24	17	17	25
FSTE G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	115.5	70.0	13.0	8.5	40	24	17	17	50
FSTE G1/4-AG 75	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	13.0	8.5	40	24	17	17	75
FSTE G1/4-AG 75 VG	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	13.0	8.5	40	24	17	17	75
FSTE G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	105.5	42.5	13.0	10.5	55	36	24	24	25
FSTE G1/2-AG 75	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	113.5	13.0	10.5	55	36	24	24	75
FSTE G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	188.5	125.5	13.0	10.5	55	36	24	24	90

Spring plungers

Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm

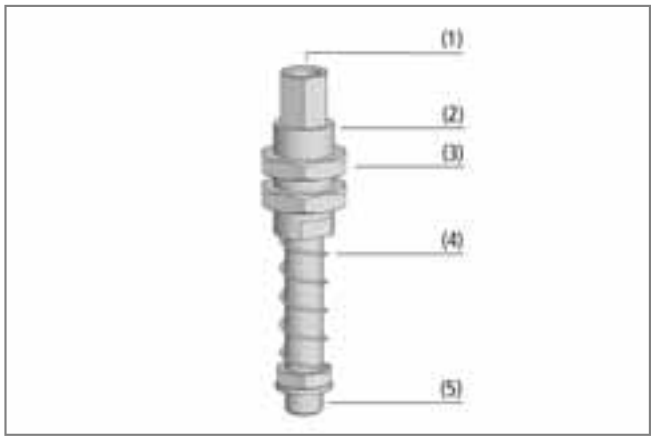
UNIVERSAL

Suitability for Industry-Specific Applications

Spring plungers FSTE-HD

Applications

- Spring plunger with special sliding bearings and one damping spring for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement
- For use under rough operating conditions
- For handling tasks with very dynamic motion and short cycle times



System design spring plungers FSTE-HD

Design

- Spring plunger consisting of high-strength stainless steel rod, brass sleeve with integrated bearing (2) and damping springs (4)
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Anti-rotation guard due to flat side on the rod and a correspondingly shaped guide sleeve
- Always female connection thread for suction pad (5) up to size M5, otherwise male thread
- Two lock nuts (3) for attachment

Mounting example spring plungers FSTE-HD

Our Highlights...	Your Benefits...
• Spring plunger with high-quality sliding bearings	> Maintenance-free, with extremely long operating life-time; suitable for short cycle times
• Spring plunger with one or two damping springs	> Guarantees soft placement on easily damaged workpieces. Absorbs shocks and vibration
• Wide range of connection threads and stroke lengths	> Available for a wide range of applications and for all standard suction pads
• Available with anti-rotation guard	> Suitable for use with oval suction pads

Spring plungers

Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm

Designation Code Spring Plungers FSTE-HD

Abbreviated designation	Version	Suction pad connection	Plunger stroke in mm	Product addition
Example FSTE-HD G1/8-AG 15 VG:				
FSTE	**HD**	**G1/8-AG**	**15**	**VG**
FSTE	HD Heavy Duty (hard use)	G1/8-AG (AG = male (M)) G1/4-AG G3/8-AG G1/2-AG	15 25 50 75 90	VG with anti-rotation guard

Ordering Data Spring Plungers FSTE-HD

Spring plunger FSTE-HD is delivered as a ready to connect product.

Spring Plungers FSTE-HD

Type*	Plunger stroke in mm**				
	15	25	50	75	90
FSTE-HD G1/8	10.01.02.00756	10.01.02.00757	10.01.02.00758	-	-
FSTE-HD G1/8 VG	10.01.02.00872	10.01.02.00873	10.01.02.00874	-	-
FSTE-HD G1/4	-	10.01.02.00763	10.01.02.00764	10.01.02.00765	-
FSTE-HD G1/4 VG	-	10.01.02.00875	10.01.02.00876	10.01.02.00877	10.01.02.01056
FSTE-HD G3/8	-	10.01.02.00811	-	10.01.02.00812	10.01.02.00813
FSTE-HD G3/8 VG	-	10.01.02.00878	-	10.01.02.00879	10.01.02.00880
FSTE-HD G1/2	-	10.01.02.00770	-	10.01.02.00771	10.01.02.00772
FSTE-HD G1/2 VG	-	10.01.02.00881	-	10.01.02.00882	10.01.02.00883

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction pads

**Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Spring plungers

Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm

Technical Data Spring Plungers FSTE-HD

Type	Spring rate [N/mm]	Spring p retension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTE-HD G1/8-AG 15	0.221	3.53	5.19	3700	385	80	0...80
FSTE-HD G1/8-AG 15 VG	0.221	3.53	5.19	3700	385	80	0...80
FSTE-HD G1/8-AG 25	0.143	3.57	5.36	3700	283	90	0...80
FSTE-HD G1/8-AG 25 VG	0.143	3.57	5.36	3700	283	90	0...80
FSTE-HD G1/8-AG 50	0.097	2.92	5.34	3700	173	110	0...80
FSTE-HD G1/8-AG 50 VG	0.097	2.92	5.34	3700	173	110	0...80
FSTE-HD G1/4-AG 25	0.711	6.47	15.36	2400	747	145	0...80
FSTE-HD G1/4-AG 25 VG	0.711	6.47	15.36	2400	747	145	0...80
FSTE-HD G1/4-AG 50	0.452	1.40	12.70	2400	466	175	0...80
FSTE-HD G1/4-AG 50 VG	0.452	1.40	12.70	2400	466	175	0...80
FSTE-HD G1/4-AG 75	0.262	5.38	15.20	2400	340	190	0...80
FSTE-HD G1/4-AG 75 VG	0.262	5.38	15.20	2400	340	190	0...80
FSTE-HD G3/8-AG 25	3.829	25.64	73.50	4800	1870	400	0...80
FSTE-HD G3/8-AG 25 VG	3.829	25.64	73.50	4800	1870	400	0...80
FSTE-HD G3/8-AG 75	1.072	37.20	77.40	4800	800	530	0...80
FSTE-HD G3/8-AG 75 VG	1.072	37.20	77.40	4800	800	530	0...80
FSTE-HD G3/8-AG 90	1.072	24.38	75.30	4800	730	545	0...80
FSTE-HD G3/8-AG 90 VG	1.072	24.38	75.30	4800	730	545	0...80
FSTE-HD G1/2-AG 25	3.829	25.64	73.50	4900	1870	400	0...80
FSTE-HD G1/2-AG 25 VG	3.829	25.64	73.50	4900	1870	400	0...80
FSTE-HD G1/2-AG 75	1.072	37.20	77.40	4900	800	530	0...80
FSTE-HD G1/2-AG 75 VG	1.072	37.20	77.40	4900	800	530	0...80
FSTE-HD G1/4-AG 90 VG	0.262	1.49	13.28	1500	300	210	0...80
FSTE-HD G1/2-AG 90	1.072	24.38	75.30	4900	730	544	0...80
FSTE-HD G1/2-AG 90 VG	1.072	24.38	75.30	4900	730	545	0...80

*Referred to 50% of operating stroke

**Maximum static loading

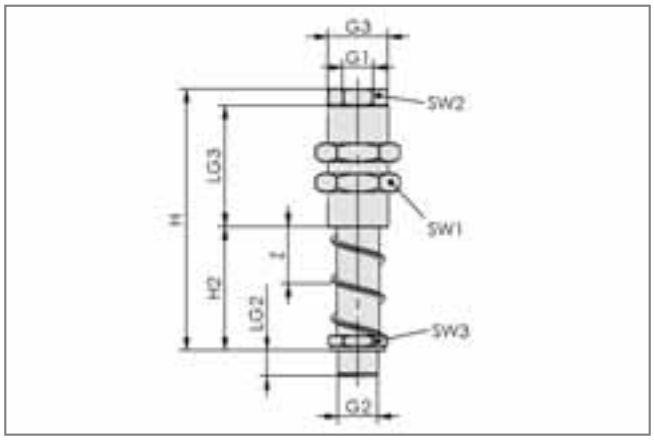
***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

Spring Plungers FSTE-HD

Stroke from 15 mm to 90 mm

Design Data Spring Plungers FSTE-HD



FSTE-HD 1/8 to 1/2 (VG)

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTE-HD G1/8-AG 15	G1/8"-F	G1/8"-M	M16x1-M	72.5	28.5	8	6.5	30	22	12	14	15
FSTE-HD G1/8-AG 15 VG	G1/8"-F	G1/8"-M	M16x1-M	72.5	28.5	8	6.5	30	22	12	14	15
FSTE-HD G1/8-AG 25	G1/8"-F	G1/8"-M	M16x1-M	85.5	41.5	8	6.5	30	22	12	14	25
FSTE-HD G1/8-AG 25 VG	G1/8"-F	G1/8"-M	M16x1-M	85.5	41.5	8	6.5	30	22	12	14	25
FSTE-HD G1/8-AG 50	G1/8"-F	G1/8"-M	M16x1-M	116.5	72.5	8	6.5	30	22	12	14	50
FSTE-HD G1/8-AG 50 VG	G1/8"-F	G1/8"-M	M16x1-M	116.5	72.5	8	6.5	30	22	12	14	50
FSTE-HD G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	12	8.5	40	24	17	17	25
FSTE-HD G1/4-AG 25 VG	G1/8"-F	G1/4"-M	M20x1.5-M	86.0	40.5	12	8.5	40	24	17	17	25
FSTE-HD G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	115.5	70.0	12	8.5	40	24	17	17	50
FSTE-HD G1/4-AG 50 VG	G1/8"-F	G1/4"-M	M20x1.5-M	115.5	70.0	12	8.5	40	24	17	17	50
FSTE-HD G1/4-AG 75	G1/8"-F	G1/4"-M	M20x1.5-M	145.5	100.0	12	8.5	40	24	17	17	75
FSTE-HD G1/4-AG 75 VG	G1/8"-F	G1/4"-M	M20x1.5-M	145.0	99.5	12	8.5	40	24	17	17	75
FSTE-HD G3/8-AG 25	G3/8"-F	G3/8"-M	M30x1.5-M	106.0	41.0	12	10.5	53	36	24	24	25
FSTE-HD G3/8-AG 25 VG	G3/8"-F	G3/8"-M	M30x1.5-M	106.0	41.0	12	10.5	53	36	24	24	25
FSTE-HD G3/8-AG 75	G3/8"-F	G3/8"-M	M30x1.5-M	177.0	112.0	12	10.5	53	36	24	24	75
FSTE-HD G3/8-AG 75 VG	G3/8"-F	G3/8"-M	M30x1.5-M	177.0	112.0	12	10.5	53	36	24	24	75
FSTE-HD G3/8-AG 90	G3/8"-F	G3/8"-M	M30x1.5-M	189.0	124.0	12	10.5	53	36	24	24	90
FSTE-HD G3/8-AG 90 VG	G3/8"-F	G3/8"-M	M30x1.5-M	189.0	124.0	12	10.5	53	36	24	24	90
FSTE-HD G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	105.5	40.5	12	10.5	53	36	24	24	25
FSTE-HD G1/2-AG 25 VG	G3/8"-F	G1/2"-M	M30x1.5-M	105.5	40.5	12	10.5	53	36	24	24	25
FSTE-HD G1/2-AG 75	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	111.5	12	10.5	53	36	24	24	75
FSTE-HD G1/2-AG 75 VG	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	111.5	12	10.5	53	36	24	24	75
FSTE-HD G1/4-AG 90 VG	G1/8"-F	G1/4"-M	M20x1.5-M	160.0	114.3	12	8.5	40	24	17	17	90
FSTE-HD G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	188.5	123.5	12	10.5	53	36	24	24	90
FSTE-HD G1/2-AG 90 VG	G3/8"-F	G1/2"-M	M30x1.5-M	188.5	123.5	12	10.5	53	36	24	24	90

Spring plungers

Spring Plungers FSTA

Stroke from 25 mm to 90 mm

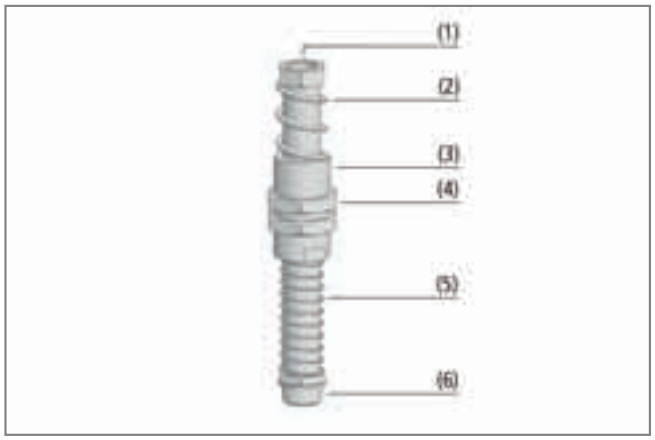
UNIVERSAL

Suitability for Industry-Specific Applications

Spring plungers FSTA

Applications

- Spring plunger with two damping springs for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement



System design spring plungers FSTA

Design

- Spring plunger consisting of a high-strength rod made of galvanized steel, guide sleeve (3) and upper (2) and lower (5) damping springs
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Thread for suction pad is always a male thread (6)
- Two lock nuts for attachment (4)

Mounting example spring plungers FSTA

Our Highlights...

- Spring plunger with two damping springs
- Upper damping spring with high spring rate

Your Benefits...

> Soft placement of the suction pad on easily damaged workpieces; good compensation for varying workpiece heights

> Prevention of excessive stroke lengths; uniform load distribution

Spring plungers

Spring Plungers FSTA

Stroke from 25 mm to 90 mm

Designation Code Spring Plungers FSTA

Abbreviated designation	Suction pad connection	Plunger stroke in mm
Example FSTA G1/2-AG 25:		
FSTA	**G1/2-AG**	**25**
FSTA	G1/4-AG (AG = male (M))	25
	G1/2-AG	50
		90

Ordering Data Spring Plungers FSTA

Spring plunger FSTA is delivered as a ready to connect product.

Spring Plungers FSTA

Type*	Plunger stroke in mm*		
	25	50	90
FSTA G1/4	10.01.02.00572	10.01.02.00573	-
FSTA G1/2	10.01.02.00577	10.01.02.00578	10.01.02.00579

*Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Technical Data Spring Plungers FSTA

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTA G1/4-AG 25	0.711	8.95	17.8	2400	800	185	0...80
FSTA G1/4-AG 50	0.262	14.10	20.6	2400	490	210	0...80
FSTA G1/2-AG 25	3.828	25.65	73.5	4900	1870	493	0...80
FSTA G1/2-AG 50	1.810	3.95	49.2	4900	1200	539	0...80
FSTA G1/2-AG 90	1.072	24.38	75.3	4900	730	645	0...80

*Referred to 50% of operating stroke

**Maximum static loading

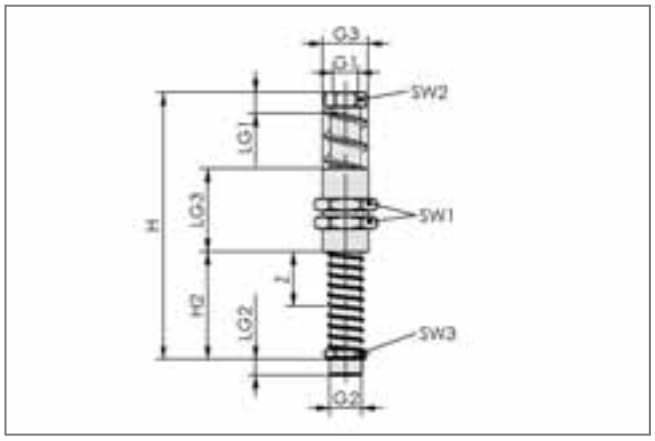
***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

Spring Plungers FSTA

Stroke from 25 mm to 90 mm

Design Data Spring Plungers FSTA



FSTA G1/4 to G1/2

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTA G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	114.5	37.0	12	8.5	40	24	17	17	25
FSTA G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	144.0	66.5	12	8.5	40	24	17	17	50
FSTA G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	146.5	42.5	12	10.5	55	36	24	24	25
FSTA G1/2-AG 50	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	72.5	12	10.5	55	36	24	24	50
FSTA G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	229.5	125.5	12	10.5	55	36	24	24	90

Spring plungers

Spring Plungers FSTA-HD

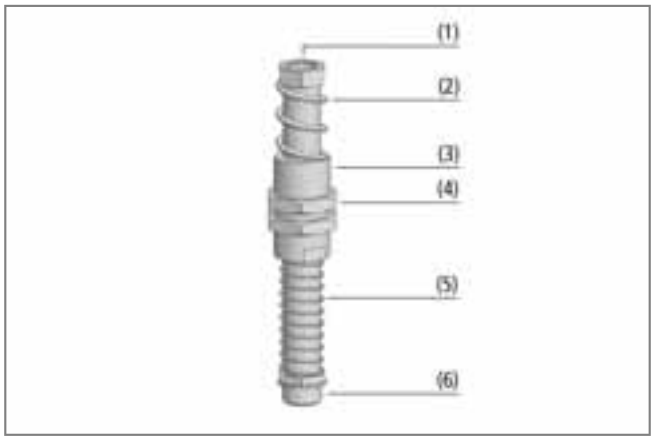
Stroke from 25 mm to 90 mm

Suitability for Industry-Specific Applications

Spring plungers FSTA-HD

Applications

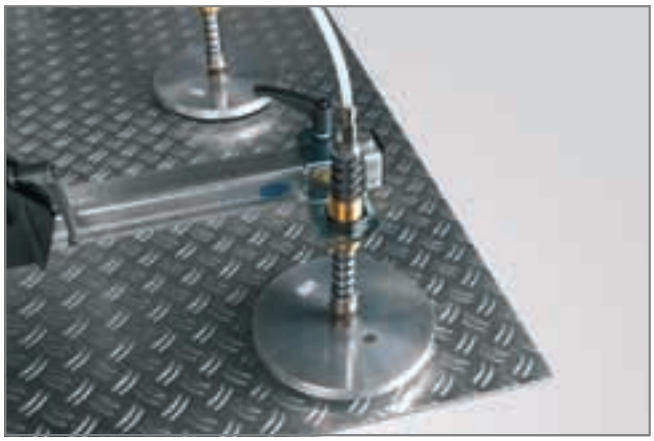
- Spring plunger with two damping springs and special sliding bearings for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement
- For use under rough operating conditions
- For handling tasks with very dynamic motion and short cycle times



System design spring plungers FSTA-HD

Design

- Spring plunger consisting of high-strength steel rod, guide sleeve (3) with integrated bearing and lower (5) and upper (2) damping spring
- Plunger rod with integrated vacuum feed, always female connection thread (1)
- Anti-rotation guard due to flat side on the rod and a correspondingly shaped guide sleeve
- Thread for suction pad is always a male thread (6)
- Two lock nuts (4) for attachment



Mounting example spring plungers FSTA-HD

Our Highlights...

- Spring plunger with high-quality sliding bearings and specially machined plunger rod
- Spring plunger with two damping springs
- Wide range of different connection threads and stroke lengths
- Optionally available with anti-rotation guard

Your Benefits...

> Maintenance-free, with extremely long operating lifetime; suitable for short cycle times

> Guarantees soft placement on easily damaged workpieces. Absorbs shocks and vibration. Prevents excessively long strokes

> Available for a wide range of applications and for all suction pads of the standard range

> Suitable for use with oval suction pads

Spring plungers

Spring Plungers FSTA-HD

Stroke from 25 mm to 90 mm

Designation Code Spring Plungers FSTA-HD

Abbreviated designation	Version	Suction pad connection	Plunger stroke in mm	Product addition
Example FSTA-HD G1/4-AG 50 VG:				
FSTA	**HD**	**G1/4-AG**	**50**	**VG**
FSTA	HD Heavy Duty (hard use)	G1/4-AG (AG = male (M)) G3/8-AG G1/2-AG	25 50 90	VG with anti-rotation guard

Ordering Data Spring Plungers FSTA-HD

Spring plunger FSTA-HD is delivered as a ready to connect product.

Spring Plungers FSTA-HD

Type*	Plunger stroke in mm*		
	25	50	90
FSTA-HD G1/4	10.01.02.00777	10.01.02.00778	-
FSTA-HD G1/4 VG	10.01.02.00884	10.01.02.00885	-
FSTA-HD G3/8	10.01.02.00814	10.01.02.00815	10.01.02.00816
FSTA-HD G3/8 VG	10.01.02.00886	10.01.02.00887	10.01.02.00888
FSTA-HD G1/2	10.01.02.00779	10.01.02.00780	10.01.02.00781
FSTA-HD G1/2 VG	10.01.02.00889	10.01.02.00890	10.01.02.00891

*Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Technical Data Spring Plungers FSTA-HD

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTA-HD G1/4-AG 25	0.711	8.95	17.8	2400	800	185	0...80
FSTA-HD G1/4-AG 25 VG	0.711	8.95	17.8	2400	800	185	0...80
FSTA-HD G1/4-AG 50	0.262	14.10	20.6	2400	490	210	0...80
FSTA-HD G1/4-AG 50 VG	0.262	14.10	20.6	2400	490	210	0...80
FSTA-HD G3/8-AG 25	3.828	25.65	73.5	4800	1870	495	0...80
FSTA-HD G3/8-AG 25 VG	3.828	25.65	73.5	4800	1870	495	0...80
FSTA-HD G3/8-AG 50	1.810	3.95	49.2	4800	1200	540	0...80
FSTA-HD G3/8-AG 50 VG	1.810	3.95	49.2	4800	1200	540	0...80
FSTA-HD G3/8-AG 90	1.072	24.38	75.3	4800	730	645	0...80
FSTA-HD G3/8-AG 90 VG	1.072	24.38	75.3	4800	730	645	0...80
FSTA-HD G1/2-AG 25	3.828	25.65	73.5	4900	1870	493	0...80
FSTA-HD G1/2-AG 25 VG	3.828	25.65	73.5	4900	1870	495	0...80
FSTA-HD G1/2-AG 50	1.810	3.95	49.2	4900	1200	539	0...80
FSTA-HD G1/2-AG 50 VG	1.810	3.95	49.2	4900	1200	540	0...80
FSTA-HD G1/2-AG 90	1.072	24.38	75.3	4900	730	645	0...80
FSTA-HD G1/2-AG 90 VG	1.072	24.38	75.3	4900	730	645	0...80

*Referred to 50% of operating stroke

**Maximum static loading

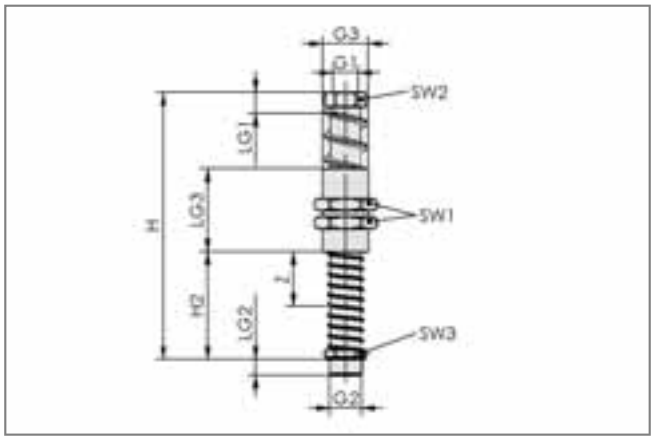
***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

Spring Plungers FSTA-HD

Stroke from 25 mm to 90 mm

Design Data Spring Plungers FSTA-HD



FSTA-HD G1/4 to G1/2

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTA-HD G1/4-AG 25	G1/8"-F	G1/4"-M	M20x1.5-M	114.5	37.0	12	8.5	40	24	17	17	25
FSTA-HD G1/4-AG 25 VG	G1/8"-F	G1/4"-M	M20x1.5-M	114.5	37.0	12	8.5	40	24	17	17	25
FSTA-HD G1/4-AG 50	G1/8"-F	G1/4"-M	M20x1.5-M	144.0	66.5	12	8.5	40	24	17	17	50
FSTA-HD G1/4-AG 50 VG	G1/8"-F	G1/4"-M	M20x1.5-M	144.0	66.5	12	8.5	40	24	17	17	50
FSTA-HD G3/8-AG 25	G3/8"-F	G3/8"-M	M30x1.5-M	146.5	49.5	12	10.5	53	36	24	24	25
FSTA-HD G3/8-AG 25 VG	G3/8"-F	G3/8"-M	M30x1.5-M	147.0	57.0	12	10.5	53	36	24	24	25
FSTA-HD G3/8-AG 50	G3/8"-F	G3/8"-M	M30x1.5-M	176.5	79.5	12	10.5	53	36	24	24	50
FSTA-HD G3/8-AG 50 VG	G3/8"-F	G3/8"-M	M30x1.5-M	177.0	87.0	12	10.5	53	36	24	24	50
FSTA-HD G3/8-AG 90	G3/8"-F	G3/8"-M	M30x1.5-M	229.5	132.5	12	10.5	53	36	24	24	90
FSTA-HD G3/8-AG 90 VG	G3/8"-F	G3/8"-M	M30x1.5-M	230.0	140.0	12	10.5	53	36	24	24	90
FSTA-HD G1/2-AG 25	G3/8"-F	G1/2"-M	M30x1.5-M	146.5	56.5	12	10.5	53	36	24	24	25
FSTA-HD G1/2-AG 25 VG	G3/8"-F	G1/2"-M	M30x1.5-M	146.5	56.5	12	10.5	53	36	24	24	25
FSTA-HD G1/2-AG 50	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	86.5	12	10.5	53	36	24	24	50
FSTA-HD G1/2-AG 50 VG	G3/8"-F	G1/2"-M	M30x1.5-M	176.5	86.5	12	10.5	53	36	24	24	50
FSTA-HD G1/2-AG 90	G3/8"-F	G1/2"-M	M30x1.5-M	229.5	139.5	12	10.5	53	36	24	24	90
FSTA-HD G1/2-AG 90 VG	G3/8"-F	G1/2"-M	M30x1.5-M	229.5	139.5	12	10.5	53	36	24	24	90

Spring plungers

Spring Plungers FSTI

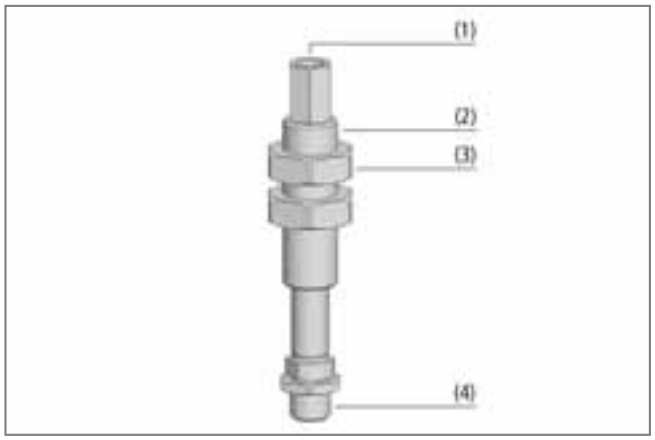
Stroke from 10 mm to 50 mm

Suitability for Industry-Specific Applications

Spring plungers FSTI

Applications

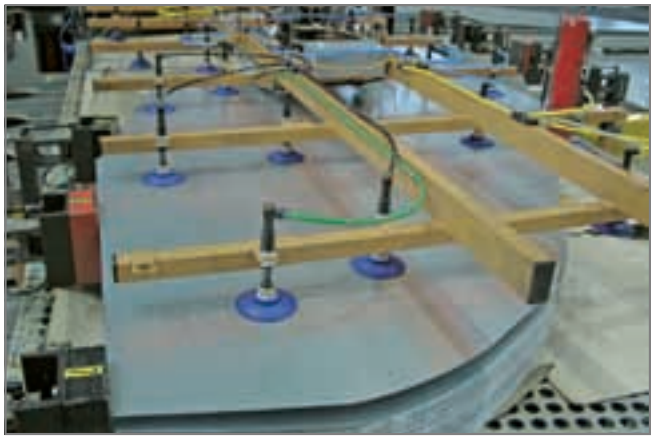
- Spring plunger with internal damping spring for handling of workpieces with differing heights (such as curved metal sheets, etc.)
- Handling of easily damaged workpieces (such as sheets of glass) without additional control functions to prevent damage, since the plunger ensures soft placement
- Particularly suitable for handling tasks in the automobile sector



System design spring plungers FSTI

Design

- Spring plunger consisting of high-strength steel rod, guide sleeve with integrated sliding bearing (2) and internal damping spring
- Connection thread for suction pad is male (4); connection thread for vacuum supply (1) either a female or male thread
- Two lock nuts (3) for attachment
- Burnished surface finish; on the version with anti-turning function, the plunger rod is specially coated for optimum sliding behaviour
- Plunger rod with integrated vacuum feed
- Anti-rotation guard due to flat side on the rod and a correspondingly shaped guide sleeve



Mounting example spring plungers FSTI

Our Highlights...

- Spring plunger with high-quality sliding bearings and excellent guidance
- Internal damping spring
- Minimum overall height; weight optimized
- Available with anti-rotation guard

Your Benefits...

> Very economical operation, since no maintenance needed

> Soft placement on easily damaged workpieces; spring protected against dirt and external mechanical forces

> Suitable for use in very small spaces and with highly dynamic motion

> Suitable for use with oval suction pads

Spring plungers

Spring Plungers FSTI

Stroke from 10 mm to 50 mm

Designation Code Spring Plungers FSTI

Abbreviated designation	Suction pad connection	Vacuum connection	Plunger stroke in mm	Product addition
Example FSTI G1/4-AG G1/8-AG 10 VG:				
FSTI	**G1/4-AG**	**G1/8-AG**	**10**	**VG**
FSTI	G1/4-AG (AG = male (M)) G3/8-AG	G1/8-AG (AG = male (M)) G1/8-IG (IG = female (F))	10 25 50	VG with anti-rotation guard

Ordering Data Spring Plungers FSTI

The spring plunger FSTI is delivered as a ready to connect product.

Spring Plungers FSTI

Type*	Plunger stroke in mm**		
	10	25	50
FSTI G1/4-AG G1/8-AG	10.01.02.00864	10.01.02.00868	10.01.02.00992
FSTI G1/4-AG G1/8-AG VG	10.01.02.00865	10.01.02.00869	10.01.02.00993
FSTI G1/4-AG G1/8-IG	10.01.02.00866	10.01.02.00870	10.01.02.00994
FSTI G1/4-AG G1/8-IG VG	10.01.02.00867	10.01.02.00871	10.01.02.00995
FSTI G3/8-AG G1/8-AG	10.01.02.00755	10.01.02.00843	10.01.02.00996
FSTI G3/8-AG G1/8-AG VG	10.01.02.00860	10.01.02.00862	10.01.02.00997
FSTI G3/8-AG G1/8-IG	10.01.02.00851	10.01.02.00850	10.01.02.00998
FSTI G3/8-AG G1/8-IG VG	10.01.02.00861	10.01.02.00863	10.01.02.00999

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction pads

**Commendation: To raise the lifetime in continuous duty, prevent the maximal slide stroke

Spring plungers

Spring Plungers FSTI

Stroke from 10 mm to 50 mm

Technical Data Spring Plungers FSTI

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTI G1/4-AG G1/8-AG 10	0.097	7.08	7.57	1000	700	150	0...80
FSTI G1/4-AG G1/8-AG 10 VG	0.097	7.08	7.57	1000	500	150	0...80
FSTI G1/4-AG G1/8-IG 10	0.097	7.08	7.57	1000	700	150	0...80
FSTI G1/4-AG G1/8-IG 10 VG	0.097	7.08	7.57	1000	500	150	0...80
FSTI G1/4-AG G1/8-AG 25	0.097	5.63	6.84	1000	700	180	0...80
FSTI G1/4-AG G1/8-AG 25 VG	0.097	5.63	6.84	1000	500	180	0...80
FSTI G1/4-AG G1/8-IG 25	0.097	5.63	6.84	1000	700	180	0...80
FSTI G1/4-AG G1/8-IG 25 VG	0.097	5.63	6.84	1000	500	180	0...80
FSTI G1/4-AG G1/8-AG 50	0.097	2.30	4.70	1000	700	230	0...80
FSTI G1/4-AG G1/8-AG 50 VG	0.097	2.30	4.70	1000	500	230	0...80
FSTI G1/4-AG G1/8-IG 50	0.097	2.30	4.70	1000	700	230	0...80
FSTI G1/4-AG G1/8-IG 50 VG	0.097	2.30	4.70	1000	500	230	0...80
FSTI G3/8-AG G1/8-AG 10	0.097	7.08	7.57	1000	700	150	0...80
FSTI G3/8-AG G1/8-AG 10 VG	0.097	7.08	7.57	1000	500	150	0...80
FSTI G3/8-AG G1/8-IG 10	0.097	7.08	7.57	1000	700	150	0...80
FSTI G3/8-AG G1/8-IG 10 VG	0.097	7.08	7.57	1000	500	150	0...80
FSTI G3/8-AG G1/8-AG 25	0.097	5.63	6.84	1000	700	180	0...80
FSTI G3/8-AG G1/8-AG 25 VG	0.097	5.63	6.84	1000	500	180	0...80
FSTI G3/8-AG G1/8-IG 25	0.097	5.63	6.84	1000	700	180	0...80
FSTI G3/8-AG G1/8-IG 25 VG	0.097	5.63	6.84	1000	500	180	0...80
FSTI G3/8-AG G1/8-AG 50	0.097	2.30	4.70	1000	700	230	0...80
FSTI G3/8-AG G1/8-AG 50 VG	0.097	2.30	4.70	1000	500	230	0...80
FSTI G3/8-AG G1/8-IG 50	0.097	2.30	4.70	1000	700	230	0...80
FSTI G3/8-AG G1/8-IG 50 VG	0.097	2.30	4.70	1000	500	230	0...80

*Referred to 50% of operating stroke

**Maximum static loading

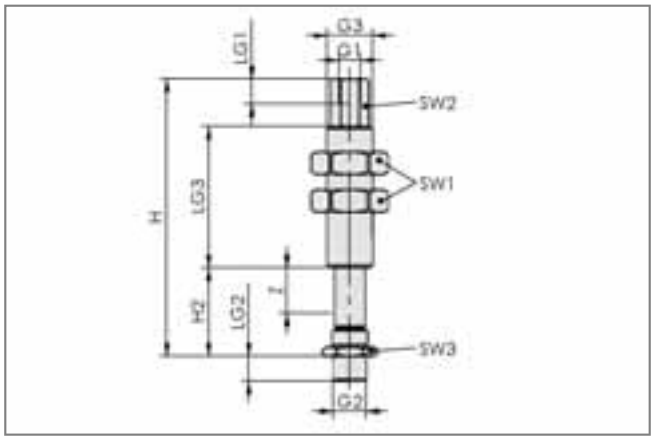
***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

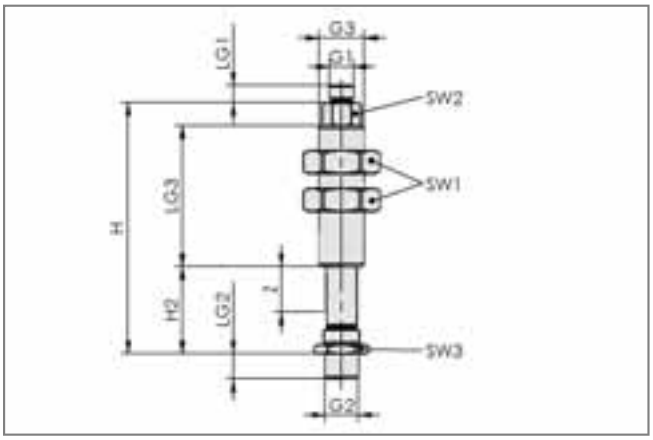
Spring Plungers FSTI

Stroke from 10 mm to 50 mm

Design Data Spring Plungers FSTI



FSTI...AG...IG (VG)



FSTI...AG...AG (VG)

Type	Dimensions in mm											
	G1	G2	G3	H	H2	LG1	LG2	LG3	SW1	SW2	SW3	Z (Stroke)
FSTI G1/4-AG G1/8-AG 10	G1/8"-M	G1/4"-M	M18x1.5-M	71.0	21.0	6.5	10	41	27	13	17	10
FSTI G1/4-AG G1/8-AG 10 VG	G1/8"-M	G1/4"-M	M18x1.5-M	71.0	21.0	6.5	10	41	27	13	17	10
FSTI G1/4-AG G1/8-IG 10	G1/8"-F	G1/4"-M	M18x1.5-M	79.5	19.5	12.0	10	41	27	13	17	10
FSTI G1/4-AG G1/8-IG 10 VG	G1/8"-F	G1/4"-M	M18x1.5-M	79.5	19.5	12.0	10	41	27	13	17	10
FSTI G1/4-AG G1/8-AG 25	G1/8"-M	G1/4"-M	M18x1.5-M	101.0	36.0	6.5	10	56	27	13	17	25
FSTI G1/4-AG G1/8-AG 25 VG	G1/8"-M	G1/4"-M	M18x1.5-M	101.0	36.0	6.5	10	56	27	13	17	25
FSTI G1/4-AG G1/8-IG 25	G1/8"-F	G1/4"-M	M18x1.5-M	109.5	34.5	12.0	10	56	27	13	17	25
FSTI G1/4-AG G1/8-IG 25 VG	G1/8"-F	G1/4"-M	M18x1.5-M	109.5	34.5	12.0	10	56	27	13	17	25
FSTI G1/4-AG G1/8-AG 50	G1/8"-M	G1/4"-M	M18x1.5-M	176.5	59.0	6.5	8	91	27	13	17	50
FSTI G1/4-AG G1/8-AG 50 VG	G1/8"-M	G1/4"-M	M18x1.5-M	176.5	59.0	6.5	8	91	27	13	17	50
FSTI G1/4-AG G1/8-IG 50	G1/8"-F	G1/4"-M	M18x1.5-M	180.0	59.0	12.0	8	91	27	13	17	50
FSTI G1/4-AG G1/8-IG 50 VG	G1/8"-F	G1/4"-M	M18x1.5-M	180.0	59.0	12.0	8	91	27	13	17	50
FSTI G3/8-AG G1/8-AG 10	G1/8"-M	G3/8"-M	M18x1.5-M	72.0	22.0	6.5	9	41	27	13	19	10
FSTI G3/8-AG G1/8-AG 10 VG	G1/8"-M	G3/8"-M	M18x1.5-M	72.0	22.0	6.5	9	41	27	13	19	10
FSTI G3/8-AG G1/8-IG 10	G1/8"-F	G3/8"-M	M18x1.5-M	82.5	22.5	12.0	9	41	27	13	19	10
FSTI G3/8-AG G1/8-IG 10 VG	G1/8"-F	G3/8"-M	M18x1.5-M	82.5	22.5	12.0	9	41	27	13	19	10
FSTI G3/8-AG G1/8-AG 25	G1/8"-M	G3/8"-M	M18x1.5-M	102.0	37.0	6.5	9	56	27	13	19	25
FSTI G3/8-AG G1/8-AG 25 VG	G1/8"-M	G3/8"-M	M18x1.5-M	102.0	37.0	6.5	9	56	27	13	19	25
FSTI G3/8-AG G1/8-IG 25	G1/8"-F	G3/8"-M	M18x1.5-M	112.5	37.5	12.0	9	56	27	13	19	25
FSTI G3/8-AG G1/8-IG 25 VG	G1/8"-F	G3/8"-M	M18x1.5-M	112.5	37.5	12.0	9	56	27	13	19	25
FSTI G3/8-AG G1/8-AG 50	G1/8"-M	G3/8"-M	M18x1.5-M	176.5	54.0	6.5	8	91	27	13	19	50
FSTI G3/8-AG G1/8-AG 50 VG	G1/8"-M	G3/8"-M	M18x1.5-M	176.5	54.0	6.5	8	91	27	13	19	50
FSTI G3/8-AG G1/8-IG 50	G1/8"-F	G3/8"-M	M18x1.5-M	180.0	54.0	12.0	8	91	27	13	19	50
FSTI G3/8-AG G1/8-IG 50 VG	G1/8"-F	G3/8"-M	M18x1.5-M	180.0	54.0	12.0	8	91	27	13	19	50

Spring plungers

Spring Plungers FSTF

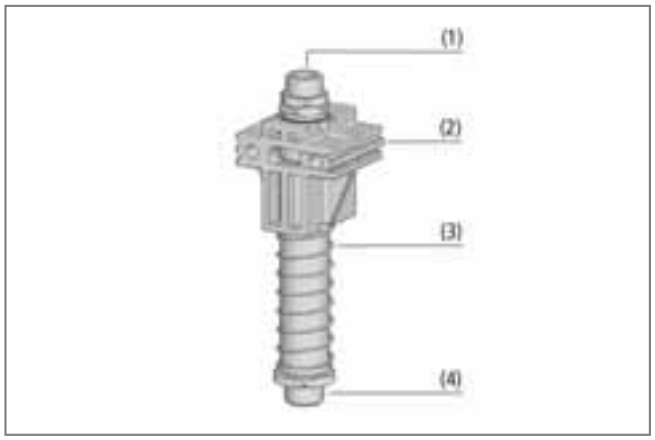
Stroke 50 mm

Suitability for Industry-Specific Applications

Spring plungers FSTF

Applications

- Spring plunger with integrated mounting facilities for handling of workpieces with differing heights
- Handling of sheets and planks of wood in the furniture, chipboard, door and flooring industries
- Handling tasks in dusty surroundings



System design spring plungers FSTF

Design

- Plastic mounting block (2) with integrated guide for plunger rod (no additional sliding bearing)
- Connection thread for suction pad (4)
- Connection thread for vacuum supply (1)
- Lower damping spring (3)
- Plunger rod made of high-strength aluminum alloy, with integrated anti-blocking device to protect against spring breakage
- Can be mounted with the mounting kit "Standard" or "Comfort" on sectional beams out of aluminum
- Versions with and without anti-rotation guard available

Mounting example spring plungers FSTF

Our Highlights...	Your Benefits...
• Variable mounting facility	> Individual, flexible and quick adaptation to the intended application
• Integrated mounting facilities	> Can be adapted for use with all common aluminum sectional beam systems
• Guide and mounting block made of high-quality injection-molded plastic	> Price and weight optimized; extremely robust and unaffected by dust

Spring plungers

Spring Plungers FSTF

Stroke 50 mm

Designation Code Spring Plungers FSTF

Abbreviated designation	Suction pad connection	Plunger stroke in mm	Product addition
Example FSTF G1/2-AG 50 VG:			
FSTF	**G1/2-AG**	**50**	**VG**
FSTF	G1/2-AG (AG = male (M))	50	VG with anti-rotation guard

Ordering Data Spring Plungers FSTF

Spring plunger FSTF is delivered as a ready to connect product.

Available accessories: mounting set

Spring Plungers FSTF

Type*	Part Number
FSTF G1/2-AG 50	10.01.02.01012
FSTF G1/2-AG 50 VG	10.01.02.01013

*VG = Version with anti-rotation guard for repeatably accurate positioning of suction pads

Ordering Data Accessories Spring Plungers FSTF

Type	Mounting set FSTF Komfort	Mounting set FSTF Standard
FSTF G1/2-AG 50	10.01.02.01031	10.01.02.01030
FSTF G1/2-AG 50 VG	10.01.02.01031	10.01.02.01030

!Standard: consisting of two screws ISKT M8x60, 1x guide block with 2x M8, 2x U-washers

!!Komfort: consisting of one release handle, one screw ISKT M8x60, 1x guide block with 2x M8, 2x U-washers

Technical Data Spring Plungers FSTF

Type	Spring rate [N/mm]	Spring pretension [N]	Spring force [N]*	Vertical load [N]**	Horizontal load [N]***	Weight [g]	Operating temperature [°C]
FSTF G1/2-AG 50	0.567	17.6	31.75	2500	800	246	0...50
FSTF G1/2-AG 50 VG	0.567	17.6	31.75	2500	800	250	0...50

*Referred to 50% of operating stroke

**Maximum static loading

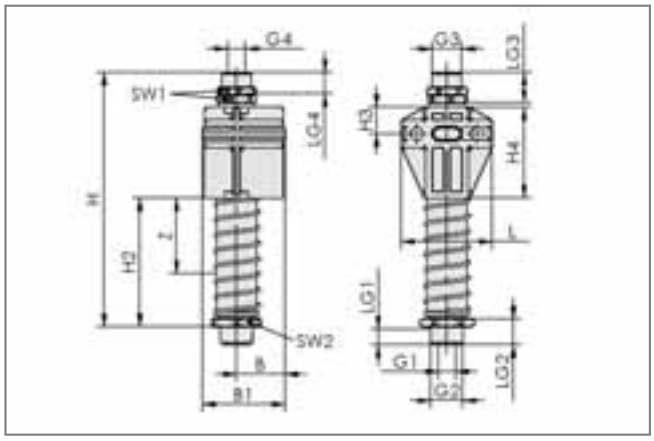
***The specification of the horizontal stress refers to the lower edge of the plunger with extended spring. It is a maximum static stress and it impairs the spring compression and extension in horizontal position.

Spring plungers

Spring Plungers FSTF

Stroke 50 mm

Design Data Spring Plungers FSTF



FSTF (VG)

Type	Dimensions in mm								
	B	B1	G1	G2	G3	G4	H	H2	H3
FSTF G1/2-AG 50	32.3	54.6	G1/4"-F	G1/2"-M	M20-M	G1/4"-F	168	85	17.5
FSTF G1/2-AG 50 VG	32.3	54.6	G1/4"-F	G1/2"-M	M20-M	G1/4"-F	168	85	17.5

Type	Dimensions in mm								
	H4	L	LG1	LG2	LG3	LG4	Z (Stroke)	SW1	SW2
FSTF G1/2-AG 50	60	60	10	17	20	10	50	24	32
FSTF G1/2-AG 50 VG	60	60	10	17	20	10	50	24	32

Holders for Suction Pads and Spring Plungers

Adapters for Elbow Connector ANW

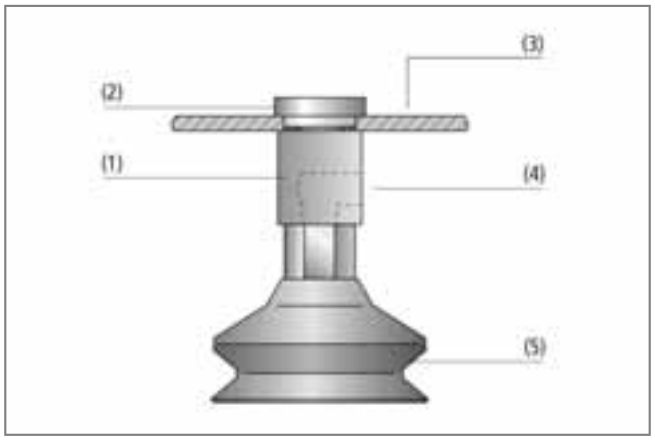
Suction pad connection from M5 to G1/2"

Suitability for Industry-Specific Applications

Adapters for elbow connector ANW

Applications

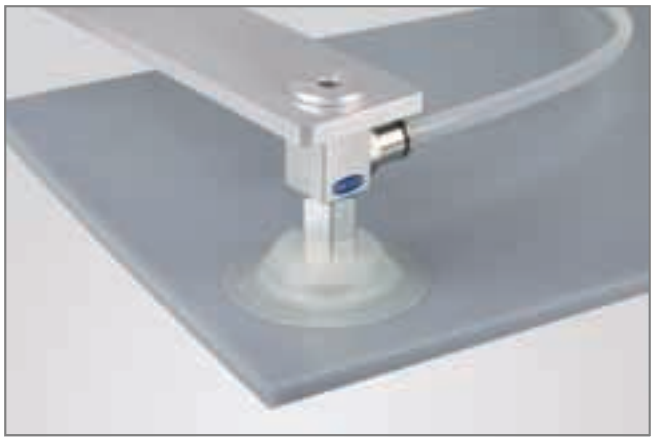
- Adapter for elbow connector for use in restricted spaces
- Adapter for side connection ANW permits mounting on other accessories such as spring plungers or, together with mounting adapter VRS-AN, on standard holders or mounting brackets



System design adapters for elbow connector ANW

Design

- Adapter for elbow connector ANW (1) made of galvanized steel with underside connection thread for suction pads (5) and side vacuum connection (4)
- Mounting thread without vacuum connector at the top
- Mounting adapter VRS-AN (2) made of galvanized steel for screwing into further accessories or for mounting with adapter for elbow connector ANW
- Connection to metal sheet (3) with a thickness of at least 3.5 mm



Mounting example adapters for elbow connector ANW

Our Highlights...	Your Benefits...
• Minimal overall height	> Smallest possible space requirements, since suction pads can be mounted directly on cross-beams
• Vacuum connector on the side	> No additional vertical space needed
• Connection threads from M5 to G1/2"	> Wide range of applications for all suction pads of the standard program
• For use together with spring plungers or for mounting with a mounting adapter directly on holders or mounting brackets	> Flexible use to meet all requirements

Holders for Suction Pads and Spring Plungers

Adapters for Elbow Connector ANW

Suction pad connection from M5 to G1/2"

Designation Code Adapters for Elbow Connector ANW

Abbreviated designation	Vacuum connection	Suction pad connection
Example ANW M5-IG M5-IG:		
ANW	**M5-IG**	**M5-IG**
ANW	M5-IG (IG = female (F)) G1/8-IG G3/8-IG	M5-IG (IG = female (F)) G1/8-AG (AG = male (M)) G1/4-AG G3/8-AG G1/2-AG

Ordering Data Adapters for Elbow Connector ANW

Adapter for elbow connector ANW is delivered as a ready to connect product. The adapter can be added to the mounting adapter VRS-AN, which is available with various threads.

Adapters for Elbow Connector ANW

Type	Part Number
ANW M5-IG M5-IG	10.01.01.10149
ANW G1/8-IG G1/8-AG	10.01.01.10113
ANW G1/8-IG G1/4-AG	10.01.01.10112
ANW G3/8-IG G3/8-AG	10.01.01.11618
ANW G3/8-IG G1/2-AG	10.01.01.10111

Ordering data Accessories Adapters for Elbow Connector ANW

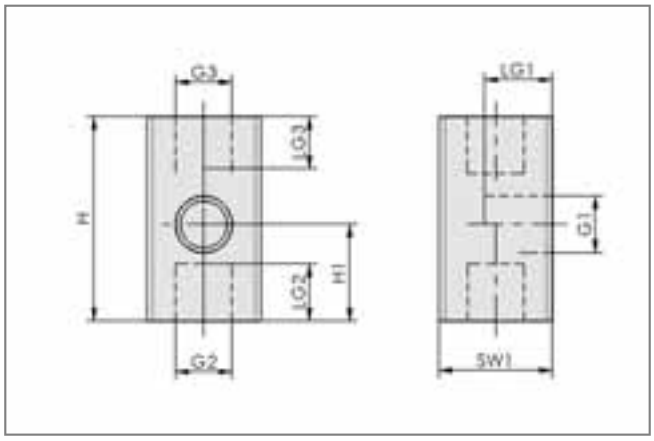
Type	VRS-AN
ANW M5-IG M5-IG	10.01.01.10150
ANW G1/8-IG G1/8-AG	10.01.01.10119
ANW G1/8-IG G1/4-AG	10.01.01.10118
ANW G3/8-IG G3/8-AG	10.01.01.10117
ANW G3/8-IG G1/2-AG	10.01.01.10117

Holders for Suction Pads and Spring Plungers

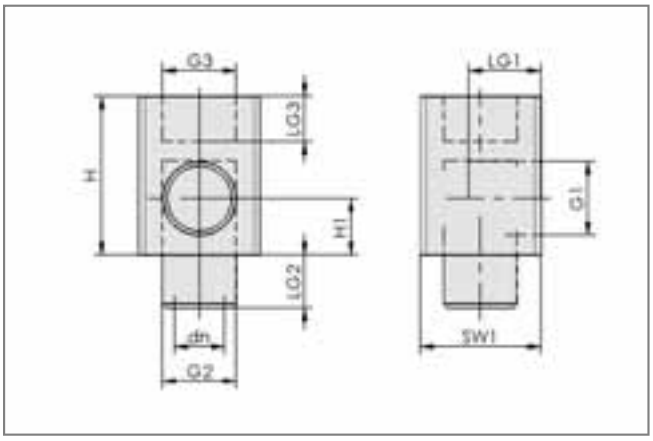
Adapters for Elbow Connector ANW

Suction pad connection from M5 to G1/2"

Design Data Adapters for Elbow Connector ANW



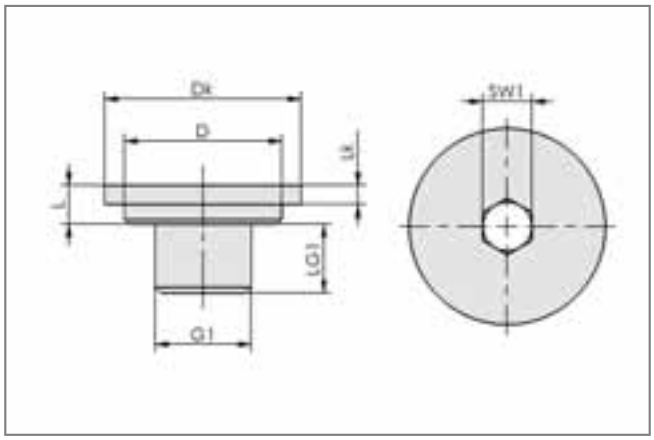
ANW M5-IG M5-IG



ANW G1/8-IG G1/8-AG to G3/8-IG G1/2-AG

Type	Dimensions in mm									
	dn	G1	G2	G3	H	H1	LG1	LG2	LG3	SW1
ANW M5-IG M5-IG	-	M5-F	M5-F	M5-F	18	8.5	6.0	5	5	10
ANW G1/8-IG G1/8-AG	6.6	G1/8"-F	G1/8"-M	G1/8"-F	21	7.5	9.5	7	6	16
ANW G1/8-IG G1/4-AG	8.0	G1/8"-F	G1/4"-M	G1/4"-F	26	8.0	11.0	10	10	18
ANW G3/8-IG G3/8-AG	10.0	G3/8"-F	G3/8"-M	G1/2"-F	35	10.5	13.0	10	12	24
ANW G3/8-IG G1/2-AG	10.0	G3/8"-F	G1/2"-M	G1/2"-F	35	10.5	13.0	10	12	24

Design Data VRS-AN



Sealing screw with collar VRS-AN

Type	Dimensions in mm						
	D	Dk	G1	L	LG1	Lk	SW1
VRS-AN M5-AG	10	14	M5-M	4	5.5	2	3
VRS-AN G1/8-AG	16	20	G1/8"-M	4	7.0	2	5
VRS-AN G1/4-AG	20	25	G1/4"-M	6	10.0	3	6
VRS-AN G1/2-AG	28	32	G1/2"-M	7	11.0	3	10

Holders for Suction Pads and Spring Plungers

Bulkhead Connectors SVS-GE

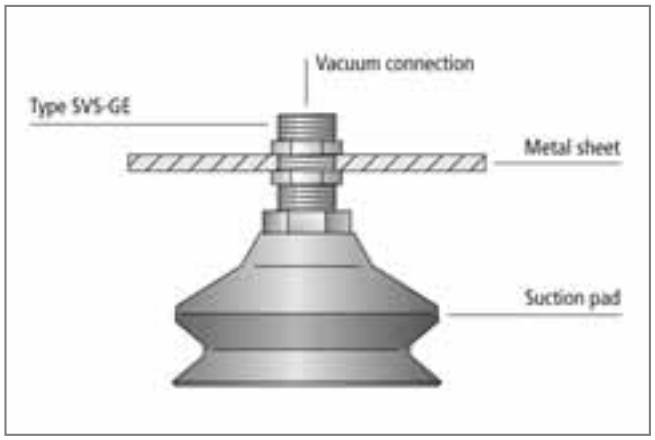
Connection thread from G1/8" to G1/4"

Suitability for Industry-Specific Applications

Bulkhead connectors SVS-GE

Applications

- Bulkhead connector for mounting of suction pads
- Adaptation of hose connections



System design bulkhead connectors SVS-GE

Design

- Stainless-steel sleeve with male and female threads
- Two locking (galvanized) nuts included
- Flats for spanner on male thread
- Vacuum connection by plug-in union (not inclued in delivery), see chapter "Filters and Connections"

Mounting example bulkhead connectors SVS-GE

Our Highlights...

- Bulkhead fitting with G1/8"-IG and G1/4"-IG threads
- Male thread over the entire length
- Locking nuts included
- Stainless steel
- Hose connection can be combined with Schmalz plug-in unions

Your Benefits...

> All suction pads and nipples with G1/8"-AG and G1/4"-AG threads can be screwed in
> Permits precise adjustment of the suction-pad position
> No further mounting elements needed
> No corrosion, high stability
> Easy adaptation to various hose diameters

Holders for Suction Pads and Spring Plungers

Bulkhead Connectors SVS-GE

Connection thread from G1/8" to G1/4"

Designation Code Bulkhead Connectors SVS-GE

Abbreviated designation	Male thread	Connection thread	Fitting length in mm
Example SVS-GE M16x1-AG G1/8-IG 30:			
SVS-GE	**M16x1-AG**	**G1/8-IG**	**30**
SVS-GE	M16x1-AG (AG = male (M)) M20x1.5-AG	G1/8-IG (IG = female (F)) G1/4-IG	30

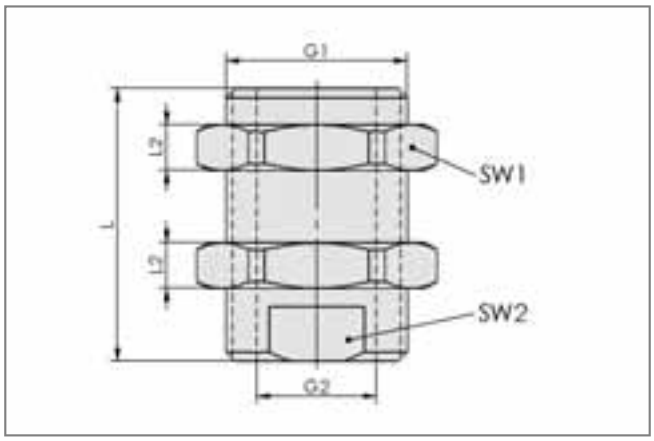
Ordering Data Bulkhead Connectors SVS-GE

Bulkhead connector SVS-GE is delivered as a ready to connect product, including two locking nuts.

Bulkhead Connectors SVS-GE

Type	Part Number
SVS-GE M20x1.5-AG G1/4-IG 30	10.08.03.00180
SVS-GE M16x1-AG G1/8-IG 30	10.08.03.00181

Design Data Bulkhead Connectors SVS-GE



SVS-GE

Type	Dimensions in mm					
	G1	G2	L	L2	SW1	SW2
SVS-GE M20x1.5-AG G1/4-IG 30	M20x1.5-M	G1/4"-F	30	5	24	17
SVS-GE M16x1-AG G1/8-IG 30	M16x1-M	G1/8"-F	30	5	22	13

Holders for Suction Pads and Spring Plungers

Holders for Light-Metal Sections HTR-STA

Suitability for Industry-Specific Applications

Holders for light-metal sections HTR-STA

Applications

- Holder for mounting of suction pads and spring plungers on light-alloy sections

Mounting example holders HTR-STA FL

Design

- Size 47: sheet-steel holder with mounting holes
- Size 55-62: angled aluminum bracket with mounting holes
- Delivered complete with M8 mounting screw and position locking pin

Mounting example holders HTR-STA WI

Our Highlights...

- Sliding mounting of light-alloy sections with slots
- Direct mounting of suction pads and spring plungers
- Fits spring plungers of the sizes M5 to G1/4"

Your Benefits...

> Flexible use, quick conversion, short set-up times

> For universal use

> Very versatile

Holders for Suction Pads and Spring Plungers

Holders for Light-Metal Sections HTR-STA

Designation Code Holders for Light-Metal Sections HTR-STA

Abbreviated designation	Dimensions length in mm	Cross-beam connection	Diameter spring plunger connection in mm	Shape
Example HTR-STA 55 1N D20 WI:				
HTR-STA	55	1N	D20	WI
HTR-STA	47 55 62	1N 1 sliding block	D10/D16 D20 D30	FL flat WI angle

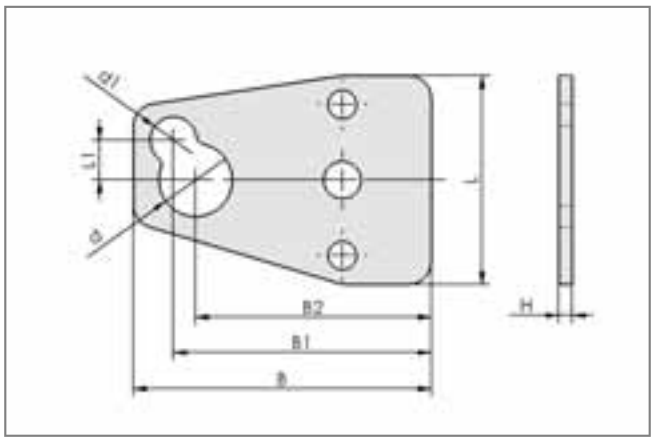
Ordering Data Holders for Light-Metal Sections HTR-STA

Holder for light-metal sections HTR-STA is delivered as a ready to connect product including mounting screws and position locking pin.

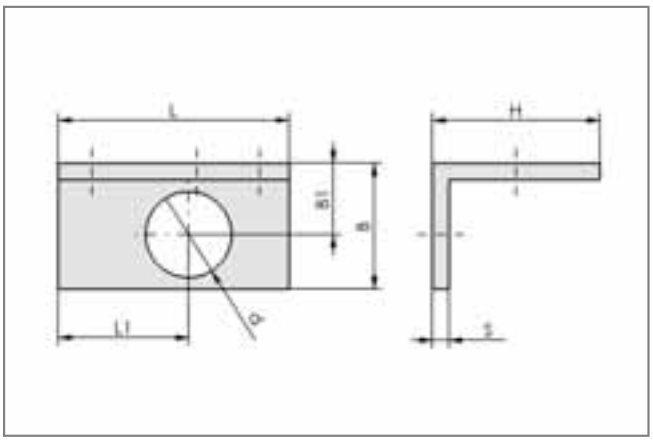
Holders for Light-Metal Sections HTR-STA

Type	Part Number
HTR-STA 47 1N D10/16 FL	10.08.03.00085
HTR-STA 55 1N D20 WI	10.08.03.00086
HTR-STA 62 1N D30 WI	10.08.03.00148

Design Data Holders for Light-Metal Sections HTR-STA



HTR-STA FL



HTR-STA WI

Type	Dimensions in mm								
	B	B1	B2	d	d1	H	L	L1	s
HTR-STA 47 1N D10/16 FL	67	58	53	17	11	3	47	9	-
HTR-STA 55 1N D20 WI	30	17	-	21	-	40	55	31	4
HTR-STA 62 1N D30 WI	50	27	-	31	-	40	62	40	5

Holders for Suction Pads and Spring Plungers

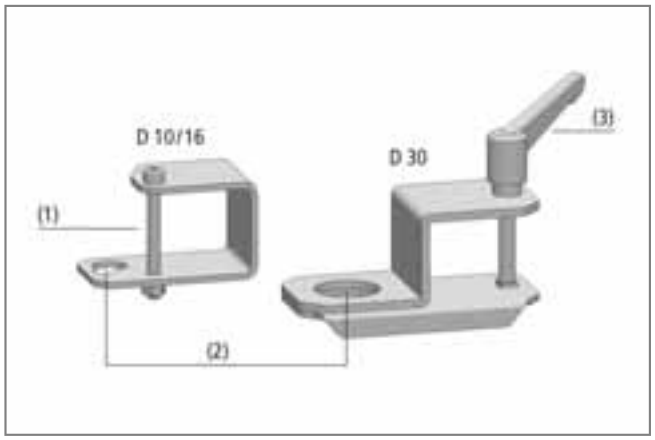
Holders for Square Tubes HTR-STS

Suitability for Industry-Specific Applications

Holders for square tubes HTR-STS

Applications

- Holder for mounting of suction pads and spring plungers on square tubes



System design holders for square tubes HTR-STS

Design

- Folded holder made from sheet steel with drilled mounting holes (2)
- Size D10/16: secured to square tube with machine screw (1)
- Size D30: secured to square tube with clamping lever and machine screw (3)

Mounting example holders HTR-STS

Our Highlights...

- Sliding mounting on square tubes
- Direct mounting of suction pads and spring plungers
- Secured with clamping lever (type STS-...-D30)
- Fits spring plungers of the sizes M5 to G1/2"

Your Benefits...

> Flexible use, quick conversion, short set-up times

> For universal use

> Can be secured and adjusted without tools

> Very versatile

Holders for Suction Pads and Spring Plungers

Holders for Square Tubes HTR-STS

Designation Code Holders for Square Tubes HTR-STS

Abbreviated designation	For square section dimensions in mm	Diameter spring plunger connection in mm	Shape
Example HTR-STS 30x30 D10/16 WI:			
HTR-STS	**30x30**	**D10/16**	**WI**
HTR-STS	30x30 40x40 50x50 60x60	D10/D16 D30	WI angle

Ordering Data Holders for Square Tubes HTR-STS

Holder for square tubes HTR-STS is delivered as a ready to connect product.

Available accessories: spacer washer and flat washer

Holders for Square Tubes HTR-STS

Type	Part Number
HTR-STS 30x30 D10/16 WI	10.08.03.00088
HTR-STS 40x40 D10/16 WI	10.08.03.00089
HTR-STS 40x40 D30 WI	10.08.03.00090
HTR-STS 50x50 D30 WI	10.08.03.00091
HTR-STS 60x60 D30 WI	10.08.03.00092

Ordering Data Accessories Holders for Square Tubes HTR-STS

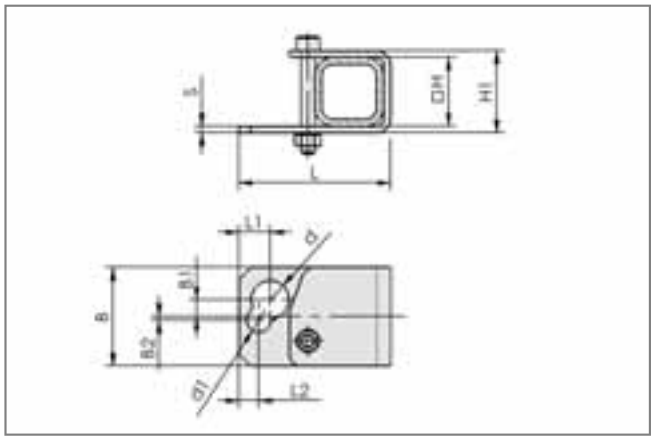
Type*	Spacer washer - M16 for spring plunger FSTE G1/8	Spacer washer - M20 for spring plunger FST(E/A) G1/4	Spacer washer - M18 for spring plunger FSTI G1/4; G3/8	Flat washer - M30 for spring plunger FST(E/A) G1/2
HTR-STS 30x30 D10/16 WI	-	-	-	-
HTR-STS 40x40 D10/16 WI	-	-	10.01.03.06140	-
HTR-STS 40x40 D30 WI	10.01.01.10025	10.01.01.10015	10.01.03.06140	20.06.01.00044
HTR-STS 50x50 D30 WI	10.01.01.10025	10.01.01.10015	10.01.03.06140	20.06.01.00044
HTR-STS 60x60 D30 WI	10.01.01.10025	10.01.01.10015	10.01.03.06140	20.06.01.00044

*Attention: For mounting of each spring plunger use two washers always

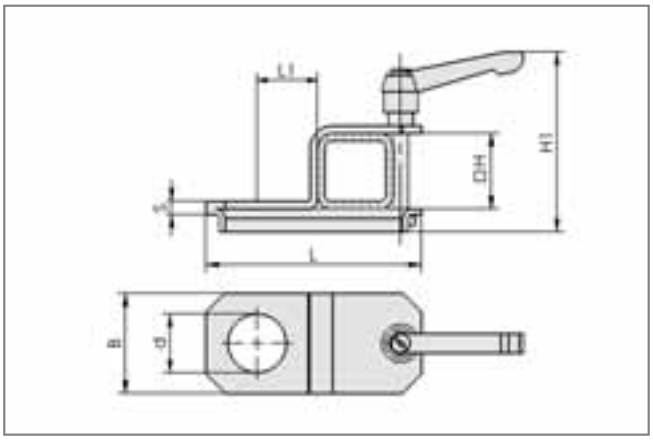
Holders for Suction Pads and Spring Plungers

Holders for Square Tubes HTR-STS

Design Data Holders for Square Tubes HTR-STS



HTR-STS D10/16



HTR-STS D30

Type	Dimensions in mm										
	B	B1	B2	d	d1	H	H1	L	L1	L2	s
HTR-STS 30x30 D10/16 WI	43	7.5	1.5	16.5	10.5	30	36	66	11	8.5	3
HTR-STS 40x40 D10/16 WI	43	7.5	1.5	16.5	10.5	40	46	76	11	8.5	3
HTR-STS 40x40 D30 WI	53	-	-	31.0	-	40	95	114	32	-	7
HTR-STS 50x50 D30 WI	53	-	-	31.0	-	50	105	124	32	-	7
HTR-STS 60x60 D30 WI	53	-	-	31.0	-	60	115	134	32	-	7

Holders for Suction Pads and Spring Plungers

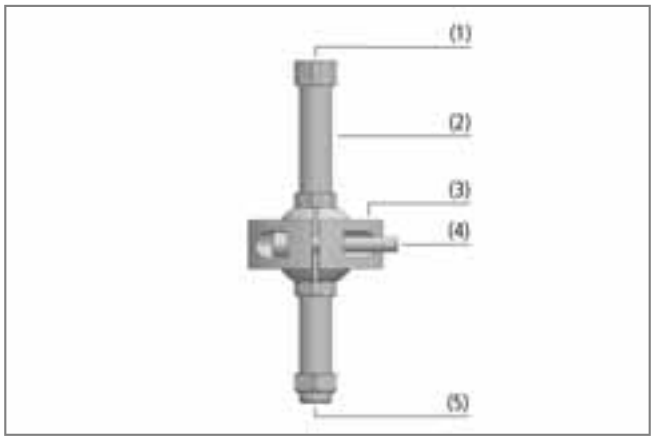
Universal Holders HTR-UNI

Suitability for Industry-Specific Applications

Universal holders HTR-UNI

Applications

- Universal holder for mounting of vacuum components on existing cross-beams made of square or round tubes with the aid of various adapters
- Adjustable height and inclination for flexible adaptation to workpieces



System design universal holders HTR-UNI

Design

- Holder made of high-strength, anodized aluminum, consisting of holder tube (2), ball clamp (3) and various adapters for mounting of square and round tubes
- Threaded tube (5) has a G1/4" thread at the bottom for a suction pad and a G1/4" thread at the top (1) for connection of a vacuum line or an inline ejector
- Incl. securing screws (4)

Suction pads with universal holders HTR-UNI being used for handling sheet metal

Our Highlights...

- Adjustment and fixing with ball clamp
- Adjustable height and inclination
- Suitable for mounting on square and round tubes
- Suction pads can be screwed directly into the G1/4" thread

Your Benefits...

> Flexible use, rapid changing, short set-up times

> Flexible adaptation to work-pieces with, e.g. curved sheet metal

> For universal use

> Quick and efficient construction of a load cross-beam

Holders for Suction Pads and Spring Plungers

Universal Holders HTR-UNI

Designation Code Universal Holders HTR-UNI

Abbreviated designation	Cross-beam connection		Connection thread		Dimensions in mm
Example HTR-UNI 1N G2 80:					
HTR-UNI	**1N**		**G2**		**80**
HTR-UNI	1N	1 sliding block	G2	connection thread	80
	2N	2 sliding blocks		G1/4-AG	140
					200

Ordering Data Universal Holders HTR-UNI

Holder HTR-UNI is delivered unassembled. The delivery consists of:
- Holder tube – available in various lengths
- Ball clamp – available in various versions

Available accessories: section adapter, tube adapter, tube adapter reducing piece, suction cup connection

Universal Holders HTR-UNI

Type	Part Number
HTR-UNI 1N G2 80	10.01.03.00107
HTR-UNI 2N G2 80	10.01.03.00223
HTR-UNI 2N G2 80*	10.01.03.00298
HTR-UNI 2N G2 140*	10.01.03.00299
HTR-UNI 2N G2 200*	10.01.03.00309

*Incl. two lock nuts

Ordering Data Universal Holders HTR-UNI

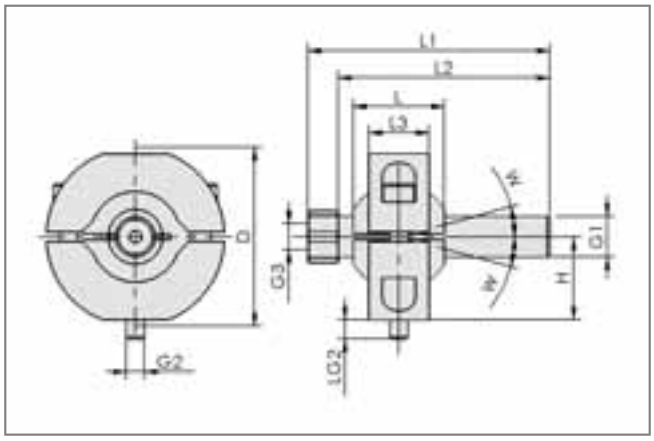
Type	Part Number
HTR-STB 30x30 UNI*	10.01.03.00135
HTR-STC D32 UNI**	10.01.03.00108
BUCHSE 32-25x21 PA***	10.01.03.00097
SAUG-ANB G1/4-AG 80	10.01.03.00292
SAUG-ANB G1/4-AG 140	10.01.03.00291
SAUG-ANB G1/4-AG 200	10.01.03.00308

*Square adapter for mount. on square sections 30x30 mm (HTR-UNI 1N G2)
**Tube adapter for mounting on round tubes with diameter 32 mm (HTR-UNI 1N G2)
***Tube adapter reducing piece for tubes with diameter 25 mm (HTR-UNI 1N G2)

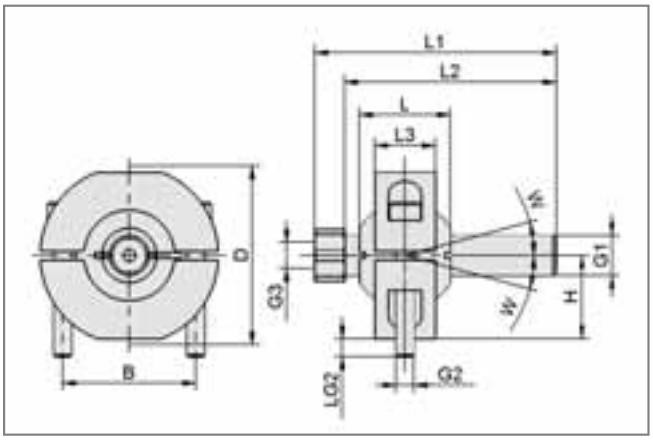
Holders for Suction Pads and Spring Plungers

Universal Holders HTR-UNI

Design Data Universal Holders HTR-UNI



HTR-UNI 1N G2



HTR-UNI 2N G2

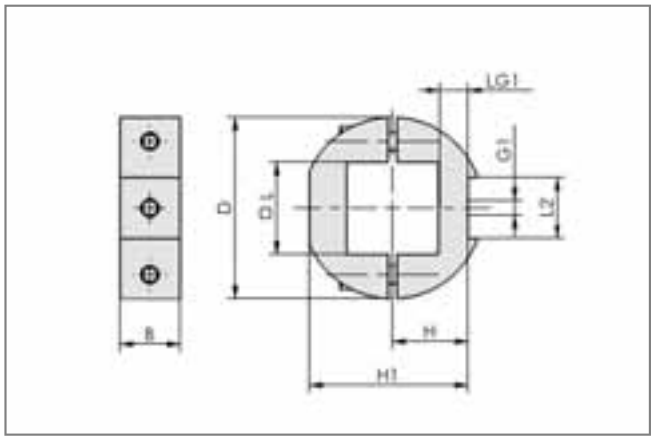
Type	Dimensions in mm											
	B	D	G1	G2	G3	H	L	L1	L2	L3	LG2	W [°]
HTR-UNI 1N G2 80	-	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	80	70	20	6	15
HTR-UNI 2N G2 80	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	80	70	20	6	15
HTR-UNI 2N G2 80*	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	80	70	20	6	15
HTR-UNI 2N G2 140*	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	140	130	20	6	15
HTR-UNI 2N G2 200*	44	59.0	G1/4"-M	M6-M	G1/4"-F	27.5	30	200	190	20	6	15

*Incl. two lock nuts

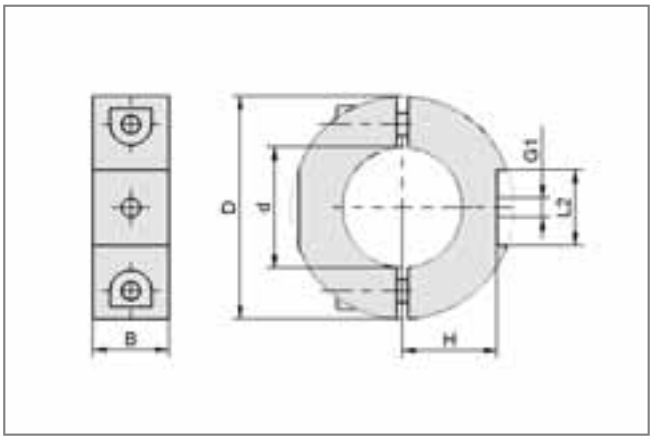
Holders for Suction Pads and Spring Plungers

Universal Holders HTR-UNI

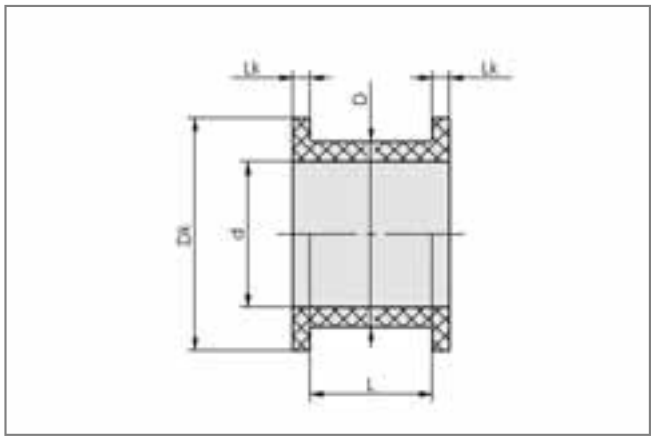
Design Data Universal Holders HTR-UNI



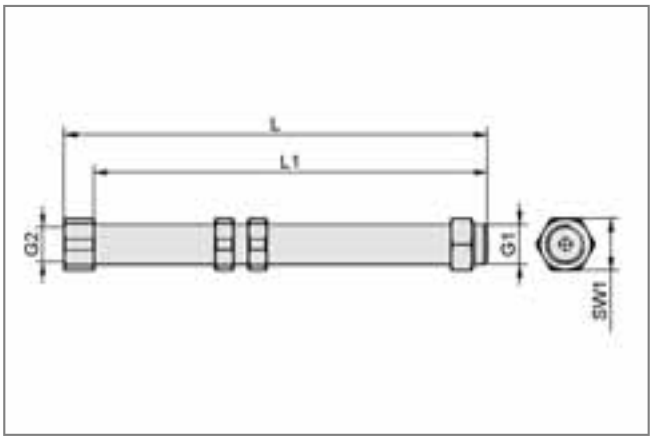
HTR-STB 30x30 UNI



HTR-STC D32 UNI



BUCHSE 32-25x21 PA



SAUG-ANB...

Type	Dimensions in mm													
	B	d	D	Dk	G1	G2	H	H1	L	L1	L2	LG1	Lk	SW1
HTR-STB 30x30 UNI	20	-	58.9	-	M6-F	-	25	52.5	30.5	-	20.1	10	-	-
HTR-STC D32 UNI	20	32	58.9	-	M6-F	-	25	-	-	-	20.1	12	-	-
BUCHSE 32-25x21 PA	-	25	32.0	40	-	-	-	-	21.0	-	-	-	3	-
SAUG-ANB G1/4-AG 80	-	-	-	-	G1/4"-M	G1/8"-F	-	-	80.0	70.0	-	-	-	17
SAUG-ANB G1/4-AG 140	-	-	-	-	G1/4"-M	G1/8"-F	-	-	140.0	130.0	-	-	-	17
SAUG-ANB G1/4-AG 200	-	-	-	-	G1/4"-M	G1/8"-F	-	-	200.0	190.0	-	-	-	17

Sections and Connectors

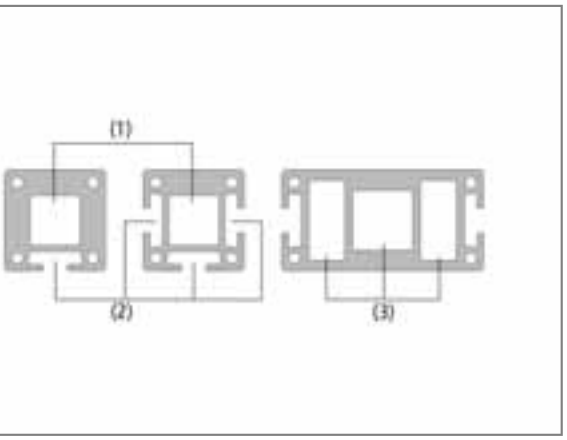
Mounting Sections MO-PROF

Suitability for Industry-Specific Applications

Mounting sections MO-PROF

Applications

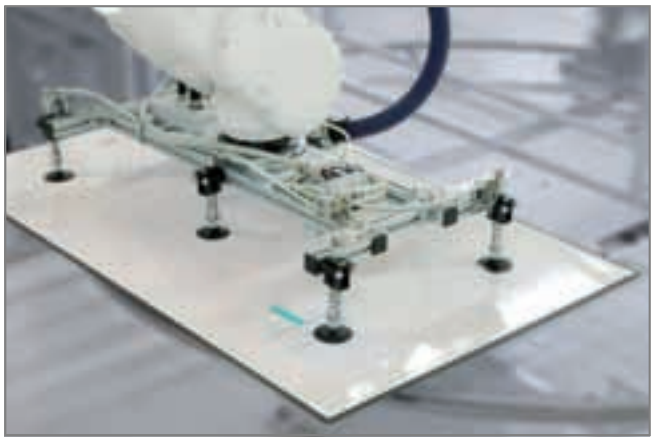
- Mounting section for flexible construction of tailor-made load cross-beams
- Used as load cross-beam and vacuum distributor
- Three-chamber section permits distribution of different vacuum and compressed-air pressures



System design mounting sections MO-PROF

Design

- Hollow extruded aluminum sections
- 40 x 40 mm section with one chamber (1) and optionally with one or three grooves on the sides (2)
- 80 x 40 mm section with three chambers (3) and two grooves on the sides
- Holes and slots at the ends for assembly with the aid of elbow and corner connectors, sealing plates and other accessories



Mounting example mounting sections MO-PROF

Our Highlights...

- Vacuum-tight hollow section with internal chambers
- Suction pads can be screwed directly into the sections
- Sections with grooved sides
- High-strength extruded aluminum sections
- Wide range of accessories such as corner connectors, sealing plates, etc.

Your Benefits...

> Vacuum/compressed air can be carried directly in the sections

> Hose-free, integrated vacuum distribution from a central connection to the individual suction pads

> Simple attachment of mounting elements such as holders and plungers

> Low weight combined with high load capacity and maximum precision

> Complete modular system for the flexible construction of load cross-beams

Designation Code Mounting Sections MO-PROF

Abbreviated designation	Dimensions in mm	Shape
Example MO-PROF 40x40 3 TN:		
MO-PROF	**40x40**	**3 TN**
MO-PROF	40x40 80x40	1 TN 1 slot 2 TN 2 slots 3 TN 3 slots

Ordering Data Mounting Sections MO-PROF

Mounting sections MO-PROF is delivered in the desired length.

Available accessories: sealing plate, sealing frame, self-cutting lens head screws, section connector, mounting bracket, sliding block

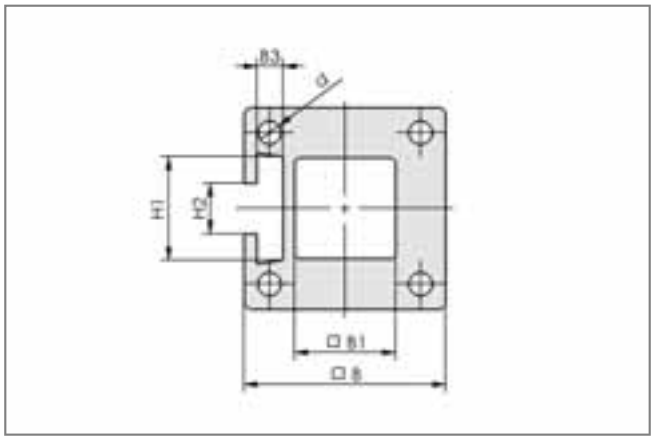
Mounting Sections MO-PROF

Type	Part Number
MO-PROF 40x40 1TN	26.07.01.00023
MO-PROF 40x40 3TN	26.07.01.00022
MO-PROF 80x40 2TN	26.07.01.00021

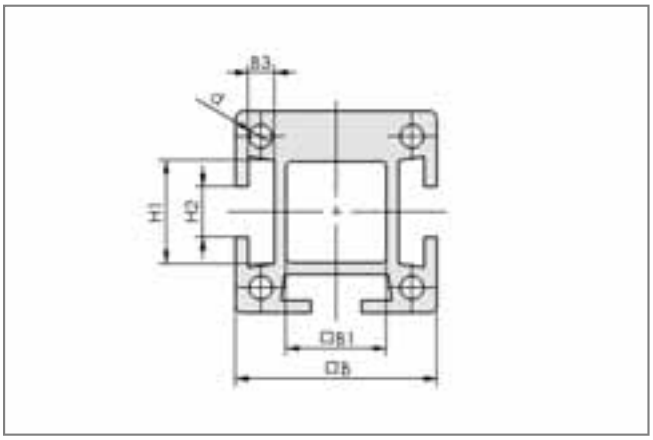
Technical Data Mounting Sections MO-PROF

Type	Area [cm²]	Resistance moment Wx [cm³]	Resistance moment Wy [cm³]	Area moment Ix [cm4]	Area moment Iy [cm4]	Mass [kg/m]	Warping (max) [mm/m]	Length (max) [mm]	Material
MO-PROF 40x40 1TN	9.1	6.9	9.6	13.7	17.0	2.5	0.8	6100	Al Mg Si 0.5 F22
MO-PROF 40x40 3TN	6.5	5.5	5.2	12.7	10.4	1.8	0.8	6100	Al Mg Si 0.5 F22
MO-PROF 80x40 2TN	12.1	14.0	19.3	28.1	77.2	3.3	0.8	6100	Al Mg Si 0.5 F22

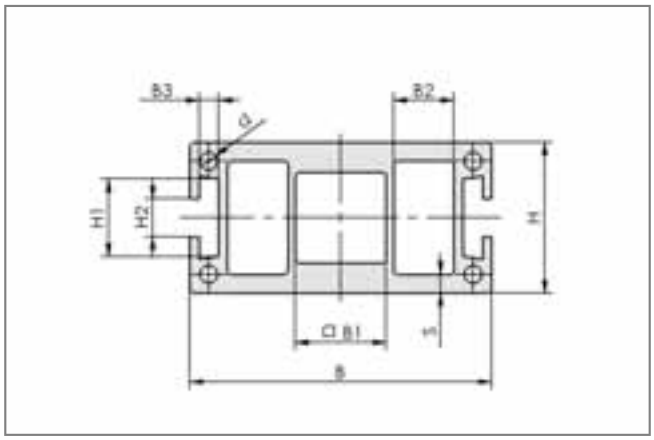
Design Data Mounting Sections MO-PROF



MO-PROF 40 x 40 1TN



MO-PROF 40 x 40 3TN



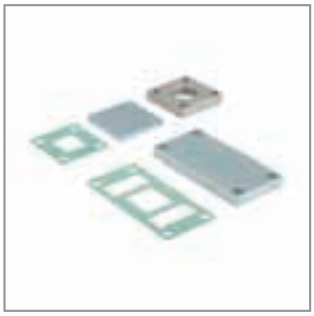
MO-PROF 80 x 40 2TN

Type	Dimensions in mm								
	B	B1	B2	B3	d	H	H1	H2	s
MO-PROF 40x40 1TN	40	20	-	5.2	4.6	40	20.5	10	-
MO-PROF 40x40 3TN	40	20	-	5.2	4.6	40	20.5	10	-
MO-PROF 80x40 2TN	80	24	14.3	5.2	4.6	40	20.5	10	4

Suction Pad Mounting Elements

Sections / Section Connectors / Accessories

Accessories for Aluminum Sections



Sealing Plate

Sealing plate 40 x 40/80 x 40 with sealing ring for sealing the ends of sections.

Part number: **25.09.06.00001**
25.09.06.00008
25.09.06.00009
25.09.06.00010
10.07.08.00131
10.07.08.00132

Sliding Blocks

Flat sliding blocks M6 and M8 for flange-mounting of further components, M6 with collar, M8 with collar, with very good guidance in the slot of the section, suitable for later installation. Material: steel, nickel-plated.

Part number: **25.09.06.00002**
25.09.06.00003
25.09.06.00012

Section Connector

Cross-plate as an additional reinforcing element for section nodes. Material: steel, 3 mm, nickel-plated.

Part number: **25.09.06.00005**

Section Connector

Corner connector for sections, suitable for the construction of vacuum grippers with integrated vacuum ducts (suitable for sections 40 x 40 with 1 slot and 40 x 40 with 3 slots). Material: aluminum with holes large enough for vacuum passage.

Part number: **10.08.03.00099**

Section Connector

Node plate as an additional reinforcing element for angled section connections. Material: steel, 3 mm, nickel-plated.

Part number: **25.09.06.00006**

Drilling Template

Drilling template for construction of T-connections with sections 40 x 40 with 1 slot. Material: steel, with drilling sleeves for the precise mounting of a T-connection with sections 40 x 40.

Part number: **10.08.03.00100**

Mounting Bracket

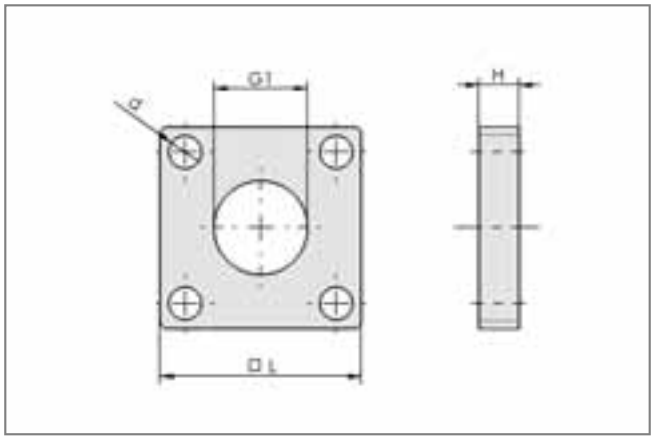
Mounting bracket as an additional reinforcing element for angled section connections. Material: steel, 5 mm, nickel-plated.

Part number: **25.09.06.00007**

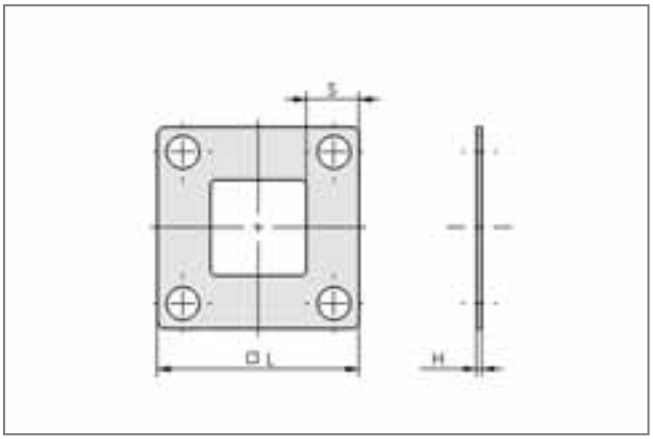
Mounting-Section Accessories

Type	Type	Part Number
Sealing plate	VRS-PL-40 MO-PROF	25.09.06.00008
Sealing plate	VRS-PL-40 G1/2-IG MO-PROF	25.09.06.00009
Sealing plate	VRS-PL-80x40 MO-PROF	25.09.06.00001
Sealing plate	VRS-PL-80x40 G1/2-IG MO-PROF	25.09.06.00010
Sealing frame	DI-RA 40x40x1 TE-50 MO-PROF	10.07.08.00131
Sealing frame	DI-RA 80x40x1 MO-PROF	10.07.08.00132
Self-cutting lens head screw	SCHR WN1552 5x20	20.10.03.00008
Section connector	VBR-PR 185x185x3 K-FL	25.09.06.00005
Section connector	VBR-PR 150x3 E-FL	25.09.06.00006
Section connector	VBR-PR 55x40 E-V	10.08.03.00099
Mounting bracket	BEF-WIN 40x40x40 5	25.09.06.00007
Sliding block	NUT-STEI 20x10 M6-IG 10	25.09.06.00002
Sliding block	NUT-STEI 20x10 M8-IG 10	25.09.06.00003
Sliding block	NUT-STEI 20x20 M8-IG 10	25.09.06.00012

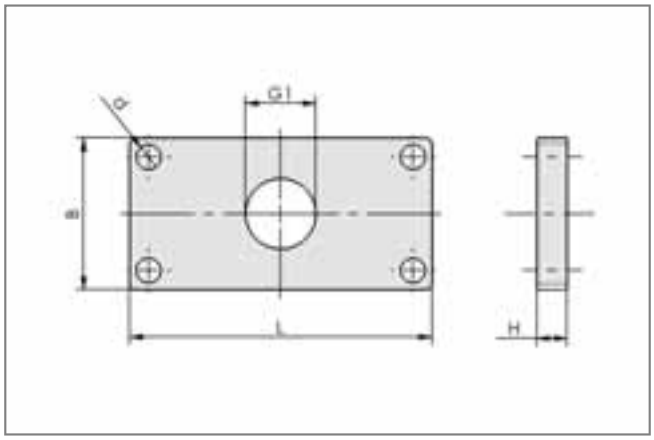
Design Data Mounting-Section Accessories



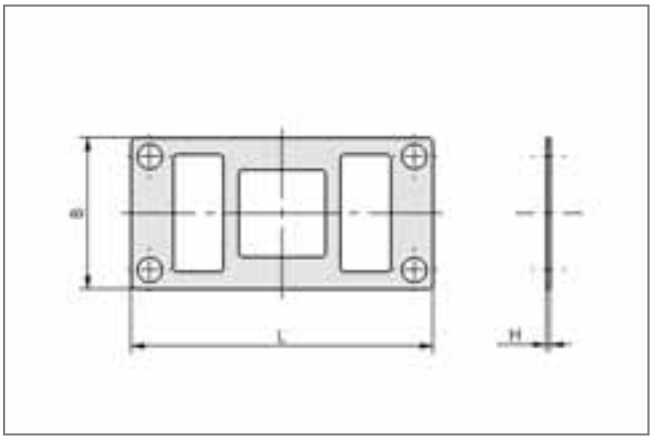
Sealing plate VRS-PL 40 x 40 (G1/2-IG) MO-PROF



Sealing frame DI-RA 40 x 40

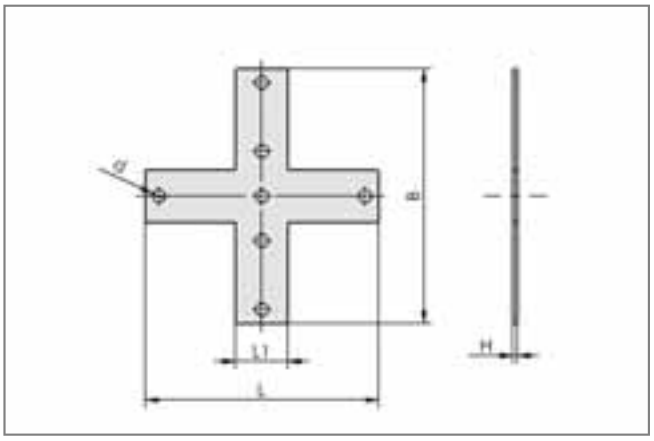


Sealing plate VRS-PL 80 x 40 (G1/2-IG) MO-PROF

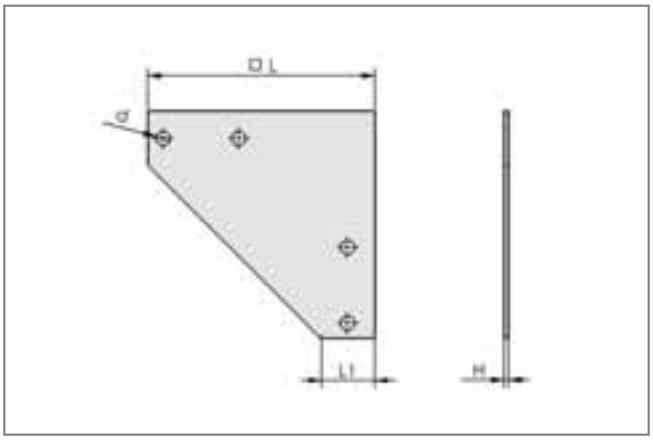


Sealing frame DI-RA 80 x 40

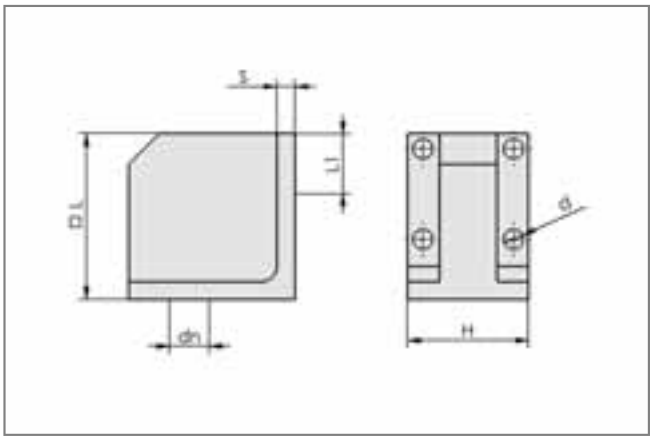
Design Data Mounting-Section Accessories



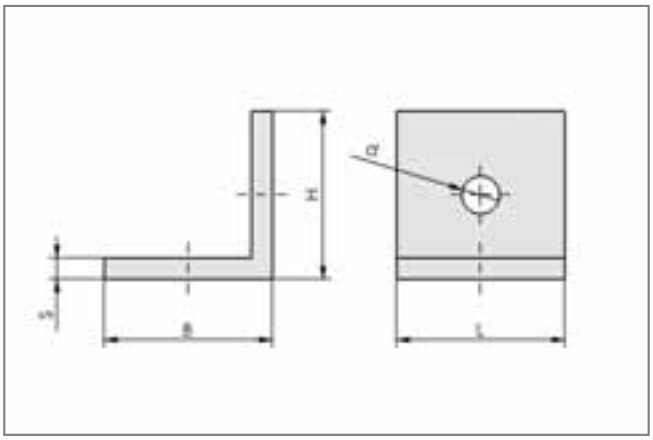
Section connector VBR-PR 185 x 185 K-FL



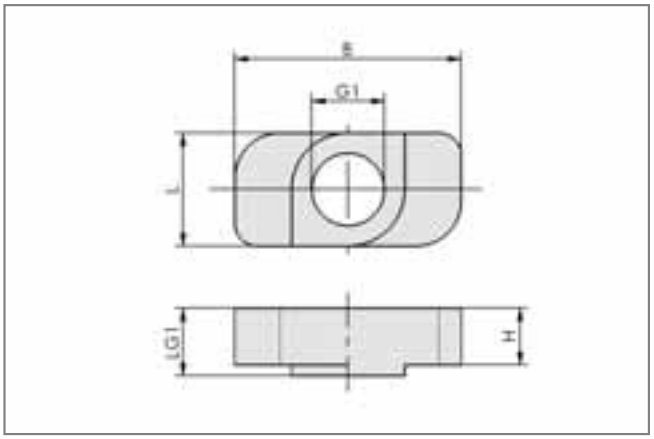
Section connector VBR-PR 150 x 150 E-FL



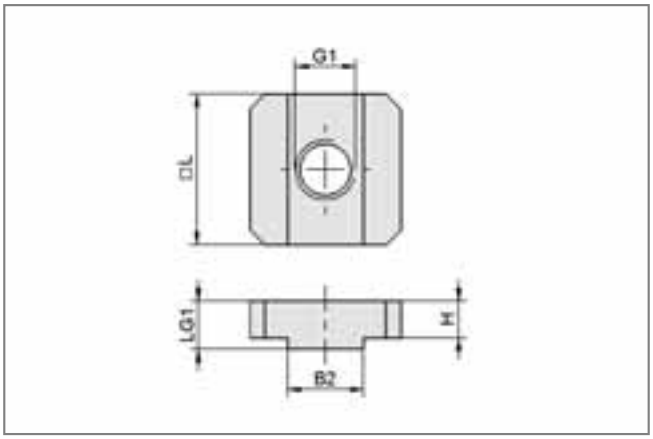
Section connector VBR-PR 55 x 40 E-V



Mounting bracket BEF-WIN 40 x 40 x 5



Sliding block NUT-STEI 20 x 10 M6-IG/ M8-IG



Sliding block NUT-STEI 20 x 20 M8-IG

Type	Dimensions in mm									
	Type	B	d	dn	G1	H	L	L1	LG1	s
Sealing plate	VRS-PL-40 MO-PROF	-	6.5	-	-	4.0	40	-	-	-
Sealing plate	VRS-PL-40 G1/2-IG MO-PROF	-	6.5	-	G1/2"-F	8.0	40	-	-	-
Sealing plate	VRS-PL-80x40 MO-PROF	40	6.5	-	-	8.0	80	-	-	-
Sealing plate	VRS-PL-80x40 G1/2-IG MO-PROF	40	6.5	-	G1/2"-F	8.0	80	-	-	-
Sealing frame	DI-RA 40x40x1 TE-50 MO-PROF	40	-	-	-	1.0	40	-	-	10.5
Sealing frame	DI-RA 80x40x1 MO-PROF	40	-	-	-	1.0	80	-	-	-
Self-cutting lens head screw	SCHR WN1552 5x20	-	-	-	-	-	20	-	-	-
Section connector	VBR-PR 185x185x3 K-FL	185	9.0	-	-	3.0	185	38	-	-
Section connector	VBR-PR 150x3 E-FL	-	9.0	-	-	3.0	150	36	-	-
Section connector	VBR-PR 55x40 E-V	-	6.5	13.0	-	40.0	55	20	-	6.0
Mounting bracket	BEF-WIN 40x40x40 5	40	9.0	-	-	40.0	40	-	-	5.0
Sliding block	NUT-STEI 20x10 M6-IG 10	10	-	-	M6-F	5.0	20	-	-	-
Sliding block	NUT-STEI 20x10 M8-IG 10	10	-	-	M8-F	5.0	20	-	6	-
Sliding block	NUT-STEI 20x20 M8-IG 10	20	-	-	M8-F	4.9	20	-	6	-

Vacuum Generators

Overview of Section 6

Vacuum Generators

Everything at a Glance

Selection Aid	Page
Selection by Suction Capacity	388
Checklist for Selection of Vacuum Generators	389
Accessories for Vacuum Generators	389
Basic Ejectors	
Basic Ejectors SEG	390
Basic Ejectors SBP	396
Basic Ejectors SBP-C with Additional Functions	401
Inline Ejectors	
Inline Ejectors SLP	409
Inline Ejectors VR	413

Basic Ejectors SEG

390

- Suction capacity up to 370 l/min
- Max. vacuum 85%
- Body made of anodized aluminum

Robust basic ejector with aluminum basic body for universal use, especially in systems with decentralized vacuum generation.

Basic Ejectors SBP

396

- Suction capacity up to 215 l/min
- Max. vacuum 85%
- Plastic housing

Compact basic ejector with plastic body for high-speed handling of suction-tight workpieces, especially in systems with decentralized vacuum generation.

Basic Ejectors SBP-C with Additional Functions

401

- Suction capacity up to 215 l/min
- Max. vacuum 85%
- Body made of plastic
- Integrated valve technologyand vacuum monitoring

Basic ejector with plastic body, integrated valve technology and vacuum switch for optimal cycle times.

Inline Ejectors SLP

409

- Suction capacity up to 16 l/min
- Max. vacuum 85%
- Body made of plastic

Lightweight, compact inline ejector with plastic body for space-saving, decentralized vacuum generation directly in the hose line.

Inline Ejectors VR

413

- Suction capacity up to 21 l/min
- Max. vacuum 90%
- Body made of aluminum

Robust inline ejector with aluminum body for space-saving decentralized vacuum generation and mounting directly on the suction pad.

Overview of Section 6

Vacuum Generators

Everything at a Glance

Multi-Stage Ejectors

Multi-Stage Ejectors SEM 417

PACKAGING WOOD COMPOSITE

- Suction capacity up to 2,370 l/min
- Max. vacuum 85%
- Body made of aluminum
- Multi-stage nozzle system

Multi-stage ejector with extremely high suction rate for handling porous workpieces, especially in systems with centralized vacuum generation.

Multi-Stage Ejectors SEM-C with Additional Functions 422

METAL PACKAGING WOOD COMPOSITE

- Suction capacity up to 673 l/min
- Max. vacuum 85%
- Body made of aluminum
- Multi-stage nozzle system

Multi-stage ejector with high suction rate and integrated system monitoring for handling of porous workpieces, especially in systems with centralized vacuum generation.

Compact Ejectors

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link 427

METAL

- Suction capacity up to 220 l/min
- Max. vacuum 85%

Efficient compact ejector with condition monitoring, IO-Link, air-saving regulation and optional power blow off for highly dynamic processes above all in the automotive and sheet metal industries.

Compact Ejectors SCPi / SMPi 432

METAL PACKAGING PLASTICS SOLAR GLASS

- Suction capacity up to 185 l/min
- Max. vacuum 85%

Lightweight, small compact ejector with integrated system monitoring, IO-Link, air-saving regulation and optional power blow off for highly dynamic, efficient processes.

Compact Ejectors SMP 438

METAL

- Suction capacity up to 200 l/min
- Max. vacuum 85%
- Body made of aluminum

Lightweight, small compact ejector with power blow off as well as optional system monitoring and optional air-saving regulation for highly dynamic, efficient processes.

SMP-Compressed Air Distributors GP 443

METAL

- Compressed air manifold for 2 to 6 compact ejectors

Collective collection plate for locking of compact ejectors SMP.

Overview of Section 6

Vacuum Generators

Everything at a Glance

Compact Ejectors SCP

445

- Suction capacity up to 200 l/min
- Max. vacuum 85%
- Body made of aluminum

Lightweight, small compact ejector with optional system monitoring and optional air-saving regulation for efficient processes.

Compact Ejectors SCP-FS

450

- Suction capacity up to 200 l/min
- Max. vacuum 85%
- Body made of aluminum

Externally controlled compact ejector with optional system monitoring for control of pneumatic valves.

SCP-Compressed Air Distributors GP

455

- Compressed air manifold for 2 to 6 compact ejectors

Collective collection plate for locking of compact ejectors SCP.

Compact Ejectors SCPM

457

- Suction capacity 6 to 23 l/min
- Max. vacuum 85%
- Body made of aluminum

Lightweight compact ejector in minimum model size with optional system monitoring and optional air-saving regulation for dynamic processes in tight spaces.

Ejectors

Ejectors with Active Blow Off SEAC

461

- Suction capacity up to 35 l/min
- Max. vacuum 85%
- Body made of plastic

Ejector with plastic body of the smallest possible dimensions and low weight as well as active blow off using compressed air, for decentralized vacuum generation in highly dynamic processes.

Ejectors with Blow Off System SEAC RP

465

- Suction capacity: up to 36 l/min
- Max. vacuum 85%

Ejector with anodized aluminum body of the smallest possible dimensions with pneumatic air-saving regulation as well as active blow off using compressed air, for decentralized vacuum generation in highly dynamic processes.

Ejectors with Atmospheric Ventilation SEAC ECO

469

- Suction capacity up to 35 l/min
- Max. vacuum 85%
- With atmospheric ventilation

Ejector with anodized aluminum body of the smallest possible dimensions as well as atmospheric ventilation for the lowest possible operating costs, for decentralized vacuum generation in dynamic processes.

Overview of Section 6

Vacuum Generators

Everything at a Glance

Holders for Ejectors SEAC / SEAC RP / SEAC ECO

472

- Mounting option for ejectors from top or side mounting
- Aluminum holder

Holder for attachment of the ejectors from the SEAC series.

Feed Ejectors SEC

474

- Suction capacity up to 8,640 l/min
- Diameter 6 to 75 mm

Ejector with high evacuation volume for applying suction to very porous parts and for transportation of bulk materials.

Vacuum Units

Vacuum Units VE / VER

477

- Suction capacity 69 l/min
- Max. vacuum 80%

Complete vacuum unit with ejector, pressure-reducing valve and optional pneumatic control.

Vacuum Pumps

Dry-Running Vacuum Pumps EVE-TR

479

- Suction capacity up to 244 m³/h
- Max. vacuum 92%

Oil-free vacuum pump with integrated fan, permanently lubricated bearings, dry-running membrane and high efficiency for handling of dense parts.

Oil-Lubricated Vacuum Pumps EVE-OG

487

- Suction capacity up to 255 m³/h
- Max. vacuum 98%

Low-maintenance, oil-lubricated vacuum pump with oil separator, three-phase current drive and optionally with additional filter and motor protection switch for handling of dense parts.

Water-Ring Pumps EVE-WR

492

- Suction capacity up to 65 m³/h
- Max. vacuum 93%

Oil and maintenance-free as well as energy-saving water-ring pump with internal exhaust air drying and water re-feeding for the highest standards for ambient air and temperature.

Overview of Section 6

Vacuum Generators

Everything at a Glance

Vacuum Reservoirs VOL

495

- Capacities: 5 to 200 l

Vacuum reservoir with non-return valve, manometer and dust filter for maintaining vacuum in case of power failure.

Vacuum Centres VZ

497

- Suction capacity up to 165 m³/h
- Max. vacuum 98%
- Reservoir capacity up to 200 l

Vacuum center with pump, vacuum reservoir and non-return valve as a complete product.

Vacuum Blowers

Vacuum Blowers SGBL-DG

500

- Suction capacity up to 540 m³/h
- Max. vacuum 46%

Vacuum blower for handling of extremely porous workpieces using maximum volume flow.

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

505

- Suction capacity up to 540 m³/h
- Max. vacuum 46%

Vacuum blower with electro-pneumatic reversing valve for control of suction and blow off, handling extremely porous workpieces using maximum volume flow.

Frequency-Regulated Vacuum Blowers SGBL-FU

510

- Suction capacity up to 335 m³/h
- Max. vacuum 50%

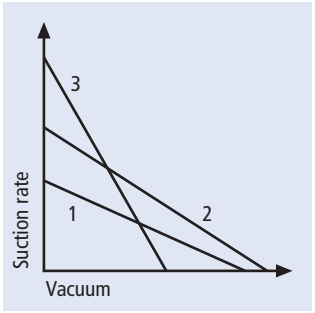
Compact vacuum blower with frequency regulation for optimal performance adjustment to the given requirements.

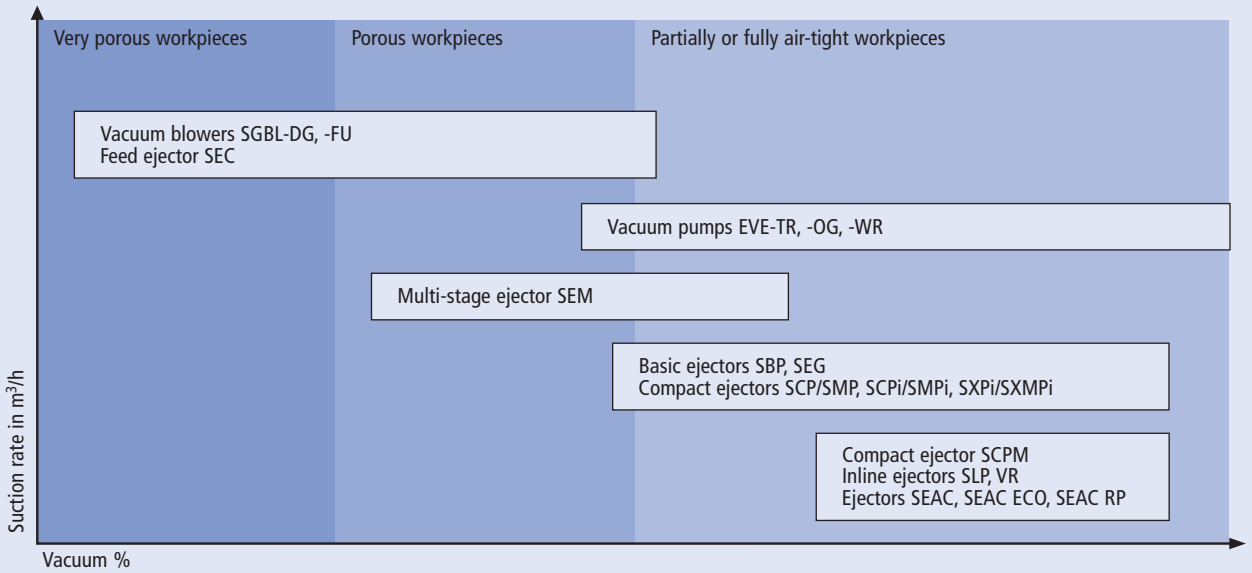
Selection by Suction Rate

The necessary vacuum can be generated with vacuum generators of various types.

The following three vacuum generators are available:
1) Ejector
2) Vacuum pump
3) Vacuum blower

Each type has its own specific advantages, but they have one thing in common: a high suction rate at a high vacuum always means high power consumption and high operating costs.





Vacuum Generators

Selection Aid

Checklist for Selection of Vacuum Generators

How is the vacuum generator driven?	Electrically (pump, blower) or pneumatically (ejector).
Is the workpiece air-tight or porous?	Affects the evacuation volume.
How large is the volume to be evacuated?	Details (in m^3/h or l/min) are shown for each vacuum generator.
How long is the required cycle time?	Affected by: the evacuation volume of the vacuum generator, the volume to be evacuated, the switching times of the valves etc.
Which vacuum value is required?	For practical use, a value of -600 mbar is assumed for calculations with air-tight workpieces.
Where is the vacuum generator located?	Affects the size, weight and additional functions.

Vacuum Accessories

Sealing Rings (DR)
Robust PA sealing rings with excellent sealing properties.

Further information in Section "Filters and Connections".

Vacuum Filters (VF/VFT/STF)
Filter the incoming air to protect the vacuum generator against dirt and resulting failure. Depending on the air-flow rate, various vacuum filters are available.

Further information in Section "Filters and Connections".

Plug-In Screw Unions
For quick, tool-free connection of hoses to vacuum generators.

Further information in Section "Filters and Connections".

Vacuum Hoses (VSL)
Carry the vacuum to the places where it is needed. Suitable for both compressed-air and vacuum.

Further information in Section "Filters and Connections".

Basic Ejectors

Basic Ejectors SEG

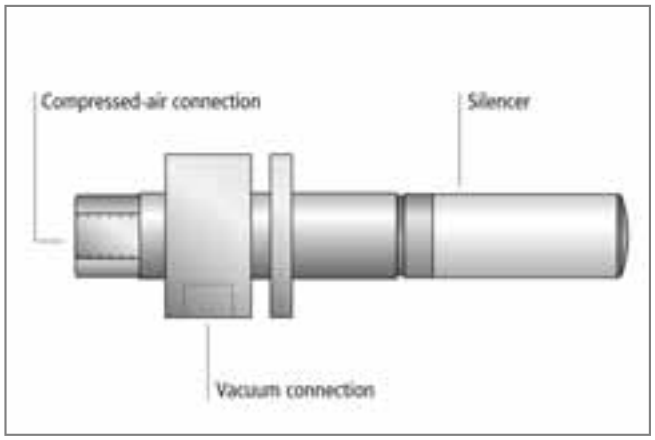
Suction rate from 7 l/min to 370 l/min

Suitability for Industry-Specific Applications

Basic ejectors SEG

Applications

- Basic ejector for universal use in vacuum systems
- Various handling tasks in the industries automotive, metal sheet, wood, food and packing



System design basic ejectors SEG

Design

- Body made of anodized aluminum
- Nozzle system made of brass
- Plastic silencer

Decentral vacuum generation by means of basic ejectors SEG for handling plastic parts

Our Highlights...

- Body with Venturi nozzle and optionally with silencer
- Minimum size; low weight due to aluminum body
- Various models with different performance figures; optimized for maximum efficiency

Your Benefits...

> No moving parts: no wear and no maintenance needed

> Suitable for small spaces and highly dynamic movements, such as on manipulators, industrial robots, feeder systems, etc.

> Very efficient: maximum suction capacity with minimum compressed-air consumption

Basic Ejectors

Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

Designation Code Basic Ejectors SEG

Abbreviated designation	Nozzle size	Shape	Version
Example SEG 10 HS:			
SEG	**10**	**HS**	
SEG	05 = 0.5 mm to 30 = 3.0 mm	HS high speed (high vacuum) HS-S high speed and narrow shape LS low speed (high suction capacity)	SDA silencer axial

Ordering Data Basic Ejectors SEG

The basic ejector SEG is delivered as a ready to connect product.

