BSS
Fire protection systems

Systems and planning aids orientated to the protection aims for practical and approved mounting






OBO BETTERMANN

OBO. Used by professionals.

OBO understands what professionals need: perfect solutions for all aspects of an electrical installation. User-friendly, practical products for fast, uncomplicated installation. Add to this a comprehensive training programme and the OBO expert hotline for on-the-spot assistance at the construction site. OBO, the brand with the hot wire to the customer.

Systems

Conducting electricity, routing data, controlling energy – with a complete product range of over 30,000 articles OBO offers user-friendly products and practical solutions for a professional data and electrical infrastructure in electrical installations. And as anyone working with OBO quality products knows, one goes hand in glove with the other. On the one hand, we can provide a wide range of products; on the other hand, we can offer networked thinking – something absolutely natural to us as a systems manufacturer.

- Seamless and complete programme for all aspects of electrical installation
- Over 30,000 items in seven product units
- Ongoing product maintenance and further development
- Proprietary development and production facilities

Quality

Professionals demand quality. A quality offered by all OBO brand products and services:

- QA certification to DIN EN ISO 9001:2000
- Tested material and manufacturing quality
- Numerous national and international test seals and certificates: GS and VDE marks, UL approvals
- Active involvement in national and international standardisation bodies
- Perfect logistical solutions for packing and shipping applications
- All the products in this catalogue are CE-compliant. This also applies to standard parts such as bolts and nuts, which are components of the respective product system.

OBO BETTERMANN

Local

OBO Bettermann has subsidiaries, regional branches and agencies in over 50 countries. All these offices are there to ensure that OBO can always provide the fastest, best, most local help to its customers.

● = Branch ● = Agency

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Support & advice

At OBO, you can be sure of receiving help from expert employees: for individual solutions and application tips and with practical seminars in the OBO training centres and branch offices.

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Futuristic components for tomorrow's building technology

Building Technology by OBO®

Transient voltage and lightning protection systems
OBO offers an entire product range for reliable protection against lightning and surge damage.

Fire protection systems
Preventive fire protection is a crucial part of building safety. OBO can offer a complete product range for all application areas of fire protection systems.

Modern buildings are becoming increasingly complex. The requirements for energy and data infrastructure are growing. OBO systems provide the flexible, convenient solution to controlling and operating the diverse functions. Yet increasing complexity creates vulnerability. Our transient and lightning protection systems and fire protection systems offer effective protection for both buildings and the people inside them.

think orange.
think connected.

OBO BUS and plug-in devices
The OBO BUS system intelligently controls the diverse functions of a building. OBO's modern plug-in devices offer intelligent solutions to meet the most discerning requirements.

Protecting lives. Maintaining values. The OBO fire protection systems

Perfect fire protection for all areas: OBO offers a complete programme of professional products for all fire protection applications in buildings – from the cellar to the roof, from a detached house to an industrial complex. In addition, there is also the knowledgeable advice of an experienced, competent system manufacturer and training courses and seminars held by professionals for professionals.

Contents

General fire protection principles

What is fire protection?

In general, fire protection is based on four pillars: construction, systems, organisation in preventive fire protection and, of course, combative fire protection. This division allows more accurate definition of the different areas with their aims.

1. Construction fire protection
Depending on the type of use, there are different requirements for buildings. In construction terms, fire sections are created, for example, and components or the position and length of emergency routes defined. The basis is the building regulations and special building regulations of the German federal states. These specify the minimum requirements for buildings with a specific type of use.

2. Systems fire protection
The use of special systems minimise fire risks, protect emergency and escape routes and maintain functions. These systems, e.g. sprinklers, fire alarms or safety lighting systems, are either required by law or for private financial interests.

3. Organisational fire protection
This area includes the known escape route plans, fire protection regulations and behavioural rules for people in case of fire. The aim is, should an emergency occur, to carry out controlled procedures, in order to minimise as far as possible the risks to personnel and visitors, who are not usually familiar with their surroundings. The creation of a company or plant fire brigade is also one of the organisational measures. Their task is, of course, combative fire protection.

4. Combative fire protection
The creation, organisation and maintenance of a fire brigade is part of the area of combative fire protection. All the vehicles and equipment as well as the functions of the personnel employed are specified. The tasks primarily consist of fighting fires and providing technical assistance. The fire brigades can be either public or private. Each cmmunity is obliged to maintain a fire brigade. Companies may have company or plant fire brigades.

All four areas must achieve the protective aims within a specific framework. This may be achieved in a number of ways. However, there is no point in trying to achieve 100% safety. The fire protection measures must be economically viable.

Fire protection concept

Protection aims

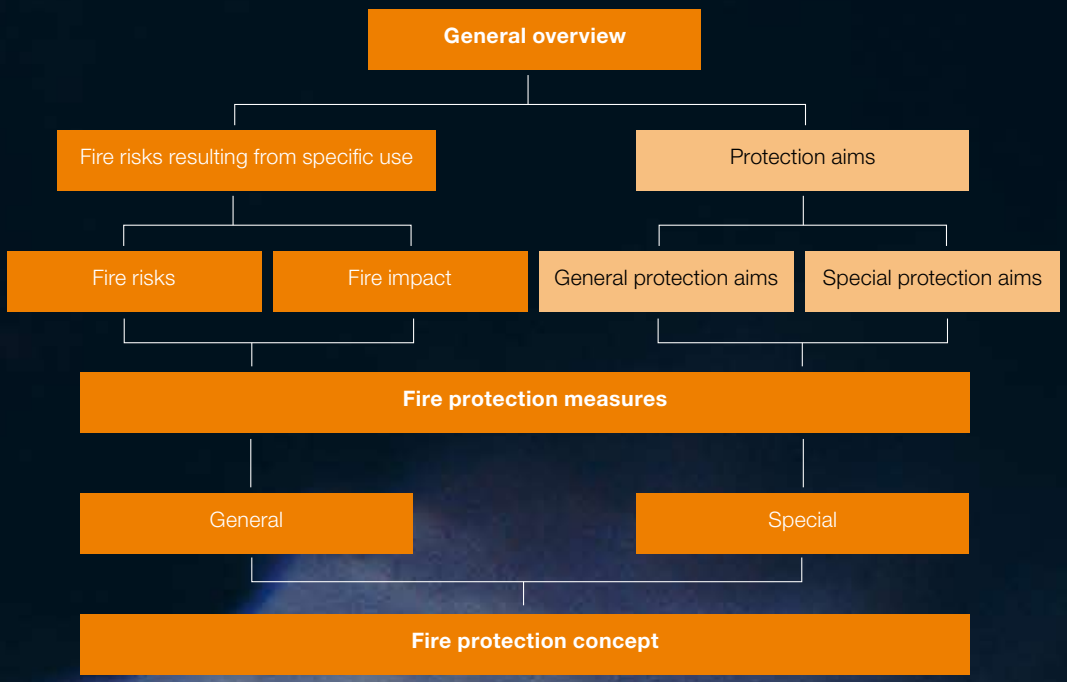
When planning a construction project, the question must be asked: which protection aims are trying to be achieved? Is it primarily about protecting people, e.g. in meeting places, or purely about protecting property? The possible risks and dangers must be evaluated fully.

Economic aspects

It is wise to combine maximum risk reduction with minimum economic costs. For example, a production facility in the chemicals industry must be protected against failure for the operator, but there is no basic public interest. Requirements by insurers may also lead to special fire protection measures.

Basic planning principles

Fire protection concepts are used to view the totality of a building and to detect all the risks and dangers. The protection aims for the buildings are specified, based on these definitions. The consequence is that special and general fire protection measures are defined and implemented for the operation of the building. The most important principle is that safe, risk-free operation must be possible.



General fire protection principles
Construction law

The devastating city fires in the Middle Ages ensured early on that people began to think about the way in which their towns and cities were built. Slowly, the crowded buildings vanished and so-called regional planning laws were introduced. Even today, these define the distances to be maintained between buildings, in order to prevent the spread of fire.

MBO – Model Building Regulations

In Germany, the Model Building Regulations are the basis for the erection of any building and the use of building products. As construction law is in the hands of the individual federal states, this basis was, in most states, introduced into the existing statutes as state building regulations.

General requirements

Paragraph 3 of the MBO lists basic requirements of constructions. It states that a construction must be "arranged, erected, modified and maintained in such a way that public safety and order as well as life, health and the natural requirements for living are not endangered." This means both people, property and their surroundings. Depending on the sector involved, the responsibilities are carried by the planners, craftsmen and operators.

Fire protection in the MBO

Paragraph 14 of the MBO makes the first fire protection requirements. As already described in §3, the building must be erected in such a way as to "prevent the causes and spread of fire and smoke, and allow the rescue of people and animals as well as effective extinguishing measures." This specifies three important protection aims.

Master Conductor System Directive MLAR

As a result of the fire at Düsseldorf Airport, the Master Conductor System Directive (MLAR) was completely revised and introduced as technical construction regulations in the appropriate construction laws of the German federal states. These regulations specify the requirements for installations in a building. They apply to electrical, plumbing and heating cable systems but not to ventilation systems. They are used for installations in emergency routes, cable routing through walls and ceilings at the ends of rooms and for systems with electrical function maintenance in case of fire. This puts into practice the protection aims specified by §14 of the MBO.

Building classes

Building types

Major fire protection is not a requirement for every building. The model building regulations define various classes of buildings, which must each be viewed differently. Classes 1 to 3 primarily contain smaller buildings, which usually contain few people. Higher buildings below the 22 metre limit can be found in classes 4 and 5.

Special buildings

Ever larger constructions mean that the requirements also become greater. Special buildings such as industrial buildings, tower blocks and meeting places are regulated by special ordinances. It is perfectly possible that a building complex is divided up into different fire sections, the fire protection of which is viewed and evaluated differently according to the type of use. If there is no special ordinance for a building, then the minimum requirements of the state building regulations apply.

Construction law – state law

Not all the German federal states have applied the Model Building Regulations and the appropriate ordinances to the same extent. It may be possible that there are differences in the regulations between states. The Master Conductor System Directive is also affected by this: the states have the right to make modifications or apply the regulations as they stand. Therefore, during the planning stage, note should be taken of not only the location of the building but also the valid regulations.

What happens during a fire?

Often, it is just carelessness – a forgotten candle, an unextinguished cigarette – or a technical defect, which triggers a catastrophe. It is only a short time before a flame becomes a fire – from the first signs to a major incident.

Each year, around 200,000 fires per year in Germany alone can cause billions of euros of damage. Each year, around 600 people die from the consequences of a fire, 60,000 are injured, 10% of them seriously.

Often underestimated is the devastating effect of the highly toxic and aggressive fire gases. Estimates suggest that around 95% of fire victims die not due to the immediate effects of the fire, but of poisoning from the smoke. Immense property damage is also incurred through the corrosive effects of the gases created during a fire. They may cause lasting damage to the structure of a building.

Sensible protection:
OBO smoke detectors from the EGS division can be integrated in a danger warning system with an OBO B.U.S. system.

Approximately 95% of all deaths during fires are caused by smoke poisoning.

Danger 1

Rapid spread of the fire

If a fire starts, then it may get out of control very quickly. The flames will soon work their way through all the combustible materials, the temperatures increase and the fire spreads ever further in an explosive manner.
During a fire, the chief task of fire brigades, alongside actually fighting the existing flames, is to prevent the fire from spreading to neighbouring buildings or building sections, in order to limit damage.
Construction components such as fire walls, fire resistant ceilings, fireproof doors, cable insulation and additional measures for preventive fire protection can help to prevent, or at least delay, the spread of fire.

Danger 2

Severe smoke creation

Smoke and soot are an often underestimated source of danger. Depending on which materials catch fire, the combustion process will cause, amongst other things, the production of the toxic gases

- Carbon monoxide
- Carbon dioxide
- Sulphur dioxide

as well as water vapour and soot.
Severe smoke creation in a burning building is not just a risk to the lives and health of the victims, but also impedes the possibility of fighting the fire, as the fire brigade will have trouble localising the source of the fire.
Therefore the aim of preventive fire protection must also be to limit smoke creation to just the affected area.

Danger 3

Creation of corrosive combustion gases

The subsequent damage of fires, and particularly of cable fires, should not be underestimated. For example, if the PVC cable insulation burns, this creates chlorine gas, which, together with the extinguishing water, creates aggressive hydrochloric acid. This acid enters the concrete, attacks steel reinforcements, and thus damages the building structure, sometimes to a great extent. Often, such subsequent damage considerably exceeds the actual fire damage. Additional corrosive combustion gas products are

- Cyanide and
- Ammoniac

Main danger of smoke creation:
1 kg of PVC will fill a 500 m³ room with thick, black smoke

Relative smoke volume of various materials and the resulting combustion products

Carbon dioxide

Sulphur dioxide

Hydrochloric acid

Water vapour

500 m³ of dense, black smoke

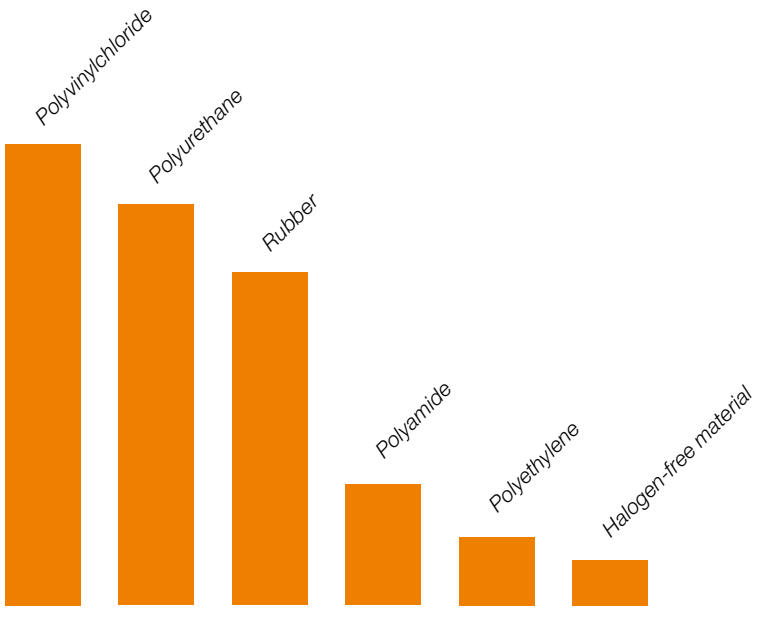
Carbon monoxide

Cyanide

Soot

Ammoniac

1 kg PVC



Relative smoke volume of various materials per minute

In Germany, 95% of all cable insulation is made from PVC.

Halogen-free insulating materials are not required by construction law.

The protection aims
Three steps to effective fire protection

In buildings containing lots of people, preventive measures should be taken for fires, so that nobody is endangered by fire and smoke. There must be a way to leave the building quickly and safely. In such emergencies, people who are unfamiliar with their surroundings have great difficulty estimating the risks correctly and leaving the building using the most direct route. Therefore, three steps for effective fire protection in buildings are essential.

1st protection aim:
Limit the spread of the fire
The constructive restriction of the fire to specific sections means that the remaining parts of the building are protected for a certain period of time. This allows protection of people and property. The fire brigades can protect additional parts of the building through extinguishing measures.

2nd protection aim:
Protect emergency and escape routes
Making emergency and escape routes fireproof allows safe evacuation. The fire brigades of course use these parts of the building to tackle the fire. Correct design can buy time if there is a fire.

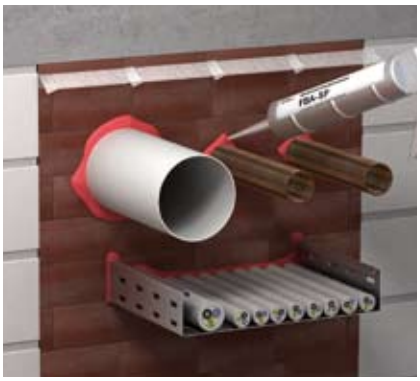
3rd protection aim:
Maintain function
Safe buildings give those present the opportunity to leave the endangered environment as quickly as possible. Safety lighting can also play a vital contribution. If there is a fire, this and other safety-relevant systems must continue to function for a sufficiently long period of time. This also permits effective support of extinguishing measures by the fire brigades.

1st protection aim:
Limit the spread of the fire.
Protect people and property.

Solution: maintenance of the fire sections

Insulation systems

- Cable insulation
- Pipe insulation
- Combination insulation



Function of fire walls

Fire walls should ensure that a fire cannot pass to neighbouring buildings or building sections. This creates so-called fire sections. The construction design of these fire walls – materials, fire resistance classes, stress values – is regulated by the state building regulations and DIN standards.

Running of cables

Electrical cables and pipes may only be run through walls and ceilings at the ends of rooms when there is a guarantee that they do not present an opportunity for fire and smoke to spread. This requirement is fulfilled by insulation systems. These permit the reliable sealing of the ceiling and wall penetrations required for installations against fire and smoke.

Special requirements

Some of the requirements for cable penetrations combined with insulation are:

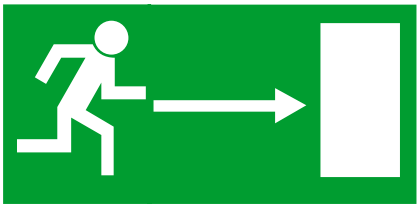
- The spread of fire and smoke must be prevented.
- Closing must be guaranteed.
- no unapproved heating of the surface of the cables and pipes of the insulation surface and any cable support systems being run through.

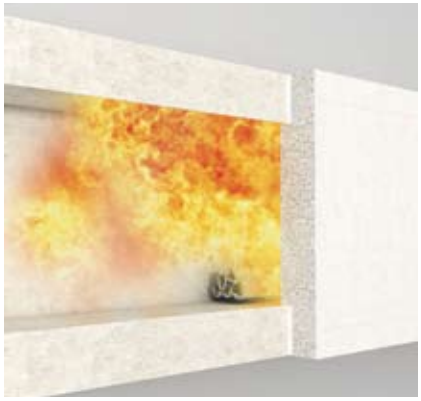
2nd protection aim: People must be able to leave the building safely.

Solution: protection of emergency and escape routes

Escape route installation systems

- False ceiling mounting
- Fire protection ducts



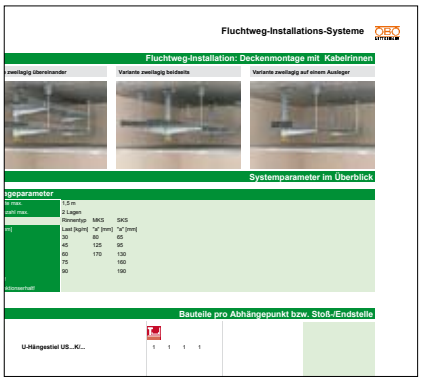


The Master Conductor System Directive (MLAR) controls installations in emergency and escape routes

There are special regulations for electrical installations in emergency and escape routes. There must be a guarantee that, if there is a fire, these routes can be used to leave the building without any risk. The Construction Supervision Commission of the German Development Ministers' Conference regulates the details of the Master Conductor System Directive (MLAR). This regulation applies to electrical installations in stairwells, corridors and passages used as emergency routes.

It must always be noted that any fire coming from an electrical installation is not permitted in this area. This requirement can be fulfilled using the following installations:

- Installation in fire protection duct systems
- Installation above suspended fire protection ceilings



You can find escape route installation systems in the green section of the catalogue.

3rd protection aim:
Important electrical systems must continue to function.
Solution: function maintenance for electrical systems

Systems
- Function maintenance systems
- Fire protection duct systems

Current for safety equipment even if there is a fire

To ensure that emergency and escape routes remain usable and also important technical equipment such as emergency lighting, fire alarm systems, smoke exhaust systems, etc. in case of fire, it is absolutely essential to provide special protection for the power supply for these systems. The use of special cables and routing systems means that it is possible to maintain the power supply, even in the case of fire, thus guaranteeing the function maintenance.

Particularly important in public buildings

Function maintenance is particularly important in buildings regularly frequented by large numbers of people. This includes public buildings such as schools, hospitals, meeting places, authorities and underground stations, but also industrial facilities, tower blocks, shopping centres and multi-storey car parks.

30 minutes: function maintenance for safe evacuation

The first 30 minutes after the start of a fire play a key role in evacuating a building. During this period, the function maintenance of the following equipment must be guaranteed:
- Safety lighting systems
- Lifts with fire controls
- Fire alarm systems
- Systems for warning and issuing information
- Smoke extraction systems

90 minutes: function maintenance for effective fire-fighting

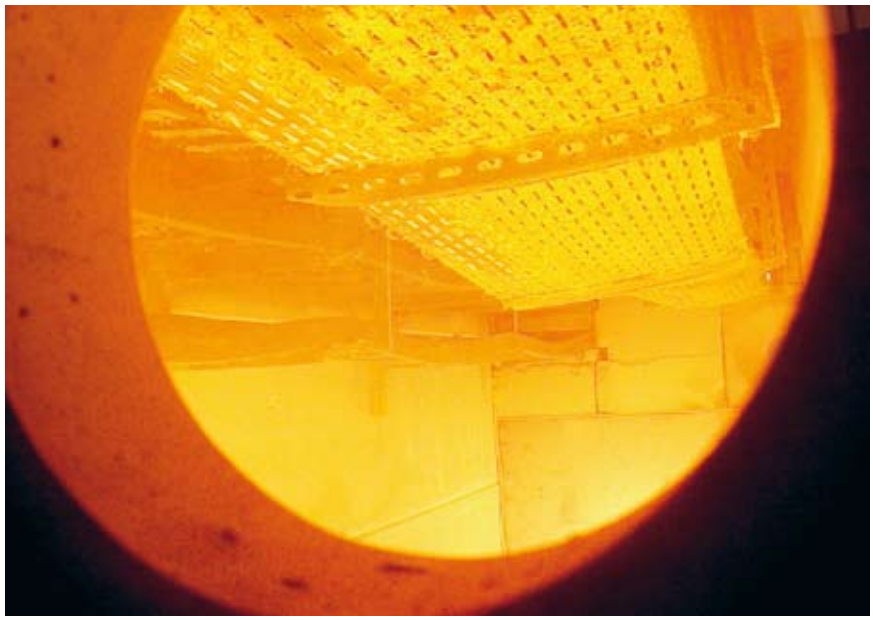
To support the fighting of fires, it is important the specific technical equipment can still be supplied with sufficient power 90 minutes after a fire starts in a building. This equipment includes:
- Water pressure intensification systems for the extinguishing water supply
- Automatic smoke extraction systems and smoke protection pressure systems
- Fire brigade lifts
- Bed lifts in hospitals and similar buildings

Tested and considered safe
Safety through fire tests

Fire testing according to DIN 4102
DIN 4102 is a key factor in the proof that products and systems fulfil fire protection requirements for electrical installations. This standard describes in detail the fire tests, which must be carried out in a special test furnace in order to obtain the appropriate test certificates, test reports and approvals.

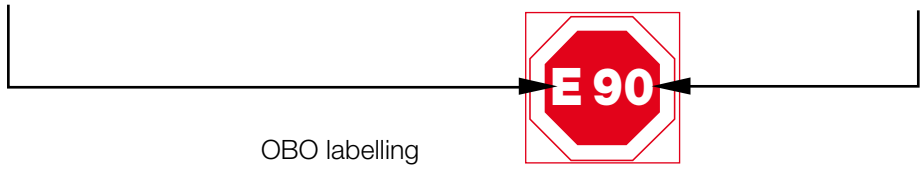
DIN 4102 “Fire behaviour of building materials and building components” consists of a number of sections. These sections describe terms, requirements for the appropriate materials or components and test criteria and test operations. A test report is created for each fire test carried out, which documents the test and the results. This report serves as the basis for the application for a general construction approval or a test report.

Safety through testing certificates
All OBO fire protection products are tested according to DIN 4102 and possess the appropriate proofs to provide the user with the greatest possible level of safety. These documents, which contain details of items to be observed during installation and the use of the appropriate products and systems, can be obtained on the Internet at www.obo.de.



Meaning of the DIN abbreviations and OBO designation

Abbreviation	Meaning of...		Abbreviation	Fire resistance period, at least...
S	*Cable insulation*	**Example** The E90 classification means that if there is fire, an electrical cable system can guarantee the power supply to the connected systems for at least 90 minutes – this can be seen in the OBO pictogram.	**30**	*30 minutes*
I	*Installation shafts and ducts*		**60**	*60 minutes*
E	*Function maintenance of electrical cable systems*		**90**	*90 minutes*
R	*Pipe insulation*		**120**	*120 minutes*



OBO labelling

Training courses and seminars
Safety through knowledge

OBO fire protection seminars: first-hand knowledge
With a comprehensive programme of training courses and seminars on the subject of fire protection in electrical engineering, OBO Bettermann is able to support its customers with specialist knowledge from a single source. Current trends and developments are explained along with information on the most important standards and regulations. As well as the theoretical principles, this concerns implementation in everyday situations.

Broad range of topics
The OBO fire protection seminars cover a wide range of subjects, ranging from general basic principles to current practical knowledge on the different product areas. Customer or project-specific seminar topics are also possible.

The OBO seminar programme can be viewed at any time at: www.obo.de

OBO regional sales offices and technical hotline
The competent OBO regional sales offices are available for individual consultation. The OBO hotline can provide help and assistance for technical problems.

Project and system technology: think in networks, work in networks
The specialists of OBO Projects and System Technology develop and implement convincing solutions for electrical installations, in particular for large-scale projects, in administrative buildings and industrial and systems construction. Here, the requirements for quality and functionality are particularly high, and the topic of fire protection is particularly important in this area.

In the field of fire protection, OBO customers can profit from the experience and the know-how of a globally operative group of companies, which was one of the first to offer tested MLAR systems. At an international level, the OBO trademark stands for innovative products developed and manufactured in-house, and for certified quality and comprehensive service.

OBO fire protection systems

Escape route installation systems
False ceiling mounting
Page 106

Escape route installation systems
Fire protection ducts
Page 138

Insulation
Special applications
Page 74

- OBO cable insulations have official approval from the Deutsches Institut für Bautechnik and fulfil the fire protection classifications S30, S90 and S120.
- Simple construction, practical, fast mounting and easy retrofitting
- No special technical knowledge required – can be installed by any installation engineer

Insulation systems

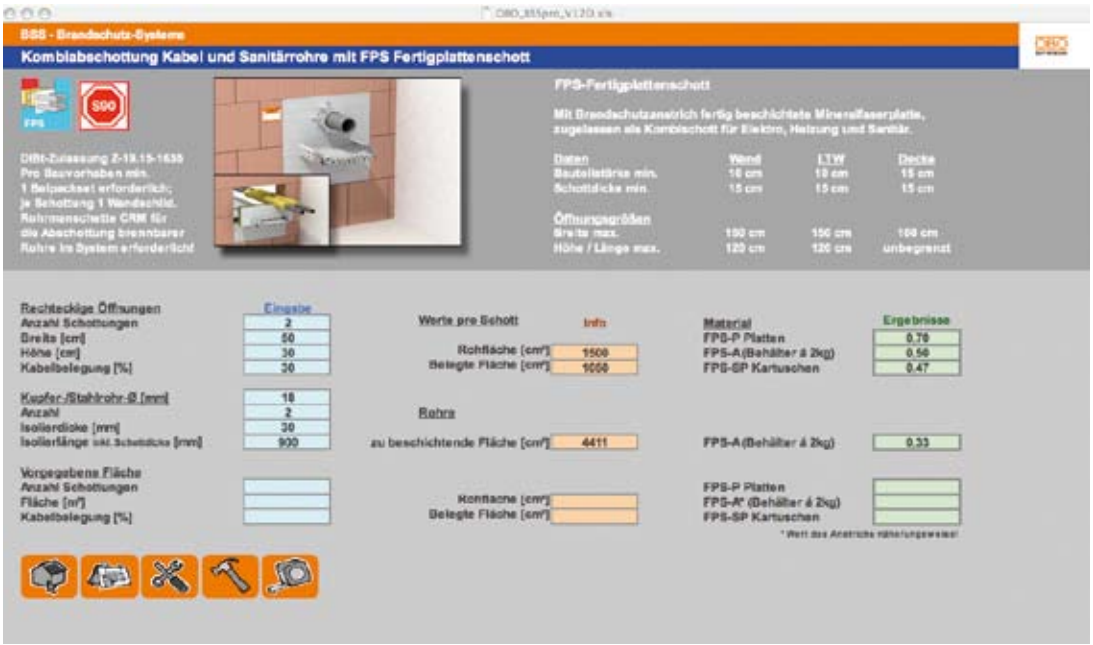
1st protection aim:
Insulation limits the spread of fire and smoke.

Modern buildings have a dense network of power and data cables. The structure of such a supply network means that it is usually necessary to run cables through ceilings and walls, which are the limits of fire sections. However, this is only approved as preventative fire protection controlled by the construction ordinance when, at the same time, effective measures are taken to prevent fire, smoke and heat from spreading via these wall penetrations. One option of solving this problem is presented by so-called insulation systems.

BSSpro cable insulation software

The “OBO BSSpro” software, which OBO now offers for free download, can support the installation engineer in all matters to do with fire protection. How much insulation is required for a specific cable assignment in a given opening size? “OBO BSSpro” can provide the answer. The software can aid any electrical engineer in their efforts to determine the material required for fire protection systems. The program contains all the current OBO cable insulation systems including the special applications for underfloor and cable routing systems. The software is really easy to use: via a rapid graphic portal, the user can quickly find the suitable insulation system. The required dimensions can be input easily in the table, which is adapted individually according to requirements. Only the quantity of insulation, the component opening and the percentage cable assignment must be specified, “OBO BSSpro” will do the rest. The user is immediately informed if appropriate limit values are exceeded or undershot. For more detailed information, there is the Internet button in the tabular view of the software.

OBO BSSpro can be downloaded now for free on the Internet at www.obo.de from the Downloads/ Software area. Additional language versions are available.



Tested safety

Testing to DIN 4102 Part 9

The legally required effect of cable insulation systems must be proved with a construction approval of the Deutsches Institut für Bautechnik in Berlin (DIBt). These approvals are based on fire tests, which are carried out by official materials testing offices on the basis of DIN 4102 Part 9.

Strict testing criteria

The cable insulation is tested in a special testing furnace, in which the sample installation on test is heated up according to a standard temperature-time curve. Depending on the required approval, the test will last 30, 60, 90 or 120 minutes. In particular, the following are tested:

- Whether the escape of fire and smoke from the fire area is prevented
- Whether the surface temperature on the side of the cable insulation away from the fire does not rise by more than 180 Kelvin above the starting temperature

This test always takes place under the worst possible installation conditions (e.g. lowest insulation thickness, largest insulation height or width).

Contents of the approvals

The certificates of approval specify the following criteria, amongst other things, for the application area and installation:

- Fire resistance class (e.g. S30, S90 or S120)
- General installation conditions (e.g. installation in concrete walls, etc.)
- Maximum insulation dimensions
- Minimum thickness of the cable insulation
- Minimum ceiling/wall thickness
- Materials to be used to create the insulation
- Installations to be carried out (e.g. cables or cable support systems)
- Sequence and type of installation
- Execution of a retro-installation

DEUTSCHES INSTITUT FÜR BAUTECHNIK

Anstalt des öffentlichen Rechts

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Allgemeine bauaufsichtliche Zulassung

Zulassungsnummer: Z-19.15-262

Antragsteller: OBO BETTERMANN GMBH + Co.
Hüingser Ring 52
58710 Menden

Zulassungsgegenstand: Kabelabschottung "HSM" der Feuerwiderstandsklasse S 120 nach DIN 4102-9

Geltungsdauer bis: 31. Mai 2009

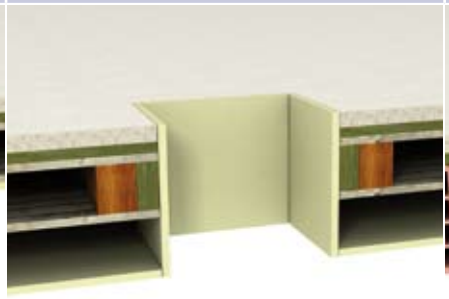
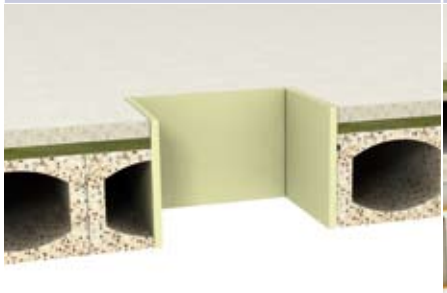
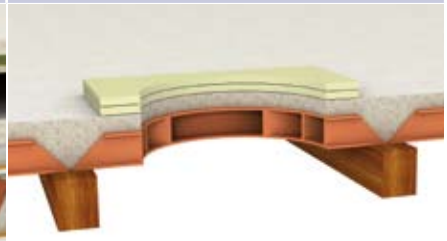
Der oben genannte Zulassungsgegenstand wird hiermit allgemein bauaufsichtlich zugelassen.
Diese allgemeine bauaufsichtliche Zulassung umfasst acht Seiten und vier Anlagen.

Selection of insulation according to application

Solid wall or ceiling					
Electrical				Combination	Plumbing
Individual cable (M)LAR	Cables and bundles	Cable and plastic pipe	Cable and support systems	Electrical and plumbing	pipes
					
OBO system solutions					
FPS-SP	**FPS** **FBS90** **KBK** **FBA-B200** **FBA-B120** **FBA-F** **FBA-S/-SR** **FBA-D** **FBA-SP**	**FBS90** **FBA-B200** **FBA-B120** **FBA-F** **FBA-S/-SR** **FBA-D** **FBA-SP**	**HSM** **FPS** **FBS90** **KBK** **FBA-B200** **FBA-B120** **FBA-F** **FBA-S/-SR**	**FPS** **FBA-B200**	**FPS** **FBS90** **FBA-B200** **CRM**

Lightweight partition wall					
Electrical				Combination	Plumbing
Individual cable (M)LAR	Cables and bundles	Cable and plastic pipe	Cable and support systems	Electrical and plumbing	Pipes
					
OBO system solutions					
FPS-SP	**FPS** **FBS90** **KBK** **FBA-B200** **FBA-B120** **FBA-F** **FBA-S/-SR** **FBA-D** **FBA-SP**	**FBS90** **FBA-B200** **FBA-B120** **FBA-F** **FBA-S/-SR** **FBA-D** **FBA-SP**	**FPS** **FBS90** **KBK** **FBA-B200** **FBA-B120** **FBA-F** **FBA-S/-SR**	**FPS** **FBA-B200**	**FPS** **FBS90** **FBA-B200** **CRM**

Special applications				
Cable ducts		Underfloor systems		Shelling
PVC	Metal	Flushfloor	Screed-covered	PVC pipe
				
OBO system solutions				
KBK-K FBA-BK	FBA-BK	FBA-B200	FBS90	FBS90

Special applications for renovations in buildings (building in existing buildings)		
Wooden beam ceiling	Wooden beam ceiling with soffit	Ribbed ceiling
		
Cavity ceiling	Vaulted ceiling	Joist ceiling
		

The following applies to any ceilings in existing buildings and to special components such as a wall structure (sandwich elements): mounting of insulation systems is approved, when this type of application is contained in the approval. Insulation systems can, by agreement with the construction authorities, be used, which, in accordance with the approval, are approved for a similar application, e.g. within a layer not made of combustible materials.

Important note: before mounting, always obtain the approval of the accepting party, e.g. lowest construction authority or fire brigade.

Get in touch with us – we'd be happy to help you!

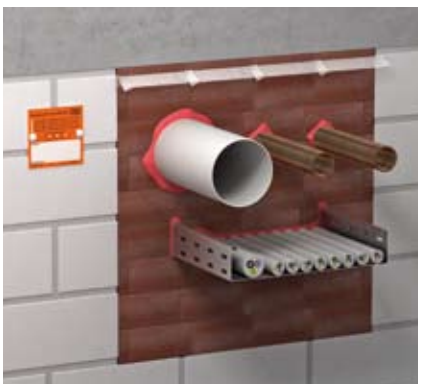
Overview of insulation systems
Cable and pipe penetrations

HSM
Mortar insulation
Dry, pre-mixed special mortar, just add water, simple processing.

FPS
Ready-assembled panel insulation
Mineral fibre plate, ready coated with fire protection coating, penetration of electrical cables, cable support systems and steel and plastic pipelines.

FBS90
2-K foam insulation
Two-component fire protection foam for quick insulation of cables and cable support systems without additional coating. Non-combustible pipes can also be run through.

KBK
Bag insulation
Shapeable fire protection bag, tidy, dust-free installation, very easy installation at a later date.



FBA-B200
Foam block insulation
Foam block as combination insulation for electrical and plumbing applications. Combustible pipes can be run without an additional sleeve.

FBA-120
Foam block insulation
Foam block of low insulation thickness to insulate small cables, e.g. IT and telecommunications.

FBA-F
Finished part insulation, box tray
Fixed outer frame and elastic inner blocks made of fire protection foam, tidy, dust-free installation, particularly suitable for installation in lightweight partitions.

FBA-S
Plug insulation
Plug made of permanently elastic, closed-pore foam, dust and fibre-free installation, easy installation at a later date.

FBA-SR
Pipe shell insulation
Fixed pipe shell and elastic plug made of closed-pore foam rubber, dust and fibre-free installation, particularly suitable for installation in lightweight partitions.

FBA-D
Drilling crown insulation
Fixed pipe seal and elastic plug made of closed-pore foam rubber, very simple, dust-free installation, particularly suitable for installation in lightweight partitions.

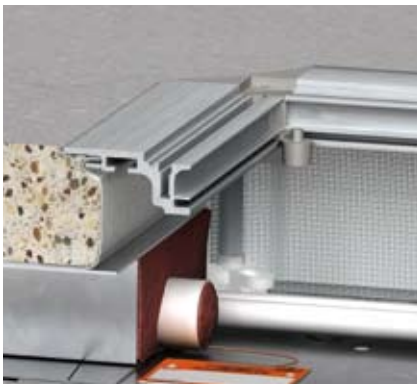
FBA-SP
Small insulation
Fire protection compound from the cartridge to close off small openings and as a component for all FBA systems.

Overview of insulation systems for special applications

KBK-K
Bag insulation for PVC cable trunking
Shapeable fire protection bag for use within run PVC cable duct. Very simple installation at a later date.

FBA-BK
Foam block insulation, PVC and metal cable ducts
Foam block for insulating installations in PVC and metal cable ducts.

FBA-B200
Foam block insulation for flushfloor underfloor systems
Foam block for use in flushfloor underfloor systems, e.g. OBO OKA.



FBS90
2-K foam insulation for screed-covered underfloor systems
Two-component fire protection foam for insulation within screed-covered underfloor systems, e.g. OBO EÜK.

FPS-SP
Single cable penetration
Fire protection compound which foams up in case of fire to close installations in components forming the end of a room, according to the LAR.

Overview of insulation systems for pipes

FPS
Pipe insulation
Pre-coated mineral fibre plate to insulate electrical and plumbing systems.

FBS90
2-K foam insulation
Two-component fire protection foam for quick insulation of non-combustible pipes. Without additional coating.

FBA-B200
Foam block insulation
Foam block as combination insulation for electrical and plumbing applications. Combustible pipes can be run without an additional sleeve.

CRM
Pipe seal
Secure closure of plastic plumbing pipes. Use in wall and ceiling mounting, also approved for lightweight partitions.

Working with material consumption tables

Tables help in the selection of materials and determination of quantities
The following catalogue offers the user a wealth of aids in the selection of the insulation types suitable for the appropriate area of application, along with the required material quantities and countless invaluable installation tips.

In addition, the OBO technical hotline is available to offer specialist advice for individual solutions.

HSM application example

Header:
Size of the wall opening

Fire protection class of the product

Container type, HSM material is available in buckets or sacks.

HSM									
	cm²	100 cm²	200 cm²	300 cm²	400 cm² (1)	500 cm²	1,000 cm²	5,000 cm²	10,000 cm²
	0%	1.8 kg	3.6 kg	5.4 kg	7.2 kg	9.0 kg	18.0 kg	90.0 kg	180.0 kg
(2)	30%	1.3 kg	2.5 kg	3.8 kg	5.0 kg (3)	6.3 kg	12.6 kg	63.0 kg	126.0 kg
	60%	0.7 kg	1.5 kg	2.2 kg	2.9 kg	3.6 kg	7.2 kg	36.0 kg	72.0 kg

S120

Cable assignment in %
as a rough value

Application example

1. Size of the wall opening 10 x 40 cm = 400 cm²
2. The cable assignment is 30%.
3. You require 5.0 kg of material.

KBK application example

Header:
Size of the wall opening

Fire protection class
of the product

Container type
KBK bags are available in three sizes: small (KBK 1), medium-sized (KBK 2) and large (KBK 3).

KBK					
cm²	100 cm²	200 cm²	1 500 cm²	1,000 cm²	5,000 cm²
0%	0 x KBK 1 + 1 x KBK 2 + 2 x KBK 3	0 x KBK 1 + 1 x KBK 2 + 4 x KBK 3	0 x KBK 1 + 2 x KBK 2 + 10 x KBK 3	0 x KBK 1 + 6 x KBK 2 + 18 x KBK 3	0 x KBK 1 + 8 x KBK 2 + 101 x KBK 3
30%	3 x KBK 1 + 1 x KBK 2 + 1 x KBK 3	4 x KBK 1 + 2 x KBK 2 + 2 x KBK 3	4 x KBK 1 + 5 x KBK 2 + 6 x KBK 3	4 x KBK 1 + 11 x KBK 2 + 13 x KBK 3	20 x KBK 1 + 54 x KBK 2 + 63 x KBK 3
2 60%	3 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 3 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 6 x KBK 2 + 2 x KBK 3	6 x KBK 1 + 12 x KBK 2 + 4 x KBK 3	28 x KBK 1 + 60 x KBK 2 + 21 x KBK 3

3

Cable assignment in %
as a rough value

Application example

1. Size of the wall opening 20 x 25 cm = 500 cm²
2. The cable assignment is 60%.
3. You require four small, six medium-sized and two large bags.

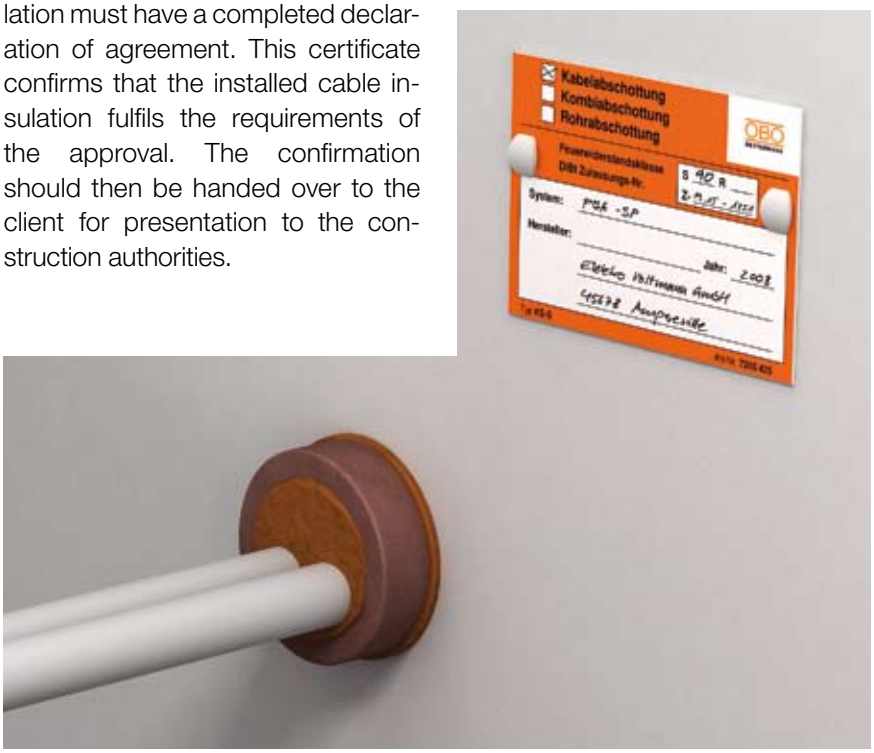
Labelling required

Each cable insulation must be permanently labelled with a sign. This labelling must contain the following information:

- Name of the erection engineer of the insulation (installation engineer)
- Head office of the installation engineer
- Insulation designation
- DIBt approval number
- Fire resistance class
- Year of manufacture

Declaration of agreement

In accordance with the construction approval, each installed cable insulation must have a completed declaration of agreement. This certificate confirms that the installed cable insulation fulfils the requirements of the approval. The confirmation should then be handed over to the client for presentation to the construction authorities.



System overview
Insulation systems

FPS
Ready-assembled panel insulation Page 37

FBS90
2-K foam insulation Page 43

FBA-F
Box insulation Page 59

Special applications Page 74

KBK
Bag insulation Page 47

HSM mortar ballast

DIBt

Fire resistance class S 120
DIBt approval Z-19.15-262

Approved insulation diameters, wall mounting	
Min. wall thickness	17.5 cm
Min. insulation thickness	18 cm
Max. insulation thickness	160 cm
Max. insulation height	280 cm
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	18 cm
Min. insulation thickness	18 cm
Max. insulation thickness	60 cm
Max. insulation length	Unlimited

OBO HSM is a dry, pre-mixed special mortar for simple, low-cost creation of cable insulation in walls and ceilings. The stirred compound has very good substrate adhesion properties, meaning that casing is usually not required for small wall openings. Casing is only required for larger openings in walls and for cable insulation in ceilings.
The mortar is waterproof, fluid and does not contain any asbestos, phenols or halogens. It can be processed by hand, with pumps or with presses. When hardened, OBO HSM is a mechanically solid cable insulation.

System components

Hard ballast in sacks, hard ballast in a bucket, fire protection filler, retrofit wedges, additional kit, wall plate

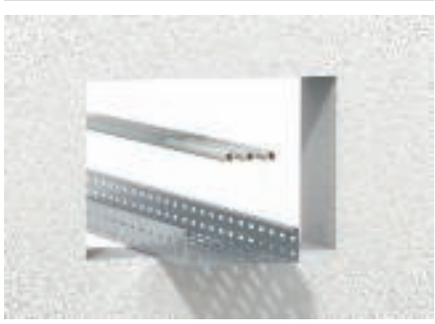
Wall insulation area of application

Installation is approved in masonry according to DIN 1053-1, or concrete or reinforced concrete to DIN 1045. The minimum insulation thickness is 18 cm.

Ceiling insulation application area

Approved installation in ceilings made of concrete or reinforced concrete to DIN 1045. Insulation thickness at least 18 cm.

Executability application



Approved assignment (max. 60%) with all kinds of electrical cables, except hollow-core cables, cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000435)

Always indicate the article number when ordering.

HSM mortar ballast

Mounting preparations

De-dust the insulation layers. Work the mortar into an applicable mass (roughly 0.5 l water is required per 1 kg of dry mortar). Shell larger wall openings on one or both sides, and ceiling openings on the underside.

Mounting of cable insulation

Close the opening tightly and completely. If necessary, insert retrofit wedges.

Mounting of retrofit wedges

Grouped arrangement of the retrofit wedges in wall insulation (group dimension: height max. 10 cm, width max. 30 cm).

Finished insulation with wall plate

Fasten the completed wall plate next to the insulation. Hand over the completed declaration of agreement to the client.

Installation at a later date

Remove of the retrofit wedges from the other side using light knocks with a hammer. Careful opening with a drill or chisel is also possible.

Closing of retro-installation

Completely close off small residual openings with HSM filler. Close off larger openings with stirred mortar.

Finished cable insulation

Installed cable insulation with additional retrofitting option.

Material consumption

HSM

cm²	100 cm²	200 cm²	300 cm²	400 cm²	500 cm²	1000 cm²	5000 cm²	10000 cm²
0%	1,8 kg	3,6 kg	5,4 kg	7,2 kg	9,0 kg	18,0 kg	90,0 kg	180,0 kg
30%	1,3 kg	2,5 kg	3,8 kg	5,0 kg	6,3 kg	12,6 kg	63,0 kg	126,0 kg
60%	0,7 kg	1,5 kg	2,2 kg	2,9 kg	3,6 kg	7,2 kg	36,0 kg	72,0 kg

When stirred with water, 1 kg of HSM dry mortar produces approx. 1 l of ready-to-apply insulation compound. The data in the table refer to the minimum insulation thickness of 18 cm.

Always indicate the article number when ordering.

HSM mortar ballast

HSM hard ballast sack

Type	Contents kg	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
HSM-S	20	1	2050.000	**7206 10 0**	

Wall ballast, dry mortar in a sack. Free of fibres, halogens and phenols, suitable for pumping, pressing and for manual installation. Fire resistance class S 120, DIBt approval Z-19.15-262.

HSM hard ballast bucket

Type	Contents kg	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
HSM-E1	3.5	1	390.000	**7206 03 8**	
HSM-E2	10.5	1	1130.000	**7206 05 4**	

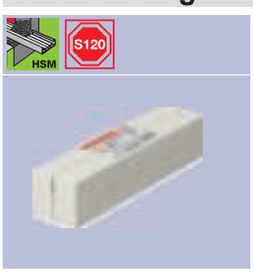
Wall ballast, dry mortar in a bucket. Free of fibres, halogens and phenols, suitable for pumping, pressing and for manual installation. Supplied with additional kit. Fire resistance class S 120, DIBt approval Z-19.15-262.

HSM-SP fire protection filler

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
HSM-SP	0.31	20	55.000	**7205 10 4**	

Fire protection filler in cartridge to form an insulating layer, to fill residual joints for retro-installations in the HSM hard ballast system. The fire protection must be stored so that it is protected from frost. At storage temperatures between +5 °C and +35 °C, the filler can be stored for at least six months.

Retrofit wedge



Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
NIK-1	25 x 30 x 240	1	67.000	**7206 20 8**	
NIK-2	25 x 30(60) x 240	1	130.000	**7206 21 6**	

Retrofit wedge set for HSM mortar ballast system.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
HSM-BS	1	7.000	**7206 27 5**	

Additional kit for HSM mortar insulation system, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

FPS ready-assembled panel insulation

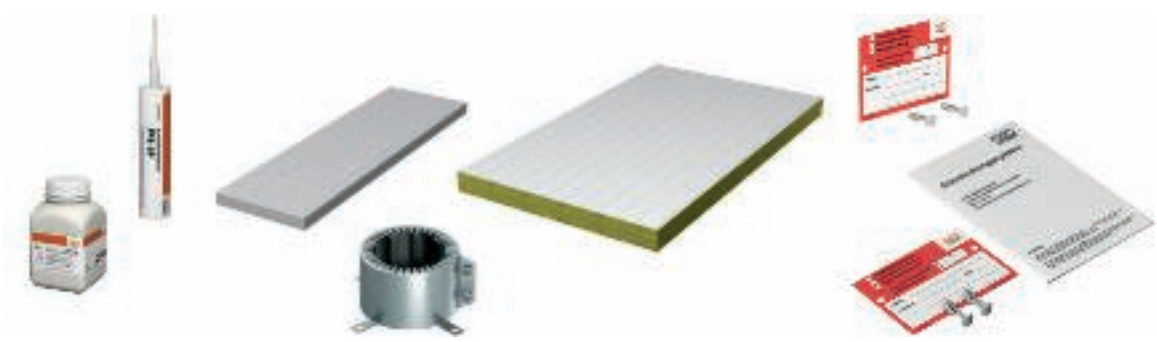
DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1636

Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	15 cm
Max. insulation thickness	150 cm
Max. insulation height	120 cm
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	15 cm
Max. insulation thickness	100 cm
Max. insulation length	Unlimited

OBO FPS is the logical addition to OBO cable insulation. The core of the system is the pre-coated mineral fibre plate. No additional final coating is required once the plate has been installed.
When there is a fire, the fire protection coating of the mineral fibre plate foams up, creating an insulating carbon foam. Together with the mineral fibre plates, this provides effective prevention of the spread of fire and smoke. The coating to be used on the cables reacts in the same way if there is a fire.
According to the construction approval, in addition to the cables, pipes made of steel, copper or various plastics may also be run through the same insulation. Therefore the OBO FPS assembled plate insulation can be termed "combination insulation". However, for pipelines, additional fire protection measures (section insulation and pipe seals) are required.

System components



Finished coating plates, coating, filler, pipe seal, calcium silicate plate, additional kit, wall plate

Wall insulation area of application

Wall structure: masonry to DIN 1053-1 or concrete or reinforced concrete to DIN 1045; porous concrete plates to DIN 4166; lightweight stand-off partitions with steel sub-construction.

Ceiling insulation application area

Ceiling structure: concrete or reinforced concrete according to DIN 1045; porous concrete according to DIN 4223.

Cable executability application

Approved assignment (max. 60%) with all kinds of electrical cables, except hollow-core cables; cable bundles with max. 10 cm external diameter (max. diameter of individual cables in bundle 21 mm). Cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FPS ready-assembled panel insulation

Pipe executability application

Steel and copper pipes up to 159 mm diameter; various plastic pipes to 160 mm diameter. You can find an exact list in the approval.

Dry construction wall application

Installation of additional wall supports and locks to form an insulation layer. The wall planking must be fastened on these sheet steel profiles.

Low wall thickness

If the wall thickness is less than 15 cm, then attach a frame made of calcium silicate plates, type FPS-K in the area of the building shell opening.

Mounting preparations

Measure the dimensions of the component opening and the exact position of the cables and cable support systems.

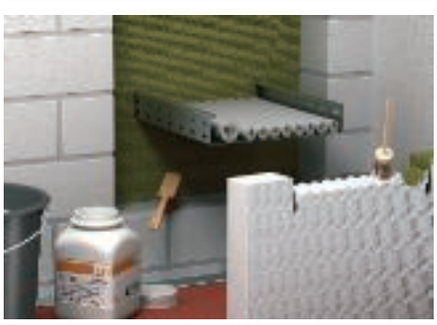
Transfer to finished coating plate

Transfer the values to the mineral fibre plate with a 3 mm overhang for tight-fitting installation. Cut the plate to size with a saw or serrated knife. If necessary, divide into smaller pieces.

First fitting

Checking of fit and possible corrections. Do not insert plates which have been cut too small.

Coating of the cut edges



Clean the component layer. Moisten the cut edges of the mineral fibre plates and the opening and apply them with the coating for adhesion.

Insertion of the plates

Slow, careful insertion of the individual plate sections with a hammer and a wooden board.

Closing of residual openings

Completely fill the residual openings with loose mineral wool (melting point above 1,000 °C). Close off smaller residual openings with the filler.

Cable coating

Coat the cables and cable tracks on both sides of the insulation to a length of 15 cm (dry layer thickness at least 1 mm). Also coat smaller residual openings.

Finished insulation with wall plate

Fasten the completed wall plate next to the insulation. Filling out of the declaration of agreement and handing over to the client.

Installation at a later date

Create an opening with a pointed saw or a serrated knife. After installing the cables, close the residual opening and coat the cables (as described).

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Always indicate the article number when ordering.

FPS ready-assembled panel insulation

Path insulation

Continuous path insulation mounting on the non-combustible pipes. Refer to the approval for the length, thickness and material. The path insulation of the individual pipes may touch.

Adjustment of the plates

Adjust of the mineral fibre plates after mounting the path insulation as with bag installation.

Coating of the path insulation

Coat the full length of the path insulation with the paint (dry layer thickness at least 1 mm).

Closing of residual joints

Close the residual gaps around the path insulation with the filler.

Pipe seal for combustible pipes

Mount the suitable pipe seal on the pipe, on both sides in the case of wall insulation, only on the underside for ceilings. The flange may not protrude beyond the edge of the insulation. Seal the pipe with fire protection filler.

Fastening of the pipe seal

Drill through the two mineral fibre plates (for M6 or M8 threaded rods). Use the flange of the pipe seal as the drilling template.

Installation of the threaded rods

Mounting of the threaded rods (M6 or M8) and fastening of the pipe seal(s).

Installed pipe seal

When the threaded rods have been lightly tightened, the installation of the pipe seal is complete.

Installed combination insulation

Real combination insulation for electrical and sanitary applications. The approved universal solution for multi-structure insulation measures.

FPS-P finished coating plate

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-P	1,000 x 600 x 60	2	684.000	**7202 27 0**	

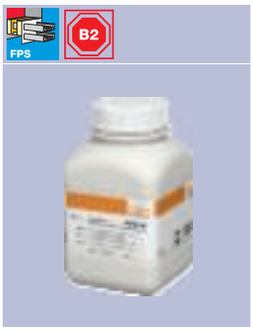
Mineral fibre plate, ready coated with insulation-forming substance, as the basis of the FPS cable insulation system, fire resistance class S 90, DIBt approval Z-19.15.1636.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FPS ready-assembled panel insulation

FPS-A coating



Type	Contents	Pack.	Weight	Item No.	Price
	kg	pcs	kg/% pc		/pc.
FPS-A	2	1	220.000	**7202 27 4**	

Coating for FPS finished plate insulation system. To coat the cables, cable support systems and the path insulation. In dry, frost-free rooms, the coating can be stored at temperatures from 5 °C to 30 °C for up to 12 months in closed original containers.

FPS-SP filler in a cartridge

Type	Contents	Pack.	Weight	Item No.	Price
	l	pcs	kg/% pc		/pc.
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

FPS-SP filler in a bucket

Type	Contents	Pack.	Weight	Item No.	Price
	kg	kg	kg/‰ pc		/kg
FPS-SP	5	5	500.000	**7202 28 0**	

Fire protection filler in a bucket, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

FPS-K calcium silicate plate

Type	Dimension	Pack.	Weight	Item No.	Price
	mm	pcs	kg/% pc		/pc.
FPS-K	500 x 150 x 20	1	42.000	**7202 28 2**	

Calcium silicate plate for FPS assembled plate insulation system, for the construction of frames in the penetration or doubling for wall thicknesses of less than 15 cm. Materials class A1 – non-combustible.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FPS ready-assembled panel insulation

CRM pipe seal

Type	Pipe Ø mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
CRM32	32	2	15.000	**7202 22 1**	
CRM40	40	2	16.000	**7202 22 3**	
CRM50	50	2	20.000	**7202 22 5**	
CRM63	63	2	28.000	**7202 22 7**	
CRM75	75	2	34.000	**7202 23 0**	
CRM90	90	2	75.000	**7202 23 2**	
CRM110	110	2	95.000	**7202 23 4**	
CRM125	125	2	100.000	**7202 23 6**	
CRM140	140	2	130.000	**7202 23 8**	
CRM160	160	2	140.000	**7202 24 0**	

Pipe seal for combustible pipes, approved for use in the FPS assembled panel insulation system as S 90 combination insulation or as independent pipe insulation R 90.

Fastening data

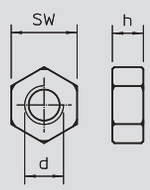
Type	Holding straps	Threaded rods
CRM32	3	M6
CRM40	3	M6
CRM50	3	M6
CRM63	4	M6
CRM75	4	M6
CRM90	4	M8
CRM110	4	M8
CRM125	4	M8
CRM140	5	M8
CRM160	5	M8

Threaded rod for CRM mounting

Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M6	6	1000	100	18.300	**3141 04 7**	
						ST / G	
2078	M8	8	1000	50	30.000	**3141 12 8**	

Threaded rod to DIN 976.

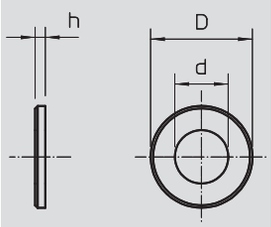
Hexagonal nut



Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M6	6	5.2	10	100	0.225	**3400 06 9**	
DIN 934	M8	8	6.8	13	100	0.474	**3400 08 5**	

Hexagonal nut to DIN 934 with metric thread.

Washer



Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
967	M6	28	6.5	2.5	100	1.150	**3402 20 7**	
967	M8	28	8.5	2.5	100	1.100	**3402 21 5**	

Washer with a larger outer diameter for universal use.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-BS	1	8.000	**7202 28 6**	

Additional kit for FPS assembly insulation system, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

FPS ready-assembled panel insulation

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

PYROSIT FBS90 2-K foam insulation

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1894

Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	15 cm
Min. insulation thickness for cables > 18 mm.	20 cm
Max. site	20 x 20 cm
Max. core drill hole	20 cm
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	15 cm
Min. insulation thickness for cables > 18 mm.	20 cm
Max. site	20 x 20 cm
Max. core drill hole	20 cm

OBO PYROSIT fire protection foam is the ideal solution for closing small openings in walls and ceilings. It can be used to provide quick, simple insulation for cables, cable support systems and even pipes. Plastic electrical installation pipes can be passed through assigned or unassigned.
Without an additional coating, the 2-K foam can be used in solid walls and ceilings and also in lightweight partitions with metal stand-off structures.
Additional applications are insulation in screed-covered underfloor systems and as pure insulation for non-combustible pipes.

System components

Cartridge, fire protection case, pistol, mixing tube, additional kit, wall plate

Wall application area

Installation is approved in masonry according to DIN 1053-1 or concrete or reinforced concrete to DIN 1045; and for lightweight partitions with metal sub-construction (LTW).

Ceiling area of application

Approved installation in ceilings made of concrete or reinforced concrete to DIN 1045.

Approved penetrations, cables

Approved assignment (max. 60%) with all kinds of electrical cables, except hollow-core cables; and for cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

PYROSIT FBS90 2-K foam insulation

Approved penetrations, pipes

According to the separate test certificate, non-combustible pipes (steel/copper) may be insulated. A combination with cables is not permitted. For mounting information, please see the pipe insulation systems.

Tuning

In thinner walls, tuning must be made from non-combustible materials.

Frame installation

Alternatively, for thinner walls, rungs with an overhang can be attached to the opening. In lightweight partitions, closure to the mineral wall is essential.

Mounting preparations

De-dust the component layer. Screw the mixing tube onto the inserted cartridge and apply the 2-K foam into the opening with short interruptions.

Processing

After mounting, carefully cut the hardened foam so that it is flush with the surface.

Ceiling shell aid

With ceiling openings, it is wise to fasten some card as a shelling aid. Cast PVC shelling pipes may remain in the opening.

Create ceiling insulation

Apply foam to the opening. Briefly interrupt pressing to allow foaming to take place.

Labelling

Completion and fastening of the identification plate. Handing over the declaration of agreement to the client.

Installation at a later date

Drill through the hardened foam with a sharp object. After installing the additional cables, close off the remainder as with first setup.

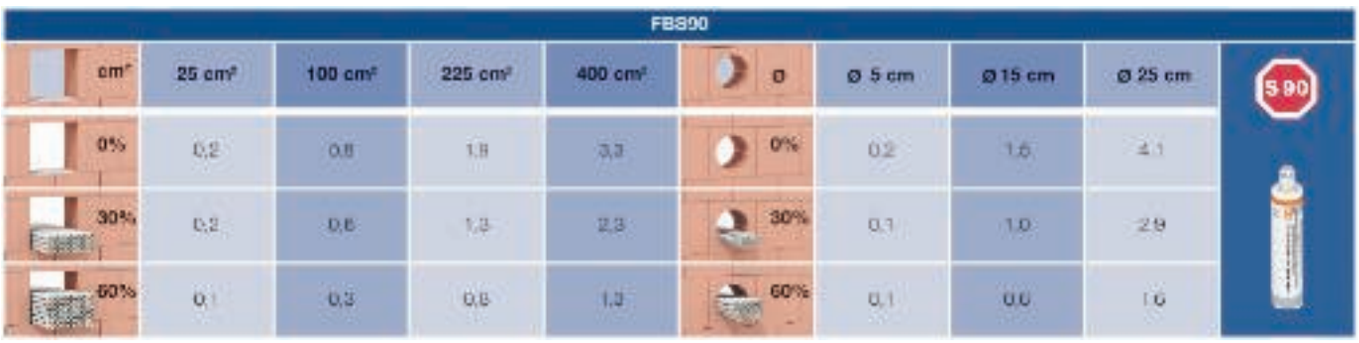
Finished insulation

Finished insulation with labelling for identification.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

PYROSIT FBS90 2-K foam insulation



PYROSIT FBS90 fire protection foam

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-S	0.28	1	53.000	**7208 22 0**	

PYROSIT 2-K fire protection foam in a cartridge, fire resistance class S 90. Including mixing tube. In dry, frost-free rooms, the fire protection foam can be stored for up to six months at a temperature of +5 °C to +30 °C. Processing with normal 1-K pistol.

Note: The 2-K cartridge pistol, type FP520, can still be used. For this, remove the adapter at the plunger opening of the cartridge.

PYROSIT fire protection case

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-K	1	340.000	**7208 22 8**	

The PYROSIT FBS90 fire protection case contains a complete collection of all the products required for mounting installation. The complete set consists of: 2 x FBS90-S, 1 x FBS90-P, 1 x FBS90-M and 1 x FBS90-BS.

PYROSIT cartridge pistol

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-P	2	100.000	**7208 22 4**	

High-quality 1-K cartridge pistol for use with the PYROSIT FBS90 2-K fire protection foam. A special 2-K pistol is not required as the cartridge is fitted with an adapter. The cartridge pistol can also be used with normal 300 mm cartridges.

PYROSIT mixer pipe

Type	Pack. PU	Weight kg/PU	Item No.	Price /pack unit
FBS90-M	1	12.500	**7208 23 2**	

10 mixing tubes and 10 extension tubes in the set for PYROSIT FBS90 2-K fire protection foam.

PYROSIT additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-BS	1	5.000	**7208 23 6**	

Additional kit for PYROSIT FBS90 2-K fire protection foam system, contains all the documents for approved mounting/documentation and an identification plate with anchors to indicate the cable insulation.

Always indicate the article number when ordering.

PYROSIT FBS90 2-K foam insulation

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

KBK bag insulation

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-262

Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	35 cm
Max. solid insulation width (LTW)	100 cm (100 cm)
Max. solid insulation height (LTW)	150 cm (100 cm)
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	35 cm
Max. insulation thickness	60 cm
Max. insulation length	Unlimited

OBO KBK are fire protection bags for cables which can be formed into any shape for simple, quick and absolutely tidy, dust-free creation of cable insulation for cable support structures. The bags can be used for permanent or temporary insulations in walls and ceilings. Additional cables can be installed quickly, tidily and economically at a later date, as the bags can be used several times over. The bags consist of a close-knit, dense and mechanically solid glass fabric with a special filling. The shell and the filling are free of asbestos and mineral fibres and are also weatherproof and waterproof.
The temperatures created during a fire trigger the reaction of the bags at approx. 130 °C, the bags stick to each other, at 240 °C, they foam up, closing off small residual openings. At above approx. 700 °C, the bags form a mechanically safe and smoke-proof closure.

System components

Fire protection bags for cables, fibre silicate plate, steel wire grid, additional kit, wall plate

Wall insulation area of application

Wall structure: masonry to DIN 1053-1; concrete or reinforced concrete to DIN 1045, porous concrete plates to DIN 4166; light stand-off partitions (LTW) with steel sub-construction.

Ceiling insulation application area

Ceiling structure: concrete or reinforced concrete to DIN 1045, porous concrete to DIN 4223.

Executability application

Approved assignment (max. 60%) with electrical cables of all kinds, except hollow cables. Cable bundles with external diameter of max. 15 cm (diameter of individual cable in a bundle max. 21 mm).
Cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

KBK bag insulation

Dry construction walls application

Installation of additional supports and locks to form a layer of insulation. The wall planking must be fastened on these sheet steel profiles. For installation sizes of less than 30 cm x 30 cm, an alternative is an all-round insulation layer made of non-combustible construction plates, which is surface-flush.

Mounting of cable insulation

Install the fire protection bag for cables laying flat in a longitudinal direction in the wall penetration and with a layered offset. For wall thicknesses of less than 20 cm, and in light partition walls, lay the fibre silicate plate KBK-FP... symmetrically on the bottom layer. Cables with an external diameter of max. 22 mm may be arranged in two layers. The spandrels need not be closed.

Finished insulation with wall plate

Completely and tightly close off the penetration using various sizes of bag. Filling out of the wall plate and fastening next to the insulation. Filling out of the declaration of agreement and handing over to the client.

Mounting preparations for ceiling insulation

Installation of KBK-SG... steel wire grid on the bottom side of the ceiling using steel anchors with construction approval (at least M8, washer d = 25–30 mm, anchor spacing 150–200 mm).

Mounting of ceiling insulation

Stacking of the fire protection bag, laying flat and in layers, up to minimum insulation thickness of 35 cm.

Mounting of protection grid

For ceiling thicknesses under 35 cm from above, mount a wire grid on the stacked bags as protection against the bags slipping (wire d = 2 mm, grid width 25 x 50 mm, fastened with anchors/bolts of at least 6 mm, washer d = 25–30 mm, anchor distance 150–200 mm).

Finished ceiling insulation

Filling out of the wall plate and fastening next to the insulation.
Filling out of the declaration of agreement and handing over to the client.

Installation at a later date

Remove bags from the insulation. After cable installation, close the penetration as on first construction.

Finished cable insulation

Material consumption

KBK

cm²	100 cm²	200 cm²	500 cm²	1000 cm²	5000 cm²
0%	0 x KBK 1 + 1 x KBK 2 + 2 x KBK 3	0 x KBK 1 + 1 x KBK 2 + 4 x KBK 3	0 x KBK 1 + 2 x KBK 2 + 10 x KBK 3	0 x KBK 1 + 6 x KBK 2 + 18 x KBK 3	0 x KBK 1 + 8 x KBK 2 + 101 x KBK 3
30%	3 x KBK 1 + 1 x KBK 2 + 1 x KBK 3	4 x KBK 1 + 2 x KBK 2 + 2 x KBK 3	4 x KBK 1 + 5 x KBK 2 + 6 x KBK 3	4 x KBK 1 + 11 x KBK 2 + 13 x KBK 3	20 x KBK 1 + 54 x KBK 2 + 63 x KBK 3
60%	3 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 3 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 6 x KBK 2 + 2 x KBK 3	6 x KBK 1 + 12 x KBK 2 + 4 x KBK 3	29 x KBK 1 + 60 x KBK 2 + 21 x KBK 3

The number of fire protection bags for cables stated is only an estimate. The exact number can only be determined during installation.

Always indicate the article number when ordering.

KBK bag insulation

Fire protection bag for cables

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KBK-1	350 x 120 x 10	20	18.000	**7202 70 9**	
KBK-2	350 x 170 x 23	20	33.000	**7202 72 5**	
KBK-3	350 x 170 x 40	10	63.000	**7202 74 1**	

Fire protection bags for cables, fire resistance class S 90, DIBt approvals Z-19.15-1115 and 1119.

Fibre silicate plate

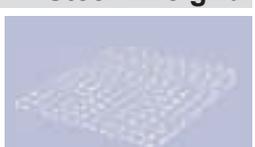
Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KBK-FP1	500 x 250 x 30	1	110.500	**7202 90 3**	
KBK-FP2	1,000 x 250 x 30	1	211.000	**7202 91 1**	

Fibre silicate plate as support for KBK bag insulation system.

Steel wire grid

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KBK-SG1	500 x 600	1	135.000	**7202 96 2**	
KBK-SG2	600 x 1,000	1	270.000	**7202 97 0**	

Steel wire grid for KBK bag insulation system; as a support and protection grid for ceiling insulation.



Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KBK-BS	1	7.000	**7202 82 2**	

Additional kit for KBK bag insulation system, contains all the documents for approved installation/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

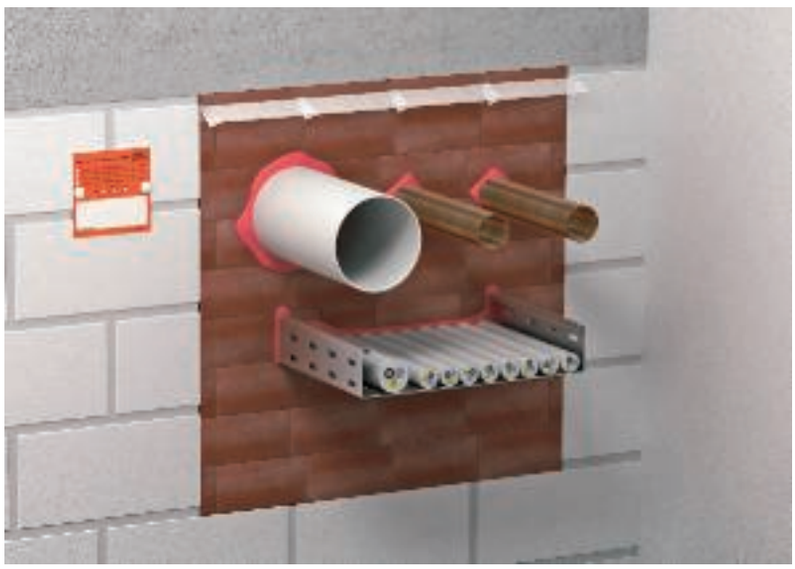
Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

FBA-B200 foam block insulation

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1849



Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	20 cm
Max. solid insulation width (LTW)	100 cm (84 cm)
Max. solid insulation height (LTW)	100 cm (57 cm)
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	20 cm
Max. insulation thickness	70 cm
Max. insulation length	Unlimited

The OBO FBA-B200 combination insulation is created from foam blocks, which, if there is a fire, expand without any noticable pressure creation. In so doing, they form an insulating carbon foam. This reliably prevents the penetration of fire and smoke through the cable insulation.
Combustible pipes can be run in this insulation without an additional sleeve. Copper and steel pipes can be insulated with or without path insulation.
All the FBA-B200 insulation is completely dust and fibre-free. This also applies to any installations at a later date. This is an aspect which is particularly important for installation in IT and laboratory rooms.

System components

Block, vacuum block, fire protection filler, additional kit, wall plate

Wall application area

Approved installation in masonry to DIN 1053-1, concrete or reinforced concrete to DIN 1045, porous concrete plates to DIN 4166, lightweight stand-off partitions with steel sub-construction.

Ceiling area of application

Approved installation in ceilings made of concrete or reinforced concrete to DIN 1045 or porous concrete to DIN 4223.

Approved penetration, electrical

Approved assignment (max. 60%) with all kinds of electrical cables, except hollow-core cables; cable support systems made of steel, aluminium or plastic profiles. Plastic electrical installation pipes, assigned and unassigned to 20 mm.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000443)

Always indicate the article number when ordering.

FBA-B200 foam block insulation

Approved penetration, sanitary

Approved assignment (max. 60%) with combustible and non-combustible sanitary pipes, also in combination with electrics. Combustible pipes do not require additional sleeves.

Tuning

In thinner walls, tuning must be made from non-combustible materials. In lightweight partitions, there must be an all-round closure layer to the mineral wool installed.

Mounting of blocks

Cut the two internal pieces to fit with a knife according to the assignment. Tight-fitting installation must be guaranteed.

Mounting of vacuum block

Place the vacuum block in the remaining residual opening. Cut the plastic sleeve of the vacuum block, so that it can again swell to its original size.

Closing of remaining joints

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Finished electrical insulation

Completion and fastening of the identification plate. Handing over the declaration of agreement to the client.

Finished insulation with tuning

Finished insulation in a lightweight partition with tuning to the required minimum insulation thickness.

Closing of remaining joints

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Ceiling insulation

Tight-fitting installation of the cut blocks in the ceiling penetration. The elastic blocks clamp each other tight in the penetration.

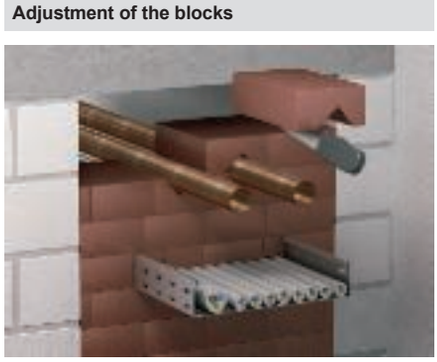
Installation at a later date

Removal of individual blocks from the insulation or cutting opening of individual blocks.
Close off the penetration as with first construction.

Non-combustible pipes

Pipes can be passed through together with electrical installations as combination insulation.

Adjustment of the blocks



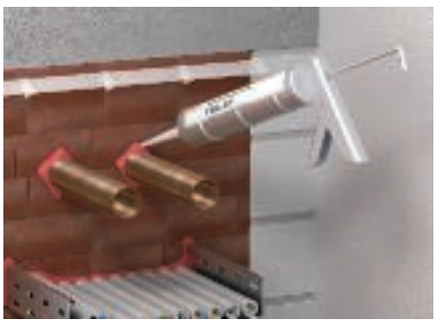
Blocks are adapted to the pipes in exactly the same way as with an electrical installation. Tight-fitting installation must be guaranteed.

FBA-B200 foam block insulation

Insert the vacuum block

Place the vacuum block in the remaining residual opening. Cut the plastic sleeve of the vacuum block, so that it can again swell to its original size.

Closing of remaining joints



Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Finished combination insulation

Attach the identification plate, complete the declaration of agreement and hand it to the client.

Finished combination insulation with tuning

Finished combination insulation in a lightweight partition with tuning to provide the required wall thickness.

Executed path insulation

According to the approval, the insulating materials of the non-combustible pipes may either be run through the insulation or end in front of it.

Continuous insulation

The insulation of non-combustible pipes can be placed on the insulation surface.

Closing of remaining joints

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Ceiling insulation of non-combustible pipes

Construction is carried out in the same way as for ceiling insulation with electrical equipment.

Combustible pipes

Combustible plastic pipes (sanitary) may be passed through without additional measures. As described above, the blocks are adjusted so that they fit tightly.

Closing the remaining joints

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Finished combination insulation

Real combination insulation with the option of multi-structure closing of electrical and sanitary installations.

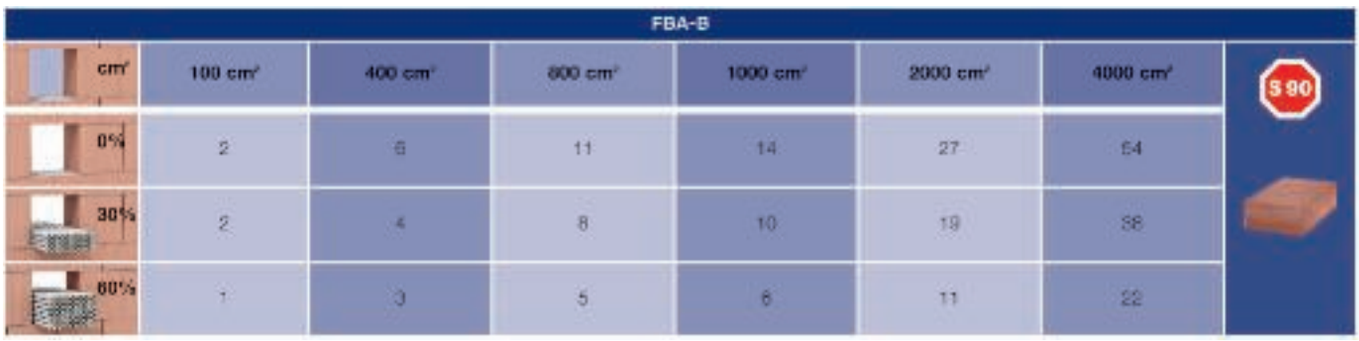
Stretched grid for ceiling insulation

To prevent the blocks from sagging should the plastic pipe burn, then a stretched grid must be mounted to stabilise the underside.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000443)

Always indicate the article number when ordering.

FBA-B200 foam block insulation



FBA-B200 block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B200	200 x 120 x 60	20	40.000	**7202 50 6**	

Foam block for combination insulation, fire resistance class S 90, DIBt approval Z-19.15-1849.

FBA-BV200 vacuum block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-BV200	200 x 120 x 25	10	40.000	**7202 51 6**	

Vacuum block, fire resistance class S 90 DIBt approval Z-19.15-1849. On cutting the film, the vacuum block expands to its original size.

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Steel wire grid

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KBK-SG1	500 x 600	1	135.000	**7202 96 2**	
KBK-SG2	600 x 1,000	1	270.000	**7202 97 0**	

Steel wire grid for KBK bag insulation system; as a support and protection grid for ceiling insulation.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B200-BS	1	4.500	**7202 54 0**	

Additional kit for FBA-B200 combination insulation, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Always indicate the article number when ordering.

FBA-B200 foam block insulation

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

FBA-B120 foam block insulation

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1850

Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	12 cm
Max. solid insulation width (LTW)	100 cm (87.5 cm)
Max. solid insulation height (LTW)	100 cm (57.5 cm)
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	12 cm
Max. insulation thickness	70 cm
Max. insulation length	Unlimited

The OBO FBA-B120 cable insulation is created from foam blocks, which, if there is a fire, expand without any noticable pressure creation. In so doing, they form an insulating carbon foam. This reliably prevents the penetration of fire and smoke through the cable insulation.
The insulation system is particularly suitable for regular retro-installations in the fields of telecommunications and IT. Here, it is primarily smaller cable cross-sections which are used. Should, in exceptional circumstances, larger cables be passed through, there is no need to remove the FBA-B120 insulation system. The intumescent coil is used here, in order to provide appropriate heat insulation.
All the FBA-B120 insulation is completely dust and fibre-free. This also applies to any installations at a later date. This is an aspect which is particularly important for installation in IT and laboratory rooms.

System components

Block, vacuum block, fire protection filler, fire protection coil, additional kit, wall plate

Wall application area

Approved installation in masonry to DIN 1053-1, concrete or reinforced concrete to DIN 1045, porous concrete plates to DIN 4166, lightweight stand-off partitions with steel sub-construction.

Ceiling area of application

Approved installation in ceilings made of concrete or reinforced concrete to DIN 1045 or porous concrete to DIN 4223.

Approved penetration

Approved assignment (max. 60%) with all kinds of electrical cables, except hollow-core cables; cable support systems made of steel, aluminium or plastic profiles. Plastic electrical installation pipes, assigned and unassigned to 20 mm.

Always indicate the article number when ordering.

FBA-B120 foam block insulation

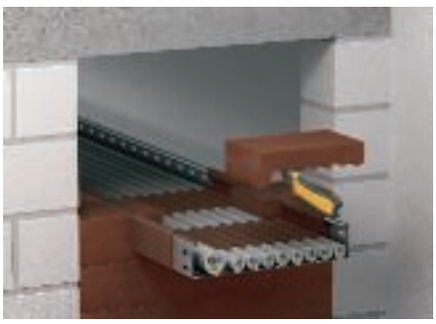
Tuning

In thinner walls, tuning must be made from non-combustible materials. In lightweight partitions, there must be an all-round closure layer to the mineral wool installed.

Cable coil

If there are cables with a diameter of more than 18 mm on the support system, then the intumescent coil must be stuck on both sides of the wall, following the contour.

Mounting of blocks



Cut the two internal pieces to fit with a knife according to the assignment. Tight-fitting installation must be guaranteed.

Mounting of vacuum block

Place the vacuum block FBA-BV 200 crosswise in the remaining residual opening. Cut the plastic sleeve of the vacuum block, so that it can again swell to its original size.

Closing of remaining joints

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Finished mounting

Completion and fastening of the identification plate. Handing over the declaration of agreement to the client.

Finished insulation with tuning

Finished insulation in a lightweight partition with tuning to the required minimum insulation thickness.

Individual cable with coil

For cables with diameters greater than 18 mm, the self-adhesive coil on both sides of the individual must be stuck in a single layer around the cable along a length of 15 cm.

Installation at a later date

Removal of individual blocks from the insulation or cutting opening of individual blocks.
Close off the penetration as with first construction.

Closing of remaining joints

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the FBA-SP fire protection compound.

Ceiling insulation

Tight fitting installation of the cut blocks in the ceiling penetration. The elastic blocks clamp each other tight in the penetration.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-B120 foam block insulation

FBA-B120						
cm²	100 cm²	400 cm²	800 cm²	1000 cm²	2000 cm²	4000 cm²
0%	0.5	2.0	4.0	5.0	10	20
30%	0.4	1.4	2.8	3.5	7.0	14
60%	0.2	0.8	1.6	2.0	4.0	8.0

FBA-B120 block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B120	250 x 120 x 80	10	66.000	**7202 50 8**	

Foam block for cable insulation, fire resistance class S 90, DIBt approval Z-19.15-1850.

FBA-BV200 vacuum block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-BV200	200 x 120 x 25	10	40.000	**7202 51 6**	

Vacuum block, fire resistance class S 90 DIBt approval Z-19.15-1849. On cutting the film, the vacuum block expands to its original size.

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

FBA-WI fire protection coil

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-WI	1,000 x 150	2	0.000	**7202 51 0**	

Intumescent cable coil for use in cable insulation FBA-B120 for cable diameters > 18 mm (also on executed cable support systems).

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B120-BS	1	4.500	**7202 54 3**	

Additional kit for FBA-B120 cable insulation, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

FBA-B120 foam block insulation

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

FBA-F box insulation

DIBt

Fire resistance classes S 30 and S 90
DIBt approval Z-19.15-1557

Approved insulation diameters, wall mounting		
Fire resistance class	S 30	S 90
Lightweight partition wall thickness, min.	7.5 cm	10 cm
Min. insulation thickness	12 cm	20 cm
Max. insulation width (group)	50 cm	50 cm
Insulation height (group) max.	50 cm	50 cm
Approved insulation diameters, ceiling mounting		
Fire resistance class	S 30	S 90
Ceiling thickness min.	15 cm	15 cm
Min. insulation thickness	12 cm	20 cm
Max. insulation width (group)	50 cm	50 cm
Insulation length (group) max.	50 cm	50 cm

OBO FAF-F is a special system for simple mounting of cable insulation in lightweight partitions (LTW). Installation in solid walls and ceilings is also possible and approved. The corner assembled plate insulation consists of a two-part frame and two matching internal pieces. A permanently elastic mixture is used for the internal pieces, whilst a solid mixture of the foam is used for the frame sections. Only the prefabricated components of the insulation system are required to mount the assembled plate insulation. As the internal area of the frame is exactly 60% of the external area, it is impossible to over assign the frame with cables. This usable area corresponds to the maximum approval cable assignment.

System components

Finished coating frame, internal piece, fire protection compound, additional kit, wall plate

Wall application area

Wall insulation
Insulation thickness: for class S 30 min. 12 cm
For class S 90: min. 20 cm
Wall structure: masonry to DIN 1053-1
Concrete or reinforced concrete to DIN 1045
Porous concrete plates to DIN 4166
Lightweight stand-off partitions with steel sub-construction

Ceiling area of application

Ceiling insulation
Insulation thickness: for class S 30 min. 12.5 cm
For class S 90: min. 20 cm
Ceiling structure: concrete or reinforced concrete according to DIN 1045
Porous concrete according to DIN 4223

Executability application

Area of use:
Electrical cables of all kinds.
Cable bundles with external diameter of max. 10 cm (diameter of individual cable in a bundle max. 21 mm).
Maximum cable assignment 60%.
Cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-F box insulation

Mounting preparations

Saw a hole in the lightweight partition with a compass saw.

Tuning

In thinner walls, tuning must be made from non-combustible materials.

Mounting of frame sections

Central insertion of the two frame sections in the opening.

Closing of frame

Close off the remaining surrounding joints with a min. 2 cm thick layer of filler or the fire protection compound. Close both sides of walls and just the underside of ceilings.

Installed cables

With previously installed cables, place the two rung sections over the cables.
Insert the rung sections in the wall opening.

Closing of frame

Close off the remaining surrounding joints with a min. 2 cm thick layer of filler or the fire protection compound.

Mounting of cable insulation

Exact cutting of the two internal pieces with a knife according to cable assignment.
Flush insertion of the cut internal pieces in the frame.

Closing of cables

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the fire protection compound.

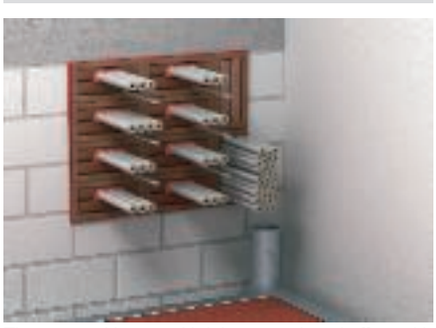
Closing with full assignment

When the cable assignment in the box with inlays is complete, close all the spandrels between the cables with at least 2 cm of the fire protection compound.

Frame group arrangement

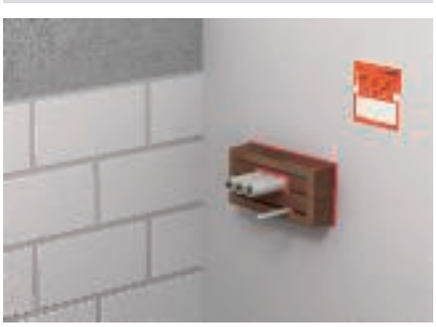
When the boxes are arranged in groups, there is no need to screw them to the component opening nor to each other. Joints between the individual rungs and the component openings should be filled with at least 2 cm of fire protection compound on both sides of the insulation.

Closing of cables



The grouped boxes with inlays are closed off as with individual boxes. Boxes with inlays without cable assignment (residual openings) should only be filled with the internal pieces.

Finished insulation with wall plate



Filling out of the wall plate and fastening next to the insulation.
Filling out of the declaration of agreement and handing over to the client.

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Always indicate the article number when ordering.

FBA-F box insulation

Installation at a later date

Pulling out the internal pieces from the box with inlays, cutting open or careful drilling of the internal pieces. After installing the cables, close off the penetration as with first construction.

Finished cable insulation

FBA-F box with inlays

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-F	200 x 200 x 100	1	122.000	**7202 66 0**	

Box with inlays, fire resistance classes S 30 and S 90, DIBt approval Z-19.15-1557. Scope of delivery: 1 two-part frame, 2 internal pieces.

FBA-FI internal piece

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-FI	200 x 175 x 35	14	36.000	**7202 66 4**	

Internal piece for FBA-F box with inlays, also as a replacement for any cable retro-installations.

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-F-BS	1	4.500	**7202 67 2**	

Additional kit for FBA-F assembly insulation system, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

FBA-S plug insulation

FBA-S S30 S90 DIBt

Fire resistance classes S 30 and S 90
DIBt approval Z-19.15-1558

Approved insulation diameters, wall mounting		
Fire resistance class	S 30	S 90
Min. wall thickness	5 cm	10 cm
Min. insulation thickness	12 cm	15 cm
Max. core drill hole	25 cm	25 cm
Approved insulation diameters, ceiling mounting		
Min. ceiling thickness	S 30	S 90
Ceiling thickness min.	15 cm	15 cm
Min. insulation thickness	12 cm	15 cm
Max. core drill hole	25 cm	25 cm

OBO FBA-S is available in eight different sizes. They consist of a permanently elastic, closed-pore foam. The FBA plugs are the ideal solution for simple creation of round cable insulation in walls and ceilings. It is also possible to use FBA plugs to close core drill holes, which were only created as reserve openings for later cable installations. Mounting is completely tidy and dust and fibre-free. This also applies to any necessary cable installations at a later date.
Therefore, the plugs can be easily used in IT and laboratory rooms. Special tools are not required for processing, a knife is sufficient. If there is a fire, the FBA plugs expand, thus creating an insulating carbon foam. Although the insulating carbon foam does not create any significant pressure increase, the cable insulation securely prevents the spread of fire and smoke.

System components

Plug, fire protection compound, additional kit, wall plate

Wall insulation area of application

Wall insulation
Insulation thickness: for class S 30 min. 12 cm
For class S 90 min. 15 cm
Wall structure: masonry to DIN 1053-1
Concrete or reinforced concrete to DIN 1045
Porous concrete slabs to DIN 4166

Ceiling insulation application area

Ceiling insulation
Insulation thickness: for class S 30 min. 12 cm
For class S 90 min. 15 cm
Ceiling structure: concrete or reinforced concrete to DIN 1045
Porous concrete to DIN 4223

Executability application

Area of use:
Electrical cables of all kinds.
Cable bundles with external diameter of max. 10 cm (diameter of individual cable in a bundle max. 21 mm).
Maximum cable assignment 60%.
Cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000443)

Always indicate the article number when ordering.

FBA-S plug insulation

Tuning application

If the component is not thick enough, then mouldings from non-combustible plates are required.
Fastening is carried out using steel bolts at a spacing of max. 25 cm.

Tuning application

Alternatively, the finished part insulation FBA-SR can be used instead of the moulding. There is then no need for the moulding.

Mounting preparations

The two halves of the pipe shell of the finished insulation should be filled in the wall with 2 cm of fire protection compound.

Mounting of cable insulation

Exact cutting of the required plugs using a knife according to cable assignment.

Mounting of cable insulation

On both sides of the penetration, insert two plugs which have been cut to size and fit tightly and flush with the wall surface. There is no need to close or fill any spaces between the two plugs.

Closing of cables

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the fire protection compound.

Mounting of cable insulation

Alternatively, the cables can be arranged on the floor of the penetration layer.

Mounting of ceiling insulation

Insert the two specially cut plugs flush to the top and bottom sides of the ceiling.

Closing of ceiling insulation

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the fire protection compound on both sides.

Finished insulation with wall plate

Filling out of the wall plate and fastening next to the insulation.
Filling out of the declaration of agreement and handing over to the client.

Installation at a later date

Cutting, careful drilling of the plug or pulling out the plug from the insulation. After cable installation, close the penetration as on first construction.

Finished insulation

When retro-installation is complete, attach the new wall plate and complete the declaration of agreement.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

FBA-S plug insulation

FBA-S plug

Type	For opening Ø mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-S65	65	20	8.000	**7202 55 1**	
FBA-S78	78	20	11.000	**7202 55 5**	
FBA-S107	107	20	19.000	**7202 55 9**	
FBA-S122	122	20	23.100	**7202 56 3**	
FBA-S134	134	20	28.600	**7202 56 7**	
FBA-S165	165	20	43.200	**7202 57 1**	
FBA-S200	200	20	67.000	**7202 57 5**	
FBA-S250	250	10	86.500	**7202 57 9**	

Plug, fire resistance classes S 30 and S 90, DIBt approval Z-19.15-1558.
Protect the FBA plugs against contact with water, as otherwise this will have a negative influence on the foaming behaviour in the case of fire.

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-S-BS	1	4.500	**7202 59 2**	

Additional kit for FBA-S foam plug insulation system, contains all the documents for approved installation/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-SR pipe shell insulation

DIBt

Fire resistance classes S 30 and S 90
DIBt approval Z-19.15-1558

Approved insulation diameters, wall mounting		
Fire resistance class	S 30	S 90
Lightweight partition wall thickness, min.	7.5 cm	10 cm
Min. insulation thickness	12 cm	15 cm
Approved insulation diameters, ceiling mounting		
Fire resistance class	S 30	S 90
Min. ceiling thickness	15 cm	15 cm
Min. insulation thickness	12 cm	15 cm

OBO FBA-SR is the ideal solution for round cable insulation, especially in lightweight partition walls (LTW). Installation in solid walls and ceilings is also possible and approved. The round assembled plate insulation consists of a two-part, fixed pipe shell with an external diameter of 140 mm and two matching FBA plugs. The two plugs are made of a permanently elastic mixture, whilst the pipe shell is made of a solid mixture.
Only the prefabricated components of the insulation system are required to mount the insulation.
Additional materials are not required. The internal diameter of the pipe shell is selected so that the resulting area is exactly 60% of the total insulation area. This means that the pipe shell can be completely filled with cables without any risk of over assignment.

System components

Pipe shell, plug, fire protection compound, additional kit, wall plate

Wall insulation area of application

Wall insulation
Insulation thickness: for class S 30 min. 12 cm
For class S 90: min. 15 cm
Wall structure: masonry to DIN 1053-1, concrete or reinforced concrete to DIN 1045, porous concrete plates to DIN 4166, lightweight stand-off partitions with steel sub-construction.

Ceiling insulation application area

Ceiling insulation
Insulation thickness: for class S 30 min. 12.5 cm
For class S 90: min. 15 cm
Ceiling structure: concrete or reinforced concrete according to DIN 1045
Porous concrete according to DIN 4223

Executability application

Area of application:
All kinds of electrical cables.
Cable bundles with external diameter of max. 10 cm (diameter of individual cable in a bundle max. 21 mm).
Maximum cable assignment 60%.
Cable support systems made of steel, aluminium or plastic profiles.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-SR pipe shell insulation

Mounting preparations

Saw a hole in the lightweight partition with a compass saw (diameter at least 145 mm).

Mounting of the pipe shells

Insert the two pipe shells, flush on one side or centrally, in the opening.

Mounting of cable insulation

Close off the remaining surrounding joints with a min. 2 cm thick layer of filler or the fire protection compound. Close both sides of walls and just the underside of ceilings.

Mounting with laid cables

With previously installed cables, place the two pipe shell sections over the cables.
Insertion of the pipe shell in the wall opening. Close off the remaining surrounding joints with a min. 2 cm thick layer of filler or the fire protection compound.

Mounting of cable insulation

Exact cutting of the two plugs with a knife according to cable assignment.

Insertion of the plugs

Flush insertion of the cut plugs in the pipe shell.

Closing of plugs

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the fire protection compound.

Close with full cable assignment

When the cable assignment in the pipe shell is complete, close all the spandrels between the cables with at least 2 cm of the fire protection compound.

Finished cable insulation with wall plate

Filling out of the wall plate and fastening next to the insulation.
Filling out of the declaration of agreement and handing over to the client.

Installation at a later date

Cutting, careful drilling of the plug or pulling out the plug from the insulation. After cable installation, close the penetration as on first construction.

Finished cable insulation

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

FBA-SR pipe shell insulation

FBA-SR pipe shell

Type	For opening Ø mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SR	140	4	73.000	**7202 58 6**	

Pipe shell, fire resistance classes S 30 and S 90, DIBt approval Z-19.15-1558. Scope of delivery: 1 two-part pipe shell, 2 plugs FBA-S107.

FBA-S107 plug

Type	For opening Ø mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-S107	107	20	19.000	**7202 55 9**	

Plug, fire resistance classes S 30 and S 90, DIBt approval Z-19.15-1558.
Protect the FBA plugs against contact with water, as otherwise this will have a negative influence on the foaming behaviour in the case of fire.

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-S-BS	1	4.500	**7202 59 2**	

Additional kit for FBA-S foam plug insulation system, contains all the documents for approved installation/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

FBA-D drilling crown insulation

DIBt

Fire resistance classes S 30 and S 90
DIBt approval Z-19.15-1559

Approved insulation diameters, wall mounting		
Fire resistance class	S 30	S 90
Lightweight partition wall thickness, min.	7.5 cm	10 cm
Min. insulation thickness	10 cm	10 cm
Approved insulation diameters, ceiling mounting		
Fire resistance class	S 30	S 90
Min. ceiling thickness	15 cm	15 cm
Min. insulation thickness	10 cm	10 cm

OBO FBA-D is the ideal solution for installing small round cable insulation quickly and simply, especially in lightweight partition walls (LTW). Installation in solid walls and ceilings is also possible and approved. The drilling crown insulation consists of a pipe shell with an external diameter of 78 mm and two matching plugs. A solid mixture of the foam is used for the pipe shell, whilst a permanently elastic mixture is used for the plugs. Tidy, especially simple, quick mounting is possible at any time as only the prefabricated components of the insulation system are required. The ratio of the external diameter to the internal diameter of the pipe shell ensures that over assignment with cables is not possible.

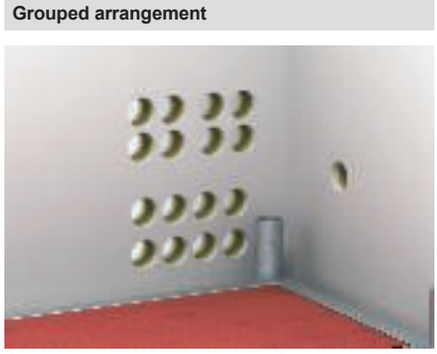
System components

Pipe shells, plug, fire protection compound, additional kit, wall plate

Wall insulation application

Wall insulation
Insulation thickness: min. 10 cm
Wall structure: masonry to DIN 1053-1
Concrete or reinforced concrete to DIN 1045
Porous concrete plates to DIN 4166
Lightweight stand-off partitions with steel sub-construction

Grouped arrangement



Grouped arrangement with up to four pipe shells is permitted. Spacing within the group at least 1 cm. Spacing between the groups at least 5 cm.

