

# High Pressure Natural Gas Compressors

**BAUER**  
COMPRESSORS



**Putting You on the  
Road to a Clean Future**

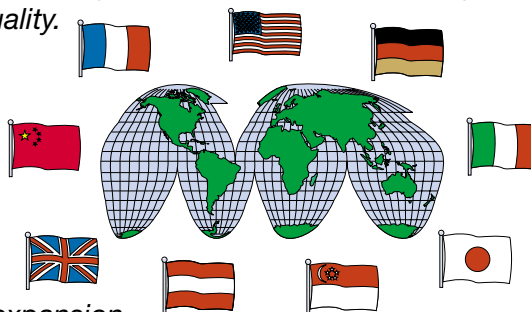
**5 – 125 HP  
5000 PSIG  
5 – 161 SCFM**

# Dedication to Quality

*BAUER has been manufacturing high pressure compressors for nearly 60 years. From our humble beginnings in the BAUER family home in Munich, Germany in 1946 to our current status as an industry leader, BAUER has worked hard to earn a reputation as the world's foremost innovative designer and manufacturer of high pressure compressors of the very highest quality.*

*Since then BAUER has expanded internationally with offices in Italy, Japan, Singapore, Austria, England, China, France and the United States. The U.S. facility, BAUER COMPRESSORS, INC. of Norfolk, Virginia, was founded in 1976.*

*Since our founding, BAUER Norfolk has experienced continued growth in sales and expansion of facilities. BAUER Norfolk is headquarters for branch offices in Miami, Los Angeles, San Francisco and Detroit. We are specialists in the markets of high pressure natural gas, industrial air, plastics technology, inert gas and breathing air.*



1946 – 1996

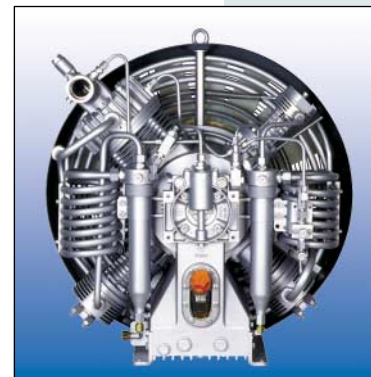


BAUER COMPRESSORS, INC. Norfolk, Virginia USA

*BAUER natural gas compressors are field proven in a multitude of installations. Our compressors are available with capacities from 5 – 161 SCFM with working pressures to 5000 PSIG and with power requirements from 5 – 125 HP. This represents the most complete line of industrial rated high pressure natural gas compressors available.*

*We are pleased to present our products for natural gas vehicle refueling. We hope you find this catalog informative and encourage you to contact BAUER for your compressed natural gas requirements.*

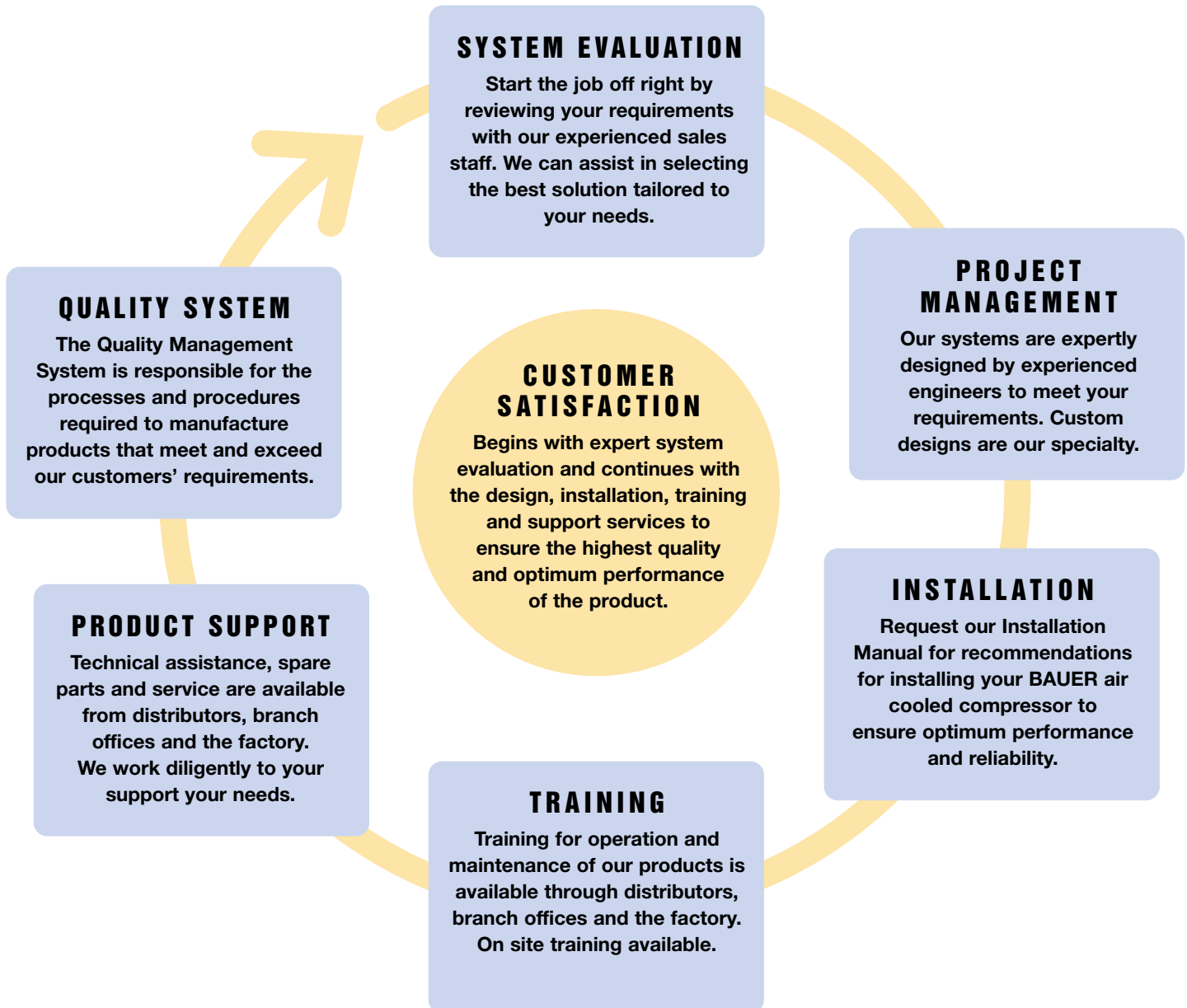
*Expertise, innovation, diversity, quality, reliability and dedication to our valued customers are reasons why BAUER is recognized as the leader in high pressure compressors.*





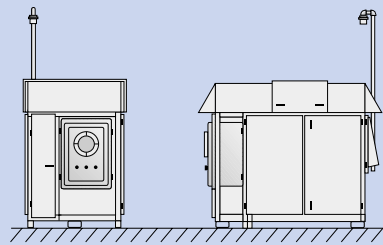
# Dedication to You

*Since the founding of our company, we have been committed to a philosophy that customer satisfaction is achieved through a strategy of continuous improvement using in-house research and development, engineering, manufacturing and support services. Our ISO 9001:2000 registered quality management system is testament to our commitment to quality and customer satisfaction.*



### Stand-Alone Compressors

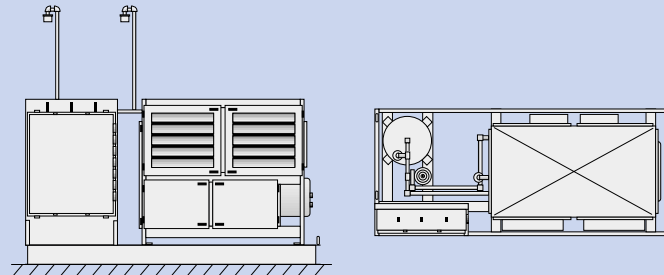
BAUER Natural Gas Compressors are available as Stand-Alone compressors that are complete with all of the necessary control and monitoring devices for safe, reliable operation. In addition to Stand-Alone designs, BAUER offers versatile skid mounted package designs that will suit the demands of most fleets.