Available spare parts: silencer

Basic Ejectors SEG

Type	Part Number
SEG 05 HS-S	10.02.01.00272
SEG 05 HS-S SDA	10.02.01.00271
SEG 07 HS-S	10.02.01.00276
SEG 07 HS-S SDA	10.02.01.00275
SEG 07 HS	10.02.01.00255
SEG 07 HS SDA	10.02.01.00110
SEG 10 HS	10.02.01.00247
SEG 10 HS SDA	10.02.01.00111
SEG 15 HS	10.02.01.00248
SEG 15 HS SDA	10.02.01.00112
SEG 20 HS	10.02.01.00256
SEG 20 HS SDA	10.02.01.00113
SEG 20 LS	10.02.01.00252
SEG 20 LS SDA	10.02.01.00114
SEG 25 HS	10.02.01.00257
SEG 25 HS SDA	10.02.01.00115
SEG 25 LS	10.02.01.00259
SEG 25 LS SDA	10.02.01.00116
SEG 30 HS	10.02.01.00258
SEG 30 HS SDA	10.02.01.00117
SEG 30 LS	10.02.01.00260
SEG 30 LS SDA	10.02.01.00118

Basic Ejectors

Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

Ordering Data Spare Parts Basic Ejectors SEG

Type	Silencer
SEG 05 HS-S	-
SEG 05 HS-S SDA	10.02.01.00539
SEG 07 HS-S	-
SEG 07 HS-S SDA	10.02.01.00539
SEG 07 HS	-
SEG 07 HS SDA	10.02.01.00540
SEG 10 HS	-
SEG 10 HS SDA	10.02.01.00540
SEG 15 HS	-
SEG 15 HS SDA	10.02.01.00903
SEG 20 HS	-
SEG 20 HS SDA	10.02.01.00905
SEG 20 LS	-
SEG 20 LS SDA	10.02.01.00905
SEG 25 HS	-
SEG 25 HS SDA	10.02.01.00907
SEG 25 LS	-
SEG 25 LS SDA	10.02.01.00907
SEG 30 HS	-
SEG 30 HS SDA	10.02.01.00909
SEG 30 LS	-
SEG 30 LS SDA	10.02.01.00909

Technical Data Basic Ejectors SEG

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SEG 05 HS-S	0.5	82	7	0.4	13	0.8	5	2	2	10	-10...80
SEG 05 HS-S SDA	0.5	82	7	0.4	13	0.8	5	2	2	11	-10...80
SEG 07 HS-S	0.7	82	16	1.0	21	1.3	5	2	2	10	-10...80
SEG 07 HS-S SDA	0.7	82	16	1.0	21	1.3	5	2	2	11	-10...80
SEG 07 HS	0.7	85	14	0.8	21	1.3	5	2	4	41	-10...80
SEG 07 HS SDA	0.7	85	14	0.8	21	1.3	5	2	4	45	-10...80
SEG 10 HS	1.0	85	34	2.0	49	2.9	5	2	4	46	-10...80
SEG 10 HS SDA	1.0	85	34	2.0	49	2.9	5	2	4	50	-10...80
SEG 15 HS	1.5	85	69	4.1	102	6.1	5	4	6	102	-10...80
SEG 15 HS SDA	1.5	85	69	4.1	102	6.1	5	4	6	110	-10...80
SEG 20 HS	2.0	85	124	7.4	186	11.2	5	4	9	118	-10...80
SEG 20 HS SDA	2.0	85	124	7.4	186	11.2	5	4	9	130	-10...80
SEG 20 LS	2.0	55	170	10.2	186	11.2	5	4	9	118	-10...80
SEG 20 LS SDA	2.0	55	170	10.2	186	11.2	5	4	9	130	-10...80
SEG 25 HS	2.5	85	184	11.0	275	16.5	5	6	12	273	-10...80
SEG 25 HS SDA	2.5	85	184	11.0	275	16.5	5	6	12	295	-10...80
SEG 25 LS	2.5	55	260	15.6	275	16.5	5	6	12	273	-10...80
SEG 25 LS SDA	2.5	55	260	15.6	275	16.5	5	6	12	295	-10...80
SEG 30 HS	3.0	85	240	14.4	392	23.5	5	6	12	352	-10...80
SEG 30 HS SDA	3.0	85	240	14.4	392	23.5	5	6	12	404	-10...80
SEG 30 LS	3.0	55	370	22.2	392	23.5	5	6	12	352	-10...80
SEG 30 LS SDA	3.0	55	370	22.2	392	23.5	5	6	12	404	-10...80

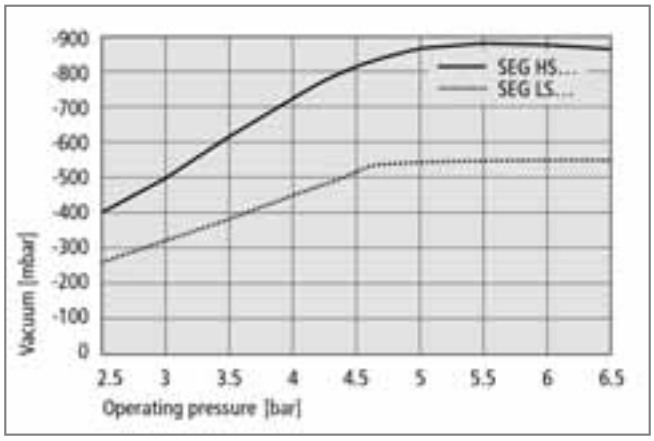
*At optimal operating pressure

**For max. length 2 m

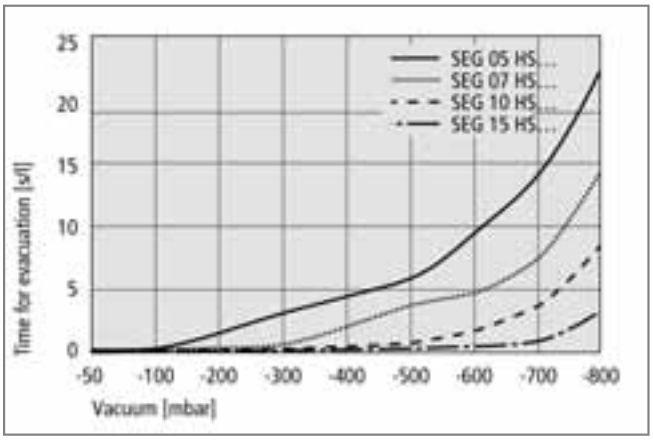
Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

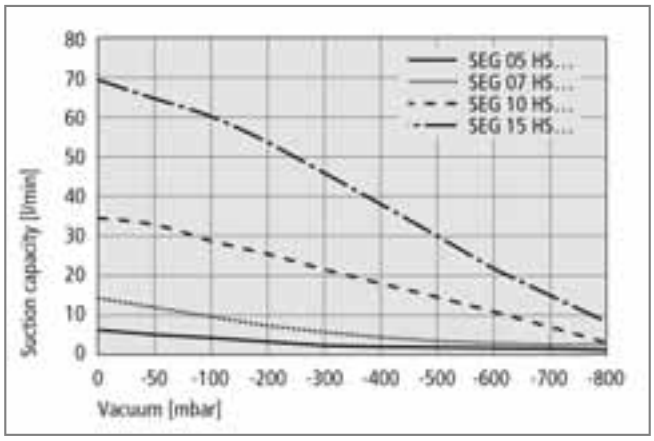
Performance Data Basic Ejectors SEG



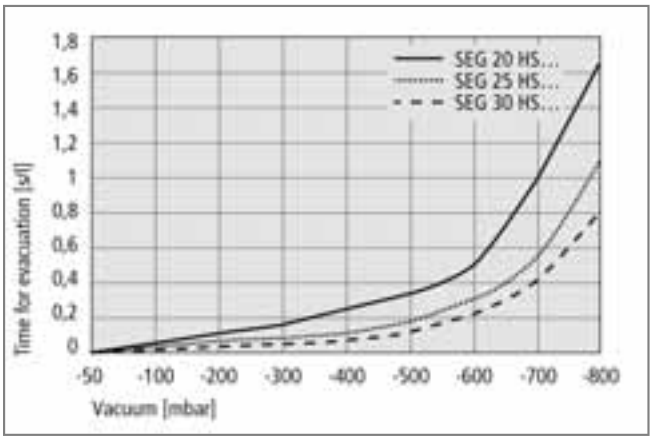
Achievable vacuum at various operating pressures



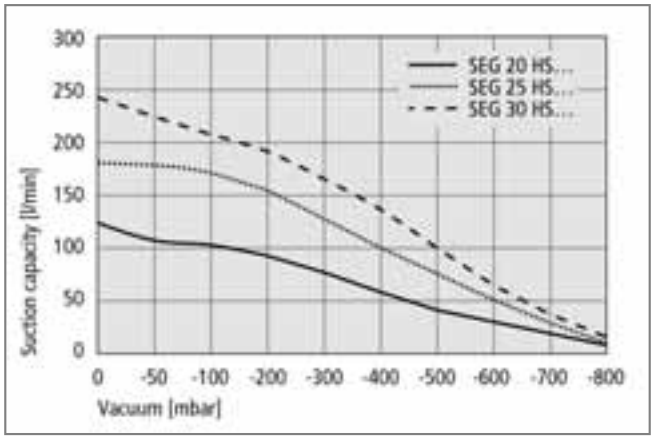
Evacuation times for various vacuum ranges



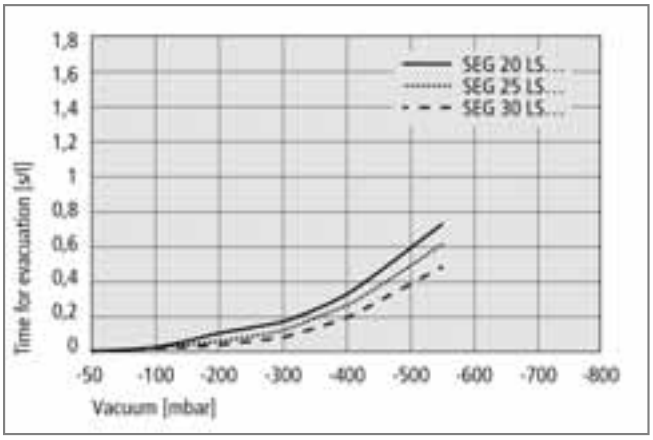
Suction capacity at various degrees of evacuation



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

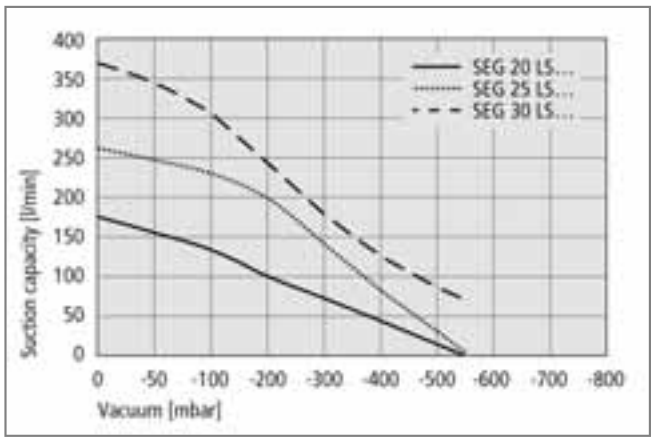


Evacuation times for various vacuum ranges

Basic Ejectors

Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEG 05 HS-S	7,0	5,9	5,1	4,3	3,4	2,6	1,9	1,4	0,5	0,2
SEG 07-HS-S	16,0	11,7	10,3	8,6	6,8	5,3	3,9	2,8	1,1	0,4
SEG 07 HS	14,0	11,7	10,3	8,6	6,8	5,3	3,9	2,8	1,1	0,4
SEG 10 HS	34,0	33,0	29,0	25,0	22,0	18,0	15,0	9,0	6,0	3,0
SEG 15 HS	69,0	64,0	60,0	53,0	43,0	36,0	30,0	22,0	16,0	8,0
SEG 20 HS	124,0	116,0	104,0	92,0	78,0	64,0	48,0	32,0	23,0	10,0
SEG 20 LS	170,0	155,0	138,0	100,0	75,0	46,0	8,0	-	-	-
SEG 25 HS	184,0	180,0	170,0	146,0	120,0	96,0	72,0	47,0	28,0	13,0
SEG 25 LS	260,0	248,0	233,0	182,0	121,0	62,0	28,0	-	-	-
SEG 30 HS	240,0	225,0	215,0	198,0	165,0	130,0	100,0	64,0	36,0	16,0
SEG 30 LS	370,0	345,0	315,0	242,0	173,0	102,0	80,0	-	-	-

Evacuation Time in s/l for Various Vacuum Ranges

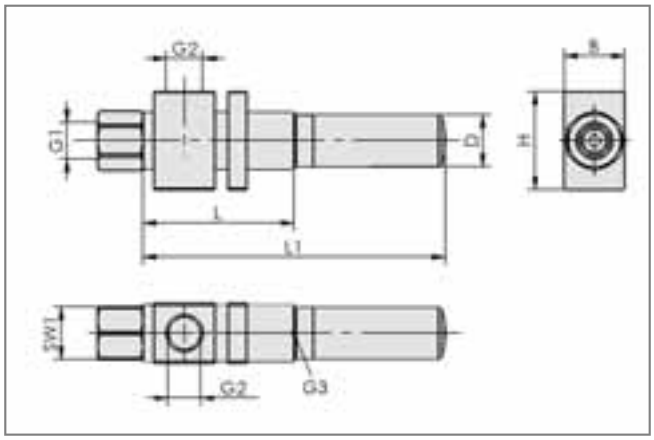
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEG 05 HS-S	0.34	0.76	1.80	3.02	4.55	6.57	9.58	14.80	22.40
SEG 07-HS-S	0.17	0.36	0.85	1.45	2.18	3.25	4.67	7.34	14.60
SEG 07 HS	0.17	0.36	0.85	1.45	2.18	3.25	4.67	7.34	14.60
SEG 10 HS	0.09	0.16	0.34	0.59	0.96	1.42	2.03	3.30	7.36
SEG 15 HS	0.05	0.07	0.19	0.31	0.48	0.72	1.12	1.70	3.60
SEG 20 HS	0.03	0.05	0.11	0.16	0.24	0.35	0.50	1.08	1.65
SEG 20 LS	0.01	0.04	0.11	0.18	0.33	0.60	1.70	-	-
SEG 25 HS	0.03	0.04	0.07	0.09	0.14	0.20	0.30	0.49	1.10
SEG 25 LS	0.02	0.03	0.08	0.15	0.26	0.50	0.83	-	-
SEG 30 HS	0.01	0.02	0.04	0.06	0.10	0.15	0.21	0.42	0.80
SEG 30 LS	0.01	0.02	0.03	0.05	0.08	0.12	-	-	-

Basic Ejectors

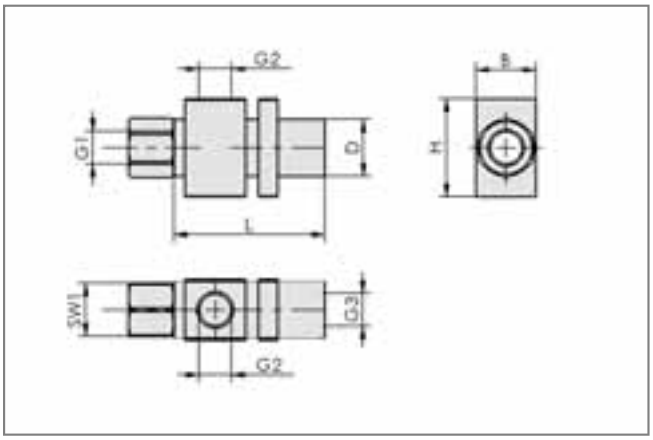
Basic Ejectors SEG

Suction rate from 7 l/min to 370 l/min

Design Data Basic Ejectors SEG



SEG 05 to 30 SDA



SEG 05 to 30

Type	Dimensions in mm								
	B	D	G1	G2	G3	H	L	L1	SW1
SEG 05 HS-S	10	7.0	M5-F	M5-F	M5-F	20	32	-	8
SEG 05 HS-S SDA	10	9.0	M5-F	M5-F	M5-F	20	32	56	8
SEG 07 HS-S	10	7.0	M5-F	M5-F	M5-F	20	32	-	8
SEG 07 HS-S SDA	10	9.0	M5-F	M5-F	M5-F	20	32	56	8
SEG 07 HS	16	16.0	G1/8"-F	G1/8"-F	G1/8"-F	26	40	-	14
SEG 07 HS SDA	16	13.6	G1/8"-F	G1/8"-F	G1/8"-F	26	40	80	14
SEG 10 HS	16	16.0	G1/8"-F	G1/8"-F	G1/8"-F	26	45	-	14
SEG 10 HS SDA	16	13.6	G1/8"-F	G1/8"-F	G1/8"-F	26	45	85	14
SEG 15 HS	22	21.0	G1/4"-F	G1/4"-F	G1/4"-F	38	60	-	17
SEG 15 HS SDA	22	20.0	G1/4"-F	G1/4"-F	G1/4"-F	38	60	106	17
SEG 20 HS	26	25.0	G1/4"-F	G1/4"-F	G3/8"-F	38	75	-	17
SEG 20 HS SDA	26	20.0	G1/4"-F	G1/4"-F	G3/8"-F	38	75	131	17
SEG 20 LS	26	25.0	G1/4"-F	G1/4"-F	G3/8"-F	38	75	-	17
SEG 20 LS SDA	26	20.0	G1/4"-F	G1/4"-F	G3/8"-F	38	75	131	17
SEG 25 HS	32	30.0	G3/8"-F	G1/2"-F	G1/2"-F	50	100	-	22
SEG 25 HS SDA	32	27.0	G3/8"-F	G1/2"-F	G1/2"-F	50	100	163	22
SEG 25 LS	32	30.0	G3/8"-F	G1/2"-F	G1/2"-F	50	100	-	22
SEG 25 LS SDA	32	27.0	G3/8"-F	G1/2"-F	G1/2"-F	50	100	163	22
SEG 30 HS	42	40.0	G3/8"-F	G1/2"-F	G3/4"-F	50	110	-	22
SEG 30 HS SDA	42	31.0	G3/8"-F	G1/2"-F	G3/4"-F	50	110	200	22
SEG 30 LS	42	40.0	G3/8"-F	G1/2"-F	G3/4"-F	50	110	-	22
SEG 30 LS SDA	42	31.0	G3/8"-F	G1/2"-F	G3/4"-F	50	110	200	22

Basic Ejectors

Basic Ejectors SBP

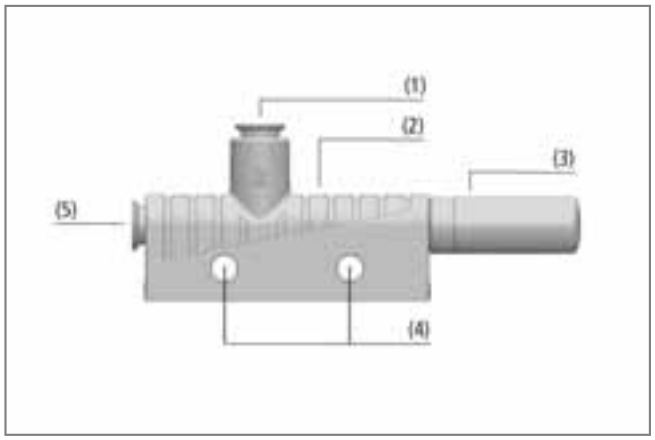
Suction rate from 8 l/min to 215 l/min

Suitability for Industry-Specific Applications

Basic ejectors SBP

Applications

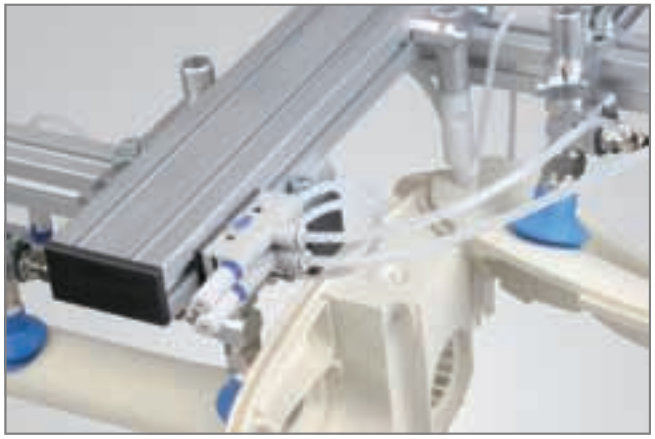
- Basic ejector with plastic housing for use in feeder systems
- Handling of electronic components
- Use in separation systems for plastic and sheet-metal machining
- Construction of ejector blocks for decentralized individual control of suction pads



System design basic ejectors SBP

Design

- One-piece housing (2) made of light, impact-resistant plastic
- Connection of compressed air (5) and vacuum (1) with quick-action push-in coupling (S1 to S3) or threaded holes (G1 to G3)
- Open silencer (3)
- Vacuum generator with single nozzle, available in six power ratings, 0.5 to 2.5 mm
- Can be fixed horizontal with mounting holes (4) or vertical with the base on a mounting plate
- Optional mounting with mounting plate and mounting kit on DIN top-hat rails



Central vacuum generation by means of basic ejectors SBP for handling plastic injection molded parts

Our Highlights...

- Plastic housing optimized for weight and size
- Ejector nozzles with six different power ratings
- Connections either with threaded holes or push-in couplings
- Open silencer

Your Benefits...

> Ideal for decentralized vacuum generation in highly dynamic processes

> Various power ratings for minimum air consumption

> Space-saving and easy to install

> Low noise levels and minimum maintenance requirements

Basic Ejectors

Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

Designation Code Basic Ejectors SBP

Abbreviated designation	Nozzle size	Connection	System monitoring
Example SBP 05 G1 SDA:			
SBP	**05**	**G1**	**SDA**
SBP	05 = 0.5 mm to 25 = 2.5 mm	G1 connection thread 1 G2 connection thread 2 G3 connection thread 3 S1 quick-connect push-in coupling 1 S2 quick-connect push-in coupling 2 S3 quick-connect push-in coupling 3	SDA silencer axial

Ordering Data Basic Ejectors SBP

The basic ejector SBP is delivered as a ready to connect product.

Available spare parts: silencer
Available accessories: mounting plate, mounting set

Basic Ejectors SBP

Type	G1*	G2*	G3*	S1*	S2*	S3*
SBP 05 SDA	10.02.01.00599	-	-	10.02.01.00563	-	-
SBP 07 SDA	10.02.01.00600	-	-	10.02.01.00564	-	-
SBP 10 SDA	-	10.02.01.00601	-	-	10.02.01.00565	-
SBP 15 SDA	-	10.02.01.00602	-	-	10.02.01.00566	-
SBP 20 SDA	-	-	10.02.01.00603	-	-	10.02.01.00567
SBP 25 SDA	-	-	10.02.01.00604	-	-	10.02.01.00568

*Connection geometry: see design data of basic ejectors SBP

Ordering Data Spare Parts and Accessories Basic Ejectors SBP

Type	Silencer
SBP 05/07 SDA	10.02.01.00539
SBP 10/15 SDA	10.02.01.00540
SBP 20/25 SDA	10.02.01.00719

*Set with two retaining clips, two screws incl. washers

Mounting plate BEF-PL	Mounting kit SET SBP/SBP-C M4-IG*
10.02.01.00511*	10.02.01.00769
10.02.01.00511**	10.02.01.00769
10.02.01.00511***	10.02.01.00769

* suitable for 11x SBP 05/07

** suitable for 7x SBP 10/15

*** suitable for 5x SBP 20/25

Basic Ejectors

Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

Technical Data Basic Ejectors SBP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level workp. gripped [dB]
SBP 05 SDA	0.5	85	8.0	0.5	14	0.8	53
SBP 07 SDA	0.7	85	16.0	1.0	22	1.3	59
SBP 10 SDA	1.0	85	37.7	2.3	48	2.9	59
SBP 15 SDA	1.5	85	71.0	4.3	105	6.3	65
SBP 20 SDA	2.0	85	127.0	7.6	197	11.8	68
SBP 25 SDA	2.5	85	215.0	12.9	311	18.7	70

*At optimal operating pressure

**For max. length 2 m

Type	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SBP 05 SDA	58	3...6	2	2	7.5	0...60
SBP 07 SDA	65	3...6	2	2	7.5	0...60
SBP 10 SDA	65	3...6	4	6	22.0	0...60
SBP 15 SDA	72	3...6	4	6	22.0	0...60
SBP 20 SDA	77	3...6	6	7	50.0	0...60
SBP 25 SDA	78	3...6	6	7	50.0	0...60

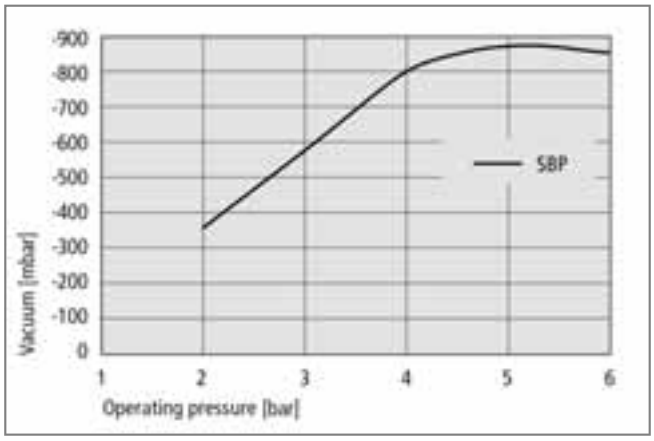
*At optimal operating pressure

**For max. length 2 m

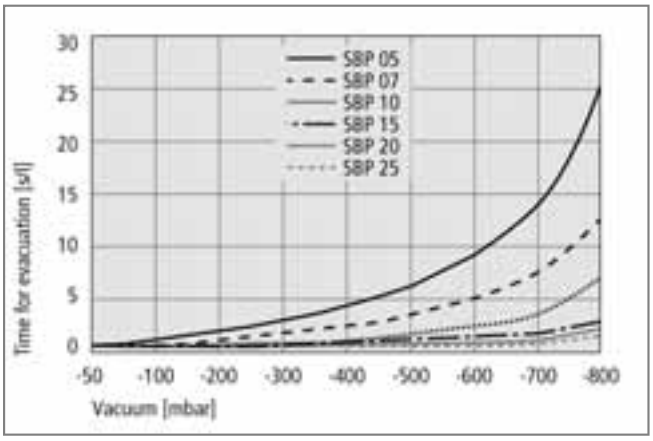
Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

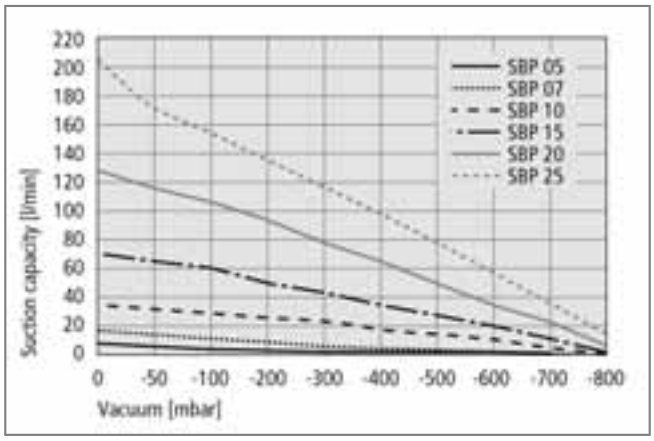
Performance Data Basic Ejectors SBP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBP 05 SDA	8.00	6.62	5.64	4.74	3.81	3.01	2.28	1.42	0.40	0.10
SBP 07 SDA	16.10	13.60	11.37	9.03	7.25	5.63	3.97	2.65	1.10	**0.30**
SBP 10 SDA	37.70	33.20	30.10	26.70	23.00	18.60	14.90	9.80	5.20	1.61
SBP 15 SDA	71.00	65.00	60.10	52.00	44.00	36.50	29.00	20.50	11.40	2.18
SBP 20 SDA	127.00	117.80	106.00	94.20	79.10	65.30	49.87	35.99	23.00	8.36
SBP 25 SDA	215.00	172.00	156.10	138.70	118.50	99.10	79.36	58.90	37.24	16.24

Evacuation Time in s/l for Various Vacuum Ranges

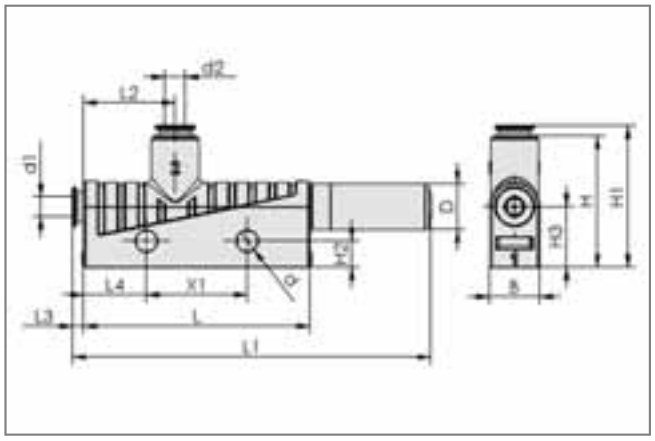
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBP 05 SDA	0.34	0.68	1.56	2.66	4.02	5.84	8.54	13.22	25.54
SBP 07 SDA	0.20	0.38	0.84	1.46	2.24	3.26	4.66	6.84	12.56
SBP 10 SDA	0.06	0.14	0.30	0.52	0.82	1.30	1.98	3.26	6.56
SBP 15 SDA	0.05	0.08	0.16	0.26	0.40	0.60	0.86	1.30	2.54
SBP 20 SDA	0.03	0.05	0.09	0.16	0.24	0.34	0.49	0.80	1.74
SBP 25 SDA	0.03	0.04	0.07	0.09	0.14	0.20	0.28	0.42	0.99

Basic Ejectors

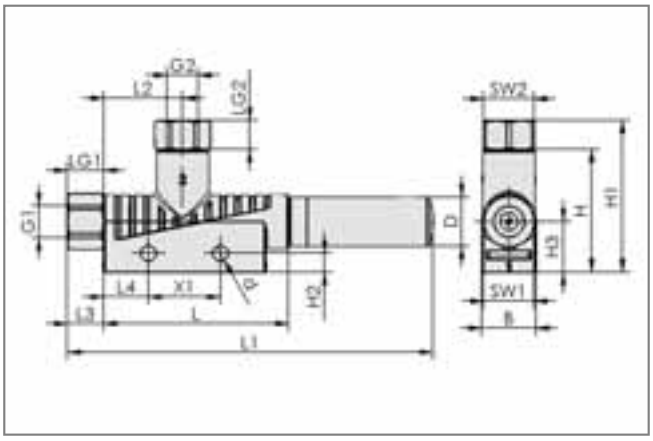
Basic Ejectors SBP

Suction rate from 8 l/min to 215 l/min

Design Data Basic Ejectors SBP



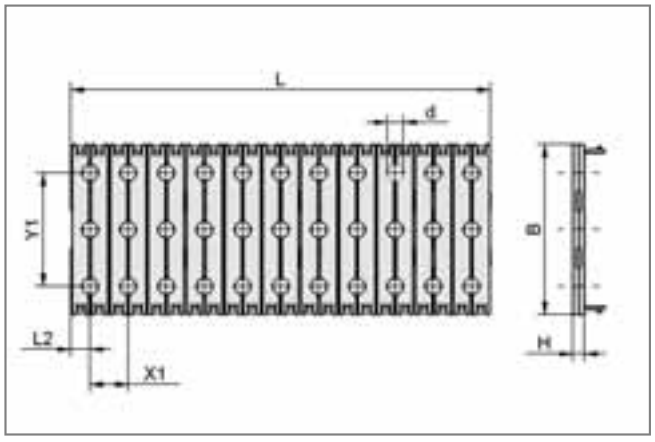
SBP S1...S3



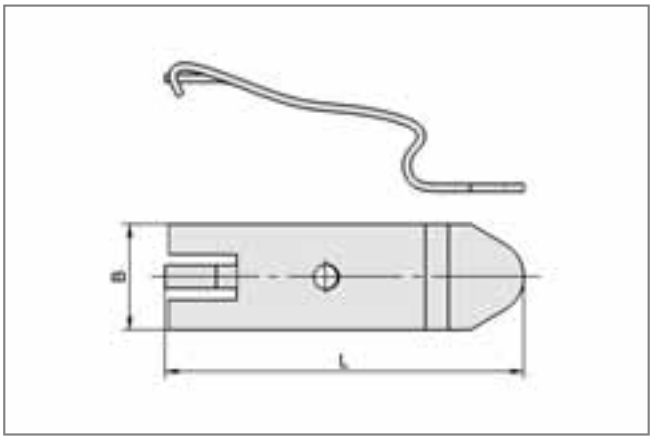
SBP G1...G3

Type	Dimensions in mm																			
	B	d	d 1	d 2	D	G1	G2	H	H1	H2	H3	L	L1	L2	L3	L4	LG1	LG2	SW1	SW2	X1
SBP 05/07 S1 SDA	10	4.2	4	4	9	-	-	26	28.0	5.2	12	45.0	71	18.0	2.0	12.5	-	-	-	-	20
SBP 10/15 S2 SDA	15	4.2	6	8	14	-	-	34	40.0	5.2	14	51.5	97	22.0	5.5	12.5	-	-	-	-	20
SBP 20/25 S3 SDA	20	4.2	8	10	20	-	-	39	45.5	5.2	17	86.5	168	24.5	5.5	12.5	-	-	-	-	20
SBP 05/07 G1 SDA	10	4.2	-	-	9	M5-F	M5-F	26	31.0	5.2	12	45.0	74	18.0	5.0	12.5	5	5	8	8	20
SBP 10/15 G2 SDA	15	4.2	-	-	14	G1/8"-F	G1/8"-F	34	42.0	5.2	14	51.5	102	22.0	10.0	12.5	8	8	14	14	20
SBP 20/25 G3 SDA	20	4.2	-	-	20	G1/4"-F	G3/8"-F	39	53.5	5.2	17	86.5	176	24.5	13.0	12.5	9	10	17	19	20

Design Data Spare Parts and Accessories Basic Ejectors SBP



BEF-PL



SET SBP/SBP-C M4-IG

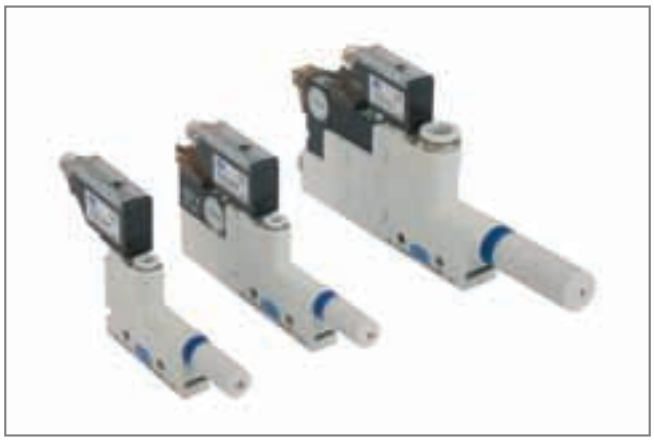
Type	Dimensions in mm						
	B	d	H	L	L2	X1	Y1
Mounting plate BEF-PL	45	4.2	3	111.1	5	10.1	30
Mounting set SET SBP/SBP-C M4-IG	14	-	-	50.0	-	-	-

Basic Ejectors

Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

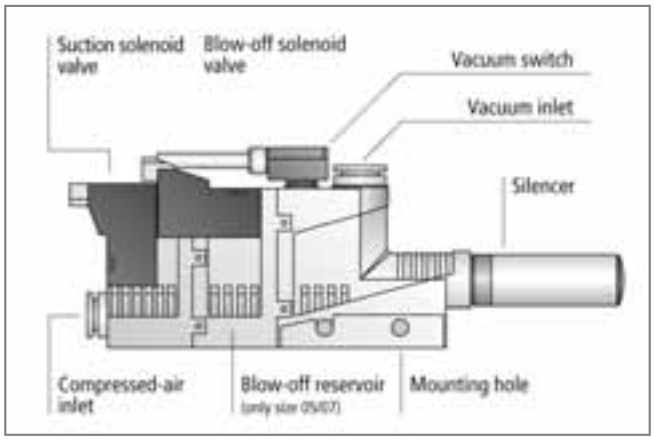
Suitability for Industry-Specific Applications



Basic ejectors SBP-C with additional functions

Applications

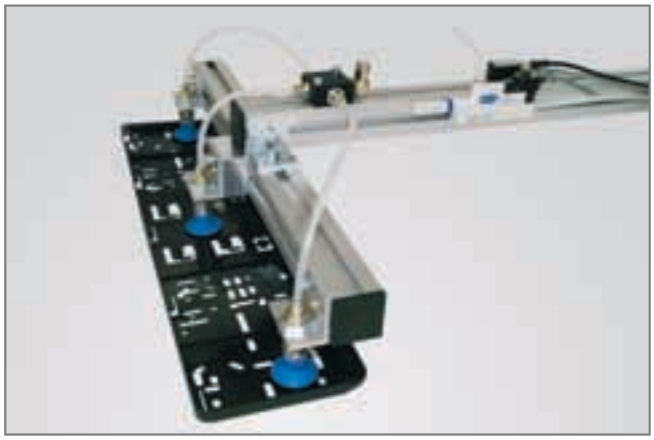
- Basic ejector with plastic housing, integrated valve technology and system monitoring for use in feeder systems with very high dynamic
- Handling of all kind of airtight components
- For use in separating systems where space is restricted
- Construction of ejector blocks for centralized or decentralized individual control of suction pads



System design basic ejectors SBP-C with additional functions

Design

- Ejector with single stage nozzle, available in six power ratings, from 0.5 to 2.5 mm nozzle diameter
- Housing made of light, impact-resistant plastic
- Connection of compressed air and vacuum with push-in coupling or threads
- Basic housing with connection facility for a vacuum switch
- Optionally available with suction or blow-off pulse, blow-off reservoir (on SBP-C 05/07) and vacuum switch
- Can be fixed horizontal with mounting holes or vertical with the base on a mounting plate
- Optional mounting with mounting plate and mounting kit on DIN top-hat rails



Central vacuum generation by means of basic ejector SBP-C for handling plastic injection molded parts

Our Highlights...

- Weight-optimized plastic housing
- Ejector nozzles with six different power ratings
- Connections either with threaded holes or push-in couplings
- Integrated valve technology and vacuum monitoring

Your Benefits...

> Ideal for decentralized vacuum generation in highly dynamic processes

> Various power ratings for optimized air consumption

> Space-saving and easy to install

> The complete solution for optimized cycletimes

Basic Ejectors

Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Designation Code Basic Ejectors SBP-C with Additional Functions

Abbreviated designation	Nozzle size	Connection	Idle position suction valve	Blow off valve	System monitoring
Example SBP-C 10 S2 NO A VS-T:					
SBP-C	**10**	**S2**	**NO**	**A**	**VS-T**
SBP-C	05 = 1.5 mm to 25 = 2.5 mm	G1 connection thread 1 G2 connection thread 2 G3 connection thread 3 S1 quick-connect push-in coupling 1 S2 quick-connect push-in coupling 2 S3 quick-connect push-in coupling 3	NC normally closed NO normally open	A blow off valve AI blow off pulse	VS-T vacuum switch with Teachbutton (PNP)

Ordering Data Basic Ejectors SBP-C with Additional Functions

The basic ejector SBP-C is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer
Available accessories: mounting plate, mounting set, connection cable

Basic Ejectors SBP-C with Additional Functions

SBP-C 05		SBP-C 07		SBP-C 10	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SBP-C 05 G1 VS-T	10.02.01.00997	**SBP-C 07 G1 VS-T**	10.02.01.00998	**SBP-C 10 G2 VS-T**	10.02.01.00999
SBP-C 05 G1 NC	10.02.01.00611	**SBP-C 07 G1 NC**	10.02.01.00612	**SBP-C 10 G2 NO A**	10.02.01.00625
SBP-C 05 G1 NC AI	10.02.01.00623	**SBP-C 07 G1 NC AI**	10.02.01.00624	**SBP-C 10 G2 NO A VS-T**	10.02.01.01008
SBP-C 05 G1 NC VS-T	10.02.01.01003	**SBP-C 07 G1 NC VS-T**	10.02.01.01004	**SBP-C 10 S2 VS-T**	10.02.01.00983
SBP-C 05 G1 NC AI VS-T	10.02.01.01005	**SBP-C 07 G1 NC AI VS-T**	10.02.01.01006	**SBP-C 10 S2 NO A**	10.02.01.00589
SBP-C 05 S1 VS-T	10.02.01.00981	**SBP-C 07 S1 VS-T**	10.02.01.00982	**SBP-C 10 S2 NO A VS-T**	10.02.01.00993
SBP-C 05 S1 NC	10.02.01.00575	**SBP-C 07 S1 NC**	10.02.01.00576		
SBP-C 05 S1 NC AI	10.02.01.00587	**SBP-C 07 S1 NC AI**	10.02.01.00588		
SBP-C 05 S1 NC VS-T	10.02.01.00987	**SBP-C 07 S1 NC VS-T**	10.02.01.00988		
SBP-C 05 S1 NC AI VS-T	10.02.01.00989	**SBP-C 07 S1 NC AI VS-T**	10.02.01.00990		

SBP-C 15		SBP-C 20		SBP-C 25	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SBP-C 15 G2 VS-T	10.02.01.01000	**SBP-C 20 G3 VS-T**	10.02.01.01001	**SBP-C 25 G3 VS-T**	10.02.01.01002
SBP-C 15 G2 NO A	10.02.01.00626	**SBP-C 20 G3 NO A**	10.02.01.00627	**SBP-C 25 G3 NO A**	10.02.01.00628
SBP-C 15 G2 NO A VS-T	10.02.01.01009	**SBP-C 20 G3 NO A VS-T**	10.02.01.01010	**SBP-C 25 G3 NO A VS-T**	10.02.01.01011
SBP-C 15 S2 VS-T	10.02.01.00984	**SBP-C 20 S3 VS-T**	10.02.01.00985	**SBP-C 25 S3 VS-T**	10.02.01.00986
SBP-C 15 S2 NO A	10.02.01.00590	**SBP-C 20 S3 NO A**	10.02.01.00591	**SBP-C 25 S3 NO A**	10.02.01.00592
SBP-C 15 S2 NO A VS-T	10.02.01.00994	**SBP-C 20 S3 NO A VS-T**	10.02.01.00995	**SBP-C 25 S3 NO A VS-T**	10.02.01.00996

Basic Ejectors

Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Ordering Data Spare Parts and Accessories Basic Ejectors SBP-C with Additional Functions

Type	Silencer
SBP-C 05/07	10.02.01.00539
SBP-C 10/15	10.02.01.00540
SBP-C 20/25	10.02.01.00719

*Set with two retaining clips, two screws incl. washers

Mounting plate BEF-PL	Mounting kit SET SBP/SBP-C M4-IG*
10.02.01.00511*	10.02.01.00769
10.02.01.00511**	10.02.01.00769
10.02.01.00511***	10.02.01.00769

* suitable for 11 SBP-C 05/07

** suitable for 7 SBP-C 10/15

*** suitable for 5 SBP-C 20/25

Ordering Data Accessories Plug Connector Basic Ejectors SBP-C with Additional Functions

Type	Connection cable for solenoid valves (3 m, PUR)	Number of connection cables*	Connection cable 4-pole for vacuum switch (5m, PUR, straight)**
SBP-C 05 G1/S1 VS-T	-	-	10.06.02.00031
SBP-C 05 G1/S1 NC ...	21.04.06.00086	1 x	10.06.02.00031
SBP-C 07 G1/S1 VS-T	-	-	10.06.02.00031
SBP-C 07 G1/S1 NC ...	21.04.06.00086	1 x	10.06.02.00031
SBP-C 10 G2/S2 VS-T	-	-	10.06.02.00031
SBP-C 10 G2/S2 NO ...	21.04.06.00086	2 x	10.06.02.00031
SBP-C 15 G2/S2 VS-T	-	-	10.06.02.00031
SBP-C 15 G2/S2 NO...	21.04.06.00086	2 x	10.06.02.00031
SBP-C 20 G3/S3 VS-T	-	-	10.06.02.00031
SBP-C 20 G3/S3 NO...	21.04.06.00086	2 x	10.06.02.00031
SBP-C 25 G3/S3 VS-T	-	-	10.06.02.00031
SBP-C 25 G3/S3 NO...	21.04.06.00086	2 x	10.06.02.00031

*For SBP-C 05/07...NC... order 1 x per ejector; For SBP-C 10/15/20/25...NO... order 2 x per ejector

**Order 1 x per ejector

Technical Data Basic Ejectors SBP-C with Additional Functions

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level workp. gripped [dB]
SBP-C 05	0.5	85	7	0.4	14	0.8	53
SBP-C 07	0.7	85	16	1.0	25	1.5	59
SBP-C 10	1.0	85	38	2.3	48	2.9	59
SBP-C 15	1.5	85	70	4.2	118	7.1	65
SBP-C 20	2.0	85	123	7.4	208	12.5	68
SBP-C 25	2.5	85	215	12.9	311	18.7	70

!The supply voltage for vacuum switches and solenoid valves is 24 VDC

*On version with solenoid valves SBP-C 07 (24) / SBP-C 25 (320) and optimal operating pressure

**For max. length 2 m

Type	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SBP-C 05	58	3...6	2	2	87	0...50
SBP-C 07	65	3...6	2	2	87	0...50
SBP-C 10	65	3...6	4	6	105	0...50
SBP-C 15	72	3...6	4	6	105	0...50
SBP-C 20	77	3...6	6	7	143	0...50
SBP-C 25	78	3...6	6	7	143	0...50

!The supply voltage for vacuum switches and solenoid valves is 24 VDC

*On version with solenoid valves SBP-C 07 (24) / SBP-C 25 (320) and optimal operating pressure

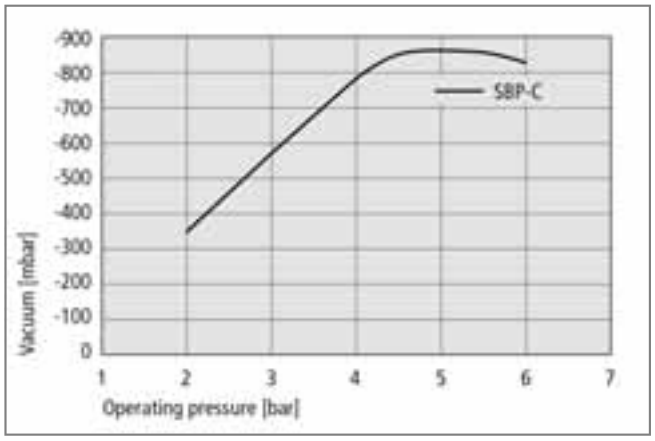
**For max. length 2 m

Basic Ejectors

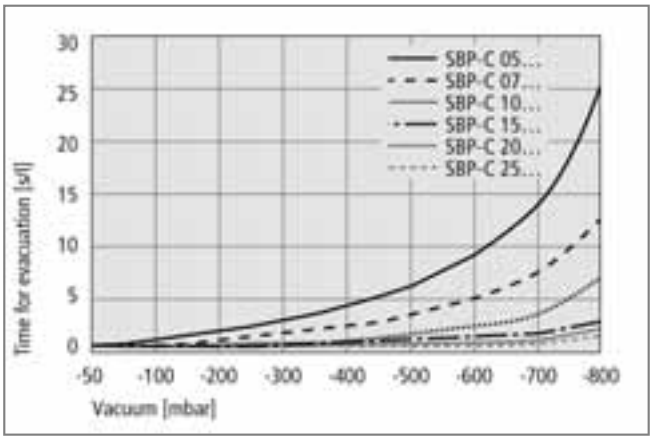
Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

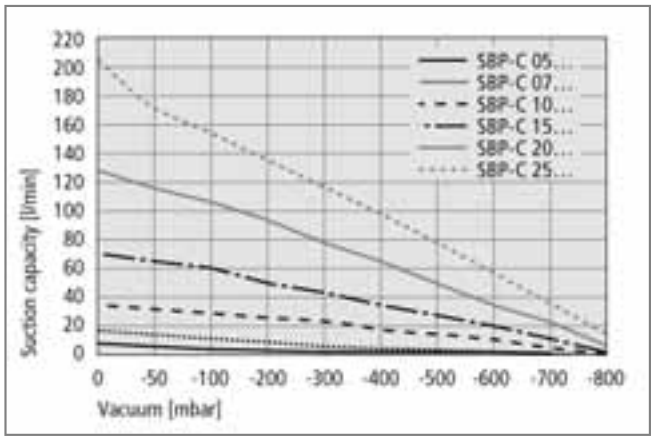
Performance Data Basic Ejectors SBP-C with Additional Functions



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBP-C 05 ...	7.00	6.20	5.30	4.50	3.70	3.00	2.20	1.40	0.40	0.10
SBP-C 07 ...	16.00	13.60	11.37	9.03	7.25	5.63	3.97	2.65	1.10	0.30
SBP-C 10 ...	38.00	33.20	30.10	26.70	23.00	18.60	14.90	9.80	5.20	1.61
SBP-C 15 ...	70.00	65.00	60.10	52.00	44.00	36.50	29.00	20.50	11.40	2.18
SBP-C 20 ...	123.00	115.00	104.00	93.00	78.00	64.00	49.00	35.50	23.00	8.00
SBP-C 25 ...	215.00	175.00	157.50	139.50	119.00	99.50	79.60	59.00	37.30	16.30

Evacuation Time in s/l for Various Vacuum Ranges

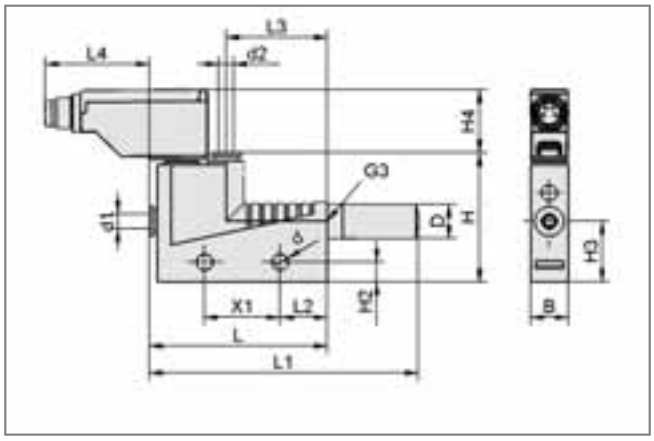
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SBP-C 05 ...	0.34	0.68	1.56	2.66	4.02	5.84	8.54	13.22	25.54
SBP-C 07 ...	0.20	0.38	0.84	1.46	2.24	3.26	4.66	6.84	12.56
SBP-C 10 ...	0.06	0.14	0.30	0.52	0.82	1.30	1.98	3.26	6.56
SBP-C 15 ...	0.05	0.08	0.16	0.26	0.40	0.60	0.86	1.30	2.54
SBP-C 20 ...	0.03	0.05	0.09	0.16	0.24	0.34	0.49	0.80	1.74
SBP-C 25 ...	0.02	0.03	0.06	0.09	0.14	0.20	0.28	0.42	0.99

Basic Ejectors

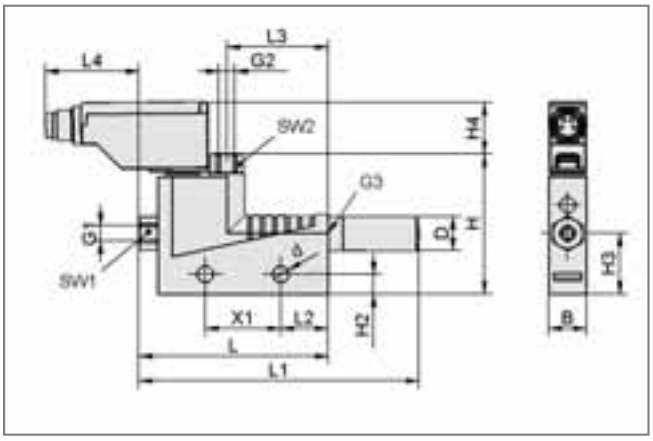
Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

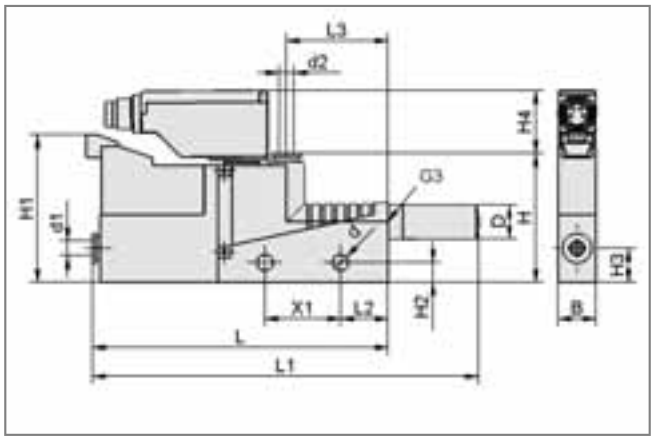
Design Data Basic Ejectors SBP-C with Additional Functions



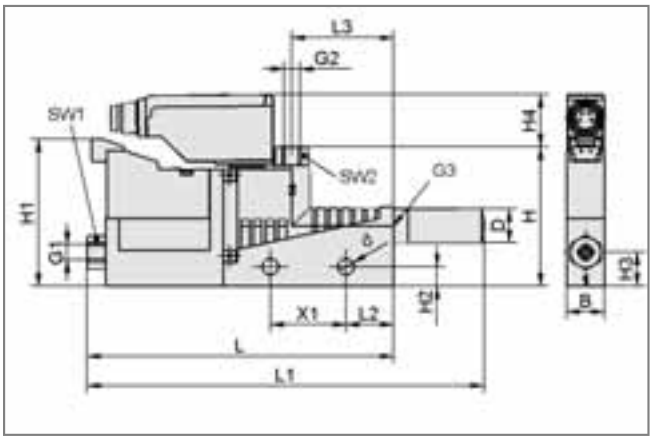
SBP-C 05/07 S1 VS-T; ... 10/15 S2 VS-T; ... 20/25 S3 VS-T



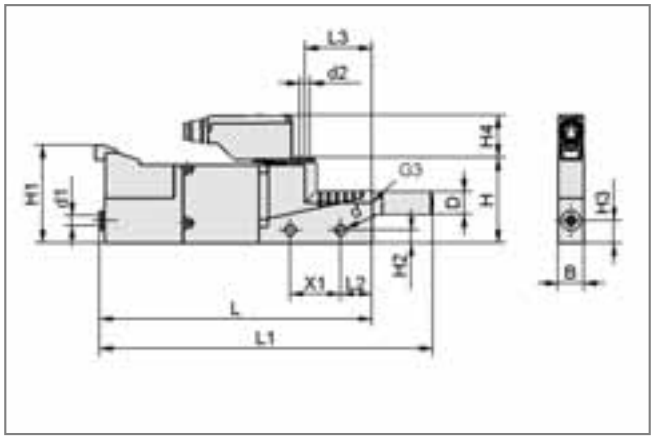
SBP-C 05/07 G1 VS-T; ... 10/15 G2 VS-T; ... 20/25 G3 VS-T



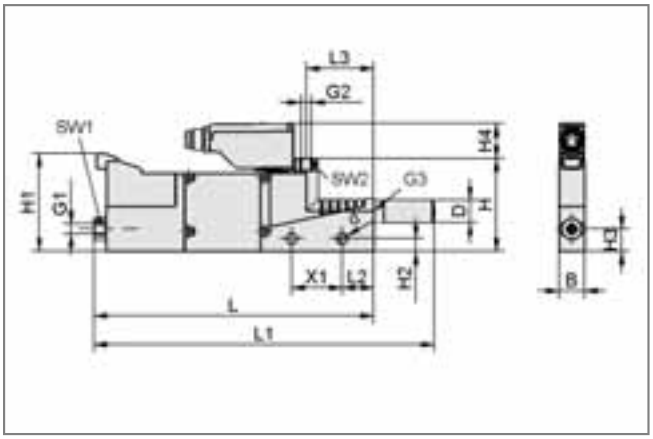
SBP-C 05/07 S1 NC (VS-T)



SBP-C 05/07 G1 NC (VS-T)



SBP-C 05/07 S1 NC AI (VS-T)

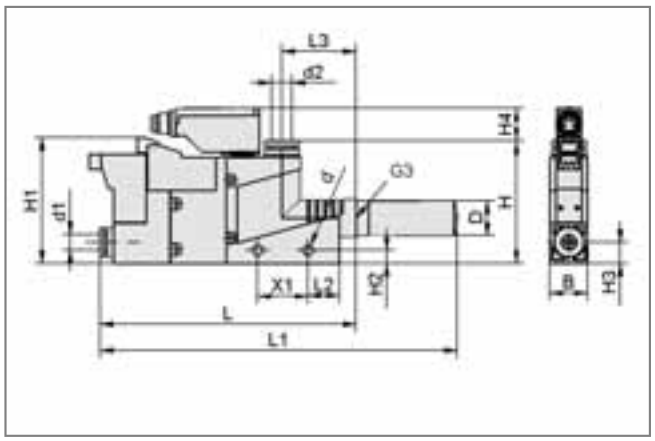


SBP-C 05/07 S1 NC AI (VS-T)

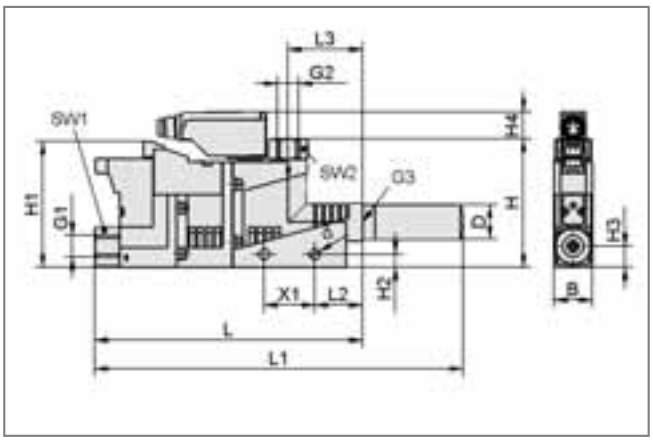
Basic Ejectors

Basic Ejectors SBP-C with Additional Functions

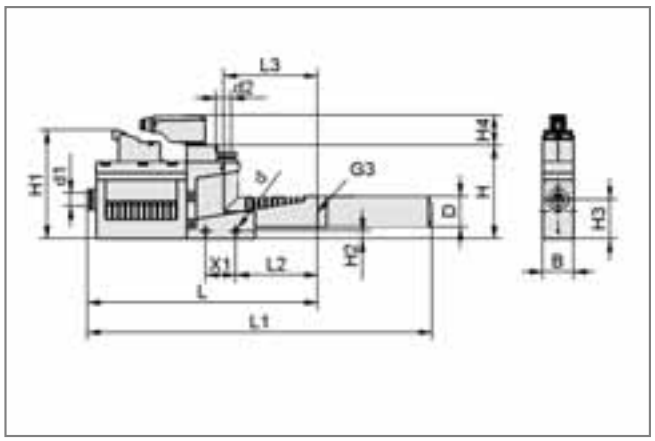
Suction rate from 7 l/min to 215 l/min



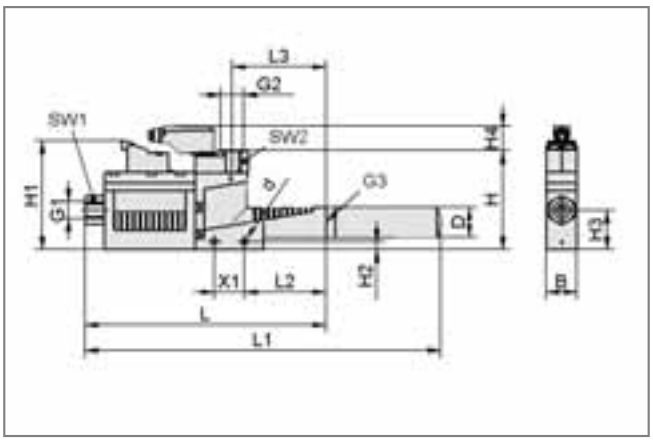
SBP-C 10/15 S2 NO A (VS-T)



SBP-C 10/15 G2 NO A (VS-T)



SBP-C 20/25 S3 NO A (VS-T)



SBP-C 20/25 G3 NO A (VS-T)

Basic Ejectors

Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Design Data Basic Ejectors SBP-C with Additional Functions

Type	Dimensions in mm										
	B	d	d1	d2	D	G1	G2	G3	H	H1	H2
SBP-C 05/07 G1 VS-T	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	-	5.2
SBP-C 05/07 G1 NC	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 G1 NC AI	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 G1 NC VS-T	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 G1 NC AI VS-T	10	4.2	-	-	9.0	M5-F	M5-F	M5-F	37.0	39	5.2
SBP-C 05/07 S1 VS-T	10	4.2	4	4	9.0	-	-	M5-F	34.0	-	5.2
SBP-C 05/07 S1 NC	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 05/07 S1 NC AI	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 05/07 S1 NC VS-T	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 05/07 S1 NC AI VS-T	10	4.2	4	4	9.0	-	-	M5-F	34.0	39	5.2
SBP-C 10/15 G2 VS-T	15	4.2	-	-	13.5	G1/8"-F	G1/8"-F	G1/8"-F	51.0	-	5.2
SBP-C 10/15 G2 NO A	15	4.2	-	-	13.5	G1/8"-F	G1/8"-F	G1/8"-F	51.0	50	5.2
SBP-C 10/15 G2 NO A VS-T	15	4.2	-	-	13.5	G1/8"-F	G1/8"-F	G1/8"-F	51.0	50	5.2
SBP-C 10/15 S2 VS-T	15	4.2	6	8	13.5	-	-	G1/8"-F	49.0	-	5.2
SBP-C 10/15 S2 NO A	15	4.2	6	8	13.5	-	-	G1/8"-F	49.0	50	5.2
SBP-C 10/15 S2 NO A VS-T	15	4.2	6	8	13.5	-	-	G1/8"-F	49.0	50	5.2
SBP-C 20/25 G3 VS-T	20	4.2	-	-	20.0	G1/4"-F	G3/8"-F	G3/8"-F	65.5	-	5.2
SBP-C 20/25 G3 NO A	20	4.2	-	-	20.0	G1/4"-F	G3/8"-F	G3/8"-F	65.5	72	5.2
SBP-C 20/25 G3 NO A VS-T	20	4.2	-	-	20.0	G1/4"-F	G3/8"-F	G3/8"-F	65.5	72	5.2
SBP-C 20/25 S3 VS-T	20	4.2	8	10	20.0	-	-	G3/8"-F	62.0	-	5.2
SBP-C 20/25 S3 NO A	20	4.2	8	10	20.0	-	-	G3/8"-F	57.5	72	5.2
SBP-C 20/25 S3 NO A VS-T	20	4.2	8	10	20.0	-	-	G3/8"-F	62.0	72	5.2

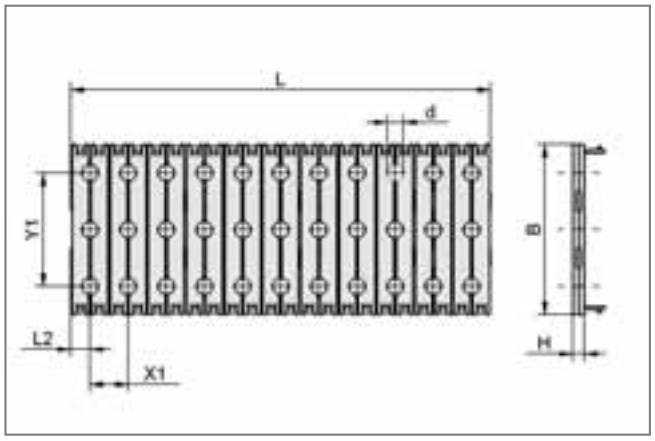
Type	Dimensions in mm										
	H3	H4	L	L1	L2	L3	L4	SW1	SW2	X1	Weight [g]
SBP-C 05/07 G1 VS-T	16.0	14.8	50.0	74.0	12.5	27.0	24.8	8	8	20	87
SBP-C 05/07 G1 NC	9.0	-	81.0	105.0	12.5	27.0	-	8	8	20	28
SBP-C 05/07 G1 NC AI	9.0	-	111.0	135.0	12.5	27.0	-	8	8	20	36
SBP-C 05/07 G1 NC VS-T	9.0	14.3	81.0	105.0	12.5	27.0	-	8	8	20	104
SBP-C 05/07 G1 NC AI VS-T	9.0	14.3	111.0	135.0	12.5	27.0	-	8	8	20	112
SBP-C 05/07 S1 VS-T	16.0	17.7	47.0	71.0	12.5	27.0	27.7	-	-	20	86
SBP-C 05/07 S1 NC	9.0	-	78.0	102.0	12.5	27.0	-	-	-	20	27
SBP-C 05/07 S1 NC AI	9.0	-	108.0	132.0	12.5	27.0	-	-	-	20	35
SBP-C 05/07 S1 NC VS-T	9.0	17.7	78.0	102.0	12.5	27.0	-	-	-	20	103
SBP-C 05/07 S1 NC AI VS-T	9.0	17.7	108.0	132.0	12.5	27.0	-	-	-	20	111
SBP-C 10/15 G2 VS-T	18.0	11.8	61.5	101.5	19.0	29.5	19.8	14	14	20	105
SBP-C 10/15 G2 NO A	8.5	-	106.0	146.0	19.0	29.5	-	14	14	20	70
SBP-C 10/15 G2 NO A VS-T	8.5	11.8	106.0	146.0	19.0	29.5	-	14	14	20	145
SBP-C 10/15 S2 VS-T	18.0	14.1	57.0	97.0	19.0	29.5	24.6	-	-	20	100
SBP-C 10/15 S2 NO A	8.5	-	101.5	141.5	19.0	29.5	-	-	-	20	65
SBP-C 10/15 S2 NO A VS-T	8.5	14.2	101.5	141.5	12.5	29.5	-	-	-	20	140
SBP-C 20/25 G3 VS-T	18.0	17.3	99.5	175.5	54.0	62.0	17.8	17	19	20	143
SBP-C 20/25 G3 NO A	8.5	-	159.5	235.5	54.0	62.0	-	17	19	20	144
SBP-C 20/25 G3 NO A VS-T	26.0	17.3	159.5	235.5	54.0	62.0	-	17	19	20	220
SBP-C 20/25 S3 VS-T	18.0	21.0	92.0	168.0	54.0	62.0	25.2	-	-	20	145
SBP-C 20/25 S3 NO A	26.0	-	152.0	228.0	54.0	62.0	-	-	-	20	146
SBP-C 20/25 S3 NO A VS-T	26.0	21.0	152.0	228.0	54.0	62.0	-	-	-	20	222

Basic Ejectors

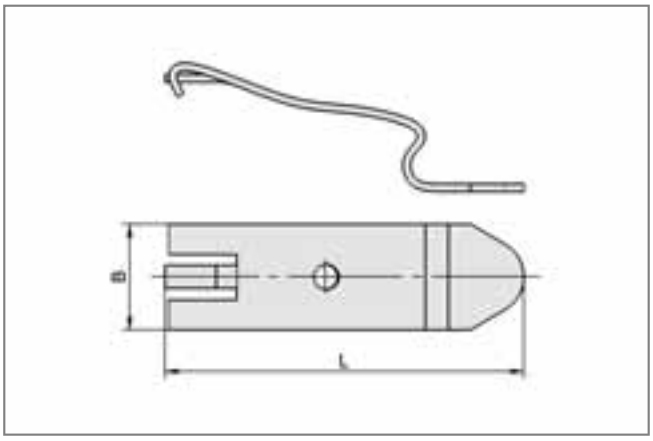
Basic Ejectors SBP-C with Additional Functions

Suction rate from 7 l/min to 215 l/min

Design Data Spare Parts and Accessories Basic Ejectors SBP-C with Additional Functions



BEF-PL



SET SBP/SBP-C M4-IG

Type	Dimensions in mm						
	B	d	H	L	L2	X1	Y1
Mounting plate BEF-PL	45	4.2	3	111.1	5	10.1	30
Mounting set SET SBP/SBP-C M4-IG	14	-	-	50.0	-	-	-

Inline Ejectors

Inline Ejectors SLP

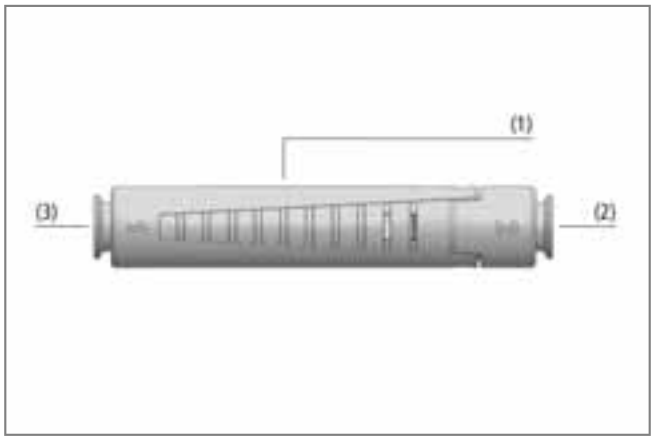
Suction rate from 8 l/min to 16 l/min

Suitability for Industry-Specific Applications

Inline ejectors SLP

Applications

- Inline ejector for mounting directly in the hose line
- Handling of electronic components
- Vacuum generation in handling systems with restricted space
- Use in separation systems for plastic and sheet-metal machining



System design inline ejectors SLP

Design

- Two-piece housing made of light, impact-resistant plastic (1)
- Axial connection of compressed air (3) and vacuum (2) with quick-action push-in couplings for hose diameter 4 mm
- Vacuum generator with single nozzle in two power ratings, 0.5 and 0.7 mm diameter
- Air outlet with good flow characteristics
- Pleasing industrial design, only 10 mm thick

Decentralized vacuum generation by means of inline ejectors SLP for handling plastic injection molded parts

Our Highlights...

- Inline vacuum generator with axial connections
- Low device weight = 5 g
- Nozzles with high suctionca-pacity at high vacuum values
- Slimline plastic housing
- Connection by means of push-in couplings
- Air outlet optimized

Your Benefits...

> Direct installation in the vacuum hose

> Ideal for highly dynamic processes

> Minimum air consumption

> Suitable for installation in restricted spaces

> No need for additional connecting elements

> Low noise output

Inline Ejectors

Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min

Designation Code Inline Ejectors SLP

Abbreviated designation	Nozzle size	Connection
Example SPL 05 S1:		
SLP	**05**	**S1**
SLP	05 = 0.5 mm 07 = 0.7 mm	S1 quick-connect push-in coupling

Ordering Data Inline Ejectors SLP

Inline ejector SLP is delivered as a ready to connect product.

Inline Ejectors SLP

Type	Part Number
SLP 05 S1	10.02.01.00561
SLP 07 S1	10.02.01.00562

Technical Data Inline Ejectors SLP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*
SLP 05 S1	0.5	85	8	0.5	13	0.8
SLP 07 S1	0.7	85	16	1.0	25	1.5

*At optimal operating pressure
**Up to a length of 2 m

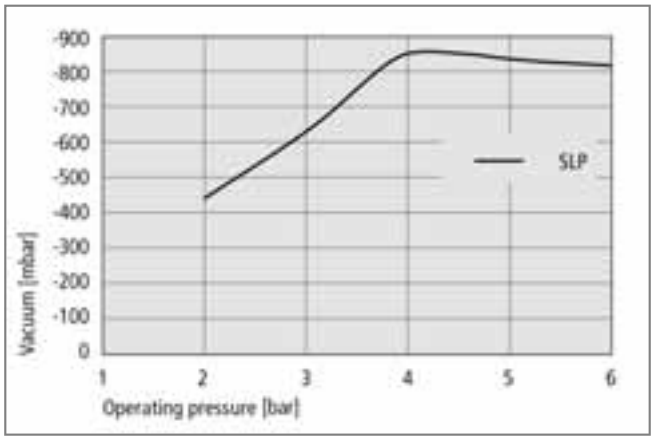
Type	Noise level workp. gripped [dB]	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air/ vacuum [mm]**	Weight [g]	Operating temperature [°C]
SLP 05 S1	52	60	4.5	2	5	0...60
SLP 07 S1	63	63	4.5	2	5	0...60

*At optimal operating pressure
**Up to a length of 2 m

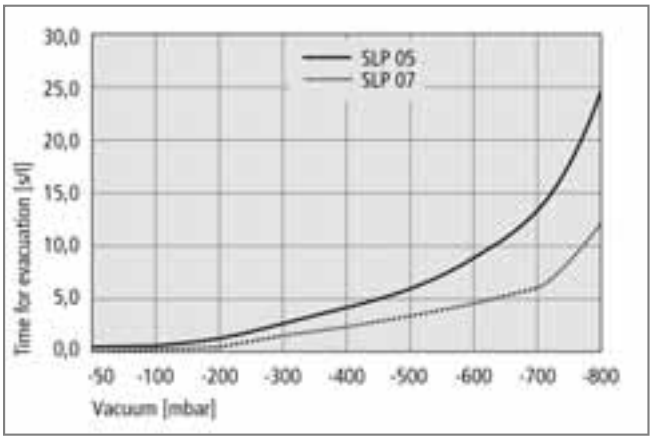
Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min

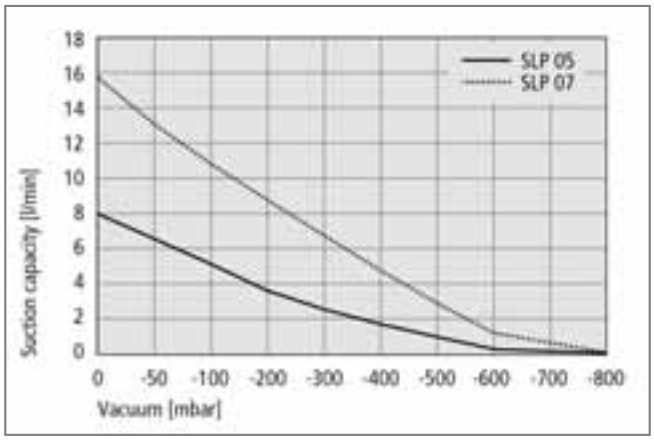
Performance Data Inline Ejectors SLP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SLP 05	8.00	6.42	4.97	3.76	2.65	1.79	1.06	0.32	0.10	0.05
SLP 07	15.90	13.30	10.89	8.70	6.67	4.65	2.88	1.29	0.55	0.06

Evacuation Time in s/l for Various Vacuum Ranges

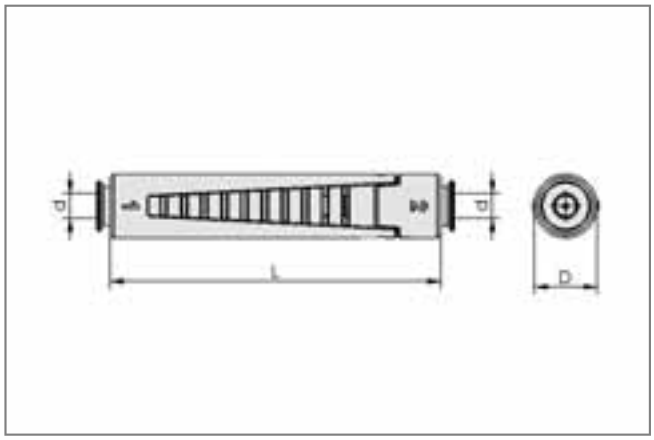
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SLP 05	0.4	0.7	1.6	2.7	4.0	5.8	8.5	13.1	24.5
SLP 07	0.2	0.4	0.8	1.4	2.2	3.2	4.6	6.7	12.7

Inline Ejectors

Inline Ejectors SLP

Suction rate from 8 l/min to 16 l/min

Design Data Inline Ejectors SLP



SLP

Type	Dimensions in mm		
	d	D	L
SLP 05 S1	4	10	57
SLP 07 S1	4	10	57

Inline Ejectors

Inline Ejectors VR

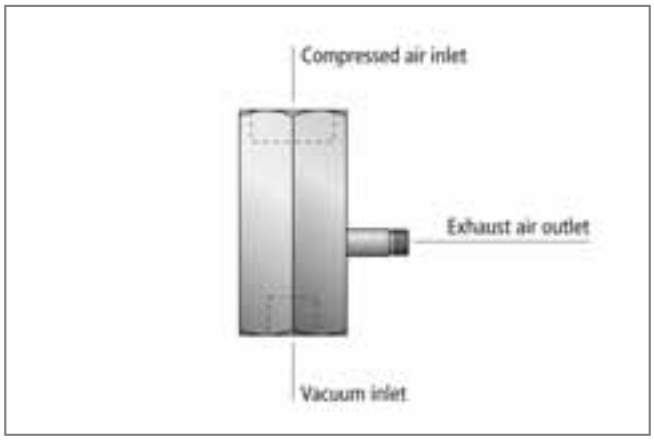
Suction rate from 7 l/min to 21 l/min

Suitability for Industry-Specific Applications

Inline ejectors VR

Applications

- Inline ejector for installation between suction pad and compressed air supply
- Handling of all types of workpieces with manipulators, industrial robots and feeder systems



System design inline ejectors VR

Design

- Body made of anodized aluminum
- Nozzle system made of brass
- Vacuum generator with single nozzle

Decentralized vacuum generation by means of inline ejector VR for handling plastic parts

Our Highlights...

- Inline ejector for installation between suction pad and compressed-air supply
- Minimum size and low weight due to aluminum body

Your Benefits...

> No costly hose installation necessary; vacuum is generated directly at the point of use

> Extremely space-saving installation; ideal for restricted spaces and highly dynamic movements

Inline Ejectors

Inline Ejectors VR

Suction rate from 7 l/min to 21 l/min

Designation Code Inline Ejectors VR

Abbreviated designation	Nozzle size
Example VR 05:	
VR	**05**
VR	05 = 0.5 mm 07 = 0.7 mm 09 = 0.9 mm

Ordering Data Inline Ejectors VR

Inline ejector VR is delivered as a ready to connect product.

Inline Ejectors VR

Type	Part Number
VR 05	10.02.01.00075
VR 07	10.02.01.00001
VR 09	10.02.01.00077

Technical Data Inline Ejectors VR

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Operating pressure [bar]	Weight [g]	Operating temperature [°C]
VR 05	0.5	87	7	0.4	12	0.7	5	15	0...60
VR 07	0.7	90	14	0.8	21	1.3	5	15	0...60
VR 09	0.9	89	21	1.3	36	2.2	5	15	0...60

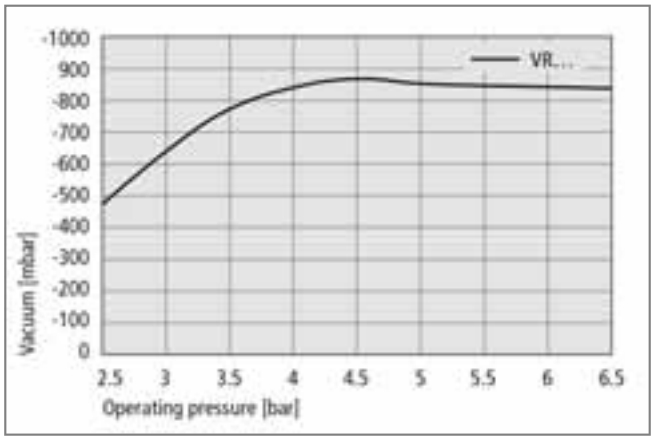
*At optimal operating pressure

Inline Ejectors

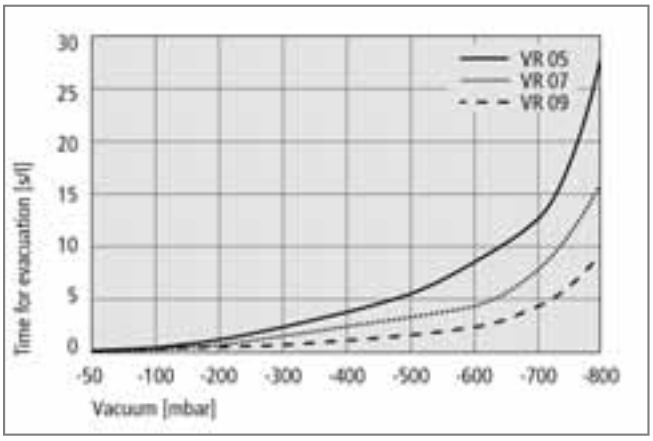
Inline Ejectors VR

Suction rate from 7 l/min to 21 l/min

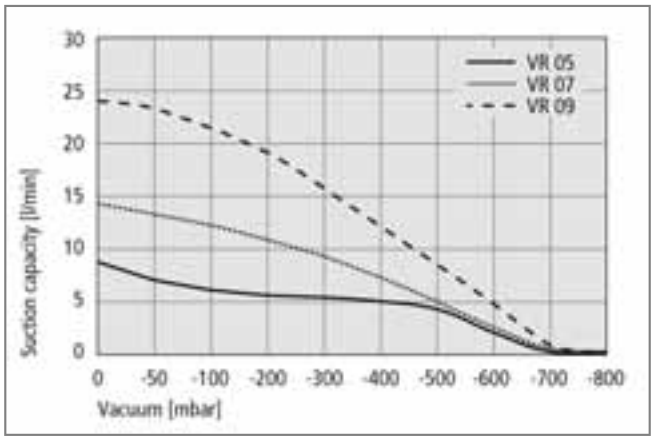
Performance Data Inline Ejectors VR



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
VR 05	8.00	7.00	6.50	6.00	5.70	5.00	4.00	2.00	0.30	0.10
VR 07	14.00	13.00	12.50	11.00	9.50	7.40	5.00	3.00	0.45	0.20
VR 09	24.00	23.00	21.00	19.00	16.00	12.00	8.00	5.00	1.10	0.24

Evacuation Time in s/l for Various Vacuum Ranges

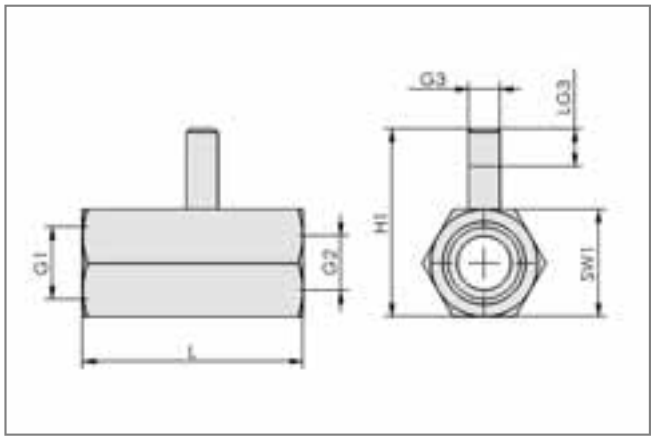
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
VR 05	0.37	0.73	1.53	2.55	3.83	5.55	7.84	12.61	27.25
VR 07	0.21	0.41	0.84	1.41	2.17	3.17	4.77	7.79	15.65
VR 09	0.10	0.22	0.49	0.81	1.25	1.83	2.75	4.45	8.62

Inline Ejectors

Inline Ejectors VR

Suction rate from 7 l/min to 21 l/min

Design Data Inline Ejectors VR



VR 05 to 09

Type	Dimensions in mm						
	G1 (P)	G2 (V)	G3 (R)	H1	L	LG3	SW1
VR 05	G1/4"-F	G1/8"-F	M5-M	29.8	35	5	17
VR 07	G1/4"-F	G1/8"-F	M5-M	29.8	35	5	17
VR 09	G1/4"-F	G1/8"-F	M5-M	29.8	35	5	17

Multi-Stage Ejectors

Multi-Stage Ejectors SEM

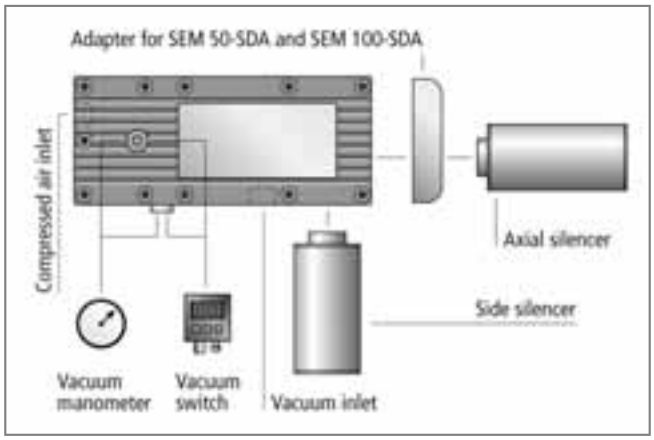
Suction rate from 332 l/min to 2,370 l/min

Suitability for Industry-Specific Applications

Multi-stage ejectors SEM

Applications

- Multi-stage ejector for handling of cardboard, packing materials, insulating materials and other porous items
- Processes that require big suction capacity and low air consumption at the same time



System design multi-stage ejectors SEM

Design

- Body and nozzle system made of robust aluminum
- Gaskets and valve flaps made of NBR
- Options: silencer, solenoid valves, vacuum switch/manometer, filter

Centralized vacuum generation by means of multi-stage ejectors SEM for handling coated wooden sheets

Our Highlights...

- Range of ejectors with a very high suction capacity
- Multi-stage ejector nozzle with high efficiency
- Optional connection facilities for compressed air, exhaust air and sensors

Your Benefits...

> Fast and safe handling of all porous materials

> Rapid evacuation in the lower vacuum range, reduced costs and shorter cycle times

> Flexible mounting; reduced design costs

Multi-Stage Ejectors

Multi-Stage Ejectors SEM

Suction rate from 332 l/min to 2,370 l/min

Designation Code Multi-Stage Ejectors SEM

Abbreviated designation	Size	Version
Example SEM 100 SDS:		
SEM	**100**	**SDS**
SEM	25	SDA silencer axial
	50	SDS silencer side-mounted
	100	
	150	
	300	

Ordering Data Multi-Stage Ejectors SEM

Multi-stage ejector SEM is delivered as a ready to connect product.

Available spare parts: silencer
Available accessories: vacuum manometer, vacuum switch

Multi-Stage Ejectors SEM

Type*	Part Number
SEM 25	10.02.01.00313
SEM 25 SDA	10.02.01.00314
SEM 25 SDS	10.02.01.00315
SEM 50	10.02.01.00316
SEM 50 SDA	10.02.01.00317
SEM 50 SDS	10.02.01.00318
SEM 100	10.02.01.00319
SEM 100 SDA	10.02.01.00320
SEM 100 SDS	10.02.01.00321
SEM 150	10.02.01.00483
SEM 150 SDA	10.02.01.00488
SEM 150 SDS	10.02.01.00489
SEM 300 SDA	10.02.01.00432

*The exhaust-air outlets of the basic version (without silencer) are open axially and to the side

Ordering Data Accessories Multi-Stage Ejectors SEM

Type	Part Number
Vacuum manometer, Ø 40 mm, rear connection*	10.07.02.00035
Vacuum switch VS-V-PNP*	10.06.02.00191
Vacuum switch VS-V-W-D-PNP*	10.06.02.00192

*Vacuum switches and manometers are delivered, packed separately, with all necessary mounting accessories. For safety reasons, the vacuum switch/manometer should be secured with commercially available screw locking compound of medium strength.

Recommended accessories for vacuum switches:
- Connection cable, PUR, 5 meter, M8-4pin, straight plug, 10.06.02.00031
- Connection cable, PUR, 5 meter, M8-4pin, 90° elbow plug, 10.06.02.00032

Multi-Stage Ejectors

Multi-Stage Ejectors SEM

Suction rate from 332 l/min to 2,370 l/min

Ordering Data Spare Parts Multi-Stage Ejectors SEM

Type*	Silencer
SEM 25	-
SEM 25 SDA	10.02.01.00309
SEM 25 SDS	10.02.01.00309
SEM 50	-
SEM 50 SDA	10.02.01.00312
SEM 50 SDS	10.02.01.00312
SEM 100	-
SEM 100 SDA	10.02.01.00312
SEM 100 SDS	10.02.01.00312
SEM 150	-
SEM 150 SDA	10.02.01.00491
SEM 150 SDS	10.02.01.00491
SEM 300 SDA	-

*The exhaust-air outlets of the basic version without silencer are open axially and to the side

Technical Data Multi-Stage Ejectors SEM

Type	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt.during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level free [dB]
SEM 25	85	402	24.1	101	6.1	90
SEM 25 SDA	85	393	23.6	101	6.1	77
SEM 25 SDS	85	332	19.9	101	6.1	75
SEM 50	85	706	42.4	197	11.8	90
SEM 50 SDA	85	704	42.2	197	11.8	80
SEM 50 SDS	85	642	38.5	197	11.8	78
SEM 100	85	1071	64.3	376	22.6	90
SEM 100 SDA	85	976	58.6	376	22.6	81
SEM 100 SDS	85	909	54.5	376	22.6	80
SEM 150	85	1400	84.0	590	35.4	95
SEM 150 SDA	85	1290	77.4	590	35.4	81
SEM 150 SDS	85	1190	71.4	590	35.4	80
SEM 300 SDA	85	2370	142.2	935	56.1	82

*At optimal operating pressure

**For max. length 2 m

Type	Noise level workp. gripped [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SEM 25	72	5	4	20	1.0	0...50
SEM 25 SDA	64	5	4	20	1.1	0...50
SEM 25 SDS	62	5	4	20	1.1	0...50
SEM 50	75	5	6	25	1.2	0...50
SEM 50 SDA	66	5	6	25	1.4	0...50
SEM 50 SDS	64	5	6	25	1.3	0...50
SEM 100	74	5	6	32	1.5	0...50
SEM 100 SDA	60	5	6	32	1.7	0...50
SEM 100 SDS	65	5	6	32	1.6	0...50
SEM 150	79	5	9	32	1.7	0...50
SEM 150 SDA	71	5	9	32	1.8	0...50
SEM 150 SDS	71	5	9	32	1.8	0...50
SEM 300 SDA	62	5	19	60	5.7	0...50

*At optimal operating pressure

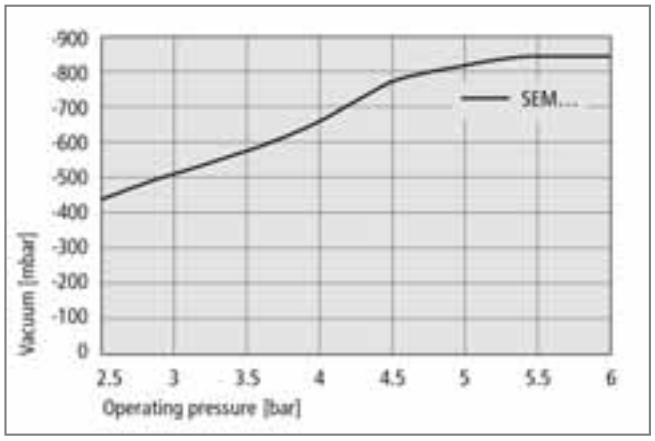
**For max. length 2 m

Multi-Stage Ejectors

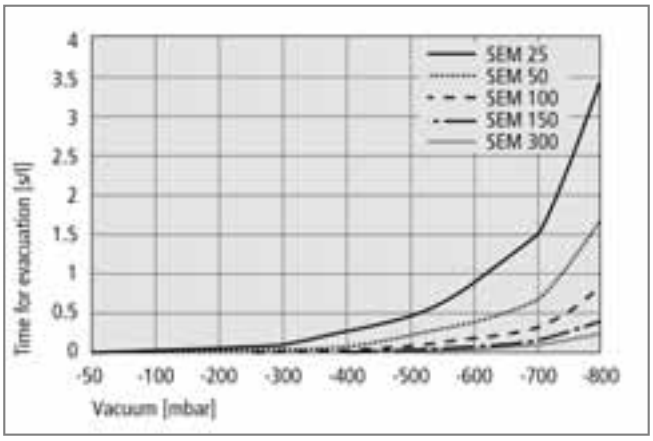
Multi-Stage Ejectors SEM

Suction rate from 332 l/min to 2,370 l/min

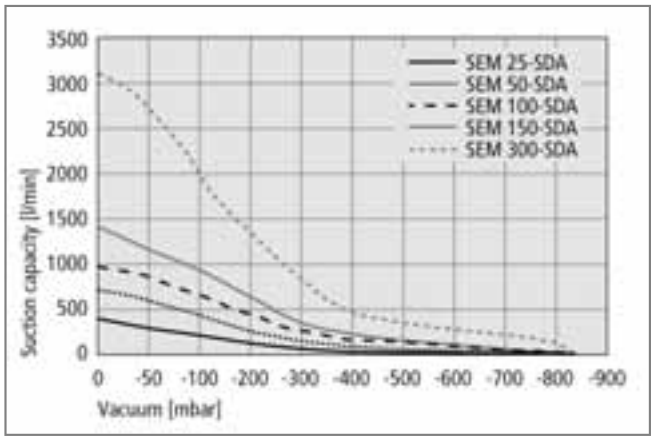
Performance Data Multi-Stage Ejectors SEM



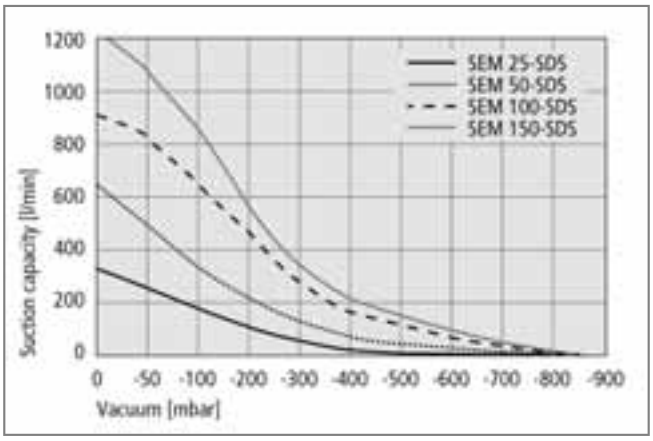
Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges (averaged for SDA/SDS)



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM 25-SDS	332	269	199	118	70	38	26	16	8	1
SEM 25-SDA	393	319	227	122	72	37	27	15	7	2
SEM 50-SDS	642	503	354	223	141	78	57	34	13	2
SEM 50-SDA	704	611	452	269	173	91	56	37	19	6
SEM 100-SDS	909	843	642	463	281	161	121	78	40	11
SEM 100-SDA	976	884	669	476	278	158	119	77	36	11
SEM 150-SDS	1233	1141	847	560	352	218	150	96	49	13
SEM 150-SDA	1433	1220	940	644	358	236	160	113	47	11
SEM 300-SDA	3110	2750	2065	1381	762	482	364	288	223	140

Multi-Stage Ejectors

Multi-Stage Ejectors SEM

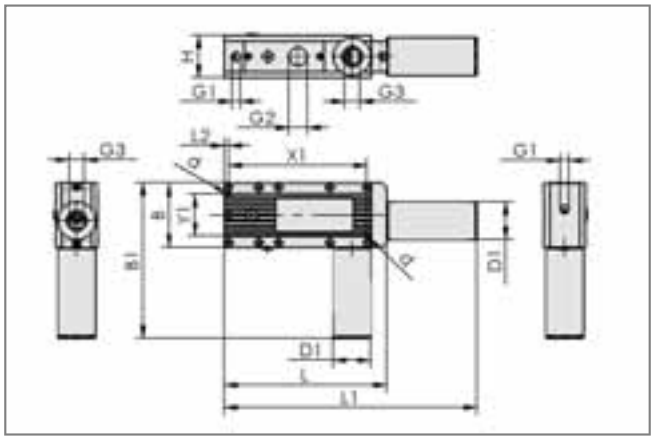
Suction rate from 332 l/min to 2,370 l/min

Evacuation Time in s/l for Various Vacuum Ranges

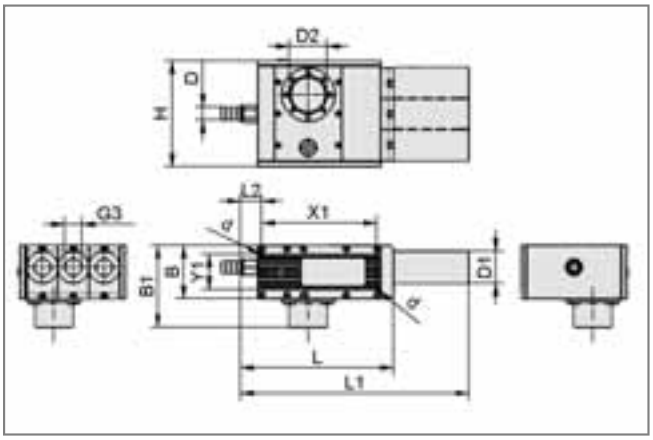
Type*	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM 25	0.02	0.04	0.07	0.14	0.27	0.46	0.81	1.51	3.37
SEM 50	0.02	0.03	0.05	0.08	0.14	0.23	0.38	0.67	1.69
SEM 100	0.01	0.02	0.04	0.07	0.10	0.14	0.21	0.34	0.82
SEM 150	0.01	0.02	0.02	0.04	0.06	0.08	0.10	0.18	0.34
SEM 300	0.00	0.01	0.02	0.02	0.03	0.05	0.08	0.11	0.27

*Average SDA/SDS values

Design Data Multi-Stage Ejectors SEM



SEM 25 to 150 SDA/SDS



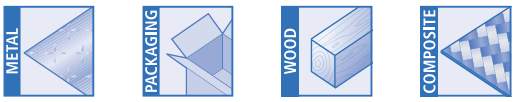
SEM 300 SDA

Type	Dimensions in mm														
	B	B1	d	D	D1	D2	G1	G2	G3	H	L	L1	L2	X1	Y1
SEM 25	85	-	5.5	-	-	-	G1/4"-F	G1/2"-F	G1/2"-F	48	195	-	6	183	55
SEM 25 SDA	85	-	5.5	-	40	-	G1/4"-F	G1/2"-F	G1/2"-F	48	195	275	6	183	55
SEM 25 SDS	85	165	5.5	-	40	-	G1/4"-F	G1/2"-F	G1/2"-F	48	195	-	6	183	55
SEM 50	85	-	5.5	-	-	-	G1/4"-F	G3/4"-F	G3/4"-F	58	195	-	6	183	55
SEM 50 SDA	85	-	5.5	-	50	-	G1/4"-F	G3/4"-F	G3/4"-F	58	215	335	6	183	55
SEM 50 SDS	85	205	5.5	-	50	-	G1/4"-F	G3/4"-F	G3/4"-F	58	195	-	6	183	55
SEM 100	85	-	5.5	-	-	-	G1/4"-F	G1"-F	G3/4"-F	68	195	-	6	183	55
SEM 100 SDA	85	-	5.5	-	50	-	G1/4"-F	G1"-F	G3/4"-F	68	215	335	6	183	55
SEM 100 SDS	85	205	5.5	-	50	-	G1/4"-F	G1"-F	G3/4"-F	68	195	-	6	183	55
SEM 150	85	-	5.5	-	-	-	G1/4"-F	G1"-F	M42x1.5-F	68	195	-	6	183	55
SEM 150 SDA	85	-	5.5	-	50	-	G1/4"-F	G1"-F	M42x1.5-F	68	215	335	6	183	55
SEM 150 SDS	85	205	5.5	-	50	-	G1/4"-F	G1"-F	M42x1.5-F	68	195	-	6	183	55
SEM 300 SDA	85	130	5.5	19	50	60	G1/2"-F	-	G3/4"-F	168	243	363	34	183	55

Multi-Stage Ejectors

Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

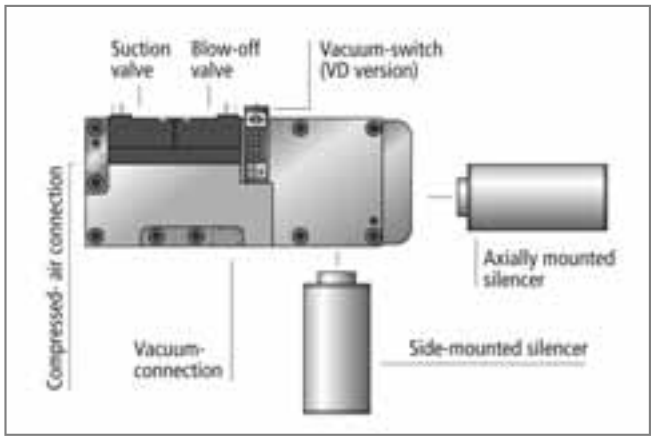


Suitability for Industry-Specific Applications

Multi-stage ejectors SEM-C with additional functions

Applications

- Multi-stage ejector with integrated valve technology and system monitoring for handling of cardboard, packing materials, insulating materials and other porous items



System design multi-stage ejectors SEM-C with additional functions

Design

- Aluminium nozzle system
- Gaskets and valve flaps made of NBR
- Silencer can be mounted axially or on the side
- Functional mounting plate with suction valve (NO or NC) and blow-off valve (NC)
- Optional vacuum switch

Centralized vacuum generation by means of multistage ejectors SEM-C for handling particle boards

Our Highlights...

- Ejector family with a very high suction capacity
- Multi-stage ejector nozzle with high efficiency
- Integrated control valves and vacuum switch
- Optional automatic air-saving function

Your Benefits...

> Fast and safe handling of all porous materials

> Fast evacuation in the lower vacuum range, cost reductions and shorter cycle times

> Compact unit for space-saving installation

> Lower energy consumption when handling air-tight parts

Multi-Stage Ejectors

Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Designation Code Multi-Stage Ejectors SEM-C with Additional Functions

Abbreviated designation	Size	Version	Idle position suction valve	Blow off- and safety non-return valve	System monitoring
Example SEM-C 25 SD NO AS VD:					
SEM-C	**25**	**SD**	**NO**	**AS**	**VD**
SEM-C	25 50 100	SD silencer	NC normally closed NO normally open	AS blow off- and safety non-return valve	VD digital vacuum switch

Ordering Data Multi-Stage Ejectors SEM-C with Additional Functions

Multi-stage ejector SEM-C is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer
Available accessories: connection cable, distributor

Multi-Stage Ejectors SEM-C with Additional Functions

Type	Part Number
SEM-C 25 SD NO AS	10.02.02.03204
SEM-C 25 SD NC AS	10.02.02.03203
SEM-C 25 SD NO AS VD	10.02.02.03206
SEM-C 25 SD NC AS VD	10.02.02.03205
SEM-C 50 SD NO AS	10.02.02.02966
SEM-C 50 SD NC AS	10.02.02.03207
SEM-C 50 SD NO AS VD	10.02.02.03057
SEM-C 50 SD NC AS VD	10.02.02.03208
SEM-C 100 SD NO AS	10.02.02.03209
SEM-C 100 SD NC AS	10.02.02.03215
SEM-C 100 SD NO AS VD	10.02.02.03211
SEM-C 100 SD NC AS VD	10.02.02.03210

Ordering Data Spare Parts Multi-Stage Ejectors SEM-C with Additional Functions

Type	Silencer*
SEM-C 25 SD NO AS	10.02.01.00309
SEM-C 25 SD NC AS	10.02.01.00309
SEM-C 25 SD NO AS VD	10.02.01.00309
SEM-C 25 SD NC AS VD	10.02.01.00309
SEM-C 50 SD NO AS	10.02.01.00312
SEM-C 50 SD NC AS	10.02.01.00312
SEM-C 50 SD NO AS VD	10.02.01.00312
SEM-C 50 SD NC AS VD	10.02.01.00312
SEM-C 100 SD NO AS	10.02.01.00312
SEM-C 100 SD NC AS	10.02.01.00312
SEM-C 100 SD NO AS VD	10.02.01.00312
SEM-C 100 SD NC AS VD	10.02.01.00312

*The silencers can be mounted axially or on the side, as desired

Multi-Stage Ejectors

Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Ordering Data Accessories Multi-Stage Ejectors SEM-C with Additional Functions

Type	Connection cable for solenoid valves* (5 m, PVC)	Distributor for air saving function**	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)
SEM-C 25 SD NO AS	21.04.06.00084	-	-	-
SEM-C 25 SD NC AS	21.04.06.00084	-	-	-
SEM-C 25 SD NO AS VD	21.04.06.00084	10.02.02.01291	10.06.02.00031	10.06.02.00032
SEM-C 25 SD NC AS VD	21.04.06.00084	10.02.02.01287	10.06.02.00031	10.06.02.00032
SEM-C 50 SD NO AS	21.04.06.00084	-	-	-
SEM-C 50 SD NC AS	21.04.06.00084	-	-	-
SEM-C 50 SD NO AS VD	21.04.06.00084	10.02.02.01291	10.06.02.00031	10.06.02.00032
SEM-C 50 SD NC AS VD	21.04.06.00084	10.02.02.01287	10.06.02.00031	10.06.02.00032
SEM-C 100 SD NO AS	21.04.06.00084	-	-	-
SEM-C 100 SD NC AS	21.04.06.00084	-	-	-
SEM-C 100 SD NO AS VD	21.04.06.00084	10.02.02.01291	10.06.02.00031	10.06.02.00032
SEM-C 100 SD NC AS VD	21.04.06.00084	10.02.02.01287	10.06.02.00031	10.06.02.00032

*Order 2 x per ejector

**Required for the automatic air-saving function; must be ordered separately as an accessory. No further cables then required!

Technical Data Multi-Stage Ejectors SEM-C with Additional Functions

Type	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Noise level free [dB]
SEM-C 25 SD NO AS	87	338	20.2	100	6.0	80
SEM-C 25 SD NC AS	87	338	20.2	100	6.0	80
SEM-C 25 SD NO AS VD	87	338	20.2	100	6.0	80
SEM-C 25 SD NC AS VD	87	338	20.2	100	6.0	80
SEM-C 50 SD NO AS	86	554	33.2	190	11.4	84
SEM-C 50 SD NC AS	86	554	33.2	190	11.4	84
SEM-C 50 SD NO AS VD	86	554	33.2	190	11.4	84
SEM-C 50 SD NC AS VD	86	554	33.2	190	11.4	84
SEM-C 100 SD NO AS	81	673	40.3	246	14.8	83
SEM-C 100 SD NC AS	81	673	40.3	246	14.8	83
SEM-C 100 SD NO AS VD	81	673	40.3	246	14.8	83
SEM-C 100 SD NC AS VD	81	673	40.3	246	14.8	83

*At optimal operating pressure

**For max. length 2 m

Type	Noise level workp. gripped [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SEM-C 25 SD NO AS	70	5	4	20	1.6	0...50
SEM-C 25 SD NC AS	70	5	4	20	1.6	0...50
SEM-C 25 SD NO AS VD	70	5	4	20	1.7	0...50
SEM-C 25 SD NC AS VD	70	5	4	20	1.7	0...50
SEM-C 50 SD NO AS	60	5	6	25	1.9	0...50
SEM-C 50 SD NC AS	60	5	6	25	1.9	0...50
SEM-C 50 SD NO AS VD	60	5	6	25	2.0	0...50
SEM-C 50 SD NC AS VD	60	5	6	25	2.0	0...50
SEM-C 100 SD NO AS	63	5	6	32	2.2	0...50
SEM-C 100 SD NC AS	63	5	6	32	2.2	0...50
SEM-C 100 SD NO AS VD	63	5	6	32	2.2	0...50
SEM-C 100 SD NC AS VD	63	5	6	32	2.2	0...50

*At optimal operating pressure

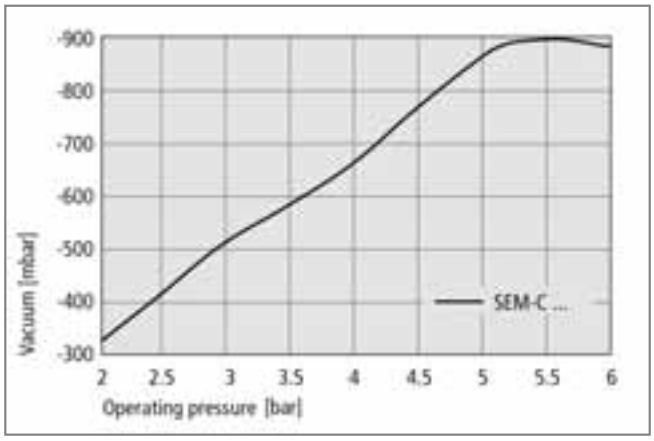
**For max. length 2 m

Multi-Stage Ejectors

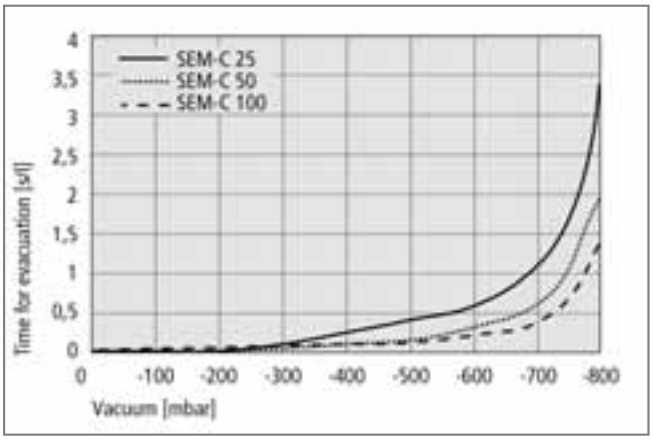
Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

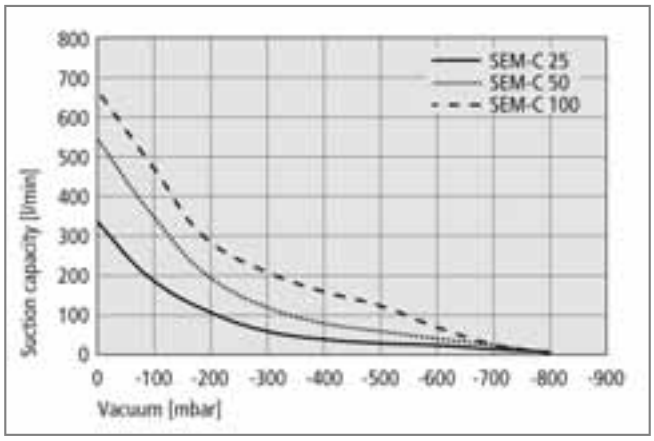
Performance Data Multi-Stage Ejectors SEM-C with Additional Functions



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM-C 25 SD	338	263	199	104	66	47	34	24	16	11
SEM-C 50 SD	554	460	349	195	123	87	63	41	21	8
SEM-C 100 SD	673	580	471	289	205	164	127	75	20	7

Evacuation Time in s/l for Various Vacuum Ranges

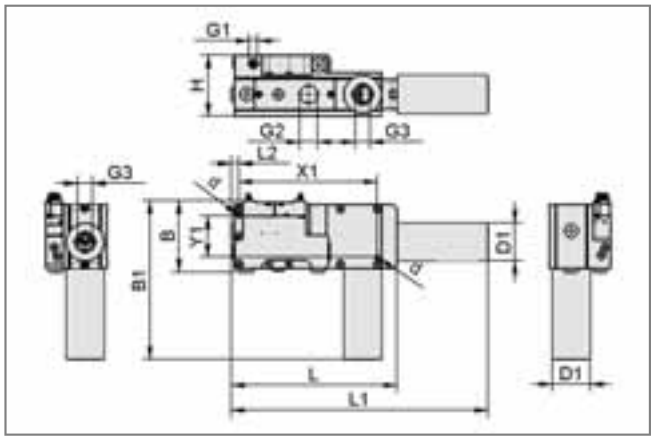
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEM-C 25 SD	0.03	0.06	0.08	0.13	0.26	0.42	0.66	1.18	3.44
SEM-C 50 SD	0.02	0.05	0.06	0.09	0.13	0.19	0.32	0.64	1.93
SEM-C 100 SD	0.03	0.05	0.06	0.08	0.13	0.17	0.23	0.4	1.34

Multi-Stage Ejectors

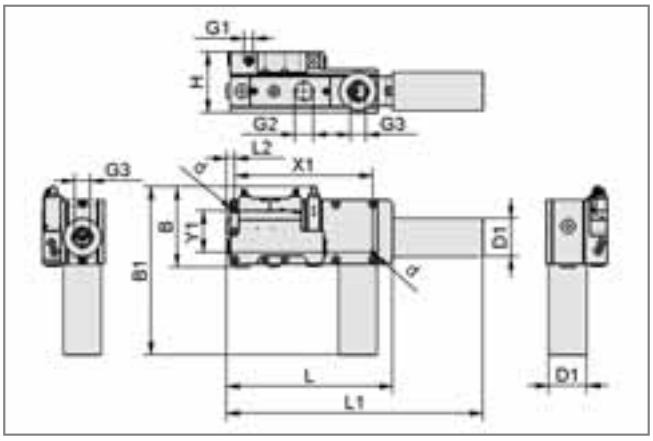
Multi-Stage Ejectors SEM-C with Additional Functions

Suction rate from 338 l/min to 673 l/min

Design Data Multi-Stage Ejectors SEM-C with Additional Functions



SEM-C 25 to 100 SD NO/NC AS



SEM-C 25 to 100 SD NO/NC AS VD

Type	Dimensions in mm												
	B	B1	d	D1	G1	G2	G3	H	L	L1	L2	X1	Y1
SEM-C 25 SD NO AS	95	170	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SD NC AS	95	170	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SD NO AS VD	117	192	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 25 SD NC AS VD	117	192	5.5	40	G1/4"-F	G1/2"-F	G1/2"-F	70	200	280	11	183	55
SEM-C 50 SD NO AS	95	210	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SD NC AS	95	210	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SD NO AS VD	117	232	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 50 SD NC AS VD	117	232	5.5	50	G1/4"-F	G3/4"-F	G3/4"-F	80	220	340	11	183	55
SEM-C 100 SD NO AS	95	210	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SD NC AS	95	210	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SD NO AS VD	117	232	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55
SEM-C 100 SD NC AS VD	117	232	5.5	50	G1/4"-F	G1"-F	G3/4"-F	90	220	340	11	183	55

Compact Ejectors

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

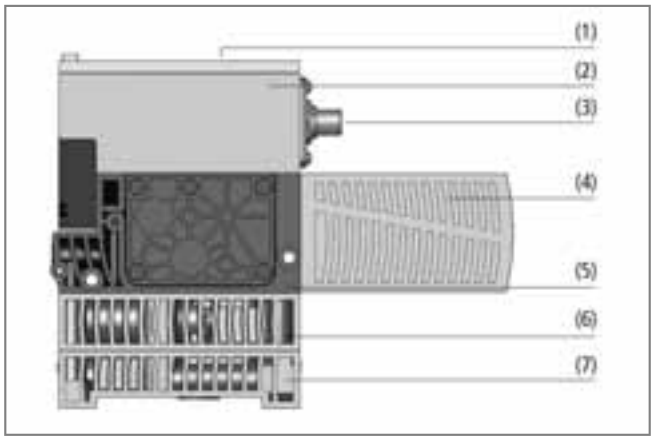
Suction rate from 185 l/min to 220 l/min

Suitability for Industry-Specific Applications

Compact ejectors X-Pump SXPi / SXMPi with IO-Link

Applications

- High-performance vacuum generator for handling suction-tight workpieces under extreme conditions, e. g. in vacuum systems in press lines for handling metal sheets
- In pick-and-place applications with short cycle times
- In automated systems for preparation and precise monitoring of the vacuum system



System design compact ejectors X-Pump SXPi / SXMPi with IO-Link

Design

- User display (1) with large-scale operating and display elements
- Control electronics (2) with diverse monitoring functions
- Electrical connection (3) via M12 plug
- Removable silencer (4)
- Basic body (5) made of extremely robust plastic
- Compact ejector SXMPi is additionally equipped with the power blow off module (6)
- Horizontal connection plate with vacuum and compressed air connection (7); optional with quick-change adapter
- Optional integrated pressure sensor

Central vacuum generation by compact ejectors SXPi / SXMPi

Our Highlights...

- Communication via IO-Link technology
- Integrated air-saving function
- Condition monitoring functions with internal and external evaluation options
- Integrated voltage regulator
- Integrated pressure monitoring (optional)
- Suction function as impulse version (optional)

Your Benefits...

> Input and output of process-specific data

> Significant reduction of energy consumption

> Process and system monitoring to avoid downtimes

> Compensation of variations in voltage

> Additional information on operating status

> No undesired air consumption in the event of power loss

Compact Ejectors

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

Designation Code Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Abbreviated designation	Nozzle size	Idle position suction valve	Additional function	Connection pneumatical	Connection electrical
Example SXPi 25 NO H M12-8:					
SXPi	**25**	**NO**	**-**	**H**	**M12-8**
SXPi without power module **SXMPi** with power module	25 = 2.5 mm 30 = 3.0 mm	IMP bistable switched with pulse NC normally closed NO normally open	PC pressure monitoring	H horizontal Q quick-change	M12-8 M12, 8-pole 2xM12-5 2xM12, 5-pole

Ordering Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Compact ejector SXPi / SXMPi is delivered as a ready to connect product (without connection cable).

Available spare parts: connection cable, base plate, ejector tester

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

SXPi 25		SXPi 30	
Type	**Part Number**	**Type**	**Part Number**
SXPi 25 NO H M12-8	10.02.02.03776	SXPi 30 NO H M12-8	10.02.02.03780
SXPi 25 NO Q M12-8	10.02.02.03777	SXPi 30 NO Q M12-8	10.02.02.03781
SXPi 25 NO H 2xM12-5	10.02.02.03778	SXPi 30 NO H 2xM12-5	10.02.02.03782
SXPi 25 NO Q 2xM12-5	10.02.02.03779	SXPi 30 NO Q 2xM12-5	10.02.02.03783
SXPi 25 NC H M12-8	10.02.02.03784	SXPi 30 NC H M12-8	10.02.02.03788
SXPi 25 NC Q M12-8	10.02.02.03785	SXPi 30 NC Q M12-8	10.02.02.03789
SXPi 25 NC H 2xM12-5	10.02.02.03786	SXPi 30 NC H 2xM12-5	10.02.02.03790
SXPi 25 NC Q 2xM12-5	10.02.02.03787	SXPi 30 NC Q 2xM12-5	10.02.02.03791
SXPi 25 IMP H M12-8	10.02.02.03792	SXPi 30 IMP H M12-8	10.02.02.03796
SXPi 25 IMP Q M12-8	10.02.02.03793	SXPi 30 IMP Q M12-8	10.02.02.03797
SXPi 25 IMP H 2xM12-5	10.02.02.03794	SXPi 30 IMP H 2xM12-5	10.02.02.03798
SXPi 25 IMP Q 2xM12-5	10.02.02.03795	SXPi 30 IMP Q 2xM12-5	10.02.02.03799

SXMPi 25		SXMPi 30	
Type	**Part Number**	**Type**	**Part Number**
SXMPi 25 NO H M12-8	10.02.02.03800	SXMPi 30 NO H M12-8	10.02.02.03804
SXMPi 25 NO Q M12-8	10.02.02.03801	SXMPi 30 NO Q M12-8	10.02.02.03805
SXMPi 25 NO H 2xM12-5	10.02.02.03802	SXMPi 30 NO H 2xM12-5	10.02.02.03806
SXMPi 25 NO Q 2xM12-5	10.02.02.03803	SXMPi 30 NO Q 2xM12-5	10.02.02.03807
SXMPi 25 NC H M12-8	10.02.02.03808	SXMPi 30 NC H M12-8	10.02.02.03812
SXMPi 25 NC Q M12-8	10.02.02.03809	SXMPi 30 NC Q M12-8	10.02.02.03813
SXMPi 25 NC H 2xM12-5	10.02.02.03810	SXMPi 30 NC H 2xM12-5	10.02.02.03814
SXMPi 25 NC Q 2xM12-5	10.02.02.03811	SXMPi 30 NC Q 2xM12-5	10.02.02.03815
SXMPi 25 IMP H M12-8	10.02.02.03816	SXMPi 30 IMP H M12-8	10.02.02.03820
SXMPi 25 IMP Q M12-8	10.02.02.03817	SXMPi 30 IMP Q M12-8	10.02.02.03821
SXMPi 25 IMP H 2xM12-5	10.02.02.03818	SXMPi 30 IMP H 2xM12-5	10.02.02.03822
SXMPi 25 IMP Q 2xM12-5	10.02.02.03819	SXMPi 30 IMP Q 2xM12-5	10.02.02.03823

Compact Ejectors

Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

Compact Ejectors SXPi/SXMPi X-Pump with IO-Link Technology and Pressure Monitoring "PC"

Type*	Part Number
SXMPi 30 IMP PC Q M12-8	10.02.02.03731

*Note: All variants listed above can also be optionally configured as "PC" variants

Ordering Data Accessories Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Accessories	Part Number	Weight [kg]
Connecting cable M12, 8-pole	21.04.05.00079	0,28
Connecting cable M12, 5-pole	21.04.05.00080	0,24
Connecting cable M12, 8-pole to 5-pole*	21.04.05.00167	0,35
Single base plate with quick-change connections	10.02.02.02473	0,18
Double base plate with quick-change connections	10.02.02.02154	0,47
Ejector tester	10.02.02.03588	0,75

*For IO-Link

Technical Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SXPi 25	2.5	85	185	11.1	290	17.4	200
SXPi 30	3.0	85	220	13.2	380	22.8	200
SXMPi 25	2.5	85	185	11.1	290	17.4	320
SXMPi 30	3.0	85	220	13.2	380	22.8	320

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

**For max. length 2 m

Type	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SXPi 25	67	3...6	8	9	0.77	0...50
SXPi 30	72	3...6	8	9	0.77	0...50
SXMPi 25	67	3...6	8	9	0.91	0...50
SXMPi 30	72	3...6	8	9	0.91	0...50

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

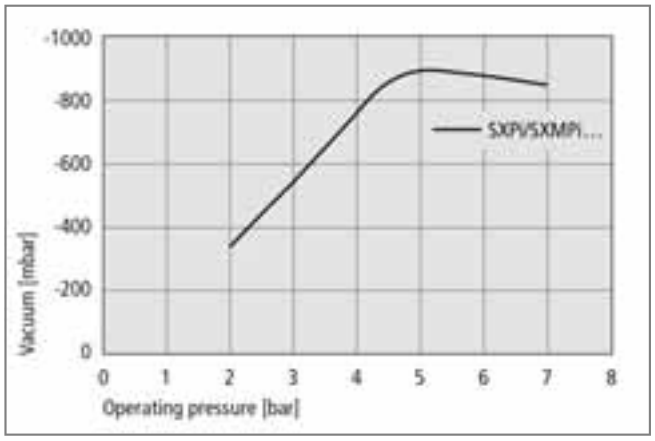
**For max. length 2 m

Compact Ejectors

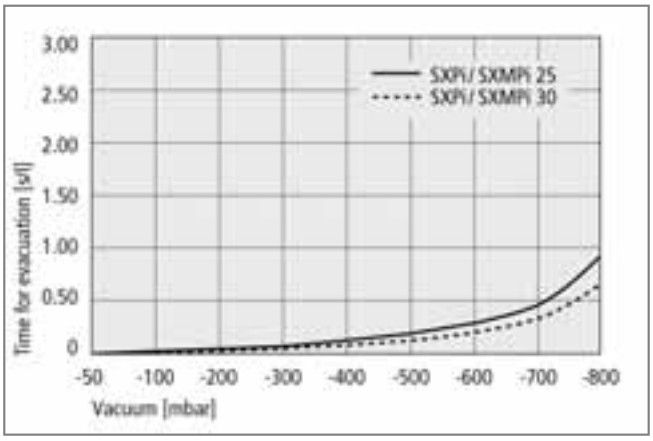
Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

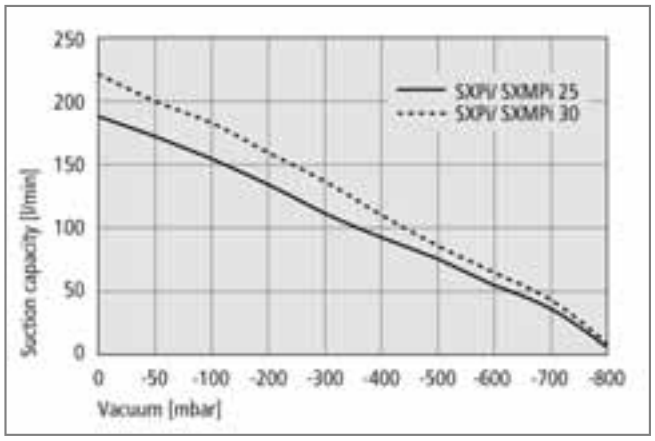
Performance Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SXPi/SXMPi 25	185	170	158	135	114	95	76	56	33	10
SXPi/SXMPi 30	220	199	184	160	138	115	91	63	39	15

Evacuation Time in s/l for Various Vacuum Ranges

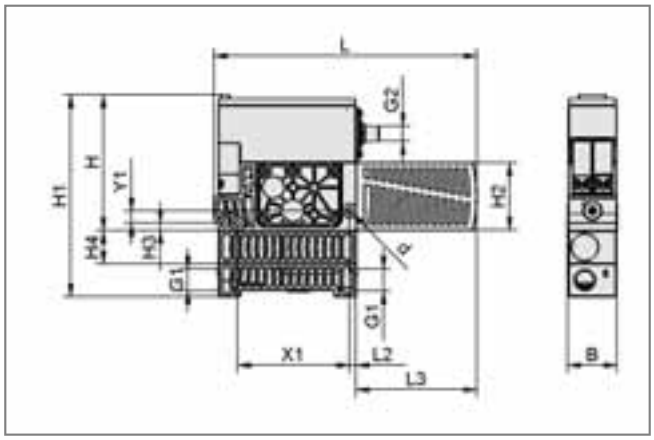
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SXPi/SXMPi 25	0.02	0.03	0.06	0.10	0.15	0.18	0.26	0.46	0.87
SXPi/SXMPi 30	0.01	0.02	0.05	0.08	0.11	0.15	0.22	0.37	0.69

Compact Ejectors

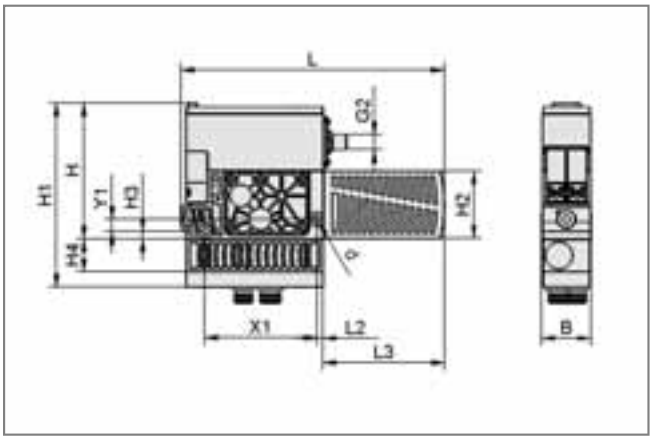
Compact Ejectors X-Pump SXPi / SXMPi with IO-Link

Suction rate from 185 l/min to 220 l/min

Design Data Compact Ejectors X-Pump SXPi / SXMPi with IO-Link



SXMPi H



SXMPi Q

Type	Dimensions in mm													
	B	d	G1	G2	H	H1	H2	H3	H4	L	L2	L3	X1	Y1
SXPi...H...	39	5.5	G3/8"-F	M12-M	108	134	54	6	-	210	5	97	89	10
SXPi...Q...	39	5.5	-	M12-M	108	120	54	6	-	210	5	97	89	10
SXMPi...H...	39	5.5	G3/8"-F	M12-M	108	160	54	6	26	210	5	97	89	10
SXMPi...Q...	39	5.5	-	M12-M	108	146	54	6	26	210	5	97	89	10

Compact Ejectors

Compact Ejectors SCPi / SMPi

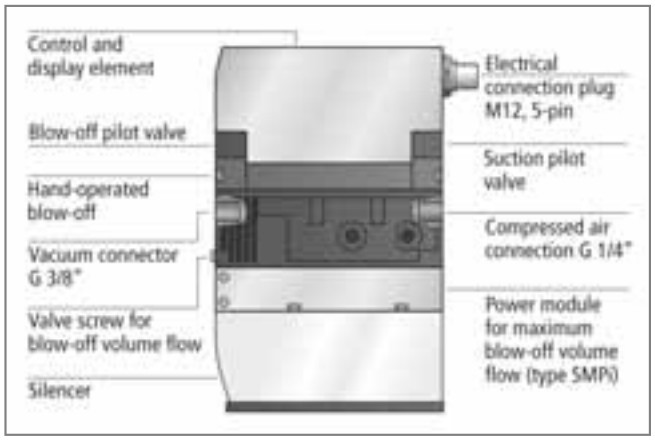
Suction rate from 75 l/min to 185 l/min

Suitability for Industry-Specific Applications

Compact ejectors SCPi / SMPi

Applications

- Handling of air-tight as well as porous workpieces
- Vacuum supply and vacuum monitoring in automated systems
- For use in sheet metal processing, the automotive industry, with packaging machines, and in various robotic applications
- Pick-and-place applications with very short cycle times (fast gripping and release realized by means of the power blow-off function)



System design compact ejectors SCPi / SMPi

Design

- Main body made of high-strength plastic
- User display with seven segments, operating keyboard and luminous display that indicates system status
- Electrical connection via standard M12 plug, optional with potential separation of sensor and actor power supply
- Integrated pneumatic valves for NO, NC or pulse switch functions
- Power blow-off piston for type SMPi provides extremely high blow-off capacity for reduced cycle times
- Adjusting screw to adjust the blow-off capacity
- Pneumatic connections (G3/8" and G1/4") with protective filters

Centralized vacuum generation by means of compact ejectors SMPi

Our Highlights...