Ceiling insulation application area

Ceiling insulation
Insulation thickness: min. 10 cm
Ceiling structure: concrete or reinforced concrete according to DIN 1045
Porous concrete according to DIN 4223

05 BSS_Katalog_2008 / en / 17/03/2009 (LLexport_000443)

Always indicate the article number when ordering.

FBA-D drilling crown insulation

Executability application

Area of use:
Electrical cables of all kinds.
Maximum cable assignment 60%.

Mounting preparations

Drill a hole in the lightweight partition with a drilling crown (diameter at least 80 mm).

Mounting of pipe shell

Insertion of the pipe shell, flush on one side or centrally, in the drill hole.

Closing of pipe shell

Close off the remaining surrounding joints with a min. 2 cm thick layer of filler or the fire protection compound. Close both sides of walls and just the underside of ceilings.

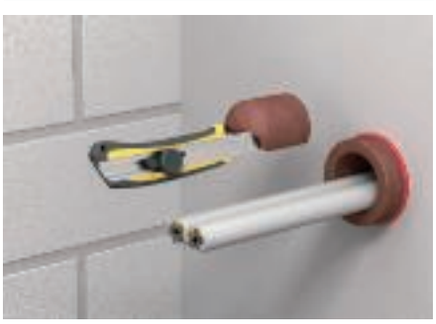
Installed cables

With previously installed cables, cut the pipe shell open and place it over the cables.
Insertion of the pipe shell in the component opening.

Closing of pipe shell

Close off the remaining surrounding joints with a min. 2 cm thick layer of filler or the fire protection compound.

Mounting of cable insulation



Exact cutting of the two plugs with a knife according to cable assignment.
Flush insertion of the cut plugs in the pipe shell.

Closing of cables

Close off all the remaining joints and gaps on both sides of the insulation with a min. 2 cm thick layer of the fire protection compound.

Close with full cable assignment

When the cable assignment in the pipe shell is complete, close all the spandrels between the cables with at least 2 cm of the fire protection compound.

Finished insulation with wall plate

Filling out of the wall plate and fastening next to the insulation.
Filling out of the declaration of agreement and handing over to the client.

Installation at a later date

Pulling out the plugs from the pipe shell, cutting open individual areas or careful drilling of the plugs. After installing the cables, close off the penetration as with first construction.

Finished cable insulation

Always indicate the article number when ordering.

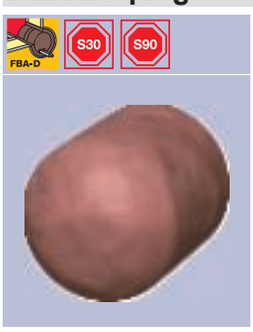
FBA-D drilling crown insulation

FBA-D drilling crown insulation

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-D100	100 x 78	4	15.500	**7202 62 4**	
FBA-D150	150 x 78	8	19.200	**7202 62 8**	

Drilling crown insulation, fire resistance class S 30, S 90, DIBt approval Z-19.15-1559. Scope of delivery: 1 pipe shell D = 78 mm, 2 plugs FBA-DS.

FBA-DS plug



Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-DS	32	4.500	**7202 63 6**	

Spare plug for drilling crown insulation for any cable retrofitting.

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-D-BS	1	4.500	**7202 64 4**	

Additional kit for drilling crown insulation system, contains all the documents for approved mounting/documentation and a wall plate with anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-SP small insulation

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1851

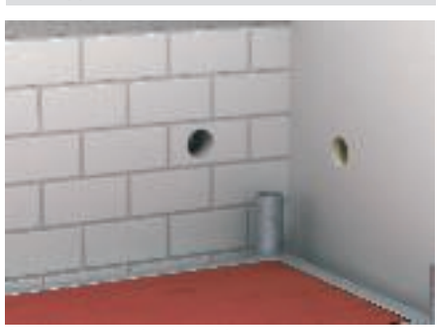
Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	10 cm
Max. core drill hole	8 cm
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	15 cm
Max. core drill hole	8 cm

OBO FBA-SP is the quick and simple option for creating small round cable insulations. If there is a fire, the fire protection filler expands, insulating any openings which have been created.
For cable insulation, core drill holes with an 80 mm diameter are created, which may then be assigned to up to 60% with cables. Then, FBA-SP is pressed into the residual opening.The insulation may also be installed in lightweight partitions (LTW). The assembled pipe shells FBA-DR are used to create the layers. The interior of these pipe shells may be completely assigned. Only the residual joints must be filled with the fire protection filler from the cartridge.

System components

Fire protection filler, pipe shells for lightweight partition, additional kit, wall plate

Wall application area

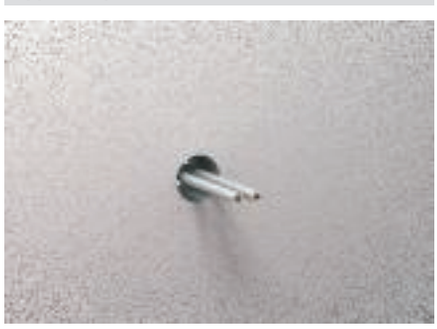


Approved mounting in solid masonry and concrete walls; with matching pipe shells, also usable in lightweight partition walls.

Ceiling area of application

The FBA-SP small insulation can also be used in solid concrete ceilings.

Approved penetrations



Approved assignment (max. 60%) with all kinds of electrical cables, except hollow-core cables. The pipe shell may be completely assigned in the lightweight partition.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-SP small insulation

Mounting of solid wall

Simply close the opening with the cables using a layer of at least 10 cm of the FBA-SP fire protection filler.

Finished insulation

Completion and mounting of the identification plate. Handover of the declaration of agreement to the client.

Mounting of lightweight partition wall

Place the pipe seal in the prepared opening.

Previously installed cables

If cables are to be insulated and have already been routed through the opening, the pipe shell can be cut open and laid around the cables.

Sticking of the pipe seal

Stick the pipe seal to both sides of the wall with the fire protection compound.

Filling of the remaining opening

Fill the residual opening around the cable with a layer at least 10 cm deep.

Complete assignment

The interior of the pipe shell may be completely assigned, as the 60% rule is not infringed.

Finished insulation in lightweight partition

Completion and mounting of the identification plate. Handover of the declaration of agreement to the client.

FBA-SP filler

Type	Contents	Pack.	Weight	Item No.	Price /pc.
	l	pcs	kg/% pc		
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-SP small insulation

Pipe shell

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-DR100	100 x 78	6	6.500	**7202 61 3**	
FBA-DR150	150 x 78	9	10.200	**7202 61 7**	

Pipe shell for use in FBA-SP small insulation in lightweight partitions.

Additional kit

Type	Item No.	Price /pc.
FBA-SP-BS	**7202 60 0**	

Additional kit for FBA-SP small insulation system, contains all the documents for approved mounting/documentation and a wall plate with anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

KBK-K bag insulation for PVC device installation duct

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1119

Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	35 cm
Min. duct size	4 x 4 cm
Max. duct size	21 x 8 cm
Approved insulation diameters, ceiling mounting	
Min. ceiling thickness	15 cm
Min. insulation thickness	35 cm
Min. duct size	4 x 4 cm
Max. duct size	21 x 8 cm

OBO KBK-K is the ideal solution for cable insulation in conjunction with cables installed in PVC cable duct. Insulation with the universally shapable fire protection bags for cables can be mounted very easily, quickly, tidily and without dust. As the bags are only mounted within the duct, the cable insulation cannot be seen from the outside. This is the precondition for a perfect cable duct installation, which is usually subjected to particular optical requirements. The bags can be used for permanent or temporary insulations in walls and ceilings. Additional cables can be installed quickly, tidily and economically at a later date, as the bags can be used several times over. The bags consist of a close-knit, dense and mechanically solid glass fabric with a special filling. The shell and the filling are free of asbestos and mineral fibres and are also weatherproof and waterproof.

System components

Fire protection cushion, holding bracket, packing set, wall sign

Wall insulation application area

Wall insulation
Insulation thickness: min. 35 cm
Wall structure: masonry acc. to DIN 1053-1
Concrete or reinforced concrete acc. to DIN 1045
Floor type light partitions with steel sub-construction

Ceiling insulation application area

Ceiling insulation
Insulation thickness: at least 35 cm
Ceiling structure: concrete or reinforced concrete to DIN 1045

Executability application

Area of application:
Any kind of electrical cable up to external diameter max. 20 mm.
Cable bundles with external diameter of max. 15 cm (diameter of individual cable in a bundle max. 20 mm).
Maximum cable assignment 60%.
Plastic cable ducts.

Always indicate the article number when ordering.

KBK-K bag insulation for PVC device installation duct

Mounted trunking

Continuous duct installation in penetration area.

Mounting preparations

It is advisable to leave an approximately 40 cm long piece of the lid symmetrically in the area of the penetration.
Completely close off the space between the routed duct or duct lid and the wall or ceiling penetration with a shape-retaining, non-combustible material (material class DIN 4102-A), e.g. cement mortar or plaster mortar.

Mounting of fire protection cushion

Install the fire protection bags for cables laying flat in a longitudinal direction within the duct.
There must always be at least one fire protection bag between the individual cable layers and between the cables and the cable duct.

Finished installation

Complete closing of the duct interior using three different bag sizes. Fill any spaces, in particular the spandrels between the cables.

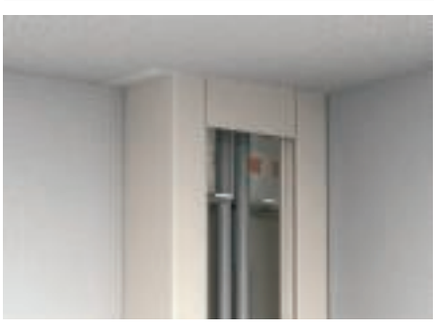
Close duct

Mount the duct lid and wall connection panel.

Prefabricated insulation with wall plate

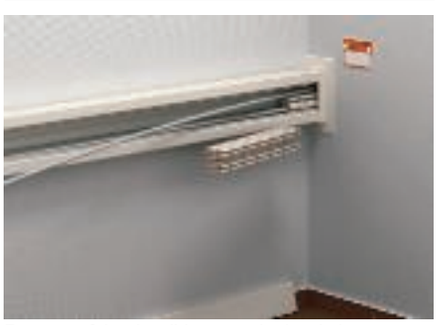
Filling out of the wall plate and fastening next to the insulation.
Filling out of the declaration of agreement and handing over to the client.

Mounting of ceiling insulation



To prevent the bags from slipping down in the duct, mount the retaining profile on the bottom side of the ceiling in the duct using PVC adhesive or anchors.
Vertical and parallel installation of the fire protection bags for cables to the cables in the cable duct.

Installation at a later date



Remove of the duct lid next to the insulation.
Remove of bags from the insulation
After cable insulation, close the duct interior as on first construction.

Prefabricated cable insulation

Material consumption

KBK-K

cm²	36 cm² (6 x 6 cm)	66 cm² (11 x 6 cm)	90 cm² (15 x 6 cm)	126 cm² (21 x 6 cm)	70,4 cm² (11 x 6,4 cm)	86,4 cm² (13,5 x 6,4 cm)	108,8 cm² (17 x 6,4 cm)
0%	2 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	2 x KBK 1 + 0 x KBK 2 + 1 x KBK 3	1 x KBK 1 + 2 x KBK 2 + 1 x KBK 3	1 x KBK 1 + 1 x KBK 2 + 2 x KBK 3	3 x KBK 1 + 0 x KBK 2 + 1 x KBK 3	2 x KBK 1 + 1 x KBK 2 + 1 x KBK 3	2 x KBK 1 + 0 x KBK 2 + 2 x KBK 3
30%	3 x KBK 1 + 0 x KBK 2 + 0 x KBK 3	3 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	2 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	2 x KBK 1 + 3 x KBK 2 + 0 x KBK 3	3 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	2 x KBK 1 + 2 x KBK 2 + 0 x KBK 3	3 x KBK 1 + 2 x KBK 2 + 0 x KBK 3
60%	2 x KBK 1 + 0 x KBK 2 + 0 x KBK 3	3 x KBK 1 + 0 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 0 x KBK 2 + 0 x KBK 3	3 x KBK 1 + 1 x KBK 2 + 0 x KBK 3	3 x KBK 1 + 0 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 0 x KBK 2 + 0 x KBK 3	4 x KBK 1 + 0 x KBK 2 + 0 x KBK 3

The number of fire protection bags for cables stated is only an estimate. The exact number can only be determined during installation.

Always indicate the article number when ordering.

KBK-K bag insulation for PVC device installation duct

Fire protection bag for cables

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KBK-1	350 x 120 x 10	20	18.000	**7202 70 9**	
KBK-2	350 x 170 x 23	20	33.000	**7202 72 5**	
KBK-3	350 x 170 x 40	10	63.000	**7202 74 1**	

Fire protection bags for cables, fire resistance class S 90, DIBt approvals Z-19.15-1115 and 1119.

Retaining profile

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /% pc
KBK-HW	10	0.360	**7202 80 6**	

Retaining profile for KBK-K bag insulation system, protection against bag slippage for ceiling insulation in PVC duct.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KBK-BS	1	7.000	**7202 82 2**	

Additional kit for KBK bag insulation system, contains all the documents for approved installation/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-BK foam block insulation for PVC and metal device installation ducts

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1558 in conjunction with surveyor's report

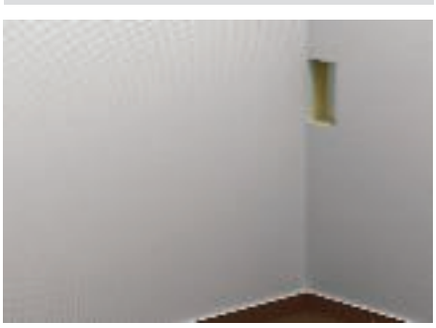
Approved insulation diameters, wall mounting	
Min. wall thickness	10 cm
Min. insulation thickness	15 cm (2 x 7.5 cm)
Max. duct cross-section	310 cm²
Thermal separation required!	

The OBO FBA-BK fire protection blocks are superbly suited as insulation for metal or plastic device installation duct. During installation, just two shaped fittings need be inserted on both sides of the wall. If there is a fire, then the block foams up, forming an insulating carbon foam. This ensures a fire and smoke gas-resistant insulation. Installation is tidy and completely free of dust and fibres.
For visual reasons, labelling can also take place within the duct. With retroinstallations, the appropriate identification plate is seen when the cover is opened.

System components

Block, fire protection compound, packing set, wall sign

Wall insulation area of application



Approved for solid walls and light partition walls.

Executability

Usable in metal or plastic device installation ducts.

Always indicate the article number when ordering.

FBA-BK foam block insulation for PVC and metal device installation ducts

Mounting preparations

When passing duct through walls, observe the surveyor's report. Fastening points and thermal separation may be required.

Closing of the wall opening

Insert short cover supports to close it. Close off remaining joints using a mineral mortar or the FBA-M fire protection compound.

Adjustment of the blocks

Using a knife, adjust the blocks to the contours of the cables in the duct.

Insertion of the blocks

Insert cut blocks tightly on both sides in the duct.

Closing of remaining joints

Fill the residual joints between the blocks and the cables as well as as the duct walls with a min. 2 cm thick layer of the FBA-M fire protection compound.

Installations at a later date

Punch through or remove mounted blocks with a screwdriver. Re-close the joints of the adjusted blocks using the FBA-M filler.

Cover and wall end piece

Adjustment of the cover and attachment of the wall end piece.

Finished cable insulation

Fill out the wall plate and attach it next to the insulation. Fill out the declaration of agreement and hand it to the client.

FBA-BK block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-BK	120 x 75 x 35	10	9.400	**7202 49 6**	

Foam block for device installation duct, fire resistance class S 90, DIBt approval Z-19.15-1558 in conjunction with surveyor's report.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-BK foam block insulation for PVC and metal device installation ducts

FBA-SP fire protection compound

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-S-BS	1	4.500	**7202 59 2**	

The packing set contains all the documents required for approved mounting and labelling of cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

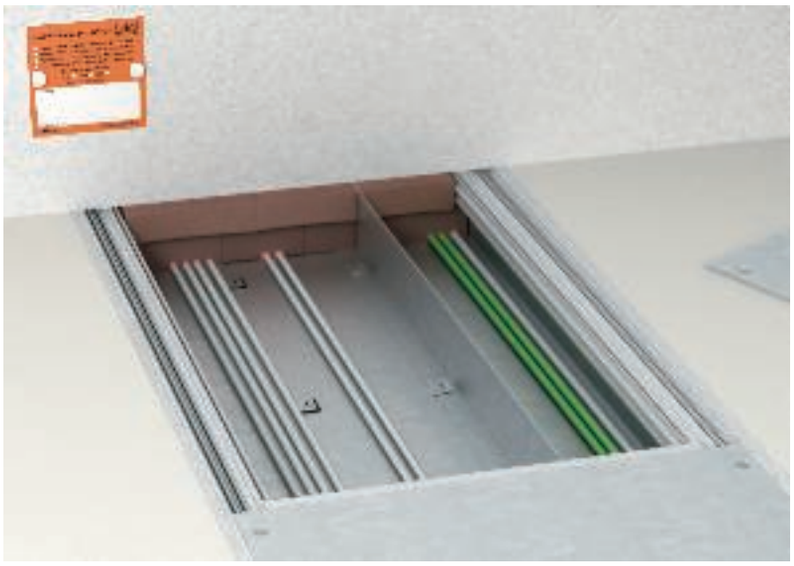
Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

FBA-B200 foam block insulation for flushfloor underfloor systems

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1849 in conjunction with surveyor's report



Approved insulation dimensions	
Min. insulation thickness	20 cm (2 x 10 cm)
Max. duct cross-section	600 x 160 mm
Plastic electrical pipe max.	20 mm

OBO FBA-B is the ideal cable insulation for use in screed-flush underfloor ducts. If, during an electrical installation, an underfloor duct passes below walls classified for fire protection, then the duct must be closed against smoke-gas penetration. For this, the duct lid is removed on both sides of the wall and the blocks inserted on both sides to a depth of 100 mm. For thinner walls, the blocks can be laid directly under the walls in a longitudinal direction without separation. The insulation thickness of 200 mm is thus achieved on account of the length of the block. Plastic installation pipes used for installation operations may also remain in the duct.

System components

Block, vacuum block, fire protection compound, packing set, labelling sign

Application area

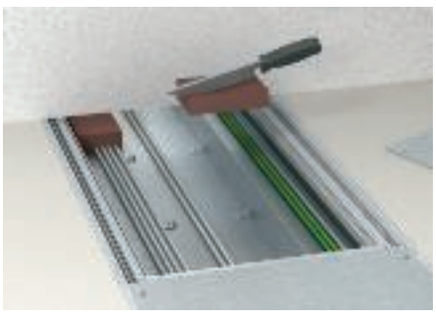
Flushfloor underfloor duct with removable inspection lid, dimensions max. 600 x 160 mm.
When installed, the insulation provides effective prevention of the spread of fire and smoke.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

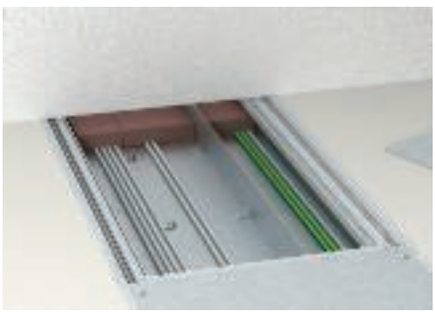
FBA-B200 foam block insulation for flushfloor underfloor systems

Preparations for installation



Adjustment of the foam blocks to the contours of the installed cables using a coarse knife.

Arrangement under the wall

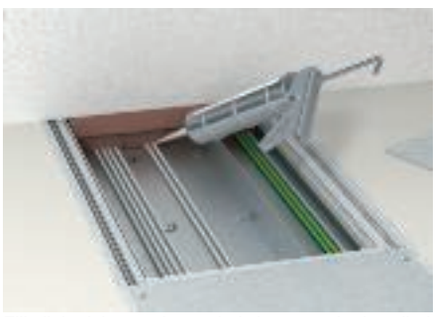


Selectable arrangement with gap on both sides of the wall (for thicker walls) or as whole block in complete length of 200 mm.

Vacuum block

Insert the vacuum block to close the residual opening. The film can remain in the insulation.

Remaining joints



Fill all the joints and spandrels between the installed cables and the blocks with a min. 2 cm thick layer of the FBA-M fire protection compound.

Labelling of the completed insulation

Fill out the identification plate and fasten it in the underfloor duct or on the wall. Then attach the lid. Fill out the declaration of agreement and hand it to the client.

Prefabricated insulation

Fitting of the duct lid on completion of the installation. This provides effective prevention of fire and smoke spread.

Material consumption S 90

FBA-B

cm²	100 cm²	400 cm²	800 cm²	1000 cm²	2000 cm²	4000 cm²
0%	2	6	11	14	27	54
30%	2	4	8	10	19	38
60%	1	3	5	6	11	22

S 90

FBA-B block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B200	200 x 120 x 60	20	40.000	**7202 50 6**	

Foam block for combination insulation and for use in flushfloor underfloor systems, fire resistance class S 90, DIBt approval Z-19.15-1849; for underfloor in conjunction with surveyor's comments.

FBA-BV vacuum block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-BV200	200 x 120 x 25	10	40.000	**7202 51 6**	

Vacuum block, fire resistance class S 90 DIBt approval Z-19.15-1849. On cutting the film, the vacuum block expands to its original size.

Always indicate the article number when ordering.

FBA-B200 foam block insulation for flushfloor underfloor systems

FBA-SP fire protection compound

DIBt B1

Type	Contents	Pack.	Weight	Item No.	Price /pc.
	l	pcs	kg/% pc		
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Additional kit

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc		
FBA-B200-BS	1	4.500	**7202 54 0**	

The packing set contains all the documents required for approved mounting and labelling of cable insulation.

Identification plate

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc		
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

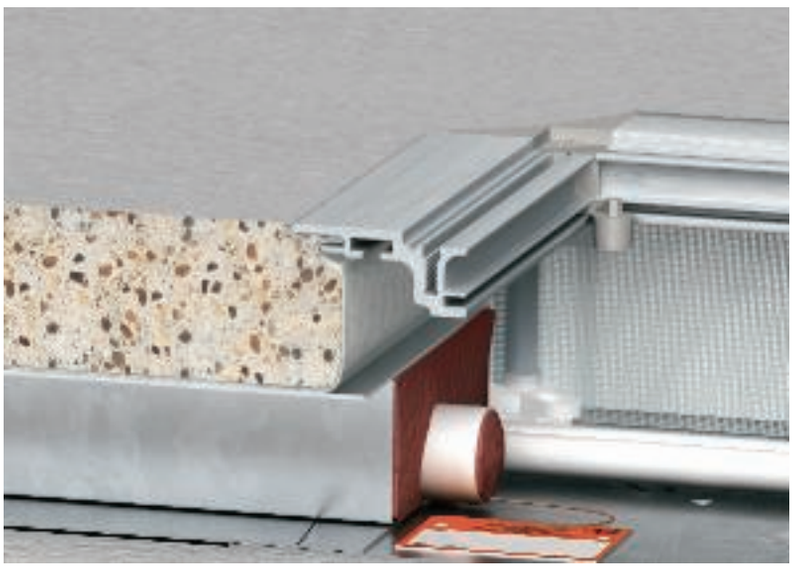
05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

PYROSIT 2-K foam insulation for screed-covered underfloor systems

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1894 in conjunction with surveyor's report



Approved insulation dimensions	
Min. screed thickness	35 mm
Min. insulation thickness	30 cm (2 x 15 cm)
Underfloor socket distance	Unlimited
Max. duct cross-section	350 x 50 mm
Plastic electrical pipe max.	Ø 20 mm

OBO PYROSIT 2-K fire protection foam is the ideal solution for closing screed-covered underfloor systems, which run below walls classified for fire protection or which connect two fire sections in the screed. This provides effective prevention of fire and smoke spread. The mixer pipe and extension pipe on the end of the cartridge allows easy mounting, even in underfloor boxes with difficult access. For cable installation at a later date, plastic electrical installation pipes with a max. diameter of 20 mm may be foamed.

System components

2-K fire protection foam, cartridge pistol, mixing tube, additional kit, identification plate

Area of application

Underfloor insulation in screed-covered duct, irrespective of the distance between the underfloor boxes.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

PYROSIT 2-K foam insulation for screed-covered underfloor systems

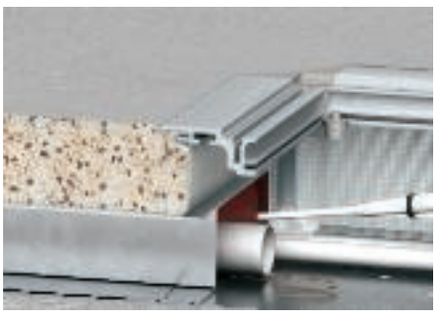
Preparation

Attachment of a 150 mm marking on the extension pipe.

Application of the foam

The two-component fire protection foam is applied to the underfloor ducts on both sides of the fire protection wall.

Foaming operation



Insert the tip into the duct up to the 150 mm mark and press out the foam evenly. In so doing, draw the pistol back slowly. Repeat for multi-compartment duct. There is no need to cut off excess foam.

Closing the pipe ends

Plastic pipes with a diameter of up to 20 mm laid at a later date can also be closed off with the foam or high-density mineral wool to avoid smoke-gas penetration.

Finished underfloor insulation

Fasten the completed identification plate on the base of the underfloor box. Hand the completed declaration of agreement to the client.

PYROSIT FBS90 fire protection foam

Type	Contents	Pack.	Weight	Item No.	Price /pc.
	l	pcs	kg/% pc		
FBS90-S	0.28	1	53.000	**7208 22 0**	

PYROSIT 2-K fire protection foam in a cartridge, fire resistance class S 90. Including mixing tube. In dry, frost-free rooms, the fire protection foam can be stored for up to six months at a temperature of +5 °C to +30 °C. Processing with normal 1-K pistol.

Note: The 2-K cartridge pistol, type FP520, can still be used. For this, remove the adapter at the plunger opening of the cartridge.

PYROSIT fire protection case

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc		
FBS90-K	1	340.000	**7208 22 8**	

The PYROSIT FBS90 fire protection case contains a complete collection of all the products required for mounting installation. The complete set consists of: 2 x FBS90-S, 1 x FBS90-P, 1 x FBS90-M and 1 x FBS90-BS.

PYROSIT cartridge pistol

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc		
FBS90-P	2	100.000	**7208 22 4**	

High-quality 1-K cartridge pistol for use with the PYROSIT FBS90 2-K fire protection foam. A special 2-K pistol is not required as the cartridge is fitted with an adapter. The cartridge pistol can also be used with normal 300 mm cartridges.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

PYROSIT 2-K foam insulation for screed-covered underfloor systems

PYROSIT mixer pipe

Type	Pack. PU	Weight kg/PU	Item No.	Price /pack unit
FBS90-M	1	12.500	**7208 23 2**	

10 mixing tubes and 10 extension tubes in the set for PYROSIT FBS90 2-K fire protection foam.

PYROSIT additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-BS	1	5.000	**7208 23 6**	

Additional kit for PYROSIT FBS90 2-K fire protection foam system, contains all the documents for approved mounting/documentation and an identification plate with anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

Single cable penetration according to (M)LAR

DIBt

Material class DIN 4102-B2 (foaming material)
DIBt approval Z-19.11-1594

Component data, wall and ceiling			
Solid component strength	60 mm	70 mm	80 mm
Fire resistance class	F 30	F 60	F 90
Ring gap max.	15 mm	15 mm	15 mm

OBO FPS-SP can be used to fill drill holes for penetrations with a single cable or multiple cables of a small cross-section routed next to each other, and through walls and ceilings marking the end of fire sections.
The ring gap around the cable must be completely closed with fire protection filler. If there is a fire, the filler foams up, preventing penetration by fire and smoke. The foaming action also draws heat from the cables, thus considerably reducing the transfer of heat via the copper cores.

System components

Filler in standard cartridge or in a bucket

Wall penetration area of application

Wall penetration
Complete closure in the wall thickness
Wall structure: concrete or masonry walls with fire protection functions.

Ceiling penetration area of application

Ceiling insulation dimensions
Complete enclosure in ceiling thickness
Ceiling structure: concrete ceiling with fire protection function

Executability application

Area of application:
Individual electrical cables

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000443)

Always indicate the article number when ordering.

Single cable penetration according to (M)LAR

Mounting preparations

Drill a hole for the cable gland in the wall or ceiling. The diameter of the drill hole is dependent on the diameter of the cable and the additional maximum approved ring gap around the cable of 15 mm.

Mounting of the cable

Install the cable through the drill hole. An average ring gap is one of maximum 15 mm. The cable may also be non-central in the drill hole.

Filling of the ring gap

Fill the ring gap in the wall or ceiling reinforcement using the compound.

Complete closing

Complete closing of the ring gap with filler.

Filled cable

Filled penetration of a single cable. Labelling is not required.

Fire protection filler in a cartridge

Type	Contents	Pack.	Weight	Item No.	Price /pc.
	l	pcs	kg/% pc		
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

Fire protection filler in a bucket

Type	Contents	Pack.	Weight	Item No.	Price /kg
	kg	kg	kg/‰ pc		
FPS-SP	5	5	500.000	**7202 28 0**	

Fire protection filler in a bucket, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

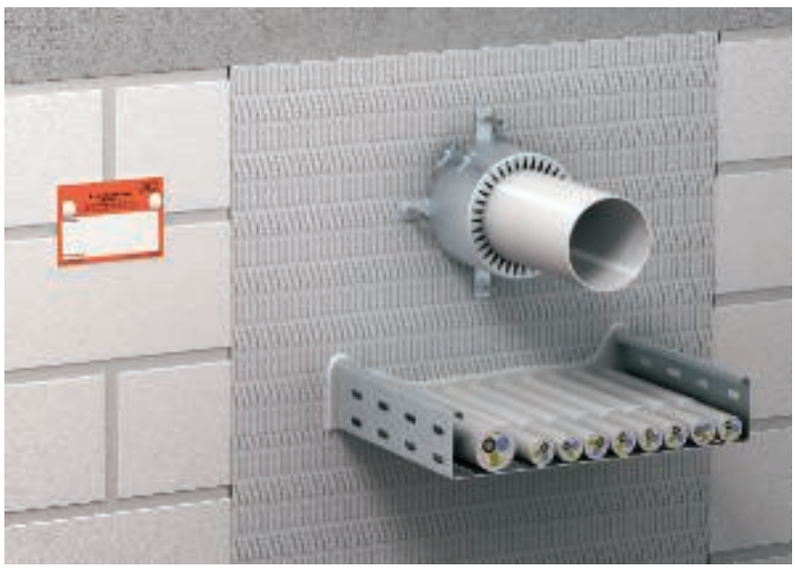
05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

FPS ready assembled panel insulation

DIBt

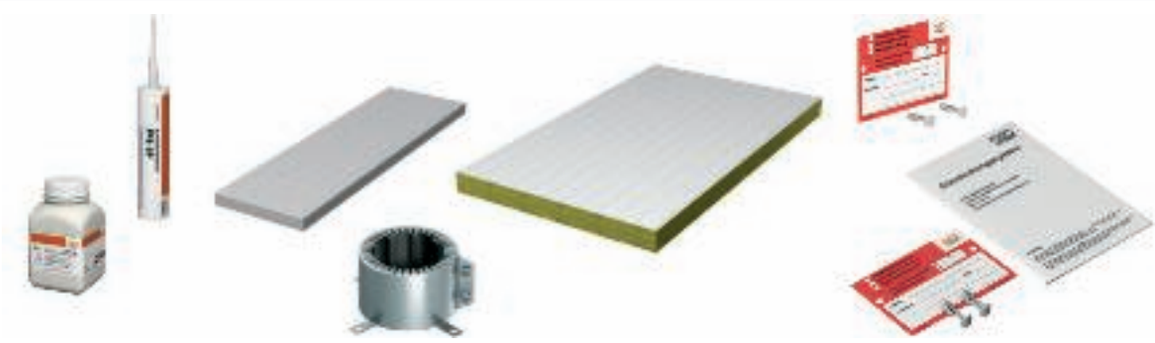
Fire resistance class S 90
DIBt approval Z-19.15-1636
AbP P-3395/7104-MPA BS

Approved data, combustible pipes (sanitary)	
Max. diameter	160 mm
Max. wall thickness	6.3 mm
For materials, see approval Use CRM pipe seal	
Approved data, non-combustible pipes (sanitary)	
Max. diameter, steel	159 mm
Max. wall thickness	14.2 mm
Max. diameter, copper	54 mm
Max. wall thickness	2 mm
Use path insulation according to the approval	



With its approval as combination insulation, the FPS assembled plate insulation, can insulate combustible and non-combustible pipes in conjunction with cables. Combustible pipes are equipped with the additional CRM pipe seal. For wall insulation, pipe seals are mounted on each side, and from the bottom for ceiling insulation. Non-combustible pipes (copper, steel) must be jacketed with approved path insulation, in order to obtain effective insulation to prevent heat transfer.

System components



Finished coating plates, coating, filler, pipe seal, calcium silicate plate, threaded rods, additional kit, wall plate

Pipe application

According to the approval, combustible and non-combustible pipes (sanitary) can be passed through. For mounting details, see the section "FPS assembled plate insulation".

Combustible pipes

Combustible pipes made of different materials are insulated using the CRM pipe seal. For wall mounting from all sides; for ceilings, install only from below.

Non-combustible pipes

Heating and drinking-water pipes made of steel and copper are provided with approved section insulation. They are coated along their entire length with an intumescent paint (at least 1 mm thick).

FPS-P finished coating plate

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-P	1,000 x 600 x 60	2	684.000	**7202 27 0**	

Mineral fibre plate, ready coated with insulation-forming substance, as the basis of the FPS cable insulation system, fire resistance class S 90, DIBt approval Z-19.15.1636.

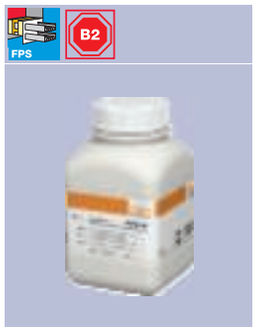
Always indicate the article number when ordering.

FPS ready assembled panel insulation

FPS-A coating

Type	Contents	Pack.	Weight	Item No.	Price /pc.
	kg	pcs	kg/% pc		
FPS-A	2	1	220.000	**7202 27 4**	

Coating for FPS finished plate insulation system. To coat the cables, cable support systems and the path insulation. In dry, frost-free rooms, the coating can be stored at temperatures from 5 °C to 30 °C for up to 12 months in closed original containers.



FPS-SP filler in a cartridge

Type	Contents	Pack.	Weight	Item No.	Price /pc.
	l	pcs	kg/% pc		
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

FPS-SP filler in a bucket

Type	Contents	Pack.	Weight	Item No.	Price /kg
	kg	kg	kg/‰ pc		
FPS-SP	5	5	500.000	**7202 28 0**	

Fire protection filler in a bucket, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

FPS-K calcium silicate plate

Type	Dimension	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc		
FPS-K	500 x 150 x 20	1	42.000	**7202 28 2**	

Calcium silicate plate for FPS assembled plate insulation system, for the construction of frames in the penetration or doubling for wall thicknesses of less than 15 cm. Materials class A1 – non-combustible.

FPS ready assembled panel insulation

CRM pipe seal

Type	Pipe Ø mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
CRM32	32	2	15.000	**7202 22 1**	
CRM40	40	2	16.000	**7202 22 3**	
CRM50	50	2	20.000	**7202 22 5**	
CRM63	63	2	28.000	**7202 22 7**	
CRM75	75	2	34.000	**7202 23 0**	
CRM90	90	2	75.000	**7202 23 2**	
CRM110	110	2	95.000	**7202 23 4**	
CRM125	125	2	100.000	**7202 23 6**	
CRM140	140	2	130.000	**7202 23 8**	
CRM160	160	2	140.000	**7202 24 0**	

Pipe seal for combustible pipes, approved for use in the FPS assembled panel insulation system as S 90 combination insulation or as independent pipe insulation R 90.

Fastening data

Type	Holding straps	Threaded rods
CRM32	3	M6
CRM40	3	M6
CRM50	3	M6
CRM63	4	M6
CRM75	4	M6
CRM90	4	M8
CRM110	4	M8
CRM125	4	M8
CRM140	5	M8
CRM160	5	M8

Threaded rod for CRM mounting

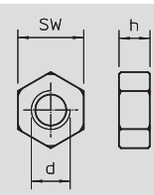
Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M6	6	1000	100	18.300	**3141 04 7**	
						ST / G	
2078	M8	8	1000	50	30.000	**3141 12 8**	

Threaded rod to DIN 976.

Hexagonal nut

Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M6	6	5.2	10	100	0.225	**3400 06 9**	
DIN 934	M8	8	6.8	13	100	0.474	**3400 08 5**	

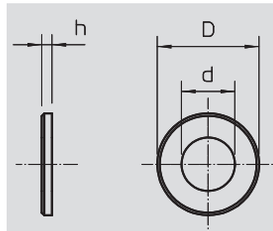
Hexagonal nut to DIN 934 with metric thread.



Washer

Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
967	M6	28	6.5	2.5	100	1.150	**3402 20 7**	
967	M8	28	8.5	2.5	100	1.100	**3402 21 5**	

Washer with a larger outer diameter for universal use.



Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-BS	1	8.000	**7202 28 6**	

Additional kit for FPS assembly insulation system, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FPS ready assembled panel insulation

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

Always indicate the article number when ordering.

PYROSIT FBS90 2-K foam insulation

Fire resistance class R 90

Approved data, non-combustible pipes (sanitary)	
Max. diameter, steel/copper	88.9 mm
Max. wall thickness	14.2 mm
Use path insulation according to the approval	

According to the general construction test certificate, the PYROSIT FBS90 fire protection foam may be used to insulate non-combustible pipes of fire resistance class R 90. The approval requires the section insulation must be inserted to prevent heat transfer. The jacket length is always 80 mm, measured from the insulation surface. The insulation thickness of the pipes may vary. Refer to the AbP for this data.

System components

2-K fire protection foam in a cartridge, cartridge pistol, fire protection case, mixing tube set, additional kit, wall plate

Wall insulation area of application

According to the general construction test certificate, non-combustible pipes (steel/copper) may be insulated. In lightweight partitions, there must be closure to the mineral wool, e.g. pipe shell.
For mounting details, see the section "FBS90 2-K foam insulation".

Foaming of the pipes

The pipes are surrounded with the 2-K foam in a single work step. Ensure that approved path insulation has been mounted.

Finished insulation

After labelling and mounting the identification plate, hand the completed declaration of agreement to the client.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

PYROSIT FBS90 2-K foam insulation

PYROSIT FBS90 fire protection foam

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-S	0.28	1	53.000	**7208 22 0**	

PYROSIT 2-K fire protection foam in a cartridge, fire resistance class S 90. Including mixing tube. In dry, frost-free rooms, the fire protection foam can be stored for up to six months at a temperature of +5 °C to +30 °C. Processing with normal 1-K pistol.

Note: The 2-K cartridge pistol, type FP520, can still be used. For this, remove the adapter at the plunger opening of the cartridge.

PYROSIT fire protection case

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-K	1	340.000	**7208 22 8**	

The PYROSIT FBS90 fire protection case contains a complete collection of all the products required for mounting installation. The complete set consists of: 2 x FBS90-S, 1 x FBS90-P, 1 x FBS90-M and 1 x FBS90-BS.

PYROSIT cartridge pistol

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-P	2	100.000	**7208 22 4**	

High-quality 1-K cartridge pistol for use with the PYROSIT FBS90 2-K fire protection foam. A special 2-K pistol is not required as the cartridge is fitted with an adapter. The cartridge pistol can also be used with normal 300 mm cartridges.

PYROSIT mixer pipe

Type	Pack. PU	Weight kg/PU	Item No.	Price /pack unit
FBS90-M	1	12.500	**7208 23 2**	

10 mixing tubes and 10 extension tubes in the set for PYROSIT FBS90 2-K fire protection foam.

PYROSIT additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBS90-BS	1	5.000	**7208 23 6**	

Additional kit for PYROSIT FBS90 2-K fire protection foam system, contains all the documents for approved mounting/documentation and an identification plate with anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

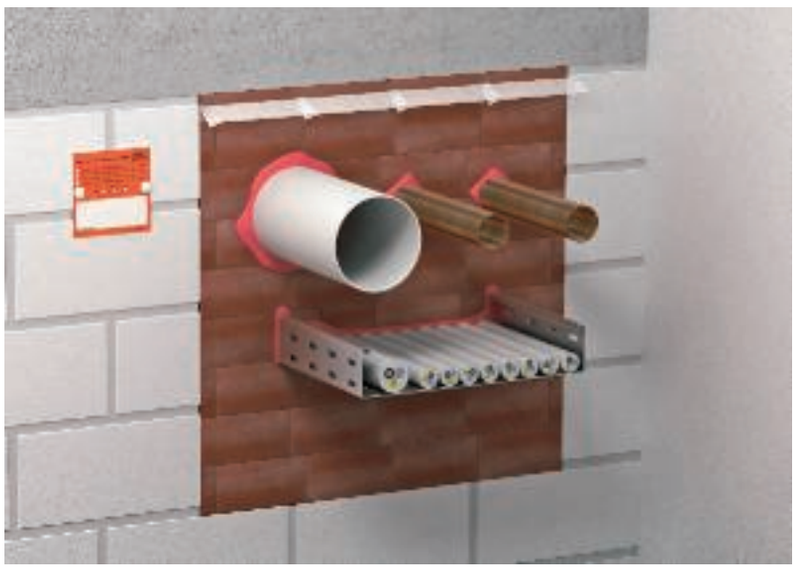
05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

FBA-B200 combination insulation

DIBt

Fire resistance class S 90
DIBt approval Z-19.15-1849



Approved data, combustible pipes (sanitary)	
Max. diameter	110 mm
Max. wall thickness	11.2 mm
For materials, see approval	
Approved data, non-combustible pipes (sanitary)	
Max. diameter, steel	168.3 mm
Max. wall thickness	14.2 mm
Max. diameter, copper	88.9 mm
Max. wall thickness	14.2 mm

The foam blocks of the FBA-B200 series are approved as combination insulation for cable penetrations together with combustible and non-combustible pipes. The special advantage is that combustible pipes can be insulated without additional, expensive components. In the case of non-combustible pipes (steel or copper), the path insulation can also be passed through as necessary to prevent heat spread, or it can end in front of the insulation surface.
The dust and fibre-free installation means that the system is also ideally suited to EDV and telecommunications applications. The FBA-B200 has risen to the demands for regular retro-installations.

System components

Foam block, vacuum block, filler, steel wire grid, additional kit, wall plate

Approved penetrations

Combustible and non-combustible pipes (sanitary) can be passed through the insulation according to the approval.
For mounting details, see the section "FBA-B200 combination foam block insulation".

Flexible options

Any standard pipe materials can be insulated. The insulation of non-combustible pipes can either be passed through or can end at the insulation surface.

Finished pipe insulation

After labelling and mounting the identification plate, hand the completed declaration of agreement to the client.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000043)

Always indicate the article number when ordering.

FBA-B200 combination insulation

FBA-B200 block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B200	200 x 120 x 60	20	40.000	**7202 50 6**	

Foam block for combination insulation, fire resistance class S 90, DIBt approval Z-19.15-1849.

FBA-BV200 vacuum block

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-BV200	200 x 120 x 25	10	40.000	**7202 51 6**	

Vacuum block, fire resistance class S 90 DIBt approval Z-19.15-1849. On cutting the film, the vacuum block expands to its original size.

FBA-SP fire protection compound

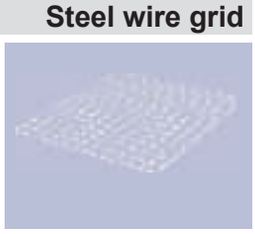
Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-SP	0.31	1	46.000	**7202 32 2**	

Fire protection filler in a cartridge, usable as small insulation in the FBA-SP system, DIBt approval Z-19.15-1851, and as a joint sealing compound for all the insulation types in the FBA series.
In dry, frost-free rooms, the fire protection compound can be stored at temperatures of +5 °C to +30 °C for up to 12 months.

Steel wire grid

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KBK-SG1	500 x 600	1	135.000	**7202 96 2**	
KBK-SG2	600 x 1,000	1	270.000	**7202 97 0**	

Steel wire grid for KBK bag insulation system; as a support and protection grid for ceiling insulation.



Additional kit

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FBA-B200-BS	1	4.500	**7202 54 0**	

Additional kit for FBA-B200 combination insulation, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the cable insulation.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

CRM pipe seals

DIBt

Fire resistance class R 90
DIBt approval Z-19.17-1621

Approved data, combustible pipes (sanitary)	
Max. diameter	160 mm
Max. wall thickness	6.2 mm
For materials, see approval	

The pipe seals of the CRM series can be used as independent pipe insulation for combustible pipes (e.g. sanitary wastewater pipes) of fire resistance class R 90.
Mounting takes place with metal anchors of size M6 or M8 on each side of the wall. Ceiling penetrations only have a pipe seal from the underside. Threaded rods are mounted using the push-through method in lightweight partitions.
If there is a fire, the plastic pipes become soft and burn. However, the openings created are closed off by the pipe seal early on. The fire protection material inserted within the seal foams up after a few minutes under high pressure, closing the softened pipe. This safely prevents the spread of fire and smoke, should a fire occur.

System components

Pipe seal, threaded rod, hexagonal nut, additional kit, wall plate

Wall application area

Approved for solid and lightweight partitions with fire protection requirements.

Ceiling area of application

Installation beneath concrete ceilings.

Approved pipes

The pipe seal can be used with wastewater pipes made of various plastics (for details, see the approval). If there is a fire, it ensures safe, smoke-gas-proof closure of the opening.

Always indicate the article number when ordering.

CRM pipe seals

Closing of ring gap

Before mounting the pipe seal, close the ring gap with fire protection filler or mineral mortar.

Wall mounting

In solid walls, mounting takes place with approved metal anchors. Threaded rods are mounted using the push-through method in lightweight partitions. The bent holding straps can be used as a drilling template.

Ceiling mounting

Whilst one pipe seal is needed on each side for wall mounting, for ceiling insulation, just one sleeve needs to be installed from below.

Fastening

The round, screwed-on CRM is also fastened from below using metal anchors.

Finished mounting

Completion by filling out and mounting the identification plate and handover of the completed declaration of agreement to the client.

Pipe seal

Type	Pipe Ø mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
CRM32	32	2	15.000	**7202 22 1**	
CRM40	40	2	16.000	**7202 22 3**	
CRM50	50	2	20.000	**7202 22 5**	
CRM63	63	2	28.000	**7202 22 7**	
CRM75	75	2	34.000	**7202 23 0**	
CRM90	90	2	75.000	**7202 23 2**	
CRM110	110	2	95.000	**7202 23 4**	
CRM125	125	2	100.000	**7202 23 6**	
CRM140	140	2	130.000	**7202 23 8**	
CRM160	160	2	140.000	**7202 24 0**	

Pipe seal for combustible pipes, approved for use in the FPS assembled panel insulation system as S 90 combination insulation or as independent pipe insulation R 90.

Fastening data

Type	Holding straps	Threaded rods
CRM32	3	M6
CRM40	3	M6
CRM50	3	M6
CRM63	4	M6
CRM75	4	M6
CRM90	4	M8
CRM110	4	M8
CRM125	4	M8
CRM140	5	M8
CRM160	5	M8

Threaded rod for push-through mounting

Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M6	6	1000	100	18.300	**3141 04 7**	
						ST / G	
2078	M8	8	1000	50	30.000	**3141 12 8**	

Threaded rod to DIN 976.

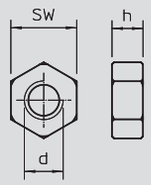
Always indicate the article number when ordering.

CRM pipe seals

Hexagonal nut

Type	Thread	Dimension d	Dimension h	SW	Pack.	Weight	Item No.	Price
		mm	mm	mm	pcs	kg/% pc	ST / G	/% pc
DIN 934	M6	6	5.2	10	100	0.225	**3400 06 9**	
DIN 934	M8	8	6.8	13	100	0.474	**3400 08 5**	

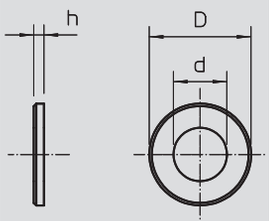
Hexagonal nut to DIN 934 with metric thread.



Washer

Type	Thread	Dimension D	Dimension d	Dimension h	Pack.	Weight	Item No.	Price
		mm	mm	mm	pcs	kg/% pc	ST / G	/% pc
967	M6	28	6.5	2.5	100	1.150	**3402 20 7**	
967	M8	28	8.5	2.5	100	1.100	**3402 21 5**	

Washer with a larger outer diameter for universal use.



Fire protection filler in a cartridge

B2

Type	Contents	Pack.	Weight	Item No.	Price
	l	pcs	kg/% pc		/pc.
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

Filler in a bucket

B2

Type	Contents	Pack.	Weight	Item No.	Price
	kg	kg	kg/‰ pc		/kg
FPS-SP	5	5	500.000	**7202 28 0**	

Fire protection filler in a bucket, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

Additional kit

CRM

Type	Pack.	Weight	Item No.	Price
	pcs	kg/% pc		/pc.
CRM-BS	1	4.500	**7202 24 8**	

Additional kit for CRM pipe seal, contains all the documents for approved mounting/documentation and a wall plate with push-fit anchors to indicate the pipe insulation.

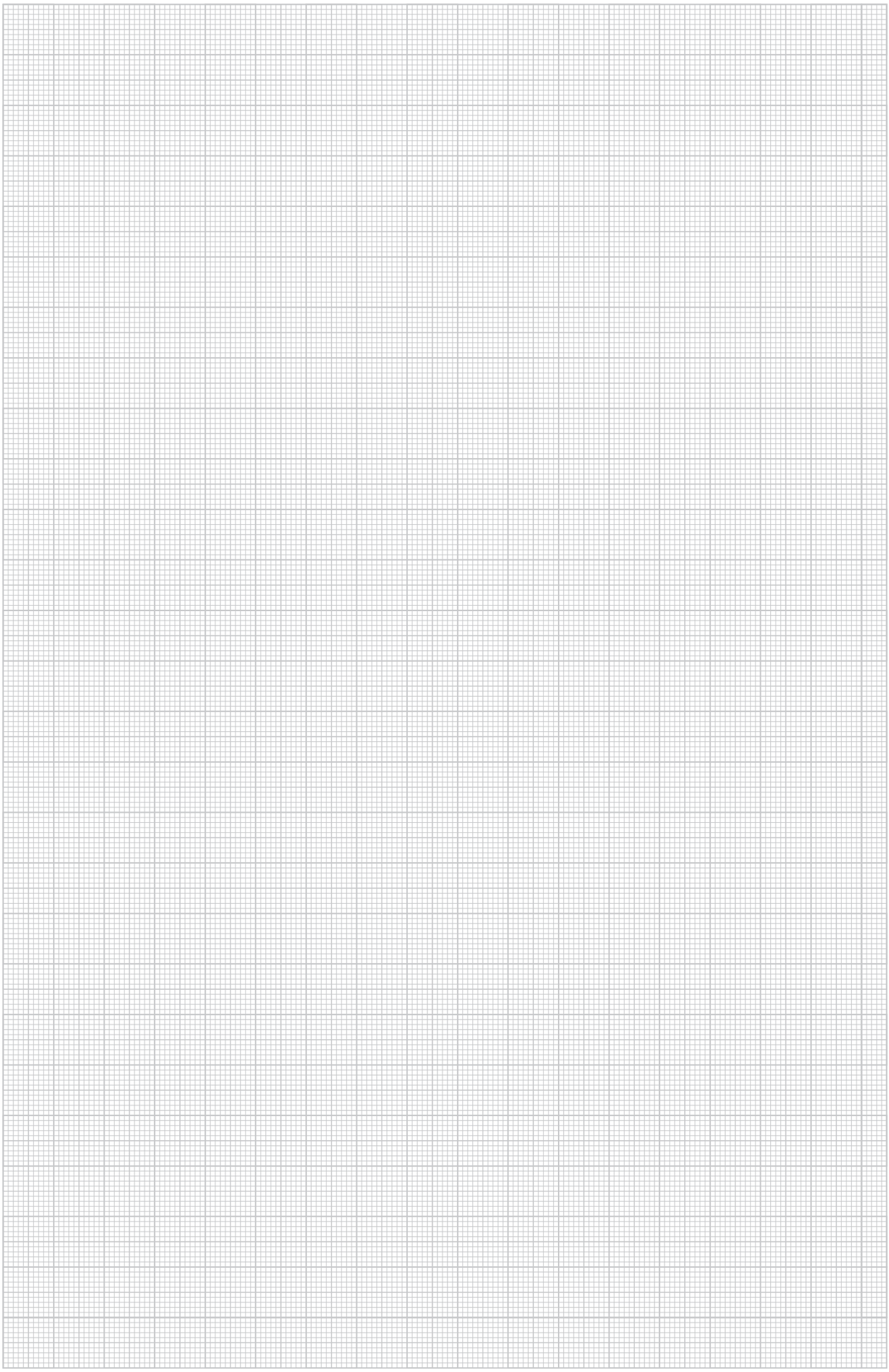
Identification plate

Type	Pack.	Weight	Item No.	Price
	pcs	kg/% pc		/pc.
KS-S	1	2.400	**7205 42 5**	

Universal identification plate to be written on for all OBO insulation. For approved identification, including two push-fit anchors.

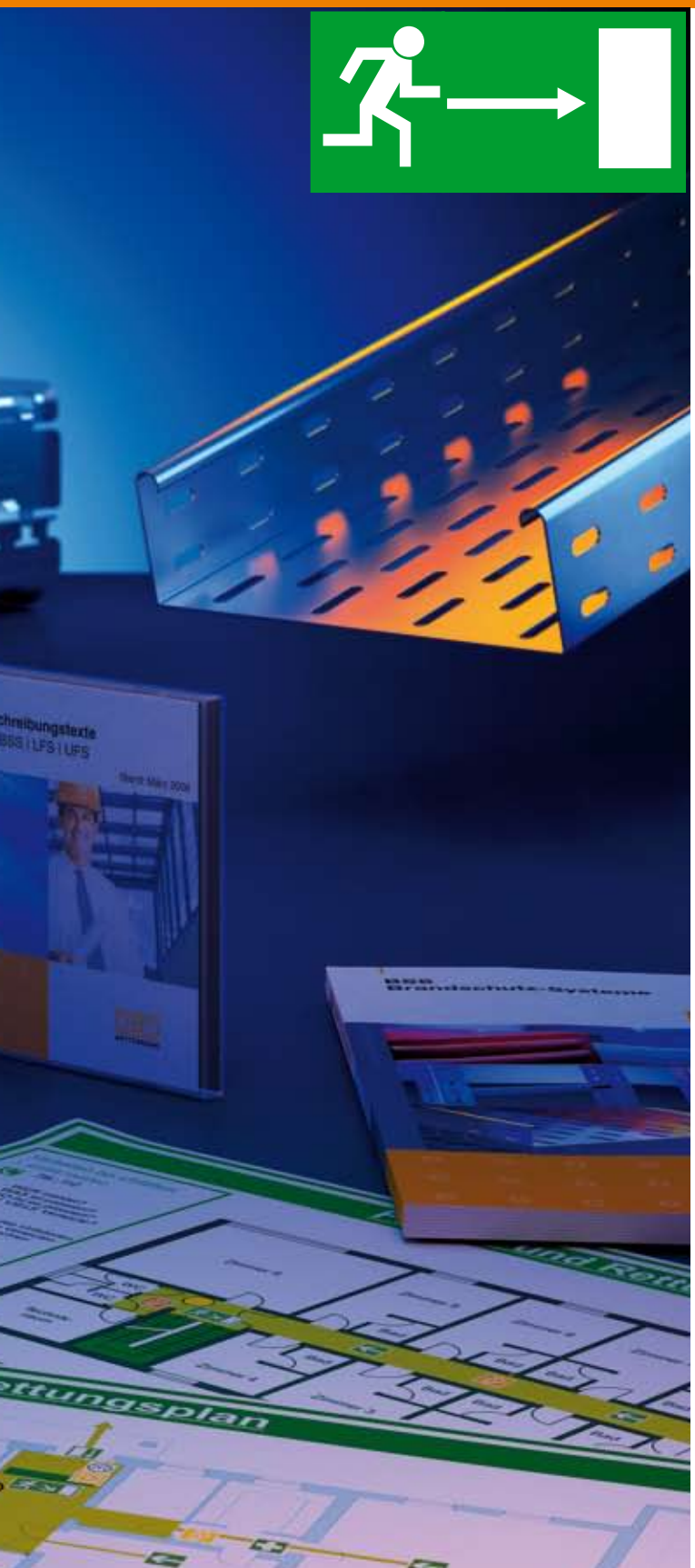
05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.



- Secure installations in emergency routes
- Can be used in false fire protection ceilings
- Installation in fire protection ducts
- Bandaging in renovation of old buildings

Basic principles of the escape route installation systems



2nd protection aim:
Escape route installation systems ensure that escape routes remain usable.

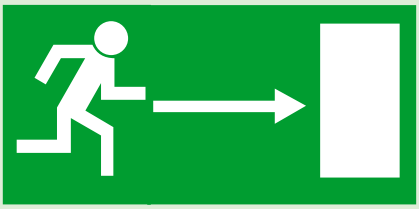
Approximately 95% of all deaths during fires are caused by smoke poisoning.

If there is a fire, the emergency and escape routes are the central lifeline and must be usable under any circumstances.

Central topic: fire loads
Any installation in the area of emergency and escape routes must not pose any additional fire load. This requirement must be fulfilled with the following installation types:

- Concealed installation
- Installation in fire protection duct systems
- Installation above suspended fire protection ceilings
- Open routing of bandaged cable support systems

What is an escape route?



Scope of validity of the MLAR regulations also contains emergency and escape routes

Apart from electrical installations in fire walls and ceilings and function maintenance in a fire, the MLAR deals particularly with installations in emergency and escape routes. Special regulations apply here, as there must be the assurance that these routes can be used safely to leave a building if there is a fire. These may be:

- Necessary stairwells
- Connecting rooms between necessary stairwells and exits into the open air
- Necessary corridors

MLAR regulations: fire protection specifications for building installation

The four letters of MLAR stand for “Muster-Leitungsanlagen-Richtlinie” or Master Conductor System Directive. This directive, created by the Construction Supervision Commission of the German Development Ministers’ Conference, controls the fire protection requirements of any installation. These include specifications for the insulation of conductors, which must be passed through fire protection walls and ceilings, for the design of installations which must guarantee the function maintenance of safety-relevant systems in case of fire, and for electrical installations in the area of emergency and escape routes.

LAR regulations of the individual German federal states

All the federal states are obliged to apply the MLAR to their construction law, but may include individual changes. This creates a Conductor System Directive or LAR for each state.

Fire tests

Testing for systems in suspended false ceilings

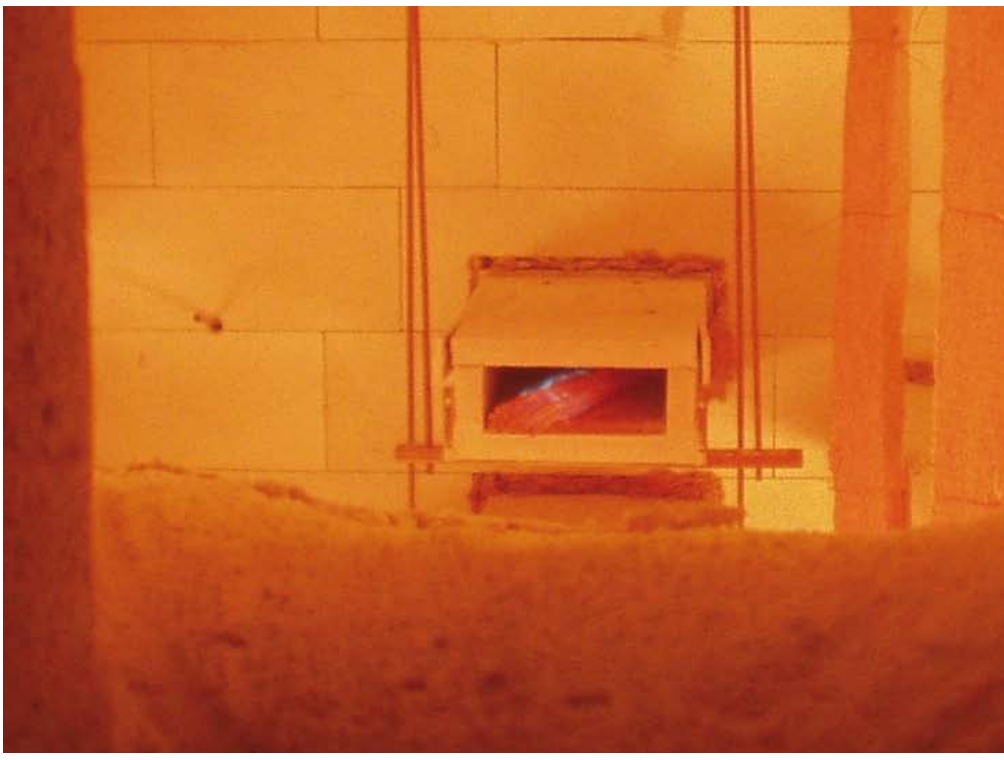
Tested OBO systems: tests in accordance with DIN 4102
To be able to offer practical solutions in the sense of the MLAR for electrical installations above suspended fire protection ceilings, OBO Bettermann has carried out fire testing in accordance with DIN 4102.

The following were tested:
- Cable support systems for wall and ceiling mounting to widths of 600 mm
- Collecting clamp, type 2031M/15, type 2031M/30 and type 2031 M/70 for wall and ceiling mounting
- Metal pressure clips type 2033M and type 2034M for ceiling mounting

The following requirements were tested successfully:
- Stability of the routing system
- Deformation of the routing system

Testing for the fire protection duct
The fire protection ducts BSK and BSKH were tested by an independent materials testing office according to DIN 4102 Part 11 and Part 12. The electrical cables were flamed within the duct.

Over the entire classified period of 90 minutes, neither fire nor smoke escaped from the duct system. This provides effective, safe protection of an emergency and escape route against a cable fire.



Approved routing types in the area of emergency and escape routes

Cable installation in fire protection ducts

OBO fire protection ducts are particularly suitable for installation in emergency and escape routes. The ducts protect the routes against the effects of a cable fire, when a much denser, blacker smoke is created.

Bandaging of cable support systems in existing buildings

The last option to protect an emergency route is the bandaging of the existing cable support system with a coated mesh, which limits the cable fire to a localised area, preventing its spread. This measure is used when the mounting of a false ceiling, classified for fire protection, or that of a fire protection duct, is not possible due to local circumstances or insufficient space. In this case, the approval of the lowest construction authorities must be obtained before mounting.

Cable routing in false ceiling applications

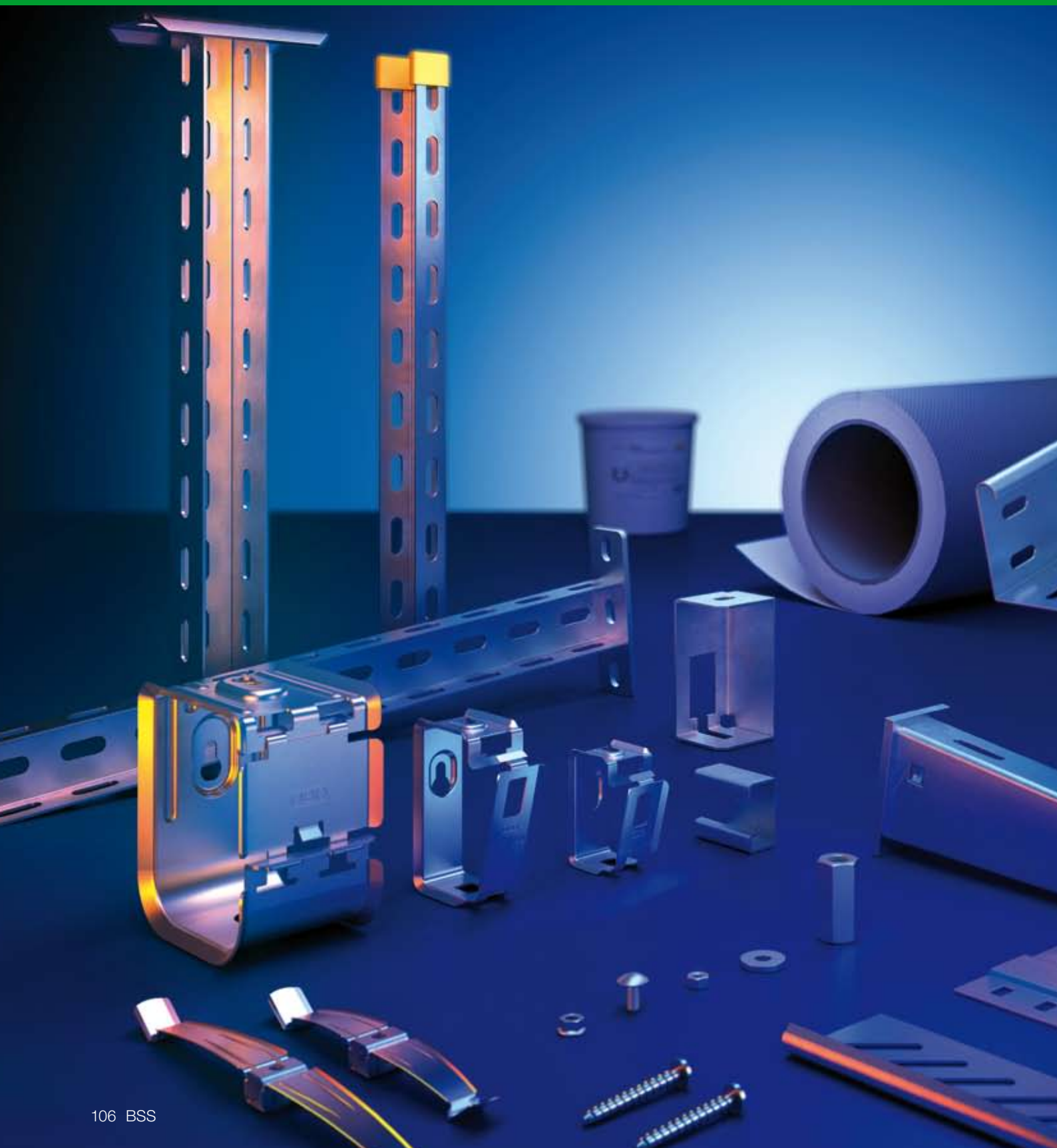
Suspended fire protection ceilings, tested for fire loads from above, create a fireproof area in the space created between the ceiling and the suspended ceiling. Even if there is a fire in the cables installed there, the emergency and escape route still remains safe. However, there must be a guarantee that the suspended ceiling is not subjected to additional mechanical loads through, for example, falling cables or parts of the support system.

Therefore, according to the MLAR, only the following are approved for electrical installations above suspended fire protection ceilings in the area of emergency and escape routes:

- Routing systems for function maintenance, tested according to DIN 4102 Part 12
- Special routing systems, fire-tested for this application

The strictly controlled system limits mean that function maintenance systems can only be used with restrictions for this type of electrical installation. To provide practical installation options for false ceiling mounting, OBO has carried out fire tests based on DIN4102 for cable support systems, collecting clamps and pressure clips.

- Systems tested in accordance with DIN 4102 Part 12
- Proven deformation behaviour
- Proven mechanical resistance with high loads
- Secure installations in emergency and escape routes



Escape route installation systems

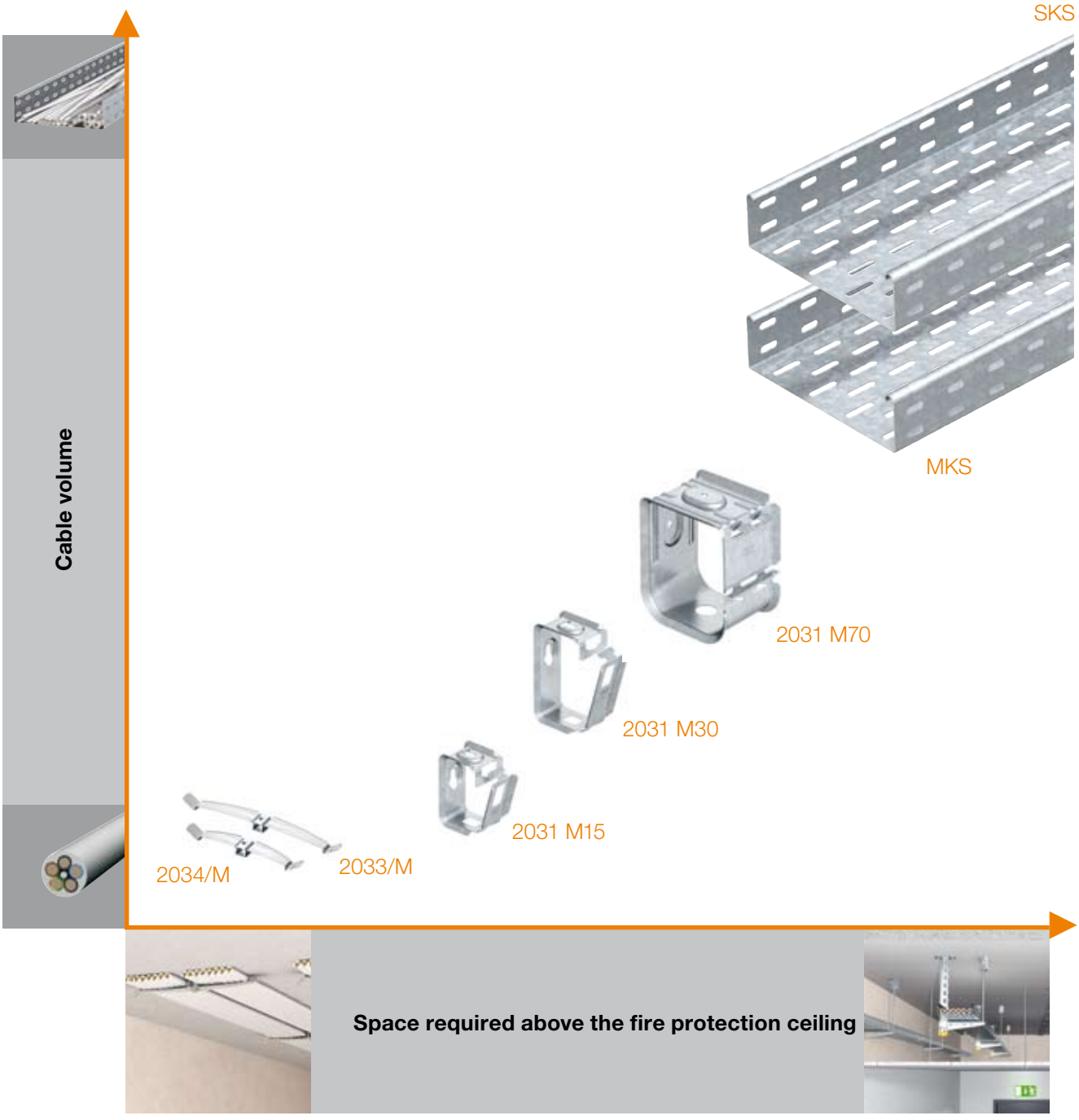
False ceiling mounting

Selection aid
Systems above false ceilings

Mounting of routing systems for electrical installations depends on two important factors:

1. **The available mounting space**
2. **The quantity of cables to be installed**

If only a few cables of a small cross-section need to be laid safely for fire protection, the fastening using pressure clips is the answer. If there is a large quantity of cables, cable trays should be used which can either be mounted on the wall or under the ceiling. In between are the collecting clamps, which can accept a medium-sized volume of cables.



Collecting clamp
Routing system for mounting under the ceiling or horizontally on the wall.

Pressure clip
Space-saving routing system for mounting under the ceiling.

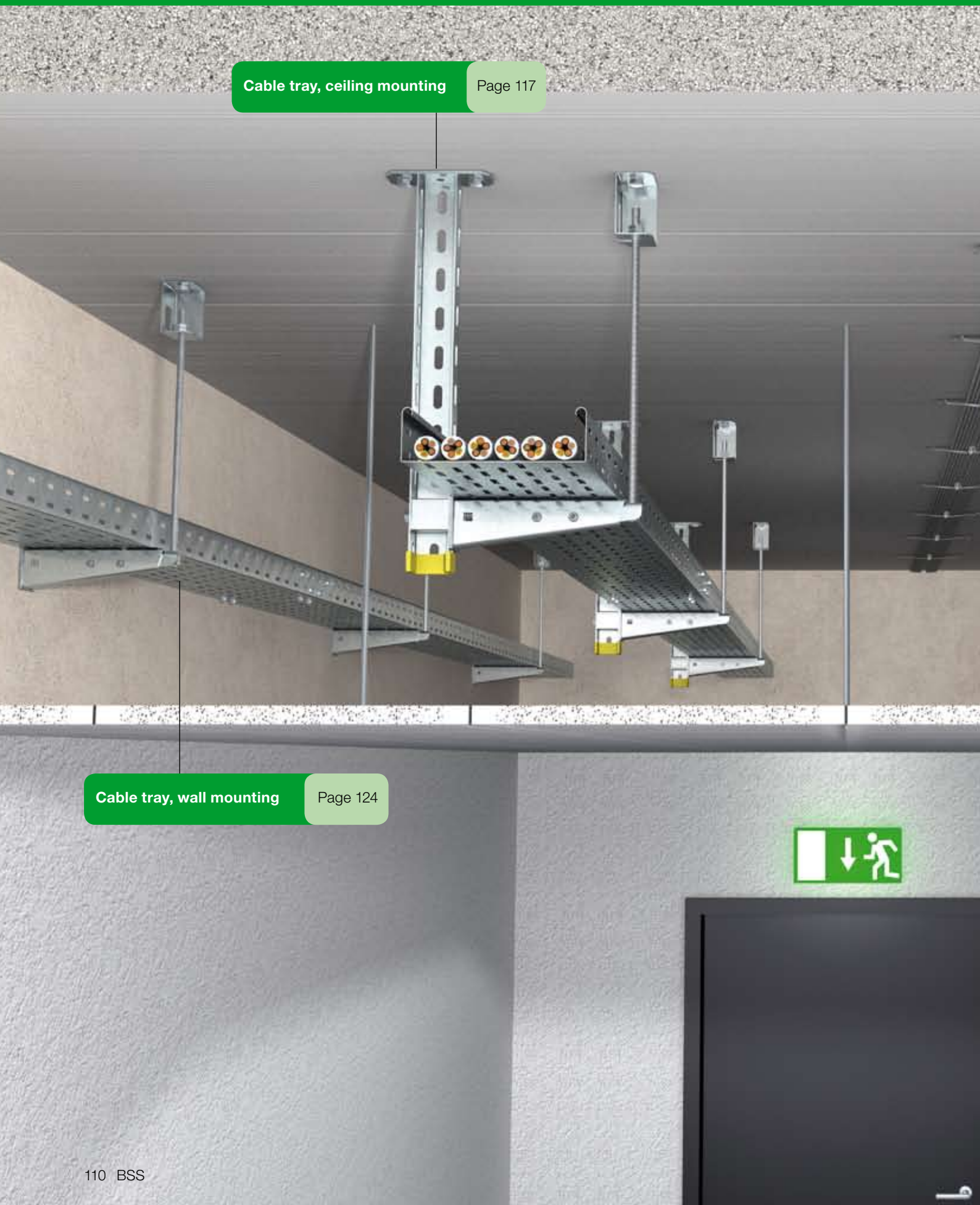
Cable tray with U suspended support
Routing system for mounting under the ceiling on a U support with threaded rod suspension.

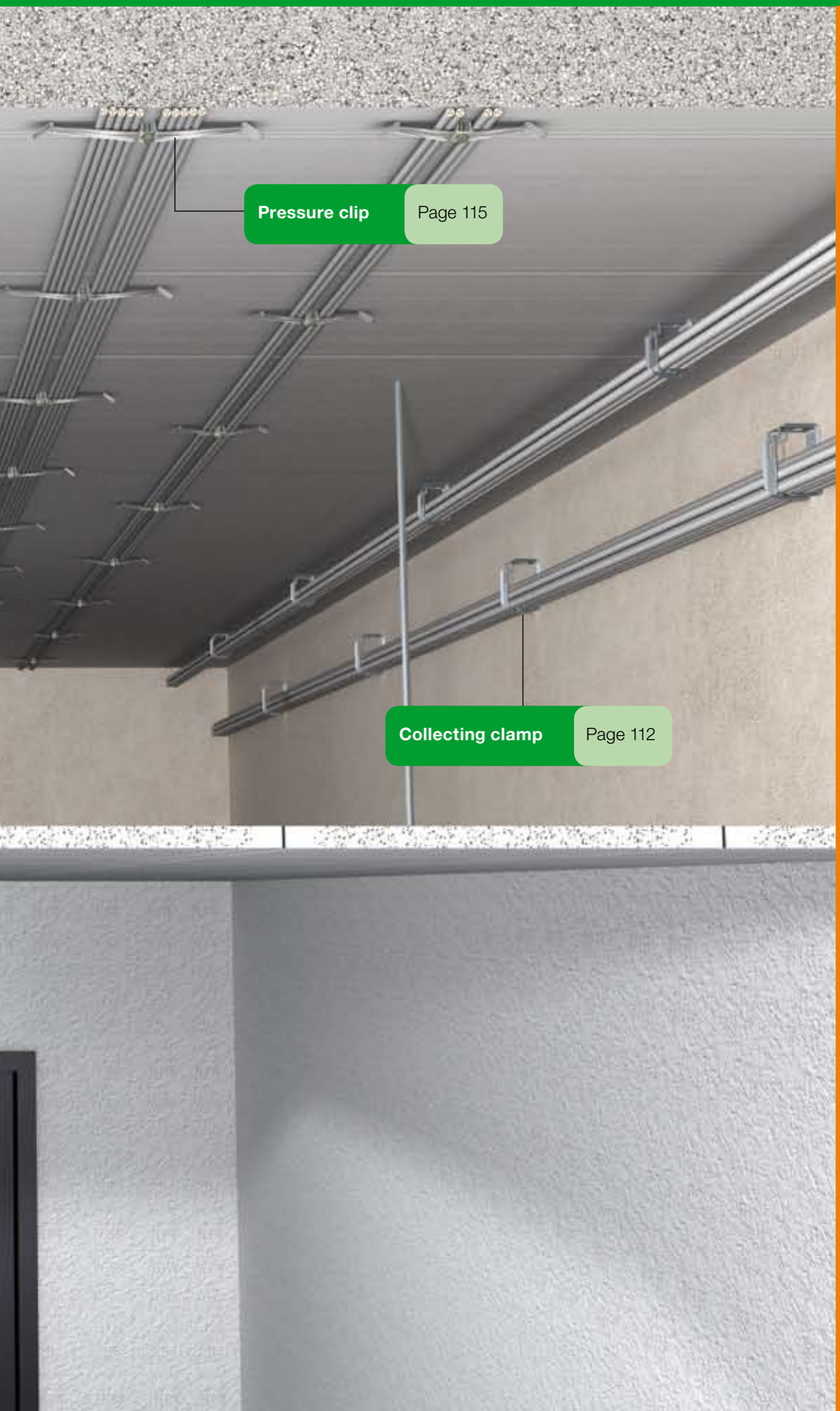
Cable tray with U cross-section
Routing system for mounting under the ceiling on a U support with threaded rod suspension.

Cable tray with wall brackets
Routing system for mounting on the wall using wall bracket.

Cable support system bandaging
Fire protection jacketing for existing cable support systems during renovation in existing buildings.

System overview
False ceiling mounting




Pressure clip
Page 115
Collecting clamp
Page 112

Wall and ceiling mounting with collecting clamp

Routing system tested in accordance with DIN 4102
Test report no. 3054/1495-Mu-
Fire load 90 minutes

Mounting parameters	
Max. fastening distance	0.8 m
Max. load-bearing capacity:	
2031 M/15	2.0 kg
2031 M/30	3.5 kg
2031 M/70	8.0 kg
Caution! No function maintenance!	

The mechanical stability of the routing type with collecting clamps in case of fire has been proved for wall and ceiling mounting for fire loads of 90 minutes.
The collecting clamps are made of galvanised sheet steel, can be opened and reclosed easily and without any tools. To allow simple cable insertion, the collecting clamps can remain open during cable routing. The holders simply need to be closed when cable installation is complete. The construction of the lock and weight of the installed cables automatically ensures that the lock does not open itself unintentionally.

System components

OBO collecting clamps, fire protection anchors, fire protection bolt ties.

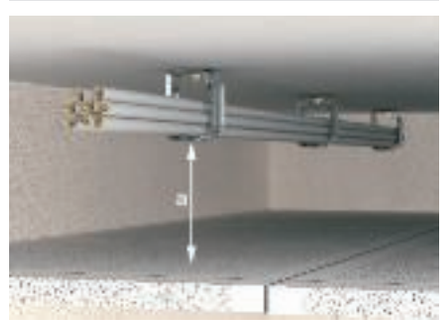
Ceiling mounting application

Tested routing variant under the ceiling.

Wall mounting application

Tested routing variant horizontally on the wall.

Distance to fire protection ceiling



Distance a to the fire protection ceiling for the fastening distance of the 60 cm collecting clamp: min. 100 mm for cable sag of max. 30 mm
Fastening distance of the collecting clamp 80 cm: min. 250 mm for cable sag of max. 50 mm

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Always indicate the article number when ordering.

Wall and ceiling mounting with collecting clamp

Mounting preparations

Draw on the exact position of the drill holes for the collecting clamps with a chalk line.

Ceiling mounting of the collecting clamps

Simultaneous mounting of the fire protection anchors with the collecting clamps as push-through mounting.

Insertion of the cables

Insert the cables in the collecting clamps. When cable routing has been completed, close the collecting clamps by hooking the opening flap into the appropriate opening.

Wall mounting of the collecting clamps

Simultaneous mounting of the fire protection anchors or fire protection bolt ties with the collecting clamps as push-through mounting.

Insertion of the cables

Insert the cables in the collecting clamps. When cable routing has been completed, close the collecting clamps by hooking the opening flap into the appropriate opening.

Mounted collecting clamps

Cables can be retro-installed at any time by opening the collecting clamps.

System parameters at a glance

Mounting parameters

Max. fastening distance	0.8 m
Max. load-bearing capacity:	
2031 M/15	2.0 kg
2031 M/30	3.5 kg
2031 M/70	8.0 kg
Caution! No function maintenance!	

Components per suspension point or joint/end point

	**Collecting clamp 2031 M/15**	* *	
	**Collecting clamp 2031 M/30**	* *	
	**Collecting clamp 2031 M/70** Including fire protection bolt tie, type MMS 6 x 50	* * * Number as necessary	

Concrete wall and ceiling

	**Fire protection anchor FNA II 6x30 M6/5**	* *	
	**Fire protection anchor FNA II 6x30/5**	* * * Number as necessary	

Always indicate the article number when ordering.

Wall and ceiling mounting with collecting clamp

Masonry wall

Fire protection bolt tie MMS 6 x 9

* *

* Number as necessary

Ceiling mounting with pressure clip

Routing system tested in accordance with DIN 4102
Test report no. 3094/2093-CM-
Fire load 30 minutes

Mounting parameters	
Max. individual cable weight	0.23 kg/m
Type 2033M	
Max. fastening distance	0.5 m
Max. cable filling	16 (2 x 8)
Type 2034M	
Max. fastening distance	0.6 m
Max. cable filling	10 (2 x 5)
Caution! No function maintenance!	

The mechanical stability of the routing type with pressure clips in case of fire has been proved for ceiling mounting for fire loads of 30 minutes.
The pressure clips are made of sprung, rustproof steel. Cable assignment is possible from both sides, and the cables simply need be pushed under the hips of the the clip. A tool is not required to actually mount the cables. The edges of the clip are suitably sloping, excluding the possibility of damage to the cables.

System components

Pressure clips, fire protection bolt ties.

Ceiling mounting application area

Ceiling mounting with metal pressure clips
Type 2034 M.

Ceiling mounting application area

Ceiling mounting with metal pressure clips
Type 2033 M.

Distance to fire protection ceiling

Distance a to the fire protection ceiling for pressure clips
Type 2033 M: at least 70 mm
Type 2034 M: at least 50 mm

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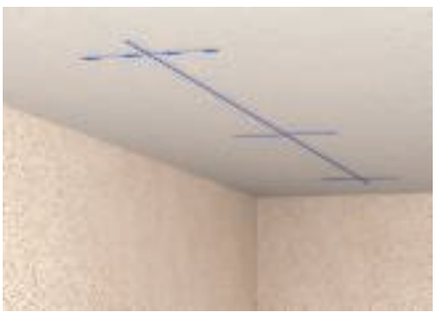
Always indicate the article number when ordering.

Ceiling mounting with pressure clip

Mounting preparations



Draw on the exact position of the drill holes for the pressure clips using a chalk mark.

Fixing the pressure clips

Push the fire protection bolt tie through the fastening hole of the pressure clips and fix in the drill hole.

Fastening the pressure clips

Turning of the bolt tie into the drill hole. Turning in can take place using a rechargeable or ratchet screwdriver, or also by hand.

Installation of the cables

Push the cables in from the side under the hips of the pressure clips.

Mounted pressure clips

System parameters at a glance

Mounting parameters

Max. individual cable weight	0.23 kg/m
Type 2033M	
Max. fastening distance	0.5 m
Max. cable filling	16 (2 x 8)
Type 2034M	
Max. fastening distance	0.6 m
Max. cable filling	10 (2 x 5)
Caution! No function maintenance!	

Components per suspension point or joint/end point

Pressure clip 2033 M	*
Pressure clip 2034 M	*
Fire protection bolt tie MMS 6 x 50	*

* Number as necessary

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Always indicate the article number when ordering.

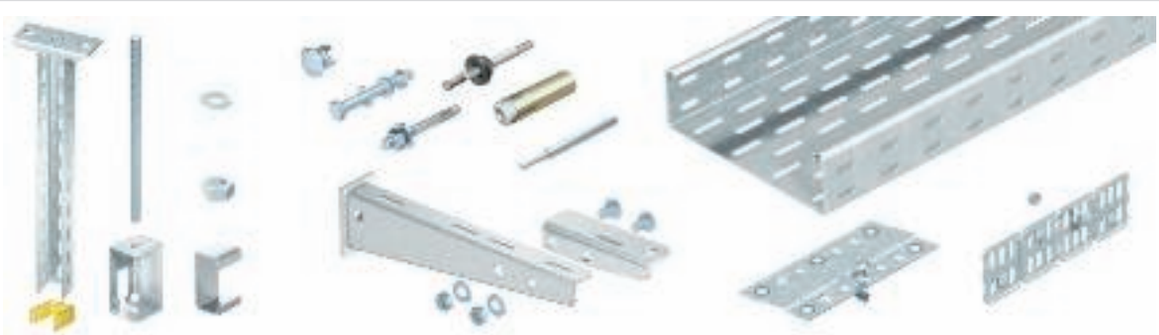
Ceiling mounting with cable trays

Routing system tested in accordance with DIN 4102 Surveyor's comments no. 3059/3644-AR/Mu- Fire load 30 minutes

Mounting parameters			
Max. support width	1.5 m		
Max. number of layers	Two layers		
	Tray	MKS	SKS
Width [mm]	Load	a [mm]	a [mm]
200	30 kg/m	80	65
300	45 kg/m	125	95
400	60 kg/m	170	130
500	75 kg/m		160
600	90 kg/m		190
Caution!			
No function maintenance!			

The mechanical stability of the routing type with cable trays in case of fire has been proved for fire loads of 30 minutes.
The tested routing system consists of a U suspended support and brackets screwed onto it. To prevent bending of the brackets in case of fire, a threaded rod lock to the ceiling is required at the bracket tip. The cable trays with a rail height of 60 mm were tested with widths of 200 mm to 600 mm as type MKS with a metal thickness of 1 mm, and in the widths 200 mm to 600 mm as type SKS with metal thickness 1.5 mm. Connect two cable trays with a screwed joint with connectors and joint plate.
Due to the varying deformations in case of fire, select the cable trays according to the space available to the false ceiling.

System components



US suspended support, bracket, cable tray, straight connector, joint plate, fire protection clamp.

Ceiling mounting application areas, cable trays type MKS and type SKS

Routing system for ceiling mounting of the cable tray of widths 200 mm to 600 mm. The suspended supports are available in lengths of up to 2 m.

Cable tray type MKS

See mounting parameters for distance a; max. suspended support length 1 m. For support lengths over 2 m, the minimum distance increases by 10 mm.

Cable tray type SKS

See mounting parameters for distance a; max. suspended support length 1 m. For support lengths over 2 m, the minimum distance increases by 10 mm.

Always indicate the article number when ordering.

Ceiling mounting with cable trays

Two-layer variant on top of each other

Routing system for ceiling mounting of the cable tray of widths 200 mm to 600 mm. The suspended supports are available in lengths of up to 2 m.

Two-layer variant on both sides

Routing system for ceiling mounting of the cable tray of widths 200 mm to 600 mm. The suspended supports are available in lengths of up to 2 m.

Two-layer variant on a bracket

Routing system for ceiling mounting of the cable tray of widths 200 mm to 600 mm. The suspended supports are available in lengths of up to 2 m.

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

Drill the anchor holes and mount the bolt ties to fasten the U supports and the fire protection clamps.

Support and clamp mounting

Screw the U supports with the fire protection clamp onto the bolt ties.

Mounting of the connection component

Screw the connection bracket in the bracket tip using truss-head bolts.

Bracket mounting on suspended support

Fastening of the bracket on the two hips of the U support with a hexagonal bolt and spacer.

Straight and floor connector mounting

Mounting of straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the tray

Fastening the cable tray on the bracket with truss-head bolts.

Mounting of threaded rod

Push the threaded rod from above through the tip of the screwed-on connection bracket and then suspend it from the side in the fire protection clamp.

Locking the threaded rod.

Secure the threaded rod in the fire protection clamp and in the connection bracket each with two hexagonal nuts.

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Ceiling mounting with cable trays

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Fastening on the connection bracket

Secure the threaded rod on the connection bracket with a nut and a lock nut.

Mounted cable tray

System parameters at a glance

Mounting parameters

Max. support width	1.5 m		
Max. number of layers	Two layers		
	Tray	MKS	SKS
Width [mm]	Load	a [mm]	a [mm]
200	30 kg/m	80	65
300	45 kg/m	125	95
400	60 kg/m	170	130
500	75 kg/m		160
600	90 kg/m		190
Caution!			
No function maintenance!			

Components per suspension point or joint/end point

U suspended support US...K/...	1	1	1	1	
Protective cap US...KS	1	1	1	1	
Fire protection anchor FAZ II 10/10GS	2	2	2	2	
Bracket AW 30F...	1	2	2	1	
Spacer DSK...	1	2	1	1	
Hexagonal bolt SKS 10 x 90	1	2	-	1	
Hexagonal bolt SKS 12 x 110	-	-	1	-	
Cable tray MKS 6...	1	2	2	2	
Cable tray SKS 6...	1	2	2	2	
Straight and angle connector RWVL 60	2	4	4	4	
Joint plate SSLB...	1	2	2	2	
Floor end plate BEB/...	1	2	2	2	
Truss-head bolts FRSB 6x12	5	10	10	10	
Truss-head bolts FRSB 6x20	1	2	2	2	

Always indicate the article number when ordering.

Ceiling mounting with cable trays

Components per suspension point or joint/end point

Threaded rod 2078/M12	1	1	2	1

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	2	1
Fire protection anchor FAZ II 10/10GS	1	1	2	1
Hexagonal nut DIN 934/M12	4	4	8	4
Washer 966/M12	2	2	4	2

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 14x40	1	1	2	1
Hexagonal nut DIN 934/M12	2	2	4	2
Washer 966/M12	1	1	2	1

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

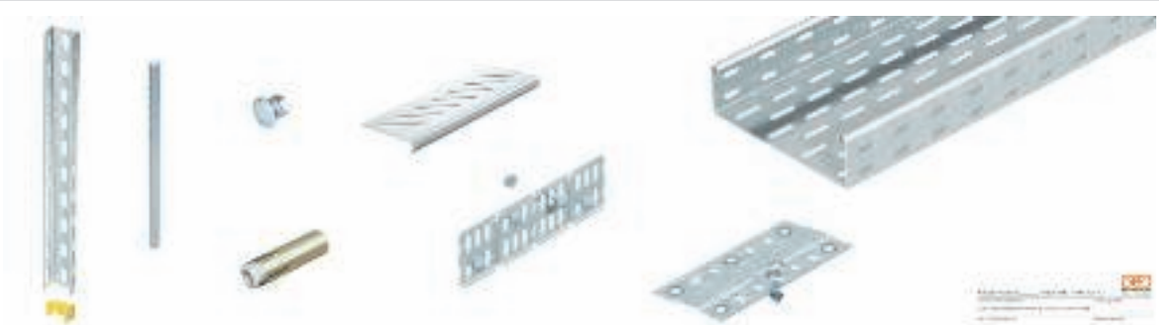
Ceiling mounting with U cross-section

Routing system tested in accordance with DIN 4102 Fire load 30 minutes

Mounting parameters			
Max. support width	1.0 m		
Max. number of layers	One layer		
	Tray	MKS	SKS
Width [mm]	Load	a [mm]	a [mm]
200	30 kg/m	80	65
300	45 kg/m	125	95
400	60 kg/m	170	130
500	75 kg/m		160
600	90 kg/m		190
Caution!			
No function maintenance!			

The cable support system in emergency and escape routes can also be installed on U cross-sections. These are fastened using threaded rods of size M10 at a support spacing of 1.0 m. The values for the deformation behaviour of the cable trays can be assumed for this mounting type in a similar way to the results of the surveyor's comments for ceiling and wall mounting. US5 or US7 profiles are used, depending on the tray width, and of course, the cable load.

System components



MKS and SKS cable trays, US3 and US5 U support, threaded rods, internal thread anchors

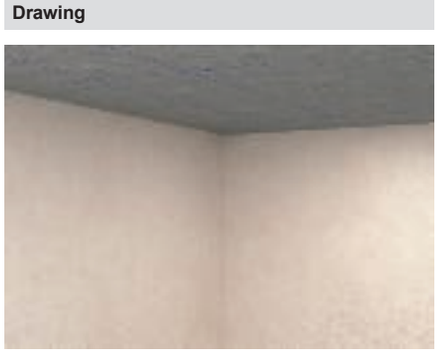
Application one tray

Single-layer mounting variant with U support as cross-section and threaded rod suspension. For SKS and MKS cable tray types.

Application two trays

Two-layer alongside mounting variant with U support as cross-section and threaded rod suspension. For SKS and MKS cable tray types.

Drawing



Draw on the exact position of the drill holes for the threaded rods using a chalk mark.

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Always indicate the article number when ordering.

Ceiling mounting with U cross-section

Drilling and anchor placement

Mounting of the impact ties to fasten the threaded rods.

Mounting

Screw the threaded rods into the impact tie and fasten the cross-sections.

Tray fastening

Mounting of the cable trays on the cross-section using truss-head bolts and combination nuts.

Mounting, two-layer

Mounting of the two cable trays on the cross-section using truss-head bolts and combination nuts.

Finished mounting

MKS or SKS cable trays on cross-section with threaded rod suspension.

System parameters at a glance

Mounting parameters

Max. support width	1.0 m		
Max. number of layers	One layer		
	Tray	MKS	SKS
Width [mm]	Load	a [mm]	a [mm]
200	30 kg/m	80	65
300	45 kg/m	125	95
400	60 kg/m	170	130
500	75 kg/m		160
600	90 kg/m		190
Caution!			
No function maintenance!			

Components per suspension point or joint/end point

U support US...	1	1	
Protective cap US...KS	2	2	
Threaded rod 2078/M10	2	2	
Hexagonal nut DIN 934/M10	6	6	

Always indicate the article number when ordering.

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Ceiling mounting with U cross-section

Components per suspension point or joint/end point

	Washer 966/M10	4	4
	Cable tray MKS 6...	1	2
	Cable tray SKS 6...	1	2
	Straight and angle connector RWVL 60	2	4
	Joint plate SSLB...	1	2
	Floor end plate BEB/...	1	2
	Truss-head bolt FRSB 6x12	6	12
	Truss-head bolt FRSB 6x20	6	12
	Washer 967/M6	2	4
	Internal thread anchor FZEA 12x40	2	2

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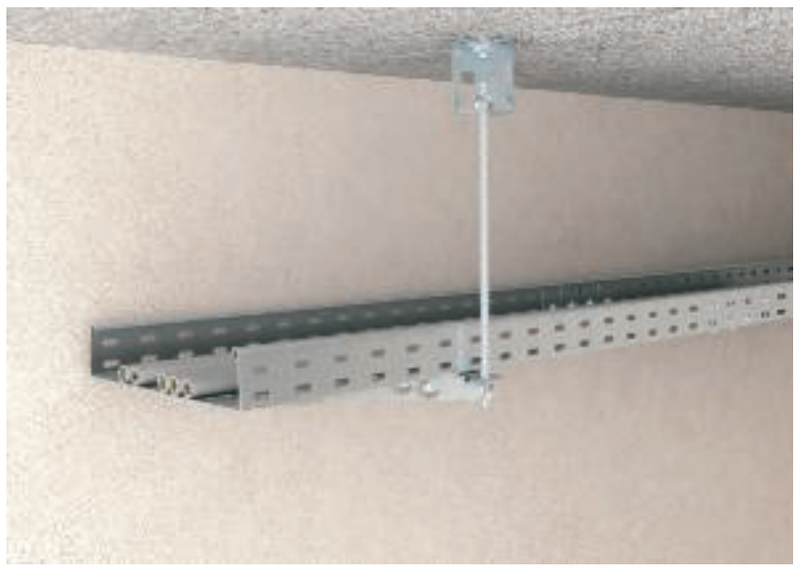
Wall mounting with cable trays



Routing system tested in accordance with DIN 4102 Surveyor's comments no. 3059/3644-AR/Mu- Fire load 30 minutes

Mounting parameters			
Max. support width	1.5 m		
Max. number of layers	One layer		
	Tray	MKS	SKS
Width [mm]	Load	a [mm]	a [mm]
200	30 kg/m	80	65
300	45 kg/m	125	95
400	60 kg/m	170	130
500	75 kg/m		160
600	90 kg/m		190
Caution!			
No function maintenance!			

The mechanical stability of the routing type with cable trays in case of fire has been proved for fire loads of 30 minutes.
The tested routing system consists of a wall bracket and a threaded rod lock to the ceiling mounted on the tip of the bracket. This stops the bracket from bending if there is a fire. Two different cable trays, each of rail height 60 mm, were tested. The cable trays were tested as type MKS with a metal thickness of 1 mm and widths of 200 mm to 400 mm, and as type SKS with metal thickness 1.5 mm with the widths 200 mm to 600 mm. Connect the ends of cable trays with screwed-on connectors with the connectors and joint plate screwed onto the tray base. Due to the varying deformations in case of fire, select the cable trays according to the space available to the false ceiling.

System components

Bracket, cable tray, straight connector, joint plate, fire protection clamp.

Wall mounting area of application, cable tray, type MKS and SKS

Routing system for ceiling mounting of the cable tray of widths 200 mm to 600 mm.

Cable tray type MKS

Distance to false ceiling for cable tray, type MKS: see mounting parameters for distance a.