Stand-Alone

### In-Line Simplex Skid

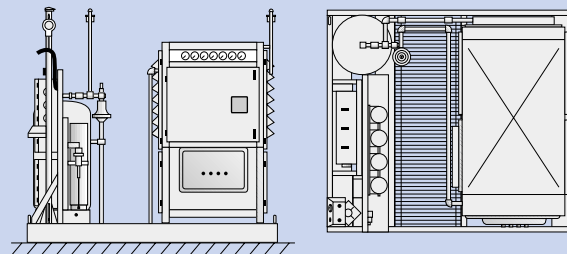
In-Line Simplex Skid is our basic skid mounted package design for compressor models up to C23.1. It will accommodate one compressor with its locally mounted accessories and ancillary equipment such as a vapor recovery system, high pressure gas processing system, priority and sequential panel and more. It is perfect for fleet owners with a limited budget.



In-Line Simplex Skid

### Enhanced Simplex Skid

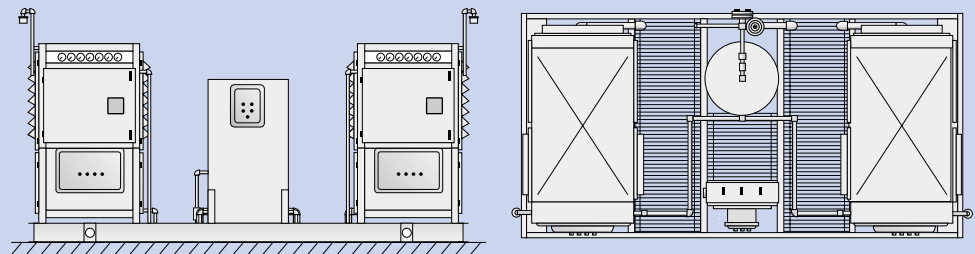
Enhanced Simplex Skid offers the same features as the In-Line Skid but features below-the-deck tube, pipe and conduit runs and sturdy, no-slip aluminum grate to cover skid openings for safe access to skid mounted components for inspection and maintenance.



Enhanced Simplex Skid

### Duplex Skid

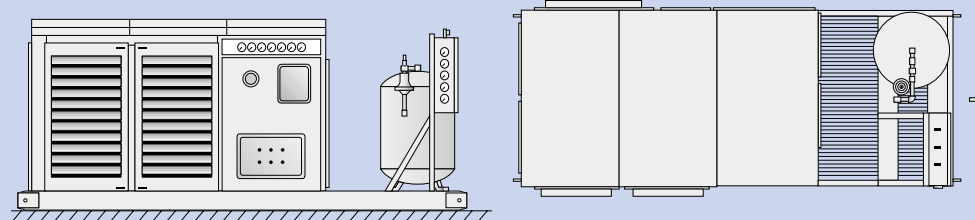
Duplex Skid offers the same great features as the Enhanced Simplex Skid, but accommodates two compressors. A Duplex Skid offers peace of mind for those times when depending on one compressor could prove disastrous. Duplex Skid is the perfect solution for large or expanding fleets. Duplex Skid can be supplied with one compressor initially with all of the provisions included on the skid for adding the second compressor at a later time.



Duplex Skid

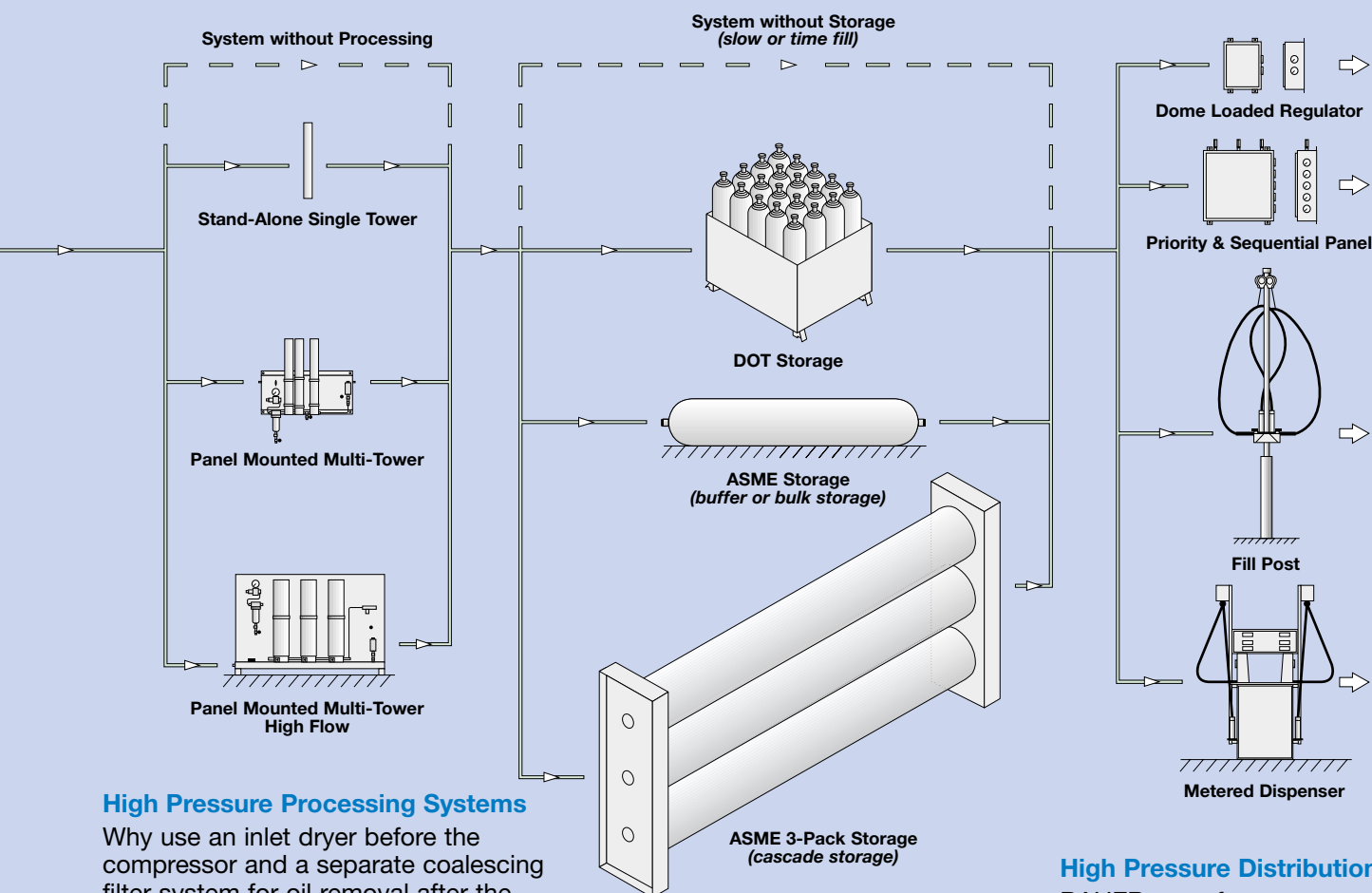
### Extended Skids *(for our larger compressors)*

Extended Skid is our largest Stand-Alone design for use with fleets that require larger volumes of natural gas. One, two or more compressors with Extended Skid can be installed to handle the demands of large fleets.