- IO-Link function with remote parameterisation
- Clearly structured user display with setting buttons
- Integrated air-saving function
- Compact disk design
- Weight-optimized housing
- Suction function as pulse version is available

Your Benefits...

> Connection to bus systems and fast data synchronisation
> Easy to enter and read vacuum parameters
> Reduced energy costs
> Minimal space requirements
> Minimal stress during high accelerations
> No undesired air consumption in case the machine is stopped

Compact Ejectors

Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 185 l/min

Designation Code Compact Ejectors SCPi / SMPi

Abbreviated designation	Nozzle size	Idle position suction valve	System monitoring	Connection electrical
Example SMPi 15 NO VD M12-5:				
SMPi	**15**	**NO**	**VD**	**M12-5**
SCPi without power blow off **SMPi with power blow off**	15 = 1.5 mm 20 = 2.0 mm 25 = 2.5 mm	IMP bistable, switched with pulse NC normally closed NO normally open	RD air saving function with digital vacuum switch VD digital vacuum switch	M12-5 M12, 5-pole

Ordering Data Compact Ejectors SCPi / SMPi

Compact ejector SCPi / SMPi is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, compressed air connection plate, ejector blanking plate, quick change connection, ejector tester

Compact Ejectors SCPi / SMPi

SCPi 15...		SCPi 20...		SCPi 25...	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SCPi 15 NO VD M12-5	10.02.02.03342	**SCPi 20 NO VD M12-5**	10.02.02.03354	**SCPi 25 NO VD M12-5**	10.02.02.03366
SCPi 15 NC VD M12-5	10.02.02.03343	**SCPi 20 NC VD M12-5**	10.02.02.03355	**SCPi 25 NC VD M12-5**	10.02.02.03367
SCPi 15 IMP VD M12-5	10.02.02.03344	**SCPi 20 IMP VD M12-5**	10.02.02.03356	**SCPi 25 IMP VD M12-5**	10.02.02.03368
SCPi 15 NO RD M12-5	10.02.02.03345	**SCPi 20 NO RD M12-5**	10.02.02.03357	**SCPi 25 NO RD M12-5**	10.02.02.03369
SCPi 15 NC RD M12-5	10.02.02.03346	**SCPi 20 NC RD M12-5**	10.02.02.03358	**SCPi 25 NC RD M12-5**	10.02.02.03370
SCPi 15 IMP RD M12-5	10.02.02.03347	**SCPi 20 IMP RD M12-5**	10.02.02.03359	**SCPi 25 IMP RD M12-5**	10.02.02.03371

SMPi 15...		SMPi 20...		SMPi 25...	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SMPi 15 NO VD M12-5	10.02.02.03336	**SMPi 20 NO VD M12-5**	10.02.02.03348	**SMPi 25 NO VD M12-5**	10.02.02.03360
SMPi 15 NC VD M12-5	10.02.02.03337	**SMPi 20 NC VD M12-5**	10.02.02.03349	**SMPi 25 NC VD M12-5**	10.02.02.03361
SMPi 15 IMP VD M12-5	10.02.02.03338	**SMPi 20 IMP VD M12-5**	10.02.02.03350	**SMPi 25 IMP VD M12-5**	10.02.02.03362
SMPi 15 NO RD M12-5	10.02.02.03339	**SMPi 20 NO RD M12-5**	10.02.02.03351	**SMPi 25 NO RD M12-5**	10.02.02.03363
SMPi 15 NC RD M12-5	10.02.02.03340	**SMPi 20 NC RD M12-5**	10.02.02.03352	**SMPi 25 NC RD M12-5**	10.02.02.03364
SMPi 15 IMP RD M12-5	10.02.02.03341	**SMPi 20 IMP RD M12-5**	10.02.02.03353	**SMPi 25 IMP RD M12-5**	10.02.02.03365

Compact Ejectors

Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 185 l/min

Ordering Data Accessories Compact Ejectors SCPi / SMPi

Accessories	Part Number	Weight [kg]
Connecting cable M12, 5-pole	21.04.05.00080	0,240
Connection distributor 3xM12, 4-pole	10.02.02.03372	0,170
Connection distributor 2xM12, 4-pole	10.02.02.03490	0,100
Compressed air connection plate GP 2	10.02.02.00917	0,375
Compressed air connection plate GP 3	10.02.02.00918	0,481
Compressed air connection plate GP 4	10.02.02.00919	0,595
Compressed air connection plate GP 5	10.02.02.00920	0,700
Compressed air connection plate GP 6	10.02.02.00921	0,807
Ejector blanking plate*	10.02.02.00728	0,017
Quick Change connection**	10.02.02.03463	0,163
Ejector tester EJEK-TEST SMPi/SCPi	10.02.02.03588	0,755

*Plate for covering unused connections when using compressed air connection plates

**For additional quick-mounting function (tool-free change of ejectors). When using with compressed air connection plates, order 1x per ejector.

Technical Data Compact Ejectors SCPi / SMPi

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SMPi 15...	1.5	85	75	4.5	115	7.2	200
SMPi 20...	2.0	85	135	8.1	180	10.8	200
SMPi 25...	2.5	85	185	11.1	290	17.4	200
SCPi 15...	1.5	85	75	4.5	115	7.2	200
SCPi 20...	2.0	85	140	8.4	180	11.7	200
SCPi 25...	2.5	85	195	11.7	290	17.4	200

!The supply voltage is 24V DC

*At optimal operating pressure

**For max. length 2 m

Type	Noise level free [dB]	Noise level workp. gripped [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SMPi 15...	75	74	4...7 bar	6	6	0.56	0...50
SMPi 20...	75	70	4...7 bar	6	8	0.56	0...50
SMPi 25...	78	77	4...7 bar	8	9	0.56	0...50
SCPi 15...	75	70	4...7 bar	6	6	0.56	0...50
SCPi 20...	75	65	4...7 bar	6	8	0.56	0...50
SCPi 25...	78	75	4...7 bar	8	9	0.56	0...50

!The supply voltage is 24V DC

*At optimal operating pressure

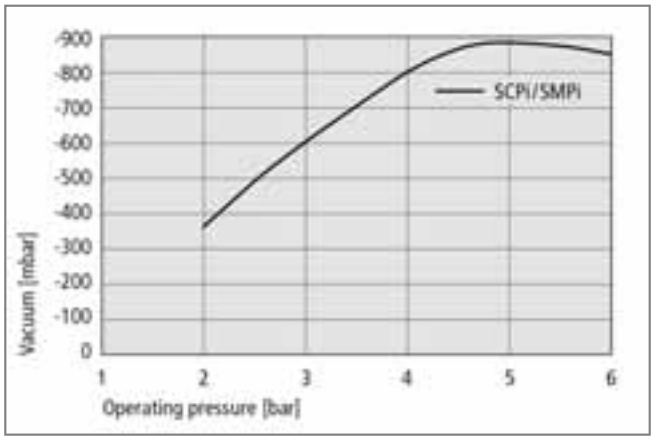
**For max. length 2 m

Compact Ejectors

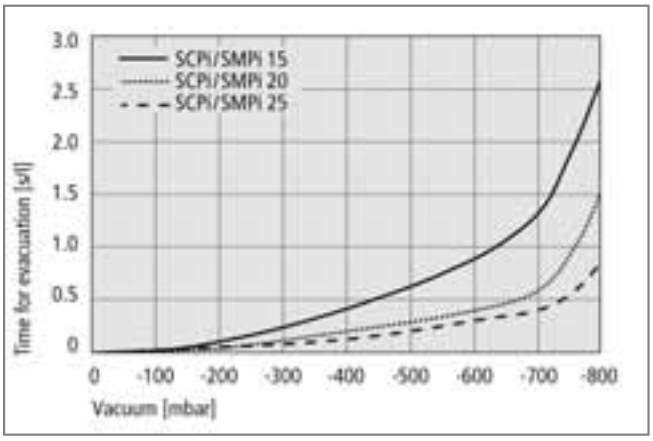
Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 185 l/min

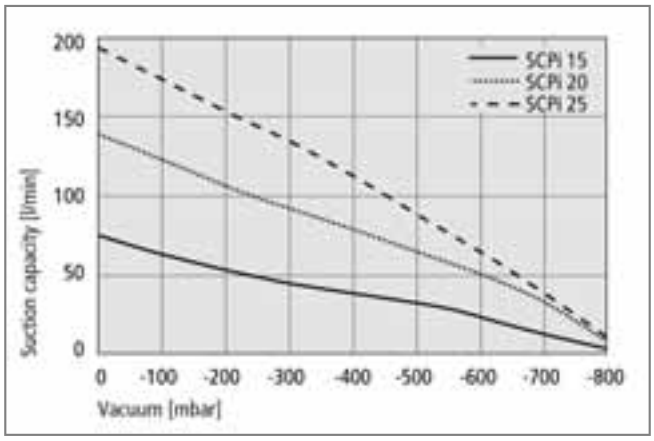
Performance Data Compact Ejectors SCPi / SMPi



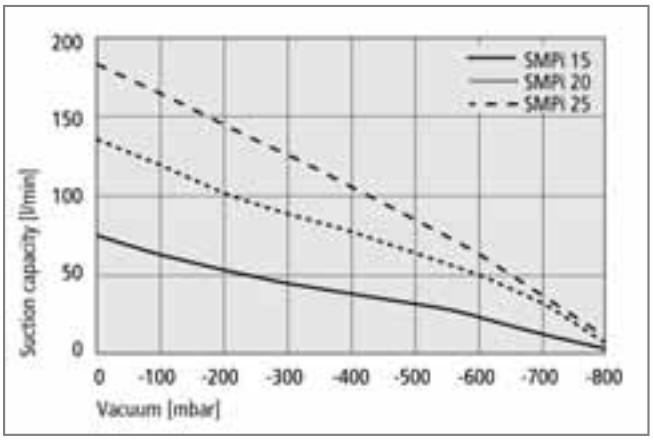
Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity SCPi... at various degrees of evacuation



Suction capacity SMPi... at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPi 15	75.0	70.3	65.4	55.2	46.3	38.3	31.2	23.9	13.5	3.4
SCPi 20	139.0	131.3	123.1	106.8	92.5	79.3	65.2	51.9	32.1	8.5
SCPi 25	195.0	188.2	176.8	153.6	133.6	112.0	89.3	67.4	39.7	11.7
SMPi 15	75.0	70.3	65.4	55.2	46.3	38.3	31.2	23.9	13.5	3.4
SMPi 20	135.0	127.5	119.5	103.7	89.8	77.0	63.3	50.4	31.1	8.2
SMPi 25	185.0	178.6	167.8	145.8	126.7	106.2	84.7	64.0	37.6	11.1

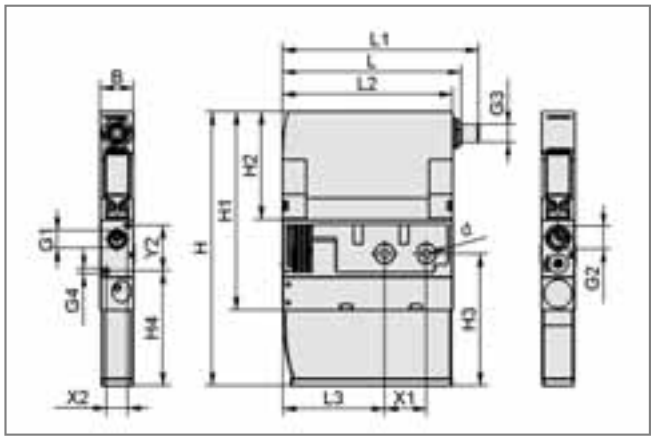
Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPi/SMPi 15	0.03	0.07	0.16	0.27	0.42	0.63	0.91	1.37	2.60
SCPi/SMPi 20	0.02	0.04	0.08	0.14	0.22	0.31	0.44	0.66	1.54
SCPi/SMPi 25	0.01	0.02	0.05	0.09	0.14	0.20	0.28	0.42	0.86

Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 185 l/min

Design Data Compact Ejectors SCPi / SMPi



SCPi.../SMPi...

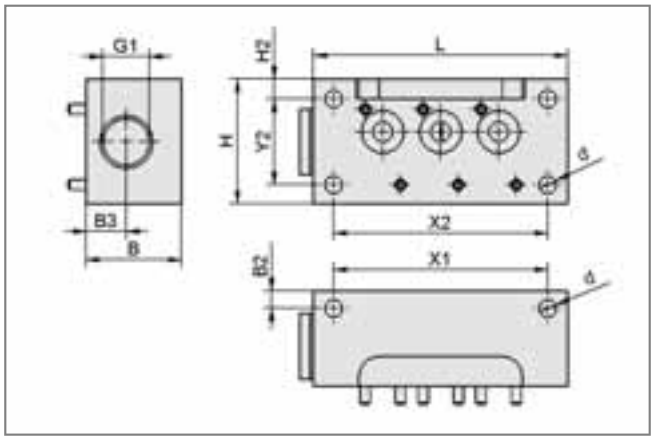
Type	Dimensions in mm																	
	B	d	G1	G2	G3	G4	H	H1	H2	H3	H4	L	L1	L2	L3	X1	X2	Y2
SMPi 15...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SMPi 20...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SMPi 25...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SCPi 15...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SCPi 20...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30
SCPi 25...	22	6.6	G1/4"-F	G3/8"-F	M12x1-M	M4-F	181.5	131.5	71.5	87.5	76	118.5	129.7	112.5	67.5	27.5	14	30

Compact Ejectors

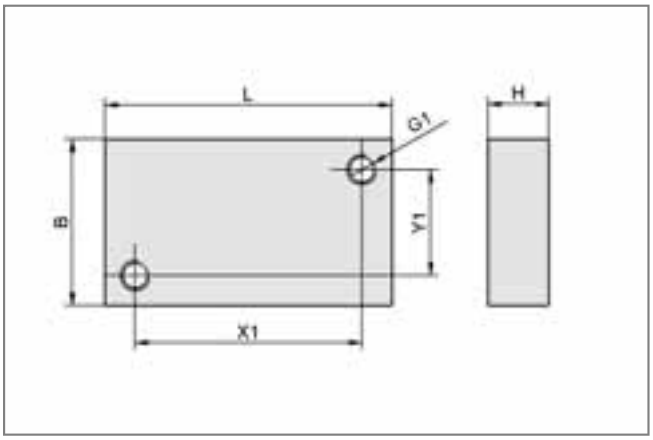
Compact Ejectors SCPi / SMPi

Suction rate from 75 l/min to 185 l/min

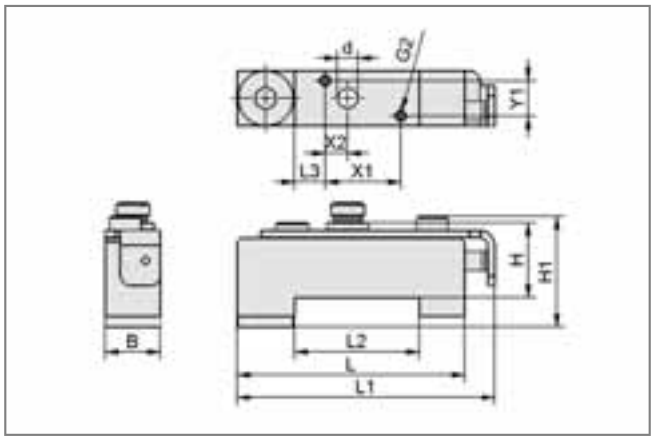
Design Data Accessories Compact Ejectors SCPi / SMPi



Compressed air connection plate GP...



Ejector blanking plate EJEK-PL...



Quick Change Connection ADP-Q1...

Type	Dimensions in mm																	
	B	B 2	B3	d	G1	G2	H	H1	H 2	X1	X2	Y 1	Y 2	L	L1	L2	L3	Number of outputs
GP 2 SMP(i)15..30/SCP(i)15..30	38	7	16	7	G1/2"-F	-	49.5	-	8	62	62	-	34	78.0	-	-	-	2
GP 3 SMP(i)15..25/SCP(i)15..25	38	7	16	7	G1/2"-F	-	49.5	-	8	85	85	-	34	101.0	-	-	-	3
GP 4 SMP(i)15..20/SCP(i)15..20	38	7	16	7	G1/2"-F	-	49.5	-	8	108	108	-	34	124.0	-	-	-	4
GP 5 SMP(i)15/SCP(i)15	38	7	16	7	G1/2"-F	-	49.5	-	8	131	131	-	34	147.0	-	-	-	5
GP 6 SMP(i)15/SCP(i)15	38	7	16	7	G1/2"-F	-	49.5	-	8	154	154	-	34	170.0	-	-	-	6
EJEK-PL SMP(i)15..30/SCP(i)20..30	22	-	-	-	M4-F	-	8.0	-	-	30	-	14	-	38.0	-	-	-	-
ADP-Q1 90.5x22x29.7 SMPi/SCPi	22	-	-	8	-	M5-F	29.7	43.9	-	30	9	14	-	90.5	102.5	49.6	12.1	1

Compact Ejectors

Compact Ejectors SMP

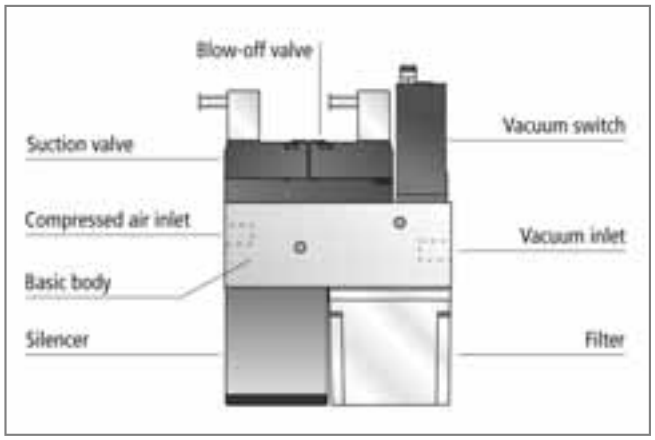
Suction rate from 65 l/min to 200 l/min

Compact ejectors SMP

Suitability for Industry-Specific Applications

Applications

- Compact ejector for handling of non-porous workpieces
- For use in the handling of sheet metal, in the automobile industry, in packing machines and in industrial robot technology
- Pick-and-place applications with very short cycle times (very fast release of workpieces thanks to the power function)



System design compact ejectors SMP

Design

- Compact ejector SMP, consisting of an anodized aluminum body, filter, silencer, two control valves (grip/blow-off) and non-return valve
- Power function for reduction of the blow-off time by about 50%
- Optionally available as NO or NC version
- Optional vacuum monitoring with electronic (VE) or digital (VD) vacuum switch
- Optional air-saving function (RE or RD)
- Suitable for mounting on block mounting plate GP
- Suitable for filtered, oil-free compressed air (4-6 bar)
- Compact ejectors with air-saving function, including cables

Central vacuum generation by compact ejectors SMP

Our Highlights...

- High suction and blow-off capacity thanks to the power function
- Wide range of models with various performance figures
- Automatic air-saving function (option)
- Versatile modular system
- Digital vacuum monitoring (option)

Your Benefits...

> Minimum cycle times due to extremely fast gripping and release of the workpieces

> Versions with optimum power ratings for all tasks

> Economical use in continuous operation

> Flexible adaptation to customer requirements

> Easy adjustment with settings shown on an LED display

Compact Ejectors

Compact Ejectors SMP

Suction rate from 65 l/min to 200 l/min

Designation Code Compact Ejectors SMP

Abbreviated designation	Nozzle size	Idle position suction valve	Blow off- and safety non-return valve	System monitoring
Example SMP 15 NO AS RE:				
SMP	**15**	**NO**	**AS**	**RE**
SMP	15 = 1.5 mm 20 = 2.0 mm 25 = 2.5 mm 30 = 3.0 mm	NC normally closed NO normally open	AS blow off valve with safety non-return valve	RD air saving function with digital vacuum switch RE air saving function with electronic vacuum switch VD digital vacuum switch VE electronic vacuum switch

Ordering Data Compact Ejectors SMP

Compact ejector SMP is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer, filter
Available accessories: connection cable, connection plug

Compact Ejectors SMP

SMP 15		SMP 20		SMP 25		SMP 30	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SMP 15 NO AS	10.02.02.00561	**SMP 20 NO AS**	10.02.02.00571	**SMP 25 NO AS**	10.02.02.00581	**SMP 30 NO AS**	10.02.02.00591
SMP 15 NC AS	10.02.02.00562	**SMP 20 NC AS**	10.02.02.00572	**SMP 25 NC AS**	10.02.02.00582	**SMP 30 NC AS**	10.02.02.00592
SMP 15 NO AS VE	10.02.02.00565	**SMP 20 NO AS VE**	10.02.02.00575	**SMP 25 NO AS VE**	10.02.02.00585	**SMP 30 NO AS VE**	10.02.02.00595
SMP 15 NC AS VE	10.02.02.00566	**SMP 20 NC AS VE**	10.02.02.00576	**SMP 25 NC AS VE**	10.02.02.00586	**SMP 30 NC AS VE**	10.02.02.00596
SMP 15 NO AS VD	10.02.02.00567	**SMP 20 NO AS VD**	10.02.02.00577	**SMP 25 NO AS VD**	10.02.02.00587	**SMP 30 NO AS VD**	10.02.02.00597
SMP 15 NC AS VD	10.02.02.00568	**SMP 20 NC AS VD**	10.02.02.00578	**SMP 25 NC AS VD**	10.02.02.00588	**SMP 30 NC AS VD**	10.02.02.00598
SMP 15 NO AS RE	10.02.02.00569	**SMP 20 NO AS RE**	10.02.02.00579	**SMP 25 NO AS RE**	10.02.02.00589	**SMP 30 NO AS RE**	10.02.02.00599
SMP 15 NO AS RD	10.02.02.00570	**SMP 20 NO AS RD**	10.02.02.00580	**SMP 25 NO AS RD**	10.02.02.00590	**SMP 30 NO AS RD**	10.02.02.00600
SMP 15 NC AS RE	10.02.02.00772	**SMP 20 NC AS RE**	10.02.02.00774	**SMP 25 NC AS RE**	10.02.02.00776	**SMP 30 NC AS RE**	10.02.02.00778
SMP 15 NC AS RD	10.02.02.00773	**SMP 20 NC AS RD**	10.02.02.00775	**SMP 25 NC AS RD**	10.02.02.00777	**SMP 30 NC AS RD**	10.02.02.00779

Compact Ejectors

Compact Ejectors SMP

Suction rate from 65 l/min to 200 l/min

Ordering Data Spare Parts and Accessories Compact Ejectors SMP

Type	Connection plug for solenoid valves* with cable (5 m, PVC)	Connection plug for solenoid valves* with cable (10 m, PUR)	Connection plug for solenoid valves* without cable	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)	Replacement silencer	Replacement filter element
SMP 15 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00651	10.02.02.00654
SMP 15 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00651	10.02.02.00654
SMP 15 NO/NC AS R...	-	-	-	-	-	10.02.02.00651	10.02.02.00654
SMP 20 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00651	10.02.02.00654
SMP 20 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00651	10.02.02.00654
SMP 20 NO/NC AS R...	-	-	-	-	-	10.02.02.00651	10.02.02.00654
SMP 25 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00652	10.02.02.00654
SMP 25 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00652	10.02.02.00654
SMP 25 NO/NC AS R...	-	-	-	-	-	10.02.02.00652	10.02.02.00654
SMP 30 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00652	10.02.02.00654
SMP 30 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00652	10.02.02.00654
SMP 30 NO/NC AS R...	-	-	-	-	-	10.02.02.00652	10.02.02.00654

*Order 2 x per ejector. In the case of regulated compact ejectors, the cable set is included with the ejector

Technical Data Compact Ejectors SMP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SMP 15	1.5	85	65.0	3.9	117	7.0	220
SMP 20	2.0	85	116.0	7.0	190	11.4	220
SMP 25	2.5	85	161.0	9.7	310	18.6	220
SMP 30	3.0	85	200.0	12.0	420	25.2	220

!The supply voltage for vacuum switches and solenoid valves is 24V DC
*At optimal operating pressure
**For max. length 2 m

Type	Noise level workp. gripped [dB]	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SMP 15	74	74	5...6	4	6	465	0...45
SMP 20	76	78	5...6	4	9	465	0...45
SMP 25	72	82	5...6	6	9	485	0...45
SMP 30	82	82	5...6	9	11	485	0...45

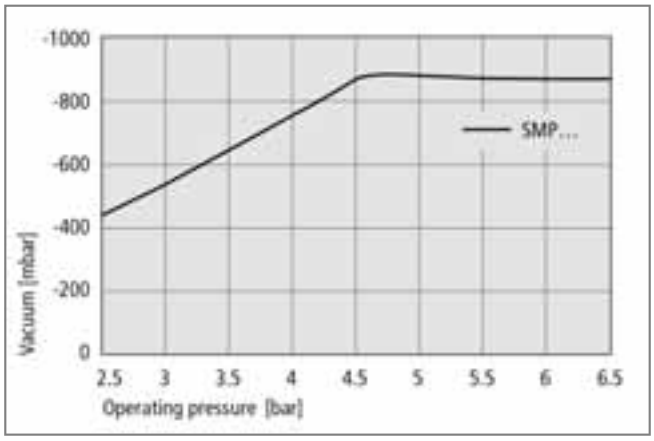
!The supply voltage for vacuum switches and solenoid valves is 24V DC
*At optimal operating pressure
**For max. length 2 m

Compact Ejectors

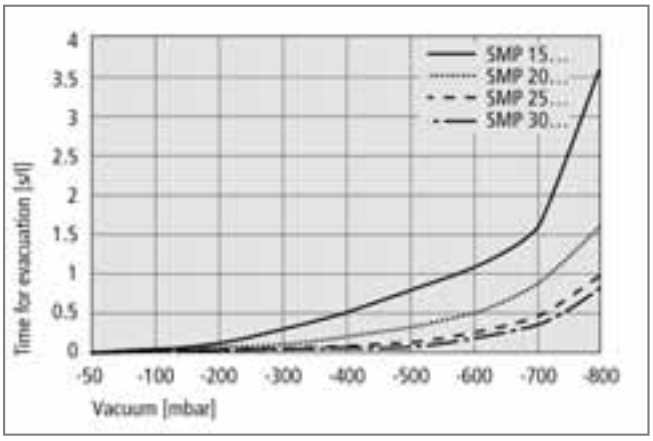
Compact Ejectors SMP

Suction rate from 65 l/min to 200 l/min

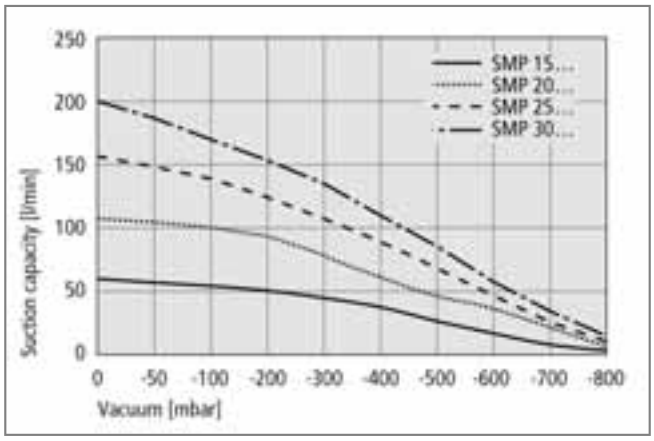
Performance Data Compact Ejectors SMP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SMP 15...	65	62	58	50	41	32	21	16	9	4
SMP 20...	116	108	101	90	78	63	48	36	18	5
SMP 25...	161	149	136	123	107	86	66	49	25	7
SMP 30...	200	184	168	153	132	107	82	61	31	9

Evacuation Time in s/l for Various Vacuum Ranges

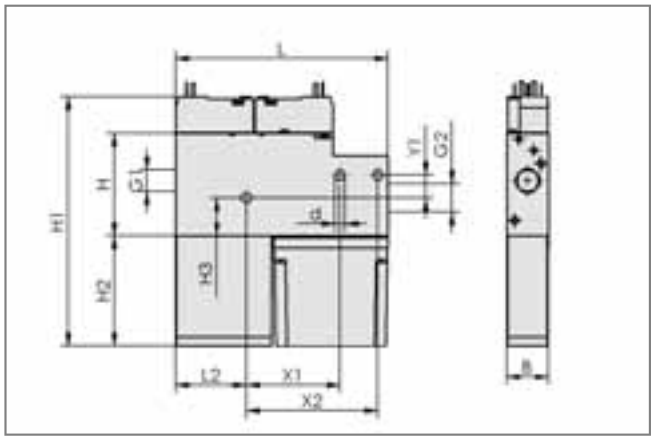
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SMP 15...	0.048	0.088	0.184	0.311	0.480	0.744	1.120	1.692	3.606
SMP 20...	0.026	0.047	0.095	0.159	0.239	0.349	0.499	0.807	1.652
SMP 25...	0.015	0.027	0.055	0.089	0.135	0.198	0.288	0.486	0.960
SMP 30...	0.012	0.021	0.044	0.071	0.108	0.160	0.232	0.392	0.810

Compact Ejectors

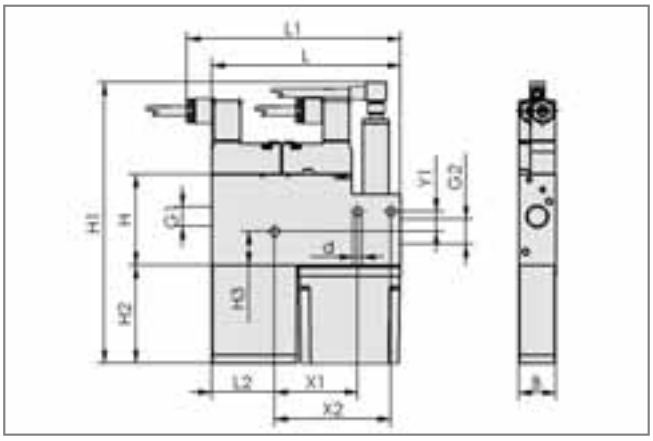
Compact Ejectors SMP

Suction rate from 65 l/min to 200 l/min

Design Data Compact Ejectors SMP



SMP 15 to 30 NC/NO AS



SMP 15 to 30 NC/NO AS V.../ R...

Type	Dimensions in mm													
	B	d	G1	G2	H	H1	H2	H3	L	L1	L2	X1	X2	Y1
SMP 15 NC/NO AS	22	5.5	G1/4"-F	G3/8"-F	54	132.5	58.5	20.1	112.5	-	37.5	49.5	69.5	12
SMP 20 NC/NO AS	22	5.5	G1/4"-F	G3/8"-F	54	132.5	58.5	20.1	112.5	-	37.5	49.5	69.5	12
SMP 25 NC/NO AS	22	5.5	G1/4"-F	G3/8"-F	54	147.5	73.5	20.1	112.5	-	37.5	49.5	69.5	12
SMP 30 NC/NO AS	22	5.5	G1/4"-F	G3/8"-F	54	147.5	73.5	20.1	112.5	-	37.5	49.5	69.5	12
SMP 15 NC/NO AS VD/RD	22	5.5	G1/4"-F	G3/8"-F	54	181.5	58.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 20 NC/NO AS VD/RD	22	5.5	G1/4"-F	G3/8"-F	54	181.5	58.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 25 NC/NO AS VD/RD	22	5.5	G1/4"-F	G3/8"-F	54	196.5	73.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 30 NC/NO AS VD/RD	22	5.5	G1/4"-F	G3/8"-F	54	196.5	73.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 15 NC/NO AS VE/RE	22	5.5	G1/4"-F	G3/8"-F	54	167.0	58.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 20 NC/NO AS VE/RE	22	5.5	G1/4"-F	G3/8"-F	54	167.0	58.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 25 NC/NO AS VE/RE	22	5.5	G1/4"-F	G3/8"-F	54	182.0	73.5	20.1	112.5	129	37.5	49.5	69.5	12
SMP 30 NC/NO AS VE/RE	22	5.5	G1/4"-F	G3/8"-F	54	182.0	73.5	20.1	112.5	129	37.5	49.5	69.5	12

Compact Ejectors

SMP-Compressed Air Distributors GP

Suitability for Industry-Specific Applications

SMP-compressed air distributors GP

Applications

- Compressed air distributor for mounting of compact ejectors in blocks with a single compressed air inlet

Design

- Baseplate made of anodized aluminum for mounting of several compact ejectors
- Central compressed-air inlet can be extended at any time
- Connections not needed for ejectors can be sealed with blanking plates
- Delivered complete with gaskets and installation material

Our Highlights...

- Baseplate for the construction of blocks of compact ejectors
- Central compressed-air inlet

Your Benefits...

> Space-saving construction of ejector blocks

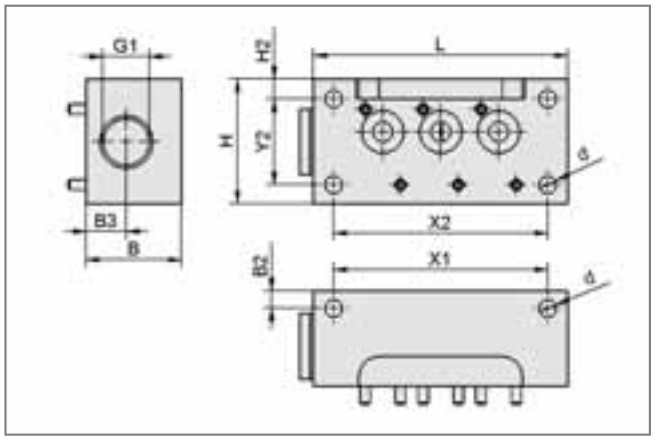
> Low installation costs

Ordering Data SMP-Compressed Air Distributors GP

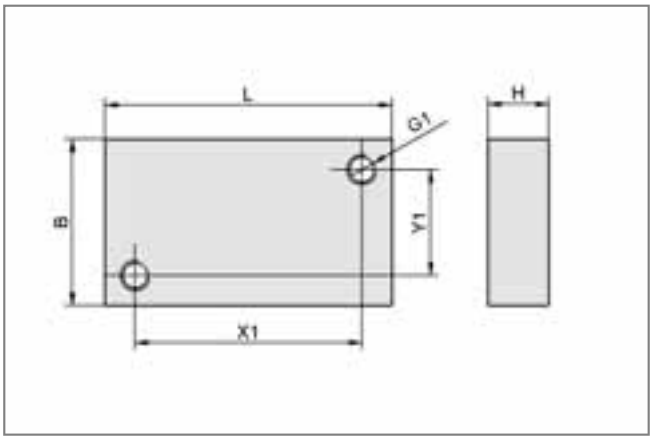
Type	Type*	Part Number
Compressed air connection plate	GP 2 SMP(i)15..30/SCP(i)15..30	10.02.02.00917
Compressed air connection plate	GP 3 SMP(i)15..25/SCP(i)15..25	10.02.02.00918
Compressed air connection plate	GP 4 SMP(i)15..20/SCP(i)15..20	10.02.02.00919
Compressed air connection plate	GP 5 SMP(i)15/SCP(i)15	10.02.02.00920
Compressed air connection plate	GP 6 SMP(i)15/SCP(i)15	10.02.02.00921
Ejector blanking plate	EJEK-PL SMP(i)15..30/SCP(i)20..30	10.02.02.00728
Ejector blanking plate	EJEK-PL SCP 10..15	10.02.02.00729

*EJEK-PL = Plate for covering unused connections

Design Data SMP-Compressed Air Distributors GP



Compressed air manifold GP SMP15..30/SCP



Ejector blanking plate EJEK-PL ...

Type	Dimensions in mm												
	B	B2	d	G1	H	H2	L	X1	X2	Y1	Y2	Number of outputs	Weight [g]
GP 2 SMP(i)15..30/SCP(i)15..30	38	7	7	G1/2"-F	49.5	8	78	62	62	-	34	2	375
GP 3 SMP(i)15..25/SCP(i)15..25	38	7	7	G1/2"-F	49.5	8	101	85	85	-	34	3	481
GP 4 SMP(i)15..20/SCP(i)15..20	38	7	7	G1/2"-F	49.5	8	124	108	108	-	34	4	595
GP 5 SMP(i)15/SCP(i)15	38	7	7	G1/2"-F	49.5	8	147	131	131	-	34	5	700
GP 6 SMP(i)15/SCP(i)15	38	7	7	G1/2"-F	49.5	8	170	154	154	-	34	6	807
EJEK-PL SMP(i)15..30/SCP(i)20..30	22	-	-	M4-F	8.0	-	38	30	-	14	-	-	17
EJEK-PL SCP 10..15	20	-	-	-	6.0	7	26	20	20	-	34	-	9

Compact Ejectors

Compact Ejectors SCP

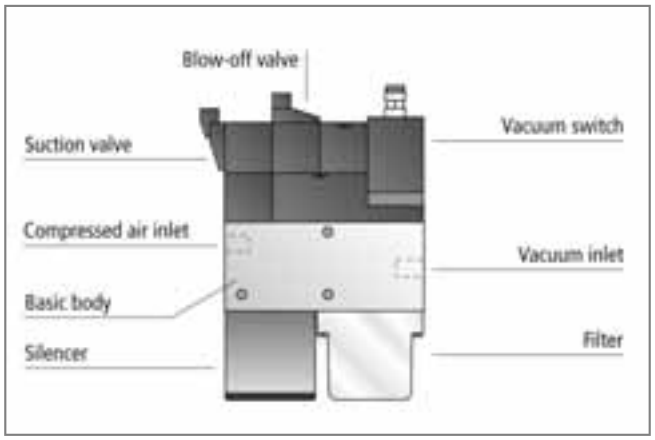
Suction rate from 37 l/min to 200 l/min

Suitability for Industry-Specific Applications

Compact ejectors SCP

Applications

- Compact ejector for handling of airtight or slightly porous work-pieces in the electronics, electrical engineering, packing, robotics and automobile industries



System design compact ejectors SCP

Design

- Basic body made from anodized aluminum
- Suction valve optionally as a normally open (NO) or normally closed (NC) valve
- Blow off valve NC, filter, silencer and non-return valve all integrated
- Optionall: electronic vacuum switch, integrated air-saving function, mounting plate for block installation
- Compact ejectors with air-saving function incl. cable

Centralized vacuum generation by means of compact ejectors SCP for handling car body parts

Our Highlights...

- Wide range of nozzle diameters from 1.0 to 3.0 mm
- Versatile modular system
- Air-saving function (optional)
- Digital vacuum monitoring (optional)

Your Benefits...

> Optimum air consumption thanks to many models with differing suction capacities

> Flexible adaptation to customer requirements

> Minimum energy costs in continuous operation

> Easy adjustment with foil keypad and LED display of the settings possible

Compact Ejectors

Compact Ejectors SCP

Suction rate from 37 l/min to 200 l/min

Designation Code Compact Ejectors SCP

Abbreviated designation	Nozzle size	Idle position suction valve	Blow off- and safety non-return valve	System monitoring
Example SCP 10 NO AS RE:				
SCP	**10**	**NO**	**AS**	**RE**
SCP	10 = 1.0 mm 15 = 1.5 mm 20 = 2.0 mm 25 = 2.5 mm 30 = 3.0 mm	NC normally closed NO normally open	AS blow off valve with safety non-return valve	RD air saving function with digital vacuum switch RE air saving function with electronic vacuum switch VD digital vacuum switch VE elektronic vacuum switch

Ordering Data Compact Ejectors SCP

Compact ejector SCP is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer, filter
Available accessories: connection cable, connection plug

Compact Ejectors SCP

SCP 10...		SCP 15...		SCP 20...	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SCP 10 NO AS	10.02.02.00601	**SCP 15 NO AS**	10.02.02.00611	**SCP 20 NO AS**	10.02.02.00621
SCP 10 NC AS	10.02.02.00602	**SCP 15 NC AS**	10.02.02.00612	**SCP 20 NC AS**	10.02.02.00622
SCP 10 NO AS VE	10.02.02.00605	**SCP 15 NO AS VE**	10.02.02.00615	**SCP 20 NO AS VE**	10.02.02.00625
SCP 10 NC AS VE	10.02.02.00606	**SCP 15 NC AS VE**	10.02.02.00616	**SCP 20 NC AS VE**	10.02.02.00626
SCP 10 NO AS VD	10.02.02.00607	**SCP 15 NO AS VD**	10.02.02.00617	**SCP 20 NO AS VD**	10.02.02.00627
SCP 10 NC AS VD	10.02.02.00608	**SCP 15 NC AS VD**	10.02.02.00618	**SCP 20 NC AS VD**	10.02.02.00628
SCP 10 NO AS RE	10.02.02.00609	**SCP 15 NO AS RE**	10.02.02.00619	**SCP 20 NO AS RE**	10.02.02.00629
SCP 10 NO AS RD	10.02.02.00610	**SCP 15 NO AS RD**	10.02.02.00620	**SCP 20 NO AS RD**	10.02.02.00630
SCP 10 NC AS RE	10.02.02.00780	**SCP 15 NC AS RE**	10.02.02.00782	**SCP 20 NC AS RE**	10.02.02.00784
SCP 10 NC AS RD	10.02.02.00781	**SCP 15 NC AS RD**	10.02.02.00783	**SCP 20 NC AS RD**	10.02.02.00785

SCP 25...		SCP 30...	
Type	**Part Number**	**Type**	**Part Number**
SCP 25 NO AS	10.02.02.00631	**SCP 30 NO AS**	10.02.02.00641
SCP 25 NC AS	10.02.02.00632	**SCP 30 NC AS**	10.02.02.00642
SCP 25 NO AS VE	10.02.02.00635	**SCP 30 NO AS VE**	10.02.02.00645
SCP 25 NC AS VE	10.02.02.00636	**SCP 30 NC AS VE**	10.02.02.00646
SCP 25 NO AS VD	10.02.02.00637	**SCP 30 NO AS VD**	10.02.02.00647
SCP 25 NC AS VD	10.02.02.00638	**SCP 30 NC AS VD**	10.02.02.00648
SCP 25 NO AS RE	10.02.02.00639	**SCP 30 NO AS RE**	10.02.02.00649
SCP 25 NO AS RD	10.02.02.00640	**SCP 30 NO AS RD**	10.02.02.00650
SCP 25 NC AS RE	10.02.02.00786	**SCP 30 NC AS RE**	10.02.02.00788
SCP 25 NC AS RD	10.02.02.00787	**SCP 30 NC AS RD**	10.02.02.00789

Compact Ejectors

Compact Ejectors SCP

Suction rate from 37 l/min to 200 l/min

Ordering Data Spare Parts and Accessories Compact Ejectors SCP

Type	Connection plug for solenoid valves* with cable (3 m, PVC)	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)	Replacement silencer	Replacement filter element
SCP 10 NO/NC AS	21.04.06.00086	-	-	10.02.02.00653	10.02.02.00655
SCP 10 NO/NC AS V...	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.00653	10.02.02.00655
SCP 10 NO/NC AS R...	-	-	-	10.02.02.00653	10.02.02.00655
SCP 15 NO/NC AS	21.04.06.00086	-	-	10.02.02.00653	10.02.02.00655
SCP 15 NO/NC AS V...	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.00653	10.02.02.00655
SCP 15 NO/NC AS R...	-	-	-	10.02.02.00653	10.02.02.00655

*Order 2 x per ejector. In the case of regulated compact ejectors, the cable set is included with the ejector

Ordering Data Spare Parts and Accessories Compact Ejectors SCP

Type	Connection plug for solenoid valves* with cable (5 m, PVC)	Connection plug for solenoid valves* with cable (10 m, PUR)	Connection plug for solenoid valves* without cable	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)	Replacement silencer	Replacement filter element
SCP 20 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00651	10.02.02.00654
SCP 20 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00651	10.02.02.00654
SCP 20 NO/NC AS R...	-	-	-	-	-	10.02.02.00651	10.02.02.00654
SCP 25 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00652	10.02.02.00654
SCP 25 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00652	10.02.02.00654
SCP 25 NO/NC AS R...	-	-	-	-	-	10.02.02.00652	10.02.02.00654
SCP 30 NO/NC AS	21.04.06.00084	21.04.06.00118	21.04.06.00085	-	-	10.02.02.00652	10.02.02.00654
SCP 30 NO/NC AS V...	21.04.06.00084	21.04.06.00118	21.04.06.00085	10.06.02.00031	10.06.02.00032	10.02.02.00652	10.02.02.00654
SCP 30 NO/NC AS R...	-	-	-	-	-	10.02.02.00652	10.02.02.00654

*Order 2 x per ejector. In the case of regulated compact ejectors, the cable set is included with the ejector

Technical Data Compact Ejectors SCP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SCP 10...	1.0	85	37	2.2	53	3.2	200
SCP 15...	1.5	85	65	3.9	117	7.0	200
SCP 20...	2.0	85	116	7.0	190	11.4	200
SCP 25...	2.5	85	161	9.7	310	18.6	200
SCP 30...	3.0	85	200	12.0	420	25.2	200

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

**For max. length 2 m

Type	Noise level workp. gripped [dB]	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SCP 10...	66	68	5	2	4	275	0...45
SCP 15...	68	68	5	4	6	275	0...45
SCP 20...	76	78	5...6	4	9	465	0...45
SCP 25...	72	82	5...6	6	9	485	0...45
SCP 30...	82	82	5...6	9	11	485	0...45

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

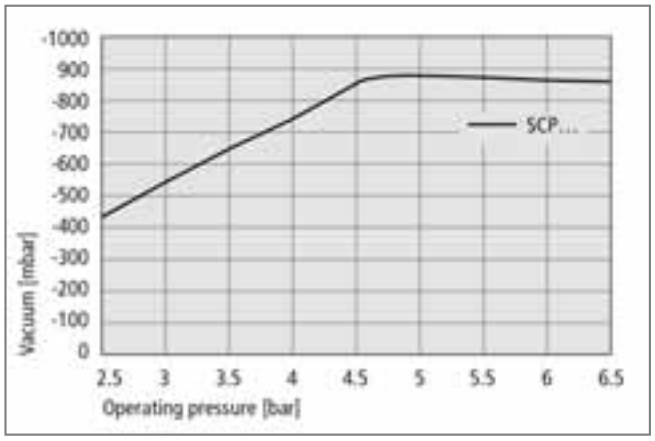
**For max. length 2 m

Compact Ejectors

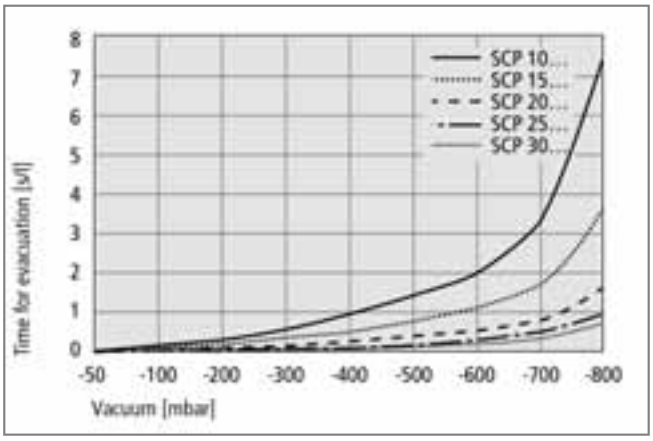
Compact Ejectors SCP

Suction rate from 37 l/min to 200 l/min

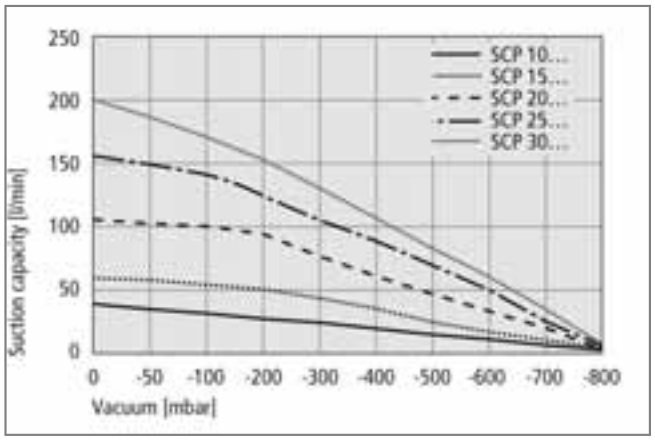
Performance Data Compact Ejectors SCP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCP 10...	37.0	35.4	33.2	28.8	24.0	19.4	16.0	11.2	6.0	1.4
SCP 15...	65.0	62.0	58.0	50.0	41.0	32.0	21.0	16.0	9.0	4.0
SCP 20...	116.0	108.0	101.0	90.0	78.0	63.0	48.0	36.0	18.0	5.0
SCP 25...	161.0	149.0	136.0	123.0	107.0	86.0	66.0	49.0	25.0	7.0
SCP 30...	200.0	184.0	168.0	153.0	132.0	107.0	82.0	61.0	31.0	9.0

Evacuation Time in s/l for Various Vacuum Ranges

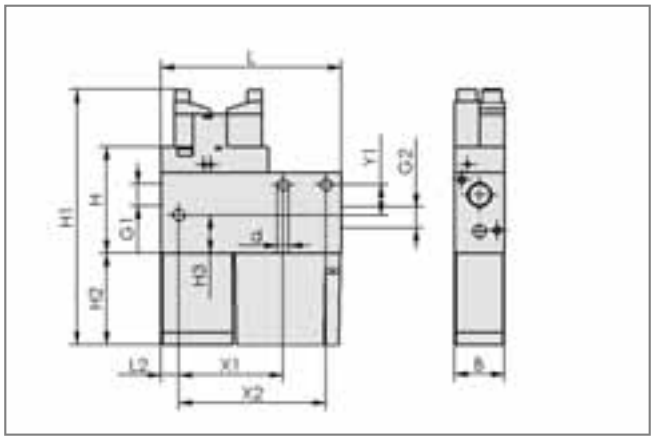
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCP-FS 10...	0.087	0.162	0.341	0.591	0.959	1.419	2.035	3.304	7.300
SCP-FS 15...	0.048	0.088	0.184	0.311	0.480	0.744	1.120	1.692	3.606
SCP-FS 20...	0.026	0.047	0.095	0.159	0.239	0.349	0.499	0.807	1.652
SCP-FS 25...	0.015	0.027	0.055	0.089	0.135	0.198	0.288	0.486	0.960
SCP-FS 30...	0.012	0.021	0.044	0.071	0.108	0.160	0.232	0.392	0.810

Compact Ejectors

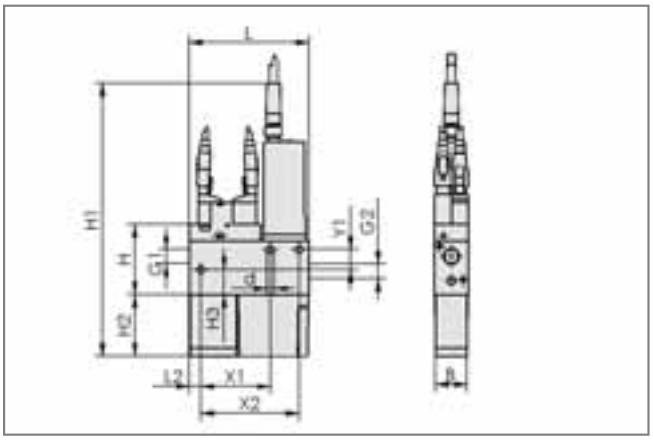
Compact Ejectors SCP

Suction rate from 37 l/min to 200 l/min

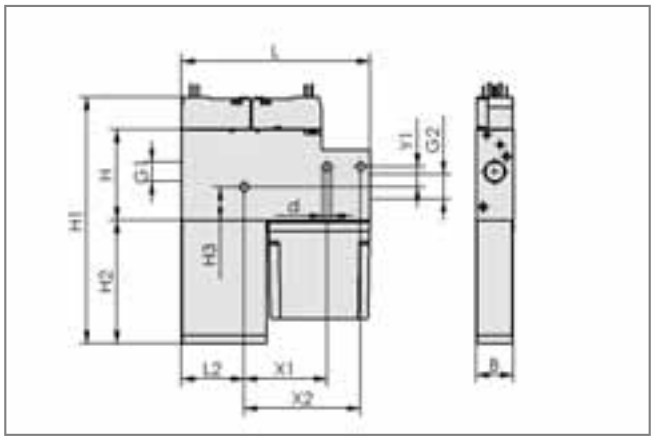
Design Data Compact Ejectors SCP



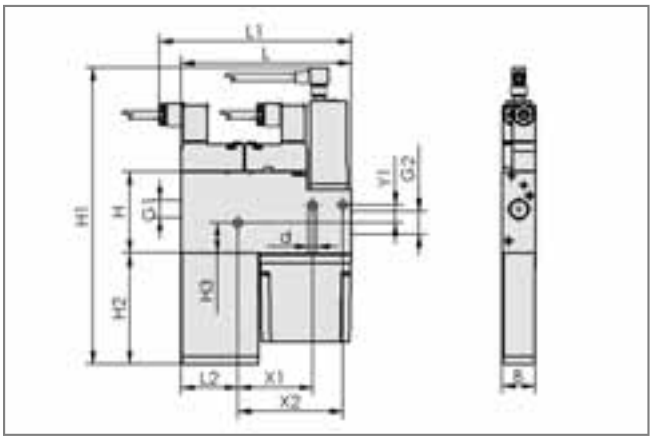
SCP 10 to 15 NC/NO AS



SCP 10 to 15 NC/NO AS V.../ R...



SCP 20 to 30 NC/NO AS



SCP 20 to 30 NC/NO AS

Design Data Compact Ejectors SCP

Type	Dimensions in mm													
	B	d	G1	G2	H	H1	H2	H3	L	L1	L2	X1	X2	Y1
SCP 10 NC/NO AS	20.2	4.5	G1/8"-F	G1/8"-F	42.2	105.0	36.5	15.0	71.5	-	7.0	41.5	58.5	12
SCP 15 NC/NO AS	20.2	4.5	G1/8"-F	G1/8"-F	42.2	105.0	36.5	15.0	71.5	-	7.0	41.5	58.5	12
SCP 20 NC/NO AS	22.0	5.5	G1/4"-F	G3/8"-F	54.0	132.5	58.5	20.1	112.5	-	37.5	49.5	69.5	12
SCP 25 NC/NO AS	22.0	5.5	G1/4"-F	G3/8"-F	54.0	147.5	73.5	20.1	112.5	-	37.5	49.5	69.5	12
SCP 30 NC/NO AS	22.0	5.5	G1/4"-F	G3/8"-F	54.0	147.5	73.5	20.1	112.5	-	37.5	49.5	69.5	12
SCP 10 NC/NO AS VE/RE	20.2	4.5	G1/8"-F	G1/8"-F	42.2	147.5	36.5	15.0	71.5	-	7.0	41.5	58.5	12
SCP 15 NC/NO AS VE/RE	20.2	4.5	G1/8"-F	G1/8"-F	42.2	147.5	36.5	15.0	71.5	-	7.0	41.5	58.5	12
SCP 20 NC/NO AS VE/RE	22.0	5.5	G1/4"-F	G3/8"-F	54.0	167.0	58.5	20.1	112.5	127	37.5	49.5	69.5	12
SCP 25 NC/NO AS VE/RE	22.0	5.5	G1/4"-F	G3/8"-F	54.0	182.0	73.5	20.1	112.5	127	37.5	49.5	69.5	12
SCP 30 NC/NO AS VE/RE	22.0	5.5	G1/4"-F	G3/8"-F	54.0	182.0	73.5	20.1	112.5	127	37.5	49.5	69.5	12
SCP 10 NC/NO AS VD/RD	20.2	4.5	G1/8"-F	G1/8"-F	42.2	162.0	36.5	15.0	71.5	-	7.0	41.5	58.5	12
SCP 15 NC/NO AS VD/RD	20.2	4.5	G1/8"-F	G1/8"-F	42.2	162.0	36.5	15.0	71.5	-	7.0	41.5	58.5	12
SCP 20 NC/NO AS VD/RD	22.0	5.5	G1/4"-F	G3/8"-F	54.0	181.5	58.5	20.1	112.5	127	37.5	49.5	69.5	12
SCP 25 NC/NO AS VD/RD	22.0	5.5	G1/4"-F	G3/8"-F	54.0	196.5	73.5	20.1	112.5	127	37.5	49.5	69.5	12
SCP 30 NC/NO AS VD/RD	22.0	5.5	G1/4"-F	G3/8"-F	54.0	196.5	73.5	20.1	112.5	127	37.5	49.5	69.5	12

Compact Ejectors

Compact Ejectors SCP-FS

Suction rate from 37 l/min to 200 l/min

Suitability for Industry-Specific Applications

Compact ejectors SCP-FS

Applications

- Compact ejector for handling of airtight or slightly porous work-pieces
- For use in the automobile, packaging and robotics industries

Design

- Anodized aluminum body with ejector nozzle, filter, silencer, non-return valve and power function
- Optional vacuum switch for system monitoring
- Control plate with threaded connections for control of the functions "grip" and "blow-off" by means of external compressed-air pulses

Our Highlights...

- Externally controlled compact ejector
- High suction and blow-off capacity
- Wide range of performance values
- Optional vacuum monitoring

Your Benefits...

> Optimum integration into field-bus systems

> Fast evacuation and blowing off reduce the cycle times

> Optimum range of models with different performance figures for adaptation to the intended task

> Increased process safety

Designation Code Compact Ejectors SCP-FS

Abbreviated designation	Nozzle size	Actuation	System monitoring
Example SCP 10 FS VE:			
SCP	**10**	**FS**	**VE**
SCP	10 = 1.0 mm 15 = 1.5 mm 20 = 2.0 mm 25 = 2.5 mm 30 = 3.0 mm	FS external control with pneumatic pulse	RP air saving function with pneumatic vacuum switch VD digital vacuum switch VE elektronic vacuum switch

Ordering Data Compact Ejectors SCP-FS

Compact ejector SCP-FS is delivered as a ready to connect product.

Compact Ejectors

Compact Ejectors SCP-FS

Suction rate from 37 l/min to 200 l/min

Compact Ejectors SCP-FS

SCP 10 FS		SCP 15 FS		SCP 20 FS	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SCP 10 FS	10.02.02.00893	SCP 15 FS	10.02.02.00897	SCP 20 FS	10.02.02.00873
SCP 10 FS VE	10.02.02.00895	SCP 15 FS VE	10.02.02.00899	SCP 20 FS VE	10.02.02.00902
SCP 10 FS VD	10.02.02.00896	SCP 15 FS VD	10.02.02.00900	SCP 20 FS VD	10.02.02.00903
				SCP 20 FS RP	10.02.02.01623

SCP 25 FS		SCP 30 FS	
Type	**Part Number**	**Type**	**Part Number**
SCP 25 FS	10.02.02.00904	SCP 30 FS	10.02.02.00908
SCP 25 FS VE	10.02.02.00906	SCP 30 FS VE	10.02.02.00910
SCP 25 FS VD	10.02.02.00907	SCP 30 FS VD	10.02.02.00911
SCP 25 FS RP	10.02.02.01956	SCP 30 FS RP	10.02.02.01643

Technical Data Compact Ejectors SCP-FS

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. airconsumption blow off [l/min]
SCP 10 FS	1.0	85	37	2.2	53	3.2	200
SCP 15 FS	1.5	85	65	3.9	117	7.0	200
SCP 20 FS	2.0	85	116	7.0	190	11.4	200
SCP 25 FS	2.5	85	161	9.7	310	18.6	200
SCP 30 FS	3.0	85	200	12.0	420	25.2	200

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

**For max. length 2 m

Type	Noise level workp. gripped [dB]	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [kg]	Operating temperature [°C]
SCP 10 FS	66	68	5	2	4	0.25	0...45
SCP 15 FS	68	68	5	4	6	0.25	0...45
SCP 20 FS	76	78	5...6	4	9	0.39	0...45
SCP 25 FS	72	82	5...6	6	9	0.41	0...45
SCP 30 FS	82	82	5...6	6	12	0.41	0...45

!The supply voltage for vacuum switches and solenoid valves is 24V DC

*At optimal operating pressure

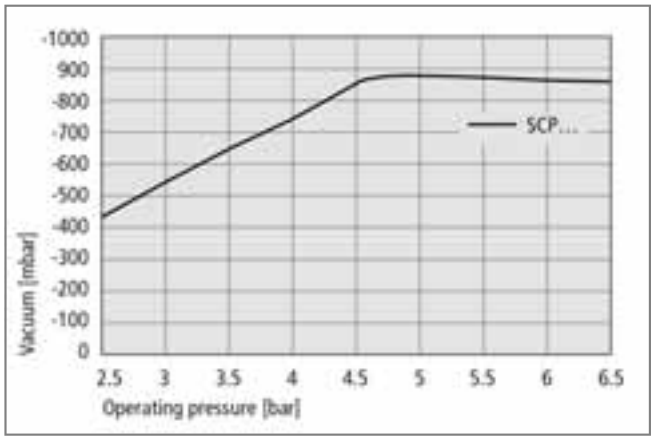
**For max. length 2 m

Compact Ejectors

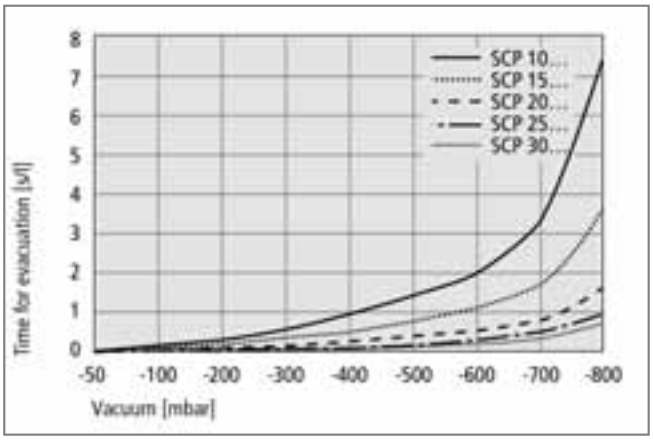
Compact Ejectors SCP-FS

Suction rate from 37 l/min to 200 l/min

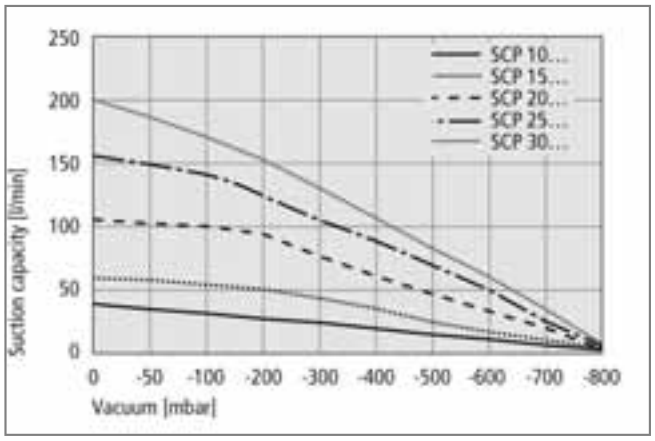
Performance Data Compact Ejectors SCP-FS



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCP-FS 10...	37.0	35.4	33.2	28.8	24.0	19.4	16.0	11.2	6.0	1.4
SCP-FS 15...	65.0	62.0	58.0	50.0	41.0	32.0	21.0	16.0	9.0	4.0
SCP-FS 20...	116.0	108.0	101.0	90.0	78.0	63.0	48.0	36.0	18.0	5.0
SCP-FS 25...	161.0	149.0	136.0	123.0	107.0	86.0	66.0	49.0	25.0	7.0
SCP-FS 30...	200.0	184.0	168.0	153.0	132.0	107.0	82.0	61.0	31.0	9.0

Evacuation Time in s/l for Various Vacuum Ranges

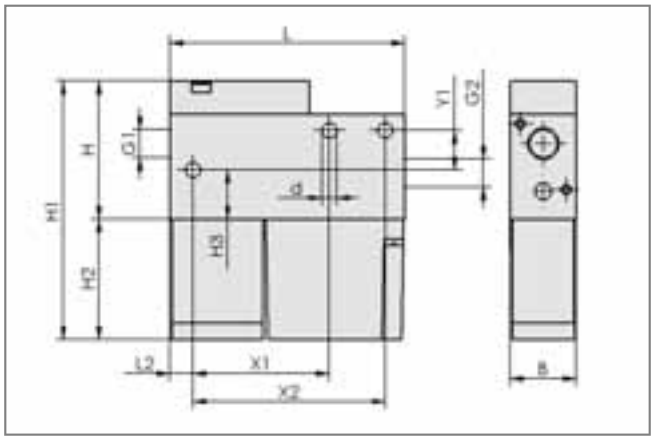
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCP-FS 10...	0.087	0.162	0.341	0.591	0.959	1.419	2.035	3.304	7.300
SCP-FS 15...	0.048	0.088	0.184	0.311	0.480	0.744	1.120	1.692	3.606
SCP-FS 20...	0.026	0.047	0.095	0.159	0.239	0.349	0.499	0.807	1.652
SCP-FS 25...	0.015	0.027	0.055	0.089	0.135	0.198	0.288	0.486	0.960
SCP-FS 30...	0.012	0.021	0.044	0.071	0.108	0.160	0.232	0.392	0.810

Compact Ejectors

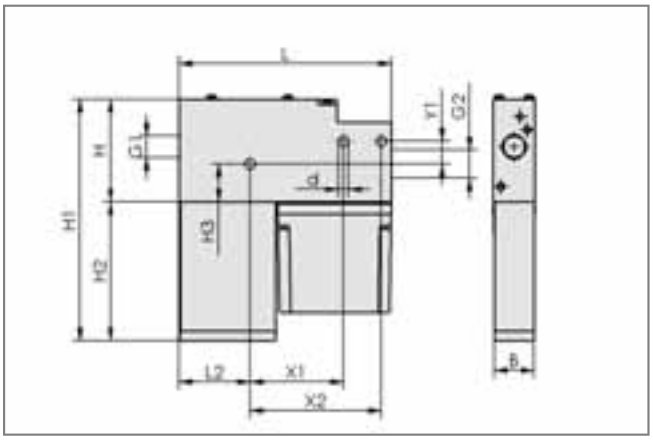
Compact Ejectors SCP-FS

Suction rate from 37 l/min to 200 l/min

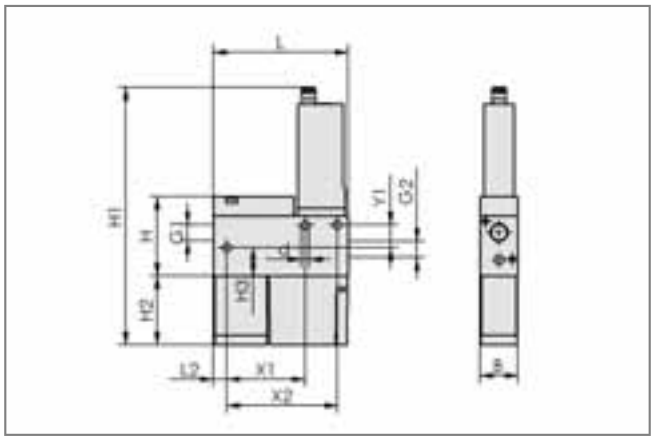
Design Data Compact Ejectors SCP-FS



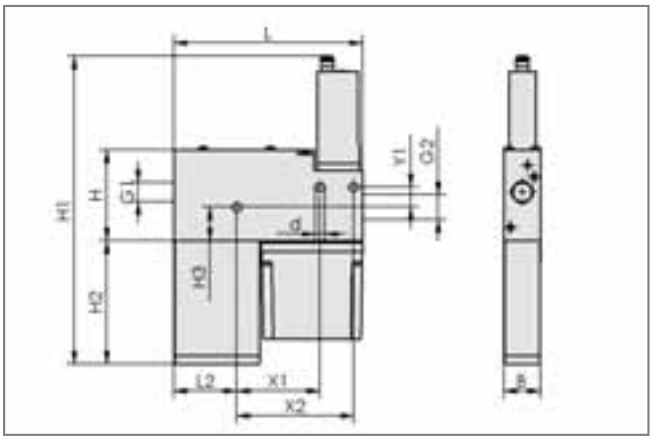
SCP 10 to 15 FS



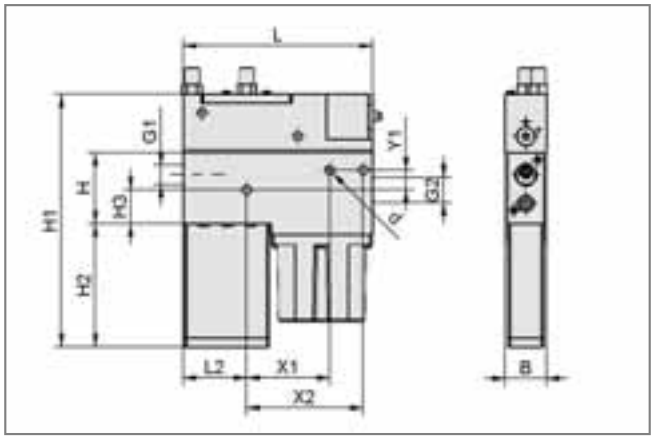
SCP 20 to 30 FS



SCP 10 to 15 FS V...



SCP 20 to 30 FS V...



SCP-FS 20 to 30 RP

Compact Ejectors

Compact Ejectors SCP-FS

Suction rate from 37 l/min to 200 l/min

Design Data Compact Ejectors SCP-FS

Type	Dimensions in mm												
	B	d	G1	G2	H	H1	H2	H3	L	L2	X1	X2	Y1
SCP 10 FS	20.2	4.5	G1/8"-F	G1/8"-F	42.5	79.0	36.5	15.0	71.5	7.0	41.5	58.5	12.0
SCP 15 FS	20.2	4.5	G1/8"-F	G1/8"-F	42.5	79.0	36.5	15.0	71.5	7.0	41.5	58.5	12.0
SCP 20 FS	22.0	5.5	G1/4"-F	G3/8"-F	54.0	112.5	58.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 25 FS	22.0	5.5	G1/4"-F	G3/8"-F	54.0	127.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 30 FS	22.0	5.5	G1/4"-F	G3/8"-F	54.0	127.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 10 FS VE	20.2	4.5	G1/8"-F	G1/8"-F	42.5	126.5	36.5	15.0	71.5	7.0	41.5	58.5	12.0
SCP 15 FS VE	20.2	4.5	G1/8"-F	G1/8"-F	42.5	126.5	36.5	15.0	71.5	7.0	41.5	58.5	12.0
SCP 20 FS VE	22.0	5.5	G1/4"-F	G3/8"-F	54.0	158.6	58.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 25 FS VE	22.0	5.5	G1/4"-F	G3/8"-F	54.0	173.6	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 30 FS VE	22.0	5.5	G1/4"-F	G3/8"-F	54.0	173.6	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 10 FS VD	20.2	4.5	G1/8"-F	G1/8"-F	42.5	136.5	36.5	15.0	71.5	7.0	41.5	58.5	12.0
SCP 15 FS VD	20.2	4.5	G1/8"-F	G1/8"-F	42.5	136.5	36.5	15.0	71.5	7.0	41.5	58.5	12.0
SCP 20 FS VD	22.0	5.5	G1/4"-F	G3/8"-F	54.0	168.5	58.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 25 FS VD	22.0	5.5	G1/4"-F	G3/8"-F	54.0	183.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 30 FS VD	22.0	5.5	G1/4"-F	G3/8"-F	54.0	183.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 20 FS RP	25.0	5.5	G1/4"-F	G3/8"-F	77.0	150.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 25 FS RP	25.0	5.5	G1/4"-F	G3/8"-F	77.0	150.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0
SCP 30 FS RP	25.0	5.5	G1/4"-F	G3/8"-F	77.0	150.5	73.5	20.1	112.5	37.5	49.5	69.5	12.0

Compact Ejectors

SCP-Compressed Air Distributors GP

Suitability for Industry-Specific Applications

SCP-Compressed air distributors GP

Applications

- Compressed air distributor for mounting of compact ejectors in blocks with a single compressed air inlet

Design

- Baseplate made of anodized aluminum for mounting of several compact ejectors
- Central compressed air inlet and extension at any time
- Connections not needed for ejectors can be sealed with blanking plates
- Delivered complete with gaskets and installation material

Our Highlights...

- Baseplate for the construction of blocks of compact ejectors
- Central compressed air inlet

Your Benefits...

> Space-saving construction of ejector blocks

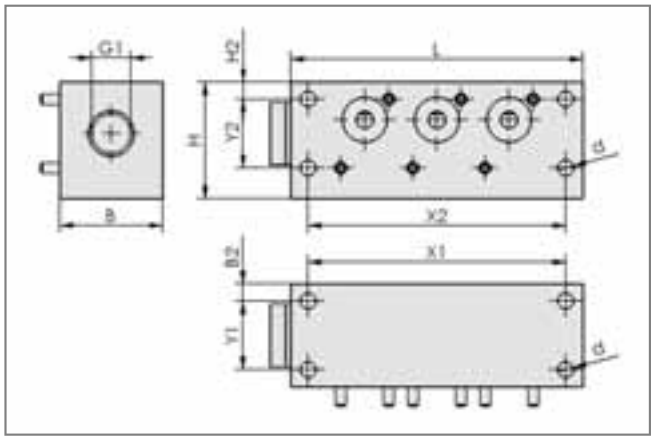
> Low installation costs

SCP-Compressed Air Distributors GP

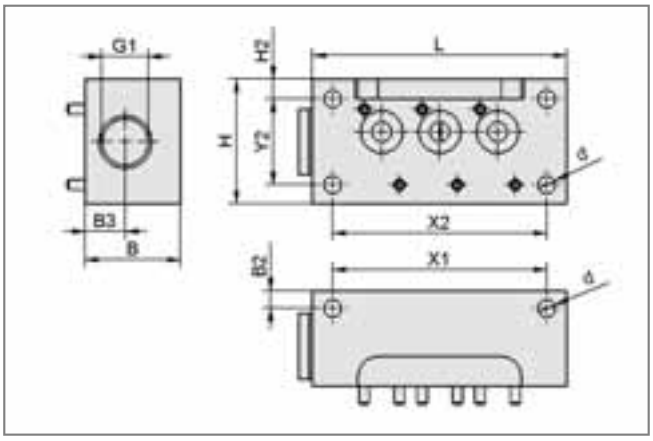
Type	Type*	Part Number
Compressed air connection plate	GP 2 SCP 10..15	10.02.02.00912
Compressed air connection plate	GP 3 SCP 10..15	10.02.02.00913
Compressed air connection plate	GP 4 SCP 10..15	10.02.02.00914
Compressed air connection plate	GP 5 SCP 10..15	10.02.02.00915
Compressed air connection plate	GP 6 SCP 10..15	10.02.02.00916
Ejector blanking plate	EJEK-PL SCP 10..15	10.02.02.00729
Compressed air connection plate	GP 2 SMP(i)15..30/SCP(i)15..30	10.02.02.00917
Compressed air connection plate	GP 3 SMP(i)15..25/SCP(i)15..25	10.02.02.00918
Compressed air connection plate	GP 4 SMP(i)15..20/SCP(i)15..20	10.02.02.00919
Ejector blanking plate	EJEK-PL SMP(i)15..30/SCP(i)20..30	10.02.02.00728

*EJEK-PL = Plate for covering unused connections

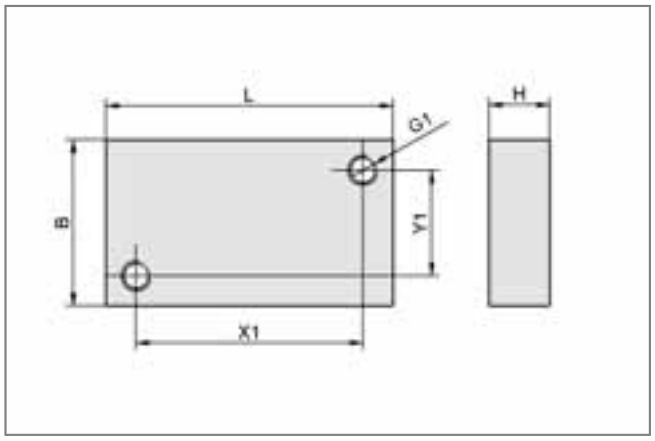
Design Data SCP-Compressed Air Distributors GP



Compressed air manifold GP SCP10..15



Compressed air manifold GP SMP15..30/SCP



Ejector blanking plate EJEK-PL ...

Type	Dimensions in mm												
	B	d	G1	H	H2	H3	L	X1	X2	Y1	Y2	Number of outputs	Weight [g]
GP 2 SCP 10..15	30	4.5	G1/4"-F	34.0	5	-	64	54	54	20	20	2	180
GP 3 SCP 10..15	30	4.5	G1/4"-F	34.0	5	-	85	75	75	20	20	3	223
GP 4 SCP 10..15	30	4.5	G1/4"-F	34.0	5	-	106	96	96	20	20	4	281
GP 5 SCP 10..15	30	4.5	G1/4"-F	34.0	5	-	127	117	117	20	20	5	333
GP 6 SCP 10..15	30	4.5	G1/4"-F	34.0	5	-	148	138	138	20	20	6	388
EJEK-PL SCP 10..15	20	-	-	6.0	7	8	26	20	20	-	34	-	9
GP 2 SMP(i)15..30/SCP(i)15..30	38	7.0	G1/2"-F	49.5	8	-	78	62	62	-	34	2	375
GP 3 SMP(i)15..25/SCP(i)15..25	38	7.0	G1/2"-F	49.5	8	-	101	85	85	-	34	3	481
GP 4 SMP(i)15..20/SCP(i)15..20	38	7.0	G1/2"-F	49.5	8	-	124	108	108	-	34	4	595
EJEK-PL SMP(i)15..30/SCP(i)20..30	22	-	M4-F	8.0	-	-	38	30	-	14	-	-	17

Compact Ejectors

Compact Ejectors SCPM

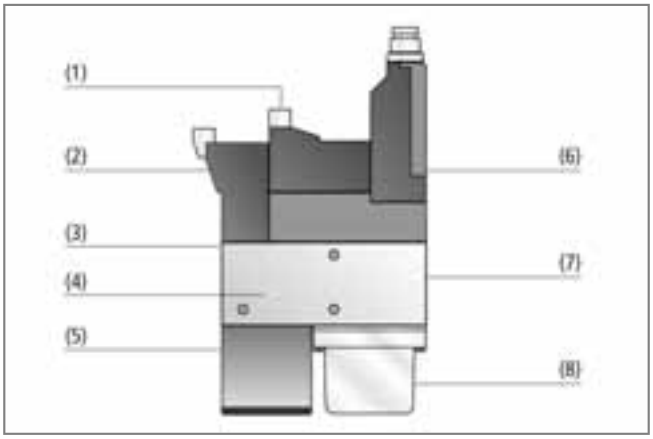
Suction rate from 6 l/min to 23 l/min

Compact ejectors SCPM

Suitability for Industry-Specific Applications

Applications

- Compact ejector for use in applications with very dynamic movements and restricted spaces
- Usage for handling with industrial robots, linear axes and in pick-and-place systems



System design compact ejectors SCPM

Design

- Blow-off valve (1) in idle position, normally closed (NC)
- Suction valve (2) in idle position, can be normally open (NO) or closed (NC)
- Compressed air connection (3)
- Basic body (4) made from anodized aluminum
- Integrated silencer (5) and filter (8)
- Vacuum connection (7)
- Can be connected to a collective connection plate (battery mounting)
- Optionally with integrated vacuum switch (6)

Central vacuum generation by compact ejectors SCPM

Our Highlights...

- Minimum size and very low weight
- Versatile modular system
- Integrated valves and vacuum monitoring
- Wide range of models with different performance figures

Your Benefits...

> Optimum vacuum generation, suitable for very dynamic movements

> Flexible adaptation to customer requirements

> Complete solution for very simple installation

> Optimum air consumption thanks to various models with differing suction capacities

Compact Ejectors

Compact Ejectors SCPM

Suction rate from 6 l/min to 23 l/min

Designation Code Compact Ejectors SCPM

Abbreviated designation	Nozzle size	Idle position suction valve	Blow off valve	System monitoring
Example SCPM 07 NO A:				
SCPM	**07**	**NO**	**A**	
SCPM	05 = 0.5 mm 07 = 0.7 mm 10 = 1.0 mm	NC normally closed NO normally open	A blow off valve	VS-T electronic vacuum switch

Ordering Data Compact Ejectors SCPM

Compact ejector SCPM is delivered as a ready to connect product (without connection cable).

Available spare parts: silencer, filter
Available accessories: connection cable

Compact Ejectors SCPM

SCPM 05...		SCPM 07...		SCPM 10...	
Type	**Part Number**	**Type**	**Part Number**	**Type**	**Part Number**
SCPM 05 NO A	10.02.02.01072	**SCPM 07 NO A**	10.02.02.01068	**SCPM 10 NO A**	10.02.02.01064
SCPM 05 NC A	10.02.02.01071	**SCPM 07 NC A**	10.02.02.01067	**SCPM 10 NC A**	10.02.02.01063
SCPM 05 NO A VS-T	10.02.02.02499	**SCPM 07 NO A VS-T**	10.02.02.02501	**SCPM 10 NO A VS-T**	10.02.02.02503
SCPM 05 NC A VS-T	10.02.02.02498	**SCPM 07 NC A VS-T**	10.02.02.02500	**SCPM 10 NC A VS-T**	10.02.02.02502

Ordering Data Spare Parts and Accessories Compact Ejectors SCPM

Type	Connection cable for solenoid valves* (3 m, PUR)	Connection cable for vacuum switch (5 m, straight, PUR)	Connection cable for vacuum switch (5 m, 90°, PUR)	Replacement silencer	Replacement filter element
SCPM 05 NO/NC A	21.04.06.00086	-	-	10.02.02.01029	10.02.02.01037
SCPM 05 NO/NC A V...	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.01029	10.02.02.01037
SCPM 07 NO/NC A	21.04.06.00086	-	-	10.02.02.01029	10.02.02.01037
SCPM 07 NO/NC A V...	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.01029	10.02.02.01037
SCPM 10 NO/NC A	21.04.06.00086	-	-	10.02.02.01029	10.02.02.01037
SCPM 10 NO/NC A V...	21.04.06.00086	10.06.02.00031	10.06.02.00032	10.02.02.01029	10.02.02.01037

*Order 2 x per ejector.

Compact Ejectors

Compact Ejectors SCPM

Suction rate from 6 l/min to 23 l/min

Technical Data Compact Ejectors SCPM

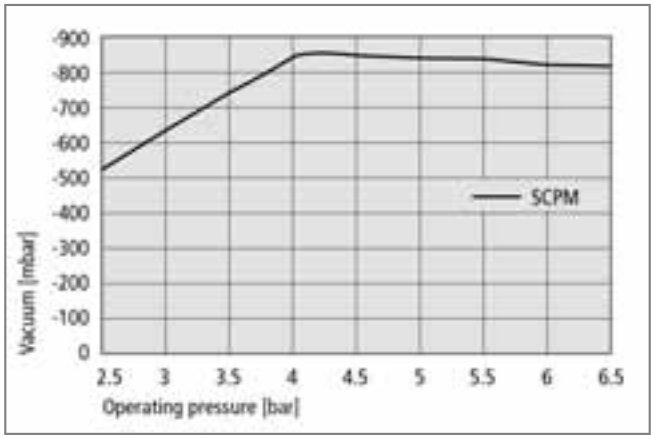
Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]
SCPM 05...	0.5	85	6	0.4	13	0.8	26
SCPM 07...	0.7	85	12	0.7	21	1.3	26
SCPM 10...	1.0	85	23	1.4	46	2.8	26

!The supply voltage for vacuum switches and solenoid valves is 24V DC
*At optimal operating pressure
**For max. length 2 m

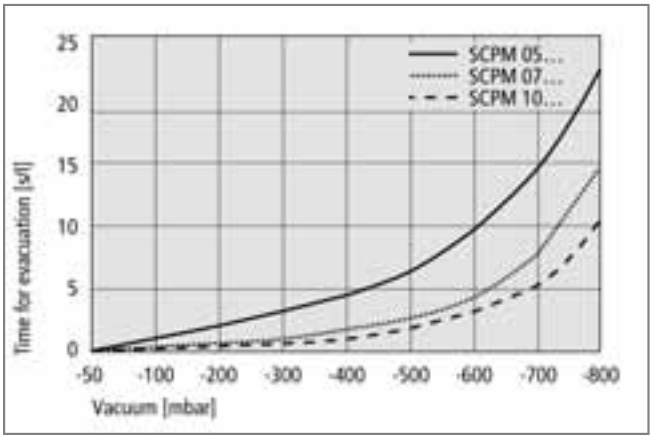
Type	Noise level workp. gripped [dB]	Noise level free [dB]	Operating pressure [bar]	Recomm. int. hose diameter compr. air [mm]**	Recomm. int. hose diameter vacuum [mm]**	Weight [g]	Operating temperature [°C]
SCPM 05...	62	62	4.5	2	2	80	0...45
SCPM 07...	67	70	4.5	2	2	80	0...45
SCPM 10...	73	76	4.5	2	4	80	0...45

!The supply voltage for vacuum switches and solenoid valves is 24V DC
*At optimal operating pressure
**For max. length 2 m

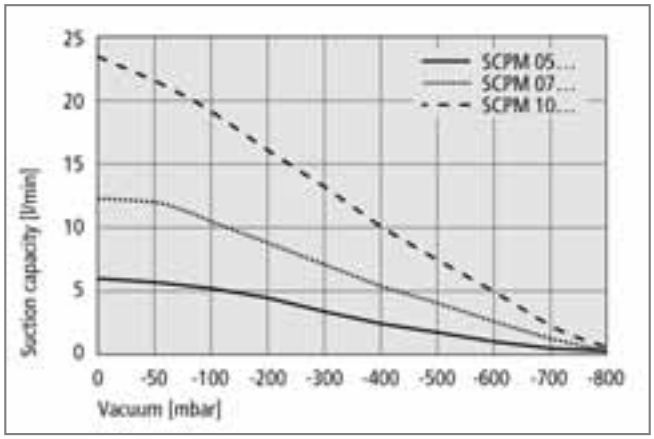
Performance Data Compact Ejectors SCPM



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Compact Ejectors

Compact Ejectors SCPM

Suction rate from 6 l/min to 23 l/min

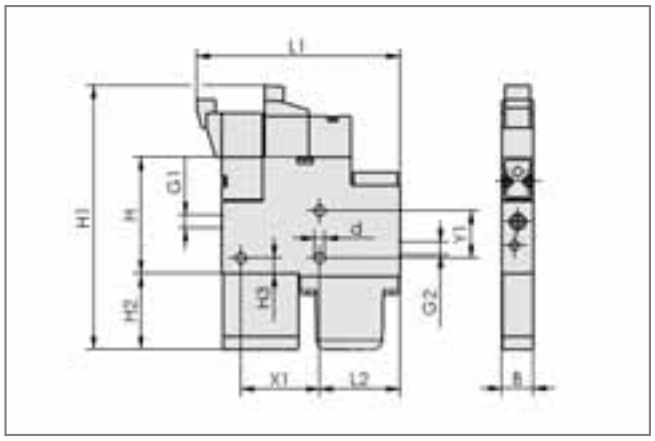
Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPM 05...	6.0	5.9	5.1	4.3	3.4	2.6	1.9	1.4	0.5	0.2
SCPM 07...	12.0	11.7	10.3	8.6	6.8	5.3	3.9	2.8	1.1	0.4
SCPM 10...	23.0	22.2	19.6	16.4	13.0	10.0	7.4	5.4	2.0	0.8

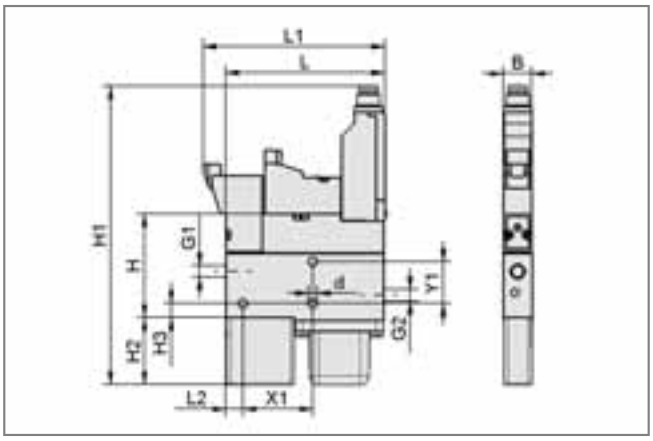
Evacuation Time in s/l for Various Vacuum Ranges

Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SCPM 05...	0.34	0.76	1.80	3.02	4.55	6.57	9.58	14.80	22.40
SCPM 07...	0.17	0.36	0.85	1.45	2.18	3.25	4.67	7.34	14.60
SCPM 10...	0.11	0.24	0.56	0.96	1.49	2.38	3.38	5.32	11.54

Design Data Compact Ejectors SCPM



SCPM 05 to 10 NC/NO A



SCPM...VS-T

Type	Dimensions in mm												
	B	d	G1	G2	H	H1	H2	H3	L	L1	L2	X1	Y1
SCPM 05 NC/NO A	10.2	3.2	M5-F	M5-F	37.5	84.0	24	5	-	64.5	25.5	25	15
SCPM 07 NC/NO A	10.2	3.2	M5-F	M5-F	37.5	84.0	24	5	-	64.5	25.5	25	15
SCPM 10 NC/NO A	10.2	3.2	M5-F	M5-F	37.5	84.0	24	5	-	64.5	25.5	25	15
SCPM 05 NC/NO A V...	10.2	3.2	M5-F	M5-F	37.2	106.8	24	5	56.5	64.5	6.0	25	15
SCPM 07 NC/NO A V...	10.2	3.2	M5-F	M5-F	37.2	106.8	24	5	56.5	64.5	6.0	25	15
SCPM 10 NC/NO A V...	10.2	3.2	M5-F	M5-F	37.2	106.8	24	5	56.5	64.5	6.0	25	15

Ejectors

Ejectors with Active Blow Off SEAC

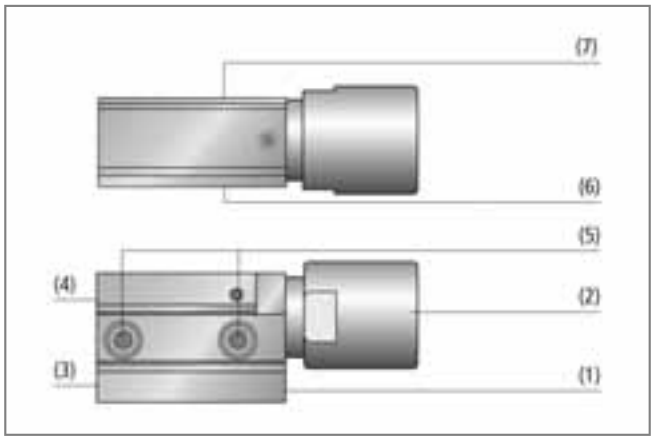
Suction rate 35 l/min

Suitability for Industry-Specific Applications

Ejectors with active blow off SEAC

Applications

- Ejector for many different applications with active blow off to realize shortest cycle times, e.g. in sheet-metal handling, the automotive industry, in packaging machines and robot technology



System design ejectors with active blow off SEAC

Design

- Main body (1) made of plastic; smallest possible dimensions and low weight
- Silencer (2) made of anodized aluminium
- Compressed air connection for blow off (3)
- Compressed air connection for suction (4)
- Two holes (5) for connecting to tooling
- Vacuum connection (6)
- Two M4 mounting screws included in delivery
- Optional with vacuum switch (7) with fixed switching point at 600 mbar, 3 m connection cable and protective cover with pull-relief (SEAC VE-SH)

Decentral vacuum generation by ejector SEAC directly at the suction pad

Our Highlights...	Your Benefits...
• Short gripping and blow off times	> Very short cycle times in automated operations
• Main body made of plastic	> Minimum size and low weight particularly suitable for highly dynamic systems
• Suitable for holder system HTS	> Direct mounting of suction pad and connector
• With silencer	> Reduced noise level
• Optional available with vacuum switch	> Part present signal for optimization of processes

Ejectors

Ejectors with Active Blow Off SEAC

Suction rate 35 l/min

Designation Code Ejectors with Active Blow Off SEAC

Abbreviated designation	Nozzle size	System monitoring
Example SEAC 10 VE-SH:		
SEAC	**10**	**VE-SH**
SEAC	10 = 1.0 mm	VE-SH vacuum switch with cover

Ordering Data Ejectors with Active Blow Off SEAC

Ejector SEAC is delivered as a ready to connect product.

Ejectors with Active Blow Off SEAC

Type	Ejector
SEAC 10	10.02.02.03058
SEAC 10 VE-SH	10.02.02.03219

Technical Data Ejectors with Active Blow Off SEAC

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Max. air consumption blow off [l/min]	Operating pressure [bar]	Weight [g]
SEAC 10	1.0	85	35	2.1	52	60	4...6 bar	62
SEAC 10 VE-SH	1.0	85	35	2.1	52	60	4...6 bar	157

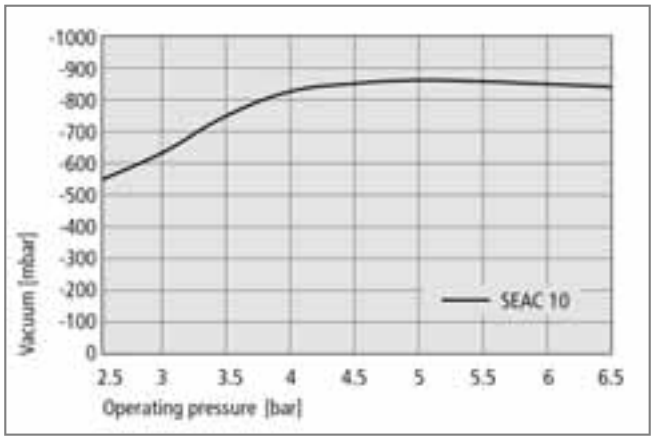
*At optimal operating pressure (4,5 bar)

Ejectors

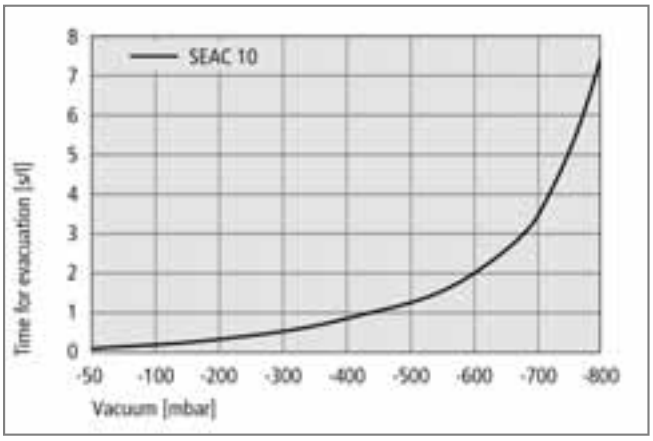
Ejectors with Active Blow Off SEAC

Suction rate 35 l/min

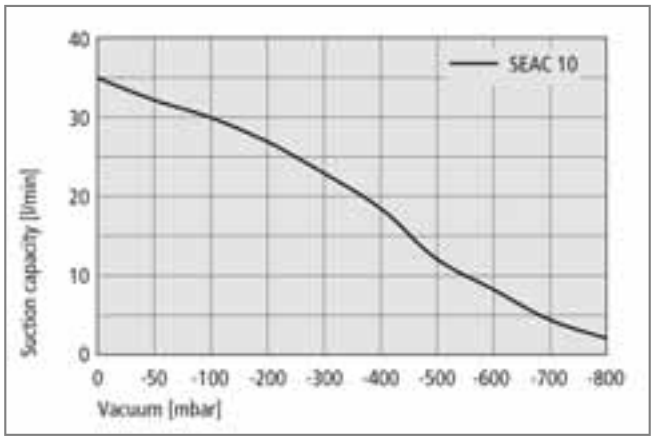
Performance Data Ejectors with Active Blow Off SEAC



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Typ	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10	35.0	32.0	30.0	27.0	23.5	18.0	12.0	8.0	4.5	2.0

Evacuation Time in s/l for Various Vacuum Ranges

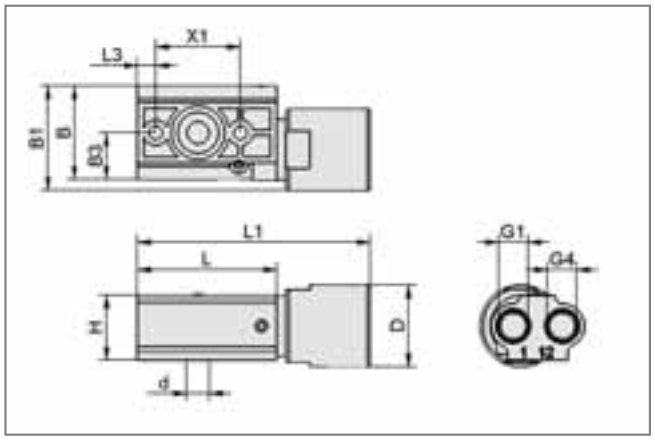
Typ	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10	0.09	0.16	0.34	0.59	0.96	1.42	2.03	3.30	7.36

Ejectors

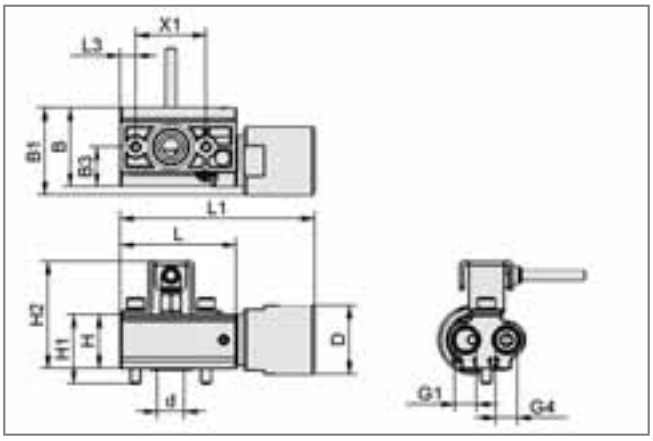
Ejectors with Active Blow Off SEAC

Suction rate 35 l/min

Design Data Ejectors with Active Blow Off SEAC



SEAC 10



SEAC 10 VE-SH

Type	Dimensions in mm												
	B	B1	B3	d	D	G1	G4	H	H1	H2	L	L1	L3	X1
SEAC 10	31	34.6	15.5	7.5	27	G1/8"-F	G1/8"-F	21.5	-	-	46	77	6	28
SEAC 10 VE-SH	31	34.6	15.5	7.5	27	G1/8"-F	G1/8"-F	21.5	27.5	42.5	46	77	6	28

Ejectors

Ejectors with Blow Off System SEAC RP

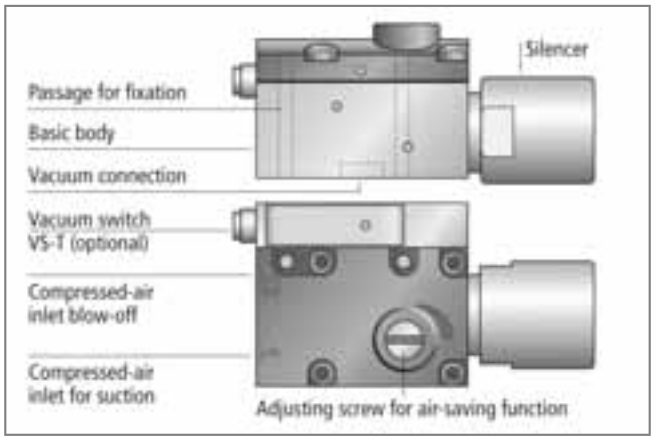
Suction rate 36 l/min

Suitability for Industry-Specific Applications

Ejectors with blow off system SEAC RP

Applications

- Ejector for vacuum generation in many different applications on tooling-systems with short cycle times, such as in sheet-metal working, the automotive industry, in packaging machines and robot technology
- Decentral vacuum generation with integrated pneumatical air saving function



System design ejectors with blow off system SEAC RP

Design

- Body made of anodized aluminium
- Integrated blow off function
- Optional vacuum switch VS-V-AH-T-PNP-S with adjustable switching point (connection cable not included in delivery)
- Two mounting screws included in delivery

Decentralized vacuum generation by means of ejector SEAC RP with blow off system right on suction pad

Our Highlights...

- Integrated pneumatical air saving function
- Short gripping and blow off times
- Minimum size and low weight
- Suitable for modular ejector-holder system
- With silencer
- Optionally available with vacuum switch

Your Benefits...

> Minimum compressed air consumption, minimal requiring of fitting
> Very short cycle times in automated operations
> Particularly suitable for highly dynamic systems
> Direct mounting of suction pad and connector
> Reduced noise level
> System monitoring function for optimisation of cycle times

Ejectors

Ejectors with Blow Off System SEAC RP

Suction rate 36 l/min

Designation Code Ejectors with Blow Off System SEAC RP

Abbreviated designation	Nozzle size	Product addition	Mounting orientation
Example SEAC 10 RP VS-T R:			
SEAC RP	**10**	**VS-T**	**R**
SEAC RP	10 = 1.0 mm	VS-T vacuum switch	L left R right

Ordering Data Ejectors with Blow Off System SEAC RP

Ejector SEAC RP is delivered as a ready to connect product.

Available accessories: connection cable

Ejectors with Blow Off System SEAC RP

Type	Part Number
SEAC 10 RP R	10.02.02.03289
SEAC 10 RP VS-T R	10.02.02.03290
SEAC 10 RP L	10.02.02.03296
SEAC 10 RP VS-T L	10.02.02.03297

Ordering Data Accessories Ejectors with Blow Off System SEAC RP

Type*	Part Number
Connection cable	10.06.02.00031

*For SEAC RP VS-T... order 1x per ejector

Technical Data Ejectors with Blow Off System SEAC RP

Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Air consumpt. during evac. [m³/h]*	Max. air consumption blow off [l/min]	Operating pressure [bar]	Weight [g]
SEAC 10 RP...	1.0	85	36	2.1	65	3.9	92	4...6	180

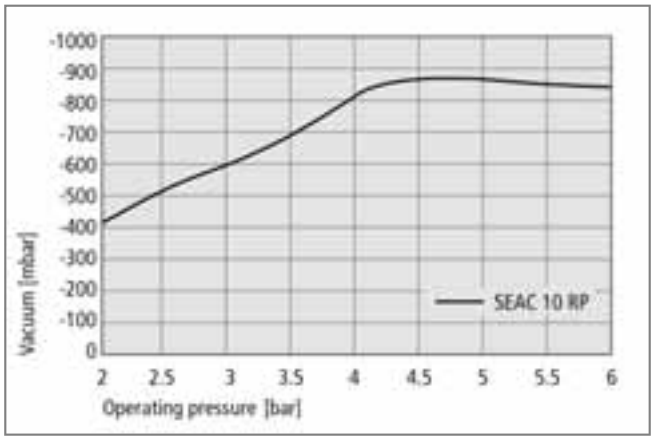
*At optimal operating pressure

Ejectors

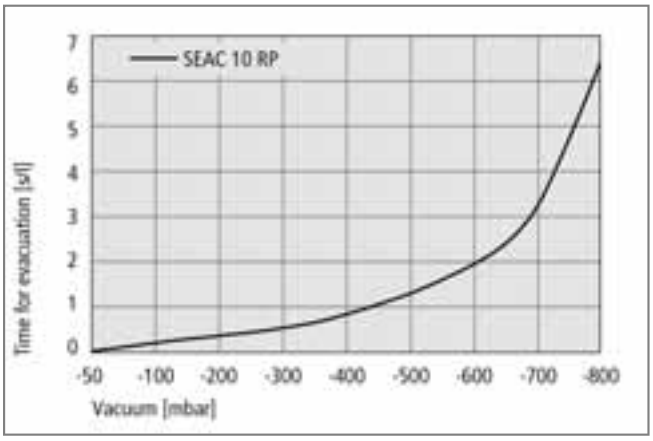
Ejectors with Blow Off System SEAC RP

Suction rate 36 l/min

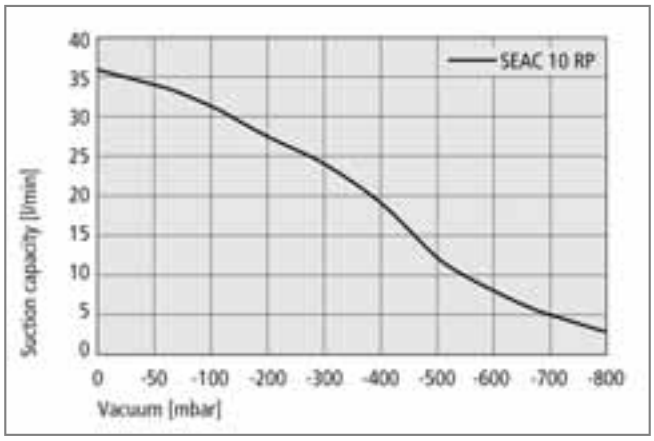
Performance Data Ejectors with Blow Off System SEAC RP



Achievable vacuum at various operating pressures



Evacuation times for various vacuum ranges



Suction capacity at various degrees of evacuation

Suction Capacity in l/min at Various Degrees of Evacuation

Type	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10 RP	36.0	34.0	32.0	27.5	24.0	19.5	12.0	8.0	5.0	3.0

Evacuation Time in s/l for Various Vacuum Ranges

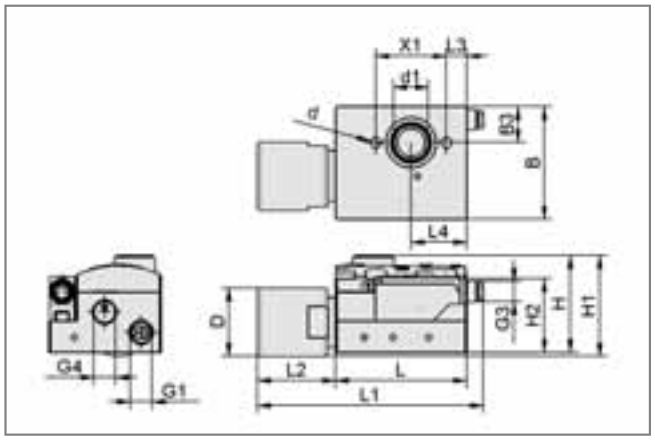
Type	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10 RP	0.12	0.20	0.39	0.62	0.93	1.35	1.98	3.26	6.50

Ejectors

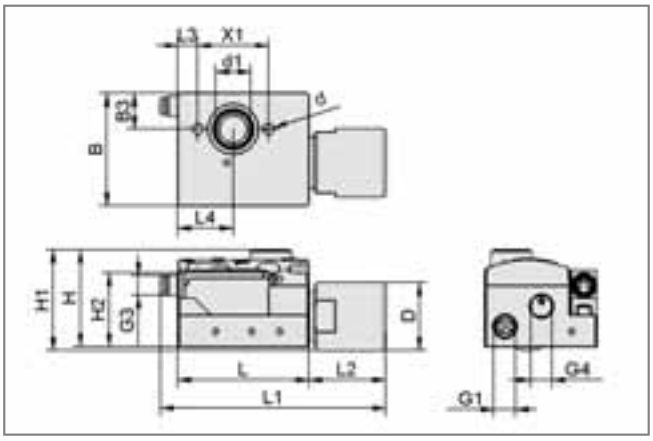
Ejectors with Blow Off System SEAC RP

Suction rate 36 l/min

Design Data SEAC RP



SEAC 10 RP (VS-T) R



SEAC 10 RP (VS-T) L

Type	Dimensions in mm																
	B	B3	d	d1	D	G1	G3	G4	H	H1	H2	L	L1	L2	L3	L4	X1
SEAC 10 RP...	44.5	14.2	4.3	13.8	27	G1/8"-F	-	G1/8"-F	38.3	39.8	29.3	52	-	29.5	8	22	28
SEAC 10 RP VS-T...	44.5	14.2	4.3	13.8	27	G1/8"-F	M8-M	G1/8"-F	38.3	39.8	29.3	52	88.1	29.5	8	22	28

Ejectors

Ejectors with Atmospheric Ventilation SEAC ECO

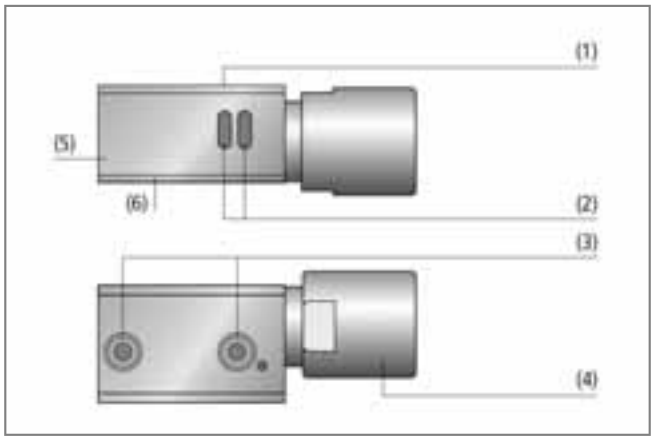
Suction rate 35 l/min

Suitability for Industry-Specific Applications

Ejectors with atmospheric ventilation SEAC ECO

Applications

- Ejector for decentralized vacuum generation for the use in many different applications with short cycle times
- In vacuum systems as economic solution thanks to the automatic release using atmospheric ventilation



System design ejectors with atmospheric ventilation SEAC ECO

Design

- Main body (1) made of anodized aluminum; smallest possible dimensions and low weight
- Openings for atmospheric ventilation (2)
- Two holes for connecting to holder (3)
- Silencer (4) made of anodized aluminum
- Compressed air connection (5)
- Vacuum connection (6)
- Two securing screws and one o-ring included in delivery

Decentral vacuum generation by ejectors SEAC ECO directly at the suction pad

Our Highlights...

- Operation with only one compressed air line
- Atmospheric ventilation
- Connection to holder system HTS with the proven "back-pack concept"
- No filter, no spare parts

Your Benefits...

> Half installation effort and reduced costs for pn. installation material such as valves, hoses etc.

> Reduced energy costs by more than 50%, since no air is consumed during quick and accurate release of parts

> Flexible adaptation to all common toolings; holder does not have to be adjusted again if the ejector is replaced

> Maintenance-free operation, thus reduced costs of maintenance and spare parts

Ejectors

Ejectors with Atmospheric Ventilation SEAC ECO

Suction rate 35 l/min

Designation Code Ejectors with Atmospheric Ventilation SEAC ECO

Abbreviated designation	Nozzle size
Example SEAC 10 ECO:	
SEAC ECO	**10**
SEAC ECO	10 = 1.0 mm

Ordering Data Ejectors with Atmospheric Ventilation SEAC ECO

Ejector SEAC ECO is delivered as a ready to connect product.

Ejectors with Atmospheric Ventilation SEAC ECO

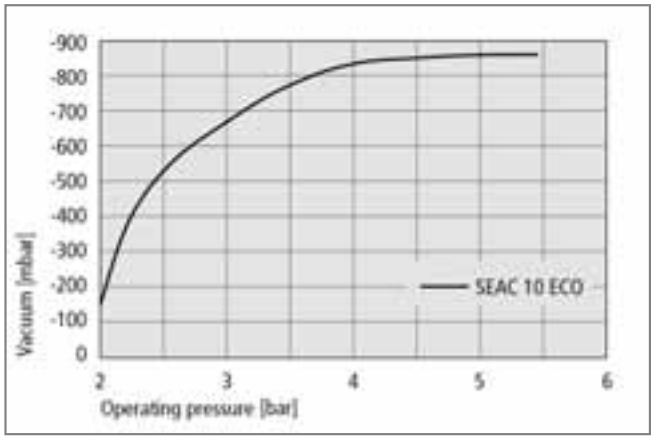
Type	Part Number
SEAC 10 ECO	10.02.02.03702

Technical Data Ejectors with Atmospheric Ventilation SEAC ECO

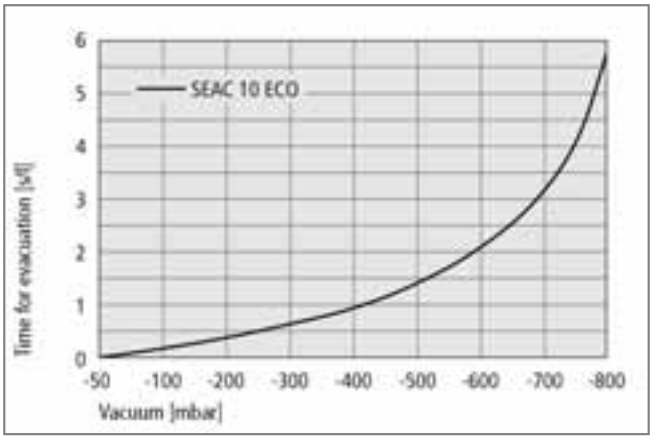
Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumpt. during evac. [l/min]*	Operating pressure [bar]	Weight [g]
SEAC 10 ECO	1.0	85	35	2.1	52	4...6	95

*At optimal operating pressure (4,5 bar)

Performance Data Ejectors with Atmospheric Ventilation SEAC ECO



Achievable vacuum at various operating pressures



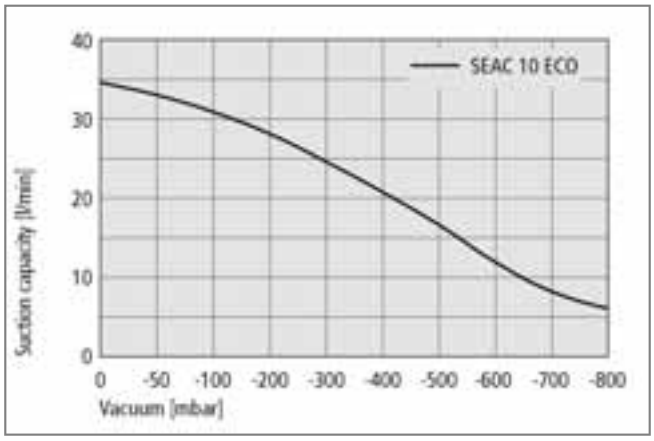
Evacuation times for various vacuum ranges

Ejectors

Ejectors with Atmospheric Ventilation SEAC ECO

Suction rate 35 l/min

Performance Data Ejectors with Atmospheric Ventilation SEAC ECO



Suction capacity at various degrees of evacuation

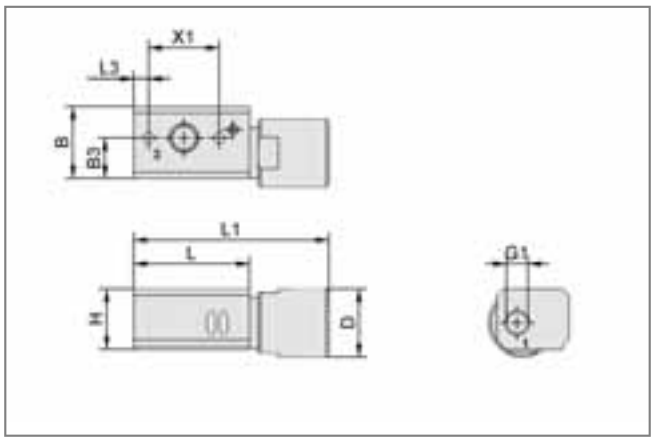
Suction Capacity in l/min at Various Degrees of Evacuation

Typ	Degree of evacuation in mbar									
	0	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10 ECO	35.0	33.0	31.6	28.0	24.3	20.7	16.8	12.0	8.2	6.5

Evacuation Time in s/l for Various Vacuum Ranges

Typ	Degree of evacuation in mbar								
	-50	-100	-200	-300	-400	-500	-600	-700	-800
SEAC 10 ECO	0.10	0.18	0.36	0.61	0.95	1.42	2.10	3.13	5.80

Design Data Ejectors with Atmospheric Ventilation SEAC ECO



SEAC 10 ECO

Type	Dimensions in mm								
	B	B3	D	G1	H	L	L1	L3	X1
SEAC 10 ECO	28.5	16.1	27	G1/8"-F	24	46	77.5	6	28

Ejectors

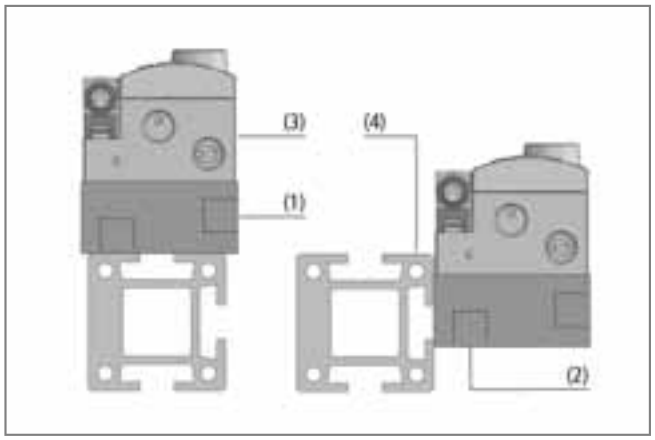
Holders for Ejectors SEAC / SEAC RP / SEAC ECO

Suitability for Industry-Specific Applications

Holders for ejectors SEAC / SEAC RP / SEAC ECO

Applications

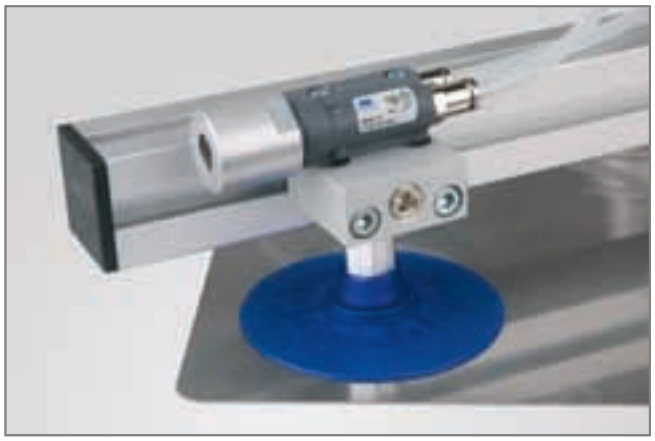
- Holder for mounting of the single ejectors SEAC, SEAC RP and SEAC ECO on tooling systems and profiles with the direct connection for single suction pads
- For use in the handling of sheet metal, in the automobile industry, in packing machines and in industrial robot technology
- Pick-and-place applications with very short cycle times



System design holders for ejectors SEAC / SEAC RP / SEAC ECO

Design

- Aluminum holder with two possible vacuum connections for connecting ejectors (3) and sections (4)
- Mounting option from top (-L): Vacuum connection on the side (1)
- Side mounting option (-S): Vacuum connection underneath (2)



Holders for ejectors SEAC / SEAC RP / SEAC ECO being used for handling sheet metal parts

Our Highlights...