Cable tray type SKS

Distance to false ceiling for cable tray, type SKS: see mounting parameters for distance a.

05 BSS_Katalog_2009 / en / 17/03/2009 (LLExport_000043)

Always indicate the article number when ordering.

Wall mounting with cable trays

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

Mounting of the bolt ties to fasten the wall brackets and the fire protection clamps.

Mounting of the connection component

Screw the connection bracket in the bracket tip using truss-head bolts.

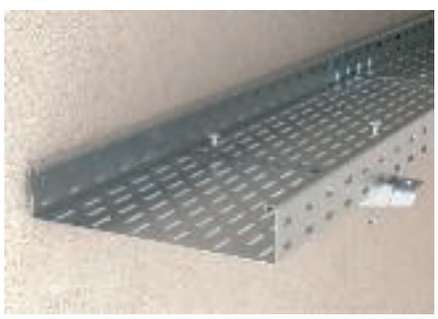
Bracket and clamp mounting

Screw the brackets with the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mounting of straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the tray



Fastening the cable tray on the bracket with truss-head bolts.

Mounting of threaded rod

Push the threaded rod from above through the tip of the screwed-on connection bracket and then suspend it from the side in the fire protection clamp.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection bracket, each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Fastening on the connection bracket

Secure the threaded rod on the connection bracket with a nut and a lock nut.

Mounted cable tray

Wall mounting with cable trays

System parameters at a glance

Mounting parameters

Max. support width	1.5 m		
Max. number of layers	One layer		
	Tray	MKS	SKS
Width [mm]	Load	a [mm]	a [mm]
200	30 kg/m	80	65
300	45 kg/m	125	95
400	60 kg/m	170	130
500	75 kg/m		160
600	90 kg/m		190
Caution!			
No function maintenance!			

Components per suspension point or joint/end point

	Bracket AW 30F...	1	1	
	Cable tray MKS 6...	1	2	
	Cable tray SKS 6...	1	2	
	Straight and angle connector RWVL 60	2	4	
	Joint plate SSLB...	1	2	
	Floor end plate BEB/...	1	2	
	Truss-head bolt FRSB 6x12	1	2	
	Truss-head bolt FRSB 6x20	1	2	
	Threaded rod 2078/M12	1	1	

Threaded rod locking with fire protection clamp

	Fire protection clamp BSB	1	1	
	Fire protection anchor FAZ II 10/10GS	1	1	
	Hexagonal nut DIN 934/M12	4	4	
	Washer 966/M12	2	2	

Threaded rod locking with internal thread anchor

	Internal thread anchor FZEA 14x40	1	1	
	Hexagonal nut DIN 934/M12	2	2	
	Washer 966/M12	1	1	

Concrete wall

	Fire protection anchor FAZ II 12/10	1	1	

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Wall mounting with cable trays

Masonry wall

	**Fire protection bolt tie MMS 10 x 80**	1	1	

Cable bandage

DIBt

DIBt approval Z-19.22-1891
Prevention of fire spread through cables system via min. 90 minutes

Technical description	
Outer side	Grey
Internal side	White
Min. overlap	5 cm
Tightening strap fastening distance	0.5 m
Cable cross-sections	No restriction
Cable types	No restriction
Support system widths	No restriction
Approval required!	

When renovating existing buildings, often there is insufficient space to create fire protected installations with fire resistant false ceilings in the escape route. The OBO FSB cable bandage can provide the necessary assistance here: if there is no other option, it is the simplest and most economical solution. Existing cable support systems are completely encased in the bandage. This means that, should there be a cable fire, the fire is not transferred to other areas by the cable installation. The cable bandage, classed as flame-retardant (DIN 4102 - B1) provides increased safety here. As an addition to the system, there are also buckets of flame protection coating available. Before mounting cable bandages and the coating in existing buildings, obtain the approval of the construction authorities.

System components

Cable bandage, flame protection coating in a bucket, tightening strap, installation strip, tightening strap locks, pliers

Ceiling area of application

Jacketing of existing cable support systems in escape routes, to prevent the spread of fires.

Wall application area

Jacketing of existing cable support systems in escape routes, to prevent the spread of fires.

Suspension components

Suspended supports, threaded rods and similar mounting components are recessed on jacketing. To do this, cut small strips of the bandage and lay them around the support system.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000943)

Always indicate the article number when ordering.

Cable bandage

Suspension of the bandage

Attach the bandage, which has been cut to the width of the support system, to one side of the tray and fix it, e.g. by clamping it in place with cables.

Jacketing of the cable tray

Place the bandage around the cable tray. Ensure that there is a mesh overlap of at least 5 cm.

Lock with tightening strap

The bandage must be secured on the cable support system using metal tightening straps or wires at a spacing of 0.5 m. We recommend using tension jacks with the tightening strap.

Cable exit

Run out cables must also be jacketed. The length of the jacketed area is at least 300 mm.

Intermediate layer

If the distance between the tight jacketing and the cables is more than 40 mm, then an additional layer of the mesh must be loosely laid in between.

Alternative jacketing

Alternatively, only the cables can be bandaged on the support system. To do this, place the mesh in the tray and wrap it round and fasten it after the cables have been installed.

Finished jacketing

Fire prevention system in escape and emergency routes, in which a false fire protection ceiling cannot be created.

Jacketing of the cable tray on the wall

Cable support systems on the wall can also be completely surrounded with the bandage.

Alternative jacketing

Alternatively, only the cables can be bandaged on the support system. To do this, place the mesh in the tray and wrap it round and fasten it after the cables have been installed.

Vertical rails

Prevention of fire spread via the cables in a vertical direction. Fastening with metallic rails, e.g. with single clips.

Clamped vertically

In the overlap area, the bandage can be stapled down using metal staples.

Vertical tightening strap

In a manner similar to horizontal fastening, tightening straps can also be used vertically at a distance of max. 0.5 m.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Cable bandage

Difficult to access points

An additional coating filler is available to handle installations which are difficult to access but must still be jacketed. This can be sprayed or painted on.

System parameters at a glance

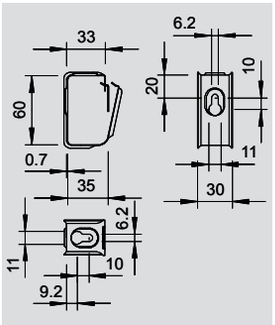
Technical description

Outer side	Grey
Internal side	White
Min. overlap	5 cm
Tightening strap fastening distance	0.5 m
Cable cross-sections	No restriction
Cable types	No restriction
Support system widths	No restriction
Approval required!	

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

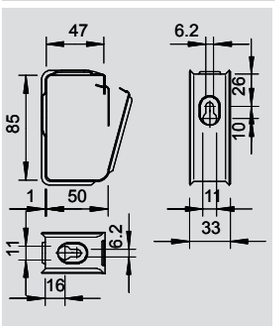
Escape route installation systems: products

Collecting clamp



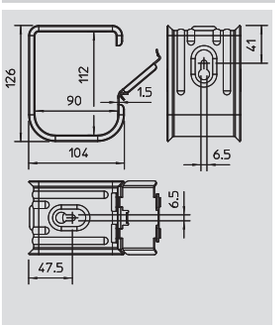
Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/M	15	50	50	3.700	**2207 02 8**	

Metal collecting clamp for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.



Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/M	30	25	25	6.200	**2207 03 6**	

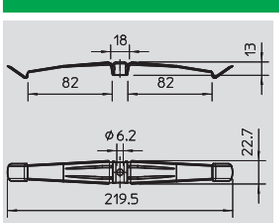
Metal collecting clamp for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.



Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/M	70	10	10	34.500	**2207 06 0**	

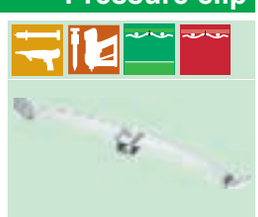
Metal collecting clamp for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.
Fire protection bolt tie MMS 6 x 50 contained in scope of delivery.

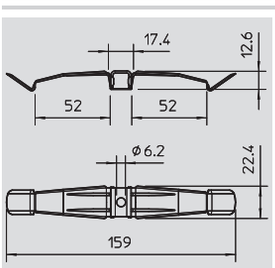
Pressure clip



Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /% pc
2033 M	16	25	25	2.310	**2204 00 0**	

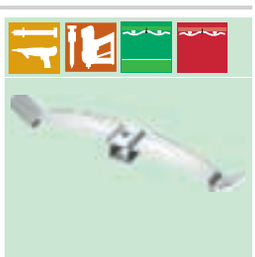
Metal pressure clip for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.
Clamping height 10 mm
Fastening hole Ø 6 mm.





Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /% pc
2034 M	10	50	50	1.860	**2204 01 0**	

Metal pressure clip for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.
Clamping height 10 mm
Fastening hole Ø 6 mm.



Always indicate the article number when ordering.

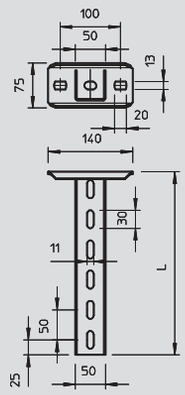
Escape route installation systems: products

Suspended support

US5

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5 K/20	200	2.5	1	100.000	**6341 52 7**	
US 5 K/30	300	2.5	1	125.000	**6341 53 5**	
US 5 K/40	400	2.5	1	150.000	**6341 54 3**	
US 5 K/50	500	2.5	1	175.000	**6341 55 1**	
US 5 K/60	600	2.5	1	200.000	**6341 57 8**	
US 5 K/70	700	2.5	1	225.000	**6341 58 6**	
US 5 K/80	800	2.5	1	255.000	**6341 59 4**	
US 5 K/90	900	2.5	1	280.000	**6341 60 8**	
US 5 K/100	1000	2.5	1	300.000	**6341 61 6**	
US 5 K/110	1100	2.5	1	330.000	**6341 62 4**	
US 5 K/120	1200	2.5	1	360.000	**6341 63 2**	

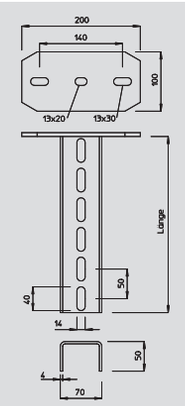
Suspended support (U profile) of dimensions 50 x 50 mm with welded head plate.



US7

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 7 K/130	1300	4	1	614.000	**6339 21 2**	
US 7 K/140	1400	4	1	654.000	**6339 22 0**	
US 7 K/150	1500	4	1	694.000	**6339 23 9**	
US 7 K/160	1600	4	1	734.000	**6339 24 7**	
US 7 K/170	1700	4	1	774.000	**6339 25 5**	
US 7 K/180	1800	4	1	814.000	**6339 26 3**	
US 7 K/190	1900	4	1	854.000	**6339 27 1**	
US 7 K/200	2000	4	1	894.000	**6339 29 8**	

Suspended support (U profile) of dimensions 70 x 50 mm with welded head plate.

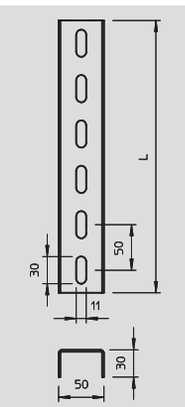


U support

US3

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FS	
US 3/30	300	2	1	39.900	**6342 30 4**	
US 3/40	400	2	1	53.200	**6342 30 6**	

U support in fixed lengths. Dimensions 30 x 50 mm.



05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

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Escape route installation systems: products

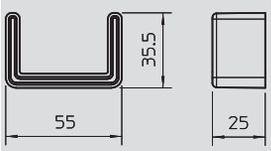
U support

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
US 5/50	500	2.5	1	133.000	**6340 93 8**	
US 5/60	600	2.5	1	160.000	**6340 94 6**	
US 5/70	700	2.5	1	175.000	**6340 95 0**	

U support in fixed lengths. Dimensions 50 x 50 mm.

US5

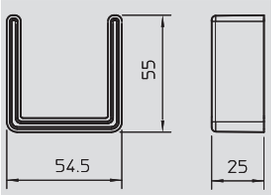
Protective cap



Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 3 KS	Sulphur yellow	20	1.070	**6338 45 7**	

Protective cap for end covering of US 3 supports.

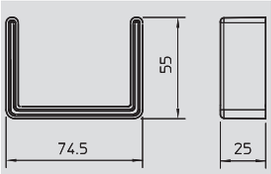
US3



Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 5 KS	Sulphur yellow	20	1.300	**6338 46 1**	

Protective cap for end covering of US 5 supports.

US5



Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 7 KS	Sulphur yellow	20	2.000	**6338 49 6**	

Protective cap for end covering of US 7 supports.

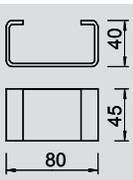
US7

Bracket

Type	Length mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW30F21	210	20	75.000	**6417 02 7**	
AW30F31	310	20	100.000	**6417 04 3**	
AW30F41	410	20	125.000	**6417 07 8**	
AW30F51	510	10	165.000	**6417 09 4**	
AW30F61	610	10	183.000	**6417 11 6**	

Bracket for mounting on suspended supports or as wall bracket for cable tray routing type above fire protection ceilings. The brackets are supplied unmounted.

Spacer



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 45	25	19.000	**6416 50 0**	

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.

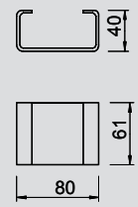
US5

Escape route installation systems: products

Spacer

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 61	20	26.000	**6416 51 9**	

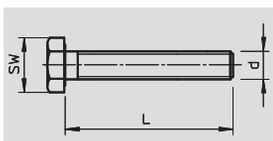
Spacer for use in U 7 supports.



Hexagonal bolt

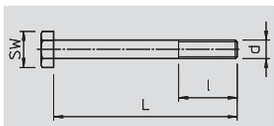
Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /pc.
SKS 10x90	M10 x 90	90	10	17	20	8.000	**6418 25 2**	

Hexagonal bolt for universal fixing of structure components.



Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /pc.
SKS 12x110	M12 x 110	110	12	19	20	14.300	**6418 31 7**	

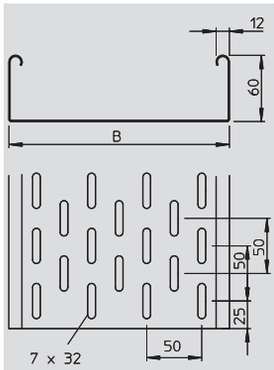
Hexagonal bolt with hexagonal nut, washer and lock washer.



Cable tray

Type	Length mm	Width mm	Metal thickness mm	Weight borders	Item No. ST / FS	Price /m
MKS 620	3000	200	1	238.600	**6055 20 6**	
MKS 630	3000	300	1	304.600	**6055 30 3**	
MKS 640	3000	400	1	368.000	**6055 40 0**	

MKS 60 = medium-weight cable tray system with a side height of 60 mm. FS version includes RV 60 straight connector set.



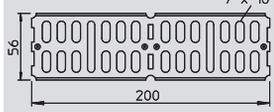
Type	Length mm	Width mm	Metal thickness mm	Weight borders	Item No. ST / FS	Price /m
SKS 620	3000	200	1.5	356.800	**6056 20 2**	
SKS 630	3000	300	1.5	421.500	**6056 29 6**	
SKS 640	3000	400	1.5	522.400	**6056 40 7**	
SKS 650	3000	500	1.5	650.300	**6056 50 4**	
SKS 660	3000	600	1.5	726.600	**6056 60 1**	

SKS 60 = heavyweight cable tray system with 60 mm side height. FS version includes RV 60 straight connector set.

Connector

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RWVL 60	200 x 56	10	15.600	**6067 11 5**	

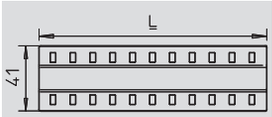
Longitudinal and angle connector for cable trays, fittings and separating retainers with a side height of 60 mm.



Always indicate the article number when ordering.

Escape route installation systems: products

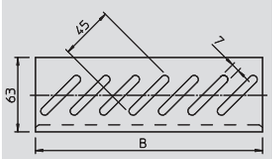
Joint plate



Type	Width mm	Quantity of screws pc.	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SSLB 200	185	2	20	16.700	**7070 21 3**	
SSLB 300	285	3	20	25.700	**7070 21 7**	
SSLB 400	385	—	20	34.700	**7070 22 1**	
SSLB 500	485	—	20	43.700	**7070 22 5**	
SSLB 600	585	—	20	52.700	**7070 23 3**	

Wide joint plate for use in all cable trays and wide span cable trays.

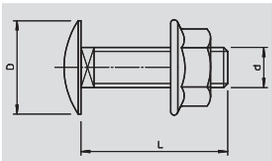
Floor end plate



Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
BEB/200	200	100	11.400	**7083 20 3**	
BEB/300	300	100	17.200	**7083 30 0**	
BEB/400	400	100	23.100	**7083 40 8**	
BEB/500	500	50	29.000	**7083 50 5**	
BEB/600	600	50	35.000	**7083 60 2**	

Bottom end plate for floor reinforcement at the ends of the cable tray and as cable protection.

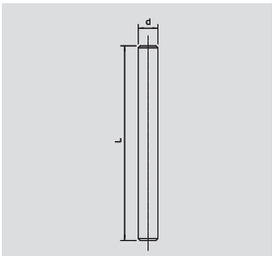
Truss-head bolt



Type	Thread	Length mm	Dimension D mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
FRSB 6x12	M6	12	13.5	6	10	100	0.990	**6406 12 2**	
FRSB 6x20	M6	20	13.5	6	10	100	1.137	**6406 20 3**	

Truss-head bolt with square neck including combination nut.

Threaded rod



Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M10	10	1000	25	49.000	**3141 20 9**	
2078	M12	12	1000	20	70.000	**3141 30 6**	

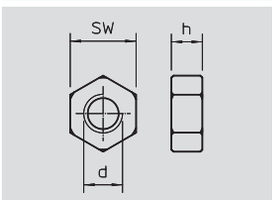
Threaded rod to DIN 976.

Fire protection clamp

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
BSB	20	41.000	**6418 19 8**	

Fire protection clamp for ceiling fastening of the threaded rod lock for routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

Hexagonal nut



Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**	
DIN 934	M12	12	10.8	19	100	1.730	**3400 12 3**	

Hexagonal nut to DIN 934 with metric thread.

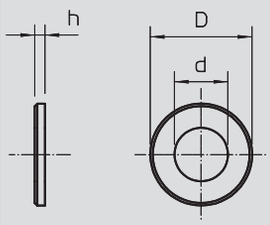
Always indicate the article number when ordering.

Escape route installation systems: products

Washer

Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
966	M10	20	10.5	2	100	0.408	**3402 09 6**	
966	M12	24	13	2.5	100	0.627	**3402 12 6**	

Washer according to DIN 125, shape A, for universal use.



Cable bandage

DIBt

Type	Length mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FSB-B	10000	1	1000.000	**7202 26 5**	

Fire protection jacketing made of flexible mesh with fire protection coating for cable support systems in existing buildings. Grey on the outside, white on the inside.

FSB flame protection coating

DIBt

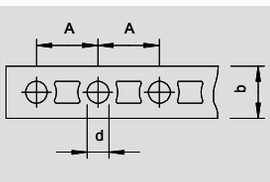
Type	Pack. kg	Weight kg/‰ pc	Item No.	Price /kg
FSB-A	12.5	1250.000	**7202 26 8**	

Fire protection coating as addition to FSB-B fire protection jacketing. For use in areas with difficult access. To prevent fire spreading via cables and cable support systems.

Installation strap

Type	Dimension mm	Per roll m	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
5055	17 x 1	10	20	106.000	**1470 17 5**	

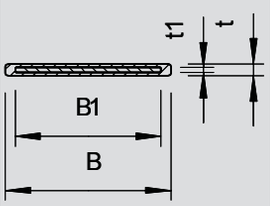
Perforated steel strap, in practical uncoiling box.



Tightening strap

Type	Dimension mm	Colour	Shipping box m	Pack. m	Weight borders	Item No. ST / G	Price /% m
574	17 x 1.0	Stone grey	250	25	5.880	**6490 01 8**	

Plastic-covered galvanised tightening strap for fastening on cable trays and ladders.



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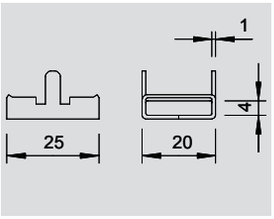
Always indicate the article number when ordering.

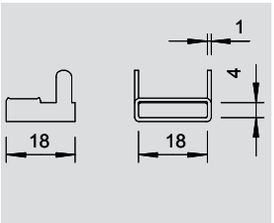
Escape route installation systems: products

Tightening strap lock



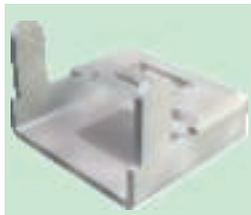
Type	Pack. pcs	Weight kg/% pc	Item No. ST / DD	Price /% pc
192	100	1.006	**6490 90 5**	

Tightening strap lock for under ceiling mounting.

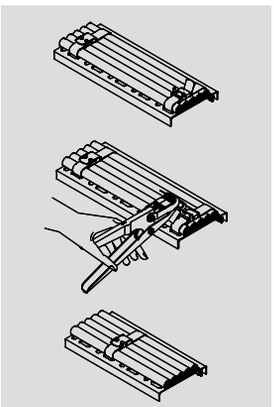


Type	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /% pc
197/VA	100	0.560	**6490 96 4**	

Tightening strap lock for single-sided locking of the tightening strap in difficult areas.

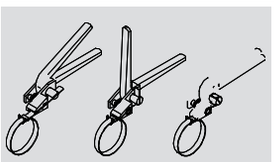


Spring chuck



Type	Pack. pcs	Weight kg/% pc	Item No. ST	Price /pc.
575	1	29.700	**6498 01 9**	

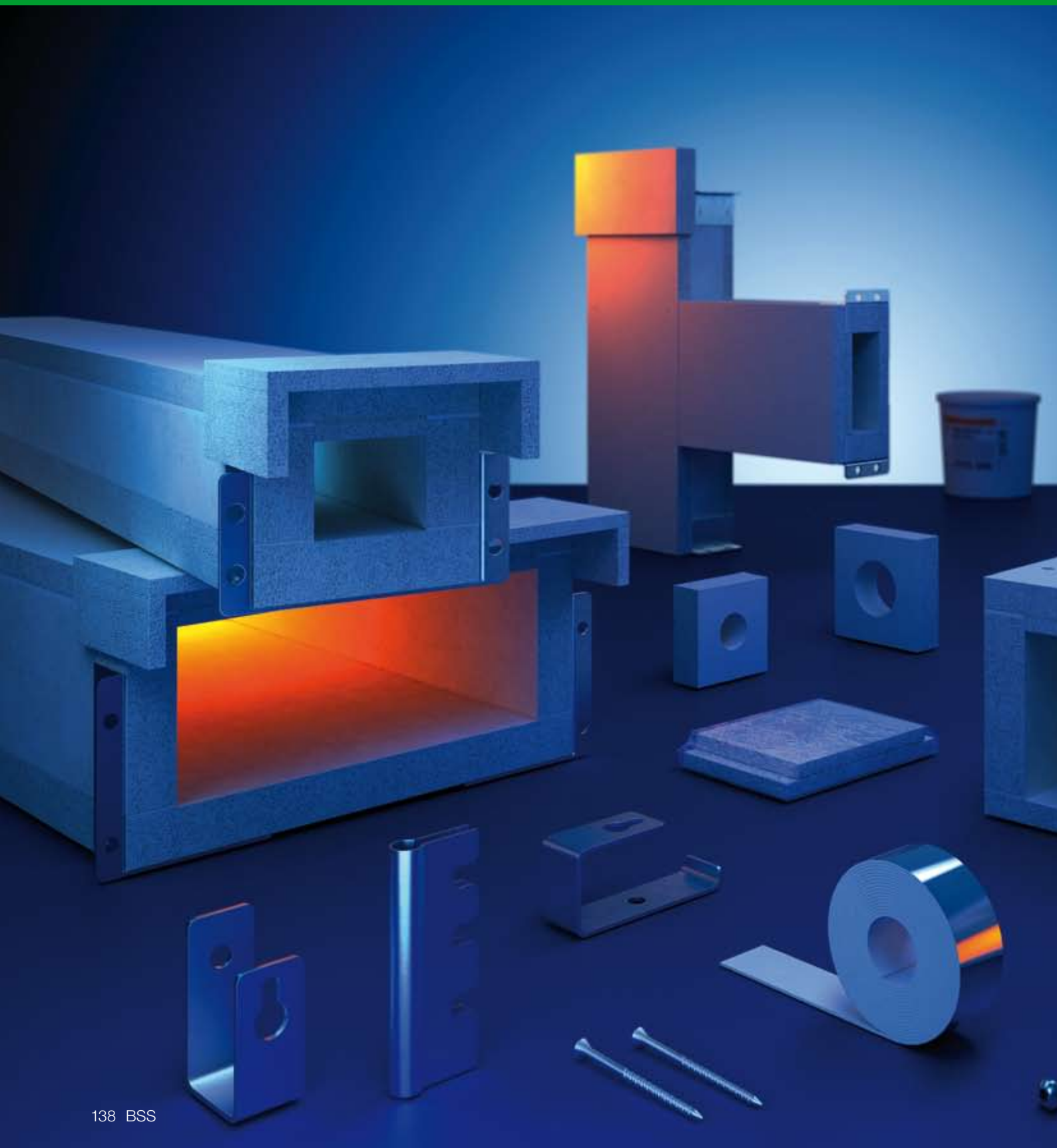
For tightening strap 574/...
Mounting the tightening strap:
1. Cut the strap to the right length, then feed it through the lock and wind it up.
2. Loop the strap around the cable, pushing the loose end through the lock.
3. Tighten the end of the strap using pliers.
4. Wind the end of the taut strap with the pliers. Remove the pliers.
5. Turn over the end of the strap using the hammer, locking the end by turning over the two protruding lobes of the lock.



Type	Pack. pcs	Weight kg/% pc	Item No. ST	Price /pc.
576	1	132.000	**6498 02 7**	

For tightening strap 574/...

- Duct system tested according to DIN 4102 Part 11
- Function maintenance system tested to DIN 4102 Part 12
- Secure installations in emergency and escape routes
- Quick, practical mounting options



Escape route installation systems

Fire protection duct

Fire protection ducts

OBO fire protection ducts are made from easily workable glass fibre, lightweight concrete (non-flammable, building material class A1). The material is harmless to both health and the environment during installation or in the event of fire. The duct surface is sealed with glass fibre, which makes it hard, smooth and abrasion-proof. However, any damage that does occur can easily be remedied using OBO BSK mortar. All ducts can be painted or papered over.

Use as an I duct in emergency and escape routes
OBO fire protection duct, used as installation ducts for protecting escape and emergency routes from the effects of cable fires.

Use as an E duct for function maintenance
The fire protection duct is always used as an E duct for function maintenance when the power supply to safety-relevant installations has to be guaranteed in the event of fire. This type of installation also achieves the third protection aim of fire-protected building installations. See also function maintenance systems.

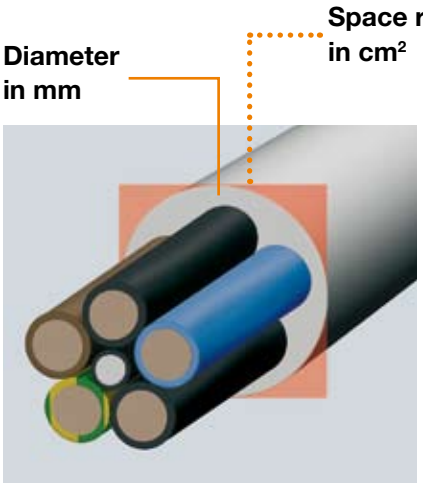
Suspended fire protection duct BSKH
The BSKH fire protection duct means that fitters will never again have to grapple with other equipment such as ventilation, heating and sanitary installations when mounting fireproofing ducts. The new BSKH fire protection duct can be securely fitted on OBO installation systems underneath existing installations. The system is particularly suited to locations where many joists block the path of direction wall or ceiling mounting. Complementing the tried-and-tested BSK fireproofing duct for direct wall and ceiling mounting, this new concept clears the way for fireproof installation.

As with the BSK, the suspended ducts may be subjected to a maximum cable load of 22.5 kg/m. The loosely attached lid ensures rapid assignment and inspection. The support distance of the mounting system is always 1 m. Fittings must be supported on all sides with a maximum distance of 100 mm to the joint. The OBO fire protection duct is tested to DIN 4102 Parts 11 and 12, and as such, is approved for use as an I duct in escape and emergency routes and as an E duct for maintaining the function of safety-relevant systems. The fire resistance period is 90 minutes for the I classification and 30 minutes when used as a functional maintenance component.

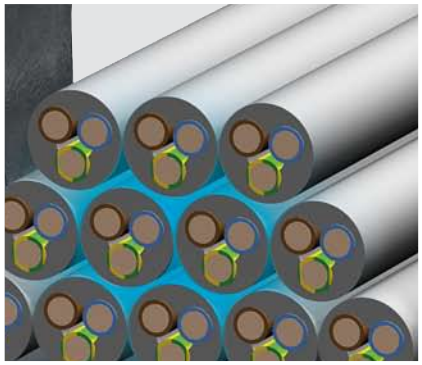
Type overview, fire protection duct					
Fire protection classes	Figure	Type	Internal dimensions H x W (mm)	External dimensions H x W (mm)	Usable cross-section areas (cm^2)*
I 90 E 30		**BSK 090506**	*50 x 60*	*95 x 120*	*22.5*
		BSK 090511	*50 x 110*	*95 x 170*	*34.3*
		**BSK 090521**	*50 x 210*	*95 x 270*	*76.3*
		**BSK 091016**	*105 x 160*	*150 x 220*	*135.3*
		**BSK 091026**	*105 x 260*	*150 x 320*	*231.3*
I 120 E 90		**BSK 120506**	*50 x 60*	*130 x 180*	*22.5*
		BSK 120511	*50 x 110*	*130 x 230*	*34.3*
		BSK 120521	*50 x 210*	*130 x 330*	*76.3*
		**BSK 121016**	*105 x 160*	*185 x 280*	*135.3*
		**BSK 121026**	*105 x 260*	*185 x 380*	*231.3*

Type over of suspended fire protection ducts					
I 90 E 30		**BSKH 090506**	*50 x 60*	*110 x 120*	*50*
		**BSKH 090511**	*50 x 110*	*110 x 170*	*55*
		**BSKH 090521**	*50 x 210*	*110 x 270*	*105*
		**BSKH 091016**	*105 x 160*	*165 x 220*	*168*
		**BSKH 091026**	*105 x 260*	*165 x 320*	*273*

** Theoretical volume*
Comply with the VDE specifications, e.g. with regard to heating



Cable diameter and space required



The useful cross-section of the cable simulates the spaces in real cable laying.

How much space do my cables really need?
The diameter says little about the actual space required by a cable. Calculate: $(2r)^2$.

This value reflects the realistic space requirements, including the compartments.

System overview
Fire protection ducts

BSKH
Suspended fire protection duct Page 150

BSK
Fire protection duct

Page 144

Fire protection duct for direct wall and ceiling mounting

I90 and I120 DIN 4102 Part 11
E30 and E90 DIN 4102 Part 12
ABP P-SAC 02/III-215
ABP P-SAC 02/III-216

Dimensions BSK I90/E30, internal/external [mm]		
BSK 090506	50 x 60	95 x 120
BSK 090511	50 x 110	95 x 170
BSK 090521	50 x 210	95 x 270
BSK 091016	105 x 160	150 x 220
BSK 091026	105 x 260	150 x 320
Dimensions BSK I120/E90, internal/external [mm]		
BSK 120506	50 x 60	130 x 180
BSK 120511	50 x 110	130 x 230
BSK 120521	50 x 210	130 x 330
BSK 121016	105 x 160	185 x 280
BSK 121026	105 x 260	185 x 380

The OBO fire protection duct consists of fibre glass light concrete fire protection plates, which are resistant to water and frost. The fire protection plates, which are classed as non-combustible (material class A1), have a compacted surface, which is thus hard, smooth and wear-resistant. The BSK fire protection duct fulfils the requirements as an I duct and as an E duct. It is thus the ideal solution as cable routing duct, taking existing fire protection requirements into account.
The I duct is used to protect escape and rescue routes against a possible cable fire.
This means that the escape and rescue routes remain free from fire, smoke and heat.
The E duct allows function maintenance of the safety-relevant circuits.

System components

BSK fire protection duct, separating clamp, separating bracket, doublers, mortar, fire protection screw tie, sealing strip, countersunk head screw

Wall and ceiling application

The duct must be mounted directly on the wall or under the ceiling.

Fittings application

All types of standard fittings, and also special fittings, can be created simply from the duct.

Surface application

It is permitted to paint or wallpaper over the duct after mounting. This allows adaptation of the duct to the appearance of the substrate.

Always indicate the article number when ordering.

Fire protection duct for direct wall and ceiling mounting

Duct trough fastening

The duct trough is fixed on the wall or ceiling with OBO fire protection bolt ties of type MMS 7.5 x 80, directly on the marking lines located on the duct base at a spacing of maximum 400 mm.

Duct trough connection point

The joints between the adjacent duct troughs are sealed using the self-adhesive sealing strips as butt joints.

Installation aid

Separating clamps are used as an installation aid for inserting the cables during ceiling mounting and separating brackets for wall mounting. These separating elements are fastened to the screw ties for duct mounting after the duct has been mounted. The OBO BSK fire protection duct may be subjected to a cable load of up to 22.5 kg/m.

Mounting of duct lid

The duct lid is sealed using the self-adhesive sealing strip. It is fastened using ten bolts on the appropriate marking lines.

Fittings in the application

Fittings can be created at any time to meet the approval from the OBO BSK fire protection duct. On the construction site, the duct routing can be adjusted easily to the local circumstances.

Mounting example, internal corner: 1st duct section

Apply sealing strips to the duct trough on the head side. Mount the duct trough in the corner of the room. In the corner, the sealing strips must be shortened to 3 mm.

Mounting example, internal corner: 2nd duct section

Fit the side walls of the second duct trough.

Filling of the remaining joints

Apply sealing strips to the cut and front surfaces. Mount the second duct trough in the corner of the room and fill unclosed joints with OBO BSK-M mortar.

Mounting of neighbouring ducts

Apply the sealing strip to additional ducts and mount them, blunt, in front of the corner piece.

Mounting preparations, 1st lid

Shorten the duct lid and apply the sealing strip on the inner sides.

Mounting of 1st lid

Screw the duct lid to the duct trough.

Mounting preparations, 2nd lid

Shorten the second duct lid and apply the sealing strip on the inner side. In addition, apply sealing strips to the front surface.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Fire protection duct for direct wall and ceiling mounting

Mounting of 2nd lid

Screw the second duct lid to the duct trough.

Mounting of end piece

Mount an end piece on the duct end.

Flat angle application

Use of a flat angle in a room corner.

External and internal corner application

Mount an internal and external corner on a wall offset.

T piece application

A T falling piece can be mounted at any point in the duct.

Intersection application

Asymmetrical fittings such as intersections and T pieces can also be created.

Use of variable duct routing

This means that no precise pre-planning is required on the construction site regarding the required fittings.

Repairs

Broken out sections of the duct and lid are refilled with BSK mortar.

Wall connection for I 90 duct

An I 90 wall connection collar is required for duct wall penetration. The individual parts of the plate are simply screwed onto the duct.

Preparation of cable exits

Drill in duct for the cables. Fasten doubler to the duct using the included bolts.

Filling of the cable exits

Cables can be run out of I duct as individual cables or as cable bundles out of the OBO BSK fire protection duct. This applies to individual cables in the case of E duct.

Detail, cable exits

For cable bundles and individual cables with larger cross-sections, additional doublers are fixed to the duct wall.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Fire protection duct for direct wall and ceiling mounting

Detail, cable exit

For individual cables with a normal cross-section, no additional doublers are fixed to the duct wall.

Re-treatment of the surface

The surface of the OBO BSK fire protection duct allows almost any secondary treatment. Wallpapering, painting and panelling allow harmonious integration of the fire protection duct into the architecture. This does not impair the fire protection classification of the fire protection duct.

Mounted fire protection duct

The individual creation of fittings on the construction site means that the OBO BSK fire protection duct is an ideal solution for the installation of cables in escape and emergency routes.

BSK fire protection duct I90 and E 30

Type	Internal dimensions mm	External dimensions mm	Length mm	Weight borders	Item No.	Price /m
BSK 090506	50x60	95x120	1000	730.000	**7215 15 0**	
BSK 090511	50x110	95x170	1000	940.000	**7215 15 4**	
BSK 090521	50x210	95x270	1000	1350.000	**7215 15 8**	
BSK 091016	105x160	150x220	1000	1430.000	**7215 16 2**	
BSK 091026	105x260	150x320	1000	1830.000	**7215 16 6**	

Fire protection duct I90/E30, to DIN 4102 Part 11 and Part 12, incl. 12 x countersunk head screw and 3 x 1 m sealing strip.

BSK end piece I90 and E 30

Type	Pack. pcs	Item No.	Price /pc.
BSK-E090506	1	**7215 25 0**	
BSK-E090511	1	**7215 25 2**	
BSK-E090521	1	**7215 25 4**	
BSK-E091016	1	**7215 25 6**	
BSK-E091026	1	**7215 25 8**	

End piece for fire protection duct I90/E 30; including appropriate fastening material.

BSK sealing strip I90 and E 30

Type	Dimension mm	Length m	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-D0930	5 x 30	15	1	37.500	**7215 42 3**	

Self-adhesive sealing strip for BSK I90/E 30 and BSKH I90/E 30.

BSK countersunk head screw I90 ad E 30

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
BSK-S0955	4.0 x 55	50	0.340	**7215 40 0**	

Countersunk head screw for fire protection duct I90/E 30, for lid and doubler fastening.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Fire protection duct for direct wall and ceiling mounting

BSK doubler I90

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-A0908	80 x 80 x 20	1	10.000	**7215 45 2**	
BSK-A0910	100 x 100 x 20	1	14.000	**7215 45 8**	

Doubler for BSK I90 and for BSKH I90:
BSK-A0908 with drill hole 40 mm, for duct heights to 95 mm,
BSK-A0910 with drill hole 60 mm, for duct heights from 110 mm.
Including fastening screws.

BSK wall connection collar I90

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-K0506	1	40.000	**7215 53 3**	
BSK-K0511	1	45.000	**7215 53 7**	
BSK-K0521	1	55.000	**7215 54 1**	
BSK-K1016	1	65.000	**7215 54 5**	
BSK-K1026	1	75.000	**7215 54 9**	

Wall connection collar for BSK, consisting of three single plates, to double the insulation for wall penetrations. Incl. fastening materia.l Only for I 90 classification.

BSK fire protection duct I120 and E 90

Type	Internal dimensions mm	External dimensions mm	Length mm	Weight borders	Item No.	Price /m
BSK 120506	50x60	130x180	1000	1490.000	**7215 21 0**	
BSK 120511	50x110	130x230	1000	1800.000	**7215 21 6**	
BSK 120521	50x210	130x330	1000	2420.000	**7215 22 2**	
BSK 121016	105x160	185x280	1000	2570.000	**7215 22 8**	
BSK 121026	105x260	185x380	1000	3190.000	**7215 23 4**	

Fire protection duct I120/E 90, to DIN 4102 Part 11 and Part 12, incl. 12 x countersunk head screw and 3 x 1 m sealing strip.

BSK end piece I120 and E 90

Type	Pack. pcs	Item No.	Price /pc.
BSK-E120506	1	**7215 27 0**	
BSK-E120511	1	**7215 27 2**	
BSK-E121016	1	**7215 27 6**	
BSK-E120521	1	**7215 27 4**	
BSK-E121026	1	**7215 27 8**	

End piece for fire protection duct I120/E 90; including appropriate fastening material.

BSK sealing strip I120 and E 90

Type	Dimension mm	Length m	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-D1260	5 x 60	15	1	74.200	**7215 43 2**	

Self-adhesive sealing strip for BSK I120/E 90.

BSK countersunk head screw I120 ad E 90

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
BSK-S1280	4.5 x 80	50	0.500	**7215 41 2**	

Countersunk head screw for BSK I120/E 90, for lid fastening

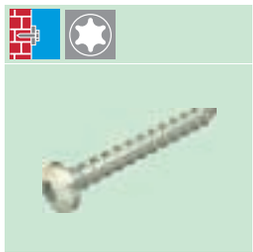
Always indicate the article number when ordering.

Fire protection duct for direct wall and ceiling mounting

Fire protection bolt tie

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
MMS7,5	7.5 x 80	50	2.174	**3498 27 1**	

Fire protection bolt tie with pan head, drive T40, drill hole 6 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.



BSK separating clamp for ceiling mounting

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
BSK-B0511	46 x 55	25	7.500	**7215 35 6**	
BSK-B0521	46 x 105	25	14.500	**7215 36 2**	
BSK-B1016	101 x 80	25	19.000	**7215 36 8**	
BSK-B1026	101 x 130	25	29.000	**7215 37 4**	

Separating clamp for BSK fire protection duct, as installation aid for ceiling mounting. Fastening by clamping under the fire protection bolt tie.

BSK separating bracket for wall mounting

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
BSK-W0511	46 x 37.5	25	5.000	**7215 31 2**	
BSK-W0521	46 x 72.5	25	9.000	**7215 31 8**	
BSK-W1016	101 x 50	25	12.500	**7215 32 4**	
BSK-W1026	101 x 97.5	25	17.500	**7215 33 0**	

Separating bracket for BSK fire protection duct, as installation aid for wall mounting. Fastening by clamping under the fire protection bolt tie.

BSK mortar

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-M	1	350.000	**7215 50 0**	

Fire protection duct mortar, dry, ready-to-use mortar in a bucket for filling joints and smaller cracks during the mounting of the BSK and BSKH fire protection ducts.

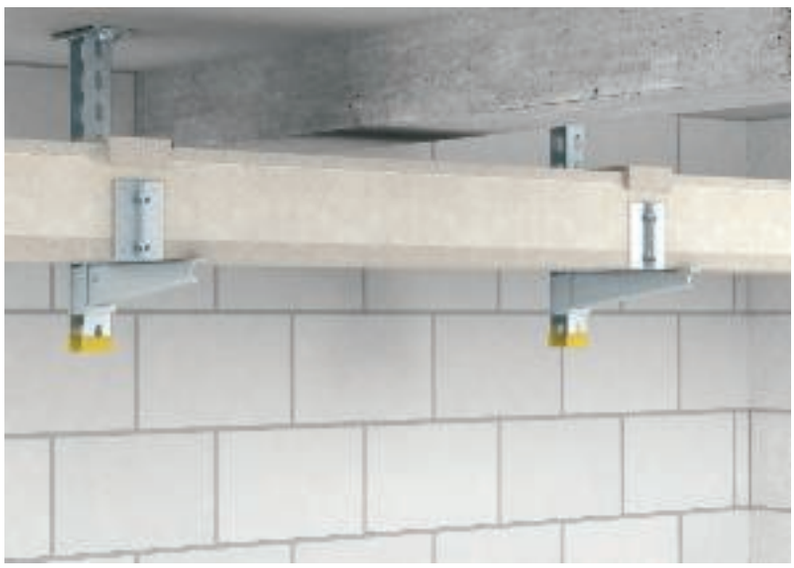
Identification plate, function maintenance

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

Fire protection duct for suspended ceiling mounting

I90 to DIN 4102 Part 11
E 30 to DIN 4102 Part 12
ABP P-SAC 02/III-215
ABP P-SAC 02/III-216



Dimensions BSKH I90/E30, internal/external [mm]		
BSKH 090506	50 x 60	110 x 120
BSKH 090511	50 x 110	110 x 170
BSKH 090521	50 x 210	110 x 270
BSKH 091016	105 x 160	165 x 220
BSKH 091026	105 x 260	165 x 320
Max. support width	1.0 m	

The fibre glass lightweight concrete ducts, which can be flamed on four sides, can be mounted on OBO mounting systems, thus offering the greatest possible flexibility in cable routing in emergency and escape routes (installation duct to DIN 4102 Part 11) or in electrical function maintenance (to DIN 4102 Part 12). This allows elegant avoidance of objects from other areas such as heating, ventilation and sanitary applications.
Mounting under the ceiling is simple, using U-shaped suspended supports and a bracket, or on a U cross-section suspended with threaded rods. The OBO BSKH is simply attached loosely. Mounted connectors ensure quick mounting in situ, whilst loosely placed lids ensure quick inspection and reassignment.

System components

BSKH fire protection ducts, fittings: 90° bend, intersection and T piece, U suspended support, brackets, connection set, sealing strip, doublers, wall connection collar, threaded rod adapter, fire protection anchor, BSK mortar

Ceiling area of application

Mounted on OBO mounting systems to go under obstacles or for direct floor crossings.

Always indicate the article number when ordering.

Fire protection duct for suspended ceiling mounting

Mounting preparations

Draw on the exact position of the drill holes for the U suspended supports at a maximum spacing of 1 m.

Placing anchors

Mount the FAZ II bolt ties to fasten the U suspended supports.

Suspended support mounting

Screw the U suspended supports onto the bolt ties.

Bracket mounting

Fasten the brackets on the U suspended support with the DSK 25 spacer and the SKS 10 x 80 hexagonal bolt.

Joint

Apply the sealing strip all the way around joints between the duct elements.

Connection, cable trough

Place the duct troughs loosely on the bracket and connect them to the pre-mounted covers using the connection screws. To protect it against shaking, you can optionally secure the duct with a short Spring screw through the bracket.

Duct lid

After installing the cables, apply the self-adhesive sealing strip to the duct lid and place it loosely on the floor trough. In so doing, observe the correct position of the pre-mounted joint cover.

I duct variant

When used as an I duct for wall penetrations, additional wall connection collars must be mounted.

E duct variant

Threaded rod lock with adapter mounted on the duct connectors and locked in the ceiling using an internal thread anchor.

E duct variant, alternative

Alternatively, the threaded rod can also be locked on the ceiling with the fire protection clamp.

Shortening duct element

If necessary, the duct elements can simply be shortened with a coarse saw. Dismantled connectors can be reused.

Mounting the connection set

After shortening, remount the available connectors on the duct.

Always indicate the article number when ordering.

Fire protection duct for suspended ceiling mounting

Fittings

All the fittings are locked with an additional suspension at a maximum distance of 100 mm to the joint on each side.

Cable bundle output

To run cable bundles or single cables with a large diameter, fasten additional doublers to the duct and completely close them with BSK mortar.

Individual cable output

Individual cables can be run directly through the duct walls. Close the ring gap with BSK mortar.

Mounted fire protection duct

Mounted BSKH with loose-fitting lid for quick inspection and retro-assignment.

BSKH fire protection duct

Type	Internal dimensions mm	External dimensions mm	Length mm	Weight borders	Item No.	Price /m
BSKH 090506	50 x 60	110 x 120	1000	915.000	**7215 17 3**	
BSKH 090511	50 x 110	110 x 170	1000	1195.000	**7215 17 7**	
BSKH 090521	50 x 210	110 x 270	1000	1640.000	**7215 18 1**	
BSKH 091016	105 x 160	165 x 220	1000	1705.000	**7215 18 5**	
BSKH 091026	105 x 260	165 x 320	1000	2245.000	**7215 18 9**	

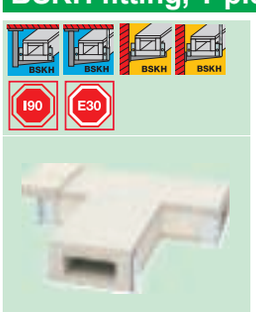
Fire protection duct BSKH I90/E 30, suspended, flammable on 4-sides, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Including mounted connector on both duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

BSKH fitting, 90° bend

Type	Internal dimensions mm	External dimensions mm	Weight kg/% pc	Item No.	Price /pc.
BSKH-FB 090506	50 x 60	110 x 120	430.000	**7215 60 2**	
BSKH-FB 090511	50 x 110	110 x 170	595.000	**7215 60 6**	
BSKH-FB 090521	50 x 210	110 x 270	1005.000	**7215 61 0**	
BSKH-FB 091016	105 x 160	165 x 220	920.000	**7215 61 4**	
BSKH-FB 091026	105 x 260	165 x 320	1405.000	**7215 61 8**	

90° bend for BSKH I90/E 30, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Fittings must be supported by additional brackets. Including mounted connector on both duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

BSKH fitting, T piece



Type	Internal dimensions mm	External dimensions mm	Weight kg/% pc	Item No.	Price /pc.
BSKH-FT 090506	50 x 60	110 x 120	565.000	**7215 63 1**	
BSKH-FT 090511	50 x 110	110 x 170	747.000	**7215 63 5**	
BSKH-FT 090521	50 x 210	110 x 270	1225.000	**7215 63 9**	
BSKH-FT 091016	105 x 160	165 x 220	1180.000	**7215 64 3**	
BSKH-FT 091026	105 x 260	165 x 320	1715.000	**7215 64 7**	

T piece for BSKH I90/E 30, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Fittings must be supported by additional brackets. Including mounted connector on all duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

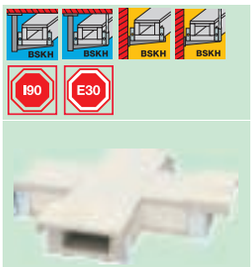
Always indicate the article number when ordering.

Fire protection duct for suspended ceiling mounting

BSKH fitting, intersection

Type	Internal dimensions mm	External dimensions mm	Weight kg/% pc	Item No.	Price /pc.
BSKH-FK 090506	50 x 60	110 x 120	740.000	**7215 66 1**	
BSKH-FK 090511	50 x 110	110 x 170	975.000	**7215 66 5**	
BSKH-FK 090521	50 x 210	110 x 270	1530.000	**7215 66 9**	
BSKH-FK 091016	105 x 160	165 x 220	1455.000	**7215 67 3**	
BSKH-FK 091026	105 x 260	165 x 320	2075.000	**7215 67 7**	

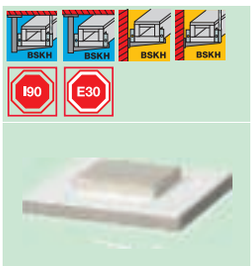
Intersection for BSKH I90/E 30, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Fittings must be supported by additional brackets. Including mounted connector on all duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.



BSKH end piece

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSKH-E090506	1	0.000	**7215 59 0**	
BSKH-E090511	1	0.000	**7215 59 2**	
BSKH-E090521	1	0.000	**7215 59 4**	
BSKH-E091016	1	0.000	**7215 59 6**	
BSKH-E091026	1	0.000	**7215 59 8**	

End piece for BSKH I90/E 30; including appropriate fastening material.



BSKH wall connection collar I90

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSKH-K0506	1	53.000	**7215 57 0**	
BSKH-K0511	1	64.000	**7215 57 4**	
BSKH-K0521	1	83.000	**7215 57 8**	
BSKH-K1016	1	87.000	**7215 58 2**	
BSKH-K1026	1	105.000	**7215 58 6**	

Wall connection collar for BSKH, consisting of four single plates, to double the insulation for wall penetrations. Incl. fastening material. Only for I90 classification.

BSKH threaded rod adapter E 30

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
BSKH-G	1	5.700	**7215 39 5**	

Adapter to accept threaded rods for the E duct application for function maintenance. The adapter is clamped between the connectors.

BSKH connector set

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
BSKH-V050	1	22.000	**7215 38 1**	
BSKH-V052	1	26.000	**7215 38 5**	
BSKH-V101	1	40.000	**7215 38 9**	

Connection set as replacement, consisting of a pair of connection plates, left/right, bolts for fastening the connectors to the duct and bolts with nuts to connect the individual duct lengths.
BSKH-V050 for ...090506 and ...090511
BSKH-V052 for ...090521
BSKH-V101 for ...091016 and ...091026

BSK sealing strip I90 and E30

Type	Dimension mm	Length m	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-D0930	5 x 30	15	1	37.500	**7215 42 3**	

Self-adhesive sealing strip for BSK I90/E 30 and BSKH I90/E 30.

Fire protection duct for suspended ceiling mounting

BSK doubler I90

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-A0908	80 x 80 x 20	1	10.000	**7215 45 2**	
BSK-A0910	100 x 100 x 20	1	14.000	**7215 45 8**	

Doubler for BSK I90 and for BSKH I90:
BSK-A0908 with drill hole 40 mm, for duct heights to 95 mm,
BSK-A0910 with drill hole 60 mm, for duct heights from 110 mm.
Including fastening screws.

BSK mortar

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-M	1	350.000	**7215 50 0**	

Fire protection duct mortar, dry, ready-to-use mortar in a bucket for filling joints and smaller cracks during the mounting of the BSK and BSKH fire protection ducts.

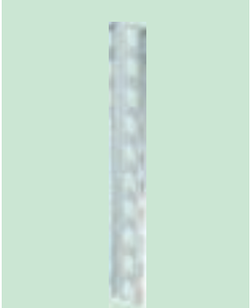
Identification plate, function maintenance

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

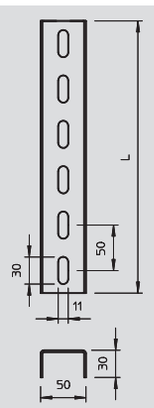
U support

US3



Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
US 3/20	200	2	1	26.600	**6342 30 2**	
US 3/30	300	2	1	39.900	**6342 30 4**	
US 3/40	400	2	1	53.200	**6342 30 6**	

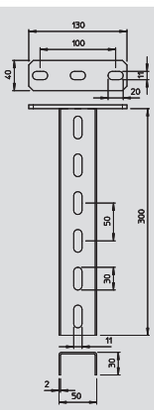
U support in fixed lengths. Dimensions 30 x 50 mm.



US3

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
US 3 K/20	200	2	1	50.500	**6342 35 1**	
US 3 K/30	300	2	1	64.400	**6342 35 3**	
US 3 K/40	400	2	4	78.300	**6342 35 5**	
US 3 K/50	500	2	1	92.300	**6342 35 7**	
US 3 K/60	600	2	1	106.200	**6342 35 9**	
US 3 K/70	700	2	1	120.200	**6342 36 2**	
US 3 K/80	800	2	1	134.100	**6342 36 4**	
US 3 K/90	900	2	1	147.800	**6342 36 6**	
US 3 K/100	1000	2	1	162.000	**6342 36 8**	
US 3 K/110	1100	2	1	175.900	**6342 37 0**	
US 3 K/120	1200	2	1	189.900	**6342 37 2**	

Suspended support (U profile) of dimensions 50 x 30 mm with welded head plate.

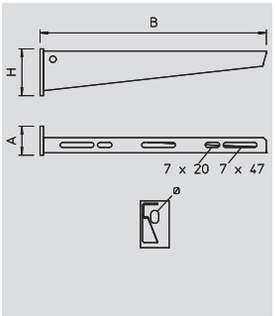


05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Fire protection duct for suspended ceiling mounting

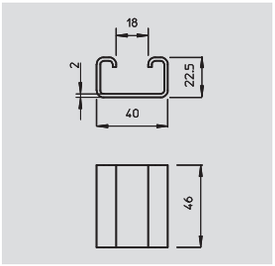
Bracket



Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FT	
AW 15/16	160	55	40	11	30	21.000	**6420 66 4**	
AW 15/21	210	60	40	11	30	26.000	**6420 68 0**	
AW 15/31	310	65	40	11	30	32.500	**6420 71 0**	
AW 15/41	410	70	40	11	30	55.000	**6420 74 5**	

Lightweight wall and support bracket with welded head plate.

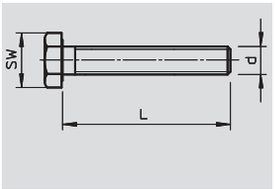
Spacer



Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
DSK 25	25	7.500	**6416 44 6**	

Spacer for use in U 3 supports.

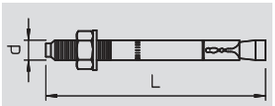
Hexagonal bolt



Type	Thread	Dimension L	Dimension d	SW	Pack.	Weight	Item No.	Price /pc.
		mm	mm	mm	pcs	kg/% pc	ST / F	
SKS 10x80	M10 x 80	80	10	17	20	7.700	**6418 25 0**	

Hexagonal bolt for universal fixing of structure components.

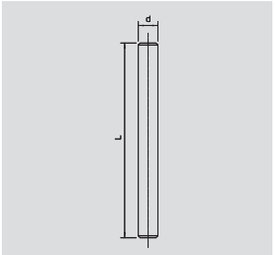
Fire protection anchor



Type	Thread	Dimension L	Dimension d	Clamping area	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / G	
FAZ II 10/10 GS	M10	95	10	10	50	7.680	**3498 54 9**	

Bolt tie for fastening heavy-duty anchors. Matches OBO mounting systems and wall support brackets and suspended supports.

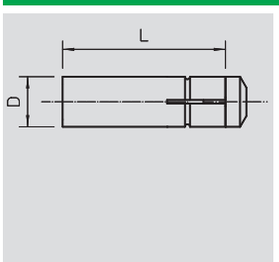
Threaded rod



Type	Thread	Dimension d	Dimension L	Pack.	Weight	Item No.	Price /% pc
		mm	mm	pcs	kg/% pc	ST / G	
2078	M10	10	1000	25	49.000	**3141 20 9**	

Threaded rod to DIN 976.

Drive-in tie bolt



Type	Thread	Dimension D	Dimension L	Screw-in depth min-max	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / G	
FZEA II 12x40	M10	12	40	13 -19	100	2.075	**3492 06 0**	

Back cut steel tie with internal thread.

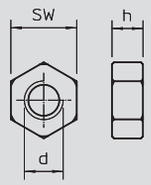
Always indicate the article number when ordering.

Fire protection duct for suspended ceiling mounting

Hexagonal nut

Type	Thread	Dimension d	Dimension h	SW	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / G	
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**	

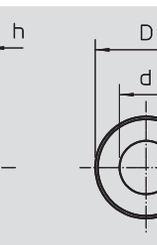
Hexagonal nut to DIN 934 with metric thread.



Washer

Type	Thread	Dimension D	Dimension d	Dimension h	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / G	
966	M10	20	10.5	2	100	0.408	**3402 09 6**	

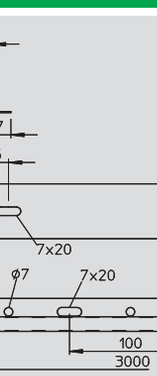
Washer according to DIN 125, shape A, for universal use.



Separating retainer

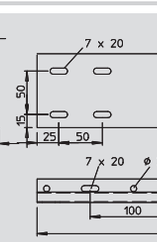
Type	Side height	Length	Pack.	Weight	Item No.	Price /m
	mm	mm	m	borders	ST / FS	
TSG 45	45	3000	45	50.000	**6062 03 2**	

Separating retainer for separation of cables of different voltages or functions.



Type	Side height	Length	Pack.	Weight	Item No.	Price /m
	mm	mm	m	borders	ST / FS	
TSG 85	85	3000	45	96.700	**6062 11 3**	

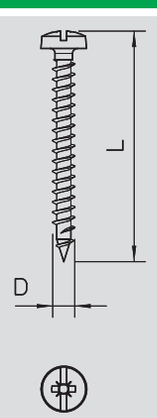
Separating retainer for separation of cables of different voltages or functions.



Sprint screw for separating retainer fastener

Type	Thickness	Length	Head Ø	Shipping box	Pack.	Weight	Item No.	Price /% pc
	mm	mm	mm	pcs	pcs	kg/% pc	ST / GGP	
4758	4	20	7.5	6000	200	0.140	**3195 22 8**	

Hardened steel, electrogalvanised and yellow passivated, as well as Hostaflon-coated, panhead with combined Philips and slotted head (Pozidrive size 2 except Ø 6 mm Pozidrive size 3).
The use of Sprint screws leads to considerably reduced screw-in times compared with standard screws. This noticeable advantage comes from the point with the first thread, which leads on to the double thread beyond.
Areas of use: wood, chipboard, Rigips panels, plastic anchors.

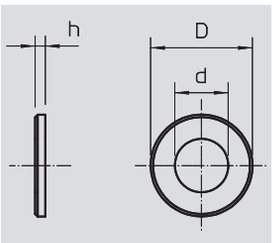


05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Fire protection duct for suspended ceiling mounting

Large washer



Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
964	M4	15	4.3	1.2	100	0.156	**3403 02 5**	

Washer of particularly large outer diameter.

Always indicate the article number when ordering.

Fire protection duct for suspended wall mounting

I90 to DIN 4102 Part 11
E30 to DIN 4102 Part 12
ABP P-SAC 02/III-215
ABP P-SAC 02/III-216

Dimensions BSKH I90/E30, internal/external [mm]		
BSKH 090506	50 x 60	110 x 120
BSKH 090511	50 x 110	110 x 170
BSKH 090521	50 x 210	110 x 270
BSKH 091016	105 x 160	165 x 220
BSKH 091026	105 x 260	165 x 320
Max. support width	1.0 m	

The fibre glass lightweight concrete ducts, which can be flamed on four sides, can be mounted on OBO mounting systems, thus offering the greatest possible flexibility in cable routing in emergency and escape routes (installation duct to DIN 4102 Part 11) or in electrical function maintenance (to DIN 4102 Part 12). This allows elegant avoidance of objects from other areas such as heating, ventilation and sanitary applications.
They are simply mounted on the wall with a bracket, upon which the OBO BSKH is simply placed loosely. Mounted connectors ensure quick mounting in situ, whilst loosely placed lids ensure quick inspection and reassignment.

System components

BSKH fire protection ducts, fittings: 90° bend, intersection and T piece, brackets, connection set, doublers, wall connection collar, threaded rod adapter, fire protection anchor, fire protection bolt tie, BSK mortar

Wall application area

Mounted on OBO mounting systems to avoid obstacles or when the wall is inaccessible for mounting.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Fire protection duct for suspended wall mounting

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets at a maximum spacing of 1 m.

Bracket mounting

Mount the brackets with MMS fire protection bolt ties for masonry or with FAZ II bolt ties for concrete.

Joint

Apply the sealing strip all the way around joints between the duct elements.

Connection, cable trough

Place the duct troughs loosely on the bracket and connect them to the pre-mounted covers using the connection screws. To protect it against shaking, you can optionally secure the duct with a short Spring screw through the bracket.

Duct lid

After installing the cables, apply the self-adhesive sealing strip to the duct lid and place it loosely on the floor trough. In so doing, observe the correct position of the pre-mounted joint cover.

I duct variant

When used as an I duct for wall penetrations, additional wall connection collars must be mounted.

E duct variant

Threaded rod lock with adapter mounted on the duct connectors and locked in the ceiling using an internal thread anchor.

E duct variant, alternative

Alternatively, the threaded rod can also be locked on the ceiling with the fire protection clamp.

Shortening duct elements

If necessary, the duct elements can simply be shortened with a coarse saw. Dismantled connectors can be reused.

Mounting the connection set

After shortening, remount the available connectors on the duct.

Fittings

All the fittings are locked with an additional suspension at a maximum distance of 100 mm to the joint on each side.

Cable bundle output

To run cable bundles or single cables with a large diameter, fasten additional doublers to the duct and completely close them with BSK mortar.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Fire protection duct for suspended wall mounting

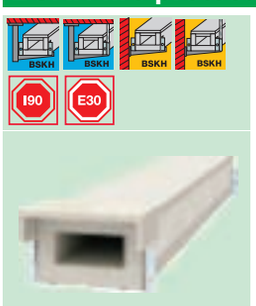
Individual cable output

Individual cables can be run directly through the duct walls. Close the ring gap with BSK mortar.

Mounted fire protection duct

Mount the BSKH with loose-fitting lid for quick inspection and retro-assignment.

BSKH fire protection duct



Type	Internal dimensions mm	External dimensions mm	Length mm	Weight borders	Item No.	Price /m
BSKH 090506	50 x 60	110 x 120	1000	915.000	**7215 17 3**	
BSKH 090511	50 x 110	110 x 170	1000	1195.000	**7215 17 7**	
BSKH 090521	50 x 210	110 x 270	1000	1640.000	**7215 18 1**	
BSKH 091016	105 x 160	165 x 220	1000	1705.000	**7215 18 5**	
BSKH 091026	105 x 260	165 x 320	1000	2245.000	**7215 18 9**	

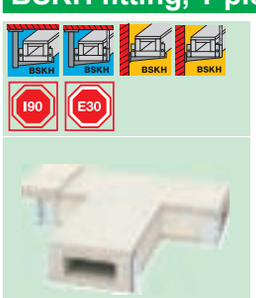
Fire protection duct BSKH I90/E 30, suspended, flammable on 4-sides, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Including mounted connector on both duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

BSKH fitting, 90° bend

Type	Internal dimensions mm	External dimensions mm	Weight kg/% pc	Item No.	Price /pc.
BSKH-FB 090506	50 x 60	110 x 120	430.000	**7215 60 2**	
BSKH-FB 090511	50 x 110	110 x 170	595.000	**7215 60 6**	
BSKH-FB 090521	50 x 210	110 x 270	1005.000	**7215 61 0**	
BSKH-FB 091016	105 x 160	165 x 220	920.000	**7215 61 4**	
BSKH-FB 091026	105 x 260	165 x 320	1405.000	**7215 61 8**	

90° bend for BSKH I90/E 30, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Fittings must be supported by additional brackets. Including mounted connector on both duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

BSKH fitting, T piece



Type	Internal dimensions mm	External dimensions mm	Weight kg/% pc	Item No.	Price /pc.
BSKH-FT 090506	50 x 60	110 x 120	565.000	**7215 63 1**	
BSKH-FT 090511	50 x 110	110 x 170	747.000	**7215 63 5**	
BSKH-FT 090521	50 x 210	110 x 270	1225.000	**7215 63 9**	
BSKH-FT 091016	105 x 160	165 x 220	1180.000	**7215 64 3**	
BSKH-FT 091026	105 x 260	165 x 320	1715.000	**7215 64 7**	

T piece for BSKH I90/E 30, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Fittings must be supported by additional brackets. Including mounted connector on all duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

BSKH fitting, intersection

Type	Internal dimensions mm	External dimensions mm	Weight kg/% pc	Item No.	Price /pc.
BSKH-FK 090506	50 x 60	110 x 120	740.000	**7215 66 1**	
BSKH-FK 090511	50 x 110	110 x 170	975.000	**7215 66 5**	
BSKH-FK 090521	50 x 210	110 x 270	1530.000	**7215 66 9**	
BSKH-FK 091016	105 x 160	165 x 220	1455.000	**7215 67 3**	
BSKH-FK 091026	105 x 260	165 x 320	2075.000	**7215 67 7**	

Intersection for BSKH I90/E 30, to DIN 4102 Part 11 and Part 12, for installation on OBO mounting systems. Fittings must be supported by additional brackets. Including mounted connector on all duct ends, 3x 1 m self-adhesive sealing strip and connecting bolts.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Fire protection duct for suspended wall mounting

BSKH end piece

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSKH-E090506	1	0.000	**7215 59 0**	
BSKH-E090511	1	0.000	**7215 59 2**	
BSKH-E090521	1	0.000	**7215 59 4**	
BSKH-E091016	1	0.000	**7215 59 6**	
BSKH-E091026	1	0.000	**7215 59 8**	

End piece for BSKH I90/E 30; including appropriate fastening material.

BSKH wall connection collar I90

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSKH-K0506	1	53.000	**7215 57 0**	
BSKH-K0511	1	64.000	**7215 57 4**	
BSKH-K0521	1	83.000	**7215 57 8**	
BSKH-K1016	1	87.000	**7215 58 2**	
BSKH-K1026	1	105.000	**7215 58 6**	

Wall connection collar for BSKH, consisting of four single plates, to double the insulation for wall penetrations. Incl. fastening material. Only for I90 classification.

BSKH threaded rod adapter E30

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
BSKH-G	1	5.700	**7215 39 5**	

Adapter to accept threaded rods for the E duct application for function maintenance. The adapter is clamped between the connectors.

BSKH connector set

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
BSKH-V050	1	22.000	**7215 38 1**	
BSKH-V052	1	26.000	**7215 38 5**	
BSKH-V101	1	40.000	**7215 38 9**	

Connection set as replacement, consisting of a pair of connection plates, left/right, bolts for fastening the connectors to the duct and bolts with nuts to connect the individual duct lengths.
BSKH-V050 for ...090506 and ...090511
BSKH-V052 for ...090521
BSKH-V101 for ...091016 and ...091026

BSK sealing strip I90 and E 30

Type	Dimension mm	Length m	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-D0930	5 x 30	15	1	37.500	**7215 42 3**	

Self-adhesive sealing strip for BSK I90/E 30 and BSKH I90/E 30.

BSK doubler I90

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-A0908	80 x 80 x 20	1	10.000	**7215 45 2**	
BSK-A0910	100 x 100 x 20	1	14.000	**7215 45 8**	

Doubler for BSK I90 and for BSKH I90:
BSK-A0908 with drill hole 40 mm, for duct heights to 95 mm,
BSK-A0910 with drill hole 60 mm, for duct heights from 110 mm.
Including fastening screws.

Fire protection duct for suspended wall mounting

BSK mortar

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
BSK-M	1	350.000	**7215 50 0**	

Fire protection duct mortar, dry, ready-to-use mortar in a bucket for filling joints and smaller cracks during the mounting of the BSK and BSKH fire protection ducts.

Identification plate, function maintenance

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

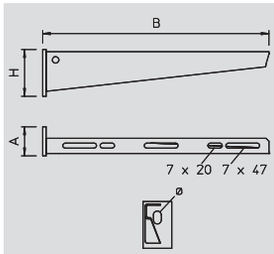
The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

Bracket

AW US3 US5 US7

Type	Width mm	Dimension H mm	Dimension A mm	Hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW 15/16	160	55	40	11	30	21.000	**6420 66 4**	
AW 15/21	210	60	40	11	30	26.000	**6420 68 0**	
AW 15/31	310	65	40	11	30	32.500	**6420 71 0**	
AW 15/41	410	70	40	11	30	55.000	**6420 74 5**	

Lightweight wall and support bracket with welded head plate.



Threaded rod

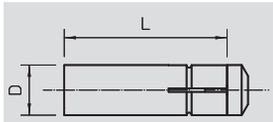
Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M10	10	1000	25	49.000	**3141 20 9**	

Threaded rod to DIN 976.

Drive-in tie bolt

Type	Thread	Dimension D mm	Dimension L mm	Screw-in depth min-max mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
FZEA II 12x40	M10	12	40	13 -19	100	2.075	**3492 06 0**	

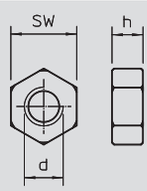
Back cut steel tie with internal thread.



Hexagonal nut

Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**	

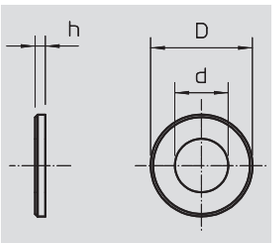
Hexagonal nut to DIN 934 with metric thread.



Always indicate the article number when ordering.

Fire protection duct for suspended wall mounting

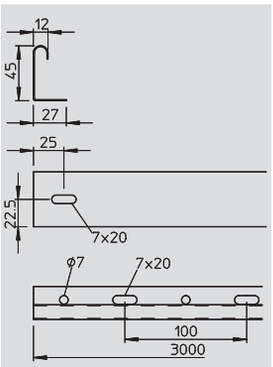
Washer



Type	Thread	Dimension D	Dimension d	Dimension h	Pack.	Weight	Item No.	Price
		mm	mm	mm	pcs	kg/% pc	ST / G	/% pc
966	M10	20	10.5	2	100	0.408	**3402 09 6**	

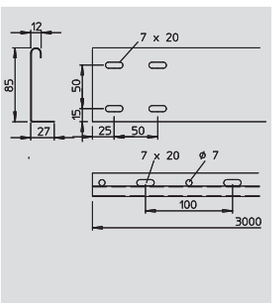
Washer according to DIN 125, shape A, for universal use.

Separating retainer



Type	Side height	Length	Pack.	Weight	Item No.	Price
	mm	mm	m	borders	ST / FS	/m
TSG 45	45	3000	45	50.000	**6062 03 2**	

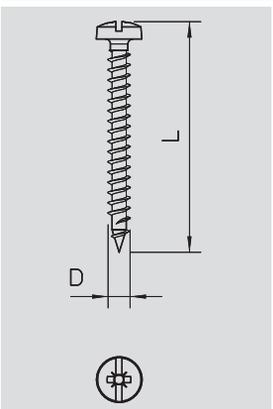
Separating retainer for separation of cables of different voltages or functions.



Type	Side height	Length	Pack.	Weight	Item No.	Price
	mm	mm	m	borders	ST / FS	/m
TSG 85	85	3000	45	96.700	**6062 11 3**	

Separating retainer for separation of cables of different voltages or functions.

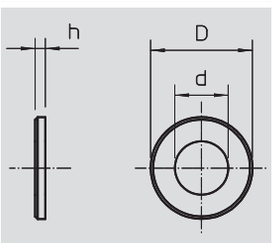
Sprint screw for separating retainer fastener



Type	Thickness	Length	Head Ø	Shipping box	Pack.	Weight	Item No.	Price
	mm	mm	mm	pcs	pcs	kg/% pc	ST / GGP	/% pc
4758	4	20	7.5	6000	200	0.140	**3195 22 8**	

Hardened steel, electrogalvanised and yellow passivated, as well as Hostaflon-coated, panhead with combined Philips and slotted head (Pozidrive size 2 except Ø 6 mm Pozidrive size 3).
The use of Sprint screws leads to considerably reduced screw-in times compared with standard screws. This noticeable advantage comes from the point with the first thread, which leads on to the double thread beyond.
Areas of use: wood, chipboard, Rigips panels, plastic anchors.

Large washer



Type	Thread	Dimension D	Dimension d	Dimension h	Pack.	Weight	Item No.	Price
		mm	mm	mm	pcs	kg/% pc	ST / G	/% pc
964	M4	15	4.3	1.2	100	0.156	**3403 02 5**	

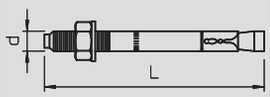
Washer of particularly large outer diameter.

Fire protection duct for suspended wall mounting

Fire protection anchor

Type	Thread	Dimension L	Dimension d	Clamping area	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / G	
FAZ II 10/10 GS	M10	95	10	10	50	7.680	**3498 54 9**	

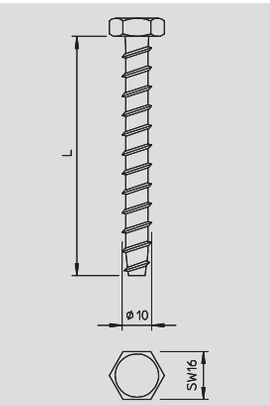
Bolt tie for fastening heavy-duty anchors. Matches OBO mounting systems and wall support brackets and suspended supports.



Fire protection bolt tie

Type	Dimension	Drill hole Ø	Dimension L	Pack.	Weight	Item No.	Price /% pc
	mm	mm	mm	pcs	kg/% pc	ST / G	
MMS10	10 x 80	8	80	50	3.800	**3498 12 3**	

Fire protection bolt tie with hexagonal head for direct installation without additional anchors. Substrate: concrete or masonry. WAF 16. Drill hole 8 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.



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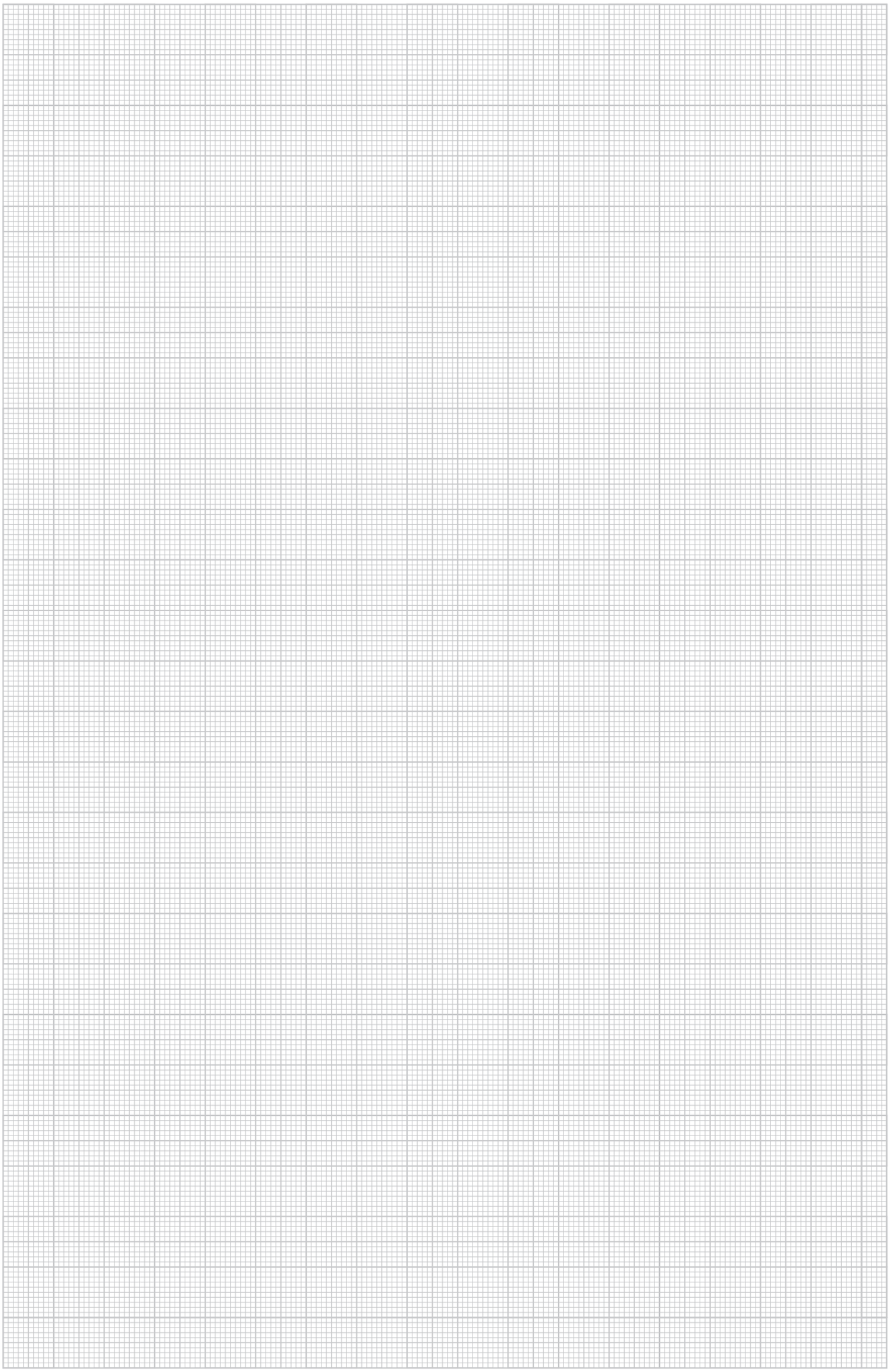
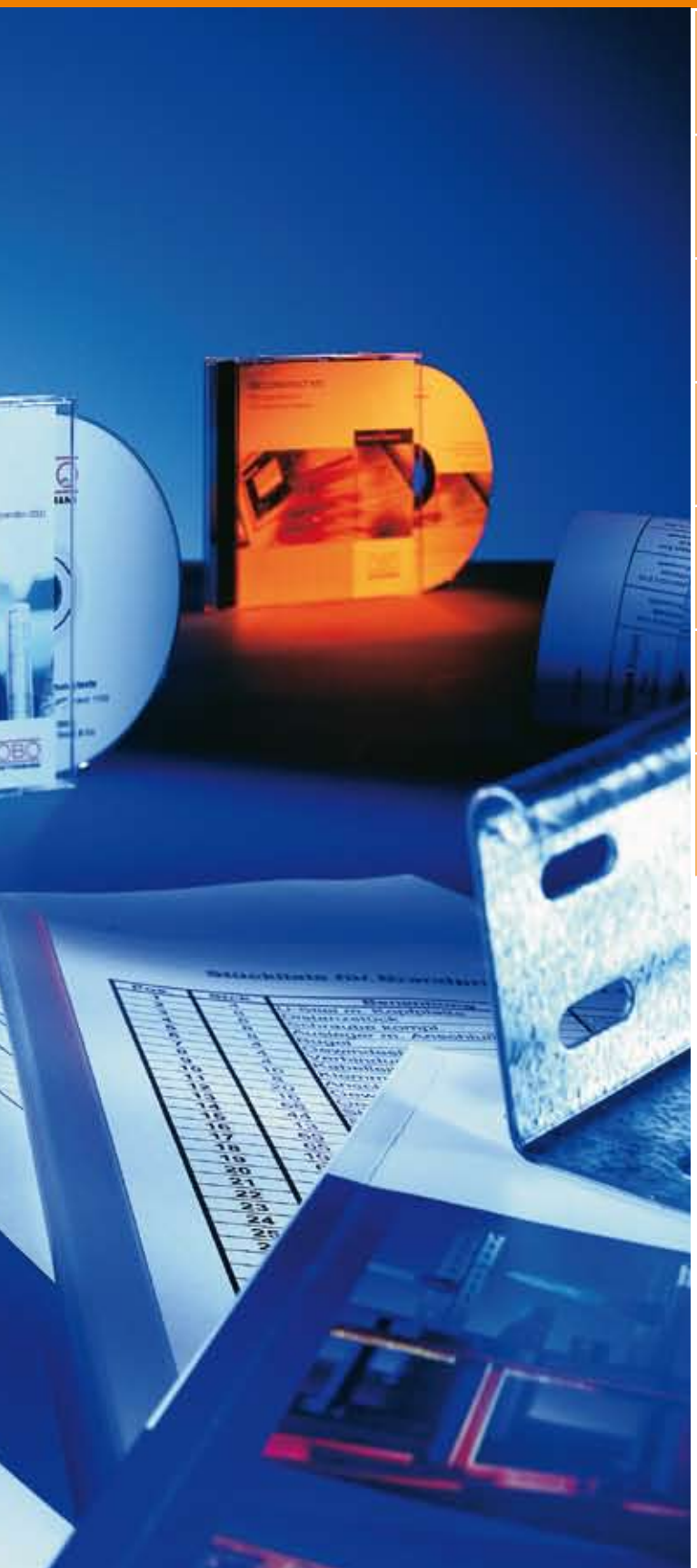
Always indicate the article number when ordering.



"Function maintenance" means the guarantee of the power supply to safety-relevant installations, such as emergency lighting and smoke extractors, in the event of fire.
OBO offers a broad range of practical systems for electrical installations for function maintenance for almost every field of application and mounting type. All the OBO systems are tested according to DIN 4102 Part 12 and can thus be used easily.

Basic principles of function maintenance systems



3rd protection aim: Important electrical systems must continue to function.

Solution: function maintenance for electrical systems

To ensure that emergency and escape routes remain usable and also important technical equipment such as emergency lighting, fire alarm systems, smoke exhaust systems, etc. in case of fire, it is absolutely essential to provide special protection for the power supply for these systems. The use of special cables and routing systems means that it is possible to maintain the power supply, even in the case of fire, thus guaranteeing the function maintenance.

What is a cable system with integrated function maintenance?

A cable system with integrated function maintenance is, according to DIN 4102 Part 12, the combination of the routing system (cable ladder, cable tray, etc.) and cables with integrated function maintenance.

Routing system

+

Cables with integrated function maintenance

=

Cable system with integrated function maintenance according to DIN 4102 Part 12

Cables and standard routing systems

The standard specifies that function maintenance of an electrical cable system includes not just the cables themselves, but also the routing systems. DIN 4102 Part 12 defines three standard routing systems:

- Routing on cable ladders
- Routing on cable trays
- Individual cable routing under the ceiling

All the OBO routing system for electrical installations with function maintenance correspond to DIN 4102 Part 12.

Function maintenance in the building regulations

The requirement for electrical installations with function maintenance is a component part of the building regulations of the German federal states. This type of installation is particularly required for buildings in which many people meet regularly: public buildings, hotels, meeting places, large industrial complexes, etc. Function maintenance applies solely to those areas which provide the power supply to safety-relevant systems such as emergency lighting, alarm systems, fire alarm systems, smoke extraction systems, etc. Here, the regulations require the power supply to be guaranteed for a specific period of time, even if there is a fire.

System labelling by the installation engineer
Each cable system must be permanently labelled with a sign. This labelling must contain the following information:

- Name of the erection engineer of the cable system (installation engineer)
- Function maintenance class E...
- Test certificate number
- Owner of the test certificate
- Year of manufacture

Besides the type and quantity of cables, the selection of the correct system is dependent on the actual conditions on the construction site.

Fastening systems
Of equal importance to the selection of the support system is the decision for the most suitable fastening system. Here, too, the individual factors on the construction site must be taken into account. The Fastening systems section contains professional, easy-to-mount solutions for any requirements.

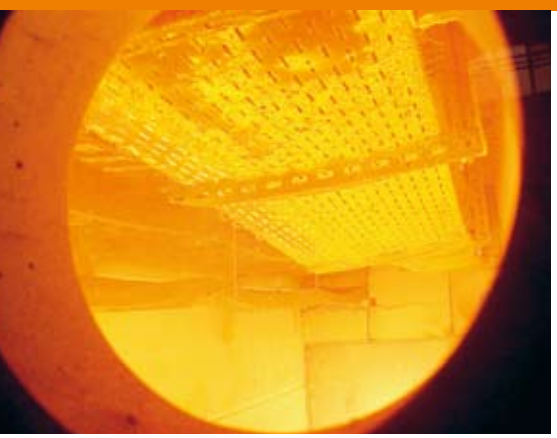
Space with multiple girders
Please note that, if there are jumps in height, the installed cables must be supported. This may be required, when cables with large cross-sections are not supported by the support system.

Combination with other systems
Ventilation systems, pipes, etc. may not be mounted above the electrical installation with function maintenance, as, if there is a fire, parts may fall down, damaging the function maintenance cables. The solution is to employ cable mounting with clips directly under the ceiling or on the wall.

Restricted spaces
The solution here is either cable mounting with clips or pressure clips directly under the ceiling or the installation of multiple narrow cable tracks above each other instead of one wide track.

Problematic substrate
As, for old ceiling structures, e.g. during renovation projects, the support force cannot be officially clarified, we recommend wall mounting.

Fire tests, proofs and approvals



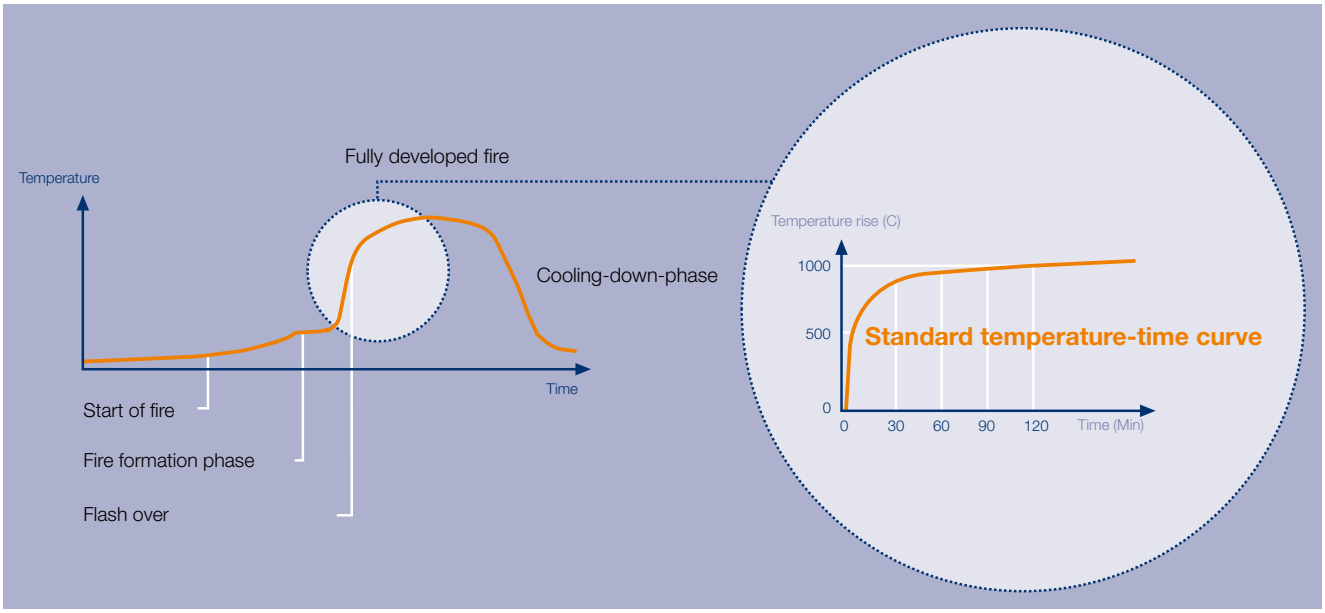
Fire testing

The proof of the function maintenance property of electrical installation material must be provided by fire testing to DIN 4102 Part 12 in an independent materials testing office. The test is carried out in a special testing furnace in which the installation to be tested is heated up according to a standard temperature-time curve. The cable systems are awarded the classes E30 to E90, depending on the length for which they manage to survive.

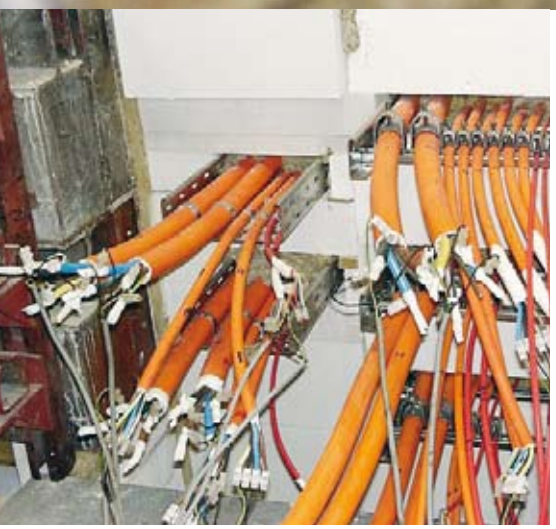
The result of the fire test is documented in a construction testing certificate.

- This test certificate is valid for cable systems with cable-specific support structures as a proof of function maintenance.
- With standard support structures, the proof of function maintenance also requires surveyor's comments in addition to the testing certificate.

Phases of natural fires / standard temperature-time curve (ETK)



A glimpse into the testing furnace: glowing of the support structure, cable with insulating layer of ash



Electrical monitoring during the test

Extreme loads for cables

If there is a fire, the cables are subjected to extreme loads from flames and heat. Nevertheless, cables used for a function maintenance installation must be able to withstand temperatures of 1,000 °C and more for a certain period of time, without there being a short-circuit of the copper conductor. As the copper conductor may anneal at these extreme temperatures, thus impairing its own mechanical stability, the support system serving as a “support corset” has a special significance.

Cables with integrated function maintenance

Therefore, in the case of cables with integrated function maintenance, the insulation has a special role to play. These cables possess a special winding around the copper conductor made of glass silk or mica tape. If there is a fire, then the cable insulation burns completely, creating a layer of ash. This is kept together by the windings and ensures that the copper conductors are kept apart and that no short-circuit of the support system can take place. In addition, a new product on the market is a cable, which, instead of special windings, has a ceramising plastic insulation. If there is a fire, this special plastic forms a ceramising ash, which also produces the required insulation of the current-carrying cores.

Halogen-free plastic

Cables with integrated function maintenance are always made of halogen-free plastic. These materials, which do not contain any chlorine, bromine or fluorine, do not create any corrosive fire gases during combustion.

Low smoke and reduced fire spread

In addition, cables with integrated function maintenance have additional positive properties during a fire, for example:

- Low smoke and/or
- Reduced fire spread

Selection aid, function maintenance systems

Standard support structure
With standard support structures, it is possible to select freely the cables required for the installation. This is possible, as all the cable manufacturers have proven the function maintenance of their cables for the standard support systems.

Benefits
- Free choice of cables, as the combination of cables and the standard support structure has the function maintenance proof
- Not bound to one specific cable type
- This structure is ideal for smaller projects
- Testing means that the countless installation variants are approved for many years

Summary:
Here, the installation engineer can “play it safe”.


Funktionserhalt - Kabelrinnen- und Gitterrinnen-Systeme
Normtragekonstruktionen: Deckenmontage mit 2 Kabelrinnen
Normtragekonstruktion nach DIN 4102 Teil 12 Gutachterliche Stellungnahme Nr. 3917/4635-2-Mu Funktionserhaltsklassen E30 und E90
Zulässige Daten
Stützweite max. 1,2 m
Kabelgewicht pro Rinne max. 10 kg/m
Lagenanzahl max. 3 Lagen
Kabelrinnenbreiten 100, 200, 300 mm
Gesamtbreite max. 500 mm
Die Verlegeart mit 2 Kabelrinnen am U-Hängestiel erfüllt die Forderungen der DIN 4102 Teil 12 als Normtragekonstruktion für die Funktionserhaltsklassen E30 und E90.
Durch die gemeinsame Verlegung von zwei Kabelrinnen mit einer Holmhöhe von 60 mm pro Ausleger verdoppelt sich die verlegbare Kabelmenge. Die maximal zulässige Kabelbelegung pro Kabelrinne von 10 kg/m bleibt aber unverändert.
Ebenfalls unverändert ist die frei wählbare Positionierung der Stoßstelle zwischen den einzelnen Auflagepunkten. Auch die Ausbildung der Stoßstelle mit verschraubten Verbindern im Rinnenholm und verschraubter Stoßstellenleiste auf dem Rinnenboden bleibt trotz der Doppelanordnung der Kabelrinnen bestehen.
Systemkomponenten

Standard support structures are marked in blue in the catalogue.

Cable-specific support systems
With cable-specific support systems, specific cables are required. Any proof is only valid for the actually tested combination of laying variant and cable. A summary cable list provides information on tested combination options.

Benefits
- Low material and mounting costs
- Limited cable selection (approval only valid for the cables tested with the system)
- Higher planning costs: the complete cable system (cable and support system) must be fully planned out
- Ideal for larger buildings (project business)

Summary:
Here, the possibilities of the combination of cables and support systems can be fully exploited – the system is optimised for the appropriate application.


Funktionserhalt - Kabelrinnen- und Gitterrinnen-Systeme
Kabelspezifische Tragekonstruktionen: Deckenmontage mit RKS-Magic©
Kabelspezifische Tragekonstruktion nach DIN 4102 Teil 12 Funktionserhaltsklassen E30 und E90
Zulässige Daten
Stützweite max. 1,5 m
Kabelgewicht pro Rinne max. 20 kg/m bis Rinnenbreite 300 mm
Kabelgewicht pro Rinne max. 30 kg/m bei Rinnenbreite 400 mm
Lagenanzahl max. 5 Lagen
Kabelrinnenbreiten 100, 200, 300, 400 mm
Das Highlight unter den kabelspezifischen Tragekonstruktionen für den elektrischen Funktionserhalt nach DIN 4102 Teil 12 ist zweifelsfrei die Verlegeart mit der Kabelrinne RKS-Magic. Geschwindigkeit, Wirtschaftlichkeit und hohe Tragfähigkeit kennzeichnen dieses System. Die RKS-M wird einfach zusammengesteckt und erfüllt doch alle Anforderungen an eine brandsichere Verlegung von Kabeln für sicherheitsrelevante Anlagen. Die hohe Belastbarkeit schafft Reserven, die gewindestangenlose Befestigung vereinfacht auch hier die Montage. Bis zu fünf Lagen können an einem Steil befestigt werden.
Highspeed trifft Economy!
Systemkomponenten

Cable-specific support systems are marked in orange in the catalogue.

Selection aid, function maintenance systems

Individual cable (unlimited cross-section)		Small cable bundle (limited cross-section)		Multiple cables	
					
Standard	**Cable-specific**	**Standard**	**Cable-specific**	**Standard**	**Cable-specific**
Clip types: *732, 733*	*Clip types:* *732, 733*	*Clip types:* *732, 733* *2056M* *2056M LW* *(with long trough)*	*Clip types:* *732, 733* *2056M* *2056M LW (with long trough)* *electrical pipes*	–	*Models:* *2031 M15* *2031 M30* *2031 M70* *2033M* *2034M*
Clearance: *0.3 m*	*Clearance:* *cable-specific, see note*	*Clearance:* *0.3 m, with long trough 0.6 m*	*Clearance:* *cable-specific, see note*	–	*Clearance:* *cable-specific, see note*
Retro-installation in the system: *not possible*		*Retro-installation in the system:* *limited possibility*		*Retro-installation in the system:* *limited possibility*	

Many cables (small cross-sections)		Many cables (large cross-sections)	
			
Standard	**Cable-specific**	**Standard**	**Cable-specific**
Tray type: *SKS*	*Tray types:* *RKSM, GRM, EKS*	*Ladder type:* *LG6*	*Ladder type:* *SL*
Clearance: *1.2 m* *Cable load: max. 10 kg/m per tray with threaded rod lock*	*Clearance:* *cable-specific, see note* *Cable load: up to 30 kg/m per tray with or without threaded lock*	*Clearance:* *1.2 m* *Cable load: max. 20 kg/m per ladder with or without threaded rod lock*	*Clearance:* *cable-specific, see note* *Support spacing: 1.5 m with or without threaded rod lock*
Retro-installation in the system: *single*		*Retro-installation in the system:* *single*	

Note:

- **Data for cable cross-sections, distances and maximum loads may vary according to cable type and cable manufacturer.**
- **Do not exceed the maximum approved cable load.**
- **For retro-installations in cable-specific routing types, observe the approved cable types.**

Overview of standard support structures

The standard laying systems defined in the testing standard DIN 4102 Part 12 include installation on cable trays, cable ladders, individual cable laying under the ceiling with profile rails, clamp clips and long troughs, and the individual cable laying under the ceiling with single clips. Please comply with the specifications of the planner in the selection of products approved for function maintenance. In addition, the on-site factors on the construction site must be taken into account.

Cable tray systems
- Support width max. 1.2 m
- Cable weight max. 10 kg/m
- Tray width max. 300 mm

Cable ladder systems
- Support width max. 1.2 m
- Cable weight max. 20 kg/m
- Ladder width max. 400 mm

Vertical ladder systems
- Clip distance max. 300 mm
- Rising track width max. 600 mm
- Cable weight max. 20 kg/m

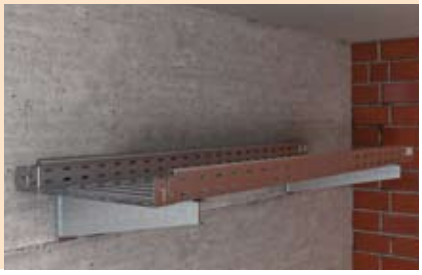
Individual routing systems
- Single clips max. 300 mm fastening distance
- Clamp clips with long troughs max. 600 mm fastening distance

Fire protection duct BSK and BSKH
- BSK for direct wall and ceiling mounting
- BSKH for suspended mounting
- No function maintenance cables required
- You can find additional information in the “Escape route installation system” chapter

Overview of cable-specific support structures

The following cable-specific support systems are viable for electrical installation with function maintenance: cable trays with and without threaded rod lock, mesh cable trays, cable ladders, single clips, collecting clamps and pressure clips. Ensure an approved combination with tested cables.

Cable tray systems
- Support spacing max. 1.5 m
- Cable weight max. 30 kg/m
- Tray width max. 500 mm
- Variants: to 5-layer
- Also without threaded rod

Mesh cable tray systems
- Support spacing max. 1.2 m
- Cable weight max. 10 kg/m
- Widths 200 and 300 mm
- Variants: 1/2/3-layer


Cable ladder systems
- Support spacing max. 1.5 m
- Cable weight max. 20 kg/m
- Width max. 500 mm
- Variants: 1/2/3-layer


Cable and pipe clamps
- Various variants, e.g. larger fixing distances, bundling...
- Space-saving mounting


Collecting clamps and pressure clips
- Various variants, e.g. larger fixing distances, bundling...
- Space-saving mounting


Cable list

The cable list simplifies the allocation of cables and routing systems to the cable system.