Extended Skid

*Each compressor includes a dedicated control system.*



### High Pressure Processing Systems

Why use an inlet dryer before the compressor and a separate coalescing filter system for oil removal after the compressor? A BAUER High Pressure Processing System for natural gas is the economical solution for drying and purifying at the *outlet* of the compressor. BAUER accomplishes both in one step. These systems use inexpensive, replaceable cartridges filled with high capacity molecular sieve specifically designed for drying natural gas. New cartridges can be quickly and easily replaced without interruption to the station. These systems have no moving parts and do not require power for operation. A BAUER High Pressure Processing System ensures gas dewpoints in accordance the latest published standards that pertain to the quality of natural gas for use as a vehicle fuel and optimum gas quality to storage and to NGVs.

See page 12 for full details

### High Pressure Storage Systems

It is essential that storage be properly sized to match the output of the compressor(s) and to the peak fueling demands of the station. Depending upon the needs of the fleet, storage can be supplied in a single bank (*a.k.a. buffer or bulk storage*) or multiple bank (*a.k.a. cascade storage*) configurations. Single bank systems save on the cost of priority and sequential systems, but limit the usable gas volume from storage. Multiple bank storage systems with priority and sequential controls maximize the usable gas volume from storage and vehicle fill efficiency.

Cylinders for natural gas storage are available to meet the code requirements of either DOT or ASME.

See pages 13-14 for full details

### High Pressure Distribution Systems

BAUER manufactures standard and custom designed products for distributing and dispensing natural gas at high pressures for NGV refueling. Products include Dome Loaded Regulator Panels, Emergency Shutoff Valve Panels and Priority and Sequential Controls. Systems are available for slow fill only, fast fill only, or combination slow fill and fast fill applications. Distribution Systems used with storage for fast filling are available for use with single or multiple banks of storage in single or multiple hose drops. Enhanced systems with PLC control and touch screen interface are available.

BAUER High Pressure Distribution Systems for Natural Gas are well known for their professional design, quality and reliability.

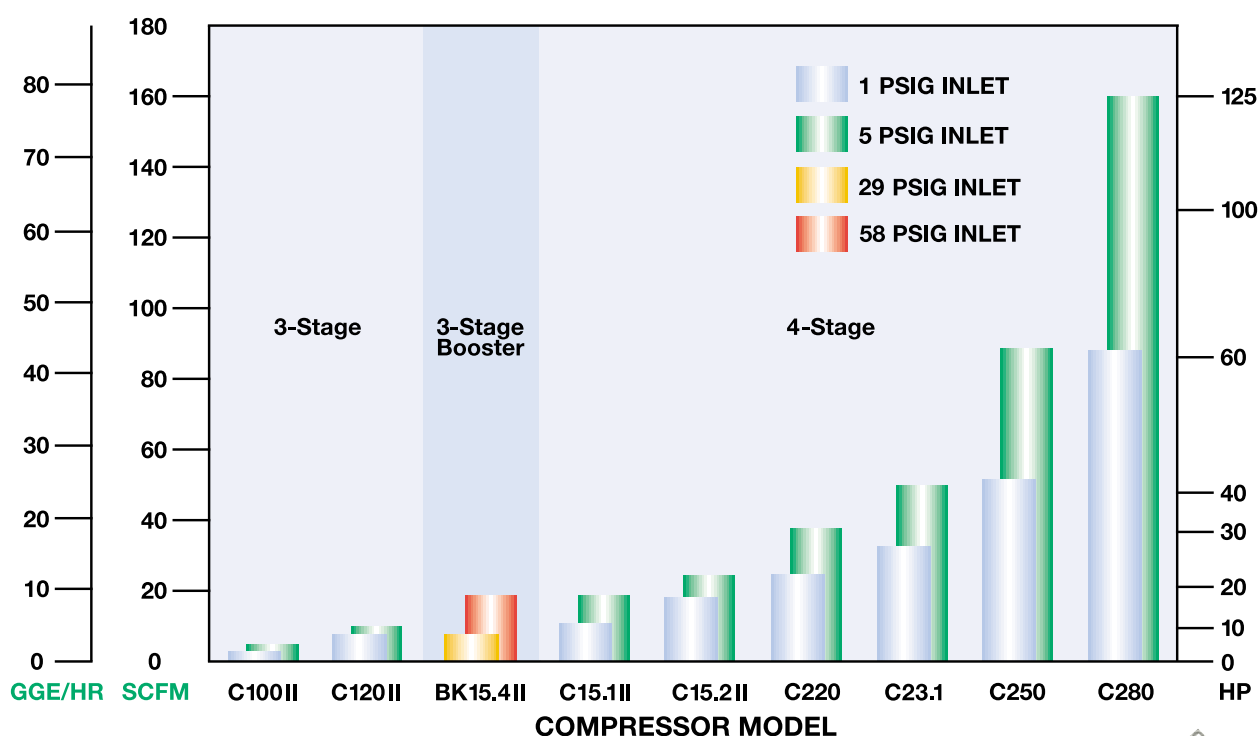
See pages 15-16 for full details

BAUER manufactures 3 and 4 stage air cooled, pressure lubricated reciprocating compressors specifically designed for compressing pipeline quality natural gas to 5000 PSIG.

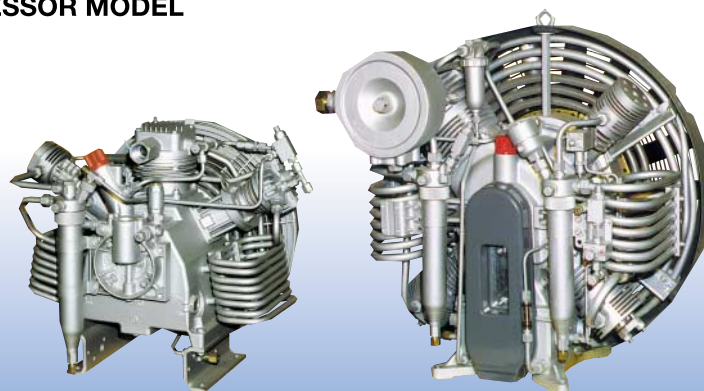
Since 1946, BAUER has been recognized as the world's most innovative designer and manufacturer of high pressure compressors of the very highest quality. Today, our ISO 9001 registration is a testament to our continued commitment to quality.