- Single ejector can be directly mounted
- Flexible connection
- Flexible connection to the suction pad (bottom or side)

Your Benefits...

> No additional connection required

> Can be mounted with all beam and profile systems

> Realisation of different applications

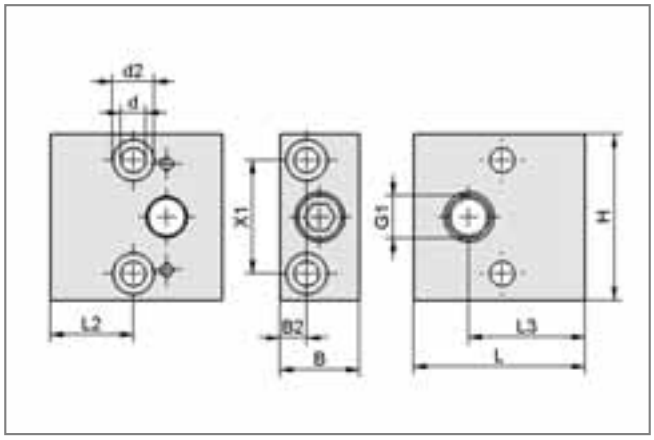
Ejectors

Holders for Ejectors SEAC / SEAC RP / SEAC ECO

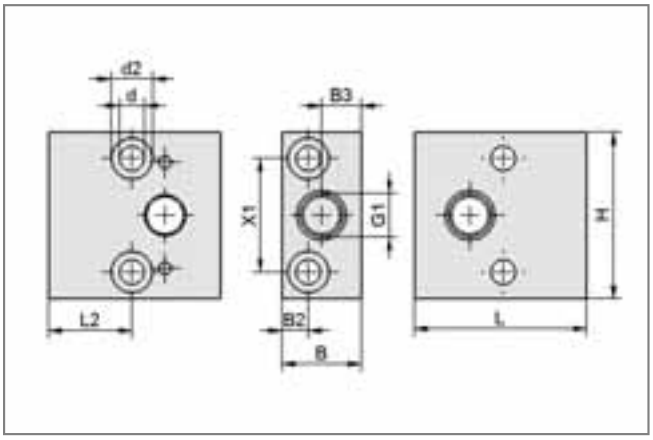
Ordering Data Holders for Ejectors SEAC / SEAC RP / SEAC ECO

Type	Part Number
ADP-EJ 45.5x21x44 SEAC S	10.02.02.03484
ADP-EJ 45.5x21x44 SEAC L	10.02.02.03483

Design Data Holders for Ejectors SEAC / SEAC RP / SEAC ECO



ADP-EJ 45.5x21x44 SEAC S



ADP-EJ 45.5x21x44 SEAC L

Type	Dimensions in mm										
	B	B2	B3	d	d2	G1	H	L	L2	L3	X1
ADP-EJ 45.5x21x44 SEAC S	21	7	-	6.6	11	G1/4"-F	44	46	22	31	30
ADP-EJ 45.5x21x44 SEAC L	21	7	10.5	6.6	11	G1/4"-F	44	46	22	-	30

Ejectors

Feed Ejectors SEC

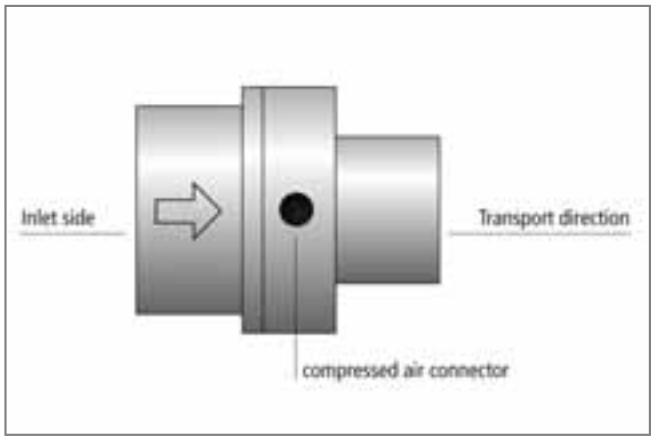
Suction rate from 225 l/min to 8,640 l/min

Suitability for Industry-Specific Applications

Feed ejectors SEC

Applications

- Gripping of very porous materials such as foams, textiles, paper and various recycling materials
- Conveyance of light solids, such as polystyrene, plastic granulates, rice or other filling materials
- Exhaust of non-aggressive vapors and gases



System design feed ejectors SEC

Design

- Body made of anodized aluminum
- Straight vacuum passage
- Compressed air enters at the side, through an annular gap

Vacuum generation by means of feed ejector SEC for transporting granulates

Our Highlights...

- Special ejector with straight vacuum passage for very high volume flow rates at low vacuum values
- Various models with different performance figures

Your Benefits...

> Handling of very porous materials and low-loss transport of bulk goods; high efficiency

> Optimum range of sizes for all applications

Ejectors

Feed Ejectors SEC

Suction rate from 225 l/min to 8,640 l/min

Designation Code Feed Ejectors SEC

Abbreviated designation	Nozzle size
Example SEC-100:	
SEC	**100**
SEC	60 = 6.0 mm 100 = 10.0 mm 200 = 20.0 mm 400 = 40.0 mm 750 = 75.0 mm

Ordering Data Feed Ejectors SEC

Ejector SEC is delivered as a ready to connect product.

Feed Ejectors SEC

Type	Part Number
SEC-60	10.02.01.01079
SEC-100	10.02.01.00078
SEC-200	10.02.01.00079
SEC-400	10.02.01.00080
SEC-750	10.02.01.00081

Technical Data Feed Ejectors SEC

Type	Nozzle-Ø [mm]	Max. vacuum [mbar]	Max. suction rate [l/min]*	Max. suction rate [m³/h]*	Air consumpt. during evac [l/min]*	Air consumpt. during evac. [m³/h]*	Operating pressure [bar]	Weight [kg]	Operating temperature [°C]
SEC-60	6	-245	215	12.9	110	6.6	2...5	0.040	-20...80
SEC-100	10	-185	610	36.6	135	8.1	2...6	0.070	-20...80
SEC-200	20	-85	1375	82.5	290	17.4	2...6	0.180	-20...80
SEC-400	40	-35	2250	135.0	445	26.7	2...6	0.525	-20...80
SEC-750	75	-5	8640	518.4	770	46.2	2...6	2.350	-20...80

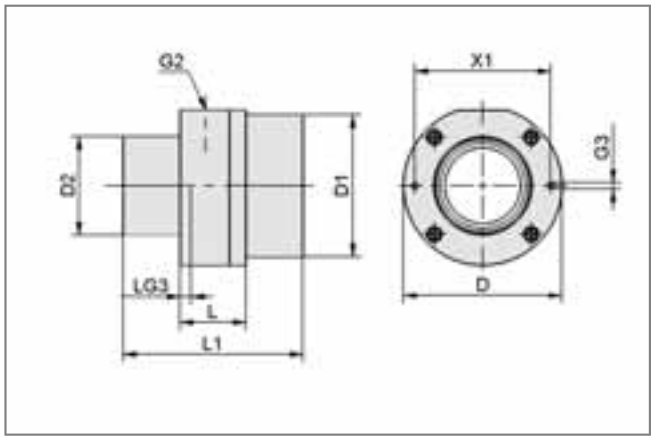
*At optimal operating pressure of approx. 4.5 bar

Ejectors

Feed Ejectors SEC

Suction rate from 225 l/min to 8,640 l/min

Design Data Feed Ejectors SEC



SEC 60 to 750

Type	Dimensions in mm								
	D	D1	D2	G2	G3	L	L1	LG3	X1
SEC-60	32	12.5	12.5	M5-F	M3-F	14	44.0	5	25
SEC-100	37	19.0	19.0	G1/8"-F	M4-F	21	70.0	8	29
SEC-200	50	38.0	32.0	G1/4"-F	M4-F	30	90.0	12	42
SEC-400	84	75.0	52.0	G3/8"-F	M4-F	35	95.0	14	72
SEC-750	140	125.0	100.0	G1/2"-F	M6-F	65	180.0	6	126

Vacuum Units

Vacuum Units VE / VER

Suction rate 69 l/min

Suitability for Industry-Specific Applications

Vacuum units VE / VER

Applications

- Vacuum unit for use as pneumatically driven vacuum generator with internal regulation
- Vacuum is generated only when a consumer is connected
- Suitable for all vacuum clamping and handling tasks

Design

- Brass nozzle system
- Steel housing
- Safety non-return valve
- Manometer
- Type VER 15 with internal regulation with the aid of an adjustable pneumatic vacuum switch
- Coating RAL 7035

Our Highlights...

- Complete vacuum generation system with ejector, monitoring and regulation functions
- Internal automatic air-saving function (optional)

Your Benefits...

> The "stand-alone solution" for universal use in all clamping and handling applications

> Economical use in continuous operation: compressed air is switched off when not needed, vacuum is regulated automatically

Designation Code Vacuum Units VE / VER

Abbreviated designation	System monitoring	Nozzle size
Example VER 15:		
VE	**R**	**15**
VE	R with air saving function	15 = 1.5 mm

Ordering Data Vacuum Units VE / VER

Vacuum unit VE / VER is delivered as a ready to connect product.

Vacuum Units VE / VER

Type	Part Number
VE 15	10.02.03.00325
VER 15	10.02.03.00335

Vacuum Units

Vacuum Units VE / VER

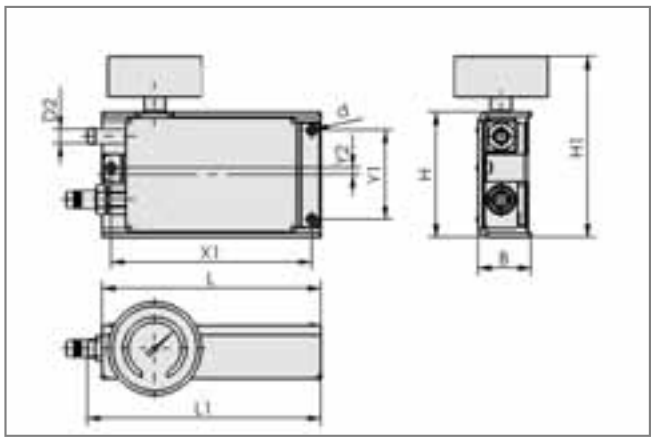
Suction rate 69 l/min

Technical Data Vacuum Units VE / VER

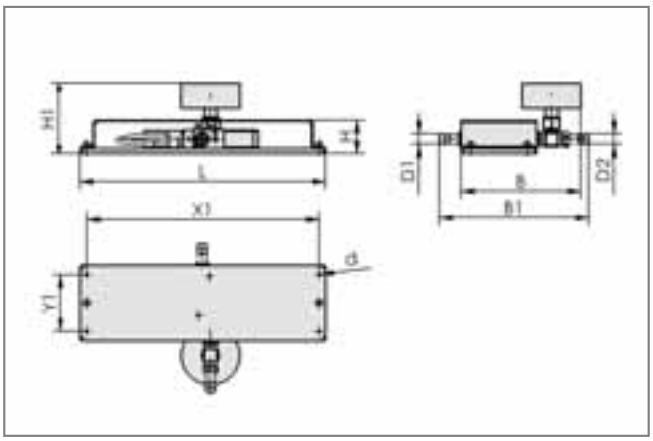
Type	Nozzle-Ø [mm]	Degree of evacuation [%]	Max. suction rate [l/min]	Max. suction rate [m³/h]	Air consumption [l/min]*	Air consumption [m³/h]*	Operating pressure [bar]	Weight [kg]
VE 15	1.5	80	69	4.1	102	6.1	5	1.4
VER 15	1.5	80	69	4.1	102	6.1	5	3.3

*At optimal operating pressure

Design Data Vacuum Units VE / VER



VE 15



VER 15

Type	Dimensions in mm											
	B	B1	d	D1	D2	H	H1	L	L1	X1	Y1	Y2
VE 15	35.0	-	4.2	-	9.5	83	120	145	154.5	133	59	4.5
VER 15	126.5	157.5	3.3	9.5	9.5	34	75	260	-	246	60	-

Vacuum Pumps

Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

Suitability for Industry-Specific Applications

Dry-running vacuum pumps EVE-TR

Applications

- Vacuum pump for making the vacuum available in universal use in a wide range of different applications in the sector of manual and automatic handling
- Handling of airtight workpieces
- Rapid evacuation of vacuum systems
- Mobile use for picking up and clamping workpieces (EVE-TR-T)

Design

- Dry-running vacuum pump, with or without additional filter
- Available in versions for single-phase AC, three-phase AC or DC power supplies
- Pump available as a multi-cell compressor with very little vibration and constant output or as a compact diaphragm pump
- Compact design with integrated cooling fan and permanently lubricated bearings
- Mounting holes with integrated damping elements
- Should preferably be mounted with the motor shaft horizontal
- Coating RAL 7035
- Version EVE-TR-T with carrying handle and control cable

Our Highlights...

- Dry-running (oil-free) vacuum pump
- Multi-cell compression principle of the rotary vane pumps
- Permanently lubricated bearings and powerful cooling fan
- Wide range of models with various outputs
- Dry-running diaphragm pump with excellent efficiency

Your Benefits...

> Robust and requiring little maintenance

> Vibration-free operation and continuous output with little pulsation

> Excellent heat dissipation

> Suction capacity adaptable to meet customer requirements

> Low current consumption, economical continuous operation

Designation Code Dry-Running Vacuum Pumps EVE-TR

Abbreviated designation	Pump type	Suction capacity in m³/h	Supply voltage	Product addition
Example EVE-TR 40 AC3 F:				
EVE	**TR**	**10**	**AC3**	**F**
EVE	TR dry-running TR-M diaphragm pump TR-T transportable	2.3 to 250	AC single-phase AC3 three-phase DC direct current	F additional filter

Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

Ordering Data Dry-Running Vacuum Pumps EVE-TR

Vacuum pump EVE-TR is delivered as a ready to connect product.

Available spare parts: filter insert, set of parts subject to wear
Available accessories: motor protection switch, vacuum regulation valve, vacuum filter

Dry-Running Vacuum Pumps EVE-TR

Type	Vacuum pump	Vacuum pump with additional filter
EVE-TR-M 2.3 DC 12	10.03.01.00163	-
EVE-TR-M 2.3 DC 24	10.03.01.00164	-
EVE-TR 4 AC	10.03.01.00120	10.03.01.00114
EVE-TR 4 AC3	10.03.01.00111	10.03.01.00113
EVE-TR-T 4 AC	-	10.03.01.00197
EVE-TR 8 AC	10.03.01.00121	10.03.01.00117
EVE-TR 8 AC3	10.03.01.00112	10.03.01.00116
EVE-TR 8 DC	10.03.01.00048	10.03.01.00044
EVE-TR 10 AC	10.03.01.00138	10.03.01.00144
EVE-TR 10 AC3	10.03.01.00137	10.03.01.00143
EVE-TR 16 AC	10.03.01.00140	10.03.01.00146
EVE-TR 16 AC3	10.03.01.00139	10.03.01.00145
EVE-TR 25 AC3	10.03.01.00141	-
EVE-TR 40 AC3	10.03.01.00142	10.03.01.00148
EVE-TR 80 AC3	10.03.01.00055	10.03.01.00008
EVE-TR 100 AC3	10.03.01.00056	10.03.01.00061
EVE-TR 140 AC3	10.03.01.00057	10.03.01.00062
EVE-TR 250 AC3	10.03.01.00171	-

Ordering Data Spare Parts Dry-Running Vacuum Pumps EVE-TR

Type	Set of parts subject to wear	Filter insert for additional filter
EVE-TR-M 2.3	-	-
EVE-TR 4	10.03.01.00108	10.07.01.00013
EVE-TR-T 4	10.03.01.00108	10.07.01.00013
EVE-TR 8	10.03.01.00109	10.07.01.00014
EVE-TR 10	10.03.01.00132	10.07.01.00017
EVE-TR 16	10.03.01.00133	10.07.01.00017
EVE-TR 25	10.03.01.00134	10.07.01.00017
EVE-TR 40	10.03.01.00135	10.07.01.00018
EVE-TR 80	22.09.01.00031	10.07.01.00018
EVE-TR 100	22.09.01.00033	10.07.01.00018
EVE-TR 140	22.09.01.00035	10.07.01.00018
EVE-TR 250	10.03.01.00187	10.03.01.00178

Ordering Data Accessories Dry-Running Vacuum Pumps EVE-TR

Type	Motor protection switch*	Vacuum regulation valve
EVE-TR-M 2.3 DC 12	-	-
EVE-TR-M 2.3 DC 24	-	-
EVE-TR 4 AC	-	10.03.01.00107
EVE-TR 4 AC3	-	10.03.01.00107
EVE-TR-T 4 AC	-	10.03.01.00107
EVE-TR 8 AC	-	10.03.01.00107
EVE-TR 8 AC3	-	10.03.01.00107
EVE-TR 8 DC	-	-
EVE-TR 10 AC	10.04.04.00120	10.03.01.00136
EVE-TR 10 AC3	10.04.04.00118	10.03.01.00136
EVE-TR 16 AC	10.04.04.00121	10.03.01.00136
EVE-TR 16 AC3	10.04.04.00119	10.03.01.00136
EVE-TR 25 AC3	10.04.04.00119	10.03.01.00136
EVE-TR 40 AC3	10.04.04.00121	10.03.01.00136
EVE-TR 80 AC3	10.04.04.00122	10.03.01.00153
EVE-TR 100 AC3	10.04.04.00122	10.03.01.00153
EVE-TR 140 AC3	10.04.04.00124	10.03.01.00153
EVE-TR 250 AC3	10.04.04.00124	-

*For voltage 400 V / 50 Hz

Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

Technical Data Dry-Running Vacuum Pumps EVE-TR

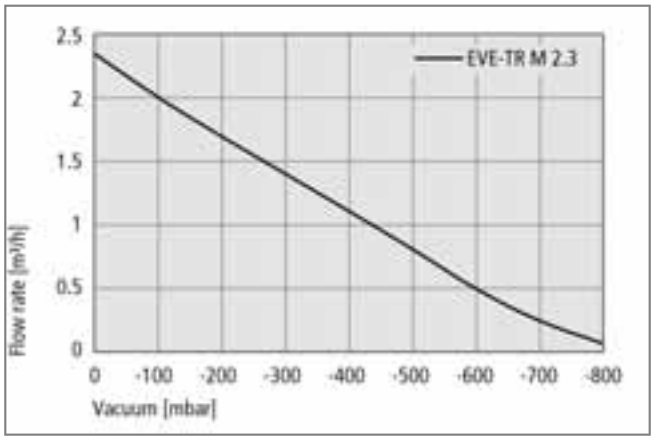
Type	Max. vacuum [mbar]	Suction rate at DC [m³/h]	Suction rate at 50 Hz [m³/h]	Suction rate at 60 Hz [m³/h]	Voltage (DC)	Voltage (50 Hz)	Voltage (60 Hz)
EVE-TR-M 2.3 DC 12	-780	2.3	-	-	12V - DC	-	-
EVE-TR-M 2.3 DC 24	-780	2.3	-	-	24V - DC	-	-
EVE-TR 4 AC	-850	-	4.1	4.7	-	230V±10%	230V±10%
EVE-TR 4 AC3	-850	-	4.1	4.7	-	175-260V or 300-450V	200-300V or 350-520V
EVE-TR-T 4 AC	-850	-	4.0	4.7	230V - AC	-	-
EVE-TR 8 AC	-850	-	7.6	8.7	-	230V±10%	230V±10%
EVE-TR 8 AC3	-850	-	7.6	8.7	-	175-260V or 300-450V	200-300V or 350-520V
EVE-TR 8 DC	-830	8.0	-	-	24V - DC	-	-
EVE-TR 10 AC	-850	-	10.0	12.0	-	230V±10%	230V±10%
EVE-TR 10 AC3	-850	-	10.0	12.0	-	175-260V or 300-450V	200-300V or 350-520V
EVE-TR 16 AC	-850	-	16.0	19.0	-	230V±10%	230V±10%
EVE-TR 16 AC3	-850	-	16.0	19.0	-	175-260V or 300-450V	200-300V or 350-520V
EVE-TR 25 AC3	-850	-	25.0	30.0	-	190-255V/330-440V AC3	190-290V/330-500V AC3
EVE-TR 40 AC3	-850	-	40.0	48.0	-	190-255V or 330-440V	190-290V or 330-500V
EVE-TR 80 AC3	-920	-	67.0	80.0	-	190-255V or 330-440V	190-290V or 330-500V
EVE-TR 100 AC3	-920	-	98.0	112.0	-	190-255V or 330-440V	190-290V or 330-500V
EVE-TR 140 AC3	-920	-	129.0	154.0	-	190-255V or 330-440V	190-290V or 330-500V
EVE-TR 250 AC3	-800	-	244.0	286.0	-	340-430V or 590-745V	340-500V or 590-865V

*Specifications for 230 V / 230 V or 400 V

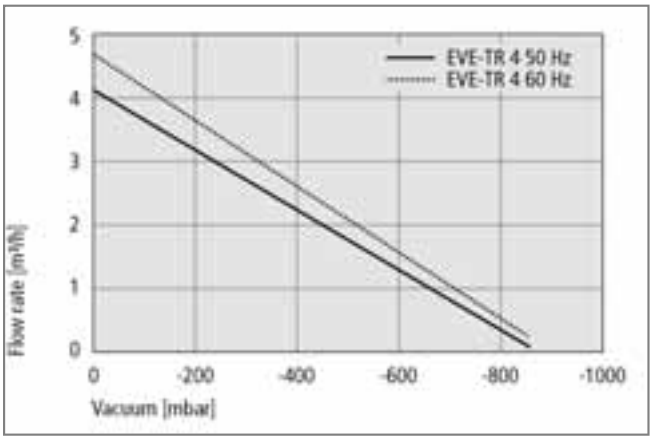
Type	Current range (50 Hz)*	Current range (60 Hz)*	Rated power [kW] at 50 Hz	Rated power [kW] at 60 Hz	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]
EVE-TR-M 2.3 DC 12	-	-	-	-	IP 54	1.3	65
EVE-TR-M 2.3 DC 24	-	-	-	-	IP 54	1.3	65
EVE-TR 4 AC	1.65A	1.65A	0.18	0.22	IP 54	7.0	59
EVE-TR 4 AC3	1,08A or 0,62A	1,08A or 0,62A	0.18	0.22	IP 54	7.0	59
EVE-TR-T 4 AC	1.65A	-	0.18	0.22	IP 54	8.5	59
EVE-TR 8 AC	3.9A	3.4A	0.35	0.42	IP 54	11.5	58
EVE-TR 8 AC3	2,35A or 1,36A	2,4A or 1,4A	0.35	0.42	IP 54	11.5	58
EVE-TR 8 DC	-	-	-	-	IP 54	7.5	70
EVE-TR 10 AC	3.0A	3.4A	0.37	0.44	IP 54	16.0	60
EVE-TR 10 AC3	2,3A or 1,33A	2,35A or 1,36A	0.37	0.45	IP 54	16.0	60
EVE-TR 16 AC	4.6A	5.2A	0.55	0.66	IP 54	22.4	61
EVE-TR 16 AC3	3,8A or 2,2A	3,9A or 2,25A	0.55	0.70	IP 54	22.4	61
EVE-TR 25 AC3	3,5-4,2A / 2,0-2,4A	4,0-3,6A / 2,3-2,1A	0.75	0.90	IP 55	26.0	62
EVE-TR 40 AC3	6,9A or 4,0A	6,9A or 4,0A	1.25	1.50	IP 55	38.5	67
EVE-TR 80 AC3	10,6-11,4A or 6,1-6,6A	12,6-10,6A or 7,3-6,1A	2.40	3.00	IP 54	69.0	72
EVE-TR 100 AC3	13,0-13,6A or 7,5-7,9A	15,5-12,4A or 8,9-7,2A	3.00	3.50	IP 54	101.0	75
EVE-TR 140 AC3	17,2-21,9A or 9,9-12,7A	20,5-19,0A or 11,8-11,0A	4.00	4.80	IP 54	111.0	76
EVE-TR 250 AC3	15,0-16,0A or 8,7-9,3A	16,8-15,3A or 9,7-8,8A	5.50	6.40	IP 55	250.0	77

*Specifications for 230 V / 230 V or 400 V

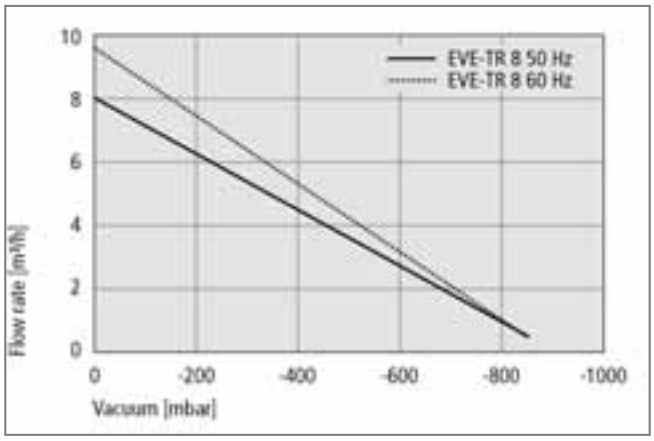
Performance Data Dry-Running Vacuum Pumps EVE-TR



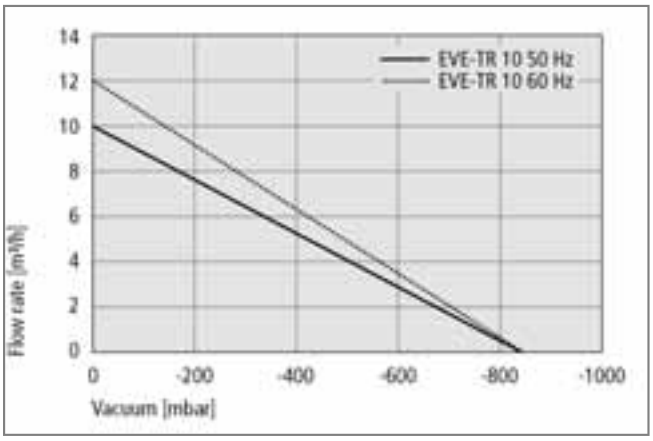
Suction capacity at various degrees of evacuation



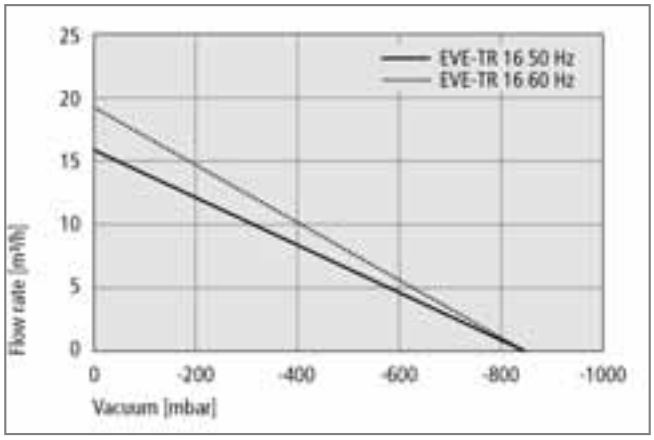
Suction capacity at various degrees of evacuation



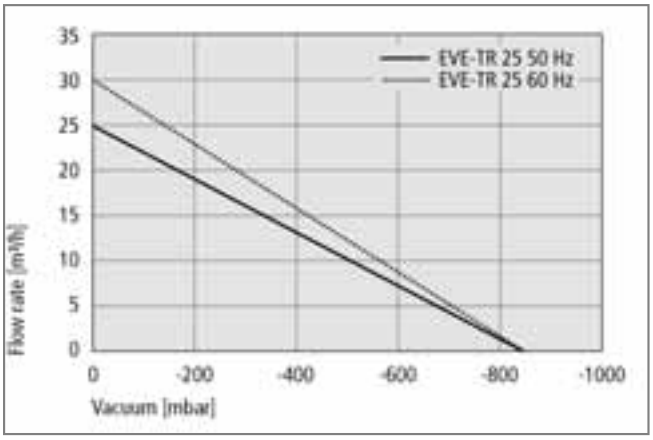
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



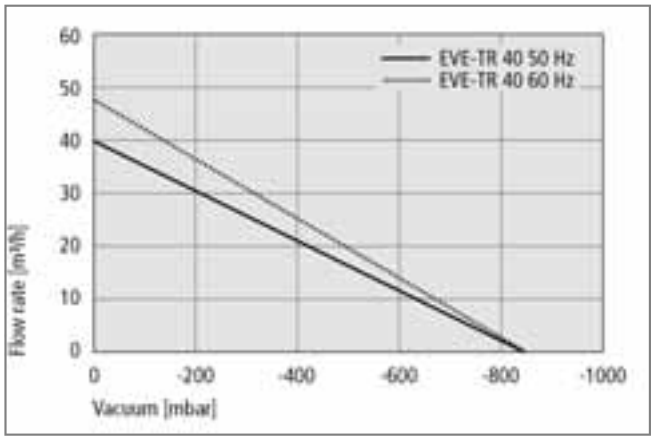
Suction capacity at various degrees of evacuation

Vacuum Pumps

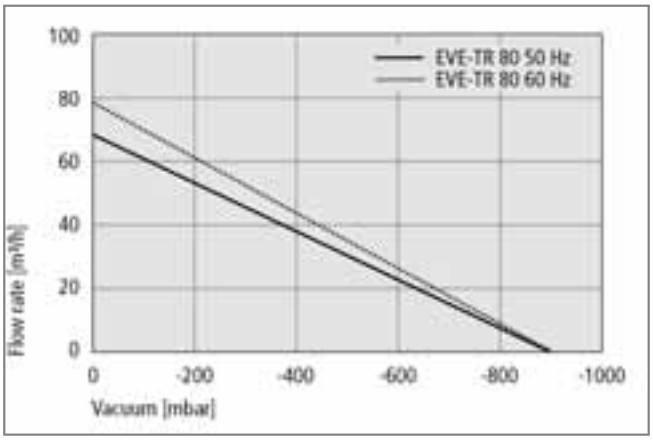
Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h

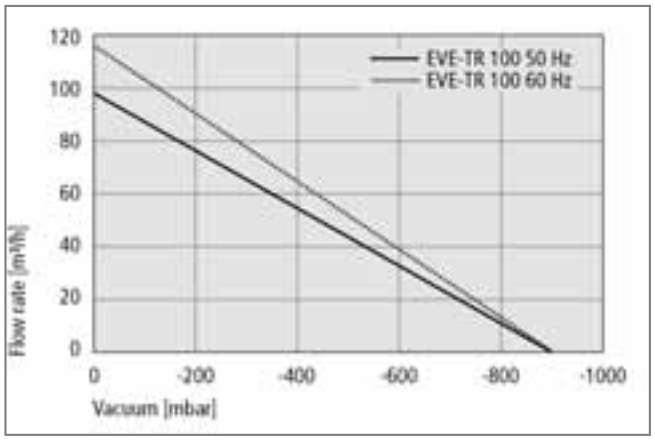
Performance Data Dry-Running Vacuum Pumps EVE-TR



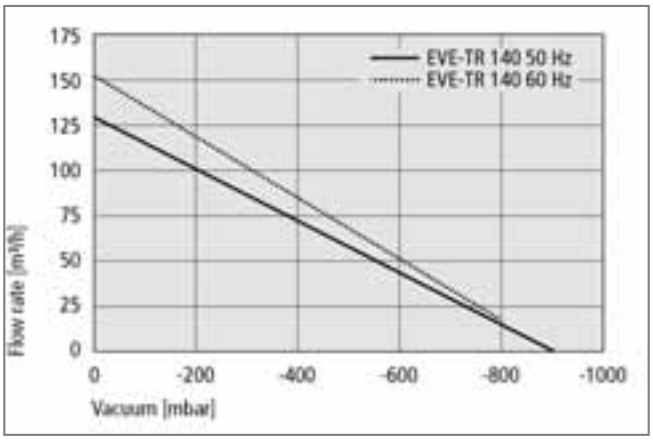
Suction capacity at various degrees of evacuation



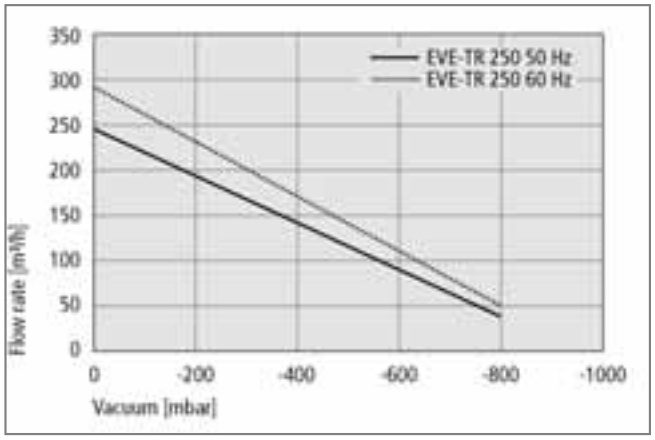
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation

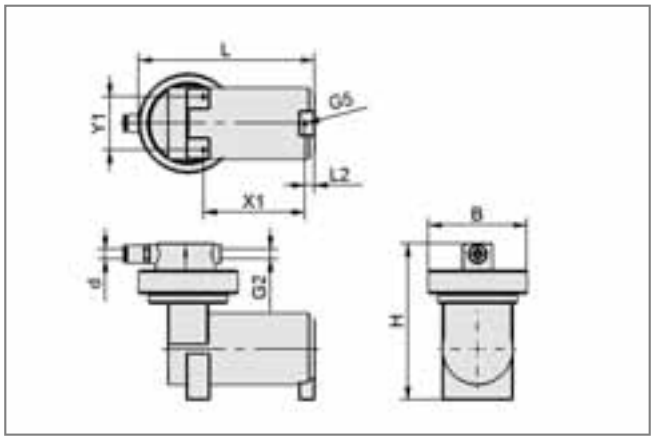


Suction capacity at various degrees of evacuation

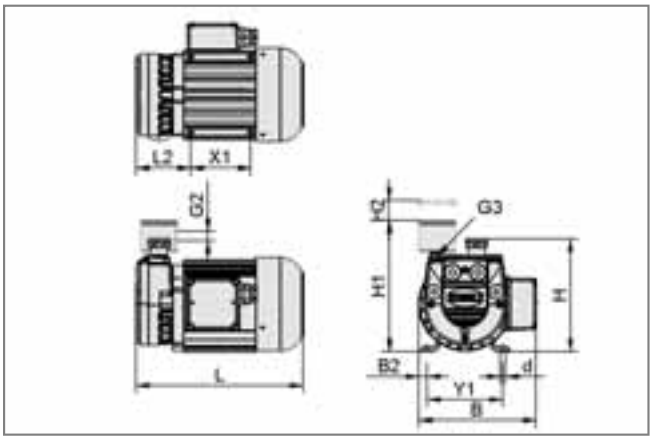


Suction capacity at various degrees of evacuation

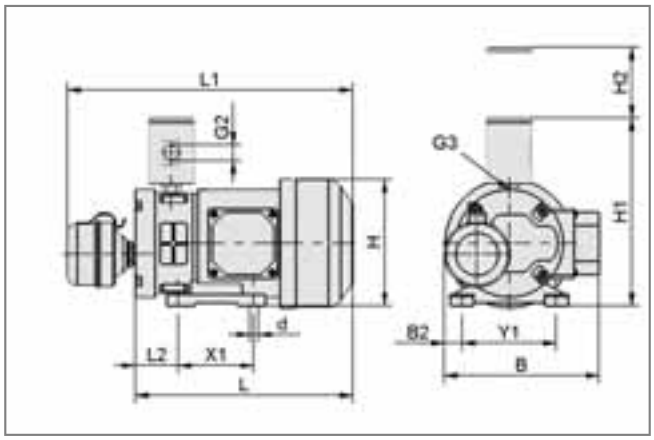
Design Data Dry-Running Vacuum Pumps EVE-TR



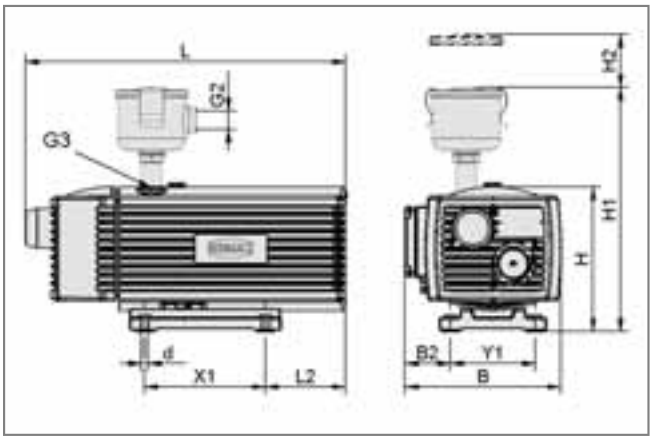
EVE-TR-M 2.3



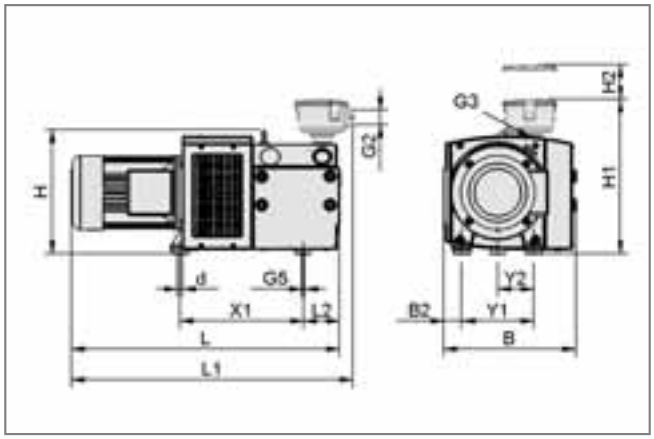
EVE-TR 4 to 8 ... F



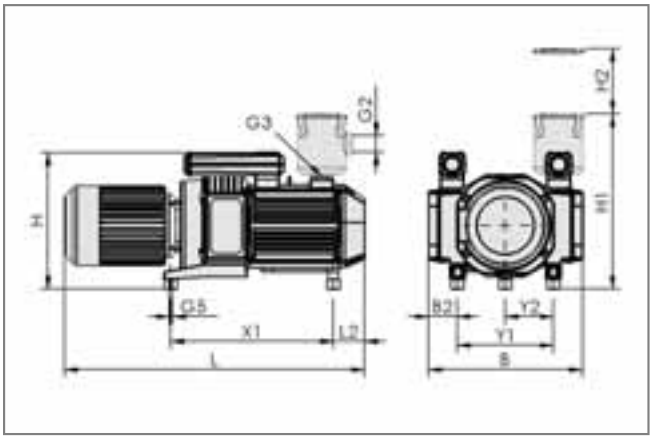
EVE-TR 8 DC (F)



EVE-TR 10 to 40 ... F



EVE-TR 80 to 140 ... F

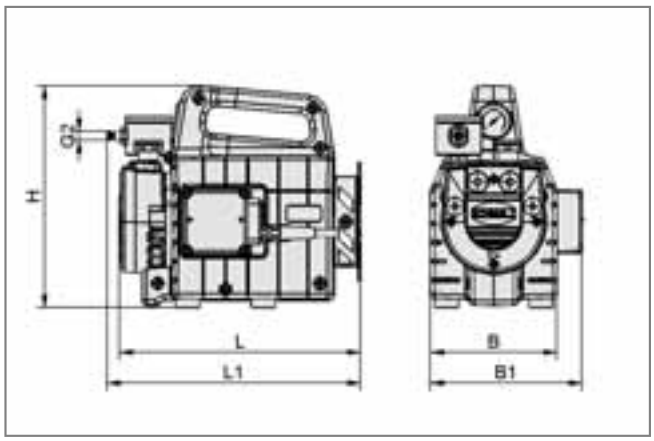


EVE-TR 250

Vacuum Pumps

Dry-Running Vacuum Pumps EVE-TR

Suction rate from 2.3 m³/h to 244 m³/h



EVE-TR-T

Design Data Dry-Running Vacuum Pumps EVE-TR

Type	Dimensions in mm															
	B	B1	B2	d	G2	G3	G5	H	H1	H2	L	L1	L2	X1	Y1	Y2
EVE-TR-M 2.3 ...	85	-	-	8	G1/8"-F	-	M4-F	135	-	-	151	-	8	87	46	-
EVE-TR 4 ...	155	-	-	7	-	G1/4-F	-	148	-	-	222	-	-	80	100	-
EVE-TR 4 ... F	155	-	12	7	G1/4-F	G1/4-F	-	148	172	41	222	-	72	80	100	-
EVE-TR-T 4 ... F	134	160.5	-	-	G1/4"-M	-	-	235	-	-	255	269	-	-	-	-
EVE-TR 8 ...	155	-	-	7	-	G3/8-F	-	154	-	-	251	-	-	80	100	-
EVE-TR 8 ... F	155	-	12	7	G3/8-F	G3/8-F	-	154	201	62	251	-	80	80	100	-
EVE-TR 8 DC	163	-	19	9	-	G3/8-F	-	134	-	-	230	302	46	80	100	-
EVE-TR 8 DC F	163	-	19	9	G3/8-F	G3/8-F	-	134	197	55	230	302	46	80	100	-
EVE-TR 10 ...	206	-	60	7	-	G1/2-F	-	195	-	-	429	-	106	160	112	-
EVE-TR 10 ... F	206	-	60	7	G3/4-F	G1/2-F	-	198	325	70	429	-	106	160	112	-
EVE-TR 16 ...	231	-	66	7	-	G1/2-F	-	211	-	-	452	-	73	202	125	-
EVE-TR 16 ... F	231	-	66	7	G3/4-F	G1/2-F	-	214	345	70	452	-	73	202	125	-
EVE-TR 25 ...	260	-	40	7	-	G3/4-F	-	290	-	-	505	-	96	220	208	-
EVE-TR 25 ... F	260	-	40	7	G3/4"-F	G3/4"-F	-	293	380	70	505	-	96	220	208	-
EVE-TR 40 ...	280	-	51	7	-	G3/4"-F	-	290	-	-	572	-	131	220	208	-
EVE-TR 40 ... F	280	-	51	7	G1-1/4"-F	G3/4"-F	-	293	425	70	572	-	131	220	208	-
EVE-TR 80 ...	353	-	48	12	-	G1-F	M8-F	328	-	-	709	-	96	326	190	95
EVE-TR 80 ... F	353	-	48	12	G1-1/4-F	G1-F	M8-F	328	420	75	709	745	96	326	190	95
EVE-TR 100 ...	470	-	110	12	-	G1-1/2-F	M8-F	336	-	-	835	-	140	398	245	123
EVE-TR 100 ... F	470	-	110	12	G1-1/4-F	G1-1/2-F	M8-F	336	466	75	835	890	140	398	245	123
EVE-TR 140 ...	470	-	110	12	-	G1-1/2-F	M8-F	336	-	-	873	-	140	398	245	123
EVE-TR 140 ... F	470	-	110	12	G1-1/4-F	G1-1/2-F	M8-F	336	437	75	873	851	140	398	245	123
EVE-TR 250 ...	644	-	126	-	-	G2-1/2"-F	M10-F	527	-	-	1192	-	124	645	360	180

Vacuum Pumps

Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

Suitability for Industry-Specific Applications

Oil-lubricated vacuum pumps EVE-OG

Applications

- Vacuum pump for universal use in a wide range of different applications in the sector of manual and automatic handling
- Handling of air-tight and porous workpieces
- For use as a central vacuum generator with high maximum vacuum

Design

- Oil-lubricated vacuum pump with integrated oil separator, three-phase power supply, optionally available with additional filter and motor-protection circuit
- Multi-vane rotary vacuum pump with constant, low-pulsation output; very little vibration
- Compact design with integrated cooling fan and permanently lubricated bearings
- Coating RAL 7035

Our Highlights...

- Oil-lubricated vacuum pump
- Multi-vane rotary pump
- Permanently lubricated bearings and powerful cooling fan
- Wide range of models with various outputs

Your Benefits...

> Robust and requiring very little maintenance for almost constant vacuum generation at high vacuum values

> Vibration-free operation and continuous, low-pulsation output

> Excellent heat dissipation

> Input volume flow rate can be adapted to meet customer requirements

Designation Code Oil-Lubricated Vacuum Pumps EVE-OG

Abbreviated designation	Pump type	Suction capacity in m^3/h	Supply voltage	Product addition
Example EVE-OG 40 AC3 F:				
EVE	**OG**	**40**	**AC3**	**F**
EVE	OG oil-lubricated	40 63 100 165 255	AC3 three-phase	F additional filter

Ordering Data Oil-Lubricated Vacuum Pumps EVE-OG

Vacuum pump EVE-OG is delivered as a ready to connect product.

Available spare parts: filter cartridge, replacement oil, maintenance kit
Available accessories: motor protection switch, filter resistance gauge, filter

Vacuum Pumps

Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

Oil-Lubricated Vacuum Pumps EVE-OG

Type*	Vacuum pump**	Vacuum pump with additional filter**
EVE-OG 10 AC3	10.03.02.00067	10.03.02.00082
EVE-OG 16 AC3	10.03.02.00047	10.03.02.00083
EVE-OG 25 AC3	10.03.02.00084	10.03.02.00020
EVE-OG 40 AC3	10.03.02.00026	10.03.02.00031
EVE-OG 63 AC3	10.03.02.00027	10.03.02.00032
EVE-OG 100 AC3	10.03.02.00028	10.03.02.00033
EVE-OG 165 AC3	10.03.02.00048	10.03.02.00049
EVE-OG 255 AC3	10.03.02.00051	10.03.02.00052

*Motorprotection with thermoelement as standard
**50 Hz standard, 60 Hz on request

Ordering Data Spare Parts and Accessories Oil-Lubricated Vacuum Pumps EVE-OG

Type	Maintenance kit for vacuum pumps*	Filter cartridge for additional filter
EVE-OG 10 AC3	10.03.02.00075	10.07.01.00017
EVE-OG 16 AC3	10.03.02.00075	10.07.01.00017
EVE-OG 25 AC3	10.03.02.00075	10.07.01.00017
EVE-OG 40 AC3	10.03.02.00060	10.07.01.00018
EVE-OG 63 AC3	10.03.02.00055	10.07.01.00018
EVE-OG 100 AC3	10.03.02.00055	10.07.01.00018
EVE-OG 165 AC3	10.03.02.00057	10.07.01.00020
EVE-OG 255 AC3	10.03.02.00057	10.07.01.00020

*Contains parts of the pump which are subject to wear

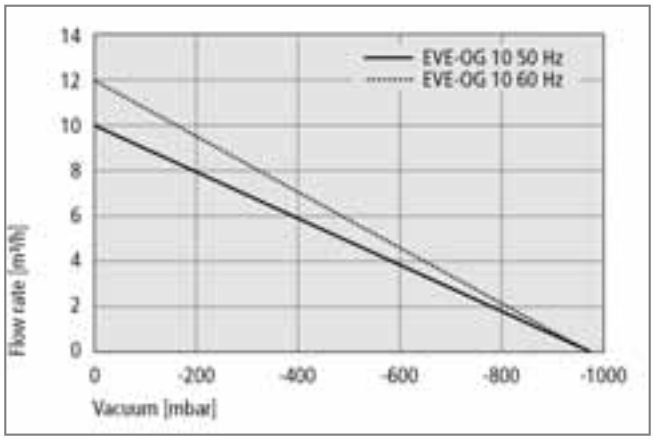
Type	Motor protection switch**	Replacement oil	Filter resistance gauge
EVE-OG 10 AC3	10.04.04.00118	27.02.01.00047	10.07.02.00050
EVE-OG 16 AC3	10.04.04.00119	27.02.01.00047	10.07.02.00050
EVE-OG 25 AC3	10.04.04.00120	27.02.01.00047	10.07.02.00050
EVE-OG 40 AC3	10.04.04.00120	27.02.01.00047	10.07.02.00050
EVE-OG 63 AC3	10.04.04.00121	27.02.01.00048	10.07.02.00050
EVE-OG 100 AC3	10.04.04.00122	27.02.01.00048	10.07.02.00050
EVE-OG 165 AC3	10.04.04.00123	27.02.01.00049	10.07.02.00051
EVE-OG 255 AC3	10.04.04.00124	27.02.01.00049	10.07.02.00051

**For voltage 400 V / 50 Hz

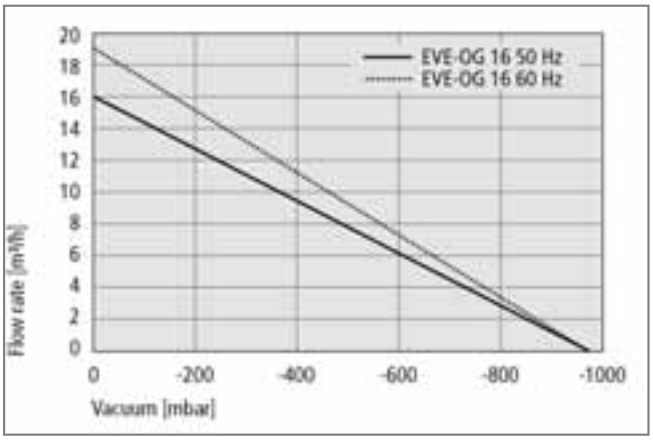
Technical Data Oil-Lubricated Vacuum Pumps EVE-OG

Type	Max. vacuum [mbar]	Suction rate at 50 Hz [m³/h]	Voltage at 50 Hz	Current range (50 Hz)	Rated power [kW] at 50 Hz	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]
EVE-OG 10 AC3	-980	10	230/400V AC	1,9A or 1,1A	0.4	IP 54	19	49
EVE-OG 16 AC3	-980	16	230/400V AC	2,8A or 1,6A	0.6	IP 54	19	53
EVE-OG 25 AC3	-980	25	230/400V AC	3,2A or 1,86A	0.8	IP 54	34	60
EVE-OG 40 AC3	-980	40	230/400±10%	4,8A or 2,8A	1.1	IP 54	38	64
EVE-OG 63 AC3	-980	63	230/400±10%	6,2A or 3,6A	1.5	IP 54	52	65
EVE-OG 100 AC3	-980	100	230/400±10%	8,8A or 5,0A	2.2	IP 54	70	67
EVE-OG 165 AC3	-980	165	200-240V or 345-420V	16,6A or 9,6A	4.0	IP 54	160	70
EVE-OG 255 AC3	-980	255	200-240V or 345-420V	23,8A or 13,8A	5.5	IP 54	190	72

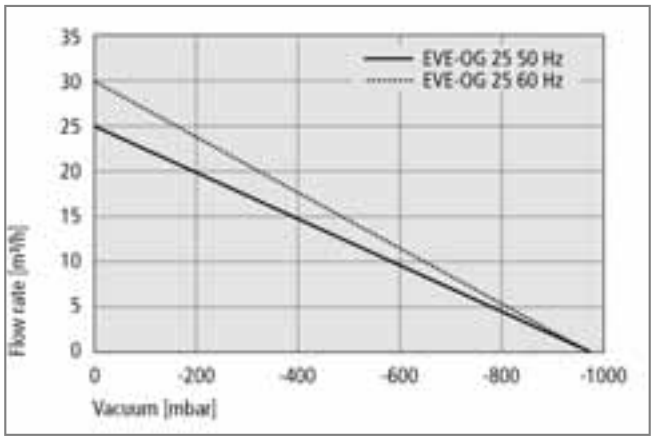
Performance Data Oil-Lubricated Vacuum Pumps EVE-OG



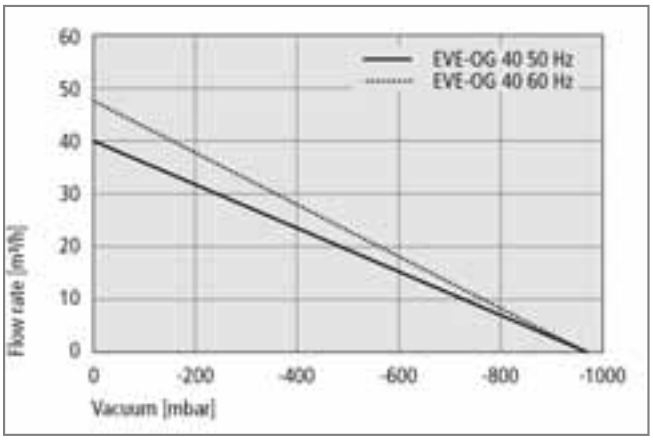
Suction capacity at various degrees of evacuation



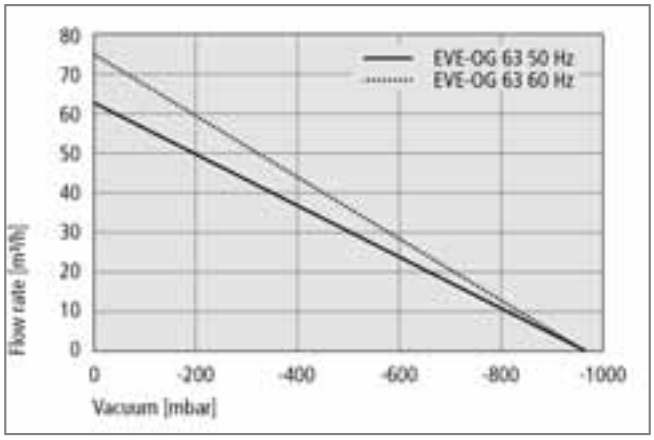
Suction capacity at various degrees of evacuation



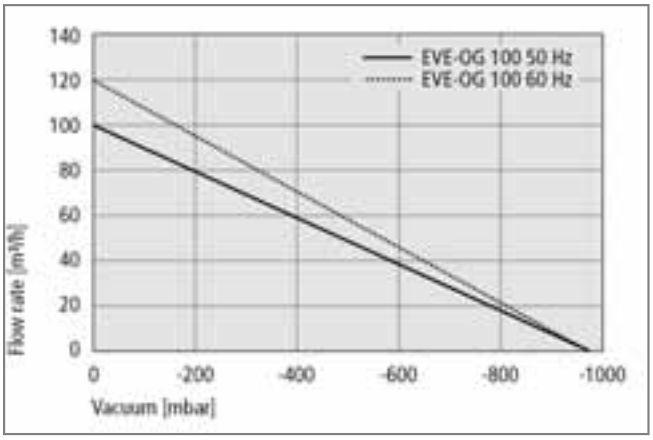
Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



Suction capacity at various degrees of evacuation



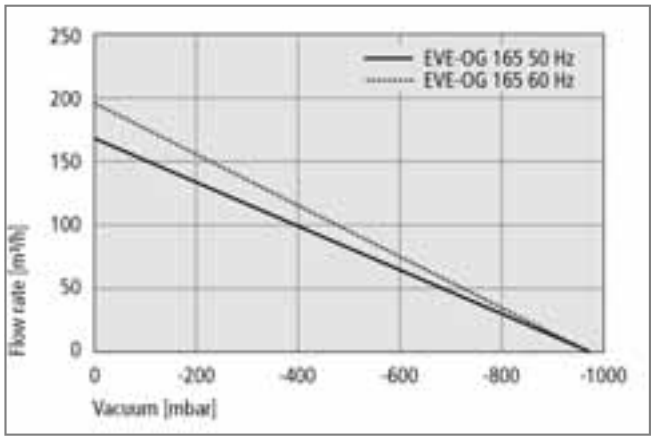
Suction capacity at various degrees of evacuation

Vacuum Pumps

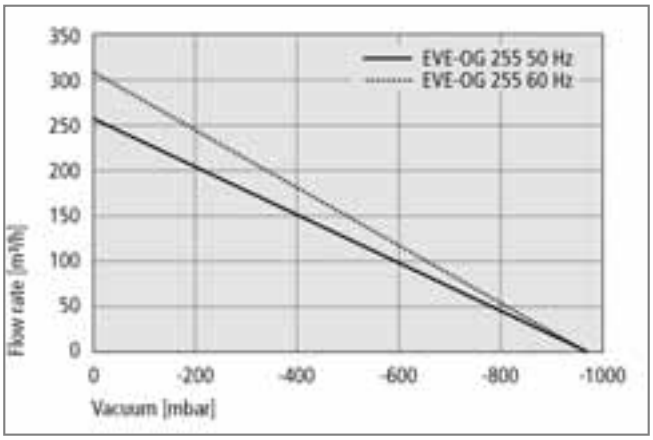
Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

Performance Data Oil-Lubricated Vacuum Pumps EVE-OG

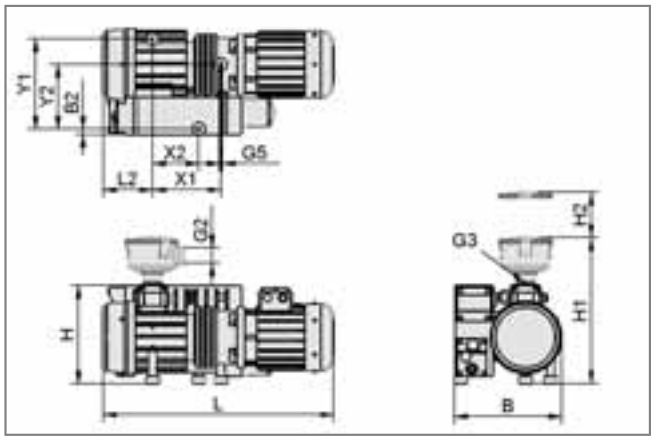


Suction capacity at various degrees of evacuation

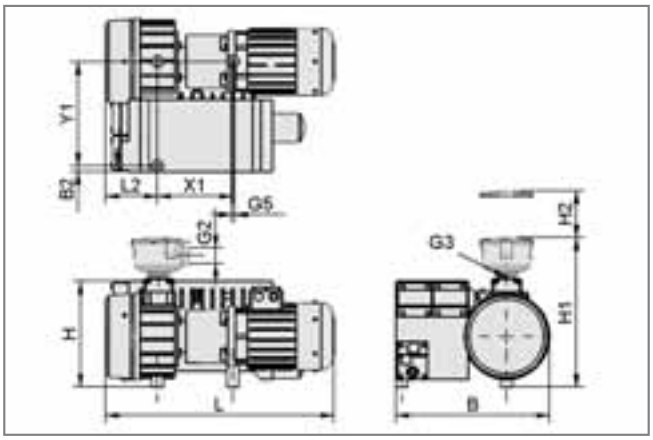


Suction capacity at various degrees of evacuation

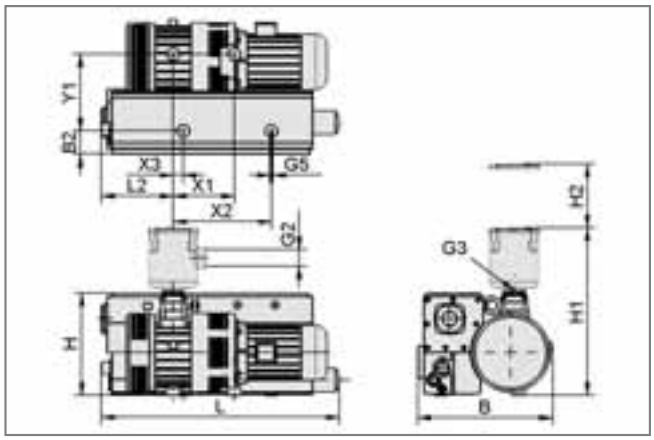
Design Data Oil-Lubricated Vacuum Pumps EVE-OG



EVE-OG 10 to 40 AC3 (F)



EVE-OG 63 to 100 AC3 (F)



EVE-OG 165 to 255 AC3 (F)

Oil-Lubricated Vacuum Pumps EVE-OG

Suction rate from 10 m³/h to 255 m³/h

Design Data Oil-Lubricated Vacuum Pumps EVE-OG

Type	Dimensions in mm														
	B	B2	G2	G3	G5	H	H1	H2	L	L2	X1	X2	X3	Y1	Y2
EVE-OG 10 AC3	212	26	G3/4"-F	G3/4"-F	M8-F	-	320	70	422	63	176	-	-	111	-
EVE-OG 10 AC3 F	212	26	G3/4"-F	G3/4"-F	M8-F	-	320	70	422	63	176	-	-	111	-
EVE-OG 16 AC3	212	26	-	G3/4"-F	M8-F	234	-	-	422	63	176	-	-	111	-
EVE-OG 16 AC3 F	212	26	G3/4"-F	G3/4"-F	M8-F	234	320	70	422	63	176	-	-	111	-
EVE-OG 25 AC3	284	17	-	G1-1/4"-F	M8-F	260	-	-	568	131	159	120	-	238	171
EVE-OG 25 AC3 F	284	17	G3/4"-F	G1-1/4"-F	M8-F	260	380	75	568	131	159	120	-	238	171
EVE-OG 40 AC3	284	15	-	G1-1/4"-F	M8-F	260	-	-	625	130	179	123	-	238	171
EVE-OG 40 AC3 F	284	15	G1-1/4"-F	G1-1/4"-F	M8-F	260	390	75	625	130	179	123	-	238	171
EVE-OG 63 AC3	406	15	-	G1-1/4-F	M8-F	280	-	-	614	137	199	-	-	277	-
EVE-OG 63 AC3 F	406	15	G1-1/4"-F	G1-1/4"-F	M8-F	280	417	75	614	137	199	-	-	277	-
EVE-OG 100 AC3	406	15	-	G1-1/4-F	M8-F	280	-	-	696	170	226	-	-	277	-
EVE-OG 100 AC3 F	406	15	G1-1/4"-F	G1-1/4"-F	M8-F	280	417	75	696	170	226	-	-	277	-
EVE-OG 165 AC3	554	92	-	G2-F	M10-F	418	-	-	921	285	243	390	40	305	-
EVE-OG 165 AC3 F	554	92	G2-1/2-F	G2-F	M10-F	418	680	240	921	285	243	390	40	305	-
EVE-OG 255 AC3	583	47	-	G2-F	M10-F	418	-	-	1056	300	303	390	-	350	-
EVE-OG 255 AC3 F	583	47	G2-1/2-F	G2-F	M10-F	418	680	240	1056	300	303	390	-	350	-

Vacuum Pumps

Water-Ring Pumps EVE-WR

Suction rate from 25 m³/h to 65 m³/h

UNIVERSAL

Suitability for Industry-Specific Applications

Water-ring pumps EVE-WR

Applications

- Vacuum pump for use in handling and packing tasks in the foodstuffs sector
- For applications with high demands with respect to the surrounding air and ambient temperature
- Suitable for continuous operation at high outputs without additional overload protection

Design

- Water-ring pump with internal drying of the exhaust air and water recovery
- Three-phase drive motor
- Multi-vane compressor with very little vibration and constant output with little pulsation
- Wear-resistant, replaceable sealing elements in the pump body
- Inlet regulator for water-level control

Our Highlights...	Your Benefits...
• Vacuum pump in the form of a water-ring pump	> Robust and maintenance-free design for the highest demands with respect to the surrounding air and the ambient temperature, such as in the foodstuffs industry
• Non-contact compression	> Needs no lubrication, no replacement of parts
• Internal water cooling permits continuous operation at high loads	> Particularly suitable for lifting and holding loads for long periods
• Wide range of models with various outputs	> The inlet volume flow rate can be adjusted to meet customer requirements
• With water-inlet regulation as standard	> Permits maintenance-free operation

Designation Code Water-Ring Pumps EVE-WR

Abbreviated designation	Pump type	Suction capacity in m³/h	Supply voltage
Example EVE-WR 45 AC3:			
EVE	**WR**	**25**	**AC3**
EVE	WR water ring	25 45 65	AC3 three-phase

Ordering Data Water-Ring Pumps EVE-WR

Vacuum pump EVE-WR is delivered as a ready to connect product.

Available accessories: additional filter, motor protection switch

Water-Ring Pumps EVE-WR

Type	Part Number
EVE-WR 25 AC3	10.03.05.00014
EVE-WR 45 AC3	10.03.05.00015
EVE-WR 65 AC3	10.03.05.00016

Ordering Data Accessories Water-Ring Pumps EVE-WR

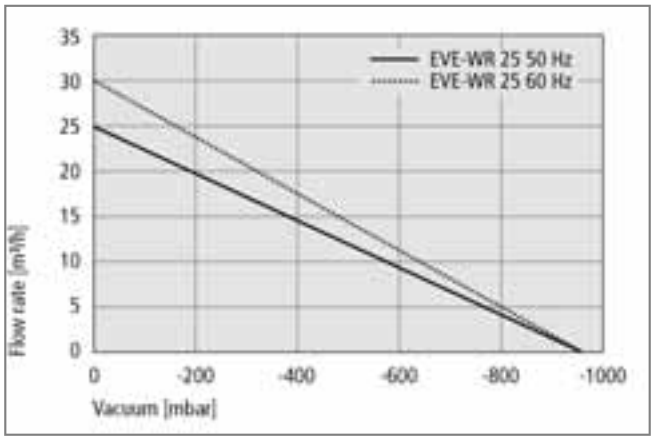
Type	additional filter	Motor protection switch
EVE-WR 25 AC3	10.07.01.00108	10.04.04.00120
EVE-WR 45 AC3	10.07.01.00109	10.04.04.00121
EVE-WR 65 AC3	10.07.01.00109	10.04.04.00123

Technical Data Water-Ring Pumps EVE-WR

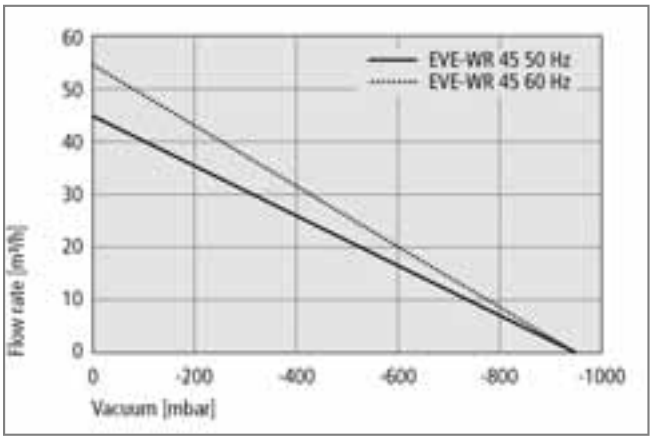
Type	Max. vacuum [mbar]	Suction rate at 50 Hz [m³/h]	Voltage at 50 Hz	Voltage at 60 Hz	Current range (50 Hz)	Current range (60 Hz)
EVE-WR 25 AC3	-930	25	200-240V or 345-420V	200-275V or 345-480V	5,0A or 2,9A	5,0A or 2,9A
EVE-WR 45 AC3	-930	45	200-240V or 345-420V	200-275V or 345-480V	9,5A or 5,5A	9,5A or 5,5A
EVE-WR 65 AC3	-930	65	200-240V or 345-420V	200-275V or 345-480V	16,6A or 9,6A	16,6A or 9,6A

Type	Rated power [kW] at 50 Hz	Rated power [kW] at 60 Hz	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]
EVE-WR 25 AC3	0.8	0.8	IP 54	38	63
EVE-WR 45 AC3	1.2	1.2	IP 54	55	67
EVE-WR 65 AC3	2.4	2.4	IP 54	68	70

Performance Data Water-Ring Pumps EVE-WR



Suction capacity at various degrees of evacuation



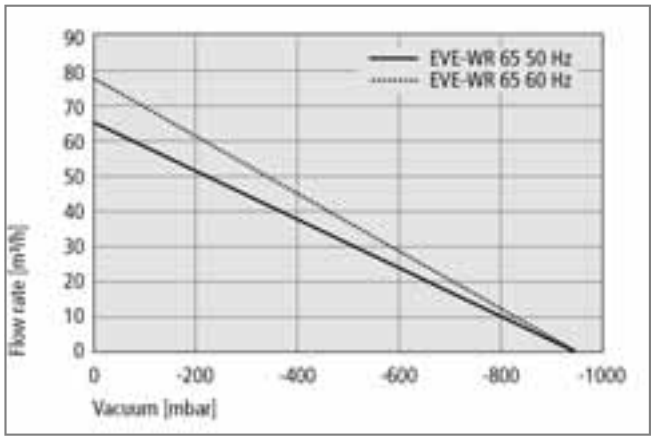
Suction capacity at various degrees of evacuation

Vacuum Pumps

Water-Ring Pumps EVE-WR

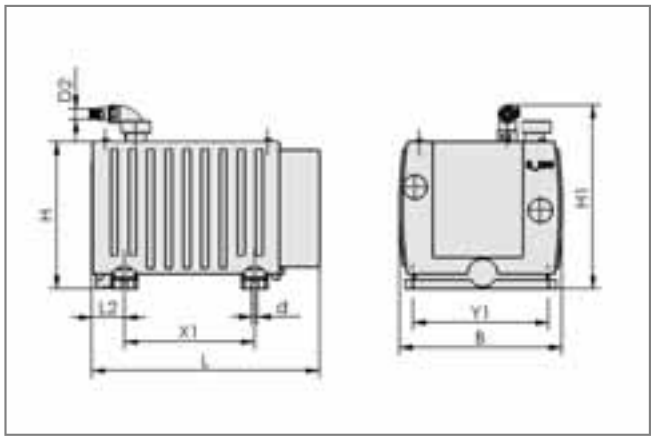
Suction rate from 25 m³/h to 65 m³/h

Performance Data Water-Ring Pumps EVE-WR



Suction capacity at various degrees of evacuation

Design Data Water-Ring Pumps EVE-WR



EVE-WR 25 to 65

Type	Dimensions in mm								
	B	d	D2	H	H1	L	L2	X1	Y1
EVE-WR 25 AC3	432	14	30	390	486	602	85	345	370
EVE-WR 45 AC3	572	14	50	436	553	744	85	450	495
EVE-WR 65 AC3	572	14	50	436	553	764	85	450	495

Vacuum Reservoirs VOL

Reservoir volume from 5 l to 200 l

Suitability for Industry-Specific Applications

Vacuum reservoirs VOL

Applications

- Vacuum reservoir for use as a safety backup in the case of sudden power failures
- Use where increased requirements for safety and reliability exist
- Suitable for use as a buffer for handling peak demands

Design

- Vacuum reservoir consisting of a steel tank with safety non-return valve, manometer and dust filter
- Coating RAL 7035

Our Highlights...

- Vacuum reservoir for use as a safety device
- Integrated non-return valve
- Large buffer volume

Your Benefits...

> Prevents release of work-pieces in the case of a sudden power failure

> Prevents the vacuum from escaping through the vacuum generator

> No need to dimension the vacuum generator to handle short-term peak demands

Designation Code Vacuum Reservoirs VOL

Abbreviated designation	Reservoir volume
Example VOL 100:	
VOL	**100**
VOL	5 = 5 l
	15 = 15 l
	50 = 50 l
	100 = 100 l
	200 = 200 l

Ordering Data Vacuum Reservoirs VOL

Vacuum reservoir VOL is delivered as a ready to connect product.

Available spare parts: filter insert

Vacuum Pumps

Vacuum Reservoirs VOL

Reservoir volume from 5 l to 200 l

Vacuum Reservoirs VOL

Type	Part Number
VOL 5	10.03.03.00108
VOL 15	10.03.03.00113
VOL 50	10.03.03.00118
VOL 100	10.03.03.00123
VOL 200	10.03.03.00128

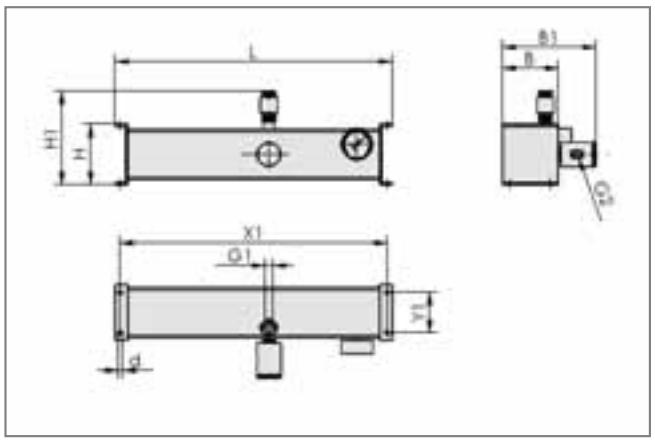
Ordering Data Spare Parts Vacuum Reservoirs VOL

Type	Filter insert
VOL 5	10.07.01.00014
VOL 15	10.07.01.00017
VOL 50	10.07.01.00018
VOL 100	10.07.01.00018
VOL 200	10.07.01.00020

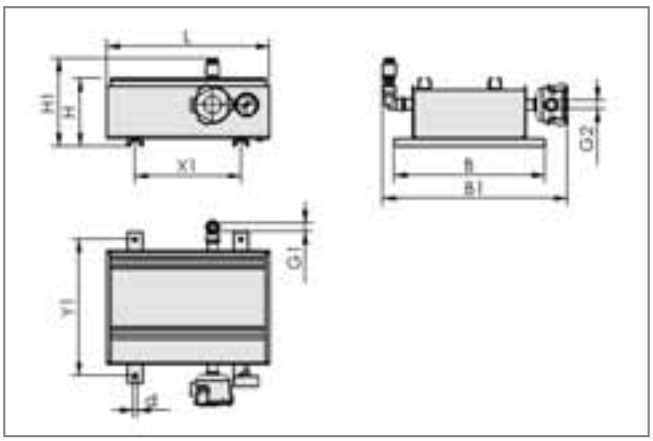
Technical Data Vacuum Reservoirs VOL

Type	Volume [l]	Weight [kg]
VOL 5	5	8.0
VOL 15	15	17.5
VOL 50	50	35.5
VOL 100	100	51.0
VOL 200	200	97.0

Design Data Vacuum Reservoirs VOL



VOL 5



VOL 15 to 200

Type	Dimensions in mm									
	B	B1	d	G1	G2	H	H1	L	X1	Y1
VOL 5	110	185	9	G3/8"-F	G3/8"-F	120	180	550	530	80
VOL 15	400	495	11	G1/2"-F	G3/4"-F	180	250	430	280	360
VOL 50	510	630	11	G3/4"-F	G1-1/4"-F	235	270	710	480	470
VOL 100	610	750	11	G1-1/4"-F	G1-1/4"-F	334	405	710	480	570
VOL 200	710	1015	11	G2"-F	G2-1/2"-F	434	495	910	592	670

Vacuum Pumps

Vacuum Centres VZ

Suction rate from 8 m³/h to 165 m³/h

Suitability for Industry-Specific Applications

Vacuum centres VZ

Applications

- Vacuum centre for use wherever there is a demand for high performance, safety and reliability

Design

- Vacuum centre, consisting of vacuum pump, vacuum reservoir, safety non-return valve, filter and manometer
- Motor-protection switch and vacuum-regulated motor switch (adjustable) available as options
- Coating RAL 7035

Our Highlights...

- Complete solution with pump, reservoir, manometer, filter and (optional) regulation
- Integrated dry-running or oil-lubricated vacuum pump
- Integrated vacuum reservoir
- Internal electrical regulation (automatic energy-saving function, optional)

Your Benefits...

> Universal use in vacuum clamping and handling applications

> Vibration-free operation; continuous output with little pulsation

> Optimum protection against short-term leaks and power failures

> Economical use in continuous operation due to automatic pump switching and automatic regulation

Designation Code Vacuum Centres VZ

Abbreviated designation	Pump type	Suction capacity in m^3/h	Supply voltage	Reservoir volume	Product addition
Example VZ-TR 40 AC3 50:					
VZ	**TR**	**40**	**AC3**	**50**	
VZ	OG oil-lubricated TR dry-running	8 to 165	AC single-phase AC3 three-phase	5 = 5 l 15 = 15 l 50 = 50 l 100 = 100 l 200 = 200 l	MS motor protection switch GMS vacuum regulated motor protection switch

Vacuum Pumps

Vacuum Centres VZ

Suction rate from 8 m³/h to 165 m³/h

Ordering Data Vacuum Centres VZ

Vacuum centre VZ is delivered as a ready to connect product.

Available spare parts: replacement cartridge for air cleaner, replacement cartridge for oil filter
Available accessories: filter cartridge for vacuum reservoir

Vacuum Centres VZ

Type	Vacuum centre without motor protection switch	with motor protection switch*	with vacuum regulated motor circuit**
VZ-TR 4 AC 5	10.03.04.00202	-	10.03.04.00203
VZ-TR 8 AC 5	10.03.04.00193	-	-
VZ-TR 10 AC3 15	10.03.04.00174	10.03.04.00175	10.03.04.00173
VZ-TR 25 AC3 50	10.03.04.00136	10.03.04.00142	10.03.04.00119
VZ-TR 40 AC3 50	10.03.04.00137	10.03.04.00143	10.03.04.00120
VZ-TR 80 AC3 100	10.03.04.00199	10.03.04.00200	10.03.04.00172
VZ-OG 63 AC3 100	10.03.04.00138	10.03.04.00144	10.03.04.00121
VZ-OG 100 AC3 100	10.03.04.00139	10.03.04.00145	10.03.04.00122
VZ-OG 165 AC3 200	10.03.04.00166	10.03.04.00167	10.03.04.00165

*For 400 V / 50 Hz voltage

**Maximum vacuum for item numbers 10.03.04.00121, 10.03.04.00122, 10.03.04.00165 = -900 mbar

Ordering Data Spare Parts and Accessories Vacuum Centres VZ

Type	Replacement cartridge for air cleaner	Replacement cartridge for oil filter	Filter cartridge for vacuum reservoir
VZ-TR 4 AC 5	-	-	10.07.01.00014
VZ-TR 8 AC 5	-	-	10.07.01.00014
VZ-TR 10 AC3 15	-	-	10.07.01.00017
VZ-TR 25 AC3 50	10.03.01.00023	-	10.07.01.00018
VZ-TR 40 AC3 50	10.03.01.00023	-	10.07.01.00018
VZ-TR 80 AC3 100	-	-	10.07.01.00018
VZ-OG 63 AC3 100	-	10.03.02.00009	10.07.01.00018
VZ-OG 100 AC3 100	-	10.03.02.00009	10.07.01.00018
VZ-OG 165 AC3 200	10.03.02.00057	10.03.02.00011	10.07.01.00020

Technical Data Vacuum Centres VZ

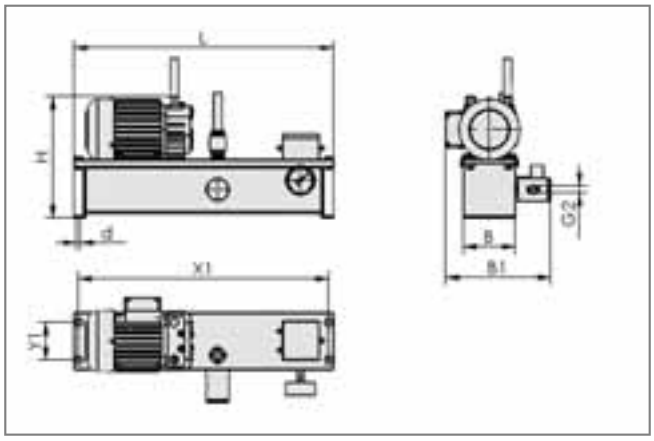
Type	Max. vacuum [mbar]	Voltage	Motor power [kW]	Volume [l]	Protection IP	Weight [kg]
VZ-TR 4 AC 5	-850	230 V, 50 Hz	0.18	5	IP 54	17
VZ-TR 8 AC 5	-850	230 V, 50 Hz	0.30	5	IP 54	17
VZ-TR 10 AC3 15	-850	230/400 V, 50 Hz	0.37	15	IP 54	37
VZ-TR 25 AC3 50	-850	230/400 V, 50 Hz	0.75	50	IP 54	69
VZ-TR 40 AC3 50	-850	230/400 V, 50 Hz	1.25	50	IP 54	82
VZ-TR 80 AC3 100	-850	230/400 V, 50 Hz	3.00	100	IP 54	129
VZ-OG 63 AC3 100	-980	230/400 V, 50 Hz	1.50	100	IP 54	112
VZ-OG 100 AC3 100	-980	230/400 V, 50 Hz	2.20	100	IP 54	130
VZ-OG 165 AC3 200	-980	230/400 V, 50 Hz	4.00	200	IP 54	271

Vacuum Pumps

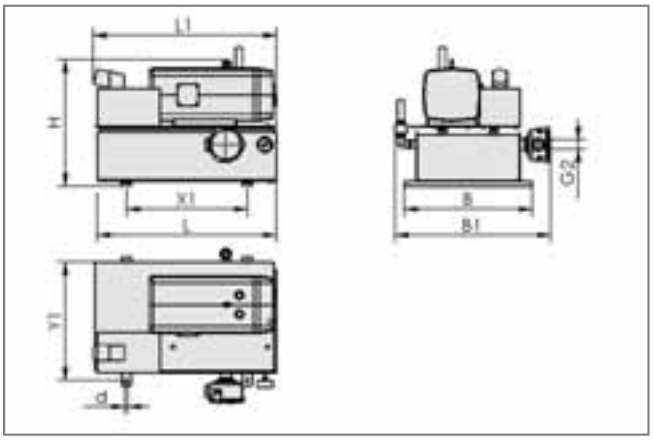
Vacuum Centres VZ

Suction rate from 8 m³/h to 165 m³/h

Design Data Vacuum Centres VZ



VZ-TR 8 AC 5



VZ-TR 10 AC3 15 to VZ-OG 165 AC3 200

Type	Dimensions in mm								
	B	B1	d	G2	H	L	L1	X1	Y1
VZ-TR 4 AC 5	110	225	9	G3/8-F	275	550	-	530	80
VZ-TR 8 AC 5	110	224	9	G3/8-F	263	550	-	530	80
VZ-TR 10 AC3 15	400	490	11	G3/4-F	440	430	430	280	360
VZ-TR 25 AC3 50	510	630	11	G1-1/4-F	580	710	730	480	470
VZ-TR 40 AC3 50	510	630	11	G1-1/4-F	580	710	770	480	470
VZ-TR 80 AC3 100	610	720	11	G1-1/4-F	690	710	715	480	570
VZ-OG 63 AC3 100	610	750	11	G1-1/4-F	700	710	720	480	570
VZ-OG 100 AC3 100	610	750	11	G1-1/4-F	700	710	750	480	570
VZ-OG 165 AC3 200	710	1040	11	G2-1/2-F	950	910	1040	592	670

Vacuum Blowers

Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h

Suitability for Industry-Specific Applications

Vacuum blowers SGBL-DG

Applications

- Vacuum blower for handling of cardboard boxes, foam materials, insulating materials, recycling materials and other extremely porous materials
- Enormous suction capacity easily compensates for any leaks

Design

- Vacuum blower in the form of a directly driven side-channel compressor, housing and impeller made of high-precision pressure-cast aluminium
- Pressure relief valve included
- Motor-protection switch and reversing valve with neutral position available as options

Our Highlights...

- Blower with a very high suction capacity
- Housing and impeller made of high-precision pressure-cast aluminium
- Wide range of models with different ratings

Your Benefits...

> Reliable handling of porous materials

> Vibration-free operation and high suction capacity

> Optimization to match customer requirements

Designation Code Vacuum Blowers SGBL-DG

Abbreviated designation	Blower type	Suction capacity in m^3/h	Maximum vacuum in mbar	Rated power in kW
Example SGBL-DG 310-360-4:				
SGBL	**DG**	**310**	**360**	**4**
SGBL	DG directly driven	80 to 540	110 to 465	0.25 to 7.5

Ordering Data Vacuum Blowers SGBL-DG

Vacuum blower SGBL-DG is delivered as a ready to connect product.

Available accessories: motor protection switch, silencer box, filter

Vacuum Blowers

Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h

Vacuum Blowers SGBL-DG

Type	Part Number
SGBL-DG-80-110-0.25	10.04.01.00008
SGBL-DG-145-120-0.7	10.04.01.00009
SGBL-DG-155-400-3	10.04.02.00067
SGBL-DG-165-180-0.95	10.04.01.00001
SGBL-DG-220-465-4	10.04.02.00068
SGBL-DG-310-270-3	10.04.01.00011
SGBL-DG-310-360-4	10.04.02.00002
SGBL-DG-310-420-5.5	10.04.02.00086
SGBL-DG-410-225-4	10.04.02.00077
SGBL-DG-490-370-7.5	10.04.02.00003
SGBL-DG-540-200-4	10.04.01.00012

Ordering Data Accessories Vacuum Blowers SGBL-DG

Type	Motor-protection switch*	Silencer box	Recommended filter
SGBL-DG-80-110-0.25	10.04.04.00118	-	10.07.01.00008
SGBL-DG-145-120-0.7	10.04.04.00119	-	10.07.01.00259
SGBL-DG-155-400-3	10.04.04.00122	10.04.04.00108	10.07.01.00259
SGBL-DG-165-180-0.95	10.04.04.00119	-	10.07.01.00259
SGBL-DG-220-465-4	10.04.04.00122	10.04.04.00109	10.07.01.00259
SGBL-DG-310-270-3	10.04.04.00122	10.04.04.00031	10.07.01.00260
SGBL-DG-310-360-4	10.04.04.00123	10.04.04.00031	10.07.01.00260
SGBL-DG-310-420-5.5	10.04.04.00123	10.04.04.00031	10.07.01.00260
SGBL-DG-410-225-4	10.04.04.00122	10.04.04.00127	10.07.01.00260
SGBL-DG-490-370-7.5	10.04.04.00125	10.04.04.00056	10.07.01.00263
SGBL-DG-540-200-4	10.04.04.00123	10.04.04.00077	10.07.01.00263

*For voltage 400 V / 50 Hz

Technical Data Vacuum Blowers SGBL-DG

Type	Suction rate at 50 Hz [m³/h]	Suction rate at 60 Hz [m³/h]	Max. vacuum [mbar] permanent (> 90 s)	Max. vacuum [mbar] temporary (< 90 s)	Voltage at 50 Hz	Voltage at 60 Hz
SGBL-DG-80-110-0.25	78	98	-110	-	200-240V or 345-415V	220-275V or 380-480V
SGBL-DG-145-120-0.7	145	177	-120	-	200-240V or 345-415V	220-275V or 380-480V
SGBL-DG-155-400-3	155	187	-400	-500	190-255V or 330-440V	190-290V or 330-500V
SGBL-DG-165-180-0.95	165	195	-180	-	230V or 400V	277V or 480V
SGBL-DG-220-465-4	220	262	-465	-500	190-255V or 330-440V	190-290V or 330-500V
SGBL-DG-310-270-3	310	380	-270	-	200-240V or 345-415V	220-275V or 380-480V
SGBL-DG-310-360-4	310	380	-360	-	380-420V or 660-725V	440-480V
SGBL-DG-310-420-5.5	320	420	-420	-	345-415V o. 600-720V	380-480V o. 660-720V
SGBL-DG-410-225-4	410	502	-225	-	190-255V or 330-440V	190-290V or 330-500V
SGBL-DG-490-370-7.5	490	610	-370	-	345-415V o. 600-720V	380-480V o. 660-720V
SGBL-DG-540-200-4	540	630	-200	-	345-415V or 690V	380-480V

*Reduction with silencer box down to approximately 65 %

Vacuum Blowers

Vacuum Blowers SGBL-DG

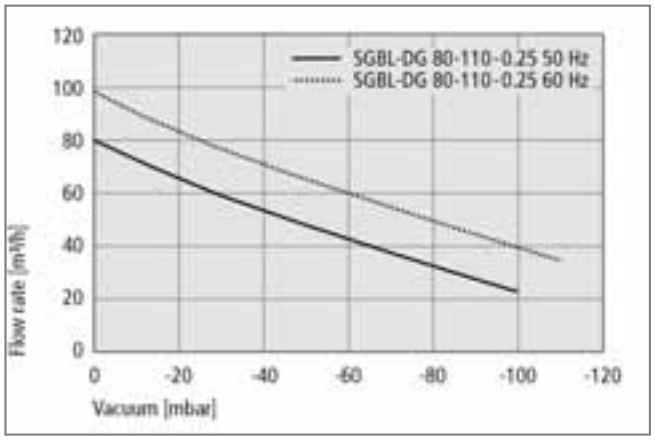
Suction rate from 78 m³/h to 540 m³/h

Technical Data Vacuum Blowers SGBL-DG

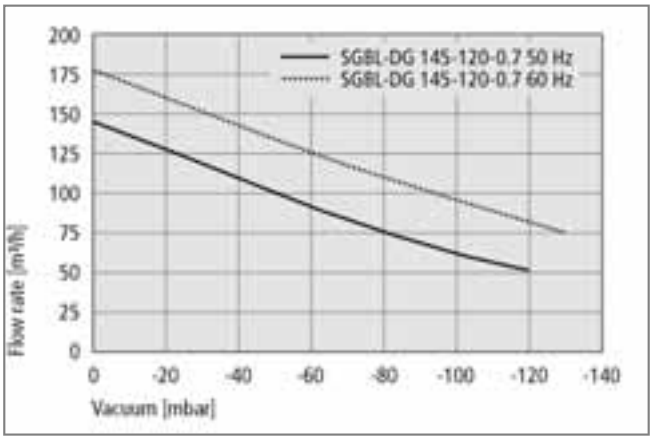
Type	Rated power [kW] at 50 Hz	Rated power [kW] at 60 Hz	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]*
SGBL-DG-80-110-0.25	0.25	0.29	IP 55	8	58
SGBL-DG-145-120-0.7	0.70	0.83	IP 55	13	63
SGBL-DG-155-400-3	3.00	3.60	IP 55	42	62
SGBL-DG-165-180-0.95	0.95	1.60	IP 55	22	72
SGBL-DG-220-465-4	4.00	4.80	IP 55	62	74
SGBL-DG-310-270-3	3.00	3.45	IP 55	34	70
SGBL-DG-310-360-4	4.00	4.80	IP 55	62	75
SGBL-DG-310-420-5.5	5.50	6.30	IP 55	70	75
SGBL-DG-410-225-4	4.00	4.60	IP 55	62	68
SGBL-DG-490-370-7.5	7.50	8.60	IP 55	169	75
SGBL-DG-540-200-4	4.00	4.60	IP 55	112	71

*Reduction with silencer box down to approximately 65 %

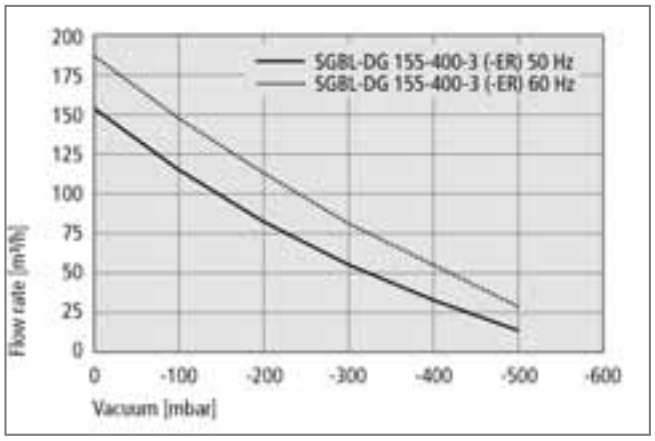
Performance Data Vacuum Blowers SGBL-DG



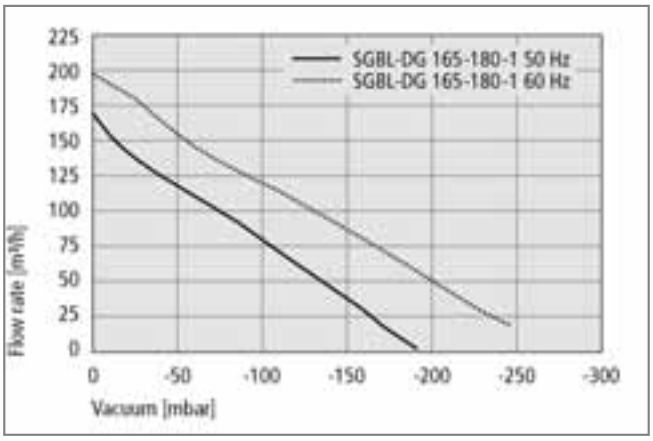
Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



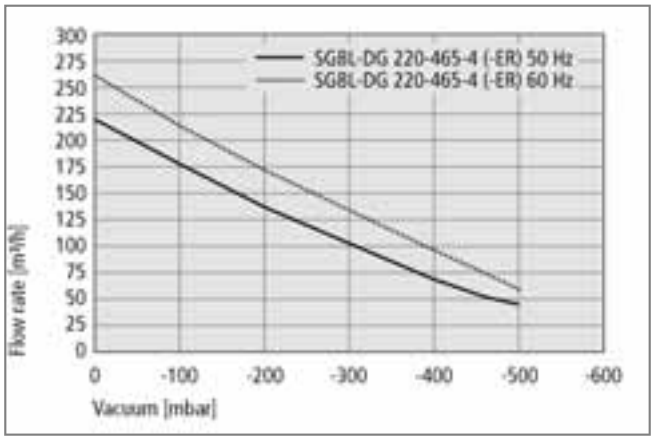
Flow rate at various degrees of evacuation

Vacuum Blowers

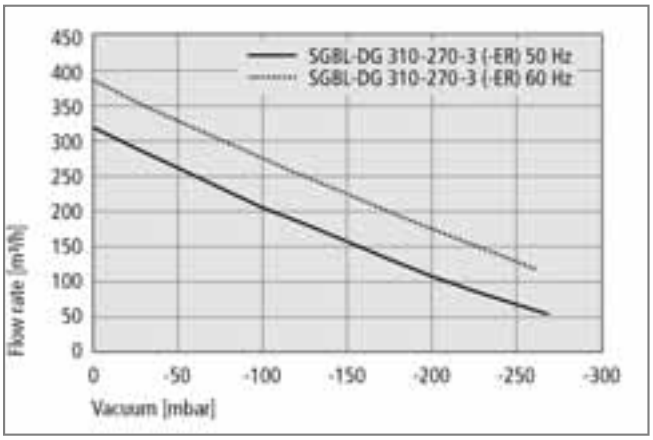
Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h

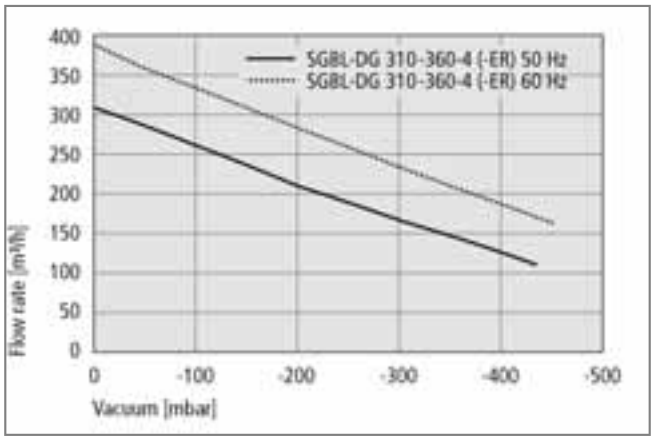
Performance Data Vacuum Blowers SGBL-DG



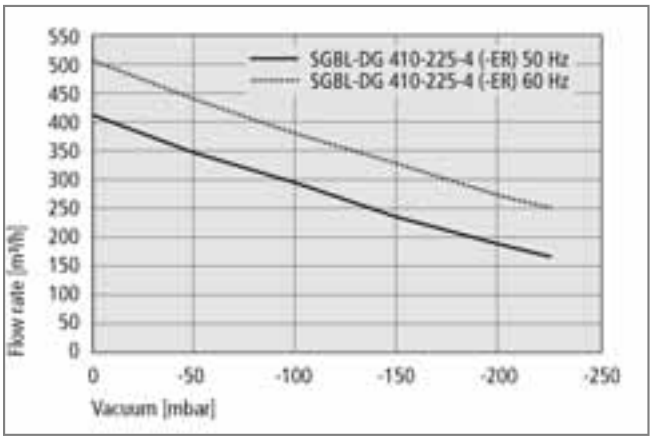
Flow rate at various degrees of evacuation



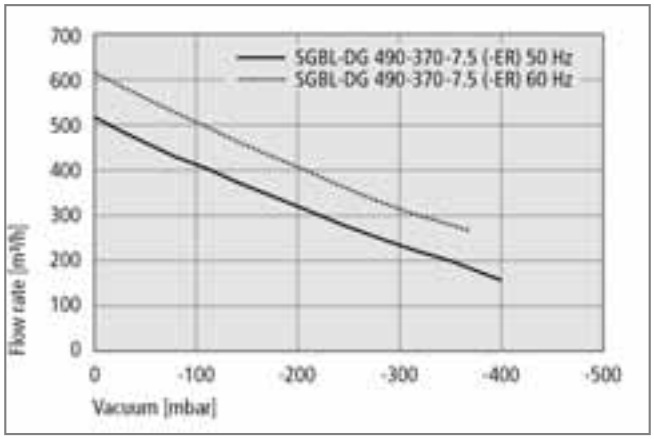
Flow rate at various degrees of evacuation



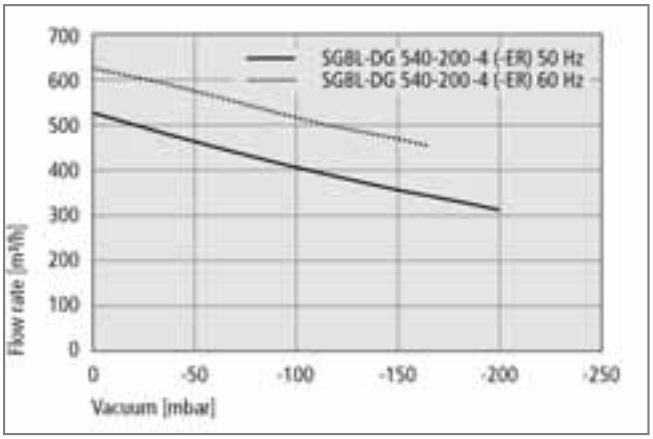
Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



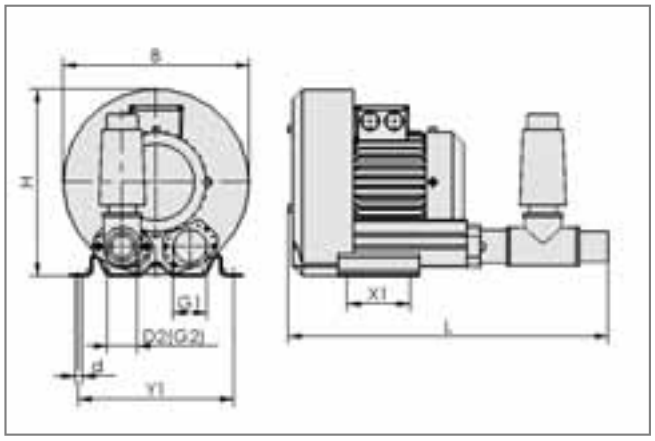
Flow rate at various degrees of evacuation

Vacuum Blowers

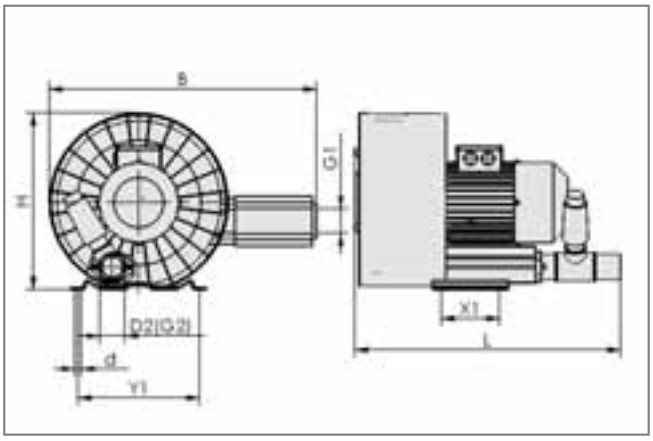
Vacuum Blowers SGBL-DG

Suction rate from 78 m³/h to 540 m³/h

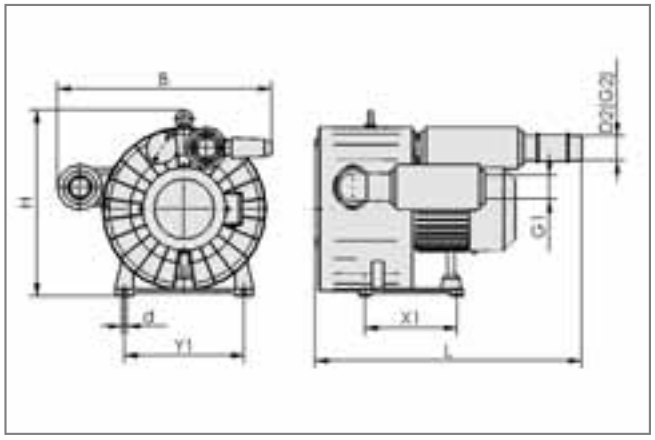
Design Data Vacuum Blowers SGBL-DG



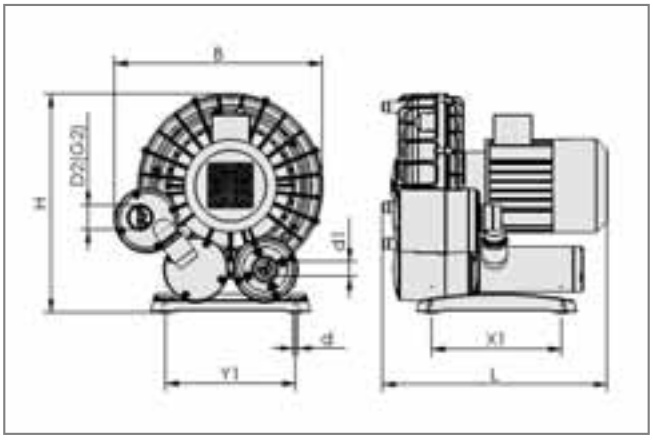
SGBL-DG 80-110-0.25; SGBL-DG 145-120-0.7; SGBL-DG 310-270-3; SGBL-DG 540-200-4



SGBL-DG 310-360-4; SGBL-DG 310-420-5.5



SGBL-DG 490-370-7.5



SGBL-DG 155-400-3; SGBL-DG 165-180-1; SGBL-DG 220-465-4; SGBL-DG 410-225-4

Type	Dimensions in mm									
	B	d	d1	D2	G1	G2	H	L	X1	Y1
SGBL-DG-80-110-0.25	246	10	-	42	G1-1/2"-F	G1-1/4"-F	247	425	83	205
SGBL-DG-145-120-0.7	285	12	-	60	G1-1/2"-F	G2"-M	302	460	95	225
SGBL-DG-155-400-3	426	12	35	60	-	G2"-M	449	502	290	290
SGBL-DG-165-180-0.95	358	11	40	50	-	G1-1/2-F	375	357	120	220
SGBL-DG-220-465-4	496	12	35	60	-	G2"-M	522	520	310	310
SGBL-DG-310-270-3	381	15	-	60	G2"-F	G2"-F	384	583	140	290
SGBL-DG-310-360-4	637	15	-	60	G2"-M	G2"-M	420	633	140	290
SGBL-DG-310-420-5.5	541	15	-	60	G2"-F	G2"-F	429	740	140	290
SGBL-DG-410-225-4	496	12	35	60	-	G2-M	522	520	310	310
SGBL-DG-490-370-7.5	655	15	-	75	G2-1/2"-M	G2-1/2"-M	566	810	280	365
SGBL-DG-540-200-4	498	15	-	75	G2-1/2"-F	G2-1/2"-F	566	792	280	365

Vacuum Blowers

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

Suitability for Industry-Specific Applications

Vacuum blowers SGBL-DG with electro-pneumatic reversing

Applications

- Vacuum blower for handling of cardboard, foam materials, insulating materials, recycling materials and other extremely porous materials
- Good compensation for leakages thanks to the enormous suction capacity
- Blower is controlled (vacuum on, blowing off, neutral position) with an electro-pneumatic reversing valve
- Use in gripping systems which need a high vacuum flow rate

Design

- Directly driven slide-channel compressor with very high suction capacity
- With reversing valve
- Housing and rotor made of extremely precise pressure-cast aluminium

Our Highlights...

- Vacuum blower with directly driven side-channel compressor
- Housing and rotor made of precise pressure-cast aluminium
- Electro-pneumatic reversing valve integrated

Your Benefits...

> Relaible handling of porous materials

> Vibration-free operation and high suction capacity, free of oil and quiet-running

> Control of the functions vacuum on, blow off and neutral position (air circulation without pressure)

Designation Code Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Abbreviated designation	Blower type	Suction capacity in m^3/h	Maximum vacuum in mbar	Rated power in kW	Product addition
Example SGBL-DG 310-360-4 ER:					
SGBL	**DG**	**310**	**360**	**4**	**ER**
SGBL	DG directly driven	155 to 540	200 to 465	3 to 7.5	ER with electro-pneumatical reversing valve

Ordering Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Vacuum blower SGBL-DG with electro-pneumatic reversing is delivered as a ready to connect product.

Available accessories: motor protection switch, silencer box, filter

Vacuum Blowers

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Type	Part Number
SGBL-DG-155-400-3-ER	10.04.02.00071
SGBL-DG-220-465-4-ER	10.04.02.00072
SGBL-DG-310-270-3-ER	10.04.01.00024
SGBL-DG-310-360-4-ER	10.04.02.00054
SGBL-DG-410-225-4-ER	10.04.02.00078
SGBL-DG-490-370-7.5-ER	10.04.02.00055
SGBL-DG-540-200-4-ER	10.04.01.00025

Ordering Accessories Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Type	Motor-protection switch*	Silencer box	Filter (Overpressure safely)
SGBL-DG-155-400-3-ER	10.04.04.00122	-	10.07.01.00231
SGBL-DG-220-465-4-ER	10.04.04.00122	-	10.07.01.00231
SGBL-DG-310-270-3-ER	10.04.04.00122	-	10.07.01.00231
SGBL-DG-310-360-4-ER	10.04.04.00123	-	10.07.01.00231
SGBL-DG-410-225-4-ER	10.04.04.00123	-	10.07.01.00231
SGBL-DG-490-370-7.5-ER	10.04.04.00125	10.04.04.00061	10.07.01.00231
SGBL-DG-540-200-4-ER	10.04.04.00123	10.04.04.00061	10.07.01.00231

*For voltage 400 V / 50 Hz

Technical Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Type	Suction rate at 50 Hz [m³/h]	Suction rate at 60 Hz [m³/h]	Max. vacuum [mbar] permanent (> 90 s)	Max. vacuum [mbar] temporary (< 90 s)	Voltage at 50 Hz	Voltage at 60 Hz	Rated power [kW] at 50 Hz
SGBL-DG-155-400-3-ER	155	187.0	-400	-500	190-255V or 330-440V	190-290V or 330-500V	3
SGBL-DG-220-465-4-ER	220	262.0	-465	-500	190-255V or 330-440V	190-290V or 330-500V	4
SGBL-DG-310-270-3-ER	310	380.0	-270	-	200-240V or 345-415V	220-275V or 380-480V	3
SGBL-DG-310-360-4-ER	310	380.0	-360	-	345-415V or 690V	440-480V	4
SGBL-DG-410-225-4-ER	410	502.0	-225	-	190-255V or 330-440V	190-290V or 330-500V	4
SGBL-DG-490-370-7.5-ER	490	610.0	-370	-	345-415V or 690V	380-480V	8
SGBL-DG-540-200-4-ER	540	630.0	-200	-	345-415V or 690V	380-480V	4

*Reduction with silencer box down to approximately 65 %

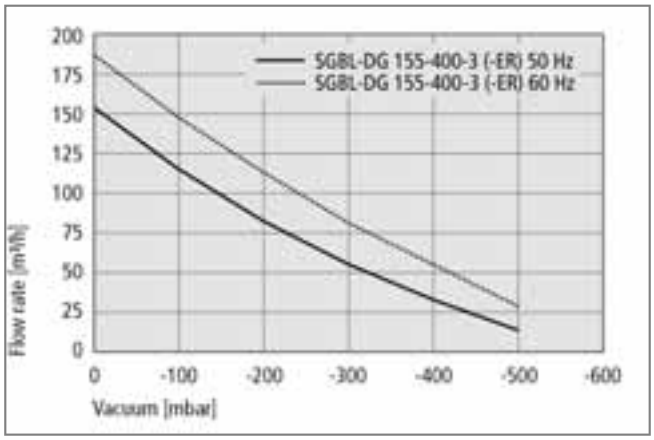
Type	Rated power [kW] at 60 Hz	Voltage reversing	Current consumption Reversing [mA]	Control pressure range	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]*
SGBL-DG-155-400-3-ER	3.6	24V-DC	0.3	2,5...3 bar	IP 55	55	62
SGBL-DG-220-465-4-ER	4.8	24V-DC	0.3	2,5...3 bar	IP 55	75	74
SGBL-DG-310-270-3-ER	3.5	24V-DC	0.3	2,5...3 bar	IP 55	39	70
SGBL-DG-310-360-4-ER	4.8	24V-DC	0.3	2,5...3 bar	IP 55	67	75
SGBL-DG-410-225-4-ER	4.6	24V-DC	0.3	2,5...3 bar	IP 55	62	68
SGBL-DG-490-370-7.5-ER	8.6	24V-DC	0.3	2,5...3 bar	IP 55	174	75
SGBL-DG-540-200-4-ER	4.6	24V-DC	0.3	2,5...3 bar	IP 55	117	71

*Reduction with silencer box down to approximately 65 %

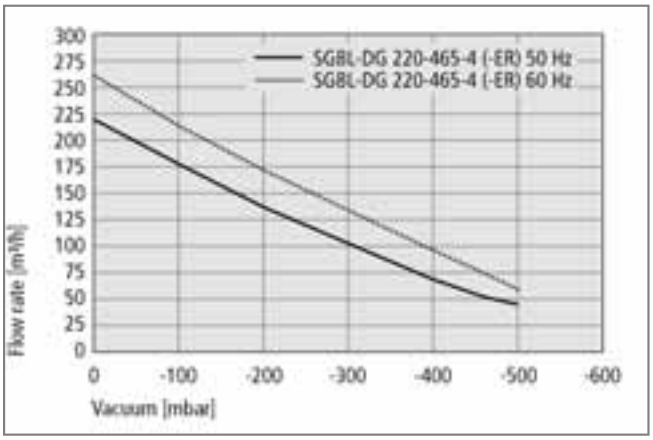
Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

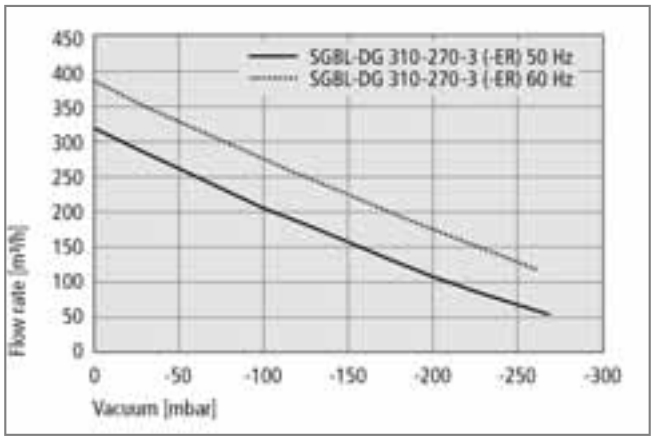
Performance Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing



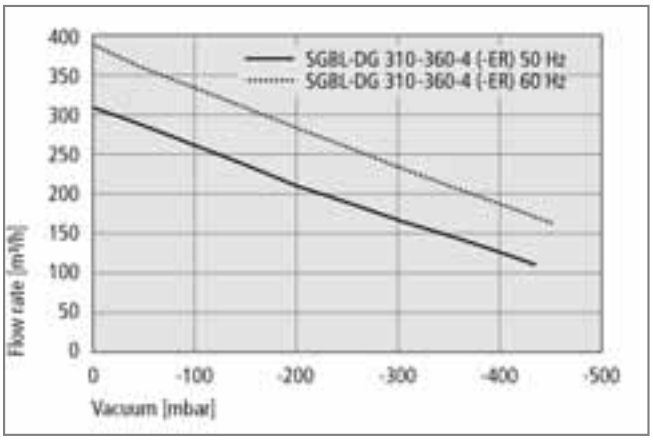
Flow rate at various degrees of evacuation



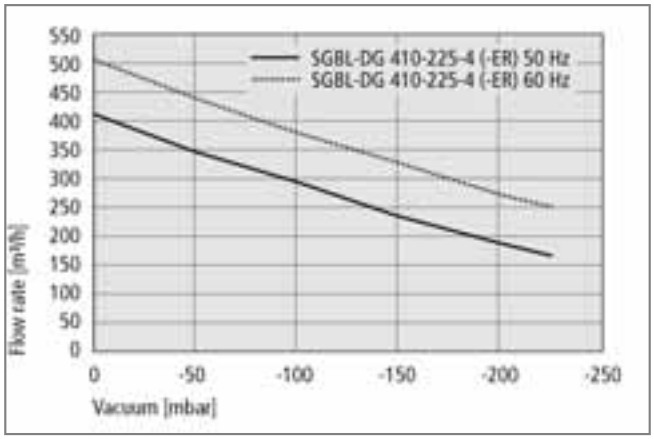
Flow rate at various degrees of evacuation



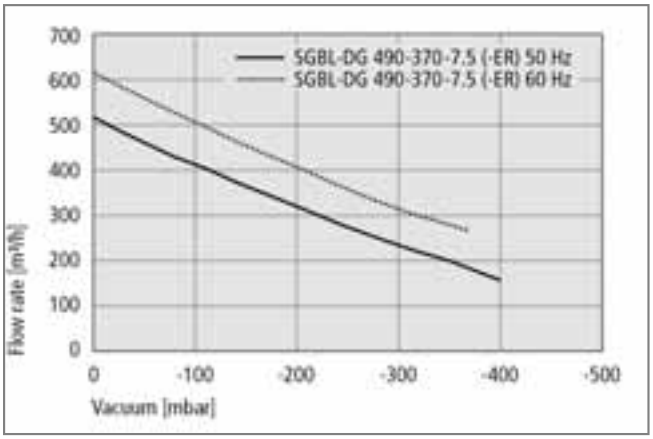
Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation



Flow rate at various degrees of evacuation

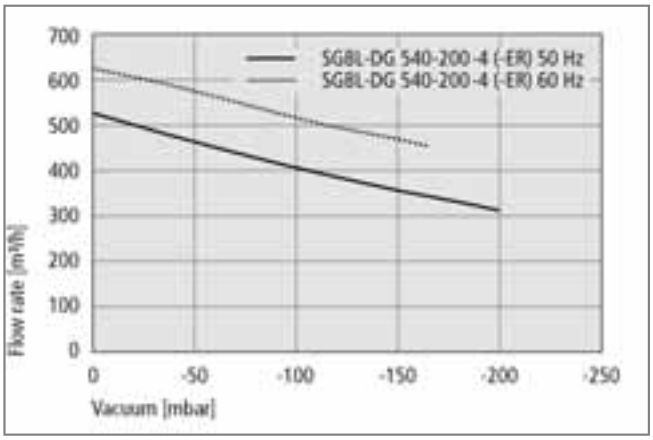


Flow rate at various degrees of evacuation

Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

Performance Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing



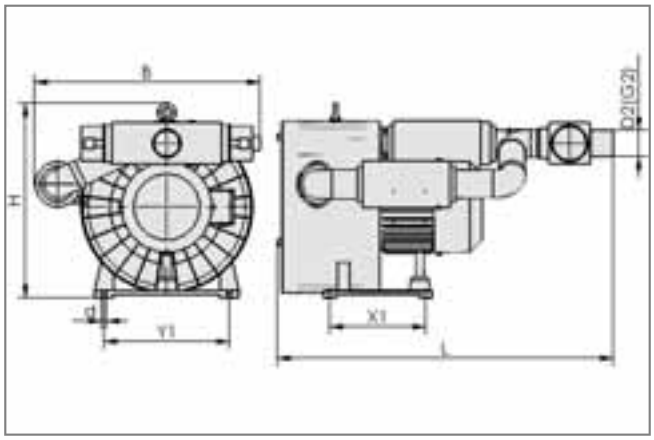
Flow rate at various degrees of evacuation

Vacuum Blowers

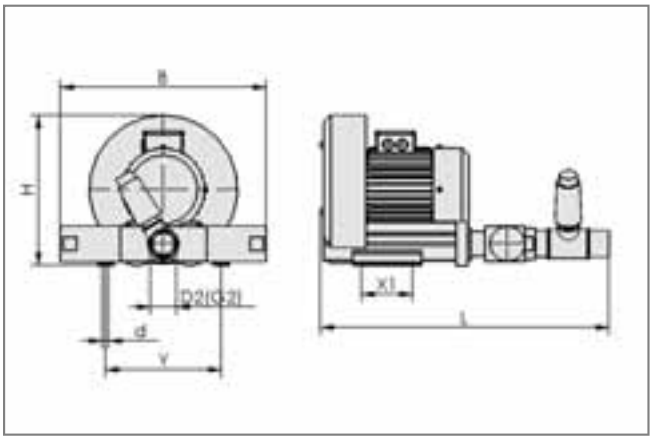
Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing

Suction rate from 155 m³/h to 540 m³/h

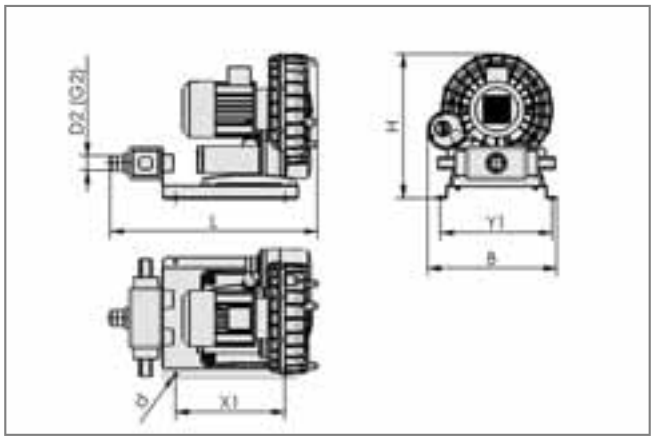
Design Data Vacuum Blowers SGBL-DG with Electro-Pneumatic Reversing



SGBL-DG 490-370-7.5-ER



SGBL-DG 310-270-3-ER; SGBL-DG 310-420-4-ER; SGBL-DG 540-200-4-ER



SGBL-DG 155-400-3-ER; SGBL-DG 220-465-4-ER; SGBL-DG 410-225-4-ER

Type	Dimensions in mm							
	B	d	D2	G2	H	L	X1	Y1
SGBL-DG-155-400-3-ER	520	13	60	G2-M	500	790	435	446
SGBL-DG-220-465-4-ER	520	13	60	G2-M	580	830	435	446
SGBL-DG-310-270-3-ER	463	15	60	G2-M	398	680	140	290
SGBL-DG-310-360-4-ER	612	15	60	G2-M	420	859	140	290
SGBL-DG-410-225-4-ER	496	12	60	G2"-M	522	520	310	310
SGBL-DG-490-370-7.5-ER	656	15	76	G2-1/2-M	567	1200	280	365
SGBL-DG-540-200-4-ER	500	15	76	G2-1/2-M	566	880	280	365

Vacuum Blowers

Frequency-Regulated Vacuum Blowers SGBL-FU

Suction rate from 180 m³/h to 335 m³/h

Suitability for Industry-Specific Applications

Frequency-regulated vacuum blowers SGBL-FU

Applications

- Vacuum blower for handling of cardboard, foam materials, insulating materials, recycled materials and other porous materials
- Handling of varying materials due to flexible regulation of suction capacity

Design

- Vacuum blower in the form of a directly driven side-channel compressor with integrated frequency converter
- Vacuum limiting and motor-overload protection provided automatically by the frequency converter
- Compact and lightweight design

Our Highlights...