You can find the current cable list at www.obo.de

Approved installation options for cable systems with integrated function maintenance in conjunction with routing systems from OBO Bettermann, Menden

	Kabelhersteller	Kabeltyp	Klasse	Daten		Bemerkung	
1	**Dätwyler** 1	NHXH NHXCH JE-H(St)H JE-H(St)HRH	E30-E90 E30-E90 E30 E30	≥ nx1,5mm² ≥ nx1,5/1,5mm² ≥ nx2x0,8mm ≥ nx2x0,8mm			
	Eupen	NHXH NHXCH NHXCH JE-H(St)H	E30-E90 E30 E90 E30	≥ nx1,5mm² ≥ nx1,5/1,5mm² ≥ nx1,5/1,5mm² ≥ nx2x0,8mm		 B ≤ 300 mm B = 400 mm	Kabelrinne RKS
	Nexans	N2XH N2XCH JE-H(St)H	E30 E30 E30	≥ nx1,5mm² ≥ nx1,5/1,5mm² ≥ nx2x0,8mm		B = 400 mm	
	Prysmian	(N)HXH (N)HXCH JE-H(St)H	E30 E30 E30	≥ nx1,5mm² ≥ nx2,5/2,5mm² ≥ nx2x0,8mm			

Application example 1

1 Approved combination:
RKS-Magic® cable tray with power cable, type NHXH E30 – E90 of make Dätwyler, function maintenance class E90, useful cross-section ≥ n x 1.5 mm², without restrictions usable with all tray widths for wall and ceiling mounting

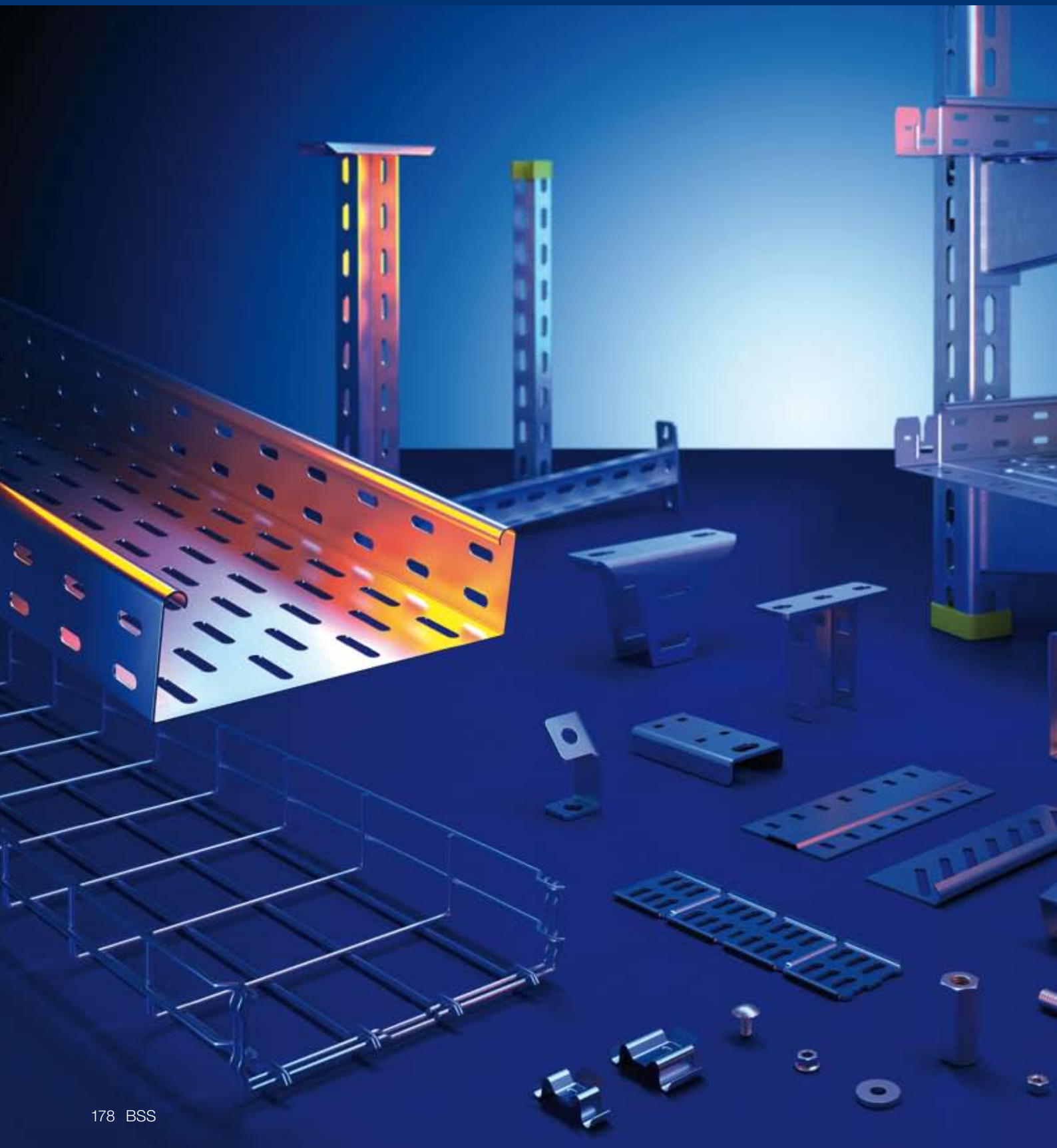
	Kabelhersteller	Kabeltyp	Klasse	Daten	Abstände	Bemerkung	
7	**Dätwyler**	NHXH	E30	≤ nx2,5mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
		JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	
		JE-H(St)H	E60	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,1 kg/m, ≤ 20 Kabel	
		JE-H(St)HRH	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	
		JE-H(St)HRH	E60	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,1 kg/m, nur Wand, ≤ 20 Kabel	2031/M15
		JE-H(St)HRH	E90	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,1 kg/m, nur Decke, ≤ 20 Kabel	
	Eupen	(N)HXH Keram	E30	nx1,5mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m, nur Wand	
		NHXH Mica	E90	nx1,5mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
		NHXH Mica	E90	≥ nx1,5mm²	0,5 m	mit Langwanne, ≤ 1,3 kg/m, nur Wand	
		JE-H(St)H Keram	E30	≥ nx2x0,8mm	0,6 m	mit Langwanne, ≤ 1,1 kg/m	
		JE-H(St)H Keram	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	
		JE-H(St)H Mica	E90	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,3 kg/m, nur Wand	
	Facab Lynen	JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	
		JE-H(St)H	E90	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,1 kg/m, nur Decke	
		JE-H(St)HRH	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	
		JE-H(St)HRH	E90	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,1 kg/m, nur Decke	
	Nexans	N2XH	E30	nx1,5mm² bis 4mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
		N2XCH	E30	nx1,5mm² bis 4mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
		N2XH	E90	nx1,5mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
		N2XCH	E90	nx1,5mm²	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
	2	J/JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	mit Langwanne, ≤ 1,1 kg/m	
	Prysmian	(N)HXH	E30	≥ nx1,5mm²	0,5 m	mit Langwanne, ≤ 1,2 kg/m, nur Decke	
	Studer	JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	
		JE-H(St)HRH	E30	≥ nx2x0,8mm	0,5 m	≤ 1,1 kg/m	

	Kabelhersteller	Kabeltyp	Klasse	Daten	Abstände	Bemerkung	
8	**Dätwyler**	JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m, nur Wand	
		JE-H(St)HRH	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m, nur Wand	
	Eupen	JE-H(St)H Keram	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m, nur Wand	
	Facab Lynen	NHXH	E90	nx6mm²	0,5 m	≤ 2,2 kg/m, nur Wand	
		NHXH	E90	nx1,5mm² bis 6mm²	0,5 m	≤ 2,2 kg/m, nur Decke	
		NHXCH	E90	nx6mm²	0,5 m	≤ 2,2 kg/m, nur Wand	
		JE-H(St)HRH	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m	
	Nexans	JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m, nur Decke	
	Studer	JE-H(St)H	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m	
		JE-H(St)HRH	E30	≥ nx2x0,8mm	0,5 m	≤ 2,5 kg/m	2031/M30

Application example 2

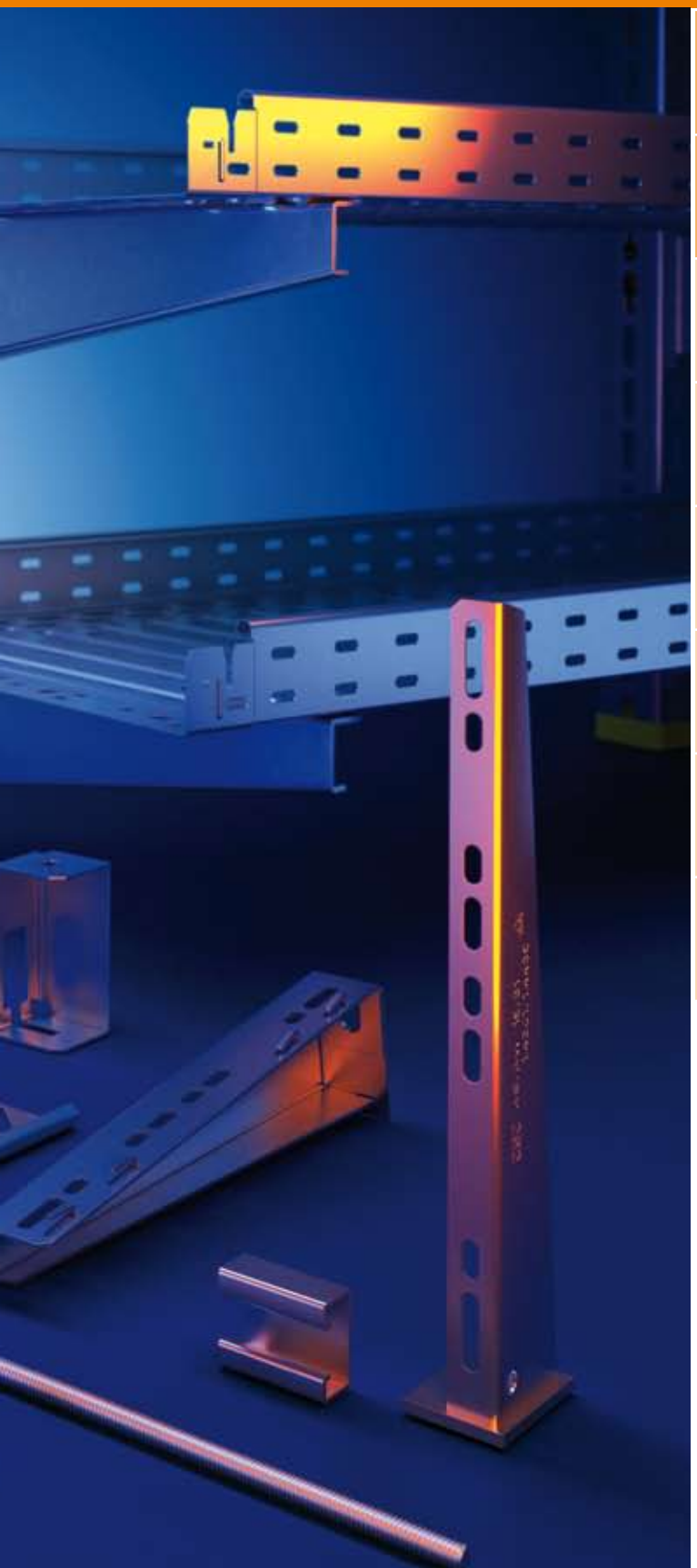
2 Approved combination:
Collecting clamp, type 2031M/15, with data cable, type J/JE-H(St)H, of make Nexans, function maintenance class E30, cable cross-section ≥ n x 2 x 0.8 mm, fastening spacing 0.5 m, restriction: with long trough and maximum cable load of 1.1 kg/m

- Fast, economical mounting with RKS-Magic® cable tray
- Fast mounting with lightweight GR-Magic® mesh cable trays
- Electrical function maintenance with high loads
- Safe installation with systems tested to DIN 4102 Part 12



Function maintenance

Cable tray systems and mesh cable tray systems



Overview of cable tray systems
Standard support structures

Ceiling mounting

Routing type with one cable tray and U suspended support

One to three-layer structures with SKS cable trays and U suspended support, bracket mounted on one or both sides.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 100, 200, 300 mm

Ceiling mounting

Routing type with two cable trays and U suspended support

One to three-layer structures with SKS cable trays and U suspended support, bracket mounted on one or both sides.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 100, 200, 300 mm
- Total width: max. 500 mm

Ceiling mounting

Routing type with one or two cable trays and US 3 cross-section

One-layer structure with SKS cable tray and threaded rod suspension on both sides with cross-section.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 1 layer for 1.2 m support width
- Width: 100, 200, 300 mm
- Total width: max. 400 mm

Wall mounting

Routing type with one cable tray and TP wall and support bracket

One to three-layer structures as wall mounting with SKS cable trays and vertical threaded rod lock to the ceiling.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 100, 200, 300 mm

Wall mounting

Routing type with one cable tray and MWA 12 wall and support bracket

One to three-layer structures as wall mounting with SKS cable trays and vertical threaded rod lock to the ceiling.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 100, 200, 300 mm

Wall mounting

Routing type with one cable tray and TP wall and support bracket

One or two-layer structures as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 2 layers for 1.2 m support width
- Width: 100, 200, 300 mm

Wall mounting

Routing type with two cable trays and MWA 12 wall and support bracket

One or two-layer structures as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 2 layers for 1.2 m support width
- Width: 100, 200, 300 mm

Wall mounting

Routing type with two cable trays and MWA 12 or AW 30 wall and support bracket

One to three-layer structures as wall mounting with SKS cable trays and vertical threaded rod lock to the ceiling.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 100, 200, 300 mm
- Total width: max. 500 mm

Wall mounting

Routing type with one cable tray and TP wall and support bracket

One or two-layer structures as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

- Support spacing: max. 1.2 m
- Cable weight per tray: max. 10 kg/m
- Number of layers: max. 2 layers for 1.2 m support width
- Width: 100, 200, 300 mm
- Total width: max. 500 mm

Overview of cable tray and mesh cable tray systems

Cable-specific support structures

Ceiling and wall mounting

Routing type with RKS-Magic® cable tray

- No threaded rod required
- Support spacing: max. 1.5 m
- Cable weight per tray: max. 30 kg/m
- Number of layers: max. 5 layers
- Cable tray width: 100, 200, 300, 400 mm

Ceiling and wall mounting

Routing type with GR-Magic® mesh cable tray

- Support spacing: max. 1.2 m
- Cable weight per mesh cable tray: max. 10 kg/m
- Number of layers: max. 3 layers
- Mesh cable tray width: 200, 300 mm

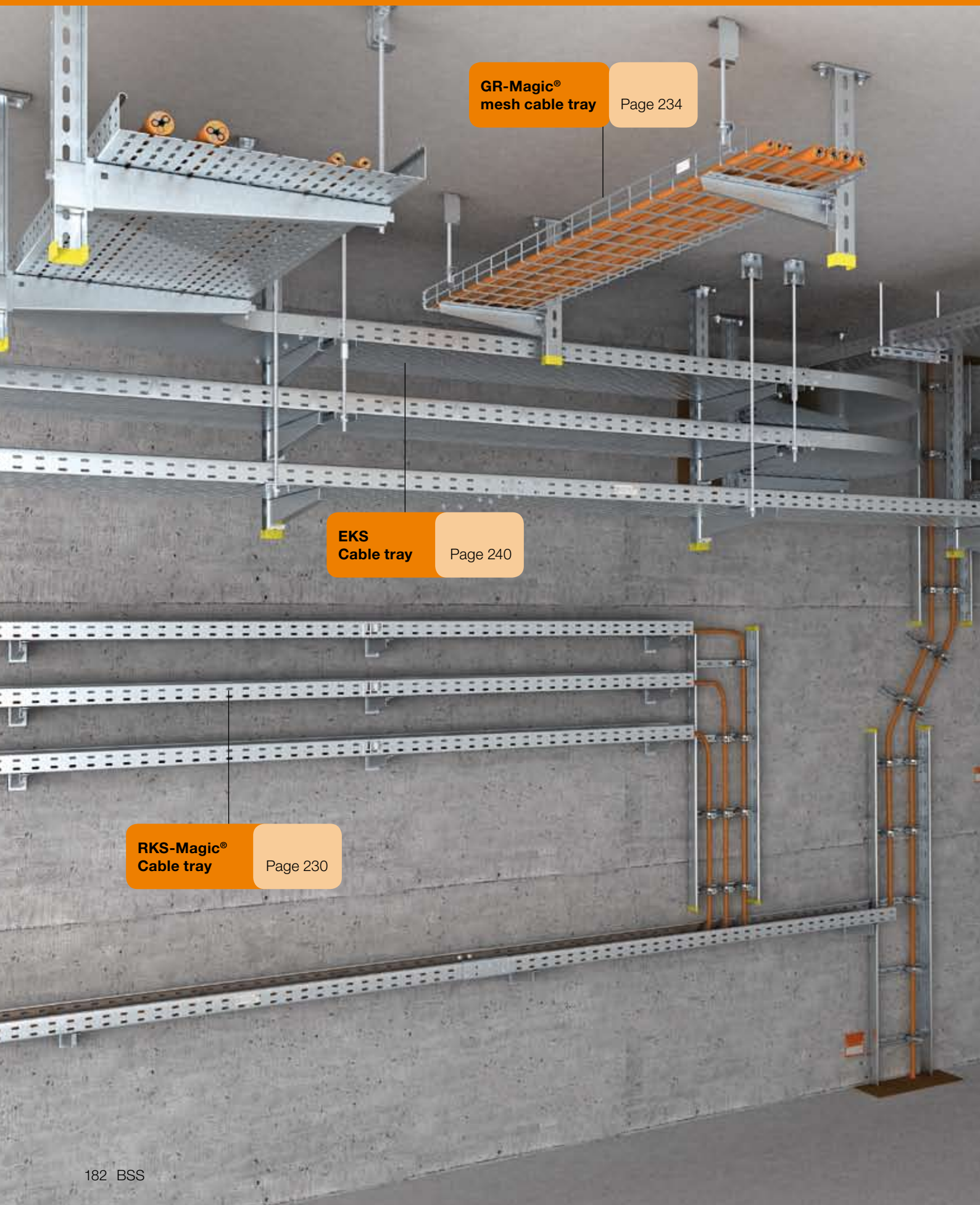
Ceiling and wall mounting

Routing type with EKS cable tray

- Also without additional threaded rod lock
- Support spacing: max. 1.5 m
- Cable weight per tray: max. 20 kg/m
- Number of layers: max. 3 layers
- Cable tray width: max. 500 mm

System overview

Function maintenance with cable tray systems and mesh cable tray systems




SKS
Cable tray
Page 184
RKS-Magic®
Cable tray
Page 226
SKS
Cable tray
Page 184

Standard support constructions: ceiling mounting with one cable tray

Standard support construction to DIN 4102 Part 12
Surveyor's comments no. 3917/4635-2-Mu
Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Six layers
Cable tray widths	100, 200, 300 mm

Mounting the cable tray with a U suspended support fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E 30 and E 90.
A cable tray with a rail height of 60 mm and a material thickness of 1.5 mm is used.
The position of the joint between the individual support points can be selected freely, whereby the connector is screwed to the tray rail and an additional joint plate to the tray base. Connect the tray ends to the tray rail using connectors and additionally to the tray base with a joint plate.

System components

U suspended supports, screw-on head plates, cable tray, straight connector, joint plate, bracket, bolt tie, fire protection clamp, identification plate

Ceiling area of application, one-sided

One-layer standard support construction made of SKS cable tray with U suspended support, bracket type MWA12/...., mounted on one side.

Ceiling area of application, one-sided

Two-layer standard support construction made of SKS cable trays with U suspended support, bracket type MWA12/...., mounted on one side.

Ceiling area of application, one-sided

Three-layer standard support construction made of SKS cable trays with U suspended support, bracket type MWA12/...., mounted on one side.

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Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with one cable tray

Ceiling area of application, both sides

Two-layer standard support construction made of SKS cable trays with U suspended support, bracket type MWA12/...., mounted on both sides.

Ceiling area of application, both sides

Three-layer standard support construction made of SKS cable trays with U suspended support, bracket type MWA12/...., mounted on both sides.

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the U supports and the fire protection clamps.

Support and clamp mounting

Screw the U supports with the fire protection clamp onto the bolt ties.

Bracket mounting

Fasten the brackets on the U support with M10 x 25 truss-head bolt.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable tray on brackets

Fasten the cable tray on the bracket with truss-head bolts.

Mounting of connection component

The connection component is mounted at approx. 100 mm from the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable tray and then suspend it from the side in the fire protection clamp.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

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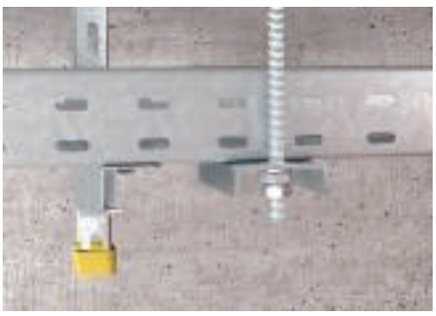
Standard support constructions: ceiling mounting with one cable tray

Lower threaded rod fastening



Secure the threaded rod on the lower connection component with a nut and a lock nut for one, two or three-layer track paths.

Threaded rod extension

Mount the connection components under each tray rail with multi-layered arrangement. Connect the individual threaded rods by mounting connection sleeves as adapters.

Mounting of head plate KU 3

Screw the head plate to the US 3 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 3 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting of head plate KUS 5

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 5 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting on sloping ceilings

Drill the anchor holes for the variable head pieces under the sloping ceiling vertically to the head
piece axis. Drill the anchor holes for the threaded rod plumb to the support.

Mounting of variable head piece KU 5V

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support. The head plate can be used to compensate sloping ceilings of up to 30°.

Bracket mounting

Fasten the bracket on the U support with a hexagonal bolt. In so doing, insert the spacer in the profile of the U support.

Locking the threaded rods

Mount the threaded rods on the anchors, previously mounted plumb to the support.

Labelling

Completion of the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

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Standard support constructions: ceiling mounting with one cable tray

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Six layers
Cable tray widths	100, 200, 300 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

U suspended support US...K/...	1	1	1	1	1
Protective cap US...KS	1	1	1	1	1
Fire protection anchor FAZ II 10/10GS	2	2	2	2	2
Wall and support bracket MWA 12/...	1	2	3	2	3
Cable tray SKS 6...	1	2	3	2	3
Straight and angle connector RWVL 60	2	4	6	4	6
Joint plate SSLB...	1	2	3	2	3
Floor end plate BEB/...	1	2	3	2	3
Truss-head bolt FRSB 6x12	6	12	18	12	18
Connection component ABR	1	2	3	2	3
Threaded rod 2078/M10	1	2	3	2	3
Connection sleeve 12005/M10	-	1	2	-	1
Identification plate KS-E	*	*	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1	2	2
Fire protection anchor FAZ II 10/10GS	1	1	1	2	2
Hexagonal nut DIN 934/M10	4	5	6	8	9
Washer 966/M10	2	3	4	4	5

Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with one cable tray

Threaded rod locking with internal thread anchor

	Internal thread anchor FZEA 12x40	1	1	1	2	2
	Hexagonal nut DIN 934/M10	2	3	4	4	5
	Washer 966/M10	1	2	3	2	3

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Standard support constructions: ceiling mounting with two cable trays

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm
Max. total width	500 mm

Mounting the two cable trays on a U suspended support fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The installable cable volume per bracket is doubled by mounting two cable trays together with a rail height of 60 mm together on one bracket. The maximum approved cable assignment per cable tray remains 10 kg/m!
Also the free positioning of the joint between the individual support points remains unaffected. The creation of the joint with screwed-on connectors in the tray rail and the screwed-on joint plate on the tray base remains despite the double arrangement of the cable trays.

System components

U suspended supports, screw-on head plates, cable tray, straight connector, bracket, bolt tie, fire protection clamp, identification plate.

Ceiling area of application, one-sided

One-layer standard support construction made of SKS cable trays with US3 suspended support, bracket type MWA12/...., mounted on one side.

Ceiling area of application, one-sided

One-layer standard support construction made of SKS cable trays with US5 suspended support, bracket type AW30/...., mounted on one side.

Ceiling area of application, one-sided

Two-layer standard support construction made of SKS cable trays with US3 suspended support, bracket type MWA12/...., mounted on one side.

Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with two cable trays

Ceiling area of application, one-sided

Two-layer standard support construction made of SKS cable trays with US5 suspended support, bracket type AW30/...., mounted on one side.

Ceiling area of application, one-sided

Three-layer standard support construction made of SKS cable trays with US3 suspended support, bracket type MWA12/...., mounted on one side.

Ceiling area of application, one-sided

Three-layer standard support construction made of SKS cable trays with US5 suspended support, bracket type AW30/...., mounted on one side.

Ceiling area of application, both sides

Two-layer standard support construction made of SKS cable trays with US3 or US5 suspended support, bracket type MWA12/.... or type AW30/... mounted on both sides.

Ceiling area of application, both sides

Three-layer standard support construction made of SKS cable trays with US3 or US5 suspended support, bracket type MWA12/.... or type AW30/... mounted on both sides.

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the U supports and the fire protection clamps.

Support and clamp mounting

Screw the U supports with the fire protection clamp onto the bolt ties.

Bracket mounting on US 3 suspended support

Fasten the brackets on the U support with M10 x 25 truss-head bolt.

Bracket mounting, US 5 suspended support

Fasten the brackets on the two hips of the U support with a hexagonal bolt and spacer.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

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Standard support constructions: ceiling mounting with two cable trays

Mounting of the cable trays

Fasten the cable trays on the bracket with truss-head bolts.

Mounting of the cable trays

Fasten the cable trays on the bracket with truss-head bolts.

Mounting of connection component

The connection component is mounted at approx. 100 mm from the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable tray and then suspend it from the side in the fire protection clamp.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one, two or three-layer track paths.

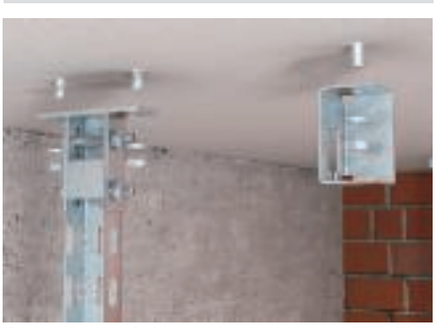
Threaded rod extension

Mount the connection components under each tray rail with multi-layered arrangement.
Connect the individual threaded rods by mounting connection sleeves as adapters.

Mounting of head plate KU 3

Screw the head plate to the US 3 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 3 support



Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting of head plate KUS 5

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Standard support constructions: ceiling mounting with two cable trays

Mounting of screwed-on US 5 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting on sloping ceilings

Drill the anchor holes for the variable head pieces under the sloping ceiling vertically to the head piece axis. Drill the anchor holes for the threaded rod plumb to the support.

Mounting of variable head piece KU 5V

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support. The head plate can be used to compensate sloping ceilings of up to 30°.

Bracket mounting

Fasten the bracket on the U support with a hexagonal bolt. In so doing, insert the spacer in the profile of the U support.

Locking the threaded rods

Mount the threaded rods on the anchors, previously mounted plumb to the support.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm
Max. total width	500 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

	U suspended support US...K/...	1	1	1	1	1
	Protective cap US...KS	1	1	1	1	1
	Wall and support bracket MWA 12/...	1	2	3	2	3
	Wall and support bracket AW 30/...	1	2	3	2	3
	Spacer DSK 45	1	2	3	1	2
	Hexagonal bolt SKS 10 x 90	1	2	3	1	2
	Fire protection anchor FAZ II 10/10GS	2	2	2	2	2

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Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with two cable trays

Components per suspension point or joint/end point

Cable tray SKS 6...	2	4	6	4	6
Straight and angle connector RWVL 60	4	8	12	8	12
Joint plate SSLB...	2	4	6	4	6
Floor end plate BEB/...	2	4	6	4	6
Truss-head bolt FRSB 6x12	12	24	36	24	36
Connection component ABR	1	2	3	2	3
Threaded rod 2078/M10	1	2	-	2	3
Threaded rod 2078/M12	-	-	3	-	-
Connection sleeve 12005/M10	-	1	-	-	1
Connection sleeve 12005/M12	-	-	2	-	-
Identification plate KS-E	*	*	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1	2	2
Fire protection anchor FAZ II 10/10GS	1	1	1	2	2
Hexagonal nut DIN 934/M10	4	5	-	8	9
Hexagonal nut DIN 934/M12	-	-	6	-	-
Washer 966/M10	2	3	-	4	5
Washer 966/M12	-	-	4	-	-

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	1	-	2	2
Internal thread anchor FZEA 14x40	-	-	1	-	-
Hexagonal nut DIN 934/M10	2	3	-	4	5
Hexagonal nut DIN 934/M12	-	-	4	-	-
Washer 966/M10	1	2	-	2	3
Washer 966/M12	-	-	3	-	-

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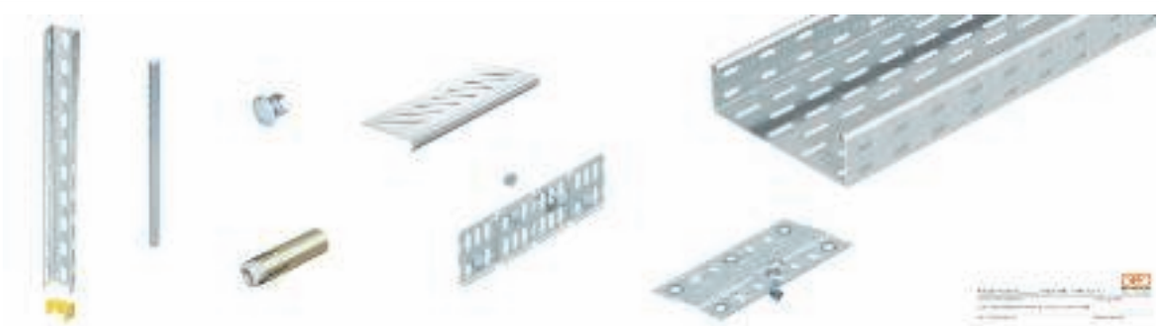
Standard support constructions: ceiling mounting with U cross-section

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	One layer
Cable tray widths	100, 200, 300 mm
Max. total width	400 mm

Mounting one or two cable trays on a US 3 cross-section fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The double-sided threaded rod suspension from the ceiling and the fact that the cross-section is just 30 mm high, means that very little space is required.
The position of the joints of the individual cable trays of rail height 60 mm can be freely selected between the cross-sections. The connection point of the trays is screwed to the rails with connectors and to the tray base with a joint plate.

System components



US 3 support, cable tray, straight connector, joint plate, identification plate.

Ceiling area of application

One-layer standard support construction made of an SKS cable tray and threaded rod suspension on both sides and cross-section, type US 3/....

Ceiling area of application

One-layer standard support construction made of two SKS cable trays and threaded rod suspension on both sides and cross-section, type US 5/....

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with U cross-section

Mounting preparations

Draw on the exact position of the drill holes for the threaded rods using a chalk mark.

Placing anchors

Mount the impact ties to fasten the threaded rods.

Mounting of threaded rods and cross-section

Screw the threaded rods with the cross-sections into the impact tie.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable tray

Fasten the cable tray on the cross-section with truss-head bolts and additional large washers.

Mounting of two cable trays

Fasten the two cable trays on the cross-section with truss-head bolts and additional large washers.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

System parameters at a glance

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	One layer
Cable tray widths	100, 200, 300 mm
Max. total width	400 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Standard support constructions: ceiling mounting with U cross-section

Components per suspension point or joint/end point

			
	U support US...	1 1	
	**Protective cap US...KS**	2 2	
	**Threaded rod 2078/M10**	2 2	
	**Hexagonal nut DIN 934/M10**	6 6	
	**Washer 966/M10**	4 4	
	**Cable tray SKS 6...**	1 2	
	**Straight and angle connector RWVL 60**	2 4	
	**Joint plate SSLB...**	1 2	
	**Floor end plate BEB/...**	1 2	
	**Truss-head bolt FRSB 6x20**	6 12	
	**Washer 967/M6**	2 4	
	**Internal thread anchor FZEA 12x40**	2 2	
	**Identification plate KS-E**	* *	

* Number as necessary

Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm

Mounting the cable trays with MWA 12 wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The vertical threaded rod lock to the ceiling allows easy wall mounting, which fulfils the requirements of the certificates.
The position of the joint connection, consisting of the cable trays with 60 mm rail height and the screwed-on connectors and the joint plate, can be selected freely between the brackets.

System components

MWA 12 wall and support bracket, cable tray, straight connector, joint plate, fire protection clamp, identification plate.

Wall application area

One-layer standard support construction as wall mounting with SKS cable tray and threaded rod locking vertically to the ceiling.

Wall application area

Two-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking vertically to the ceiling.

Wall application area

Three-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking vertically to the ceiling.

Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the fire protection clamps.

Bracket and clamp mounting

Screw the brackets with the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable tray

Fasten the cable tray on the bracket with truss-head bolts.

Mounting of connection component

Mount the connection component under the cable tray with truss-head bolts at a spacing of maximum 100 mm next to the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable tray and then suspend it from the side in the fire protection clamp.

Locking the threaded rod.

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one, two or three-layer track paths.

Threaded rod extension

Connect the individual threaded rods by mounting connection sleeves as adapters.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 17/03/2008 (LLExport_000443)

Standard support constructions: wall mounting with MWA 12

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

Wall and support bracket MWA 12/...	1	2	3
Cable tray SKS 6...	1	2	3
Straight and angle connector RWVL 60	2	4	6
Joint plate SSLB...	1	2	3
Floor end plate BEB/...	1	2	3
Truss-head bolt FRSB 6x12	6	12	18
Connection component ABR	1	2	3
Threaded rod 2078/M10	1	2	3
Connection sleeve 12005/M10	-	1	2
Identification plate KS-E	*	*	*

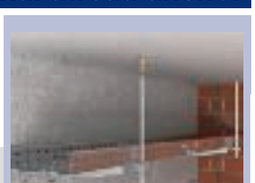
* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1
Fire protection anchor FAZ II 10/10GS	1	1	1
Hexagonal nut DIN 934/M10	4	5	6
Washer 966/M10	2	3	4

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	1	1
Hexagonal nut DIN 934/M10	2	3	4
Washer 966/M10	1	2	3



Concrete wall

Fire protection anchor FAZ II 10/10GS	1	2	3

Standard support constructions: wall mounting with MWA 12

Masonry wall

Fire protection bolt tie MMS 10 x 80

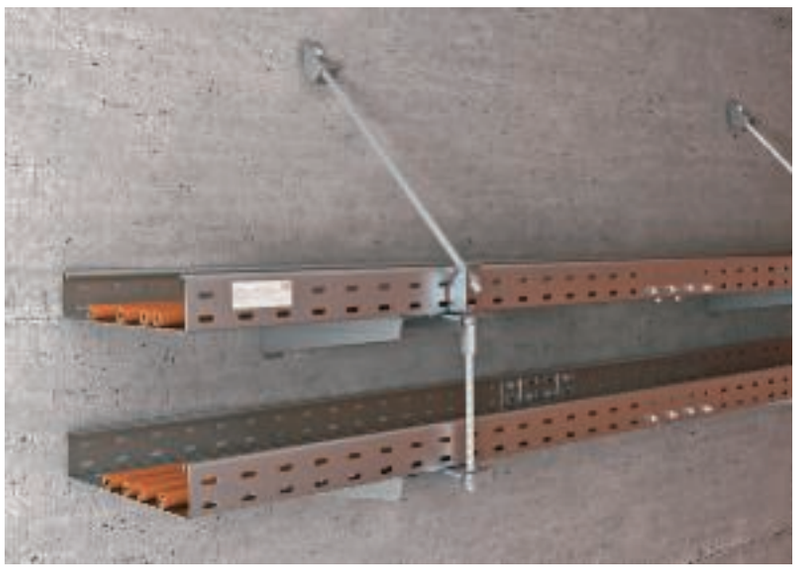
1 2 3

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with MWA 12 and diagonal threaded rod

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Cable tray widths	100, 200, 300 mm

Mounting cable trays on MWA 12 wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The threaded rod lock is mounted sloping to the wall irrespective of the distance to the ceiling or the ceiling structure.
The position of the joints between the brackets can be chosen freely. To connect the joints of the cable trays, screw two connectors to the tray rails and a joint plate to the tray base.

System components

MWA 12 wall and support bracket, cable tray, straight connector, joint plate, sloping connection component, identification plate.

Wall application area

One-layer standard support construction as wall mounting with SKS cable tray and threaded rod locking diagonally to the wall.

Wall application area

Two-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12 and diagonal threaded rod

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and connection components using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the connection components.

Bracket and connection component mounting

Screw the brackets with the connection components onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable trays

Fasten the cable trays on the bracket with truss-head bolts.

Mounting of connection component

Mount the connection component under the cable tray with truss-head bolts at a spacing of maximum 100 mm next to the bracket.

Mounting of sloping connection component

Mount the second connection component diagonally on the connection component with a hexagonal bolt. Lock the bolt with a hexagonal nut for single-layer cable tray mounting.

Mounting of threaded rod

Push the threaded rod through the two connection components and then lock each of the two ends with two lock nuts.

Lower threaded rod fastening

Secure the threaded rod on the connection component with a nut and a lock nut for two-layer track paths.

Vertical threaded rod extension

Fasten the lower vertical threaded rod with a connection sleeve as an adapter on the fastening screw of the connection component.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with MWA 12 and diagonal threaded rod

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Cable tray widths	100, 200, 300 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

	Wall and support bracket MWA 12/...	1	2
	Cable tray SKS 6...	1	2
	Straight and angle connector RWVL 60	2	4
	Joint plate SSLB...	1	2
	Floor end plate BEB/...	1	2
	Truss-head bolt FRSB 6x12	6	12
	Connection component ABR	1	2
	Sloping connection component ABS	2	2
	Hexagonal bolt SKS 10 x 40	1	1
	Threaded rod 2078/M10	1	2
	Connection sleeve 12005/M10	-	1
	Hexagonal nut DIN 934/M10	5	6
	Washer 966/M10	3	4
	Identification plate KS-E	*	*

* Number as necessary

Concrete wall

	Fire protection anchor FAZ II 10/10GS	2	3

Masonry wall

	Fire protection bolt tie MMS 10 x 80	2	3

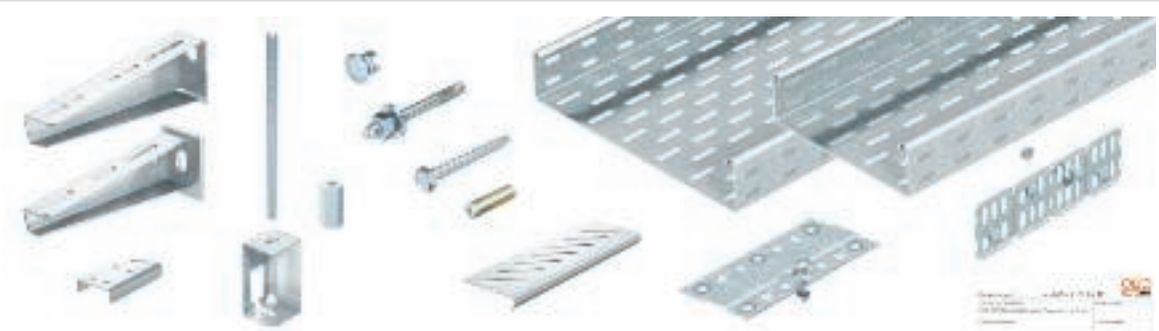
Standard support constructions: wall mounting with two cable trays

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm
Max. total width	500 mm

Routing the two cable ladders on MWA or AW wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The installable cable volume per bracket is doubled by mounting two cable trays with a rail height of 60 mm together on one bracket. A cable assignment of maximum 10 kg/m is permitted per tray. With this routing type, the threaded rod is locked vertically to the ceiling.
The position of the joint can be freely selected, whereby the ends of the cable trays are screwed to the tray rails using connectors and a joint plate is screwed to the tray base.

System components



MWA 12 and AW 30 wall and support bracket, cable tray, straight connector, joint plate, fire protection clamp, identification plate.

Wall application area

One-layer standard support construction as wall mounting with SKS cable tray and threaded rod locking vertically to the ceiling.

Wall application area

Two-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking vertically to the ceiling.

Wall application area

Three-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking vertically to the ceiling.

Standard support constructions: wall mounting with two cable trays

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and fire protection clamps using a chalk mark.

Placing anchors

The bolt ties are required to fasten the brackets and fire protection clamps.

Bracket and clamp mounting

Screw the brackets with the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable trays

Fasten the cable trays on the bracket with truss-head bolts.

Mounting of connection component

Mount the front connection component under the cable tray with truss-head bolts at a spacing of maximum 100 mm next to the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable tray and then suspend it from the side in the fire protection clamp.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one, two or three-layer track paths.

Threaded rod extension

Connect the individual threaded rods by mounting connection sleeves as adapters.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with two cable trays

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm
Max. total width	500 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

Wall and support bracket MWA 12/...	1	2	3
Wall and support bracket AW 30/...	1	2	3
Cable tray SKS 6...	2	4	6
Straight and angle connector RWVL 60	4	8	12
Joint plate SSLB...	2	4	6
Floor end plate BEB/...	2	4	6
Truss-head bolt FRSB 6x12	12	24	36
Connection component ABR	1	2	3
Threaded rod 2078/M10	1	2	-
Threaded rod 2078/M12	-	-	3
Connection sleeve 12005/M10	-	1	-
Connection sleeve 12005/M12	-	-	2
Identification plate KS-E	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1
Fire protection anchor FAZ II 10/10GS	1	1	1
Hexagonal nut DIN 934/M10	4	5	-
Hexagonal nut DIN 934/M12	-	-	6
Washer 966/M10	2	3	-
Washer 966/M12	-	-	4

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: wall mounting with two cable trays

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	1	-
Internal thread anchor FZEA 14x40	-	-	1
Hexagonal nut DIN 934/M10	2	3	-
Hexagonal nut DIN 934/M12	-	-	4
Washer 966/M10	1	2	-
Washer 966/M12	-	-	3

Concrete wall

Fire protection anchor FAZ II 10/10GS	1	2	3

Masonry wall

Fire protection bolt tie MMS 10 x 80	1	2	3

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

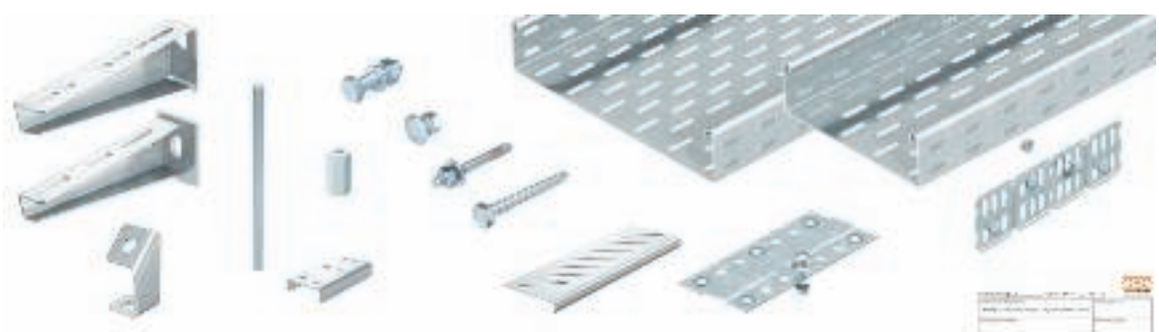
Standard support constructions: wall mounting with two cable trays and diagonal threaded rod

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Cable tray widths	100, 200, 300 mm
Max. total width	500 mm

Mounting two cable trays on MWA or AW wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The sloping threaded rod lock to the wall is completely detached from the ceiling. A maximum cable assignment of 10 kg/m per cable tray with simultaneous mounting of two trays per bracket means that double the amount of cables can be installed in cable trays.
The position of the joint can be selected completely independently of the spacing to the brackets. The joint must be fitted with screwed-on connectors and a screwed-on joint plate.

System components



MWA 12 and AW 30 wall and support bracket, cable tray, straight connector, joint plate, sloping connection component, identification plate.

Wall application area

One-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

Wall application area

Two-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with two cable trays and diagonal threaded rod

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and connection components using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the connection components.

Bracket and clamp mounting

Screw the brackets with the connection components onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable trays

Fasten the cable trays on the bracket with truss-head bolts.

Mounting of connection component

Mount the connection component under the cable tray with truss-head bolts at a spacing of maximum 100 mm next to the bracket.

Mounting of sloping connection component

Mount the second connection component diagonally on the connection component with a hexagonal bolt. Lock the bolt with a hexagonal nut for single-layer cable tray mounting.

Mounting of threaded rod

Push the threaded rod through the two connection components and then lock each of the two ends with two lock nuts.

Lower threaded rod fastening

Secure the threaded rod on the connection component with a nut and a lock nut for two-layer track paths.

Vertical threaded rod extension

Fasten the lower vertical threaded rod with a connection sleeve as an adapter on the fastening screw of the connection component.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with two cable trays and diagonal threaded rod

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Cable tray widths	100, 200, 300 mm
Max. total width	500 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

Wall and support bracket MWA 12/...	1	-	
Wall and support bracket AW 30/...	1	2	
Cable tray SKS 6...	2	4	
Straight and angle connector RWVL 60	4	8	
Joint plate SSLB...	2	4	
Floor end plate BEB/...	2	4	
Truss-head bolt FRSB 6x12	12	24	
Connection component ABR	1	2	
Sloping connection component ABS	2	2	
Hexagonal bolt SKS 10 x 40	1	-	
Hexagonal bolt SKS 12 x 40	-	1	
Threaded rod 2078/M10	1	-	
Threaded rod 2078/M12	-	2	
Connection sleeve 12005/M12	-	1	
Hexagonal nut DIN 934/M10	5	-	
Hexagonal nut DIN 934/M12	-	6	
Washer 966/M10	3	-	
Washer 966/M12	-	4	
Identification plate KS-E	*	*	

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	2	3	

Masonry wall

Fire protection bolt tie MMS 10 x 80	2	3	

Always indicate the article number when ordering.

Standard support constructions: wall mounting with TPSA

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm

Mounting the cable trays with TP wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The threaded rod lock through the bracket tip allows symmetrical arrangement of the bracket and the threaded rod run vertically to the ceiling.
Screw the ends of the 60 mm high cable tray to the tray rail using connectors and to the tray base with a joint plate. The position of the joint can be selected freely between the wall brackets.

System components

TP wall and support bracket, cable tray, straight connector, joint plate, fire protection clamp, identification plate.

Wall application area

One-layer standard support construction as wall mounting with SKS cable tray and threaded rod locking vertically to the ceiling.

Wall application area

Two-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking vertically to the ceiling.

Wall application area

Three-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking vertically to the ceiling.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with TPSA

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the fire protection clamps.

Bracket and clamp mounting

Screw the brackets with the spacer and the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

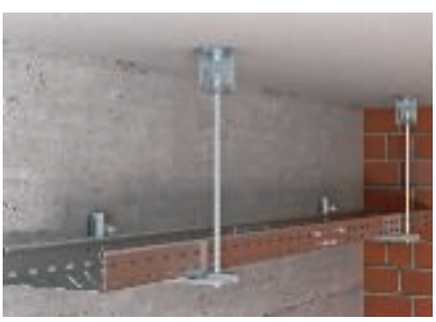
Mounting of the cable tray

Fasten the cable tray on the bracket with truss-head bolts.

Mounting of threaded rod

Push the threaded rod from above through the connection component over the bracket tip protruding from the cable tray and then suspend it from the side in the fire protection clamp.

Locking the threaded rod.



Secure the threaded rod in the fire protection clamp and in the bracket each with two hexagonal nuts.

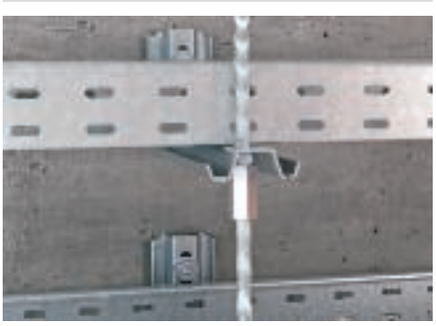
Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod fastening

Secure the threaded rod on the lower bracket with a nut and a lock nut for one, two or three-layer track paths.

Threaded rod extension



Connect the individual threaded rods by mounting connection sleeves as adapters.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with TPSA

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Cable tray widths	100, 200, 300 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

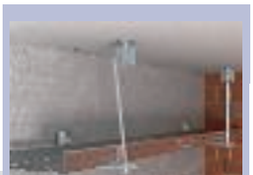
Components per suspension point or joint/end point

Bracket TPSA/...	1	2	3
Protective cap TPS KS	1	2	3
Spacer DS 4	1	2	3
Cable tray SKS 6...	1	2	3
Straight and angle connector RWVL 60	2	4	6
Joint plate SSLB...	1	2	3
Floor end plate BEB/...	1	2	3
Truss-head bolt FRSB 6x12	6	12	18
Threaded rod 2078/M10	1	2	3
Connection sleeve 12005/M10	-	1	2
Identification plate KS-E	*	*	*

* Number as necessary

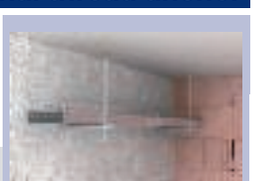
Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1
Fire protection anchor FAZ II 10/10GS	1	1	1
Hexagonal nut DIN 934/M10	4	5	6
Washer 966/M10	2	3	4



Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	1	1
Hexagonal nut DIN 934/M10	2	3	4
Washer 966/M10	1	2	3



Standard support constructions: wall mounting with TPSA

Concrete wall

Fire protection anchor FAZ II 10/30

1 2 3

Masonry wall

Fire protection bolt tie MMS 10 x 100

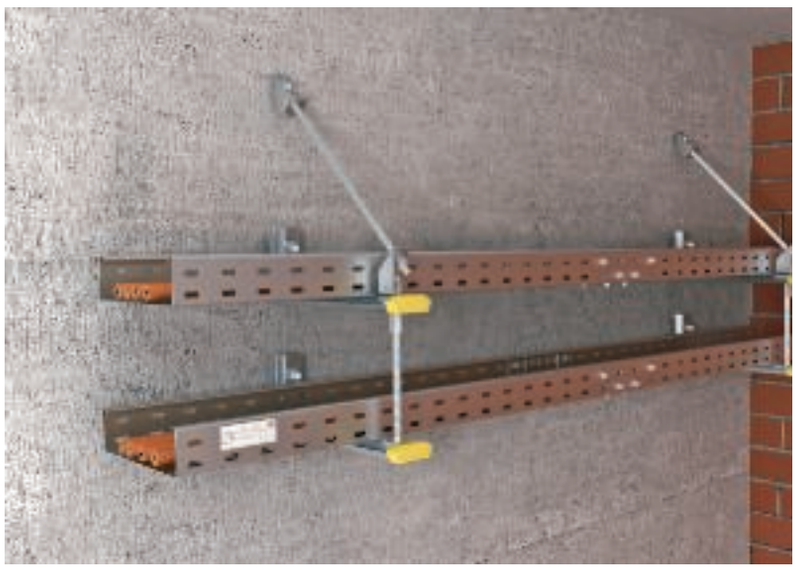
1 2 3

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: wall mounting with TPSA and diagonal threaded rod

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-2-Mu Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Cable tray widths	100, 200, 300 mm

Mounting two cable trays on TP wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The sloping threaded rod lock to the wall allows mounting completely detached from the ceiling.
Irrespective of the position between the brackets, the joint should be made by screwing together the ends of the 60 mm high cable tray with connectors and a joint plate.

System components

TP wall and support bracket, cable tray, straight connector, joint plate, sloping connection component, identification plate.

Wall application area

One-layer standard support construction as wall mounting with SKS cable tray and threaded rod locking diagonally to the wall.

Wall application area

Two-layer standard support construction as wall mounting with SKS cable trays and threaded rod locking diagonally to the wall.

Standard support constructions: wall mounting with TPSA and diagonal threaded rod

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and connection components using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the connection components.

Bracket and connection component mounting

Screw the brackets with the spacer and the connection components onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable tray

Fasten the cable tray on the bracket with truss-head bolts.

Mounting of sloping connection component

Mount the second connection component diagonally on the bracket tip with a hexagonal bolt. Lock the bolt with a hexagonal nut for single-layer cable tray mounting.

Mounting of threaded rod

Push the threaded rod through the two connection components and then lock each of the two ends with two lock nuts.

Lower threaded rod fastening

Secure the threaded rod on the lower bracket with a nut and a lock nut for two-layer track paths.

Vertical threaded rod extension

Fasten the lower vertical threaded rod with a connection sleeve as an adapter on the fastening screw of the connection component.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with TPSA and diagonal threaded rod

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Cable tray widths	100, 200, 300 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

Bracket TPSA/...	1	2
Protective cap TPS KS	1	2
Spacer DS 4	1	2
Cable tray SKS 6...	1	2
Straight and angle connector RWVL 60	2	4
Joint plate SSLB...	1	2
Floor end plate BEB/...	1	2
Truss-head bolt FRSB 6x12	6	12
Sloping connection component ABS	2	2
Hexagonal bolt SKS 10 x 40	1	1
Threaded rod 2078/M10	1	2
Connection sleeve 12005/M10	-	1
Hexagonal nut DIN 934/M10	5	6
Washer 966/M10	3	4
Identification plate KS-E	*	*

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	2	3
Fire protection anchor FAZ II 10/30	1	2

Masonry wall

Fire protection bolt tie MMS 10 x 80	2	3
Fire protection bolt tie MMS 10 x 100	1	2

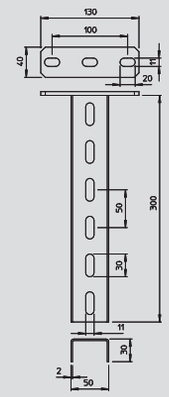
Standard support constructions: products

Suspended support

US3

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
US 3 K/20	200	2	1	50.500	**6342 35 1**	
US 3 K/30	300	2	1	64.400	**6342 35 3**	
US 3 K/40	400	2	4	78.300	**6342 35 5**	
US 3 K/50	500	2	1	92.300	**6342 35 7**	
US 3 K/60	600	2	1	106.200	**6342 35 9**	
US 3 K/70	700	2	1	120.200	**6342 36 2**	
US 3 K/80	800	2	1	134.100	**6342 36 4**	
US 3 K/90	900	2	1	147.800	**6342 36 6**	
US 3 K/100	1000	2	1	162.000	**6342 36 8**	
US 3 K/110	1100	2	1	175.900	**6342 37 0**	
US 3 K/120	1200	2	1	189.900	**6342 37 2**	

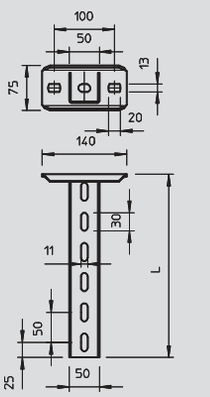
Suspended support (U profile) of dimensions 50 x 30 mm with welded head plate.



US5 VDE

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
US 5 K/20	200	2.5	1	100.000	**6341 52 7**	
US 5 K/30	300	2.5	1	125.000	**6341 53 5**	
US 5 K/40	400	2.5	1	150.000	**6341 54 3**	
US 5 K/50	500	2.5	1	175.000	**6341 55 1**	
US 5 K/60	600	2.5	1	200.000	**6341 57 8**	
US 5 K/70	700	2.5	1	225.000	**6341 58 6**	
US 5 K/80	800	2.5	1	255.000	**6341 59 4**	
US 5 K/90	900	2.5	1	280.000	**6341 60 8**	
US 5 K/100	1000	2.5	1	300.000	**6341 61 6**	
US 5 K/110	1100	2.5	1	330.000	**6341 62 4**	
US 5 K/120	1200	2.5	1	360.000	**6341 63 2**	

Suspended support (U profile) of dimensions 50 x 50 mm with welded head plate.

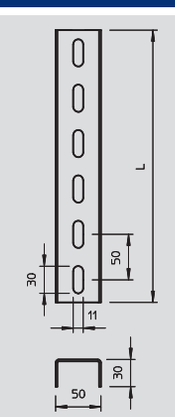


U support

US3

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
US 3/30	300	2	1	39.900	**6342 30 4**	
US 3/40	400	2	1	53.200	**6342 30 6**	
US 3/50	500	2	1	66.500	**6342 30 8**	
US 3/60	600	2	1	79.800	**6342 31 0**	
US 3/70	700	2	1	93.400	**6342 31 2**	
US 3/80	800	2	1	106.500	**6342 31 4**	
US 3/90	900	2	1	119.800	**6342 31 6**	
US 3/100	1000	2	1	133.100	**6342 31 8**	
US 3/150	1500	2	1	199.600	**6342 32 8**	
US 3/200	2000	2	1	266.100	**6342 33 8**	

U support in fixed lengths. Dimensions 30 x 50 mm.

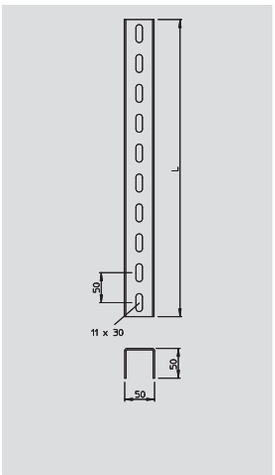


05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: products

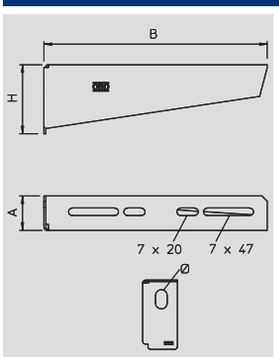
U support



Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5/30	300	2.5	1	79.000	**6340 90 3**	
US 5/40	400	2.5	1	106.000	**6340 91 1**	
US 5/50	500	2.5	1	133.000	**6340 93 8**	
US 5/60	600	2.5	1	160.000	**6340 94 6**	
US 5/70	700	2.5	1	175.000	**6340 95 0**	
US 5/80	800	2.5	1	200.000	**6340 95 4**	
US 5/90	900	2.5	1	227.000	**6340 95 8**	
US 5/100	1000	2.5	1	265.000	**6340 96 2**	
US 5/150	1500	2.5	1	395.000	**6340 96 6**	
US 5/200	2000	2.5	1	526.000	**6340 97 0**	

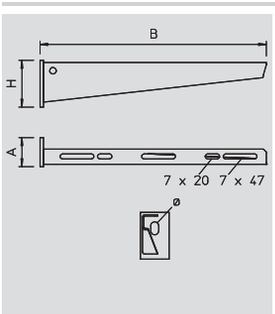
U support in fixed lengths. Dimensions 50 x 50 mm.

Wall and support brackets



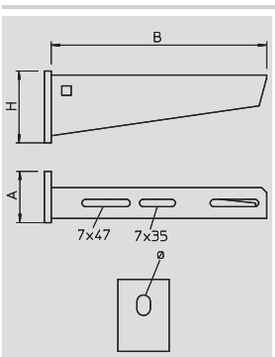
Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FS	
MWA 12/11	110	53	32.5	11	30	12.700	**6424 71 6**	
MWA 12/21	210	65	32.5	11	30	24.500	**6424 73 2**	
MWA 12/31	310	75	38	11	30	57.000	**6424 74 0**	
MWA 12/41	410	83	38	11	30	68.000	**6424 75 9**	

Folded lightweight wall and support bracket.



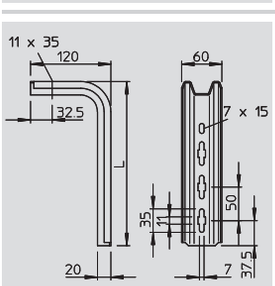
Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FT	
AW 15/11	110	50	40	11	30	14.500	**6420 65 6**	
AW 15/21	210	60	40	11	30	26.000	**6420 68 0**	
AW 15/31	310	65	40	11	30	32.500	**6420 71 0**	
AW 15/41	410	70	40	11	30	55.000	**6420 74 5**	
AW 15/51	510	75	40	11	20	72.000	**6420 78 8**	

Lightweight wall and support bracket with welded head plate.



Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FT	
AW 30/21	210	70	50	13	25	42.000	**6419 72 0**	
AW 30/31	310	80	50	13	25	63.000	**6419 74 7**	
AW 30/41	410	80	50	13	20	93.000	**6419 76 3**	
AW 30/51	510	90	50	13	10	132.500	**6419 79 8**	

Medium-weight wall and support bracket with welded head plate.



Type	Length	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
TPSA/195	195	20	41.000	**6364 15 2**	
TPSA/295	295	20	55.000	**6364 26 8**	
TPSA/395	395	20	69.000	**6364 27 6**	

Bracket for mounting on TPS suspended supports or as wall bracket for standard cable tray routing type for function maintenance to DIN 4102 Part 12.

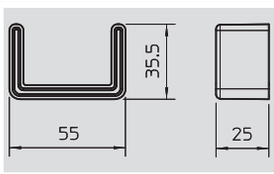
Always indicate the article number when ordering.

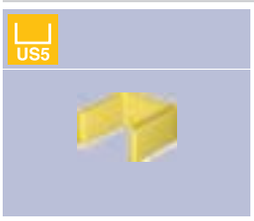
Standard support constructions: products

Protective cap

Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 3 KS	Sulphur yellow	20	1.070	**6338 45 7**	

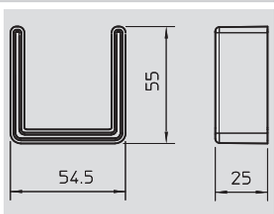
Protective cap for end covering of US 3 supports.

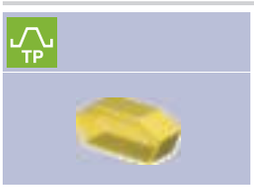




Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 5 KS	Sulphur yellow	20	1.300	**6338 46 1**	

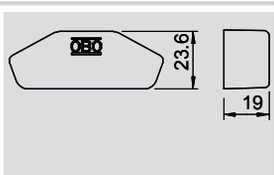
Protective cap for end covering of US 5 supports.





Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
TPS KS	Sulphur yellow	10	0.800	**6364 62 4**	

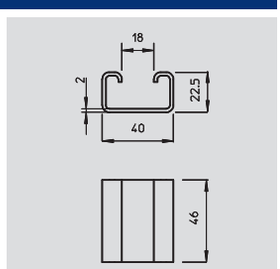
Protective cap for end covering of TP supports.



Spacer

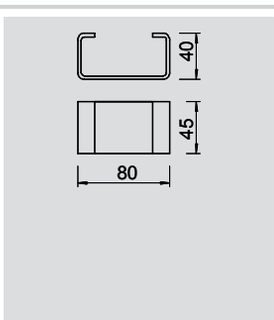
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 25	25	7.500	**6416 44 6**	

Spacer for use in U 3 supports.



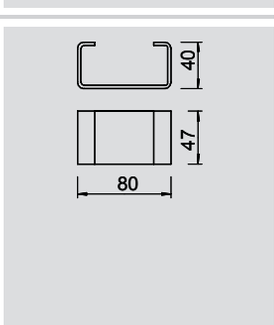
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 45	25	19.000	**6416 50 0**	

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 47	25	17.000	**6416 50 4**	

Spacer for use in head plate, type KU 5 V.

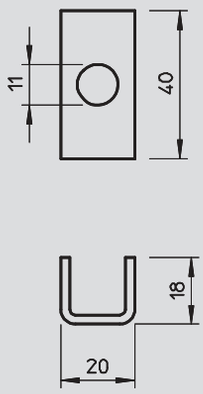


05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: products

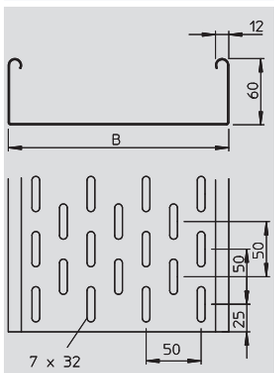
Spacer



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
DS 4	20	3.800	**6416 55 1**	

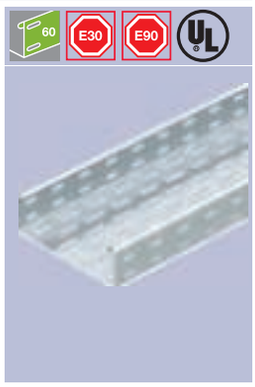
Spacer for use in trapezoidal profiles, type TP.

Cable tray

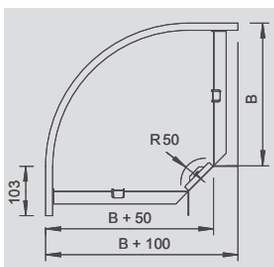


Type	Length mm	Width mm	Metal thickness mm	Weight borders	Item No. ST / FS	Price /m
SKS 610	3000	100	1.5	239.400	**6056 10 5**	
SKS 620	3000	200	1.5	356.800	**6056 20 2**	
SKS 630	3000	300	1.5	421.500	**6056 29 6**	

SKS 60 = heavyweight cable tray system with 60 mm side height. FS version includes RV 60 straight connector set.

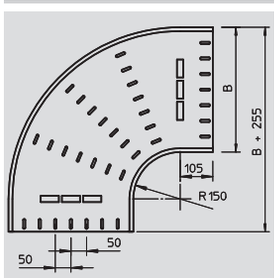


Fitting



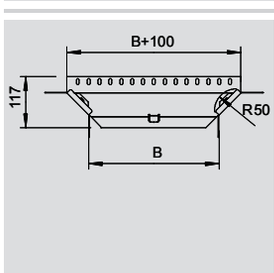
Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RB 90 610	100	1	56.000	**6043 21 6**	
RB 90 620	200	1	95.000	**6043 22 4**	
RB 90 630	300	1	150.000	**6043 23 2**	

90° bend, horizontal, for all cable tray types of 60 mm side height.



Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RB 90 640	400	1	523.400	**7001 29 0**	
RB 90 650	500	1	683.400	**7001 30 4**	

90° bend, horizontal, for all cable tray types of 60 mm side height.



Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RAA 610	100	1	35.000	**6040 40 3**	
RAA 620	200	1	40.000	**6040 43 8**	
RAA 630	300	1	50.000	**6040 44 6**	

Mounting/branch piece for horizontal and vertical use. For all cable tray types of 60 mm side height.

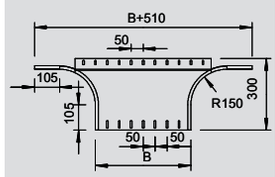
Always indicate the article number when ordering.

Standard support constructions: products

Fitting

Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RAA 640	400	1	220.000	**7002 39 4**	
RAA 650	500	1	255.000	**7002 41 6**	

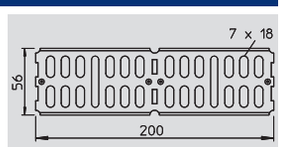
Mounting/branch piece for horizontal and vertical use. For all cable tray types of 60 mm side height.



Connector

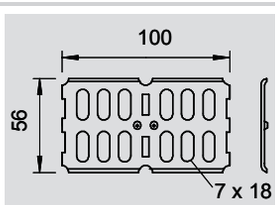
Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RWVL 60	200 x 56	10	15.600	**6067 11 5**	

Longitudinal and angle connector for cable trays, fittings and separating retainers with a side height of 60 mm.



Type	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RLVK 60	60	10	9.200	**6067 09 3**	

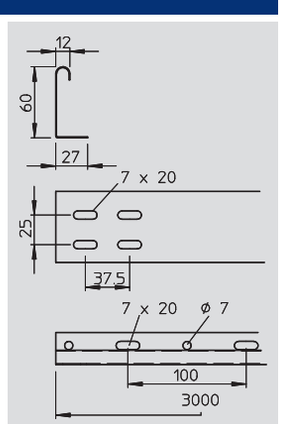
Straight connector for straight connection of cable trays, fittings and separating retainers with a side height of 60 mm.



Separating retainer

Type	Side height mm	Length mm	Weight borders	Item No. ST / FS	Price /m
TSG 60	60	3000	57.300	**6062 06 7**	

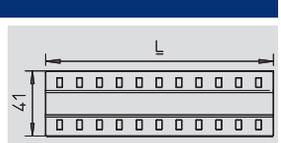
Separating retainer for separation of cables of different voltages or functions.



Joint plate

Type	Width mm	Quantity of screws pc.	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SSLB 100	85	2	20	7.700	**7070 20 5**	
SSLB 200	185	2	20	16.700	**7070 21 3**	
SSLB 300	285	3	20	25.700	**7070 21 7**	

Wide joint plate for use in all cable trays and wide span cable trays.

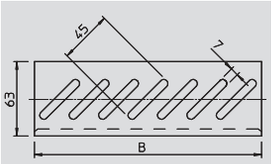


05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

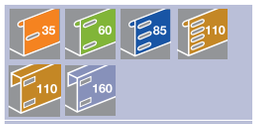
Standard support constructions: products

Floor end plate



Type	Width	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
BEB/100	100	100	5.400	**7083 10 6**	
BEB/200	200	100	11.400	**7083 20 3**	
BEB/300	300	100	17.200	**7083 30 0**	

Bottom end plate for floor reinforcement at the ends of the cable tray and as cable protection.



Connection component

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
ABR	20	23.000	**6364 94 2**	

The connection component is the connection between the threaded rod lock and the suspension system for the routing types with cable trays for function maintenance to DIN 4102 Part 12.

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FS	
ABS FS	20	7.500	**6365 02 7**	

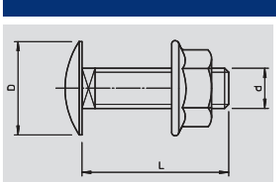
The connection component is the connecting element for the sloping arrangement of the threaded rod locking for wall mounting of the standard routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

Fire protection clamp

Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
BSB	20	41.000	**6418 19 8**	

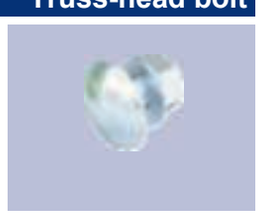
Fire protection clamp for ceiling fastening of the threaded rod lock for routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

Truss-head bolt

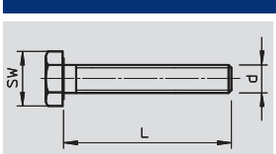


Type	Thread	Length	Dimension D	Dimension d	SW	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	mm	pcs	kg/% pc	ST / F	
FRSB 6x12	M6	12	13.5	6	10	100	0.990	**6406 12 2**	
FRSB 6x15	M6	16	13.5	6	10	100	1.065	**6406 15 7**	
FRSB 6x20	M6	20	13.5	6	10	100	1.137	**6406 20 3**	

Truss-head bolt with square neck including combination nut.

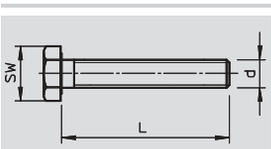


Hexagonal bolt



Type	Thread	Dimension L	Dimension d	SW	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / F	
SKS 10x40	M10 x 40	40	10	17	50	4.700	**3160 75 0**	
SKS 10x80	M10 x 80	80	10	17	20	7.700	**6418 25 0**	
SKS 10x90	M10 x 90	90	10	17	20	8.000	**6418 25 2**	

Hexagonal bolt for universal fixing of structure components.



Type	Thread	Dimension L	Dimension d	SW	Pack.	Weight	Item No.	Price /% pc
		mm	mm	mm	pcs	kg/% pc	ST / F	
SKS 12x40	M12 x 40	40	12	19	25	7.800	**3163 11 3**	

Hexagonal bolt for universal fixing of structure components.

Always indicate the article number when ordering.

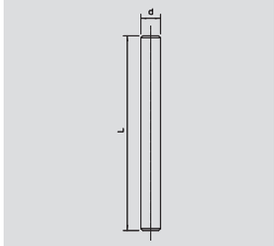
Standard support constructions: products

Threaded rod

Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G
2078	M10	10	1000	25	49.000	**3141 20 9**
2078	M12	12	1000	20	70.000	**3141 30 6**

Price /% pc

Threaded rod to DIN 976.

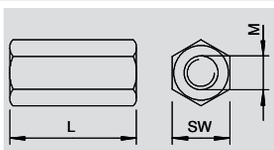


Connection sleeve

Type	Thread	Dimension M	Dimension L mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G
12005	M10	10	40	17	50	6.000	**6410 10 3**
12005	M12	12	40	19	25	7.000	**6410 11 1**

Price /% pc

Connection sleeve with continuous internal thread.

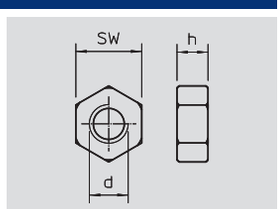


Hexagonal nut

Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**
DIN 934	M12	12	10.8	19	100	1.730	**3400 12 3**

Price /% pc

Hexagonal nut to DIN 934 with metric thread.

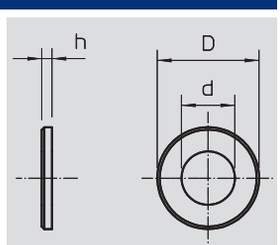


Washer

Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G
966	M10	20	10.5	2	100	0.408	**3402 09 6**
966	M12	24	13	2.5	100	0.627	**3402 12 6**

Price /% pc

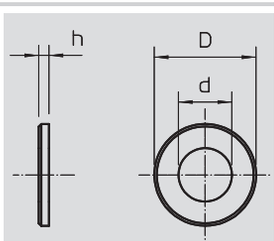
Washer according to DIN 125, shape A, for universal use.



Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G
967	M6	28	6.5	2.5	100	1.150	**3402 20 7**

Price /% pc

Washer with a larger outer diameter for universal use.



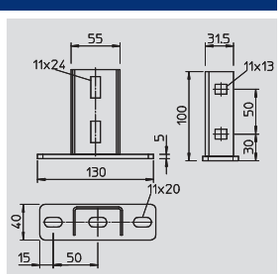
Head plate

US3

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT
KU 3	10	46.800	**6348 87 4**

Price /pc.

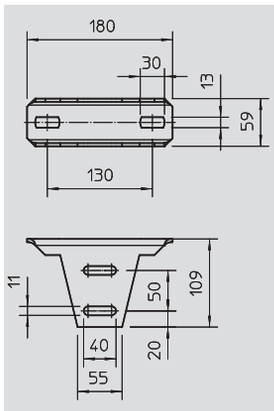
Head plate for mounting on US 3 supports.



Always indicate the article number when ordering.

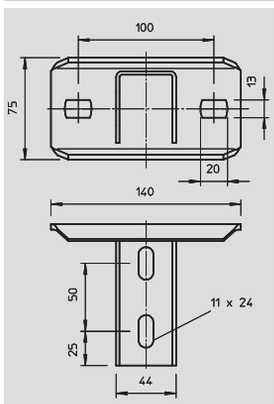
Standard support constructions: products

Head plate



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 5 V	1	78.900	**6348 92 0**	

Variable head plate for mounting on US 5 support.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KUS 5	1	70.000	**6348 90 4**	

Head plate for mounting on US 5 support.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Cable-specific support constructions: ceiling mounting with RKS-Magic®

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.5 m
Max. cable weight per tray to tray width 300 mm	20 kg/m
Max. cable weight per tray for tray width 400 mm	30 kg/m
Max. number of layers	Five layers
Cable tray widths 100, 200, 300, 400 mm	

The highlight of the cable-specific support structures for electrical function maintenance to DIN 4102 Part 12 is, without doubt, laying with the RKS-Magic® cable tray. Speed, economy and a high load capacity are the hallmarks of this system. The RKS-M is simply joined together and yet still fulfils all the requirements for fire-protected cable routing for safety-relevant systems. The high load capacity creates reserves, whilst the fastening without threaded rods simplifies mounting. Up to five layers can be fastened to one support.
High speed meets economy.

System components

U suspended supports, wall and support bracket, protective cap, cable trays, fire protection anchors, identification plate

Four-layer variant on both sides

One to four-layer mounting variant with US5K suspended support and tray widths to 300 mm.

Three-layer variant on one side

One to three-layer mounting variant, mounted on one side, with US5K suspended support and 400 mm tray widths.

Three-layer variant on both sides

One to three-layer mounting variant, mounted on both sides, with US5K suspended support and 400 mm tray widths.

05 BSS_Katalog_2008 / en / 17/03/2009 (LL=xport_000443)

Always indicate the article number when ordering.

Cable-specific support constructions: ceiling mounting with RKS-Magic®

Five-layer variant on both sides

One to five-layer mounting variant, mounted on both sides, with US7K suspended support and tray widths to 300 mm.

Four-layer variant on one side

One to four-layer mounting variant, mounted on one side, with US7K suspended support and 400 mm tray widths.

Four-layer variant on both sides

One to four-layer mounting variant with US7K suspended support and 400 mm tray widths.

Connection

The straight connection is created by simply laying the cable trays one inside another. Observe the mounting direction.

Lowering

Insert the cable tray into the existing sleeve opening from above.

Locking

Lock with an audible click. The connection is secure. No additional bolts are required.

Connection straps

When the cable tray has locked in place, turn over the connection straps with a screwdriver.

Slackening the connection

To slacken the connection, push the point of a screwdriver under the spring element. This opens the lock.

Mounting with connector set

With shortened cable trays, the connection is made using the RV 60. For this, clamp the side sections in the rail and fasten them to the side section with two truss-head bolts on each side.

Mounting with connector set

Place the joint plate on one side of the rail beneath the side section and push it down.

Mounting with connector set

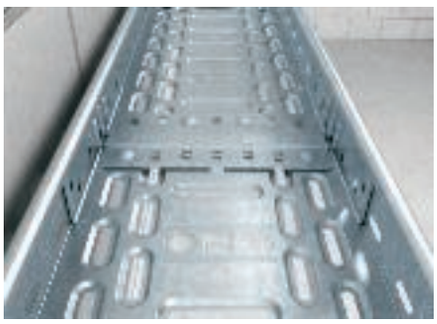
Lock the joint plate into the second side piece of the connector.

Joint reinforcement

The connection with the quick connector set must be additionally reinforced using the SSLB joint plate.

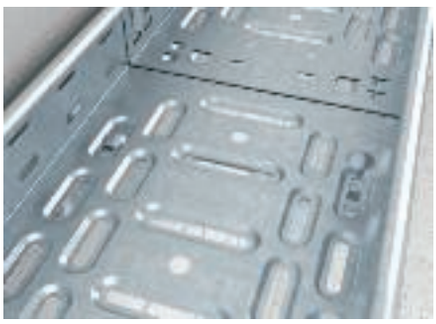
Cable-specific support constructions: ceiling mounting with RKS-Magic®

Joint reinforcement



The number of truss-head bolts required is dependent on the width and contained in the specifications of the test certificate.

Fastening on bracket



Mount the truss-head bolts through the slots. The quantity is dependent on the width of the cable tray. See test certificate for individual data.

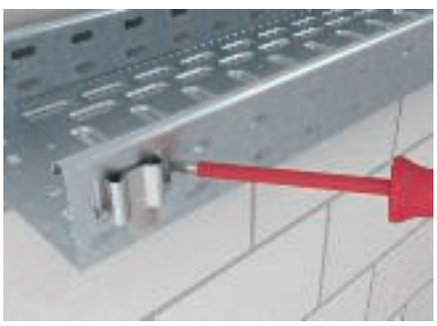
Screwed on separating retainer

Fastening the TSG 60 separating retainer with truss-head bolts. The separating retainer can be run directly over the joint.

Quick fastening, separating retainer

Quick fastening of the TSG 60/S separating retainer with the TSG RKS clamping piece. Simply lock the fastening through.

Dismantling of the spring element



Remove the spring elements with a screwdriver to mount fittings.

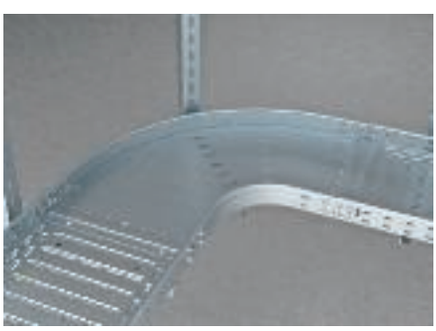
Mounting of bend

The spring elements must be removed to mount fittings. The side rails are screwed on and the cut edge reinforced with the connector set and joint plate.

Mounting of bend

Fittings with large radii must be additionally supported. The side rails are screwed on and the cut edge reinforced with the connector set and joint plate.

Support, bend



Support of bends at an angle of 45° should be mounted in the form of an additional bracket. The maximum spacing between joints is 150 mm.

Mounting of mounting/branch piece

The spring elements must be removed to mount mounting/branch pieces. The side rails are screwed on and the cut edge reinforced with the connector set and joint plate.

Support, fittings

Fittings must be supported by additional brackets on each side. Maximum distance to the joint 150 mm.

Lid mounting, universal clamp

Place the lid on the cable tray and lock it in place using the universal clamps in the slots of the side rails.

Lid mounting, sash lock

Place the lid on the cable tray and lock it in place by turning the sash locks through 90°.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000943)

Cable-specific support constructions: ceiling mounting with RKS-Magic®

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per tray to tray width 300 mm	20 kg/m
Max. cable weight per tray for tray width 400 mm	30 kg/m
Max. number of layers	Five layers
Cable tray widths	100, 200, 300, 400 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	(N)HXH	E30-E90	≥ nx1.5 mm²		
	(N)HXCH	E30-E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E60	≥ nx2 x 0.8 mm	B ≤ 300 mm	
	JE-H(St)HRH	E30	≥ nx2 x 0.8 mm		
Eupen	NHXH	E30-E90	≥ nx1.5 mm²		
	(N)HXH	E60	≥ nx1.5 mm²	B ≤ 300 mm	
	(N)HXCH	E30	≥ nx1.5/1.5 mm²	B ≤ 300 mm	
	NHXCH	E90	≥ nx1.5/1.5 mm²	B = 400 mm	
	JE-H(St)H	E30-E90	≥ nx2 x 0.8 mm		
Nexans	N2XH	E30-E60	≥ nx1.5 mm²		
	N2XH	E90	≥ nx1.5 mm²		
	N2XCH	E30	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
Prysmian	(N)HXH	E30	≥ nx1.5 mm²		
	(N)HXHX	E90	≥ nx1.5 mm²	B = 400 mm	
	(N)HXCH	E30	≥ nx2.5/2.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H	E60	≥ nx2 x 0.8 mm	B = 400 mm	

Components per suspension point or joint/end point

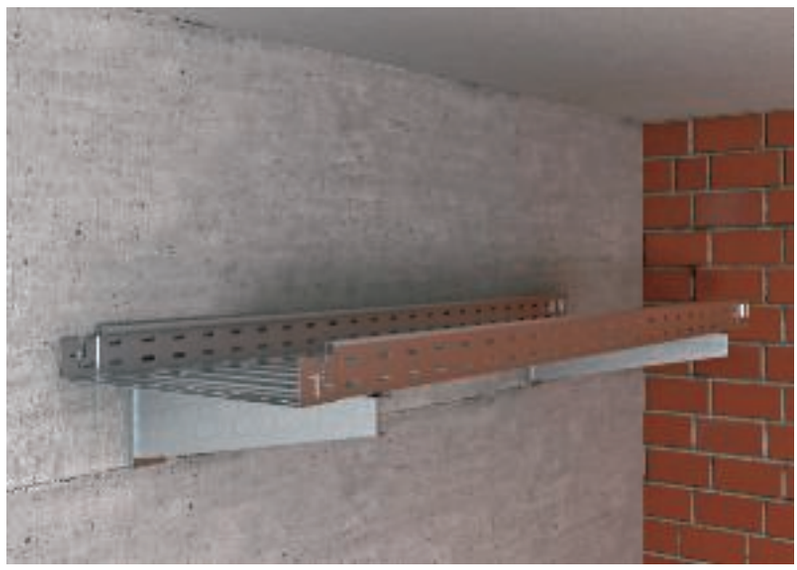
U suspended support US 5K/...	1	1	1	1	1
Protective cap US 5 KS	1	1	1	1	1
Fire protection anchor FAZ II 10/10GS	2	-	-	-	-
Fire protection anchor FAZ II 12/10	-	2	2	2	2
Wall and support bracket AW 30/11...21	1	2	3	2	3
Wall and support bracket AW 55/31...41	1	2	3	2	3
Spacer DSK 45	1	2	3	1	2
Hexagonal bolt SKS 10 x 90	1	2	3	1	2
Washer DIN440/11	2	4	6	4	6
Cable tray RKS-Magic®	1	2	3	2	3
Floor end plate BEB/...	1	2	3	2	3
Truss-head bolt FRSB 6x16	2	4	6	4	6
Identification plate KS-E	*	*	*		

* Number as necessary

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: wall mounting with RKS-Magic®

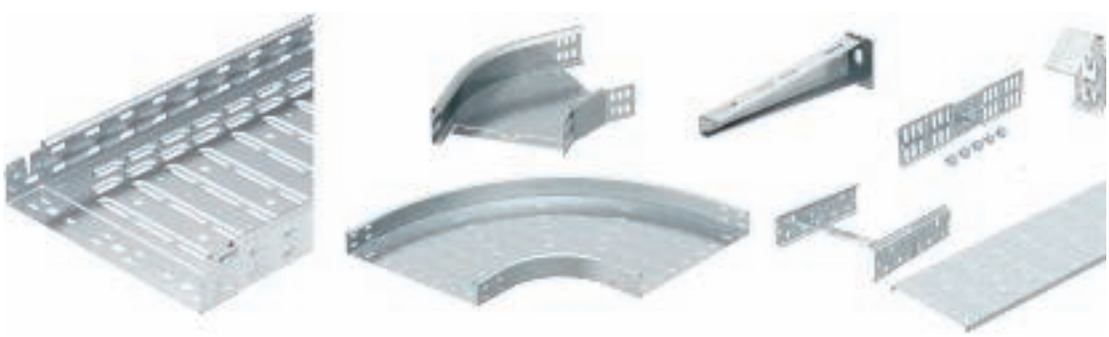
Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.5 m
Max. cable weight per tray to tray width 300 mm	20 kg/m
Max. cable weight per tray for tray width 400 mm	30 kg/m
Max. number of layers	Unlimited
Cable tray widths	100, 200, 300, 400 mm

Things are also coming along nicely on the wall. Drill the hole, screw on the bracket, attach the RKS-Magic® cable tray – click – and you're done! Only the bracket need now be fastened. This allows a 100% increase in routing speed. All the requirements for fire-protected routing with integrated function maintenance to DIN 4102 Part 12 are also guaranteed here. The number of layers is almost only limited by the height of the wall.
Once again: High speed meets economy.

System components



Wall and support bracket, cable trays, fire protection anchors, fire protection bolt ties, identification plate

Wall mounting

Multi-layer wall mounting is possible, but cavities must be provided for cable insertion. Spacing restrictions are only created by the anchor systems used and the substrate.

Connection

The straight connection is created by simply laying the cable trays one inside another. Observe the mounting direction.

Lowering

Insert the cable tray into the existing sleeve opening from above.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_000433)

One or two-layer cable-specific support constructions: wall mounting with RKS-Magic®

Locking

Lock with an audible click. The connection is secure. No additional bolts are required.

Connection straps

When the cable tray has locked in place, turn over the connection straps with a screwdriver.

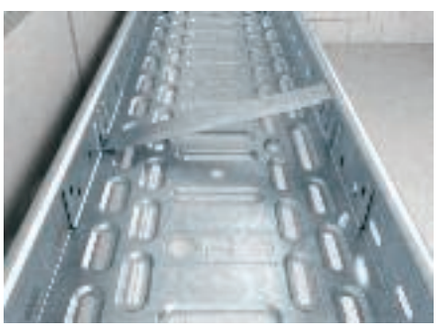
Slackening the connection

To slacken the connection, push the point of a screwdriver under the spring element. This opens the lock.

Mounting with connector set

With shortened cable trays, the connection is made using the RV 60. For this, clamp the side sections in the rail and fasten them to the side section with two truss-head bolts on each side.

Mounting with connector set



Place the joint plate on one side of the rail beneath the side section and push it down.

Mounting with connector set

Lock the joint plate into the second side piece of the connector.

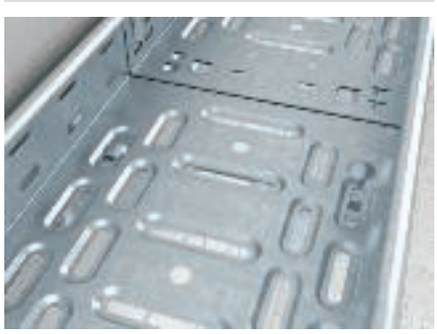
Joint reinforcement

The connection with the quick connector set must be additionally reinforced using the SSLB joint plate.

Joint reinforcement

The number of truss-head bolts required is dependent on the width and contained in the specifications of the test certificate.

Fastening on bracket



Mount the truss-head bolts through the slots. The quantity is dependent on the width of the cable tray. See test certificate for individual data.

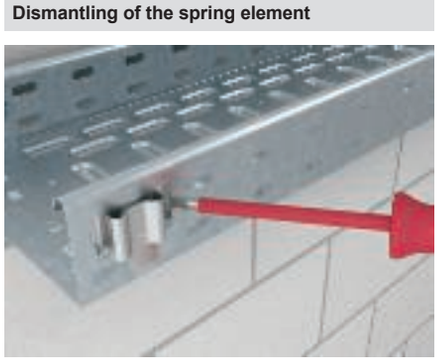
Screwed on separating retainer

Fastening the TSG 60 separating retainer with truss-head bolts. The separating retainer can be run directly over the joint.

Quick fastening, separating retainer

Quick fastening of the TSG 60/S separating retainer with the TSG RKS clamping piece. Simply lock the fastening through.

Dismantling of the spring element



Remove the spring elements with a screwdriver to mount fittings.

One or two-layer cable-specific support constructions: wall mounting with RKS-Magic®

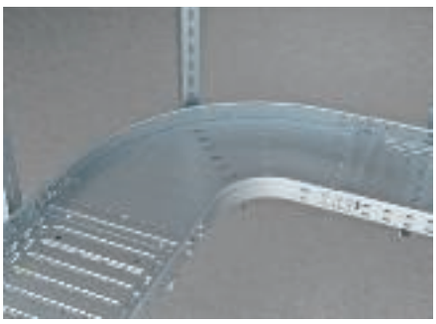
Mounting of bend

The spring elements must be removed to mount fittings. The side rails are screwed on and the cut edge reinforced with the connector set and joint plate.

Mounting of bend

Fittings with large radii must be additionally supported. The side rails are screwed on and the cut edge reinforced with the connector set and joint plate.

Support, bend



Support of bends at an angle of 45° should be mounted in the form of an additional bracket. The maximum spacing between joints is 150 mm.

Mounting of mounting/branch piece

The spring elements must be removed to mount mounting/branch pieces. The side rails are screwed on and the cut edge reinforced with the connector set and joint plate.

Support, fittings

Fittings must be supported by additional brackets on each side. Maximum distance to the joint 150 mm.

Lid mounting, universal clamp

Place the lid on the cable tray and lock it in place using the universal clamps in the slots of the side rails.

Lid mounting, sash lock

Place the lid on the cable tray and lock it in place by turning the sash locks through 90°.

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: wall mounting with RKS-Magic®

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per tray to tray width 300 mm	20 kg/m
Max. cable weight per tray for tray width 400 mm	30 kg/m
Max. number of layers	Unlimited
Cable tray widths	100, 200, 300, 400 mm

Approved cable types				
Cable manufacturer	Cable type	Class	Data	Note
Dätwyler	(N)HXH	E30-E90	≥ nx1.5 mm²	
	(N)HXCH	E30-E90	≥ nx1.5/1.5 mm²	
	JE-H(St)H	E30	≥ nx2 x 0.8 mm	
	JE-H(St)HRH	E60	≥ nx2 x 0.8 mm	B ≤ 300 mm
	JE-H(St)HRH	E30	≥ nx2 x 0.8 mm	
Eupen	NHXH	E30-E90	≥ nx1.5 mm²	
	(N)HXH	E60	≥ nx1.5 mm²	B ≤ 300 mm
	(N)HXCH	E30	≥ nx1.5/1.5 mm²	B ≤ 300 mm
	NHXCH	E90	≥ nx1.5/1.5 mm²	B = 400 mm
	JE-H(St)H	E30-E90	≥ nx2 x 0.8 mm	
Nexans	N2XH	E30-E60	≥ nx1.5 mm²	
	N2XH	E90	≥ nx1.5 mm²	
	N2XCH	E30	≥ nx1.5/1.5 mm²	
	JE-H(St)H	E30	≥ nx2 x 0.8 mm	
Prysmian	(N)HXH	E30	≥ nx1.5 mm²	
	(N)HXHX	E90	≥ nx1.5 mm²	B = 400 mm
	(N)HXCH	E30	≥ nx2.5/2.5 mm²	
	JE-H(St)H	E30	≥ nx2 x 0.8 mm	
	JE-H(St)H	E60	≥ nx2 x 0.8 mm	B = 400 mm

Components per suspension point or joint/end point

	VE	
Wall and support bracket AW 30/11...21	1	
Wall and support bracket AW 55/31...41	1	
Cable tray RKS-Magic®	1	
Floor end plate BEB/...	1	
Truss-head bolts FRSB 6x16	2	
Identification plate KS-E	*	
	* Number as necessary	

Concrete wall

	VE	
Fire protection anchor FAZ II 12/10	1	
Washer DIN440/14	1	

Masonry wall

	VE	
Fire protection bolt tie MMS 10 x 80	1	
Washer DIN440/11	1	

Always indicate the article number when ordering.

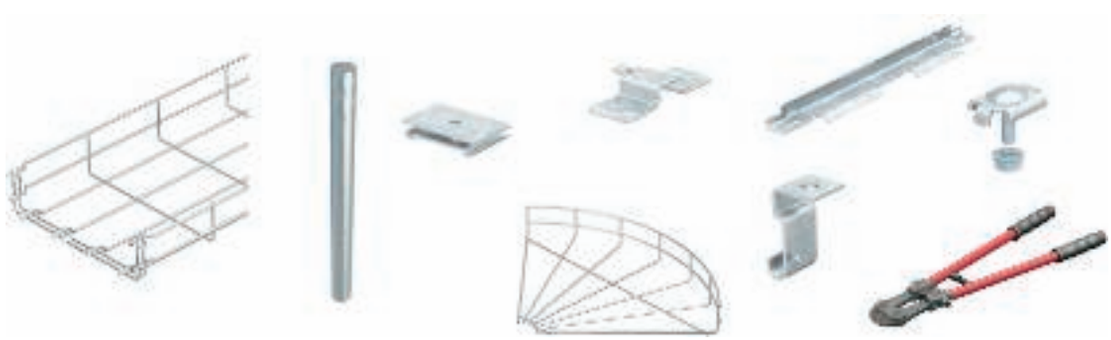
Cable-specific support constructions: ceiling mounting with GR-Magic®

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Mesh cable tray widths	200, 300 mm

The cable-specific support structure with the GR-Magic mesh cable tray is a quick and simple variant for a lightweight system with integrated electrical function maintenance to DIN 4102 Part 12.
This quick and screwless method of interconnecting the mesh cable trays and connecting them to the brackets ensures a fast mounting speed. A maximum of three layers (2 + 1) can be implemented on a U suspended support.

System components



Mesh cable trays, U support, brackets, side holders, fire protection clamps, internal thread anchors, fire protection anchors, fire protection bolt ties, identification plate

Ceiling area of application

One and two-layer routing of GR-Magic mesh cable trays.

Ceiling area of application

Three-layer routing of GR-Magic mesh cable trays in the 2 + 1 variant on a US3K suspended support.

Connection

Screwless connection of two troughs through simple insertion in the integrated connection sleeve.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_uu043)

Always indicate the article number when ordering.

Cable-specific support constructions: ceiling mounting with GR-Magic®

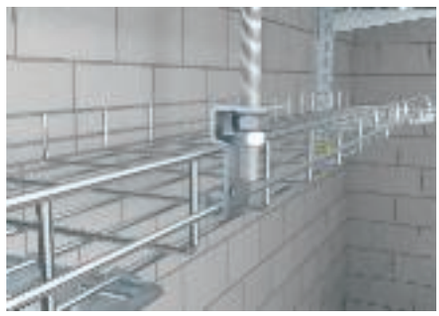
Locking

Locking the mesh cable tray in the sleeve. This creates a fire-proof, quick connection.

Fastening on bracket

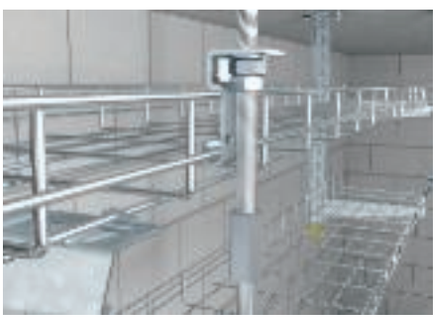
Align the connected mesh cable trays on the brackets and secure them by bending the holding straps of the MWAG.

Side holder mounting, one-layer



In the case of single-layer mounting, the side holder is suspended from the lower wire and secured with the screw. The threaded rod is mounted with the washer and the hexagonal nut and then locked in place.

Side holder mounting, two-layer



Mount the side holder as before. The threaded rod must be as high as the mesh cable tray again, in order to secure the second layer with the connection sleeve.

Mounted cable tray

Cable system with identification plate with integrated function maintenance.

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Three layers
Mesh cable tray widths	200, 300 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Eupen	NHXH	E30-E90	≥ nx1.5 mm²		
	NHXCH	E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H Ceramic	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H Mica	E90	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

U suspended support US 3 K/...	1	1	1	
Protective cap US 3 KS	1	1	1	
Wall and support bracket MWAG 12/...	1	2	3	
Truss-head bolt FRS 10x25	1	2	3	
Mesh cable tray GRM 55/...	1	2	3	
Threaded rod 2078/M8	1	2	3	

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific support constructions: ceiling mounting with GR-Magic®

Components per suspension point or joint/end point

	Side holder SH M10	1	2	3
	Hexagonal nut DIN 934/M8	2	4	6
	Large washer 964/M8	1	2	3
	Connection sleeve 12005/M8	-	1	1
	Identification plate KS-E	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

	Fire protection clamp BSB	1	1	2
	Fire protection anchor FAZ II 10/10GS	1	-	-
	Hexagonal nut DIN 934/M8	2	2	4
	Large washer 964/M8	1	1	2

Threaded rod locking with internal thread anchor

	Internal thread anchor FZEA 10x40	1	1	2

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

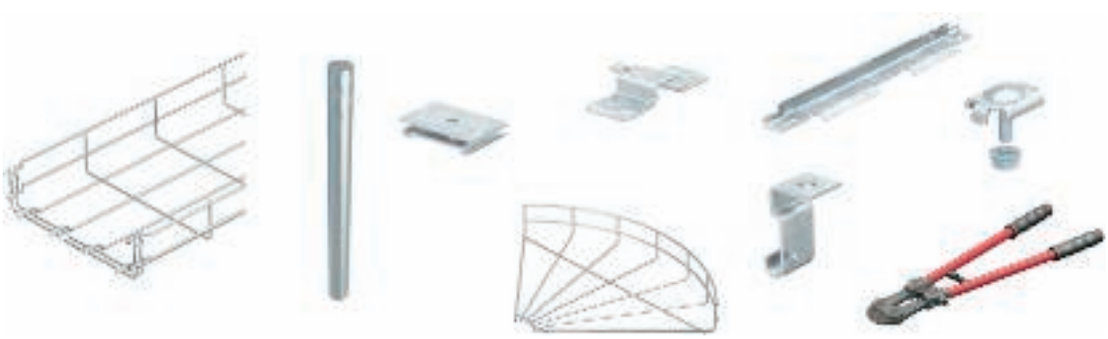
One or two-layer cable-specific support constructions: wall mounting with GR-Magic®

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Mesh cable tray widths	200, 300 mm

The cable-specific support structure with the GR-Magic mesh cable tray is a quick and simple variant for a lightweight system with integrated electrical function maintenance to DIN 4102 Part 12.
This quick and screwless method of interconnecting the mesh cable trays and connecting them to the brackets ensures a fast mounting speed. A maximum of two layers can be implemented on the wall.