Our business is compressing, processing, storing and dispensing air and gases to high pressure. No other manufacturer or packager of NGV compressors offers as much diversity and experience as BAUER.

We offer the most complete line of field-proven industrial natural gas compressors for refueling small to large to NGV fleets. We welcome the opportunity to serve your needs for refueling NGVs.



**NEW BOOSTER! BK 15.4 II**  
 29 to 58 PSIG INLET  
 5000 PSIG DISCHARGE  
 14 to 28 SCFM, 7.5 to 15 HP



**3 STAGE**  
 5 - 7.5 HP  
 100 and 120 Series

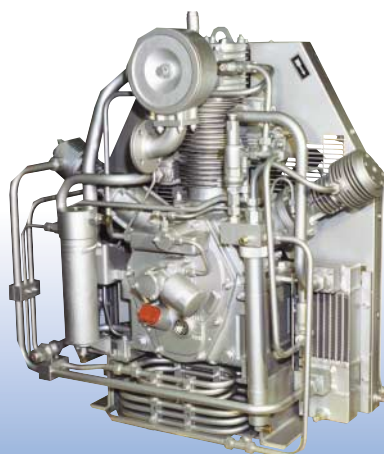
**4 STAGE**  
 10 - 20 HP  
 150 Series

# – The Compressor

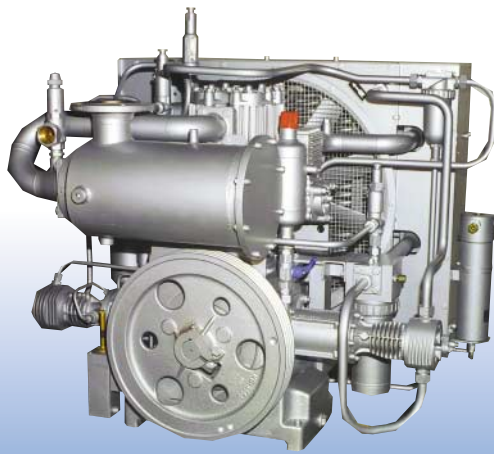
## THE BAUER ADVANTAGES...

- Available in a Wide Range of Capacities to Meet Specific Fleet Requirements
- Proven Air Cooled Design – Economical, Reliable, **Environmentally Friendly**
- Roller or Needle Bearings Used at Each Bearing Surface for Reduced Friction and Heat, Improved Mechanical Efficiency and Extended Oil Life
- Heavy-Duty Roller Bearings for Strong Support of the Crankshaft and Long Bearing Life
- Counterbalanced Crankshaft for Smooth, Practically Vibration-Free Operation for Extended Life and Requires No Special Foundation
- Corrosion Resistant Materials for All Coolers and Separators
- Large Surface Area and Fine Ribbing on Cylinders for Efficient Heat Dissipation
- Pressurized Lubrication for Reliable Lubrication of Internal Components
- Readily Accessible Valves – No Major Disassembly Required for Inspection and Maintenance
- Extended Maintenance Intervals Due to Efficient Cooling and Pressure Lubrication
- Easy to Maintain and Service
- Affordable Genuine BAUER Replacement Parts for Quality Repairs
- Intake Filter for Protection of the Internal Components of the Compressor
- Encapsulated Crankcase to Protect the Environment, **No Oil Laden Mist** or **Gas** Vented to the Atmosphere
- Automatic Condensate Drain for Automatic Drainage of the Interstage and Final Separators and Unloaded Starting

## ...FOR YOUR BENEFIT



4 STAGE  
25 - 30 HP  
220 Series



4 STAGE  
40 - 50 HP  
230 Series



4 STAGE  
50 - 125 HP  
250 and 280 Series



## Intake Filter

Clean, filtered gas is essential for proper operation of the compressor. The intake to the compressor is protected by a high performance filter. Additional filtration or treatment of the gas may be required depending upon the quality of the gas.

## Valves

The BAUER design guarantees optimum flow and efficiency, thus maximizing valve life. All valves are readily accessible for inspection and maintenance. Valve maintenance is inexpensive and easy to complete.

## Separators

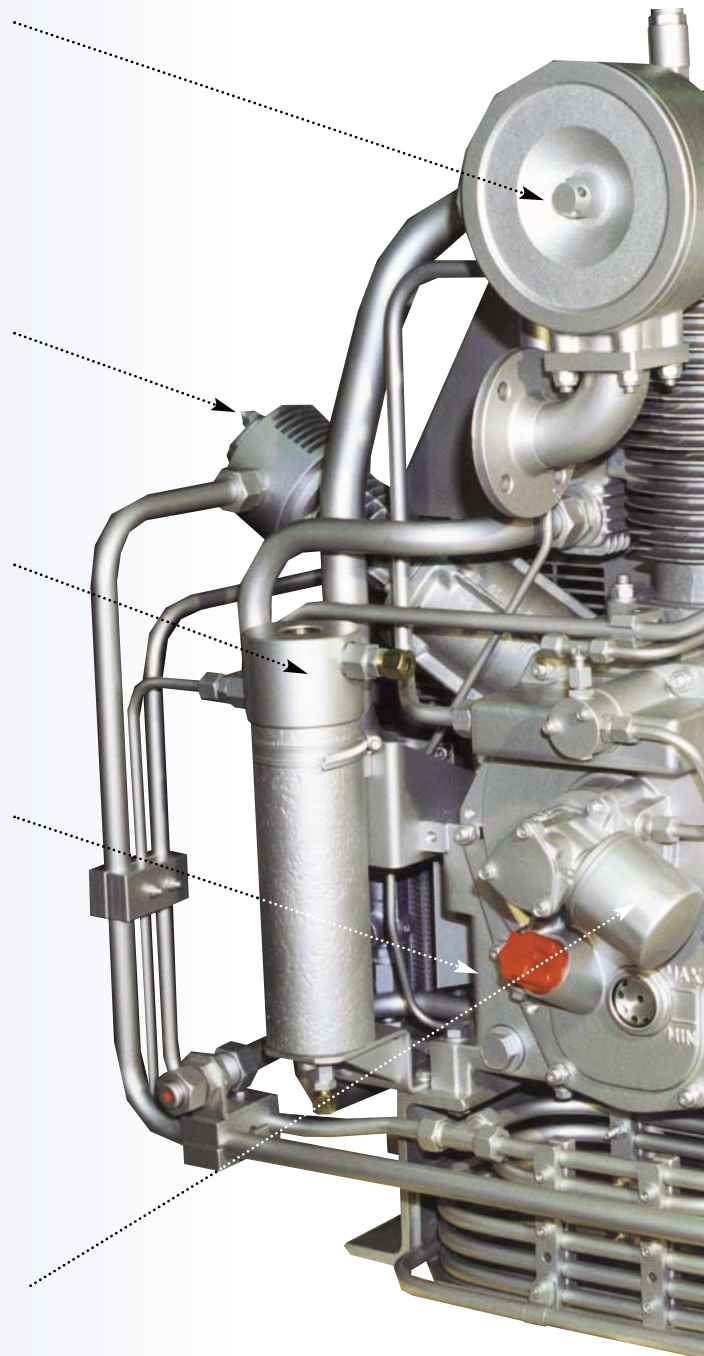
Separators remove oil and water from the compressed gas. All separators are made of corrosion resistant materials for long life and to prevent contamination of the compressed gas.