- Integrated frequency converter, controlled locally or by an external controller
- Energy savings at lower speeds
- Wide range of models with varying performance

Your Benefits...

> Optimum adjustment of the volume flow rate or thevacuum value to meet customer requirements

> Reduced electricity costs and noise output levels

> Safety for every application

Designation Code Frequency-Regulated Vacuum Blowers SGBL-FU

Abbreviated designation	Blower type	Suction capacity in m^3/h	Maximum vacuum in mbar	Rated power in kW	Product addition
Example SGBL-FU 335-250-4 ER:					
SGBL	**FU**	**335**	**250**	**4**	**ER**
SGBL	FU frequency-regulated	180 335	400 250	4	ER with electro-pneumatical reversing valve

Ordering Data Frequency-Regulated Vacuum Blowers SGBL-FU

Vacuum blower SGBL-FU is delivered as a ready to connect product.

Available accessories: silencer box

Vacuum Blowers

Frequency-Regulated Vacuum Blowers SGBL-FU

Suction rate from 180 m³/h to 335 m³/h

Frequency-Regulated Vacuum Blowers SGBL-FU

Type	Vacuum blowers	Vacuum blowers with electropneumatical reversing valve
SGBL-FU 180-400	10.04.02.00069	10.04.02.00070
SGBL-FU 335-250	10.04.01.00040	10.04.01.00041

Ordering Accessories Data Frequency-Regulated Vacuum Blowers SGBL-FU

Type	Silencer box
SGBL-FU 180-400-4	10.04.04.00110
SGBL-FU 335-250-4	10.04.04.00110
SGBL-FU 180-400-4-ER	-
SGBL-FU 335-250-4-ER	-

Technical Data Frequency-Regulated Vacuum Blowers SGBL-FU

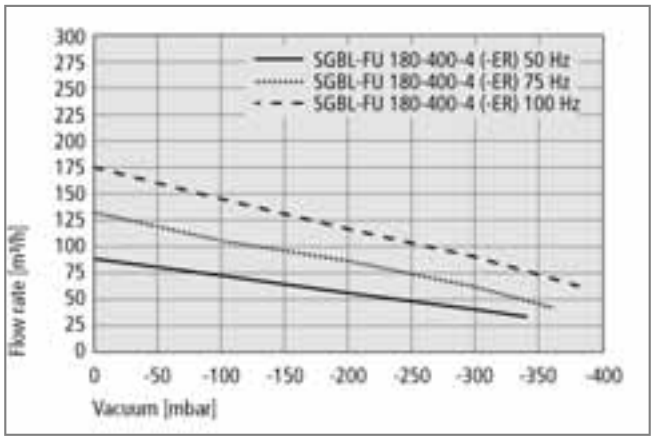
Type	Suction rate at 100 Hz [m³/h]	Max. vacuum [mbar] permanent (> 90 s)	Max. vacuum [mbar] temporary (< 90 s)	Voltage	Voltage reversing	Rated current [A]	current consumption Reversing [mA]
SGBL-FU 180-400-4	180	-400	-500	400V ±10%	-	7.4	-
SGBL-FU 335-250-4	335	-250	-	380-500V AC3	-	7.4	-
SGBL-FU 180-400-4-ER	180	-400	-500	400V ±10%	24V-DC	7.4	320
SGBL-FU 335-250-4-ER	335	-250	-	400V ±10%	24V-DC	7.4	320

*Reduction with silencer box down to approximately 65 %

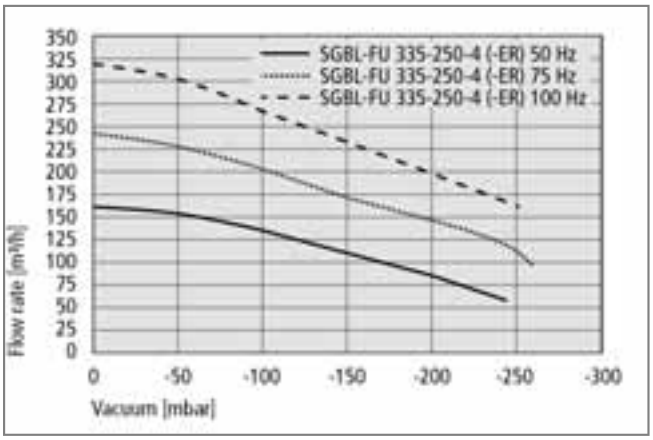
Type	Control pressure range	Rated power [kW] at 100 Hz	Mains frequency [Hz]	Protection IP	Weight [kg]	Noise level at 50 Hz [dB]*
SGBL-FU 180-400-4	-	4	100	IP 54	35	72
SGBL-FU 335-250-4	-	4	100	IP 54	35	72
SGBL-FU 180-400-4-ER	2,5...3 bar	4	100	IP 54	48	72
SGBL-FU 335-250-4-ER	2,5...3 bar	4	100	IP 54	35	72

*Reduction with silencer box down to approximately 65 %

Performance Data Frequency-Regulated Vacuum Blowers SGBL-FU



Flow rate at various degrees of evacuation



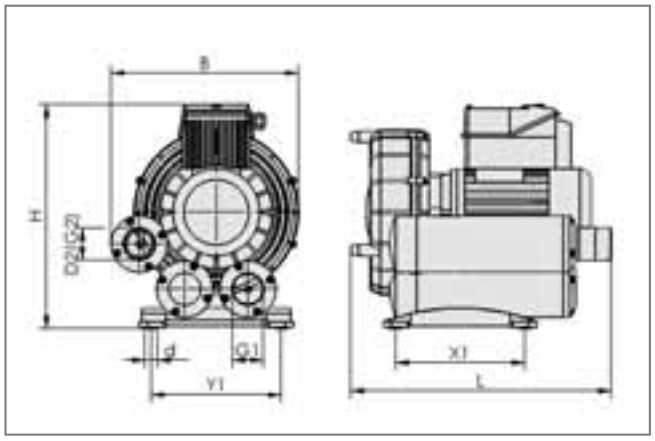
Flow rate at various degrees of evacuation

Vacuum Blowers

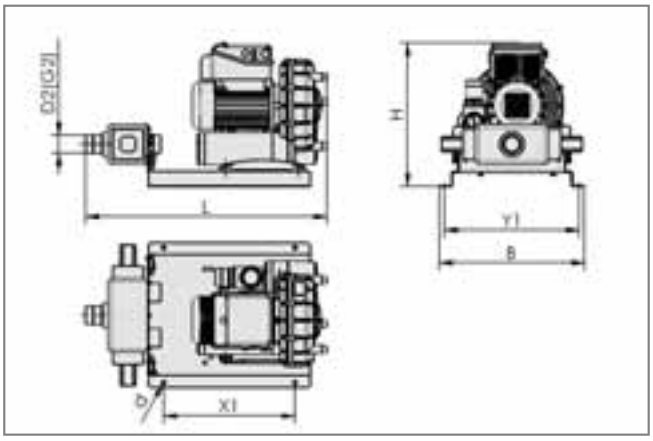
Frequency-Regulated Vacuum Blowers SGBL-FU

Suction rate from 180 m³/h to 335 m³/h

Design Data Frequency-Regulated Vacuum Blowers SGBL-FU



SGBL-FU 180-400-4; SGBL-FU 335-250-4



SGBL-FU 180-400-4-ER; SGBL-FU 335-250-4-ER

Type	Dimensions in mm								
	B	d	D2	G1	G2	H	L	X1	Y1
SGBL-FU 180-400-4	350	12	60	G2"-F	G2"-M	425	445	240	240
SGBL-FU 335-250-4	350	12	60	G2"-F	G2"-M	425	445	240	240
SGBL-FU 180-400-4-ER	480	13	60	-	G2-M	475	800	435	446
SGBL-FU 335-250-4-ER	480	13	60	-	G2"-M	475	800	435	446

Valve Technology

Overview of Section 7

Valve Technology

Everything at a Glance

Selection Aid Page

Overview Valves 518

Checklist for Selection of Valves 518

Solenoid Valves

Inline Valves IV 519

- Nominal diameter: 3 mm
- Nominal flow rate: 2 m³/h
- Voltage: 24 V

Inline valve in compact design for control of the vacuum directly on the suction pad.

Solenoid Valves EMV 522

- Nominal diameter: 2 to 25 mm
- Nominal flow rate: 1 to 88 m³/h
- Voltages =/~ 24/230 V

Directly controlled solenoid valve with short opening and closing times, control of suction, venting and blow-off of the suction pad possible.

Solenoid Valves EMVO 526

- Nominal diameter: 12 to 25 mm
- Nominal flow rate: 21 to 101 m³/h
- Voltages =/~ 24/230 V

Directly controlled solenoid valve with large nominal diameter for high flow rates, control of suction and venting of the suction pad possible.

Solenoid Valves EMVP 528

- Nominal diameter: 5 to 50 mm
- Nominal flow rate: 3 to 310 m³/h
- Voltages =/~ 24/230 V

Pneumatically controlled solenoid valve with extremely short opening and closing times, as well as high nominal flow rates; control of suction and venting of the suction pad possible.

Check Valves

Check Valves SVK, SVKG, SVV 533

- Max. blow-off flow rate: 4.8 to 47.4 m³/h
- Connection thread: M5 to G1/2"

Check valve for sealing the vacuum line as well as for reduction of the volume flow and maintenance of the vacuum if not all suction pads are covered.

Overview of Section 7

Valve Technology

Everything at a Glance

Check Valves SVN

536

PACKAGING WOOD

- Max. blow-off flow rate: 27 m³/h
- Connection thread: G1/4"

Check valve with shaped nipple for direct connection to the suction pad, reduction of the volume flow and maintenance of the vacuum if not all suction pads are covered.

Flow Resistors SW

539

METAL PACKAGING WOOD

- Nozzle diameter: 0.25 to 2.0 mm

Flow resistance without moving parts, in minimum model size for reduction of the volume flow and maintenance of the vacuum if not all suction pads are covered.

Sensing Valves

Sensing Valves TV / TVN

542

UNIVERSAL

- Flow rate: 0.7 to 9.6 m³/h
- Connection thread: G1/8" to G1/2"

Sensing valve as spring-loaded sensing plunger for mechanically checking the coverage of the suction pad.

Non-Return Valves

Non-Return Valves RSV

545

UNIVERSAL

- Nominal diameter: 6 to 54 mm
- Nominal flow rate: 5 to 350 m³/h
- Connection thread: G1/4" to G2"

Non-return valve with spring return safeguards the system in case of power failure or failure of the vacuum generator.

Manually Actuated Valves

Two-Way Ball Valves KVZ

548

UNIVERSAL

- Nominal diameter: 8 to 50 mm
- Nominal flow rate: 5 to 310 m³/h

Manual two-way ball valve for switching entire vacuum/pressure circuits or individual suction pads on or off.

Three-Way Ball Valves KVD

550

UNIVERSAL

- Nominal diameter: 6 to 25 mm
- Nominal flow rate: 5 to 55 m³/h

Manual three-way ball valve for switching entire vacuum or pressure circuits or individual suction pads on or off.

Overview of Section 7

Valve Technology

Everything at a Glance

Manual Slide Valves HSV

552

- Nominal diameter: 7 to 24 mm
- Nominal flow rate: 6 to 50 m³/h

Manual sliding valve for manually switching entire vacuum or pressure circuits or individual suction pads on or off.

Overview Valves

Application	Check Valves	Flow Resistors	Sensing Valves
Handling of porous workpieces such as chipboards and MDF panels	● (If type SVN is used)	●	
Handling of air-tight workpieces such as sheets of metal of varying sizes	●		●
Handling of cardboard sheets and boxes of varying sizes		●	
Handling operations with very short cycle times	●		●
Cases where some of the suction pads are not fully in contact with the workpiece	●	●	
Cases where the workpiece is to be blown off for faster release	●	Restricted by the reduced cross-section	

Checklist for Selection of Valves

Which functions are required?	We can supply solenoid valves (3/2-way, 2/2-way), manually actuated vacuum and compressed-air valves, check valves, sensing valves and flow resistors.
Which volume flow rate needs to be controlled?	This determines the nominal flow rate and the size of the valve.
What are the requirements with respect to size, weight and cycle times?	Further information can be found in the design data and/or technical data of the valves.
Which type of energy is available?	See the notes in the design data or the technical data (solenoid valve EMVP also needs a compressed-air supply).
Does the workpiece need to be released very quickly (blown off)?	With type EMV, compressed-air for blowing off can be connected directly. Otherwise, additional valves are needed for this function.

Solenoid Valves

Inline Valves IV

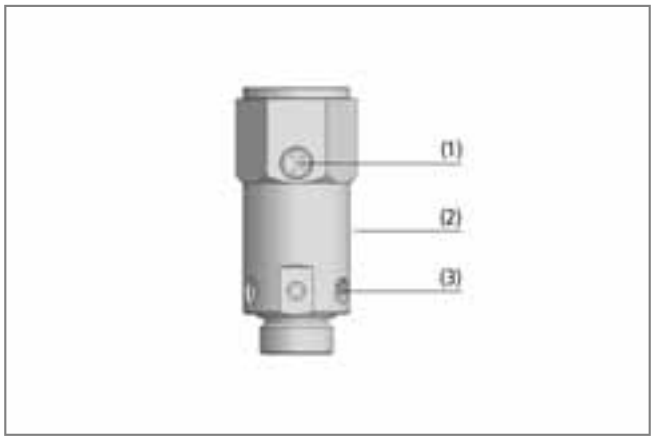
Nominal diameter 3 mm

Suitability for Industry-Specific Applications

Inline valves IV

Applications

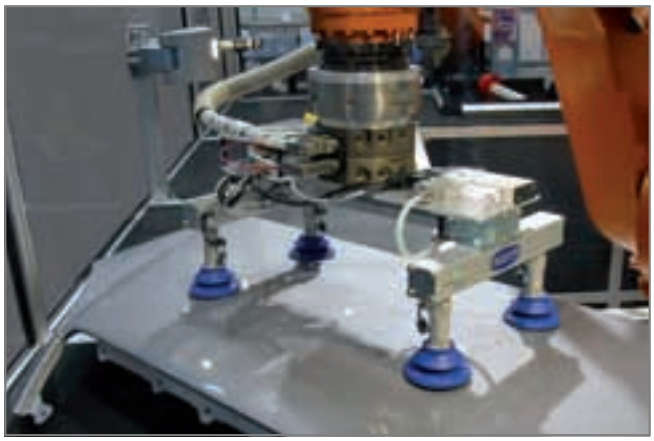
- Inline valve for deactivation of unused suction pads
- Individual control of the suction pads of a "vacuum carpet", e.g. when picking items from stock
- System monitoring in vacuum spiders by active activation and de-activation of suction pads



System design inline valves IV

Design

- Attachment facility for vacuum sensor
- External body made of aluminum (2)
- Integrated filter (3) for ventilation
- 4-pin M8 connector (1)
- Nominal diameter 3 mm; nominal flow rate 2 m³/h



Suction pads with inline valves IV being used for handling car bodywork parts

Our Highlights...

- Direct mounting in a suction pad
- Compact construction, simple installation
- Integrated filter screen to protect against dirt
- Decentralized vacuum control and system monitoring with a valve and an optional Mini-Sensor

Your Benefits...

> Individual control of single suction pads

> Minimum space requirements; simple installation

> Increased functional safety

> Improved process reliability and reduced standstill times of vacuum systems

Solenoid Valves

Inline Valves IV

Nominal diameter 3 mm

Designation Code Inline Valves IV

Abbreviated designation		Nominal size in mm	Version		Vacuum connection	Suction pad connection	Voltage in V
Example	**IV 3 3/2 G3/8-IG G3/8-AG 24V-DC:**						
IV		**3**	**3/2**		**G3/8-IG**	**G3/8-AG**	**24V-DC**
IV		3	3/2	3/2-way valve	G3/8-IG (IG = female (F)) G1/4-IG	G3/8-AG (AG = male (M))	24V-DC

Ordering Data Inline Valves IV

Inline valve IV is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, vacuum sensors

Inline Valves IV

Type	Part Number
IV 3 3/2 G3/8-IG G3/8-AG 24V-DC	10.05.01.00172
IV 3 3/2 G1/4-IG G3/8-AG 24V-DC	10.05.01.00173

Ordering Data Accessories Inline Valves IV

Type	Connection cable, 5 m, M8 straight	Connection cable, 5 m, M8 90°	Vacuum sensors analogue VS-V SA M5*	Vacuum sensors digital VS-V SD 60 M5*
IV3 G3/8-IG G3/8-AG 24V-DC	10.06.02.00031	10.06.02.00032	10.06.02.00224	10.06.02.00257
IV3 G1/4-IG G3/8-AG 24V-DC	10.06.02.00031	10.06.02.00032	10.06.02.00224	10.06.02.00257

*See section "Switches and system monitoring" for further details

Technical Data Inline Valves IV

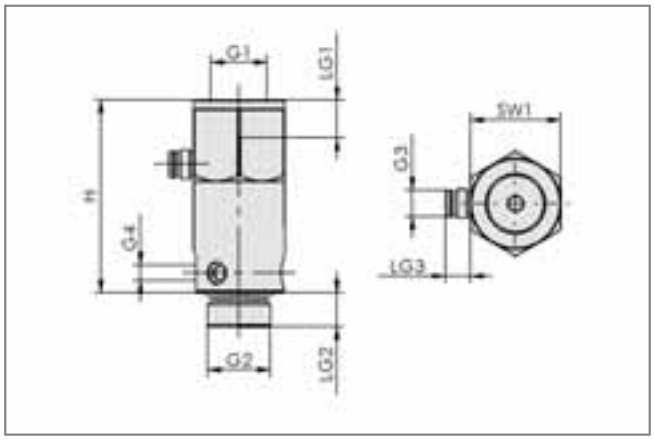
Type	Nominal size [mm]	Principle of operation	Voltage	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Weight [kg]
IV 3 3/2 G3/8-IG G3/8-AG 24V-DC	3	Normally open	24V - DC	2	33	2.4	0.065
IV 3 3/2 G1/4-IG G3/8-AG 24V-DC	3	Normally open	24V - DC	2	33	2.4	0.065

Solenoid Valves

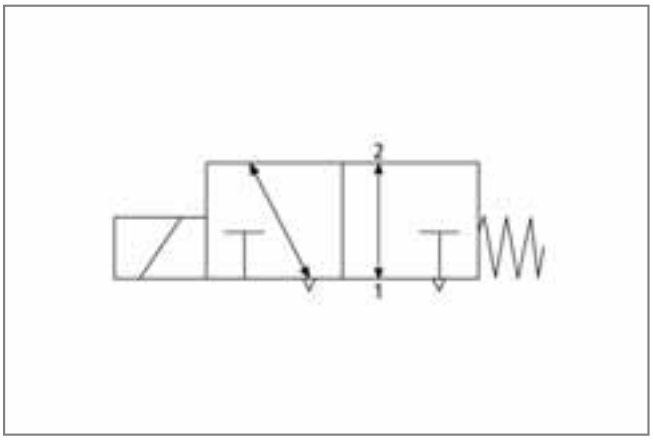
Inline Valves IV

Nominal diameter 3 mm

Design Data and Functional Circuit Diagramm Inline Valves IV



IV 3



Circuit diagram IV 3 (1 = vacuum generator; 2 = suction pad)

Type	Dimensions in mm								
	G1	G2	G3	G4	H	LG1	LG2	LG3	SW1
IV 3 3/2 G3/8-IG G3/8-AG 24V-DC	G3/8"-F	G3/8"-M	M8-M	M5-F	51	10	9	6.5	24
IV 3 3/2 G1/4-IG G3/8-AG 24V-DC	G1/4"-F	G3/8"-M	M8-M	M5-F	51	10	9	6.5	24

Solenoid Valves

Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm

Suitability for Industry-Specific Applications

Solenoid valves EMV

Applications

- Control of vacuum, blow-off and venting of the suction pad
- Control of compressed air or vacuum in lines with smaller cross-sections
- NO function ensures workpiece is held even in the case of a power failure
- For handling tasks with short switching times
- Suitable for neutral or filtered air

Design

- Directly controlled solenoid valve
- Valve EMV 2 and EMV 3 always with NC switching function
- Degree of protection IP 65
- Connection socket complies with DIN 43 650, Form A
- Supplied complete with plug connector and (for DC operation) a quenching diode

Our Highlights...

- Seat valve in robust metal housing
- Directly controlled
- 3/2-way valve (exception: EMV 3 is a 2/2-way valve)
- Switching function NO (exception: EMV 2 and EMV 3 are NC)

Your Benefits...

> Suitable for vacuum and compressed air

> Short opening and closing times

> Control of on/off and venting functions

> Safety in the case of a power failure

Designation Code Solenoid Valves EMV

Abbreviated designation	Nominal size in mm	Voltage in V	Version	Idle position suction valve
Example EMV 5 24V-DC 3/2 NO:				
EMV	**5**	**24V-DC**	**3/2**	**NO**
EMV	2 3 5 10 15 20 25	24V-DC direct current 230V-AC single-phase	3/2 3/2-way-valve	NC normally closed NO normally open

Ordering Data Solenoid Valves EMV

Solenoid valve EMV is delivered as a ready to connect product.

Available accessories: venting filter

Solenoid Valves

Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm

Solenoid Valves EMV

Type	Operating voltage	
	230V-AC	24V-DC
EMV 2	-	10.05.01.00290
EMV 3	10.05.01.00067	10.05.01.00066
EMV 5	10.05.01.00069	10.05.01.00068
EMV 10	10.05.01.00071	10.05.01.00070
EMV 15	10.05.01.00073	10.05.01.00072
EMV 20	10.05.01.00075	10.05.01.00074
EMV 25	10.05.01.00077	10.05.01.00076

Ordering Accessories Data Solenoid Valves EMV

Type	Venting filter with mounting kit
EMV 2	-
EMV 3	-
EMV 5	10.05.01.00060
EMV 10	10.05.01.00061
EMV 15	10.05.01.00062
EMV 20	10.05.01.00063
EMV 25	10.05.01.00064

Technical Data Solenoid Valves EMV

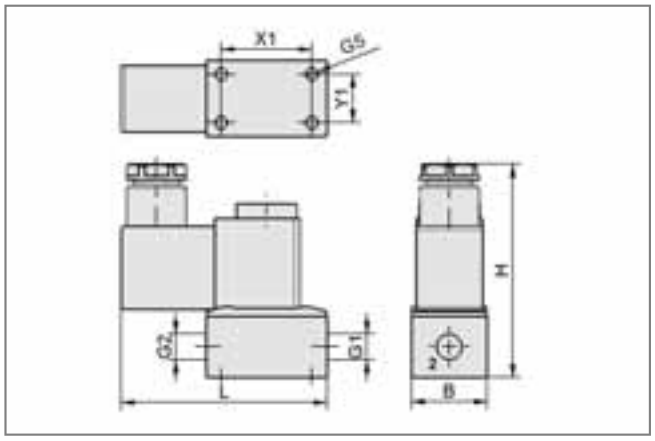
Type	Nominal size [mm]	Principle of operation	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Closing time [ms]	Weight [kg]
EMV 2	2	Normally closed	1	17	2.5	10	0.150
EMV 3	3	Normally closed	2	33	5.0	20	0.200
EMV 5	5	Normally open	4	67	15.0	20	0.518
EMV 10	10	Normally open	20	333	32.0	25	2.510
EMV 15	15	Normally open	34	567	38.4	80	4.665
EMV 20	20	Normally open	53	883	40.8	100	6.375
EMV 25	25	Normally open	88	1467	63.8	135	9.600

Solenoid Valves

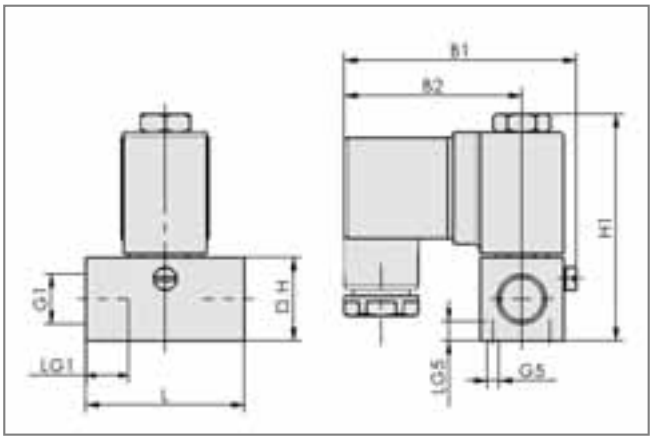
Solenoid Valves EMV

Nominal diameter from 2 mm to 25 mm

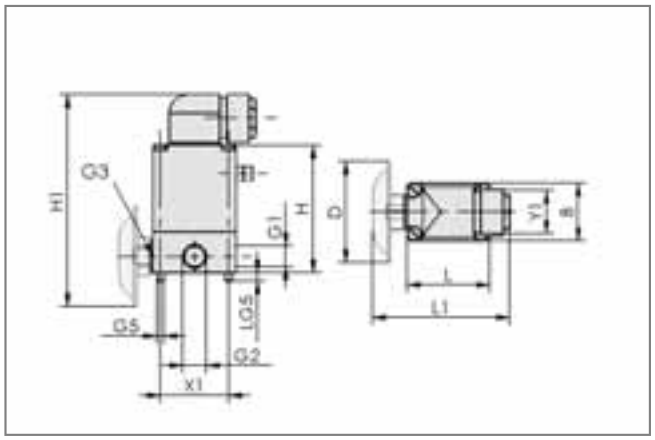
Design Data Solenoid Valves EMV



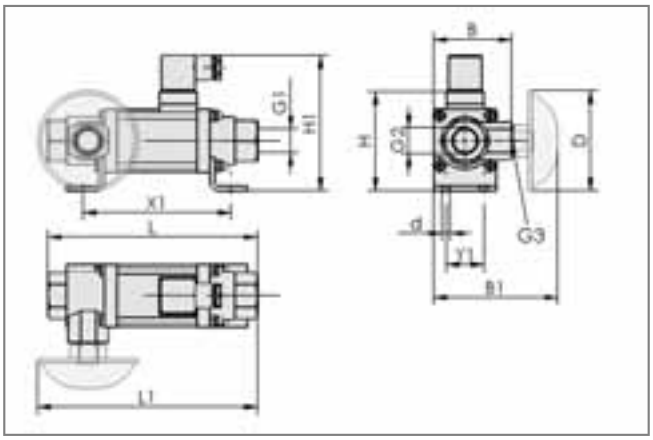
EMV 2



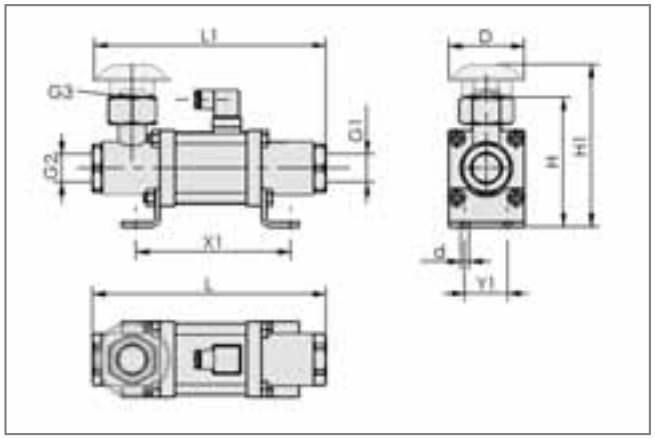
EMV 3



EMV 5



EMV 10

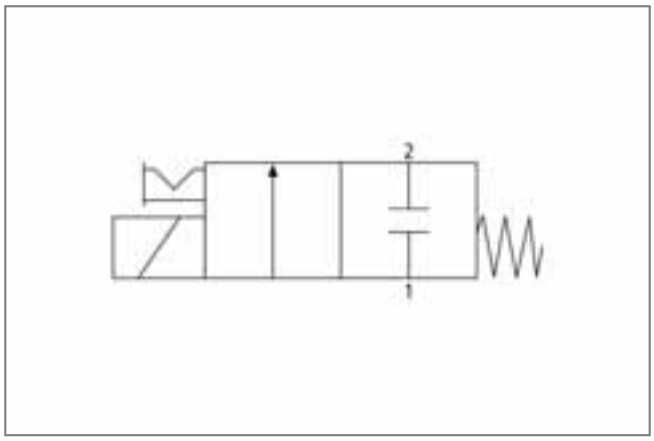


EMV 15...25

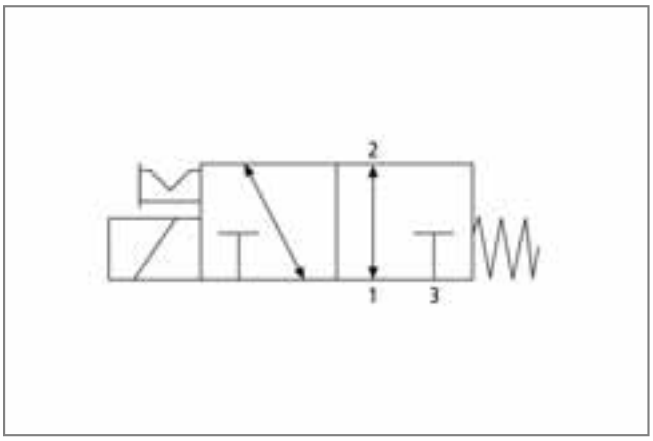
Design Data Solenoid Valves EMV

Type	Dimensions in mm															
	B	B1	B2	d	D	G1	G2	G3	G5	H	H1	L	L1	LG1	LG5	X1	Y1
EMV 2	25	-	-	-	-	G1/8"-F	G1/8"-F	-	M5-F	70	-	68.0	-	-	-	30.0	16
EMV 3	-	61.5	47	-	-	G1/4"-F	-	-	M3-F	22	60.0	42.0	-	12	5	-	-
EMV 5	32	-	-	-	56	G1/4"-F	G1/4"-F	G1/4"-F	M4-F	71	118.0	46.0	76.0	-	5	38.0	24
EMV 10	62	98.5	-	7.0	80	G1/2"-F	G1/2"-F	G1/2"-F	-	79	108.0	166.5	174.5	-	-	117.5	30
EMV 15	-	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	-	113	139.5	209.0	211.0	-	-	133.0	40
EMV 20	-	-	-	8.5	80	G1"-F	G1"-F	G1"-F	-	137	172.0	247.0	245.0	-	-	164.0	45
EMV 25	-	-	-	8.5	80	G1-1/4"-F	G1-1/4"-F	G1-1/4"-F	-	145	180.0	281.0	271.5	-	-	94.0	72

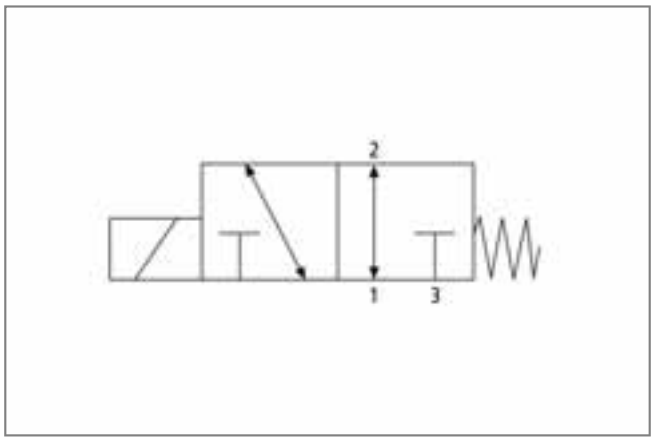
Functional Circuit Diagram Solenoid Valves EMV



Circuit diagram EMV 3 (1 = vacuum generator; 2 = suction pad)



Circuit diagram EMV 2, EMV 5 (1 = vacuum generator; 2 = suction pad; 3 = ventilation)



Circuit diagram EMV 10-25 (1 = vacuum generator; 2 = suction pad; 3 = ventilation)

Solenoid Valves

Solenoid Valves EMVO

Nominal diameter from 12 mm to 25 mm

UNIVERSAL

Suitability for Industry-Specific Applications

Solenoid valves EMVO

Applications

- Solenoid valve for use at high volume flow rates in systems with large cross-sections
- Control of vacuum, blow-off and venting of the suction pad
- Suitable for neutral or filtered air

Design

- Directly controlled solenoid valve
- Switching function (NC)
- Seat valve in housing made of brass and aluminum
- Degree of protection IP 65
- Connection socket complies with DIN 43 650, Form A
- Supplied complete with plug connector

Our Highlights...

- 3/2-way valve
- Valve with large nominal diameter
- Directly controlled

Your Benefits...

> Control of vacuum on/off or venting function

> Suitable for lines with large nominal flow rates

> Short opening and closing times

Designation Code Solenoid Valves EMVO

Abbreviated designation	Nominal size in mm	Voltage in V	Version	Idle position suction valve
Example EMVO 12 230V-AC 3/2 NC:				
EMVO	**12**	**230V-AC**	**3/2**	**NC**
EMVO	12 20 25	24V-DC direct current 230V-AC single-phase	3/2 3/2-way-valve	NC normally closed NO normally open

Ordering Data Solenoid Valves EMVO

Solenoid valve EMVO is delivered as a ready to connect product.

Available accessories: venting filter

Solenoid Valves

Solenoid Valves EMVO

Nominal diameter from 12 mm to 25 mm

Solenoid Valves EMVO

Type	Operating voltage	
	230V-AC	24V-DC
EMVO 12	10.05.01.00052	10.05.01.00049
EMVO 20	10.05.01.00053	10.05.01.00050
EMVO 25	-	10.05.01.00051

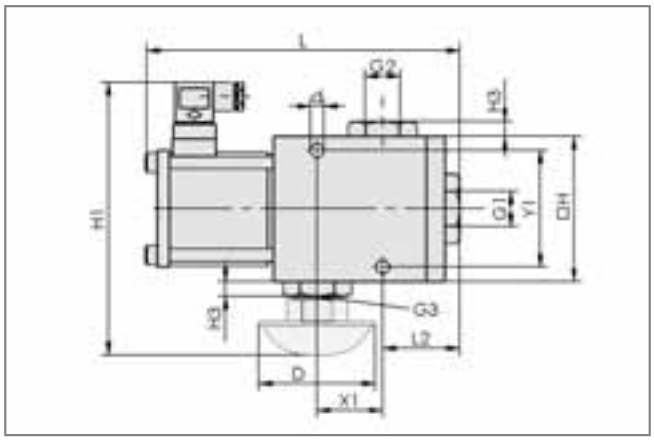
Ordering Data Accessories Solenoid Valves EMVO

Type	Venting filter with mounting kit
EMVO 12	10.05.01.00061
EMVO 20	10.05.01.00062
EMVO 25	10.05.01.00063

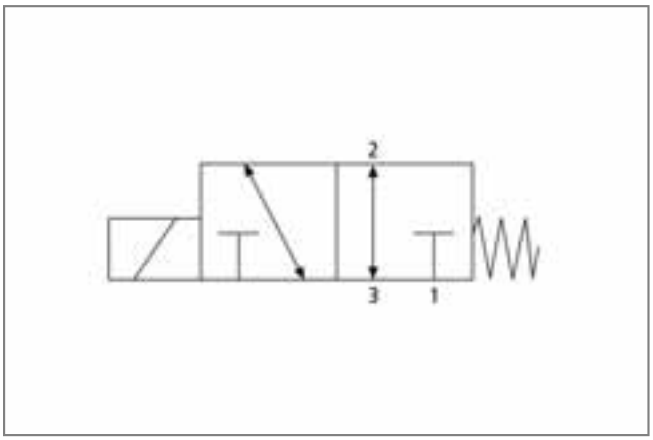
Technical Data Solenoid Valves EMVO

Type	Nominal size [mm]	Principle of operation	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Power consumption AC3 [W]	Weight [kg]
EMVO 12	12	Normally closed	21	350	18.3	35.2	1.2
EMVO 20	20	Normally closed	72	1200	40.8	35.2	5.8
EMVO 25	25	Normally closed	101	1683	40.8	35.2	5.7

Design Data and Functional Circuit Diagram Solenoid Valves EMVO



EMVO 12 to 25



Circuit diagram EMVO (1 = vacuum generator; 2 = suction pad; 3 = ventilation)

Type	Dimensions in mm											
	d	D	G1	G2	G3	H	H1	H3	L	L2	X1	Y1
EMVO 12	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	60	135.5	-	122	32	24	40
EMVO 20	9.0	80	G3/4"-F	G3/4"-F	G3/4"-F	100	187.5	10	206	43	45	80
EMVO 25	9.0	80	G1"-F	G1"-F	G1"-F	100	172.0	-	206	43	45	80

Solenoid Valves

Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm

UNIVERSAL

Suitability for Industry-Specific Applications

Solenoid valves EMVP

Applications

- Solenoid valve for control at high nominal flow rates
- Control of vacuum, blow-off and venting of the suction pad
- NO function ensures the workpiece is held even in the case of a power failure
- For handling tasks with very short switching times
- Suitable for neutral or filtered gases

Design

- Solenoid valve with pneumatic pilot control
- Seat valve in aluminum housing (EMVP 5, EMVP 8) as well as plastic housing EMVP 10 to 50
- Degree of protection IP 65 according to EN 60529
- Connection socket (EMVP 10-50) complies with DIN 43 650, Form A
- Supplied complete with plug connector and (for DC operation) a quenching diode

Our Highlights...

- Pilot control with compressed air (p = 5 bar)
- Wide range of nominal diameters
- 3/2-way valve
- Bistable impulse valve

Your Benefits...

> Extremely short opening and closing times
> Also suitable for high volume flow rates
> Control of vacuum on/off or venting functions
> Prevention of air consuption in case of power failures

Designation Code Solenoid Valves EMVP

Abbreviated designation	Nominal size in mm	Voltage in V	Version	Idle position suction valve
Example EMVP 15 24V-DC 3/2 NC:				
EMVP	**15**	**24V-DC**	**3/2**	**NC**
EMVP	5 8 10 15 20 25 32 50	24V-DC direct current 230V-AC single-phase	3/2 3/2-way-valve 5/2 5/2-way-valve	IMP bistable, switched with pulse NC normally closed NO normally open

Ordering Data Solenoid Valves EMVP

Solenoid valve EMVP is delivered as a ready to connect product.

Available accessories: venting filter, connection cable for solenoid valves, socket with M12-connection

Solenoid Valves EMVP

Type	Part Number
EMVP 5 24V-DC 3/2 NC	10.05.02.00162
EMVP 5 24V-DC 5/2 IMP	10.05.02.00163
EMVP 8 24V-DC 3/2 NC	10.05.02.00164
EMVP 8 24V-DC 5/2 IMP	10.05.02.00165
EMVP 10 230V-AC 3/2 NO	10.05.02.00143
EMVP 10 24V-DC 3/2 NO	10.05.02.00144
EMVP 15 230V-AC 3/2 NO/NC	10.05.02.00145
EMVP 15 24V-DC 3/2 NO/NC	10.05.02.00146
EMVP 15 24V-DC 3/2 IMP	10.05.02.00147
EMVP 20 230V-AC 3/2 NO/NC	10.05.02.00148
EMVP 20 24V-DC 3/2 NO/NC	10.05.02.00149
EMVP 20 24V-DC 3/2 IMP	10.05.02.00167
EMVP 25 230V-AC 3/2 NO/NC	10.05.02.00150
EMVP 25 24V-DC 3/2 NO/NC	10.05.02.00151
EMVP 25 24V-DC 3/2 IMP	10.05.02.00152
EMVP 32 230V-AC 3/2 NO	10.05.02.00074
EMVP 32 24V-DC 3/2 NO	10.05.02.00068
EMVP 50 230V-AC 3/2 NO	10.05.02.00075
EMVP 50 24V-DC 3/2 NO	10.05.02.00069

Ordering Data Accessories Solenoid Valves EMVP

Type	Venting filter with mounting kit	Connection cable for solenoid valves (3 m, PUR)	Socket with M12-connection
EMVP 5 24V-DC 3/2 NC	-	-	-
EMVP 5 24V-DC 5/2 IMP	-	-	-
EMVP 8 24V-DC 3/2 NC	-	-	-
EMVP 8 24V-DC 5/2 IMP	-	-	-
EMVP 10 230V-AC 3/2 NO	10.05.01.00065	-	-
EMVP 10 24V-DC 3/2 NO	10.05.01.00065	-	10.05.02.00157
EMVP 15 230V-AC 3/2 NO/NC	10.05.01.00061	-	-
EMVP 15 24V-DC 3/2 NO/NC	10.05.01.00061	-	10.05.02.00157
EMVP 15 24V-DC 3/2 IMP	10.05.01.00061	21.04.06.00086	-
EMVP 20 230V-AC 3/2 NO/NC	10.05.01.00062	-	-
EMVP 20 24V-DC 3/2 NO/NC	10.05.01.00062	-	10.05.02.00157
EMVP 20 24V-DC 3/2 IMP	10.05.01.00062	21.04.06.00086	-
EMVP 25 230V-AC 3/2 NO/NC	10.05.01.00063	-	-
EMVP 25 24V-DC 3/2 NO/NC	10.05.01.00063	-	10.05.02.00157
EMVP 25 24V-DC 3/2 IMP	10.05.01.00063	21.04.06.00086	-
EMVP 32 230V-AC 3/2 NO	10.05.01.00062	-	-
EMVP 32 24V-DC 3/2 NO	10.05.01.00062	-	10.05.02.00157
EMVP 50 230V-AC 3/2 NO	10.05.01.00064	-	-
EMVP 50 24V-DC 3/2 NO	10.05.01.00064	-	10.05.02.00157

Solenoid Valves

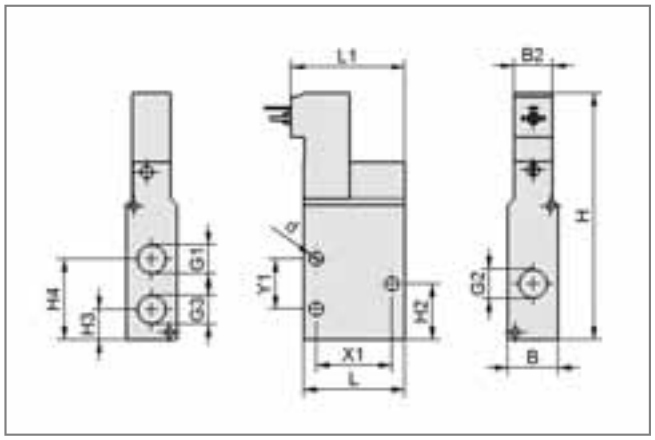
Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm

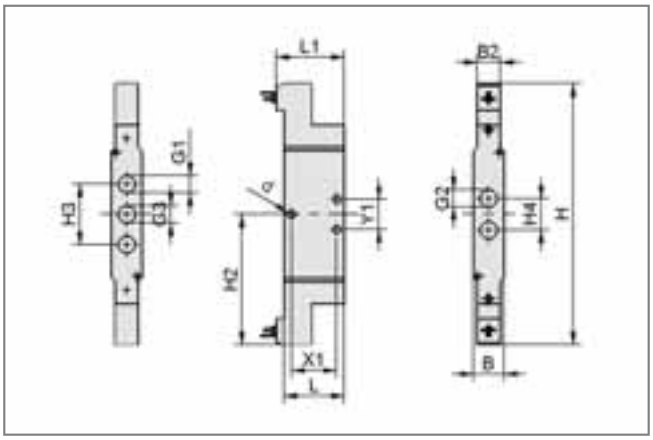
Technical Data Solenoid Valves EMVP

Type	Nominal size [mm]	Principle of operation	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Power consumption DC [W]	Closing time [ms]	Weight [kg]
EMVP 5 24V-DC 3/2 NC	5	Normally closed	3	50	1	19	0.11
EMVP 5 24V-DC 5/2 IMP	5	Double pilot valve	3	50	1	13	0.16
EMVP 8 24V-DC 3/2 NC	8	Normally closed	6	100	1	19	0.15
EMVP 8 24V-DC 5/2 IMP	8	Double pilot valve	6	100	1	11	0.27
EMVP 10 230V-AC 3/2 NO	10	Normally open	10	167	5	22	0.42
EMVP 10 24V-DC 3/2 NO	10	Normally open	10	167	5	22	0.42
EMVP 15 230V-AC 3/2 NO/NC	15	Optionally NO/NC	20	333	5	90	0.39
EMVP 15 24V-DC 3/2 NO/NC	15	Optionally NO/NC	20	333	5	90	0.39
EMVP 15 24V-DC 3/2 IMP	15	Double pilot valve	20	333	5	110	0.55
EMVP 20 230V-AC 3/2 NO/NC	20	Optionally NO/NC	40	667	5	90	0.37
EMVP 20 24V-DC 3/2 NO/NC	20	Optionally NO/NC	40	667	5	90	0.37
EMVP 20 24V-DC 3/2 IMP	20	Double pilot valve	40	667	5	110	0.53
EMVP 25 230V-AC 3/2 NO/NC	25	Optionally NO/NC	90	1500	5	80	0.52
EMVP 25 24V-DC 3/2 NO/NC	25	Optionally NO/NC	90	1500	5	80	0.52
EMVP 25 24V-DC 3/2 IMP	25	Double pilot valve	90	1500	5	100	0.68
EMVP 32 230V-AC 3/2 NO	32	Normally open	130	2167	5	300	0.50
EMVP 32 24V-DC 3/2 NO	32	Normally open	130	2167	5	300	0.50
EMVP 50 230V-AC 3/2 NO	50	Normally open	310	5167	5	500	1.36
EMVP 50 24V-DC 3/2 NO	50	Normally open	310	5167	5	500	1.36

Design Data Solenoid Valves EMVP



EMVP 5/8...NC



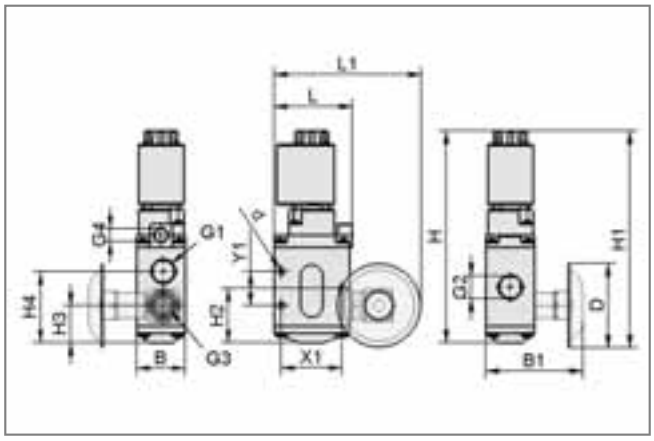
EMVP 5/8...IMP

Solenoid Valves

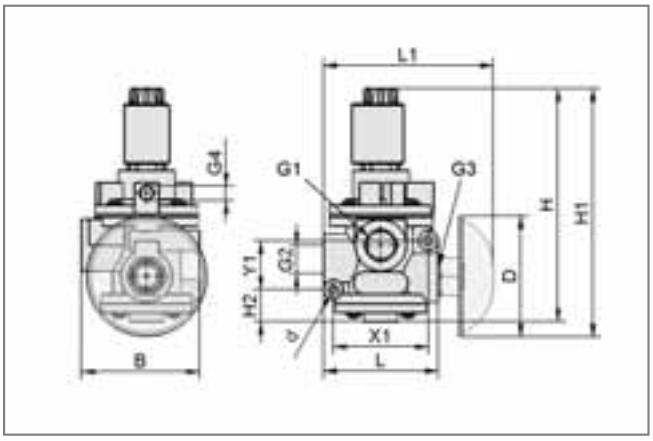
Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm

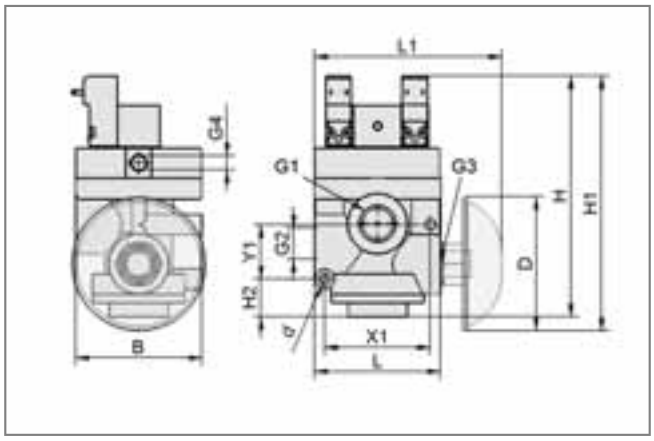
Design Data Solenoid Valves EMVP



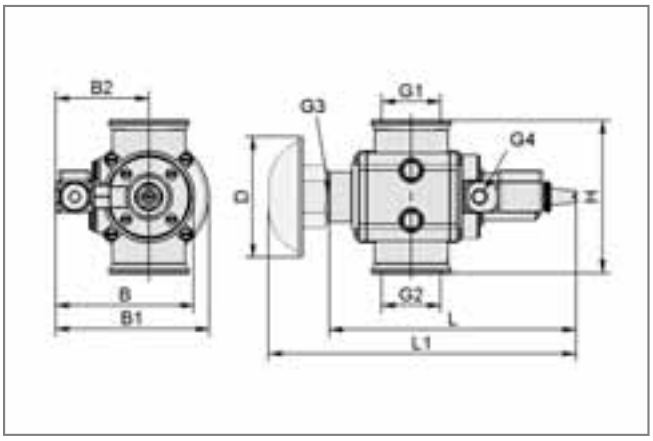
EMVP 10



EMVP 15/20/25...NO/NC



EMVP 15/20/25...IMP



EMVP 32/50

Type	Dimensions in mm								
	B	B1	B2	d	D	G1	G2	G3	G4
EMVP 5 24V-DC 3/2 NC	15.0	-	15.0	4.3	-	G1/8"-F	G1/8"-F	G1/8"-F	-
EMVP 5 24V-DC 5/2 IMP	15.2	-	15.2	4.3	-	G1/8"-F	G1/8"-F	G1/8"-F	-
EMVP 8 24V-DC 3/2 NC	20.0	-	15.2	5.5	-	G1/4"-F	G1/4"-F	G1/4"-F	-
EMVP 8 24V-DC 5/2 IMP	20.0	-	15.2	5.5	-	G1/4"-F	G1/4"-F	G1/4"-F	-
EMVP 10 230V-AC 3/2 NO	35.0	65	-	4.3	56	G3/8"-F	G3/8"-F	G3/8"-F	G1/8"-F
EMVP 10 24V-DC 3/2 NO	35.0	65	-	4.3	56	G3/8"-F	G3/8"-F	G3/8"-F	G1/8"-F
EMVP 15 230V-AC 3/2 NO/NC	75.0	-	-	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	G1/8"-F
EMVP 15 24V-DC 3/2 NO/NC	75.0	-	-	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	G1/8"-F
EMVP 15 24V-DC 3/2 IMP	75.0	-	-	6.5	80	G1/2"-F	G1/2"-F	G1/2"-F	G1/8"-F
EMVP 20 230V-AC 3/2 NO/NC	75.0	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	G1/8"-F
EMVP 20 24V-DC 3/2 NO/NC	75.0	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	G1/8"-F
EMVP 20 24V-DC 3/2 IMP	75.0	-	-	6.5	80	G3/4"-F	G3/4"-F	G3/4"-F	G1/8"-F
EMVP 25 230V-AC 3/2 NO/NC	94.0	-	-	8.0	80	G1"-F	G1"-F	G1"-F	G1/8"-F
EMVP 25 24V-DC 3/2 NO/NC	94.0	-	-	8.0	80	G1"-F	G1"-F	G1"-F	G1/8"-F
EMVP 25 24V-DC 3/2 IMP	94.0	-	-	8.0	80	G1"-F	G1"-F	G1"-F	G1/8"-F
EMVP 32 230V-AC 3/2 NO	90.5	101	61.5	-	80	G1-1/4"-F	G1-1/4"-F	G3/4"-F	G1/8"-F
EMVP 32 24V-DC 3/2 NO	90.5	101	61.5	-	80	G1-1/4"-F	G1-1/4"-F	G3/4"-F	G1/8"-F
EMVP 50 230V-AC 3/2 NO	114.0	151	105.5	-	80	G2"-F	G2"-F	G1-1/4"-F	G1/8"-F
EMVP 50 24V-DC 3/2 NO	114.0	151	105.5	-	80	G2"-F	G2"-F	G1-1/4"-F	G1/8"-F

Solenoid Valves

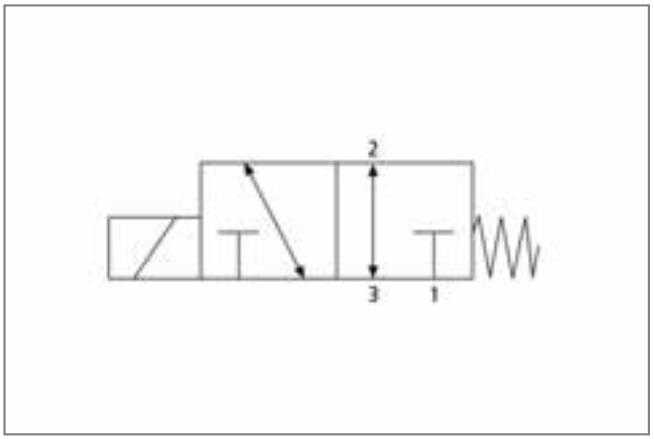
Solenoid Valves EMVP

Nominal diameter from 5 mm to 50 mm

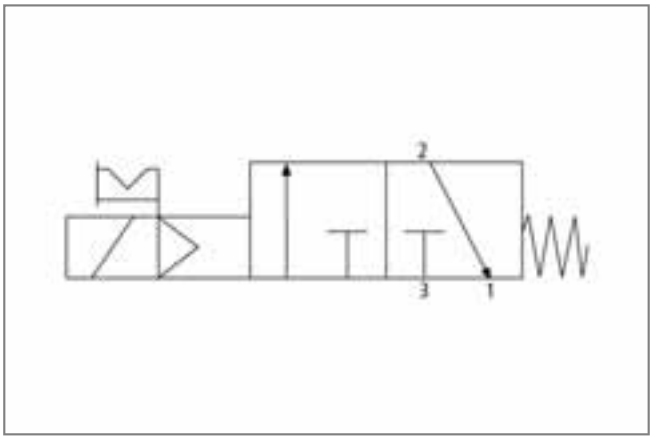
Design Data Solenoid Valves EMVP

Type	Dimensions in mm								
	H	H1	H2	H3	H4	L	L1	X1	Y1
EMVP 5 24V-DC 3/2 NC	88	-	20	12.0	27	32	37	23	15
EMVP 5 24V-DC 5/2 IMP	153	-	76	30.0	15	32	37	23	15
EMVP 8 24V-DC 3/2 NC	98	-	22	12.0	32	40	45	30	20
EMVP 8 24V-DC 5/2 IMP	173	-	86	40.0	21	40	45	30	20
EMVP 10 230V-AC 3/2 NO	148	143.5	33	20.5	45	50	98	40	23
EMVP 10 24V-DC 3/2 NO	148	143.5	33	20.5	45	50	98	40	23
EMVP 15 230V-AC 3/2 NO/NC	166	174.8	23	-	-	75	112	63	33
EMVP 15 24V-DC 3/2 NO/NC	166	174.8	23	-	-	75	112	63	33
EMVP 15 24V-DC 3/2 IMP	144	152.1	23	-	-	75	112	63	33
EMVP 20 230V-AC 3/2 NO/NC	166	174.8	23	-	-	75	116	63	33
EMVP 20 24V-DC 3/2 NO/NC	166	174.8	23	-	-	75	116	63	33
EMVP 20 24V-DC 3/2 IMP	144	152.1	23	-	-	75	116	63	33
EMVP 25 230V-AC 3/2 NO/NC	190	196.5	22	-	-	94	132	76	37
EMVP 25 24V-DC 3/2 NO/NC	190	196.5	22	-	-	94	132	76	37
EMVP 25 24V-DC 3/2 IMP	167	173.8	22	-	-	94	132	76	37
EMVP 32 230V-AC 3/2 NO	101	-	-	-	-	163	204	-	-
EMVP 32 24V-DC 3/2 NO	101	-	-	-	-	163	204	-	-
EMVP 50 230V-AC 3/2 NO	142	-	-	-	-	225	260	-	-
EMVP 50 24V-DC 3/2 NO	142	-	-	-	-	225	260	-	-

Functional Circuit Diagram Solenoid Valves EMVP



Circuit diagram EMVP 5 and EMVP 8 (1 = vacuum generator; 2 = suction pad; 3 = ventilation)



Circuit diagram EMVP 10 to 50 NO/NC (1 = vacuum generator; 2 = suction pad; 3 = ventilation)

Check Valves

Check Valves SVK, SVKG, SVV

Connection thread from M5 to G1/2"

Suitability for Industry-Specific Applications

Check valves SVK, SVKG, SVV

Applications

- Check valve for applications where some of the suction pads may not be in contact with the workpiece
- Deactivation of unused suction pads, the system vacuum is maintained
- Handling of workpieces with varying sizes and shapes with the same gripper system

Design

- Ball seat valve
- Ball in brass seat, installed in a space-saving manner in an aluminum body
- On the type SVV, the flow rate can be adjusted continuously with an adjusting screw
- Suitable for installation in any orientation

Our Highlights...

- Check valve in the form of a ball seat valve
- Reaction dependent on the volume flow rate
- Wide range of nominal sizes
- Available with male thread at the top (type SVK) or bottom (type SVKG)

Your Benefits...

> Closing of vacuum lines leading to unused suction pads to maintain the system vacuum

> Low leakage rate which can be compensated with the aid of a bypass

> Suitable for use in applications with high nominal flow rates

> Can be connected to all common suction pads and plates

Designation Code Check Valves SVK, SVKG, SVV

Abbreviated designation	Connection thread
Example SVK M5-IG:	
SVK	**M5-IG**
SVK male thread at the top	M5-AG (AG = male (M))
SVKG male thread at the bottom	M5-IG (IG = female (F))
SVV adjusting screw	G1/8-AG
	G1/8-IG
	G1/4-AG
	G1/4-IG
	G3/8-AG
	G3/8-IG
	G1/2-AG
	G1/2-IG

Ordering Data Check Valves SVK, SVKG, SVV

Check valve SVK, SVKG, SVV is delivered as a ready to connect product.

Check Valves

Check Valves SVK, SVKG, SVV

Connection thread from M5 to G1/2"

Check Valves SVK, SVKG, SVV

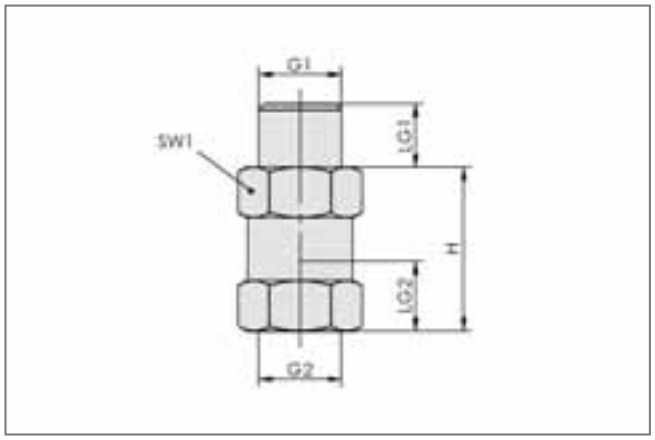
Type	Part Number
SVK M5-IG	10.05.03.00033
SVK G1/8-IG	10.05.03.00034
SVK G1/4-IG	10.05.03.00035
SVK G3/8-IG	10.05.03.00036
SVK G1/2-IG	10.05.03.00037
SVKG M5-AG	10.05.03.00166
SVKG G1/8-AG	10.05.03.00128
SVKG G1/4-AG	10.05.03.00131
SVKG G3/8-AG	10.05.03.00135
SVKG G1/2-AG	10.05.03.00133
SVV G1/4-IG	10.05.03.00003

Technical Data Check Valves SVK, SVKG, SVV

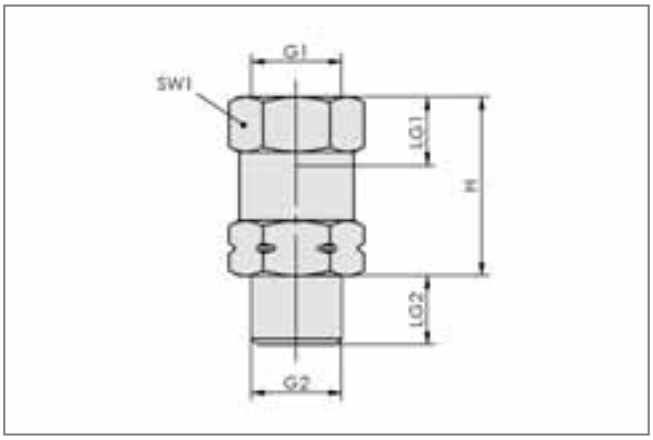
Type	Required evacuation rate for pu = -0,3 bar [m³/h]	Required evacuation rate for pu = -0,3 bar [l/min]	Required evacuation rate for pu = -0,6 bar [m³/h]	Required evacuation rate for pu = -0,6 bar [l/min]	Max. flow rate [m³/h] when blowing off*	Max. flow rate [l/min] when blowing off*	Weight [g]
SVK M5-IG	0.07	1.2	0.08	1.3	4.8	80	2.2
SVK G1/8-IG	0.14	2.3	0.15	2.5	18.6	310	11.2
SVK G1/4-IG	0.17	2.9	0.20	3.4	20.4	340	17.5
SVK G3/8-IG	0.44	7.3	0.48	8.0	35.4	590	30.3
SVK G1/2-IG	0.49	8.1	0.54	9.0	47.4	790	47.4
SVKG M5-AG	0.07	1.2	0.08	1.3	4.8	80	2.2
SVKG G1/8-AG	0.14	2.3	0.15	2.5	18.6	310	11.2
SVKG G1/4-AG	0.17	2.9	0.20	3.4	20.4	340	17.5
SVKG G3/8-AG	0.44	7.3	0.48	8.0	35.4	590	30.3
SVKG G1/2-AG	0.49	8.1	0.54	9.0	47.4	790	47.4
SVV G1/4-IG	1.36	22.6	1.72	28.6	24.0	400	24.7

*Blow-off pressure 5bar

Design Data Check Valves SVK, SVKG, SVV



SVK M5 to G1/2



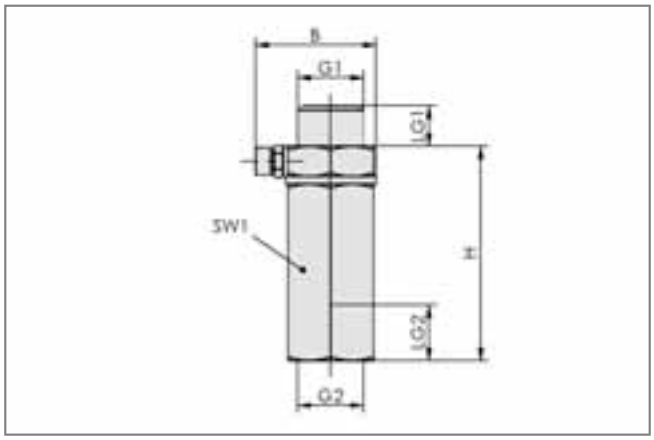
SVKG M5 to G1/2

Check Valves

Check Valves SVK, SVKG, SVV

Connection thread from M5 to G1/2"

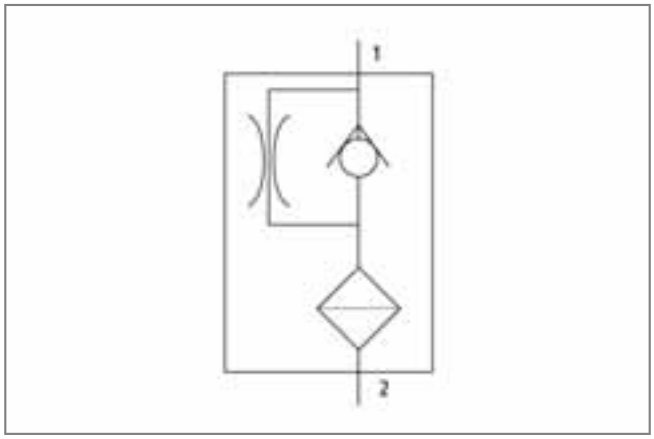
Design Data Check Valves SVK, SVKG, SVV



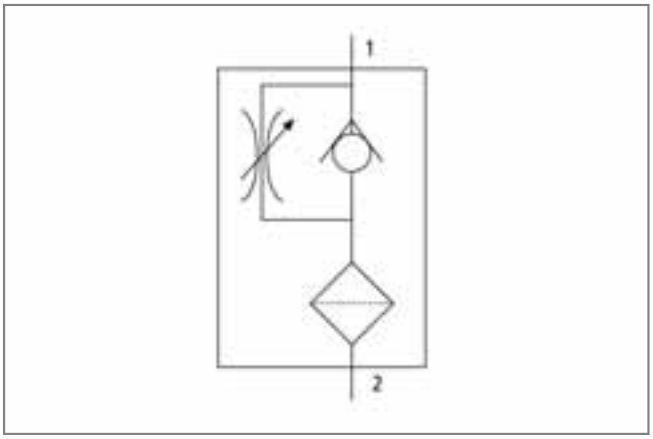
SVV G1/4

Type	Dimensions in mm						
	B	G1	G2	H	LG1	LG2	SW1
SVK M5-IG	-	M5-M	M5-F	15.5	4.5	4.5	8
SVK G1/8-IG	-	G1/8"-M	G1/8"-F	26.0	8.0	8.5	14
SVK G1/4-IG	-	G1/4"-M	G1/4"-F	26.0	10.0	11.0	17
SVK G3/8-IG	-	G3/8"-M	G3/8"-F	29.0	10.0	12.0	22
SVK G1/2-IG	-	G1/2"-M	G1/2"-F	29.0	12.0	14.0	27
SVKG M5-AG	-	M5-F	M5-M	20.0	4.5	4.5	8
SVKG G1/8-AG	-	G1/8"-F	G1/8"-M	26.0	8.5	8.0	14
SVKG G1/4-AG	-	G1/4"-F	G1/4"-M	26.0	11.0	10.0	17
SVKG G3/8-AG	-	G3/8"-F	G3/8"-M	29.0	12.0	10.0	22
SVKG G1/2-AG	-	G1/2"-F	G1/2"-M	29.0	14.0	12.0	27
SVV G1/4-IG	23.9	G1/4"-M	G1/4"-F	42.5	8.0	11.0	17

Functional Circuit Diagram Check Valves SVK, SVKG, SVV



Circuit diagram SVK/SVKG (1 = vacuum generator; 2 = suction pad)



Circuit diagram SVV (1 = vacuum generator; 2 = suction pad)

Check Valves

Check Valves SVN

Connection thread G1/4"

Check valves SVN

Suitability for Industry-Specific Applications

Applications

- Check valves for handling porous workpieces
- Deactivation of unused suction pads, the system vacuum is maintained

Design

- Flying-ball valve mounted in a space-saving manner in an aluminum body
- Blow-off function provides self-cleaning effect for use in dusty surroundings
- Molded-on nipple for various types of suction pads (size identical to that of a standard nipple)

Our Highlights...

- Special check valve with flying ball
- Integrated nipple for connection of a suction pad
- Check valve with self-cleaning effect
- Reaction dependent on the volume flow rate
- Minimum size

Your Benefits...

> Reduction of the cross-section of the vacuum line leading to an unused suction pad; special version for porous workpieces

> No additional nipple needed for many different types of suction pad

> Special version for use in dusty surroundings

> Not triggered by the normal leakage encountered when handling porous workpieces

> Also suitable for use in restricted spaces

Designation Code Check Valves SVN

Abbreviated designation	Connection thread	Nipple family
Example SVN G1/4-AG N011:		
SVN	**G1/4-AG**	**N011**
SVN	G1/4-AG M10x1.25 (AG = male (M)) G1/4-AG	N009 to N019

Ordering Data Check Valves SVN

Check valve SVN is delivered as a ready to connect product.

Check Valves

Check Valves SVN

Connection thread G1/4"

Check Valves SVN

Type	Part Number
SVN G1/4-AG N011	10.05.03.00068
SVN G1/4-AG N012	10.05.03.00074
SVN G1/4-AG N013	10.05.03.00066
SVN G1/4-AG N014	10.05.03.00070
SVN G1/4-AG N015	10.05.03.00072
SVN G1/4-AG N018	10.05.03.00054
SVN G1/4-AG N019	10.05.03.00056
SVN G1/4-AG M10x1.25-AG N009	10.05.03.00060

Technical Data Check Valves SVN

Type	Required evacuation rate for pu = -0,3 bar [m³/h]	Required evacuation rate for pu = -0,3 bar [l/min]	Required evacuation rate for pu = -0,6 bar [m³/h]	Required evacuation rate for pu = -0,6 bar [l/min]	Max. flow rate [m³/h] when blowing off*	Max. flow rate [l/min] when blowing off*	Weight [g]
SVN G1/4-AG N011	2.3	38.3	3.3	55	27	450	8
SVN G1/4-AG N012	2.3	38.3	3.3	55	27	450	15
SVN G1/4-AG N013	2.3	38.3	3.3	55	27	450	9
SVN G1/4-AG N014	2.3	38.3	3.3	55	27	450	12
SVN G1/4-AG N015	2.3	38.3	3.3	55	27	450	18
SVN G1/4-AG N018	2.3	38.3	3.3	55	27	450	8
SVN G1/4-AG N019	2.3	38.3	3.3	55	27	450	18
SVN G1/4-AG M10x1.25-AG N009	2.3	38.3	3.3	55	27	450	10

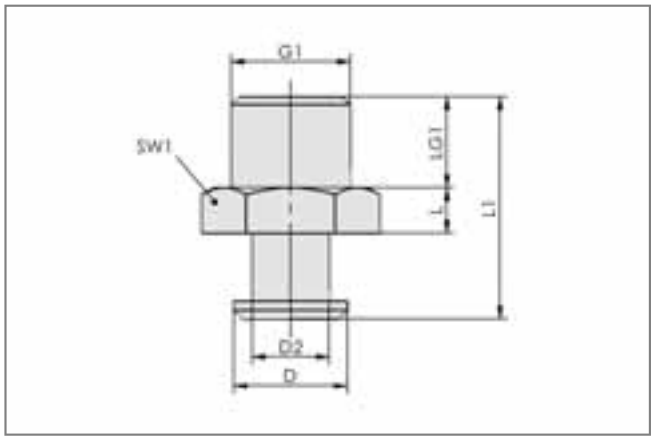
*Blow-off pressure 5bar

Check Valves

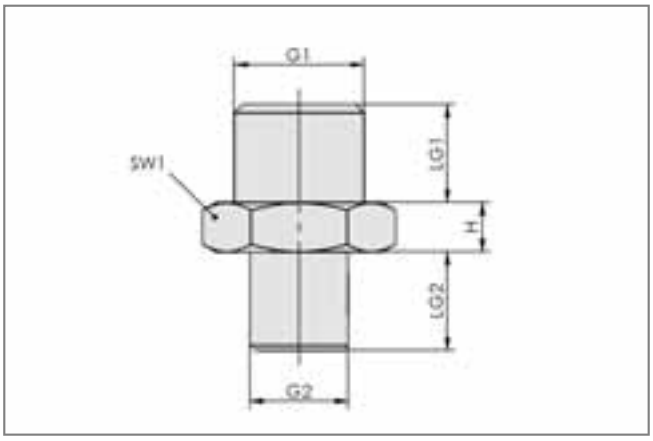
Check Valves SVN

Connection thread G1/4"

Design Data Check Valves SVN



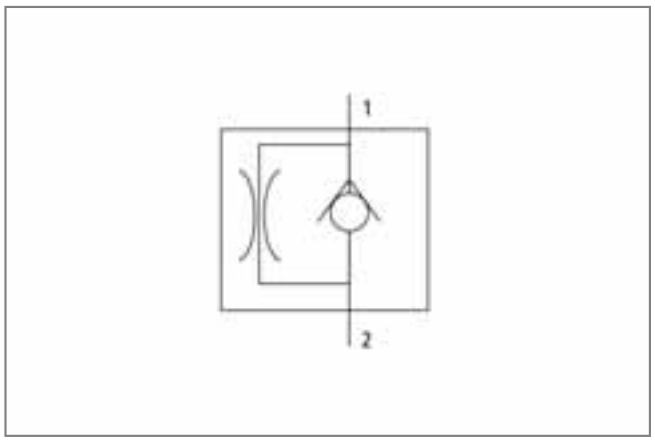
SVN G1/4-AG N011...N019



SVN G1/4-AG M10x1.25-AG N009

Type	Dimensions in mm							
	D	G1	G2	H	H1	LG1	LG2	SW1
SVN G1/4-AG N011	12.5	G1/4"-M	-	5	25	10	-	17
SVN G1/4-AG N012	18.0	G1/4"-M	-	5	30	10	-	22
SVN G1/4-AG N013	12.5	G1/4"-M	-	5	29	10	-	17
SVN G1/4-AG N014	16.5	G1/4"-M	-	5	30	10	-	17
SVN G1/4-AG N015	16.5	G1/4"-M	-	5	38	10	-	22
SVN G1/4-AG N018	14.0	G1/4"-M	-	5	29	11	-	17
SVN G1/4-AG N019	20.0	G1/4"-M	-	6	40	11	-	21
SVN G1/4-AG M10x1.25-AG N009	-	G1/4"-M	M10x1.25-M	5	10	10	10.0	17

Functional Circuit Diagram Check Valves SVN



Circuit diagram SVN (1 = vacuum generator; 2 = suction pad)

Check Valves

Flow Resistors SW

Nominal diameter from 0.25 mm to 2 mm

Suitability for Industry-Specific Applications

Flow resistors SW

Applications

- Flow resistor for handling of porous workpieces
- Reduction of the flow rate through individual suction pads in order to maintain the vacuum in the overall system
- May be installed in any orientation

Design

- Double-ended threaded nipple with reduced flow cross section
- Large gradation of different flow cross sections

Our Highlights...

- No moving parts
- Acts as a flow resistor with a reduced cross-section
- Minimum size

Your Benefits...

> Robust design with long operating lifetime

> Reduction of the cross-section of the vacuum line, particularly useful when handling porous workpieces

> Also suitable for use in restricted spaces

Designation Code Flow Resistors SW

Abbreviated designation	Nominal size	Connection thread
Example SW 25 G1/8-AG:		
SW	**25**	**G1/8-AG**
SW	25 = 0.25 mm to 200 = 2.00 mm	G1/8-AG (AG = male (M)) G1/4-AG

Ordering Data Flow Resistors SW

Flow resistor SW is delivered as a ready to connect product.

Check Valves

Flow Resistors SW

Nominal diameter from 0.25 mm to 2 mm

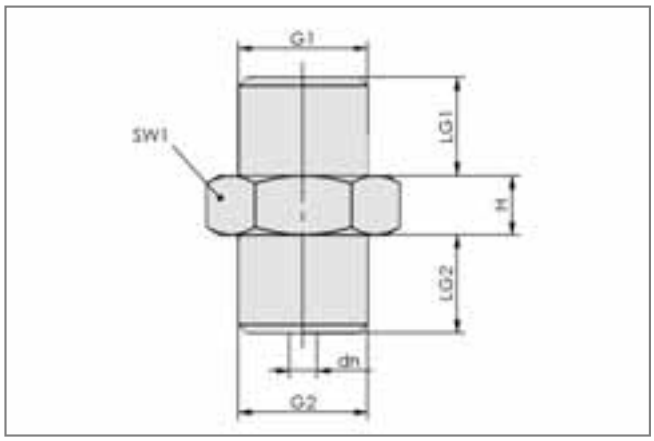
Flow Resistors SW

Type	Connection	
	G1/4"-M	G1/8"-M
SW 25	-	10.05.04.00034
SW 40	10.05.04.00010	10.05.04.00001
SW 50	10.05.04.00011	10.05.04.00002
SW 60	10.05.04.00012	10.05.04.00003
SW 70	10.05.04.00013	10.05.04.00004
SW 80	10.05.04.00014	10.05.04.00005
SW 90	10.05.04.00015	10.05.04.00006
SW 100	10.05.04.00016	10.05.04.00007
SW 110	10.05.04.00017	10.05.04.00008
SW 120	10.05.04.00018	10.05.04.00009
SW 150	10.05.04.00029	-
SW 200	10.05.04.00019	-

Technical Data Flow Resistors SW

Type	Nominal size	Required evacuation rate for pu = -0,3 bar [m³/h]	Required evacuation rate for pu = -0,3 bar [l/min]	Required evacuation rate for pu = -0,6 bar [m³/h]	Required evacuation rate for pu = -0,6 bar [l/min]
SW 25	0.25 mm	0.01	0.2	0.02	0.3
SW 40	0.40 mm	0.06	1.0	0.08	1.3
SW 50	0.50 mm	0.13	2.2	0.15	2.5
SW 60	0.60 mm	0.18	3.0	0.19	3.1
SW 70	0.70 mm	0.24	4.0	0.26	4.3
SW 80	0.80 mm	0.30	4.9	0.32	5.3
SW 90	0.90 mm	0.39	6.5	0.42	7.0
SW 100	1.00 mm	0.47	7.8	0.50	8.4
SW 110	1.10 mm	0.62	10.3	0.63	10.5
SW 120	1.20 mm	0.74	12.3	0.76	12.7
SW 150	1.50 mm	1.32	22.0	1.40	23.4
SW 200	2.00 mm	2.05	34.1	2.18	36.4

Design Data Flow Resistors SW



SW 25 to 200

Check Valves

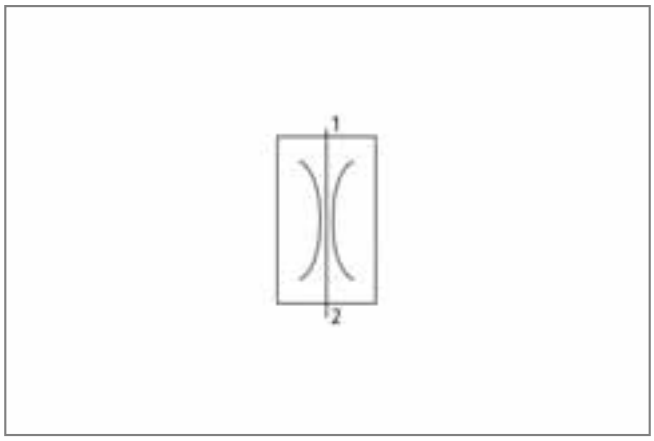
Flow Resistors SW

Nominal diameter from 0.25 mm to 2 mm

Design Data Flow Resistors SW

Type	Dimensions in mm						
	dn	G1	G2	H	LG1	LG2	SW1
SW 25 G1/8-AG	0.25	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 40 G1/8-AG	0.40	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 50 G1/8-AG	0.50	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 60 G1/8-AG	0.60	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 70 G1/8-AG	0.70	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 80 G1/8-AG	0.80	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 90 G1/8-AG	0.90	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 100 G1/8-AG	1.00	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 110 G1/8-AG	1.10	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 120 G1/8-AG	1.20	G1/8"-M	G1/8"-M	6	9.5	9.5	14
SW 40 G1/4-AG	0.40	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 50 G1/4-AG	0.50	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 60 G1/4-AG	0.60	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 70 G1/4-AG	0.70	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 80 G1/4-AG	0.80	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 90 G1/4-AG	0.90	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 100 G1/4-AG	1.00	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 110 G1/4-AG	1.10	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 120 G1/4-AG	1.20	G1/4"-M	G1/4"-M	6	10.0	10.0	17
SW 150 G1/4-AG	1.50	G1/4"-M	G1/4"-M	5	9.0	9.0	17
SW 200 G1/4-AG	2.00	G1/4"-M	G1/4"-M	5	9.0	9.0	17

Functional Circuit Diagram Flow Resistors SW



Circuit diagram SW 25-200 (1 = vacuum generator; 2 = suction pad)

Sensing Valves

Sensing Valves TV / TVN

Rated flow from 12 l/min to 160 l/min

Suitability for Industry-Specific Applications

Sensing valves TV / TVN

Applications

- Sensing valve for applications where some of the suction pads may not always be in contact with the workpiece
- Vacuum line to a suction pad is opened only if a workpiece is detected by a mechanical sensor
- May be installed in any orientation

Design

- Sensing valve with spring-loaded plunger and protective cap
- Type TVN with molded-on suction-pad nipple for direct mounting
- Does not react if the suction pad is only partially in contact with the workpiece

Our Highlights...

- Sensing valve with spring-loaded plunger
- Reaction is unaffected by the workpiece material
- Minimum size

Your Benefits...

> The vacuum line is opened only if the suction pad is in contact with the workpiece (mechanical sensing)

> Can also be used for porous workpieces

> Also suitable for use in restricted spaces

Designation Code Sensing Valves TV / TVN

Abbreviated designation		Connection thread	Plunger stroke in mm	Nipple family
Example TV G1/4-AG 5:				
TV		**G1/4-AG**	**5**	
TV	**without suction pad nipple**	G1/8-AG (AG = male (M))	5	N007
TVN	**with molded-on suction pad nipple**	G1/4-AG	to	N008
		G1/2-AG	13	N009
				N041

Ordering Data Sensing Valves TV / TVN

Sensing valve TV / TVN is delivered as a ready to connect product.

Sensing Valves

Sensing Valves TV / TVN

Rated flow from 12 l/min to 160 l/min

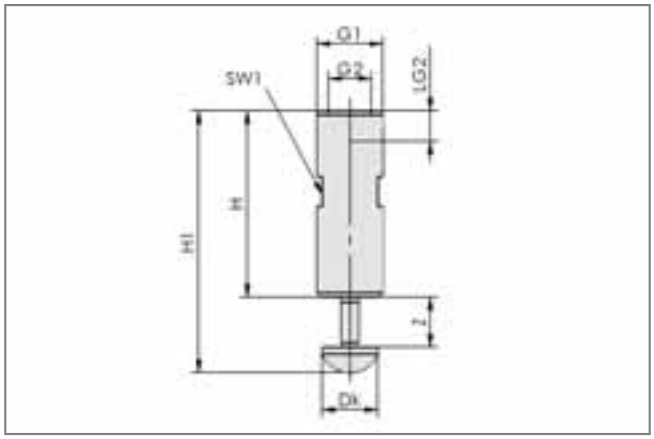
Sensing Valves TV / TVN

Type	Part Number
TV G1/4-AG 8	10.05.10.00064
TV G1/4-AG 13	10.05.10.00061
TV G1/2-AG 13	10.05.10.00038
TVN G1/8-AG 6 N007	10.05.10.00021
TVN G1/8-AG 6.5 N008	10.05.10.00023
TVN G1/4-AG 8.4 N041	10.05.10.00058
TVN G1/4-AG 9 N009	10.05.10.00065

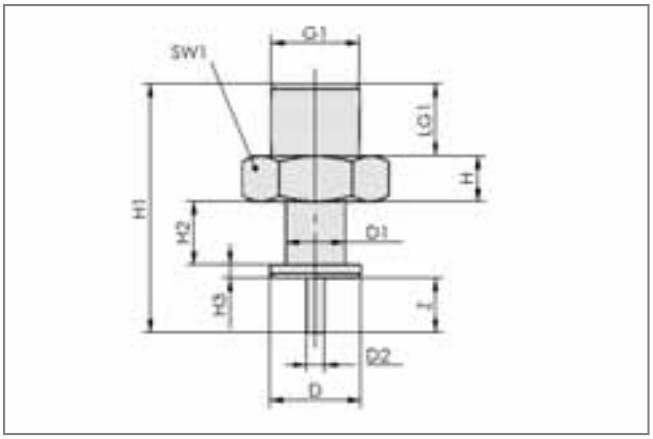
Technical Data Sensing Valves TV / TVN

Type	Nominal flow rate [m³/h]	Nominal flow rate [l/min]
TV G1/4-AG 8	3.3	55
TV G1/4-AG 13	3.3	55
TV G1/2-AG 13	9.6	160
TVN G1/8-AG 6 N007	0.7	12
TVN G1/8-AG 6.5 N008	0.7	12
TVN G1/4-AG 8.4 N041	4.6	78
TVN G1/4-AG 9 N009	4.6	78

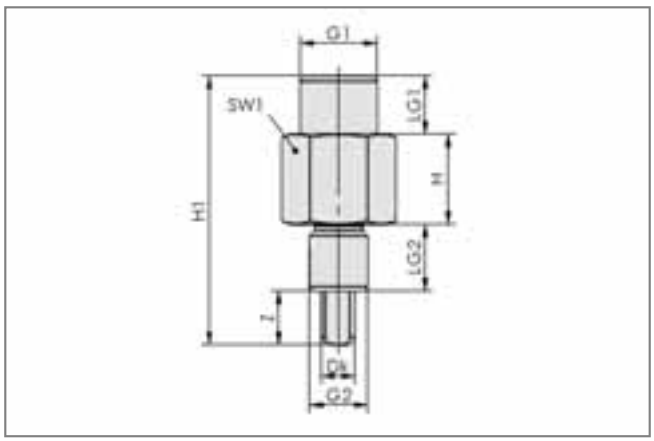
Design Data Sensing Valves TV / TVN



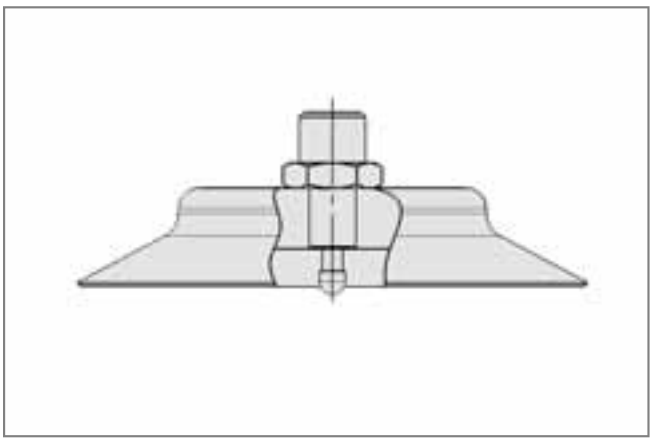
TV G1/4 to G1/2



TVN G1/8-AG-6, G1/8-AG-6.5 and G1/4-AG-8.4



TVN G1/4-AG-9



Installation example, sensing valve in flat suction pad

Sensing Valves

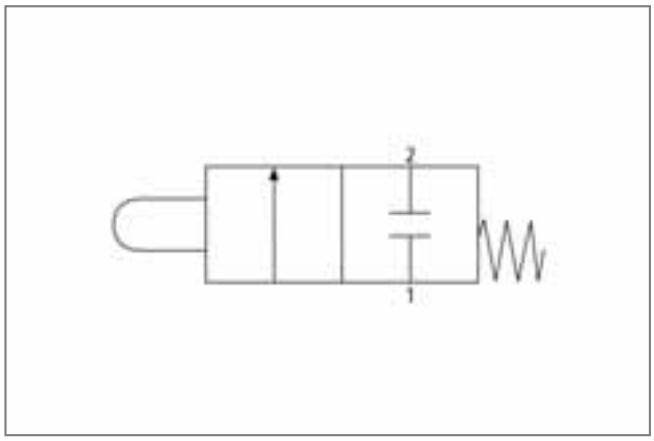
Sensing Valves TV / TVN

Rated flow from 12 l/min to 160 l/min

Design Data Sensing Valves TV / TVN

Type	Dimensions in mm													
	D	D1	D2	Dk	G1	G2	H	H1	H2	H3	LG1	LG2	SW1	Z
TV G1/4-AG 8	-	-	-	11	G1/4"-M	G1/8"-F	45.5	58.2	-	-	-	6	11	8.0
TV G1/4-AG 13	-	-	-	11	G1/4"-M	G1/8"-F	45.5	63.5	-	-	-	6	11	13.0
TV G1/2-AG 13	-	-	-	11	G1/2"-M	G3/8"-F	54.5	67.5	-	-	-	12	19	13.0
TVN G1/8-AG 6 N007	10	6.5	2.0	-	G1/8"-M	-	5.0	27.5	7.0	1.5	8	-	14	6.0
TVN G1/8-AG 6.5 N008	14	8.5	2.0	-	G1/8"-M	-	5.0	28.5	7.0	2.0	8	-	14	6.5
TVN G1/4-AG 8.4 N041	17	8.7	6.0	-	G1/4"-M	-	10.0	44.7	12.3	3.0	11	-	17	8.4
TVN G1/4-AG 9 N009	-	-	-	6	G1/4"-M	M10x1.25-M	15.5	47.0	-	-	10	12	17	9.0

Functional Circuit Diagram Sensing Valves TV / TVN



Circuit diagram TV/TVN (1 = vacuum generator; 2 = suction pad)

Recommended Suction Pad Connections TVN

Sensing valve with nipple TVN	Suction pad type*
TVN G1/8-AG 6	PFG 25
TVN G1/8-AG 6	PFG 30
TVN G1/8-AG 6	PFG 35
TVN G1/8-AG 6	PFG 40
TVN G1/8-AG 6.5	PFG 50
TVN G1/4-AG 8.7	SHFN 50, SHFN 70, SHFN 85
TVN G1/4-AG 9	PFG 60, SHFN 70 E, SHFN 85 E
TVN G1/4-AG 9	PFG 80, SHFN 70 E, SHFN 85 E
TVN G1/4-AG 9	PFG 95, SHFN 70 E, SHFN 85 E

*Except PFG VU1

Non-Return Valves

Non-Return Valves RSV

Nominal diameter from 6 mm to 54 mm

Suitability for Industry-Specific Applications

Non-return valves RSV

Applications

- Non-return valve for maintaining the vacuum in the case of a power failure or a failure of the vacuum generator
- Can also be used with energy-saving systems when handling non-porous materials
- May be installed in any orientation

Design

- Spring-loaded seat valve
- Brass body (RSV 6, which is made of aluminum)
- Seat made of synthetic rubber, gasket made of nylon
- Stainless-steel spring

Our Highlights...

- Seat-type non-return valve
- Wide range of nominal diameters
- Very small size

Your Benefits...

> Closure of the vacuum line in order to maintain the system vacuum in the case, for example, of a power failure

> Very low to very high nominal flow rates possible

> Also suitable for use in restricted spaces

Designation Code Non-Return Valves RSV

Abbreviated designation	Nominal size in mm	Connection thread
Example RSV 6 G1/4-IG:		
RSV	**6**	**G1/4-IG**
RSV	6 to 54	G1/4-IG (IG = female (F)) G3/8-IG G1/2-IG G3/4-IG G1-IG G1-1/4-IG G1-1/2-IG G2-IG

Ordering Data Non-Return Valves RSV

Non-return valve RSV is delivered as a ready to connect product.

Non-Return Valves

Non-Return Valves RSV

Nominal diameter from 6 mm to 54 mm

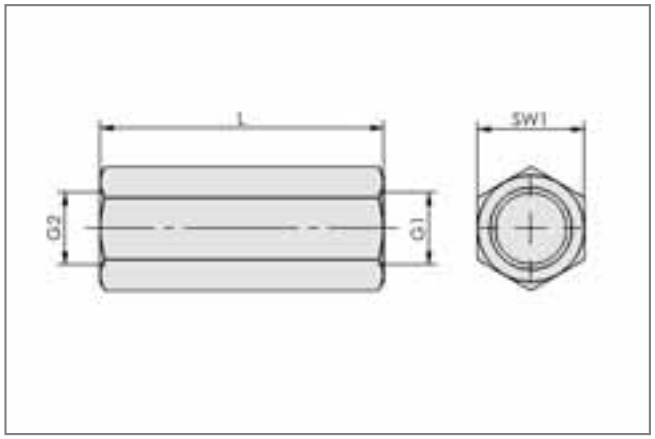
Non-Return Valves RSV

Type	Part Number
RSV 6 G1/4-IG	10.05.05.00001
RSV 14 G3/8-IG	10.05.05.00002
RSV 18 G1/2-IG	10.05.05.00003
RSV 20 G3/4-IG	10.05.05.00004
RSV 28 G1-IG	10.05.05.00005
RSV 36 G1-1/4-IG	10.05.05.00006
RSV 42 G1-1/2-IG	10.05.05.00007
RSV 54 G2-IG	10.05.05.00008

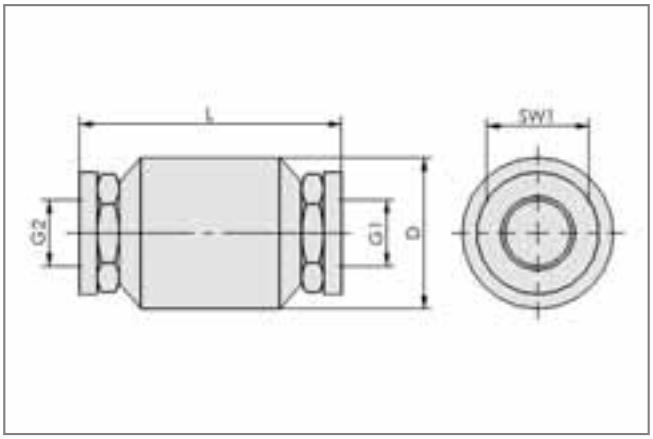
Technical Data Non-Return Valves RSV

Type	Nominal size [mm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Opening pressure [mbar]	Weight [kg]
RSV 6 G1/4-IG	6	5	83	20	0.02
RSV 14 G3/8-IG	14	20	333	20	0.18
RSV 18 G1/2-IG	18	26	433	20	0.19
RSV 20 G3/4-IG	20	45	750	20	0.27
RSV 28 G1-IG	28	75	1250	20	0.49
RSV 36 G1-1/4-IG	36	125	2083	20	0.74
RSV 42 G1-1/2-IG	42	200	3333	20	0.98
RSV 54 G2-IG	54	350	5833	20	1.10

Design Data Non-Return Valves RSV



RSV 6



RSV 14 to 54

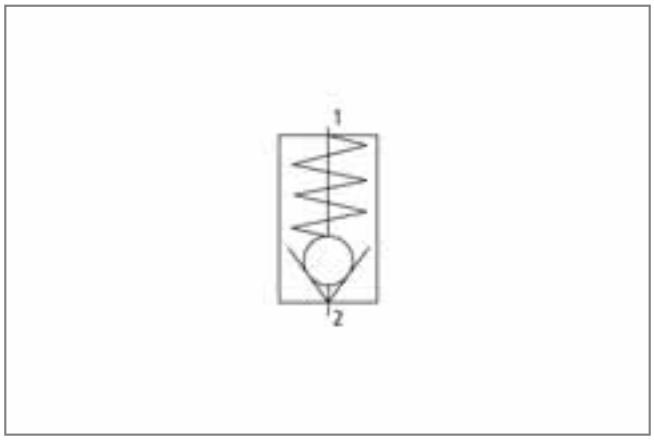
Type	Dimensions in mm				
	D	G1	G2	L	SW1
RSV 6 G1/4-IG	-	G1/4"-F	G1/4"-F	45	17
RSV 14 G3/8-IG	34	G3/8"-F	G3/8"-F	59	23
RSV 18 G1/2-IG	34	G1/2"-F	G1/2"-F	62	27
RSV 20 G3/4-IG	41	G3/4"-F	G3/4"-F	69	33
RSV 28 G1-IG	52	G1"-F	G1"-F	84	40
RSV 36 G1-1/4-IG	63	G1-1/4"-F	G1-1/4"-F	88	50
RSV 42 G1-1/2-IG	71	G1-1/2"-F	G1-1/2"-F	96	50
RSV 54 G2-IG	87	G2"-F	G2"-F	100	70

Non-Return Valves

Non-Return Valves RSV

Nominal diameter from 6 mm to 54 mm

Functional Circuit Diagram Non-Return Valves RSV



Circuit diagram RSV (1 = vacuum generator; 2 = suction pad)

Manually Actuated Valves

Two-Way Ball Valves KVZ

Nominal diameter from 8 mm to 50 mm

Suitability for Industry-Specific Applications

Two-way ball valves KVZ

Applications

- Two-way ball valve for manual connection and disconnection of vacuum and compressed air circuits
- For use in vacuum spiders and handling devices
- May be installed in any orientation

Design

- Ball valve made of brass (body and ball)
- Teflon gaskets
- 2/2-way valve

Our Highlights...

- For use with vacuum and compressed air
- Wide range of nominal sizes
- Robust brass construction

Your Benefits...

> Absolutely tight: no leaks

> Optimum matching to nominal flow rate

> Robust and free of wear

Designation Code Two-Way Ball Valves KVZ

Abbreviated designation	Nominal size in mm	Version
Example KVZ 8 2/2:		
KVZ	**8**	**2/2**
KVZ	8 20 32 50	2/2 2/2-way-valve

Ordering Data Two-Way Ball Valves KVZ

Two-way ball valve KVZ is delivered as a ready to connect product.

Two-Way Ball Valves KVZ

Type	Part Number
KVZ 8 2/2	10.05.08.00018
KVZ 20 2/2	10.05.08.00007
KVZ 32 2/2	10.05.08.00008
KVZ 50 2/2	10.05.08.00009

Manually Actuated Valves

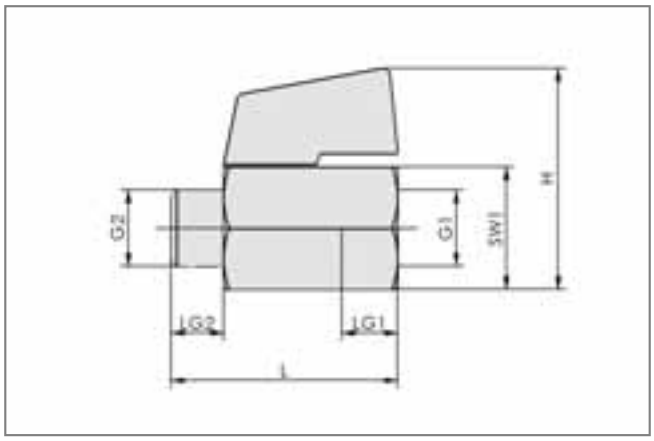
Two-Way Ball Valves KVZ

Nominal diameter from 8 mm to 50 mm

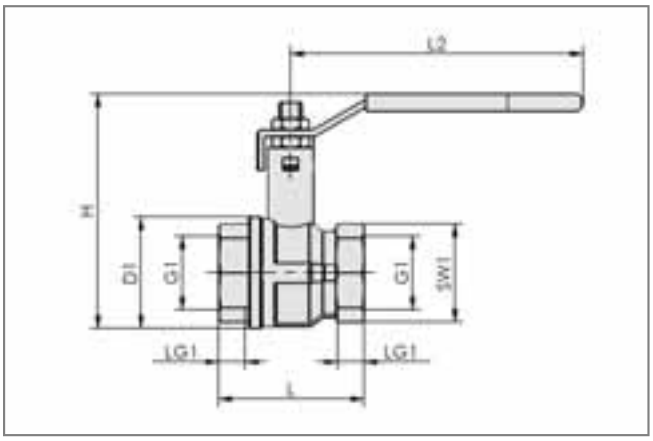
Technical Data Two-Way Ball Valves KVZ

Type	Nominal size [mm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Work area [bar]	Weight [kg]
KVZ 8 2/2	8	10	167	-0.95...16.0	0.077
KVZ 20 2/2	20	45	750	-0.95...16.0	0.280
KVZ 32 2/2	32	100	1667	-0.95...16.0	0.700
KVZ 50 2/2	50	310	5167	-0.95...16.0	1.470

Design Data Two-Way Ball Valves KVZ



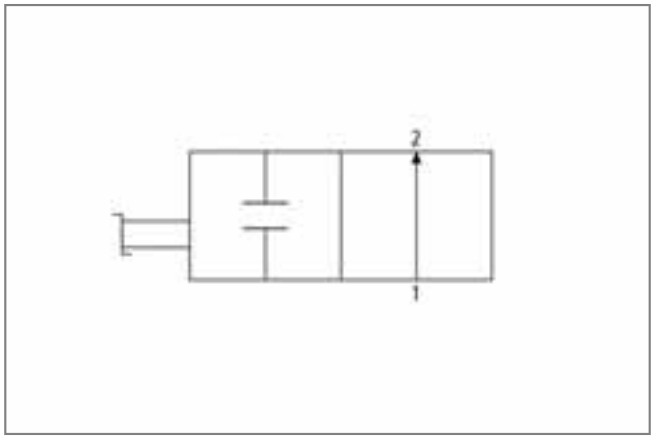
KVZ 8



KVZ 20 to 50

Type	Dimensions in mm								
	D1	G1	G2	H	L	L2	LG1	LG2	SW1
KVZ 8 2/2	-	G1/4"-F	G1/4"-M	38.0	39	-	10.5	9	21
KVZ 20 2/2	39	G3/4"-F	-	69.3	54	120	12.0	-	31
KVZ 32 2/2	59	G1-1/4"-F	-	124.2	77	155	15.5	-	48
KVZ 50 2/2	86	G2"-F	-	151.0	106	155	19.5	-	66

Functional Circuit Diagram Two-Way Ball Valves KVZ



Circuit diagram KVZ (1 = vacuum generator; 2 = suction pad)

Manually Actuated Valves

Three-Way Ball Valves KVD

Nominal diameter from 6 mm to 25 mm

Three-way ball valves KVD

Suitability for Industry-Specific Applications

Applications

- Three-way ball valve for manual connection and disconnection of vacuum and compressed air circuits
- Activation and venting of individual suction pads
- For use in vacuum spiders and handling devices
- May be installed in any orientation

Design

- Ball valve made of brass (body and ball)
- Teflon gaskets
- Aluminium handle
- 3/2-way valve

Our Highlights...

- For use with vacuum and compressed air
- Wide range of nominal sizes
- Robust brass construction
- Venting function

Your Benefits...

> Absolutely tight: no leaks

> Optimal matching to the nominal flow rate

> Robust and free of wear

> Venting function for quick release of parts

Designation Code Three-Way Ball Valves KVD

Abbreviated designation	Nominal size in mm	Version
Example KVD 6 3/2:		
KVD	**6**	**3/2**
KVD	6 10 15 20 25	3/2 3/2-way-valve

Ordering Data Three-Way Ball Valves KVD

Three-way ball valve KVD is delivered as a ready to connect product.

Manually Actuated Valves

Three-Way Ball Valves KVD

Nominal diameter from 6 mm to 25 mm

Three-Way Ball Valves KVD

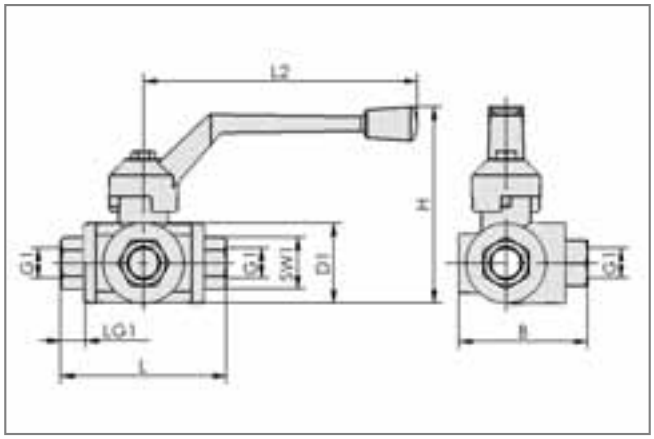
Type	Part Number
KVD 6 3/2	10.05.08.00001
KVD 10 3/2	10.05.08.00002
KVD 15 3/2	10.05.08.00003
KVD 20 3/2	10.05.08.00004
KVD 25 3/2	10.05.08.00005

Technical Data Three-Way Ball Valves KVD

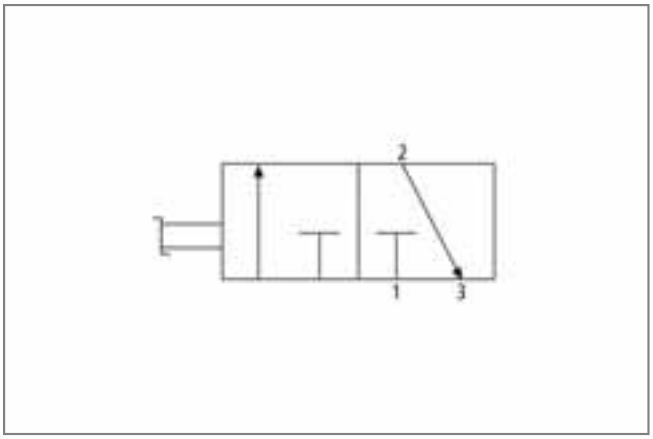
Type	Nominal size [mm]	Nominal flow rate [m³/h]*	Nominal flow rate [l/min]*	Work area [bar]	Weight [kg]
KVD 6 3/2	6	5	83	-0.95...16.0	0.081
KVD 10 3/2	10	15	250	-0.95...16.0	0.810
KVD 15 3/2	15	22	367	-0.95...16.0	0.810
KVD 20 3/2	20	45	750	-0.95...16.0	1.260
KVD 25 3/2	25	55	917	-0.95...16.0	1.930

*In the case of a pressure drop of 50 mbar

Design Data Three-Way Ball Valves KVD



KVD 6 to 25



Circuit diagram KVD (1 = vacuum generator; 2 = suction pad; 3 = ventilation)

Type	Dimensions in mm							
	B	D1	G1	H	L	L2	LG1	SW1
KVD 6 3/2	58	39	G1/4"-F	85.0	77	125	19	22
KVD 10 3/2	58	39	G3/8"-F	85.0	77	125	19	22
KVD 15 3/2	58	39	G1/2"-F	85.0	77	125	19	29
KVD 20 3/2	70	47	G3/4"-F	107.0	92	145	23	34
KVD 25 3/2	80	55	G1"-F	124.0	104	170	25	41

Manually Actuated Valves

Manual Slide Valves HSV

Nominal diameter from 7 mm to 24 mm

Manual slide valves HSV

Suitability for Industry-Specific Applications

Applications

- Manual slide valve for manual switching of vacuum or compressed air circuits
- Robust construction permits high switching frequencies
- For use in vacuum gripping systems and handling devices
- May be installed in any orientation

Design

- Manual slide valve made of brass and aluminium
- Additional lock possible (HSV 12 3/2 S)
- Easily-actuated sliding sleeve
- 3/2-way valve

Our Highlights...

- For use with vacuum and compressed air
- Wide range of nominal sizes
- Robust metal construction
- Small size
- Venting function

Your Benefits...

> Absolutely vacuum-tight: no leaks
> Optimum matching to the nominal flow rate
> Robust and free of wear
> Space-saving and ergonomical
> Venting function for quick release of parts

Designation Code Manual Slide Valves HSV

Abbreviated designation	Nominal size in mm	Version
Example HSV 7 3/2:		
HSV	**7**	**3/2**
HSV	7	3/2 3/2-way-valve
	8	
	12	
	24	

Ordering Data Manual Slide Valves HSV

Manual slide valve HSV is delivered as a ready to connect product.

Manually Actuated Valves

Manual Slide Valves HSV

Nominal diameter from 7 mm to 24 mm

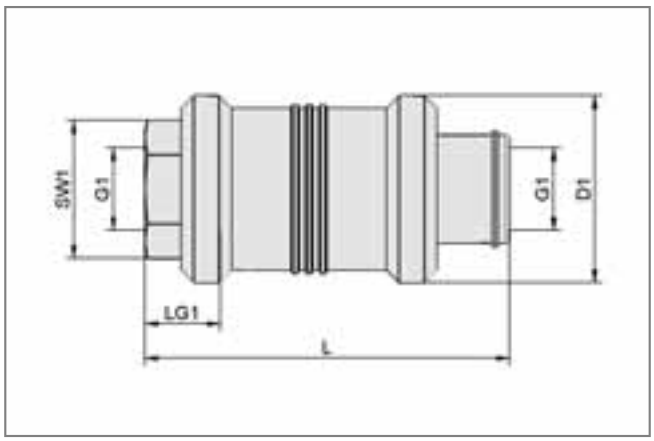
Manual Slide Valves HSV

Type	Part Number
HSV 7 3/2	10.05.07.00034
HSV 8 3/2	10.05.07.00035
HSV 12 3/2	10.05.07.00036
HSV 12 3/2 S	10.05.07.00037
HSV 24 3/2 S	10.05.07.00038

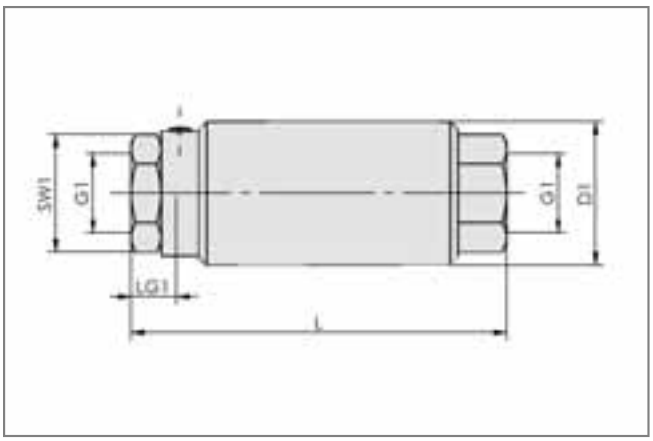
Technical Data Manual Slide Valves HSV

Type	Nominal size [mm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Work area [bar]	Weight [kg]
HSV 7 3/2	7	6	100	-0.95...10.0	0.097
HSV 8 3/2	8	10	167	-0.95...10.0	0.156
HSV 12 3/2	12	16	267	-0.95...10.0	0.230
HSV 12 3/2 S	12	16	267	-0.95...10.0	0.356
HSV 24 3/2 S	24	50	833	-0.95...10.0	0.513

Design Data Manual Slide Valves HSV



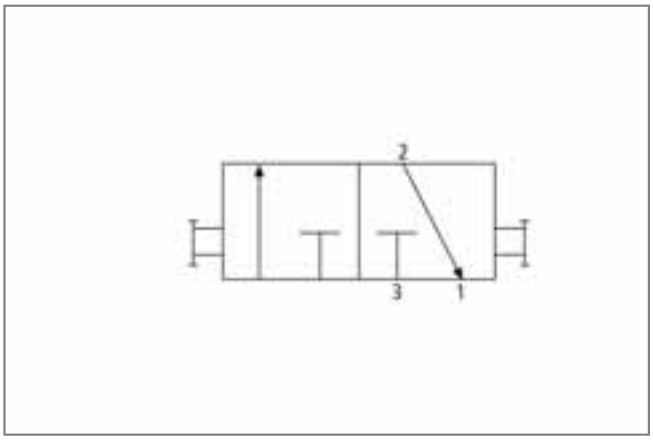
HSV 7 3/2 to 12 3/2



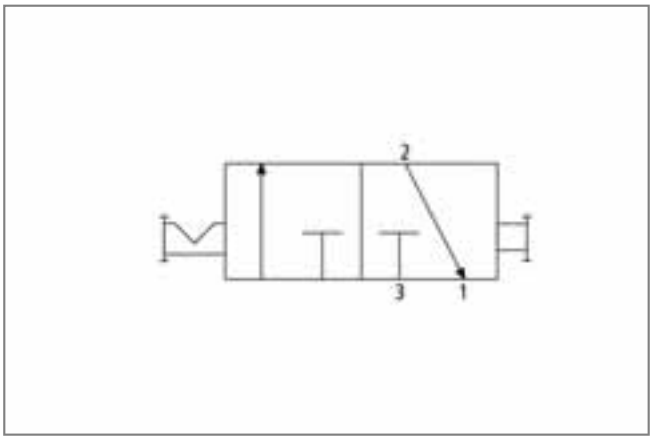
HSV 12 3/2 S and HSV 24 3/2 S with lock

Type	Dimensions in mm				
	D1	G1	L	LG1	SW1
HSV 7 3/2	30	G1/4"-F	58.0	12	19
HSV 8 3/2	35	G3/8"-F	70.7	15	22
HSV 12 3/2	40	G1/2"-F	80.0	16	27
HSV 12 3/2 S	38	G1/2"-F	99.5	15	27
HSV 24 3/2 S	45	G3/4"-F	110.0	16	32

Functional Circuit Diagram Manual Slide Valves HSV



Circuit diagram HSV (1 = vacuum generator; 2 = suction pad; 3 = ventilation)



Circuit diagram HSV-S (1 = vacuum generator; 2 = suction pad; 3 = ventilation)

Switches and System Monitoring

Overview of Section 8

Switches and System Monitoring

Everything at a Glance

Selection Aid	Page
Checklist for Selection of measuring and control devices	561

Vacuum Switches

Vacuum Switches VS-V-PM / EM-ST • Vacuum switch in electro-mechanical and pneumatical version • Measuring range: from -1 to 0 bar	Mechanical vacuum switch in electrical and pneumatic version with adjustable switching point.	562
Vacuum Switches VS-V-SA / SD • Miniature electronic vacuum switch • Measuring range: from -1 to 0 bar	Vacuum switch in minimalist design, optionally with digital or analog switching output.	565
Vacuum Switches VS-V-AH / AV-T • Electronic vacuum switch • Measuring range: from -1 to 0 bar • Switching function: PNP	Vacuum switch with two digital switch outputs, teach button for fast adjustment of the switching point and two-color LED indicator.	568
Vacuum Switches VS-V-A-PNP-S • Electronic vacuum switch • Measuring range: from -1 to 0 bar • Switching function: PNP	Vacuum switch with digital and analog switching output and adjustable switching point.	572
Vacuum Switches VS-V • Electronic vacuum switch • Measuring range: -1 to 0 bar • Switching function: PNP, NPN	Vacuum switch with digital and analog switching output, adjustable switching point and adjustable hysteresis.	574

Overview of Section 8

Switches and System Monitoring

Everything at a Glance

Vacuum Switches VS-V-D — 577

- Electronic vacuum switch
- Measuring range: from -1 to 0 bar
- Switching function: PNP, NPN

Vacuum switch with two separately programmable digital outputs, foil keypad, digital display, adjustable switching point and adjustable hysteresis.

Vacuum Switches VS-V-W-D — 580

- Electronic vacuum switch
- Measuring range: from -1 to 0 bar
- Switching function: PNP, NPN

Vacuum switch (cubical design) with two separately programmable digital outputs, foil keypad, digital display, adjustable switching point and adjustable hysteresis.

Vacuum Switches VS-V-W-D-K(-2C) — 584

- Electronic vacuum switch
- Measuring range: from -1 to 0 bar
- Switching function: PNP, NPN

Vacuum switch with two separately programmable digital outputs, digital display, adjustable switching point and adjustable hysteresis.

Pressure Switches

Pressure Switches VS-P1 — 588

- Electronic pressure switch
- Measuring range: from 0 to 1 bar
- Switching function: PNP, NPN

Pressure switch with digital and analog switching output, adjustable switching point and adjustable hysteresis.

Pressure Switches VS-P10-D — 591

- Electronic pressure switch
- Measuring range: from 0 to 10 bar
- Switching function: PNP

Pressure switch with two separately programmable digital outputs, foil keypad, digital display, adjustable switching point and adjustable hysteresis.

Pressure Switches VS-P10-W-D — 594

- Electronic pressure switch
- Measuring range: from 0 to 10 bar
- Switching function: PNP, NPN

Pressure switch (cubical design) with two separately programmable digital outputs, foil keypad, digital display, adjustable switching point and adjustable hysteresis.

Pressure Switches VS-P10-AH / AV-T — 598

- Electronic pressure switch
- Measuring range: from 0 to 10 bar
- Switching function: PNP

Pressure switch with two digital switch outputs, teach button for fast adjustment of the switching point and two-color LED indicator.

Overview of Section 8

Switches and System Monitoring

Everything at a Glance

Pressure Switches VS-P10-W-D-K(-2C)

602

- Electronic pressure switch
- Measuring range: from 0 to 10 bar
- Switching function: PNP, NPN

Pressure switch with two separately programmable digital outputs, digital display, adjustable switching point and adjustable hysteresis.

Combined Vacuum/Pressure Switches

Vacuum and Pressure Switches VS-P

606

- Electronic vacuum and pressure switch
- Measuring range: from -1 to 10 bar
- Switching function: PNP, NPN

Combined vacuum/pressure switch with digital and analog switching output, function LED, adjustable switching point and adjustable hysteresis.

Connectors and Adapters for Vacuum Switches

Cables and Plugs for Vacuum Switches

609

- Connecting cables
- Adapter plugs

Connection of the various types of switches, adaptation to customer requirements.

Measuring and Control Devices

Vacuum Regulators VR

610

- Adjustment range: -990 to -14 mbar

Mechanically adjustable vacuum controller with very high accuracy to compensate for design-related pressure fluctuations.

Manometers VAM

612

- Measuring range: from -1 to 0 bar

Manometer with different scales for analog measurement and monitoring of the vacuum value.

Pressure-Reduction Valves DM

615

- Max. pressure: 12 bar
- Work area: 0.5 to 10 bar

Mechanically adjustable pressure reducer for regulation of compressed air in compressed air systems.

Overview of Section 8

Switches and System Monitoring

Everything at a Glance

Warning Devices

Warning Devices, Acoustic-Electronic WN-AE V

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617

- Monitoring range: -1 to 0 bar
- Audible warning signal with 100 dBA

Electronic warning device with acoustic signal for monitoring vacuum systems.

Checklist for Selection of Measuring and Control Devices

Which measuring range is required?	Vacuum only, pressure only or both? Is overpressure resistance necessary?
Which functions are needed?	Switch with a digital switching output? Switch with two digital outputs? Switch with one digital and one analogue output? With adjustable hysteresis?
Which output signals are required? **How should the switch be set?**	Adjustment with potentiometer? Programming with keypad? Quick setting with teach button?
What is the supply voltage and which signal voltages are needed?	Voltage range? Switching voltages for the controller? Which switching capacity is needed (switched current in mA)?
Which measuring accuracy is necessary?	Hysteresis? Repeatability? Temperature stability?
Which connection facilities exist?	Connection cable (pin assignments, material)? Interchangeability?
Which size and weight restrictions apply?	Mounting facilities? Is on-site adjustment possible?