System components



Mesh cable trays, brackets, side holders, fire protection clamps, internal thread anchors, fire protection anchors, fire protection bolt ties, identification plate

Wall application area

One to two-layer routing on the wall with threaded rod lock to ceiling.

Connection

Screwless connection of two troughs through simple insertion in the integrated connection sleeve.

Locking

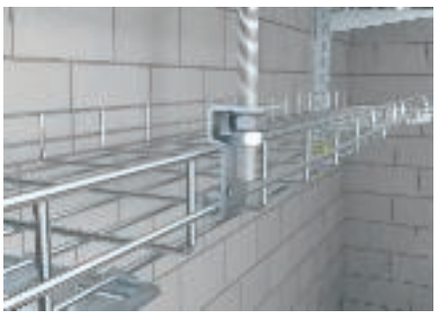
Locking the mesh cable tray in the sleeve. This creates a fireproof, quick connection.

One or two-layer cable-specific support constructions: wall mounting with GR-Magic®

Fastening on bracket

Align the connected mesh cable trays on the brackets and secure them by bending the holding straps of the MWAG.

Side holder mounting, one-layer



In the case of single-layer mounting, the side holder is suspended from the lower wire and secured with the screw. The threaded rod is mounted with the washer and the hexagonal nut and then locked in place.

Side holder mounting, two-layer

Mount the side holder as before. The threaded rod must be as high as the mesh cable tray again, in order to secure the second layer with the connection sleeve.

Mounted cable tray

Cable system with identification plate with integrated function maintenance.

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Two layers
Mesh cable tray widths	200, 300 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Eupen	NHXH	E30-E90	≥ nx1.5 mm²		
	NHXCH	E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H Ceramic	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H Mica	E90	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

	Wall and support bracket MWAG 12/...	1	2
	Mesh cable tray GRM 55/...	1	2
	Threaded rod 2078/M8	1	2
	Side holder SH M10	1	2
	Hexagonal nut DIN 934/M8	2	4
	Large washer 964/M8	1	2
	Connection sleeve 12005/M8	-	1
	Identification plate KS-E	*	*

* Number as necessary

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: wall mounting with GR-Magic®

Threaded rod locking with fire protection clamp

	Fire protection clamp BSB	1	1
	Fire protection anchor FAZ II 10/10GS	1	1
	Hexagonal nut DIN 934/M8	2	2
	Large washer 964/M8	1	1

Threaded rod locking with internal thread anchor

	Internal thread anchor FZEA 10x40	1	1

Concrete wall

	Fire protection anchor FAZ II 10/10GS	1	2

Masonry wall

	Fire protection bolt tie MMS 10 x 80	1	2

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific support constructions: ceiling mounting with EKS

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.5 m
Max. cable weight per tray	20 kg/m
Max. number of layers	Three layers
Cable tray widths mm	100, 200, 300, 400, 500

The cable-specific routing type with cable trays fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. This special routing type considerably exceeds the maximum mounting values of the standard support structure with cable trays.
The necessary threaded rod lock of the routing system is created using the connection components mounted next to the brackets.
A cable tray is used with a rail height of 60 mm and a material thickness of 2.0 mm. The joint is connected using screwed-on external connectors and a joint plate on the tray base with additionally screwed down joint reinforcement. The position of the joints between the brackets can be chosen freely.

System components

U suspended supports, screw-on head plates, bracket, cable tray, straight connector, joint plate, joint reinforcement, fire protection clamp, identification plate.

Ceiling area of application, one-sided

One-layer cable-specific support construction made of EKS cable tray with U suspended support, bracket mounted on one side.

Ceiling area of application, one-sided

Two-layer cable-specific support construction made of EKS cable trays with U suspended support, bracket mounted on one side.

Ceiling area of application, one-sided

Three-layer cable-specific support construction made of EKS cable trays with U suspended support, bracket mounted on one side. The third layer (lower cable tray) must be locked with a separate threaded rod.

Always indicate the article number when ordering.

Cable-specific support constructions: ceiling mounting with EKS

Ceiling area of application, both sides

Two-layer cable-specific support construction made of EKS cable trays with U suspended support, bracket mounted on both sides.

Ceiling area of application, both sides

Three-layer cable-specific support construction made of EKS cable trays with U suspended support, bracket mounted on both sides.

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

The bolt ties are required to fasten the supports and fire protection clamps.

Support and clamp mounting

Screw the U supports with the fire protection clamp onto the bolt ties.

Bracket mounting

Fasten the brackets on the two hips of the U support with a hexagonal bolt and spacer.

Straight and floor connector mounting

Mount the external connectors with the joint of the tray ends using truss-head bolts. Additional screwing of the joint plate to the tray floor, together with the joint reinforcement under the tray.

Mounting of the cable tray

Fasten the cable tray on the bracket with truss-head bolts.

Mounting of connection component

Mount the connection component under the cable tray with truss-head bolts at a spacing of maximum 100 mm next to the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable tray and then suspend it from the side in the fire protection clamp.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

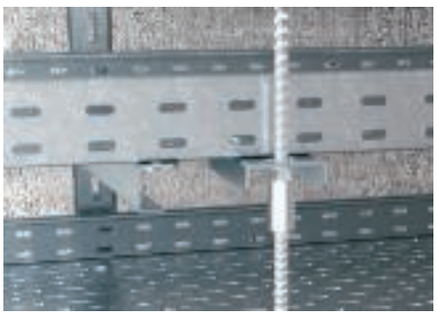
Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Cable-specific support constructions: ceiling mounting with EKS

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut.

Threaded rod extension



Mount connection components under each tray rail with multi-layered arrangement. Connect the individual threaded rods by mounting connection sleeves as adapters.

Mounting of head plate KUS 5

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 5 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting of head plate KU 7

Screw the head plate to the U 7 support with two hexagonal bolts.

Mounting of screwed-on US 7 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting on sloping ceilings

When carrying out mounting on sloping ceilings using variable head pieces, ensure that the anchors for the head pieces are vertical to the head piece axis and that the anchors for the threaded rod are drilled plumb to the support.

Mounting of variable head piece KU 5 V

Screw the head plate to the US 5 support. During mounting, the spacer DSK 47 and the hexagonal bolt SKS 10 x 80 are inserted. The head plate can be used to compensate sloping ceilings of up to 30°.

Mounting of variable head piece KU 7 VQP

Screw the head plate to the US 7 support. During mounting, the spacer DSK 45 and the hexagonal bolt SKS 12 x 80 are inserted. The head plate can be used to compensate sloping ceilings of up to 30°.

Bracket mounting

The bracket, type AW 30, is fastened to the U support using a hexagonal bolt, type SKS, with a spacer of type DKS.

Locking the threaded rod

Mount the threaded rods on the anchors, previously mounted plumb to the support.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000943)

Cable-specific support constructions: ceiling mounting with EKS

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per tray	20 kg/m
Max. number of layers	Three layers
Cable tray widths mm	100, 200, 300, 400, 500

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	NHXH	E30 - E90	≥ nx1.5 mm²		
	NHXCH	E30 - E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E90	≥ nx2 x 0.8 mm		
Eupen	(N)HXH ceramic	E30	≥ nx1.5 mm²		
	(N)HXCH ceramic	E30	≥ nx1.5/1.5 mm²		
	NHXH Mica	E90	>= nx1.5 mm²		
	NHXCH Mica	E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H Ceramic	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H Mica	E90	≥ nx2 x 0.8 mm		
Faber	NHXH	E30	nx10 mm²		
	NHXCH	E30	≥ nx1.5/1.5 mm²		
	(N)HXH	E30	≥ nx1.5 to 6 mm²		
Nexans	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
Studer	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E30	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

U suspended support US...K/...	1	1	1	1	1
Protective cap US...KS	1	1	1	1	1
Fire protection anchor FAZ II 10/10GS	2	-	-	-	-
Fire protection anchor FAZ II 12/10	-	2	2	2	2
Wall and support bracket AW 30/...	1	2	3	2	3
Spacer DSK 45	1	2	3	1	2
Hexagonal bolt SKS 10 x 90	1	2	3	1	2
Cable tray EKS 6...	1	2	3	2	3
Connector AVR60	2	4	6	4	6
Joint plate SSL/E90/...	1	2	3	2	3
Joint reinforcement SSL/SV...	1	2	3	2	3
Floor end plate BEB/...	1	2	3	2	3
Truss-head bolt FRSB 6x12	2	4	6	4	6
Connection component ABR	1	2	3	2	3
Threaded rod 2078/M10	1	-	-	-	-
Threaded rod 2078/M12	-	2	3	2	3
Connection sleeve 12005/M12	-	1	1	-	1

Always indicate the article number when ordering.

Cable-specific support constructions: ceiling mounting with EKS

Components per suspension point or joint/end point

	Identification plate KS-E	*	*	*		
		* Number as necessary				

Threaded rod locking with fire protection clamp

	Fire protection clamp BSB	1	1	2		
	Fire protection anchor FAZ II 10/10GS	1	-	-		
	Fire protection anchor FAZ II 12/10	-	1	2	2	2
	Hexagonal nut DIN 934/M10	4	-	-	-	-
	Hexagonal nut DIN 934/M12	-	5	9	8	9
	Washer 966/M10	2	-	-	-	-
	Washer 966/M12	-	3	5	4	5

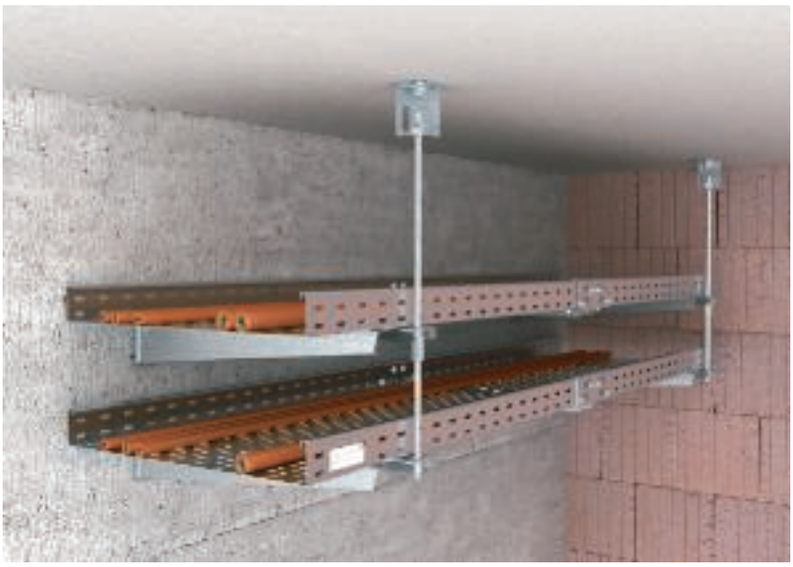
Threaded rod locking with internal thread anchor

	Internal thread anchor FZEA 12x40	1	-	-	-	-
	Internal thread anchor FZEA 14x40	-	1	2	2	2
	Hexagonal nut DIN 934/M10	2	-	-	-	-
	Hexagonal nut DIN 934/M12	-	3	5	4	5
	Washer 966/M10	1	-	-	-	-
	Washer 966/M12	-	2	3	2	3

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: wall mounting with EKS

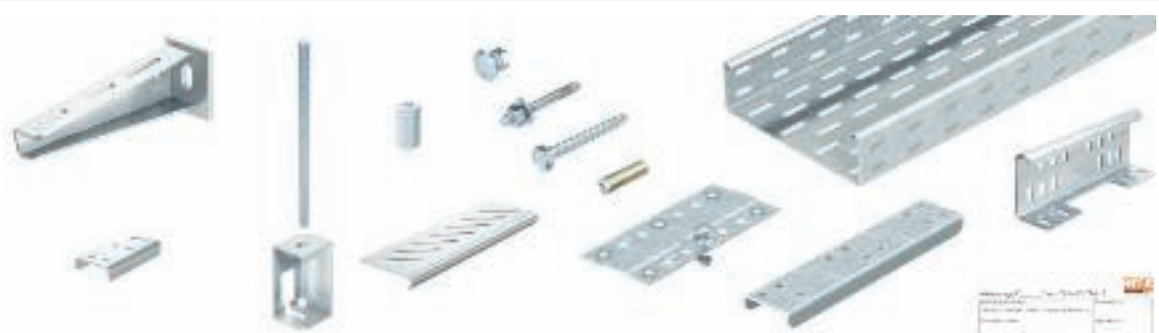
Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.5 m
Max. cable weight per tray	20 kg/m
Max. number of layers	Two layers
Cable tray widths mm	100, 200, 300, 400, 500

The cable-specific routing type with cable trays fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. This special routing type considerably exceeds the maximum mounting values of the standard support structure with cable trays.
The threaded rod of the routing system is fixed to the ceiling using connection components screwed on directly next to the brackets. The cable trays used have a material thickness of 2.0 mm and a rail height of 60 mm. The position of the joint can be selected freely between the brackets. The joint connection is created using screwed-on external connectors and a joint plate on the tray base. This is screwed down under the tray using additional joint reinforcement.

System components



AW 30 wall and support bracket, cable tray, straight connector, joint plate, joint reinforcement, fire protection clamp, identification plate.

Wall application area

One-layer cable-specific support construction for wall mounting with EKS cable tray and threaded rod locking vertically to the ceiling.

Wall application area

Two-layer cable-specific support construction for wall mounting with EKS cable trays and threaded rod locking vertically to the ceiling.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: wall mounting with EKS

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and fire protection clamps using a chalk mark.

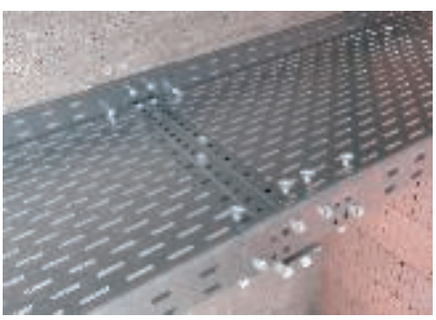
Placing anchors

Mount the bolt ties to fasten the wall brackets and the fire protection clamps.

Bracket and clamp mounting

Screw the brackets with the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight and floor connector mounting



Mount the external connectors with the joint of the tray ends using truss-head bolts. Additional screwing of the joint plate to the tray floor, together with the joint reinforcement under the tray.

Mounting of the cable tray

Fasten the cable tray on the bracket with truss-head bolts.

Mounting of connection component

Mount the connection component under the cable tray with truss-head bolts at a spacing of maximum 100 mm next to the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable tray and then suspend it from the side in the fire protection clamp.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod mounting

Secure the threaded rod on the lower connection component with a nut and a lock nut.

Threaded rod extension

Connect the individual threaded rods by mounting connection sleeves as adapters.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

One or two-layer cable-specific support constructions: wall mounting with EKS

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per tray	20 kg/m
Max. number of layers	Two layers
Cable tray widths mm	100, 200, 300, 400, 500

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	NHXH	E30 - E90	≥ nx1.5 mm²		
	NHXCH	E30 - E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E90	≥ nx2 x 0.8 mm		
Eupen	(N)HXH ceramic	E30	≥ nx1.5 mm²		
	(N)HXCH ceramic	E30	≥ nx1.5/1.5 mm²		
	NHXH Mica	E90	≥ nx1.5 mm²		
	NHXCH Mica	E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H Ceramic	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H Mica	E90	≥ nx2 x 0.8 mm		
Faber	NHXH	E30	nx10 mm²		
	NHXCH	E30	≥ nx1.5/1.5 mm²		
	(N)HXH	E30	≥ nx1.5 to 6 mm²		
Nexans	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
Studer	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E30	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

Wall and support bracket AW 30/...	1	2
Cable tray EKS 6...	1	2
Connector AVR60	2	4
Joint plate SSL/E90/...	1	2
Joint reinforcement SSL/SV...	1	2
Floor end plate BEB/...	1	2
Truss-head bolt FRSB 6x12	2	4
Connection component ABR	1	2
Threaded rod 2078/M10	1	-
Threaded rod 2078/M12	-	2
Connection sleeve 12005/M12	-	1
Identification plate KS-E	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1
Fire protection anchor FAZ II 10/10GS	1	-
Fire protection anchor FAZ II 12/10	-	1
Hexagonal nut DIN 934/M10	4	-

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: wall mounting with EKS

Threaded rod locking with fire protection clamp

Hexagonal nut DIN 934/M12	-	5
Washer 966/M10	2	-
Washer 966/M12	-	3

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	-
Internal thread anchor FZEA 14x40	-	1
Hexagonal nut DIN 934/M10	2	-
Hexagonal nut DIN 934/M12	-	3
Washer 966/M10	1	-
Washer 966/M12	-	2

Concrete wall

Fire protection anchor FAZ II 10/10GS	1	2

Masonry wall

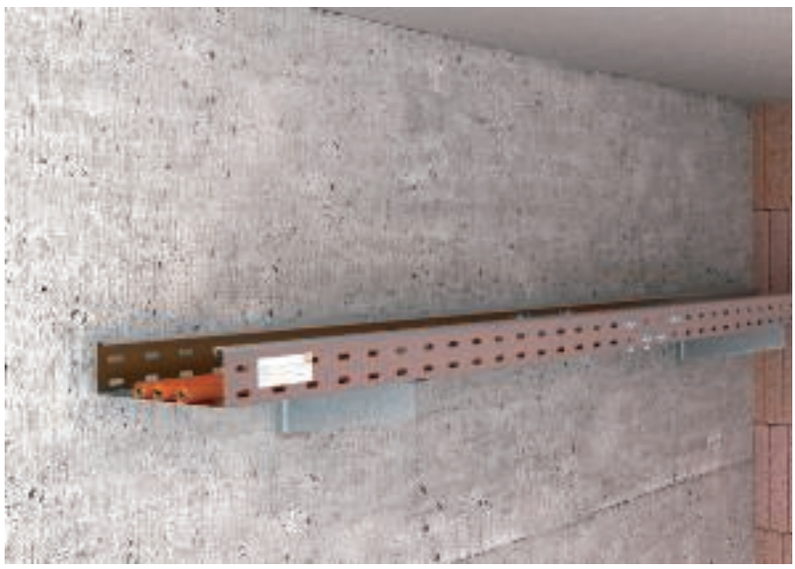
Fire protection bolt tie MMS 10 x 80	1	2

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: wall mounting with EKS without threaded rod

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.5 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Unlimited
Cable tray width	200 mm

The cable-specific routing type with cable tray fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. The maximum support spacing for this routing type is greater than the approved value of the standard support structure with cable trays.
Additional threaded rod locking is not required.
The position of the joint of the cable trays with 60 mm rail height and 2 mm material thickness can be chosen freely. The tray ends are connected using screwed-on connectors in the tray rails and a screwed-on joint plate in the tray base.

System components

AW 55 wall bracket, cable tray, straight connector, joint plate, identification plate.

Single-layer wall application area

One-layer cable-specific support construction for wall mounting with EKS cable tray, without additional threaded rod locking.

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: wall mounting with EKS without threaded rod

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets.

Bracket mounting

Screw the brackets onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the bracket and screw it into the drill hole.

Straight and floor connector mounting

Mount straight connectors and joint plate with truss-head bolts to interconnect the cable ladders.

Mounting of the cable tray

Fasten the cable tray on the bracket with truss-head bolts.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per tray	10 kg/m
Max. number of layers	Unlimited
Cable tray width	200 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	NHXH	E30 - E90	≥ nx1.5 mm²		
	NHXCH	E30 - E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E90	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

Wall and support bracket AW 55/21	1	
Cable tray EKS 620	1	
Straight and angle connector RWVL 60	2	
Joint plate SSL/E90/20	1	
Floor end plate BEB/200	1	
Truss-head bolt FRSB 6x12	2	
Identification plate KS-E	*	

* Number as necessary

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: wall mounting with EKS without threaded rod

Concrete wall

	Fire protection anchor FAZ II 10/10GS	1		

Masonry wall

	Fire protection bolt tie MMS 10 x 80	1		

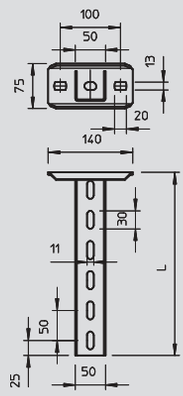
Cable-specific support constructions: products

Suspended support

US5

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5 K/20	200	2.5	1	100.000	**6341 52 7**	
US 5 K/30	300	2.5	1	125.000	**6341 53 5**	
US 5 K/40	400	2.5	1	150.000	**6341 54 3**	
US 5 K/50	500	2.5	1	175.000	**6341 55 1**	
US 5 K/60	600	2.5	1	200.000	**6341 57 8**	
US 5 K/70	700	2.5	1	225.000	**6341 58 6**	
US 5 K/80	800	2.5	1	255.000	**6341 59 4**	
US 5 K/90	900	2.5	1	280.000	**6341 60 8**	
US 5 K/100	1000	2.5	1	300.000	**6341 61 6**	
US 5 K/110	1100	2.5	1	330.000	**6341 62 4**	
US 5 K/120	1200	2.5	1	360.000	**6341 63 2**	

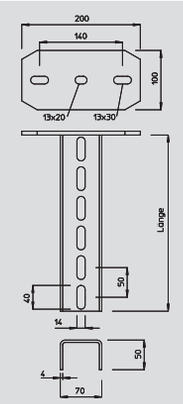
Suspended support (U profile) of dimensions 50 x 50 mm with welded head plate.



US7

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 7 K/130	1300	4	1	614.000	**6339 21 2**	
US 7 K/140	1400	4	1	654.000	**6339 22 0**	
US 7 K/150	1500	4	1	694.000	**6339 23 9**	
US 7 K/160	1600	4	1	734.000	**6339 24 7**	
US 7 K/170	1700	4	1	774.000	**6339 25 5**	
US 7 K/180	1800	4	1	814.000	**6339 26 3**	
US 7 K/190	1900	4	1	854.000	**6339 27 1**	
US 7 K/200	2000	4	1	894.000	**6339 29 8**	

Suspended support (U profile) of dimensions 70 x 50 mm with welded head plate.

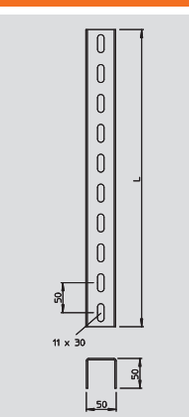


U support

US5

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5/20	200	2.5	1	53.000	**6340 88 1**	
US 5/30	300	2.5	1	79.000	**6340 90 3**	
US 5/40	400	2.5	1	106.000	**6340 91 1**	
US 5/50	500	2.5	1	133.000	**6340 93 8**	
US 5/60	600	2.5	1	160.000	**6340 94 6**	
US 5/70	700	2.5	1	175.000	**6340 95 0**	
US 5/80	800	2.5	1	200.000	**6340 95 4**	
US 5/90	900	2.5	1	227.000	**6340 95 8**	
US 5/100	1000	2.5	1	265.000	**6340 96 2**	
US 5/150	1500	2.5	1	395.000	**6340 96 6**	
US 5/200	2000	2.5	1	526.000	**6340 97 0**	

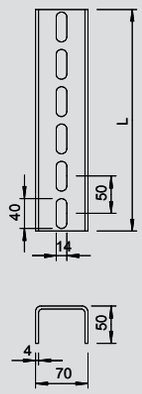
U support in fixed lengths. Dimensions 50 x 50 mm.



Always indicate the article number when ordering.

Cable-specific support constructions: products

U support

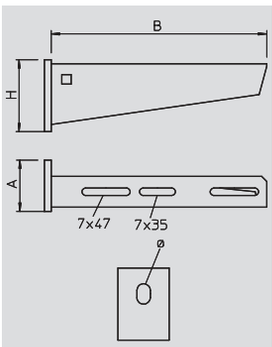


Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 7/20	200	4	1	80.000	**6340 01 6**	
US 7/30	300	4	1	120.000	**6340 03 2**	
US 7/40	400	4	1	160.000	**6340 05 9**	
US 7/50	500	4	1	200.000	**6340 07 5**	
US 7/60	600	4	1	240.000	**6340 09 1**	
US 7/70	700	4	1	280.000	**6340 11 3**	
US 7/80	800	4	1	320.000	**6340 14 8**	
US 7/90	900	4	1	360.000	**6340 16 4**	
US 7/100	1000	4	1	400.000	**6340 18 0**	
US 7/110	1100	4	1	440.000	**6340 19 9**	
US 7/120	1200	4	1	480.000	**6340 20 2**	
US 7/130	1300	4	1	520.000	**6340 21 0**	
US 7/140	1400	4	1	560.000	**6340 22 9**	
US 7/150	1500	4	1	600.000	**6340 23 7**	
US 7/160	1600	4	1	640.000	**6340 24 5**	
US 7/170	1700	4	1	680.000	**6340 25 3**	
US 7/180	1800	4	1	720.000	**6340 26 1**	
US 7/190	1900	4	1	760.000	**6340 28 8**	
US 7/200	2000	4	1	800.000	**6340 29 6**	

US7

U support in fixed lengths. Dimensions 70 x 50 mm.

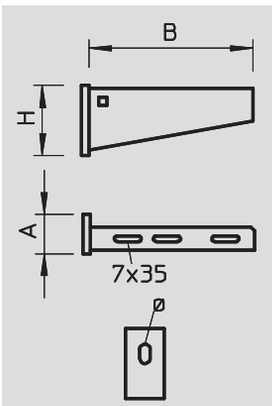
Wall and support brackets



Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FT	
AW 30/11	110	60	50	11	30	24.000	**6419 70 4**	
AW 30/21	210	70	50	13	25	42.000	**6419 72 0**	
AW 30/31	310	80	50	13	25	63.000	**6419 74 7**	
AW 30/41	410	80	50	13	20	93.000	**6419 76 3**	
AW 30/51	510	90	50	13	10	132.500	**6419 79 8**	

AW US5 US7 VDE

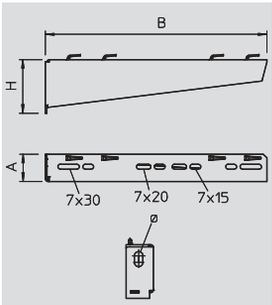
Medium-weight wall and support bracket with welded head plate.



Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FT	
AW 55/21	210	90	50	13.5	1	98.000	**6418 55 4**	
AW 55/31	310	110	50	13.5	1	130.000	**6418 57 0**	
AW 55/41	410	130	50	13.5	1	174.000	**6418 59 7**	

AW US7

Heavyweight wall and support bracket with welded head plate.



Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FS	
MWAG 12/21	210	65	32.5	11	30	24.400	**6424 60 8**	
MWAG 12/31	310	75	38	11	30	50.300	**6424 61 6**	

AW US3 US5 US7

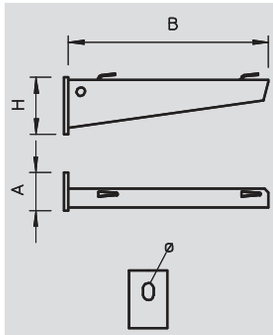
Folded lightweight wall and support bracket for screwless mesh cable tray fastening.

Cable-specific support constructions: products

Wall and support brackets

Type	Width mm	Dimension H mm	Dimension A mm	Hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW G 15/21	210	60	40	11	30	26.000	**6420 60 8**	
AW G 15/31	310	65	40	11	30	35.000	**6420 61 0**	

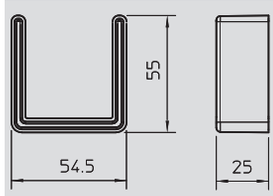
Lightweight wall and support bracket with welded head plate for screwless mesh cable tray fastening.



Protective cap

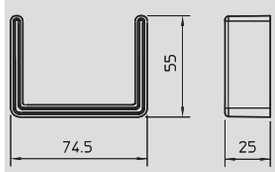
Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 5 KS	Sulphur yellow	20	1.300	**6338 46 1**	

Protective cap for end covering of US 5 supports.



Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 7 KS	Sulphur yellow	20	2.000	**6338 49 6**	

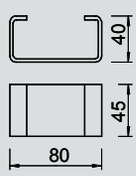
Protective cap for end covering of US 7 supports.



Spacer

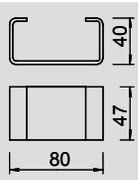
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 45	25	19.000	**6416 50 0**	

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.



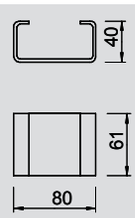
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 47	25	17.000	**6416 50 4**	

Spacer for use in head plate, type KU 5 V.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 61	20	26.000	**6416 51 9**	

Spacer for use in U 7 supports.

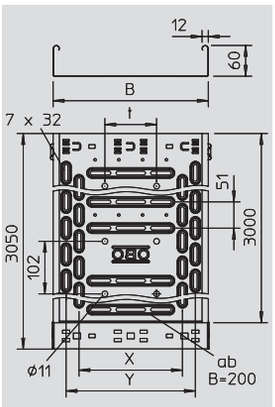


05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

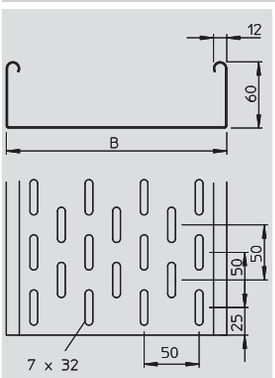
Cable-specific support constructions: products

Cable tray



Type	Width	Metal thickness	Length	Weight	Item No.	Price /m
	mm	mm	mm	borders	ST / FS	
RKSM 610	100	0.75	3050	134.300	**6047 61 1**	
RKS 620	200	0.75	3050	183.000	**6047 63 8**	
RKSM 630	300	0.75	3050	239.000	**6047 65 4**	
RKSM 640	400	0.9	3050	416.700	**6047 68 9**	

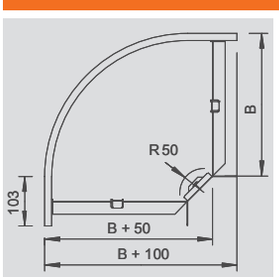
RKSM 60 = Rational Magic cable tray system with 60 mm side height.



Type	Width	Metal thickness	Length	Weight	Item No.	Price /m
	mm	mm	mm	borders	ST / FS	
EKS 610	100	2	3000	350.000	**6056 14 8**	
EKS 620	200	2	3000	482.000	**6056 22 9**	
EKS 630	300	2	3000	608.000	**6056 32 6**	
EKS 640	400	2	3000	764.000	**6056 42 3**	
EKS 650	500	2	3000	852.000	**6056 52 0**	

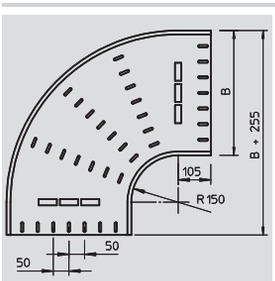
EKS 60 = extra-heavy cable tray system with 60 mm side height.

Fitting for cable tray



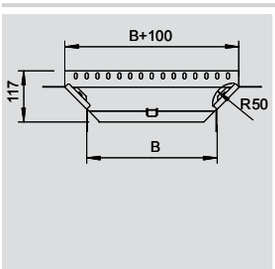
Type	Width	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
RB 90 610	100	1	56.000	**6043 21 6**	
RB 90 620	200	1	95.000	**6043 22 4**	
RB 90 630	300	1	150.000	**6043 23 2**	

90° bend, horizontal, for all cable tray types of 60 mm side height.



Type	Width	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
RB 90 640	400	1	523.400	**7001 29 0**	
RB 90 650	500	1	683.400	**7001 30 4**	

90° bend, horizontal, for all cable tray types of 60 mm side height.



Type	Width	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
RAA 610	100	1	35.000	**6040 40 3**	
RAA 620	200	1	40.000	**6040 43 8**	
RAA 630	300	1	50.000	**6040 44 6**	

Mounting/branch piece for horizontal and vertical use. For all cable tray types of 60 mm side height.

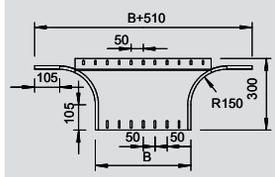
Always indicate the article number when ordering.

Cable-specific support constructions: products

Fitting for cable tray

Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RAA 640	400	1	220.000	**7002 39 4**	
RAA 650	500	1	255.000	**7002 41 6**	

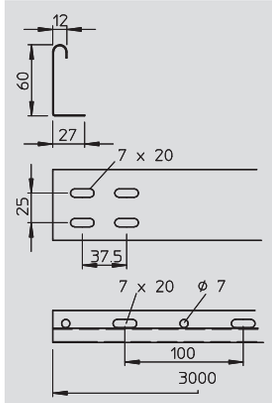
Mounting/branch piece for horizontal and vertical use. For all cable tray types of 60 mm side height.



Separating retainer for cable tray

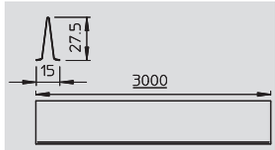
Type	Side height mm	Length mm	Weight borders	Item No. ST / FS	Price /m
TSG 60	60	3000	57.300	**6062 06 7**	

Separating retainer for separation of cables of different voltages or functions.



Type	Side height mm	Length mm	Weight borders	Item No. ST / FS	Price /m
TSG 60/S	60	3000	51.000	**6062 28 8**	

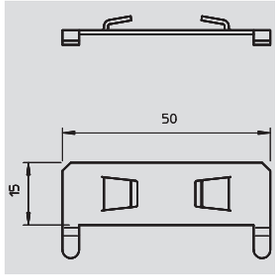
Separating retainer for separation of cables of different voltages or functions.



Clamping piece for separating retainer fastening

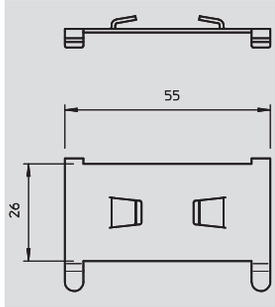
Type	Side height mm	Length mm	Weight kg/% pc	Item No. ST / FS	Price /% pc
KS RKS			0.902	**6062 29 6**	

Clamp for screwless fixing of separating retainers.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
KS MKS/SKS	100	1.200	**6062 30 0**	

Clamping piece for screwless fastening of separating retainers.



Connector for cable tray

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
AVR60	10	28.500	**6069 20 7**	

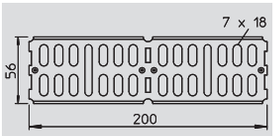
External connector for mechanical connection of cable ladder sections for routing types with cable ladders for function maintenance to DIN 4102 Part 12.
The connector reaches from outside, over the tray rail, to under the base, thus guaranteeing a mechanically stable connection of the tray sections.

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

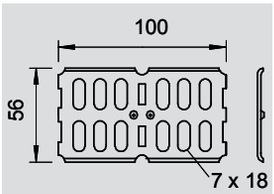
Cable-specific support constructions: products

Connector for cable tray



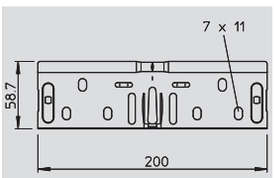
Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RWVL 60	200 x 56	10	15.600	**6067 11 5**	

Longitudinal and angle connector for cable trays, fittings and separating retainers with a side height of 60 mm.



Type	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RLVK 60	60	10	9.200	**6067 09 3**	

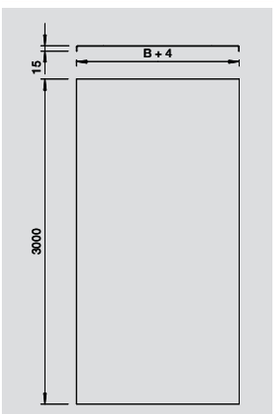
Straight connector for straight connection of cable trays, fittings and separating retainers with a side height of 60 mm.



Type	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RV 610	60	10	18.400	**6068 15 4**	
RV 620	60	10	20.900	**6068 17 0**	
RV 630	60	10	23.400	**6068 18 9**	
RV 640	60	10	30.900	**6068 19 7**	

Quick connector set for straight, screwless connections of cable trays and fittings with a side height of 60 mm.

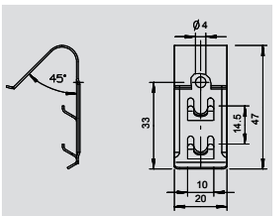
Lid for cable tray



Type	Width mm	Metal thickness mm	Length mm	Weight borders	Item No. ST / FS	Price /m
DRLU/100	100	0.75	3000	98.900	**6052 10 3**	
DRLU/200	200	1	3000	177.400	**6052 21 0**	
DRLU/300	300	1	3000	255.900	**6052 30 7**	
DRLU/400	400	1	3000	334.400	**6052 40 5**	

Unperforated lid for cable trays and mesh cable trays.

Lid clamp, universal



Type	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /% pc
DKU	60	0.650	**6065 60 0**	

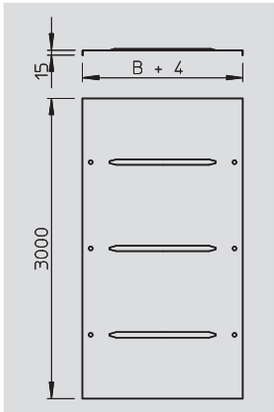
Lip clamp for universal fastening of unperforated lids on cable trays, mesh cable trays and AZ small ducts.

Cable-specific support constructions: products

Lid with sash lock

Type	Width mm	Metal thickness mm	Length mm	Weight borders	Item No. ST / FS	Price /m
DRL/100	100	0.75	3000	101.300	**6052 09 6**	
DRL/200	200	1	3000	179.800	**6052 20 7**	
DRL/300	300	1	3000	258.300	**6052 30 4**	
DRL/400	400	1	3000	336.800	**6052 40 1**	

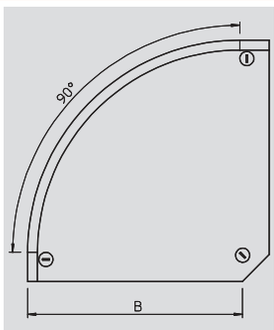
Lid for cable trays and cable ladders with three pairs of sash locks.



Lid for fitting, 90° bend

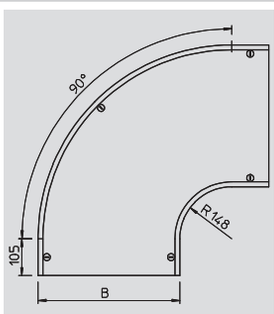
Type	Width mm	Metal thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
DFB 90/100	100	1	1	21.400	**7129 61 0**	
DFB 90/200	200	1	1	54.200	**7129 63 7**	
DFB 90/300	300	1	1	96.400	**7129 65 3**	

Lid for 90° bend with pre-mounted sash locks.



Type	Width mm	Metal thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
DFB 90/400	400	1.25	1	336.000	**7129 68 8**	

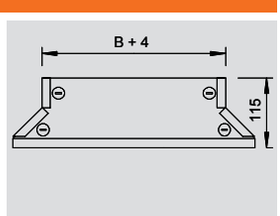
Lid for 90° bend with pre-mounted sash locks.



Lid for fitting, mounting/branch piece

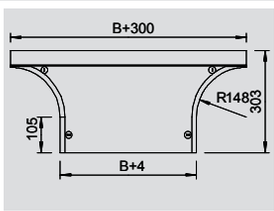
Type	Width mm	Metal thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
DFAA/100	100	1	1	18.000	**7128 42 8**	
DFAA/200	200	1	1	28.000	**7128 44 4**	
DFAA/300	300	1	1	38.000	**7128 46 0**	

Lid for mounting/branch piece with pre-mounted sash locks.



Type	Width mm	Metal thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
DFAA/400	400	1.25	1	150.000	**7128 48 7**	

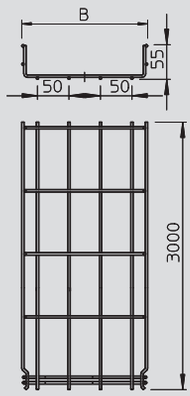
Lid for mounting/branch piece with pre-mounted sash locks.



Always indicate the article number when ordering.

Cable-specific support constructions: products

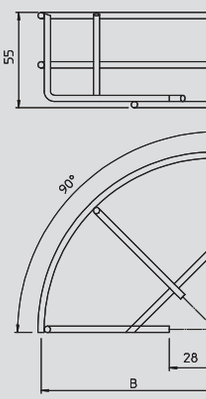
Mesh cable tray



Type	Width mm	Wire Ø mm	Length mm	Weight borders	Item No. ST / G	Price /m
GRM 55/200	200	4.8	3000	151.000	**6001 44 7**	
GRM 55/300	300	4.8	3000	194.500	**6001 44 8**	
					ST / FT	
GRM 55/200	200	4.8	3000	154.300	**6001 42 1**	
GRM 55/300	300	4.8	3000	200.700	**6001 42 4**	

Mesh cable tray with shaped connector of side height 55 mm.

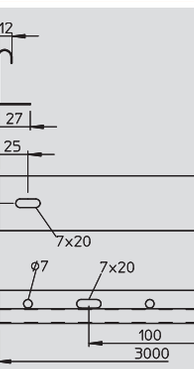
Fitting for mesh cable tray



Type	Width mm	Wire Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /pc.
GRB 90/520	200	3.9	1	18.400	**6001 93 9**	
GRB 90/530	300	4.4	1	41.700	**6001 94 7**	

90° bend, horizontal, for all mesh cable trays of 55 mm side height.

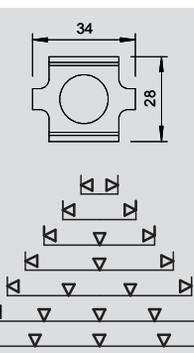
Separating retainer for mesh cable tray



Type	Side height mm	Length mm	Pack. m	Weight borders	Item No. ST / FS	Price /m
TSG 45	45	3000	45	50.000	**6062 03 2**	

Separating retainer for separation of cables of different voltages or functions.

Connector



Type	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /pc.
GSV 34	25	3.000	**6016 59 6**	

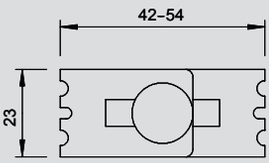
Screwed version of joint connector for cable trays.

Cable-specific support constructions: products

Connector

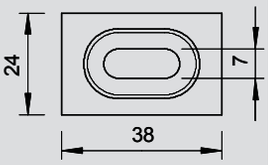
Type	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /pc.
GEV 36	100	3.000	**6016 71 5**	

Corner connector for the creation of mesh cable tray bend elements.



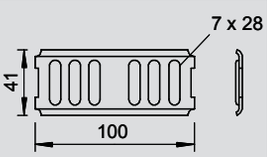
Type	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /pc.
GKT 38	100	2.200	**6017 03 7**	

Clamping piece for fastening separating retainers in mesh cable trays.



Type	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RLVK 45	45	10	8.800	**6067 06 9**	

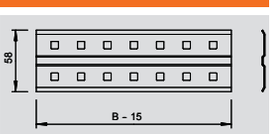
Connector for longitudinal connection separating retainer, type TSG 45.



Joint plate

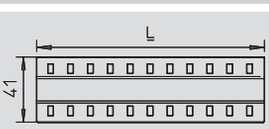
Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SSL/E90/10	100	100	12.000	**7070 51 9**	
SSL/E90/20	200	100	16.000	**7070 53 5**	
SSL/E90/30	300	100	20.000	**7070 55 1**	
SSL/E90/40	400	50	24.000	**7070 58 6**	
SSL/E90/50	500	40	28.000	**7070 60 8**	

To cover and connect the joints in the cable trays of routing types with cable trays for function maintenance to DIN 4102 Part 12.



Type	Width mm	Quantity of screws pc.	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SSLB 100	85	2	20	7.700	**7070 20 5**	
SSLB 200	185	2	20	16.700	**7070 21 3**	
SSLB 300	285	3	20	25.700	**7070 21 7**	
SSLB 400	385	4	20	34.700	**7070 22 1**	

Wide joint plate for use in all cable trays and wide span cable trays.



Joint reinforcement

Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SSL/SV100	74	20	12.000	**7070 80 6**	
SSL/SV200	174	16	30.000	**7070 81 0**	
SSL/SV300	274	20	48.000	**7070 81 4**	
SSL/SV400	374	16	66.000	**7070 81 8**	
SSL/SV500	474	10	84.000	**7070 82 2**	

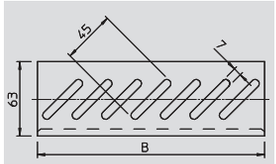
To reinforce the joints in the cable trays for special routing types with cable trays for function maintenance to DIN 4102 Part 12.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

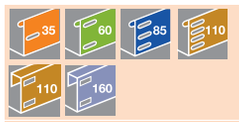
Cable-specific support constructions: products

Floor end plate



Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
BEB/100	100	100	5.400	**7083 10 6**	
BEB/200	200	100	11.400	**7083 20 3**	
BEB/300	300	100	17.200	**7083 30 0**	
BEB/400	400	100	23.100	**7083 40 8**	
BEB/500	500	50	29.000	**7083 50 5**	

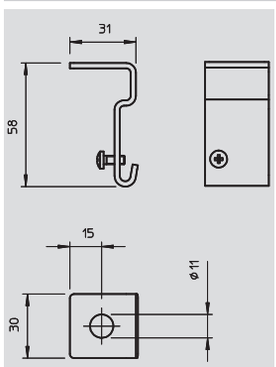
Bottom end plate for floor reinforcement at the ends of the cable tray and as cable protection.



Connection component

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
ABR	20	23.000	**6364 94 2**	

The connection component is the connection between the threaded rod lock and the suspension system for the routing types with cable trays for function maintenance to DIN 4102 Part 12.



Type	For threaded rod	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SH M10	M10	50	5.500	**6015 33 6**	

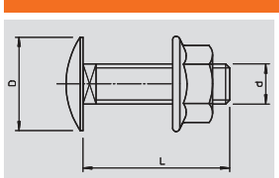
Side holder for side suspension of cable trays.

Fire protection clamp

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
BSB	20	41.000	**6418 19 8**	

Fire protection clamp for ceiling fastening of the threaded rod lock for routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

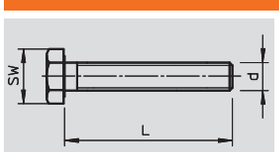
Truss-head bolt



Type	Thread	Length mm	Dimension D mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
FRSB 6x12	M6	12	13.5	6	10	100	0.990	**6406 12 2**	
FRSB 6x15	M6	16	13.5	6	10	100	1.065	**6406 15 7**	
FRSB 6x20	M6	20	13.5	6	10	100	1.137	**6406 20 3**	

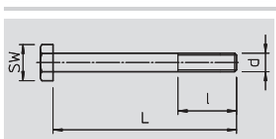
Truss-head bolt with square neck including combination nut.

Hexagonal bolt



Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /pc.
SKS 10x80	M10 x 80	80	10	17	20	7.700	**6418 25 0**	
SKS 10x90	M10 x 90	90	10	17	20	8.000	**6418 25 2**	

Hexagonal bolt for universal fixing of structure components.



Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /pc.
SKS 12x80	M12 x 80	80	12	19	20	11.800	**6418 28 7**	
SKS 12x100	M12 x 100	100	12	19	20	12.600	**6418 29 5**	

Hexagonal bolt with hexagonal nut, washer and lock washer.

Always indicate the article number when ordering.

Cable-specific support constructions: products

Threaded rod

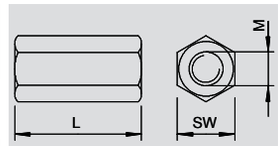
Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M8	8	1000	50	30.000	**3141 12 8**	
2078	M10	10	1000	25	49.000	**3141 20 9**	
2078	M12	12	1000	20	70.000	**3141 30 6**	

Threaded rod to DIN 976.

Connection sleeve

Type	Thread	Dimension M	Dimension L mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
12005	M8	8	30	13	50	2.000	**6410 08 1**	
12005	M12	12	40	19	25	7.000	**6410 11 1**	

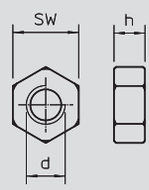
Connection sleeve with continuous internal thread.



Hexagonal nut

Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M8	8	6.8	13	100	0.474	**3400 08 5**	
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**	
DIN 934	M12	12	10.8	19	100	1.730	**3400 12 3**	

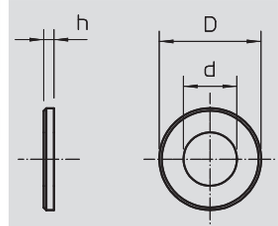
Hexagonal nut to DIN 934 with metric thread.



Washer

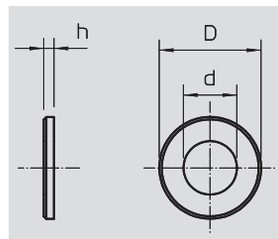
Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
964	M8	20	8.4	1.5	100	0.240	**3403 12 2**	

Washer of particularly large outer diameter.



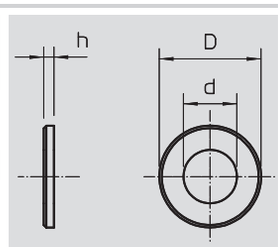
Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
966	M10	20	10.5	2	100	0.408	**3402 09 6**	
966	M12	24	13	2.5	100	0.627	**3402 12 6**	

Washer according to DIN 125, shape A, for universal use.



Type	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
DIN440/11	34	11	3	100	1.985	**6408 72 9**	
DIN440/14	44	13.5	4	100	4.736	**6408 73 7**	

Washer of particularly large outer diameter.



05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

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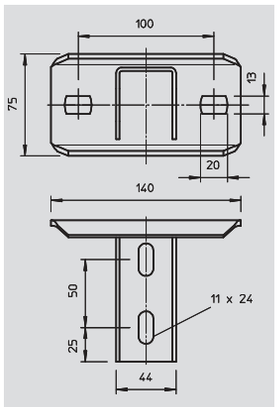
Cable-specific support constructions: products

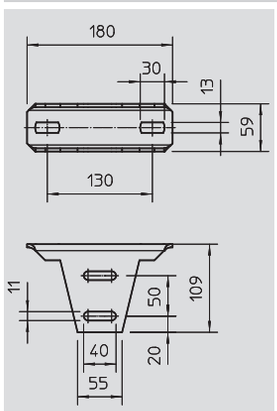
Head plate



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KUS 5	1	70.000	**6348 90 4**	

Head plate for mounting on US 5 support.

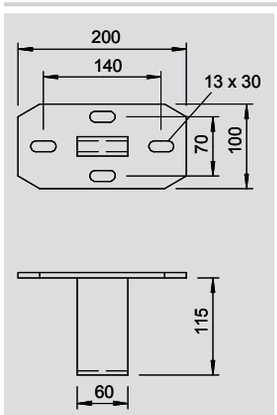
US5



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 5 V	1	78.900	**6348 92 0**	

Variable head plate for mounting on US 5 support.

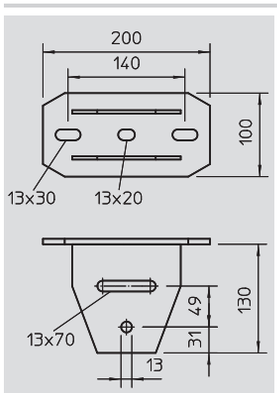
US5



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 7	1	160.000	**6349 10 2**	

Lightweight head plate for mounting on US 7 support.

US7



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 7 VQP	10	157.000	**6349 15 3**	

Variable head plate for mounting on US 7 support.

US7

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

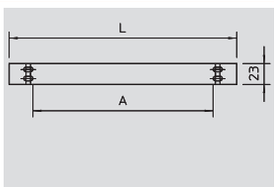
Always indicate the article number when ordering.

Cable-specific support constructions: products

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /pc.
KS-GR	20	0.810	**6017 70 2**	
KS-GR	20	1.350	**6017 70 5**	

Identification plate for screwless fastening on mesh cable trays.



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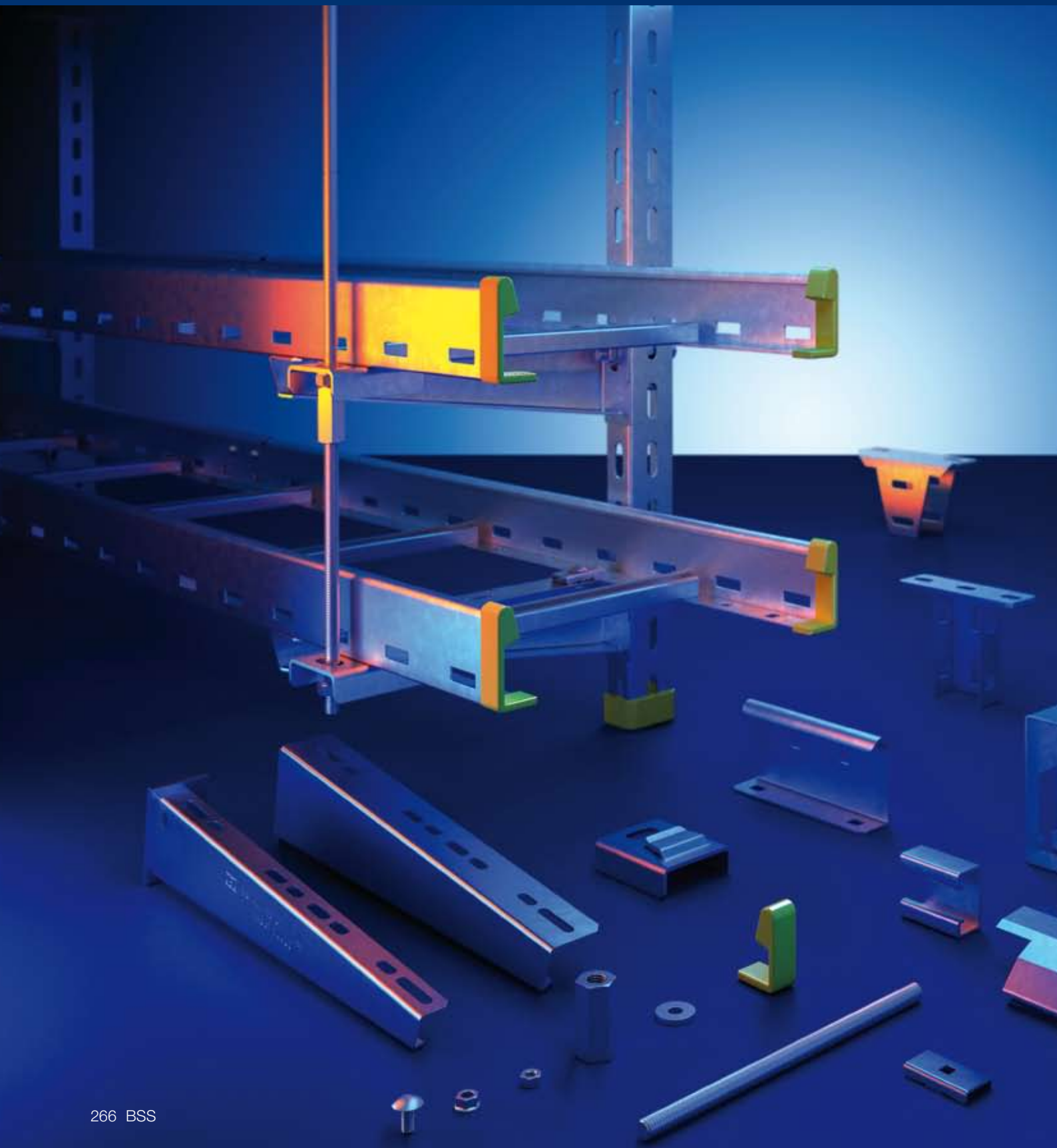
Always indicate the article number when ordering.

- Cable ladders with a special rung spacing
- Good ventilation of large cable cross-sections
- Electrical function maintenance with high loads
- Safe installation with systems tested to DIN 4102 Part 12



Function maintenance
of cable ladder systems

Overview of cable ladder systems
Standard support structures

Ceiling mounting

Cable ladder routing type with U suspended support

One to three-layer structures with cable ladders and U suspended support, bracket mounted on one or both sides

- Support spacing: max. 1.2 m
- Cable weight per ladder: max. 20 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 200, 300, 400 mm

Ceiling mounting

Cable ladder routing type with US 3 cross-section

One-layer structure with cable ladder and threaded rod suspension on both sides with cross-section.

- Support spacing: max. 1.2 m
- Cable weight per ladder: max. 20 kg/m
- Number of layers: max. 1 layer for 1.2 m support width
- Width: 200, 300, 400 mm

Wall mounting

Cable ladder routing type with MWA 12 wall and support bracket

One to three-layer structures as wall mounting with cable ladders and vertical threaded rod lock to the ceiling.

- Support spacing: max. 1.2 m
- Cable weight per ladder: max. 20 kg/m
- Number of layers: max. 3 layers for 1.2 m support width
- Width: 200, 300, 400 mm

Wall mounting

Cable ladder routing type with MWA 12 wall and support bracket

One or two-layer standard support constructions as wall mounting with cable ladders and threaded rod locking diagonally to the wall.

- Support spacing: max. 1.2 m
- Cable weight per ladder: max. 20 kg/m
- Number of layers: max. 2 layers for 1.2 m support width
- Width: 200, 300, 400 mm


Funktionserhalt - Kabelleiter-Systeme

Normtragekonstruktionen: Deckenmontage mit U-Hängestiel

Normtragekonstruktion nach
DIN 4102 Teil 12
Gutachterliche Stellungnahme
Nr. 3917/4635-1-Mu
Funktionserhaltsklassen
E30 und E90

Zulässige Daten

Stützweite max.	1,2 m
Kabelgewicht pro Leiter max.	20 kg/m
Lagenanzahl max.	3 Lagen
Kabelleiterbreiten	200, 300, 400 mm

Die Verlegeart Kabelleiter mit US 3-Hängestiel erfüllt die Forderungen der DIN 4102 Teil 12 als Normtragekonstruktion für die Funktionserhaltsklassen E30 und E90.
Verwendet wird eine Kabelleiter mit einer Holmhöhe von 60 mm und einer Materialstärke von 1,5 mm. Der Sprossenabstand beträgt 150 mm. Zusätzliche Sprossenauflagebleche sind daher nicht notwendig.
Die Lage der Stoßstelle ist frei wählbar zwischen den einzelnen Auflagepunkten. Der Verbinder wird über den Leiterholm gesteckt und in diesem verschraubt.

Systemkomponenten

Standard support structures are marked in blue in the catalogue.

Overview of cable ladder systems
Cable-specific support structures

Ceiling mounting

Cable ladder laying type U suspended support

One to three-layer cable-specific support structure with cable ladders and U suspended support, bracket mounted on one or both sides.

- Support spacing: max. 1.5 m
- Cable weight per ladder: max. 20 kg/m
- Number of layers: max. 3 layers
- Width: 200, 300, 400, 500 mm

Wall mounting

Cable ladder routing type with AW 30 wall and support bracket

One or two-layer cable-specific support construction for wall mounting with cable ladders and threaded rod locking verticallly to ceiling.

- Support spacing: max. 1.5 m
- Cable weight per ladder: max. 20 kg/m
- Number of layers: max. 2 layers
- Width: 200, 300, 400, 500 mm

Wall mounting

Cable ladder routing type with AW 55 wall bracket

One-layer cable-specific support construction for wall mounting with cable ladders, without additional threaded rod lock.

- Support spacing: max. 1.5 m
- Cable weight per ladder: max. 10 kg/m
- Cable tray width: 200 mm


Funktionserhalt - Kabelleiter-Systeme

Kabelspezifische Tragekonstruktionen: Wandmontage SL mit AW 55

Kabelspezifische Tragekonstruktion nach DIN 4102 Teil 12 Funktionserhaltsklassen E30 und E90

Zulässige Daten

Stützweite max.	1,5 m
Kabelgewicht pro Leiter max.	10 kg/m
Lagenanzahl max.	unbegrenzt
Kabelleiterbreite	200 mm

Die kabelspezifische Verlegeart mit Kabelleitern erfüllt die Forderungen der DIN 4102 Teil 12 für die Funktionserhaltsklassen E30 und E90. Der maximale Stützabstand bei dieser Verlegeart ist größer als der zulässige Wert der Normtragekonstruktion mit Kabelleitern.
Eine zusätzliche Gewindestangensicherung ist nicht erforderlich.
Die Stoßstelle der Kabelleitern mit 60 mm Holmhöhe, 2 mm Materialstärke und Sprossenabstand 150 mm ist in der Lage frei wählbar. Die Verbindung der Leiterenden erfolgt mit verschraubten Außenverbindern.

Systemkomponenten

Cable-specific support systems are marked in orange in the catalogue.

System overview
Function maintenance with cable ladder systems

LG 60
Cable ladder Page 272

Standard support constructions: ceiling mounting with U suspended support

Standard support construction to DIN 4102 Part 12
Surveyor's comments no. 3917/4635-1-Mu
Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Three layers
Cable ladder widths	200, 300, 400 mm

Routing the cable ladder with US 3 suspended support fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
A cable ladder with a rail height of 60 mm and a material thickness of 1.5 mm is used. The rung spacing is 150 mm. Support plates are therefore not required as an additional support area.
The position of the joints between the individual support points can be chosen freely. The connector is placed over the ladder rail and screwed in it.

System components

US 3 suspended support, US 5 suspended support MWA 12 bracket, hexagonal bolt, bolt tie, cable ladder, connector, clamping piece, connection component, threaded rod, connection sleeve, fire protection clamp, identification plate.

Ceiling area of application, one-sided

One-layer standard support construction made of LG60VS/F cable ladder with U suspended support, bracket type MWA12/...., mounted on one side.

Ceiling area of application, one-sided

Two-layer standard support construction made of LG60VS/F cable ladders with U suspended support, bracket type MWA12/...., mounted on one side.

Ceiling area of application, one-sided

Three-layer standard support construction made of LG60VS/F cable ladders with U suspended support, bracket type MWA12/...., mounted on one side.

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Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with U suspended support

Ceiling area of application, both sides

Two-layer standard support construction made of LG60VS/F cable ladders with U suspended support, bracket type MWA12/...., mounted on both sides.

Ceiling area of application, both sides

Three-layer standard support construction made of LG60VS/F cable ladders with U suspended support, bracket type MWA12/...., mounted on both sides.

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the U supports and the fire protection clamps.

Support and clamp mounting

Screw the U supports with the fire protection clamp onto the bolt ties.

Bracket mounting

Fasten the brackets on the U support with M10 x 25 truss-head bolt.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of the ladders

Fasten the cable ladder on the bracket with clamping pieces.

Mounting of connection component

Connect the connection component onto the under belt of the ladder rail at a distance of 100 mm to the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the ladder rail and then suspend it from the side in the fire protection clamp.

Locking the threaded rod

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

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Standard support constructions: ceiling mounting with U suspended support

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one, two or three-layer track paths.

Threaded rod extension

Mount of connection components on each cable ladder rail with multi-layered arrangement. Connection of the individual threaded rods by mounting connection sleeves as adapters.

Mounting of head plate KU 3

Screw the head plate to the US 3 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 3 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting of head plate KUS 5

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 5 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting on sloping ceilings

Drill the anchor holes for the variable head pieces under the sloping ceiling vertically to the head piece axis. Drill the anchor holes for the threaded rod plumb to the support.

Mounting of variable head piece KU 5 V

Screw the head plate to the U support using a hexagonal bolt. In so doing, insert the spacer into the U support. The head plate can be used to compensate sloping ceilings of up to 30°.

Bracket mounting

Fasten the bracket on the U support with a hexagonal bolt. In so doing, insert the appropriate spacer in the profile of the U support.

Locking the threaded rod.

Mount the threaded rods on the anchors, previously mounted plumb to the support.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

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Standard support constructions: ceiling mounting with U suspended support

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Three layers
Cable ladder widths	200, 300, 400 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

U suspended support US 3 K/...	1	1	1	1	1
Protective cap US 3 KS	1	1	1	1	1
Fire protection anchor FAZ II 10/10GS	2	2	2	2	2
Wall and support bracket MWA 12/...	1	2	3	2	3
Cable ladders LG 6... VS/F	1	2	3	2	3
Protective cap SKH 60	2	4	6	4	6
Connector AVL 60	2	4	6	4	6
Clamping piece LKS 40	2	4	6	4	6
Exit plate LAB/...	1	2	3	2	3
Support plate LALB/...	1	2	3	2	3
Connection component ABL	1	2	3	2	3
Threaded rod 2078/M10	1	2	-	2	3
Threaded rod 2078/M12	-	-	3	-	-
Connection sleeve 12005/M10	-	1	-	-	1
Connection sleeve 12005/M12	-	-	2	-	-
Identification plate KS-E	*	*	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1	2	2
Fire protection anchor FAZ II 10/10GS	1	1	1	1	1
Hexagonal nut DIN 934/M10	4	5	-	8	9

Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with U suspended support

Threaded rod locking with fire protection clamp

Hexagonal nut DIN 934/M12	-	-	6	-	-
Washer 966/M10	2	3	-	4	5
Washer 966/M12	-	-	4	-	-

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	1	-	1	1
Internal thread anchor FZEA 14x40	-	-	1	-	-
Hexagonal nut DIN 934/M10	2	3	-	4	5
Hexagonal nut DIN 934/M12	-	-	4	-	-
Washer 966/M10	1	2	-	2	3
Washer 966/M12	-	-	3	-	-

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Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with U cross-section

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	One layer
Cable ladder widths	200, 300, 400 mm

Routing the cable ladder with US 3 cross-section fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The rung spacing in the cable ladder with the 60 mm rail height is 150 mm. Support plates are therefore not required as an additional support area.
The joints of the ladder rails are connected using external connectors, which are screwed to the rails. The position of the joints is independent of the position between the cross-sections.

System components

US 3 support, impact tie, cable ladder, connector, clamping piece, threaded rod, identification plate.

One-layer ceiling area of application

One-layer standard support construction made of an LG60VS/F cable ladder and threaded rod suspension on both sides and cross-section, type US 3/....

Always indicate the article number when ordering.

Standard support constructions: ceiling mounting with U cross-section

Mounting preparations

Draw on the exact position of the drill holes for the threaded rods using a chalk mark.

Placing anchors

Mount the impact ties to fasten the threaded rods.

Mount the cross-section

Screw the threaded rods with the cross-sections into the impact tie.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of ladder on cross-section

Fasten the cable ladder on the cross-section with clamping pieces and additional large washers.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable tray.

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	One layer
Cable ladder widths	200, 300, 400 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

U support US 3/...	1	
Protective cap US 3 KS	2	
Threaded rod 2078/M10	2	
Hexagonal nut DIN 934/M10	6	
Washer 966/M10	4	
Cable ladders LG 6... VS/F	1	

Always indicate the article number when ordering.

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Standard support constructions: ceiling mounting with U cross-section

Components per suspension point or joint/end point

	**Protective cap SKH 60**	2		
	**Connector AVL 60**	2		
	**Exit plate LAB/...**	1		
	**Support plate LALB/...**	1		
	**Clamping piece LKS 40**	2		
	**Washer 967/M6**	2		
	**Internal thread anchor FZEA 12x40**	2		
	**Identification plate KS-E**	*		

* Number as necessary

Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Three layers
Cable ladder widths	200, 300, 400 mm

Mounting the cable ladders with MWA wall and support brackets fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The vertical threaded rod lock to the ceiling allows wall mounting. Additional support plates are not required, as the rung spacing of the cable ladder is 150 mm.
The position of the joint connection, consisting of the external connectors screwed to the 60 mm high ladder rails, can be selected freely between the brackets.

System components

MWA bracket, bolt tie, cable ladder, connector, clamping piece, connection component, threaded rod, connection sleeve, fire protection clamp, identification plate.

Wall application area

One-layer standard support construction made of LG60 VS/F cable ladder with MWA wall and support bracket, type MWA12/..., for wall mounting. The threaded rod is locked vertically to the ceiling.

Wall application area

Two-layer standard support construction made of LG60 VS/F cable ladders with MWA wall and support bracket, type MWA12/..., for wall mounting. The threaded rod is locked vertically to the ceiling.

Wall application area

Three-layer standard support construction made of LG60 VS/F cable ladders with MWA wall and support bracket, type MWA12/..., for wall mounting. The threaded rod is locked vertically to the ceiling.

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Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the fire protection clamps.

Bracket and clamp mounting

Screw the brackets with the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of the cable ladders

Fasten the cable ladder on the bracket with clamping pieces.

Mounting of connection component

Connect the connection component onto the under belt of the ladder rail at a distance of 100 mm to the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the rail of the cable ladder and then suspend it from the side in the fire protection clamp.

Locking the threaded rod.

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one, two or three-layer track paths.

Threaded rod extension

Connect the individual threaded rods by mounting connection sleeves as adapters.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with MWA 12

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Three layers
Cable ladder widths	200, 300, 400 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

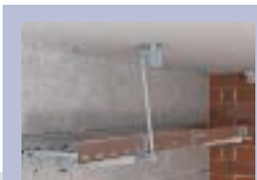
Components per suspension point or joint/end point

Wall and support bracket MWA 12/...	1	2	3
Cable ladders LG 6... VS/F	1	2	3
Protective cap SKH 60	2	4	6
Connector AVL 60	2	4	6
Clamping piece LKS 40	2	4	6
Exit plate LAB/...	1	2	3
Support plate LALB/...	1	2	3
Connection component ABL	1	2	3
Threaded rod 2078/M10	1	2	-
Threaded rod 2078/M12	-	-	3
Connection sleeve 12005/M10	-	1	-
Connection sleeve 12005/M12	-	-	2
Identification plate KS-E	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	1
Fire protection anchor FAZ II 10/10GS	1	1	1
Hexagonal nut DIN 934/M10	4	5	-
Hexagonal nut DIN 934/M12	-	-	6
Washer 966/M10	2	3	-
Washer 966/M12	-	-	4



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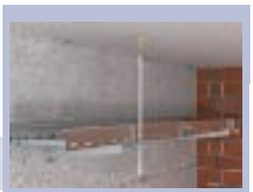
Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	1	-	
Internal thread anchor FZEA 14x40	-	-	1	
Hexagonal nut DIN 934/M10	2	3	-	
Hexagonal nut DIN 934/M12	-	-	4	
Washer 966/M10	1	2	-	
Washer 966/M12	-	-	3	

Concrete wall

Fire protection anchor FAZ II 10/10GS	1	2	3

Masonry wall

Fire protection bolt tie MMS 10 x 80	1	2	3

Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12 or AW 30 and diagonal threaded rod

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mu Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Two layers
Cable ladder widths	200, 300, 400 mm

Mounting the cable ladders on the wall fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
The sloping arrangement of the threaded rod lock allows mounting of the suspension system irrespective of the ceiling structure and the spacing to the ceiling. The rungs of the cable ladder with rail height 60 mm are mounted in the ladder rails at a spacing of 150 mm. Support plates are therefore not required to increase the support area for the cables.
The position of the joints between the brackets can be chosen freely. The external connector is placed over the ladder rail and screwed to it.

System components

MWA12 bracket, bolt tie, cable ladder, connector, clamping piece, connection component, sloping connection component, threaded rod, connection sleeve, fire protection clamp, identification plate.

Wall application area

One-layer standard support construction made of LG60VS/F cable ladder with bracket type MWA12/... for wall mounting. The threaded rod is locked diagonally on the wall.

Wall application area

Two-layer standard support construction made of LG60VS/F cable ladders with bracket type, AW30/... for wall mounting. The threaded rod is locked diagonally on the wall.

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Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12 or AW 30 and diagonal threaded rod

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and connection components using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the connection components.

Bracket and clamp mounting

Screw the brackets with the connection components onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of the ladders

Fasten the cable ladder on the bracket with clamping pieces.

Mounting of connection component

Connect the connection component onto the under belt of the ladder rail at a distance of 100 mm to the bracket.

Mounting of sloping connection component

Mount the second connection component diagonally on the connection component with a hexagonal bolt. Lock the bolt with a hexagonal nut for single-layer cable ladder mounting.

Mounting of threaded rod

Push the threaded rod through the two connection components and then lock each of the two ends with two lock nuts.

Lower threaded rod fastening

Secure the threaded rod on the connection component with a nut and a lock nut for two-layer track paths.

Vertical threaded rod extension

Fasten the lower vertical threaded rod with a connection sleeve as an adapter on the fastening screw of the connection component.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Standard support constructions: wall mounting with MWA 12 or AW 30 and diagonal threaded rod

System parameters at a glance

Approved data

Max. support width	1.2 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Two layers
Cable ladder widths	200, 300, 400 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per suspension point or joint/end point

Wall and support bracket MWA 12/...	1	-	
Wall and support bracket AW 30/...	-	2	
Cable ladders LG 6... VS/F	1	2	
Protective cap SKH 60	2	4	
Connector AVL 60	2	4	
Clamping piece LKS 40	2	4	
Exit plate LAB/...	1	2	
Support plate LALB/...	1	2	
Connection component ABL	1	2	
Sloping connection component ABS	2	2	
Hexagonal bolt SKS 10 x 40	1	-	
Hexagonal bolt SKS 12 x 40	-	1	
Threaded rod 2078/M10	1	-	
Threaded rod 2078/M12	-	2	
Connection sleeve 12005/M12	-	1	
Hexagonal nut DIN 934/M10	5	-	
Hexagonal nut DIN 934/M12	-	6	
Washer 966/M10	3	-	
Washer 966/M12	-	4	
Identification plate KS-E	*	*	

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	2	3	

Always indicate the article number when ordering.

Standard support constructions: wall mounting with MWA 12 or AW 30 and diagonal threaded rod

Masonry wall

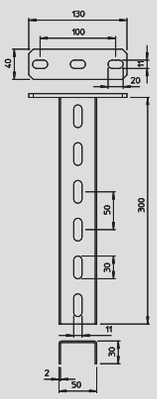
	**Fire protection bolt tie MMS 10 x 80**	2	3	

Standard support constructions: products

Suspended support

Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 3 K/20	200	2	1	50.500	**6342 35 1**	
US 3 K/30	300	2	1	64.400	**6342 35 3**	
US 3 K/40	400	2	4	78.300	**6342 35 5**	
US 3 K/50	500	2	1	92.300	**6342 35 7**	
US 3 K/60	600	2	1	106.200	**6342 35 9**	
US 3 K/70	700	2	1	120.200	**6342 36 2**	
US 3 K/80	800	2	1	134.100	**6342 36 4**	
US 3 K/90	900	2	1	147.800	**6342 36 6**	
US 3 K/100	1000	2	1	162.000	**6342 36 8**	
US 3 K/110	1100	2	1	175.900	**6342 37 0**	
US 3 K/120	1200	2	1	189.900	**6342 37 2**	

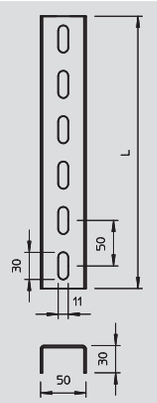
Suspended support (U profile) of dimensions 50 x 30 mm with welded head plate.



U support

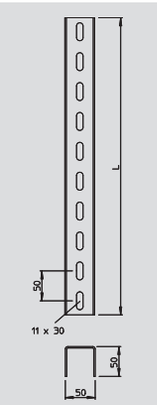
Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FS	
US 3/30	300	2	1	39.900	**6342 30 4**	
US 3/40	400	2	1	53.200	**6342 30 6**	
US 3/50	500	2	1	66.500	**6342 30 8**	
US 3/60	600	2	1	79.800	**6342 31 0**	
US 3/70	700	2	1	93.400	**6342 31 2**	
US 3/80	800	2	1	106.500	**6342 31 4**	
US 3/90	900	2	1	119.800	**6342 31 6**	
US 3/100	1000	2	1	133.100	**6342 31 8**	
US 3/150	1500	2	1	199.600	**6342 32 8**	
US 3/200	2000	2	1	266.100	**6342 33 8**	

U support in fixed lengths. Dimensions 30 x 50 mm.



Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5/30	300	2.5	1	79.000	**6340 90 3**	
US 5/40	400	2.5	1	106.000	**6340 91 1**	
US 5/50	500	2.5	1	133.000	**6340 93 8**	
US 5/60	600	2.5	1	160.000	**6340 94 6**	
US 5/70	700	2.5	1	175.000	**6340 95 0**	
US 5/80	800	2.5	1	200.000	**6340 95 4**	
US 5/90	900	2.5	1	227.000	**6340 95 8**	
US 5/100	1000	2.5	1	265.000	**6340 96 2**	
US 5/150	1500	2.5	1	395.000	**6340 96 6**	
US 5/200	2000	2.5	1	526.000	**6340 97 0**	

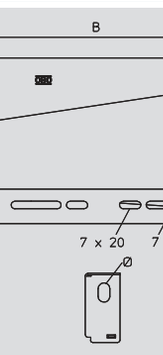
U support in fixed lengths. Dimensions 50 x 50 mm.



Wall and support brackets

Type	Width	Dimension H	Dimension A	Hole Ø	Pack.	Weight	Item No.	Price /pc.
	mm	mm	mm	mm	pcs	kg/% pc	ST / FS	
MWA 12/21	210	65	32.5	11	30	24.500	**6424 73 2**	
MWA 12/31	310	75	38	11	30	57.000	**6424 74 0**	
MWA 12/41	410	83	38	11	30	68.000	**6424 75 9**	

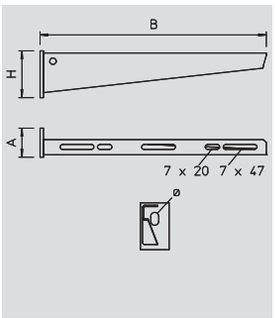
Folded lightweight wall and support bracket.



Always indicate the article number when ordering.

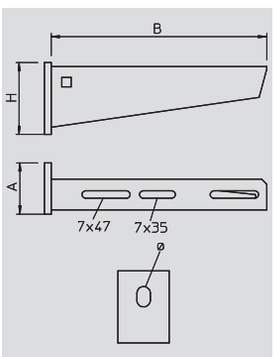
Standard support constructions: products

Wall and support brackets



Type	Width mm	Dimension H mm	Dimension A mm	Hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW 15/21	210	60	40	11	30	26.000	**6420 68 0**	
AW 15/31	310	65	40	11	30	32.500	**6420 71 0**	
AW 15/41	410	70	40	11	30	55.000	**6420 74 5**	

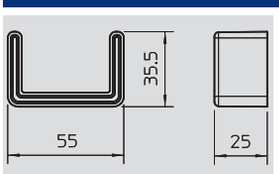
Lightweight wall and support bracket with welded head plate.



Type	Width mm	Dimension H mm	Dimension A mm	Hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW 30/21	210	70	50	13	25	42.000	**6419 72 0**	
AW 30/31	310	80	50	13	25	63.000	**6419 74 7**	
AW 30/41	410	80	50	13	20	93.000	**6419 76 3**	

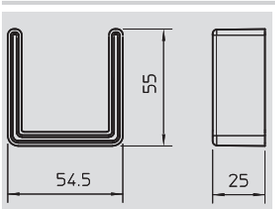
Medium-weight wall and support bracket with welded head plate.

Protective cap



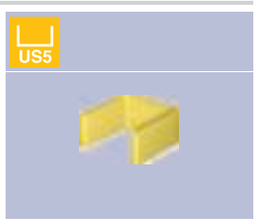
Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 3 KS	Sulphur yellow	20	1.070	**6338 45 7**	

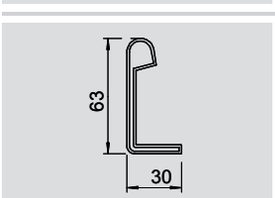
Protective cap for end covering of US 3 supports.



Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 5 KS	Sulphur yellow	20	1.300	**6338 46 1**	

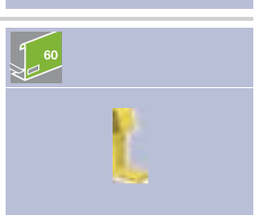
Protective cap for end covering of US 5 supports.



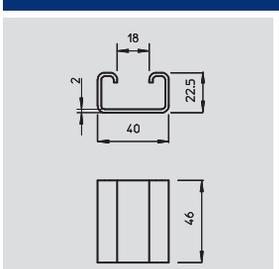


Type	Colour	Pack. pair	Weight kg/% pair	Item No. PE	Price /pair
SKH 60	yellow	40	1.000	**6222 53 6**	

End cap to cover cable ladder ends of side height 60 mm.



Spacer



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 25	25	7.500	**6416 44 6**	

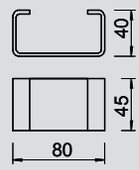
Spacer for use in U 3 supports.

Standard support constructions: products

Spacer

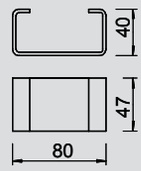
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 45	25	19.000	**6416 50 0**	

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 47	25	17.000	**6416 50 4**	

Spacer for use in head plate, type KU 5 V.

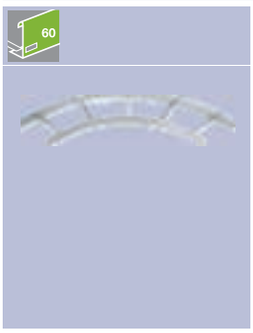


Cable ladder

Type	Width mm	Length mm	Frame distance mm	Weight borders	Item No. ST / FS	Price /m
LG 620 VS/F	200	6000	150	324.700	**6207 50 1**	
LG 630 VS/F	300	6000	150	373.300	**6207 50 5**	
LG 640 VS/F	400	6000	150	422.000	**6207 50 9**	

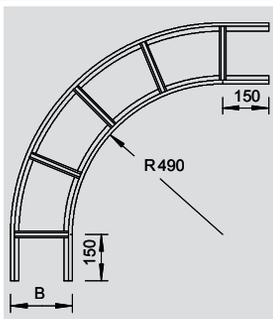
Routing the cable ladder with US 3 suspended support fulfils the requirements of DIN 4102 Part 12 as a standard support structure for function maintenance classes E30 and E90.
A cable ladder with a rail height of 60 mm and a material thickness of 1.5 mm is used. The rung spacing is 150 mm. Support plates are therefore not required as an additional support area.
The position of the joints between the individual support points can be chosen freely. The connector is placed over the ladder rail and screwed in it.

Fitting



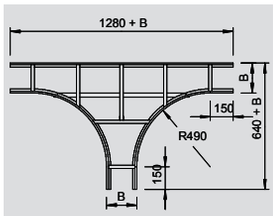
Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LBI 90/620 VS	200	1	358.000	**6211 22 4**	
LBI 90/630 VS	300	1	412.000	**6211 23 2**	
LBI 90/640 VS	400	1	497.000	**6211 24 0**	

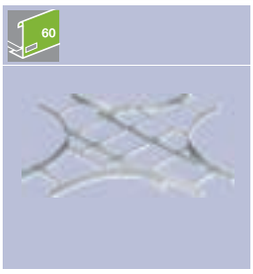
90° bend, horizontal, for cable ladders with VS rungs and a side height of 60 mm.



Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LT 620 VS	200	1	677.000	**6213 72 3**	
LT 630 VS	300	1	789.000	**6213 73 1**	
LT 640 VS	400	1	871.000	**6213 75 8**	

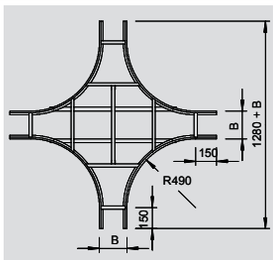
T piece, horizontal, for cable ladders with VS rungs and a side height of 60 mm.





Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LK 620 VS	200	1	935.000	**6214 22 3**	
LK 630 VS	300	1	1080.000	**6214 23 1**	
LK 640 VS	400	1	1175.000	**6214 25 8**	

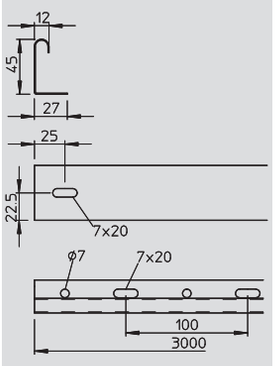
Horizontal cross-over for cable ladders with VS rungs and a side height of 60 mm.



Always indicate the article number when ordering.

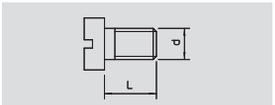
Standard support constructions: products

Separating retainer



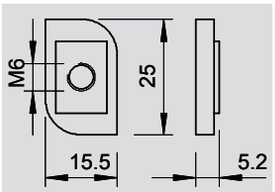
Type	Side height mm	Length mm	Pack. m	Weight borders	Item No. ST / FS	Price /m
TSG 45	45	3000	45	50.000	**6062 03 2**	

Separating retainer for separation of cables of different voltages or functions.



Type	Thread	Length mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
341	M6	10	100	0.392	**3153 09 6**	

Cylinder head bolt according to ISO 1207 with metric thread.



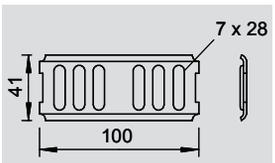
Type	Thread	Version	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5017	M6	No screw	100	0.985	**1143 06 9**	

Slide nut for profile rails with a slot width of 16–17 mm.
For VS rung, mountable from above.

Connector

Type	Width mm	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
AVL 60	135	65	10	23.200	**6208 77 0**	

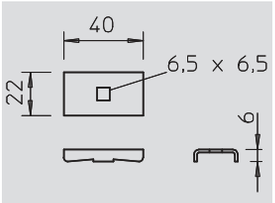
External connector for mechanical connection of cable ladder sections for routing types with cable ladders for function maintenance to DIN 4102 Part 12.



Type	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RLVK 45	45	10	8.800	**6067 06 9**	

Connector for longitudinal connection separating retainer, type TSG 45.

Clamping piece



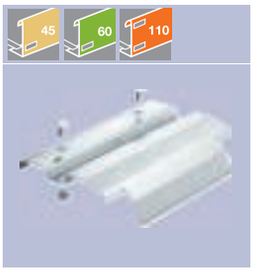
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LKS 40	50	3.400	**6221 07 6**	

Clamp for fixing cable ladders.

Always indicate the article number when ordering.

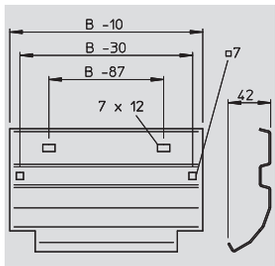
Standard support constructions: products

Exit plate



Type	Width mm	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
LAB/20	200	45 -110	20	40.000	**6220 43 6**	
LAB/30	300	45 -110	25	60.000	**6220 44 4**	
LAB/40	400	45 -110	25	79.000	**6220 45 2**	

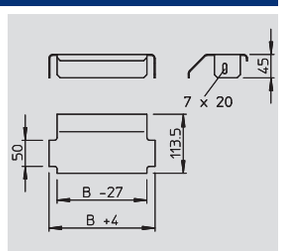
Exit plate for mounting on the rung for vertically exiting cables.



Support plate

Type	Width mm	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
LALB/20	200	45 -110	10	36.000	**6221 85 8**	
LALB/30	300	45 -110	10	53.000	**6221 86 6**	
LALB/40	400	45 -110	10	70.000	**6221 87 4**	

Support plate to increase the cable volume and for cable protection.



Support plate for fitting

Type	Width mm	Height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SAB 20	180	16.5	25	31.000	**6222 94 3**	
SAB 30	280	16.5	25	50.000	**6222 95 1**	
SAB 40	380	16.5	25	65.000	**6222 97 8**	

Support plates to increase the support area for the cables in the fittings for routing types with cable ladders for function maintenance to DIN 4102 Part 12. Use the support plates to ensure the largest possible support surface in the cable ladder fittings for the function maintenance cables in case of fire. The support plates are just laid loosely on the rungs of the cable ladder fittings. The lugs pointing down prevent slippage.

Connection component

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
ABL	20	15.000	**6221 46 7**	

The connection component is the connection between the threaded rod lock and the suspension system for the routing types with cable ladders for function maintenance to DIN 4102 Part 12.
It is attached to the under belt of the ladder rail at a distance of max. 100 mm from the bracket.
When the threaded rod has been mounted, the connection component is secured against slipping.

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
ABS FS	20	7.500	**6365 02 7**	

The connection component is the connecting element for the sloping arrangement of the threaded rod locking for wall mounting of the standard routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

Fire protection clamp

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
BSB	20	41.000	**6418 19 8**	

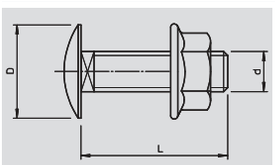
Fire protection clamp for ceiling fastening of the threaded rod lock for routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

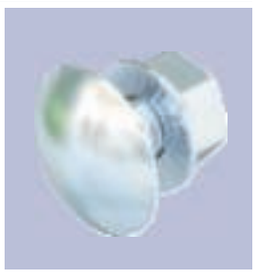
Standard support constructions: products

Truss-head bolt

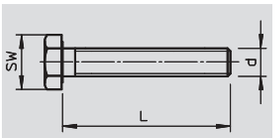


Type	Thread	Dimension D mm	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
FRS 10x25	M10	24	10	25	50	4.260	**6407 52 1**	

Truss-head bolt with square neck including combination nut.

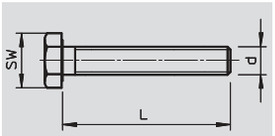


Hexagonal bolt



Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
SKS 10x40	M10 x 40	40	10	17	50	4.700	**3160 75 0**	
SKS 10x80	M10 x 80	80	10	17	20	7.700	**6418 25 0**	

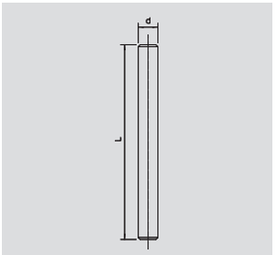
Hexagonal bolt for universal fixing of structure components.



Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
SKS 12x40	M12 x 40	40	12	19	25	7.800	**3163 11 3**	

Hexagonal bolt for universal fixing of structure components.

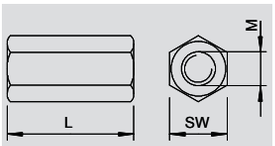
Threaded rod



Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M10	10	1000	25	49.000	**3141 20 9**	
2078	M12	12	1000	20	70.000	**3141 30 6**	

Threaded rod to DIN 976.

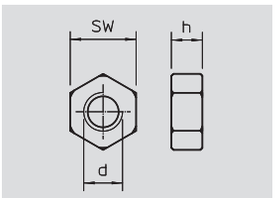
Connection sleeve



Type	Thread	Dimension M	Dimension L mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
12005	M10	10	40	17	50	6.000	**6410 10 3**	
12005	M12	12	40	19	25	7.000	**6410 11 1**	

Connection sleeve with continuous internal thread.

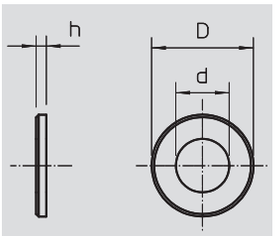
Hexagonal nut



Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**	
DIN 934	M12	12	10.8	19	100	1.730	**3400 12 3**	

Hexagonal nut to DIN 934 with metric thread.

Washer



Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
966	M10	20	10.5	2	100	0.408	**3402 09 6**	
966	M12	24	13	2.5	100	0.627	**3402 12 6**	

Washer according to DIN 125, shape A, for universal use.

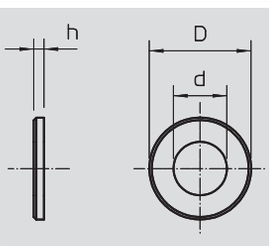
Always indicate the article number when ordering.

Standard support constructions: products

Washer

Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
967	M6	28	6.5	2.5	100	1.150	**3402 20 7**	

Washer with a larger outer diameter for universal use.

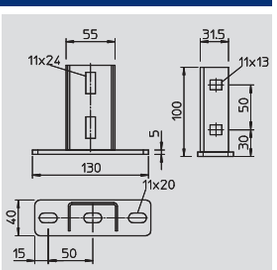


Head plate

US3

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 3	10	46.800	**6348 87 4**	

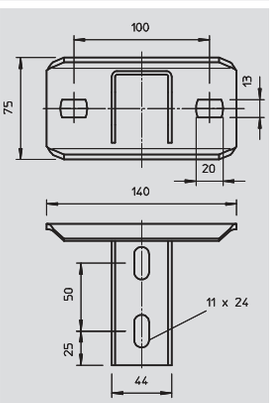
Head plate for mounting on US 3 supports.



US5

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KUS 5	1	70.000	**6348 90 4**	

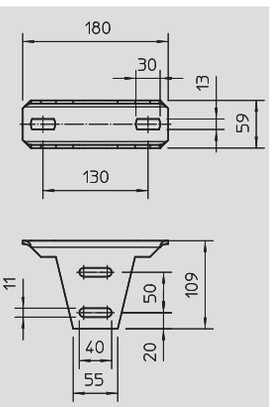
Head plate for mounting on US 5 support.



US5

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 5 V	1	78.900	**6348 92 0**	

Variable head plate for mounting on US 5 support.



Identification plate

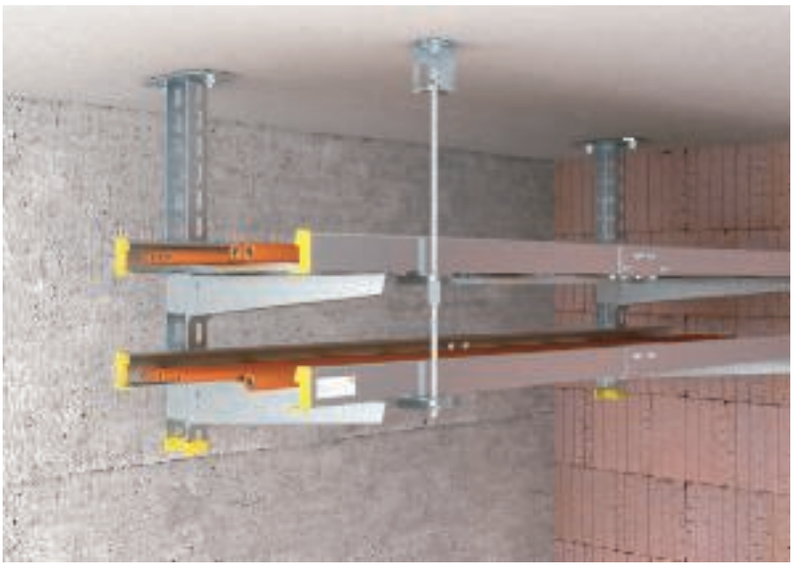
Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

Always indicate the article number when ordering.

Cable-specific support constructions: SL ceiling mounting with U suspended support

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.5 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Three layers
Cable ladder widths	200, 300, 400, 500 mm

The cable-specific routing type with cable ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. This special routing type exceeds the maximum values of the standard support structure with cable ladders.
The brackets with an additional threaded rod suspension are secured using connection components mounted next to the bracket tip.
The cable ladder used has a rail height of 60 mm and a material thickness of 2.0 mm. The rung spacing is 150 mm.
The position of the joint can be selected freely between the brackets. The external connector is placed over the rail of the cable ladder and screwed to it using four bolts.

System components

US 5 suspended support, US 7 suspended support AW 30 bracket, spacer, hexagonal bolt, bolt tie, cable ladder, connector, clamping piece, connection component, threaded rod, connection sleeve, fire protection clamp, identification plate.

Ceiling area of application, one-sided

One-layer cable-specific support construction made of SL60VS/F cable ladder with U suspended support, bracket mounted on one side.

Ceiling area of application, one-sided

Two-layer cable-specific support construction made of SL60VS/F cable ladders with U suspended support, bracket mounted on one side.

Ceiling area of application, one-sided

Three-layer cable-specific support construction made of SL60VS/F cable ladders with U suspended support, bracket mounted on one side. The third layer (lower cable tray) must be locked with a separate threaded rod.

Always indicate the article number when ordering.

Cable-specific support constructions: SL ceiling mounting with U suspended support

Ceiling area of application, both sides

Two-layer cable-specific support construction made of SL60VS/F cable ladders with U suspended support, bracket mounted on both sides.

Ceiling area of application, both sides

Three-layer cable-specific support construction made of SL60VS/F cable ladders with U suspended support, bracket mounted on both sides.

Mounting preparations

Draw on the exact position of the drill holes for the suspended supports and fire protection clamps using a chalk mark.

Placing anchors

The bolt ties are required to fasten the supports and fire protection clamps.

U support and clamp mounting

Screw the U supports with the fire protection clamp onto the bolt ties.

Bracket mounting

Fasten the brackets on the two hips of the U support with a hexagonal bolt and spacer.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of the cable ladders

Fasten the cable ladder on the bracket with clamping pieces.

Mounting of connection component

The connection component is clamped to the under belt of the ladder rail at a maximum of 100 mm from the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the ladder rail and then suspend it from the side in the fire protec-
tion clamp.

Locking the threaded rod.

Secure the threaded rod in the fire protection clamp and in the connection component each with two hexagonal nuts.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

Cable-specific support constructions: SL ceiling mounting with U suspended support

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one or two-layer track paths.

Threaded rod extension

Mount connection components on each cable ladder rail with multi-layered arrangement. Connect the individual threaded rods by mounting connection sleeves as adapters.

Mounting of head plate KUS 5

Screw the head plate to the US 5 support using a hexagonal bolt. In so doing, insert the spacer into the U support.

Mounting of screwed-on US 5 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting of head plate KU 7

Screw the head plate to the U 7 support with two hexagonal bolts.

Mounting of screwed-on US 7 support

Fasten the head plate on the mounted bolt ties. The bolt ties can also be used for push-through mounting.

Mounting on sloping ceilings

When carrying out mounting on sloping ceilings using variable head pieces, ensure that the anchors for the head pieces are vertical to the head piece axis and that the anchors for the threaded rod are drilled plumb to the support.

Mounting of variable head piece KU 5 V

Screw the head plate to the US 5 support. During mounting, the spacer DSK 47 and the hexagonal bolt SKS 10 x 80 are inserted. The head plate can be used to compensate sloping ceilings of up to 30°.

Mounting of variable head piece KU 7 VQP

Screw the head plate to the US 7 support. During mounting, the spacer DSK 45 and the hexagonal bolt SKS 12 x 80 are inserted. The head plate can be used to compensate sloping ceilings of up to 30°.

Bracket mounting

The bracket, type AW 30, is fastened to the U support using a hexagonal bolt, type SKS, with a spacer of type DKS.

Locking the threaded rod

Mount the threaded rods on the anchors, previously mounted plumb to the support.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Always indicate the article number when ordering.