## Crankcase

The crankcase serves as a strong foundation for the cylinders, sturdy support for the driving gear and provides a large oil reservoir. The crankcase is completely sealed against dirt and moisture for protection of internal components. BAUER uses a sturdy cast aluminum alloy crankcase on compressor frames through the 23 series. A rugged cast iron crankcase is used on the 25 and 28 series compressor frames. The crankcase is fully encapsulated to prevent the release of oil laden gas to the environment.

## Lubrication

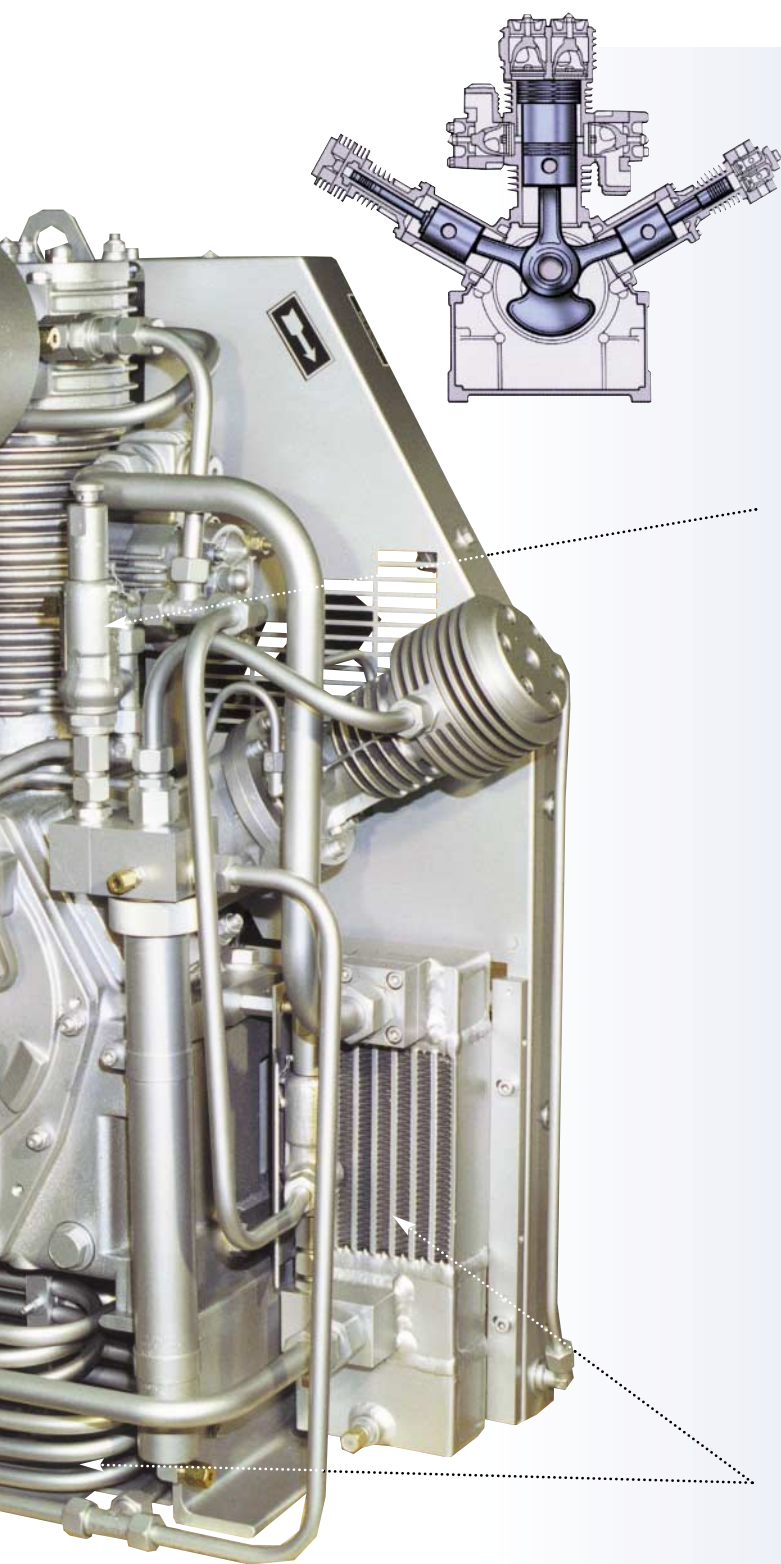
All BAUER compressors are pressure lubricated for reliable lubrication of internal components. A sight glass and oil filter are standard on all models.



**4 STAGE  
25 - 30 HP  
IK220C**



# Gas Compressor Technology



## Drive Gear

All bearing surfaces on the driving gear use a long life roller or needle bearings for reduced friction and maximum mechanical efficiency. The drive gear is supported in the crankcase with heavy duty ball bearings. The dynamically counter-balanced crankshaft provides smooth, practically vibration-free operation.

## Safety Valves

A safety valve is installed after each stage of compression to ensure safe operation and to protect the compressor from overpressure.

## Automatic Condensate Drain (ACD)

The ACD automates the drainage of the interstage and final separators. This device enhances the use of the compressor for heavy-duty use by draining the condensed oil and water from the interstage and final separators. A timed sequential drain mode is used to keep a balanced load on the compressor during the drain cycle. This is a key feature for ensuring long compressor life. The ACD also unloads the compressor automatically for unloaded restarting. Manual valves are included to override the automatic operation of the ACD for troubleshooting purposes.

## Cooling

The BAUER air cooled design is based on more than 55 years experience. All coolers are located in the direct blast of the cooling fan(s) for effective removal of the heat of compression. All cylinders and cylinder heads have large surfaces and fine ribbing for maximum heat dissipation. Cooler operating temperatures result in improved efficiency in the separators and reduced oil vapor carryover to storage and to NGVs. All coolers are made of corrosion resistant material for long life and non-contaminating service. The BAUER air cooled design provides discharge gas temperatures from 20°F to 30°F above ambient.



BAUER Natural Gas Compressor Units include all of the instrumentation and control devices that are necessary for the safe, reliable operation of the compressor. Our complete scope of supply for standard models sets us apart from the competition.