Vacuum Switches

Vacuum Switches VS-V-PM / EM-ST

Measurement range from -1 bar to 0 bar

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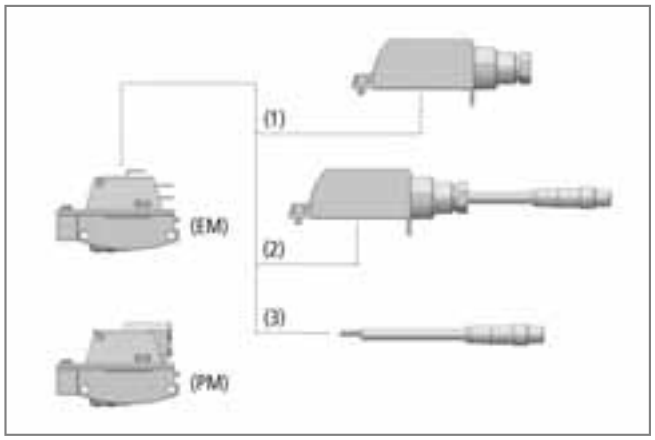
Suitability for Industry-Specific Applications

Vacuum switches VS-V-EM-ST

Applications

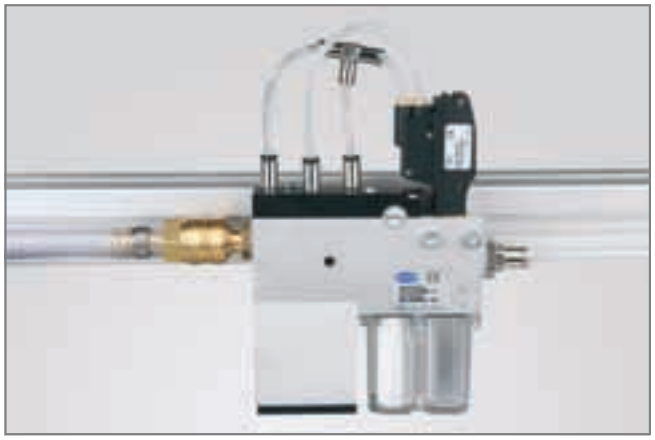
- Mechanical vacuum switch for process monitoring
- Optimization of cycle times or regulation circuits
- Application in processes where an electric or pneumatic signal related to a defined vacuum value is required
- Can be used as a measuring and switching element



System design vacuum switches VS-V-PM / EM-ST

Design

- Vacuum switch in electro-mechanical (EM) and pneumatic (PM) version
- VS-V-EM-ST with one digital switching output in NO/NC version
- VS-V-PM with pneumatic output in NO or alternatively NC version
- Robust and hard-wearing plastic housing
- Cover (1) for IP-protection and strain relief of the connection cable (optional for EM version)
- Cover (2) for IP-protection and mounted M8 4-pin plug (optional for EM version)
- 2 m cable (3) with M8 plug, 4-pin (optional for EM version)



Mounting example vacuum switch VS-V-PM

Our Highlights...	Your Benefits...
• Robust plastic housing	> Solid construction, precise operation
• Electro-mechanical version	> Switching of DC and AC with one version
• Pneumatical version	> No electric connections required, pure pneumatic operation
• Adjustable switching point	> Individually adaptable to process parameter
• Modular design with optional accessories	> Customizable to process requirements

Vacuum Switches VS-V-PM / EM-ST

Measurement range from -1 bar to 0 bar

Designation Code Vacuum Switches VS-V-PM / EM-ST

Abbreviated designation	Measuring range in bar	Principle of operation	Electrical connection
Example VS-V-EM-ST:			
VS	V	EM	ST
VS	V -1 to 0	EM electro-mechanical PM pneumatical	NC normally closed NO normally open ST contact of flat-pin plug (for EM version)

Ordering Data Vacuum Switches VS-V-PM / EM-ST

Vacuum switch VS-V-PM / EM-ST is delivered as a ready to connect product (without connection cable).

Available accessories: cover, connection cable

Vacuum Switches VS-V-PM / EM-ST

Type	Part Number
VS-V-PM-NC	10.06.02.00455
VS-V-PM-NO	10.06.02.00456
VS-V-EM-ST	10.06.02.00457

Ordering data accessories Vacuum Switches VS-V-PM / EM-ST

Type	Cover ABDK-ST	Cover ABDK-M8-4	Connection cable (2m) 4-pole, M8 plug
VS-V-PM-NC	-	-	-
VS-V-PM-NO	-	-	-
VS-V-EM-ST	10.06.02.00453	10.06.02.00454	10.06.02.00460

Technical Data Vacuum Switches VS-V-PM / EM-ST

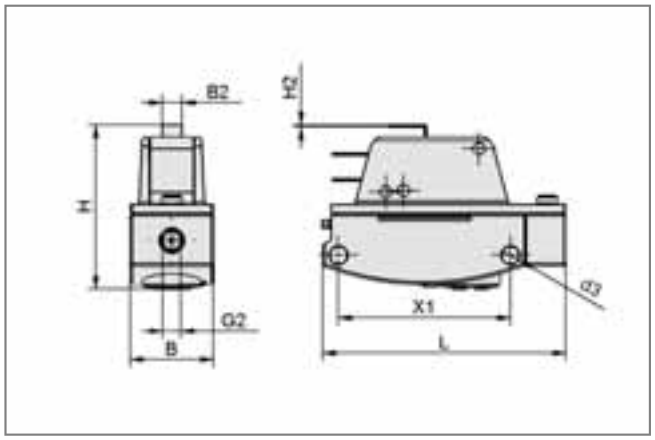
Type	VS-V-PM-NC	VS-V-PM-NO	VS-V-EM-ST
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	6	6	6
Repeatability	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Hysteresis	Fixed: approx. 40 mbar	Fixed: approx. 10 mbar	Fixed: 60...80 mbar
Switching capacity [A]	-	-	10
Switching frequency [Hz]	-	-	1
Electrical connection	-	-	Plug-in connection
Measured medium connection	M5-F	M5-F	M5-F
Control pressure range	1,5...8 bar	1,5...8 bar	-
Voltage	-	-	max. 30V DC/ 250V AC
Max. flow rate [l/min]	100	100	-
Protection IP	-	-	IP 65 (with cover)
Operating temperature [°C]	0...60 °C	0...60 °C	0...60 °C
Weight [g]	33	33	33

Vacuum Switches

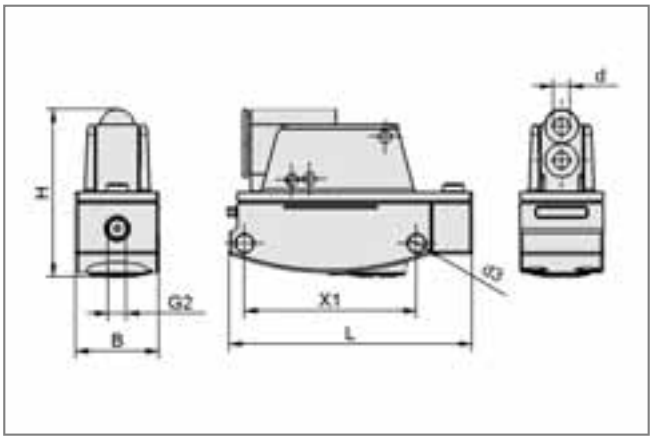
Vacuum Switches VS-V-PM / EM-ST

Measurement range from -1 bar to 0 bar

Design Data Vacuum Switches VS-V-PM / EM-ST



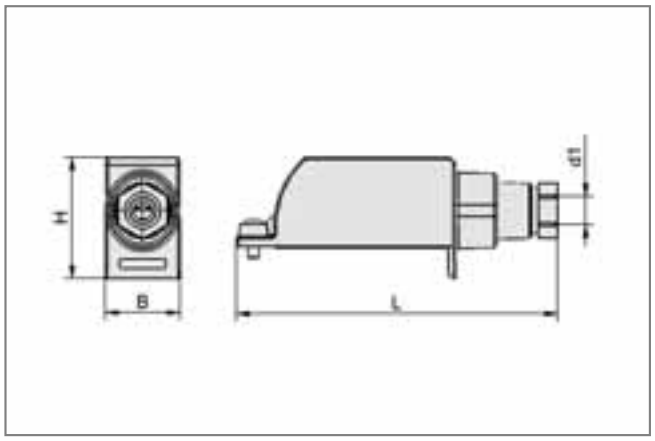
VS-V-EM-ST



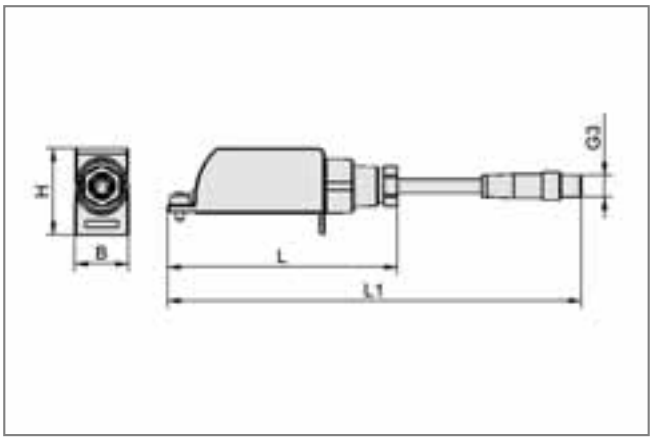
VS-V-PM-...

Type	Dimensions in mm								
	B	B2	d	d3	G2	H	H2	X1	L
VS-V-PM-NC	19.8	-	4	4.2	M5-F	40.0	-	41	58
VS-V-PM-NO	19.8	-	4	4.2	M5-F	40.0	-	41	58
VS-V-EM-ST	19.8	4.8	-	4.2	M5-F	36.1	0.5	41	58

Design Data Accessories Vacuum Switches VS-V-PM / EM-ST



ABDK-ST



ABDK-M8-4

Type	Dimensions in mm					
	B	d1	G3	H	L	L1
ABDK-ST	19.8	6	-	32	85	-
ABDK-M8-4	19.8	-	M8-M	32	85	154

Vacuum Switches

Vacuum Switches VS-V-SA / SD

Measuring range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Vacuum switches VS-V-SA / SD

Applications

- Electronic vacuum switch for measurement of vacuum values close to the suction pad
- Remote evaluation of the signals
- Processing of output signals in, for example, a stored-program controller
- Ideal for outputting part-presence signals
- For use in all areas of automated handling

Design

- Mini-sensor with housing and connection cable
- Available with either screw connector or plug connector
- Analogue or digital output signal

Our Highlights...

- Minimum size and low weight
- Optionally with analogue or digital output
- High measuring accuracy
- Vacuum connection with M3 or M5 thread or with diameter 4 or 6 mm plug-in tubes, according to version

Your Benefits...

> Optimum installation in vacuum systems, even with high rates of acceleration

> Suitable sensors for various applications

> Precise output signals

> Flexible mounting facilities

Designation Code Vacuum Switches VS-V-SA / SD

Abbreviated designation	Measuring range in bar	Principle of function	Switching point in mbar	Vacuum connection
Example VS-V-SD-60-D6:				
VS	**V**	**SD**	**60**	**D6**
VS	V -1 to 0	SA sensor analogue SD sensor digital	60 switching point -600	D4 plug-in tube D6 plug-in tube M3 thread M5 thread

Ordering Data Vacuum Switches VS-V-SA / SD

Vacuum switch VS-V-SA / SD is delivered as a ready to connect product.

Vacuum Switches

Vacuum Switches VS-V-SA / SD

Measuring range from -1 bar to 0 bar

Vacuum Switches VS-V-SA / SD

Type	Part Number
VS-V-SA-M5	10.06.02.00224
VS-V-SA-M3	10.06.02.00225
VS-V-SA-D4	10.06.02.00226
VS-V-SA-D6	10.06.02.00227
VS-V-SD-60-M5	10.06.02.00257
VS-V-SD-60-M3	10.06.02.00258
VS-V-SD-60-D4	10.06.02.00259
VS-V-SD-60-D6	10.06.02.00260

Technical Data Vacuum Switches VS-V-SA / SD

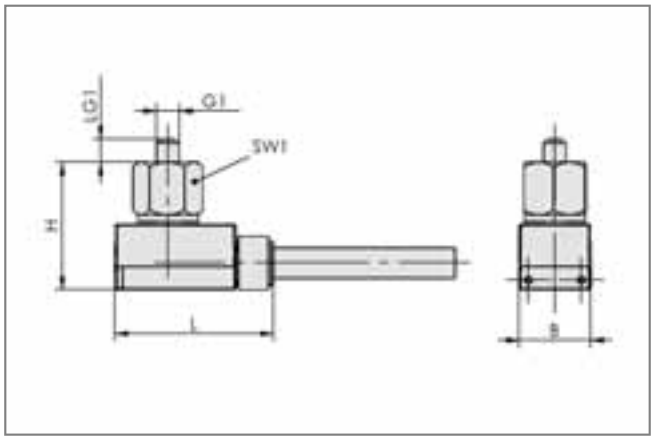
Type	VS-V-SA-M...	VS-V-SA-D..	VS-V-SD-60-M...	VS-V-SD-60-D...
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	5	5	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	-	-	Fixed: approx. 20 mbar	Fixed: approx. 20 mbar
Output signal	Analogue: 1...5 V	Analogue: 1...5 V	1 digital	1 digital
Switching capacity [mA]	-	-	60	60
Point attitude	-	-	- 600 mbar	- 600 mbar
Indication	-	-	LED	LED
Electrical connection	Cable	Cable	Cable	Cable
Voltage	10-24V DC	10-24V DC	10-24V DC	10-24V DC
Protection IP	IP 40	IP 40	IP 40	IP 40
Temperature influence	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0...50 °C	0...50 °C	0...50 °C	0...50 °C
Length of cable [m]	3	3	3	3
Weight [g]	5	5	5	5

Vacuum Switches

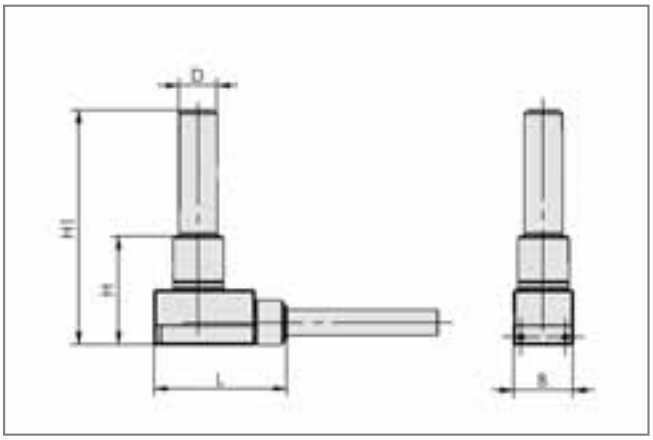
Vacuum Switches VS-V-SA / SD

Measuring range from -1 bar to 0 bar

Design Data Vacuum Switches VS-V-SA / SD



VS-V-SA/SD-M3 and M5



VS-V-SA/SD-D4 and D6

Type	Dimensions in mm							
	B	D	G1	H	H1	L	LG1	SW1
VS-V-SA/SD-M3	9.5	-	M3-M	16.9	-	21	3	8
VS-V-SA/SD-M5	9.5	-	M5-M	16.9	-	21	5	8
VS-V-SA/SD-D4	9.5	4	-	17.2	32.2	21	-	-
VS-V-SA/SD-D6	9.5	6	-	17.2	37.2	21	-	-

Vacuum Switches

Vacuum Switches VS-V-AH / AV-T

Measuring range from -1 bar to 0 bar

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Suitability for Industry-Specific Applications

Vacuum switches VS-V-AV / AH-T

Applications

- Electronic safety monitoring, optimization of cycle times, energy-saving functions
- Can be used as a measuring and switching element
- Suitable for use in very dynamic handling systems

Design

- Plastic housing in 10 mm design
- Adapter plate for quick mounting, either vertically or horizontally
- Teach button integrated into the cover
- Transparent cover over the LED indicator
- Power and control connections via 4-pin M8 connector
- Optionally available with M5 vacuum connection or 6 mm plug-in tube

Our Highlights...

- Switching points adjustable with the "teach" button
- Two digital switch outputs
- Two-color LED indicator
- For vertical or horizontal mounting
- Electronic vacuum sensor
- Current switching capacity 200 mA

Your Benefits...

> Quick adjustment of the process
> Makes further switching elements unnecessary
> Easily visible status indication
> Space-saving installation
> Very precise switching and repeatability
> Direct switching possible

Designation Code Vacuum Switches VS-V-AH / AV-T

Abbreviated designation	Measuring range in bar	Connection	Switching point adjustment	Switching function	Product addition
Example VS-P10-AV-T-PNP-S:					
VS	**P10**	**AV**	**T**	**PNP**	
VS	P10 0 to 10	AH horiontal AV vertical	T teachbutton	PNP switches to plus	S hysteresis fixed

Ordering Data Vacuum Switches VS-V-AH / AV-T

Vacuum switch VS-V-AH / AV-T is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, connection adapter

Vacuum Switches

Vacuum Switches VS-V-AH / AV-T

Measuring range from -1 bar to 0 bar

Vacuum Switches VS-V-AH / AV-T

Type	Part Number
VS-V-AH-T-PNP-S	10.06.02.00294
VS-V-AH-T-PNP	10.06.02.00295
VS-V-AV-T-PNP-S	10.06.02.00292
VS-V-AV-T-PNP	10.06.02.00293

Ordering Data Accessories Vacuum Switches VS-V-AH / AV-T

Connection cable 4-pole		Connection adapter optional	
Material PUR, 5 m, straight	Material PUR, 5 m, 90°	Plug-in tube D6	Screw thread M5-AG
10.06.02.00031	10.06.02.00032	10.06.02.00300	10.06.02.00299

Accessories Vacuum Switches VS-V-AH / AV-T

VS-V-AV-T-PNP with plug-in tube D6

VS-V-AH-T-PNP with screw thread M5-AG

Technical Data Vacuum Switches VS-V-AH / AV-T

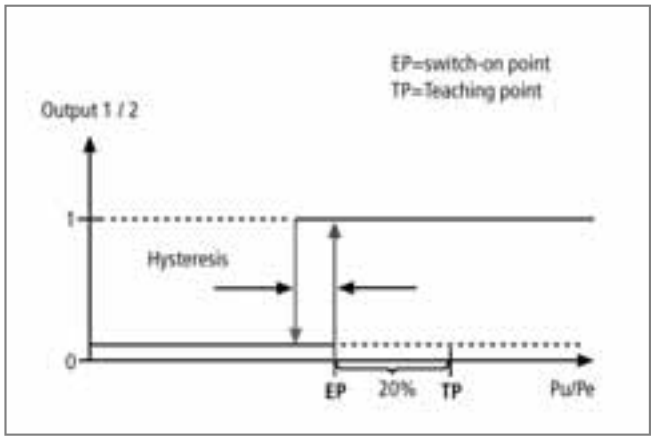
Type	VS-V-AH-T-PNP-S	VS-V-AH-T-PNP	VS-V-AV-T-PNP-S	VS-V-AV-T-PNP
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	5	5	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Fixed: approx. 20 mbar	Adjustable	Fixed: approx. 20 mbar	Adjustable
Output signal	2 digital	2 digital	2 digital	2 digital
Switching capacity [mA]	200	200	200	200
Indication	LED	LED	LED	LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Voltage	10-30V DC	10-30V DC	10-30V DC	10-30V DC
Current consumption [mA]	20	20	20	20
Protection IP	IP 40	IP 40	IP 40	IP 40
Temperature influence	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0...60 °C	0...60 °C	0...60 °C	0...60 °C
Weight [g]	6	6	6	6

Vacuum Switches

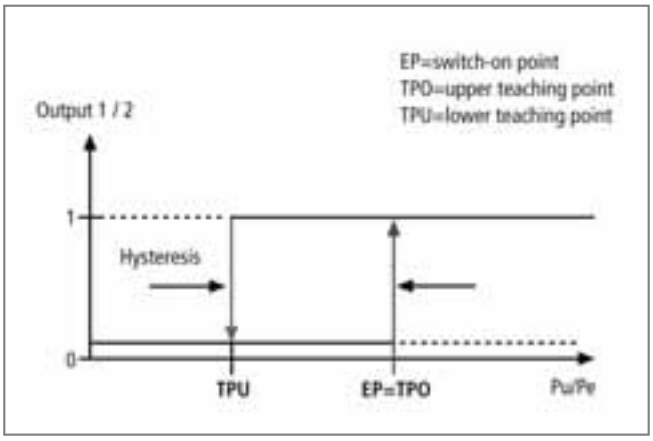
Vacuum Switches VS-V-AH / AV-T

Measuring range from -1 bar to 0 bar

Switching-Point Adjustment Vacuum Switches VS-V-AH / AV-T

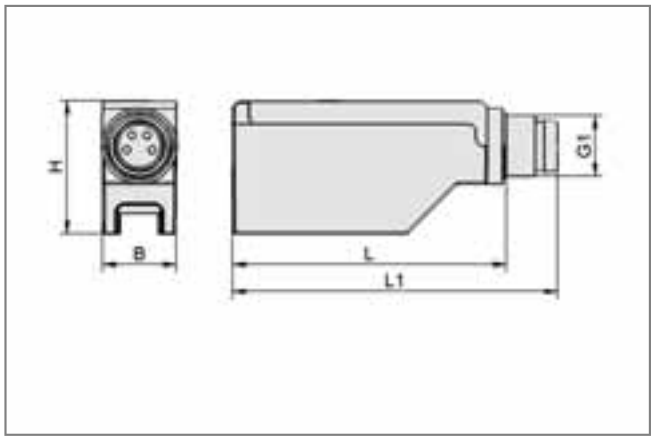


VS-V-AH/AV-T-S (Switching function: fixed hysteresis)

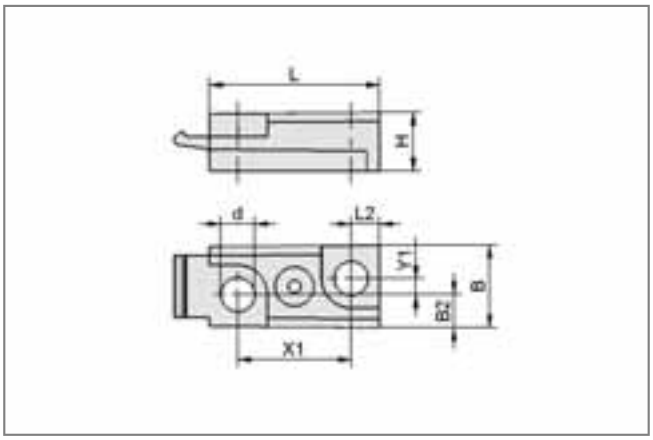


VS-V-AH/AV-T (Switching function: adjustable hysteresis)

Design Data Vacuum Switches VS-V-AH / AV-T



VS-V-AH/AV-T



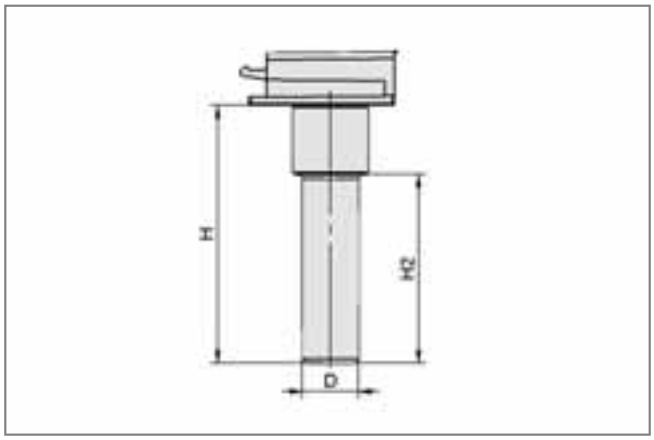
FLAN-PL 13.5x6.6x4.6 VS

Type	Dimensions in mm									
	B	B2	G1	d	H	L	L1	L2	X1	Y1
VS-V-AH-T-PNP-S	10	-	M8-M	-	17.5	36.2	43	-	-	-
VS-V-AH-T-PNP	10	-	M8-M	-	17.5	36.2	43	-	-	-
VS-V-AV-T-PNP-S	10	-	M8-M	-	16.4	41.2	48	-	-	-
VS-V-AV-T-PNP	10	-	M8-M	-	16.4	41.2	48	-	-	-
FLAN-PL	7	2.6	-	2.7	4.6	13.5	-	2.3	9	1.3

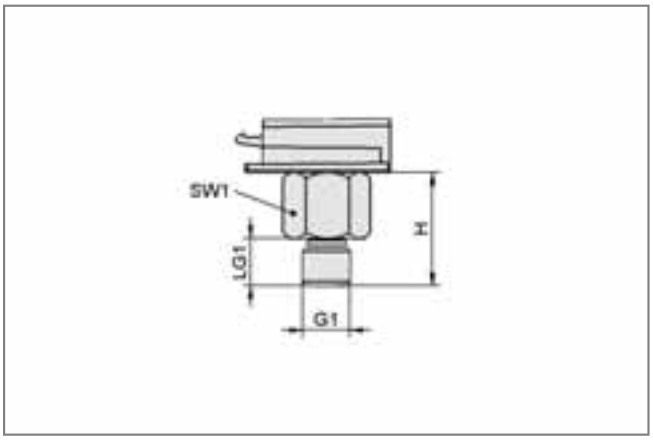
Vacuum Switches VS-V-AH / AV-T

Measuring range from -1 bar to 0 bar

Design Data Accessories Vacuum Switches VS-V-AH / AV-T



ADAP-VS 6-1.3x16



ADAP-VS M5-AG-1.3x16

Type	Dimensions in mm						
	Type	D	G1	H	H2	LG1	SW1
Connection adapter D6	ADAP-VS 6-1.3x16	6	-	27.3	20.0	-	-
Connection adapter M5	ADAP-VS M5-AG-1.3x16	-	M5-M	12.0	-	5.0	8

Vacuum Switches

Vacuum Switches VS-V-A-PNP-S

Measuring range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Vacuum switches VS-V-A-PNP-S

Applications

- Electronic vacuum switch for system monitoring of vacuum systems
- Optimization of cycle times and regulation circuits to increase efficiency of vacuum systems
- Compact construction and low weight permit use directly on the suction pad
- For use in all areas of automated handling

Design

- Electronic vacuum switch in robust polyamide housing
- Vacuum connection via aluminum flange; additional M5 female thread
- Switching point adjustable with a screw; hysteresis fixed
- Supply voltage and signal output via 4-pin M8 screw connector
- Integrated LED for indication of the switching state

Our Highlights...

- Electronic vacuum switch
- Analogue and digital outputs
- Switching point adjustable

Your Benefits...

> Precise measurement and switching

> Adjustable vacuum limit value and continuous vacuum monitoring

> Easily adapted to meet customer requirements

Designation Code Vacuum Switches VS-V-A-PNP-S

Abbreviated designation	Measuring range in bar	Connection	Switching function	Electronic connection	Product addition
Example VS-V-A-PNP-M8-4-S:					
VS	**V**	**A**	**PNP**	**M8-4**	**S**
VS	V -1 to 0	A flange connection	PNP switches to plus	M8-4 connector M8, 4-pole	S hysteresis fixed

Ordering Data Vacuum Switches VS-V-A-PNP-S

Vacuum switch VS-V-A-PNP-S is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable

Vacuum Switches

Vacuum Switches VS-V-A-PNP-S

Measuring range from -1 bar to 0 bar

Vacuum Switches VS-V-A-PNP-S

Type	Part Number
VS-V-A-PNP-M8-4-S	10.06.02.00070

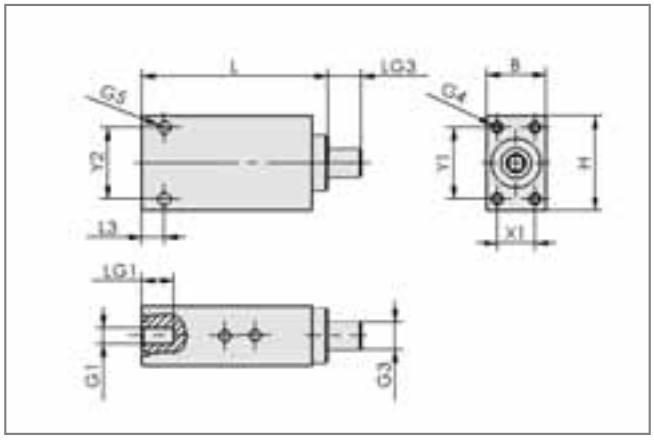
Ordering Data Accessories Vacuum Switches VS-V-A-PNP-S

Connection cable 4-pole	
Material PUR, 5 m, straight	Material PUR, 5 m, 90°
10.06.02.00031	10.06.02.00032

Technical Data Vacuum Switches VS-V-A-PNP-S

Type	VS-V-A-PNP-M8-4-S
Measured medium	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar
Max. overpressure resistance [bar]	5
Repeatability	5 mbar
Hysteresis	Min. 5 mbar (at -300 mbar), max. 12 mbar (at -900 mbar)
Output signal	1 anal./1 dig 1...5V
Switching capacity [mA]	125
Indication	LED
Electrical connection	Male connect M8, 4 pole
Measured medium connection	Flange with thread M5-F
Voltage	12-24V DC
Current consumption [mA]	30
Protection IP	IP 40
Temperature influence	1 mbar/°C
Operating temperature [°C]	-20...70 °C
Weight [g]	25

Design Data Vacuum Switches VS-V-A-PNP-S



VS-V-A-PNP-M8-4-S

Type	Dimensions in mm													
	B	G1	G3	G4	G5	H	L	L2	L3	LG1	LG3	X1	Y1	Y2
VS-V-A-PNP-M8-4-S	15.8	M5-F	M8x1-M	M3-F	M4-F	25	50	-	6	5	9	10	19	19

Vacuum Switches

Vacuum Switches VS-V

Measuring range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Vacuum switches VS-V

Applications

- Universal electronic vacuum switch for safety monitoring and optimization of cycle times and regulation circuits
- Small size and low weight permit use directly on the suction pad

Design

- Electronic vacuum switch in robust polycarbonate housing
- Vacuum connection with flange or G1/8" male thread; both versions with additional M5 female thread
- Switching point and hysteresis adjustable with screws
- Supply voltage via 4-pin M8 screw connector
- Integrated LED for indication of the switching state
- Venting plug (reference air, IP 65) for screwing into switch housing

Our Highlights...

- Electronic vacuum switch
- Switching point and hysteresis adjustable
- Analogue and digital outputs

Your Benefits...

> Precise measurement

> Can be adapted easily to meet customer requirements

> Adjustable vacuum limit value and continuous vacuum monitoring

Designation Code Vacuum Switches VS-V

Abbreviated designation	Measuring range in bar	Connection	Switching function
Example VS-V-A-PNP:			
VS	**V**	**A**	**PNP**
VS	V -1 to 0	A flange connection	NPN switches to minus PNP switches to plus

Ordering Data Vacuum Switches VS-V

Vacuum switch VS-V is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, connection hose for reference air

Vacuum Switches

Vacuum Switches VS-V

Measuring range from -1 bar to 0 bar

Vacuum Switches VS-V

Type	Part Number
VS-V-PNP	10.06.02.00027
VS-V-A-PNP	10.06.02.00028
VS-V-NPN	10.06.02.00037
VS-V-A-NPN	10.06.02.00038

Ordering Data Accessories Vacuum Switches VS-V

Type	Part Number
Connection cable 4-pole, material PUR, 5 m, straight, union nut	10.06.02.00031
Connection cable 4-pole, material PUR, 5 m, 90°, with union nut	10.06.02.00032
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

Note: See "connector and adapter" in this section for more connection possibilities.

Scope of Delivery for Vacuum Switches VS-V

Scope of delivery	VS...	VS...A...
Screwdriver	1 x	1 x
Screw M3	1 x	1 x
Venting plug M3	1 x	1 x
O-rings 3 mm	2 x	2 x
O-ring d = 8.9 x 1.9	-	1 x
Mounting bracket	-	1 x
Washers M4	-	2 x
Spring washers M4	-	2 x
Screws M4 x 6	-	2 x

Technical Data Vacuum Switches VS-V

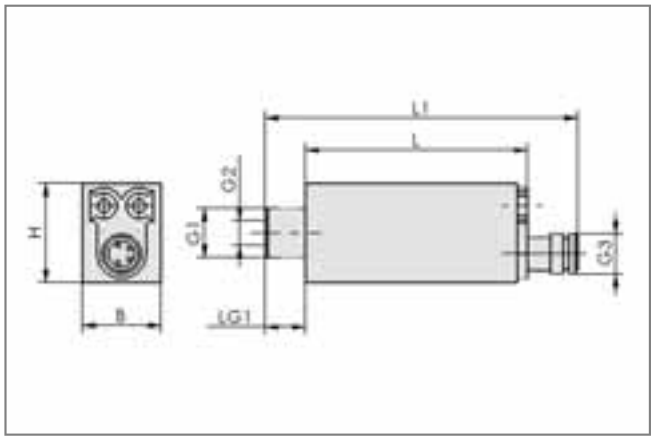
Type	VS-V	VS-V-A
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable: 3 to 25% of set value	Adjustable: 3 to 25% of set value
Output signal	1 anal./1 dig 1...5V	1 anal./1 dig 1...5V
Switching capacity [mA]	125	125
On time [ms]	5	5
Indication	LED	LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole
Measured medium connection	G1/8" male + M5 fem.	Flange with thread M5-F
Voltage	10.8-30V DC	10.8-30V DC
Current consumption [mA]	30	30
Protection IP	IP 40/65 (with hose)	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0...50 °C	0...50 °C
Weight [g]	18	23

Vacuum Switches

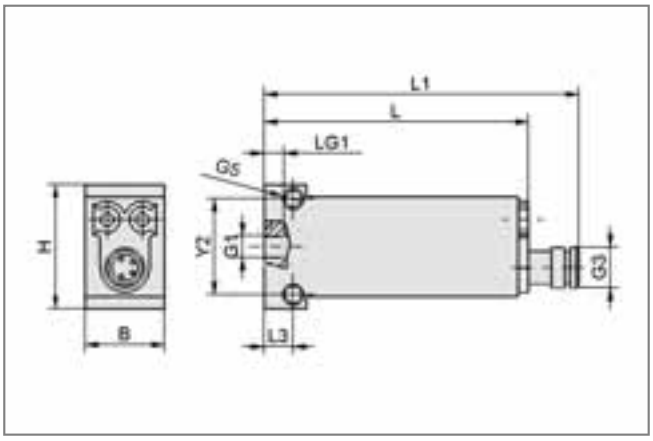
Vacuum Switches VS-V

Measuring range from -1 bar to 0 bar

Design Data Vacuum Switches VS-V



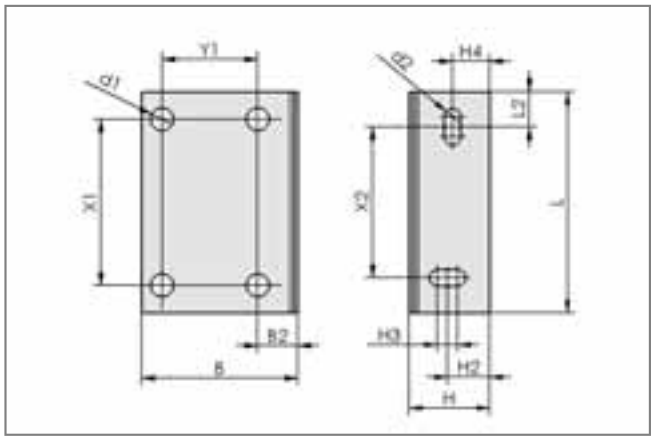
VS-V



VS-V-A

Type	Dimensions in mm										
	B	G1	G2	G3	G5	H	L	L1	L3	LG1	Y2
VS-V	15.7	G1/8"-M	M5-F	M8x1-M	-	19.7	44	62	-	8.0	-
VS-V-A	15.7	M5-F	-	M8x1-M	-	24.7	53	62	5.8	4.5	19

Design Data Accessories vacuum switch



Mounting bracket BEF-WIN

Type	Dimensions in mm											
	B	B2	d1	d2	H	H2	H3	H4	L	L2	X1	X2	Y1
Mounting bracket	31	8	4.5	3.2	16	8	4	7.4	44	7.0	33	30	19

Vacuum Switches

Vacuum Switches VS-V-D

Measuring range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Vacuum switches VS-V-D

Applications

- Electronic vacuum switch for system monitoring of vacuum systems
- Optimization of cycle times and regulation circuits to increase efficiency of vacuum systems
- For use in all areas of automated handling

Design

- Electronic vacuum switch in a robust polycarbonate housing
- Vacuum connection with G1/8" male thread; additional M5 female thread
- 3-digit display and foil keypad on the front for adjustment of the settings
- Integrated LED for indication of the switching state
- Supply voltage via 4-pin M8 screw connector
- Compact construction and low weight

Our Highlights...

- Electronic vacuum switch with digital display
- Switching point and hysteresis programmable with the foil keypad
- Two separately programmable digital outputs
- Special functions programmable

Your Benefits...

> Precise switching with two separate switch outputs

> Easily adapted to meet customer requirements

> Upper and lower limit values can be displayed

> Further adaptation possible

Designation Code Vacuum Switches VS-V-D

Abbreviated designation	Measuring range in bar	Display	Switching function	Product addition
Example VS-V-D-NPN:				
VS	**V**	**D**	**NPN**	
VS	V -1 to 0	D digital display	NPN switches to minus PNP switches to plus	C with PIN-code protection

Ordering Data Vacuum Switches VS-V-D

Vacuum switch VS-V-D is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, mounting set, connection hose

Vacuum Switches

Vacuum Switches VS-V-D

Measuring range from -1 bar to 0 bar

Vacuum Switches VS-V-D

Type	Part Number
VS-V-D PNP	10.06.02.00049
VS-V-D NPN	10.06.02.00055
VS-V-D PNP C	10.06.02.00270

Ordering Data Accessories Vacuum Switches VS-V-D

Type	Part Number
Connection cable material PUR, 5 m, straight, with union nut	10.06.02.00031
Connection cable material PUR, 5 m, 90°, with union nut	10.06.02.00032
Mounting set* for VS-V-D-PNP	10.06.02.00061
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

*Set consists of mounting bracket and G1/8" nut

Note: See "connector and adapter" in this section for more connection possibilities.

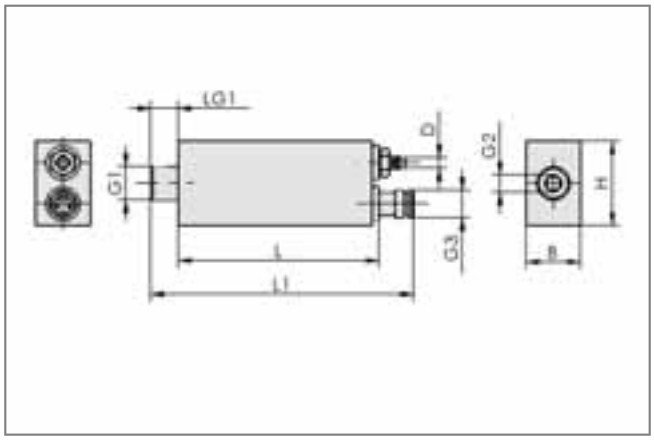
Technical Data Vacuum Switches VS-V-D

Type	VS-V-D PNP	VS-V-D NPN	VS-V-D PNP C
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	5	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital	2 digital	2 digital
Switching capacity [mA]	180	180	180
Indication	2xLED	2xLED	2xLED
Display resolution	0 bar, 5 mmHg, 0.2 inHg, 1 kPa	0 bar, 5 mmHg, 0.2 inHg, 1 kPa	0 bar, 5 mmHg, 0.2 inHg, 1 kPa
Display units	bar, mmHg, inHg, kPa	bar, mmHg, inHg, kPa	bar, mmHg, inHg, kPa
Measured-value display	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Measured medium connection	G1/8" male + M5 fem.	G1/8" male + M5 fem.	G1/8" male + M5 fem.
Voltage	10.8-30V DC	10.8-30V DC	10.8-30V DC
Current consumption [mA]	30	30	30
Protection IP	IP 40/65 (with hose)	IP 40/65 (with hose)	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value in the range 0 to 50°C	± 3% of full-scale value in the range 0 to 50°C	± 3% of full-scale value in the range 0 to 50°C
Operating temperature [°C]	0...50 °C	0...50 °C	0...50 °C
Weight [g]	25	25	25

Vacuum Switches VS-V-D

Measuring range from -1 bar to 0 bar

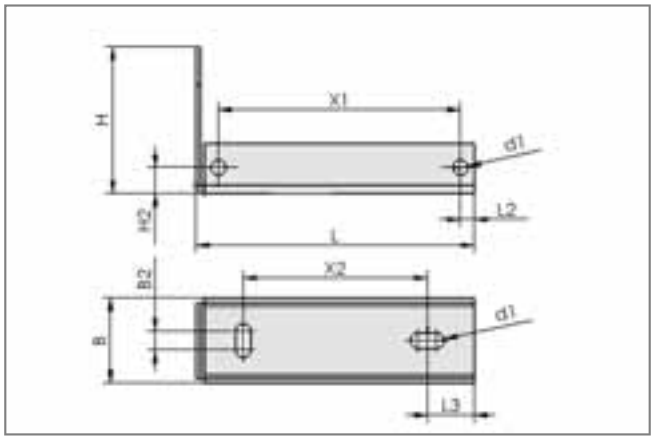
Design Data Vacuum Switches VS-V-D



VS-V-D

Type	Dimensions in mm								
	B	D	G1	G2	G3	H	L	L1	LG1
VS-V-D	16	3.4	G1/8"-M	M5-F	M8x1-M	24.7	58.5	75.5	8

Design Data Accessories Vacuum Switches VS-V-D



Mounting bracket

Type	Dimensions in mm									
	B	B2	d1	H	H2	L	L2	L3	X1	X2
Mounting bracket	31	8	4.5	16.0	8	44.0	7	10	33	30

Vacuum Switches

Vacuum Switches VS-V-W-D

Measuring range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Vacuum switches VS-V-W-D

Applications

- Electronic vacuum switch for system monitoring of vacuum systems
- Optimization of cycle times and regulation circuits to increase efficiency of vacuum systems
- Cubical design also suitable for panel mounting
- For use in all areas of automated handling

Design

- Electronic vacuum switch in a robust polycarbonate housing
- Vacuum connection with G 1/8" female thread
- 3-digit display and foil keypad on the front for adjustment of the settings
- Integrated LED for indication of the switching state
- Supply voltage via 4-pin M8 screw connector
- Compact construction and low weight

Our Highlights...

- Electronic vacuum switch with digital display
- Switching point and hysteresis programmable with the foil keypad
- Two separately programmable digital outputs
- Special functions programmable

Your Benefits...

> Precise switching with two separate switch outputs

> Can be adapted easily to meet customer requirements

> Upper and lower limit values can be displayed

> Further adaptation possible

Designation Code Vacuum Switches VS-V-W-D

Abbreviated designation	Measuring range in bar	Shape	Display	Switching function	Product addition
Example VS-V-W-D-PNP-C:					
VS	**V**	**W**	**D**	**PNP**	**C**
VS	V -1 to 0	W cube shape	D digital display	NPN switches to minus PNP switches to plus	C with PIN-code-protection

Ordering Data Vacuum Switches VS-V-W-D

Vacuum switch VS-V-W-D is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, flange plate, mounting frame, mounting bracket, connection hose

Vacuum Switches

Vacuum Switches VS-V-W-D

Measuring range from -1 bar to 0 bar

Vacuum Switches VS-V-W-D

Type	Part Number
VS-V-W-D-PNP	10.06.02.00113
VS-V-W-D-NPN	10.06.02.00126
VS-V-W-D-PNP-C	10.06.02.00271

Ordering Data Accessories Vacuum Switches VS-V-W-D

Type	Part Number
Connection cable PUR, 5 m, straight, with mounting nut M8	10.06.02.00031
Connection cable PUR, 5 m, 90°, with mounting nut M8	10.06.02.00032
Flange plate for dir. mount. and press. conn. G1/8"-IG on the side*	10.06.02.00116
Mounting frame	10.06.02.00115
Mounting bracket	10.06.02.00154
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

!Note: See "Connectors and adapters" in this section for more connection possibilities

*Complete with 2 screws M3x6 and O-ring seal 10x1.5

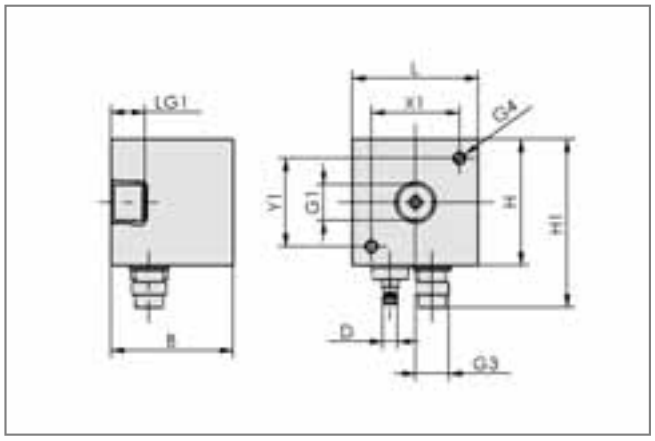
Technical Data Vacuum Switches VS-V-W-D

Type	VS-V-W-D
Measured medium	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar
Max. overpressure resistance [bar]	5
Repeatability	± 1% of full-scale value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital
Switching capacity [mA]	180
Indication	2xLED
Display resolution	0 bar, 5 mmHg, 0.2 inHg, 1 kPa
Display units	bar, mmHg, inHg, kPa
Measured-value display	3-digit 7-segment LED
Electrical connection	Male connect M8, 4 pole
Measured medium connection	Thread G1/8"-F
Voltage	10.8-30V DC
Current consumption [mA]	55
Protection IP	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value in the range 0 to 50°C
Operating temperature [°C]	0...50 °C
Weight [g]	25

Vacuum Switches VS-V-W-D

Measuring range from -1 bar to 0 bar

Design Data Vacuum Switches VS-V-W-D



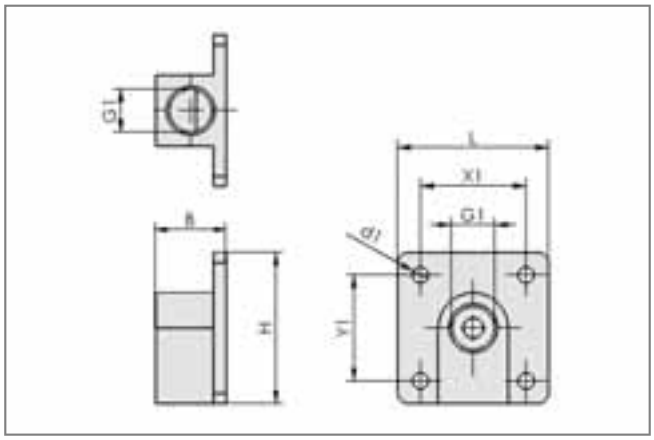
VS-V-W-D

Type	Dimensions in mm										
	B	D	G1	G3	G4	H	H1	L	LG1	X1	Y1
VS-V-W-D	29	3.4	G1/8"-F	M8x1-M	M3-F	30	40	30	8	21	21

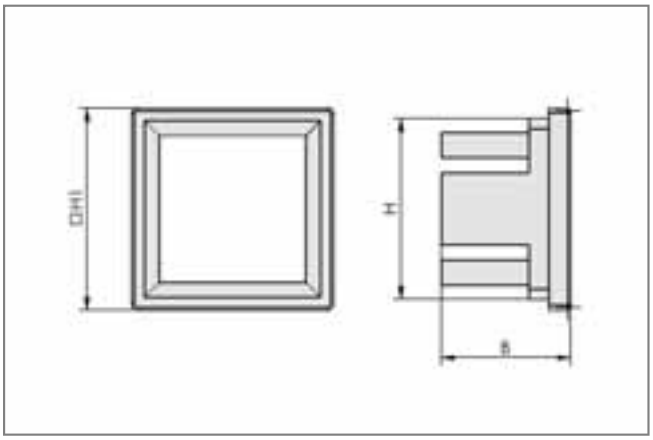
Vacuum Switches VS-V-W-D

Measuring range from -1 bar to 0 bar

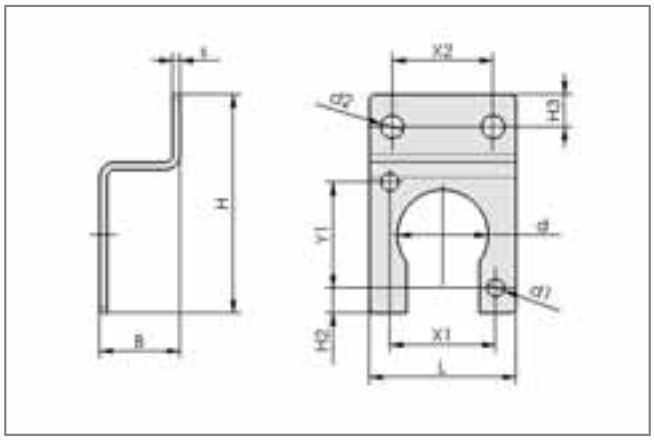
Design Data Accessories Vacuum Switches VS-V-W-D



Flange plate



Mounting frame



Mounting bracket

Type	Dimensions in mm														
	B	d	d1	d2	G1	H	H1	H2	H3	L	L2	s	X1	X2	Y1
Flange plate	14.0	-	3.2	-	G1/8"-F	30	-	-	-	30	-	-	21	-	21
Mounting frame	25.6	-	-	-	-	36	40.0	-	-	-	-	-	-	-	-
Mounting bracket	16.0	18	3.4	4.5	-	44	-	5	6.5	29	-	1.5	21	20	21

Vacuum Switches

Vacuum Switches VS-V-W-D-K(-2C)

Measuring range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Vacuum switches VS-V-W-D-K(-2C)

Applications

- Vacuum switch for use in vacuum systems for safety monitoring and optimizing cycle times
- Creating control circuits to improve the efficiency of vacuum systems
- The switch can be mounted in panels due to its cubic construction and optional mounting frame with a transparent protective cap
- Can be installed in handling systems directly where it is used thanks to its small design and low weight

Design

- Electronic switch in a stable plastic housing made from polycarbonate
- Switch with either a one- or two-color display
- Connection for measuring vacuum with G1/8" female thread (switch with one-color display) or G1/8" male thread (switch with two-color display)
- Hysteresis and comparator mode
- 2 m connection cable
- Mounting bracket and mounting frame for mounting into switch panel available as accessories

Our Highlights...	Your Benefits...
• Vacuum switch with a digital display, also available with a two-color display	> Clear visual monitoring of the system and the process
• All functions are set using an intelligent menu structure	> Fast and easy installation or adjusting any settings
• Integrated automatic setting of switching point	> Optimal switching points determined automatically using the process parameters and without manual programming
• Anti-chattering function with adjustable response times	> Stable switching output even in the event of sudden, brief fluctuations in the main vacuum
• Switch function with freely-adjustable switching points, in either hysteresis or comparator mode	> Optimal adjustment of switching points and output signals

Vacuum Switches VS-V-W-D-K(-2C)

Measuring range from -1 bar to 0 bar

Designation Code Vacuum Switches VS-V-W-D-K(-2C)

Abbreviated designation	Measuring range in bar	Shape	Display	Cable	Display	Switching-function
Example VS-V-W-D-K-2C-PNP:						
VS	**V**	**W**	**D**	**K**	**2C**	**PNP**
VS	V -1 to 0	W cube shape	D digital display	K Cable	2C two-colored display	NPN switches to minus PNP switches to plus

Ordering Data Vacuum Switches VS-V-W-D-K(-2C)

Vacuum switch VS-V-W-D-K(-2C) is delivered as a ready to connect product.

Available accessories: mounting bracket, mounting frame

Vacuum Switches VS-V-W-D-K(-2C)

Type	Part Number
VS-V-W-D-K-NPN	10.06.02.00417
VS-V-W-D-K-PNP	10.06.02.00418
VS-V-W-D-K-2C-NPN	10.06.02.00421
VS-V-W-D-K-2C-PNP	10.06.02.00422

Ordering Data Accessories Vacuum Switches VS-V-W-D-K(-2C)

Type	Mounting bracket*	Mounting frame for mounting into switch panel
VS-V-W-D-K-NPN	10.06.02.00425	10.06.02.00426
VS-V-W-D-K-PNP	10.06.02.00425	10.06.02.00426
VS-V-W-D-K-2C-NPN	10.06.02.00425	10.06.02.00427
VS-V-W-D-K-2C-PNP	10.06.02.00425	10.06.02.00427

*Set comprises two mounting brackets (see accessories design data)

Vacuum Switches

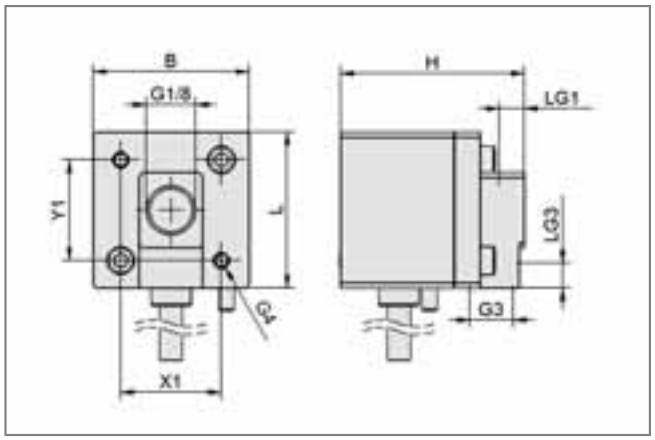
Vacuum Switches VS-V-W-D-K(-2C)

Measuring range from -1 bar to 0 bar

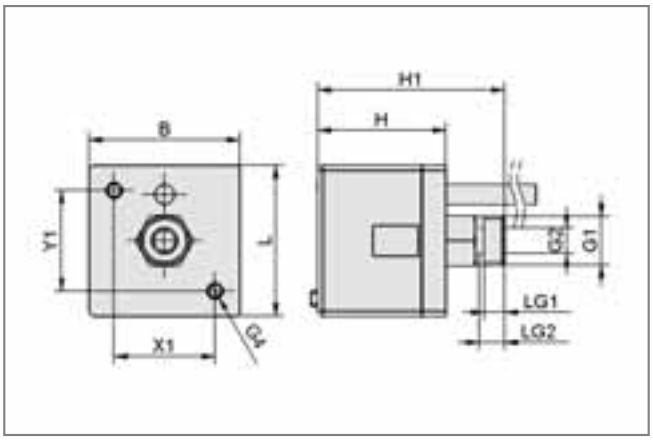
Technical Data Vacuum Switches VS-V-W-D-K(-2C)

Type	VS-V-W-D-K-NPN	VS-V-W-D-K-PNP	VS-V-W-D-K-2C-NPN	VS-V-W-D-K-2C-PNP
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	3	3	3	3
Repeatability	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital	2 digital	1 digital	1 digital
Switching capacity [mA]	80	80	125	125
Indication	2xLED	2xLED	-	-
Measured-value display	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED
Electrical connection	Cable	Cable	Cable	Cable
Measured medium connection	Thread G1/8"-F	Thread G1/8"-F	Thread G1/8"-M	Thread G1/8"-M
Voltage	12-24V DC	12-24V DC	12-24V DC	12-24V DC
Current consumption [mA]	55	55	45	45
Protection IP	IP 40	IP 40	IP 40	IP 40
Operating temperature [°C]	0...50 °C	0...50 °C	0...50 °C	0...50 °C
Weight [g]	105	105	75	75

Design Data Vacuum Switches VS-V-W-D-K(-2C)



Vacuum switch VS-V-W-D-K



Vacuum switch VS-V-W-D-K-2C

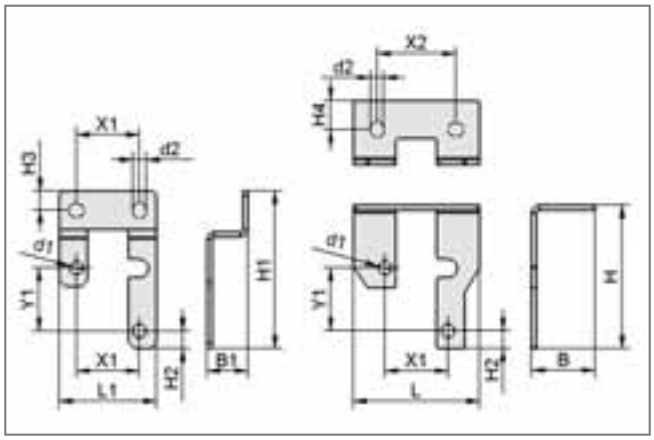
Type	Dimensions in mm						
	B	G1	G2	G3	G4	H	H1
VS-V-W-D-K	31	G1/8"-F	-	G1/8"-F	M3-F	36.5	-
VS-V-W-D-K-2C	30	G1/8"-M	M5-F	-	M3-F	25.4	37.1

Type	Dimensions in mm					
	L	LG1	LG2	LG3	X1	Y1
VS-V-W-D-K	31	5	-	5	20	20
VS-V-W-D-K-2C	30	4	5	-	20	20

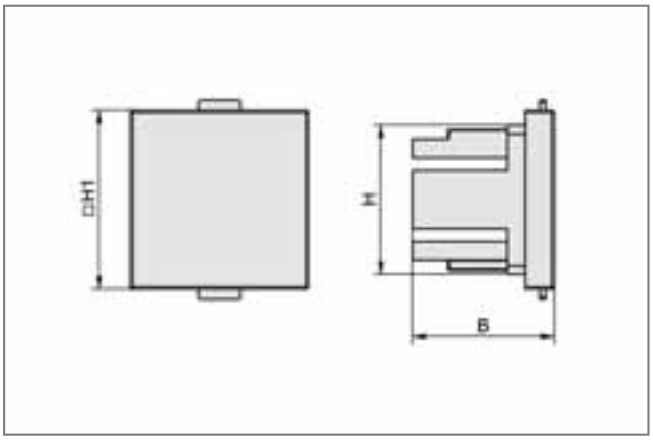
Vacuum Switches VS-V-W-D-K(-2C)

Measuring range from -1 bar to 0 bar

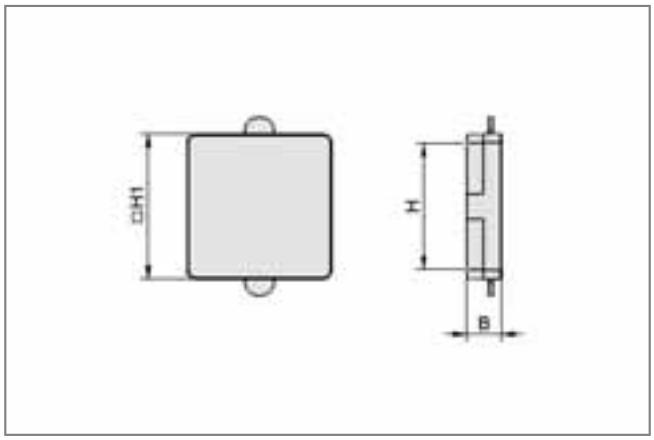
Design Data Accessories Vacuum Switches VS-V-W-D-K(-2C)



Mounting bracket



Mounting frame EINB-RAx33.8x35.4 for VS-V-W-D-K



Mounting frame EINB-RAx8.5x30 for VS-V-W-D-K-2C

Type	Dimensions in mm						
	B	B1	d1	d2	H	H1	H2
Mounting bracket	20	13.0	4.3	4.2	45.5	50.0	6
Mounting frame VS-V-W-D-K	34	-	-	-	35.4	42.5	-
Mounting frame VS-V-W-D-K-2C	9	-	-	-	30.0	34.5	-

Type	Dimensions in mm						
	H3	H4	L	L1	X1	X2	Y1
Mounting bracket	6.1	9.1	40	31	20	25	20
Mounting frame VS-V-W-D-K	-	-	-	-	-	-	-
Mounting frame VS-V-W-D-K-2C	-	-	-	-	-	-	-

Pressure Switches

Pressure Switches VS-P1

Measuring range from 0 bar to 1 bar

Suitability for Industry-Specific Applications

Pressure switches VS-P1

Applications

- Electronic pressure switch for system monitoring of pressure systems
- Optimization of cycle times and regulation circuits to increase efficiency of pressure systems
- For use in all areas of automated handling

Design

- Electronic pressure switch in robust polycarbonate housing
- Pressure connection via flange or a G1/8" male thread; both versions with additional M5 female thread
- Switching point and hysteresis adjustable with screw
- Integrated LED for indication of the switching state
- Electrical connections with 4-pin M8 screw connector
- Compact construction and low weight

Our Highlights...

- Electronic pressure switch
- Switching point and hysteresis adjustable
- Analogue and digital outputs

Your Benefits...

> Precise measurement and switching

> Easily adapted to customer's requirements

> Adjustable pressure limit value and continuous pressure monitoring

Designation Code Pressure Switches VS-P1

Abbreviated designation	Measuring range in bar	Connection	Switching function
Example VS-P1-A-PNP:			
VS	**P1**	**A**	**PNP**
VS	P1 0 to 1	- connection thread A flange connection	NPN switches to minus PNP switches to plus

Ordering Data Pressure Switches VS-P1

Pressure switch VS-P1 is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, connection hose

Pressure Switches VS-P1

Measuring range from 0 bar to 1 bar

Pressure Switches VS-P1

Type	Part Number
VS-P1-PNP	10.06.02.00051
VS-P1-A-PNP	10.06.02.00050
VS-P1-NPN	10.06.02.00104
VS-P1-A-NPN	10.06.02.00106

Ordering Data Accessories Pressure Switches VS-P1

Type	Part Number
Connection cable 4-pole, material PUR, 5 m, straight, union nut	10.06.02.00031
Connection cable 4-pole, material PUR, 5 m, 90°, with union nut	10.06.02.00032
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

!Note: See "Connector and Adapter" in this section for more connection possibilities.

Scope of Delivery for Pressure Switches VS-P1

Scope of delivery	VS...	VS...A...
Screwdriver	1 x	1 x
Screw M3	1 x	1 x
Venting plug M3	1 x	1 x
O-rings 3 mm	2 x	2 x
O-ring d = 8.9 x 1.9	-	1 x
Mounting bracket	-	1 x
Washers M4	-	2 x
Spring washers M4	-	2 x
Screws M4 x 6	-	2 x

Technical Data Pressure Switches VS-P1

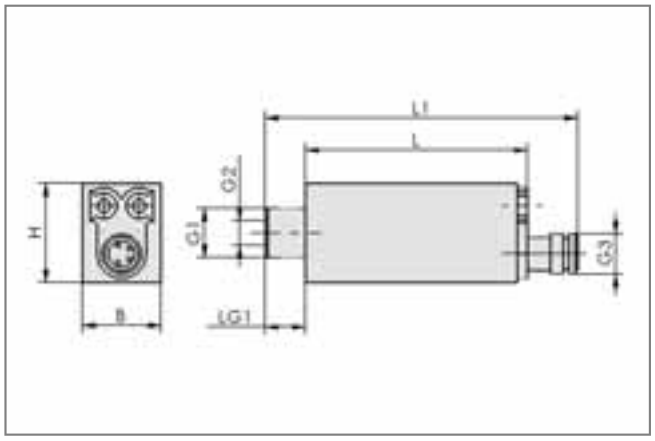
Type	VS-P1	VS-P1-A
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	0...1 bar	0...1 bar
Max. overpressure resistance [bar]	5	5
Repeatability	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable: 3 to 25% of set value	Adjustable: 3 to 25% of set value
Output signal	1 anal./1 dig 1...5V	1 anal./1 dig 1...5V
Switching capacity [mA]	125	125
On time [ms]	5	5
Indication	LED	LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole
Measured medium connection	G1/8" male + M5 fem.	Flange with thread M5-F
Voltage	10.8-30V DC	10.8-30V DC
Current consumption [mA]	30	30
Protection IP	IP 40/65 (with hose)	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0...50 °C	0...50 °C
Weight [g]	18	23

Pressure Switches

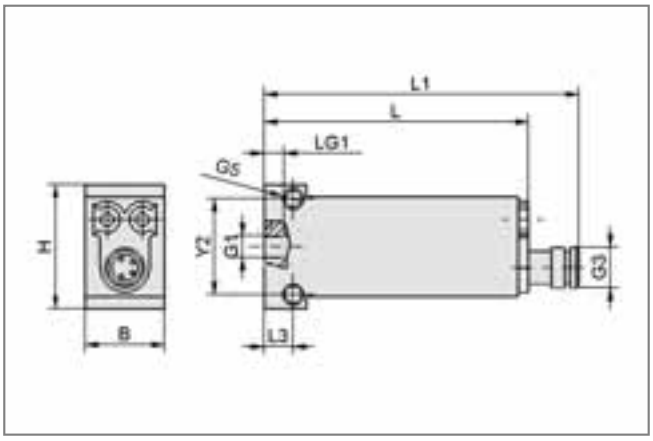
Pressure Switches VS-P1

Measuring range from 0 bar to 1 bar

Design Data Pressure Switches VS-P1



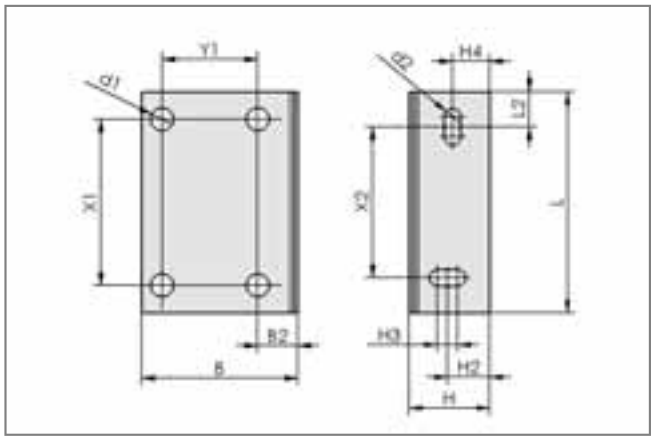
VS-P1



VS-P1-A

Type	Dimensions in mm										
	B	G1	G2	G3	G5	H	L	L1	L3	LG1	Y2
VS-P1	15.7	G1/8"-M	M5-F	M8x1-M	-	19.7	44	62	-	8.0	-
VS-P1-A	15.7	M5-F	-	M8x1-M	M4-F	24.7	53	62	5.8	4.5	19

Design Data Accessories Pressure Switches VS-P1



Mounting bracket BEF-WIN

Type	Dimensions in mm											
	B	B2	d1	d2	H	H2	H3	H4	L	L2	X1	X2	Y1
Mounting bracket	31.0	8.0	4.5	3.2	16.0	8	4.0	7.4	44.0	7.0	33	30.0	19.0

Pressure Switches

Pressure Switches VS-P10-D

Measuring range from 0 bar to 10 bar

Suitability for Industry-Specific Applications

Pressure switches VS-P10-D

Applications

- Electronic pressure switch for system monitoring of pressure systems
- Optimization of cycle times and regulation circuits to increase efficiency of pressure systems
- Compact construction and low weight permit use directly on the suction pad
- For use in all areas of automated handling

Design

- Electronic pressure switch in robust polycarbonate housing
- Pressure connection via G1/8" male thread, additional M5 female thread
- Display with three digits and foil keypad on front for setting the values
- Integrated LED for indication of the switching state
- Electrical connections via 4-pin M8 screw connector

Our Highlights...

- Electronic pressure switch with digital display
- Switching point and hysteresis programmable with foil keypad
- Two separately programmable digital outputs
- Special functions programmable

Your Benefits...

> Precise switching with two separate switch outputs

> Can be adapted optimally to customer requirements

> Upper and lower limit values can be displayed

> Further adaptation possible

Designation Code Pressure Switches VS-P10-D

Abbreviated designation	Measuring range im bar	Display	Switching function
Example VS-P10-D-PNP:			
VS	**P10**	**D**	**PNP**
VS	P10 0 to 10	D digital display	PNP switches to plus

Ordering Data Pressure Switches VS-P10-D

Pressure switch VS-P10-D is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, mounting set, connection hose

Pressure Switches VS-P10-D

Type	Part Number
VS-P10-D-PNP	10.06.02.00056

Pressure Switches

Pressure Switches VS-P10-D

Measuring range from 0 bar to 10 bar

Ordering Data Accessories Pressure Switches VS-P10-D

Type	Part Number
Connection cable PUR, 5 m, straight, with union nut	10.06.02.00031
Connection cable PUR, 5 m, 90°, with union nut	10.06.02.00032
Mounting set* for VS-V-D-PNP	10.06.02.00061
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

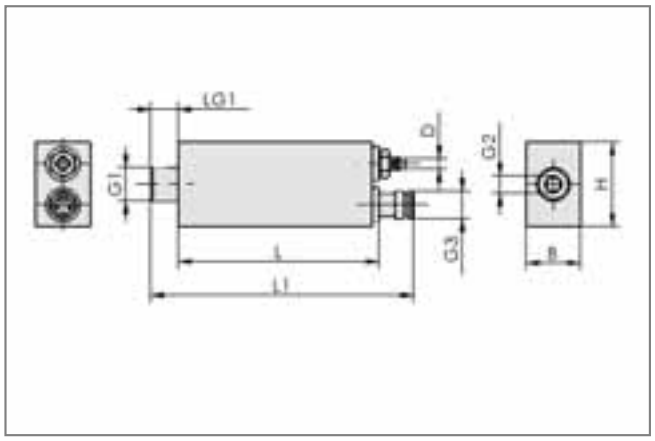
*Set consists of mounting bracket and G1/8" nut, usable for VS-V-D-PNP and VS-P-D-PNP

Note: See "connector and adapter " in this section for more connection possibilities

Technical Data Pressure Switches VS-P10-D

Type	VS-P10-D-PNP
Measured medium	Non-aggressive gases; dry, oil-free air
Measuring range	0...10 bar
Max. overpressure resistance [bar]	16
Repeatability	± 1% of full-scale value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital
Switching capacity [mA]	180
Indication	2xLED
Display resolution	0 bar, 1 psi, 0.05 kgf/cm², 0.01 Mpa
Display units	bar, psi, kgf/cm², Mpa
Measured-value display	3-digit 7-segment LED
Electrical connection	Male connect M8, 4 pole
Measured medium connection	G1/8" male + M5 fem.
Voltage	10.8-30V DC
Current consumption [mA]	55
Protection IP	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value in the range 0 to 50°C
Operating temperature [°C]	0...50 °C
Weight [g]	25

Design Data Pressure Switches VS-P10-D



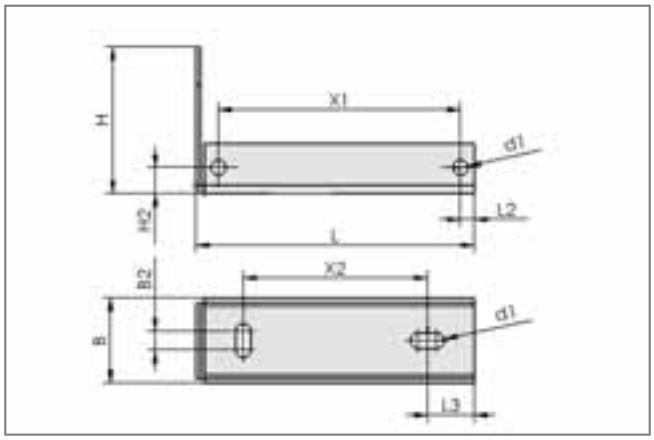
VS-P10-D

Type	Dimensions in mm							
	B	D	G1	G2	G3	H	L	L1
VS-P10-D-PNP	16	3.4	G1/8"-M	M5-F	M8x1-M	24.7	58.5	75.5

Pressure Switches VS-P10-D

Measuring range from 0 bar to 10 bar

Design Data Accessories Pressure Switches VS-P10-D



Mounting bracket

Type	Dimensions in mm									
	B	B2	d1	H	H2	L	L2	L3	X1	X2
Mounting bracket	31	8	4.5	16.0	8	44.0	7	10	33	30

Pressure Switches

Pressure Switches VS-P10-W-D

Measuring range from 0 bar to 10 bar

Suitability for Industry-Specific Applications

Pressure switches VS-P10-W-D

Applications

- Electronic pressure switch for system monitoring of pressure systems
- Optimization of cycle times and regulation circuits to increase efficiency of pressure systems
- Compact construction and low weight permit use directly on the suction pad
- Cubical design also suitable for panel mounting
- For use in all areas of automated handling

Design

- Electronic pressure switch in robust polycarbonate housing
- Pressure connection via G1/8" female thread
- Display with three digits and foil keypad on front for setting the values
- Integrated LED for indication of the switching state
- Electrical connections and signal output via 4-pin M8 screw connector

Our Highlights...

- Electronic pressure switch with digital display
- Switching point and hysteresis programmable with the foil keypad
- Two separately programmable digital output
- Special functions can be programmed

Your Benefits...

> Electronically precise switching with two separate switch outputs

> Can be adapted optimally to customer requirements

> Upper and lower limit values can be displayed

> Further adaptation possible

Designation Code Pressure Switches VS-P10-W-D

Abbreviated designation	Measuring range im bar	Shape	Display	Switching function
Example VS-P10-W-D-PNP:				
VS	**P10**	**W**	**D**	**PNP**
VS	P10 0 to 10	W cube shape	D digital display	NPN switches to minus PNP switches to plus

Ordering Data Pressure Switches VS-P10-W-D

Pressure switch VS-P10-W-D is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, flange, panel mounting set, mounting bracket, connection hose

Pressure Switches VS-P10-W-D

Measuring range from 0 bar to 10 bar

Pressure Switches VS-P10-W-D

Type	Part Number
VS-P10-W-D-PNP	10.06.02.00114
VS-P10-W-D-NPN	10.06.02.00127

Ordering Data Accessories Pressure Switches VS-P10-W-D

Type	Part Number
Connection cable PUR, 5 m, straight, with union nut M8	10.06.02.00031
Connection cable PUR, 5 m, 90°, with union nut M8	10.06.02.00032
Flange for direct mounting and pressure conn. G1/8" IG* on the side	10.06.02.00116
Mounting frame	10.06.02.00115
Mounting bracket	10.06.02.00154
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

Note: See "connector and adapter" in this section for more connection possibilities

*Complete with 2 screws M3x6 and O-ring seal 10x1,5

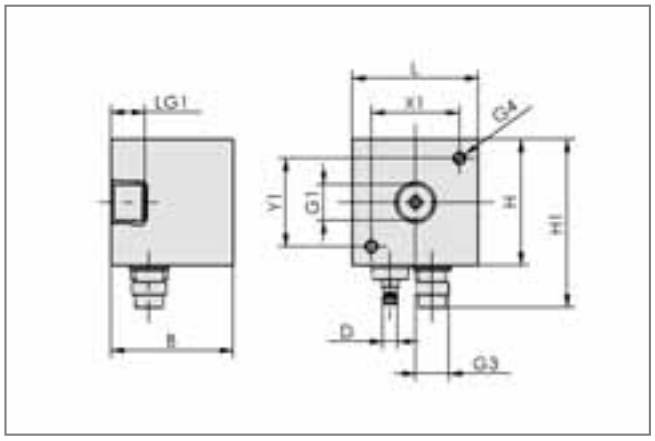
Technical Data Pressure Switches VS-P10-W-D

Type	VS-P10-W-D
Measured medium	Non-aggressive gases; dry, oil-free air
Measuring range	0...10 bar
Max. overpressure resistance [bar]	16
Repeatability	± 1% of full-scale value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital
Switching capacity [mA]	180
Indication	2xLED
Display resolution	0 bar, 1 psi, 0.05 kgf/cm², 0.01 Mpa
Display units	bar, psi, kgf/cm², Mpa
Measured-value display	3-digit 7-segment LED
Electrical connection	Male connect M8, 4 pole
Measured medium connection	Thread G1/8"-F
Voltage	10.8-30V DC
Current consumption [mA]	55
Protection IP	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value in the range 0 to 50°C
Operating temperature [°C]	0...50 °C
Weight [g]	25

Pressure Switches VS-P10-W-D

Measuring range from 0 bar to 10 bar

Design Data Pressure Switches VS-P10-W-D



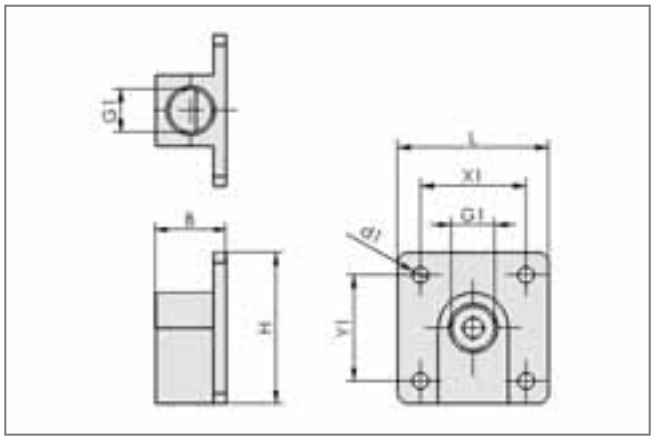
VS-P10-W-D

Type	Dimensions in mm										
	B	D	G1	G3	G4	H	H1	L	LG1	X1	Y1
VS-P10-W-D	29	3.4	G1/8"-F	M8x1-M	M3-F	30	40	30	8	21	21

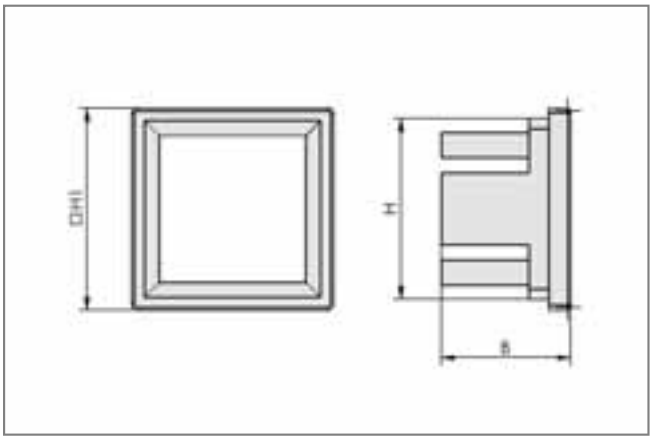
Pressure Switches VS-P10-W-D

Measuring range from 0 bar to 10 bar

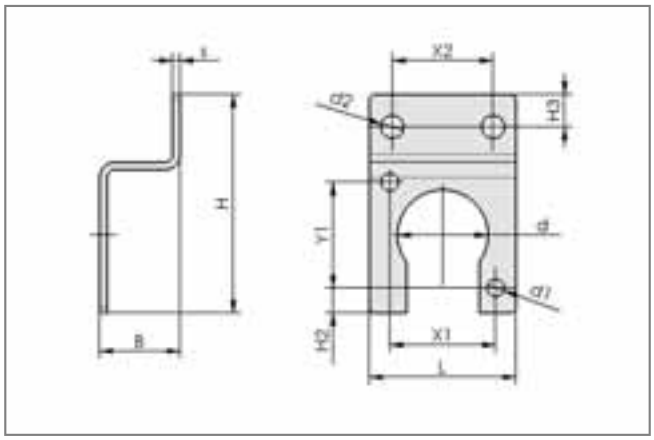
Design Data Accessories Pressure Switches VS-P10-W-D



Flange plate



Mounting frame



Mounting bracket

Type	Dimensions in mm														
	B	d	d1	d2	G1	H	H1	H2	H3	L	L2	s	X1	X2	Y1
Flange plate	14.0	-	3.2	-	G1/8"-F	30	-	-	-	30	-	-	21	-	21
Mounting frame	25.6	-	-	-	-	36	40	-	-	-	-	-	-	-	-
Mounting bracket	16.0	18	3.4	4.5	-	44	-	5	6.5	29	-	1.5	21	20	21

Pressure Switches

Pressure Switches VS-P10-AH / AV-T

Measuring range from 0 bar to 10 bar

Suitability for Industry-Specific Applications

Pressure switches VS-P10-AH / VS-P10-AV-T

Applications

- Pressure switch for electronic safety monitoring in pressure systems
- Suitable for both measuring and switching
- Suitable for use in highly dynamic handling systems

Design

- Plastic housing in 10 mm design
- Adapter plate for quick mounting, either vertically or horizontally
- Teach button integrated into the cover
- Transparent cover over the LED indicator
- Power and control connections via 4-pin M8 connector
- Available with 6 mm plug-in tube or M5 pneumatic connection

Our Highlights...

- Switching points can be set with teach button
- Two digital outputs
- Two-colour LED indicator
- For upright or flat mounting
- Switching capacity 200 mA
- Minimum size
- Weight only 6 g

Your Benefits...

> Fast adjustment of switching points
> Fewer switching elements needed
> Easily visible status indication
> Space-saving installation
> High switching capacity
> Low space requirements
> Mass of switch almost negligible

Designation Code Pressure Switches VS-P10-AH / AV-T

Abbreviated designation	Measuring range in bar	Connection	Switching point adjustment	Switching function	Product addition
Example VS-P10-AV-T-PNP-S:					
VS	**P10**	**AV**	**T**	**PNP**	
VS	P10 0 to 10	AH horiontal AV vertical	T teachbutton	PNP switches to plus	S hysteresis fixed

Ordering Data Pressure Switches VS-P10-AH / AV-T

Pressure switch VS-P10-AH / AV-T is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, connection adapter

Pressure Switches VS-P10-AH / AV-T

Measuring range from 0 bar to 10 bar

Pressure Switches VS-P10-AH / AV-T

Type	Part Number
VS-P10-AH-T-PNP-S	10.06.02.00382
VS-P10-AH-T-PNP	10.06.02.00383
VS-P10-AV-T-PNP-S	10.06.02.00384
VS-P10-AV-T-PNP	10.06.02.00385

Ordering Data Accessories Pressure Switches VS-P10-AH / AV-T

Connection cable 4-pole		Connection adapter optional	
Material PUR, 5 m, straight	Material PUR, 5 m, 90°	Plug-in tube D6	Screw thread M5-AG
10.06.02.00031	10.06.02.00032	10.06.02.00300	10.06.02.00299

Accessories Pressure Switches VS-P10-AH / AV-T

VS-P10-AV-T-PNP with plug-in tube D6

VS-P10-AH-T-PNP with screw thread M5-AG

Technical Data Pressure Switches VS-P10-AH / AV-T

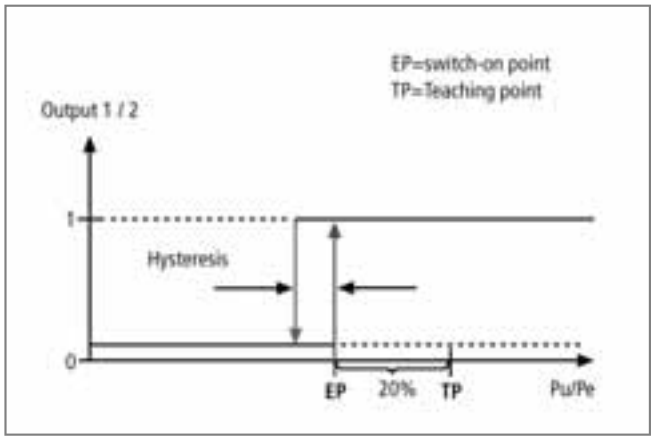
Type	VS-P10-AH-T-PNP-S	VS-P10-AH-T-PNP	VS-P10-AV-T-PNP-S	VS-P10-AV-T-PNP
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	0...10 bar	0...10 bar	0...10 bar	0...10 bar
Max. overpressure resistance [bar]	15	15	15	15
Repeatability	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Fixed: 2% of full-scale value	Adjustable	Fixed: 2% of full-scale value	Adjustable
Output signal	2 digital	2 digital	2 digital	2 digital
Switching capacity [mA]	200	200	200	200
Indication	2xLED	2xLED	2xLED	2xLED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole	Male connect M8, 4 pole
Voltage	10-30V DC	10-30V DC	10-30V DC	10-30V DC
Current consumption [mA]	-	-	-	-
Protection IP	IP 40	IP 40	IP 40	IP 40
Temperature influence	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0...60 °C	0...60 °C	0...60 °C	0...60 °C
Weight [g]	6	6	6	6

Pressure Switches

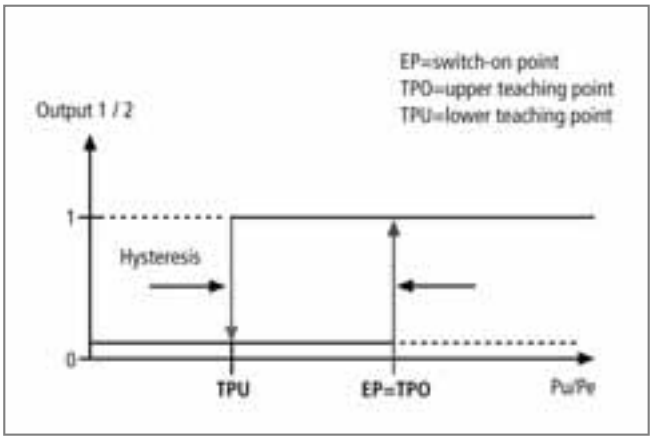
Pressure Switches VS-P10-AH / AV-T

Measuring range from 0 bar to 10 bar

Switching-Point Adjustment Pressure Switches VS-P10-AH / AV-T

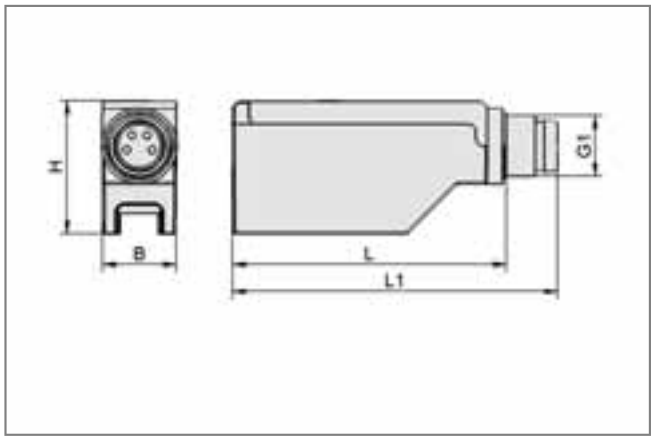


VS-P10-AH/AV-T-S (Switching function: fixed hysteresis)

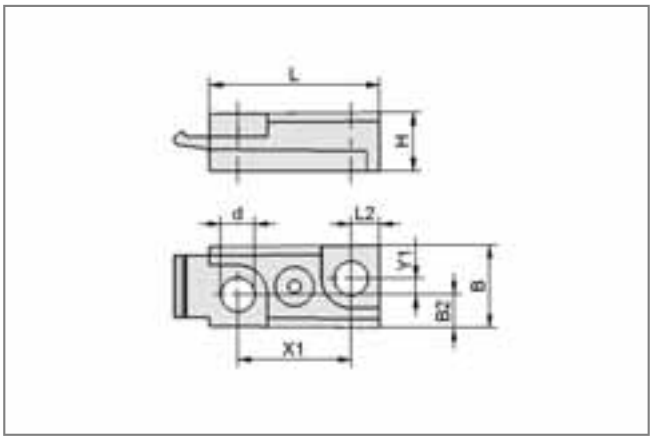


VS-P10-AH/AV-T (Switching function: adjustable hysteresis)

Design Data Pressure Switches VS-P10-AH / AV-T



VS-P10-AH/AV-T



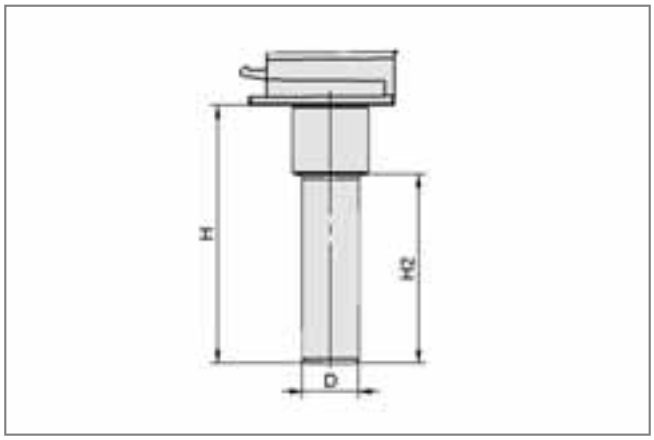
FLAN-PL 13.5x6.6x4.6 VS

Type	Dimensions in mm									
	B	B2	G1	d	H	L	L1	L2	X1	Y1
VS-P10-AH-T-PNP-S	10	-	M8-M	-	17.5	36.2	43	-	-	-
VS-P10-AH-T-PNP	10	-	M8-M	-	17.5	36.2	43	-	-	-
VS-P10-AV-T-PNP-S	10	-	M8-M	-	16.4	41.2	48	-	-	-
VS-P10-AV-T-PNP	10	-	M8-M	-	16.4	41.2	48	-	-	-
FLAN-PL	7	2.6	-	2.7	4.6	13.5	-	2.3	9	1.3

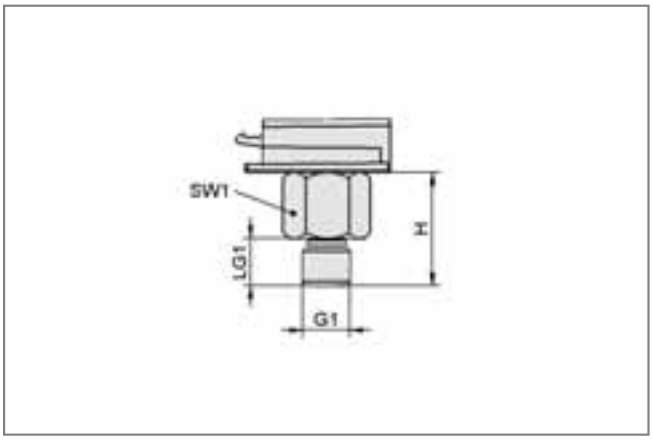
Pressure Switches VS-P10-AH / AV-T

Measuring range from 0 bar to 10 bar

Design Data Accessories Pressure Switches VS-P10-AH / AV-T



ADAP-VS 6-1.3x16



ADAP-VS M5-AG-1.3x16

Type	Dimensions in mm						
	Type	D	G1	H	H2	LG1	SW1
Connection adapter D6	ADAP-VS 6-1.3x16	6	-	27.3	20.0	-	-
Connection adapter M5	ADAP-VS M5-AG-1.3x16	-	M5-M	12.0	-	5.0	8

Pressure Switches

Pressure Switches VS-P10-W-D-K(-2C)

Measuring range from 0 bar to 10 bar

Pressure switches VS-P10-W-D-K(-2C)

Suitability for Industry-Specific Applications

Applications

- Pressure switch for use in pressure systems for safety monitoring and optimizing cycle times
- Creating control circuits to improve the efficiency of pressure systems
- The switch can be mounted in panels due to its cubic construction and optional mounting frame with a transparent protective cap
- Can be installed in handling systems directly where it is used thanks to its small design and low weight

Design

- Electronic switch in a stable plastic housing made from polycarbonate
- Switch with either one- or two-color display
- Connection for measuring pressure with G1/8" female thread (switch with one-color display) or G1/8" male thread (switch with two-color display)
- Hysteresis and comparator mode
- 2 m connection cable
- Mounting bracket and mounting frame for mounting into switch panel available as accessories

Our Highlights...

- Pressure switch with a digital display, also available with a two-color display
- All functions are set using an intelligent menu structure
- Integrated automatic setting of switching point
- Anti-chattering function with adjustable response times
- Switch function with freely-adjustable switching points, in either hysteresis or comparator mode

Your Benefits...

> Clear visual monitoring of the system and the process

> Fast and easy installation or adjusting of the settings

> Optimal switching points determined automatically using the process parameters and without manual programming

> Stable switching output even in the event of sudden, brief fluctuations in the main pressure

> Optimal adjustment of switching points and output signals

Pressure Switches

Pressure Switches VS-P10-W-D-K(-2C)

Measuring range from 0 bar to 10 bar

Designation Code Pressure Switches VS-P10-W-D-K(-2C)

Abbreviated designation	Measuring range in bar	Shape	Display	Cable	Display	Switching-function
Example VS-P10-W-D-K-2C-PNP:						
VS	**P10**	**W**	**D**	**K**	**2C**	**PNP**
VS	P10 0 to 10	W cube shape	D digital display	K Cable	2C two-colored display	NPN switches to minus PNP switches to plus

Ordering Data Pressure Switches VS-P10-W-D-K(-2C)

Pressure switch VS-P10-W-D-K(-2) is delivered as a ready to connect product.

Available accessories: mounting bracket, mounting frame

Pressure Switches VS-P10-W-D-K(-2C)

Type	Part Number
VS-P10-W-D-K-NPN	10.06.02.00419
VS-P10-W-D-K-PNP	10.06.02.00420
VS-P10-W-D-K-2C-NPN	10.06.02.00423
VS-P10-W-D-K-2C-PNP	10.06.02.00424

Ordering Data Accessories Pressure Switches VS-P10-W-D-K(-2C)

Type	Mounting bracket*	Mounting frame for mounting into switch panel
VS-P10-W-D-K-NPN	10.06.02.00425	10.06.02.00426
VS-P10-W-D-K-PNP	10.06.02.00425	10.06.02.00426
VS-P10-W-D-K-2C-NPN	10.06.02.00425	10.06.02.00427
VS-P10-W-D-K-2C-PNP	10.06.02.00425	10.06.02.00427

*Set comprises two mounting brackets (see accessories design data)

Pressure Switches

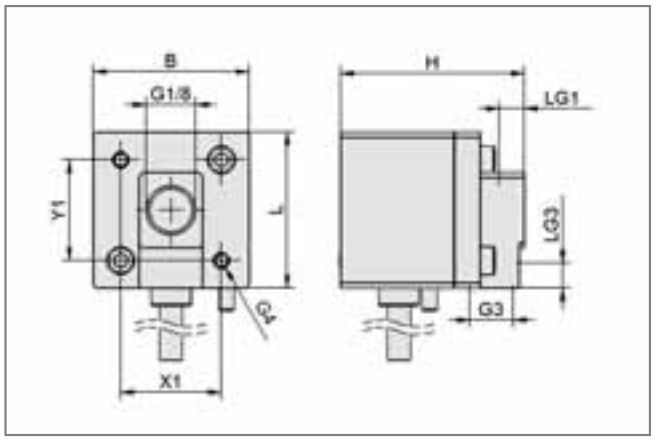
Pressure Switches VS-P10-W-D-K(-2C)

Measuring range from 0 bar to 10 bar

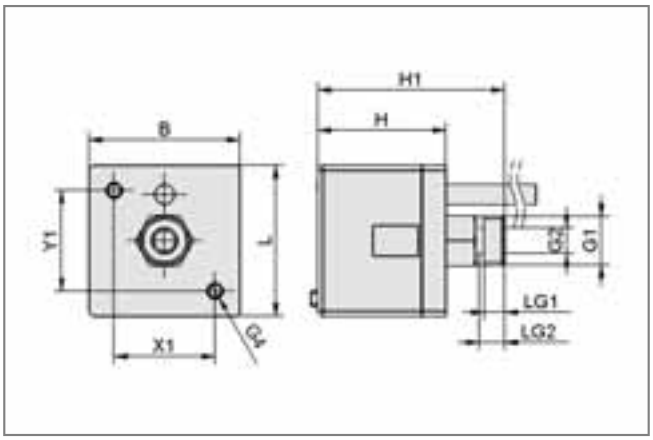
Technical Data Pressure Switches VS-P10-W-D-K(-2C)

Type	VS-P10-W-D-K-NPN	VS-P10-W-D-K-PNP	VS-P10-W-D-K-2C-NPN	VS-P10-W-D-K-2C-PNP
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	0...10 bar	0...10 bar	0...10 bar	0...10 bar
Max. overpressure resistance [bar]	15	15	15	15
Repeatability	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value	± 0.2% of max. set value
Hysteresis	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode	Adjustable: 0 to 100% of set value or comparator mode
Output signal	2 digital	2 digital	1 digital	1 digital
Switching capacity [mA]	80	80	125	125
Indication	2xLED	2xLED	-	-
Measured-value display	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED	3-digit 7-segment LED
Electrical connection	Cable	Cable	Cable	Cable
Measured medium connection	Thread G1/8"-F	Thread G1/8"-F	Thread G1/8"-M	Thread G1/8"-M
Voltage	12-24V DC	12-24V DC	12-24V DC	12-24V DC
Current consumption [mA]	55	55	45	45
Protection IP	IP 40	IP 40	IP 40	IP 40
Operating temperature [°C]	0...50 °C	0...50 °C	0...50 °C	0...50 °C
Weight [g]	105	105	75	75

Design Data Pressure Switches VS-P10-W-D-K(-2C)



Pressure switch VS-P10-W-D-K



Pressure switch VS-P10-W-D-K-2C

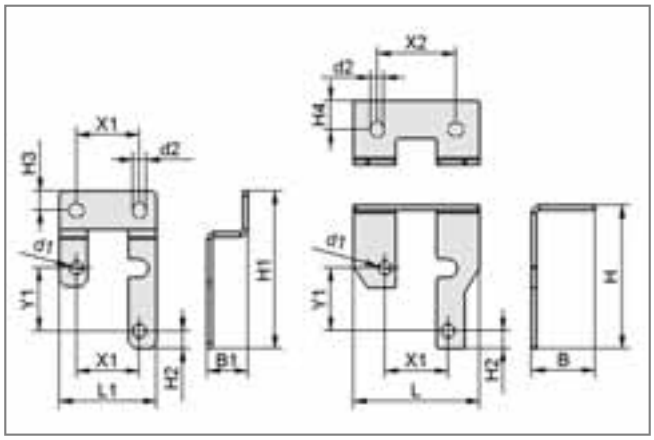
Type	Dimensions in mm						
	B	G1	G2	G3	G4	H	H1
VS-P10-W-D-K	31	G1/8"-F	-	G1/8"-F	M3-F	36.5	-
VS-P10-W-D-K-2C	30	G1/8"-M	M5-F	-	M3-F	25.4	37.1

Type	Dimensions in mm					
	L	LG1	LG2	LG3	X1	Y1
VS-P10-W-D-K	31	5	-	5	20	20
VS-P10-W-D-K-2C	30	4	5	-	20	20

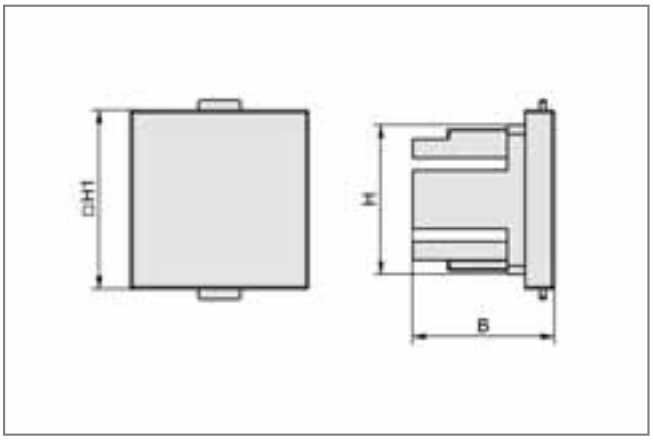
Pressure Switches VS-P10-W-D-K(-2C)

Measuring range from 0 bar to 10 bar

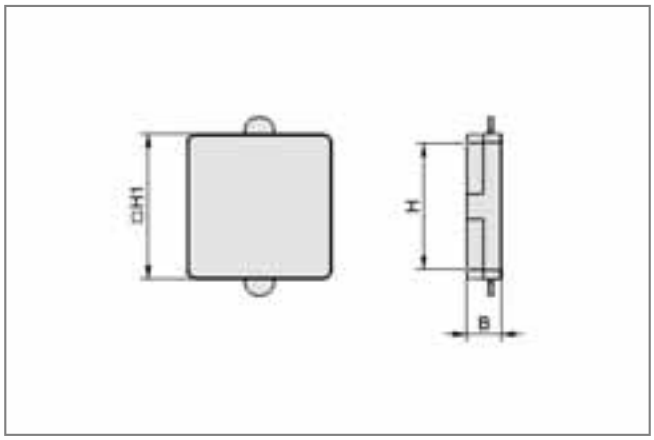
Design Data Accessories Pressure Switches VS-P10-W-D-K(-2C)



Mounting bracket



Mounting frame EINB-RAx33.8x35.4 for VS-P10-W-D-K



Mounting frame EINB-RAx33.8x35.4 for VS-P10-W-D-K-2C

Type	Dimensions in mm						
	B	B1	d1	d2	H	H1	H2
Mounting bracket	20	13.0	4.3	4.2	45.5	50.0	6
Mounting frame VS-P10-W-D-K	34	-	-	-	35.4	42.5	-
Mounting frame VS-P10-W-D-K-2C	9	-	-	-	30.0	34.5	-

Type	Dimensions in mm						
	H3	H4	L	L1	X1	X2	Y1
Mounting bracket	-	9.1	40	31	20	25	20
Mounting frame VS-P10-W-D-K	-	-	-	-	-	-	-
Mounting frame VS-P10-W-D-K-2C	-	-	-	-	-	-	-

Combined Vacuum/Pressure Switches

Vacuum and Pressure Switches VS-P

Measuring range from -1 bar to 10 bar

Suitability for Industry-Specific Applications

Vacuum and pressure switches VS-P

Applications

- Electronic vacuum and pressure switch for system monitoring of vacuum / pressure systems
- Optimization of cycle times and regulation circuits to increase efficiency of systems
- For use in all areas of automated handling

Design

- Electronic vacuum and pressure switch in a robust polycarbonate housing
- Pressure-line connection with flange or with G1/8" male thread; both versions with additional M5 female thread
- Switching point and hysteresis adjustable with screws
- Power input via 4-pin M8 screw connector
- Indication of the switching state with integrated function LED
- Venting plug (reference air, IP 65) for screwing into switch housing
- Compact construction and low weight

Our Highlights...

- Electronic vacuum and pressure switch
- Adjustable switching point and hysteresis
- Analogue and digital outputs
- Measuring range -1 to +10 bar; withstands overpressures up to 16bar

Your Benefits...

> Precise measurement and switching

> Easily adaptable to match customer requirements

> Adjustable vacuum limit value and continuous vacuum monitoring

> Suitable for all special applications in the vacuum and compressed-air sectors

Designation Code Vacuum and Pressure Switches VS-P

Abbreviated designation	Measuring range in bar	Connection	Switching function
Example VS-P-A-PNP:			
VS	**P**	**A**	**PNP**
VS	P -1 to 10	A flange connection	NPN switches to minus PNP switches to plus

Ordering Data Vacuum and Pressure Switches VS-P

Vacuum and pressure switch VS-P is delivered as a ready to connect product (without connection cable).

Available accessories: connection cable, connection hose

Combined Vacuum/Pressure Switches

Vacuum and Pressure Switches VS-P

Measuring range from -1 bar to 10 bar

Vacuum and Pressure Switches VS-P

Type	Part Number
VS-P-PNP	10.06.02.00029
VS-P-A-PNP	10.06.02.00030
VS-P-NPN	10.06.02.00039
VS-P-A-NPN	10.06.02.00040

Ordering Data Accessories Vacuum and Pressure Switches VS-P

Type	Part Number
Connection cable 4-pole, material PUR, 5 m, straight, union nut	10.06.02.00031
Connection cable 4-pole, material PUR, 5 m, 90°, with union nut	10.06.02.00032
Connection hose for reference air (for IP65), ordering unit: metres	10.07.09.00063

Note: See "connector and adapter " in this section for more connection possibilities.

Scope of Delivery for Vacuum and Pressure Switches VS-P

Scope of delivery	VS...	VS...A...
Screwdriver	1 x	1 x
Screw M3	1 x	1 x
Venting plug M3	1 x	1 x
O-rings 3 mm	2 x	2 x
O-ring d = 8.9 x 1.9	-	1 x
Mounting bracket	-	1 x
Washers M4	-	2 x
Spring washers M4	-	2 x
Screws M4 x 6	-	2 x

Technical Data Vacuum and Pressure Switches VS-P

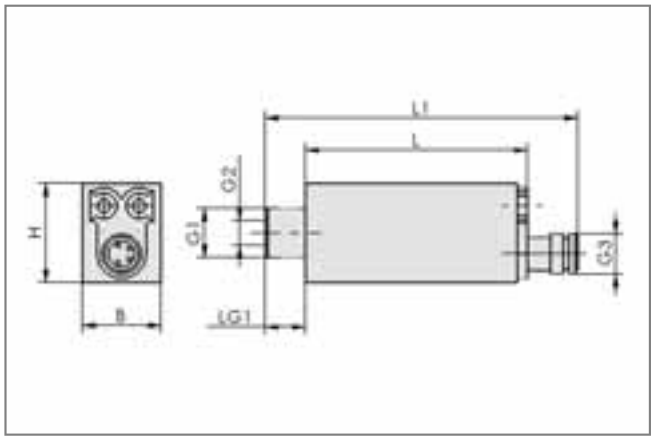
Type	VS-P	VS-P-A
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...10 bar	-1...10 bar
Max. overpressure resistance [bar]	16	16
Repeatability	± 1% of full-scale value	± 1% of full-scale value
Hysteresis	Adjustable: 3 to 25% of set value	Adjustable: 3 to 25% of set value
Output signal	1 anal./1 dig 1...5V	1 anal./1 dig 1...5V
Switching capacity [mA]	125	125
On time [ms]	5	5
Indication	LED	LED
Electrical connection	Male connect M8, 4 pole	Male connect M8, 4 pole
Measured medium connection	G1/8" male + M5 fem.	Flange with thread M5-F
Voltage	10.8-30V DC	10.8-30V DC
Current consumption [mA]	30	30
Protection IP	IP 40/65 (with hose)	IP 40/65 (with hose)
Temperature influence	± 3% of full-scale value	± 3% of full-scale value
Operating temperature [°C]	0...50 °C	0...50 °C
Weight [g]	18	23

Combined Vacuum/Pressure Switches

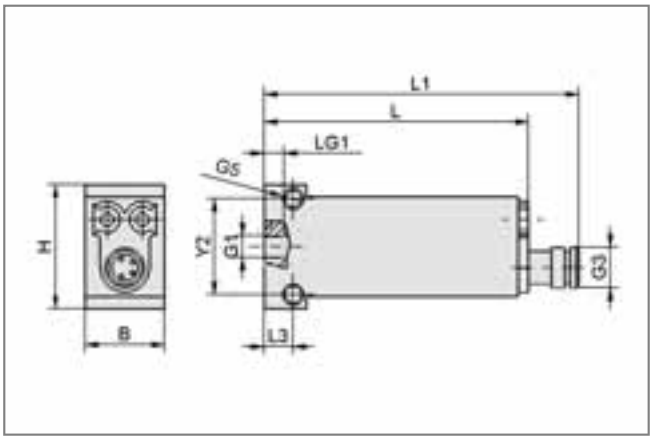
Vacuum and Pressure Switches VS-P

Measuring range from -1 bar to 10 bar

Design Data Vacuum and Pressure Switches VS-P



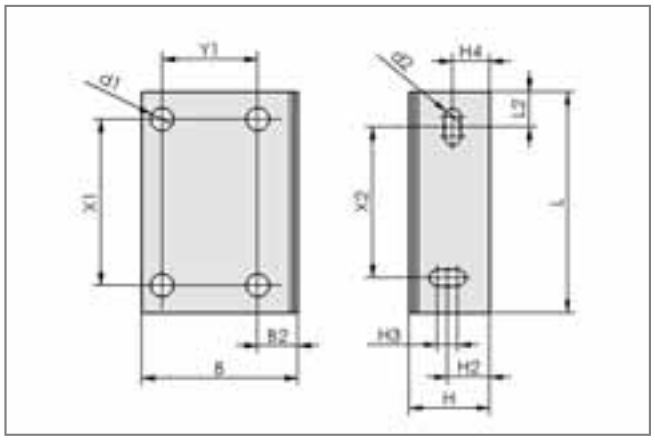
VS-P



VS-P-A

Type	Dimensions in mm										
	B	G1	G2	G3	G5	H	L	L1	L3	LG1	Y2
VS-P	15.7	G1/8"-M	M5-F	M8x1-M	-	19.7	44	62	-	8.0	-
VS-P-A	15.7	M5-F	-	M8x1-M	M4-F	24.7	53	62	5.8	4.5	19

Design Data Accessories Vacuum Switches VS-P



Mounting bracket BEF-WIN

Type	Dimensions in mm											
	B	B2	d1	d2	H	H2	H3	H4	L	L2	X1	X2	Y1
Mounting bracket	31.0	8.0	4.5	3.2	16.0	8	4.0	7.4	44.0	7.0	33	30.0	19.0

Connectors and Adapters for Vacuum Switches

Cables and Plugs for Vacuum Switches

Suitability for Industry-Specific Applications

Cables and plugs for vacuum switches

Applications

- Electrical connection of vacuum and pressure switches
- Adaptation of the connectors to customer requirements

Design

- Electrical connection cables with screw-in M8 connector (to meet IP 65 requirements) or plug-in connector
- Various lengths available
- Available with PUR (for high dynamic requirements)
- Adapter from M8 to M12 available as an option

Our Highlights...

- Electrical connection cables and adapters
- Wide range of different versions

Your Benefits...

> Accessories for all switch types

> For adaptation to customer requirements and local standards

Ordering Data Cables and Plugs for Vacuum Switches

Type	Type*	Part Number
Connection cable	ASK B-M8-4 5000 PUR GE	10.06.02.00031
Connection cable	ASK B-M8-4 5000 PUR W	10.06.02.00032
Connection cable	ASK B-M8-4 5000 PUR W-LED	10.06.02.00047
Connection cable	ASK B-M8-4 2000 PUR GE	10.06.02.00084
Connection plug	ASS B-M8-4 M12-4	10.06.02.00048

*5000 = 5 m long; 2000 = 2 m long GE = straight cable outlet; W = angled (90°) cable outlet; W-LED = angled (90°) cable outlet with LED indicator

Measuring and Control Devices

Vacuum Regulators VR

Working area from -990 mbar to -14 mbar

Suitability for Industry-Specific Applications

Vacuum regulators VR

Applications

- Compensation for the pressure variations inherent in vacuum generators
- Also suitable for measuring and testing tasks

Design

- Vacuum regulator in a robust aluminum housing; diaphragm made of FPM
- Continuous adjustment with the aid of a spindle

Our Highlights...

- Mechanically adjustable vacuum regulator
- Constant regulation of the vacuum

Your Benefits...

> Precise manual adjustment with very good repeatability

> Very precise maintenance of the set value, unaffected by pressure variations caused by the vacuum generator

Designation Code Vacuum Regulators VR

Abbreviated designation	Connection thread	Mounting possibility
Example VR G1/4-IG HW:		
VR	**G1/4-IG**	**HW**
VR	G1/4-IG (IG = female (F)) G3/8-IG	HW holding angle

Ordering Data Vacuum Regulators VR

Vacuum regulator VR is delivered as a ready-to-connection product, including holding angle.

Vacuum Regulators VR

Type*	Part Number
VR G1/4-IG HW	10.05.05.00075
VR G3/8-IG HW	10.05.05.00026

*Suitable manometers can be found under "Manometer VAM"

Measuring and Control Devices

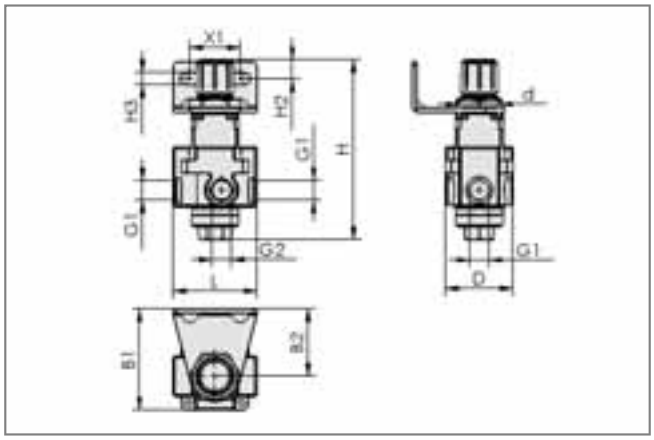
Vacuum Regulators VR

Working area from -990 mbar to -14 mbar

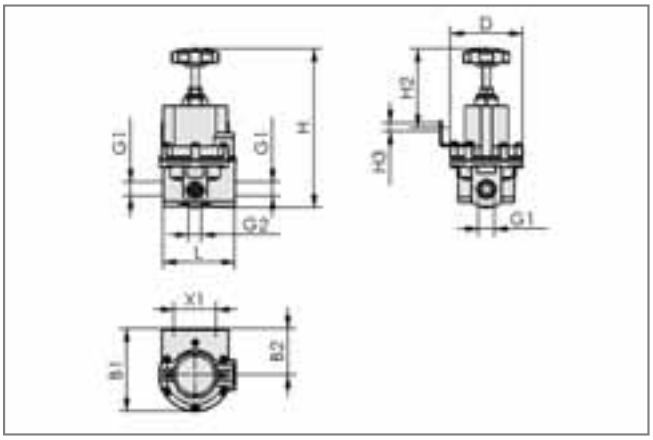
Technical Data Vacuum Regulators VR

Type	Work area	Repeatability	Max. flow rate [l/min]	Max. flow rate [m³/h]	Operating temp.	Weight [kg]	Max. pressure [bar]
VR G1/4-IG HW	-950...-25 mbar	± 2% of full-scale value	200	12.0	5...60 °C	0.20	5
VR G3/8-IG HW	-990...-14 mbar	5.0 mbar	270	16.2	5...60 °C	0.65	5

Design Data Vacuum Regulators VR



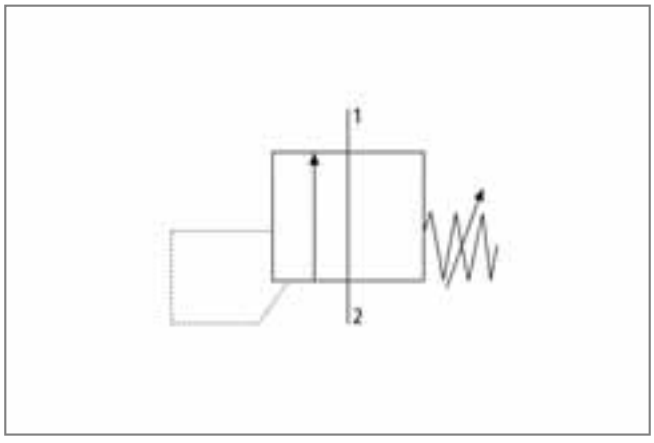
VR G1/4-IG



VR G3/8-IG

Type	Dimensions in mm										
	B1	B2	d	D	G1	G2	H	H2	H3	L	X1
VR G1/4-IG HW	60.0	40	24	40.0	G1/4"-F	G1/4"-F	109	11.4	7	50	30
VR G3/8-IG HW	87.2	49	-	76.4	G3/8"-F	G3/8"-F	168	83.3	9	76	45

Functional Circuit Diagram Vacuum Regulators VR



Circuit diagram VR

Measuring and Control Devices

Manometers VAM

Measurement range from -1,000 mbar to 0 mbar

UNIVERSAL

Suitability for Industry-Specific Applications

Manometers VAM

Applications

- Vacuum manometer for analogue measurement and monitoring of vacuum values
- Universal use in vacuum systems

Design

- Vacuum manometer VAM 67 V H-SE is a spring-tube manometer
- VAM 100 V250 and VAM 63 V400 are capsule-element manometers with zero adjustment
- VAM 67 V H-SE has a fixed front ring
- Vacuum connection either at the rear (-H) or the bottom(-U)

Our Highlights...

- Conventional spring-tube or capsule-element vacuum manometers
- Standardized dimensions and connections
- Various measuring ranges

Your Benefits...

> Simple and reliable; proven in many years of use

> Suitable for all existing vacuum applications

> Function is matched to customer requirements

Designation Code Manometers VAM

Abbreviated designation	Diameter in mm	Measuring range in mbar	Vacuum connection	Scale unit	Shape
Example VAM 100 V250 U:					
VAM	**100**	**V250**	**U**		
VAM	40 63 67 100	V250 -250 to 0 V400 -400 to 0 V1000 -1000 to 0	H back U bottom	- mbar PSI PSI	SE for panel mounting

Ordering Data Manometers VAM

Manometer VAM is delivered as a ready to connect product.

Available accessories: pressure-limiter valve

Manometers VAM

Measurement range from -1,000 mbar to 0 mbar

Manometers VAM

Type	Part Number
VAM 100 V250 U	10.07.02.00001
VAM 63 V250 H	10.07.02.00006
VAM 63 V400 H	10.07.02.00002
VAM 63 V U PSI	10.07.02.00004
VAM 67 V H-SE	10.07.02.00016
VAM 40 V H	10.07.02.00007
VAM 63 V H PSI	10.07.02.00003

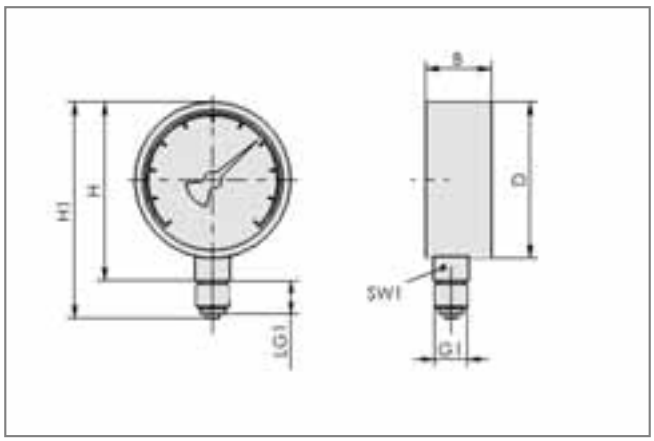
Ordering Data Accessories Manometers VAM

Type	Part Number
Pressure-limiter valve	10.05.05.00057

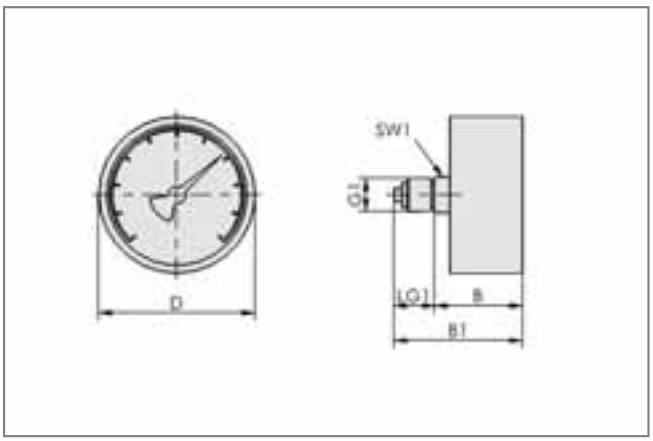
Technical Data Manometers VAM

Type	Measuring range
VAM 100 V250 U	-250...0 mbar
VAM 63 V250 H	-250...0 mbar
VAM 63 V400 H	-400...0 mbar
VAM 63 V U PSI	-1...0 bar
VAM 67 V H-SE	-1...0 bar
VAM 40 V H	-1...0 bar
VAM 63 V H PSI	-1...0 bar

Design Data Manometers VAM



VAM 63U and 100U



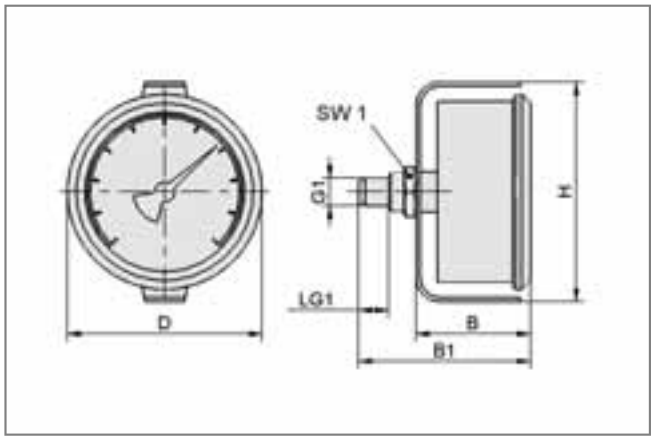
VAM 40H and 63H

Measuring and Control Devices

Manometers VAM

Measurement range from -1,000 mbar to 0 mbar

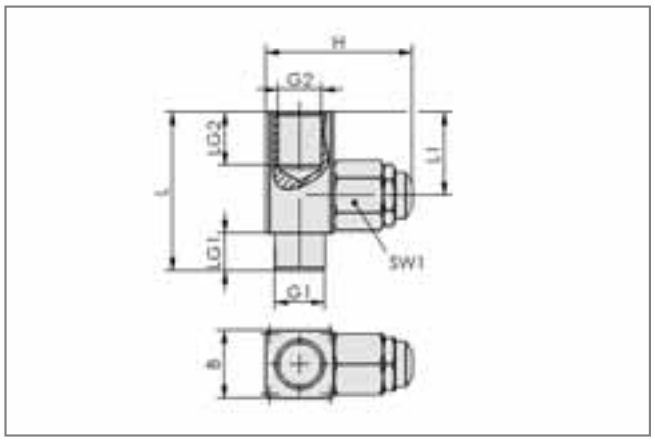
Design Data Manometers VAM



VAM 63 V H-SE

Type	Dimensions in mm							
	B	B1	D	G1	H	H1	LG1	SW1
VAM 100 V250 U	87	-	100	G1/2"-M	112	142.0	25	22
VAM 63 V250 H	34	46	63	G1/4"-M	-	-	12	14
VAM 63 V400 H	34	46	63	G1/4"-M	-	-	12	14
VAM 63 V U PSI	26	-	63	G1/4"-M	68	82.5	13	14
VAM 67 V H-SE	40	59	67	G1/8"-M	76	-	10	-
VAM 40 V H	30	40	40	G1/8"-M	-	-	10	14
VAM 63 V H PSI	35	48	63	G1/4"-M	-	-	13	14

Design Data Accessories Manometers VAM



Pressure-limiting valve DBV-M

Type	Dimensions in mm								
	B	G1	G2	H	L	L1	LG1	LG2	SW1
Pressure-limiter valve	18	G1/4"-M	G1/4"-F	46	42	22	10	14	16

Measuring and Control Devices

Pressure-Reduction Valves DM

Working area from 0.5 bar to 10.0 bar

Suitability for Industry-Specific Applications

Pressure-reduction valves DM

Applications

- Pressure-reduction valve for manual control of compressed air in systems
- Targeted supply of compressed air through precise pressure control, for pneumatic vacuum generators, etc.
- For use in testing and measuring applications, such as testing for leaks

Design

- Pressure-reduction valve with robust aluminum housing
- Precise pressure adjustment with lockable control handle
- Pressure gauge and bracket included with delivery

Our Highlights...