Cable-specific support constructions: SL ceiling mounting with U suspended support

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Three layers
Cable ladder widths	200, 300, 400, 500 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	NHXH	E30 - E90	≥ nx1.5 mm²		
	NHXCH	E30 - E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E90	≥ nx2 x 0.8 mm		
Eupen	(N)HXH ceramic	E30	≥ nx1.5 mm²		
	(N)HXCH ceramic	E30	≥ nx1.5/1.5 mm²		
	JE-H(St)H Ceramic	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H Mica	E90	≥ nx2 x 0.8 mm		
Faber	NHXH	E30	≥ nx10 mm²		
	NHXCH	E30	≥ nx1.5/1.5 mm²		
	(N)HXH	E30	≥ nx1.5 to 6 mm²		
Nexans	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
Studer	JE-H(St)H	E30 - E90	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E30 - E90	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

U suspended support US...K/...	1	1	1	1	1	
Protective cap US...KS	1	1	1	1	1	
Fire protection anchor FAZ II 10/10GS	2	-	-	-	-	
Fire protection anchor FAZ II 12/10	-	2	2	2	2	
Wall and support bracket AW 30/...	1	2	3	2	3	
Spacer DSK 45	1	2	3	1	2	
Spacer DSK 61	1	2	3	1	2	
Hexagonal bolt SKS 10 x 90	1	2	3	1	2	
Hexagonal bolt SKS 12 x 110	1	2	3	1	2	
Cable ladder SL 6... VS/F	1	2	3	2	3	
Protective cap SKH 60	2	4	6	4	6	
Connector AVL 60	2	4	6	4	6	
Clamping piece LKS 40	2	4	6	4	6	
Exit plate LAB/...	1	2	3	2	3	
Support plate LALB/...	1	2	3	2	3	

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific support constructions: SL ceiling mounting with U suspended support

Components per suspension point or joint/end point

Connection component ABL	1	2	3	2	3
Threaded rod 2078/M10	1	-	-	-	-
Threaded rod 2078/M12	-	2	3	2	3
Connection sleeve 12005/M12	-	1	1	-	1
Identification plate KS-E	*	*	*	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

Fire protection clamp BSB	1	1	2	2	2
Fire protection anchor FAZ II 10/10GS	1	-	-	-	-
Fire protection anchor FAZ II 12/10	-	1	2	2	2
Hexagonal nut DIN 934/M10	4	-	-	-	-
Hexagonal nut DIN 934/M12	-	5	9	8	9
Washer 966/M10	2	-	-	-	-
Washer 966/M12	-	3	5	4	5

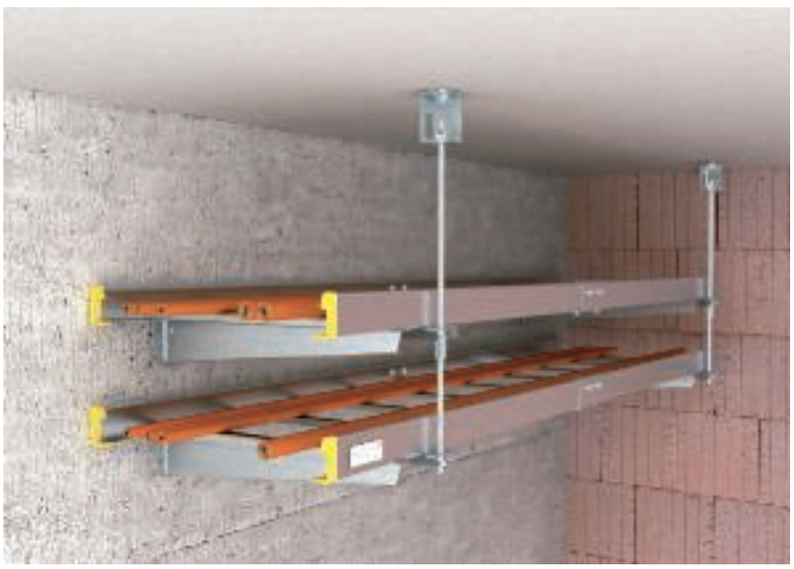
Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	-	-	-	-
Internal thread anchor FZEA 14x40	-	1	2	2	2
Hexagonal nut DIN 934/M10	2	-	-	-	-
Hexagonal nut DIN 934/M12	-	3	5	4	5
Washer 966/M10	1	-	-	-	-
Washer 966/M12	-	2	3	2	3

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: SL wall mounting with AW 30

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90



Approved data	
Max. support width	1.5 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Two layers
Cable ladder widths	200, 300, 400, 500 mm

The cable-specific routing type with cable ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. This special routing type exceeds the maximum values of the standard support structure with cable ladders.
The required additional bracket securing is carried out by mounting threaded rods to connection components fastened to the ladder rails directly next to the bracket tip.
The cable ladder used, with a rung spacing of 150 mm and a rail height of 60 mm, has a material thickness of 2.0 mm.
Irrespective of the position of the joint relative to the brackets, it can be possess screwed-on external connectors.

System components

AW 30 bracket, bolt tie, cable ladder, connector, clamping piece, connection component, threaded rod, connection sleeve, fire protection clamp, identification plate.

Wall application area

One-layer cable-specific support construction for wall mounting with SL60VS/F cable ladders, with threaded rod locking vertically to the ceiling.

Wall application area

Two-layer cable-specific support construction for wall mounting with SL60VS/F cable ladders, with threaded rod locking vertically to the ceiling.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: SL wall mounting with AW 30

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets and fire protection clamps using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets and the fire protection clamps.

Bracket and clamp mounting

Screw the brackets with the fire protection clamp onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the components and screw it into the drill hole.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of the cable ladders

Fasten the cable ladder on the bracket with clamping pieces.

Mounting of connection component

The connection component is clamped to the under belt of the ladder rail at a maximum of 100 mm from the bracket.

Mounting of threaded rod

Push the threaded rod from above through the connection component protruding from the ladder rail and then suspend it from the side in the fire protection clamp.

Alternative threaded rod mounting

Alternatively, fastening the threaded rods under the ceiling with an internal thread anchor (impact tie) is also approved.

Lower threaded rod fastening

Secure the threaded rod on the lower connection component with a nut and a lock nut for one or two-layer track paths.

Threaded rod extension

Mount connection components on each cable ladder rail with multi-layered arrangement. Connect the individual threaded rods by mounting connection sleeves as adapters.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: SL wall mounting with AW 30

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per ladder	20 kg/m
Max. number of layers	Two layers
Cable ladder widths	200, 300, 400, 500 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	NHXH	E30 - E90	≥ nx1.5 mm²		
	NHXCH	E30 - E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E90	≥ nx2 x 0.8 mm		
Eupen	(N)HXH ceramic	E30	≥ nx1.5 mm²		
	(N)HXCH ceramic	E30	≥ nx1.5/1.5 mm²		
	JE-H(St)H Ceramic	E30	≥ nx2 x 0.8 mm		
	JE-H(St)H Mica	E90	≥ nx2 x 0.8 mm		
Faber	NHXH	E30	≥ nx10 mm²		
	NHXCH	E30	≥ nx1.5/1.5 mm²		
	(N)HXH	E30	≥ nx1.5 to 6 mm²		
Nexans	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
Studer	JE-H(St)H	E30 - E90	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E30 - E90	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

		L	LL
	**Wall and support bracket AW 30/...**	1	2
	**Cable ladder SL 6... VS/F**	1	2
	**Protective cap SKH 60**	2	4
	**Connector AVL 60**	2	4
	**Clamping piece LKS 40**	2	4
	**Exit plate LAB/...**	1	2
	**Support plate LALB/...**	1	2
	**Connection component ABL**	1	2
	**Threaded rod 2078/M10**	1	-
	**Threaded rod 2078/M12**	-	2
	**Connection sleeve 12005/M12**	-	1
	**Identification plate KS-E**	*	*

* Number as necessary

Threaded rod locking with fire protection clamp

		L	LL
	**Fire protection clamp BSB**	1	1
	**Fire protection anchor FAZ II 10/10GS**	1	-
	**Fire protection anchor FAZ II 12/10**	-	1

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: SL wall mounting with AW 30

Threaded rod locking with fire protection clamp

Hexagonal nut DIN 934/M10	4	-	-	
Hexagonal nut DIN 934/M12	-	5		
Washer 966/M10	2	-		
Washer 966/M12	-	3		

Threaded rod locking with internal thread anchor

Internal thread anchor FZEA 12x40	1	-		
Internal thread anchor FZEA 14x40	-	1		
Hexagonal nut DIN 934/M10	2	-	-	
Hexagonal nut DIN 934/M12	-	3		
Washer 966/M10	1	-		
Washer 966/M12	-	2		

Concrete wall

Fire protection anchor FAZ II 10/10GS	1	2	

Masonry wall

Fire protection bolt tie MMS 10 x 80	1	2	

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: SL wall mounting with AW 55

Cable-specific support construction to DIN 4102 Part 12 Function maintenance classes E 30 and E 90

Approved data	
Max. support width	1.5 m
Max. cable weight per ladder	10 kg/m
Max. number of layers	Unlimited
Cable ladder width	200 mm

The cable-specific routing type with cable ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. The maximum support spacing for this routing type is greater than the approved value of the standard support structure with cable ladders.
Additional threaded rod locking is not required.
The position of the joint of the cable ladders with 60 mm rail height, 2 mm material thickness and 150 mm rung spacing can be chosen freely. The ladder ends are connected using screwed on external connectors.

System components

AW 55 bracket, bolt tie, fire protection bolt tie, cable ladder, connector, clamping piece, identification plate.

Wall application area

One-layer cable-specific support construction for wall mounting with SL60VS/F cable ladders, without additional threaded rod locking.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

One or two-layer cable-specific support constructions: SL wall mounting with AW 55

Mounting preparations

Draw on the exact position of the drill holes for the wall brackets using a chalk mark.

Placing anchors

Mount the bolt ties to fasten the wall brackets.

Bracket mounting

Screw the brackets onto the bolt ties. In the case of mounting on masonry walls, push the bolt tie through the bracket and screw it into the drill hole.

Straight connector mounting

Mount straight connectors with truss-head bolts to interconnect the cable ladders.

Mounting of the cable ladders

Fasten the cable ladder on the bracket with clamping pieces.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

System parameters at a glance

Approved data

Max. support width	1.5 m
Max. cable weight per ladder	10 kg/m
Max. number of layers	Unlimited
Cable ladder width	200 mm

Approved cable types					
Cable manufacturer	Cable type	Class	Data	Note	
Dätwyler	NHXH	E30 - E90	≥ nx1.5 mm²		
	NHXCH	E30 - E90	≥ nx1.5/1.5 mm²		
	JE-H(St)H	E30	≥ nx2 x 0.8 mm		
	JE-H(St)HRH	E90	≥ nx2 x 0.8 mm		

Components per suspension point or joint/end point

	Wall and support bracket AW 55/21	1	
	Cable ladder SL 620 VS/F	1	
	Protective cap SKH 60	2	
	Connector AVL 60	2	
	Clamping piece LKS 40	2	
	Exit plate LAB/20	1	
	Support plate LALB/20	1	

Always indicate the article number when ordering.

One or two-layer cable-specific support constructions: SL wall mounting with AW 55

Components per suspension point or joint/end point

	Identification plate KS-E	VE	* * Number as necessary	

Concrete wall

	**Fire protection anchor FAZ II 10/10GS**	VE	1	

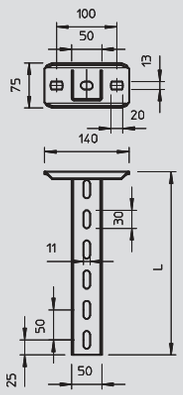
Masonry wall

	**Fire protection bolt tie MMS 10 x 80**	VE	1	

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific support constructions: products

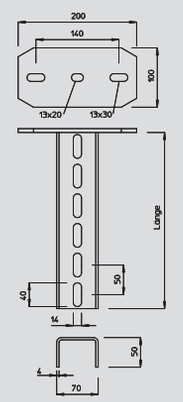
Suspended support



Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5 K/20	200	2.5	1	100.000	**6341 52 7**	
US 5 K/30	300	2.5	1	125.000	**6341 53 5**	
US 5 K/40	400	2.5	1	150.000	**6341 54 3**	
US 5 K/50	500	2.5	1	175.000	**6341 55 1**	
US 5 K/60	600	2.5	1	200.000	**6341 57 8**	
US 5 K/70	700	2.5	1	225.000	**6341 58 6**	
US 5 K/80	800	2.5	1	255.000	**6341 59 4**	
US 5 K/90	900	2.5	1	280.000	**6341 60 8**	
US 5 K/100	1000	2.5	1	300.000	**6341 61 6**	
US 5 K/110	1100	2.5	1	330.000	**6341 62 4**	
US 5 K/120	1200	2.5	1	360.000	**6341 63 2**	

Suspended support (U profile) of dimensions 50 x 50 mm with welded head plate.

US5

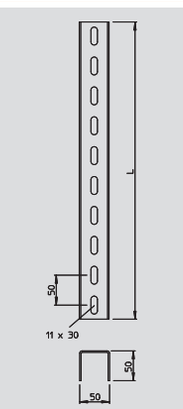


Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 7 K/130	1300	4	1	614.000	**6339 21 2**	
US 7 K/140	1400	4	1	654.000	**6339 22 0**	
US 7 K/150	1500	4	1	694.000	**6339 23 9**	
US 7 K/160	1600	4	1	734.000	**6339 24 7**	
US 7 K/170	1700	4	1	774.000	**6339 25 5**	
US 7 K/180	1800	4	1	814.000	**6339 26 3**	
US 7 K/190	1900	4	1	854.000	**6339 27 1**	
US 7 K/200	2000	4	1	894.000	**6339 29 8**	

Suspended support (U profile) of dimensions 70 x 50 mm with welded head plate.

US7

U support



Type	Length	Material thickness	Pack.	Weight	Item No.	Price /pc.
	mm	mm	pcs	kg/% pc	ST / FT	
US 5/30	300	2.5	1	79.000	**6340 90 3**	
US 5/40	400	2.5	1	106.000	**6340 91 1**	
US 5/50	500	2.5	1	133.000	**6340 93 8**	
US 5/60	600	2.5	1	160.000	**6340 94 6**	
US 5/70	700	2.5	1	175.000	**6340 95 0**	
US 5/80	800	2.5	1	200.000	**6340 95 4**	
US 5/90	900	2.5	1	227.000	**6340 95 8**	
US 5/100	1000	2.5	1	265.000	**6340 96 2**	
US 5/150	1500	2.5	1	395.000	**6340 96 6**	
US 5/200	2000	2.5	1	526.000	**6340 97 0**	

U support in fixed lengths. Dimensions 50 x 50 mm.

US5

Always indicate the article number when ordering.

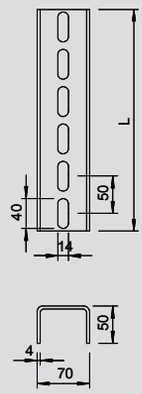
Cable-specific support constructions: products

U support

US7

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
US 7/30	300	4	1	120.000	**6340 03 2**	
US 7/40	400	4	1	160.000	**6340 05 9**	
US 7/50	500	4	1	200.000	**6340 07 5**	
US 7/60	600	4	1	240.000	**6340 09 1**	
US 7/70	700	4	1	280.000	**6340 11 3**	
US 7/80	800	4	1	320.000	**6340 14 8**	
US 7/90	900	4	1	360.000	**6340 16 4**	
US 7/100	1000	4	1	400.000	**6340 18 0**	
US 7/110	1100	4	1	440.000	**6340 19 9**	
US 7/120	1200	4	1	480.000	**6340 20 2**	
US 7/130	1300	4	1	520.000	**6340 21 0**	
US 7/140	1400	4	1	560.000	**6340 22 9**	
US 7/150	1500	4	1	600.000	**6340 23 7**	
US 7/160	1600	4	1	640.000	**6340 24 5**	
US 7/170	1700	4	1	680.000	**6340 25 3**	
US 7/180	1800	4	1	720.000	**6340 26 1**	
US 7/190	1900	4	1	760.000	**6340 28 8**	
US 7/200	2000	4	1	800.000	**6340 29 6**	

U support in fixed lengths. Dimensions 70 x 50 mm.

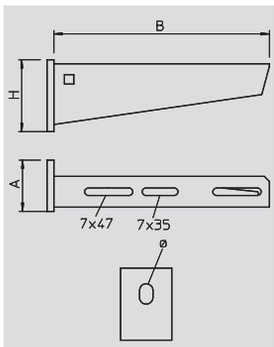


Wall and support brackets

AW US5 US7

Type	Width mm	Dimension H mm	Dimension A mm	Hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW 30/21	210	70	50	13	25	42.000	**6419 72 0**	
AW 30/31	310	80	50	13	25	63.000	**6419 74 7**	
AW 30/41	410	80	50	13	20	93.000	**6419 76 3**	
AW 30/51	510	90	50	13	10	132.500	**6419 79 8**	

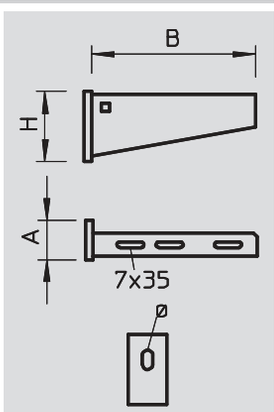
Medium-weight wall and support bracket with welded head plate.



AW US7

Type	Width mm	Dimension H mm	Dimension A mm	Hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
AW 55/21	210	90	50	13.5	1	98.000	**6418 55 4**	

Heavyweight wall and support bracket with welded head plate.

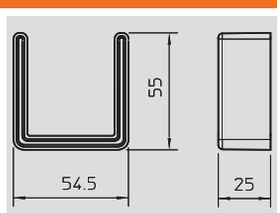


Protective cap

US5

Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 5 KS	Sulphur yellow	20	1.300	**6338 46 1**	

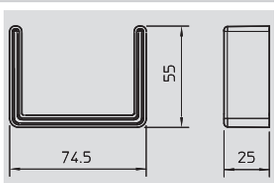
Protective cap for end covering of US 5 supports.



US7

Type	Colour	Pack. pcs	Weight kg/% pc	Item No. PE	Price /pc.
US 7 KS	Sulphur yellow	20	2.000	**6338 49 6**	

Protective cap for end covering of US 7 supports.



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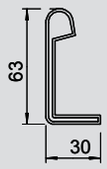
Always indicate the article number when ordering.

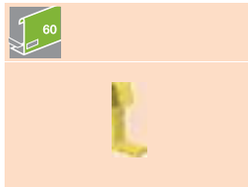
Cable-specific support constructions: products

Protective cap

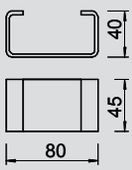


Type	Colour	Pack. pair	Weight kg/% pair	Item No. PE	Price /pair
SKH 60	yellow	40	1.000	**6222 53 6**	

End cap to cover cable ladder ends of side height 60 mm.

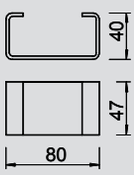


Spacer



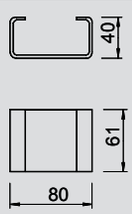
Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 45	25	19.000	**6416 50 0**	

Spacer for use in U 5 support and in the head plate, type KU 7 VQP.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 47	25	17.000	**6416 50 4**	

Spacer for use in head plate, type KU 5 V.



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
DSK 61	20	26.000	**6416 51 9**	

Spacer for use in U 7 supports.

Cable ladder

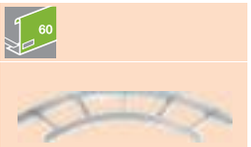
Type	Width mm	Length mm	Frame distance mm	Weight borders	Item No. ST / FS	Price /m
SL 620 VS /F	200	6000	150	409.000	**6207 92 8**	
SL 630 VS /F	300	6000	150	457.600	**6207 93 2**	
SL 640 VS /F	400	6000	150	506.300	**6207 93 6**	
SL 650 VS /F	500	6000	150	555.000	**6207 94 0**	

Heavyweight cable ladder for electrical function maintenance to DIN 4102 Part 12. Material thickness 2 mm.

Always indicate the article number when ordering.

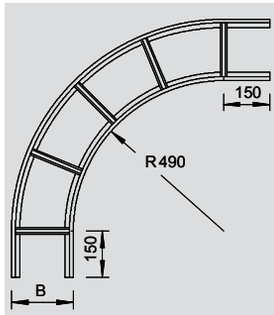
Cable-specific support constructions: products

Fitting



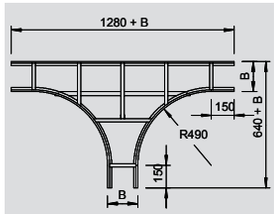
Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LBI 90/620 VS	200	1	358.000	**6211 22 4**	
LBI 90/630 VS	300	1	412.000	**6211 23 2**	
LBI 90/640 VS	400	1	497.000	**6211 24 0**	
LBI 90/650 VS	500	1	558.000	**6211 25 9**	

90° bend, horizontal, for cable ladders with VS rungs and a side height of 60 mm.



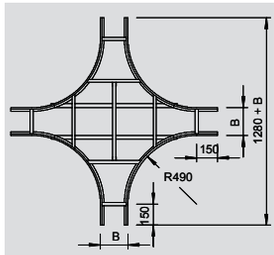
Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LT 620 VS	200	1	677.000	**6213 72 3**	
LT 630 VS	300	1	789.000	**6213 73 1**	
LT 640 VS	400	1	871.000	**6213 75 8**	
LT 650 VS	500	1	952.000	**6213 76 6**	

T piece, horizontal, for cable ladders with VS rungs and a side height of 60 mm.



Type	Width mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LK 620 VS	200	1	935.000	**6214 22 3**	
LK 630 VS	300	1	1080.000	**6214 23 1**	
LK 640 VS	400	1	1175.000	**6214 25 8**	
LK 650 VS	500	1	1271.000	**6214 26 6**	

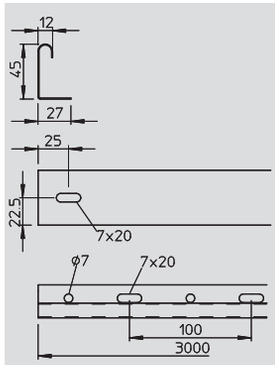
Horizontal cross-over for cable ladders with VS rungs and a side height of 60 mm.



Separating retainer

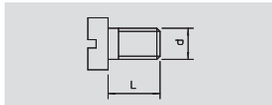
Type	Side height mm	Length mm	Pack. m	Weight borders	Item No. ST / FS	Price /m
TSG 45	45	3000	45	50.000	**6062 03 2**	

Separating retainer for separation of cables of different voltages or functions.



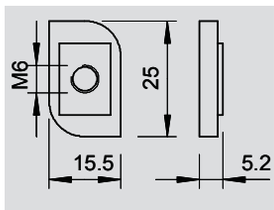
Type	Thread	Length mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
341	M6	10	100	0.392	**3153 09 6**	

Cylinder head bolt according to ISO 1207 with metric thread.



Type	Thread	Version	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5017	M6	No screw	100	0.985	**1143 06 9**	

Slide nut for profile rails with a slot width of 16–17 mm.
For VS rung, mountable from above.



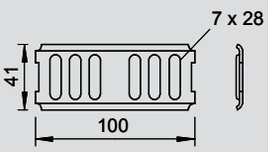
Always indicate the article number when ordering.

Cable-specific support constructions: products

Connector

Type	Width mm	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
AVL 60	135	65	10	23.200	**6208 77 0**	

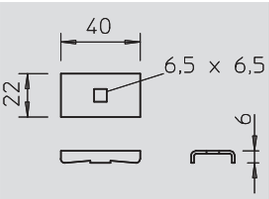
External connector for mechanical connection of cable ladder sections for routing types with cable ladders for function maintenance to DIN 4102 Part 12.



Type	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
RLVK 45	45	10	8.800	**6067 06 9**	

Connector for longitudinal connection separating retainer, type TSG 45.

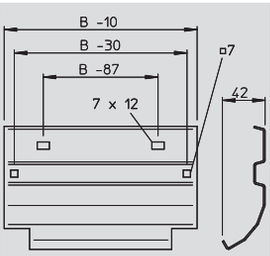
Clamping piece



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
LKS 40	50	3.400	**6221 07 6**	

Clamp for fixing cable ladders.

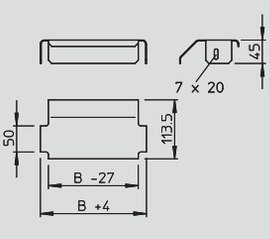
Exit plate



Type	Width mm	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
LAB/20	200	45 -110	20	40.000	**6220 43 6**	
LAB/30	300	45 -110	25	60.000	**6220 44 4**	
LAB/40	400	45 -110	25	79.000	**6220 45 2**	
LAB/50	500	45 -110	15	98.000	**6220 46 0**	

Exit plate for mounting on the rung for vertically exiting cables.

Support plate



Type	Width mm	Side height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
LALB/20	200	45 -110	10	36.000	**6221 85 8**	
LALB/30	300	45 -110	10	53.000	**6221 86 6**	
LALB/40	400	45 -110	10	70.000	**6221 87 4**	
LALB/50	500	45 -110	10	86.000	**6221 88 2**	

Support plate to increase the cable volume and for cable protection.

Support plate for fitting

Type	Width mm	Height mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /pc.
SAB 20	180	16.5	25	31.000	**6222 94 3**	
SAB 30	280	16.5	25	50.000	**6222 95 1**	
SAB 40	380	16.5	25	65.000	**6222 97 8**	

Support plates to increase the support area for the cables in the fittings for routing types with cable ladders for function maintenance to DIN 4102 Part 12. Use the support plates to ensure the largest possible support surface in the cable ladder fittings for the function maintenance cables in case of fire. The support plates are just laid loosely on the rungs of the cable ladder fittings. The lugs pointing down prevent slippage.

Always indicate the article number when ordering.

Cable-specific support constructions: products

Connection component

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
ABL	20	15.000	**6221 46 7**	

The connection component is the connection between the threaded rod lock and the suspension system for the routing types with cable ladders for function maintenance to DIN 4102 Part 12.
It is attached to the under belt of the ladder rail at a distance of max. 100 mm from the bracket.
When the threaded rod has been mounted, the connection component is secured against slipping.

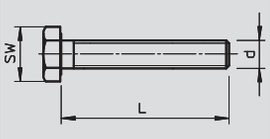
Fire protection clamp

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
BSB	20	41.000	**6418 19 8**	

Fire protection clamp for ceiling fastening of the threaded rod lock for routing types with cable ladders and cable trays for function maintenance to DIN 4102 Part 12.

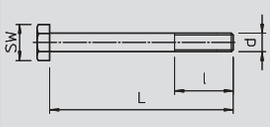
Hexagonal bolt

Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /pc.
SKS 10x80	M10 x 80	80	10	17	20	7.700	**6418 25 0**	
SKS 10x90	M10 x 90	90	10	17	20	8.000	**6418 25 2**	



Hexagonal bolt for universal fixing of structure components.

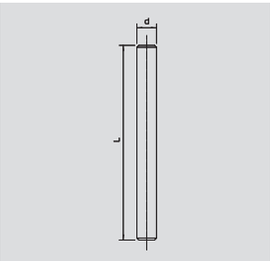
Type	Thread	Dimension L mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /pc.
SKS 12x80	M12 x 80	80	12	19	20	11.800	**6418 28 7**	
SKS 12x110	M12 x 110	110	12	19	20	14.300	**6418 31 7**	



Hexagonal bolt with hexagonal nut, washer and lock washer.

Threaded rod

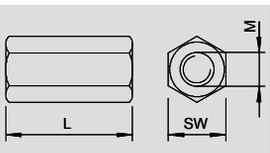
Type	Thread	Dimension d mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2078	M10	10	1000	25	49.000	**3141 20 9**	
2078	M12	12	1000	20	70.000	**3141 30 6**	



Threaded rod to DIN 976.

Connection sleeve

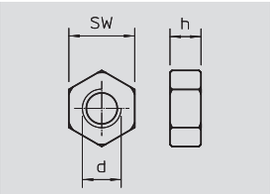
Type	Thread	Dimension M	Dimension L mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
12005	M12	12	40	19	25	7.000	**6410 11 1**	



Connection sleeve with continuous internal thread.

Hexagonal nut

Type	Thread	Dimension d mm	Dimension h mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
DIN 934	M10	10	8.4	17	100	1.084	**3400 10 7**	
DIN 934	M12	12	10.8	19	100	1.730	**3400 12 3**	

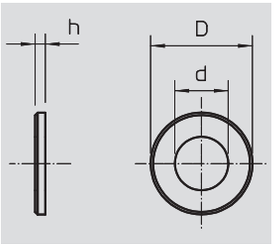


Hexagonal nut to DIN 934 with metric thread.

Always indicate the article number when ordering.

Cable-specific support constructions: products

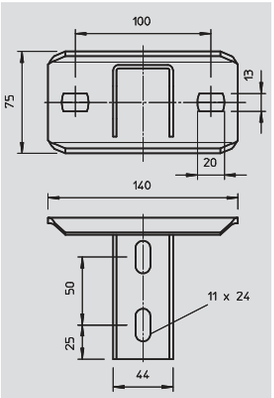
Washer



Type	Thread	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
966	M10	20	10.5	2	100	0.408	**3402 09 6**	
966	M12	24	13	2.5	100	0.627	**3402 12 6**	

Washer according to DIN 125, shape A, for universal use.

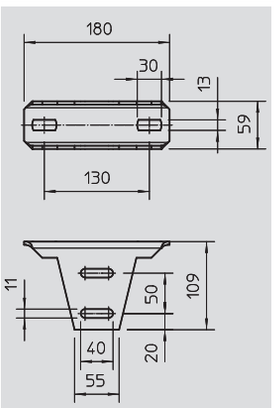
Head plate



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KUS 5	1	70.000	**6348 90 4**	

Head plate for mounting on US 5 support.

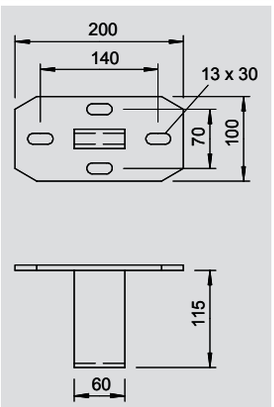
US5



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 5 V	1	78.900	**6348 92 0**	

Variable head plate for mounting on US 5 support.

US5



Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 7	1	160.000	**6349 10 2**	

Lightweight head plate for mounting on US 7 support.

US7

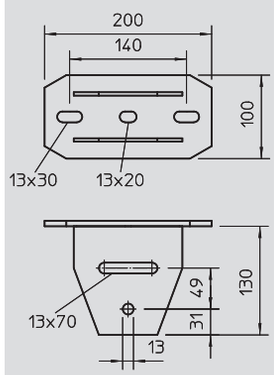
Cable-specific support constructions: products

Head plate

US7

Type	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /pc.
KU 7 VQP	10	157.000	**6349 15 3**	

Variable head plate for mounting on US 7 support.



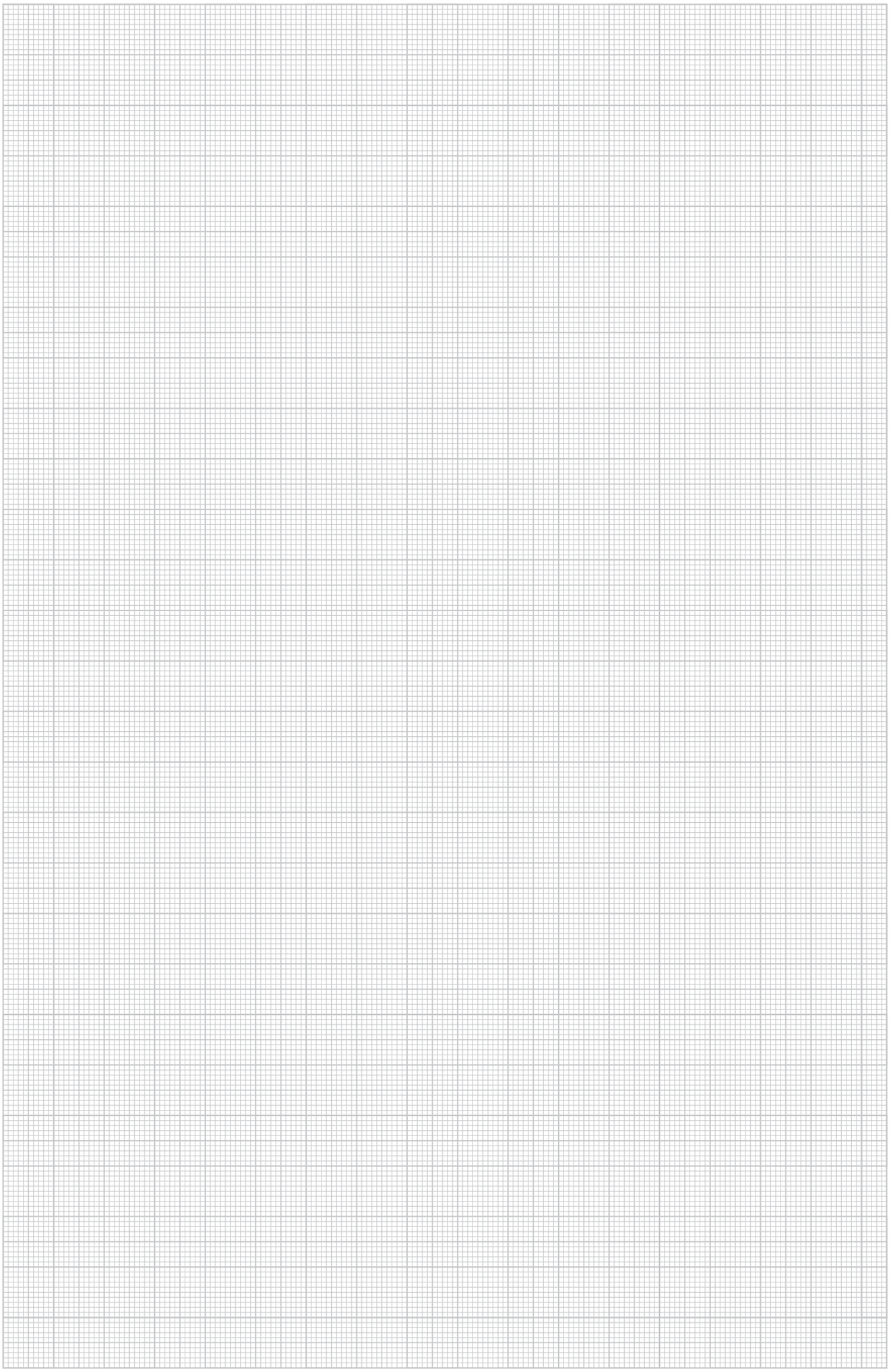
Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.



- Vertical ladders for vertical routing
- Lightweight, heavyweight and industrial versions
- Electrical function maintenance with high loads
- Safe installation with systems tested to DIN 4102 Part 12

Function maintenance with vertical ladder systems

Overview of vertical ladder systems
Standard support constructions

Vertical ladders for vertical routing of function maintenance cables, to be mounted with or without connectors. The following parameters apply to all the systems:

- Cable load: max. 20 kg/m
- Rung distance: max. 0.3 m
- Fastening distance: max. 1.2 m
- Single cable assignment: diameter not limited
- Routing with cable bundles: max. 3 cables with a diameter of max. 25 mm
- Approved for all cable types

Lightweight ladder routing type
- Rising track width: 200, 300, 400 mm

Heavyweight ladder routing type
- Rising track width: 400, 500, 600 mm

Industrial ladder routing type
- Rising track width: 400, 500, 600 mm

Cable strain relief
Cables on rising tracks must be effectively supported in the transfer area between vertical and horizontal outing, to prevent bending or sliding. Continuous cable systems are only awarded function maintenance classification when there is effective support at a maximum distance of 3.5 m.

Strain relief through loops
To prevent the cable from breaking due to its own weight if there is a fire, route the cables in a loop. The horizontal cable length must be at least 0.3 m. The fastening clips on the horizontal may not, as with vertical mounting, exceed a spacing of 0.3 m. During the installation, the permissible bending radii of the cables may also be observed. The 3.5 m spacing of these supports may not be exceeded.

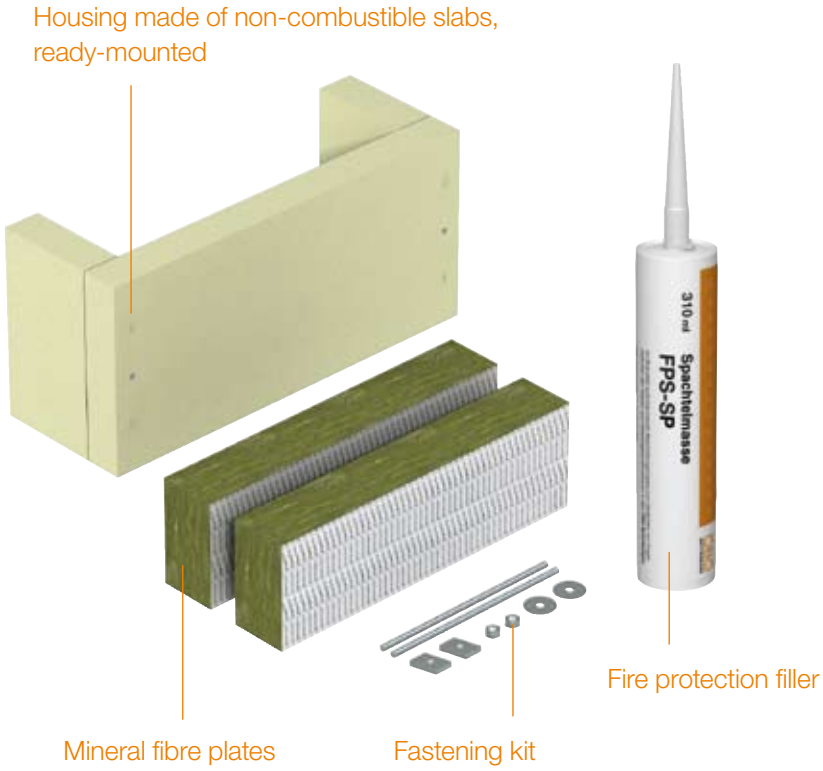
Strain relief through cable insulation
An additional support option is the installation of approved cable insula tions in the ceiling openings. In so doing, the fire resistance length of the insulation system must correspond to the function maintenance class of the installed cable system. In this case, the storey height may not exceed 3.5 m.

Strain relief for vertical routing

The OBO ZSE90 strain relief allows avoidance of the costly loops, in accordance with DIN 4102 Part 12. The universally applicable solution is approved for all E30/E90 vertical ladder types and, naturally, also for single clips, which run cables vertically. There is no dependency on specific cable types or manufacturers. This allows highly economical and space-saving support of the vertically installed function maintenance cables according to DIN standards.

LG 60 lightweight industrial ladder with ZSE90 strain relief

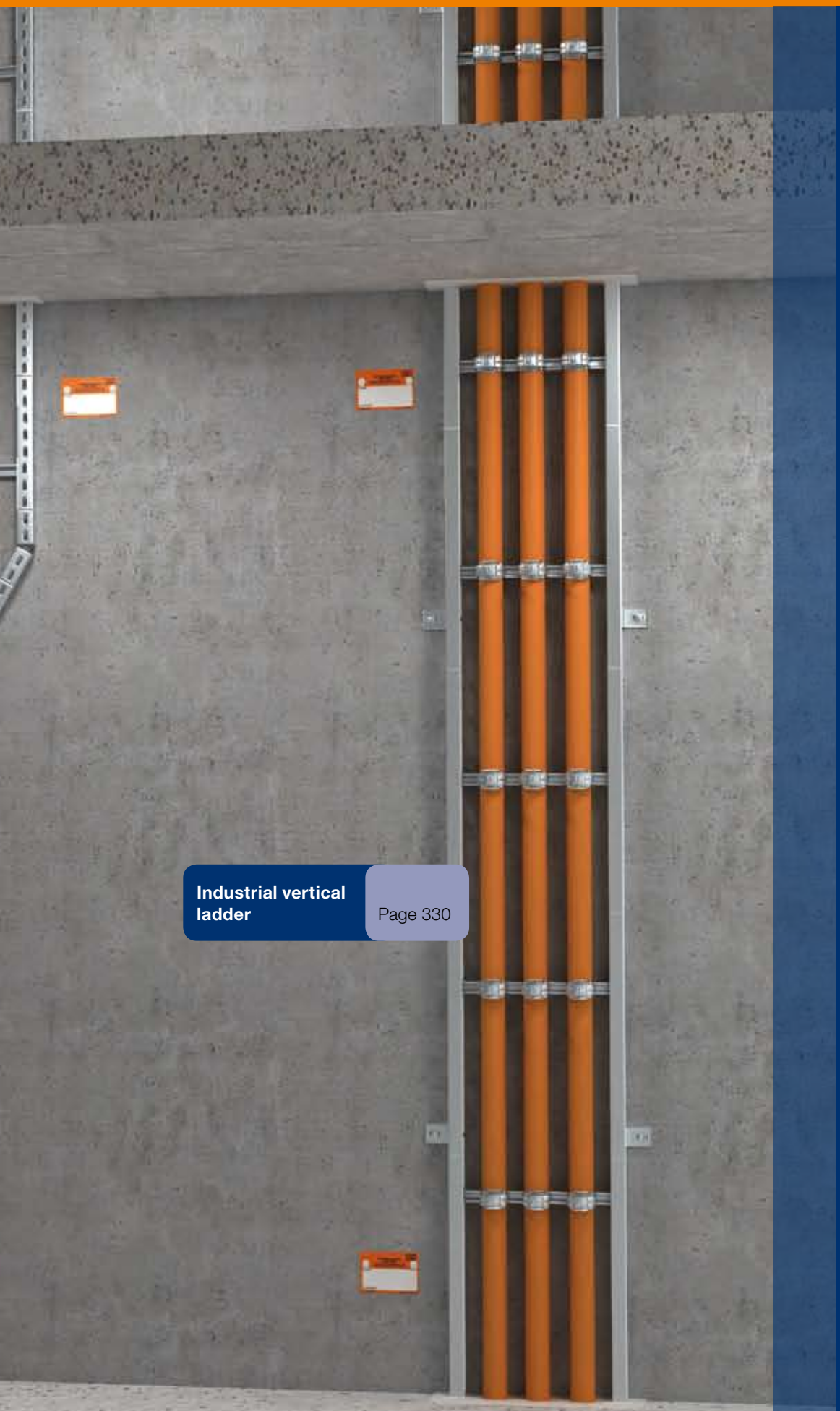
SLS vertical industrial ladder with ZSE90 strain relief



Individual clips or clamp clips on profile rail with ZSE90 strain relief

No restriction on cable types, approved for E30 and E90 with one type. Fastening in the profile rail or next to the cable line. Penetration of the ladder rails approved.

System overview
Function maintenance with vertical ladder systems



Industrial vertical ladder Page 330

Standard support constructions: lightweight vertical ladder

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mer Part 4 Function maintenance classes E 30 and E 90

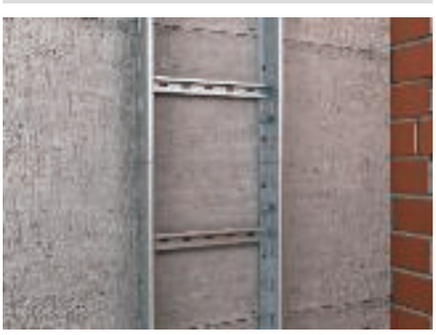
Approved data	
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	200, 300, 400
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

The routing type with lightweight vertical ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. The lightweight vertical ladders have a rung spacing of 0.30 m and can be used for widths of up to 400 and 600 mm. The cables must be fastened on each rung with clamp clips of type 2056 UM/... made of galvanised sheet steel with a riveted metal pressure trough.
According to the surveyor's comments, bundling of up to three cables in a clamp clip is possible. The individual diameter of the bundles cables may not exceed 25 mm.
There is no limit to the diameter of cables individually fastened with clamp clips.

System components

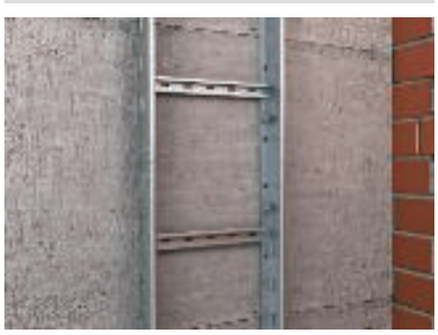
Lightweight vertical ladder, straight connector, bolt tie, fire protection bolt tie, clamp clip, identification plate.

Wall application area without connectors



Standard support construction made of vertical ladder L 6... VS. The joint is mounted without connectors.

Wall application area with connectors



Standard support construction made of vertical ladder L 6... VS. Mounting with straight connectors is approved at any point between the fastening points.

Draw on the anchor holes

Transfer the position of the holes drilled in the vertical ladder to the wall.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

Always indicate the article number when ordering.

Standard support constructions: lightweight vertical ladder

Drilling of the anchor holes

Drill the anchor holes in the wall.

Mounting of the vertical ladder

Screw the vertical ladder using the bolt ties (size 10 mm) with push-through mounting. In the case of mounting on masonry walls, push the bolt tie through the ladder rails and screw it into the drill hole.

Joint design with connector

Screw the straight connectors in both ladder rails using a total of 4 truss-head bolts.

Joint plate mounting without connectors

Fasten the two adjoining ladder ends with anchors in both rails at a distance of maximum 100 mm from the rail end.

Fastening the cables

Fasten the cables to each rung of the cable ladder with clamp clips.

Cable strain relief

Create the necessary strain relief using additional profile rails. Arrange and space of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

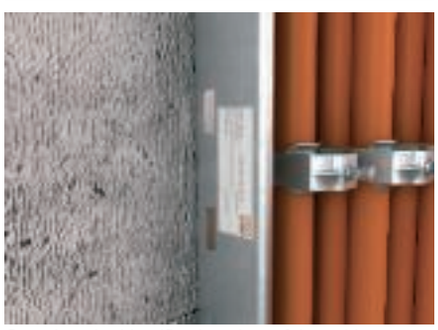
Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling



Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

Standard support constructions: lightweight vertical ladder

System parameters at a glance

Approved data

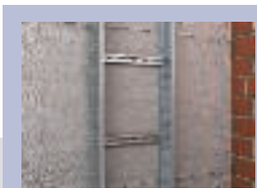
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	200, 300, 400
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per connection point

Cable ladders LG 6...VS	1
Straight connector LLV 60	2
Truss-head bolt FRS 8x16	4
Identification plate KS-E	*

* Number as necessary



Profile rails for strain relief

Profile rail 1268	*
Profile rail 2068	*

* Number as necessary

Locking of the clamp clips

Slide nut 5019	*
Washer DIN440/7	*
Hexagonal bolt 342/M6x16	*

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	*
Fire protection anchor FNA II M6/5	*
Fire protection anchor FNA II 6x30	*

* Number as necessary

Masonry wall

Fire protection bolt tie MMS 10 x 80	*
Fire protection bolt tie MMS 6 x 50	*

* Number as necessary

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: lightweight vertical ladder

Fastening clips

	**Clamp clip with metal pressure trough 2056/M**	*	
	**Clamp clip with metal pressure trough 2056/M2**	*	
	**Clamp clip with metal pressure trough 2056/M3**	* * Number as necessary	

Always indicate the article number when ordering.

Standard support constructions: heavyweight vertical ladder

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mer Part 4 Function maintenance classes E 30 and E 90

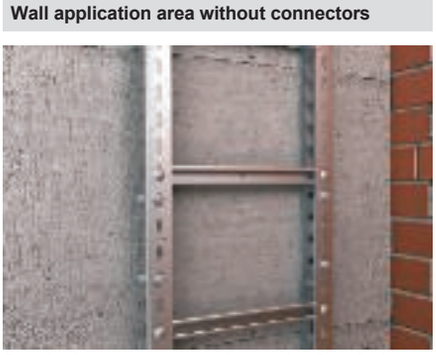
Approved data	
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

The routing type with heavyweight vertical ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. Vertical ladders of widths between 400 and 600 mm can be used. Mount the rungs at a maximum spacing of 300 mm. To fasten the cables on each rung, use clamp clips of type 2056 UM/... made of galvanised sheet steel with a riveted metal pressure trough.
Bundles of up to three cables may be created under a clamp clip. The individual diameter of the bundles cables may not exceed 25 mm.
There is no limit to the diameter of cables individually fastened with clamp clips.

System components

Heavyweight vertical ladder, U support connector, bolt tie, fire protection bolt tie, clamp clip, identification plate

Wall application area without connectors



Standard support construction made of vertical ladder SLM50C40F. The joint is mounted without connectors.

Wall application area with connectors

Standard support construction made of vertical ladder SLM50C40F. Mounting with straight connectors is approved at any point between the fastening points.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Standard support constructions: heavyweight vertical ladder

Mounting preparations

Draw on the exact position of the drill holes for the vertical ladders using a chalk mark.

Drilling of the anchor holes

Drill the anchor holes in the wall.

Mounting of the vertical ladder

Screw the vertical ladder using the bolt ties (size 10 mm) with push-through mounting. In the case of mounting on masonry walls, push the bolt tie through the ladder rails and screw it into the drill hole.

Joint design with connector

Screw the straight connectors in both ladder rails using truss-head bolts.

Joint plate mounting without connectors

Fasten the two adjoining ladder ends with anchors in both rails at a distance of maximum 100 mm from the rail end.

Fastening the cables

Fasten the cables to each rung of the cable ladder with clamp clips.

Cable strain relief

Creation of the necessary strain relief using additional profile rails. Arrange and space of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

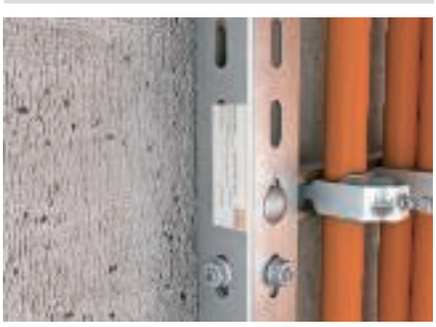
Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling



Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Standard support constructions: heavyweight vertical ladder

System parameters at a glance

Approved data

Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per connection point

Vertical ladder, SLM50C40F	1
U support connector VUS 5	2
Identification plate KS-E	*

* Number as necessary

Profile rail for strain relief

Profile rail CPS 4	*

* Number as necessary

Locking of the clamp clips

Slide nut GMH18	*
Washer DIN440/7	*
Hexagonal bolt 342/M6x16	*

* Number as necessary

Concrete wall

Fire protection anchor FAZ II 10/10GS	*
Fire protection anchor FNA II M6/5	*
Fire protection anchor FNA II 6x30	*

* Number as necessary

Masonry wall

Fire protection bolt tie MMS 10 x 80	*
Fire protection bolt tie MMS 6 x 50	*

* Number as necessary

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Standard support constructions: heavyweight vertical ladder

Fastening clips

Clamp clip with metal pressure trough 2056U/M

*

* Number as necessary

Standard support constructions: industrial vertical ladder

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-1-Mer Part 4 Function maintenance classes E 30 and E 90

Approved data	
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

The routing type with industrial vertical ladders fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. Vertical ladders of widths between 400 and 600 mm can be used. When mounting rungs, maintain a spacing of maximum 300 mm. To fasten the cables on each rung, use clamp clips of type 2056 UM/... made of galvanised sheet steel with a riveted metal pressure trough.
Bundles of up to three cables may be created under a clamp clip. The individual diameter of the bundles cables may not exceed 25 mm.
There is no limit to the diameter of individually fastened cables.

System components

Industrial vertical ladder, I support connector, bolt tie, fire protection bolt tie, identification plate

Wall application area without connectors

Standard support construction made of vertical ladder SLS80C40F. The joint is mounted without connectors.

Always indicate the article number when ordering.

Standard support constructions: industrial vertical ladder

Mounting preparations

Draw on the exact position of the drill holes for the vertical ladders using a chalk mark.

Mounting the fastening bracket

Mount the fastening bracket with bolt tie (dimension 10 mm) in push-through style. In the case of mounting on masonry walls, push the bolt tie through the fastening bracket and screw it into the drill hole.

Mounting of vertical ladder

Screw the vertical ladder to the fastening brackets using a truss-head bolt.

Joint fastening

Fasten of the two adjoining ladder ends with fastening brackets on both rails at a distance of maximum 100 mm from the rail end.

Fastening the cables

Fasten the cables to each rung of the cable ladder with clamp clips.

Cable strain relief

Create the necessary strain relief using additional profile rails. Arrange and space of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate to the cable ladder.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

Standard support constructions: industrial vertical ladder

System parameters at a glance

Approved data

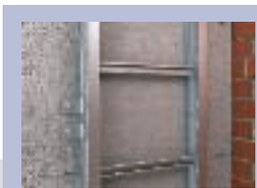
Max. fastening distance	1.2 m
Max. cable weight	20 kg/m
Max. rung distance	0.3 m
Rising track widths mm	400, 500, 600
Max. individual cable diameter	Unlimited
Triple cable bundle with Max. individual diameter	25 mm

Note:
Any cable tested to DIN 4102 Part 12 can be inserted.
Therefore the routing types are independent of the cable type and cable manufacturer.

Components per connection point

Vertical ladder, SLS80C40F	1
Fastening bracket BW80/55	2
Identification plate KS-E	*

* Number as necessary



Profile rail for strain relief

Profile rail CPS 4	*

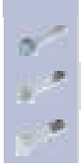
* Number as necessary

Locking of the clamp clips

Slide nut GMH18	*
Washer DIN440/7	*
Hexagonal bolt 342/M6x16	*

* Number as necessary

Concrete wall



Fire protection anchor FAZ II 12/10	*
Fire protection anchor FNA II M6/5	*
Fire protection anchor FNA II 6x30	*

* Number as necessary

Masonry wall

Fire protection bolt tie MMS 10 x 80	*
Fire protection bolt tie MMS 6 x 50	*

* Number as necessary

Fastening clips

Clamp clip with metal pressure trough 2056U/M	*

* Number as necessary

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

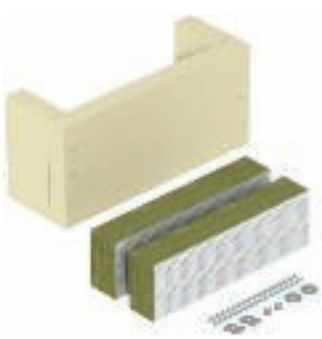
Strain relief to DIN

Support measure for vertical routing to DIN 4102 Part 12 Surveyor's comments 8357/2007 MPA BS Function maintenance classes E 30/E 90

Approved technical data	
Lightweight vertical ladder, max.	400 mm
Heavyweight vertical ladder, max.	600 mm
Industrial vertical ladder, max.	600 mm
Individual clips, vertical	600 mm
BBS clips with C rail	600 mm
Max. distance	3.5 m
Any cable tested to DIN 4102 Part 12 is approved.	

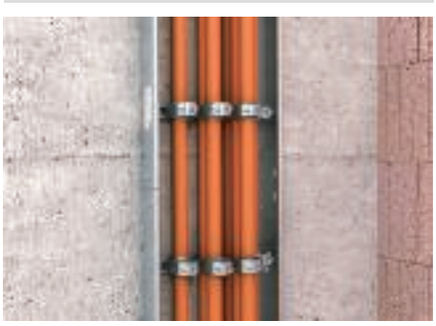
With vertical routing of function maintenance cables to DIN 4102 Part 12 with vertical ladders or in single clips, the standard requires effective cable support at a spacing of max. 3.5 m. If there is a fire, the ZSE 90 strain relief ensures that the "insulated" profile rail or rung stays relatively "cold" in comparison to the fire area. Now, the most which will be suspended from the strain relief is the copper weight of the 3.5 m cable. This limits the risk that the cable breaks. This guarantees sure function maintenance.
The OBO ZSE 90 strain relief can be used for all widths of rising track. There is no restriction to tested cable combinations. The ZSE 90 is approved for all function maintenance cables.

System components



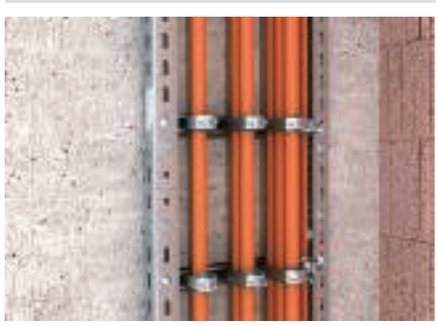
Housing strain relief, coated mineral fibre plates, fire protection filler, mounting set with fastening material

Lightweight rising track



Usable in the lightweight version with VS rung.

Heavyweight rising track



Usable in the heavyweight version with U profiles and CPS4 rung.

Industrial rising track

Usable in the industrial version with IS8 profiles and CPS4 rung.

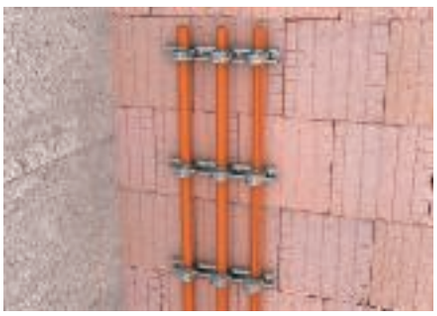
Always indicate the article number when ordering.

Strain relief to DIN

Vertical routing with single clips

Usable with single clip through fastening next to the cables with fire protection bolt tie.

Clamp clip and profile rail



Usable with clamp clips with 1268/2068 profile rail through fastening in the profile rail with slide nut.

Mounting in a rising track

Push the threaded rod, with the slide nut on it, into the rail. Turning the threaded rod causes the slide nut to cross-thread, thus securing the threaded rod in place.

Mount spacer

Hexagonal nuts with large washers are screwed onto the threaded rods according to the distance of the internal housing dimension. This prevents break-
age of the fire protection plates when the nuts are tightened from the outside.

Determining the drill size

Measure the spacing of the threaded rods in the profile rail.

Transfer dimension

Transfer the measured value to the centre line of the housing and draw it on.

Drilling

Drill the holes for the M8 threaded rods. In so doing, work carefully and without great pressure, to avoid breaking the plates.

Attachment of the housing

The housing is pushed carefully onto the threaded rods and up to the wall. If necessary, correct the distance of the internal nuts. Then, fasten it on the outside with nuts and large washers.

Insert mineral fibre plate

The mineral fibre plate, adapted to the cable contours, is fitted into the housing so that it has a tight fit. Residual openings behind the cables are filled with cuttings.

Mineral wool filling

The cavity of the housing is filled with loose mineral wool (melting point > 1,000 °C). Then the top plate is installed so that it is tightly fitting.

Closing residual joints

Finally, close off all the joints with fire protection filler from the cartridge.

Finished support

Approved solution as effective support according to DIN 4102 Part 12. Universal solution for E 30 to E 90; all cable manufacturers approved.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

Strain relief to DIN

Support, heavyweight rising track

Support, industrial rising track

Support, single clip/clamp clip

Alternative fastening

Finished mounting

When the rising track is fully assigned or there is no profile rail, the threaded rods are fastened with the MMS-ST 7.5 fire protection bolt tie and the M8 connection sleeve. Drill 6 mm to the side of the rising track. Further mounting steps are described above.

System parameters at a glance

Approved technical data

Lightweight vertical ladder, max.	400 mm
Heavyweight vertical ladder, max.	600 mm
Industrial vertical ladder, max.	600 mm
Individual clips, vertical	600 mm
BBS clips with C rail	600 mm
Max. distance	3.5 m
Any cable tested to DIN 4102 Part 12 is approved.	

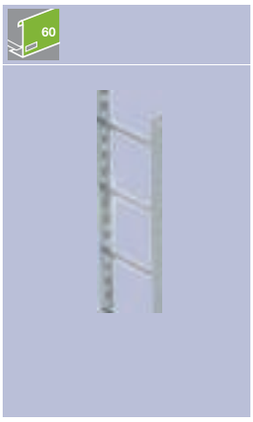
Strain relief every 3.5 m

	**Strain relief ZSE90**	ZSE 90	*	
	Mounting set		*	
			* Number as necessary	

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

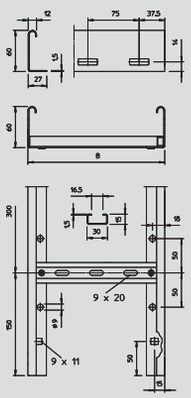
Vertical ladder: products

Vertical ladder, LG 60 VS

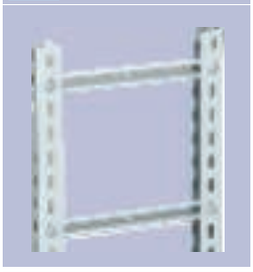


Type	Width mm	Rail thickness mm	Frame distance mm	Length mm	Weight borders	Item No. ST / FS	Price /m
LG 620 VS	200	1.5	300	6000	273.800	**6208 62 7**	
LG 630 VS	300	1.5	300	6000	298.000	**6208 63 0**	
LG 640 VS	400	1.5	300	6000	322.200	**6208 63 3**	

Cable ladder with perforated side rail of side height 60 mm with riveted C profile rungs, open in an upwards direction (VS version).



Vertical ladder, SLM50



Type	Width mm	Frame distance mm	Length mm	Weight borders	Item No. ST / FT	Price /m
SLM50C40F	400	300	3000	766.000	**6010 00 8**	
SLM50C40F	500	300	3000	821.000	**6010 01 6**	
SLM50C40F	600	300	3000	876.000	**6010 02 4**	

Heavyweight vertical ladder system for electrical function maintenance to DIN 4102 Part 12. Approved clips, type 2056 U/M. Supplied unmounted.

Vertical ladder, SLS80

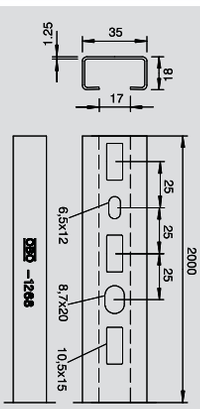
Type	Width mm	Frame distance mm	Length mm	Weight borders	Item No. ST / FT	Price /m
SLS80C40F	400	300	3000	1487.000	**6010 10 5**	
SLS80C40F	500	300	3000	1542.000	**6010 11 3**	
SLS80C40F	600	300	3000	1597.000	**6010 12 1**	

Industrial vertical ladder system for electrical function maintenance to DIN 4102 Part 12. Approved clips, type 2056 U/M. Supplied unmounted.

Profile rail

Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
1268	200	1.25	25	14.300	**1104 26 8**	
1268	300	1.25	25	21.450	**1104 28 4**	
1268	400	1.25	10	28.550	**1104 29 2**	
1268	500	1.25	10	35.750	**1104 30 6**	
1268	2000	1.25	20	71.500	**1104 50 0**	

Lightweight profile rail, perforated, slot width 17 mm.

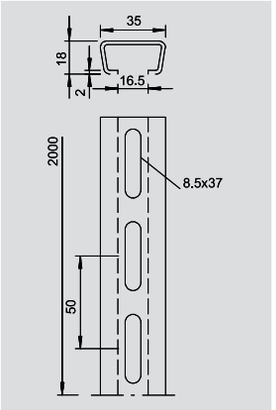


Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

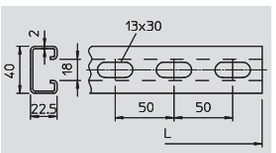
Vertical ladder: products

Profile rail



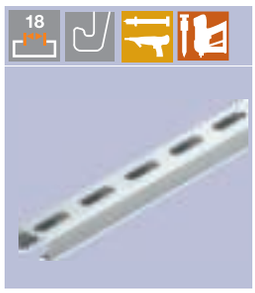
Type	Length	Material thickness	Pack.	Weight	Item No.	Price /% m
	mm	mm	m	borders	ST / FT	
2068	2000	1.5	20	89.000	**1119 65 6**	

Profile rail, perforated, slot width 16.5 mm.

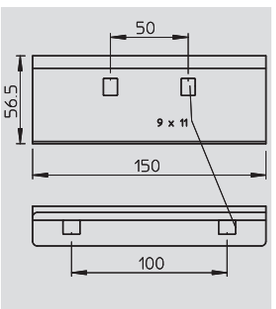


Type	Length	Material thickness	Pack.	Weight	Item No.	Price /% m
	mm	mm	m	borders	ST / FT	
CPS 4	2000	2	10	160.000	**1121 97 9**	

Heavyweight profile rail, perforated, slot width 18 mm.

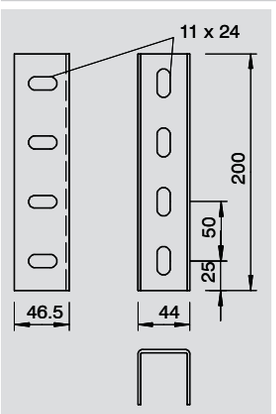


Connector



Type	Side height	Pack.	Weight	Item No.	Price /pc.
	mm	pcs	kg/% pc	ST / FS	
LLV 60	60	20	18.000	**6208 80 0**	

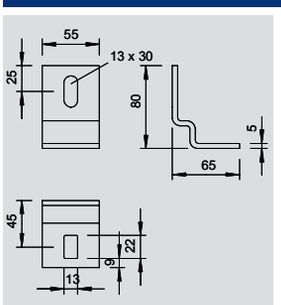
Straight connectors as internal connectors to connect cable ladders and fittings of 60 mm side height.



Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
VUS 5	10	80.000	**6018 50 5**	

U support connector to connect US 5 supports.

Fastening bracket



Type	Pack.	Weight	Item No.	Price /pc.
	pcs	kg/% pc	ST / FT	
BW 80/55	10	32.000	**6019 52 8**	

Fastening bracket for mounting IS 8 supports on the wall.

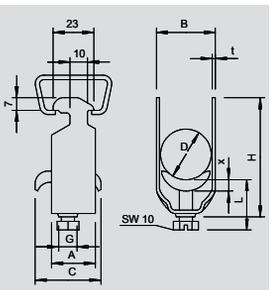
Always indicate the article number when ordering.

Vertical ladder: products

Clamp clip

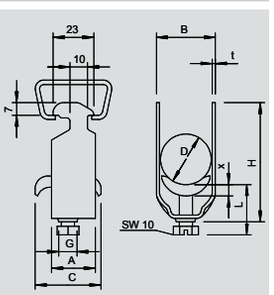
Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M	8 -12	16	30	1.5	100	3.200	**1156 00 4**	
2056/M	12 -16	20	30	1.5	100	3.500	**1156 01 2**	
2056/M	16 -22	27	30	1.5	100	4.400	**1156 02 0**	
2056/M	22 -28	33	30	2	100	6.100	**1156 03 9**	
2056/M	28 -34	39	35	2	100	7.700	**1156 04 7**	
2056/M	34 -40	45	35	2	100	8.600	**1156 05 5**	
2056/M	40 -46	51	35	2	100	9.600	**1156 06 3**	
2056/M	46 -52	57	35	2	100	10.400	**1156 07 1**	
2056/M	52 -58	64	35	2.5	100	13.100	**1156 09 8**	
2056/M	58 -64	70	35	2.5	100	14.500	**1156 10 1**	
2056/M	64 -70	76	35	2.5	50	16.100	**1156 12 8**	
2056/M	70 -76	82	40	2.5	25	18.300	**1156 13 6**	
2056/M	76 -82	88	40	2.5	25	19.100	**1156 14 4**	
2056/M	82 -90	97	40	3	25	23.300	**1156 15 2**	
2056/M	90 -100	107	40	3	25	25.400	**1156 16 0**	

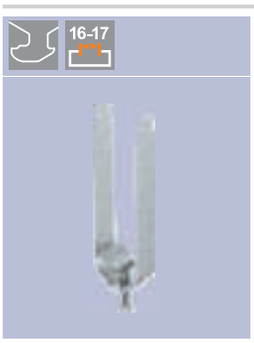
Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M2	8 -12	16	30	1.5	50	3.980	**1156 17 9**	
2056/M2	12 -16	20	30	1.5	50	4.750	**1156 18 7**	
2056/M2	16 -22	27	30	1.5	50	6.900	**1156 19 5**	
2056/M2	22 -28	33	34	2	50	7.800	**1156 20 9**	

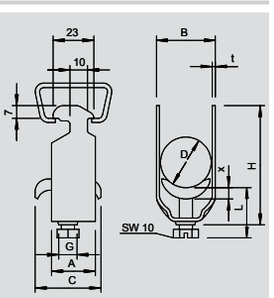
Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.





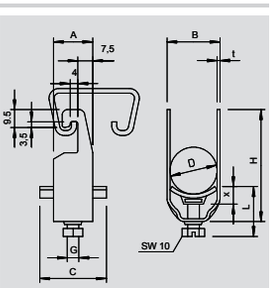
Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M3	8 -12	16	34	1.5	50	4.050	**1156 24 1**	
2056/M3	12 -16	20	34	1.5	50	5.800	**1156 26 8**	
2056/M3	16 -22	27	34	1.5	50	6.500	**1156 27 6**	
2056/M3	22 -28	33	34	2	50	9.500	**1156 28 4**	

Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056U/M	8 -12	16	34	1.5	100	3.300	**1158 00 7**	
2056U/M	12 -16	20	34	1.5	100	3.520	**1158 01 5**	
2056U/M	16 -22	27	34	1.5	100	3.960	**1158 02 3**	
2056U/M	22 -28	33	34	2	100	5.890	**1158 03 1**	
2056U/M	28 -34	39	34	2	100	7.650	**1158 05 8**	
2056U/M	34 -40	45	34	2	100	8.360	**1158 06 6**	
2056U/M	40 -46	51	40	2	100	10.890	**1158 07 4**	
2056U/M	46 -52	57	40	2	100	11.660	**1158 08 2**	
2056U/M	52 -58	64	40	2.5	100	14.740	**1158 09 0**	
2056U/M	58 -64	70	40	2.5	100	15.730	**1158 10 4**	
2056U/M	64 -70	76	40	2.5	50	18.200	**1158 11 2**	
2056U/M	70 -76	82	40	2.5	25	20.600	**1158 12 0**	

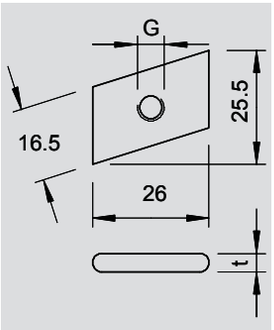
Suitable for all C profile rails with slot width 18 mm. Also suitable for flat, bracket and U irons of 4–12 mm material thickness.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Always indicate the article number when ordering.

Vertical ladder: products

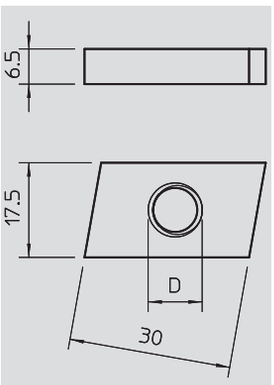
Slippage protection



Type	Dimension G mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5019	6	4	100	1.150	**1144 10 3**	

Slide nut for profile rails with a slot width of 16–17 mm.

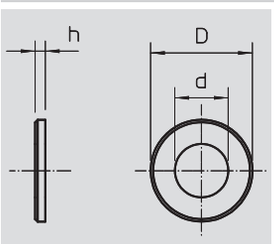
16-17



Type	Dimension D mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
GMH18	6	50	2.400	**1146 50 5**	

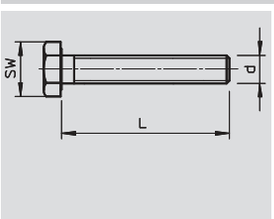
Slide nut for profile rails with a slot width of 18 mm.

18



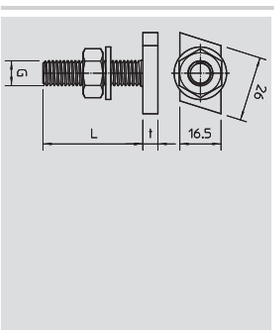
Type	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
DIN440/7	22	6.6	2	100	0.550	**6408 70 2**	

Washer of particularly large outer diameter.



Type	Thread	Length mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
342	M6	16	6	10	100	0.494	**3156 14 1**	

Hexagonal bolt to ISO 4017 with metric thread.



Type	Thread	Dimension L mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
5022	M6	25	5	50	1.960	**1151 01 0**	

Hammer-head bolt with washer and nut for profile rails with slot width 16–17 mm.

16-17

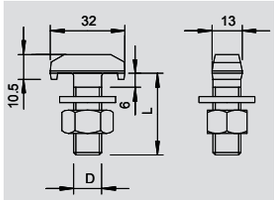
Always indicate the article number when ordering.

Vertical ladder: products

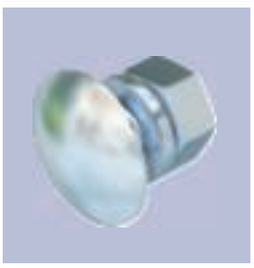
Slippage protection

Type	Thread	Dimension L mm	Dimension D mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5023	M10	30	10	50	4.130	**1153 41 2**	

Hammer-head bolt with washer and nut for profile rails with slot width 18 mm.

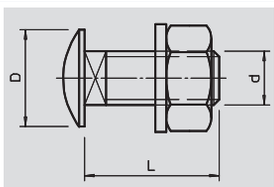


Truss-head bolt

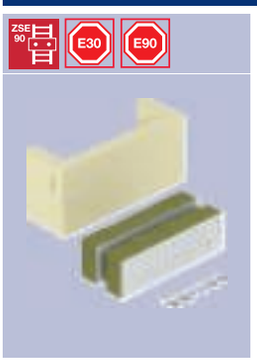


Type	Thread	Dimension L mm	Dimension D mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / F	Price /% pc
FRS 8x16	M8	16	20	8	13	50	1.900	**6406 96 3**	
FRS 8x35	M8	35	20	8	13	50	2.550	**6407 04 8**	
FRS 10x25	M10	25	24	10	17	50	4.140	**6407 56 0**	
FRS 12x25	M12	25	30	12	19	10	6.610	**6406 25 4**	

Truss-head bolt with square neck. With washer and hexagonal nut.



Strain relief



Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
ZSE90/13	1	375.000	**7215 70 1**	
ZSE90/14	1	445.000	**7215 70 5**	
ZSE90/15	1	515.000	**7215 70 8**	
ZSE90/23	1	510.000	**7215 71 2**	
ZSE90/24	1	610.000	**7215 71 5**	
ZSE90/25	1	680.000	**7215 71 8**	
ZSE90/26	1	795.000	**7215 72 5**	
ZSE90/27	1	884.000	**7215 72 9**	

Strain relief for vertical cable routing, approved for all cable types and all vertical routing systems. Function maintenance classes E 30 and E 90. Housing including mineral fibre plates, fastening material and cartridge with fire protection filler.

Mounting set

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
ZSE90/M1	1	32.000	**7215 74 1**	
ZSE90/M2	1	35.000	**7215 74 5**	

Spare parts in mounting set with all the small parts for mounting the ZSE 90 strain relief on and next to rising tracks for function maintenance.

Fire protection filler

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594. In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

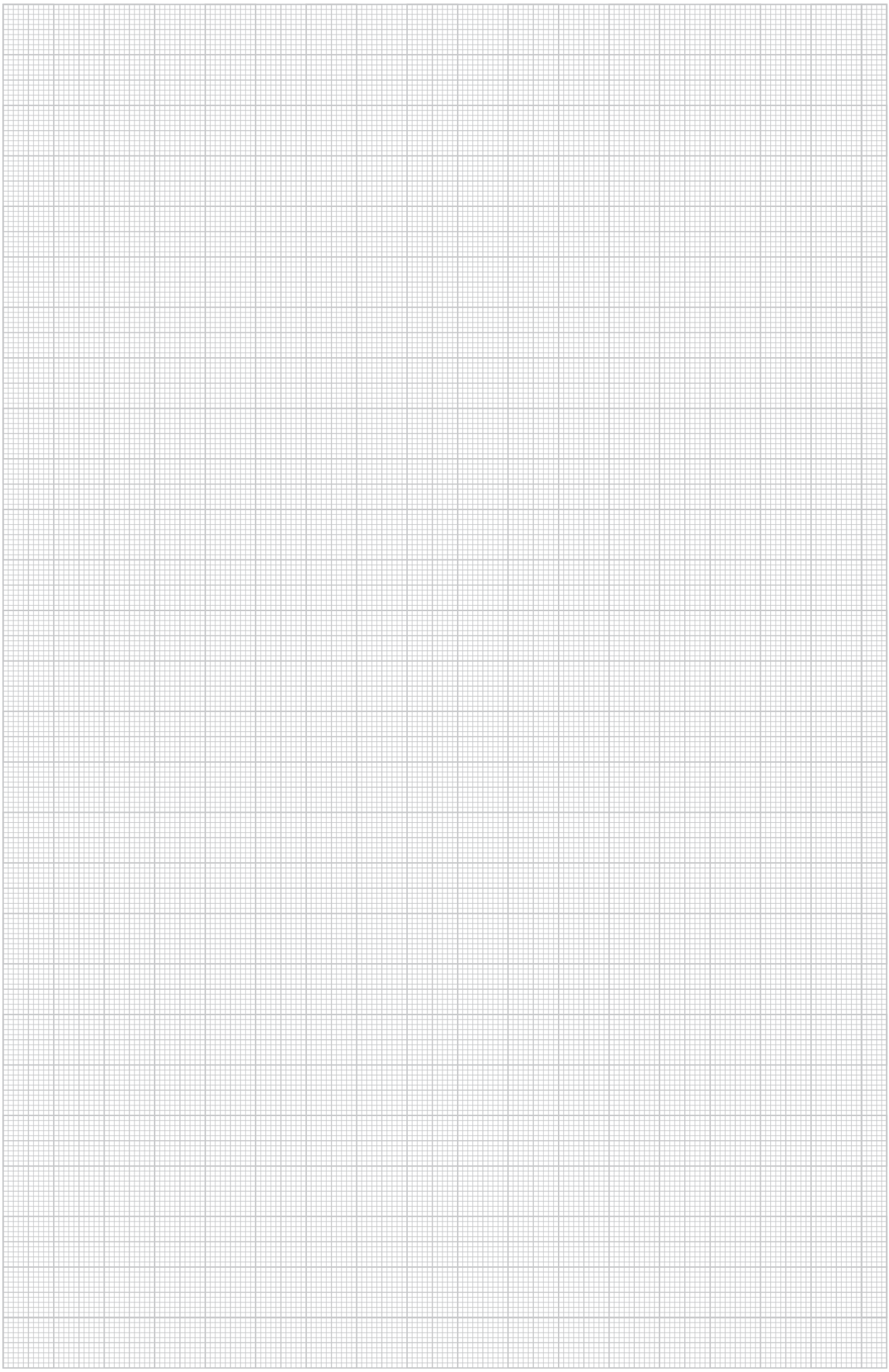
Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

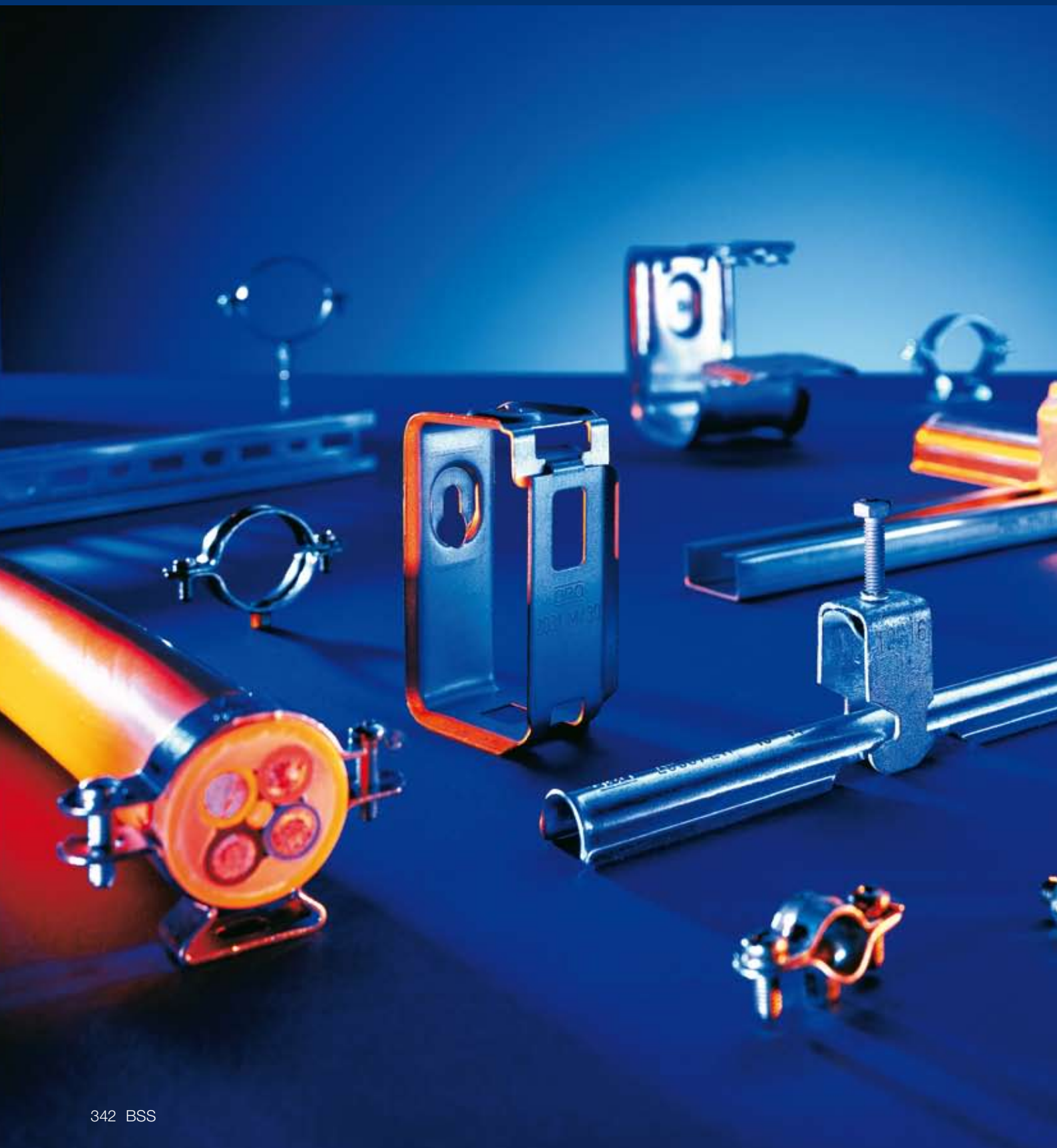
The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.



- Pressure clips and collecting clamps
- Cable and pipe spacer clips
- Clamp clips on profile rail, with and without long trough
- Safe installation with systems tested to DIN 4102 Part 12



Function maintenance with individual routing systems

Overview of individual routing systems
Standard support constructions

Wall or ceiling mounting
Clamp clip routing type with long trough
- Rail mounting: max. 0.6 m
- Anchor distance in the rail: max. 0.25 m
- Single cable assignment: diameters of up to 62 mm possible
- Routing with cable bundles: max. 3 cables with a diameter of max. 25 mm

Wall or ceiling mounting
Clamp clip laying type without long trough
- Rail mounting: max. 0.3 m
- Anchor distance in the rail: max. 0.25 m
- Single cable assignment: diameters of up to 100 mm possible
- Routing with cable bundles: max. 3 cables with a diameter of max. 25 mm

Wall or ceiling mounting
Single clip laying type 732
Standard support structure made of screw-in spacer clips for individual laying and bundling of up to three cables, vertical or horizontal mounting on the wall or under the ceiling.
- Rail mounting: max. 0.3 m
- Single cable assignment: diameters of up to 50 mm possible
- Routing with cable bundles: max. 3 cables with a diameter of max. 25 mm

Wall or ceiling mounting
Single clip laying type 733
Standard support structure made of spacer clips for individual laying and bundling of up to three cables, vertical or horizontal mounting on the wall or under the ceiling.
- Rail mounting: max. 0.3 m
- Single cable assignment: diameters of up to 50 mm possible
- Routing with cable bundles: max. 3 cables with a diameter of max. 25 mm

Overview of individual routing systems
Cable-specific laying types

Wall or ceiling mounting
Pressure clip routing type
- Space-saving routing type
- Type 2034M:
  max. cable assignment 2 x 7
- Type 2033M:
  max. cable assignment 2 x 9
- Suitable for
  fire alarm cables

Wall or ceiling mounting
Routing type, collecting clamp
- Type 2031 M/15
  Fastening distance: max. 0.5 m
  Cable assignment: max. 1.1 kg/m
- Type 2031 M/30
  Mounting distance: max. 0.5 m
  Cable assignment:
  max. 2.5 kg/m
- Type 2031 M/70
  Mounting distance: max. 0.8 m
  Cable assignment:
  max. 6.0 kg/m
- Other fastening distances and assignments possible according to cable manufacturer's specifications

Wall or ceiling mounting
Clamp clip routing type with long trough
- Rail distances, bundlings and cable assignments according to cable manufacturer's data

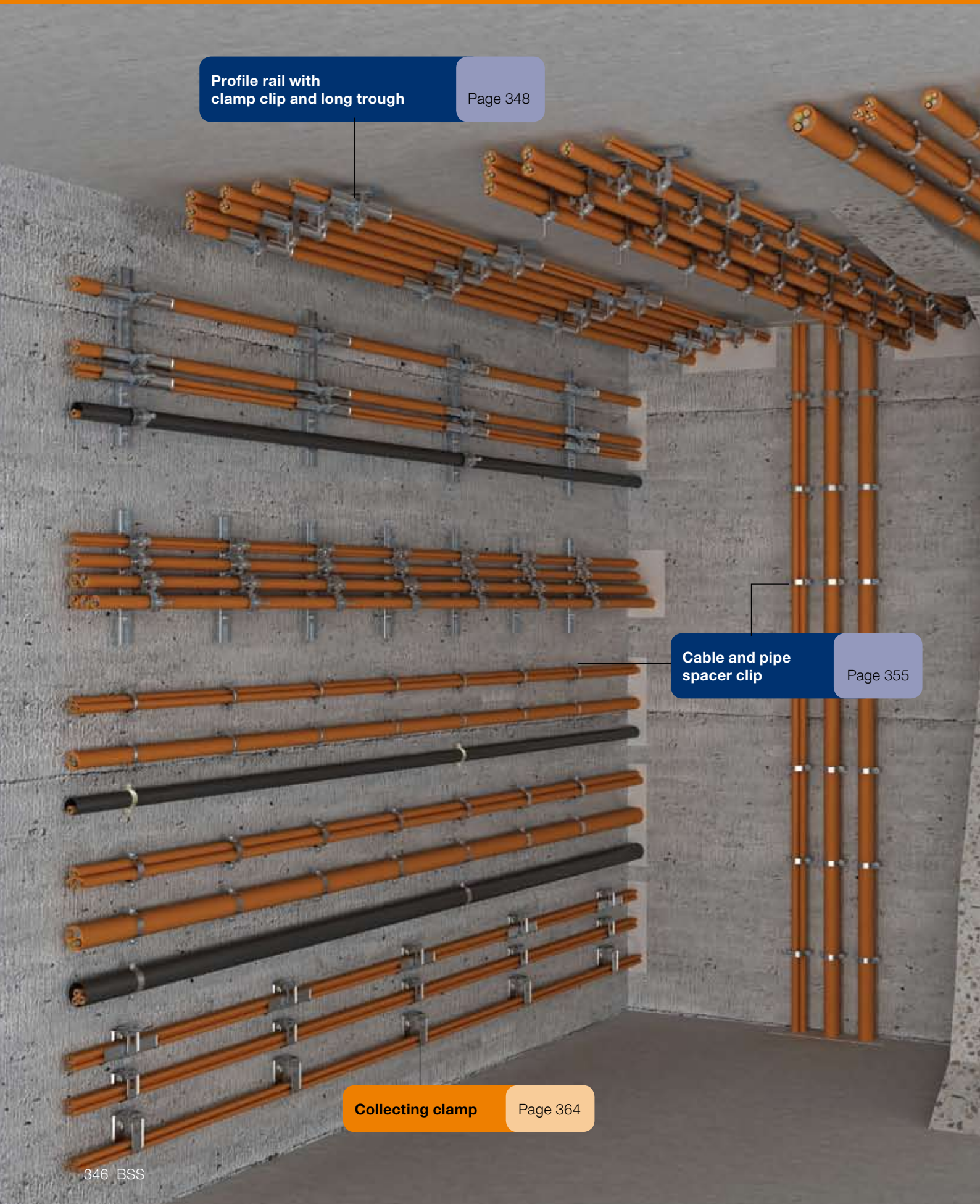
Wall or ceiling mounting
Clamp clip routing type without long trough
- Mounting vertically or horizontally on the wall or under the ceiling
- Rail distances, bundlings and cable assignments according to cable manufacturer's data

Wall or ceiling mounting
Routing type, single clip 732/733
- Cable-specific routing type of screw-in spacer clip for individual routing, mounting vertically or horizontally on the wall or under the ceiling
- Rail distances, bundlings and cable assignments according to cable manufacturer's data

Wall or ceiling mounting
Steel armoured pipe routing type
- Cable-specific routing type, assignment and filling factors according to cable manufacturer's data

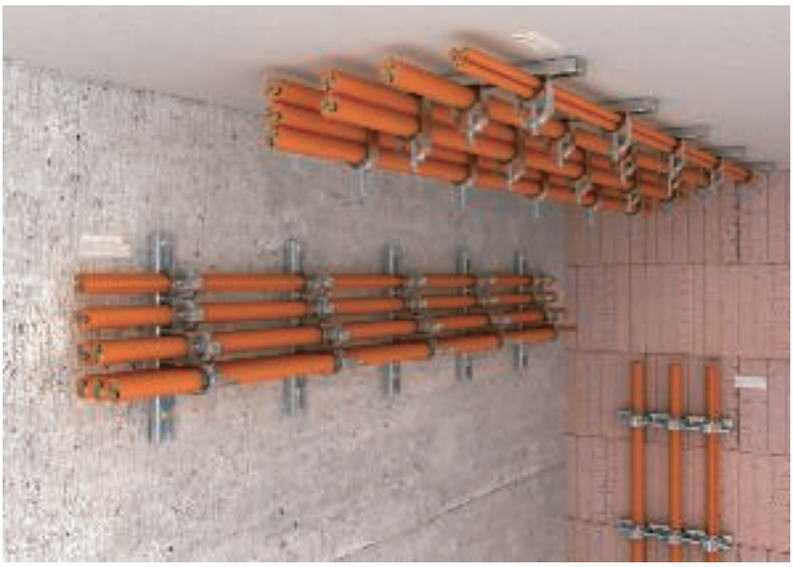
System overview

Function maintenance with individual routing systems




Pressure clip
Page 361
Steel armoured pipe
Page 353
Profile rail with clamp clip
Page 351

Standard and cable-specific laying types: profile rail with clamp clip



Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-Mer Parts 3 and 4 Function maintenance classes E 30 and E 90

Standard support construction	
Max. rail fastening distance	0.3 m
Max. anchor spacing in rail	0.25 m
Max. individual cable diameter	100 mm
Cable bundle max.	3 x 25 mm
Cable-specific routing	
Cable types and spacings dependent on the cable manufacturer.	

The routing type with clamp clips fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. In addition, the use as a cable-specific routing type to DIN 4102 Part 12 is possible, depending on the specifications of the cable manufacturer.
The clamp clips used are made of galvanised sheet steel with a riveted metal pressure trough. Various profile rails are available to match the clamp clip.

System components

Clamp clip, profile rail, fire protection anchor, fire protection bolt tie

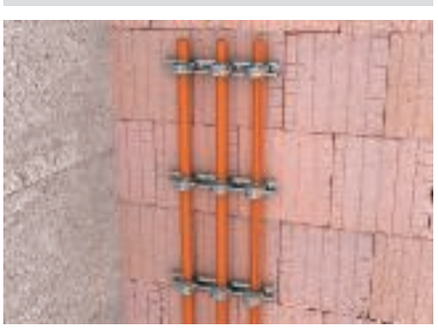
Wall application area

Standard support structure made of clamp clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, horizontally on the wall.
Cable-specific routing type with rail spacings and cable assignments mounted horizontally on the wall according to the cable manufacturer's specifications.

Ceiling area of application

Standard support structure made of spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, under the ceiling.
Cable-specific routing type with rail spacings and cable assignments mounted on the ceiling according to the cable manufacturer's specifications.

Vertical application area



Standard support structure made of clamp clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, vertically on the wall.
Cable-specific routing type with rail spacings and cable assignments mounted vertically according to the cable manufacturer's specifications.

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Standard and cable-specific laying types: profile rail with clamp clip

Mounting preparations

Draw on the exact position of the drill holes for the profile rails using a chalk mark. In the profile rail, ensure an anchor spacing of max. 250 mm.

Mounting of the profile rails

Mount the rails on the wall or under the ceiling with fire protection anchors. In the case of mounting on masonry walls, push the bolt tie and screw it into the drill hole.

Mounting of individual cable under the ceiling

Mount the individual cables to the profile rails using clamp clips.

Mounting of cable bundle under the ceiling

Mount individual cable bundles to the profile rails using clamp clips. The cables can be combined in a clamp clip. Alternatively, the use of double or triple clamp clips is approved for bundle routing.

Mounting of individual cable on the wall

Mount the individual cables to the profile rails using clamp clips.

Mounting of cable bundle on the wall

Mount individual cable bundles to the profile rails using clamp clips. Combination of cables in a clamp clip and the alternative use of double or triple clamp clips is approved for bundle routing.

Securing of the clamp clips

If there is a fire, then cables mounted horizontally on a wall may not fall off. To ensure against this, mount slide nuts with bolt and large washer on each profile rail as security directly underneath the lowest clamp clip. If there are spaces between the clamp clips, each clip should be secured.

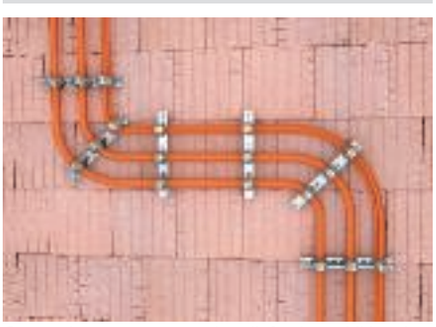
Vertical routing, single cable

Mount the individual cables to the profile rails using clamp clips.

Vertical routing, bundling

Mount individual cable bundles to the profile rails using clamp clips. Alternatively, the use of double or triple clamp clips is approved for bundle routing.

Cable strain relief



Create the necessary strain relief using additional profile rails. Arrangement and spacing of the rails, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

Standard and cable-specific laying types: profile rail with clamp clip

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

Steel armoured pipes

Cable-specific routing with Stapa pipe. Observe the cable manufacturer's information on assignment and filling factors.

System parameters at a glance

Standard support construction

Max. rail fastening distance	0.3 m
Max. anchor spacing in rail	0.25 m
Max. individual cable diameter	100 mm
Cable bundle max.	3 x 25 mm

Note:
A range of tested and approved combinations are possible.
Please request the current "Cable-specific support structures" list.

Profile rail

Profile rail 1268	*	*	*
Profile rail 2068	*	*	*

* Number as necessary

Fastening clip

Clamp clip with metal pressure trough 2056/M	*	*	*
Clamp clip with metal pressure trough 2056/M2	*	*	*
Clamp clip with metal pressure trough 2056/M3	*	*	*

* Number as necessary

Locking of the clamp clip

Slide nut 5019	-	*	-
Washer DIN440/7	-	*	-
Hexagonal bolt 342/M6x16	-	*	-

* Number as necessary

Concrete wall or ceiling

Fire protection anchor FNA II M6/5	*	*	*

Always indicate the article number when ordering.

Standard and cable-specific laying types: profile rail with clamp clip

Concrete wall or ceiling

Fire protection anchor FNA II 6x30

* * *
* Number as necessary

Masonry wall

Fire protection bolt tie MMS 6 x 50

\- * *
* Number as necessary

Identification plate

Identification plate KS-E

* * *
* Number as necessary

Standard and cable-specific laying types: cable and pipe spacer clip 732

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-Mer Parts 3 and 4 Function maintenance classes E 30 and E 90

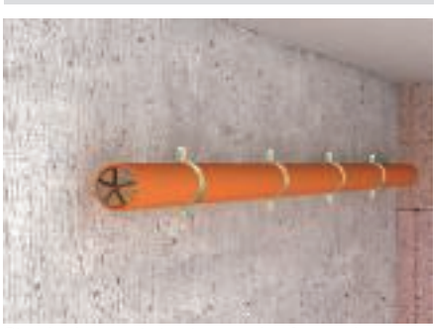
Standard support construction	
Max. rail fastening distance	0.3 m
Max. anchor spacing in rail	0.25 m
Max. individual cable diameter	50 mm
Cable bundle max.	3 x 25 mm
Cable-specific routing	
Cable types and spacings dependent on the cable manufacturer.	

The routing type with individual clips fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. In addition, the use as a cable-specific routing type to DIN 4102 Part 12 is possible, depending on the specifications of the cable manufacturer.
A closed screw-in spacer clip made of galvanised sheet steel is used. The clip base contains an M6 internal thread meaning that the clip can be screwed directly onto the fire protection anchor and the fire protection bolt tie with M6 thread. In addition, there is the option of push-through mounting through the threaded section with the 5 mm fire protection bolt tie.

System components

Screw-in spacer clip, fire protection anchors, fire protection bolt ties.

Wall application area



Standard support structure made of screw-in spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, horizontally on the wall.
Cable-specific routing type with clip spacings and cable assignments mounted horizontally on the wall according to the cable manufacturer's specifications.

Ceiling area of application

Standard support structure made of screw-in spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, under the ceiling.
Cable-specific routing type with clip spacings and cable assignments mounted on the ceiling according to the cable manufacturer's specifications.

Vertical application area

Standard support structure made of screw-in spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, vertically on the wall.
Cable-specific routing type with clip spacings and cable assignments mounted vertically according to the cable manufacturer's specifications.

Always indicate the article number when ordering.

Standard and cable-specific laying types: cable and pipe spacer clip 732

Mounting preparations

Draw on the exact position of the drill holes for the screw-in spacer clips using a chalk mark.

Mounting of anchors

Mount the fire protection anchors or fire protection bolt ties to fasten the screw-in spacer clips. The 5 mm fire protection bolt ties are mounted in push-through form together with the clip.

Mounting of the screw-in spacer clip

Screw the screw-in spacer clips onto the connection thread of the anchor or bolt tie. Push the 5 mm fire protection bolt tie through the internal thread of the clip bases and screw it into the drill hole.

Mounting of individual cable

Insert the individual cables in the screw-in spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Mounting of cable bundle

Insert the cable bundles in the screw-in spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Vertical routing, single cable

Insert the individual cables in the screw-in spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Vertical routing, bundling

Insert the cable bundles in the screw-in spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

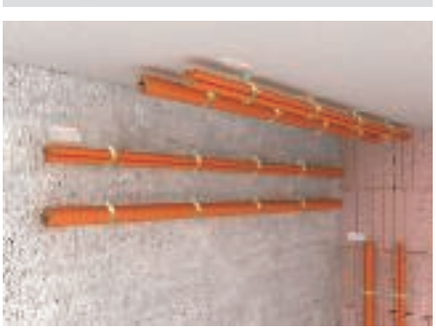
Cable strain relief

Create the necessary strain relief using additional screw-in spacer clips. Arrangement and spacing of the clips, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

Labelling



Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

Steel armoured pipes

Cable-specific routing with Stapa pipe. Observe the cable manufacturer's information on assignment and filling factors.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

Standard and cable-specific laying types: cable and pipe spacer clip 732

System parameters at a glance

Standard support construction	
Max. rail fastening distance	0.3 m
Max. anchor spacing in rail	0.25 m
Max. individual cable diameter	50 mm
Cable bundle max.	3 x 25 mm

Note:
A range of tested and approved combinations are possible.
Please request the current "Cable-specific support structures" list.

Cable and pipe spacer clip

Clip, type 732

* * *
* Number as necessary

Concrete wall or ceiling

Fire protection anchor FNA II M6/5

* * *
* Number as necessary

Masonry wall

Fire protection bolt tie HMS-KS

* * *

Fire protection bolt tie MMS-ST

* * *
* Number as necessary

Identification plate

Identification plate KS-E

* * *
* Number as necessary

Always indicate the article number when ordering.

Standard and cable-specific laying types: cable and pipe spacer clip 733

Standard support construction to DIN 4102 Part 12 Surveyor's comments no. 3917/4635-Mer Parts 3 and 4 Function maintenance classes E 30 and E 90

Standard support construction	
Max. rail fastening distance	0.3 m
Max. anchor spacing in rail	0.25 m
Max. individual cable diameter	50 mm
Cable bundle max.	3 x 25 mm
Cable-specific routing	
Cable types and spacings dependent on the cable manufacturer.	