- Automatic fail-close solenoid valve at inlet – automatically stops the flow of gas from the pipeline to the compressor's inlet under normal and fault conditions.
- Inlet buffer tank – eliminates pressure pulsations from the compressor's first stage of compression to the gas meter.
- Safety devices for low/high inlet pressure, compressor low oil temperature and compressor relief valve overpressure. Each device effects an immediate fault shutdown (*first out fault logic*) of the compressor and annunciation with a visual fault indicator.
- Panel mounted pressure gauge for each stage of compression, oil pressure, inlet pressure and discharge pressure – enables a quick check on the status and performance of the compressor unit.
- Hourmeter – records the number of operating hours for easy maintenance scheduling.
- Coalescing separator on compressor outlet – removes condensed oil and water droplets from the gas stream. Provides effective prefiltering of the gas before entry to the optional high pressure gas processing system. Includes a *reusable* sintered element for reduced maintenance cost.
- Automatic Condensate Drain (ACD) system – drains the interstage and final separators automatically in a *timed sequential drain mode* during normal operation and at shutdown. Manual valves are included override the automatic operation of the ACD to facilitate troubleshooting. Most competitors drain all stages at one time, which has an adverse affect on reciprocating compressors.
- Pressure switch at compressor outlet – for automatic starting and stopping of the compressor.
- Explosion proof electric motor with v-belt drive and belt guard – some competitors use non-explosive proof motors

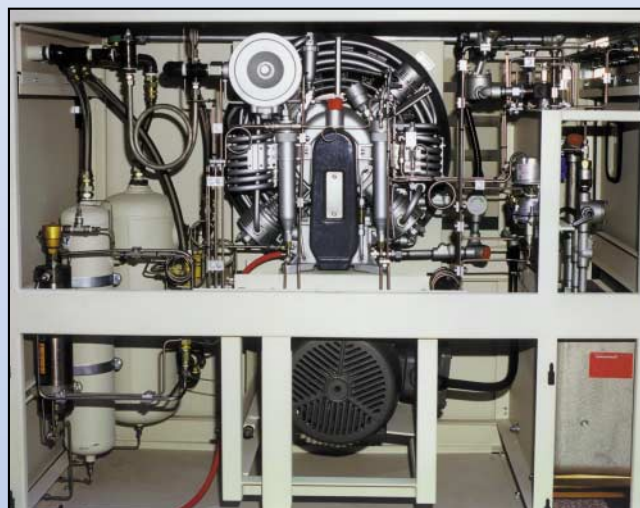


# Packaging Technology

- Stainless steel tubing, tube fittings and high pressure instrument pipe fittings – one key to successful compressor operation is knowing how to install high pressure tubing to reduce transfer of vibration throughout the package. BAUER is renowned for quality craftsmanship of high pressure tubing and for the practically vibration-free operation of the compressor units.

- Locally mounted, PLC based compressor control circuit supplied in a NEMA 7 explosion proof enclosure with UL listed electrical panel:

- Full voltage, non-reversing motor starter with overload protection and manual reset.
  - Control voltage transformer with fuses on primary and secondary sides.
  - Off/On selector switch.
  - Power ON light to indicate that the electric circuit is energized with power.
  - Line power conditioner for PLC power supply.
  - Intrinsically safe switch amplifiers for digital safety devices low oil pressure switch, high temperature switch and final pressure switch.
  - Thermostatically controlled heater for electrical enclosure.
- Rigid conduit for wiring with *factory poured sealing devices* – some packagers pour the sealing devices prior to shipment because they do not or cannot pretest their systems. This important step can be easily forgotten in the field and jeopardize the integrity of the entire station.
  - Factory testing on natural gas – ensures that the package is ready for operation upon installation and connection to gas and electrical services.
  - Factory quality to ISO Standards – a testament to our commitment to quality and an assurance that not every manufacturer or packager can provide.
  - Factory warranty – compressor and controls are designed, packaged, tested and warranted by the manufacturer.
  - Factory customer service – factory personnel are available to assist by phone, fax or email.
  - Built in compliance to the latest edition of NFPA 52 and ANSI NGV 4.8.



## ply for Reliable Operation



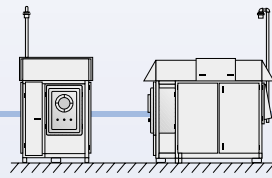
# Dimensional Data for Standard Packages

| COMPRESSOR<br>MODEL | DIMENSIONS<br>L x W x H | WEIGHT |
|---------------------|-------------------------|--------|
|                     | INCHES                  | LB     |
|                     | MM                      | KG     |

*Dimensions and weights are approximate.*

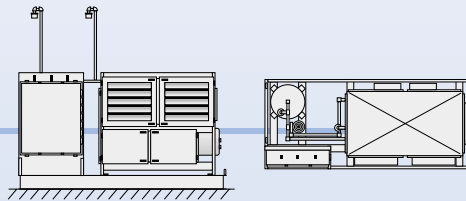
## Stand-Alone Compressors

|                  |                    |             |
|------------------|--------------------|-------------|
| C100II – C15.2II | 72 x 46 x 60       | 1900 - 2200 |
|                  | 1829 x 1168 x 1524 | 864 - 1000  |
| C220             | 80 x 51 x 76       | 2800        |
|                  | 2032 x 1295 x 1930 | 1273        |
| C23.1            | 84 x 51 x 72       | 3100        |
|                  | 2134 x 1295 x 1829 | 1409        |
| C250 – C280      | 120 x 78 x 78      | 6500 - 7000 |
|                  | 3048 x 1981 x 1981 | 2955 - 3182 |



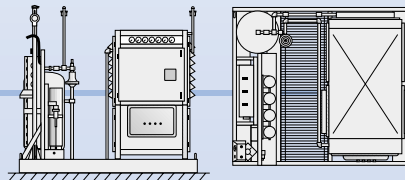
## In-Line Simplex Skid (through Model C23.1)

|                |                    |             |
|----------------|--------------------|-------------|
| C100II – C23.1 | 120 x 52 x 84      | 3500 - 4500 |
|                | 3048 x 1321 x 2134 | 1591 - 2045 |



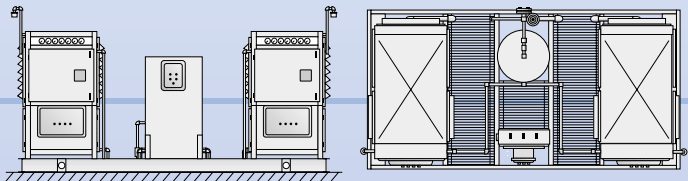
## Enhanced Simplex Skid (through Model C23.1)

|                             |                    |             |
|-----------------------------|--------------------|-------------|
| C100II – C23.1              | 102 x 92 x 84      | 3900 - 4900 |
|                             | 2591 x 2337 x 2134 | 1773 - 2227 |
| with DOT Basket (not shown) | 120 x 92 x 84      | 8200 - 9200 |
|                             | 3048 x 2337 x 2134 | 3727 - 4182 |



## Duplex Skid (through Model C23.1)

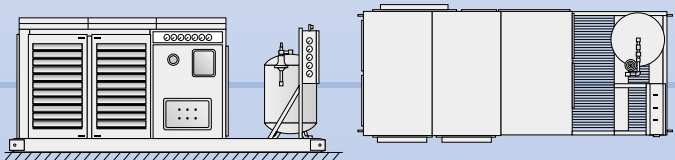
|                  |                    |              |
|------------------|--------------------|--------------|
| C100II – C15.2II | 160 x 102 x 70     | 8500 - 10500 |
|                  | 4064 x 2591 x 1778 | 3864 - 4773  |
| C220 – C23.1     | 180 x 102 x 84     | 9000 - 11500 |
|                  | 4572 x 2591 x 2134 | 4091 - 5227  |



## Extended Skids

|             |                    |             |
|-------------|--------------------|-------------|
| C250 – C280 | 180 x 72 x 78      | 9000 - 9500 |
|             | 4572 x 1829 x 1981 | 4091 - 4318 |

*Extended skid design to be modified over the course of 2005.*



*Consult BAUER for custom designed packages.*

# High Pressure Drying and Purifying

*Why dry at the inlet of the compressor and use a separate coalescing filter system for oil removal after the compressor when a BAUER High Pressure Processing System for natural gas can accomplish both in one step?*