- Mechanically adjustable pressure-reduction valve
- Precise control of the pressure
- Independent of primary pressure and relievable

Your Benefits...

> Manual adjustment with very high repeatability

> Set value is maintained with high degree of accuracy

> Easy installation in any position

Designation Code Pressure-Reduction Valves DM

Abbreviated designation	Working area	Threaded connection
Example DM 0.5...10.0 G1/2-IG:		
DM	**0.5...10.0**	**G1/2-IG**
DM	0.5...10.0 0.5 to 10.0 bar	G1/2-IG (IG = female (F))

Ordering Data Pressure-Reduction Valves DM

Pressure-reduction valve DM is delivered as a ready to connect product, including mounting bracket.

Pressure-Reduction Valves DM

Type	Part Number
DM 0.5...10.0 G1/2	10.07.11.00025

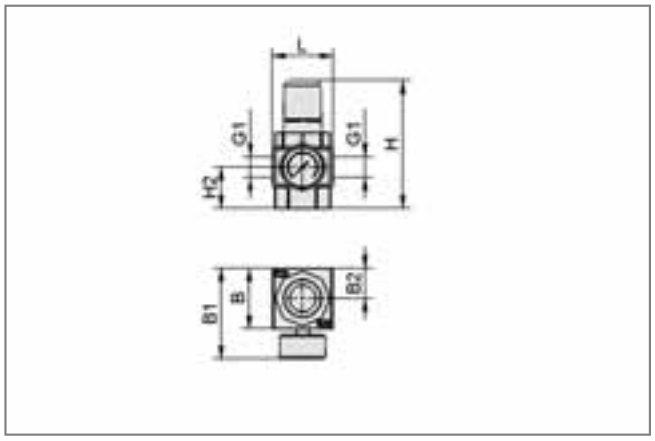
Technical Data Pressure-Reduction Valves DM

Type	Work area	Max. flow rate [l/min]*	Max. flow rate [m³/h]*	Operating temp.	Weight [kg]	Max. pressure [bar]
DM 0.5...10.0 G1/2	0.5...10.0 bar	1300	78	-10...60 °C	0.74	12

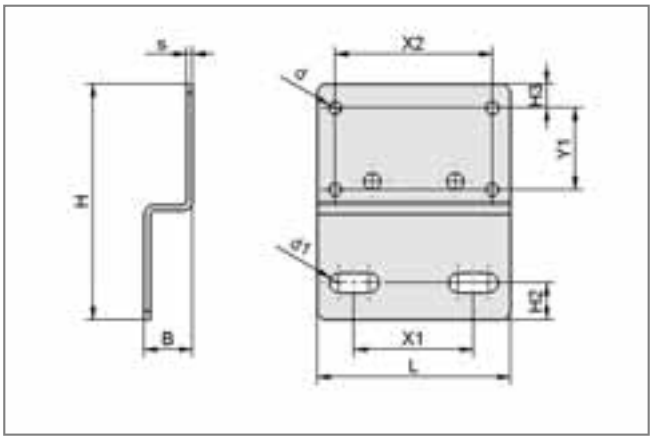
Pressure-Reduction Valves DM

Working area from 0.5 bar to 10.0 bar

Design Data Pressure-Reduction Valves DM



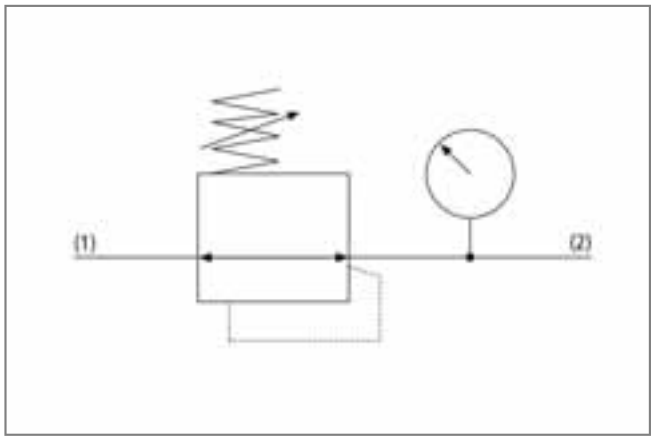
DM 0.5...10.0 G1/2



Mounting bracket

Type	Dimensions in mm													
	B	B1	B2	d	d1	G1	H	H2	H3	L	s	X1	X2	Y1
DM 0.5...10.0 G1/2	64	96	32	-	-	G1-1/2"-F	136	43.5	-	64	-	-	-	-
BEF-WIN 64x16x78 DM	16	-	-	4	7	-	78	12.3	8	64	2	40	52	27

Functional Circuit Diagram Pressure-Reduction Valves DM



Circuit diagram DM (1 = pressure; 2 = vacuum)

Warning Devices

Warning Devices, Acoustic-Electronic WN-AE V

Measurement range from -1 bar to 0 bar

Suitability for Industry-Specific Applications

Warning devices, acoustic-electronic WN-AE V

Applications

- Warning device for system monitoring with warning if the vacuum drops or the electric power fails
- Monitoring of vacuum systems

Design

- Electronic warning device with integrated electronic vacuum switch
- Electronics mounted in a robust, impact-resistant macrolon housing
- Power cable and hose for vacuum connection enter housing via a cable gland

Our Highlights...

- Loud, audible warning signal (100 dB)
- Integrated voltage monitor
- Switching point adjustable in the range -1 to 0 bar
- Electronic warning device

Your Benefits...

> Reliable warning, even in very noisy surroundings

> Audible warning signal also sounds in the case of a power failure

> Flexible use at various vacuum values

> Reliable monitoring of vacuum systems

Designation Code Warning Devices, Acoustic-Electronic WN-AE V

Abbreviated designation	Principle of function	Voltage
Example WN-AE V AC:		
WN	**AE**	**V AC**
WN	AE acoustic-electronic	V AC single-pahse V DC direct current

Ordering Data Warning Devices, Acoustic-Electronic WN-AE V

Warning device WN-AE V is delivered as a ready to connect product.

Warning Devices, Acoustic-Electronic WN-AE V

Type	Part Number
WN-AE V AC	10.07.05.00012
WN-AE V DC	10.07.05.00016

Warning Devices

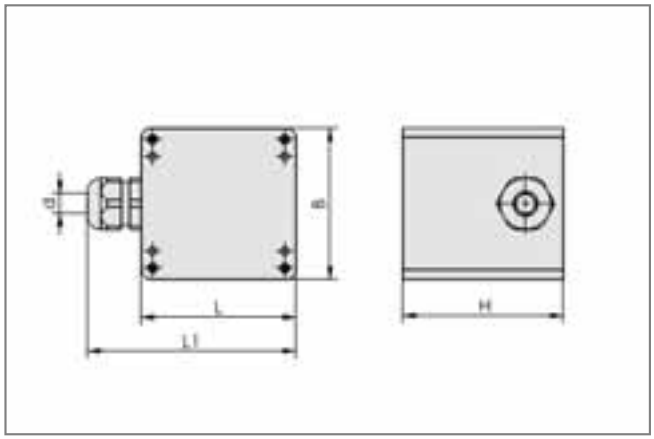
Warning Devices, Acoustic-Electronic WN-AE V

Measurement range from -1 bar to 0 bar

Technical Data Warning Devices, Acoustic-Electronic WN-AE V

Type	WN-AE V AC	WN-AE V DC
Measured medium	Non-aggressive gases; dry, oil-free air	Non-aggressive gases; dry, oil-free air
Measuring range	-1...0 bar	-1...0 bar
Max. overpressure resistance [bar]	5	5
Repeatability	5 mbar	5 mbar
Hysteresis	Fixed: approx. 20 mbar	Fixed: approx. 20 mbar
On time [ms]	1	1
Voltage	200-280V - AC	24V - DC
Current consumption [mA]	100	100
Protection IP	IP 40/53 (assembled)	IP 40/53 (assembled)
Length of cable [m]	3	3
Length vacuum hose [m]	1	1
Temperature influence	1 mbar/°C	1 mbar/°C
Operating temperature [°C]	0...40 °C	0...40 °C
Weight [g]	430	430

Design Data WN-AE V



WN-AE V

Type	Dimensions in mm				
	B	d	H	L	L1
WN-AE V AC	80	10	85	82	111
WN-AE V DC	80	10	85	82	111

Filters and Connections

Overview of Section 9

Filters and Connections

Everything at a Glance

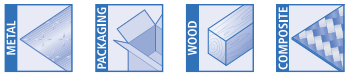
Selection Aid

	Page
Checklist for Selection of Filters	623
Checklist for Selection of Connecting Elements	623
Overview Flow Resistance in Hoses	623
Checklist for Selection of Hoses	624

Vacuum Filters

Vacuum Filters VF / STF / STF-D

625



- Nominal flow rates: from 6 to 360 m³/h
- Pore sizes 3 to 30 µm

Vacuum filter for use in very dusty environments with a degree of separation of almost 100%; central installation in the vacuum system for protection of the vacuum generator.

Vacuum Cup Filters VFT

628

- Pore sizes 80 and 100 µm
- Connection thread 1/8" to 3/4"
- Materials PE and stainless steel
- Nominal flow rate: from 45 to 770 l/min

Vacuum cup filter for central integration in vacuum systems with light to medium degrees of contamination for protection of the vacuum generator; filter elements can be cleaned.

Inline Filters VFI

632

- Nominal flow rates: from 32 to 66 l/min
- Filter mesh: 50 µm
- Connection options: hose 4/2, 6/4 or 8/6

Inline filter for simple, decentralized installation directly on the suction pad, in vacuum systems with light to medium degrees of contamination for protection of the vacuum generator.

Vacuum Distributors

Vacuum / Compressed-Air Distributors VTR

635

- 5-way and 9-way manifolds
- Connections G1/8" and G1/4"

Distributor for vacuum supply of several suction pads for central vacuum generation.

Hoses and Connectors

Vacuum / Compressed-Air Hoses VSL

637

- External/internal diameters from 4/2 to 85/75
- Materials: PA, PE, PU, PVC

Vacuum / compressed air hose made from PA, PE, PU or PVC, optionally reinforced with hard PVC spirals, wire spirals or fabric lining.

Overview of Section 9

Filters and Connections

Everything at a Glance

Hose Clamps SSB / SSD

641

- Clamping diameters from 10 to 84 mm

Hose clamps with stable threaded spindle for securing smooth or wire-reinforced hose lines on hose nozzles.

Screw in Push Fittings

644

- Connection thread M5 to G1/2"
- Material: nickel-plated brass

Screw in push fittings for quick, tool-free connection of hoses.

Accessories for Screw Unions

652

- Connection thread M5 to 1 1/2"
- Material: nickel-plated brass

Accessories for screw fittings for closing, reducing, enlarging and extending threaded holes.

Rotary Inlets DEF

661

- Rotation speed: 21 to 3,500 rpm

High-strength aluminum or steel rotary connections for connecting hose lines.

Sealing Rings DR

663

- Internal diameters: 3.5 to 48 mm
- Material: PA

Sealing rings for sealing of connection nipples and other connection elements.

Vacuum accessories

Service and installation products

665

Leak detection spray, vacuum testing kit, lubricant for vacuum equipment, special adhesives, screw-locking compoound, Teflon sealing tape, ejector tester

Installation of vacuum components. Maintenance of vacuum systems.

Filters and Connections

Selection Aid

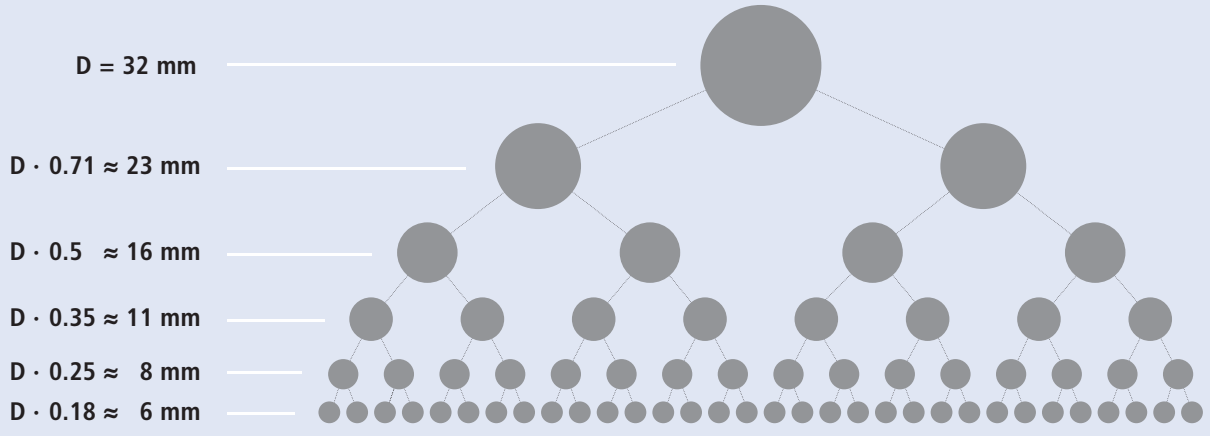
Checklist for Selection of Filters

What is the minimum required nominal flow rate?	See the notes in the technical data.
Are there any size restrictions?	See the notes in the design data.
Is maintenance assured?	Planning and design should permit easy maintenance.

Checklist for Selection of Connecting Elements

Which diameter is needed?	See the design diagram below "Overview Flow Resistance in Hoses"
How long are the hoses?	The hose recommendations are based on a hose length of 2 m. For longer hoses, larger diameters must be used.
Which hose material is needed?	See the material notes. In trailing cable installations, we recommend the use of polyurethane hoses.
What are the best hose connections for the application?	For dynamic applications, you should always use unions which are secured with union nuts or hose clamps.

Overview Flow Resistance in Hoses



Aid for the dimensioning of distribution hoses:
Example: A hose with an internal diameter D = 32 mm has the same internal flow rate as 32 hoses with an internal diameter of 6 mm or 4 hoses with an internal diameter of 16 mm.

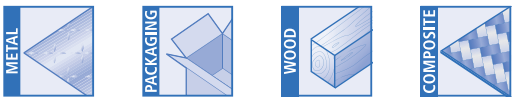
Checklist for Selection of Hoses

Criterion/material	PVC	PU	PE	PA
Resistance to oil	Good	Excellent	Good	Very good
Resistance to fuels and natural gas	Medium	Very good	Medium	Good
Resistance to weathering	Medium	Excellent	Medium	Medium
Behaviour at low temperatures	Freezes at -20 °C	Similar to a hard plastic at -35 to -40 °C, but no embrittlement	Freezes at -50 °C	Freezes at -40 °C
Behaviour at high temperatures	Withstands 70 °C for long periods	Withstands 80 °C for long periods, for short periods up to 100 °C	Withstands 70 °C for long periods	Withstands 85 °C for long periods
Dynamic stress resistance	Tensile strength: good; Ductile yield: very good; suitable for static installation	Tensile strength: excellent Ductile yield: excellent, very high elasticity, excellent creepage resistance, thus suitable for trailing cable installations	Tensile strength: very good Ductile yield: very good, suitable for static installation	Tensile strength: very good Ductile yield: good, suitable for static installation
Resistance to abrasion	Good	Excellent	Good	Good

Vacuum Filters

Vacuum Filters VF / STF / STF-D

Rated flow from 100 l/min to 8,000 l/min



Suitability for Industry-Specific Applications

Vacuum filters VF / STF / STF-D

Applications

- Vacuum filter for protection of easily damaged vacuum generators (such as pumps and blowers) by filtering the incoming air
- For use in dusty surroundings; removal of almost 100% of the dust and dirt

Design

- Vacuum filter type VF: aluminum filter house, cover screwed on, filter cartridge with wire mesh (VF G-1/4 F) or paper (VF G-3/8 F) filter
- Vacuum filter type STF N: sheet-steel filter housing, cover clipped on, filter cartridge with special paper filter
- Vacuum filter types STF P: plastic filter housing, cover clipped on, with mounting bracket, filter cartridge with special paper filter, large-size connections
- Type STF-D P: with additional pressure monitor for measuring the degree of contamination

Our Highlights...

- Wide range of sizes with various performance figures
- Replaceable filter cartridges
- Filter elements with almost 100% removal of dust and dirt
- Optionally with monitoring of the degree of contamination of the filter cartridge

Your Benefits...

> The right filter for each vacuum generator

> Low operating costs, environmentally friendly design

> Optimum protection of vacuum generators against dust and dirt

> Maximum system availability

Ordering Data Vacuum Filters VF / STF / STF-D

Vacuum filter VF/STF/STF-D is delivered as a ready to connect product.

Available spare parts: replacement filter cartridge
Available accessories: mounting bracket

Vacuum Filters

Vacuum Filters VF / STF / STF-D

Rated flow from 100 l/min to 8,000 l/min

Vacuum Filters VF / STF / STF-D

Type*	Part Number
VF-6 G1/4-IG 15	10.07.01.00003
VF-10 G3/8-IG 30	10.07.01.00004
STF G3/4-IG N	10.07.01.00007
STF G1-1/4-IG N	10.07.01.00008
STF G2-1/2-IG N	10.07.01.00010
STF 60 P 4.5 SSD	10.07.01.00259
STF 60 P 6.0 SSD	10.07.01.00260
STF 75 P 8.0 SSD	10.07.01.00263
STF-D 60 P 4.5 F SSD	10.07.01.00266
STF-D 60 P 6.0 F SSD	10.07.01.00262
STF-D 75 P 8.0 F SSD	10.07.01.00265

*STF-D: incl. differential pressure monitor to control the filter

Ordering Data Spare Parts and Accessories Vacuum Filters VF / STF / STF-D

Type	Mounting bracket
VF-6 G1/4-IG 15	10.07.01.00011
VF-10 G3/8-IG 30	10.07.01.00011
STF G3/4-IG N	-
STF G1-1/4-IG N	-
STF G2-1/2-IG N	-
STF 60 P 4.5 SSD	-
STF 60 P 6.0 SSD	-
STF 75 P 8.0 SSD	-
STF-D 60 P 4.5 F SSD	-
STF-D 60 P 6.0 F SSD	-
STF-D 75 P 8.0 F SSD	-

Type	Replacement filter cartridge
VF-6 G1/4-IG 15	10.07.01.00013
VF-10 G3/8-IG 30	10.07.01.00014
STF G3/4-IG N	10.07.01.00017
STF G1-1/4-IG N	10.07.01.00018
STF G2-1/2-IG N	10.07.01.00020
STF 60 P 4.5 SSD	10.07.01.00060
STF 60 P 6.0 SSD	10.07.01.00054
STF 75 P 8.0 SSD	10.07.01.00079
STF-D 60 P 4.5 F SSD	10.07.01.00060
STF-D 60 P 6.0 F SSD	10.07.01.00054
STF-D 75 P 8.0 F SSD	10.07.01.00079

Technical Data Vacuum Filters VF / STF / STF-D

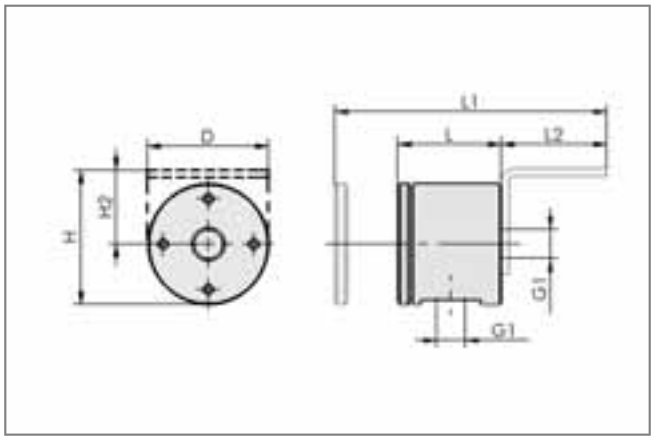
Type	Filter pore size [µm]	Nominal flow rate [m³/h]	Nominal flow rate [l/min]	Max. vacuum [mbar]	Max. overpressure at 25°C [bar]	Weight [kg]
VF-6 G1/4-IG 15	15	6	100	-950	6.0	0.13
VF-10 G3/8-IG 30	30	10	166	-950	6.0	0.22
STF G3/4-IG N	3	42	700	-950	1.0	0.50
STF G1-1/4-IG N	3	96	1600	-950	1.0	1.00
STF G2-1/2-IG N	3	360	6000	-950	1.0	4.30
STF 60 P 4.5 SSD	3	270	4500	-500	0.3	2.00
STF 60 P 6.0 SSD	3	360	6000	-500	0.3	2.40
STF 75 P 8.0 SSD	3	480	8000	-500	0.3	2.60
STF-D 60 P 4.5 F SSD	3	270	4500	-500	0.3	2.10
STF-D 60 P 6.0 F SSD	3	360	6000	-500	0.3	2.40
STF-D 75 P 8.0 F SSD	3	480	8000	-500	0.3	2.60

Vacuum Filters

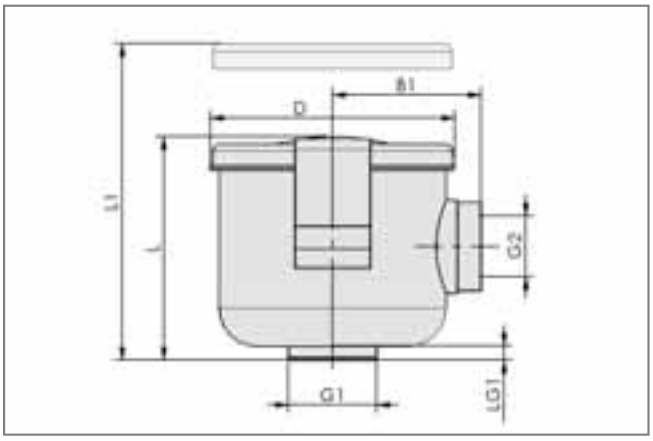
Vacuum Filters VF / STF / STF-D

Rated flow from 100 l/min to 8,000 l/min

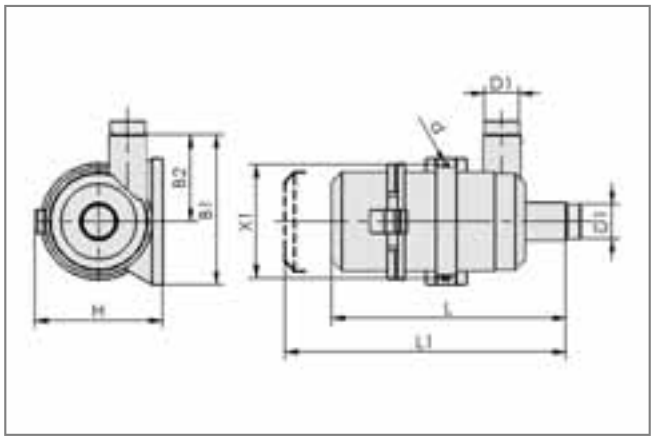
Design Data Vacuum Filters VF / STF / STF-D



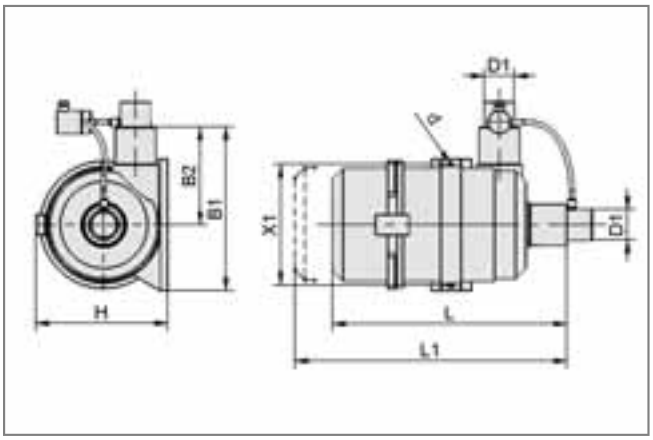
VF G1/4 to G3/8



STF G3/4 to STF G2-1/2



STF 60 / STF 75



STF-D 60 / STF-D 75

Type	Dimensions in mm													
	B1	B2	D	D1	G1	G2	H	H2	L	L1	L2	LG1	X1	d
VF-6 G1/4-IG 15	-	-	48	-	G1/4"-F	-	54	30	41	108	42	-	-	-
VF-10 G3/8-IG 30	-	-	48	-	G3/8"-F	-	54	30	70	157	42	-	-	-
STF G3/4-IG N	59	-	97	-	G3/4"-F	G3/4"-F	-	-	89	159	-	5.5	-	-
STF G1-1/4-IG N	81	-	136	-	G1-1/4"-F	G1-1/4"-F	-	-	116	191	-	17.0	-	-
STF G2-1/2-IG N	123	-	200	-	G2-1/2"-F	G2-1/2"-F	-	-	250	490	-	12.0	-	-
STF 60 P 4.5 SSD	221	112	-	60	-	-	218	-	355	658	-	-	192	9
STF 60 P 6.0 SSD	265	142	-	60	-	-	253	-	390	741	-	-	220	9
STF 75 P 8.0 SSD	280	148	-	75	-	-	260	-	415	774	-	-	237	9
STF-D 60 P 4.5 F SSD	221	112	-	60	-	-	218	-	355	658	-	-	192	9
STF-D 60 P 6.0 F SSD	265	142	-	60	-	-	253	-	390	741	-	-	220	9
STF-D 75 P 8.0 F SSD	280	148	-	75	-	-	260	-	415	774	-	-	192	9

Vacuum Filters

Vacuum Cup Filters VFT

Rated flow from 45 l/min to 770 l/min

Suitability for Industry-Specific Applications

Vacuum cup filters VFT

Applications

- Vacuum cup filter for protection of easily damaged vacuum generators (such as pumps and blowers) by filtering the incoming air
- Filtering of vacuum and compressed air at pressures up to 7 bar
- Filtering with pore size 80 µm of air with a small to medium amount of contamination
- Filtering with pore size 100 µm of air with larger amounts of contamination

Design

- Vacuum cup filter with filter cup made of clear nylon
- Filter cartridge made of polyethylene (pore size 80 µm) or stainless steel (pore size 100 µm)
- Stainless steel cartridge can be cleaned and reused several times

Our Highlights...

- Wide range of sizes
- Filter elements with very good separation
- Filter pore sizes 80 and 100 µm
- Filter elements made of stainless steel (100 µm) and polyethylene (80 µm)
- Filter cup made of clear nylon

Your Benefits...

> Suitable filter for all vacuum generators

> Optimum protection of vacuum generators against dust and dirt

> Ideal for use as pre-filters and fine filters for air with varying amounts of contamination

> Long-life filter elements which can be cleaned and reused

> Degree of contamination easily visible

Designation Code Vacuum Cup Filters VFT

Abbreviated designation	Connection thread	Filter fineness in µm	Product addition
Example VFT G1/8-IG 80:			
VFT	**G1/8-IG**	**80**	
VFT	G1/8-IG (IG = female (F)) G1/4-IG G3/8-IG G1/2-IG G3/4-IG	80 100	-

Vacuum Filters

Vacuum Cup Filters VFT

Rated flow from 45 l/min to 770 l/min

Ordering Data Vacuum Cup Filters VFT

Vacuum filter VFT is delivered as a ready to connect product.

Available spare parts: replacement filter cartridge
Available accessories: holder

Vacuum Cup Filters VFT

Type	Part Number
VFT G1/8-IG 80	10.07.01.00116
VFT G1/8-IG 100	10.07.01.00117
VFT G1/4-IG 80	10.07.01.00119
VFT G1/4-IG 100	10.07.01.00120
VFT G3/8-IG 80	10.07.01.00122
VFT G3/8-IG 100	10.07.01.00123
VFT G1/2-IG 80	10.07.01.00125
VFT G1/2-IG 100	10.07.01.00126
VFT G3/4-IG 80	10.07.01.00128
VFT G3/4-IG 100	10.07.01.00129

Ordering Data Spare Parts and Accessories Vacuum Cup Filters VFT

Type	Holder*
VFT G1/8-IG 80	10.07.01.00228
VFT G1/8-IG 100	10.07.01.00228
VFT G1/4-IG 80	10.07.01.00228
VFT G1/4-IG 100	10.07.01.00228
VFT G3/8-IG 80	10.07.01.00228
VFT G3/8-IG 100	10.07.01.00228
VFT G1/2-IG 80	10.07.01.00228
VFT G1/2-IG 100	10.07.01.00228
VFT G3/4-IG 80	10.07.01.00229
VFT G3/4-IG 100	10.07.01.00229

*complete with 2 mounting screws

Type	Replacement filter cartridge
VFT G1/8-IG 80	10.07.01.00141
VFT G1/8-IG 100	10.07.01.00132
VFT G1/4-IG 80	10.07.01.00141
VFT G1/4-IG 100	10.07.01.00132
VFT G3/8-IG 80	10.07.01.00143
VFT G3/8-IG 100	10.07.01.00135
VFT G1/2-IG 80	10.07.01.00143
VFT G1/2-IG 100	10.07.01.00135
VFT G3/4-IG 80	10.07.01.00145
VFT G3/4-IG 100	10.07.01.00138

Technical Data Vacuum Cup Filters VFT

Type	Filter pore size [µm]	Nominal flow rate [l/min]	Nominal flow rate [m³/h]	Max. vacuum [mbar]	Max. overpressure at 25°C [bar]	Max. overpressure at 50°C [bar]	Weight [g]
VFT G1/8-IG 80	80	45	2.7	-990	7	5	49
VFT G1/8-IG 100	100	50	3.0	-990	7	5	49
VFT G1/4-IG 80	80	110	6.6	-990	7	5	47
VFT G1/4-IG 100	100	140	8.4	-990	7	5	47
VFT G3/8-IG 80	80	245	14.7	-990	7	5	79
VFT G3/8-IG 100	100	290	17.4	-990	7	5	79
VFT G1/2-IG 80	80	300	18.0	-990	7	5	76
VFT G1/2-IG 100	100	320	19.2	-990	7	5	76
VFT G3/4-IG 80	80	600	36.0	-990	7	5	164
VFT G3/4-IG 100	100	770	46.2	-990	7	5	164

Vacuum Filters

Vacuum Cup Filters VFT

Rated flow from 45 l/min to 770 l/min

Filters for Ejectors

Vacuum generator	Recommended filter*	
	Filter element PE, 80 µm	Filter element stainless steel, 100 µm
SCPM 05, SEG 05, VR 05	VFT G1/8-IG 80	VFT G1/8-IG 100
SCPM 07, SEG 07, VR 07, VRI 07	VFT G1/8-IG 80	VFT G1/8-IG 100
VR 09, VRI 09	VFT G1/8-IG 80	VFT G1/8-IG 100
SCP 10, SCPM 10, SEG 10, SEA 10	VFT G1/8-IG 80	VFT G1/8-IG 100
SCP 15, SEG 15, VE/VER 15, SMP 15	VFT G1/4-IG 80	VFT G1/4-IG 100
SCP 20, SEG 20, SMP 20	VFT G3/8-IG 80	VFT G3/8-IG 100
SCP 25, SEG 25, SMP 25	VFT G1/2-IG 80	VFT G3/8-IG 100
SCP 30, SEG 30, SMP 30	VFT G3/4-IG 80	VFT G1/2-IG 100

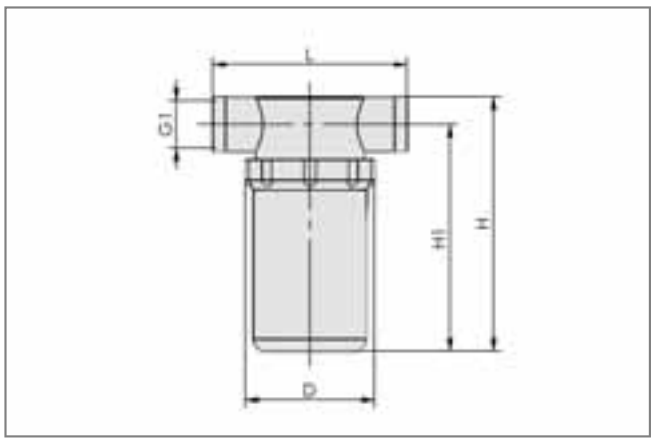
*These recommendations are valid for low to medium dirt levels commonly encountered in industrial applications. In dirty surroundings, select the next larger filter.

Filters for Vacuum Pumps

Vacuum pump	Recommended filter*	
	Filter element PE, 80 µm	Filter element stainless steel, 100 µm
EVE-TR 4...	VFT G1/4-IG 80	VFT G1/8-IG 100
EVE-TR 8...	VFT G1/2-IG 80	VFT G1/4-IG 100
EVE-TR 10...	VFT G1/2-IG 80	VFT G1/4-IG 100
EVE-TR 16...	VFT G1/2-IG 80	VFT G3/8-IG 100
EVE-TR 25..	VFT G3/4-IG 80	VFT G3/4-IG 100

*These recommendations are valid for low to medium dirt levels commonly encountered in industrial applications. In dirty surroundings, select the next larger filter.

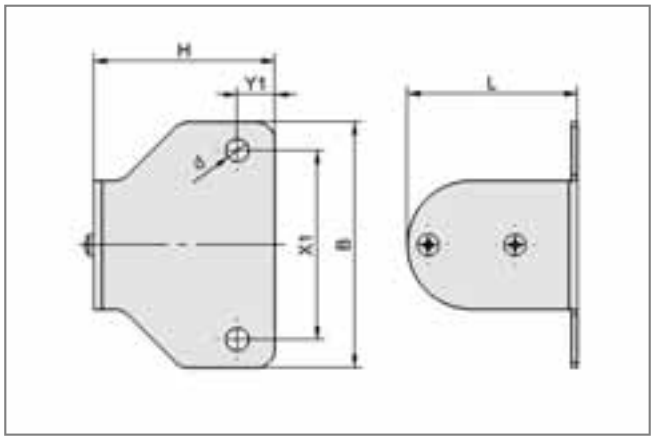
Design Data Vacuum Cup Filters VFT



VFT G1/8 to G3/4

Type	Dimensions in mm				
	D	G1	H	H1	L
VFT G1/8-IG 80	48.0	G1/8"-F	60	50	76.0
VFT G1/8-IG 100	48.0	G1/8"-F	60	50	76.0
VFT G1/4-IG 80	48.0	G1/4"-F	60	50	76.0
VFT G1/4-IG 100	48.0	G1/4"-F	60	50	76.0
VFT G3/8-IG 80	48.5	G3/8"-F	101	88	77.2
VFT G3/8-IG 100	48.5	G3/8"-F	101	88	77.2
VFT G1/2-IG 80	48.0	G1/2"-F	101	88	77.2
VFT G1/2-IG 100	48.5	G1/2"-F	101	88	77.2
VFT G3/4-IG 80	75.0	G3/4"-F	137	118	90.5
VFT G3/4-IG 100	75.0	G3/4"-F	137	118	90.5

Design Data Accessories Filter Holders



Filter holder HTR-FIL

Part Number	Dimensions in mm						
	Type	B	d	H	L	X1	Y1
10.07.01.00228	HTR-FIL 2S WI VFT1/8-1/2	65	6	48	45	50	10
10.07.01.00229	HTR-FIL 2S WI VFT3/4	85	6	52	70	70	10

Vacuum Filters

Inline Filters VFI

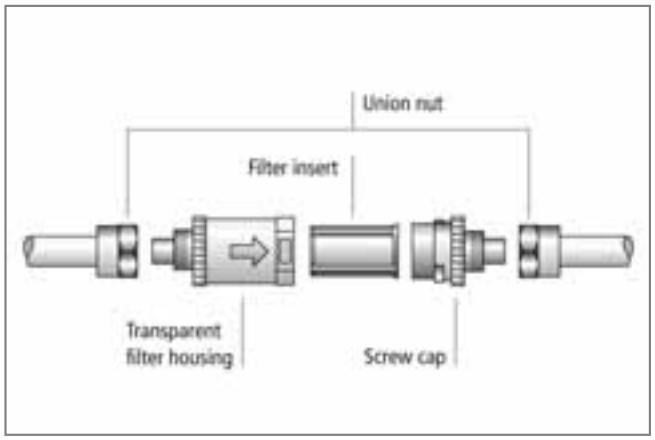
Rated flow from 32 l/min to 66 l/min

Suitability for Industry-Specific Applications

Inline filters VFI

Applications

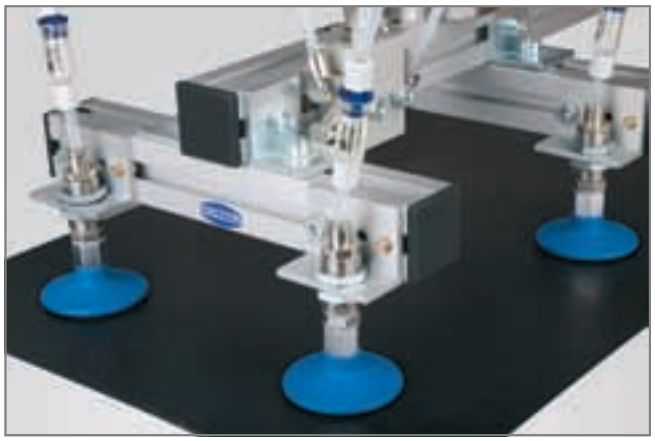
- Inline filter for use in vacuum systems with minor to medium dirt levels
- Can be mounted on individual suction pads for the handling of dirty workpieces
- Simple hose connection



System design inline filters VFI

Design

- Nozzles with union nuts on both ends for connection of hoses (internal hose diameter 4 and 6 mm); alternatively available with a push-in hose connection (version S1 and S2)
- Transparent filter housing with arrow for indication of the flow direction
- Filter head with knurled screw cap
- Slide-in filter element made of transparent material for visual monitoring



Mounting example inline filters VFI

Our Highlights...

- Fast and easily replaceable filter insert
- Indication of degree of contamination through transparent housing
- Simple hose connection
- Vacuum filter capable of withstanding short-term pressures of up to 7 bar

Your Benefits...

> Low operating costs, environmentally friendly product

> Fast identification permits efficient maintanance

> Quick installation

> Suitable for universal use in systems with vacuum and pressure

Vacuum Filters

Inline Filters VFI

Rated flow from 32 l/min to 66 l/min

Designation Code Inline Filters VFI

Abbreviated designation	For Diameter in mm		Filter fineness in µm
Example VFI 6/4 50:			
VFI	**6/4**		**50**
VFI	6/4	outside/inside	50
	8/6		
	S1	quick-action push-in coupling (Ø 4/2)	
	S2	quick-action push-in coupling (Ø 6/4)	

Ordering Data Inline Filters VFI

Inline filter VFI is delivered as a ready to connect product.

Available spare parts: replacement filter cartridge

Inline Filters VFI

Type	Part Number
VFI 6/4 50	10.07.01.00241
VFI 8/6 50	10.07.01.00245
VFI S1 50	10.07.01.00329
VFI S2 50	10.07.01.00328

Ordering Data Spare Parts Inline Filters VFI

Type	Replacement filter cartridge*
VFI 6/4 50	10.07.01.00244
VFI 8/6 50	10.07.01.00248
VFI S1 50	10.07.01.00244
VFI S2 50	10.07.01.00248

*Packaging unit: 5 pieces

Technical Data Inline Filters VFI

Type	Filter pore size [µm]	Nominal flow rate [l/min]*	Nominal flow rate [m³/h]*	Max. vacuum [mbar]	Max. overpressure at 25°C [bar]	Max. overpressure at 50°C [bar]	Weight [g]
VFI 6/4 50	50	32	1.92	-990	7	5	6
VFI 8/6 50	50	66	3.96	-990	7	5	10
VFI S1 50	50	32	1.92	-990	7	5	6
VFI S2 50	50	66	3.96	-990	7	5	17

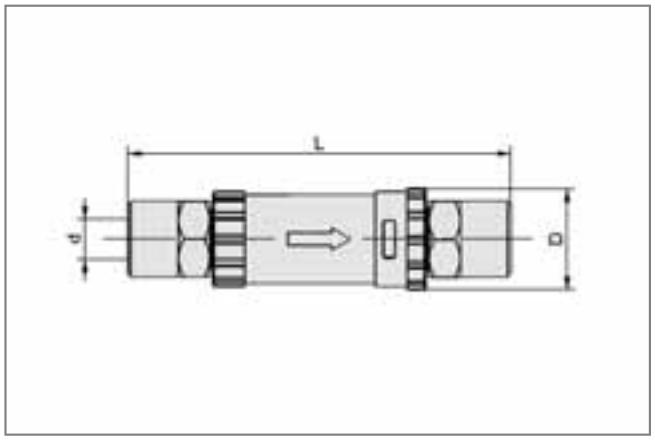
*In the case of a pressure drop of max. 40 mbar while gripping

Vacuum Filters

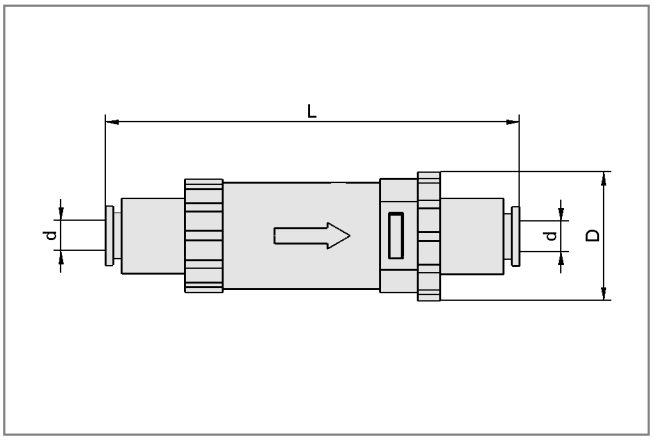
Inline Filters VFI

Rated flow from 32 l/min to 66 l/min

Design Data Inline Filters VFI



VFI-6/4, VFI-8/6



VFI S1/S2

Type	Dimensions in mm		
	d	D	L
VFI 6/4 50	6	16	61
VFI 8/6 50	8	23	68
VFI S1 50	4	17	55
VFI S2 50	6	25	69

Vacuum Distributors

Vacuum / Compressed-Air Distributors VTR

No. of threads from 5 to 9

Suitability for Industry-Specific Applications

Vacuum / compressed-air distributors VTR

Applications

- Distribution of vacuum in systems with a central vacuum generator and several suction pads
- Distribution of compressed air in systems with several distributed vacuum generators

Design

- Distributor made of high-strength aluminium with mounting holes

Our Highlights...

- Large cross-sections and matched inlets and outlets
- Two different sizes available
- Sizes matched to other accessories

Your Benefits...

> Reduces and optimizes the flow resistance

> Permits optimisation for fast evacuation times and low flow resistance

> The ideal solution for a complete installation

Designation Code Vacuum / Compressed-Air Distributors VTR

Abbreviated designation	Connection thread 1	Number of threads	Connection thread 2
Example VTR G1/4-IG 5xG1/8:			
VTR	**G1/4-IG**	**5x**	**G1/8-IG**
VTR	G1/4-IG (IG = female (F))	5x	G1/8-IG (IG = female (F))
	G3/8-IG	9x	G1/4-IG

Ordering Data Vacuum / Compressed-Air Distributors VTR

Vacuum / compressed-air distributor VTR is delivered as a ready to connect product.

Vacuum / Compressed-Air Distributors VTR

Type	Part Number
VTR G1/4-IG 5xG1/8	10.09.03.00058
VTR G3/8-IG 5xG1/4	10.09.03.00060
VTR G1/4-IG 9xG1/8	10.09.03.00056
VTR G3/8-IG 9xG1/4	10.09.03.00054

Vacuum Distributors

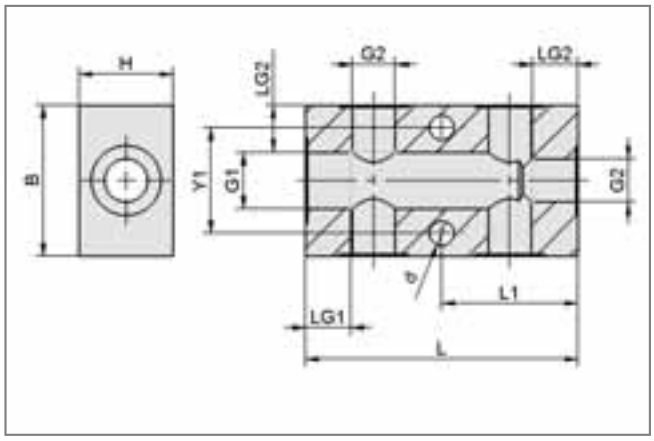
Vacuum / Compressed-Air Distributors VTR

No. of threads from 5 to 9

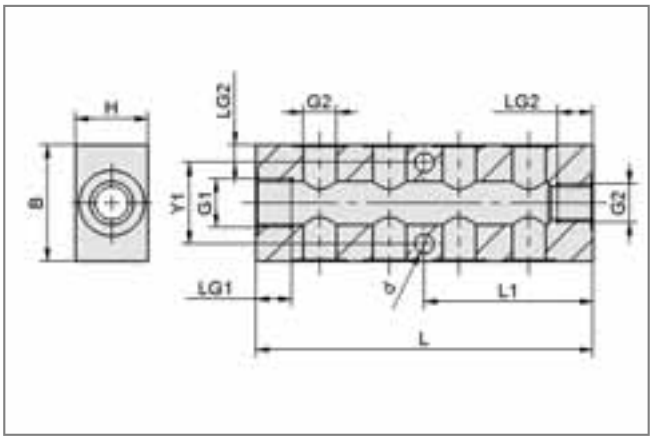
Technical Data Vacuum / Compressed-Air Distributors VTR

Type	Distributor type	Weight [g]
VTR G1/4-IG 5xG1/8	5 x thread G1/8"-F	90
VTR G3/8-IG 5xG1/4	5 x thread G1/4"-F	110
VTR G1/4-IG 9xG1/8	9 x thread G1/8"-F	120
VTR G3/8-IG 9xG1/4	9 x thread G1/4"-F	240

Design Data Vacuum / Compressed-Air Distributors VTR



VTR 5



VTR 9

Type	Dimensions in mm									
	B	d	G1	G2	H	L	L1	LG1	LG2	Y1
VTR G1/4-IG 5xG1/8	35	6.5	G1/4"-F	G1/8"-F	20	60	30	10	9	22
VTR G3/8-IG 5xG1/4	40	6.5	G3/8"-F	G1/4"-F	25	72	36	13	11	27
VTR G1/4-IG 9xG1/8	35	6.5	G1/4"-F	G1/8"-F	20	90	45	13	9	22
VTR G3/8-IG 9xG1/4	40	6.5	G3/8"-F	G1/4"-F	25	116	58	13	11	27

Hoses and Connectors

Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Suitability for Industry-Specific Applications

Vacuum / compressed-air hoses VSL

Applications

- Hose connections in vacuum systems
- Polyurethane (PU) hoses for use in energy distribution systems

Design

- Vacuum hoses made of PVC, PU, PA and PE, some in the form of a hard PVC spiral (PS), with a wire spiral (DS) or a textile layer (G)

Our Highlights...

- Vacuum hoses with internal diameters of 2 to 75 mm
- Wide range of materials

Your Benefits...

> Wide range of sizes permits optimization for best evacuation time and flow resistance

> Suitable hoses for all applications

Designation Code Vacuum / Compressed-Air Hoses VSL

Abbreviated designation	Diameter in mm	Material	Product addition
Example VSL 15-9 PVC-G:			
VSL	**15-9**	**PVC**	**G**
VSL	4-2 outside-inside to 87-75	PA polyamide PE polyethylene PU polyurethane PVC polyvinyl chloride	DS wire spirale G textile layer PS PVC spiral

Ordering Data Vacuum / Compressed-Air Hoses VSL

Vacuum/compressed-air hose VSL is delivered in the desired length.

Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Vacuum / Compressed-Air Hoses VSL

Type	Part Number	Hose clamps
VSL 4-2 PE	10.07.09.00013	-
VSL 4-2 PU	10.07.09.00001	-
VSL 4-2.7 PA	10.07.09.00063	-
VSL 6-4 PE	10.07.09.00014	-
VSL 6-4 PU	10.07.09.00002	-
VSL 8-6 PE	10.07.09.00015	-
VSL 8-6 PU	10.07.09.00003	-
VSL 10-7 PE	10.07.09.00083	-
VSL 10-7 PU	10.07.09.00084	-
VSL 12-9 PE	10.07.09.00050	-
VSL 12-9 PU	10.07.09.00037	-
VSL 14-11 PU	10.07.09.00038	10.07.10.00001
VSL 15-9 PVC-G	10.07.09.00005	10.07.10.00001
VSL 18-12 PVC-DS	10.07.09.00016	10.07.10.00002
VSL 21-12 PVC-G	10.07.09.00006	10.07.10.00002
VSL 26-19 PVC-DS	10.07.09.00007	10.07.10.00086
VSL 27-20 PU-DS*	10.07.09.00047	10.07.10.00086
VSL 34-25 PVC-DS	10.07.09.00041	10.07.10.00087
VSL 33-25 PU-DS*	10.07.09.00051	10.07.10.00087
VSL 41-32 PVC-DS	10.07.09.00008	10.07.10.00019
VSL 42-32 PU-DS*	10.07.09.00036	10.07.10.00019
VSL 42-35 PVC-PS	10.07.09.00010	10.07.10.00019
VSL 44-38 PU-DS*	10.07.09.00031	10.07.10.00020
VSL 47-38 PU-DS	10.07.09.00052	10.07.10.00020
VSL 48-38 PVC-DS	10.07.09.00009	10.07.10.00004
VSL 48-40 PVC-PS	10.07.09.00011	10.07.10.00020
VSL 60-50 PU-DS*	10.07.09.00020	10.07.10.00036
VSL 60-50 PU-DS	10.07.09.00076	10.07.10.00036
VSL 61-50 PVC-DS	10.07.09.00033	10.07.10.00017
VSL 71-60 PVC-DS	10.07.09.00012	10.07.10.00017
VSL 71-60 PU-DS*	10.07.09.00034	10.07.10.00017
VSL 71-60 PU-DS	10.07.09.00065	10.07.10.00017
VSL 85-75 PVC-PS	10.07.09.00048	10.07.10.00037
VSL 85-75 PU-DS*	10.07.09.00054	10.07.10.00037
VSL 87-75 PU-DS	10.07.09.00061	10.07.10.00037

*For use in energy distribution systems

Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Technical Data Vacuum / Compressed-Air Hoses VSL

Type	Material	Operating pressure [bar]*	Operating temperature [°C]	Min. bend radius [mm]**	Max. length [m]***
VSL 4-2 PE	PE	-0.95...10.0	-40...90	20	100
VSL 4-2 PU	PU	-0.95...10.0	-20...90	20	50
VSL 4-2.7 PA	PA	-0.95...20.0	-40...90	30	50
VSL 6-4 PE	PE	-0.95...10.0	-50...65	35	100
VSL 6-4 PU	PU	-0.95...10.0	-20...90	35	500
VSL 8-6 PE	PE	-0.95...10.0	-50...65	45	100
VSL 8-6 PU	PU	-0.95...10.0	-20...90	45	500
VSL 10-7 PE	PE	-0.95...10.0	-30...70	60	100
VSL 10-7 PU	PU	-0.95...10.0	-40...85	60	50
VSL 12-9 PE	PE	-0.95...10.0	-20...70	70	100
VSL 12-9 PU	PU	-0.95...10.0	-20...90	70	50
VSL 14-11 PU	PU	-0.95...10.0	-20...90	100	100
VSL 15-9 PVC-G	PVC, with textile layer	-0.95...10.0	-20...70	50	50
VSL 18-12 PVC-DS	PVC, with wire spiral	-0.9...5.0	-20...70	85	30
VSL 21-12 PVC-G	PVC, with textile layer	-0.95...10.0	-20...70	80	50
VSL 26-19 PVC-DS	PVC, with wire spiral	-0.9...5.0	-20...70	85	30
VSL 27-20 PU-DS	PU, with wire spiral	-0.95...4.0	-20...90	70	25
VSL 34-25 PVC-DS	PVC, with wire spiral	-0.85...4	-20...70	95	30
VSL 33-25 PU-DS	PU, with wire spiral	-0.95...4.0	-20...90	75	20
VSL 41-32 PVC-DS	PVC, with wire spiral	-0.85...4	-20...70	110	30
VSL 42-32 PU-DS	PU, with wire spiral	-0.95...3.2	-20...90	95	20
VSL 42-35 PVC-PS	PVC, with PVC spiral	-0.5...0.5	-20...70	65	50
VSL 44-38 PU-DS	PU, with wire spiral	-0.82...3.1	-20...90	95	10
VSL 47-38 PU-DS	PU, with wire spiral	-0.96...3.2	-20...90	115	15
VSL 48-38 PVC-DS	PVC, with wire spiral	-0.85...4	-20...70	120	30
VSL 48-40 PVC-PS	PVC, with PVC spiral	-0.5...0.5	-20...70	70	50
VSL 60-50 PU-DS	PU, with wire spiral	-0.78...2.9	-20...90	95	10
VSL 60-50 PU-DS	PU, with wire spiral	-0.96...3.2	-20...90	145	15
VSL 61-50 PVC-DS	PVC, with wire spiral	-0.78...1.5	-20...70	90	30
VSL 71-60 PVC-DS	PVC, with wire spiral	-0.75...1.3	-20...70	110	25
VSL 71-60 PU-DS	PU, with wire spiral	-0.74...2.5	-20...90	105	15
VSL 71-60 PU-DS	PU, with wire spiral	-0.96...3.2	-20...90	170	15
VSL 85-75 PVC-PS	PVC, with PVC spiral	-0.59...1.0	-20...70	130	10
VSL 85-75 PU-DS	PU, with wire spiral	-0.59...2.0	-20...90	130	10
VSL 87-75 PU-DS	PU, with wire spiral	-0.96...3.2	-20...90	210	15

*In reference to media and ambient temperature of + 20°C

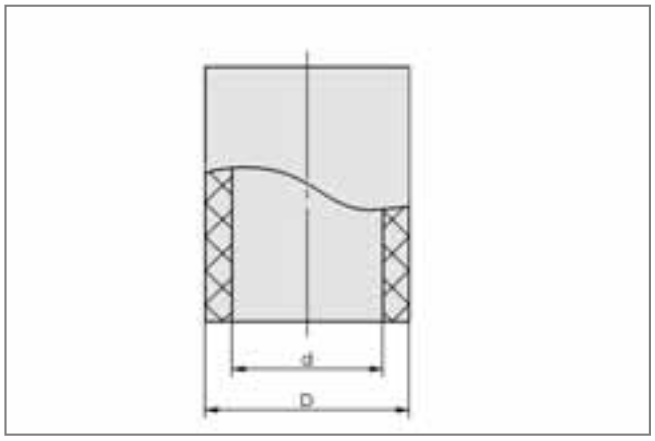
**Referred to the inner side of the hose bend in a static state

***Please indicate the tube length when placing the order!

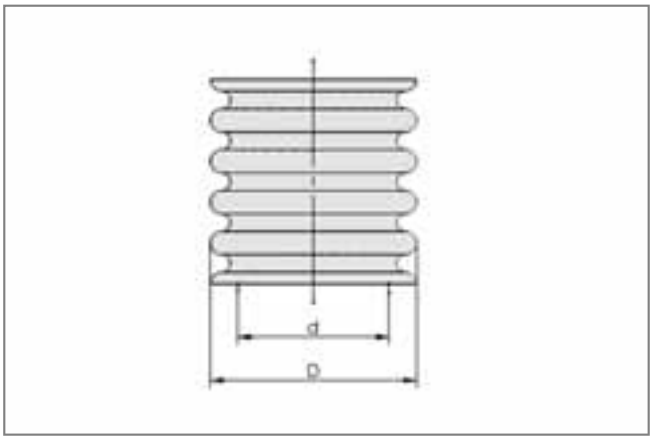
Vacuum / Compressed-Air Hoses VSL

Material PA, PE, PU, PVC

Design Data Vacuum / Compressed-Air Hoses VSL



VSL 4-2 to 21-12



VSL 26-19 to 85-75 with wire or hard-PVC spiral

Type	Dimensions in mm	
	d	D
VSL 4-2 PE	2	4
VSL 4-2 PU	2	4
VSL 4-2.7 PA	3	4
VSL 6-4 PE	4	6
VSL 6-4 PU	4	6
VSL 8-6 PE	6	8
VSL 8-6 PU	6	8
VSL 10-7 PE	7	10
VSL 10-7 PU	7	10
VSL 12-9 PE	9	12
VSL 12-9 PU	9	12
VSL 14-11 PU	11	14
VSL 15-9 PVC-G	9	15
VSL 18-12 PVC-DS	12	18
VSL 21-12 PVC-G	12	21
VSL 26-19 PVC-DS	19	26
VSL 27-20 PU-DS	20	27
VSL 34-25 PVC-DS	25	34
VSL 33-25 PU-DS	25	33
VSL 41-32 PVC-DS	32	41
VSL 42-32 PU-DS	32	42
VSL 42-35 PVC-PS	35	42
VSL 44-38 PU-DS	38	44
VSL 47-38 PU-DS	38	47
VSL 48-38 PVC-DS	38	48
VSL 48-40 PVC-PS	40	48
VSL 60-50 PU-DS	50	60
VSL 60-50 PU-DS	50	60
VSL 61-50 PVC-DS	50	61
VSL 71-60 PVC-DS	60	71
VSL 71-60 PU-DS	60	71
VSL 71-60 PU-DS	60	71
VSL 85-75 PVC-PS	75	85
VSL 85-75 PU-DS	75	85
VSL 87-75 PU-DS	75	87

Hose Clamps SSB / SSD

Clamping range from 10 mm to 84 mm

Suitability for Industry-Specific Applications

Hose clamps SSB / SSD

Applications

- Hose clamp SSB for securing smooth hoses
- Hose clamp SSD for securing hoses with wire reinforcement

Design

- Hose clamp made of galvanized steel
- Robust clamping screw for safe clamping

Our Highlights...

- Hose clamps with diameters up to 84 mm
- High clamping forces due to robust clamping screw

Your Benefits...

> Fitting for all vacuum hoses in our product range

> Secure clamping of all vacuum hoses, including those with wire spirals

Designation Code Hose Clamps SSB / SSD

Abbreviated designation	Clamping range in mm
Example SSB 10-16:	
SSB	**10-16**
SSB smooth hoses	10-16
SSD hoses with wire reinforcement	to 76.5-84

Ordering Data Hose Clamps SSB / SSD

Hose clamp SSB / SSD is delivered in the desired diameter.

Hose Clamps SSB / SSD

Clamping range from 10 mm to 84 mm

Hose Clamps SSB / SSD

Type	Part Number	Protection caps
SSB 10-16	10.07.10.00001	20.12.01.00036
SSB 16-27	10.07.10.00002	20.12.01.00036
SSB 20-32	10.07.10.00003	20.12.01.00036
SSD 24-27	10.07.10.00086	-
SSD 27-33	10.07.10.00087	-
SSB 35-50	10.07.10.00004	20.12.01.00036
SSB 40-60	10.07.10.00005	20.12.01.00036
SSB 60-80	10.07.10.00006	20.12.01.00036
SSD 35-40	10.07.10.00018	-
SSD 38-43	10.07.10.00019	-
SSD 43-49	10.07.10.00020	-
SSD 54-60	10.07.10.00036	-
SSD 60-68	10.07.10.00017	-
SSD 76.5-84	10.07.10.00037	-

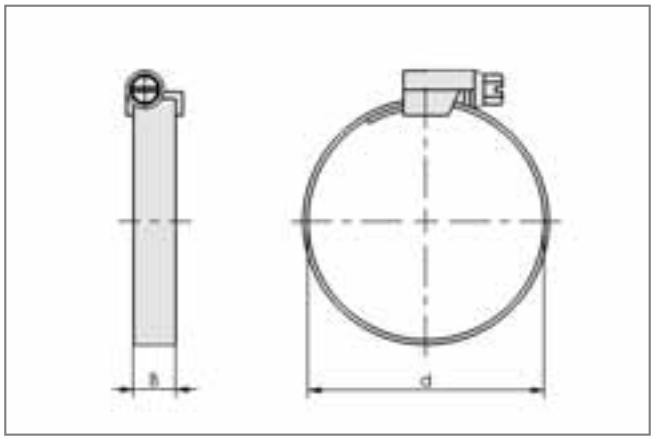
Technical Data Hose Clamps SSB / SSD

Type	Clamping range	Material
SSB 10-16	10 - 16 mm	Steel galvanised
SSB 16-27	16 - 27 mm	Steel galvanised
SSB 20-32	20 - 32 mm	Steel galvanised
SSD 24-27	24 - 27 mm	Steel galvanised
SSD 27-33	27 - 33 mm	Steel galvanised
SSB 35-50	35 - 50 mm	Steel galvanised
SSB 40-60	40 - 60 mm	Steel galvanised
SSB 60-80	60 - 80 mm	Steel galvanised
SSD 35-40	35 - 40 mm	Steel galvanised
SSD 38-43	38 - 43 mm	Steel galvanised
SSD 43-49	43 - 49 mm	Steel galvanised
SSD 54-60	54 - 60 mm	Steel galvanised
SSD 60-68	60 - 68 mm	Steel galvanised
SSD 76.5-84	76.5 - 84 mm	Steel galvanised

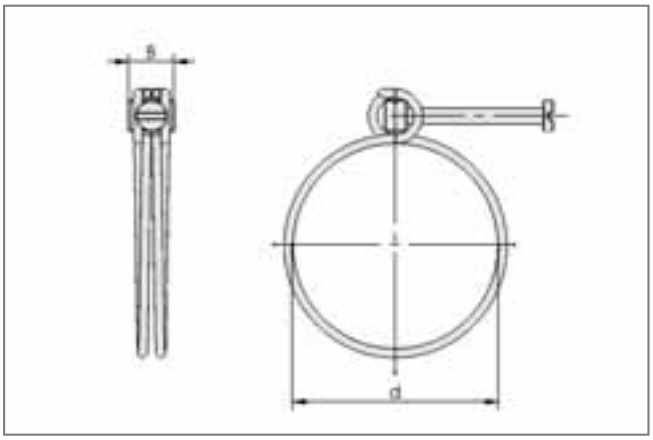
Hose Clamps SSB / SSD

Clamping range from 10 mm to 84 mm

Design Data Hose Clamps SSB / SSD



SSB 10-16 to 60-80



SSD 35-40 to 76.5-84

Type	Dimensions in mm	
	B	d
SSB 10-16	9	16
SSB 16-27	9	27
SSB 20-32	9	32
SSD 24-27	12	27
SSD 27-33	12	33
SSB 35-50	9	50
SSB 40-60	9	60
SSB 60-80	9	80
SSD 35-40	13	40
SSD 38-43	-	-
SSD 43-49	15	49
SSD 54-60	-	-
SSD 60-68	15	68
SSD 76.5-84	18	84

Hoses and Connectors

Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm

Suitability for Industry-Specific Applications

Screw in push fittings

Applications

- Screw in push fittings for quick connection of smooth hoses without the need for tools
- For use as a connecting element in vacuum systems
- Suitable for hoses with external tolerances in accordance with CETOP RP 54 P

Design

- Screw in push fitting, clamping clip and unlocking element made of nickel-plated brass
- Hose-connection sealed with an NBR gasket
- Whitworth pipe thread

Our Highlights...

- Screw in push fittings with integrated clamping clip
- Hoses clamped on the outside
- Absolutely vacuum-tight, shaped for optimum flow
- Body and clamping clip made of nickel-plated brass
- Various versions available

Your Benefits...

> Quick and safe connection and disconnection of all smooth hoses without the need for tools

> No pinching of the hose: full cross-section remains open

> Specially designed for vacuum applications

> Suitable for very rough use; long lifetime; re-usable

> The right connection for every application

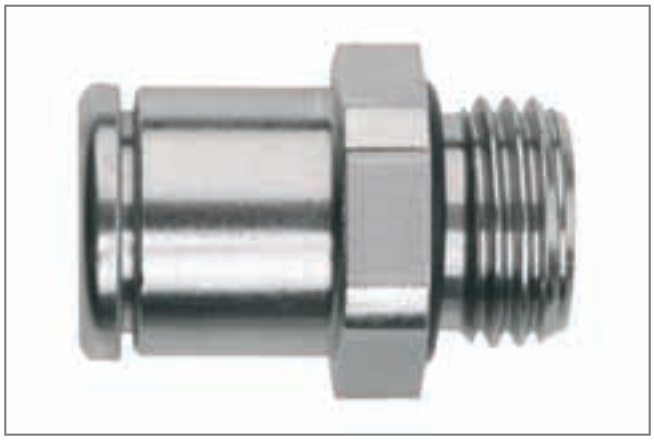
Technical Data Screw in Push Fittings

Type	Operating pressure [bar]	Operating temperature [°C]	Material
Screw in Push Fittings	-0.95...15.0	-20...80	Brass, nickel-plated

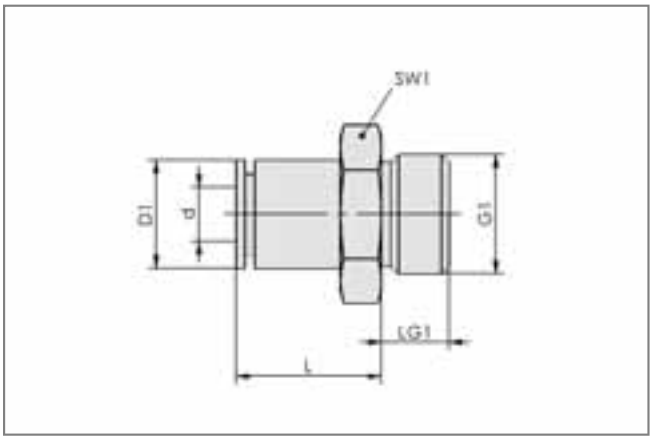
Screw in Push Fittings

Hose outer diameter from 4 mm to 14 mm

Design Data Screw in Push Fittings STV-GE



Screw in push fittings STV-GE



Screw in push fitting STV-GE

Type	Dimensions in mm					
	d	D1	G1	L	LG1	SW1
STV-GE M5-AG 4	4	7.9	M5-M	15.7	4.5	8
STV-GE M5-AG 6	6	9.9	M5-M	18.8	4.5	10
STV-GE G1/8-AG 4	4	7.9	G1/8"-M	13.7	5.5	13
STV-GE G1/8-AG 6	6	11.4	G1/8"-M	16.4	5.5	13
STV-GE G1/8-AG	-	-	G1/8"-M	-	-	-
STV-GE G1/4-AG 4	4	8.6	G1/4"-M	11.8	7.8	17
STV-GE G1/4-AG 6	6	11.2	G1/4"-M	15.2	7.8	17
STV-GE G1/4-AG 8	8	13.9	G1/4"-M	17.8	7.4	17
STV-GE G1/4-AG 10	10	16.5	G1/4"-M	23.4	7.4	17
STV-GE G1/4-AG 12	12	19.5	G1/4"-M	26.6	7.0	20
STV-GE G3/8-AG 8	8	14.6	G3/8"-M	17.4	7.6	20
STV-GE G3/8-AG 10	10	16.5	G3/8"-M	20.1	7.5	20
STV-GE G3/8-AG 12	12	19.5	G3/8"-M	23.6	7.4	20
STV-GE G3/8-AG 14	14	21.5	G3/8"-M	30.5	7.3	22
STV-GE G1/2-AG 10	10	16.5	G1/2"-M	18.5	9.5	24
STV-GE G1/2-AG 12	12	19.5	G1/2"-M	24.0	9.5	24
STV-GE G1/2-AG 14	14	21.5	G1/2"-M	25.0	9.6	24

Hoses and Connectors

Screw in Push Fittings

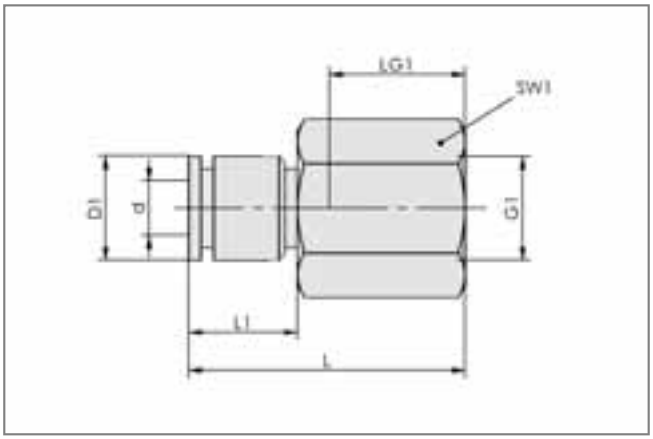
Hose outer diameter from 4 mm to 14 mm

Screw in Push Fittings STV-GE

Type	Part Number
STV-GE M5-AG 4	10.08.02.00200
STV-GE M5-AG 6	10.08.02.00201
STV-GE G1/8-AG 4	10.08.02.00202
STV-GE G1/8-AG 6	10.08.02.00204
STV-GE G1/8-AG	10.08.02.00206
STV-GE G1/4-AG 4	10.08.02.00203
STV-GE G1/4-AG 6	10.08.02.00205
STV-GE G1/4-AG 8	10.08.02.00207
STV-GE G1/4-AG 10	10.08.02.00251
STV-GE G1/4-AG 12	10.08.02.00208
STV-GE G3/8-AG 8	10.08.02.00237
STV-GE G3/8-AG 10	10.08.02.00252
STV-GE G3/8-AG 12	10.08.02.00209
STV-GE G3/8-AG 14	10.08.02.00211
STV-GE G1/2-AG 10	10.08.02.00253
STV-GE G1/2-AG 12	10.08.02.00210
STV-GE G1/2-AG 14	10.08.02.00300

Design Data Screw in Push Fittings STVI-GE

Screw in push fittings STVI-GE



Screw in push fitting STVI-GE

Type	Dimensions in mm						
	d	D1	G1	L	L1	LG1	SW1
STVI-GE G1/8-IG 4	4	8.5	G1/8"-F	23.5	9.5	8	14
STVI-GE G1/8-IG 6	6	11.5	G1/8"-F	26.5	12.0	8	14
STVI-GE G1/8-IG 8	8	14.5	G1/8"-F	29.5	15.0	8	14
STVI-GE G1/4-IG 4	4	8.5	G1/4"-F	30.5	9.5	12	17
STVI-GE G1/4-IG 6	6	11.5	G1/4"-F	30.5	12.0	12	17
STVI-GE G1/4-IG 8	8	14.5	G1/4"-F	33.5	15.0	12	17
STVI-GE G1/4-IG 10	10	16.5	G1/4"-F	37.0	17.5	12	17

Screw in Push Fittings

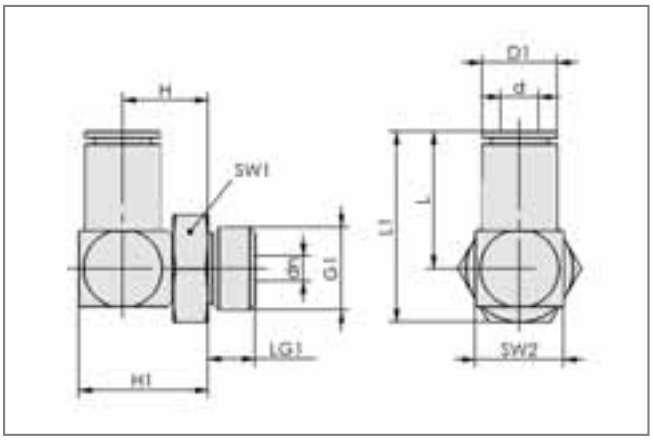
Hose outer diameter from 4 mm to 14 mm

Screw in Push Fittings STVI-GE

Type	Part Number
STVI-GE G1/8-IG 4	10.08.02.00149
STVI-GE G1/8-IG 6	10.08.02.00150
STVI-GE G1/8-IG 8	10.08.02.00151
STVI-GE G1/4-IG 4	10.08.02.00152
STVI-GE G1/4-IG 6	10.08.02.00153
STVI-GE G1/4-IG 8	10.08.02.00154
STVI-GE G1/4-IG 10	10.08.02.00260

Design Data Screw in Push Fittings STV-W

Screw in push fittings STV-W



Screw in push fitting STV-W

Type	Dimensions in mm										
	d	D1	dn	G1	H	H1	L	L1	LG1	SW1	SW2
STV-W M5-AG 4 MV	4	8.5	2.5	M5-M	8.7	13.6	16.4	21.4	4.7	8	10
STV-W M5-AG 6 MV	6	9.9	2.5	M5-M	8.7	13.6	19.7	24.7	4.7	8	10
STV-W G1/8-AG 4 MV	4	8.5	3.0	G1/8"-M	10.7	15.7	16.4	27.1	5.7	13	10
STV-W G1/8-AG 6 MV	6	11.3	4.1	G1/8"-M	12.8	19.9	20.1	27.1	5.7	13	14
STV-W G1/8-AG 8 MV	8	14.6	5.5	G1/8"-M	13.7	21.8	24.0	32.0	5.7	13	16
STV-W G1/4-AG 4 MV	4	8.5	3.0	G1/4"-M	11.5	16.8	16.4	25.5	7.5	17	10
STV-W G1/4-AG 6 MV	6	11.3	4.1	G1/4"-M	13.5	20.4	20.2	29.4	7.5	17	14
STV-W G1/4-AG 8 MV	8	14.6	6.5	G1/4"-M	14.8	22.7	24.0	33.2	7.5	17	16
STV-W G1/4-AG 10 MV	10	16.6	8.0	G1/4"-M	15.5	24.5	27.2	36.3	7.5	17	18
STV-W G1/4-AG 12 MV	12	19.8	8.5	G1/4"-M	17.0	27.0	34.5	44.5	7.5	17	20
STV-W G3/8-AG 8 MV	8	14.3	6.5	G3/8"-M	16.0	23.9	23.7	34.6	7.5	20	16
STV-W G3/8-AG 10 MV	10	16.5	8.0	G3/8"-M	17.0	26.0	35.1	46.0	7.5	20	18
STV-W G3/8-AG 12 MV	12	19.8	9.0	G3/8"-M	18.0	27.9	34.1	45.0	7.5	20	20
STV-W G1/2-AG 10 MV	10	16.6	8.0	G1/2"-M	17.6	26.5	27.0	40.0	9.5	24	18
STV-W G1/2-AG 12 MV	12	19.8	9.0	G1/2"-M	18.5	28.5	34.3	47.3	9.5	24	20

Hoses and Connectors

Screw in Push Fittings

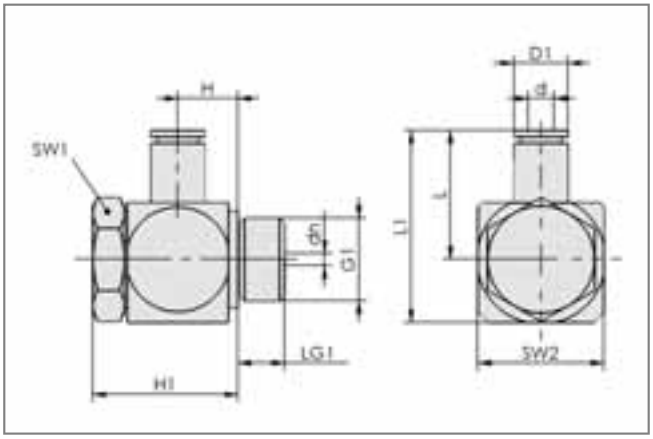
Hose outer diameter from 4 mm to 14 mm

Screw in Push Fittings STV-W

Type	Part Number
STV-W M5-AG 4 MV	10.08.02.00155
STV-W M5-AG 6 MV	10.08.02.00235
STV-W G1/8-AG 4 MV	10.08.02.00156
STV-W G1/8-AG 6 MV	10.08.02.00158
STV-W G1/8-AG 8 MV	10.08.02.00160
STV-W G1/4-AG 4 MV	10.08.02.00157
STV-W G1/4-AG 6 MV	10.08.02.00159
STV-W G1/4-AG 8 MV	10.08.02.00161
STV-W G1/4-AG 10 MV	10.08.02.00254
STV-W G1/4-AG 12 MV	10.08.02.00162
STV-W G3/8-AG 8 MV	10.08.02.00236
STV-W G3/8-AG 10 MV	10.08.02.00255
STV-W G3/8-AG 12 MV	10.08.02.00163
STV-W G1/2-AG 10 MV	10.08.02.00256
STV-W G1/2-AG 12 MV	10.08.02.00164

Design Data Screw in Push Fittings STV-WF

Plug-in union STV-WF



Screw in push fitting STV-WF

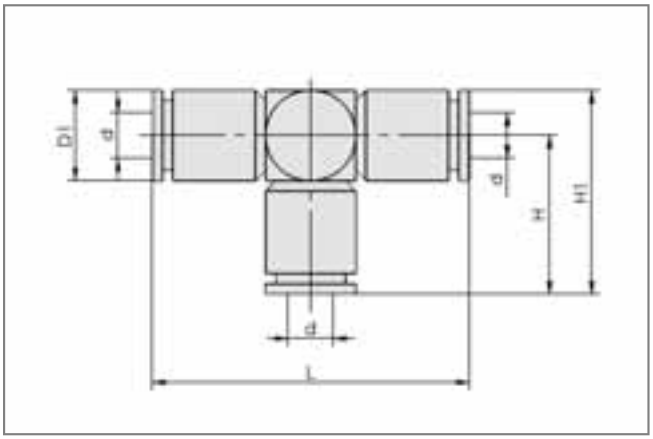
Type	Dimensions in mm										
	d	D1	dn	G1	H	H1	L	L1	LG1	SW1	SW2
STV-WF M5-AG 4	4	8.6	2.5	M5-M	8.4	16.6	16.5	20.1	3.5	8	8.5
STV-WF G1/8-AG 4	4	8.6	5.4	G1/8"-M	9.8	23.6	17.4	25.3	5.0	14	16.0
STV-WF G1/8-AG 6	6	11.4	5.4	G1/8"-M	9.8	23.6	21.4	25.3	5.0	14	16.0
STV-WF G1/8-AG 8	8	14.3	5.4	G1/8"-M	9.8	23.6	23.4	31.3	5.0	14	16.0
STV-WF G1/8-AG 5.4	5	16.7	10.0	G1/8"-M	9.8	23.6	25.2	33.6	5.0	14	17.0
STV-WF G1/4-AG 4	4	8.5	7.2	G1/4"-M	9.8	23.9	19.5	29.4	6.7	17	20.0
STV-WF G1/4-AG 6	6	11.8	7.2	G1/4"-M	9.8	23.9	22.9	32.9	6.7	17	20.0
STV-WF G1/4-AG 10	10	16.6	7.2	G1/4"-M	10.0	23.9	27.8	37.7	6.7	17	20.0
STV-WF G1/4-AG 8	8	14.5	7.2	G1/4"-M	9.8	23.9	25.6	35.5	6.7	17	20.0
STV-WF G3/8-AG 8	8	14.3	9.4	G3/8"-M	10.0	24.9	26.7	37.6	6.7	22	22.0
STV-WF G3/8-AG 10	10	16.7	9.4	G3/8"-M	10.0	24.9	29.2	40.1	6.7	22	22.0

Screw in Push Fittings STV-WF

Type	Part Number
STV-WF M5-AG 4	10.08.02.00165
STV-WF G1/8-AG 4	10.08.02.00166
STV-WF G1/8-AG 6	10.08.02.00168
STV-WF G1/8-AG 8	10.08.02.00170
STV-WF G1/8-AG 5.4	10.08.02.00257
STV-WF G1/4-AG 4	10.08.02.00167
STV-WF G1/4-AG 6	10.08.02.00169
STV-WF G1/4-AG 10	10.08.02.00258
STV-WF G1/4-AG 8	10.08.02.00171
STV-WF G3/8-AG 8	10.08.02.00234
STV-WF G3/8-AG 10	10.08.02.00259

Design Data Plug-In Unions SVB-T

Plug-in connector SVB-T



Plug-in connector SVB-T

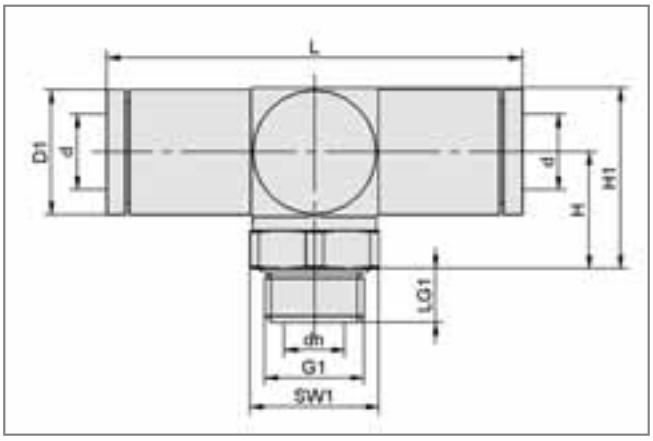
Type	Dimensions in mm				
	d	D1	H	H1	L
SVB-T 4	4	8.6	16.3	20.6	34.0
SVB-T 6	6	11.9	21.0	27.0	42.0
SVB-T 8	8	14.4	24.7	31.9	49.0
SVB-T 10	10	16.7	27.7	36.0	55.5
SVB-T 12	12	19.9	34.0	44.0	69.0
SVB-T 14	14	21.3	36.0	46.5	72.0

Plug-in unions SVB-T

Type	Part Number
SVB-T 4	10.09.02.00020
SVB-T 6	10.09.02.00021
SVB-T 8	10.09.02.00022
SVB-T 10	10.09.02.00025
SVB-T 12	10.09.02.00023
SVB-T 14	10.09.02.00046

Design Data Screw in Push Fittings STV-T

Screw in push fitting STV-T



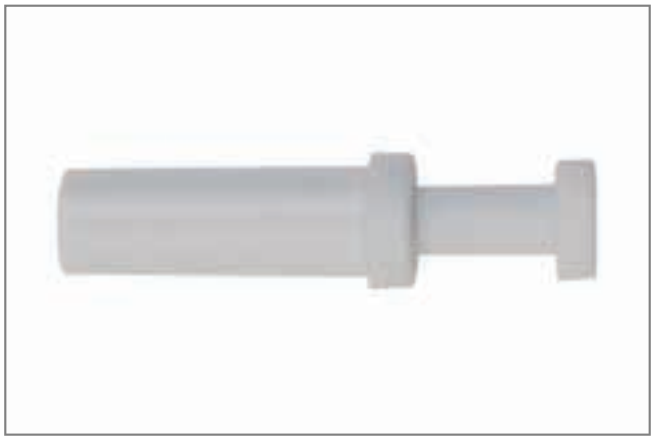
Screw in push fitting STV-T

Type	Dimensions in mm								
	d	D1	dn	G1	H	H1	L	LG1	SW1
STV-T M5-AG 4	4	8.7	2.0	M5-M	9.6	14.0	34.0	4.5	8
STV-T G1/8-AG 4	4	8.7	3.0	G1/8"-M	11.7	16.0	32.5	5.5	13
STV-T G1/8-AG 6	6	12.0	4.0	G1/8"-M	14.0	20.0	41.5	5.5	13
STV-T G1/8-AG 8	8	14.1	5.5	G1/8"-M	15.0	22.0	48.7	5.5	13
STV-T G1/4-AG 6	6	11.3	4.0	G1/4"-M	12.6	18.4	41.0	7.6	17
STV-T G1/4-AG 8	8	14.1	6.5	G1/4"-M	16.1	23.2	48.5	7.6	17
STV-T G1/4-AG 10	10	16.5	8.0	G1/4"-M	15.0	23.2	54.9	7.6	17
STV-T G1/4-AG 12	12	19.6	8.4	G1/4"-M	16.8	26.6	69.0	7.6	17

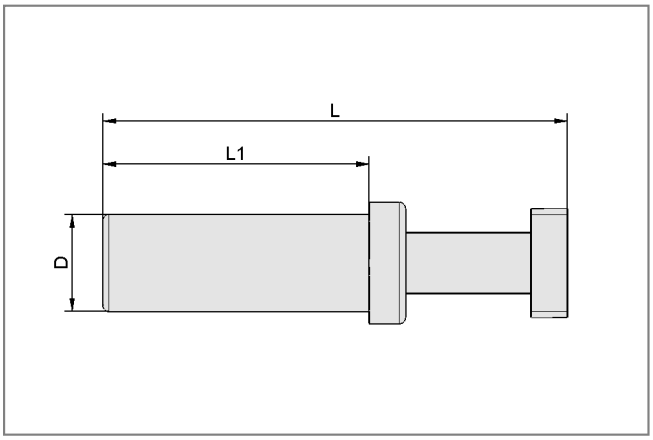
Screw in Push Fittings STV-T

Type	Part Number
STV-T M5-AG 4	10.09.02.00038
STV-T G1/8-AG 4	10.09.02.00039
STV-T G1/8-AG 6	10.09.02.00040
STV-T G1/8-AG 8	10.09.02.00041
STV-T G1/4-AG 6	10.09.02.00042
STV-T G1/4-AG 8	10.09.02.00043
STV-T G1/4-AG 10	10.09.02.00044
STV-T G1/4-AG 12	10.09.02.00045

Design Data Sealing Plugs VRS-STEC



Sealing plug VRS-STEC



Sealing plug VRS-STEC

Type	Dimensions in mm	
	D	L
VRS-STEC 4x30.5	4	31
VRS-STEC 6x34.3	6	34
VRS-STEC 8x38.4	8	38
VRS-STEC 10x42	10	42
VRS-STEC 12x44	12	44

Sealing Plugs VRS-STEC

Type	Part Number
VRS-STEC 4x30.5	10.08.06.00011
VRS-STEC 6x34.3	10.08.06.00012
VRS-STEC 8x38.4	10.08.06.00013
VRS-STEC 10x42	10.08.06.00060
VRS-STEC 12x44	10.08.06.00041

Suitability for Industry-Specific Applications

Accessories for screw unions

Applications

- Accessories for screw-in unions are used wherever it is necessary to seal threaded holes, to convert to a smaller or larger thread or to extend the unions

Design

- Accessories made of robust brass with nickel-plated surfaces

Our Highlights...

- Wide range of accessories
- All accessories made of brass with nickel-plated surfaces

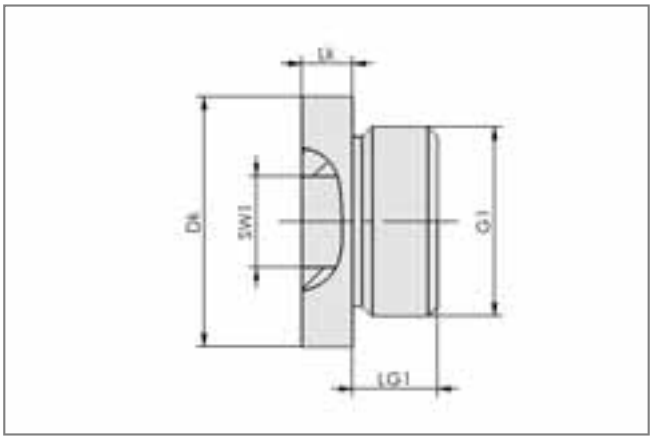
Your Benefits...

> All accessories from a single source

> Long lifetime, reusable, mechanically strong and with a good-looking finish

Design Data Sealing Screws with Collar VRS-SB

Sealing screw with collar VRS-SB



Sealing screw with collar VRS-SB

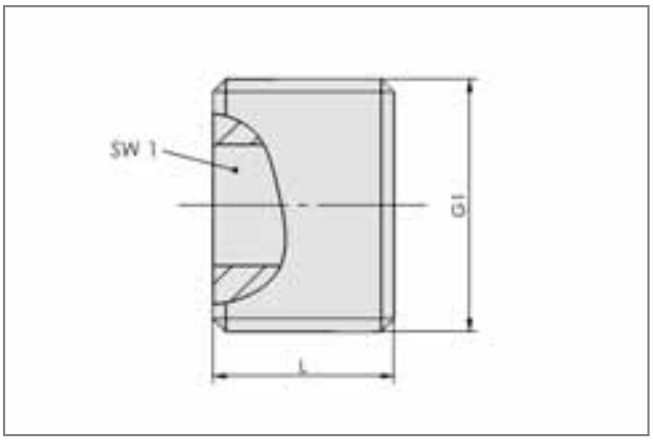
Type	Dimensions in mm				
	Dk	G1	LG1	Lk	SW1
VRS-SB M5-AG ISKT O-Ring	8	M5-M	5.0	2.5	3
VRS-SB G1/8-AG ISKT O-Ring	14	G1/8"-M	5.5	3.5	5
VRS-SB G1/4-AG ISKT O-Ring	18	G1/4"-M	7.5	4.5	6
VRS-SB G3/8-AG ISKT O-Ring	22	G3/8"-M	7.5	4.5	8
VRS-SB G1/2-AG ISKT O-Ring	27	G1/2"-M	14.0	5.0	10

Sealing Screws with Collar VRS-SB

Type	Part Number
VRS-SB M5-AG ISKT O-Ring	10.08.06.00064
VRS-SB G1/8-AG ISKT O-Ring	10.08.06.00043
VRS-SB G1/4-AG ISKT O-Ring	10.08.06.00044
VRS-SB G3/8-AG ISKT O-Ring	10.08.06.00045
VRS-SB G1/2-AG ISKT O-Ring	10.08.06.00046

Design Data Sealing Screws without Collar VRS-S

Sealing screw without collar VRS-S



Sealing screw without collar VRS-S

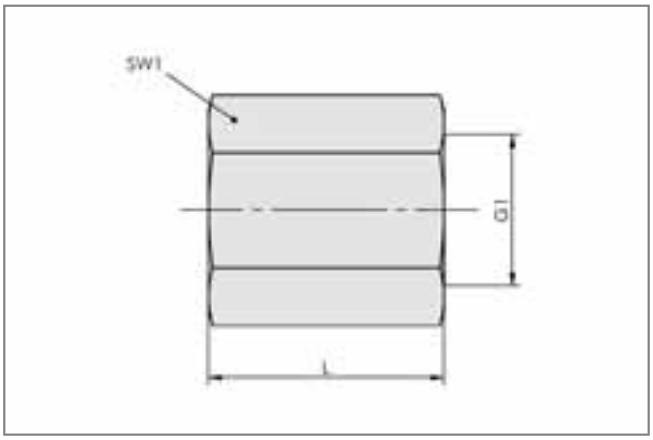
Type	Dimensions in mm			
	G1	L	LG1	SW1
VRS-S G1/8-AG	G1/8"-M	6	6	5
VRS-S G1/4-AG	G1/4"-M	9	9	6
VRS-S G3/8-AG	G3/8"-M	10	10	8
VRS-S G1/2-AG	G1/2"-M	12	12	10
VRS-S G3/4-AG	G3/4"-M	14	10	12

Sealing Screws without Collar VRS-S

Type	Part Number
VRS-S G1/8-AG	10.08.06.00047
VRS-S G1/4-AG	10.08.06.00048
VRS-S G3/8-AG	10.08.06.00049
VRS-S G1/2-AG	10.08.06.00050
VRS-S G3/4-AG	10.08.06.00051

Design Data Bushings MUF-S

Sleeve with hexagon MUF-S



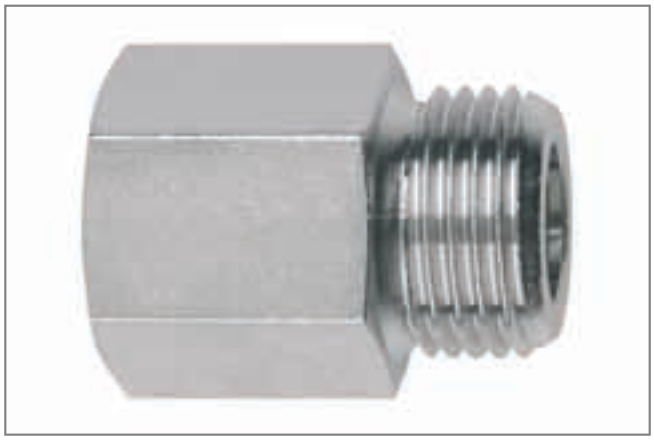
Sleeve with hexagon MUF-S

Type	Dimensions in mm		
	G1	L	SW1
MUF-S M5-IG 9 SW8 MV	M5-F	9	8
MUF-S G1/8-IG 18 SW14 MV	G1/8"-F	18	14
MUF-S G1/4-IG 26 SW17 MV	G1/4"-F	26	17
MUF-S G3/8-IG 26 SW22 MV	G3/8"-F	26	22
MUF-S G1/2-IG 30 SW27 MV	G1/2"-F	30	27
MUF-S G3/4-IG 28 SW32 MV	G3/4"-F	28	32
MUF-S G1-IG 33 SW41 MV	G1"-F	33	41

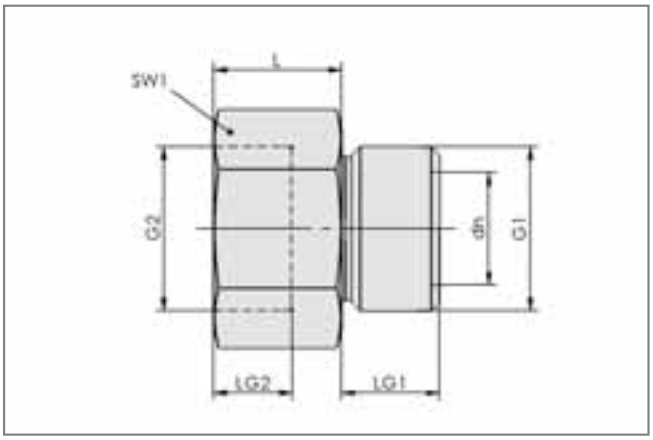
Bushings MUF-S

Type	Part Number
MUF-S M5-IG 9 SW8 MV	10.08.05.00124
MUF-S G1/8-IG 18 SW14 MV	10.08.05.00125
MUF-S G1/4-IG 26 SW17 MV	10.08.05.00126
MUF-S G3/8-IG 26 SW22 MV	10.08.05.00127
MUF-S G1/2-IG 30 SW27 MV	10.08.05.00128
MUF-S G3/4-IG 28 SW32 MV	10.08.05.00129
MUF-S G1-IG 33 SW41 MV	10.08.05.00130

Design Data Extension Hexagon Flats VRL-S



Extension with hexagon flats VRL-S



Extension with hexagon flats VRL-S

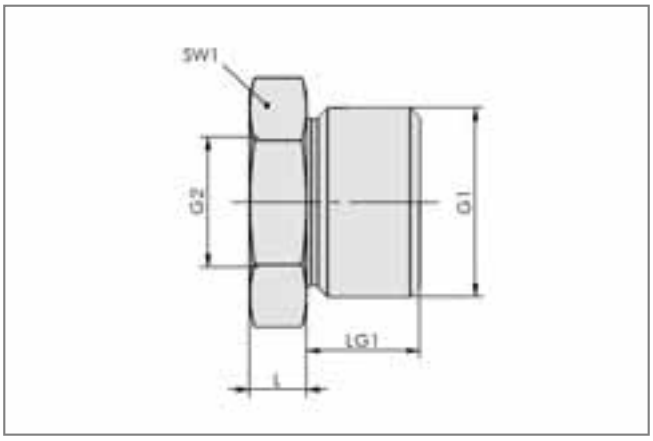
Type	Dimensions in mm						
	dn	G1	G2	L	LG1	LG2	SW1
VRL-S M5 8	2.5	M5-M	M5-F	8	4.5	6.6	8
VRL-S G1/8 15	5.0	G1/8"-M	G1/8"-F	15	8.0	13.0	14
VRL-S G1/4 18	7.0	G1/4"-M	G1/4"-F	18	10.0	15.0	17
VRL-S G1/2 22	12.0	G1/2"-M	G1/2"-F	22	12.0	16.3	24

Extension Hexagon Flats VRL-S

Type	Part Number
VRL-S M5 8	10.08.04.00088
VRL-S G1/8 15	10.08.04.00090
VRL-S G1/4 18	10.08.04.00092
VRL-S G1/2 22	10.08.04.00097

Design Data Reduction Pieces RED-STK

Reduction piece with hexagon RED-STK



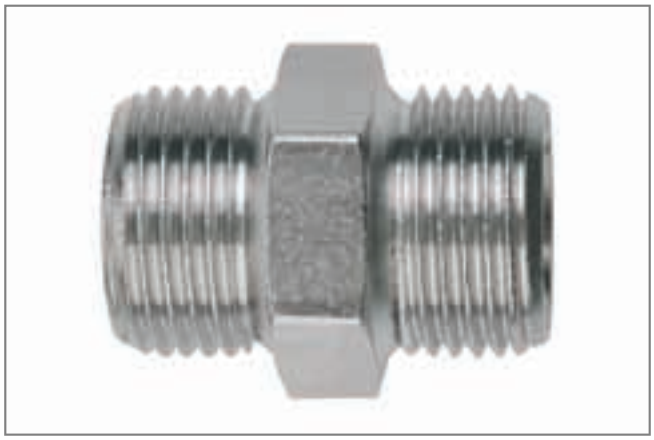
Reduction piece with hexagon RED-STK

Type	Dimensions in mm				
	G1	G2	L	LG1	SW1
RED-STK G1/8-AG M5-IG	G1/8"-M	M5-F	3.5	6.5	14
RED-STK G1/4-AG G1/8-IG	G1/4"-M	G1/8"-F	4.0	10.0	17
RED-STK G3/8-AG G1/8-IG	G3/8"-M	G1/8"-F	5.0	10.0	19
RED-STK G3/8-AG G1/4-IG	G3/8"-M	G1/4"-F	5.0	10.0	19
RED-STK G1/2-AG G1/4-IG	G1/2"-M	G1/4"-F	6.0	12.0	24
RED-STK G1/2-AG G3/8-IG	G1/2"-M	G3/8"-F	6.0	12.0	24
RED-STK G3/4-AG G3/8-IG	G3/4"-M	G3/8"-F	7.0	14.0	32
RED-STK G3/4-AG G1/2-IG	G3/4"-M	G1/2"-F	7.0	14.0	32
RED-STK G1-AG G1/2-IG	G1"-M	G1/2"-F	8.0	16.0	41
RED-STK G1-AG G3/4-IG	G1"-M	G3/4"-F	8.0	16.0	41

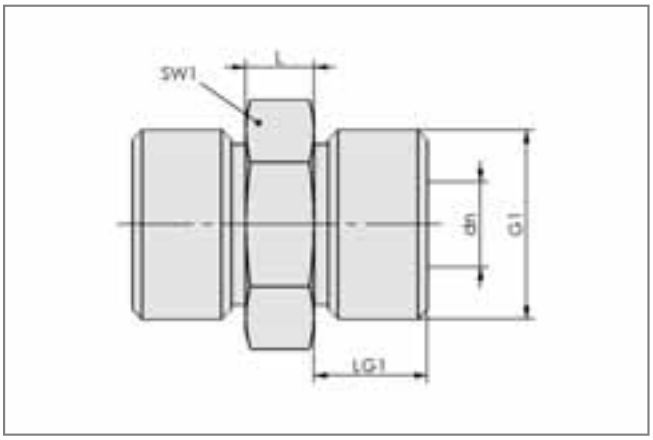
Reduction Pieces RED-STK

Type	Part Number
RED-STK G1/8-AG M5-IG	10.08.04.00089
RED-STK G1/4-AG G1/8-IG	10.08.04.00091
RED-STK G3/8-AG G1/8-IG	10.08.04.00093
RED-STK G3/8-AG G1/4-IG	10.08.04.00094
RED-STK G1/2-AG G1/4-IG	10.08.04.00095
RED-STK G1/2-AG G3/8-IG	10.08.04.00096
RED-STK G3/4-AG G3/8-IG	10.08.04.00098
RED-STK G3/4-AG G1/2-IG	10.08.04.00099
RED-STK G1-AG G1/2-IG	10.08.04.00100
RED-STK G1-AG G3/4-IG	10.08.04.00101

Design Data Double Fittings DOP-NIP



Double nipple with hexagon DOP-NIP



Double nipple with hexagon DOP-NIP

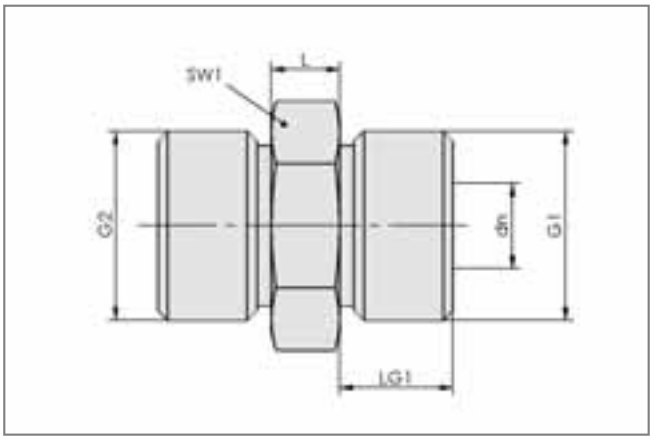
Type	Dimensions in mm				
	dn	G1	L	LG1	SW1
DOP-NIP-S M5-AGx4	2.5	M5-M	4	4.5	8
DOP-NIP-S G1/8-AGx5	4.6	G1/8"-M	5	6.5	14
DOP-NIP-S G1/4-AGx5	7.6	G1/4"-M	5	10.0	17
DOP-NIP-S G3/8-AGx5	11.0	G3/8"-M	5	9.0	19
DOP-NIP-S G1/2-AGx6	12.0	G1/2"-M	6	12.0	24
DOP-NIP-S G3/4-AGx8	15.0	G3/4"-M	8	14.0	32
DOP-NIP-S G1-AGx10	20.0	G1"-M	10	16.0	41

Double Fittings DOP-NIP

Type	Part Number
DOP-NIP-S M5-AGx4	10.08.05.00131
DOP-NIP-S G1/8-AGx5	10.08.05.00132
DOP-NIP-S G1/4-AGx5	10.08.05.00133
DOP-NIP-S G3/8-AGx5	10.08.05.00134
DOP-NIP-S G1/2-AGx6	10.08.05.00135
DOP-NIP-S G3/4-AGx8	10.08.05.00136
DOP-NIP-S G1-AGx10	10.08.05.00137

Design Data Reduction Nipples RED-NIP

Reduction nipple with hexagon RED-NIP



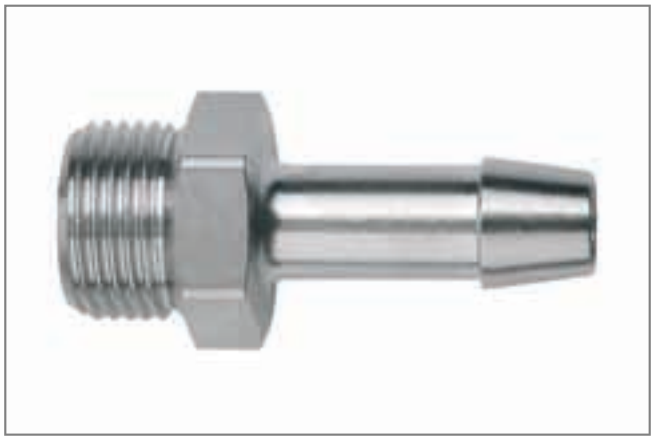
Reduction nipple with hexagon RED-NIP

Type	Dimensions in mm						
	dn	G1	G2	L	LG1	LG2	SW1
RED-NIP-S G1/8-AG M5-AG	2.5	G1/8"-M	M5-M	4	6.5	4.5	14
RED-NIP-S G1/4-AG G1/8-AG	4.6	G1/4"-M	G1/8"-M	5	10.0	6.5	17
RED-NIP-S G3/8-AG G1/4-AG	7.5	G3/8"-M	G1/4"-M	6	10.0	10.0	19
RED-NIP-S G1/2-AG G1/4-AG	7.5	G1/2"-M	G1/4"-M	6	12.0	10.0	24
RED-NIP-S G1/2-AG G3/8-AG	10.0	G1/2"-M	G3/8"-M	6	12.0	10.0	24
RED-NIP-S G3/4-AG G1/2-AG	12.0	G3/4"-M	G1/2"-M	8	14.0	12.0	32
RED-NIP-S G1-AG G1/2-AG	12.0	G1"-M	G1/2"-M	10	16.0	12.0	41
RED-NIP-S G1-AG G3/4-AG	17.0	G1"-M	G3/4"-M	10	16.0	14.0	41

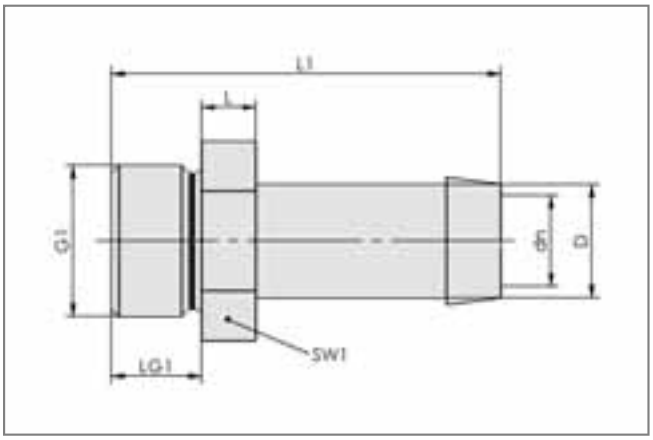
Reduction Nipples RED-NIP

Type	Part Number
RED-NIP-S G1/8-AG M5-AG	10.08.05.00138
RED-NIP-S G1/4-AG G1/8-AG	10.08.05.00139
RED-NIP-S G3/8-AG G1/4-AG	10.08.05.00141
RED-NIP-S G1/2-AG G1/4-AG	10.08.05.00140
RED-NIP-S G1/2-AG G3/8-AG	10.08.05.00142
RED-NIP-S G3/4-AG G1/2-AG	10.08.05.00143
RED-NIP-S G1-AG G1/2-AG	10.08.05.00144
RED-NIP-S G1-AG G3/4-AG	10.08.05.00145

Design Data Hose Nozzles ST



Hose nozzle ST



Hose nozzle ST

Type	Dimensions in mm							
	D	dn	G1	L	L1	LG1	SW1	Recom. internal hose diameter d [mm]
ST M3-AG 2	2.4	1.2	M3-M	2.0	10.8	3.5	5	2
ST M5-AG 4	4.4	2.2	M5-M	3.3	18.4	4.4	8	4
ST G1/8-AG 4	4.5	3.5	G1/8"-M	5.0	34.0	8.0	14	4
ST G1/8-AG 6	5.4	4.4	G1/8"-M	5.0	34.0	8.0	14	6
ST G1/8-AG 9	8.3	4.0	G1/8"-M	5.0	34.0	8.0	14	9
ST G1/4-AG 6	5.5	4.5	G1/4"-M	5.0	42.0	10.0	17	6
ST G1/4-AG 9	8.5	7.5	G1/4"-M	5.0	42.0	10.0	17	9
ST G1/4-AG 12	13.0	7.5	G1/4"-M	5.5	42.0	10.0	17	12
ST G3/8-AG 9	8.5	7.4	G3/8"-M	6.0	43.0	10.0	19	9
ST G3/8-AG 12	13.0	10.0	G3/8"-M	5.9	43.0	10.0	19	12
ST G1/2-AG 9	8.6	7.5	G1/2"-M	6.1	45.0	11.9	24	9
ST G1/2-AG 12	12.5	7.6	G1/2"-M	9.0	64.5	16.0	24	12
ST G1/2-AG 19	19.0	14.3	G1/2"-M	10.0	58.0	12.0	24	19
ST G3/4-AG 12	13.0	10.4	G3/4"-M	8.0	60.0	16.0	32	12
ST G3/4-AG 19	19.0	16.0	G3/4"-M	7.8	60.0	15.8	32	19
ST G3/4-AG 25	25.0	18.5	G3/4"-M	8.5	60.0	16.0	32	25
ST G1-AG 25	25.0	22.0	G1"-M	10.1	62.0	15.8	36	25
ST G1-AG 32	32.0	26.0	G1"-M	10.5	62.0	16.0	36	32
ST G1-1/4-AG 32	32.0	27.9	G1-1/4"-M	10.3	62.0	15.9	46	32
ST G1-1/4-AG 38	38.2	32.8	G1-1/4"-M	8.0	60.0	12.0	48	38
ST G1-1/2-AG 38	38.0	29.9	G1-1/2"-M	12.2	64.0	15.5	50	38

Hose Nozzles ST

Type	Part Number
ST M3-AG 2	10.08.03.00151
ST M5-AG 4	10.08.03.00152
ST G1/8-AG 4	10.08.03.00153
ST G1/8-AG 6	10.08.03.00154
ST G1/8-AG 9	10.08.03.00155
ST G1/4-AG 6	10.08.03.00156
ST G1/4-AG 9	10.08.03.00157
ST G1/4-AG 12	10.08.03.00158
ST G3/8-AG 9	10.08.03.00159
ST G3/8-AG 12	10.08.03.00160
ST G1/2-AG 9	10.08.03.00161
ST G1/2-AG 12	10.08.03.00162
ST G1/2-AG 19	10.08.03.00163
ST G3/4-AG 12	10.08.03.00164
ST G3/4-AG 19	10.08.03.00165
ST G3/4-AG 25	10.08.03.00166
ST G1-AG 25	10.08.03.00167
ST G1-AG 32	10.08.03.00168
ST G1-1/4-AG 32	10.08.03.00169
ST G1-1/4-AG 38	10.08.03.00123
ST G1-1/2-AG 38	10.08.03.00170

Rotary Inlets DEF

Max. speed 3,500/min

Suitability for Industry-Specific Applications

Rotary inlets DEF

Applications

- Supplying fast-moving machine parts or rotating gripper systems with compressed air or vacuum

Design

- Rotary inlet with steel rotor and body made of high-strength aluminum

Our Highlights...

- Rotary inlet for connection to rotating machine elements
- Made of high-strength aluminum and steel

Your Benefits...

> Connection of compressed air or vacuum even to fast-moving machine elements or grippers

> Long lifetime, no maintenance needed

Designation Code Rotary Inlets DEF

Abbreviated designation	Shape		Maximal speed
Example DEF R 3500:			
DEF	**R**		**3500**
DEF	GE	straight	21
	L	left-handed thread	250
	R	right-handed thread	3500
	W	angled	

Ordering Data Rotary Inlets DEF

Type	Part Number
DEF R 250	10.07.03.00001
DEF R 3500	10.07.03.00002
DEF L 3500	10.07.03.00003
DEF GE 21	10.07.03.00005
DEF W 21	10.07.03.00006

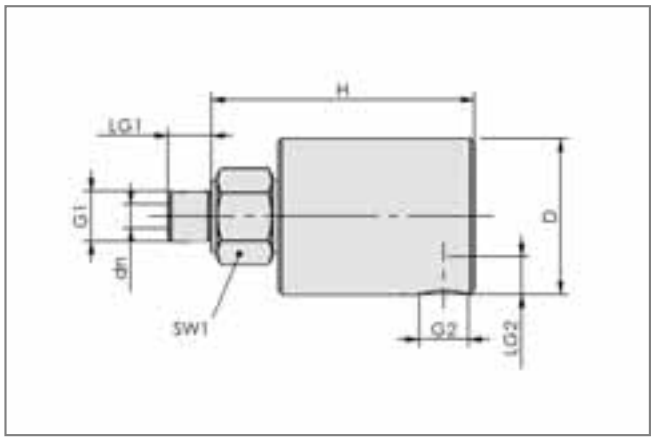
Rotary Inlets DEF

Max. speed 3,500/min

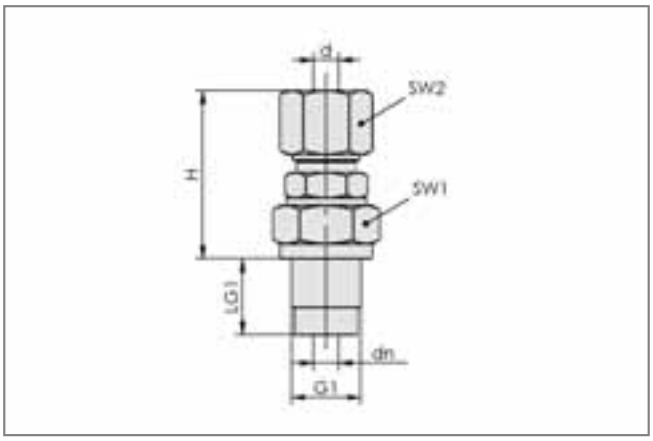
Technical Data Rotary Inlets DEF

Type	Max. speed [1/min]	Weight [g]
DEF R 250	250	300
DEF R 3500	3500	400
DEF L 3500	3500	400
DEF GE 21	21	100
DEF W 21	21	100

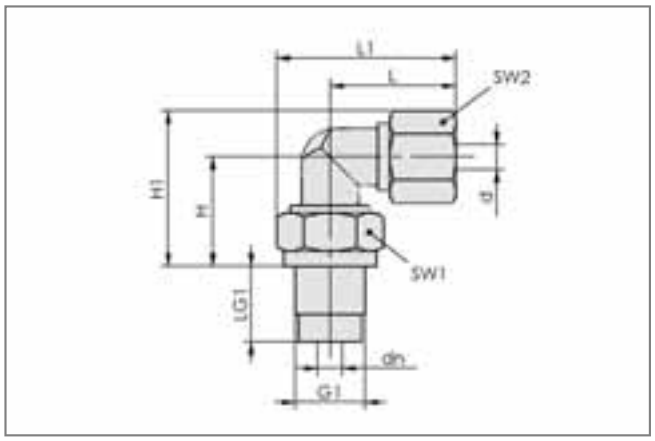
Design Data Rotary Inlets DEF



DEF R 250, R 3500, L 3500



DEF GE 21



DEF W 21

Type	Dimensions in mm												
	D	d	dn	G1	G2	H	H1	L	L1	LG1	LG2	SW1	SW2
DEF R 250	38.0	-	8.0	M16x2-M	R1/4"-F	68.0	-	-	-	14.5	14.5	22	-
DEF R 3500	41.2	-	6.4	G1/4"-M	R1/4"-F	69.5	-	-	-	11.5	20.6	22	-
DEF L 3500	41.2	-	6.4	G1/4"-M	R1/4"-F	69.5	-	-	-	11.5	20.6	22	-
DEF GE 21	-	8	6.0	G3/8"-M	-	40.0	-	-	-	18.0	-	22	19
DEF W 21	-	8	6.0	G3/8"-M	-	26.0	37	30	43	18.0	-	22	19

Sealing Rings DR

For thread from M3 to G1 1/2"

Suitability for Industry-Specific Applications

Sealing rings DR

Applications

- Sealing of connection nipples and other connecting elements

Design

- Polyamide sealing ring Easy-Fix with internal locking element to secure the ring on the thread

Our Highlights...

- Sealing rings made of polyamide PA
- Optionally available with integrated fixing facility (Easy-Fix)
- Wide range of diameters

Your Benefits...

> Excellent sealing properties

> Sealing ring cannot be lost when mounting and removing the connecting element

> The ideal solution for complete hose-connection systems

Designation Code Sealing Rings DR

Abbreviated designation	Connection thread	Material	Product addition
Example DR M5 PA:			
DR	**M5**	**PA**	
DR	M3 to G1 1/2	PA polyamide	Easy-Fix

Ordering Data Sealing Rings DR

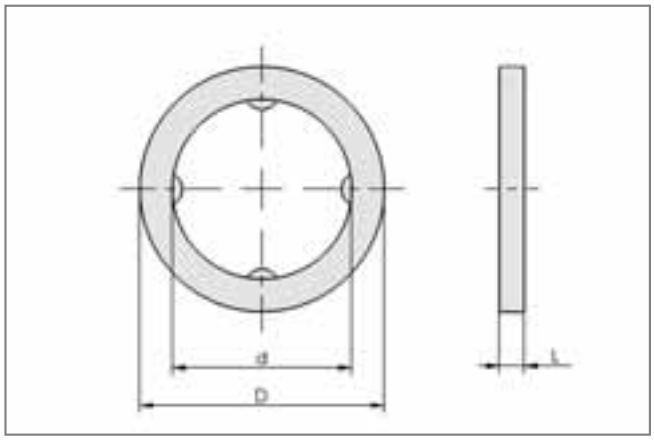
Type	Sealing ring DR	Sealing ring DR Easy-Fix*
DR M3	10.07.08.00018	-
DR M5	10.07.08.00019	10.07.08.00245
DR G1/8	10.07.08.00020	10.07.08.00247
DR G1/4	10.07.08.00021	10.07.08.00248
DR G3/8	10.07.08.00022	10.07.08.00249
DR G1/2	10.07.08.00023	10.07.08.00250
DR G3/4	10.07.08.00024	10.07.08.00251
DR G1	10.07.08.00025	10.07.08.00252
DR G1 1/4	10.07.08.00026	-
DR G1 1/2	10.07.08.00027	-

*Sealing ring with inner centering pins. Ensures optimal sealing. Cannot slip off the thread when the screw connection is opened.