The routing type with individual clips fulfils the requirements of DIN 4102 Part 12 for the function maintenance classes E30 and E90. In addition, the use as a cable-specific routing type to DIN 4102 Part 12 is possible, depending on the specifications of the cable manufacturer.
The spacer clip used is made of galvanised sheet steel. The spacer clip is fastened using the required fire protection anchors and fire protection bolt ties through the slot in the clip base.

System components




Spacer clip, fire protection anchors, fire protection bolt ties.

Wall application area

Standard support structure made of spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, horizontally on the wall.
Cable-specific routing type with clip spacings and cable assignments mounted horizontally on the wall according to the cable manufacturer's specifications.

Ceiling area of application

Standard support structure made of spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, under the ceiling.
Cable-specific routing type with clip spacings and cable assignments mounted on the ceiling according to the cable manufacturer's specifications.

Vertical area of application

Standard support structure made of spacer clips for individual routing and bundling of up to three cables with a diameter of maximum 25 mm, vertically on the wall.
Cable-specific routing type with clip spacings and cable assignments mounted vertically according to the cable manufacturer's specifications.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_000443)

Always indicate the article number when ordering.

Standard and cable-specific laying types: cable and pipe spacer clip 733

Mounting preparations

Draw on the exact position of the drill holes for the spacer clips using a chalk mark.

Mounting of spacer clip

Simultaneously mount the fire protection anchors or fire protection bolt ties with the spacer clips as push-through mounting through the slot in the clip base.

Mounting of individual cable

Insert the individual cables in the spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Mounting of cable bundle

Insert the cable bundles in the spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Vertical routing, single cable

Insert the individual cables in the spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Vertical routing, bundling

Insert the cable bundles in the spacer clip and suspend the clip cover from the screws. Then screw the two parts of the clip together.

Cable strain relief

Create the necessary strain relief using additional spacer clips. Arrange and space of the clips, taking the approved bend radii of the cables and the horizontal installation length of at least 300 mm into account.

Strain relief through cable insulation

Install cable insulation in the ceiling penetrations as strain relief. The fire resistance length of the insulation must correspond to at least the function maintenance length of the cable system.

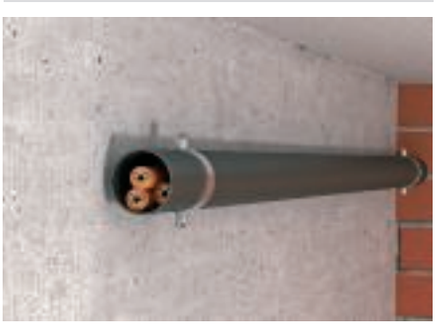
Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate.

Strain relief with ZSE 90

Strain relief with OBO ZSE 90. Approved for all cable types, function maintenance class E 30 and E 90.

Steel armoured pipes



Cable-specific routing with Stapa pipe. Observe the cable manufacturer's information on assignment and filling factors.

Always indicate the article number when ordering.

Standard and cable-specific laying types: cable and pipe spacer clip 733

System parameters at a glance

Standard support construction

Max. rail fastening distance	0.3 m
Max. anchor spacing in rail	0.25 m
Max. individual cable diameter	50 mm
Cable bundle max.	3 x 25 mm

Note:
A range of tested and approved combinations are possible.
Please request the current "Cable-specific support structures" list.

Cable and pipe spacer clip

Clip, type 733

* * *
* Number as necessary

Concrete wall or ceiling

Fire protection anchor FNA II M6/5

* * *
* Number as necessary

Masonry wall

Fire protection bolt tie MMS 6 x 50

* * *
* Number as necessary

Identification plate

Identification plate KS-E

* * *
* Number as necessary

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific laying type: ceiling mounting with pressure clip

Cable-specific support construction to DIN 4102 Part 12 Function maintenance class E 30

Cable-specific routing	
Max. fastening distance	0.5 m
Cable filling 2033M max.	2 x 9
Cable filling 2034M max.	2 x 7
Cable types dependent on the cable manufacturer.	

The cable-specific routing type using metal pressure clips for electrical function maintenance to DIN 4102 Part 12 is particularly practical if there is little or no mounting space available. With just small additions, fire signal cables or power cables for safety lighting systems can be laid in a space-saving way. To do this, simply pull the VA wings downwards and release them when the cables have been inserted. This allows secure, proven fastening for the function maintenance class E30.

System components

Pressure clip, fire protection bolt tie

Ceiling mounting

Pressure clips made of metal 2033M and 2034M

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific laying type: ceiling mounting with pressure clip

Mounting preparations

Draw on and drilling the fastening holes.

Fixing the pressure clips

Attach the fire protection bolt tie by pushing it through and fixing it in the drill hole. If necessary, use the spacer 2033/D to increase the clamping area.

Fastening the pressure clips

Turn the anchor using a rechargeable or ratchet screwdriver, or also by hand.

Installation of the cables

Insert the cable from the side with the lug of the pressure clip pulled down.

Mounted cables

Safe, space-saving routing of fire alarm and power cables of a small cross-section.

System parameters at a glance

Cable-specific routing

Max. fastening distance	0.5 m
Cable filling 2033M max.	2 x 9
Cable filling 2034M max.	2 x 7
Cable types dependent on the cable manufacturer.	

Approved cable types							
Cable manufacturer	Cable type	Class	Data	Distances	Note	Pressure clip	
Eupen	(N)HXH	E30	4 x 1.5 mm²	0.5 m	2 x 7 cables	2033 M	
	JE-H(St)H Ceramic	E30	2 x 2 x 0.8 mm	0.5 m	2 x 9 cables	2033 M	
	JE-H(St)H Ceramic	E30	4 x 2 x 0.8 mm	0.5 m	2 x 7 cables	2033 M	
	(N)HXH	E30	4 x 1.5 mm²	0.5 m	2 x 4 cables	2034 M	
	JE-H(St)H Ceramic	E30	2 x 2 x 0.8 mm	0.5 m	2 x 7 cables	2034 M	
	JE-H(St)H Ceramic	E30	4 x 2 x 0.8 mm	0.5 m	2 x 5 cables	2034 M	

Components per fastening point

Pressure clip 2033 M	*	
Pressure clip 2034 M	*	
Spacer 2033/D	*	
	* Number as necessary	

Concrete ceiling

Fire protection bolt tie MMS 6 x 50	* -	
	* Number as necessary	

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific laying type: ceiling mounting with pressure clip

Identification plate

	Identification plate KS-E		* * * Number as necessary	

Cable-specific laying type: collecting clamp

Cable-specific support construction to DIN 4102 Part 12
Function maintenance classes E 30 and E 90

Cable-specific routing		
Type	Distances	Assignment
2031 M/15	0.5 m	1.1 kg
2031 M/30	0.5 m	2.5 kg
2031 M/70	0.8 m	6.0 kg

The cable-specific routing type with collecting clamps fulfils the requirements of DIN 4102 Part 12 for function maintenance classes E30 and E90.
The collecting clamps used are made of galvanised sheet steel and can be opened and reclosed without using tools. During cable assignment, the brackets can remain open to allow simple cable insertion. The collecting clamps are suitable for wall and ceiling mounting, depending on the specifications of the cable manufacturers. An additional long trough may also be required for the collecting clamp, type 231 M/15, according to the specifications of the cable manufacturers.

System components

Collecting clamps, fire protection anchors, fire protection bolt ties.

Wall application area

Cable-specific routing as horizontal wall mounting.

Ceiling area of application

Cable-specific routing as ceiling mounting

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Cable-specific laying type: collecting clamp

Mounting preparations

Draw on the exact position of the drill holes for the collecting clamps with a chalk line.

Ceiling mounting of the collecting clamp

Simultaneously mount of the fire protection anchors with the collecting clamps as push-through mounting.

Mounting of the long trough, ceiling

If necessary, place the long trough loosely in the collecting clamp and turn over the straps located in the base. This fixes the long trough in the collecting clamp, preventing it from falling out.

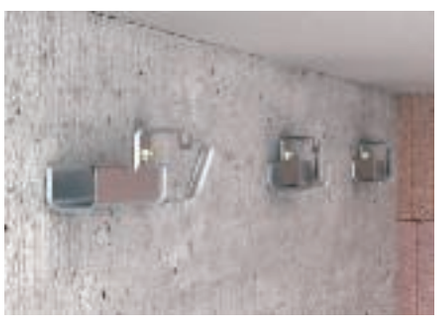
Insertion of the cables, ceiling

Insert the cables in the collecting clamp. When cable routing has been completed, close the collecting clamps by hooking the opening flap into the appropriate opening.

Wall mounting of the collecting clamp

Simultaneously mount the fire protection anchors or fire protection bolt ties with the collecting clamps as push-through mounting.

Mounting of the long trough, wall



If necessary, place the long trough loosely in the collecting clamp and turn over the straps located in the base. This fixes the long trough in the collecting clamp, preventing it from falling out.

Insertion of the cables, wall

Insert the cables in the collecting clamp. When cable routing has been completed, close the collecting clamps by hooking the opening flap into the appropriate opening.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate.

Labelling

Complete the identification plate of the cable system with the name of the company carrying out the installation, test certificate number and the year of manufacture. Then affix the plate.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific laying type: collecting clamp

System parameters at a glance

Cable-specific routing

Type	Distances	Assignment
2031 M/15	0.5 m	1.1 kg
2031 M/30	0.5 m	2.5 kg
2031 M/70	0.8 m	6.0 kg

Approved cable types (please request current list!)						
Cable manufacturer	Cable type	Class	Data	Distances	Note	
Dätwyler	NHXH	E30	≤nx2.5 mm²	0.5 m	With long trough, ≤ 1.1 kg/m	
	JE-H(St)H	E30	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
	JE-H(St)H	E60	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.1 kg/m, ≤ 20 cables	
	JE-H(St)HRH	E30	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
	JE-H(St)HRH	E60	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.1 kg/m, wall only, ≤ 20 cables	
	JE-H(St)HRH	E90	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.1 kg/m, ceiling only, ≤ 20 cables	
Eupen	(N)HXH ceramic	E30	nx1.5 mm²	0.5 m	With long trough, ≤ 1.1 kg/m, wall only	
	NHXH Mica	E90	nx1.5 mm²	0.5 m	With long trough, ≤ 1.1 kg/m	
	NHXH Mica	E90	≥nx1.5 mm²	0.5 m	With long trough, ≤ 1.3 kg/m, wall only	
	JE-H(St)H Ceramic	E30	≥nx2 x 0.8 mm	0.6 m	With long trough, ≤ 1.1 kg/m	
	JE-H(St)H Ceramic	E30	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
	JE-H(St)H Mica	E90	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.3 kg/m, wall only	
Facab Lynen	JE-H(St)H	E30	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
	JE-H(St)H	E90	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.1 kg/m, ceiling only	
	JE-H(St)HRH	E30	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
	JE-H(St)HRH	E90	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.1 kg/m, ceiling only	
Nexans	N2XH	E30	nx1.5 mm² to 4 mm²	0.5 m	With long trough, ≤ 1.1 kg/m	
	N2XCH	E30	nx1.5 mm² to 4 mm²	0.5 m	With long trough, ≤ 1.1 kg/m	
	N2XH	E90	nx1.5 mm²	0.5 m	With long trough, ≤ 1.1 kg/m	
	N2XCH	E90	nx1.5 mm²	0.5 m	With long trough, ≤ 1.1 kg/m	
	J/JE-H(St)H	E30	≥nx2 x 0.8 mm	0.5 m	With long trough, ≤ 1.1 kg/m	
Prysmian	(N)HXH	E30	≥nx1.5 mm²	0.5 m	With long trough, ≤ 1.2 kg/m, ceiling only	
Studer	JE-H(St)H	E30 - E90	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
	JE-H(St)HRH	E30 - E90	≥nx2 x 0.8 mm	0.5 m	≤ 1.1 kg/m	
Collecting clamp 2031 M/30						
Cable manufacturer	Cable type	Class	Data	Distances	Note	
Dätwyler	JE-H(St)H	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m, wall only	
	JE-H(St)HRH	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m, wall only	
Eupen	JE-H(St)H Ceramic	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m, wall only	
Facab Lynen	NHXH	E90	nx6 mm²	0.5 m	≤ 2.2 kg/m, wall only	
	NHXH	E90	nx1.5 mm² to 6 mm²	0.5 m	≤ 2.2 kg/m, ceiling only	
	NHXCH	E90	nx6 mm²	0.5 m	≤ 2.2 kg/m, wall only	
	JE-H(St)HRH	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m	
Nexans	JE-H(St)H	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m, ceiling only	
Studer	JE-H(St)H	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m	
	JE-H(St)HRH	E30	≥nx2 x 0.8 mm	0.5 m	≤ 2.5 kg/m	
Collecting clamp 2031 M/70						
Cable manufacturer	Cable type	Class	Data	Distances	Note	
Eupen	(N)HXH ceramic	E30	≤nx16 mm²	0.8 m	≤ 6.0 kg/m	
	(N)HXCH ceramic	E30	≥nx1.5/1.5 mm²	0.8 m	≤ 6.0 kg/m	
	NHXCH Mica	E90	≥nx1.5/1.5 mm²	0.6 m	≤ 6.0 kg/m	
	JE-H(St)H Ceramic	E30	≥nx2 x 0.8 mm	0.8 m	≤ 6.0 kg/m	

Components per fastening point

	Collecting clamp 2031/M15	*	*
	Long trough 2031/LW15	*	*
	Collecting clamp 2031/M30	*	*

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Cable-specific laying type: collecting clamp

Components per fastening point

	**Collecting clamp 2031/M70** Including fire protection bolt tie, type MMS 6 x 50	* *	* Number as necessary	

Concrete wall or ceiling

	**Fire protection anchor FNA II M6/5**	* *		
	**Fire protection anchor FNA II 6x30**	* *	* Number as necessary	

Masonry wall

	**Fire protection bolt tie MMS 6 x 50**	* -	* Number as necessary	

Identification plate

	Identification plate KS-E	* *	* Number as necessary	

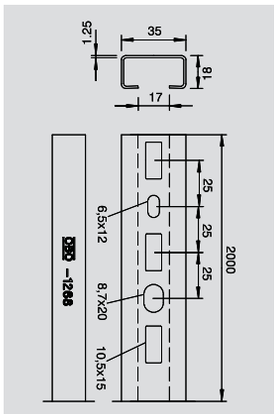
Always indicate the article number when ordering.

Individual laying: products

Profile rail

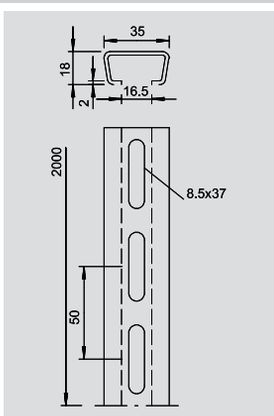
Type	Length mm	Material thickness mm	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
1268	200	1.25	25	14.300	**1104 26 8**	
1268	300	1.25	25	21.450	**1104 28 4**	
1268	400	1.25	10	28.550	**1104 29 2**	
1268	500	1.25	10	35.750	**1104 30 6**	
1268	2000	1.25	20	71.500	**1104 50 0**	

Lightweight profile rail, perforated, slot width 17 mm.



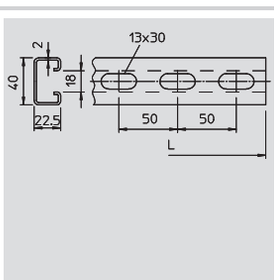
Type	Length mm	Material thickness mm	Pack. m	Weight borders	Item No. ST / FT	Price /% m
2068	2000	1.5	20	89.000	**1119 65 6**	

Profile rail, perforated, slot width 16.5 mm.



Type	Length mm	Material thickness mm	Pack. m	Weight borders	Item No. ST / FT	Price /% m
CPS 4	2000	2	10	160.000	**1121 97 9**	

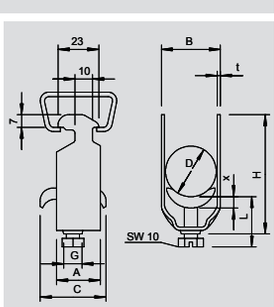
Heavyweight profile rail, perforated, slot width 18 mm.



Clamp clip

Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M	8 -12	16	30	1.5	100	3.200	**1156 00 4**	
2056/M	12 -16	20	30	1.5	100	3.500	**1156 01 2**	
2056/M	16 -22	27	30	1.5	100	4.400	**1156 02 0**	
2056/M	22 -28	33	30	2	100	6.100	**1156 03 9**	
2056/M	28 -34	39	35	2	100	7.700	**1156 04 7**	
2056/M	34 -40	45	35	2	100	8.600	**1156 05 5**	
2056/M	40 -46	51	35	2	100	9.600	**1156 06 3**	
2056/M	46 -52	57	35	2	100	10.400	**1156 07 1**	
2056/M	52 -58	64	35	2.5	100	13.100	**1156 09 8**	
2056/M	58 -64	70	35	2.5	100	14.500	**1156 10 1**	
2056/M	64 -70	76	35	2.5	50	16.100	**1156 12 8**	
2056/M	70 -76	82	40	2.5	25	18.300	**1156 13 6**	
2056/M	76 -82	88	40	2.5	25	19.100	**1156 14 4**	
2056/M	82 -90	97	40	3	25	23.300	**1156 15 2**	
2056/M	90 -100	107	40	3	25	25.400	**1156 16 0**	

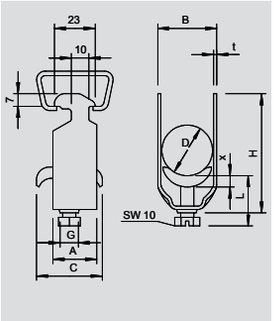
Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Always indicate the article number when ordering.

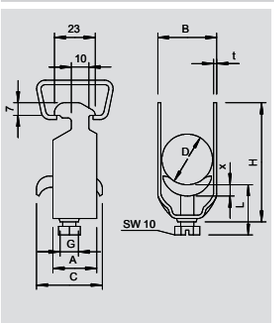
Individual laying: products

Clamp clip



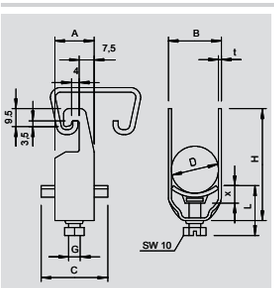
Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M2	8 -12	16	30	1.5	50	3.980	**1156 17 9**	
2056/M2	12 -16	20	30	1.5	50	4.750	**1156 18 7**	
2056/M2	16 -22	27	30	1.5	50	6.900	**1156 19 5**	
2056/M2	22 -28	33	34	2	50	7.800	**1156 20 9**	

Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056/M3	8 -12	16	34	1.5	50	4.050	**1156 24 1**	
2056/M3	12 -16	20	34	1.5	50	5.800	**1156 26 8**	
2056/M3	16 -22	27	34	1.5	50	6.500	**1156 27 6**	
2056/M3	22 -28	33	34	2	50	9.500	**1156 28 4**	

Suitable for all C profile rails with slot width 16–17 mm.
Clip, screw and pressure trough made of hot-dip galvanised steel.



Type	Tension area D mm	Dimension B mm	Dimension C mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / FT	Price /% pc
2056U/M	8 -12	16	34	1.5	100	3.300	**1158 00 7**	
2056U/M	12 -16	20	34	1.5	100	3.520	**1158 01 5**	
2056U/M	16 -22	27	34	1.5	100	3.960	**1158 02 3**	
2056U/M	22 -28	33	34	2	100	5.890	**1158 03 1**	
2056U/M	28 -34	39	34	2	100	7.650	**1158 05 8**	
2056U/M	34 -40	45	34	2	100	8.360	**1158 06 6**	
2056U/M	40 -46	51	40	2	100	10.890	**1158 07 4**	
2056U/M	46 -52	57	40	2	100	11.660	**1158 08 2**	
2056U/M	52 -58	64	40	2.5	100	14.740	**1158 09 0**	
2056U/M	58 -64	70	40	2.5	100	15.730	**1158 10 4**	
2056U/M	64 -70	76	40	2.5	50	18.200	**1158 11 2**	
2056U/M	70 -76	82	40	2.5	25	20.600	**1158 12 0**	

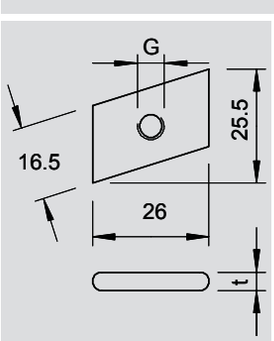
Suitable for all C profile rails with slot width 18 mm. Also suitable for flat, bracket and U irons of 4–12 mm material thickness.
Clip, screw and pressure trough made of hot-dip galvanised steel.

Long trough

Type	Tension area D mm	For clip 2056/M	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2058/LW 10	6 -10	8 -12	50	4.000	**1195 79 4**	
2058/LW 14	10 -14	12 -16	50	5.340	**1195 80 8**	
2058/LW 20	14 -20	16 -22	50	7.380	**1195 81 6**	
2058/LW 26	20 -26	22 -28	25	9.270	**1195 82 4**	
2058/LW 32	26 -32	28 -34	25	11.460	**1195 83 2**	
2058/LW 38	32 -38	34 -40	25	12.880	**1195 84 0**	
2058/LW 44	38 -44	40 -46	25	14.760	**1195 85 9**	
2058/LW 50	44 -50	46 -52	25	16.650	**1195 86 7**	
2058/LW 56	50 -56	52 -58	25	18.220	**1195 87 5**	
2058/LW 62	56 -62	58 -64	25	19.900	**1195 88 3**	

In addition to the clamp clip, to increase the support area for cables with integrated function maintenance, a long trough (L = 200 mm) is mounted.

Slippage protection



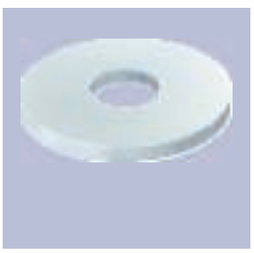
Type	Dimension G mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
5019	6	4	100	1.150	**1144 10 3**	

Slide nut for profile rails with a slot width of 16–17 mm.

Always indicate the article number when ordering.

Individual laying: products

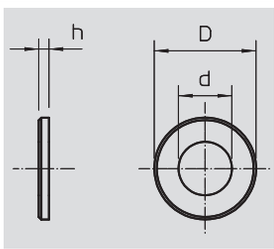
Slippage protection



Type	Dimension D mm	Dimension d mm	Dimension h mm	Pack. pcs	Weight kg/% pc	Item No. ST / F
DIN440/7	22	6.6	2	100	0.550	**6408 70 2**

Washer of particularly large outer diameter.

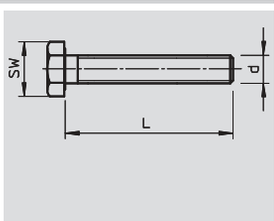
Price /% pc



Type	Thread	Length mm	Dimension d mm	SW mm	Pack. pcs	Weight kg/% pc	Item No. ST / G
342	M6	16	6	10	100	0.494	**3156 14 1**

Hexagonal bolt to ISO 4017 with metric thread.

Price /% pc

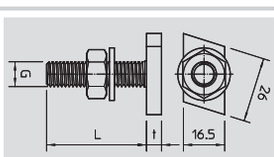


16-17 mm

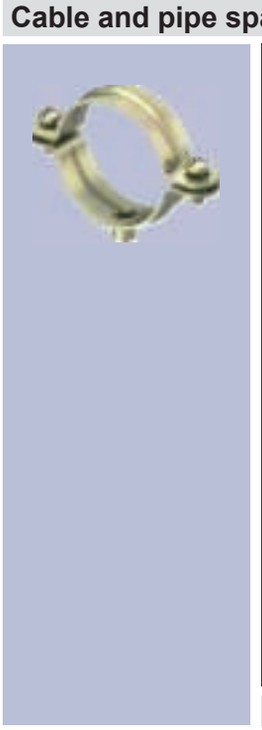
Type	Thread	Dimension L mm	Dimension t mm	Pack. pcs	Weight kg/% pc	Item No. ST / F
5022	M6	25	5	50	1.960	**1151 01 0**

Hammer-head bolt with washer and nut for profile rails with slot width 16–17 mm.

Price /% pc



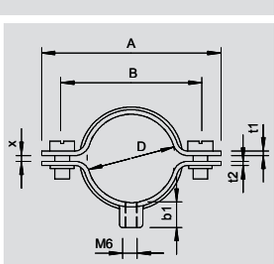
Cable and pipe spacer clip



Type	Tension area D mm	Material thickness mm	Dimension A mm	Dimension B mm	Dimension b1 mm	Pack. pcs	Weight kg/% pc	Item No. ST / GTP
732	5 -6	1	35	23	15	100	1.160	**1360 05 1**
732	7 -8	1	34	22	18	100	1.310	**1360 08 6**
732	9 -10	1	36	24	18	100	1.360	**1360 10 8**
732	10.5 -12	1	38	26	18	100	1.460	**1360 12 4**
732	12.5 -14	1	40	28	18	100	1.480	**1360 14 0**
732	13.5 -15	1	41	29	18	100	1.530	**1360 15 9**
732	14.5 -16	1	42	30	18	100	1.590	**1360 16 7**
732	16.5 -18	1	44	32	18	100	1.620	**1360 18 3**
732	18.5 -20	1	46	34	18	50	1.730	**1360 20 5**
732	20 -22	1	48	36	18	50	1.780	**1360 22 1**
732	22 -24	1	50	38	18	50	1.840	**1360 24 8**
732	24 -26	1	52	40	18	50	1.920	**1360 26 4**
732	26 -28	1.5	59	45	18	50	2.840	**1360 28 0**
732	28 -30	1.5	61	47	18	50	3.040	**1360 30 2**
732	31 -33	1.5	64	50	18	25	3.120	**1360 33 7**
732	33 -35	1.5	66	52	18	25	3.280	**1360 35 3**
732	36 -38	1.5	69	55	18	25	3.490	**1360 38 8**
732	38 -40	1.5	71	57	18	25	3.600	**1360 39 6**
732	40 -42	1.5	73	59	18	25	3.840	**1360 42 6**
732	43 -45	1.5	76	62	18	25	3.990	**1360 45 0**
732	46 -48	1.5	79	65	18	25	4.040	**1360 48 5**
732	48 -50	1.5	81	67	18	25	4.160	**1360 50 7**
732	53 -55	1.5	86	72	18	25	4.480	**1360 55 8**
732	58 -60	1.5	91	77	18	25	4.960	**1360 60 4**
732	61 -63	1.5	94	80	18	25	5.000	**1360 63 9**

With thread M6.

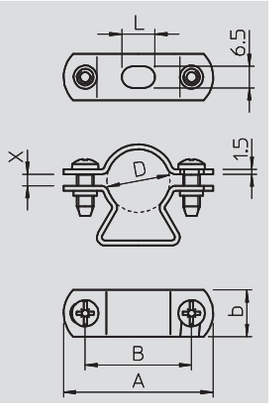
Price /% pc



Always indicate the article number when ordering.

Individual laying: products

Cable and pipe spacer clip



Type	Tension area D mm	Hole size mm	Material thickness mm	Size	Screw	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
733	11 -13	6,5 x 10	1.5	M12	M5 x 12	50	2.310	**1361 13 9**	
733	14 -16	6,5 x 10	1.5	M16	M5 x 14	50	2.430	**1361 16 3**	
733	17 -19	6,5 x 10	1.5	Pg11	M5 x 14	50	2.500	**1361 19 8**	
733	19 -21	6,5 x 10	1.5	M20	M5 x 14	50	2.730	**1361 20 1**	
733	21 -23	6,5 x 10	1.5	Pg16	M5 x 14	50	2.870	**1361 23 6**	
733	24 -29	6,5 x 10	1.5	M25	M5 x 18	50	3.480	**1361 29 5**	
733	30 -38	6,5 x 10	1.5	M32	M5 x 18	25	4.040	**1361 38 4**	
733	39 -48	6,5 x 10	1.5	M40	M5 x 18	25	4.810	**1361 48 1**	
733	48 -54	6,5 x 14	1.5	M50	M5 x 18	25	5.800	**1361 51 1**	
733	53 -61	6,5 x 14	1.5	Pg48	M5 x 18	20	6.370	**1361 61 9**	
733	63	8 x 18	2	M63	M5 x 18	20	6.940	**1361 63 5**	

Steel screw material.
*Size M16 are not suitable for nail guns.
*Sizes M16–PG16 not suitable for bolt-firing tool.

Strain relief

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
ZSE90/13	1	375.000	**7215 70 1**	
ZSE90/14	1	445.000	**7215 70 5**	
ZSE90/15	1	515.000	**7215 70 8**	
ZSE90/23	1	510.000	**7215 71 2**	
ZSE90/24	1	610.000	**7215 71 5**	
ZSE90/25	1	680.000	**7215 71 8**	
ZSE90/26	1	795.000	**7215 72 5**	
ZSE90/27	1	884.000	**7215 72 9**	

Strain relief for vertical cable routing, approved for all cable types and all vertical routing systems. Function maintenance classes E 30 and E 90. Housing including mineral fibre plates, fastening material and cartridge with fire protection filler.

Mounting set

Type	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
ZSE90/M1	1	32.000	**7215 74 1**	
ZSE90/M2	1	35.000	**7215 74 5**	

Spare parts in mounting set with all the small parts for mounting the ZSE 90 strain relief on and next to rising tracks for function maintenance.

Fire protection filler

Type	Contents l	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FPS-SP	0.31	1	41.000	**7202 27 8**	

Fire protection filler in a cartridge, for filling residual joints and for retro-installations in the FPS assembled panel insulation system.
Also approved as an intumescent material for closing core drill holes for individual cable penetrations according to MLAR. Fire resistance class S 30 to S 90, DIBt approval Z-19.11-1594.
In dry, frost-free rooms, the filler can be stored at temperatures from +5 °C to +30 °C for up to 12 months in closed original containers.

Identification plate

Type	Pack. pcs	Weight kg/% pc	Item No. PVC	Price /pc.
KS-E	10	0.220	**7205 42 2**	

The self-adhesive identification plate for labelling contains all the data required for approved cable system labelling for function maintenance as required by DIN 4102 Part 12.

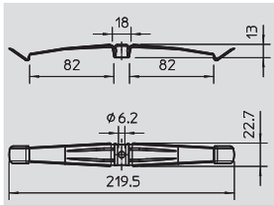
Always indicate the article number when ordering.

Individual laying: products

Pressure clip

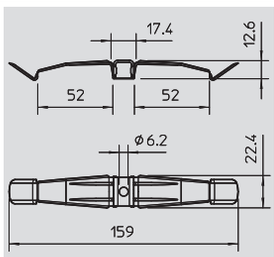
Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /% pc
2033 M	16	25	25	2.310	**2204 00 0**	

Metal pressure clip for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.
Clamping height 10 mm
Fastening hole Ø 6 mm.



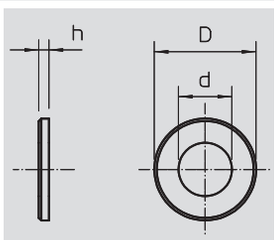
Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. V2A	Price /% pc
2034 M	10	50	50	1.860	**2204 01 0**	

Metal pressure clip for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.
Clamping height 10 mm
Fastening hole Ø 6 mm.



Type	Dimension D mm	Dimension d mm	Dimension h mm	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
2033/D	15	6.4	3	3000	50	0.340	**2205 09 7**	

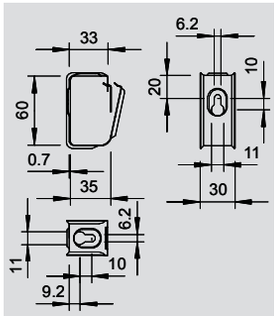
To increase the clamping height for pressure clips from 10 to 13 mm for thicker cables.



Collecting clamp

Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/M	15	50	50	3.700	**2207 02 8**	

Metal collecting clamp for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.

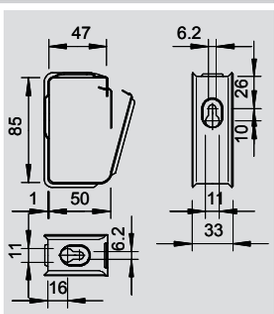


Type	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/LW15	25	8.200	**2207 18 4**	

During fire tests according to DIN 4102 Part 12, the special routing type with collecting clamp achieves the function maintenance class E 30.
The collecting clamp used is made of galvanised sheet steel and can be easily opened for cable assignment and reclosed without the use of tools.

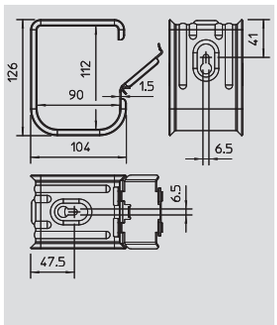
Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/M	30	25	25	6.200	**2207 03 6**	

Metal collecting clamp for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.



Individual laying: products

Collecting clamp



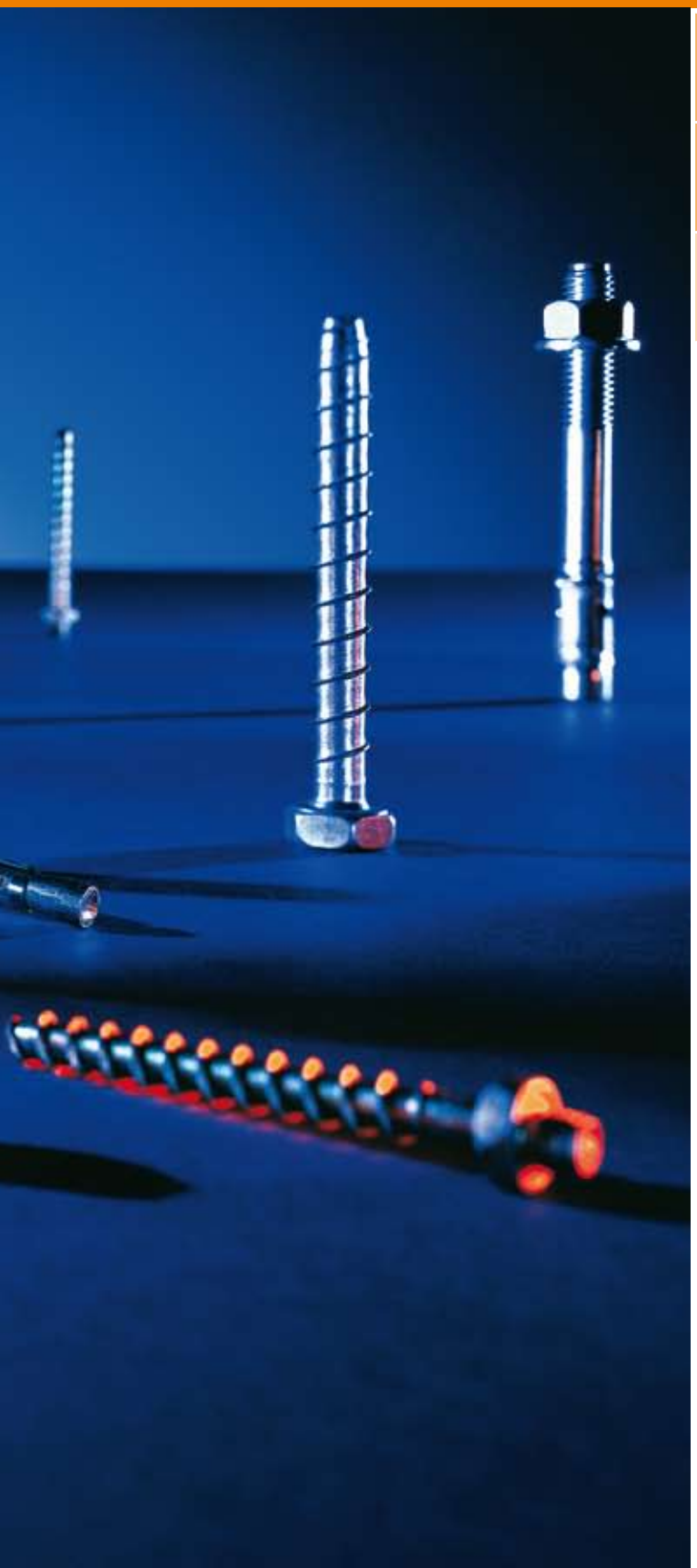
Type	No. of cables NYM 3 x 1.5	Shipping box pcs	Pack. pcs	Weight kg/% pc	Item No. ST / FS	Price /% pc
2031/M	70	10	10	34.500	**2207 06 0**	

Metal collecting clamp for high mechanical stability, even in case of fire. Halogen-free, fire load-free. Also approved as a cable-specific variant for electrical function maintenance to DIN 4102 Part 12.
Fire protection bolt tie MMS 6 x 50 contained in scope of delivery.

Always indicate the article number when ordering.

- Fastenings tested and approved for fires
- Various substrates possible
- High fire resistance period
- Safe installations with tested systems

Fastening systems



Basic principles of fastening systems

Fire testing
Special anchors are required for the fireproof fastening of routing systems for electrical installations for wall and ceiling mounting. These are not taken into account in the testing of cable systems with integrated function maintenance. They require their own proof of suitability as a fastening material in case of fire. This can be obtained with its own fire testing. All the OBO fire protection fastenings possess either a European technical (ETA) or a German national approval (AbZ to DIN) as proof of usability.

Tested fire protection anchors for concrete ceilings and walls
The OBO fire protection anchors for concrete walls and ceilings were subjected to fire testing. Depending on the fire resistance class, values for the maximum load capacity were determined, which are also documented in the appropriate test certificates. In addition, the anchors have a general construction approval from DIBt Berlin or a European approval. The OBO anchors are metal spreading anchors, which are able to accept and dissipate safely the loads which occur during a fire. The precondition is the compliance with the maximum approved load data specified in the test certificates and approvals.

Fastening in hollow brick and porous concrete
Injection mortar systems are available for these substrates. A spread-free closure is created with the stone substrate using the mortar in a wire sleeve. This system also has the proof of use for fires.

Fire protection bolt tie tested for masonry
The OBO fire protection bolt ties were also tested to DIN 4102 and received the appropriate test certificates for mounting in masonry. In addition, some of the products have a general construction approval from DIBt Berlin for mounting in concrete. The fire protection bolt ties must be mounted in accordance with the specifications in the test reports. The loads which occur in a fire and in normal use are safely accepted by the ties, whose special thread cuts into the masonry when screwed into the drill hole.

Overview of fastening systems

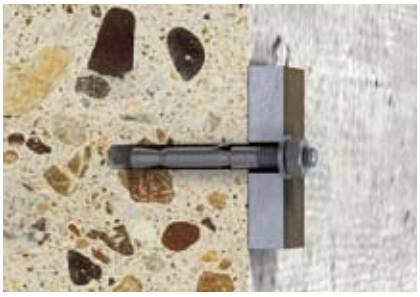
Metal spreading anchor

Fire protection anchor FAZ II

- To fasten normal loads
- For reinforced or unreinforced concrete

Heavy-duty anchor FH

- To fasten heavy loads
- For reinforced or unreinforced concrete



Fire protection nail tie FNA II with threaded connection M6

- To fasten normal loads
- For reinforced or unreinforced concrete

Fire protection nail tie FNA II with nail head M6

- To fasten normal loads
- For reinforced or unreinforced concrete

Internal thread anchor FZEA II

- To fasten normal loads
- For reinforced or unreinforced concrete

FHY cavity ceiling tie

- To fasten normal loads
- For pre-stressed concrete, cavity ceilings

Injection tie

Injection mortar FIS V
- To fasten normal loads
- For hollow brick, hollow concrete blocks

Injection mortar FIS V
- To fasten normal loads for porous concrete

Fire protection bolt tie

Bolt tie MMS6
- To fasten normal loads
- For calcareous sandstone full brick, calcareous sandstone hollow brick and tiled full brick

Bolt tie MMS10
- To fasten heavy loads
- For calcareous sandstone full brick, calcareous sandstone hollow brick and tiled full brick

Bolt tie MMS-ST
- With M6 threaded connection
- To fasten normal loads
- For calcareous sandstone solid brick, calcareous sandstone hollow brick and tiled full brick

Bolt tie HMS-KS
- To fasten normal loads
- For calcareous sandstone solid brick, calcareous sandstone hollow brick and tiled full brick

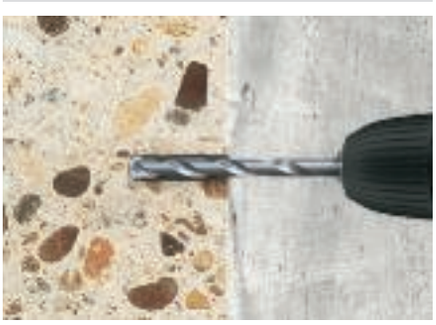
Metal spreading anchor

European technical approval
ETA-05/0069
Fire resistance class to F120

Approved data (FAZ II)		
Substrate	Concrete	
Resistance classes	Min. C20/25	Max. C50/60
Load max. [kN]	30 minutes	90 minutes
M8	1.3	0.9
M10	2.3	1.9
M12	4.0	3.2

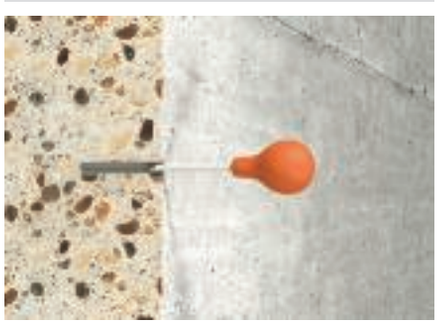
OBO Bettermann's fire protection anchors were fire-tested in a manner similar to DIN 4102. A maximum load capacity for anchoring in concrete was determined according to the fire resistance class. This load data is documented in an appropriate test certificate.
In addition to the proof of fire protection, the anchors have a European technical approval for normal applications. The load capacity during a fire is considerably below that in a cold state. However, this is completely sufficient to fasten the routing components of the various routing types.

Drilling an anchor hole



Drill the anchor hole according to the anchor approval information for the drill hole diameter and the drill hole depth.

Blowing out of the drill hole



Free the drill hole of dust by blowing it out.

Mounting anchors

Insert the anchor in the drill hole. The anchor can be mounted using the push-through mounting.

Anchor fastening

Anchor fastening by tightening the hexagonal nuts with the torque specified in the approval.

Alternative heavy-duty anchor

If very large loads need to be fastened, then the FH heavy-duty anchor can be used as an alternative.

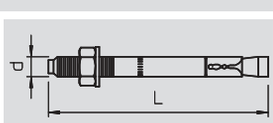
Mounted anchor

Ideal fastening option with fire protection classification in concrete.

Fire protection anchor

Type	Thread	Dimension L mm	Dimension d mm	Clamping area mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
FAZ II 8/30 GS	M8	97	8	30	50	3.800	**3498 48 4**	
FAZ II 10/10 GS	M10	95	10	10	50	7.680	**3498 54 9**	
FAZ II 10/30	M10	115	10	30	25	7.520	**3498 58 1**	
FAZ II 12/10	M12	110	12	10	20	10.400	**3498 65 4**	

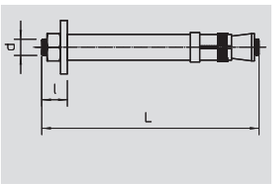
Bolt tie for fastening heavy-duty anchors. Matches OBO mounting systems and wall support brackets and suspended supports.



Always indicate the article number when ordering.

Metal spreading anchor

Heavy-duty anchor



Type	Thread	Dimension L mm	Dimension d mm	Clamping area mm	Drill hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
FH II 18x80	M12	120	18	10	18	10	20.000	**3498 74 3**	

Heavy-duty anchor for fastening components with large loads.

Always indicate the article number when ordering.

Metal spreading anchor

European technical approval
ETA-06/0175
Fire resistance class to F120

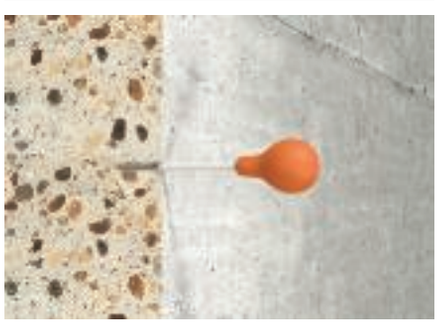
Approved data (FNA II)		
Substrate	Concrete	
Resistance classes	Min. C20/25	Max. C50/60
Load max. [kN]	30 minutes	90 minutes
Thread	0.35	0.30
Nail head	1.60	0.70

OBO Bettermann's fire protection anchors were fire-tested in a manner similar to DIN 4102. For a fire resistance length of 90 minutes, a maximum load capacity was determined when anchored in concrete. This load data is documented in the construction approval.
The low load capacity in a fire is absolutely sufficient for fastening components such as profile rails, spacer clips and also collecting clamps.

Drilling an anchor hole

Drill the anchor hole according to the anchor approval information for the drill hole diameter and the drill hole depth.

Blowing out of the drill hole

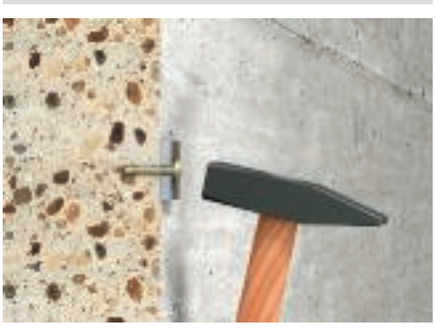


Freeing the drill hole of dust by blowing it out.

Mounting preparations

Insert the anchor in the drill hole. The anchor can be mounted using the push-through mounting.

Mounting anchors



Knock the anchor into the drill hole until the anchor head or the washer touches the connection component.

Mounted anchor

Simple fastening option as pass-through mounting with fire protection classification in concrete.

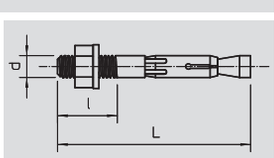
Mounted anchor

Simple fastening option with fire protection classification in concrete.

Nail tie

Type	Thread	Clamping area	Dimension d	Dimension l	Dimension L	Pack.	Weight	Item No.		Price /% pc
		mm	mm	mm	mm	pcs	kg/% pc	ST	/ G	
FNA II 6	M6	5	6	13	53	100	1.400	**3498 42 5**		

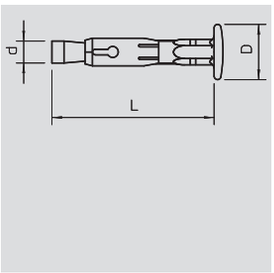
Nail tie with M6 thread. European technical approval for concrete. Fire resistance class to F 120 according to fire protection testing report.



Always indicate the article number when ordering.

Metal spreading anchor

Nail tie



Type	Clamping area	Dimension d	Dimension L	Dimension D	Pack.	Weight	Item No.	Price
	mm	mm	mm	mm	pcs	kg/% pc	ST / G	/% pc
FNA II 6	5	6	40	15	100	1.120	**3498 46 8**	

Nail tie with drive-in head. European technical approval for concrete. Fire resistance class to F 120 according to fire protection testing report.

Metal spreading anchor

European technical approval
ETA-06/0271
Fire resistance class to F120

Approved data (FZEA II)		
Substrate	Concrete	
Resistance classes	Min. C20/25	Max. C50/60
Load max. [kN]	30 minutes	90 minutes
M8	1.0	0.8
M10	1.8	1.6
M12	1.8	1.8

OBO Bettermann's fire protection anchors were fire-tested in a manner similar to DIN 4102. For a fire resistance length of 90 minutes, a maximum load capacity was determined when anchored in concrete. This load data is documented in the construction approval.
The considerably reduced load capacity in a fire is, however, completely sufficient to fasten the components of the various routing types.

Drilling an anchor hole

Drill the anchor hole using the system-bound drill, type FZUB, and create the drill hole back cut by making swivelling movements with the hammer drill.

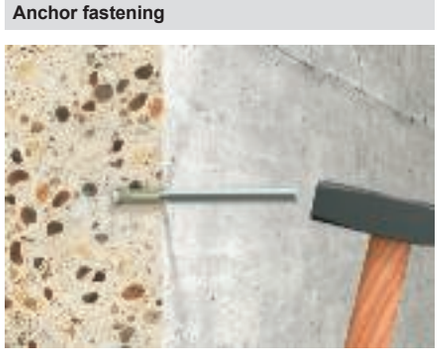
Blowing out of the drill hole

Free the drill hole of dust by blowing it out.

Mounting anchors

Insert the anchor in the drill hole. The anchor must be flush with the drill hole.

Anchor fastening

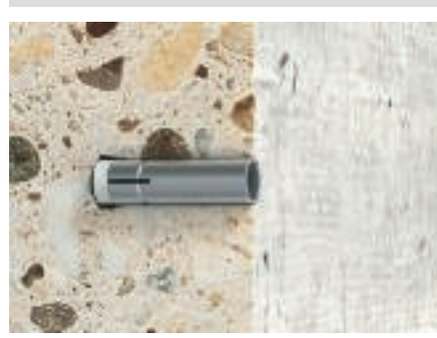


Knock in the spreading pin in the anchor using the appropriate impact mandrel. Then the component to be mounted can be fastened.

Tie for pre-stressed concrete hollow ceilings

The FHY is used with concrete false ceilings. Spreading takes place when the component is mounted, an impact mandrel is not required.

Mounted anchor



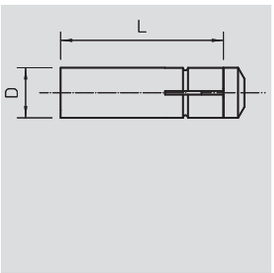
Ideal fastening option with fire protection classification.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_uuu43)

Always indicate the article number when ordering.

Metal spreading anchor

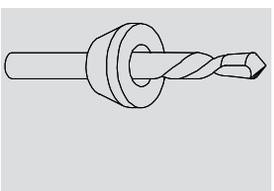
Internal thread anchor



Type	Thread	Dimension D mm	Dimension L mm	Screw-in depth min-max mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
FZEA II 10x40	M8	10	40	11 -17	100	1.550	**3492 03 6**	
FZEA II 12x40	M10	12	40	13 -19	100	2.075	**3492 06 0**	
FZEA II 14x40	M12	14	40	15 -21	50	2.750	**3492 09 5**	

Back cut steel tie with internal thread.

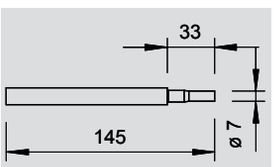
Universal drill



Type	Drill hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST	Price /pc.
FZUB 10x40	10	1	11.800	**3492 33 8**	
FZUB 12x40	12	1	12.200	**3492 36 2**	
FZUB 14x40	14	1	12.500	**3492 39 7**	

The universal drill for SDS seats guarantees correct, approved mounting of the FZEA tie.

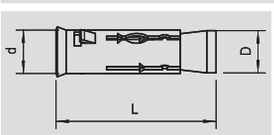
Drive-in mandrel



Type	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /pc.
FZED 10x40	10	10.500	**3492 62 1**	
FZED 12x40	10	17.800	**3492 66 4**	
FZED 14x40	10	25.000	**3492 69 9**	

The impact mandrel guarantees correct, approved mounting of the FZEA tie.

Cavity ceiling tie



Type	Thread	Screw-in depth min-max mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
FHY M8	M8	43 -55	25	1.300	**3498 76 0**	
FHY M10	M10	52 -60	20	3.200	**3498 76 4**	

Cavity ceiling tie with internal thread for use in stressed concrete core slab ceilings.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

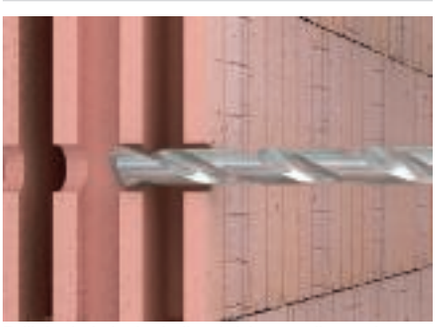
Injection tie

General construction approval Z-21.3-1824
Report of the MPA BS
Function maintenance class to F120

Approved data		
Substrate	Hollow brick	HLz4
	Hollow blocks	Hbl2
	Porous concrete	
Load max. [kN]	See approval!	

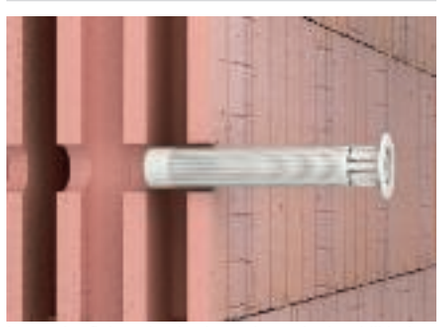
The FIS V injection mortar system is particularly suitable for fire protection fastening in hollow brick, cavity concrete blocks or even in porous concrete. The non-spreading connection is created through the use of the plastic wire sleeve and a threaded anchor rod. The components are tested and approved for a fire resistance period of 90 minutes, rising to 120 minutes in porous concrete.

Use in hollow brick



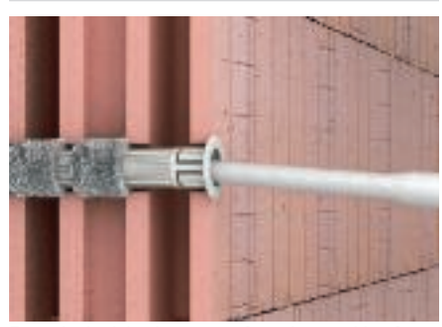
Drill the hole in the hollow brick according to the selected anchor size and then clean it.

Mounting preparations



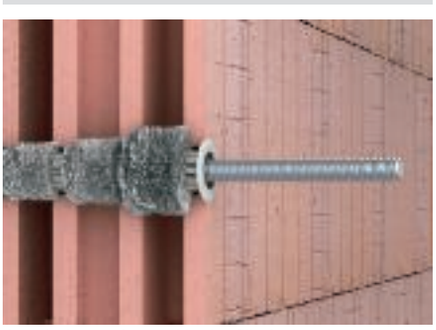
Insert the fitting plastic sieve sleeve in the drill hole.

Applying the injection mortar



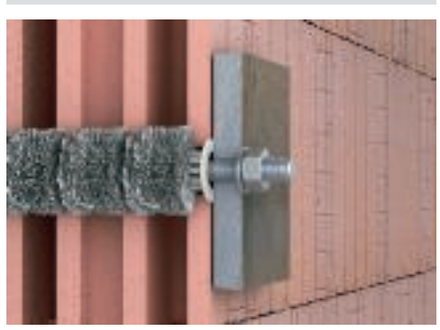
Press in the injection mortar from the cartridge from the base of the drill hole to the opening. In so doing, draw the point back slowly.

Inserting the anchor rod



Attach the anchor rod in the filled wire sleeve up to the set marking. The mortar pushes through the openings of the wire sleeve, forming a closure.

Mount the component



The component can be mounted when the injection mortar has hardened. Comply with the tightening torque in the approval. The hardening time is dependent on the ambient temperature.

Use in porous concrete wall

Drill the anchor hole using the special PBB conical drill. In so doing, rotate the drill to create the back cut of the opening.

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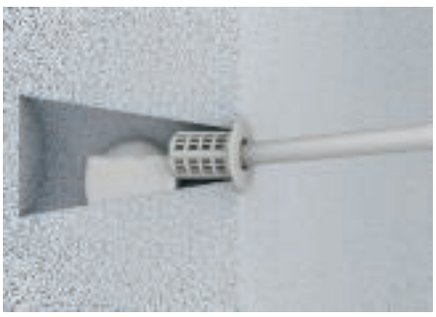
Always indicate the article number when ordering.

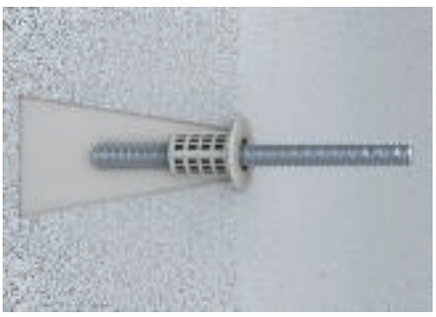
Injection tie

Applying the injection mortar



After thorough cleaning of the opening, insert the centring sleeve into the opening. Then insert mortar from the cartridge from the base of the drill hole to the opening.

Inserting the anchor rod



Attach the anchor rod in the filled wire sleeve up to the set marking. The mortar closes up the back-cut.

Mount the component

The component can be mounted when the injection mortar has hardened. Comply with the tightening torque in the approval. The hardening time is dependent on the ambient temperature.

Mounted component

Approved, fire-protected system for fastening in hollow brick and porous concrete.

2-K mortar cartridge

Type	Unit TE	Contents	Pack.	Weight	Item No.	Price /pc.
		l	pcs	kg/% pc		
FIS V360S	180	0.36	6	50.000	**3488 40 3**	

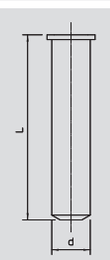
Two-component injection mortar for universal, spread-free anchoring in concrete and stone substrates.

Anchor rod

Type	Dimension L	Dimension d	SW	Pack.	Weight	Item No.	Price /% pc
	mm	mm	mm	pcs	kg/% pc	ST / G	
FIS A M6x70	70	6	10	10	1.800	**3488 29 2**	
FIS A M8x90	90	8	13	10	3.800	**3488 29 8**	

Injection threaded rod for use in injection mortar.

Plastic wire sleeve



Type	Dimension d	Dimension L	Consumption TE	Pack.	Weight	Item No.	Price /% pc
	mm	mm		pcs	kg/% pc	PP	
FIS H 12x50 K	12	50	5	50	0.225	**3488 45 2**	
FIS H 12x85 K	12	85	10	50	0.420	**3488 46 4**	
FIS H 16x85 K	16	75	12	50	1.000	**3488 46 2**	

Injection tie sleeve for use in hollow brick and stones in combination with injection mortar system.

Always indicate the article number when ordering.

Injection tie

Pressing gun

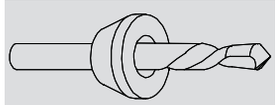
Type	Colour	Pack. pcs	Weight kg/% pc	Item No.	Price /pc.
FIS AK	red	1	140.000	**3488 52 7**	

Pressing gun for two-component injection mortar.

Conical drill for porous concrete

Type	Drill hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST	Price /% pc
FIS PBB	15	1	22.570	**3488 52 5**	

Conical drill PBB with SDS chuck for correct, approval mounting of the injection tie system in porous concrete.



Centring sleeves for porous concrete

Type	Dimension d mm	Pack. pcs	Weight kg/% pc	Item No. PP	Price /% pc
FIS PBZ	15	10	0.350	**3488 51 5**	

Centring sleeve for using the injection tie system in porous concrete.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Bolt tie

General DIBt construction approval for concrete substrates Tested in accordance with DIN 4102 Fire resistance classes to F90

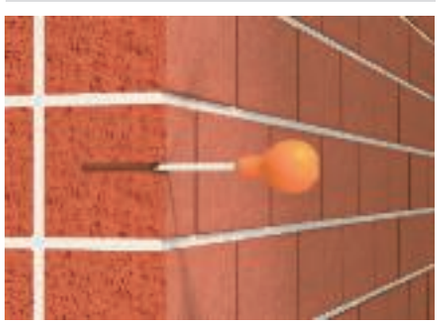
Approved data		
Substrate	Concrete	
	Masonry	KSV, KSL, Vz
Load max. [kN]	30 minutes	90 minutes
MMS10	2.3	1.0

OBO Bettermann's fire protection bolt ties, type MMS10, were fire-tested in a manner similar to DIN 4102.
The maximum load capacity depending on the fire resistance class was determined for different types of masonry.
This load data is documented in an appropriate test certificate.
If there is a fire, the load capacity for the tested masonry types is sufficient for fireproof fastening of the different components for function maintenance false ceiling mounting. The fire protection bolt ties are screwed directly into the drill hole, like a threaded drill in metal. There is no need for an additional anchor.

Drilling the fastening hole

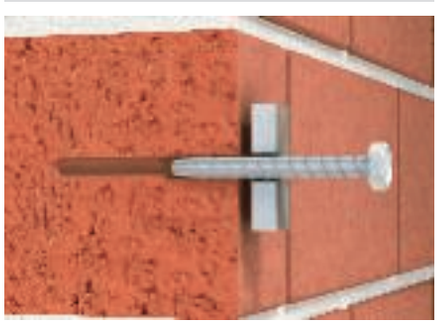
Drill the fastening hole in accordance with the specifications in the mounting instructions. The drill hole depth must be at least 2 cm deeper than the length of the bolt tie. Any layer of plaster should not be taken into account in the minimum setting depth.

Blowing out of the drill hole



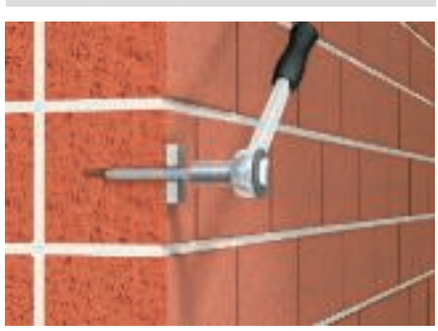
Free the drill hole of dust by blowing it out.

Fixing the fire protection bolt tie



Push the fire protection bolt tie through the fastening hole of the appropriate component and fix in the drill hole.

Fastening the component



Turn the bolt tie into the drill hole. Turning in can take place using a rechargeable or ratchet screwdriver, or also by hand.

Fastened fire protection bolt tie

Ideal fastening option with fire protection classification for various types of masonry.

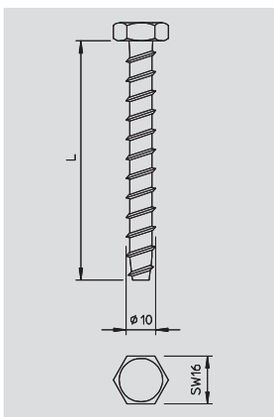
Always indicate the article number when ordering.

Bolt tie

MMS hex

Type	Dimension mm	Drill hole Ø mm	Dimension L mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
MMS10	10 x 80	8	80	50	3.800	**3498 12 3**	
						ST / G	
MMS10	10 x 100	8	100	50	4.600	**3498 15 8**	

Fire protection bolt tie with hexagonal head for direct installation without additional anchors. Substrate: concrete or masonry. WAF 16. Drill hole 8 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.



Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Bolt tie

General DIBt construction approval for concrete substrates
Tested in accordance with DIN 4102
Fire resistance classes to F90

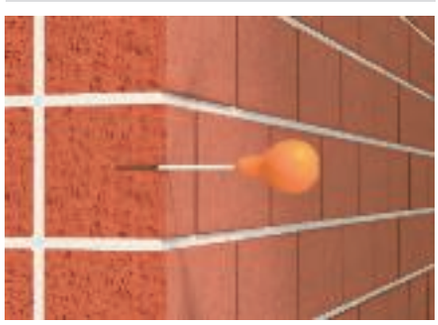
Approved data		
Substrate	Concrete	
	Masonry	KSV, KSL, Vz
Load max. [kN]	30 minutes	90 minutes
MMS6	0.80	0.35
MMS7.5	1.25	0.50

OBO Bettermann's fire protection bolt ties, type MMS, were fire-tested in a manner similar to DIN 4102. The maximum load capacity, depending on the fire resistance class, was determined for different types of masonry. These values are documented in an appropriate test certificate. Taking the occurring loads for the function maintenance application and for false ceiling mounting into account, the determined load capacities for the different masonry types are absolutely sufficient. The fire protection bolt tie can simply be screwed directly into the drill hole without additional anchors.

Drilling the fastening hole

Drill the fastening hole in accordance with the specifications in the mounting instructions. The drill hole depth must be at least 2 cm deeper than the length of the bolt tie. Any layer of plaster should not be taken into account in the minimum setting depth.

Blowing out of the drill hole



Free the drill hole of dust by blowing it out.

Fixing the fire protection bolt tie

Push the fire protection bolt tie through the fastening hole of the appropriate component and fix in the drill hole.

Fastening the component

Turn the bolt tie into the drill hole. Turning in can take place using a rechargeable or ratchet screwdriver, or also by hand.

Fastened fire protection bolt tie

Ideal fastening option with fire protection classification for various types of masonry.

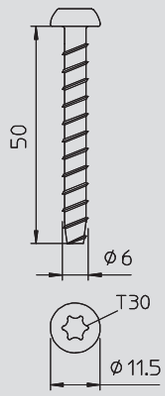
Always indicate the article number when ordering.

Bolt tie

MMS pan head

Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / GC	Price /% pc
MMS6	6 x 50	100	0.960	**3498 10 7**	

Fire protection bolt tie with pan head, drive T30, drill hole 5 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.



Type	Dimension mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
MMS7,5	7.5 x 80	50	2.174	**3498 27 1**	

Fire protection bolt tie with pan head, drive T40, drill hole 6 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.

Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Bolt tie

General DIBt construction approval for concrete substrates
Tested in accordance with DIN 4102
Fire resistance classes to F90

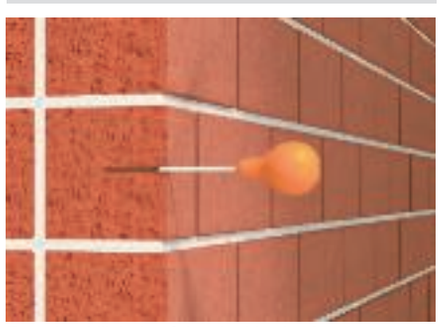
Approved data		
Substrate	Concrete	
	Masonry	KSV, KSL, Vz
Load max. [kN]	30 minutes	90 minutes
MMS-ST	0.80	0.35

OBO Bettermann's fire protection bolt tie, type MMS-ST, was fire-tested in a manner similar to DIN 4102.
The maximum load capacity in a fire was determined for various masonry substrates. These load values are documented in an appropriate test certificate.
The proven load capacity is fully sufficient for the loads occurring for function maintenance when mounted with the spacer clip, type 732.
The bolt tie is mounted without additional anchors. It cuts into the substrate like a threaded drill and therefore can be screwed directly into the drill hole.

Drilling the fastening hole

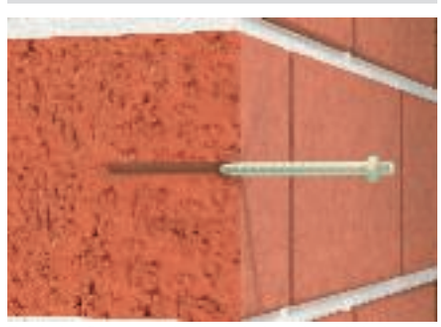
Drill the fastening hole in accordance with the specifications in the mounting instructions. The drill hole depth must be at least 2 cm deeper than the length of the bolt tie. Any layer of plaster should not be taken into account in the minimum setting depth.

Blowing out of the drill hole



Free the drill hole of dust by blowing it out.

Fixing the fire protection bolt tie

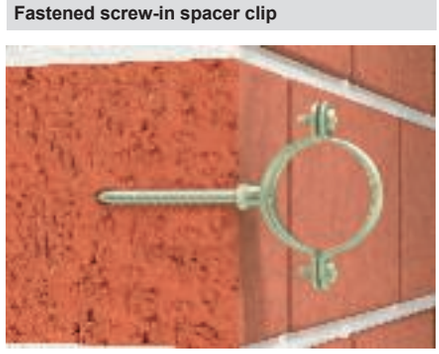


Push the fire protection bolt tie into the drill hole and fix it.

Screw in the fire protection bolt tie

Turn the bolt tie into the drill hole. Turning in can take place using a rechargeable or ratchet screwdriver, or also by hand.

Fastened screw-in spacer clip



On the spacer clip screwed onto the connection thread of the bolt tie.

Fastened fire protection bolt tie

Ideal fastening option with fire protection classification for various types of masonry for screwing on screw-in spacer clips.

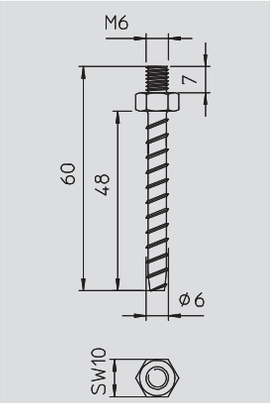
Always indicate the article number when ordering.

Bolt tie

MMS-ST with thread

Type	Thread	Dimension mm	Drill hole Ø mm	Pack. pcs	Weight kg/% pc	Item No. ST / G	Price /% pc
MMS-ST	M6	6 x 60	5	100	1.400	**3498 26 3**	

Hexagonal fire protection bolt tie with M6 head, WAF 10, drill hole 5 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.



Always indicate the article number when ordering.

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Bolt tie

Tested in accordance with DIN 4102
Fire resistance classes to F90

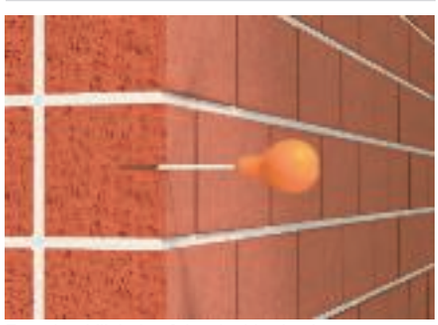
Approved data		
Substrate	Concrete	
	Masonry	KSV, KSL, Vz
Load max. [kN]	30 minutes	90 minutes
HMS-KS	0.50	0.15

OBO Bettermann's fire protection bolt tie, type HMS-KS, was fire-tested in a manner similar to DIN 4102.
The maximum load capacity depending on the fire resistance class was determined for different types of masonry. These values are documented in the appropriate test certificates.
The shape of the bolt tie head is designed in such a way that it disappears in the catchment area of the thread in the base of the screw-in spacer clip, type 732. This means that it is possible to use the bolt tie for pass-through mounting through the thread. The load capacities occurring in conjunction with this clip are absolutely sufficient for the function maintenance application for the different masonry types.
The fire protection bolt tie can simply be screwed directly into the drill hole without additional anchors.

Drilling the fastening hole

Drill the fastening hole in accordance with the specifications in the mounting instructions. The drill hole depth must be at least 2 cm deeper than the length of the bolt tie. Any layer of plaster should not be taken into account in the minimum setting depth.

Blowing out of the drill hole

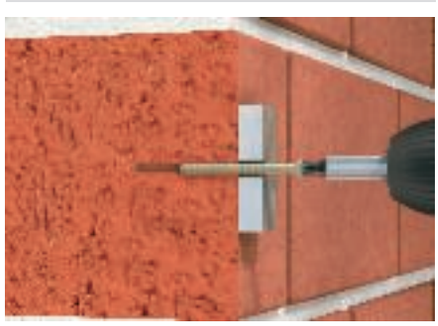


Free the drill hole of dust by blowing it out.

Fixing the fire protection bolt tie

Push the fire protection bolt tie through the threaded section in the clip foot and fix in the drill hole.

Fastening the spacer clip

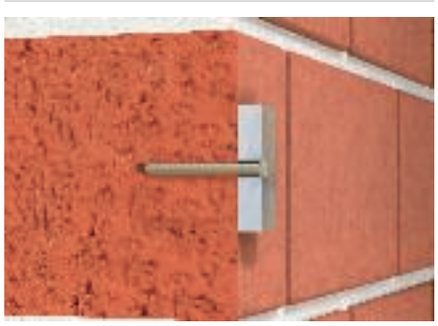


Turn the bolt tie into the drill hole. Turning in can take place using a rechargeable or ratchet screwdriver, or also by hand.

Fastened screw-in spacer clip

The head of the bolt tie fits exactly into the catchment area of the thread.

Fastened fire protection bolt tie



Ideal fastening option with fire protection classification for various types of masonry for screwing on fastening clips.

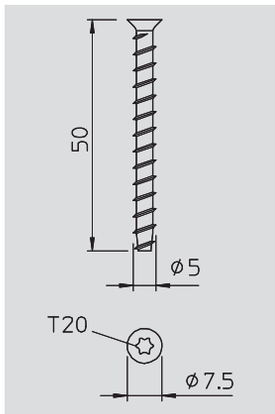
Always indicate the article number when ordering.

Bolt tie

HMS-KS countersunk head

Type	Dimension	Drill hole Ø	Pack.	Weight	Item No.	Price /% pc
	mm	mm	pcs	kg/% pc	ST / G	
HMS-KS	5 x 50	4	200	0.460	**3498 20 4**	

Fire protection bolt tie with conical countersunk head, drive T20, drill hole 4 mm. Fire protection tested according to DIN 4102. Fire resistance class to F90.



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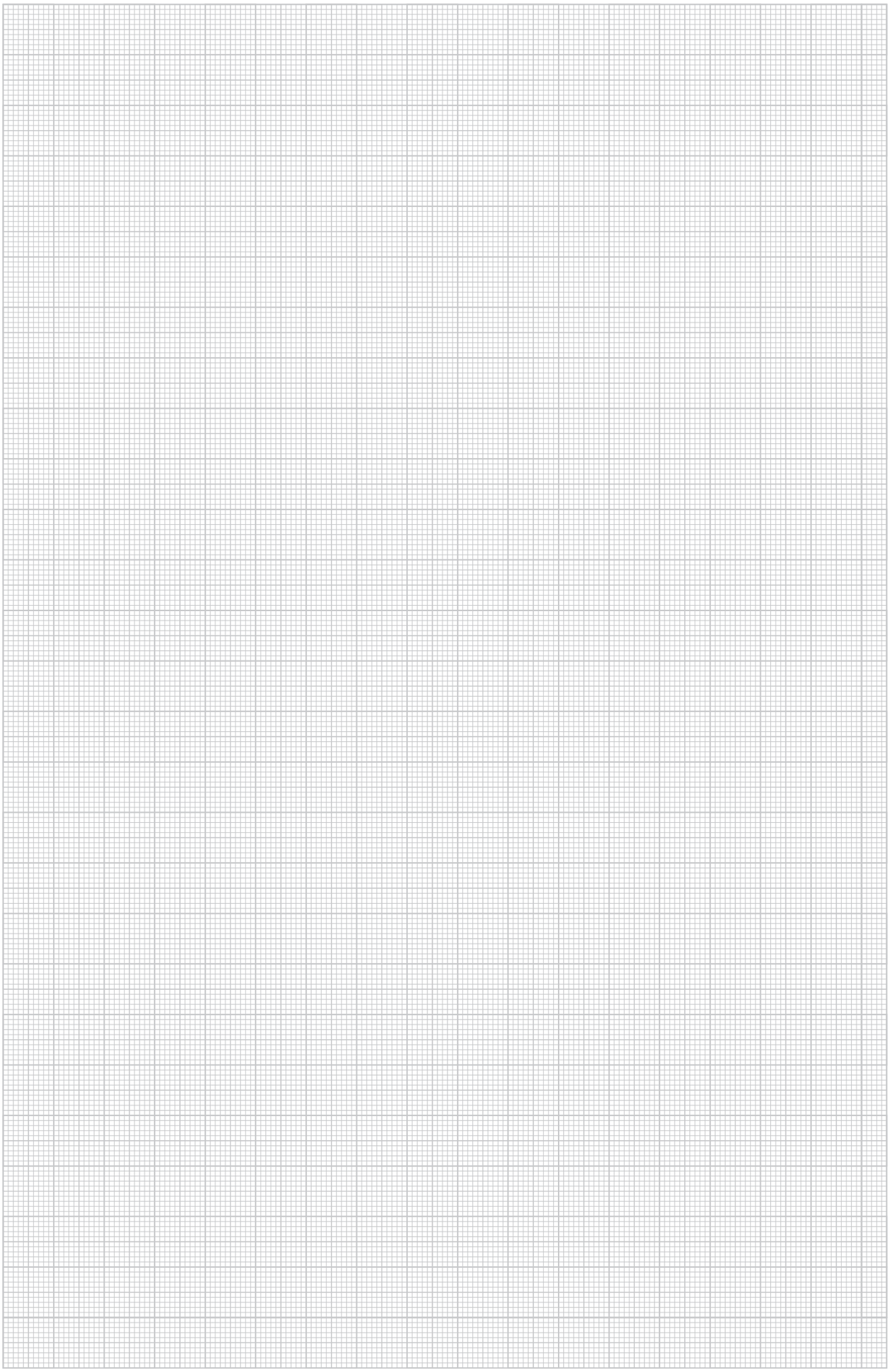

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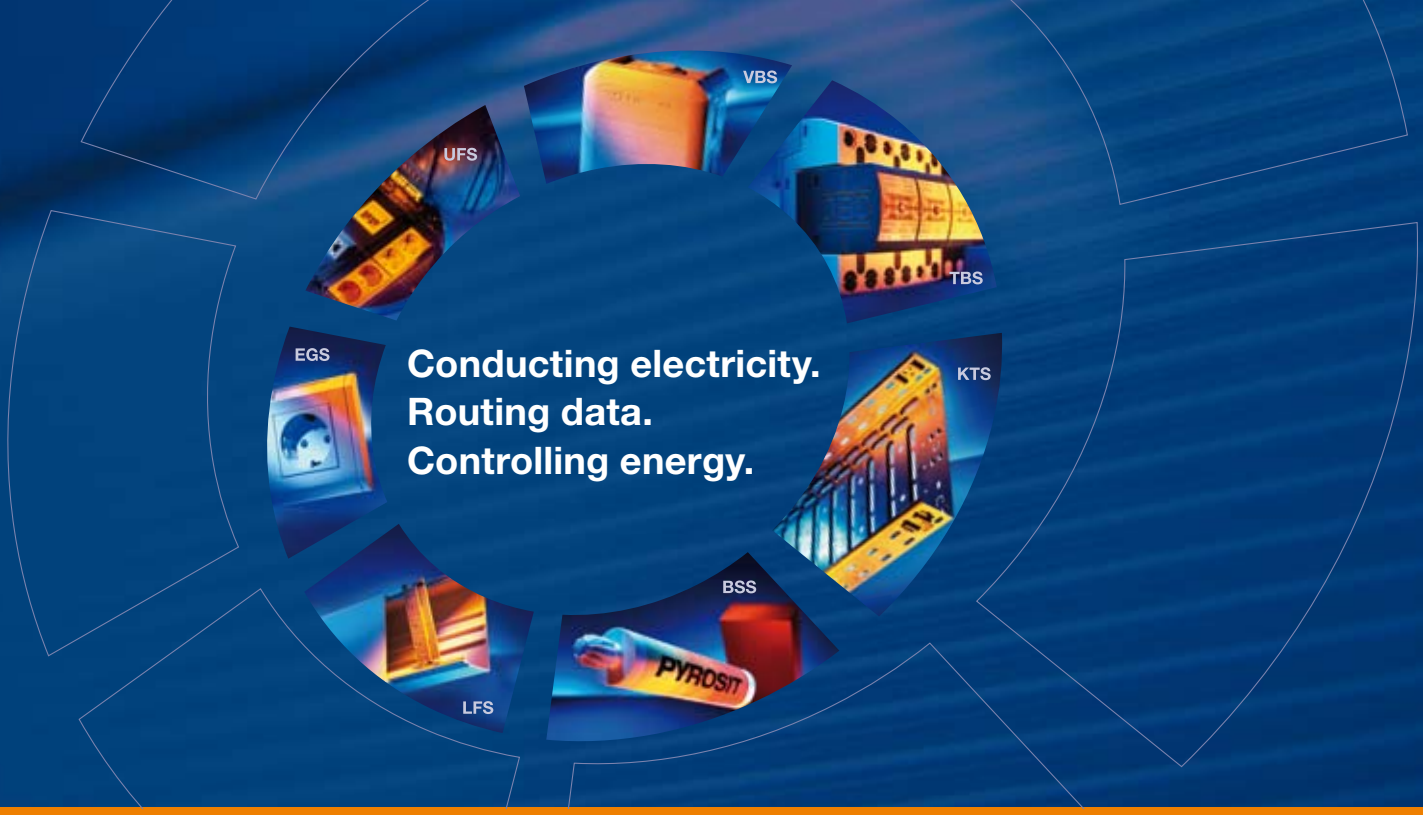

Conducting electricity. Routing data. Controlling energy.

VBS connection and fastening systems
- Junction box systems
- Concealed and cavity wall systems
- Terminal systems
- Cable gland systems
- Cable/pipe fastening systems, plastic
- Cable/pipe fastening systems, metal
- Cable/pipe fastening systems, special
- Pipe systems
- Beam clamp systems
- Rail systems
- BBS clamp clip systems
- Screw-in and knock-in systems

TBS transient and lightning protection systems
- Surge protection systems
- Equipotential bonding systems
- Lightning protection systems
- Earthing systems

KTS cable support systems
- Mounting systems
- Cable tray systems
- Mesh cable tray systems
- Cable ladder systems
- Wide span systems
- Vertical ladder systems
- Luminaire support systems
- Modular systems
- Stainless steel systems
- Function maintenance systems and escape route installation systems

BSS fire protection systems
- Insulation systems
- Escape route installation systems
- Fire protection duct systems
- Function maintenance systems

LFS cable routing systems
- Cable trunking systems, PVC
- Cable trunking systems. metal
- Skirting trunking systems
- Wiring trunking systems
- Device installation trunking systems, PVC
- Device installation trunking systems, steel
- Device installation trunking systems, aluminium
- Service pole systems
- Device systems
- Fire protection duct systems

EGS device systems
- Switch systems
- OBO B.U.S systems
- Intelligent workstation systems
- Energy distribution systems
- Modul 45 systems
- Data technology systems
- Industrial and special connector systems

UFS underfloor systems
- Underfloor systems, screed-covered
- Underfloor systems, flushfloor, open
- Underfloor systems, flushfloor, closed
- Underfloor systems, in-concrete
- Onfloor systems
- Device installation systems
- Modul 45 systems and data technology
- Fire protection systems

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OBO BETTERMANN

Test marks

DIBt Deutsches Institut für Bautechnik Berlin, Germany

Forschungs- und Materialprüfungsanstalt, Germany

CE Communautés Européennes, EC declaration of conformity according to EC directives

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Pictogram explanation

Fire protection

- HSM mortar insulation system
- FPS assembly plate insulation system
- FBS90 2-K foam insulation, electrical
- KBK bag insulation system
- FBA-B200 foam block insulation
- FBA-B120 foam block insulation
- FBA-F assembly insulation box shell
- FBA-S flexible foam plug insulation system
- FBA-SR assembly insulation pipe shell
- FBA-D drilling crown insulation
- FBA-SP small insulation
- KBK-K cushion ballast system
- FBA-BK cable insulation system
- FBS90 2-K foam insulation, underfloor
- FBA-B200 foam block insulation, underfloor
- CRM pipe seal
- FBS90 2-K foam insulation, pipes
- Fire resistance class S 30
- Fire resistance class S 90
- Fire resistance class S 120
- Fire resistance class R 90
- Function maintenance class E 30
- Function maintenance class E90
- Fire resistance class I 90
- Fire resistance class I 120
- Fire protection duct for ceiling mounting
- Fire protection duct for wall mounting
- Fire protection duct, suspended, for I90 ceiling mounting
- Fire protection duct, suspended, for E30 wall mounting
- Fire protection duct, suspended, for I90 wall mounting
- Fire protection duct, suspended, for E30 ceiling mounting
- Material class DIN 4102-B1
- Material class DIN 4102-B2

Pictogram explanation

Escape route installation systems

- Escape route ceiling mounting, one-layer
- Escape route ceiling mounting, with pressure clip
- Escape route ceiling mounting, GRIP
- Escape route wall mounting, GRIP
- Escape route wall mounting, one layer
- Escape route ceiling mounting, two layers
- Escape route ceiling mounting, two layers on both sides
- Escape route ceiling mounting, two layers
- Escape route ceiling mounting, one-layer cross-section
- Escape route wall mounting, two layers
- Escape route, cable bandage, renovation
- Escape route ceiling mounting, cross-section

Function maintenance systems

- Ceiling mounting, one-layer
- Ceiling mounting, two-layer
- Ceiling mounting, three-layer
- Ceiling mounting on both sides, one-layer
- Ceiling mounting on both sides, two and one-layer
- Ceiling mounting with cross-section
- Ceiling mounting with cross-section
- Wall mounting, one-layer, threaded rod to ceiling
- Wall mounting, two-layer, threaded rod to ceiling
- Wall mounting, three-layer, threaded rod to ceiling
- Wall mounting, two trays
- Wall mounting, one-layer, threaded rod to wall
- Wall mounting, two-layer, threaded rod to wall
- OBO GRIP
- Wall mounting, one tray without threaded rod
- Clamp clip with long trough, ceiling
- Clamp clip, vertical wall
- Individual clip, ceiling
- Lightweight rising track
- OBO GRIP wall routing type
- OBO GRIP ceiling routing type
- Individual clip, horizontal wall

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Pictogram explanation

Function maintenance systems


Heavyweight rising track


Individual clip, vertical wall


Clamp clip with long trough, wall


Clamp clip, horizontal wall


Industrial vertical ladder


Clamp clip, ceiling

Strain relief for vertical cable routing


Ceiling mounting without threaded rod, one-layer


Ceiling mounting without threaded rod, two-layer


Ceiling mounting without threaded rod, three-layer


Ceiling mounting without threaded rod, two layers on both sides


Ceiling mounting without threaded rod, three-layer (2 + 1)

Flange clamp systems


Fire protection anchor


Fire protection bolt tie


FIS V injection mortar


FHY cavity ceiling tie

Surfaces

F Hot-dip galvanised

FS Strip-galvanised

G Electro-galvanised

FT Hot-dip galvanised

Metals

St Steel

VA Stainless steel, material no. 1.4310

05 BSS_Katalog_2008 / en / 30/03/2009 (LLExport_00043)

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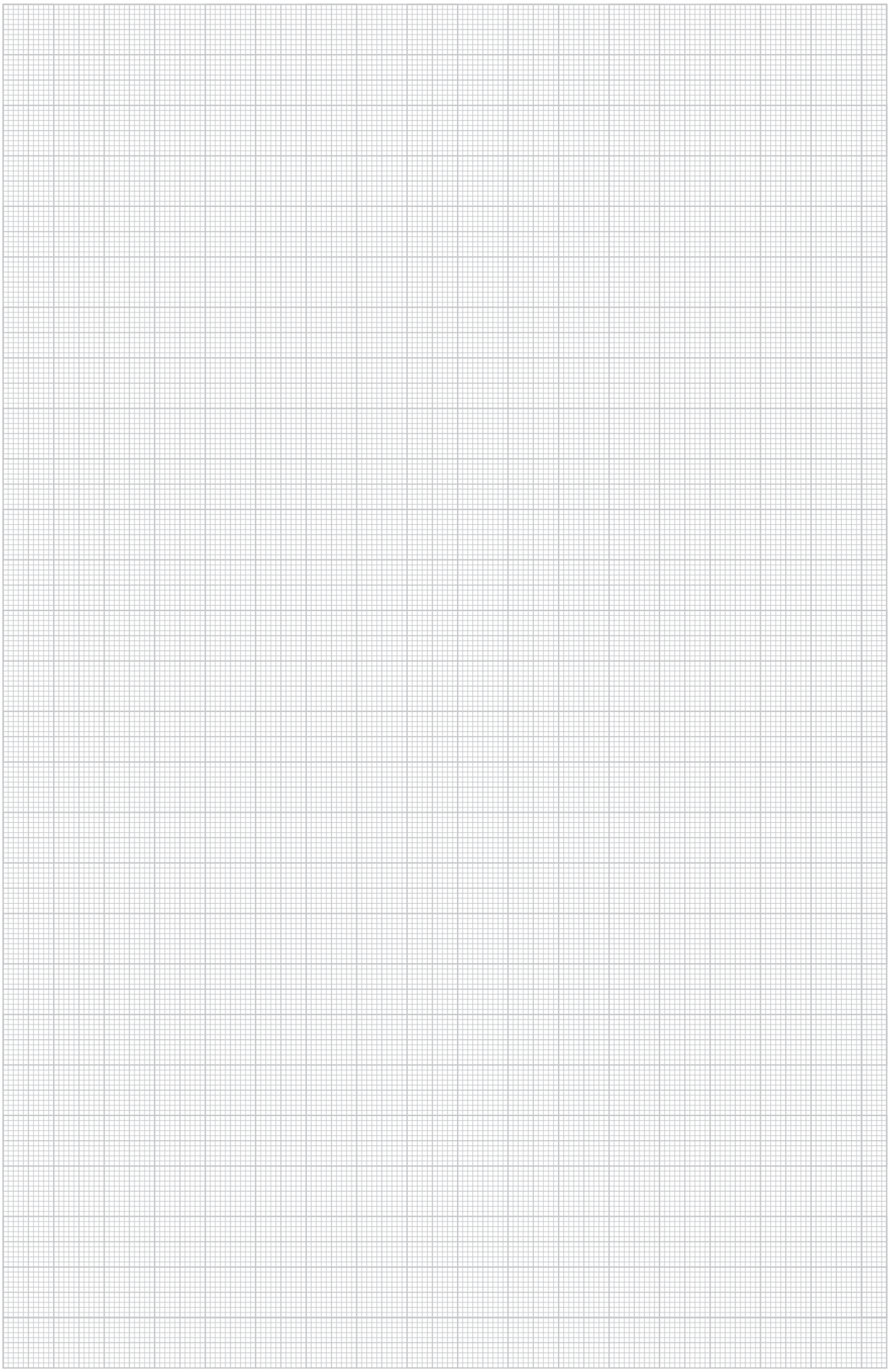

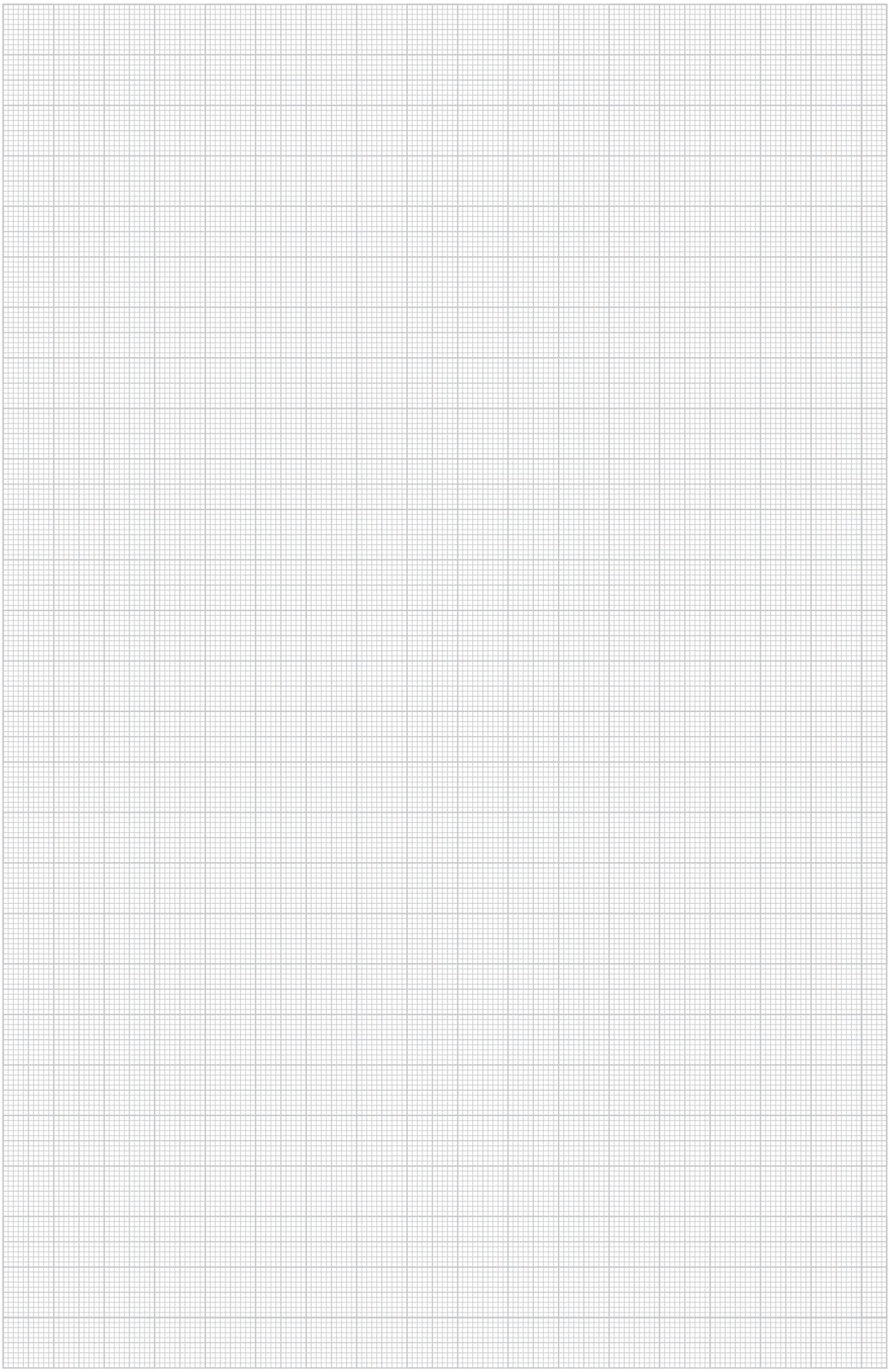

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

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05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page
		/% pc				/% pc				/% pc				/m	
5038290	**1104 26 8**		336	5115038	**1360 22 1**		370	5714255	**3488 46 2**		387	5391203	**6047 63 8**		255
5038351	**1104 28 4**		336	5115090	**1360 24 8**		370	5437444	**3488 46 4**		387	5391210	**6047 65 4**		255
5836353	**1104 29 2**		336	5115151	**1360 26 4**		370	5437468	**3488 51 5**		388	5391227	**6047 68 9**		255
5038412	**1104 30 6**		336	5115212	**1360 28 0**		370	5437499	**3488 52 5**		388				
		/% m		5115274	**1360 30 2**		370			/pc.		6057979	**6052 09 6**		258
5038771	**1104 50 0**		336	5115335	**1360 33 7**		370	5318910	**3488 52 7**		388	6029716	**6052 10 3**		257
				5115397	**1360 35 3**		370					6058150	**6052 20 7**		258
5047599	**1119 65 6**		337	5115458	**1360 38 8**		370			/% pc		6030071	**6052 21 0**		257
				5115519	**1360 39 6**		370	5454038	**3492 03 6**		385	6058273	**6052 30 4**		258
5050230	**1121 97 9**		337	5115571	**1360 42 6**		370	5454090	**3492 06 0**		155	6031399	**6052 30 7**		257
				5115632	**1360 45 0**		370	5454151	**3492 09 5**		385	6058396	**6052 40 1**		258
		/% pc		5115694	**1360 48 5**		370			/pc.		6031511	**6052 40 5**		257
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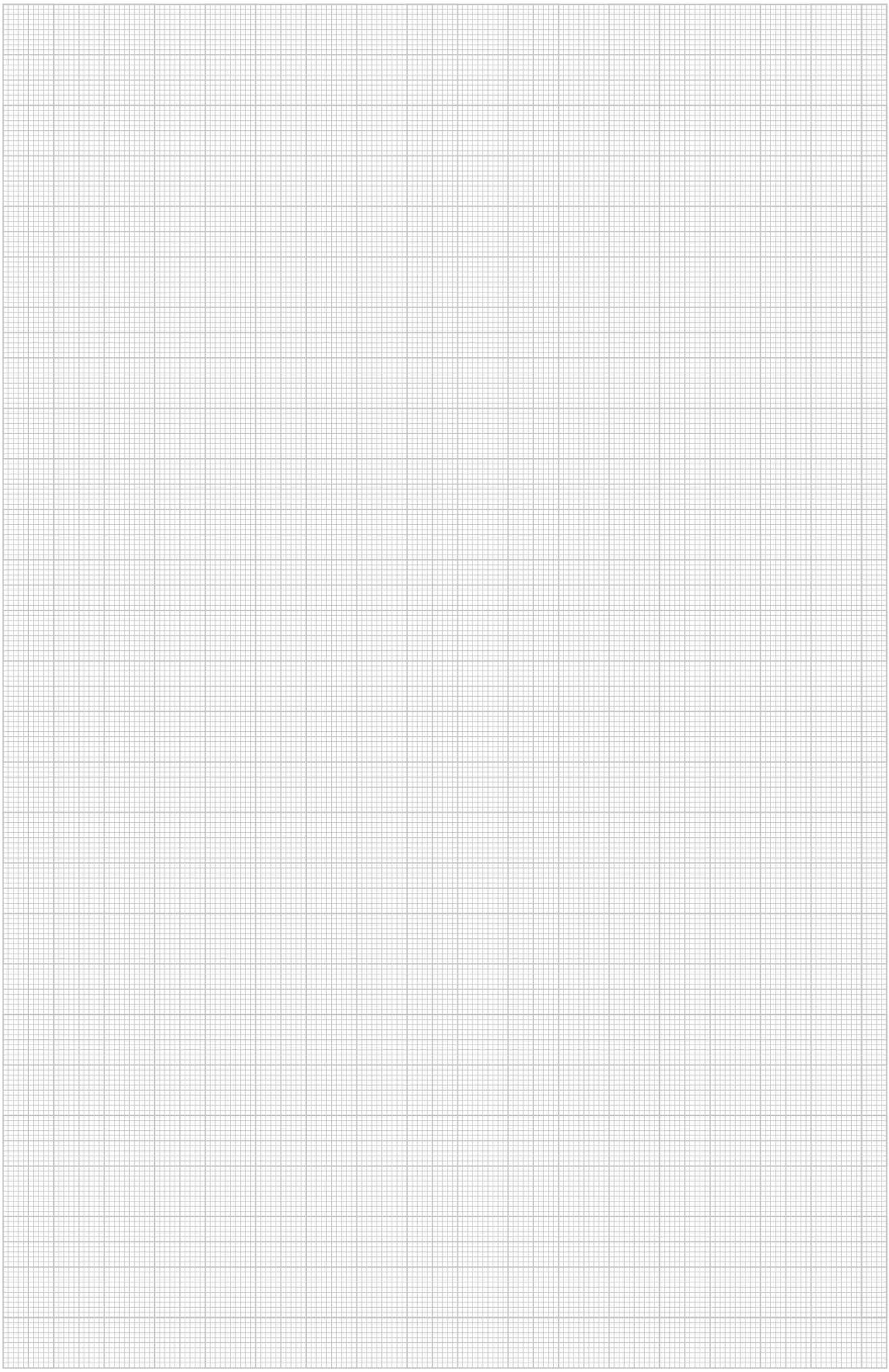
5053712	**1144 10 3**		339	5115878	**1360 60 4**		370	5454519	**3492 39 7**		385	6059775	**6055 30 3**		134
				5569114	**1360 63 9**		370	5454212	**3492 62 1**		385	6059836	**6055 40 0**		134
5054559	**1146 50 5**		339					5454274	**3492 66 4**		385				
				5115939	**1361 13 9**		371	5454335	**3492 69 9**		385				
5057017	**1151 01 0**		339	5115991	**1361 16 3**		371					6060191	**6056 10 5**		221
				5116059	**1361 19 8**		371			/% pc		6542659	**6056 14 8**		255
5058335	**1153 41 2**		339	5116110	**1361 20 1**		371	5963929	**3498 10 7**		392	6060252	**6056 20 2**		134
				5116172	**1361 23 6**		371	5963981	**3498 12 3**		164	6114672	**6056 22 9**		255
5062714	**1156 00 4**		338	5116233	**1361 29 5**		371	5964049	**3498 15 8**		390	6060313	**6056 29 6**		134
5062776	**1156 01 2**		338	5116295	**1361 38 4**		371	5964100	**3498 20 4**		396	6389834	**6056 32 6**		255
5062837	**1156 02 0**		338	5116356	**1361 48 1**		371	5964162	**3498 26 3**		394	6060375	**6056 40 7**		134
5062899	**1156 03 9**		338	5116417	**1361 51 1**		371	5519973	**3498 27 1**		149	6625215	**6056 42 3**		255
5062950	**1156 04 7**		338	5116479	**1361 61 9**		371	5461890	**3498 42 5**		382	6060436	**6056 50 4**		134
5063018	**1156 05 5**		338	5116530	**1361 63 5**		371	5693192	**3498 46 8**		383	6625277	**6056 52 0**		255
5063070	**1156 06 3**		338					5504252	**3498 48 4**		380	6060498	**6056 60 1**		134
5063131	**1156 07 1**		338			/pc.		5888499	**3498 54 9**		155				
5063193	**1156 09 8**		338	5138372	**1470 17 5**		136	5888550	**3498 58 1**		380	6062959	**6062 03 2**		156
5063254	**1156 10 1**		338					5888611	**3498 65 4**		380				
5063315	**1156 12 8**		338			/% pc		5489139	**3498 74 3**		381	6063079	**6062 06 7**		222
5063377	**1156 13 6**		338	5036616	**2204 00 0**		131	5598930	**3498 76 0**		385	6063192	**6062 11 3**		156
5063438	**1156 14 4**		338	5210672	**2204 01 0**		131	5599111	**3498 76 4**		385				
5063490	**1156 15 2**		338									6599899	**6062 28 8**		256
5063551	**1156 16 0**		338	5044970	**2205 09 7**		372							/% pc	
5494836	**1156 17 9**		338							/m		6599950	**6062 29 6**		256
5494898	**1156 18 7**		338	5863953	**2207 02 8**		131	5045281	**6001 42 1**		259	6146352	**6062 30 0**		256
5494959	**1156 19 5**		338	5798798	**2207 03 6**		131	6815050	**6001 42 4**		259				
5958703	**1156 20 9**		338	5022497	**2207 06 0**		131	5045274	**6001 44 7**		259	6441372	**6065 60 0**		257
5958765	**1156 24 1**		338	5864011	**2207 18 4**		372	6858675	**6001 44 8**		259				
5958826	**1156 26 8**		338							/pc.				/pc.	
5958888	**1156 27 6**		338	5253211	**3141 04 7**		41	6352692	**6001 93 9**		259	6065295	**6067 06 9**		260
5958949	**1156 28 4**		338	5253334	**3141 12 8**		41	6352753	**6001 94 7**		259				
				5253396	**3141 20 9**		135					6065417	**6067 09 3**		222
5498254	**1158 00 7**		338	5253457	**3141 30 6**		135			/m		6065530	**6067 11 5**		134
5498315	**1158 01 5**		338					6959723	**6010 00 8**		336				
5498377	**1158 02 3**		338					6959785	**6010 01 6**		336	6066797	**6068 15 4**		257
5498438	**1158 03 1**		338	5254836	**3153 09 6**		291	6959846	**6010 02 4**		336	6066919	**6068 17 0**		257
5498490	**1158 05 8**		338					6959907	**6010 10 5**		336	6066971	**6068 18 9**		257
5498551	**1158 06 6**		338	5255437	**3156 14 1**		339	6959969	**6010 11 3**		336	6067039	**6068 19 7**		257
5498612	**1158 07 4**		338					6960026	**6010 12 1**		336				
5498674	**1158 08 2**		338	5257356	**3160 75 0**		223								
5498735	**1158 09 0**		338							/pc.		6451272	**6069 20 7**		256
5498797	**1158 10 4**		338	5258131	**3163 11 3**		223	6608539	**6015 33 6**		261				
5498858	**1158 11 2**		338											/m	
5498919	**1158 12 0**		338	5275299	**3195 22 8**		156	6520510	**6016 59 6**		259	5299639	**6207 50 1**		290
								6307876	**6016 71 5**		260	5299646	**6207 50 5**		290
5082033	**1195 79 4**		369	5298090	**3400 06 9**		41					5299684	**6207 50 9**		290
5082095	**1195 80 8**		369	5298151	**3400 08 5**		41	6307937	**6017 03 7**		260	6705559	**6207 92 8**		309
5082156	**1195 81 6**		369	5298212	**3400 10 7**		135	5164630	**6017 70 2**		264	6705610	**6207 93 2**		309
5082217	**1195 82 4**		369	5298274	**3400 12 3**		135	5164647	**6017 70 5**		264	6705672	**6207 93 6**		309
5082279	**1195 83 2**		369									6705733	**6207 94 0**		309
5082330	**1195 84 0**		369	5300137	**3402 09 6**		136	6446896	**6018 50 5**		337				
5082392	**1195 85 9**		369	5300199	**3402 12 6**		136					5064251	**6208 62 7**		336
5082453	**1195 86 7**		369	5300311	**3402 20 7**		41	6014538	**6019 52 8**		337	5064268	**6208 63 0**		336
5082514	**1195 87 5**		369	5300373	**3402 21 5**		41					5064299	**6208 63 3**		336
5237853	**1195 88 3**		369											/pc.	
				5867913	**3403 02 5**		157	6379392	**6040 40 3**		221	6960262	**6208 77 0**		291
5114499	**1360 05 1**		370	5868217	**3403 12 2**		262	6379453	**6040 43 8**		221	6139514	**6208 80 0**		337
5114550	**1360 08 6**		370					6379514	**6040 44 6**		221				
5114611	**1360 10 8**		370									6143719	**6211 22 4**		290
5114673	**1360 12 4**		370	5437376	**3488 29 2**		387	6050475	**6043 21 6**		221	6143771	**6211 23 2**		290
5114734	**1360 14 0**		370	5437383	**3488 29 8**		387	6050536	**6043 22 4**		221	6143832	**6211 24 0**		290
5114796	**1360 15 9**		370			/pc.		6050598	**6043 23 2**		221	6143894	**6211 25 9**		310
5114857	**1360 16 7**		370	5319276	**3488 40 3**		387								
5114918	**1360 18 3**		370			/% pc				/m		6150915	**6213 72 3**		290
5114970	**1360 20 5**		370	5437437	**3488 45 2**		387	5390879	**6047 61 1**		255	6150977	**6213 73 1**		290

EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page	EAN-C.	Art. no.	Price	Page
		/pc.				/pc.				/pc.				/pc.	
6151035	**6213 75 8**		290	6536474	**6341 58 6**		132	6650590	**6417 02 7**		133	6231072	**7083 10 6**		223
6151097	**6213 76 6**		310	6536412	**6341 59 4**		132	6650651	**6417 04 3**		133	6231195	**7083 20 3**		135
				6536351	**6341 60 8**		132	6650712	**6417 07 8**		133	6231256	**7083 30 0**		135
6152353	**6214 22 3**		290	6536290	**6341 61 6**		132	6650774	**6417 09 4**		133	6231317	**7083 40 8**		135
6152414	**6214 23 1**		290	6536238	**6341 62 4**		132	6650835	**6417 11 6**		133	6231379	**7083 50 5**		135
6152476	**6214 25 8**		290	6536177	**6341 63 2**		132					6231492	**7083 60 2**		135
6152537	**6214 26 6**		310					6204311	**6418 19 8**		135				
								6437474	**6418 25 0**		155				
6163397	**6220 43 6**		292	6221776	**6342 30 2**		154	6518470	**6418 25 2**		134	6249015	**7128 42 8**		258
6163458	**6220 44 4**		292	6222018	**6342 30 4**		132	6204434	**6418 28 7**		261	6249077	**7128 44 4**		258
6163519	**6220 45 2**		292	6222070	**6342 30 6**		132	6204496	**6418 29 5**		261	6249138	**7128 46 0**		258
6163571	**6220 46 0**		311	6222315	**6342 30 8**		218	6204557	**6418 31 7**		134	6249190	**7128 48 7**		258
				6222377	**6342 31 0**		218	6204731	**6418 55 4**		253				
6164530	**6221 07 6**		291	6222438	**6342 31 2**		218	6204793	**6418 57 0**		253	6250752	**7129 61 0**		258
6976881	**6221 46 7**		292	6222490	**6342 31 4**		218	6204854	**6418 59 7**		253	6250813	**7129 63 7**		258
6166152	**6221 85 8**		292	6223510	**6342 31 6**		218					6250875	**7129 65 3**		258
6166213	**6221 86 6**		292	6223572	**6342 31 8**		218					6250936	**7129 68 8**		258
6166275	**6221 87 4**		292	6223633	**6342 32 8**		218	6206599	**6419 70 4**		253				
6166336	**6221 88 2**		311	6224296	**6342 33 8**		218	6206711	**6419 72 0**		219				
								6206773	**6419 74 7**		219	5077572	**7202 22 1**		41
		/pair		6224470	**6342 35 1**		154	6206834	**6419 76 3**		219	5077589	**7202 22 3**		41
6167296	**6222 53 6**		289	6224531	**6342 35 3**		154	6206896	**6419 79 8**		219	5077619	**7202 22 5**		41
		/pc.		6224593	**6342 35 5**		154					5077626	**7202 22 7**		41
6555857	**6222 94 3**		292	6224654	**6342 35 7**		154					5077633	**7202 23 0**		41
6555918	**6222 95 1**		292	6224715	**6342 35 9**		154	6662531	**6420 60 8**		254	5077640	**7202 23 2**		41
6555970	**6222 97 8**		292	6224777	**6342 36 2**		154	6662593	**6420 61 0**		254	5077671	**7202 23 4**		41
				6225019	**6342 36 4**		154					5077688	**7202 23 6**		41
				6225071	**6342 36 6**		154	6207077	**6420 65 6**		219	5077695	**7202 23 8**		41
6229215	**6338 45 7**		133	6225132	**6342 36 8**		154	6207138	**6420 66 4**		155	5077701	**7202 24 0**		41
6469871	**6338 46 1**		133	6225378	**6342 37 0**		154	6207190	**6420 68 0**		155	5448372	**7202 24 8**		98
				6225439	**6342 37 2**		154	6207251	**6420 71 0**		155	5448235	**7202 26 5**		136
6185238	**6338 49 6**		133					6207312	**6420 74 5**		155			/kg	
								6207374	**6420 78 8**		219	5448242	**7202 26 8**		136
6187218	**6339 21 2**		132	6340217	**6348 87 4**		224							/pc.	
6187270	**6339 22 0**		132	6168910	**6348 90 4**		225					6141555	**7202 27 0**		39
6187331	**6339 23 9**		132	6901456	**6348 92 0**		225	6325030	**6424 60 8**		253	6141616	**7202 27 4**		40
6187393	**6339 24 7**		132					6325337	**6424 61 6**		253	6141678	**7202 27 8**		40
6187454	**6339 25 5**		132	6191413	**6349 10 2**		263							/kg	
6187515	**6339 26 3**		132	6191475	**6349 15 3**		263	6636853	**6424 71 6**		219	5430353	**7202 28 0**		40
6187577	**6339 27 1**		132					6636976	**6424 73 2**		219			/pc.	
6187638	**6339 29 8**		132					6637034	**6424 74 0**		219	6141739	**7202 28 2**		40
				6199037	**6364 15 2**		219	6637096	**6424 75 9**		219	6141791	**7202 28 6**		41
6187690	**6340 01 6**		253	6199150	**6364 26 8**		219					5428190	**7202 32 2**		53
6187751	**6340 03 2**		253	6199211	**6364 27 6**		219					5077794	**7202 49 6**		78
6187812	**6340 05 9**		253	6635238	**6364 62 4**		220			/% m		5428206	**7202 50 6**		53
6187874	**6340 07 5**		253					6209354	**6490 01 8**		136	5428213	**7202 50 8**		57
6187935	**6340 09 1**		253	6501731	**6364 94 2**		223			/% pc		5428275	**7202 51 0**		57
6187997	**6340 11 3**		253					6209774	**6490 90 5**		137	5428220	**7202 51 6**		53
6188055	**6340 14 8**		253	6469819	**6365 02 7**		223	6209835	**6490 96 4**		137	5428282	**7202 54 0**		53
6188116	**6340 16 4**		253									5428312	**7202 54 3**		57
6188178	**6340 18 0**		253							/pc.		6142217	**7202 55 1**		64
6188239	**6340 19 9**		253			/% pc		6209897	**6498 01 9**		137	6142279	**7202 55 5**		64
6188291	**6340 20 2**		253	6199815	**6406 12 2**		135	6209958	**6498 02 7**		137	6142330	**7202 55 9**		64
6188352	**6340 21 0**		253									6142392	**7202 56 3**		64
6188413	**6340 22 9**		253	6199877	**6406 15 7**		223					6142453	**7202 56 7**		64
6188475	**6340 23 7**		253	6199990	**6406 20 3**		135	6211630	**7001 29 0**		221	6142514	**7202 57 1**		64
6188536	**6340 24 5**		253	6200054	**6406 25 4**		340	6211692	**7001 30 4**		221	6142576	**7202 57 5**		64
6188598	**6340 25 3**		253	6201259	**6406 96 3**		340					6142637	**7202 57 9**		64
6188659	**6340 26 1**		253					6212897	**7002 39 4**		222	6142699	**7202 58 6**		67
6188710	**6340 28 8**		253	6201433	**6407 04 8**		340	6212958	**7002 41 6**		222	6142750	**7202 59 2**		64
6188772	**6340 29 6**		253	5354956	**6407 52 1**		293					5428329	**7202 60 0**		73
6959006	**6340 88 1**		252	6201914	**6407 56 0**		340	6079971	**7070 20 5**		222	5428336	**7202 61 3**		73
6959068	**6340 90 3**		219					6094882	**7070 21 3**		135	5428343	**7202 61 7**		73
6959129	**6340 91 1**		219	6479955	**6408 70 2**		339	6094943	**7070 21 7**		135	6142811	**7202 62 4**		70
6959181	**6340 93 8**		133	6480074	**6408 72 9**		262	6095001	**7070 22 1**		135	6142934	**7202 62 8**		70
6601752	**6340 94 6**		133	6480135	**6408 73 7**		262	6095063	**7070 22 5**		135	6143290	**7202 63 6**		70
6043927	**6340 95 0**		133					6095186	**7070 23 3**		135	6143658	**7202 64 4**		70
6044047	**6340 95 4**		219	6202218	**6410 08 1**		262					6144013	**7202 66 0**		61
6044160	**6340 95 8**		219	6202270	**6410 10 3**		224	6226573	**7070 51 9**		260	6144372	**7202 66 4**		61
6284177	**6340 96 2**		219	6202331	**6410 11 1**		224	6226634	**7070 53 5**		260	6145096	**7202 67 2**		61
6437597	**6340 96 6**		219					6226696	**7070 55 1**		260	6460991	**7202 70 9**		49
6437658	**6340 97 0**		219			/pc.		6511570	**7070 58 6**		260	6460878	**7202 72 5**		49
				6229277	**6416 44 6**		155	6511631	**7070 60 8**		260	6460755	**7202 74 1**		49
				6202812	**6416 50 0**		133	6475810	**7070 80 6**		260			/% pc	
6536771	**6341 52 7**		132	6894253	**6416 50 4**		220	6451456	**7070 81 0**		260	6449538	**7202 80 6**		76
6536719	**6341 53 5**		132	6202874	**6416 51 9**		134	6451517	**7070 81 4**		260			/pc.	
6536658	**6341 54 3**		132					6451579	**7070 81 8**		260	6460694	**7202 82 2**		49
6536597	**6341 55 1**		132	6202997	**6416 55 1**		221	6451630	**7070 82 2**		260	6449774	**7202 90 3**		49
6536535	**6341 57 8**		132									6449712	**7202 91 1**		49

EAN-C.	Art. no.	Price	Page
		/pc.	
6449651	**7202 96 2**		49
6449590	**7202 97 0**		49
6263653	**7205 10 4**		36
5010661	**7205 42 2**		149
5448259	**7205 42 5**		36
6263899	**7206 03 8**		36
6263950	**7206 05 4**		36
6264070	**7206 10 0**		36
6264131	**7206 20 8**		36
6264193	**7206 21 6**		36
6264254	**7206 27 5**		36
5447368	**7208 22 0**		45
5447375	**7208 22 4**		45
5447382	**7208 22 8**		45
		/pack unit	
5447399	**7208 23 2**		45
		/pc.	
5447405	**7208 23 6**		45
		/m	
6024834	**7215 15 0**		147
6024957	**7215 15 4**		147
6025077	**7215 15 8**		147
6025190	**7215 16 2**		147
6025312	**7215 16 6**		147
5077800	**7215 17 3**		152
5077817	**7215 17 7**		152
5077824	**7215 18 1**		152
5077855	**7215 18 5**		152
5077862	**7215 18 9**		152
6645794	**7215 21 0**		148
6645855	**7215 21 6**		148
6887477	**7215 22 2**		148
6887538	**7215 22 8**		148
6887590	**7215 23 4**		148
		/pc.	
5430360	**7215 25 0**		147
5430384	**7215 25 2**		147
5430391	**7215 25 4**		147
5430407	**7215 25 6**		147
5430414	**7215 25 8**		147
5430421	**7215 27 0**		148
5430438	**7215 27 2**		148
5430445	**7215 27 4**		148
5430476	**7215 27 6**		148
5430483	**7215 27 8**		148
		/% pc	
6896110	**7215 31 2**		149
6896172	**7215 31 8**		149
6896233	**7215 32 4**		149
6896295	**7215 33 0**		149
6896356	**7215 35 6**		149
6896417	**7215 36 2**		149
6896479	**7215 36 8**		149
6896530	**7215 37 4**		149
		/pc.	
5077879	**7215 38 1**		153
5077886	**7215 38 5**		153
5077916	**7215 38 9**		153
5077923	**7215 39 5**		153
		/% pc	
6887651	**7215 40 0**		148
6887774	**7215 41 2**		149
		/pc.	
6025558	**7215 42 3**		147
6645978	**7215 43 2**		148
6779055	**7215 45 2**		148
6779116	**7215 45 8**		148
6888214	**7215 50 0**		149
6025923	**7215 53 3**		148
6026043	**7215 53 7**		148
6026166	**7215 54 1**		148
6026289	**7215 54 5**		148
6026401	**7215 54 9**		148
5077930	**7215 57 0**		153
5077947	**7215 57 4**		153
5077978	**7215 57 8**		153
5077985	**7215 58 2**		153
5077992	**7215 58 6**		153
5430490	**7215 59 0**		153
5430506	**7215 59 2**		153
5430537	**7215 59 4**		153
5430544	**7215 59 6**		153
5430551	**7215 59 8**		153
5084242	**7215 60 2**		152
5084273	**7215 60 6**		152
5084280	**7215 61 0**		152
5084297	**7215 61 4**		152
5084303	**7215 61 8**		152
5084334	**7215 63 1**		152
5084341	**7215 63 5**		152
5084358	**7215 63 9**		152
5084365	**7215 64 3**		152
5084396	**7215 64 7**		152
5084402	**7215 66 1**		153
5084419	**7215 66 5**		153
5084426	**7215 66 9**		153
5084457	**7215 67 3**		153
5084464	**7215 67 7**		153
5447429	**7215 70 1**		340
5447436	**7215 70 5**		340
5447443	**7215 70 8**		340
5447450	**7215 71 2**		340
5447467	**7215 71 5**		340
5447474	**7215 71 8**		340
5447481	**7215 72 5**		340
5447498	**7215 72 9**		340
5447504	**7215 74 1**		340
5447511	**7215 74 5**		340

05 BSS_Katalog_2008 / en / 17/03/2009 / LLExport_00043



Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/% pc	
192	/ St / DD	6209774	6490 90 5		137
197/VA	/ V2A	6209835	6490 96 4		137
341	M6 10/ ST / G	5254836	3153 09 6		291
341	M6 10/ ST / G	5254836	3153 09 6		310
342	M6 16/ St / G	5255437	3156 14 1		339
342	M6 16/ St / G	5255437	3156 14 1		370
				/% m	
574	17 x 1.0 Stone grey/ St / G	6209354	6490 01 8		136
				/pc.	
575	/ St	6209897	6498 01 9		137
576	/ St	6209958	6498 02 7		137
				/% pc	
732	5-6 1/ St / GTP	5114499	1360 05 1		370
732	7-8 1/ St / GTP	5114550	1360 08 6		370
732	9-10 1/ St / GTP	5114611	1360 10 8		370
732	10,5-12 1/ St / GTP	5114673	1360 12 4		370
732	12,5-14 1/ St / GTP	5114734	1360 14 0		370
732	13,5-15 1/ St / GTP	5114796	1360 15 9		370
732	14,5-16 1/ St / GTP	5114857	1360 16 7		370
732	16,5-18 1/ St / GTP	5114918	1360 18 3		370
732	18,5-20 1/ St / GTP	5114970	1360 20 5		370
732	20-22 1/ St / GTP	5115038	1360 22 1		370
732	22-24 1/ St / GTP	5115090	1360 24 8		370
732	24-26 1/ St / GTP	5115151	1360 26 4		370
732	26-28 1,5/ St / GTP	5115212	1360 28 0		370
732	28-30 1,5/ St / GTP	5115274	1360 30 2		370
732	31-33 1,5/ St / GTP	5115335	1360 33 7		370
732	33-35 1,5/ St / GTP	5115397	1360 35 3		370
732	36-38 1,5/ St / GTP	5115458	1360 38 8		370
732	38-40 1,5/ St / GTP	5115519	1360 39 6		370
732	40-42 1,5/ St / GTP	5115571	1360 42 6		370
732	43-45 1,5/ St / GTP	5115632	1360 45 0		370
732	46-48 1,5/ St / GTP	5115694	1360 48 5		370
732	48-50 1,5/ St / GTP	5115755	1360 50 7		370
732	53-55 1,5/ St / GTP	5115816	1360 55 8		370
732	58-60 1,5/ St / GTP	5115878	1360 60 4		370
732	61-63 1,5/ St / GTP	5569114	1360 63 9		370
733	11-13 6,5 x 10/ St / G	5115939	1361 13 9		371
733	14-16 6,5 x 10/ St / G	5115991	1361 16 3		371
733	17-19 6,5 x 10/ St / G	5116059	1361 19 8		371
733	19-21 6,5 x 10/ St / G	5116110	1361 20 1		371
733	21-23 6,5 x 10/ St / G	5116172	1361 23 6		371
733	24-29 6,5 x 10/ St / G	5116233	1361 29 5		371
733	30-38 6,5 x 10/ St / G	5116295	1361 38 4		371
733	39-48 6,5 x 10/ St / G	5116356	1361 48 1		371
733	48-54 6,5 x 14/ St / G	5116417	1361 51 1		371
733	53-61 6,5 x 14/ St / G	5116479	1361 61 9		371
733	63-63 8 x 18/ St / G	5116530	1361 63 5		371
964	M4 15-15 / ST / G	5867913	3403 02 5		157
964	M4 15-15 / ST / G	5867913	3403 02 5		163
964	M8 20-20 / ST / G	5868217	3403 12 2		262
966	M10 20/ ST / G	5300137	3402 09 6		136
966	M10 20/ ST / G	5300137	3402 09 6		156
966	M10 20/ ST / G	5300137	3402 09 6		163
966	M10 20/ ST / G	5300137	3402 09 6		224
966	M10 20/ ST / G	5300137	3402 09 6		262
966	M10 20/ ST / G	5300137	3402 09 6		293
966	M10 20/ ST / G	5300137	3402 09 6		313
966	M12 24/ ST / G	5300199	3402 12 6		136
966	M12 24/ ST / G	5300199	3402 12 6		224
966	M12 24/ ST / G	5300199	3402 12 6		262
966	M12 24/ ST / G	5300199	3402 12 6		293
966	M12 24/ ST / G	5300199	3402 12 6		313
967	M6 28/ St / G	5300311	3402 20 7		41
967	M6 28/ St / G	5300311	3402 20 7		90
967	M6 28/ St / G	5300311	3402 20 7		98
967	M6 28/ St / G	5300311	3402 20 7		224
967	M6 28/ St / G	5300311	3402 20 7		294
967	M8 28/ St / G	5300373	3402 21 5		41
967	M8 28/ St / G	5300373	3402 21 5		90
967	M8 28/ St / G	5300373	3402 21 5		98
1268	200 1,25/ ST / FS	5038290	1104 26 8		336
1268	200 1,25/ ST / FS	5038290	1104 26 8		368
1268	300 1,25/ ST / FS	5038351	1104 28 4		336
1268	300 1,25/ ST / FS	5038351	1104 28 4		368
1268	400 1,25/ ST / FS	5836353	1104 29 2		336
1268	400 1,25/ ST / FS	5836353	1104 29 2		368
1268	500 1,25/ ST / FS	5038412	1104 30 6		336
1268	500 1,25/ ST / FS	5038412	1104 30 6		368
				/% m	
1268	2000 1,25/ ST / FS	5038771	1104 50 0		336
1268	2000 1,25/ ST / FS	5038771	1104 50 0		368
				/% pc	
2031/LW15	/ St / FS	5864011	2207 18 4		372
2031/M	15 50/ St / FS	5863953	2207 02 8		131
2031/M	30 25/ St / FS	5798798	2207 03 6		131
2031/M	70 10/ St / FS	5022497	2207 06 0		131
2031/M	15 50/ St / FS	5863953	2207 02 8		372
2031/M	30 25/ St / FS	5798798	2207 03 6		372
2031/M	70 10/ St / FS	5022497	2207 06 0		372
2033 M	16 25/ V2A	5036616	2204 00 0		131
2033 M	16 25/ V2A	5036616	2204 00 0		371
2033/D	15 6,4/ St / G	5044970	2205 09 7		372
2034 M	10 50/ V2A	5210672	2204 01 0		131
2034 M	10 50/ V2A	5210672	2204 01 0		372
2056/M	8-12 16/ ST / FT	5062714	1156 00 4		338
2056/M	8-12 16/ ST / FT	5062714	1156 00 4		368
2056/M	12-16 20/ ST / FT	5062776	1156 01 2		338
2056/M	12-16 20/ ST / FT	5062776	1156 01 2		368
2056/M	16-22 27/ ST / FT	5062837	1156 02 0		338
2056/M	16-22 27/ ST / FT	5062837	1156 02 0		368
2056/M	22-28 33/ ST / FT	5062899	1156 03 9		338
2056/M	22-28 33/ ST / FT	5062899	1156 03 9		368
2056/M	28-34 39/ ST / FT	5062950	1156 04 7		338
2056/M	28-34 39/ ST / FT	5062950	1156 04 7		368
2056/M	34-40 45/ ST / FT	5063018	1156 05 5		338
2056/M	34-40 45/ ST / FT	5063018	1156 05 5		368
2056/M	40-46 51/ ST / FT	5063070	1156 06 3		338
2056/M	40-46 51/ ST / FT	5063070	1156 06 3		368
2056/M	46-52 57/ ST / FT	5063131	1156 07 1		338
2056/M	46-52 57/ ST / FT	5063131	1156 07 1		368
2056/M	52-58 64/ ST / FT	5063193	1156 09 8		338
2056/M	52-58 64/ ST / FT	5063193	1156 09 8		368
2056/M	58-64 70/ ST / FT	5063254	1156 10 1		338
2056/M	58-64 70/ ST / FT	5063254	1156 10 1		368
2056/M	64-70 76/ ST / FT	5063315	1156 12 8		338
2056/M	64-70 76/ ST / FT	5063315	1156 12 8		368
2056/M	70-76 82/ ST / FT	5063377	1156 13 6		338
2056/M	70-76 82/ ST / FT	5063377	1156 13 6		368
2056/M	76-82 88/ ST / FT	5063438	1156 14 4		338
2056/M	76-82 88/ ST / FT	5063438	1156 14 4		368
2056/M	82-90 97/ ST / FT	5063490	1156 15 2		338
2056/M	82-90 97/ ST / FT	5063490	1156 15 2		368
2056/M	90-100 107/ ST / FT	5063551	1156 16 0		338
2056/M	90-100 107/ ST / FT	5063551	1156 16 0		368
2056/M2	8-12 16/ St / FT	5494836	1156 17 9		338
2056/M2	8-12 16/ St / FT	5494836	1156 17 9		369
2056/M2	12-16 20/ St / FT	5494898	1156 18 7		338
2056/M2	12-16 20/ St / FT	5494898	1156 18 7		369
2056/M2	16-22 27/ St / FT	5494959	1156 19 5		338
2056/M2	16-22 27/ St / FT	5494959	1156 19 5		369
2056/M2	22-28 33/ St / FT	5958703	1156 20 9		338
2056/M2	22-28 33/ St / FT	5958703	1156 20 9		369
2056/M3	8-12 16/ St / FT	5958765	1156 24 1		338

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/% pc	
2056/M3	8-12 16/ St / FT	5958765	1156 24 1		369
2056/M3	12-16 20/ St / FT	5958826	1156 26 8		338
2056/M3	12-16 20/ St / FT	5958826	1156 26 8		369
2056/M3	16-22 27/ St / FT	5958888	1156 27 6		338
2056/M3	16-22 27/ St / FT	5958888	1156 27 6		369
2056/M3	22-28 33/ St / FT	5958949	1156 28 4		338
2056/M3	22-28 33/ St / FT	5958949	1156 28 4		369
2056U/M	8-12 16/ St / FT	5498254	1158 00 7		338
2056U/M	8-12 16/ St / FT	5498254	1158 00 7		369
2056U/M	12-16 20/ St / FT	5498315	1158 01 5		338
2056U/M	12-16 20/ St / FT	5498315	1158 01 5		369
2056U/M	16-22 27/ St / FT	5498377	1158 02 3		338
2056U/M	16-22 27/ St / FT	5498377	1158 02 3		369
2056U/M	22-28 33/ St / FT	5498438	1158 03 1		338
2056U/M	22-28 33/ St / FT	5498438	1158 03 1		369
2056U/M	28-34 39/ St / FT	5498490	1158 05 8		338
2056U/M	28-34 39/ St / FT	5498490	1158 05 8		369
2056U/M	34-40 45/ St / FT	5498551	1158 06 6		338
2056U/M	34-40 45/ St / FT	5498551	1158 06 6		369
2056U/M	40-46 51/ St / FT	5498612	1158 07 4		338
2056U/M	40-46 51/ St / FT	5498612	1158 07 4		369
2056U/M	46-52 57/ St / FT	5498674	1158 08 2		338
2056U/M	46-52 57/ St / FT	5498674	1158 08 2		369
2056U/M	52-58 64/ St / FT	5498735	1158 09 0		338
2056U/M	52-58 64/ St / FT	5498735	1158 09 0		369
2056U/M	58-64 70/ St / FT	5498797	1158 10 4		338
2056U/M	58-64 70/ St / FT	5498797	1158 10 4		369
2056U/M	64-70 76/ St / FT	5498858	1158 11 2		338
2056U/M	64-70 76/ St / FT	5498858	1158 11 2		369
2056U/M	70-76 82/ St / FT	5498919	1158 12 0		338
2056U/M	70-76 82/ St / FT	5498919	1158 12 0		369
2058/LW 10	6-10 8-12 / St / FS	5082033	1195 79 4		369
2058/LW 14	10-14 12-16 / St / FS	5082095	1195 80 8		369
2058/LW 20	14-20 16-22 / St / FS	5082156	1195 81 6		369
2058/LW 26	20-26 22-28 / St / FS	5082217	1195 82 4		369
2058/LW 32	26-32 28-34 / St / FS	5082279	1195 83 2		369
2058/LW 38	32-38 34-40 / St / FS	5082330	1195 84 0		369
2058/LW 44	38-44 40-46 / St / FS	5082392	1195 85 9		369
2058/LW 50	44-50 46-52 / St / FS	5082453	1195 86 7		369
2058/LW 56	50-56 52-58 / St / FS	5082514	1195 87 5		369
2058/LW 62	56-62 58-64 / St / FS	5237853	1195 88 3		369
				/% m	
2068	2000 1,5/ ST / FT	5047599	1119 65 6		337
2068	2000 1,5/ ST / FT	5047599	1119 65 6		368
				/% pc	
2078	M6 6/ St / G	5253211	3141 04 7		41
2078	M6 6/ St / G	5253211	3141 04 7		90
2078	M6 6/ St / G	5253211	3141 04 7		97
2078	M10 10/ ST / G	5253396	3141 20 9		135
2078	M10 10/ ST / G	5253396	3141 20 9		155
2078	M10 10/ ST / G	5253396	3141 20 9		162
2078	M10 10/ ST / G	5253396	3141 20 9		224
2078	M8 8/ ST / G	5253334	3141 12 8		262
2078	M10 10/ ST / G	5253396	3141 20 9		293
2078	M10 10/ ST / G	5253396	3141 20 9		312
2078	M8 8/ ST / G	5253334	3141 12 8		41
2078	M8 8/ ST / G	5253334	3141 12 8		90
2078	M8 8/ ST / G	5253334	3141 12 8		97
2078	M12 12/ ST / G	5253457	3141 30 6		135
2078	M12 12/ ST / G	5253457	3141 30 6		224
2078	M10 10/ ST / G	5253396	3141 20 9		262
2078	M12 12/ ST / G	5253457	3141 30 6		293
2078	M12 12/ ST / G	5253457	3141 30 6		312
2078	M12 12/ ST / G	5253457	3141 30 6		262
4758	4 20/ ST / GGP	5275299	3195 22 8		156
4758	4 20/ ST / GGP	5275299	3195 22 8		163
5017	M6/ ST / G	5053415	1143 06 9		291
5017	M6/ ST / G	5053415	1143 06 9		310
5019	6 4/ ST / G	5053712	1144 10 3		339
5019	6 4/ ST / G	5053712	1144 10 3		369

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/% pc	
5022	M6 25/ ST / F	5057017	1151 01 0		339
5022	M6 25/ ST / F	5057017	1151 01 0		370
5023	M10 30/ ST / G	5058335	1153 41 2		339
				/pc.	
5055	17 x 1/ ST / FS	5138372	1470 17 5		136
				/% pc	
12005	M10 10/ ST / G	6202270	6410 10 3		224
12005	M8 8/ ST / G	6202218	6410 08 1		262
12005	M10 10/ ST / G	6202270	6410 10 3		293
12005	M12 12/ ST / G	6202331	6410 11 1		312
12005	M12 12/ ST / G	6202331	6410 11 1		224
12005	M12 12/ ST / G	6202331	6410 11 1		262
12005	M12 12/ ST / G	6202331	6410 11 1		293
				/pc.	
ABL	/ St / FT	6976881	6221 46 7		292
ABL	/ St / FT	6976881	6221 46 7		312
ABR	/ St / FT	6501731	6364 94 2		223
ABR	/ St / FT	6501731	6364 94 2		261
ABS FS	/ St / FS	6469819	6365 02 7		223
ABS FS	/ St / FS	6469819	6365 02 7		292
AVL 60	135 65/ St / FS	6960262	6208 77 0		291
AVL 60	135 65/ St / FS	6960262	6208 77 0		311
AVR60	/ St / FS	6451272	6069 20 7		256
AW 15/11	110 50/ ST / FT	6207077	6420 65 6		219
AW 15/16	160 55/ ST / FT	6207138	6420 66 4		155
AW 15/16	160 55/ ST / FT	6207138	6420 66 4		162
AW 15/21	210 60/ ST / FT	6207190	6420 68 0		289
AW 15/21	210 60/ ST / FT	6207190	6420 68 0		155
AW 15/21	210 60/ ST / FT	6207190	6420 68 0		162
AW 15/21	210 60/ ST / FT	6207190	6420 68 0		219
AW 15/31	310 65/ ST / FT	6207251	6420 71 0		289
AW 15/31	310 65/ ST / FT	6207251	6420 71 0		155
AW 15/31	310 65/ ST / FT	6207251	6420 71 0		162
AW 15/31	310 65/ ST / FT	6207251	6420 71 0		219
AW 15/41	410 70/ ST / FT	6207312	6420 74 5		289
AW 15/41	410 70/ ST / FT	6207312	6420 74 5		155
AW 15/41	410 70/ ST / FT	6207312	6420 74 5		162
AW 15/41	410 70/ ST / FT	6207312	6420 74 5		219
AW 15/51	510 75/ ST / FT	6207374	6420 78 8		219
AW 30/11	110 60/ ST / FT	6206599	6419 70 4		253
AW 30/21	210 70/ ST / FT	6206711	6419 72 0		289
AW 30/21	210 70/ ST / FT	6206711	6419 72 0		219
AW 30/21	210 70/ ST / FT	6206711	6419 72 0		253
AW 30/21	210 70/ ST / FT	6206711	6419 72 0		308
AW 30/31	310 80/ ST / FT	6206773	6419 74 7		289
AW 30/31	310 80/ ST / FT	6206773	6419 74 7		219
AW 30/31	310 80/ ST / FT	6206773	6419 74 7		253
AW 30/31	310 80/ ST / FT	6206773	6419 74 7		308
AW 30/41	410 80/ ST / FT	6206834	6419 76 3		289
AW 30/41	410 80/ ST / FT	6206834	6419 76 3		219
AW 30/41	410 80/ ST / FT	6206834	6419 76 3		253
AW 30/41	410 80/ ST / FT	6206834	6419 76 3		308
AW 30/51	510 90/ ST / FT	6206896	6419 79 8		219
AW 30/51	510 90/ ST / FT	6206896	6419 79 8		253
AW 30/51	510 90/ ST / FT	6206896	6419 79 8		308
AW 55/21	210 90/ ST / FT	6204731	6418 55 4		253
AW 55/21	210 90/ ST / FT	6204731	6418 55 4		308

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Type listing

Structure of the EAN number: Country code **40** Manufacturer code **1219** (for articles beginning with **0**: **1010**) Individual EAN-C **5647589**

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
AW 55/31	310 110/ ST / FT	6204793	6418 57 0		253
AW 55/41	410 130/ ST / FT	6204854	6418 59 7		253
AW G 15/21	210 60/ ST / FT	6662531	6420 60 8		254
AW G 15/31	310 65/ ST / FT	6662593	6420 61 0		254
AW30F21	210/ St / FT	6650590	6417 02 7		133
AW30F31	310/ St / FT	6650651	6417 04 3		133
AW30F41	410/ St / FT	6650712	6417 07 8		133
AW30F51	510/ St / FT	6650774	6417 09 4		133
AW30F61	610/ St / FT	6650835	6417 11 6		133
BEB/100	100/ ST / FS	6231072	7083 10 6		223
BEB/100	100/ ST / FS	6231072	7083 10 6		261
BEB/200	200/ ST / FS	6231195	7083 20 3		135
BEB/200	200/ ST / FS	6231195	7083 20 3		223
BEB/200	200/ ST / FS	6231195	7083 20 3		261
BEB/300	300/ ST / FS	6231256	7083 30 0		135
BEB/300	300/ ST / FS	6231256	7083 30 0		223
BEB/300	300/ ST / FS	6231256	7083 30 0		261
BEB/400	400/ ST / FS	6231317	7083 40 8		135
BEB/400	400/ ST / FS	6231317	7083 40 8		261
BEB/500	500/ ST / FS	6231379	7083 50 5		135
BEB/500	500/ ST / FS	6231379	7083 50 5		261
BEB/600	600/ ST / FS	6231492	7083 60 2		135
BSB	/ St / FT	6204311	6418 19 8		135
BSB	/ St / FT	6204311	6418 19 8		223
BSB	/ St / FT	6204311	6418 19 8		261
BSB	/ St / FT	6204311	6418 19 8		292
BSB	/ St / FT	6204311	6418 19 8		312
				/m	
BSK 090506	50x60 95x120/ -19,0	6024834	7215 15 0		147
BSK 090511	50x110 95x170/ -19,0	6024957	7215 15 4		147
BSK 090521	50x210 95x270/ -19,0	6025077	7215 15 8		147
BSK 091016	105x160 150x220/ -19,0	6025190	7215 16 2		147
BSK 091026	105x260 150x320/ -19,0	6025312	7215 16 6		147
BSK 120506	50x60 130x180/ -19,0	6645794	7215 21 0		148
BSK 120511	50x110 130x230/ -19,0	6645855	7215 21 6		148
BSK 120521	50x210 130x330/ -19,0	6887477	7215 22 2		148
BSK 121016	105x160 185x280/ -19,0	6887538	7215 22 8		148
BSK 121026	105x260 185x380/ -19,0	6887590	7215 23 4		148
				/pc.	
BSK-A0908	80 x 80 x 20/ -19,0	6779055	7215 45 2		148
BSK-A0908	80 x 80 x 20/ -19,0	6779055	7215 45 2		154
BSK-A0908	80 x 80 x 20/ -19,0	6779055	7215 45 2		161
BSK-A0910	100 x 100 x 20/ -19,0	6779116	7215 45 8		148
BSK-A0910	100 x 100 x 20/ -19,0	6779116	7215 45 8		154
BSK-A0910	100 x 100 x 20/ -19,0	6779116	7215 45 8		161
				/% pc	
BSK-B0511	46 x 55/ ST / FS	6896356	7215 35 6		149
BSK-B0521	46 x 105/ ST / FS	6896417	7215 36 2		149
BSK-B1016	101 x 80/ ST / FS	6896479	7215 36 8		149
BSK-B1026	101 x 130/ ST / FS	6896530	7215 37 4		149
				/pc.	
BSK-D0930	5 x 30 15	6025558	7215 42 3		147
BSK-D0930	5 x 30 15	6025558	7215 42 3		161
BSK-D1260	5 x 60 15	6645978	7215 43 2		148
BSK-E090506		5430360	7215 25 0		147
BSK-E090511		5430384	7215 25 2		147
BSK-E090521		5430391	7215 25 4		147
BSK-E091016		5430407	7215 25 6		147
BSK-E091026		5430414	7215 25 8		147
BSK-E120506		5430421	7215 27 0		148
BSK-E120511		5430438	7215 27 2		148
BSK-E120521		5430445	7215 27 4		148
BSK-E121016		5430476	7215 27 6		148
BSK-E121026		5430483	7215 27 8		148
				/m	
BSKH 090506	50 x 60 110 x 120	5077800	7215 17 3		152
BSKH 090506	50 x 60 110 x 120	5077800	7215 17 3		160
BSKH 090511	50 x 110 110 x 170	5077817	7215 17 7		152
BSKH 090511	50 x 110 110 x 170	5077817	7215 17 7		160
BSKH 090521	50 x 210 110 x 270	5077824	7215 18 1		152
BSKH 090521	50 x 210 110 x 270	5077824	7215 18 1		160
BSKH 091016	105 x 160 165 x 220	5077855	7215 18 5		152
BSKH 091016	105 x 160 165 x 220	5077855	7215 18 5		160
BSKH 091026	105 x 260 165 x 320	5077862	7215 18 9		152
BSKH 091026	105 x 260 165 x 320	5077862	7215 18 9		160
				/pc.	
BSKH-E090506		5430490	7215 59 0		153
BSKH-E090506		5430490	7215 59 0		161
BSKH-E090511		5430506	7215 59 2		153
BSKH-E090511		5430506	7215 59 2		161
BSKH-E090521		5430537	7215 59 4		153
BSKH-E090521		5430537	7215 59 4		161
BSKH-E091016		5430544	7215 59 6		153
BSKH-E091016		5430544	7215 59 6		161
BSKH-E091026		5430551	7215 59 8		153
BSKH-E091026		5430551	7215 59 8		161
BSKH-FB 090506	50 x 60 110 x 120	5084242	7215 60 2		152
BSKH-FB 090506	50 x 60 110 x 120	5084242	7215 60 2		160
BSKH-FB 090511	50 x 110 110 x 170	5084273	7215 60 6		152
BSKH-FB 090511	50 x 110 110 x 170	5084273	7215 60 6		160
BSKH-FB 090521	50 x 210 110 x 270	5084280	7215 61 0		152
BSKH-FB 090521	50 x 210 110 x 270	5084280	7215 61 0		160
BSKH-FB 091016	105 x 160 165 x 220	5084297	7215 61 4		152
BSKH-FB 091016	105 x 160 165 x 220	5084297	7215 61 4		160
BSKH-FB 091026	105 x 260 165 x 320	5084303	7215 61 8		152
BSKH-FB 091026	105 x 260 165 x 320	5084303	7215 61 8		160
BSKH-FK 090506	50 x 60 110 x 120	5084402	7215 66 1		153
BSKH-FK 090506	50 x 60 110 x 120	5084402	7215 66 1		160
BSKH-FK 090511	50 x 110 110 x 170	5084419	7215 66 5		153
BSKH-FK 090511	50 x 110 110 x 170	5084419	7215 66 5		160
BSKH-FK 090521	50 x 210 110 x 270	5084426	7215 66 9		153
BSKH-FK 090521	50 x 210 110 x 270	5084426	7215 66 9		160
BSKH-FK 091016	105 x 160 165 x 220	5084457	7215 67 3		153
BSKH-FK 091016	105 x 160 165 x 220	5084457	7215 67 3		160
BSKH-FK 091026	105 x 260 165 x 320	5084464	7215 67 7		153
BSKH-FK 091026	105 x 260 165 x 320	5084464	7215 67 7		160
BSKH-FT 090506	50 x 60 110 x 120	5084334	7215 63 1		152
BSKH-FT 090506	50 x 60 110 x 120	5084334	7215 63 1		160
BSKH-FT 090511	50 x 110 110 x 170	5084341	7215 63 5		152
BSKH-FT 090511	50 x 110 110 x 170	5084341	7215 63 5		160
BSKH-FT 090521	50 x 210 110 x 270	5084358	7215 63 9		152
BSKH-FT 090521	50 x 210 110 x 270	5084358	7215 63 9		160
BSKH-FT 091016	105 x 160 165 x 220	5084365	7215 64 3		152
BSKH-FT 091016	105 x 160 165 x 220	5084365	7215 64 3		160
BSKH-FT 091026	105 x 260 165 x 320	5084396	7215 64 7		152
BSKH-FT 091026	105 x 260 165 x 320	5084396	7215 64 7		160
BSKH-G	/ St / FS	5077923	7215 39 5		153
BSKH-G	/ St / FS	5077923	7215 39 5		161

Always indicate the article number when ordering.

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
BSKH-K0506		5077930	7215 57 0		153
BSKH-K0506		5077930	7215 57 0		161
BSKH-K0511		5077947	7215 57 4		153
BSKH-K0511		5077947	7215 57 4		161
BSKH-K0521		5077978	7215 57 8		153
BSKH-K0521		5077978	7215 57 8		161
BSKH-K1016		5077985	7215 58 2		153
BSKH-K1016		5077985	7215 58 2		161
BSKH-K1026		5077992	7215 58 6		153
BSKH-K1026		5077992	7215 58 6		161
BSKH-V050	/ St / FS	5077879	7215 38 1		153
BSKH-V050	/ St / FS	5077879	7215 38 1		161
BSKH-V052	/ St / FS	5077886	7215 38 5		153
BSKH-V052	/ St / FS	5077886	7215 38 5		161
BSKH-V101	/ St / FS	5077916	7215 38 9		153
BSKH-V101	/ St / FS	5077916	7215 38 9		161
BSK-K0506	/ -19,0	6025923	7215 53 3		148
BSK-K0511	/ -19,0	6026043	7215 53 7		148
BSK-K0521	/ -19,0	6026166	7215 54 1		148
BSK-K1016	/ -19,0	6026289	7215 54 5		148
BSK-K1026	/ -19,0	6026401	7215 54 9		148
BSK-M		6888214	7215 50 0		149
BSK-M		6888214	7215 50 0		154
BSK-M		6888214	7215 50 0		162
				/% pc	
BSK-S0955	4.0 x 55/ ST / G	6887651	7215 40 0		148
BSK-S1280	4.5 x 80/ ST / G	6887774	7215 41 2		149
BSK-W0511	46 x 37.5/ ST / FS	6896110	7215 31 2		149
BSK-W0521	46 x 72.5/ ST / FS	6896172	7215 31 8		149
BSK-W1016	101 x 50/ ST / FS	6896233	7215 32 4		149
BSK-W1026	101 x 97.5/ ST / FS	6896295	7215 33 0		149
				/pc.	
BW 80/55	/ ST / FT	6014538	6019 52 8		337
				/% m	
CPS 4	2000 2/ ST / FT	5050230	1121 97 9		337
CPS 4	2000 2/ ST / FT	5050230	1121 97 9		368
				/pc.	
CRM110		5077671	7202 23 4		41
CRM110		5077671	7202 23 4		90
CRM110		5077671	7202 23 4		97
CRM125		5077688	7202 23 6		41
CRM125		5077688	7202 23 6		90
CRM125		5077688	7202 23 6		97
CRM140		5077695	7202 23 8		41
CRM140		5077695	7202 23 8		90
CRM140		5077695	7202 23 8		97
CRM160		5077701	7202 24 0		41
CRM160		5077701	7202 24 0		90
CRM160		5077701	7202 24 0		97
CRM32		5077572	7202 22 1		41
CRM32		5077572	7202 22 1		90
CRM32		5077572	7202 22 1		97
CRM40		5077589	7202 22 3		41
CRM40		5077589	7202 22 3		90
CRM40		5077589	7202 22 3		97
CRM50		5077619	7202 22 5		41
CRM50		5077619	7202 22 5		90
CRM50		5077619	7202 22 5		97
CRM63		5077626	7202 22 7		41
CRM63		5077626	7202 22 7		90
CRM63		5077626	7202 22 7		97
CRM75		5077633	7202 23 0		41
CRM75		5077633	7202 23 0		90
CRM75		5077633	7202 23 0		97
CRM90		5077640	7202 23 2		41
CRM90		5077640	7202 23 2		90
CRM90		5077640	7202 23 2		97
CRM-BS		5448372	7202 24 8		98
DFAA/100	100 1/ ST / FS	6249015	7128 42 8		258
DFAA/200	200 1/ ST / FS	6249077	7128 44 4		258
DFAA/300	300 1/ ST / FS	6249138	7128 46 0		258
DFAA/400	400 1,25/ ST / FS	6249190	7128 48 7		258
DFB 90/100	100 1/ ST / FS	6250752	7129 61 0		258
DFB 90/200	200 1/ ST / FS	6250813	7129 63 7		258
DFB 90/300	300 1/ ST / FS	6250875	7129 65 3		258
DFB 90/400	400 1,25/ ST / FS	6250936	7129 68 8		258
				/% pc	
DIN 934	M6 6/ ST / G	5298090	3400 06 9		41
DIN 934	M6 6/ ST / G	5298090	3400 06 9		90
DIN 934	M6 6/ ST / G	5298090	3400 06 9		98
DIN 934	M10 10/ ST / G	5298212	3400 10 7		135
DIN 934	M10 10/ ST / G	5298212	3400 10 7		156
DIN 934	M10 10/ ST / G	5298212	3400 10 7		162
DIN 934	M10 10/ ST / G	5298212	3400 10 7		224
DIN 934	M8 8/ ST / G	5298151	3400 08 5		262
DIN 934	M10 10/ ST / G	5298212	3400 10 7		293
DIN 934	M10 10/ ST / G	5298212	3400 10 7		312
DIN 934	M8 8/ ST / G	5298151	3400 08 5		41
DIN 934	M8 8/ ST / G	5298151	3400 08 5		90
DIN 934	M8 8/ ST / G	5298151	3400 08 5		98
DIN 934	M12 12/ ST / G	5298274	3400 12 3		135
DIN 934	M12 12/ ST / G	5298274	3400 12 3		224
DIN 934	M10 10/ ST / G	5298212	3400 10 7		262
DIN 934	M12 12/ ST / G	5298274	3400 12 3		293
DIN 934	M12 12/ ST / G	5298274	3400 12 3		312
DIN 934	M12 12/ ST / G	5298274	3400 12 3		262
DIN440/11	34-34 11/ ST / F	6480074	6408 72 9		262
DIN440/14	44-44 13,5/ ST / F	6480135	6408 73 7		262
DIN440/7	22-22 6,6/ ST / F	6479955	6408 70 2		339
DIN440/7	22-22 6,6/ ST / F	6479955	6408 70 2		370
DKU	/ V2A	6441372	6065 60 0		257
				/m	
DRL/100	100 0,75/ ST / FS	6057979	6052 09 6		258
DRL/200	200 1/ ST / FS	6058150	6052 20 7		258
DRL/300	300 1/ ST / FS	6058273	6052 30 4		258
DRL/400	400 1/ ST / FS	6058396	6052 40 1		258
DRLU/100	100 0,75/ ST / FS	6029716	6052 10 3		257

Type listing

Structure of the EAN number: Country code **40** Manufacturer code **1219** (for articles beginning with **0**: **1010**) Individual EAN-C **5647589**

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/m	
DRLU/200	200 1/ ST / FS	6030071	6052 21 0		257
DRLU/300	300 1/ ST / FS	6031399	6052 30 7		257
DRLU/400	400 1/ ST / FS	6031511	6052 40 5		257
				/pc.	
DS 4	/ ST / FS	6202997	6416 55 1		221
DSK 25	/ ST / FT	6229277	6416 44 6		155
DSK 25	/ ST / FT	6229277	6416 44 6		220
DSK 25	/ ST / FT	6229277	6416 44 6		289
DSK 45	/ ST / FT	6202812	6416 50 0		133
DSK 45	/ ST / FT	6202812	6416 50 0		220
DSK 45	/ ST / FT	6202812	6416 50 0		254
DSK 45	/ ST / FT	6202812	6416 50 0		290
DSK 45	/ ST / FT	6202812	6416 50 0		309
DSK 47	/ ST / FT	6894253	6416 50 4		220
DSK 47	/ ST / FT	6894253	6416 50 4		254
DSK 47	/ ST / FT	6894253	6416 50 4		290
DSK 47	/ ST / FT	6894253	6416 50 4		309
DSK 61	/ ST / FT	6202874	6416 51 9		134
DSK 61	/ ST / FT	6202874	6416 51 9		254
DSK 61	/ ST / FT	6202874	6416 51 9		309
				/m	
EKS 610	100 2/ ST / FS	6542659	6056 14 8		255
EKS 620	200 2/ ST / FS	6114672	6056 22 9		255
EKS 630	300 2/ ST / FS	6389834	6056 32 6		255
EKS 640	400 2/ ST / FS	6625215	6056 42 3		255
EKS 650	500 2/ ST / FS	6625277	6056 52 0		255
				/% pc	
FAZ II 10/10 GS	M10 95/ ST / G	5888499	3498 54 9		155
FAZ II 10/10 GS	M10 95/ ST / G	5888499	3498 54 9		164
FAZ II 10/10 GS	M10 95/ ST / G	5888499	3498 54 9		380
FAZ II 10/30	M10 115/ ST / G	5888550	3498 58 1		380
FAZ II 12/10	M12 110/ ST / G	5888611	3498 65 4		380
FAZ II 8/30 GS	M8 97/ ST / G	5504252	3498 48 4		380
				/pc.	
FBA-B120	250 x 120 x 80	5428213	7202 50 8		57
FBA-B120-BS		5428312	7202 54 3		57
FBA-B200	200 x 120 x 60	5428206	7202 50 6		53
FBA-B200	200 x 120 x 60	5428206	7202 50 6		81
FBA-B200	200 x 120 x 60	5428206	7202 50 6		95
FBA-B200-BS		5428282	7202 54 0		53
FBA-B200-BS		5428282	7202 54 0		82
FBA-B200-BS		5428282	7202 54 0		95
FBA-BK	120 x 75 x 35	5077794	7202 49 6		78
FBA-BV200	200 x 120 x 25	5428220	7202 51 6		53
FBA-BV200	200 x 120 x 25	5428220	7202 51 6		57
FBA-BV200	200 x 120 x 25	5428220	7202 51 6		81
FBA-BV200	200 x 120 x 25	5428220	7202 51 6		95
FBA-D100	100 x 78/ -16,0	6142811	7202 62 4		70
FBA-D150	150 x 78/ -16,0	6142934	7202 62 8		70
FBA-D-BS		6143658	7202 64 4		70
FBA-DR100	100 x 78	5428336	7202 61 3		73
FBA-DR150	150 x 78	5428343	7202 61 7		73
FBA-DS		6143290	7202 63 6		70

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
FBA-F	200 x 200 x 100	6144013	7202 66 0		61
FBA-F-BS		6145096	7202 67 2		61
FBA-FI	200 x 175 x 35	6144372	7202 66 4		61
FBA-S107	107/ -16,0	6142330	7202 55 9		67
FBA-S107	107/ -16,0	6142330	7202 55 9		64
FBA-S122	122/ -16,0	6142392	7202 56 3		64
FBA-S134	134/ -16,0	6142453	7202 56 7		64
FBA-S165	165/ -16,0	6142514	7202 57 1		64
FBA-S200	200/ -16,0	6142576	7202 57 5		64
FBA-S250	250/ -16,0	6142637	7202 57 9		64
FBA-S65	65/ -16,0	6142217	7202 55 1		64
FBA-S78	78/ -16,0	6142279	7202 55 5		64
FBA-S-BS		6142750	7202 59 2		64
FBA-S-BS		6142750	7202 59 2		67
FBA-S-BS		6142750	7202 59 2		79
FBA-SP		5428190	7202 32 2		53
FBA-SP		5428190	7202 32 2		57
FBA-SP		5428190	7202 32 2		61
FBA-SP		5428190	7202 32 2		64
FBA-SP		5428190	7202 32 2		67
FBA-SP		5428190	7202 32 2		70
FBA-SP		5428190	7202 32 2		72
FBA-SP		5428190	7202 32 2		79
FBA-SP		5428190	7202 32 2		82
FBA-SP		5428190	7202 32 2		95
FBA-SP-BS		5428329	7202 60 0		73
FBA-SR	140	6142699	7202 58 6		67
FBA-WI	1,000 x 150	5428275	7202 51 0		57
FBS90-BS		5447405	7208 23 6		45
FBS90-BS		5447405	7208 23 6		85
FBS90-BS		5447405	7208 23 6		93
FBS90-K		5447382	7208 22 8		45
FBS90-K		5447382	7208 22 8		84
FBS90-K		5447382	7208 22 8		93
				/pack unit	
FBS90-M		5447399	7208 23 2		45
FBS90-M		5447399	7208 23 2		85
FBS90-M		5447399	7208 23 2		93
				/pc.	
FBS90-P		5447375	7208 22 4		45
FBS90-P		5447375	7208 22 4		84
FBS90-P		5447375	7208 22 4		93
FBS90-S		5447368	7208 22 0		45
FBS90-S		5447368	7208 22 0		84
FBS90-S		5447368	7208 22 0		93
				/% pc	
FH II 18x80	M12 120/ ST / G	5489139	3498 74 3		381
FHY M10	M10 52-60 / ST / G	5599111	3498 76 4		385
FHY M8	M8 43-55 / ST / G	5598930	3498 76 0		385
FIS A M6x70	70 6/ St / G	5437376	3488 29 2		387
FIS A M8x90	90 8/ St / G	5437383	3488 29 8		387
				/pc.	
FIS AK	red	5318910	3488 52 7		388

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Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/% pc	
FIS H 12x50 K	12 50/ PP	5437437	3488 45 2		387
FIS H 12x85 K	12 85/ PP	5437444	3488 46 4		387
FIS H 16x85 K	16 75/ PP	5714255	3488 46 2		387
FIS PBB	15/ St	5437499	3488 52 5		388
FIS PBZ	15/ PP	5437468	3488 51 5		388
				/pc.	
FIS V360S		5319276	3488 40 3		387
				/% pc	
FNA II 6	M6/ ST / G	5461890	3498 42 5		382
FNA II 6	6/ ST / G	5693192	3498 46 8		383
				/pc.	
FPS-A		6141616	7202 27 4		40
FPS-A		6141616	7202 27 4		89
FPS-BS		6141791	7202 28 6		41
FPS-BS		6141791	7202 28 6		90
FPS-K	500 x 150 x 20	6141739	7202 28 2		40
FPS-K	500 x 150 x 20	6141739	7202 28 2		89
FPS-P	1,000 x 600 x 60	6141555	7202 27 0		39
FPS-P	1,000 x 600 x 60	6141555	7202 27 0		88
FPS-SP		6141678	7202 27 8		40
				/kg	
FPS-SP		5430353	7202 28 0		40
				/pc.	
FPS-SP		6141678	7202 27 8		87
				/kg	
FPS-SP		5430353	7202 28 0		87
				/pc.	
FPS-SP		6141678	7202 27 8		89
				/kg	
FPS-SP		5430353	7202 28 0		89
				/pc.	
FPS-SP		6141678	7202 27 8		98
				/kg	
FPS-SP		5430353	7202 28 0		98
				/pc.	
FPS-SP		6141678	7202 27 8		340
FPS-SP		6141678	7202 27 8		371
				/% pc	
FRS 10x25	M10 24/ St / G	5354956	6407 52 1		293
FRS 10x25	M10 25/ ST / F	6201914	6407 56 0		340
FRS 12x25	M12 25/ ST / F	6200054	6406 25 4		340
FRS 8x16	M8 16/ ST / F	6201259	6406 96 3		340
FRS 8x35	M8 35/ ST / F	6201433	6407 04 8		340
FRSB 6x12	M6 12/ ST / F	6199815	6406 12 2		135
FRSB 6x12	M6 12/ ST / F	6199815	6406 12 2		223
FRSB 6x12	M6 12/ ST / F	6199815	6406 12 2		261
FRSB 6x15	M6 16/ ST / F	6199877	6406 15 7		223
FRSB 6x15	M6 16/ ST / F	6199877	6406 15 7		261
FRSB 6x20	M6 20/ ST / F	6199990	6406 20 3		135
FRSB 6x20	M6 20/ ST / F	6199990	6406 20 3		223
FRSB 6x20	M6 20/ ST / F	6199990	6406 20 3		261
				/kg	
FSB-A		5448242	7202 26 8		136
				/pc.	
FSB-B	10000	5448235	7202 26 5		136

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/% pc	
FZEA II 10x40	M8 10/ ST / G	5454038	3492 03 6		385
FZEA II 12x40	M10 12/ ST / G	5454090	3492 06 0		155
FZEA II 12x40	M10 12/ ST / G	5454090	3492 06 0		162
FZEA II 12x40	M10 12/ ST / G	5454090	3492 06 0		385
FZEA II 14x40	M12 14/ ST / G	5454151	3492 09 5		385
				/pc.	
FZED 10x40	/ ST / G	5454212	3492 62 1		385
FZED 12x40	/ ST / G	5454274	3492 66 4		385
FZED 14x40	/ ST / G	5454335	3492 69 9		385
FZUB 10x40	10-10 / ST	5454397	3492 33 8		385
FZUB 12x40	12-12 / ST	5454458	3492 36 2		385
FZUB 14x40	14-14 / ST	5454519	3492 39 7		385
GEV 36	/ ST / G	6307876	6016 71 5		260
GKT 38	/ ST / G	6307937	6017 03 7		260
				/% pc	
GMH18	6-6 / ST / G	5054559	1146 50 5		339
				/pc.	
GRB 90/520	200 3,9/ ST / G	6352692	6001 93 9		259
GRB 90/530	300 4,4/ ST / G	6352753	6001 94 7		259
				/m	
GRM 55/200	200 4,8/ ST / G	5045274	6001 44 7		259
GRM 55/200	200 4,8/ ST / FT	5045281	6001 42 1		259
GRM 55/300	300 4,8/ ST / G	6858675	6001 44 8		259
GRM 55/300	300 4,8/ ST / FT	6815050	6001 42 4		259
				/pc.	
GSV 34	/ ST / G	6520510	6016 59 6		259
				/% pc	
HMS-KS	5 x 50 4-4 / ST / G	5964100	3498 20 4		396
				/pc.	
HSM-BS		6264254	7206 27 5		36
HSM-E1	/ -13,0	6263899	7206 03 8		36
HSM-E2	/ -13,0	6263950	7206 05 4		36
HSM-S	/ -13,0	6264070	7206 10 0		36
HSM-SP		6263653	7205 10 4		36
KBK-1	350 x 120 x 10/ -15,0	6460991	7202 70 9		49
KBK-1	350 x 120 x 10/ -15,0	6460991	7202 70 9		76
KBK-2	350 x 170 x 23/ -15,0	6460878	7202 72 5		49
KBK-2	350 x 170 x 23/ -15,0	6460878	7202 72 5		76
KBK-3	350 x 170 x 40/ -15,0	6460755	7202 74 1		49
KBK-3	350 x 170 x 40/ -15,0	6460755	7202 74 1		76
KBK-BS		6460694	7202 82 2		49
KBK-BS		6460694	7202 82 2		76
KBK-FP1	500 x 250 x 30/ -12,0	6449774	7202 90 3		49
KBK-FP2	1,000 x 250 x 30/ -12,0	6449712	7202 91 1		49
				/% pc	
KBK-HW	/ PVC	6449538	7202 80 6		76
				/pc.	
KBK-SG1	500 x 600/ St / FT	6449651	7202 96 2		49
KBK-SG1	500 x 600/ St / FT	6449651	7202 96 2		53

Type listing

Structure of the EAN number: Country code **40** Manufacturer code **1219** (for articles beginning with **0**: **1010**) Individual EAN-C **5647589**

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
KBK-SG1	500 x 600 / St / FT	6449651	7202 96 2		95
KBK-SG2	600 x 1,000 / St / FT	6449590	7202 97 0		49
KBK-SG2	600 x 1,000 / St / FT	6449590	7202 97 0		53
KBK-SG2	600 x 1,000 / St / FT	6449590	7202 97 0		95
				/% pc	
KS MKS/SKS	/ ST / FS	6146352	6062 30 0		256
KS RKS	/ ST / FS	6599950	6062 29 6		256
				/pc.	
KS-E	/ PVC	5010661	7205 42 2		149
KS-E	/ PVC	5010661	7205 42 2		154
KS-E	/ PVC	5010661	7205 42 2		162
KS-E	/ PVC	5010661	7205 42 2		225
KS-E	/ PVC	5010661	7205 42 2		263
KS-E	/ PVC	5010661	7205 42 2		294
KS-E	/ PVC	5010661	7205 42 2		314
KS-E	/ PVC	5010661	7205 42 2		340
KS-E	/ PVC	5010661	7205 42 2		371
KS-GR	/ V2A	5164630	6017 70 2		264
KS-GR	/ V2A	5164647	6017 70 5		264
KS-S		5448259	7205 42 5		36
KS-S		5448259	7205 42 5		42
KS-S		5448259	7205 42 5		46
KS-S		5448259	7205 42 5		49
KS-S		5448259	7205 42 5		54
KS-S		5448259	7205 42 5		58
KS-S		5448259	7205 42 5		61
KS-S		5448259	7205 42 5		64
KS-S		5448259	7205 42 5		67
KS-S		5448259	7205 42 5		70
KS-S		5448259	7205 42 5		73
KS-S		5448259	7205 42 5		76
KS-S		5448259	7205 42 5		79
KS-S		5448259	7205 42 5		82
KS-S		5448259	7205 42 5		85
KS-S		5448259	7205 42 5		91
KS-S		5448259	7205 42 5		93
KS-S		5448259	7205 42 5		95
KS-S		5448259	7205 42 5		98
KU 3	/ ST / FT	6340217	6348 87 4		224
KU 3	/ ST / FT	6340217	6348 87 4		294
KU 5 V	/ ST / FT	6901456	6348 92 0		225
KU 5 V	/ ST / FT	6901456	6348 92 0		263
KU 5 V	/ ST / FT	6901456	6348 92 0		294
KU 5 V	/ ST / FT	6901456	6348 92 0		313
KU 7	/ ST / FT	6191413	6349 10 2		263
KU 7	/ ST / FT	6191413	6349 10 2		313
KU 7 VQP	/ ST / FT	6191475	6349 15 3		263
KU 7 VQP	/ ST / FT	6191475	6349 15 3		314
KUS 5	/ ST / FT	6168910	6348 90 4		225
KUS 5	/ ST / FT	6168910	6348 90 4		263
KUS 5	/ ST / FT	6168910	6348 90 4		294
KUS 5	/ ST / FT	6168910	6348 90 4		313
LAB/20	200 45-110 / ST / FT	6163397	6220 43 6		292
LAB/20	200 45-110 / ST / FT	6163397	6220 43 6		311
LAB/30	300 45-110 / ST / FT	6163458	6220 44 4		292
LAB/30	300 45-110 / ST / FT	6163458	6220 44 4		311
LAB/40	400 45-110 / ST / FT	6163519	6220 45 2		292
LAB/40	400 45-110 / ST / FT	6163519	6220 45 2		311
LAB/50	500 45-110 / ST / FT	6163571	6220 46 0		311
				/pc.	
LALB/20	200 45-110 / ST / FT	6166152	6221 85 8		292
LALB/20	200 45-110 / ST / FT	6166152	6221 85 8		311
LALB/30	300 45-110 / ST / FT	6166213	6221 86 6		292
LALB/30	300 45-110 / ST / FT	6166213	6221 86 6		311
LALB/40	400 45-110 / ST / FT	6166275	6221 87 4		292
LALB/40	400 45-110 / ST / FT	6166275	6221 87 4		311
LALB/50	500 45-110 / ST / FT	6166336	6221 88 2		311
LBI 90/620 VS	200 / ST / FS	6143719	6211 22 4		290
LBI 90/620 VS	200 / ST / FS	6143719	6211 22 4		310
LBI 90/630 VS	300 / ST / FS	6143771	6211 23 2		290
LBI 90/630 VS	300 / ST / FS	6143771	6211 23 2		310
LBI 90/640 VS	400 / ST / FS	6143832	6211 24 0		290
LBI 90/640 VS	400 / ST / FS	6143832	6211 24 0		310
LBI 90/650 VS	500 / ST / FS	6143894	6211 25 9		310
				/m	
LG 620 VS	200 1,5 / St / FS	5064251	6208 62 7		336
LG 620 VS/F	200 6000 / St / FS	5299639	6207 50 1		290
LG 630 VS	300 1,5 / St / FS	5064268	6208 63 0		336
LG 630 VS/F	300 6000 / St / FS	5299646	6207 50 5		290
LG 640 VS	400 1,5 / St / FS	5064299	6208 63 3		336
LG 640 VS/F	400 6000 / St / FS	5299684	6207 50 9		290
				/pc.	
LK 620 VS	200 / ST / FS	6152353	6214 22 3		290
LK 620 VS	200 / ST / FS	6152353	6214 22 3		310
LK 630 VS	300 / ST / FS	6152414	6214 23 1		290
LK 630 VS	300 / ST / FS	6152414	6214 23 1		310
LK 640 VS	400 / ST / FS	6152476	6214 25 8		290
LK 640 VS	400 / ST / FS	6152476	6214 25 8		310
LK 650 VS	500 / ST / FS	6152537	6214 26 6		310
LKS 40	/ ST / FS	6164530	6221 07 6		291
LKS 40	/ ST / FS	6164530	6221 07 6		311
LLV 60	60-60 / St / FS	6139514	6208 80 0		337
LT 620 VS	200 / ST / FS	6150915	6213 72 3		290
LT 620 VS	200 / ST / FS	6150915	6213 72 3		310
LT 630 VS	300 / ST / FS	6150977	6213 73 1		290
LT 630 VS	300 / ST / FS	6150977	6213 73 1		310
LT 640 VS	400 / ST / FS	6151035	6213 75 8		290
LT 640 VS	400 / ST / FS	6151035	6213 75 8		310
LT 650 VS	500 / ST / FS	6151097	6213 76 6		310
				/m	
MKS 620	3000 200 / ST / FS	6059713	6055 20 6		134
MKS 630	3000 300 / ST / FS	6059775	6055 30 3		134
MKS 640	3000 400 / ST / FS	6059836	6055 40 0		134
				/% pc	
MMS10	10 x 80 8-8 / ST / G	5963981	3498 12 3		164
MMS10	10 x 80 8-8 / ST / G	5963981	3498 12 3		390
MMS10	10 x 100 8-8 / ST / G	5964049	3498 15 8		390
MMS6	6 x 50 / ST / GC	5963929	3498 10 7		392
MMS7,5	7.5 x 80 / ST / G	5519973	3498 27 1		149
MMS7,5	7.5 x 80 / ST / G	5519973	3498 27 1		392
MMS-ST	M6 6 x 60 / St / G	5964162	3498 26 3		394

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
MWA 12/11	110 53/ ST / FS	6636853	6424 71 6		219
MWA 12/21	210 65/ ST / FS	6636976	6424 73 2		288
MWA 12/21	210 65/ ST / FS	6636976	6424 73 2		219
MWA 12/31	310 75/ ST / FS	6637034	6424 74 0		288
MWA 12/31	310 75/ ST / FS	6637034	6424 74 0		219
MWA 12/41	410 83/ ST / FS	6637096	6424 75 9		288
MWA 12/41	410 83/ ST / FS	6637096	6424 75 9		219
MWAG 12/21	210 65/ ST / FS	6325030	6424 60 8		253
MWAG 12/31	310 75/ ST / FS	6325337	6424 61 6		253
NIK-1	25 x 30 x 240/ -12,0	6264131	7206 20 8		36
NIK-2	25 x 30(60) x 240/ -12,0	6264193	7206 21 6		36
RAA 610	100/ ST / FS	6379392	6040 40 3		221
RAA 610	100/ ST / FS	6379392	6040 40 3		255
RAA 620	200/ ST / FS	6379453	6040 43 8		221
RAA 620	200/ ST / FS	6379453	6040 43 8		255
RAA 630	300/ ST / FS	6379514	6040 44 6		221
RAA 630	300/ ST / FS	6379514	6040 44 6		255
RAA 640	400/ ST / FS	6212897	7002 39 4		222
RAA 640	400/ ST / FS	6212897	7002 39 4		256
RAA 650	500/ ST / FS	6212958	7002 41 6		222
RAA 650	500/ ST / FS	6212958	7002 41 6		256
RB 90 610	100/ ST / FS	6050475	6043 21 6		221
RB 90 610	100/ ST / FS	6050475	6043 21 6		255
RB 90 620	200/ ST / FS	6050536	6043 22 4		221
RB 90 620	200/ ST / FS	6050536	6043 22 4		255
RB 90 630	300/ ST / FS	6050598	6043 23 2		221
RB 90 630	300/ ST / FS	6050598	6043 23 2		255
RB 90 640	400/ ST / FS	6211630	7001 29 0		221
RB 90 640	400/ ST / FS	6211630	7001 29 0		255
RB 90 650	500/ ST / FS	6211692	7001 30 4		221
RB 90 650	500/ ST / FS	6211692	7001 30 4		255
				/m	
RKS 620	200 0,75/ St / FS	5391203	6047 63 8		255
RKSM 610	100 0,75/ St / FS	5390879	6047 61 1		255
RKSM 630	300 0,75/ St / FS	5391210	6047 65 4		255
RKSM 640	400 0,9/ St / FS	5391227	6047 68 9		255
				/pc.	
RLVK 45	45-45 / ST / FS	6065295	6067 06 9		260
RLVK 45	45-45 / ST / FS	6065295	6067 06 9		291
RLVK 45	45-45 / ST / FS	6065295	6067 06 9		311
RLVK 60	60-60 / ST / FS	6065417	6067 09 3		222
RLVK 60	60-60 / ST / FS	6065417	6067 09 3		257
RV 610	60-60 / ST / FS	6066797	6068 15 4		257
RV 620	60-60 / ST / FS	6066919	6068 17 0		257
RV 630	60-60 / ST / FS	6066971	6068 18 9		257
RV 640	60-60 / ST / FS	6067039	6068 19 7		257
RWVL 60	200 x 56/ ST / FS	6065530	6067 11 5		134

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
RWVL 60	200 x 56/ ST / FS	6065530	6067 11 5		222
RWVL 60	200 x 56/ ST / FS	6065530	6067 11 5		257
SAB 20	180 16,5/ St / FS	6555857	6222 94 3		292
SAB 20	180 16,5/ St / FS	6555857	6222 94 3		311
SAB 30	280 16,5/ St / FS	6555918	6222 95 1		292
SAB 30	280 16,5/ St / FS	6555918	6222 95 1		311
SAB 40	380 16,5/ St / FS	6555970	6222 97 8		292
SAB 40	380 16,5/ St / FS	6555970	6222 97 8		311
SH M10	M10/ ST / FS	6608539	6015 33 6		261
				/pair	
SKH 60	yellow/ PE	6167296	6222 53 6		289
SKH 60	yellow/ PE	6167296	6222 53 6		309
				/% pc	
SKS 10x40	M10 x 40 40/ ST / F	5257356	3160 75 0		223
SKS 10x40	M10 x 40 40/ ST / F	5257356	3160 75 0		293
				/pc.	
SKS 10x80	M10 x 80 80/ ST / F	6437474	6418 25 0		155
SKS 10x80	M10 x 80 80/ ST / F	6437474	6418 25 0		261
SKS 10x80	M10 x 80 80/ ST / F	6437474	6418 25 0		312
SKS 10x80	M10 x 80 80/ ST / F	6437474	6418 25 0		223
SKS 10x80	M10 x 80 80/ ST / F	6437474	6418 25 0		293
SKS 10x90	M10 x 90 90/ ST / F	6518470	6418 25 2		134
SKS 10x90	M10 x 90 90/ ST / F	6518470	6418 25 2		261
SKS 10x90	M10 x 90 90/ ST / F	6518470	6418 25 2		312
SKS 10x90	M10 x 90 90/ ST / F	6518470	6418 25 2		223
SKS 12x100	M12 x 100 100/ ST / F	6204496	6418 29 5		261
SKS 12x110	M12 x 110 110/ ST / F	6204557	6418 31 7		134
SKS 12x110	M12 x 110 110/ ST / F	6204557	6418 31 7		312
				/% pc	
SKS 12x40	M12 x 40 40/ ST / F	5258131	3163 11 3		223
SKS 12x40	M12 x 40 40/ ST / F	5258131	3163 11 3		293
				/pc.	
SKS 12x80	M12 x 80 80/ ST / F	6204434	6418 28 7		261
SKS 12x80	M12 x 80 80/ ST / F	6204434	6418 28 7		312
				/m	
SKS 610	3000 100/ ST / FS	6060191	6056 10 5		221
SKS 620	3000 200/ ST / FS	6060252	6056 20 2		134
SKS 620	3000 200/ ST / FS	6060252	6056 20 2		221
SKS 630	3000 300/ ST / FS	6060313	6056 29 6		134
SKS 630	3000 300/ ST / FS	6060313	6056 29 6		221
SKS 640	3000 400/ ST / FS	6060375	6056 40 7		134
SKS 650	3000 500/ ST / FS	6060436	6056 50 4		134
SKS 660	3000 600/ ST / FS	6060498	6056 60 1		134
SL 620 VS /F	200 6000/ St / FS	6705559	6207 92 8		309
SL 630 VS /F	300 6000/ St / FS	6705610	6207 93 2		309
SL 640 VS /F	400 6000/ St / FS	6705672	6207 93 6		309
SL 650 VS /F	500 6000/ St / FS	6705733	6207 94 0		309
SLM50C40F	400/ St / FT	6959723	6010 00 8		336
SLM50C40F	500/ St / FT	6959785	6010 01 6		336
SLM50C40F	600/ St / FT	6959846	6010 02 4		336
SLS80C40F	400/ St / FT	6959907	6010 10 5		336
SLS80C40F	500/ St / FT	6959969	6010 11 3		336
SLS80C40F	600/ St / FT	6960026	6010 12 1		336

Type	Dimensions/Colo	EAN-C.	Art. no.	Price	Page
				/pc.	
SSL/E90/10	100/ St / FS	6226573	7070 51 9		260
SSL/E90/20	200/ St / FS	6226634	7070 53 5		260
SSL/E90/30	300/ St / FS	6226696	7070 55 1		260
SSL/E90/40	400/ St / FS	6511570	7070 58 6		260
SSL/E90/50	500/ St / FS	6511631	7070 60 8		260
SSL/SV100	74/ St / FS	6475810	7070 80 6		260
SSL/SV200	174/ St / FS	6451456	7070 81 0		260
SSL/SV300	274/ St / FS	6451517	7070 81 4		260
SSL/SV400	374/ St / FS	6451579	7070 81 8		260
SSL/SV500	474/ St / FS	6451630	7070 82 2		260
SSLB 100	85/ ST / FS	6079971	7070 20 5		222
SSLB 100	85/ ST / FS	6079971	7070 20 5		260
SSLB 200	185/ ST / FS	6094882	7070 21 3		135
SSLB 200	185/ ST / FS	6094882	7070 21 3		222
SSLB 200	185/ ST / FS	6094882	7070 21 3		260
SSLB 300	285/ ST / FS	6094943	7070 21 7		135
SSLB 300	285/ ST / FS	6094943	7070 21 7		222
SSLB 300	285/ ST / FS	6094943	7070 21 7		260
SSLB 400	385/ ST / FS	6095001	7070 22 1		135
SSLB 400	385/ ST / FS	6095001	7070 22 1		260
SSLB 500	485/ ST / FS	6095063	7070 22 5		135
SSLB 600	585/ ST / FS	6095186	7070 23 3		135
TPS KS	Sulphur yellow/ PE	6635238	6364 62 4		220
TPSA/195	195/ St / FS	6199037	6364 15 2		219
TPSA/295	295/ St / FS	6199150	6364 26 8		219
TPSA/395	395/ St / FS	6199211	6364 27 6		219
				/m	
TSG 45	45-45 3000/ ST / FS	6062959	6062 03 2		156
TSG 45	45-45 3000/ ST / FS	6062959	6062 03 2		163
TSG 45	45-45 3000/ ST / FS	6062959	6062 03 2		259
TSG 45	45-45 3000/ ST / FS	6062959	6062 03 2		291
TSG 45	45-45 3000/ ST / FS	6062959	6062 03 2		310
TSG 60	60-60 3000/ ST / FS	6063079	6062 06 7		222
TSG 60	60-60 3000/ ST / FS	6063079	6062 06 7		256
TSG 60/S	60-60 3000/ ST / FS	6599899	6062 28 8		256
TSG 85	85-85 3000/ ST / FS	6063192	6062 11 3		156
TSG 85	85-85 3000/ ST / FS	6063192	6062 11 3		163
				/pc.	
US 3 K/100	1000 2/ ST / FT	6225132	6342 36 8		154
US 3 K/100	1000 2/ ST / FT	6225132	6342 36 8		218
US 3 K/100	1000 2/ ST / FT	6225132	6342 36 8		288
US 3 K/110	1100 2/ ST / FT	6225378	6342 37 0		154
US 3 K/110	1100 2/ ST / FT	6225378	6342 37 0		218
US 3 K/110	1100 2/ ST / FT	6225378	6342 37 0		288
US 3 K/120	1200 2/ ST / FT	6225439	6342 37 2		154
US 3 K/120	1200 2/ ST / FT	6225439	6342 37 2		218
US 3 K/120	1200 2/ ST / FT	6225439	6342 37 2		288
US 3 K/20	200 2/ ST / FT	6224470	6342 35 1		154
US 3 K/20	200 2/ ST / FT	6224470	6342 35 1		218
US 3 K/20	200 2/ ST / FT	6224470	6342 35 1		288
US 3 K/30	300 2/ ST / FT	6224531	6342 35 3		154
US 3 K/30	300 2/ ST / FT	6224531	6342 35 3		218
				/pc.	
US 3 K/30	300 2/ ST / FT	6224531	6342 35 3		288
US 3 K/40	400 2/ ST / FT	6224593	6342 35 5		154
US 3 K/40	400 2/ ST / FT	6224593	6342 35 5		218
US 3 K/40	400 2/ ST / FT	6224593	6342 35 5		288
US 3 K/50	500 2/ ST / FT	6224654	6342 35 7		154
US 3 K/50	500 2/ ST / FT	6224654	6342 35 7		218
US 3 K/50	500 2/ ST / FT	6224654	6342 35 7		288
US 3 K/60	600 2/ ST / FT	6224715	6342 35 9		154
US 3 K/60	600 2/ ST / FT	6224715	6342 35 9		218
US 3 K/60	600 2/ ST / FT	6224715	6342 35 9		288
US 3 K/70	700 2/ ST / FT	6224777	6342 36 2		154
US 3 K/70	700 2/ ST / FT	6224777	6342 36 2		218
US 3 K/70	700 2/ ST / FT	6224777	6342 36 2		288
US 3 K/80	800 2/ ST / FT	6225019	6342 36 4		154
US 3 K/80	800 2/ ST / FT	6225019	6342 36 4		218
US 3 K/80	800 2/ ST / FT	6225019	6342 36 4		288
US 3 K/90	900 2/ ST / FT	6225071	6342 36 6		154
US 3 K/90	900 2/ ST / FT	6225071	6342 36 6		218
US 3 K/90	900 2/ ST / FT	6225071	6342 36 6		288
US 3 KS	Sulphur yellow/ PE	6229215	6338 45 7		133
US 3 KS	Sulphur yellow/ PE	6229215	6338 45 7		220
US 3 KS	Sulphur yellow/ PE	6229215	6338 45 7		289
US 3/100	1000 2/ ST / FS	6223572	6342 31 8		218
US 3/100	1000 2/ ST / FS	6223572	6342 31 8		288
US 3/150	1500 2/ ST / FS	6223633	6342 32 8		218
US 3/150	1500 2/ ST / FS	6223633	6342 32 8		288
US 3/20	200 2/ ST / FS	6221776	6342 30 2		154
US 3/200	2000 2/ ST / FS	6224296	6342 33 8		218
US 3/200	2000 2/ ST / FS	6224296	6342 33 8		288
US 3/30	300 2/ ST / FS	6222018	6342 30 4		132
US 3/30	300 2/ ST / FS	6222018	6342 30 4		218
US 3/30	300 2/ ST / FS	6222018	6342 30 4		288
US 3/30	300 2/ ST / FS	6222018	6342 30 4		154
US 3/40	400 2/ ST / FS	6222070	6342 30 6		132
US 3/40	400 2/ ST / FS	6222070	6342 30 6		218
US 3/40	400 2/ ST / FS	6222070	6342 30 6		288
US 3/40	400 2/ ST / FS	6222070	6342 30 6		154
US 3/50	500 2/ ST / FS	6222315	6342 30 8		218
US 3/50	500 2/ ST / FS	6222315	6342 30 8		288
US 3/60	600 2/ ST / FS	6222377	6342 31 0		218
US 3/60	600 2/ ST / FS	6222377	6342 31 0		288
US 3/70	700 2/ ST / FS	6222438	6342 31 2		218
US 3/70	700 2/ ST / FS	6222438	6342 31 2		288
US 3/80	800 2/ ST / FS	6222490	6342 31 4		218
US 3/80	800 2/ ST / FS	6222490	6342 31 4		288
US 3/90	900 2/ ST / FS	6223510	6342 31 6		218
US 3/90	900 2/ ST / FS	6223510	6342 31 6		288
US 5 K/100	1000 2,5/ ST / FT	6536290	6341 61 6		132
US 5 K/100	1000 2,5/ ST / FT	6536290	6341 61 6		218
US 5 K/100	1000 2,5/ ST / FT	6536290	6341 61 6		252
US 5 K/100	1000 2,5/ ST / FT	6536290	6341 61 6		307
US 5 K/110	1100 2,5/ ST / FT	6536238	6341 62 4		132
US 5 K/110	1100 2,5/ ST / FT	6536238	6341 62 4		218
US 5 K/110	1100 2,5/ ST / FT	6536238	6341 62 4		252
US 5 K/110	1100 2,5/ ST / FT	6536238	6341 62 4		307
US 5 K/120	1200 2,5/ ST / FT	6536177	6341 63 2		132
US 5 K/120	1200 2,5/ ST / FT	6536177	6341 63 2		218
US 5 K/120	1200 2,5/ ST / FT	6536177	6341 63 2		252
US 5 K/120	1200 2,5/ ST / FT	6536177	6341 63 2		307

Type	Dimensions/Colo	EAN-C.	Art. no.	Price /pc.	Page
US 5 K/20	200 2,5/ ST / FT	6536771	6341 52 7		132
US 5 K/20	200 2,5/ ST / FT	6536771	6341 52 7		218
US 5 K/20	200 2,5/ ST / FT	6536771	6341 52 7		252
US 5 K/20	200 2,5/ ST / FT	6536771	6341 52 7		307
US 5 K/30	300 2,5/ ST / FT	6536719	6341 53 5		132
US 5 K/30	300 2,5/ ST / FT	6536719	6341 53 5		218
US 5 K/30	300 2,5/ ST / FT	6536719	6341 53 5		252
US 5 K/30	300 2,5/ ST / FT	6536719	6341 53 5		307
US 5 K/40	400 2,5/ ST / FT	6536658	6341 54 3		132
US 5 K/40	400 2,5/ ST / FT	6536658	6341 54 3		218
US 5 K/40	400 2,5/ ST / FT	6536658	6341 54 3		252
US 5 K/40	400 2,5/ ST / FT	6536658	6341 54 3		307
US 5 K/50	500 2,5/ ST / FT	6536597	6341 55 1		132
US 5 K/50	500 2,5/ ST / FT	6536597	6341 55 1		218
US 5 K/50	500 2,5/ ST / FT	6536597	6341 55 1		252
US 5 K/50	500 2,5/ ST / FT	6536597	6341 55 1		307
US 5 K/60	600 2,5/ ST / FT	6536535	6341 57 8		132
US 5 K/60	600 2,5/ ST / FT	6536535	6341 57 8		218
US 5 K/60	600 2,5/ ST / FT	6536535	6341 57 8		252
US 5 K/60	600 2,5/ ST / FT	6536535	6341 57 8		307
US 5 K/70	700 2,5/ ST / FT	6536474	6341 58 6		132
US 5 K/70	700 2,5/ ST / FT	6536474	6341 58 6		218
US 5 K/70	700 2,5/ ST / FT	6536474	6341 58 6		252
US 5 K/70	700 2,5/ ST / FT	6536474	6341 58 6		307
US 5 K/80	800 2,5/ ST / FT	6536412	6341 59 4		132
US 5 K/80	800 2,5/ ST / FT	6536412	6341 59 4		218
US 5 K/80	800 2,5/ ST / FT	6536412	6341 59 4		252
US 5 K/80	800 2,5/ ST / FT	6536412	6341 59 4		307
US 5 K/90	900 2,5/ ST / FT	6536351	6341 60 8		132
US 5 K/90	900 2,5/ ST / FT	6536351	6341 60 8		218
US 5 K/90	900 2,5/ ST / FT	6536351	6341 60 8		252
US 5 K/90	900 2,5/ ST / FT	6536351	6341 60 8		307
US 5 KS	Sulphur yellow/ PE	6469871	6338 46 1		133
US 5 KS	Sulphur yellow/ PE	6469871	6338 46 1		220
US 5 KS	Sulphur yellow/ PE	6469871	6338 46 1		254
US 5 KS	Sulphur yellow/ PE	6469871	6338 46 1		289
US 5 KS	Sulphur yellow/ PE	6469871	6338 46 1		308
US 5/100	1000 2,5/ ST / FT	6284177	6340 96 2		219
US 5/100	1000 2,5/ ST / FT	6284177	6340 96 2		288
US 5/100	1000 2,5/ ST / FT	6284177	6340 96 2		307
US 5/100	1000 2,5/ ST / FT	6284177	6340 96 2		252
US 5/150	1500 2,5/ ST / FT	6437597	6340 96 6		219
US 5/150	1500 2,5/ ST / FT	6437597	6340 96 6		288
US 5/150	1500 2,5/ ST / FT	6437597	6340 96 6		307
US 5/150	1500 2,5/ ST / FT	6437597	6340 96 6		252
US 5/20	200 2,5/ ST / FT	6959006	6340 88 1		252
US 5/200	2000 2,5/ ST / FT	6437658	6340 97 0		219
US 5/200	2000 2,5/ ST / FT	6437658	6340 97 0		288
US 5/200	2000 2,5/ ST / FT	6437658	6340 97 0		307
US 5/200	2000 2,5/ ST / FT	6437658	6340 97 0		252
US 5/30	300 2,5/ ST / FT	6959068	6340 90 3		219
US 5/30	300 2,5/ ST / FT	6959068	6340 90 3		288
US 5/30	300 2,5/ ST / FT	6959068	6340 90 3		307
US 5/30	300 2,5/ ST / FT	6959068	6340 90 3		252
US 5/40	400 2,5/ ST / FT	6959129	6340 91 1		219
US 5/40	400 2,5/ ST / FT	6959129	6340 91 1		288
US 5/40	400 2,5/ ST / FT	6959129	6340 91 1		307
US 5/40	400 2,5/ ST / FT	6959129	6340 91 1		252
US 5/50	500 2,5/ ST / FT	6959181	6340 93 8		133
US 5/50	500 2,5/ ST / FT	6959181	6340 93 8		219
US 5/50	500 2,5/ ST / FT	6959181	6340 93 8		288
US 5/50	500 2,5/ ST / FT	6959181	6340 93 8		307
US 5/50	500 2,5/ ST / FT	6959181	6340 93 8		252
US 5/60	600 2,5/ ST / FT	6601752	6340 94 6		133
US 5/60	600 2,5/ ST / FT	6601752	6340 94 6		219
US 5/60	600 2,5/ ST / FT	6601752	6340 94 6		288
US 5/60	600 2,5/ ST / FT	6601752	6340 94 6		307
US 5/60	600 2,5/ ST / FT	6601752	6340 94 6		252
US 5/70	700 2,5/ ST / FT	6043927	6340 95 0		133
US 5/70	700 2,5/ ST / FT	6043927	6340 95 0		219
US 5/70	700 2,5/ ST / FT	6043927	6340 95 0		288
US 5/70	700 2,5/ ST / FT	6043927	6340 95 0		307
US 5/70	700 2,5/ ST / FT	6043927	6340 95 0		252
US 5/80	800 2,5/ ST / FT	6044047	6340 95 4		219
US 5/80	800 2,5/ ST / FT	6044047	6340 95 4		288
US 5/80	800 2,5/ ST / FT	6044047	6340 95 4		307
US 5/80	800 2,5/ ST / FT	6044047	6340 95 4		252
US 5/90	900 2,5/ ST / FT	6044160	6340 95 8		219
US 5/90	900 2,5/ ST / FT	6044160	6340 95 8		288
US 5/90	900 2,5/ ST / FT	6044160	6340 95 8		307
US 5/90	900 2,5/ ST / FT	6044160	6340 95 8		252
US 7 K/130	1300 4/ ST / FT	6187218	6339 21 2		132
US 7 K/130	1300 4/ ST / FT	6187218	6339 21 2		252
US 7 K/130	1300 4/ ST / FT	6187218	6339 21 2		307
US 7 K/140	1400 4/ ST / FT	6187270	6339 22 0		132
US 7 K/140	1400 4/ ST / FT	6187270	6339 22 0		252
US 7 K/140	1400 4/ ST / FT	6187270	6339 22 0		307
US 7 K/150	1500 4/ ST / FT	6187331	6339 23 9		132
US 7 K/150	1500 4/ ST / FT	6187331	6339 23 9		252
US 7 K/150	1500 4/ ST / FT	6187331	6339 23 9		307
US 7 K/160	1600 4/ ST / FT	6187393	6339 24 7		132
US 7 K/160	1600 4/ ST / FT	6187393	6339 24 7		252
US 7 K/160	1600 4/ ST / FT	6187393	6339 24 7		307
US 7 K/170	1700 4/ ST / FT	6187454	6339 25 5		132
US 7 K/170	1700 4/ ST / FT	6187454	6339 25 5		252
US 7 K/170	1700 4/ ST / FT	6187454	6339 25 5		307
US 7 K/180	1800 4/ ST / FT	6187515	6339 26 3		132
US 7 K/180	1800 4/ ST / FT	6187515	6339 26 3		252
US 7 K/180	1800 4/ ST / FT	6187515	6339 26 3		307
US 7 K/190	1900 4/ ST / FT	6187577	6339 27 1		132
US 7 K/190	1900 4/ ST / FT	6187577	6339 27 1		252
US 7 K/190	1900 4/ ST / FT	6187577	6339 27 1		307
US 7 K/200	2000 4/ ST / FT	6187638	6339 29 8		132
US 7 K/200	2000 4/ ST / FT	6187638	6339 29 8		252
US 7 K/200	2000 4/ ST / FT	6187638	6339 29 8		307
US 7 KS	Sulphur yellow/ PE	6185238	6338 49 6		133
US 7 KS	Sulphur yellow/ PE	6185238	6338 49 6		254
US 7 KS	Sulphur yellow/ PE	6185238	6338 49 6		308
US 7/100	1000 4/ ST / FT	6188178	6340 18 0		308
US 7/100	1000 4/ ST / FT	6188178	6340 18 0		253
US 7/110	1100 4/ ST / FT	6188239	6340 19 9		308
US 7/110	1100 4/ ST / FT	6188239	6340 19 9		253
US 7/120	1200 4/ ST / FT	6188291	6340 20 2		308
US 7/120	1200 4/ ST / FT	6188291	6340 20 2		253
US 7/130	1300 4/ ST / FT	6188352	6340 21 0		308
US 7/130	1300 4/ ST / FT	6188352	6340 21 0		253
US 7/140	1400 4/ ST / FT	6188413	6340 22 9		308
US 7/140	1400 4/ ST / FT	6188413	6340 22 9		253
US 7/150	1500 4/ ST / FT	6188475	6340 23 7		308
US 7/150	1500 4/ ST / FT	6188475	6340 23 7		253
US 7/160	1600 4/ ST / FT	6188536	6340 24 5		308
US 7/160	1600 4/ ST / FT	6188536	6340 24 5		253
US 7/170	1700 4/ ST / FT	6188598	6340 25 3		308
US 7/170	1700 4/ ST / FT	6188598	6340 25 3		253
US 7/180	1800 4/ ST / FT	6188659	6340 26 1		308
US 7/180	1800 4/ ST / FT	6188659	6340 26 1		253

Type listing

Structure of the EAN number: Country code **40** Manufacturer code **1219** (for articles beginning with **0**: **1010**) Individual EAN-C **5647589**

Type	Dimensions/Colo	EAN-C.	Art. no.	Price /pc.	Page
US 7/190	1900 4/ ST / FT	6188710	6340 28 8		308
US 7/190	1900 4/ ST / FT	6188710	6340 28 8		253
US 7/20	200 4/ ST / FT	6187690	6340 01 6		253
US 7/200	2000 4/ ST / FT	6188772	6340 29 6		308
US 7/200	2000 4/ ST / FT	6188772	6340 29 6		253
US 7/30	300 4/ ST / FT	6187751	6340 03 2		308
US 7/30	300 4/ ST / FT	6187751	6340 03 2		253
US 7/40	400 4/ ST / FT	6187812	6340 05 9		308
US 7/40	400 4/ ST / FT	6187812	6340 05 9		253
US 7/50	500 4/ ST / FT	6187874	6340 07 5		308
US 7/50	500 4/ ST / FT	6187874	6340 07 5		253
US 7/60	600 4/ ST / FT	6187935	6340 09 1		308
US 7/60	600 4/ ST / FT	6187935	6340 09 1		253
US 7/70	700 4/ ST / FT	6187997	6340 11 3		308
US 7/70	700 4/ ST / FT	6187997	6340 11 3		253
US 7/80	800 4/ ST / FT	6188055	6340 14 8		308
US 7/80	800 4/ ST / FT	6188055	6340 14 8		253
US 7/90	900 4/ ST / FT	6188116	6340 16 4		308
US 7/90	900 4/ ST / FT	6188116	6340 16 4		253
VUS 5	/ ST / FT	6446896	6018 50 5		337
ZSE90/13		5447429	7215 70 1		340
ZSE90/13		5447429	7215 70 1		371
ZSE90/14		5447436	7215 70 5		340
ZSE90/14		5447436	7215 70 5		371
ZSE90/15		5447443	7215 70 8		340
ZSE90/15		5447443	7215 70 8		371
ZSE90/23		5447450	7215 71 2		340
ZSE90/23		5447450	7215 71 2		371
ZSE90/24		5447467	7215 71 5		340
ZSE90/24		5447467	7215 71 5		371
ZSE90/25		5447474	7215 71 8		340
ZSE90/25		5447474	7215 71 8		371
ZSE90/26		5447481	7215 72 5		340
ZSE90/26		5447481	7215 72 5		371
ZSE90/27		5447498	7215 72 9		340
ZSE90/27		5447498	7215 72 9		371
ZSE90/M1		5447504	7215 74 1		340
ZSE90/M1		5447504	7215 74 1		371
ZSE90/M2		5447511	7215 74 5		340
ZSE90/M2		5447511	7215 74 5		371

05 BSS_Katalog_2008 / en / 17/03/2009 (LLExport_00043)

Always indicate the article number when ordering.