*BAUER High Pressure Gas Processing Systems are the economical solution for drying and purifying natural gas for NGV refueling stations. BAUER recommends only high pressure drying for NGV refueling station compressors. Installed immediately after the compressor, these dependable, yet simplistic systems ensure gas dewpoints in accordance the latest published standards that pertain to the quality of natural gas for use as a vehicle fuel and optimum gas quality to storage and to NGVs. These systems use replaceable cartridges filled with high*

*capacity molecular seive tailored for drying natural gas without removing the odorant. New cartridges are inexpensive and can be quickly and easily replaced at your convenience and without interruption to the station. There are no moving parts to the systems and they do not require power for operation. An electronic dewpoint monitor with LCD display is available for indicating gas dewpoint in choice of engineering units. The moisture sensor is installed downstream of the gas processing system. BAUER High Pressure Processing Systems for natural gas can be used downstream of competitive brand natural gas compressors. Consult BAUER for more information about High Pressure Gas Processing Systems for NGV refueling.*

BAUER High Pressure Processing Systems for natural gas are heatless, non-regenerative, adsorptive type dryer/purifiers. They are designed for working pressures of 2000 – 5000 PSIG.

Scope of supply includes:

- Bypass Circuit with Bypass Valve at Inlet
- Liquid Filled Pressure Gauge at Inlet
- Safety Valve for Overpressure Protection

- Coalescing Pre-filter with Manual Drain
- Multi-tower Processing with Replaceable Cartridges
- Particulate After-filter
- Check Valve at Panel Inlet and Outlet
- Pressure Maintaining Valve at Outlet
- Vent Valve
- Visual Moisture Indicator
- Panel Mounted

| MODEL                      | MAXIMUM FLOW RATE SCFM | FOR COMPRESSOR MODEL          |
|----------------------------|------------------------|-------------------------------|
| P5-CNG/2<br>(two tower)    | 40                     | C100II – C15.1II              |
| P10-CNG/3<br>(three tower) | 40                     | C15.2II – C220 and BK 15.4 II |
| P12-CNG/2<br>(two tower)   | 161                    | C23.1 – C250                  |
| P14-CNG/3<br>(three tower) | 161                    | C250 – C280                   |

*Each model is available with one additional tower.*



P5 – P10/CNG



P12 – P14/CNG

# High Pressure Storage Systems

The chart below summarizes the relationship of pressure and volume for natural gas with a specific gravity of 0.6 and a temperature of 70° F. The chart lists the volume of natural gas in terms of standard cubic feet gas volume (SCFgv) that can be compressed into one standard cubic foot water volume (SCFwv). Among the many uses of this chart, it can be used to estimate how much gas a NGV needs to refuel or to determine how much gas is usable from storage. A few examples are provided to demonstrate how the chart can be used.

**Example 1 – What is the water volume of a natural gas cylinder that has a capacity of 763 SCFgv at 3600 PSIG?**

From the chart, 296.34 SCFgv are compressed into 1 SCFwv at 3600 PSIG.

$$763 \text{ SCFgv} / (296.34 \text{ SCFgv} / \text{SCFwv}) = 2.57 \text{ SCFwv}$$

**Example 2 – How much buffer storage rated to 5000 PSIG is required to provide 2500 SCFgv to fill NGVs to 3000 PSIG?**

Tip: to insure quick filling allow a minimum of 400 PSI differential pressure between the fill pressure of the vehicle and the pressure remaining in storage at the end of the fill (3000 PSIG + 400 PSID = 3400 PSIG).

From the chart, 356.93 SCFgv are compressed into 1 SCFwv at 5000 PSIG and 284.75 SCFgv are compressed into 1 SCFwv at 3400 PSIG.

$$356.93 - 284.75 = 72.18 \text{ SCFgv} / \text{SCFwv}$$

$$2500 \text{ SCFgv} / (72.18 \text{ SCFgv} / \text{SCFwv}) = 34.2 \text{ SCFwv}$$

(water volume required in storage)

$$34.2 \text{ SCFwv} \times (356.93 \text{ SCFgv} / \text{SCFwv}) = 12,362 \text{ SCFgv}$$

Check:

$$\text{At 3400 PSIG, } 34.2 \text{ SCFwv} \times (284.75 \text{ SCFgv} / \text{SCFwv}) = 9,738 \text{ SCFgv}$$

$$12,362 - 9,738 = 2,624 \text{ SCFgv available from storage}$$

Standard Cubic Feet (SCF) of Natural Gas Compressed into One Cubic Foot of Water Volume at Given Pressures

| Pressure PSIG | SCF Per Cubic Foot Water Volume | Pressure PSIG | SCF Per Cubic Foot Water Volume | Pressure PSIG | SCF Per Cubic Foot Water Volume | Pressure PSIG | SCF Per Cubic Foot Water Volume | Pressure PSIG | SCF Per Cubic Foot Water Volume |
|---------------|---------------------------------|---------------|---------------------------------|---------------|---------------------------------|---------------|---------------------------------|---------------|---------------------------------|
| 0             | 1.00                            | 1050          | 84.54                           | 2100          | 185.67                          | 3150          | 267.84                          | 4200          | 325.90                          |
| 50            | 4.45                            | 1100          | 89.24                           | 2150          | 190.06                          | 3200          | 271.73                          | 4250          | 327.90                          |
| 100           | 7.92                            | 1150          | 93.79                           | 2200          | 194.45                          | 3250          | 275.14                          | 4300          | 329.88                          |
| 150           | 11.55                           | 1200          | 98.40                           | 2250          | 198.84                          | 3300          | 278.46                          | 4350          | 332.21                          |
| 200           | 15.15                           | 1250          | 103.19                          | 2300          | 203.23                          | 3350          | 281.61                          | 4400          | 334.52                          |
| 250           | 18.76                           | 1300          | 107.78                          | 2350          | 207.89                          | 3400          | 284.75                          | 4450          | 336.44                          |
| 300           | 22.49                           | 1350          | 112.56                          | 2400          | 213.39                          | 3450          | 287.51                          | 4500          | 338.33                          |
| 350           | 26.34                           | 1400          | 117.39                          | 2450          | 216.96                          | 3500          | 290.24                          | 4550          | 340.58                          |
| 400           | 30.02                           | 1450          | 122.29                          | 2500          | 221.36                          | 3550          | 293.30                          | 4600          | 342.43                          |
| 450           | 33.93                           | 1500          | 127.24                          | 2550          | 225.47                          | 3600          | 296.34                          | 4650          | 343.89                          |
| 500           | 37.82                           | 1550          | 132.26                          | 2600          | 229.57                          | 3650          | 298.29                          | 4700          | 345.71                          |
| 550           | 41.86                           | 1600          | 137.34                          | 2650          | 233.06                          | 3700          | 300.92                          | 4750          | 348.62                          |
| 600           | 45.96                           | 1650          | 142.13                          | 2700          | 236.82                          | 3750          | 303.52                          | 4800          | 350.39                          |
| 650           | 49.92                           | 1700          | 147.13                          | 2750          | 241.19                          | 3800          | 306.46                          | 4850          | 351.78                          |
| 700           | 54.04                           | 1750          | 151.81                          | 2800          | 244.92                          | 3850          | 309.38                          | 4900          | 353.14                          |
| 750           | 58.47                           | 1800          | 156.31                          | 2850          | 248.64                          | 3900          | 311.92                          | 4950          | 354.86                          |
| 800           | 62.64                           | 1850          | 161.43                          | 2900          | 252.33                          | 3950          | 314.06                          | 5000          | 356.93                          |
| 850           | 67.01                           | 1900          | 166.61                          | 2950          | 256.01                          | 4000          | 316.55                          | 5050          | 358.90                          |
| 900           | 71.54                           | 1950          | 171.26                          | 3000          | 259.67                          | 4050          | 319.38                          | 5100          | 361.78                          |
| 950           | 75.80                           | 2000          | 175.76                          | 3050          | 262.64                          | 4100          | 321.82                          | 5150          | 362.30                          |
| 1000          | 80.01                           | 2050          | 180.58                          | 3100          | 265.59                          | 4150          | 323.87                          | 5200          | 364.31                          |

Information in this chart is for reference only.