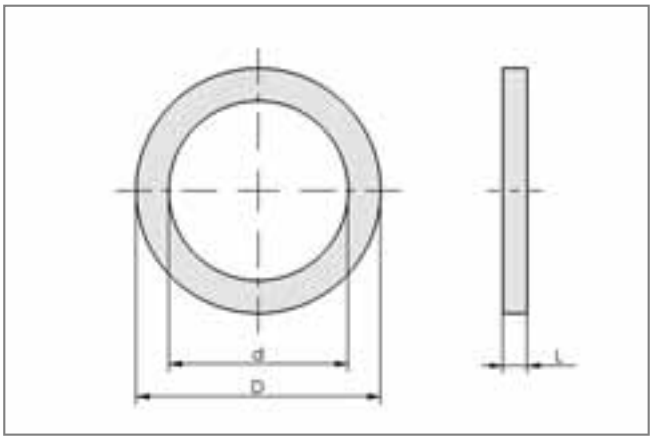
Sealing Rings DR

For thread from M3 to G1 1/2"

Design Data Sealing Rings DR



DR Easy-Fix



DR

Type	Dimensions in mm		
	d	D	L
DR M3	4	6	1.0
DR M5	5	8	1.2
DR G1/8	10	15	1.5
DR G1/4	14	18	1.5
DR G3/8	17	22	2.0
DR G1/2	22	26	1.5
DR G3/4	27	33	2.0
DR G1	34	39	2.0
DR G1 1/4	42	49	2.0
DR G1 1/2	48	55	2.0

Vacuum Accessories

Service and Installation Products

Service Products

Leak-Detection Spray
Quick and reliable detection of leaks in vacuum lines, at connections and in complete vacuum systems. Special foam detects leaks reliably.
Spray can contents 400 ml
Part number: 10.07.11.00023

Vacuum Testing Kit
Reliable measurement of the vacuum directly in the suction pad with the aid of a needle probe.
Part number: 10.07.11.00024

Special Lubricant for Vacuum Technology
For lubrication of spring-plunger rods. Optimizes the sliding properties and improves process safety, particularly in rough operating conditions.
Temperature range: -50 °C to +150 °C
Can contents 125 ml
Part number: 10.07.11.00022

Ejector Tester
Functional testing of compact ejectors SCPi/SMPi and SXPi/SXMPi.
Part number: 10.02.02.03588

Installation Products

Special Adhesive 401
Reliable gluing of sealing sections and cords. Provides a permanently elastic connection and ensures a long operating lifetime of the seal, even under continually varying stresses.
Temperature range: -10 °C to +80 °C
Tube contents 3 g
Part number: 10.07.08.00258

Screw-Locking Compound 243
Medium-strength. Suitable for all threaded metal connections. Prevents loosening of nuts and screws as the result of vibration. The connections can still be loosened with normal tools.
Temperature range: -10 °C to +150 °C
Bottle contents 10 g
Part number: 10.07.08.00256

Screw-Locking Compound 221
Low-strength. Suitable for all threaded metal connections. Prevents loosening of nuts and screws as the result of vibration and also seals the connection. The connections can still be loosened with normal tools.
Temperature range: -10 °C to +150 °C
Bottle contents 10 g
Part number: 10.07.08.00255

Teflon Sealing Tape
For sealing screw connections. Resistant to all aggressive media. Does not become brittle with age. Does not stick or swell.
Temperature range: -60 °C to +200 °C
Roll 12 m of sealing
Part number: 10.07.08.00257

Vacuum Gripping Systems

Overview of Section 10

Vacuum Gripping Systems

Large-Area Vacuum Gripping Systems FXC/FMC	Page	668
Large-Area Vacuum Gripping Systems SBX		682
Vacuum Layer Gripping Systems SPZ		685
Vacuum Suction Spiders SSP		688

Large-Area Gripping Systems FXC/FMC

Flexibility for Automated Processes

Large-area vacuum gripping system FXC for powerful handling of wooden boards

Applications

- Handling workpieces with a wide range of dimensions and/or undefined positions
- Handling workpieces with gaps
- Automated palletizing/depalletizing, order picking and sorting of a wide range of workpieces with only one type of gripper
- Handling workpieces made from various materials such as cardboard, wood, metal, glass or plastic

Large-area vacuum gripping system FXC

Our Highlights

- Sealing plate
- Valve type protected against contamination and easy to clean
- Innovative valve concept

Your Benefits

> Quick and cost-effective replacement of the plate

> Operational safety and a high degree of system availability

> Intelligent vacuum generation saves energy with fast cycle times

Type FXC

- Integrated plug-in ejector

> Integrated, compact construction

- Extruded aluminium profile with integration of functions in the end covers

> Variable in length, robust lightweight design for fast cycle times

Type FMC

- External vacuum generation

> Flexible vacuum generation adapted to the individual application

- Extruded aluminium profile with a minimal height

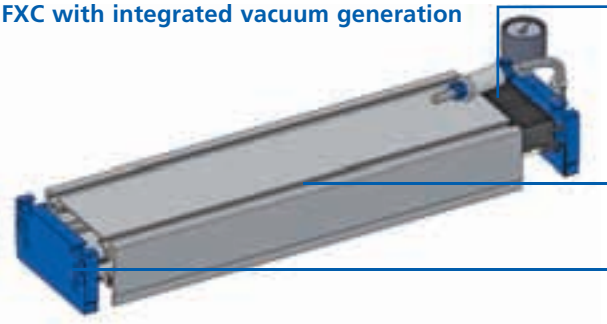
> Lightweight design for fast cycle times and cost-effective handling systems

Large-area vacuum gripping system FMC

Large-Area Gripping Systems FXC/FMC

Modular Configuration

FXC with integrated vacuum generation

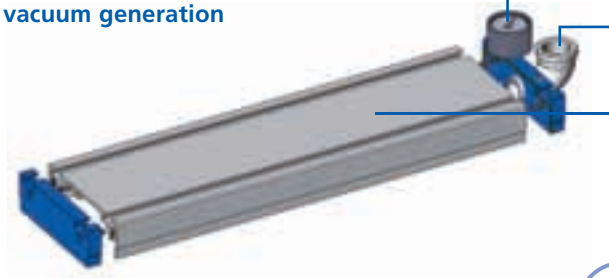


Vacuum generator (FXC)
- Plug-in ejector with lightweight design
- Quickly replaceable
- Alternatively with up to 4 multi-stage ejectors for optimum performance adjustment

T-slot
- For flexible mechanical attachment of the gripper

End cover with function modules
- For the "sensor", "blow-off" and "separation" connections

FMC with connection for external vacuum generation



Vacuum display using vacuum manometer

Connection pieces (FMC)
- For external vacuum generator

Main body
- Made from extruded aluminium section
- Variable in width by combining units
- Variable in length
- Protective housing for vacuum generator (FXC)
- Lower height with FMC type

Main body

+

Valve component

Valve type SVKW
- Quick blow-off and fast cycle times for increased production speed
- High degree of air passage for handling porous and rough workpieces

Valve type SW
- Flow screens for any installation position and high accelerations

Valve components

+

Sealing plate

Sealing plate (foam)
- Flexible and highly resistant
- Different grids according to the width of the workpiece
- Quickly replaceable
- Optional: sealing plate with integrated filter screen to protect against contamination

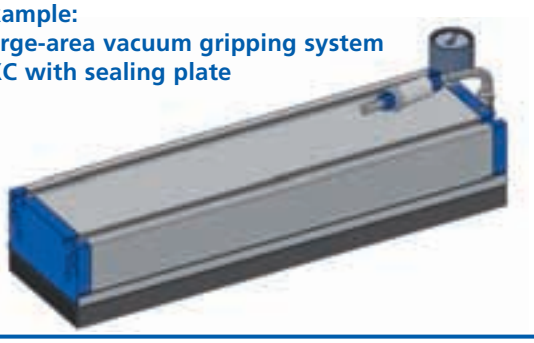
Suction pads

Suction pads (elastomer)
- Soft, adaptable sealing lip
- Quickly replaceable

Sealing elements

=

Example:
Large-area vacuum gripping system
FXC with sealing plate



Example:
Large-area vacuum gripping system
FMC with suction pads

Complete large-area vacuum gripping systems

Large-Area Gripping Systems FXC/FMC

Sealing Element – the Interface to Workpieces

Sealing Elements: Sealing Plate and Suction Pads

Sealing elements are the crucial interface between the gripping system and the workpiece. There are two different sealing elements available for the large-area vacuum gripping systems FXC/FMC: Sealing plate and suction pads. Large-area vacuum gripping systems with a sealing plate are perfect for handling rigid workpieces such as furniture and wooden boards. Large-area vacuum gripping systems with suction pads are used to handle non-rigid workpieces such as shrink wrapped products and cardboard boxes. Both versions have a quick-change mechanism that allows the elements to be quickly replaced. This minimizes maintenance and downtimes of the system.

Sealing plate (foam)

Large-area vacuum gripping systems FXC/FMC with various sealing plates

Standard foam with a medium grid
- For workpiece widths of 60 mm or higher
- Hole spacing 36 mm, foam height 20 mm

Standard foam with a fine grid
- For workpiece widths of 30 mm or higher
- Hole spacing 18 mm, foam height 20 mm

Combifoam
- For workpiece diameters of 50 mm or higher
- Hole spacing 18 mm, foam height 23 mm
- Patented innovative layer structure

Application areas

- Handling of rigid workpieces
- Standard foam with a grid is used for handling boards, plates, pallets, aluminium profiles and checker plates
- Combifoam is mainly used for handling glass, cosmetic cases, buckets and cans with a continuous edge (e.g. cans of drinks, etc.)

Specific product features

- Rugged, flexible foam ensures a long lifetime
- Quick-change adhesive rape ensures fast and simple foam replacement
- Different sealing plates ensure that a wide range of workpieces can be gripped and handled
- Optional separation function ensures safe handling of porous workpieces

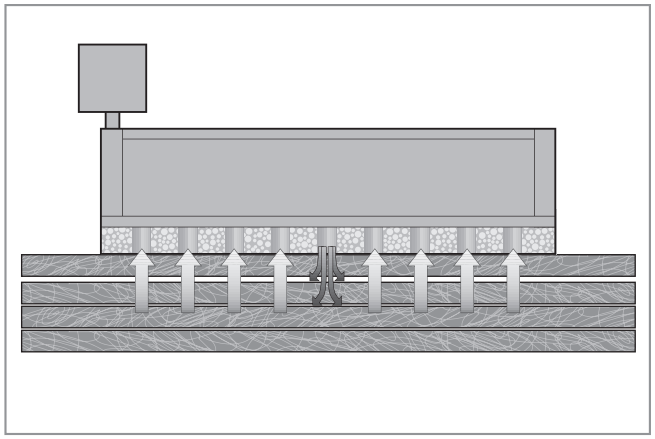


Diagram of the separation function

Optional separation function

The separation function prevents several workpieces from sticking to each other when destacking. Applying a compressed-air jet through the sucked workpiece keeps the under-lying workpiece from being gripped. In this way, only one workpiece is picked up and held.

The separation function is used for all porous workpieces such as cardboard boxes, MDF or chipboards.

Type	Part number	Air consumption [l/min]	Weight [kg]
FXC-SW 435,5-V	10.01.21.00246	197	3.2

Note: Available on other sizes of vacuum gripping systems on request.

Large-Area Gripping Systems FXC/FMC

Sealing Element – the Interface to Workpieces

Suction pads

Large-area vacuum gripping systems FXC/FMC with a wide range of suction pads

Packaging suction pads
- Bellows suction pads (1.5 folds) of Type SPB1
- Made from wear-proof and abrasion-proof material Elastodur

Standard suction pads
- Bellows suction pads (2.5 folds)
- Food grade silicone material (FDA conform)

Plug-in suction pads
- Suction pad made of silicone
- Integrated flow resistance
- Quick-change function as plug-in option

Application areas

- Handling of non-rigid workpieces such as cardboard boxes, plastic bags, trays, etc.

Specific product features

- Reduced energy consumption due to excellent sealing properties
- Adaptable, soft sealing lips ensure that curved and non-rigid surfaces are sealed
- Quick installation and removal of the suction pads minimizes maintenance and downtimes of the system

Special Type: Large-Area Vacuum Gripping System FXC/FMC for Handling of Doors

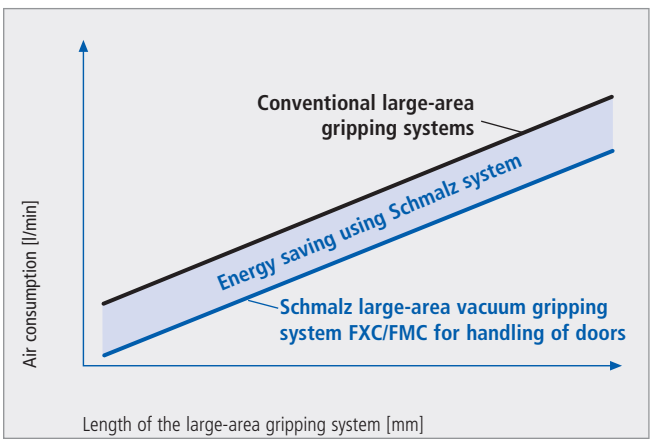
Application areas

- Handling of workpieces of various sizes and/or undefined positions
- Handling of workpieces with gaps for automated palletizing/depalletizing
- Order picking and sorting doors

Specific product features

- Reduction of energy consumption using the valve components that are optimized for handling doors
- Rugged, flexible foam with integrated sealing plate protected against contamination ensures a long lifetime
- Large-area vacuum gripping system with extended area of operation ensures flexible handling of doors with a frame width of only 80 mm

Large-area vacuum gripping system FXC/FMC for handling of doors

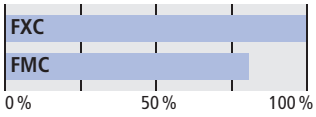
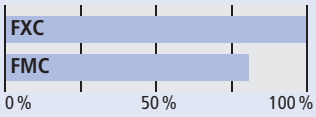
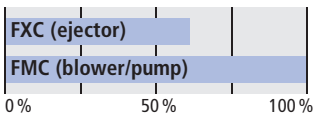
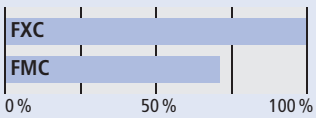
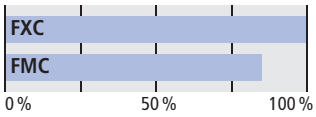


Energy saving using the large-area vacuum gripping system FXC/FMC for handling of doors

Large-Area Gripping Systems FXC/FMC

Selection of Products

Selection Criteria FXC/FMC

Application features	FXC/FMC comparison	Recommended type
Maximum effectiveness of vacuum generation Integration of vacuum generation at the effective location in the large-area vacuum gripping system	Flow effiencicy 	FXC
Integration of functions and process safety Process safety as well as minimization of protruding edges and risk of damage by avoiding vacuum hoses, distributors and attachment elements between the vacuum generator and the large-area vacuum gripping system	Integration of functions 	FXC
Minimal system costs Time and costs for purchasing and installing the vacuum generator	Investment cost comparison 	FXC
Dynamic and minimal cycle times Weight and large-area gripper height at the robot/portal head	Gripper weight 	FMC
Operation with electrical vacuum generation Operating costs for compressed-air (internal vacuum generator: ejector) or energy (external vacuum generator: vacuum pump or blower)	Operating costs (energy) 	FMC

Selection of Product Features Based on Application Features

Application features	Recommended product features
Fast cycle times and rough workpiece surfaces	Valve type SVKW*
Cost-effective design	Valve type SW
Heavily soiled environment, dust (dry)	Sealing plate with integrated filter screen
Separation of porous materials from stack (e.g. chipboards, MDF)	FXC/FMC with integrated separation function
Workpiece width	30 mm or higher for fine grid (18mm), 60 mm or higher for medium grid (36mm)
Non-rigid workpieces	Solution with large-area vacuum gripping system FXC-SG or vacuum suction spider SSP
Energy efficient and fast cycle times	Solution with large-area vacuum gripping system FXC/FMC-HD
Handling doors with and without gaps	Solution with vacuum door gripper FXC/FMC
Handling cans, exposed glass and trays	Solution with combifoam sealing plate for large-area vacuum gripping system FXC/FMC or layer gripping system SPZ

*SVKW application: up to a vertical acceleration of 5 m/s²; horizontal swivel range up to max. 45°

Service and practical tips

- Increase in load-bearing capacity and handling safety for uneven layers and rough surfaces by firmly pressing down on them as well as floating/flexible suspension of the large-area gripper
- The lifetime of the sealing plate (foam) for linear attachment and lifting is generally 3 months to 1 year
- The lifetime of the suction pads for linear attachment and lifting is generally 6 months to 1 year
- Maintenance every 6 months increases the lifetime of the large-area vacuum gripping system
- Suction tests with original workpieces are always required to ensure functionality. We perform these at our test centre individually for your application

Large-Area Gripping Systems FXC/FMC

Product Specifications

Ordering Data for Large-Area Vacuum Gripping Systems FXC/FMC with Sealing Plate (Foam)

Ordering guide for FXC/FMC large-area vacuum gripping system with sealing plate (foam)			
Abbreviated designation	**Valve technology**	**Length (x width) [mm]**	**Hole spacing**
Example: FXC-SW 435,5 18			
FXC	**SW**	**435.5**	**18**
FXC	SW Flow resistance	435.5	18 fine
FMC	SVKW Flow valve	831.5	36 medium

Type	Part number without filter	Part number with filter
FX-SW 120x60	10.01.11.01802	-
FX-SW 120x60 SEA*	10.01.11.01800	-
FXC-SW 435.5 18	10.01.21.00116	10.01.21.00121
FXC-SW 435.5 36	10.01.21.00126	10.01.21.00131
FXC-SW 633.5 18	10.01.21.00117	10.01.21.00122
FXC-SW 633.5 36	10.01.21.00127	10.01.21.00132
FXC-SW 831.5 18	10.01.21.00118	10.01.21.00123
FXC-SW 831.5 36	10.01.21.00128	10.01.21.00133
FXC-SW 1227.5 18	10.01.21.00119	10.01.21.00124
FXC-SW 1227.5 36	10.01.21.00129	10.01.21.00134
FXC-SW 1425.5 18	10.01.21.00120	10.01.21.00125
FXC-SW 1425.5 36	10.01.21.00130	10.01.21.00135
FXC-SVKW 435.5 18	10.01.21.00042	10.01.21.00151
FXC-SVKW 435.5 36	10.01.21.00155	10.01.21.00153
FXC-SVKW 633.5 18	10.01.21.00043	10.01.21.00152
FXC-SVKW 633.5 36	10.01.21.00156	10.01.21.00154
FXC-SVKW 831.5 18	10.01.21.00044	10.01.21.00110
FXC-SVKW 831.5 36	10.01.21.00107	10.01.21.00113
FXC-SVKW 1227.5 18	10.01.21.00105	10.01.21.00111
FXC-SVKW 1227.5 36	10.01.21.00108	10.01.21.00114
FXC-SVKW 1425.5 18	10.01.21.00106	10.01.21.00112
FXC-SVKW 1425.5 36	10.01.21.00109	10.01.21.00115

Type	Part number without filter	Part number with filter
FM-SW 76x22	10.01.11.00851	-
FM-SW 120x60	10.01.11.01823	-
FMC-SW 435.5 18	10.01.21.00101	10.01.21.00136
FMC-SW 435.5 36	10.01.21.00141	10.01.21.00146
FMC-SW 633.5 18	10.01.21.00102	10.01.21.00137
FMC-SW 633.5 36	10.01.21.00142	10.01.21.00147
FMC-SW 831.5 18	10.01.21.00103	10.01.21.00138
FMC-SW 831.5 36	10.01.21.00143	10.01.21.00148
FMC-SW 1227.5 18	10.01.21.00099	10.01.21.00139
FMC-SW 1227.5 36	10.01.21.00144	10.01.21.00149
FMC-SW 1425.5 18	10.01.21.00100	10.01.21.00140
FMC-SW 1425.5 36	10.01.21.00145	10.01.21.00150
FMC-SVKW 435.5 18	10.01.21.00052	10.01.21.00161
FMC-SVKW 435.5 36	10.01.21.00171	10.01.21.00166
FMC-SVKW 633.5 18	10.01.21.00157	10.01.21.00162
FMC-SVKW 633.5 36	10.01.21.00172	10.01.21.00167
FMC-SVKW 831.5 18	10.01.21.00158	10.01.21.00163
FMC-SVKW 831.5 36	10.01.21.00173	10.01.21.00168
FMC-SVKW 1227.5 18	10.01.21.00159	10.01.21.00164
FMC-SVKW 1227.5 36	10.01.21.00174	10.01.21.00169
FMC-SVKW 1425.5 18	10.01.21.00160	10.01.21.00165
FMC-SVKW 1425.5 36	10.01.21.00175	10.01.21.00170

*Large-area gripping system blow-off function for fast releasing of workpieces

Ordering Data for Sealing Plates

Type	Part number without filter	Part number with filter
DI-PL 76x22	10.01.11.01388	-
DI-PL 120x60	10.01.10.00874	-
DI-PL 435.5x120 18	10.01.21.00018	10.01.21.00198
DI-PL 435.5x120 36	10.01.21.00022	10.01.21.00203
DI-PL 633.5x120 18	10.01.21.00046	10.01.21.00199
DI-PL 633.5x120 36	10.01.21.00062	10.01.21.00204
DI-PL 831.5x120 18	10.01.21.00059	10.01.21.00200
DI-PL 831.5x120 36	10.01.21.00063	10.01.21.00205
DI-PL 1227.5x120 18	10.01.21.00060	10.01.21.00201
DI-PL 1227.5x120 36	10.01.21.00064	10.01.21.00206
DI-PL 1425.5x120 18	10.01.21.00061	10.01.21.00202
DI-PL 1425.5x120 36	10.01.21.00065	10.01.21.00207

Note: For the sealing plate a special foam for vacuum applications is used. We also offer oil-resistant and temperature-resistant foams (temperature > 60°C) for special applications.

Ordering Data for Accessories

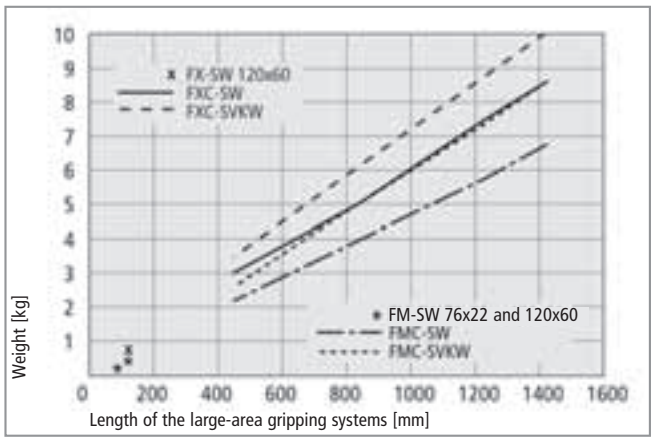
Type	Artikelnummer
Vacuum switch VS-V-D PNP	10.06.02.00343
Vacuum switch VS-V-D PNP with flange plate	10.01.10.00431
Solenoid valve kit suction on/off	10.01.21.00241
Solenoid valve kit blow-off on/off	10.01.21.02405
Solenoid valve kit suction on/off and blow-off on/off	10.01.21.00242
Attachment kit T-slot nuts	10.01.21.00243
Attachment kit robot flange	10.01.21.00244
Attachment kit spring-mounted suspension	10.01.21.02407

Note: It is possible use an additional silencer to reduce noise (FX 120 x 60).

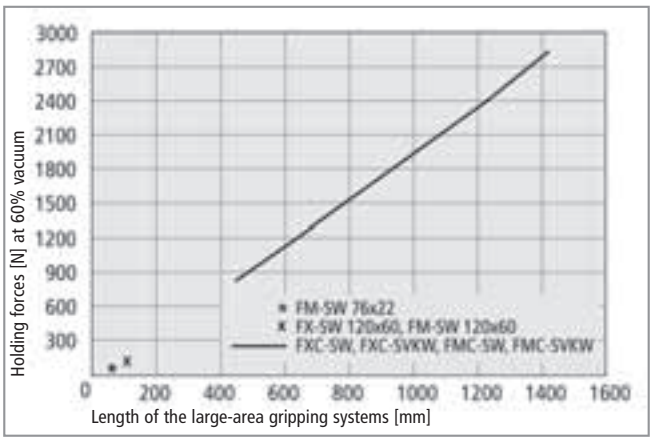
Large-Area Gripping Systems FXC/FMC

Product Specifications

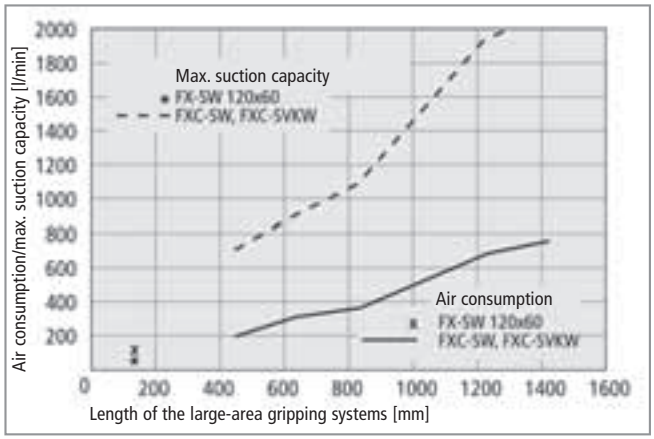
Technical Data of Large-Area Vacuum Gripping Systems FXC/FMC with Sealing Plate (Foam)



Weight of the large-area vacuum gripping systems



Holding forces [N] at 60% vacuum and full coverage of the large-area vacuum gripping systems holding a rigid workpiece

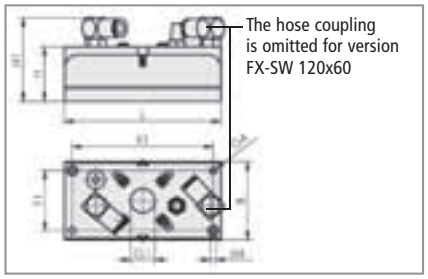


Air consumption and suction capacity of the large-area vacuum gripping system FX/FXC (FM/FMC can not be represented due to the external vacuum generator)

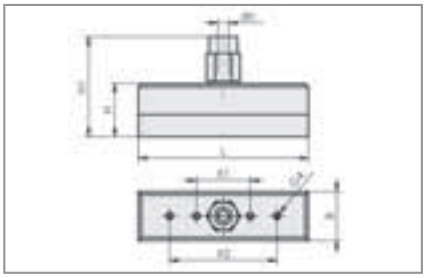
Type	Noise level [db (A)]	Max. evacuation level [%]
FXC	65	80
FMC	-*	-*

*FMC can not be represented due to the external vacuum generation

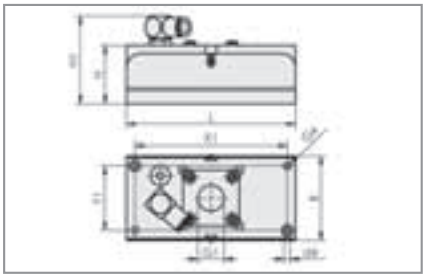
Construction Data of the Large-Area Vacuum Gripping Systems FX/FM with Sealing Plate (Foam)



FX-SW 120x60 SEA



FM-SW 76x22



FM-SW 120x60

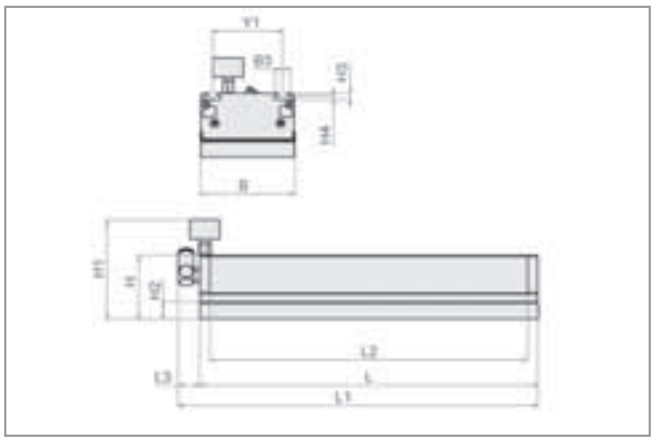
Type	Dimensions [mm]									
	B	d4	dn	G1	G4	H*	H1	L	X1	X2	Y1
FX-SW 120x60	60	4.5	-	G1/2"-F	M6-F	42	63	120	108	-	46
FX-SW 120x60 SEA**	60	4.5	-	G1/2"-F	M6-F	42	63	120	108	-	46
FM-SW 76x22	22	-	8	-	M3-F	24	35	76	24	48	-
FM-SW 120x60	60	4.5	-	G1/2"-F	M6-F	42	63	120	108	-	46

*Other foam heights and foam types on request **Gripping systems with integrated blow-off piston for quick lowering of the workpiece
Note: Type FX requires compressed-air hose 8/6mm, type FM requires vacuum hose 8/6mm.

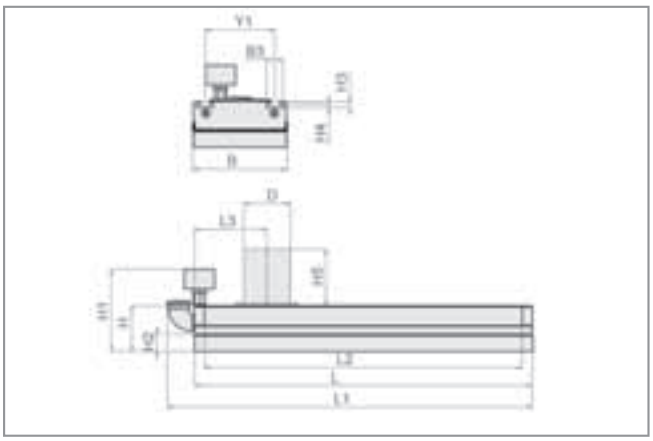
Large-Area Gripping Systems FXC/FMC

Product Specifications

Construction Data of the Large-Area Vacuum Gripping Systems FXC/FMC with Sealing Plate (Foam)



FXC



FMC

Type	Dimensions [mm]													
	B	B3	D	H	H1	H2*	H3	H4	H5	L	L1	L2	L3	Y1
FXC-SW 435.5 18/36	122	21	-	82	128	22	7.7	5.2	-	435.5	462.5	409.5	27	90
FXC-SW 633.5 18/36	122	21	-	82	128	22	7.7	5.2	-	633.5	660.5	607.5	27	90
FXC-SW 831.5 18/36	122	21	-	82	128	22	7.7	5.2	-	831.5	858.5	805.5	27	90
FXC-SW 1227.5 18/36	122	21	-	82	128	22	7.7	5.2	-	1,227.5	1,281.5	1,201.5	27	90
FXC-SW 1425.5 18/36	122	21	-	82	128	22	7.7	5.2	-	1,425.5	1,479.5	1,399.5	27	90
FXC-SVKW 435.5 18/36	122	21	-	82	128	22	7.7	5.2	-	435.5	462.5	409.5	27	90
FXC-SVKW 633.5 18/36	122	21	-	82	128	22	7.7	5.2	-	633.5	660.5	607.5	27	90
FXC-SVKW 831.5 18/36	122	21	-	82	128	22	7.7	5.2	-	831.5	858.5	805.5	27	90
FXC-SVKW 1227.5 18/36	122	21	-	82	128	22	7.7	5.2	-	1,227.5	1,281.5	1,201.5	27	90
FXC-SVKW 1425.5 18/36	122	21	-	82	128	22	7.7	5.2	-	1,425.5	1,479.5	1,399.5	27	90
FMC-SW 435.5 18/36**	122	21	3/4"-F	59	128	22	7.7	5.2	-	435.5	471.5	409.5	-	90
FMC-SW 633.5 18/36	122	21	32	59	128	22	7.7	5.2	36	633.5	633.5	607.5	-	90
FMC-SW 831.5 18/36	122	21	60	59	128	22	7.7	5.2	73	831.5	831.5	805.5	103	90
FMC-SW 1227.5 18/36	122	21	60	59	128	22	7.7	5.2	73	1,227.5	1,227.5	1,201.5	103	90
FMC-SW 1425.5 18/36	122	21	60	59	128	22	7.7	5.2	73	1,425.5	1,425.5	1,399.5	103	90
FMC-SVKW 435.5 18/36**	122	21	3/4"-F	59	128	22	7.7	5.2	-	435.5	471.5	409.5	-	90
FMC-SVKW 633.5 18/36	122	21	32	59	128	22	7.7	5.2	36	633.5	633.5	607.5	-	90
FMC-SVKW 831.5 18/36	122	21	60	59	128	22	7.7	5.2	73	831.5	831.5	805.5	103	90
FMC-SVKW 1227.5 18/36	122	21	60	59	128	22	7.7	5.2	73	1,227.5	1,227.5	1,201.5	103	90
FMC-SVKW 1425.5 18/36	122	21	60	59	128	22	7.7	5.2	73	1,425.5	1,425.5	1,399.5	103	90

*Other foam heights and foam types on request
**With side connection piece
Note: Type FXC requires compressed-air hose 8/6mm, type FMC requires vacuum hose (dimension D). Customer-specific gripper solutions on request.

Ordering Data for Large-Area Vacuum Gripping Systems FXC/FMC with Suction Pads

Ordering guide for FXC/FMC large-area vacuum gripping system with suction pads				
Abbreviated designation	**Valve technology**	**Length (x width) [mm]**	**Grid**	**Suction pads**
Example: FXC-SW 435.5 54 SBP1-30				
FXC	**SW**	**435.5**	**54**	**SPB1-30**
FXC	SW Flow resistance	435.5	36	FG20
FMC	SVKW Flow valve	831.5	54	SPB1-30 SPB1-40

Type	Part number without filter	Part number with filter
FX-SW 120x60 20 FG12	10.01.11.02009	-
FX-SW 120x60 20 FG12 SEA*	10.01.11.02008	-
FXC-SW 435.5 36 FG20	10.01.21.01819	10.01.21.02753
FXC-SW 435.5 54 SPB1-30	10.01.21.01814	10.01.21.02728
FXC-SW 435.5 54 SPB1-40	10.01.21.01669	10.01.21.02720
FXC-SW 633.5 36 FG20	10.01.21.01820	10.01.21.02754
FXC-SW 633.5 54 SPB1-30	10.01.21.01815	10.01.21.02729
FXC-SW 633.5 54 SPB1-40	10.01.21.01670	10.01.21.02721
FXC-SW 831.5 36 FG20	10.01.21.01821	10.01.21.02755
FXC-SW 831.5 54 SPB1-30	10.01.21.01816	10.01.21.02730
FXC-SW 831.5 54 SPB1-40	10.01.21.01811	10.01.21.02722
FXC-SW 1227.5 36 FG20	10.01.21.01822	10.01.21.02756
FXC-SW 1227.5 54 SPB1-30	10.01.21.01817	10.01.21.02731
FXC-SW 1227.5 54 SPB1-40	10.01.21.01812	10.01.21.02723
FXC-SVKW 435.5 36 FG20	10.01.21.01662	10.01.21.02761
FXC-SVKW 435.5 54 SPB1-30	10.01.21.01528	10.01.21.02740
FXC-SVKW 435.5 54 SPB1-40	10.01.21.01653	10.01.21.02736
FXC-SVKW 633.5 36 FG20	10.01.21.01664	10.01.21.02762
FXC-SVKW 633.5 54 SPB1-30	10.01.21.01634	10.01.21.02741
FXC-SVKW 633.5 54 SPB1-40	10.01.21.01658	10.01.21.02737
FXC-SVKW 831.5 36 FG20	10.01.21.01665	10.01.21.02763
FXC-SVKW 831.5 54 SPB1-30	10.01.21.01636	10.01.21.02742
FXC-SVKW 831.5 54 SPB1-40	10.01.21.01659	10.01.21.02738
FXC-SVKW 1227.5 36 FG20	10.01.21.01666	10.01.21.02764
FXC-SVKW 1227.5 54 SPB1-30	10.01.21.01642	10.01.21.02743
FXC-SVKW 1227.5 54 SPB1-40	10.01.21.01660	10.01.21.02739

Type	Part number without filter	Part number with filter
FM-SW 120x60 20 FG12	10.01.11.02010	-
FMC-SW 435.5 36 FG20	10.01.21.01836	10.01.21.02757
FMC-SW 435.5 54 SPB1-30	10.01.21.01830	10.01.21.02732
FMC-SW 435.5 54 SPB1-40	10.01.21.01824	10.01.21.02724
FMC-SW 633.5 36 FG20	10.01.21.01837	10.01.21.02758
FMC-SW 633.5 54 SPB1-30	10.01.21.01831	10.01.21.02733
FMC-SW 633.5 54 SPB1-40	10.01.21.01825	10.01.21.02725
FMC-SW 831.5 36 FG20	10.01.21.01838	10.01.21.02759
FMC-SW 831.5 54 SPB1-30	10.01.21.01832	10.01.21.02734
FMC-SW 831.5 54 SPB1-40	10.01.21.01826	10.01.21.02726
FMC-SW 1227.5 36 FG20	10.01.21.01840	10.01.21.02760
FMC-SW 1227.5 54 SPB1-30	10.01.21.01833	10.01.21.02735
FMC-SW 1227.5 54 SPB1-40	10.01.21.01827	10.01.21.02727
FMC-SVKW 435.5 36 FG20	10.01.21.01805	10.01.21.02765
FMC-SVKW 435.5 54 SPB1-30	10.01.21.01800	10.01.21.02748
FMC-SVKW 435.5 54 SPB1-40	10.01.21.01795	10.01.21.02744
FMC-SVKW 633.5 36 FG20	10.01.21.01806	10.01.21.02766
FMC-SVKW 633.5 54 SPB1-30	10.01.21.01801	10.01.21.02749
FMC-SVKW 633.5 54 SPB1-40	10.01.21.01796	10.01.21.02745
FMC-SVKW 831.5 36 FG20	10.01.21.01807	10.01.21.02767
FMC-SVKW 831.5 54 SPB1-30	10.01.21.01802	10.01.21.02750
FMC-SVKW 831.5 54 SPB1-40	10.01.21.01797	10.01.21.02746
FMC-SVKW 1227.5 36 FG20	10.01.21.01808	10.01.21.02768
FMC-SVKW 1227.5 54 SPB1-30	10.01.21.01803	10.01.21.02751
FMC-SVKW 1227.5 54 SPB1-40	10.01.21.01798	10.01.21.02747

*Large-area gripping system blow-off function for fast releasing of workpieces
Note: Type FXC 1227.5 has a second slide-in ejector.

Ordering Data for Suction Pads

Type	Part number without filter	Part number with filter
FG12*	10.01.06.00558	-
FG20 (plug-in suction pads)	10.01.06.01562	10.01.06.02536
FG20	10.01.06.00059	10.01.06.02608
SPB1-30	10.01.06.02454	10.01.21.03708
SPB1-40	10.01.06.02455	10.01.21.03715

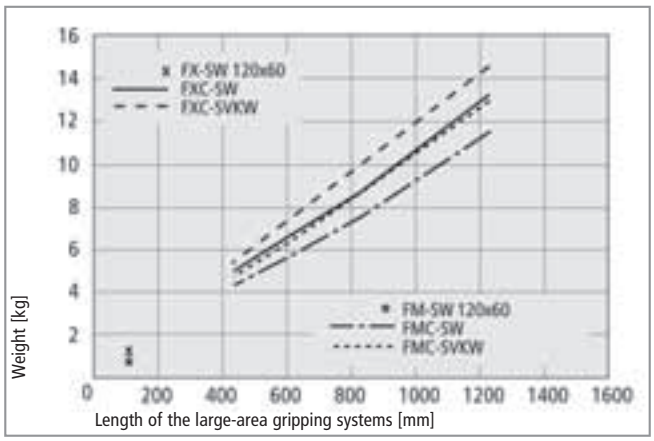
*For Type FX/FM
Note: Other types of suction pads (design, material) on request.

Ordering Data for Accessories

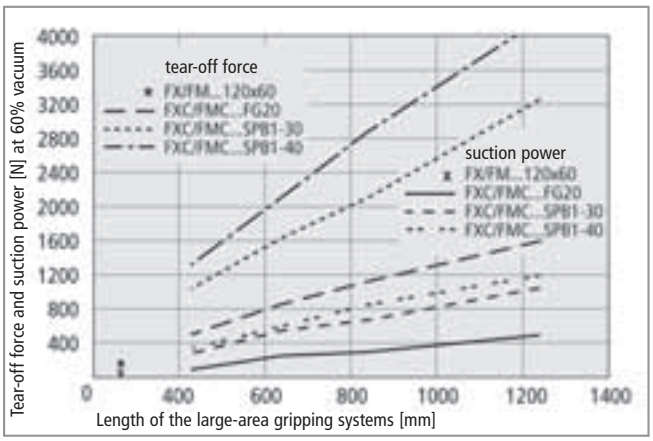
Type	Part number
Vacuum switch VS-V-D PNP	10.06.02.00343
Vacuum switch VS-V-D PNP with flange plate	10.01.10.00431
Solenoid valve kit suction on/off	10.01.21.00241
Solenoid valve kit blow-off on/off	10.01.21.02405
Solenoid valve kit suction on/off and blow-off on/off	10.01.21.00242
Attachment kit T-slot nuts	10.01.21.00243
Attachment kit robot flange	10.01.21.00244
Attachment kit spring-mounted suspension	10.01.21.02407

Note: it is possible use an additional silencer to reduce noise (FX 120x60).

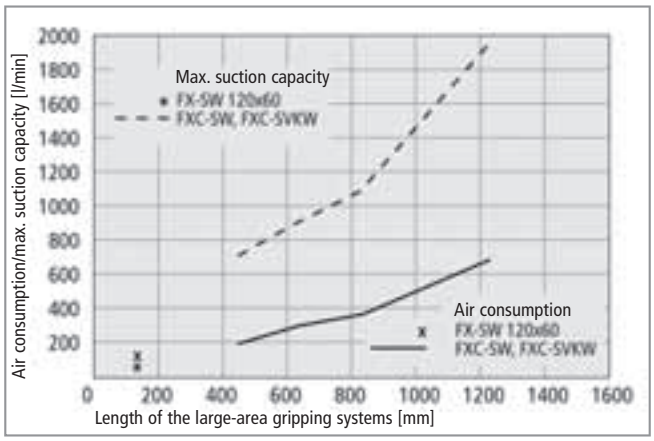
Technical Data of Large-Area Vacuum Gripping Systems FXC/FMC with Suction Pads



Weight of the large-area vacuum gripping systems (Types FXC-SW and FMC-SW with suction pads FG20 are lighter)



Tear-off force and suction power [N] at 60% vacuum and full coverage of the large-area vacuum gripping systems holding a rigid workpiece

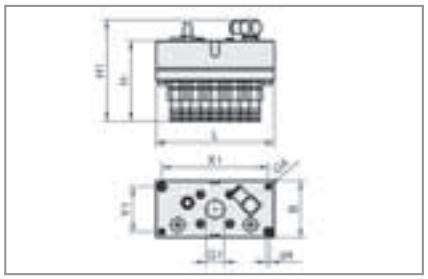


Air consumption and suction capacity of the large-area vacuum gripping system FX/FXC (FM/FMC can not be represented due to the external vacuum generator)

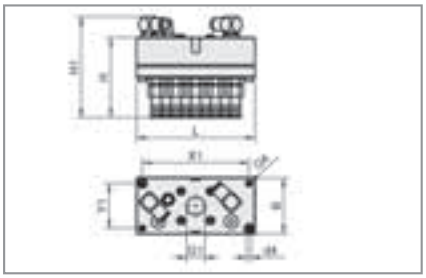
Type	Noise level [db (A)]	Max. evacuation level [%]
FXC	65	80
FMC	-*	-*

*FMC can not be represented due to the external vacuum generation

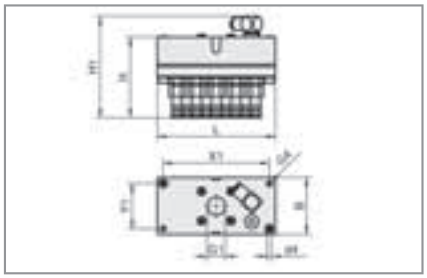
Construction Data of the Large-Area Vacuum Gripping Systems FX/FM with Suction Pads



FX-SG 120x60



FX-SG 120x60 SEA



FM-SG 120x60

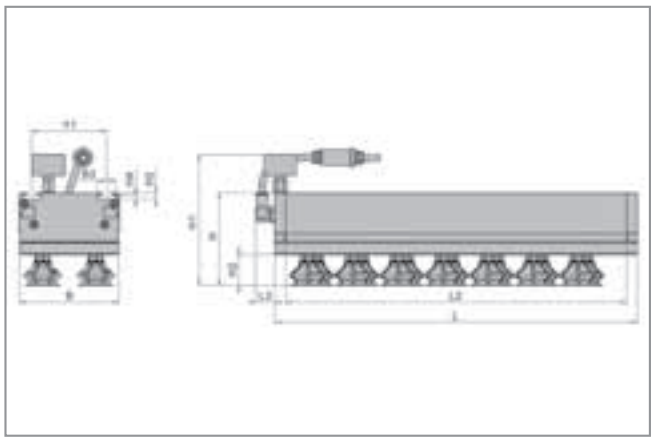
Type	Dimensions [mm]									
	B	d4	G1	G4	H*	H1	L	X1	Y1	N***
FX-SW 120x60 20 FG12	60	4.5	G1/2"-F	M6-F	82	103	120	108	46	14
FX-SW 120x60 20 FG12 SEA**	60	4.5	G1/2"-F	M6-F	82	103	120	108	46	14
FM-SW 120x60 20 FG12	60	4.5	G1/2"-F	M6-F	82	103	120	108	46	14

*Other types of suction pads (design, material) on request
**Gripping systems with integrated blow-off piston for quick lowering of the workpiece
***Number of suction pads
Note: Type FX requires compressed-air hose 8/6mm, type FM requires vacuum hose 8/6mm.

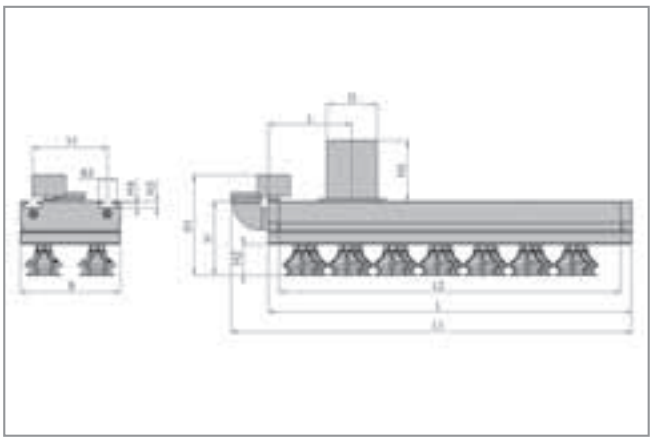
Large-Area Gripping Systems FXC/FMC

Product Specifications

Construction Data of the Large-Area Vacuum Gripping Systems FXC/FMC with Suction Pads



FXC



FMC

Typ	Dimensions [mm]														
	B	B3	D	H	H1	H2*	H3	H4	H5	L	L1	L2	L3	Y1	N***
FXC-SW 435.5 36 FG20	122	21	-	86	132	24	7.7	5.2	-	435.5	-	409.5	23	90	44
FXC-SVKW 435.5 36 FG20	120	21	-	104	150	30	7.7	5.2	-	435.5	-	409.5	23	90	44
FXC-SW/SVKW 435.5 54 SPB1-30	120	21	-	104	147	29	7.7	5.2	-	435.5	-	409.5	23	90	30
FXC-SW/SVKW 435.5 54 SPB1-40	120	21	-	112	158	37	7.7	5.2	-	435.5	-	409.5	23	90	14
FXC-SW 633.5 36 FG20	122	21	-	86	132	24	7.7	5.2	-	633.5	-	607.5	23	90	64
FXC-SVKW 633.5 36 FG20	120	21	-	104	150	30	7.7	5.2	-	633.5	-	607.5	23	90	64
FXC-SW/SVKW 633.5 54 SPB1-30	120	21	-	104	147	29	7.7	5.2	-	633.5	-	607.5	23	90	44
FXC-SW/SVKW 633.5 54 SPB1-40	120	21	-	112	158	37	7.7	5.2	-	633.5	-	607.5	23	90	22
FXC-SW 831.5 36 FG20	122	21	-	86	132	24	7.7	5.2	-	831.5	-	805.5	23	90	88
FXC-SVKW 831.5 36 FG20	120	21	-	104	150	30	7.7	5.2	-	831.5	-	805.5	23	90	88
FXC-SW/SVKW 831.5 54 SPB1-30	120	21	-	104	147	29	7.7	5.2	-	831.5	-	805.5	23	90	60
FXC-SW/SVKW 831.5 54 SPB1-40	120	21	-	112	158	37	7.7	5.2	-	831.5	-	805.5	23	90	30
FXC-SW-1227.5 36 FG20	122	21	-	86	132	24	7.7	5.2	-	1,227.5	-	1,201.5	23	90	132
FXC-SVKW 1227.5 36 FG20	120	21	-	104	150	30	7.7	5.2	-	1,227.5	-	1,201.5	23	90	132
FXC-SW/SVKW 1227.5 54 SPB1-30	120	21	-	104	147	29	7.7	5.2	-	1,227.5	-	1,201.5	23	90	88
FXC-SW/SVKW 1227.5 54 SPB1-40	120	21	-	112	158	37	7.7	5.2	-	1,227.5	-	1,201.5	23	90	44
FMC-SW 435.5 36 FG20**	122	21	3/4"-F	63	109	24	7.7	5.2	-	435.5	479.5	409.5	-	90	44
FMC-SVKW 435.5 36 FG20**	120	21	3/4"-F	81	127	30	7.7	5.2	-	435.5	479.5	409.5	-	90	44
FMC-SW/SVKW 435.5 54 SPB1-30**	120	21	3/4"-F	81	124	29	7.7	5.2	-	435.5	479.5	409.5	-	90	30
FMC-SW/SVKW 435.5 54 SPB1-40**	120	21	3/4"-F	89	135	37	7.7	5.2	-	435.5	479.5	409.5	-	90	14
FMC-SW 633.5 36 FG20	122	21	G 1 1/4"-M	63	109	24	7.7	5.2	35	633.5	633.5	607.5	103	90	64
FMC-SVKW 633.5 36 FG20	120	21	G 1 1/4"-M	81	127	30	7.7	5.2	35	633.5	633.5	607.5	103	90	64
FMC-SW/SVKW 633.5 54 SPB1-30	120	21	G 1 1/4"-M	81	124	29	7.7	5.2	35	633.5	633.5	607.5	103	90	44
FMC-SW/SVKW 633.5 54 SPB1-40	120	21	G 1 1/4"-M	89	135	37	7.7	5.2	35	633.5	633.5	607.5	103	90	22
FMC-SW 831.5 36 FG20	122	21	60	63	109	24	7.7	5.2	73	831.5	831.5	805.5	103	90	88
FMC-SVKW 831.5 36 FG20	120	21	60	81	127	30	7.7	5.2	73	831.5	831.5	805.5	103	90	88
FMC-SW/SVKW 831.5 54 SPB1-30	120	21	60	81	124	29	7.7	5.2	73	831.5	831.5	805.5	103	90	60
FMC-SW/SVKW 831.5 54 SPB1-40	120	21	60	89	135	37	7.7	5.2	73	831.5	831.5	805.5	103	90	30
FMC-SW 1227.5 36 FG20	122	21	60	63	109	24	7.7	5.2	73	1,227.5	1,227.5	1,201.5	103	90	132
FMC-SVKW 1227.5 36 FG20	120	21	60	81	127	30	7.7	5.2	73	1,227.5	1,227.5	1,201.5	103	90	132
FMC-SW/SVKW 1227.5 54 SPB1-30	120	21	60	81	124	29	7.7	5.2	73	1,227.5	1,227.5	1,201.5	103	90	88
FMC-SW/SVKW 1227.5 54 SPB1-40	120	21	60	89	135	37	7.7	5.2	73	1,227.5	1,227.5	1,201.5	103	90	44

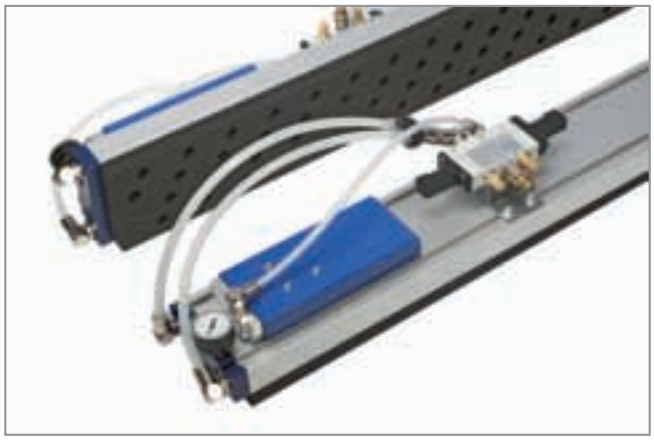
*Other types of suction pads (design, material) on request
**With side connection piece
***Number of suction pads
Note: Type FXC requires compressed-air hose 8/6 mm, type FMC requires vacuum hose (dimension, D). Customer-specific gripper solutions on request.

Large-Area Gripping Systems FXC-HD/FMC-HD

Heavy-Duty – Robust, Fast, Energy Efficient

Supplementary product features for FXC/FMC – HD version

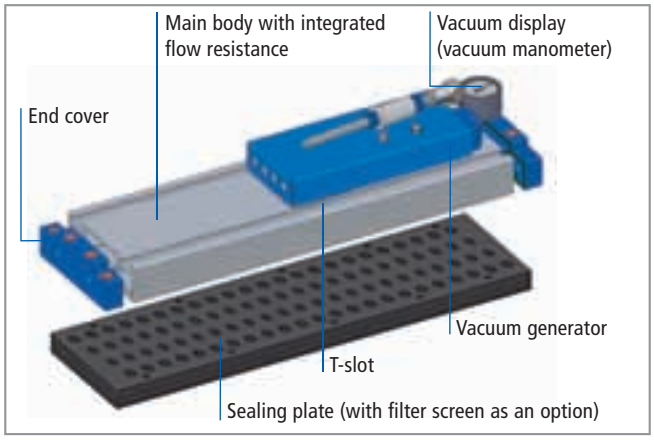
- Reduced energy consumption using optimized technology
- High level of stability using 3 chamber solid profile
- Faster cycle times using lower inner volume
- High degree of durability using a very stable main body



Large-area vacuum gripping system FXC-HD

Applications

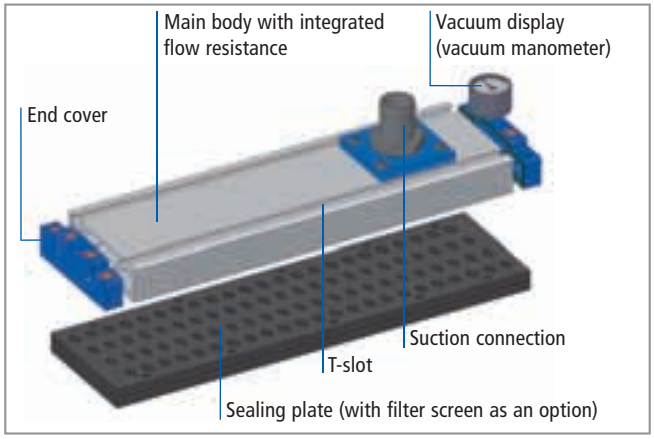
- Handling workpieces with a wide range of dimensions and/or undefined positions
- Handling workpieces with gaps
- Automated palletizing/depalletizing, order picking and sorting of a wide range of workpieces with only one type of gripper
- Handling workpieces made from various materials such as cardboard, wood, metal, glass or plastic



Large-area vacuum gripping system FXC-HD with vacuum generator directly mounted

Design

- Large-area vacuum gripping system FXC-HD with vacuum generator directly mounted
- Large-area vacuum gripping system FMC-HD with connection for external vacuum generation
- Increased operating pressure of 6 bar
- Separate suction and blow-off chamber ensure faster handling
- Various formats can adapt to a wide range of handling tasks



Large-area vacuum gripping system FMC-HD with connection for external vacuum generation

Our Highlights

- Extra robust
- Optimized interior volume
- Separate suction and blow-off chamber (air for suction and blow-off flows through separate flow resistances)

Your Benefits

> Fast lowering and high blow-off pressure

> Minimal suction and releasing times ensure savings in energy costs

> Faster releasing with reduced energy consumption

Large-Area Gripping Systems FXC-HD/FMC-HD

Product Specifications

Ordering Data for Large-Area Vacuum Gripping Systems FXC-HD/FMC-HD

Ordering guide for large-area vacuum gripping systems FXC-HD/FMC-HD				
Abbreviated designation	**Valve technology**	**Type**	**Length [mm]**	**Hole spacing**
Example: FXC-SW HD 435 18				
FXC	**SW**	**HD**	**435**	**18**
FXC	SW Flow resistance	HD Heavy Duty	435	18 fine
FMC			633	36 medium

Type	Part number without filter	Part number with filter
FXC-SW-HD 435 18	10.01.21.02637	10.01.21.02396
FXC-SW-HD 435 36	10.01.21.02638	10.01.21.02639
FXC-SW-HD 633 18	10.01.21.02640	10.01.21.02641
FXC-SW-HD 633 36	10.01.21.02642	10.01.21.02643
FXC-SW-HD 831 18	10.01.21.02644	10.01.21.02645
FXC-SW-HD 831 36	10.01.21.02646	10.01.21.02647
FXC-SW-HD 1227 18	10.01.21.02648	10.01.21.02649
FXC-SW-HD 1227 36	10.01.21.02650	10.01.21.02651
FXC-SW-HD 1425 18	10.01.21.02652	10.01.21.02653
FXC-SW-HD 1425 36	10.01.21.02654	10.01.21.02655

Type	Part number without filter	Part number with filter
FMC-SW-HD 435 18	10.01.21.02656	10.01.21.02657
FMC-SW-HD 435 36	10.01.21.02658	10.01.21.02659
FMC-SW-HD 633 18	10.01.21.02660	10.01.21.02661
FMC-SW-HD 633 36	10.01.21.02662	10.01.21.02663
FMC-SW-HD 831 18	10.01.21.02664	10.01.21.02665
FMC-SW-HD 831 36	10.01.21.02666	10.01.21.02667
FMC-SW-HD 1227 18	10.01.21.02668	10.01.21.02669
FMC-SW-HD 1227 36	10.01.21.02670	10.01.21.02671
FMC-SW-HD 1425 18	10.01.21.02672	10.01.21.02673
FMC-SW-HD 1425 36	10.01.21.02674	10.01.21.02675

Ordering Data for Sealing Plates

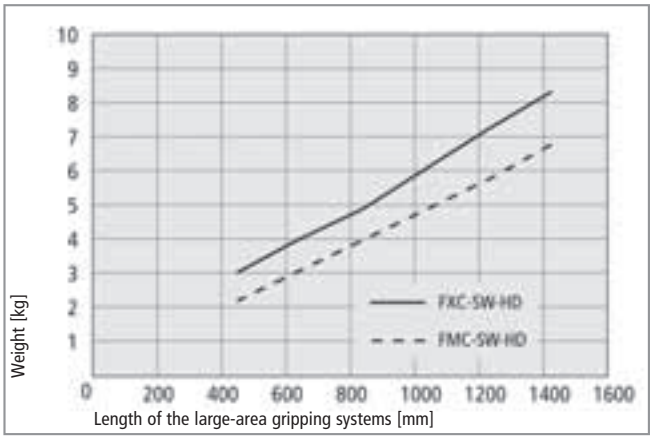
Type sealing plate FXC-HD/FMC-HD*	Part number without filter	Part number with filter
DI-PL 399x120 18	10.01.21.02687	10.01.21.02677
DI-PL 399x120 36	10.01.21.02688	10.01.21.02678
DI-PL 597x120 18	10.01.21.02689	10.01.21.02679
DI-PL 597x120 36	10.01.21.02690	10.01.21.02680
DI-PL 795x120 18	10.01.21.02691	10.01.21.02681
DI-PL 795x120 36	10.01.21.02692	10.01.21.02682
DI-PL 1191x120 18	10.01.21.02693	10.01.21.02683
DI-PL 1191x120 36	10.01.21.02694	10.01.21.02684
DI-PL 1389x120 18	10.01.21.02695	10.01.21.02685
DI-PL 1389x120 36	10.01.21.02696	10.01.21.02686

*Shortened sealing plate

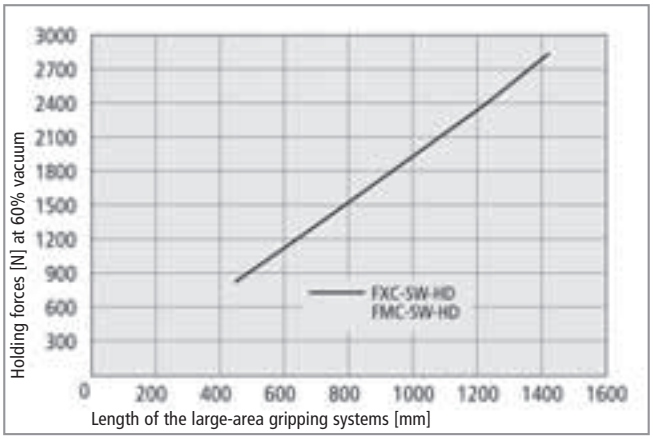
Ordering Data for Accessories

Type	Part number
Vacuum switch VS-V-D PNP	10.06.02.00343
Vacuum switch VS-V-D PNP with flange plate	10.01.10.00431
Solenoid valve kit suction on/off	10.01.21.00241
Solenoid valve kit blow-off on/off	10.01.21.04002
Solenoid valve kit suction on/off and blow-off on/off	10.01.21.04001
Attachment kit T-slot nuts	10.01.21.00243
Attachment kit robot flange	10.01.21.00244
Attachment kit spring-mounted suspension	10.01.21.02407

Technical Data for Large-Area Vacuum Gripping Systems FXC-HD/FMC-HD



Weight of the large-area vacuum gripping systems FXC-HD/FMC-HD

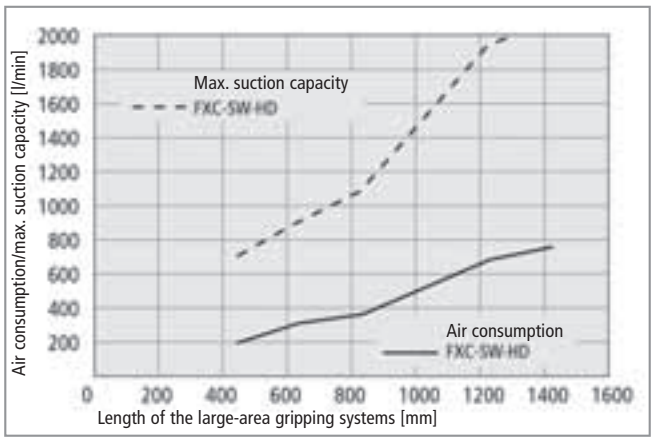


Holding forces [N] at 60% vacuum and full coverage of the large-area vacuum gripping systems FXC-HD/FMC-HD holding a rigid workpiece

Large-Area Gripping Systems FXC-HD/FMC-HD

Product Specifications

Technical Data for Large-Area Vacuum Gripping Systems FXC-HD/FMC-HD

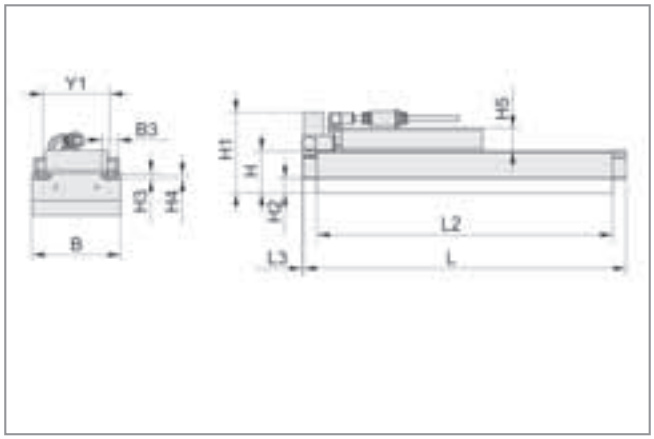


Air consumption and suction capacity of the large-area vacuum gripping system FXC-HD (FMC-HD can not be represented due to the external vacuum generator)

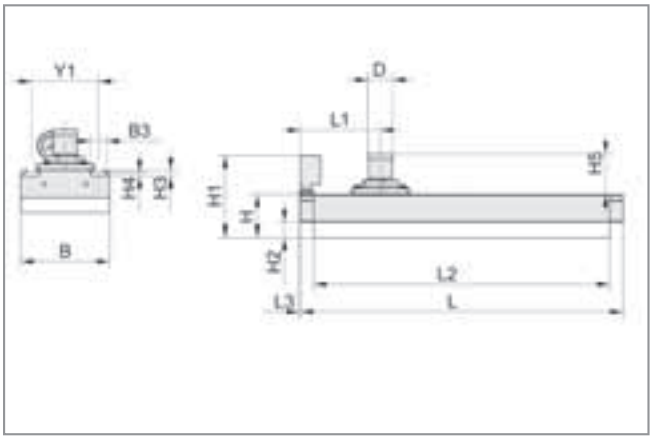
Type	Noise level [db (A)]	max. evacuation level [%]
FXC-HD	74	80
FMC-HD	-*	-*

*FMC-HD can not be represented due to the external vacuum generation

Construction Data for Large-Area Vacuum Gripping Systems FXC-HD/FMC-HD



FXC-HD



FMC-HD

Type	Dimensions [mm]													
	B	B3	D	H	H1	H2*	H3	H4	H5	L	L1	L2	L3	Y1
FXC-SW-HD 435 18/36	120	21	-	57	113	20	7.7	5.2	29	435.5	-	399.5	2	90
FXC-SW-HD 633 18/36	120	21	-	57	113	20	7.7	5.2	29	633.5	-	597.5	2	90
FXC-SW-HD 831 18/36	120	21	-	57	113	20	7.7	5.2	29	831.5	-	795.5	2	90
FXC-SW-HD 1227 18/36	120	21	-	57	113	20	7.7	5.2	29	1,227.5	-	1,191.5	2	90
FXC-SW-HD 1425 18/36	120	21	-	57	113	20	7.7	5.2	29	1,425.5	-	1,389.5	2	90
FMC-SW-HD 435 18/36	120	21	1¼"-M	57	113	20	7.7	5.2	36	435.5	103	399.5	2	90
FMC-SW-HD 633 18/36	120	21	1¼"-M	57	113	20	7.7	5.2	36	633.5	103	597.5	2	90
FMC-SW-HD 831 18/36	120	21	60	57	113	20	7.7	5.2	73	831.5	103	795.5	2	90
FMC-SW-HD 1227 18/36	120	21	60	57	113	20	7.7	5.2	73	1,227.5	103	1,191.5	2	90
FMC-SW-HD 1425 18/36	120	21	60	57	113	20	7.7	5.2	73	1,425.5	103	1,389.5	2	90

*Other foam heights and foam types on request

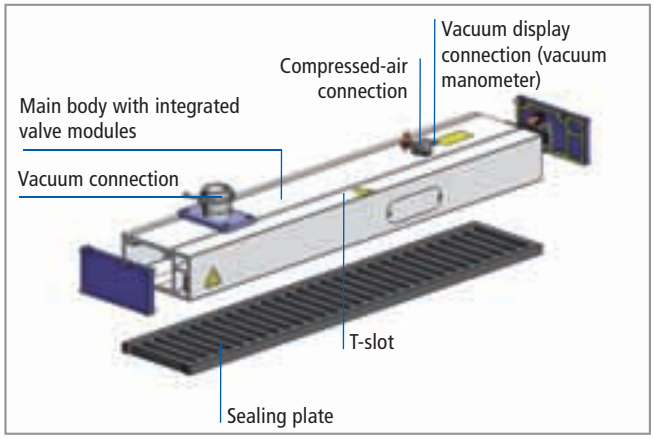
Large-Area Gripping Systems SBX

Powerful Handling with Maximum Flexibility

Large-area vacuum gripping system SBX for handling of wooden boards

Applications

- Handling (generally layers) of sawn timber, sheet materials, laminated beams, steel profiles, construction timber and pallets with heavily warped, rough surfaces
- The low weight and compact size make it ideal for operating with industrial robots and portals



Large-area vacuum gripping system SBX with connection for external vacuum generation

Design

- Patented large-area vacuum gripping system SBX as modular component system with integrated functions for the vacuum generation, the activation of the valve chamber and the release of workpieces
- Various vacuum generators (ejector, pump or blower) can be selected according to the application
- Variable length of the large-area vacuum gripping system SBX according to the application

Large-area vacuum gripping system SBX with connection for external vacuum generation

Our Highlights

- Integrated flow valves
- Modular design of gripper with various types of vacuum generation
- Design with integrated vacuum generation
- Can also be used as double beam
- High storage chamber vacuum pressure (energy density to -0.9 bar)

Your Benefits

> Suction openings that are not in use automatically close; extra strong holding force

> Flexible adjustment to the respective requirements

> Fast vacuum generation ensures minimization of cycle times

> Safe handling of long and heavy workpieces

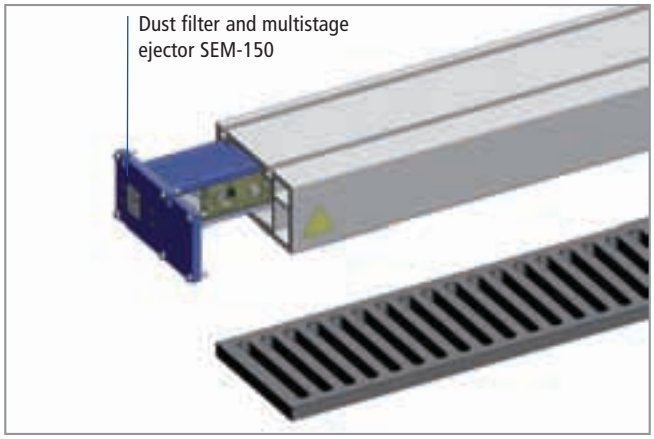
> Handling of uneven or warped workpieces

Large-Area Gripping Systems SBX

Product Specifications

SBX Types

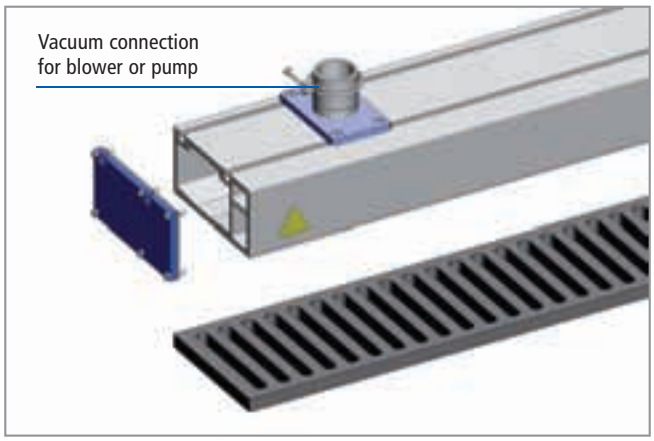
The large-area vacuum gripping system SBX is available in two designs that have different methods of vacuum generation (ejector or blower/pump). They are used especially in the wood industry.



Large-area vacuum gripping system SBX with integrated vacuum generator

SBX with integrated vacuum generator

- Design with integrated vacuum generator (multi-stage ejector SEM-150) and dust filter
- Minimization of cycle times
- Fast vacuum generation
- Hoses and connections are integrated in the large-area vacuum gripping system ensuring no interfering contours
- Simple installation by connecting only one cable as well as the compressed-air connection
- Ejector and dust filter can also be attached externally (optional)



Large-area vacuum gripping system SBX with connection for external vacuum generation

SBX with connection for external vacuum generation

- Design for operation with external vacuum generator (blower/pump)
- Simple maintenance work using external vacuum generation (blower/pump)
- Low operating costs using electrical vacuum generation
- Large volume flow for handling of heavily warped and porous workpieces

Ordering Data for Large-Area Vacuum Gripping Systems SBX

Ordering guide for large-area vacuum gripping system SBX

Abbreviated designation	Length x width [mm]	Hole spacing	Foam height [mm]	Vacuum generation
Example: SBX 1040x200 35 20 SEM-150				
SBX	**1,040x200**	**35**	**20**	**SEM-150**
SBX	1,040x200 1,040x400	35 medium	20	- blower/pump SEM-150 multi-stage ejector

Type	Part number
SBX 1040x200 35 20 SEM-150	10.01.20.00003
SBX 1250x200 35 20 SEM-150	10.01.20.00004
SBX 1040x200 35 20	10.01.20.00005
SBX 1250x200 35 20	10.01.20.00006
SBX 1040x400 35 20	10.01.20.00022
SBX 1250x400 35 20	10.01.20.00023

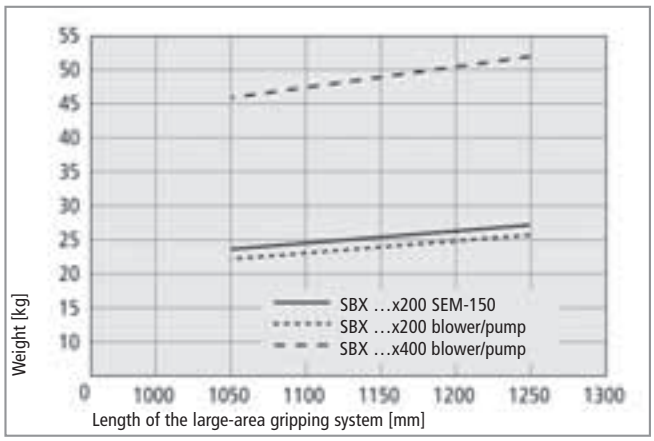
Ordering data sealing plate

Type	Part number
Di-PL 1250x200-020	10.01.20.00155
Di-PL 1250x400-020	10.01.20.00154

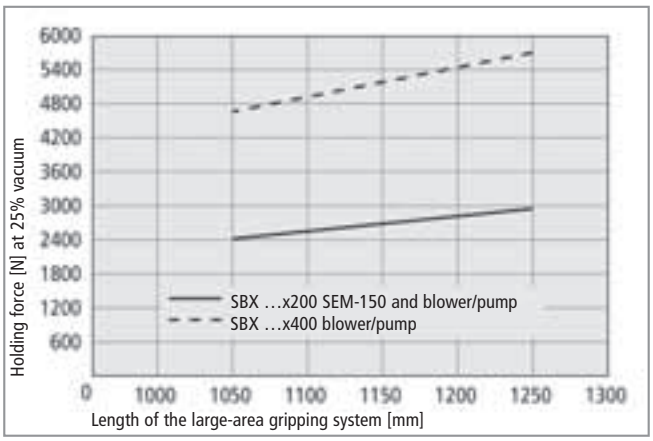
Large-Area Gripping Systems SBX

Product Specifications

Technical Data of Large-Area Vacuum Gripping Systems SBX



Weight of the large-area vacuum gripping system SBX

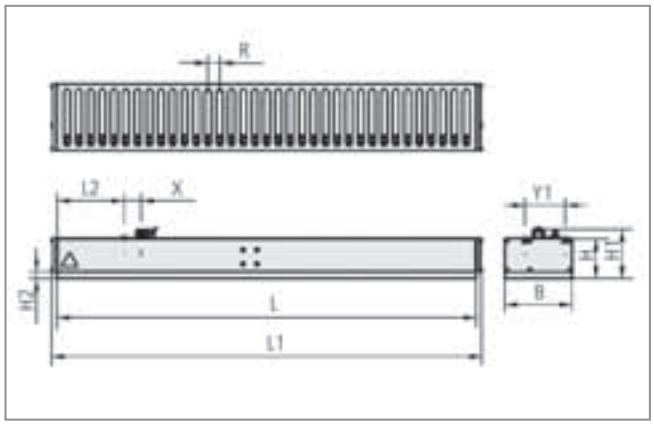


Holding force [N] at 25% vacuum of the large-area vacuum gripping system SBX

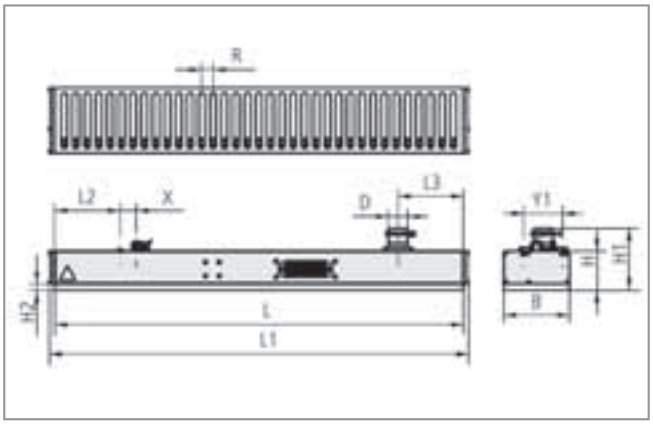
Type	Width [mm]	Vacuum generator	Noise level [db (A)]	Max. evacuation level [%]	Air consumption [l/min]	Max. suction capacity [l/min]
SBX	200	ejector	78	80	640	1,400
SBX	400	blower/pump	-*	-*	-*	-*
SBX	400	blower/pump	-*	-*	-*	-*

*Can not be represented due to external vacuum generation

Construction Data for Large-Area Vacuum Gripping Systems SBX



Large-area vacuum gripping system SBX with integrated vacuum generator



Large-area vacuum gripping system SBX with connection for external vacuum generation

Typ	Dimensions [mm]											
	L	L1	L2	L3	B	H*	H1	H2	D	R	X	Y1
SBX 1040x200 35 20 SEM-150	1,040	1,073	200	200	200	120	148.0	20	-	35	50	120
SBX 1250x200 35 20 SEM-150	1,250	1,283	200	200	200	120	148.0	20	-	35	50	120
SBX 1040x200 35 20	1,040	1,073	200	200	200	120	188.5	20	60	35	50	120
SBX 1250x200 35 20	1,250	1,283	200	200	200	120	188.5	20	60	35	50	120
SBX 1040x400 35 20	1,040	1,073	200	200	400	120	188.5	20	60	35	50	120
SBX 1250x400 35 20	1,250	1,283	200	200	400	120	188.5	20	60	35	50	120

*Other foam heights and foam types on request
Note: Type SBX requires compressed-air 15/9mm. Customer-specific gripper solutions on request.

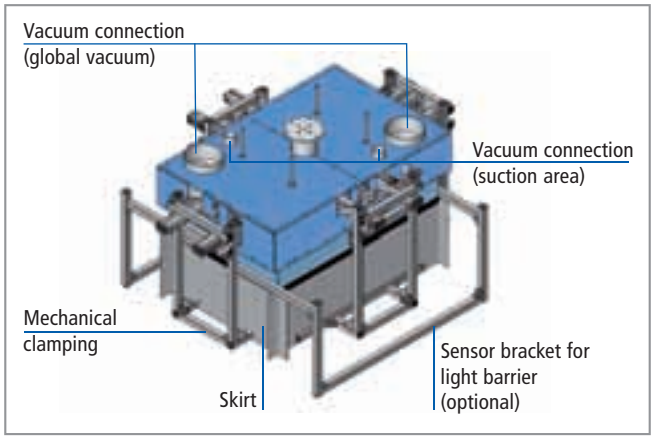
Layer Gripping Systems SPZ

Dynamic Palletizing and Depalletizing

Layer gripping system SPZ

Applications

- Palletizing/depalletizing of complete product layers
- Use in warehouse logistics and intralogistics
- A combination of vacuum technology and mechanical clamping is used for palletizing and depalletizing part-pallets
- Universal gripping system for handling intermediate layers, pallets, cardboard, boxes, film packaging, products in trays etc.



Layer gripping system SPZ-M-C with mechanical clamping and skirt

Design

- Vacuum layer gripping system with state-of-the-art valve and vacuum flow technology as well as modular gripper modules based on the tried and tested technology of the FXC/FMC series
- Options for mechanical gripping modules that can be controlled pneumatically or by an electric motor
- Modern construction optimized for weight and force according to FMEA (Failure Mode and Effect Analysis)
- Modular components for all conventional bus controllers
- Optional energy saving versions for all designs
- Vacuum connections (suction area and global vacuum chamber within the skirt) to generate the vacuum in both circuits

Layer gripping system SPZ-M-C with mechanical clamping and skirt

Our Highlights

- Layer gripping system for various product layer sizes and layer arrangements
- Suction area made of flexible special foam or alternatively of individual suction pads
- Modular structure
- Version for deep freeze sector

Your Benefits

> Palletizing and depalletizing of complete product layers (minimization of cycle time)

> Can be perfectly adapted to workpiece structure; no gripper replacement for heterogeneous workpieces required

> Can be adjusted to fit every application optimally

> Automated palletizing/depalletizing to -30°C

Layer Gripping Systems SPZ

Product Versions for Various Applications

SPZ Types

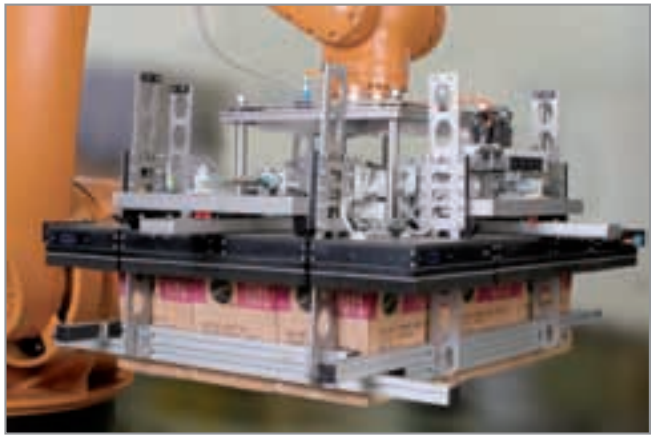
The layer gripping system SPZ is available in three designs. Each one combines different methods of gripping. There is a suitable solution for every application including handling with only vacuum, support with a mechanical clamping and an additional global vacuum chamber (including skirt). All designs can be configured for operation in the deep freeze sector to -30°C.

Layer gripping system SPZ without mechanical clamping

SPZ without mechanical clamping

The SPZ has modular, locked large-area vacuum grippers and is the basic design with which complete layers of a pallet are handled.

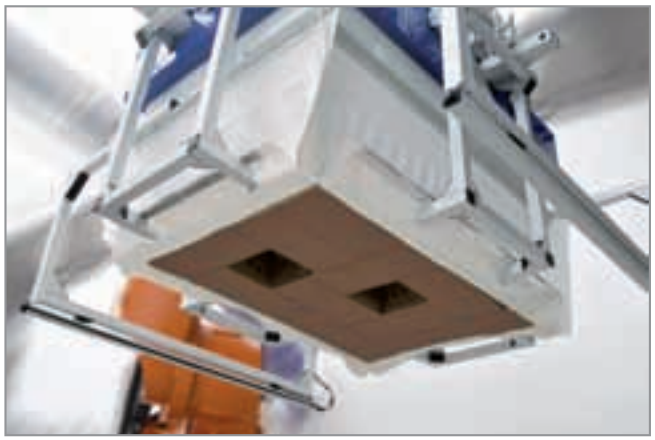
The picture shows a typical handling example with combifoam.



Layer gripping system SPZ with mechanical clamping

SPZ-M with mechanical clamping

Workpieces that are difficult to pick up with vacuum only due to their surface can be handled with the layer gripping system with mechanical clamping support, which provides additional force and stability.



Layer gripping system SPZ with mechanical clamping and skirt

SPZ-M-C with mechanical clamping and skirt

A global vacuum chamber is generated using the patented skirt concept. Together with the mechanical clamping, the layer gripping system SPZ-M-C also handles products that, until now, had to be transported manually or were much more difficult to handle automatically.

Optional with a mounting system for sensor technology.

Suction tests with original workpieces are always required to ensure functionality. We perform these in our test centre individually for your application.

Layer Gripping Systems SPZ

Product Specifications

Range of Applications and Workpieces

The innovative gripper principles of the layer gripping system SPZ allow automated handling of almost all product layers, intermediate layers and pallets. It is therefore ideal for use in the warehouse logistics and intralogistics sector. It enables:
- Careful handling of products
- High processing speed
- No gripper replacement and no set-up times changing applications

Products in unmixed layers for depalletizing/palletizing applications with SPZ-M and SPZ-M-C

Large range of products that can be handled

- Cardboard boxes, combipacks, bottles, cans, glass, foils, sacks, etc.
- Shrink wrapped goods (primary and secondary packaging)
- Packaged goods in trays (closed trays and trays open)
- Cooled and frozen goods
- Handling with and without intermediate layers
- Optional: intermediate layer separation

Special application areas

- Layering pattern with "chimneys" (gaps in the layering pattern)
- Products with removable and hinged lids
- Inhomogeneous products such as soft plastic bottles

Technical Data and Construction Data of Layer Gripping Systems SPZ

The data of the layer gripping system SPZ varies according to the respective configuration depending on the numerous types. The following table shows the most important features of the basic types of the layer gripping system SPZ.

Type	Gripping principles			Pallet size [mm]	Ambient temperature [°C]
	Vacuum suction area	Mechanical gripper	Global vacuum chamber incl. skirt		
SPZ	✓			Euro pallet (1,200 x 800)	Standard design:
SPZ-M	✓	✓		Industry pallet (1,200 x 1,000)	0 to +40 °C (ice free)
SPZ-M-C	✓*	✓	✓	US pallet (1,210 x 1,010)	Deep freeze design:
				Special sizes on request	up to -30 °C

* SPZ-M-C can be optionally equipped with a metal plate instead of the suction surface
The workpieces are then handled by using the mechanical clamping and the global vacuum chamber.

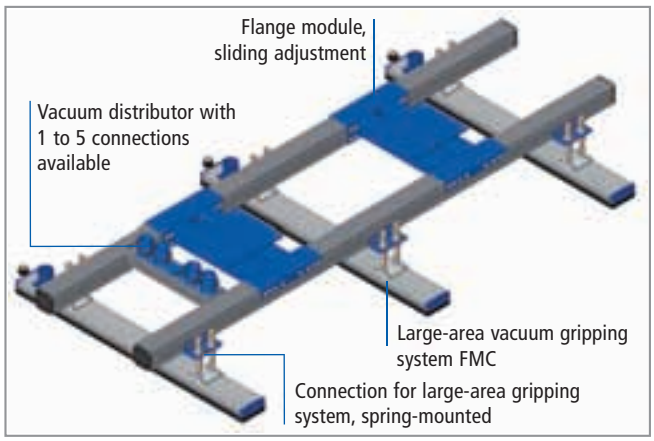
Vacuum Suction Spiders SSP

Complete Systems for Individual Applications

Vacuum suction spider SSP-FMC with large-area grippers

Applications

- Linking robots in presses and bending centers, automating plastic machines, injection-mould machines and deep drawing machines, working centers in wood/plastic sector, water jet machines, laser machines and punching/nipple machines
- Order picking in storage and distribution centers to portal or industrial robots
- Metal sections, blanks, stone, sheet materials, car body parts, glass and ceramic components, solar panels as well as non-rigid workpieces, etc.



Vacuum suction spider SSP-FMC with large-area vacuum gripping systems as basic design

Design

- The modular system enables optimal selection of suction pads, large-area vacuum gripping systems, magnets or mechanical grippers together with plungers, holders and profiles, valve modules with sensors
- Various vacuum generators (ejector, pump, blower) can be selected according to the application
- Options for quick adjustment or fixed setting, blank separation, workpiece request or collision protection
- Sealing elements in various designs of types FXC/FMC and SBX

Vacuum suction spider SSP with suction plates

Our Highlights

- Modular component gripping system consisting of various individual coordinated components
- Combination of various gripping principles (vacuum, mechanical, magnet etc.)
- Standard solutions made from aluminium, steel pipe elements and plastic elements
- Intelligent valve modules for unused suction pads

Your Benefits

> Fast and cost-effective structure of complete gripping systems for minimal cycle times and the highest degree of process safety

> Flexible adaptation to the relevant requirement saving time and high process costs

> Low weight and high acceleration using an optimum selection of materials

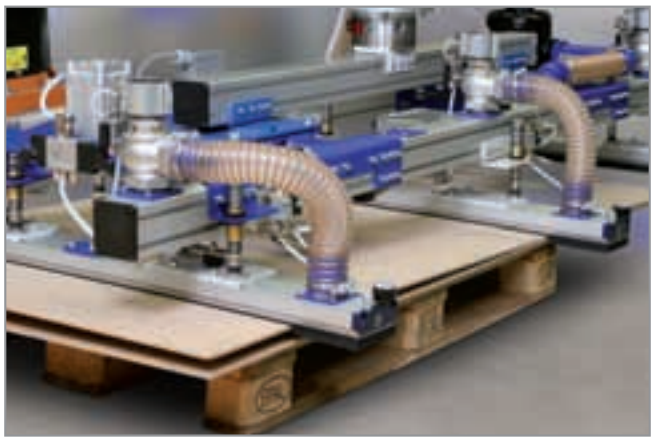
> Highly modern gripping technology saves time when removing the workpieces

Vacuum Suction Spiders SSP

Modular Configuration

SSP Types

Modular system of vacuum suction spiders SSP



Expanded design of the vacuum suction spider SSP-FMC, optimized for handling chipboards

The vacuum suction spider SSP was designed according to a modular principle. All versions of the vacuum suction spider are derived from the basic design. They can be flexibly optimized using various extensions for complex handling tasks.

Basic design

The large-area vacuum gripping system FMC is used as standard with a low height and an external vacuum generator – alternatively it can be fitted with the large-area vacuum gripping system FXC or SBX as well as suction pads.

Expansion options

The following expansion options are available for the vacuum suction spider based on the basic design:

- Separation functions of the FXC/FMC large-area vacuum gripper enable safe separation of porous workpieces
- Peeling unit enables separation of airtight workpieces
- Electrical terminal box with multi-pin connection plugs enables very quick installation
- Valve unit enables optimal adjustment of the blower output or suction capacity for the workpiece to be handled
- Sensor unit enables part recognition and optimization of cycle times

Customer-specific design of the vacuum suction spider SSP

Customer-specific design of the vacuum suction spider SSP for handling various large cardboard boxes

The vacuum suction spider SSP can be adjusted to the finest details for customer requirements regardless of the module. Almost all combinations of vacuum components such as vacuum suction pads, vacuum generators, connections and attachment elements can be used. The vacuum suction spider can be adapted perfectly to any application.

Overview of Section 11

Services

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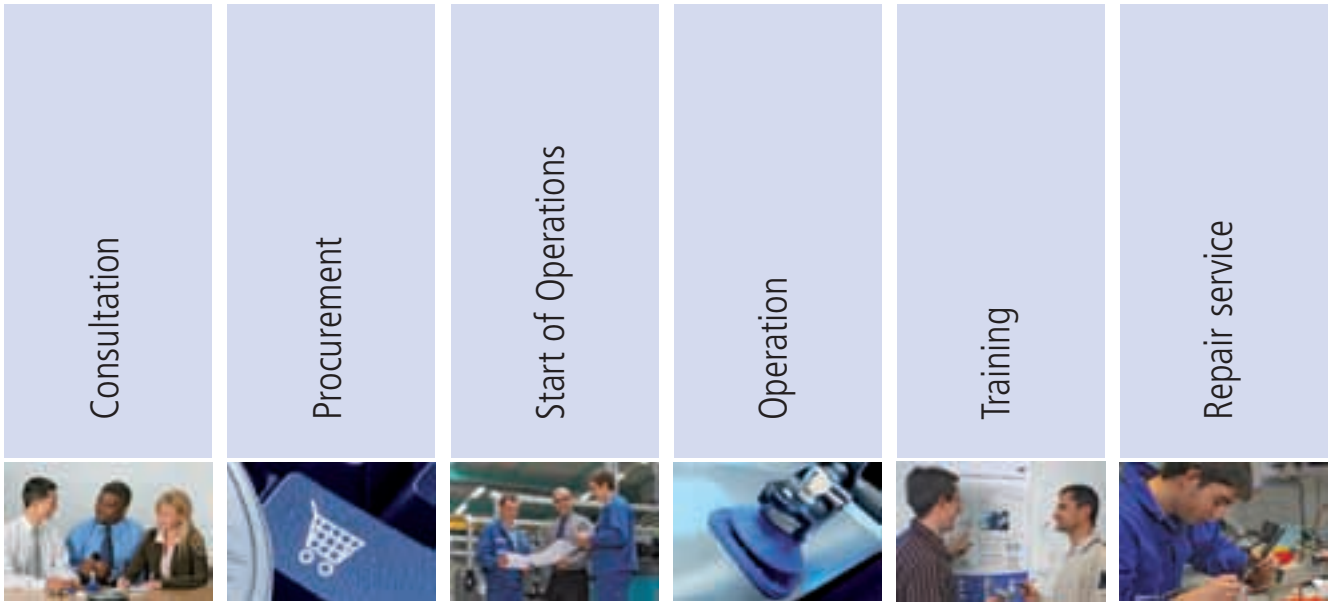
Services

Services for Your Vacuum System



Our expertise in providing systems together with years of experience in producing components gives you the real competitive advantage you need. Our highly qualified system consultants offer quality advice regarding all your vacuum system needs, from planning and design to installation, commissioning and beyond. Thanks to our forward thinking approach with a sharp focus on technological innovation and functional performance, Schmalz customers can count on an economical system design and efficient processes.

Consultation and Procurement

Schmalz offers an extremely broad range of standard components which stand out for their universal structure and can be implemented in a large number of applications. Schmalz also offers advanced technological components and complete systems that have been conceived and designed for special applications.

We would be pleased to advise you and work together to find the optimal solution for your application. You can count on professional project planning and the expert realization of your vacuum solution. Our experienced system consultants are available to answer any of your questions in person, allowing you to profit from our years of experience and in-depth technical knowledge.

Our online shop is available 24 hours a day at www.schmalz.com, where we also offer some great advantages: you can download CAD models in 2D and 3D for free, which can then be integrated directly into your CAD designs. Our availability check function allows you to confirm that your desired product is in stock at our main warehouse in Germany. You can therefore plan and place your order with maximum efficiency.

Warranty
Of course, our products are subject to the highest quality requirements, and that we guarantee their perfect condition and complete functionality. However, if a product still does not meet your expectations, we pledge to find a fast solution.

You can find detailed information about the warranty in our General Terms and Conditions.

Services

Services for Your Vacuum System

Commissioning and Operation

From the project planning stages until the day your product starts operation - we will be with you all the way. On request, our service technicians can also be at hand on-site when the products are delivered to commission the system for operation. Vacuum gripping systems are integrated into your production process on-site and together we initiate the start of operations. Our technicians can also install individual vacuum components such as pumps and blowers into your system.

Our experienced service technicians ensure that your vacuum system is operating with maximum efficiency by carrying out regular inspections and maintenance work. They can identify possible problem sources at an early stage and guarantee the highest degree of availability.

Our compact ejectors can be fitted with an integrated system monitor that ensures early error diagnosis. The compact ejector reports system errors either directly to the system control unit or visually via a warning light.

Detailed information about the recommended maintenance intervals can be found in the operating instructions delivered with the product.

www.schmalz.com/**operating-instructions**

Repair and Spare Part Procurement

Of course you can also contact us in case of an emergency; we provide a quick and straightforward service.

Removable products such as pumps, valves and other individual vacuum components are tested on the Schmalz premises. Once the source of the error has been identified, we will be in touch to discuss your options. A replacement vacuum ejector is provided in the interim period as part of our exchange service.

Products that cannot be removed such as vacuum gripping systems, other complete systems and individual components will be tested on-site at your premises. Our service technicians are fast and reliable in identifying and rectifying the source of the problem. You can purchase replacement parts extremely quickly via our online shop.

When returning products, we ask you to inform us in advance so that we can process your delivery with maximum speed and reliability.

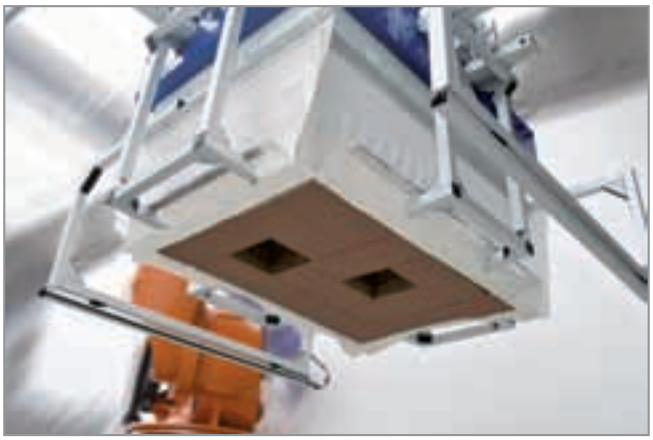
You can find our contact information in the chapter "Contact".

Services

Test Center – Functional Testing with Original Workpieces

We support you throughout the project planning and design of your vacuum system. You give us a task, and we perform it – quickly, competently and reliably. To do this, we design the complete system tailored to your individual requirements and build it from our range of vacuum components and gripping systems.

Functional Testing of Complete Systems
Part of the project planning for complete systems involves conducting trials with original workpieces. This ensures excellent performance and a high degree of safety. In order to carry out the tests under conditions that are as realistic as possible, Schmalz has its own test center at its headquarters in Glatten, Germany. Using original workpieces, our team at the test center is able to identify possible weak points immediately and determine suitable solutions. We are therefore able to guarantee that our systems operate smoothly and can be integrated into your processes with ease.



Endurance Testing
Our products are subject to endurance testing as part of their development. For example, suction pads are tested for wear resistance and chemical resistance to oils, and ejectors are tested for leaks and maximum performance capability.

Selecting Suitable Vacuum Components for the Packaging Industry

Modern production processes are placing increasingly higher demands on vacuum suction pads. This is especially true in the packaging industry, where specific demands are created by the need to handle extremely different materials such as cardboard boxes of various weights and sizes, blister packs and foils.

With the "Suction Pads for the Packaging Industry" test set, Schmalz enables you to waste no time in identifying and choosing the best suction pad for your particular application in the packaging industry.

The set contains every component you need for the suction test:
- More than 80 vacuum suction pads in various shapes and materials to cover almost all applications
- Three ejectors with differing suction capacities create the vacuum directly via a compressed air connection
- A vacuum gauge up to -1 bar, a polyurethane vacuum hose and a number of connection elements complete the test set

Ordering information

Type	Part number
Test Set Packaging	30.02.03.00226

Selecting Suitable Vacuum Components for Other Industries

We have also developed suitable test sets for other industries. Contact us to find out more and we will select the appropriate components for your tests from our product range.

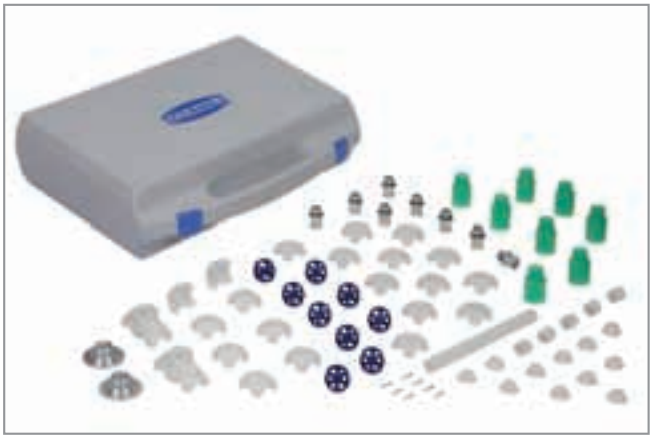
You can find our contact information in the "Contact" section.

Starter Set for Vacuum End Effectors

Until now, a custom-manufactured gripper for each format was used on packaging machines. Now, with Schmalz system modules, vacuum end effectors can be configured flexibly: the user can assemble end effectors from a range of different flanges, connection elements and suction pads, and these can then be quickly modified when required. To make designing the gripper even more straightforward, every element of the modular system can be downloaded as a CAD model from our website:
www.schmalz.com/**vee**

With the VEE starter set, you can instantly configure vacuum end effectors for the fastest possible packaging processes

Contents
- 120-piece starter set with all components for installing up to two VEE vacuum end effectors
- Eight SPB4-30 vacuum suction pads for bags and other non-rigid types of packaging
- Quick-change coupler with bayonet fastener
- Supplied in a sturdy plastic case with detailed assembly instructions



Ordering information

Type	Part number
VEE Starter Set	10.01.36.00030

Qualified, motivated employees with a high level of expertise and technical knowledge are vital for an innovative and competitive business. They form the basis for commercial success. Schmalz imparts knowledge – carefully tailored to meet the needs of your company's employees.

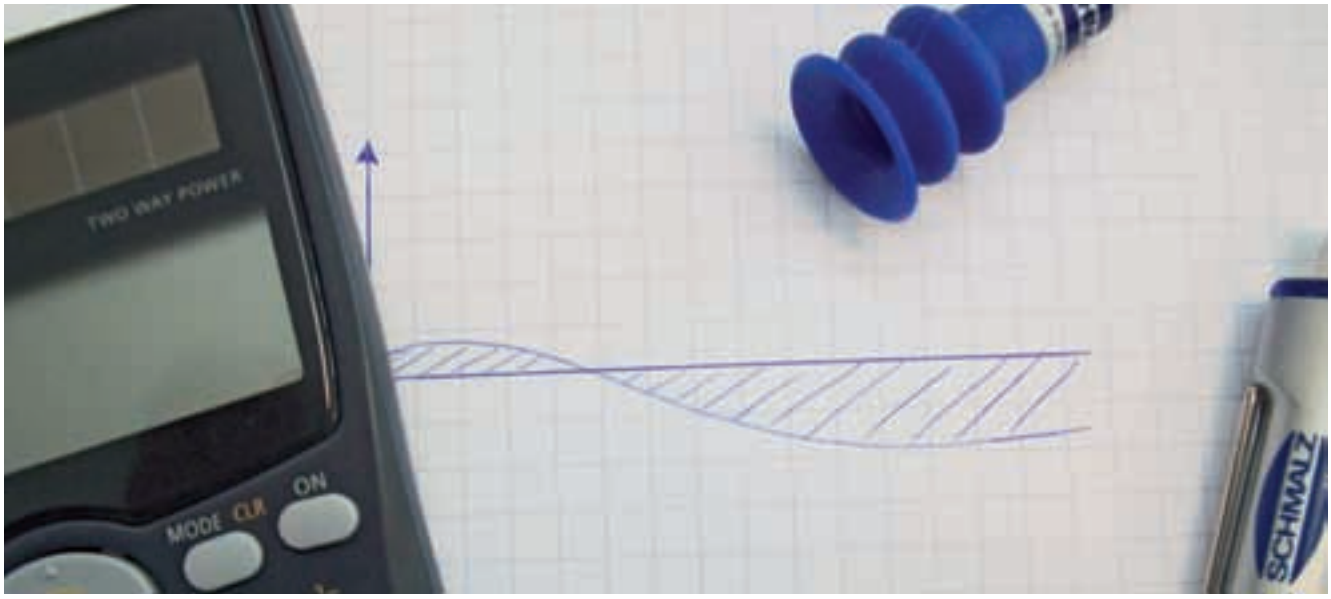
Training Courses and Seminars with a Vacuum Specialist

Schmalz has extensive knowledge about vacuum technology. The functions and application areas of vacuum components, how these can be used effectively in automation systems and the efficient design and conception of complex vacuum systems, are particular areas of expertise. This gives participants on Schmalz training courses the chance to benefit from years of knowledge and intensive individual support.

Get in touch with us; we would be happy to offer a seminar tailored to your requirements.

You can find our contact information in the chapter "Contact".

Schmalz Calculator



The Schmalz Calculator is a program by Schmalz which is free of charge. It permits easy and quick conversion of system variables and calculations for the layout of vacuum systems.

Numerous units and variables are clearly arranged in 14 primary groups on the Schmalz Calculator. These primary groups are located in the "Units Calculator". With just a few clicks, you can convert units here. For example, you can convert various units in the areas of flow rate, pressure, output, area, time, distance, energy, power, mass, etc. in no time at all.

Calculation of these general variables, however, is only one of the Schmalz Calculator's functions. When solving vacuum-specific calculations, the calculator turns out to be the real "expert".

The "vacuum calculator" provides you with information on:
- Evacuation time for pumps
- Suction capacity and area
- Suction force
- Suction capacity for pumps
- Hose diameter

Schmalz's expert knowledge of vacuum technology and its long-time experience in the area of systems layout also form the basis for this calculator's programming. Values for the vacuum sector can hardly be calculated faster and more confidently.

Additional highlights:
- Frequently used or needed start and target values can be assigned to the "user-defined" area.
- Custom-created entries are possible, i.e., the user can define a start and target value himself, assign a conversion factor, calculate using this value and/or delete the entries again.
- Decimal places can be set from 0 to 5.
- The Schmalz Calculator contains an integrated help.

Download the Schmalz Calculator free of charge and test it!

www.schmalz.com/**calculator**

Teaching and Learning Aids

Vacuum Training Set from Schmalz

The vacuum training set is an aid for training courses on the subject of vacuum technology in the field of automation. Designed to accompany lessons, it consists of a portable set of suitcases with various vacuum components for assembling sample applications. With the aid of a detailed exercise book, students are introduced to vacuum technology step by step and can work independently on self-contained lessons that build on each other.

The training set allows for practical learning – from the simple assembly of a vacuum system to a complex system solution that requires students to optimize the components selected.

Educational Poster "Operating principles and schematic symbols in vacuum technology"

Concise specialist knowledge is taught in the workplace directly: What is vacuum? How does a suction pad work? How does a blower work? What do the different schematic symbols mean? This DIN A1 Schmalz educational poster answers these questions and covers further principles of vacuum technology.

The educational poster is available in German and English.

Ordering information

Type	Part number
Training Set	10.02.02.03043
Educational Poster German	29.01.03.00546
Educational Poster English	29.01.03.00608

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Contact

Contact to the Vacuum Specialist

Website

Schmalz Products and Services
- Vacuum technology solutions for your industry
- Practical applications in detail
- Complete product range
- All technical details
- CAD model downloads
- Quick access to catalogues and operating instructions
- Information about accessories and spare parts
- Overview of Schmalz services

Your Personal Online Shop Account
- Check price and availability in real time
- Order center with all orders, including their status (even for fax and telephone orders)
- Online order tracking
- Place additional orders and order spare parts quickly and easily
- Security and data protection

Schmalz News and Vacuum Technology News
- Product news
- All about the Schmalz Group worldwide
- List of international trade fair appearances
- Vacuum technology newsletter
- International job listings

www.schmalz.com

Contact

Contact to the Vacuum Specialist

International Sales Network

Working together with our customers, Schmalz system consultants can design a tailored vacuum system for any individual application. Whether you are looking for a vacuum solution for automation technology, handling technology or clamping technology, Schmalz is the right partner for you. Our sales network of local field representatives, international subsidiaries and trade partners ensures quick and competent information and advice.

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You can find contact information for our trade partners in 50 other countries at **www.schmalz.com/salesnetwork**

Contact

Request for Quotation

Adressor

Company

Name

Department

Street

Post code/city

Phone

E-mail

Your project number/reference number

Delivery address (if different from return address)

Company

Name of recipient

Department

Street

Post code/city

Phone

E-mail

Customer no. (if known)

No.	Part designation	Part no.

Please send me a non-binding proposal

Date, Signature

Surname, First name

Company stamp

General Terms and Conditions of Sale and Delivery

Issue: January 2011

1. Scope of application

1. We shall perform our deliveries and services solely on the general terms and conditions of trade set out below. Other terms and conditions of the other party shall be valid only insofar as they are in accordance with our terms; otherwise they are hereby expressly opposed.
2. It is agreed that these general terms and conditions of trade also apply to future orders without having to make special reference to them again.
3. Differing or supplementary agreements are valid only if concluded in writing or confirmed by us in writing.

2. Quotations, prices

1. Unless expressly designated as binding, quotations in their entirety are given without engagement.
2. In the case of quotations designated as binding, a contract is only brought about if our quotation is accepted by the purchaser within two months from the quotation date. On expiry of this time we shall no longer be bound by the quotation.
3. Our prices are quoted exclusive of VAT at the current statutory rate. They are valid EXW Glatten (ICC-Incoterms® 2010) and therefore do not include packing, transport, postage and insurance or other dispatch costs. In the case of a net order value of less than EUR 50 we shall be entitled to charge a minimum quantity supplement of EUR 10 net.
4. We shall be entitled to adjust our quotation prices to take account of increased wage and material costs, including price increases by our suppliers, if the goods are delivered more than four months after conclusion of the contract and the cost increase occurred after conclusion of the contract.
5. Failing the conclusion of a contract the cost of samples made up at the purchaser's request and associated preliminary work shall be to the purchaser's account.
6. We reserve the copyright and right of title to all cost estimates, drawings and other tender documents. They may be made available to third parties only with our consent.

3. Deliveries, passing of risk

1. Partial deliveries are permissible and commit the purchaser to paying the pro rata payment unless it would be unreasonable for the purchaser to accept the partial delivery. Each partial delivery shall be deemed fulfilment of a separate order according to these terms and conditions.
2. Deliveries are made ex-works at the purchaser's expense. The risk in respect of the goods shall pass to the purchaser on leaving the loading platform at the manufacturer's works (FCA free carrier Glatten) or notification of readiness for dispatch (EXW ex works Glatten). This shall also apply to partial deliveries and instances in which we have undertaken to meet transport charges or haulage and assembly of the goods.
3. Equipment is delivered disassembled where the method of shipment and the transport risk so require.
4. Transport or other insurance will be arranged only if specifically requested by the purchaser and at the purchaser's expense.
5. In the event of delay in taking delivery, the storage charges we incur shall be to the purchaser's account. These will amount to a half of one per cent for each full week's delay, to a maximum however of 5 % of the net value of the delivery not taken. The purchaser has the right to prove lesser damage and we reserve the right to prove greater damage. We shall be entitled, after setting of a reasonable period and its expiry, to dispose of the delivery items elsewhere and to deliver to the purchaser with suitably extended terms.
6. In individual cases, we will accept the return of delivered goods within 3 months of delivery, providing the goods are standard products and are in "as new" condition. For the quality inspection of the returned goods and their return to stock, we will charge 20 % of the net value of the goods or € 20,00, whichever is greater.

4. Delivery periods and dates

1. Delivery periods quoted by us are not binding and only approximate unless transactions where time is of the essence are expressly stipulated in individual contracts. They only become binding once we have duly received all the documents, authorisations and approvals necessary for the execution of the order and agreed payments from our customer.
2. The delivery time shall commence at the earliest on receipt of our order acknowledgment by the purchaser. It shall be deemed met if the delivery items leave the loading platform at the manufacturer's works or notification of readiness for dispatch is sent within the time. Delivery period days shall be taken to mean working days.
3. In cases of force majeure or other circumstances beyond our control (e.g. official measures, strike, lock-out, operating stoppages, material procurement problems, transport disruptions, etc., including any affecting our suppliers) the delivery periods shall be extended appropriately, even if already confirmed. This shall also apply if the circumstances referred to above arise during an existing delay. If such circumstances make it impossible or unreasonable for us to perform, we shall be released from our obligation to perform. If the delay in delivery lasts longer than one month, both we and the purchaser shall be entitled to withdraw from the contract.

5. Payments

1. Payments shall be made net within ten days from date of invoice.
2. If satisfaction of our claim for payment is jeopardized by purchaser's bad financial circumstances occurring or coming to light after conclusion of the contract, we shall be entitled to demand cash on delivery or cash in advance, to retain goods not yet delivered and to cease further work on current orders and to withdraw from contracts already concluded with the purchaser unless the purchaser pays in advance or otherwise provides security.

6. Reservation of title

1. The goods supplied shall remain our property as reserved property pending satisfaction of all existing and future claims arising from the business relationship. This also applies if individual or all claims have been included in a current invoice and the balance has been struck and accepted. Acceptances, bills and cheques shall count as payment only after their irrevocable encashment.
2. The purchaser shall only be entitled to dispose of the goods in the normal course of business if the purchaser here and now assigns to us all claims against customers or third parties arising from the disposal. The purchaser is not entitled otherwise to dispose of the reserved property, in particular by pledging or assigning as security.
If the reserved property is disposed of unprocessed or after processing or mixing with items that are the purchaser's sole property, the purchaser here and now cedes the claims arising from disposal of the reserved property to us in full. If reserved property is disposed of by the purchaser – after processing/mixing – together with goods not belonging to us, the purchaser here and now cedes the claims arising from disposal in the amount of the value of the reserved property with all subsidiary rights and priority ahead of the others. We accept the assignment. Should a current account relationship exist between the purchaser and his buyer, assignment shall extend not only to the balance recognised according to article 355 of the Commercial Code but also to any excess amount arising from this current account relationship, which shall be due for payment immediately without statement and verification.
The purchaser shall be entitled to collect these claims, even after assignment, until revocation. Our authority to collect the claims ourselves is not affected; we undertake, however, not to collect the claims and not to revoke the purchaser's authority to collect provided the purchaser duly meets his payment and other obligations. We can require the purchaser to notify us of claims assigned and the debtors, give us all the information necessary for collection, surrender the relevant documents and advise the debtors of the assignment.
Any processing or working up of reserved property is undertaken by the purchaser on behalf of us as manufacturer without any obligations on our part thereby arising. In the case of processing, combination, mixing or blending of reserved property with other items not belonging to us, we shall have proportional co-ownership of the new article in proportion to the value of the reserved property to the other items processed on the date of processing, combination, mixing or blending. Should the purchaser acquire sole ownership of the new article, it is agreed that the purchaser shall grant us co-ownership of the new article in proportion to the value of the processed or combined, mixed or blended reserved property to the new article and shall keep it in safe custody for us at no charge.
3. The purchaser undertakes to dispose of the goods supplied by us only under the proviso that he reserves title to these goods until the purchase price has been paid in full, and agrees that if reservation of title is forfeited by virtue of disposal, combining, processing or blending, it be replaced by title to the new article or the claim arising therefrom.
4. In the event of default by the purchaser or a petition to institute insolvency proceedings in respect of the purchaser's assets we shall be entitled to demand the immediate restitution of the goods delivered subject to reservation of title. Taking back does not imply withdrawal from the contract. The deferred claims shall then become due for payment immediately. Deposited bills are to be redeemed contemporaneously against payment in cash, irrespective of their due date.
5. Should the value of the securities provided exceed the claims to be secured by more than 20 %, we undertake, at the insistence of the purchaser, to reassign those securities which exceed 120 % of the value of our receivables. The choice of which securities to release shall rest with us.
6. The purchaser undertakes to insure the reserved goods against each insurable loss. He shall assign to us in advance his claims arising out of the insurance contracts and shall produce proof of the concluding of the contracts to us on request.
7. The purchaser is to notify us without delay of attempts by third parties to seize goods belonging to us or substituted claims thereto, enclosing relevant documents.

7. Guarantee and liability

1. Any notices of defects and complaints of any nature must be made without delay on receipt of the delivery, article 377 of the Commercial Code. The rejected items are to be sent to us, carriage paid, after prior consultation.
2. The regular warranty period is 12 months starting from the delivery date.
3. In case of defects we shall have the right, at our discretion, to undertake repairs or to replace the defective parts. In the case of replacement we shall bear the cost of the replacement item including dispatch to the originally stipulated contractual place of delivery, but not the cost of dismantling and fitting or other expenses. If the purchaser requests that we ship to a different place or perform services on site, the purchaser shall meet the extra costs involved. Items replaced shall become our property. The guarantee period in respect of the replacement and remedial work is 3 months and is not less than the original guarantee period for the delivery item. Should repair or replacement prove impossible or fail at least twice or not be carried out by us despite setting an appropriate period of time to do so, the purchaser may demand a reduction in price, rescind the contract or claim damages, unless specified otherwise below. However, claims for damages presuppose that the purchaser can prove our fault.
4. No guarantee will be accepted for defects or damage occurring through no fault on our part due to unsuitable or inappropriate use, incorrect assembly or commissioning, excessive stressing, natural wear and tear, incorrect or negligent handling, unsuitable operating substances, chemical, electrochemical or electrical influences (unless these were provided for in the contract).
5. Liability for damages shall be excluded to the extent permitted by law. We shall not be liable for damage not attributable to malicious intent or gross negligence unless the fault relates to a cardinal duty and/or an owner or senior executive of this company. This exclusion of liability shall not include cases in which material defects or deficiencies in title due to negligent breach of duty result in death, bodily injury or health damage.
6. Our liability shall be limited to the net value of the goods in the delivery containing the defective item. It is limited to typically foreseeable damage.

8. Assembly

1. Where we are asked to carry out assembly as well as supply, assembly will be carried out on the basis of an independent contract for services separate from the supply.
2. Our special written assembly terms will apply to such a contract.

9. Miscellaneous provisions

1. The place of performance and venue is Freudenstadt
2. German law shall apply exclusively. The validity of the UN Convention on Contracts for the International Sale of Goods (CISG) of is expressly excluded.
3. Should any provisions of these terms and conditions be inoperative, this shall not affect the operative effect of the other provisions hereof. The inoperative provision shall be replaced by a provision such that the originally intended economic purpose is achieved as best possible.

Contact

Imprint

Vacuum Components
Catalog 2012/2013

Printed on: 09/2011

All contents and technical data were correct when the catalog went into print. Great care has been taken in the compilation of the catalog and all technical and other information was thoroughly checked. However, Schmalz accepts no liability for faulty or incomplete information, mistakes or printing errors.

Schmalz reserves the right to make changes for the sake of the further product development.

Schmalz shall not be held liable for size variation resulting from production and the materials used.

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All contractual relationships, orders and purchase agreements are subject to our general terms of sale and delivery. A current version of our sales and delivery agreement is available at www.schmalz.com.

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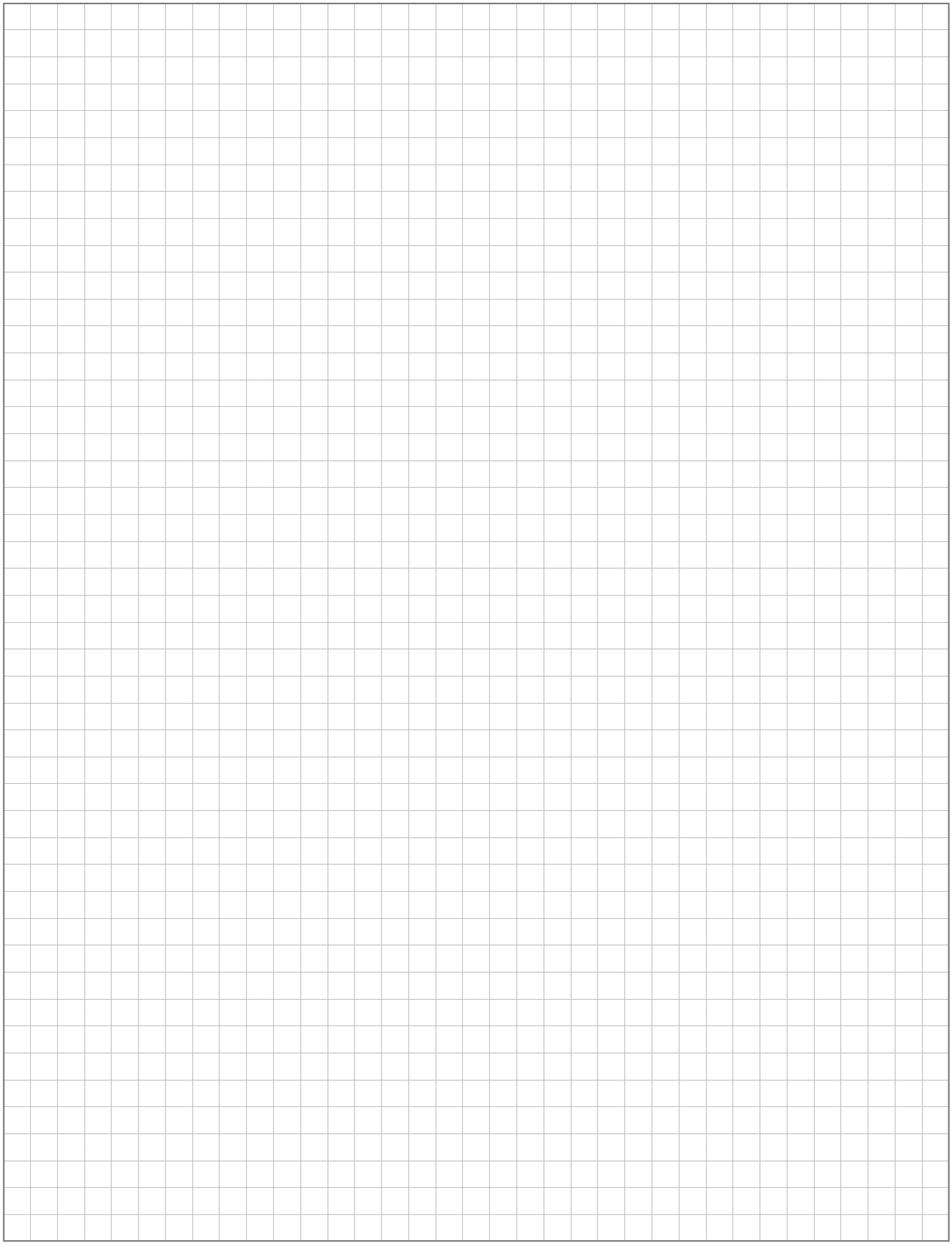

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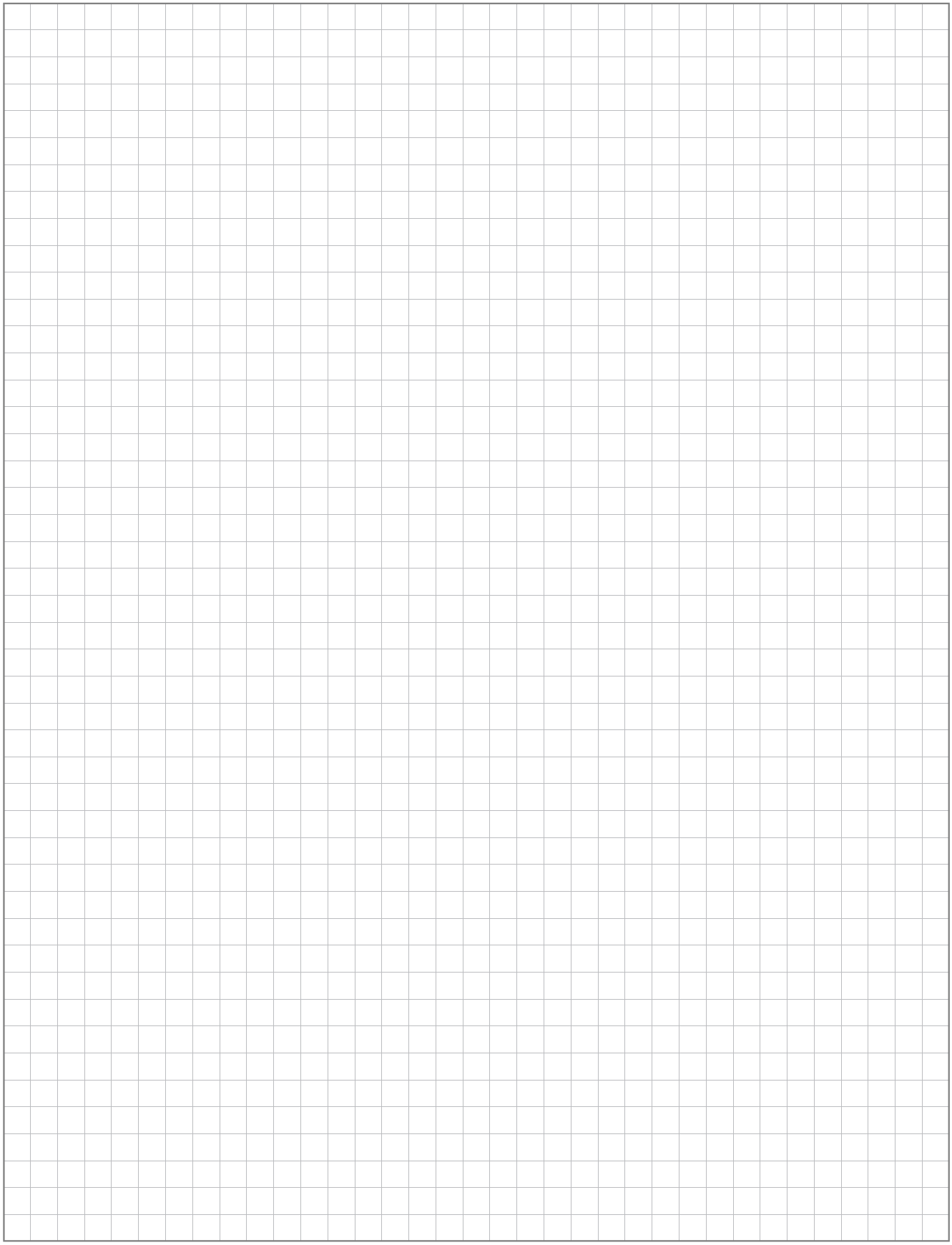

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