# Technical Data

## Technical Data for Typical Natural Gas Storage Cylinders and Assemblies

| NUMBER OF CYLINDERS           | GAS VOLUME SCFgv <sup>1</sup> | WATER VOLUME SCFwv <sup>2</sup> | WORKING PRESSURE PSIG | DESIGN PRESSURE PSIG | DIAMETER INCHES (D) | LENGTH (L) | WIDTH (W) | HEIGHT (H) | WEIGHT LBS |
|-------------------------------|-------------------------------|---------------------------------|-----------------------|----------------------|---------------------|------------|-----------|------------|------------|
| <b>DOT CYLINDERS</b>          |                               |                                 |                       |                      |                     |            |           |            |            |
| 1                             | 460                           | 1.55                            | 3600                  | 6000                 | 9.25                | 51"        | 40"       | 61"        | 190        |
| 10                            | 4600                          | 15.5                            | 3600                  | 6000                 | 9.25                | 51"        | 40"       | 61"        | 2100       |
| 20                            | 9200                          | 31                              | 3600                  | 6000                 | 9.25                | 51"        | 40"       | 61"        | 4000       |
| <b>ASME SINGLE CYLINDERS</b>  |                               |                                 |                       |                      |                     |            |           |            |            |
| 1                             | 525                           | 1.47                            | 5000                  | 5500                 | 9.56                | 54"        | —         | —          | 400        |
| 1                             | 785                           | 2.19                            | 5000                  | 5500                 | 11.65               | 56"        | —         | —          | 435        |
| 1                             | 830                           | 2.33                            | 5000                  | 5500                 | 11.65               | 59"        | —         | —          | 460        |
| 1                             | 945                           | 2.65                            | 5000                  | 5500                 | 11.65               | 66"        | —         | —          | 575        |
| 1                             | 5714                          | 16.0                            | 5000                  | 5500                 | 20                  | 12'-1"     | 30"       | 27"        | 4300       |
| 1                             | 10030                         | 28.1                            | 5000                  | 5500                 | 20                  | 19'-9"     | 30"       | 27"        | 6500       |
| 1                             | 12207                         | 34.2                            | 5000                  | 5500                 | 20                  | 23'-7"     | 30"       | 27"        | 7500       |
| <b>ASME 3-PACK ASSEMBLIES</b> |                               |                                 |                       |                      |                     |            |           |            |            |
| 3                             | 11049                         | 31.0                            | 5000                  | 5500                 | 20                  | 9'-0"      | 48"       | 4'-4"      | 8800       |
| 3                             | 17133                         | 48.0                            | 5000                  | 5500                 | 20                  | 12'-1"     | 27"       | 7'-4"      | 12000      |
| 3                             | 30090                         | 84.3                            | 5000                  | 5500                 | 20                  | 19'-9"     | 27"       | 7'-4"      | 18500      |
| 3                             | 36621                         | 102.6                           | 5000                  | 5500                 | 20                  | 23'-7"     | 27"       | 7'-4"      | 22000      |

1. SCFgv = standard cubic feet gas volume. Referenced to 0.6 specific gravity, 70° F and working pressure.

2. SCFwv = standard cubic feet water volume, the internal volume of the cylinder(s).

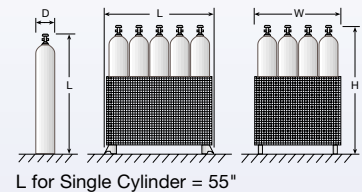
Information in this chart is for reference only. Other storage systems are available.

Dimensions for ASME single cylinders and 3-pack assemblies do not include valves at each end of the cylinders except for the 11,049 scf capacity 3-pack assembly.

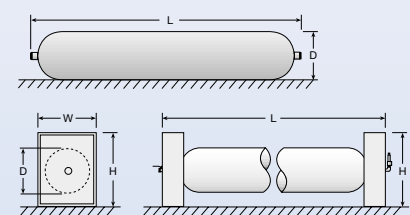
Consult BAUER to confirm your requirements for storage.

Cylinders for natural gas storage are available to meet the code requirements of either the Department of Transportation (D.O.T.) or the American Society of Mechanical Engineers (A.S.M.E.)

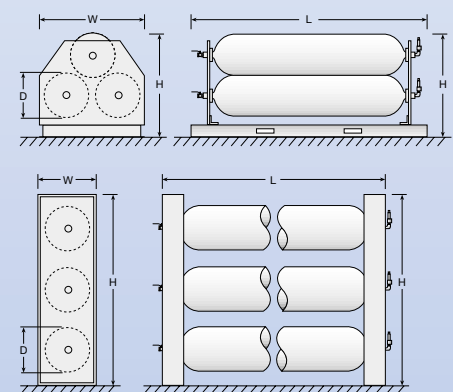
### DOT CYLINDERS



### ASME SINGLE CYLINDERS



### ASME 3-PACK ASSEMBLIES



### NATURAL GAS EQUIVALENTS

1 GGE = 123.5 SCF    1SCF = 923.7 BTU  
123.5 SCF = 5.66 LB    140 SCF = 1 GAL Diesel  
1 GAL Propane = 92 SCF Natural Gas

All values are nominal.

# High Pressure Gas Distribution Systems

*BAUER manufactures standard and custom designed products for distributing and dispensing natural gas at high pressures for NGV refueling. Products include Dome Loaded Regulator Panels, Emergency Shutoff Valve Panels and Priority and Sequential Controls. Systems are available for slow fill only, fast fill only, or combination slow fill and fast fill applications. Distribution Systems used with*

*storage for fast filling are available for use with single or multiple banks of storage in single or multiple hose drops. Enhanced systems with PLC control and touch screen interface are available.*

*BAUER High Pressure Distribution Systems for natural gas are well known for their professional design, quality and reliability.*

## Components

BAUER uses only new, high quality components that are designed specifically for use with natural gas. All BAUER High Pressure Distribution Systems for NGV refueling are designed in compliance to nationally recognized standards and guidelines for high pressure natural gas compressor packages. We maintain a complete inventory of high pressure tubing, tube fittings, instrument pipe fittings, valves, gauges, regulators and other miscellaneous components. Our design staff carefully reviews each application to ensure meeting or exceeding customer requirements. BAUER pays particular attention to safety, so every distribution system includes a safety relief valve.

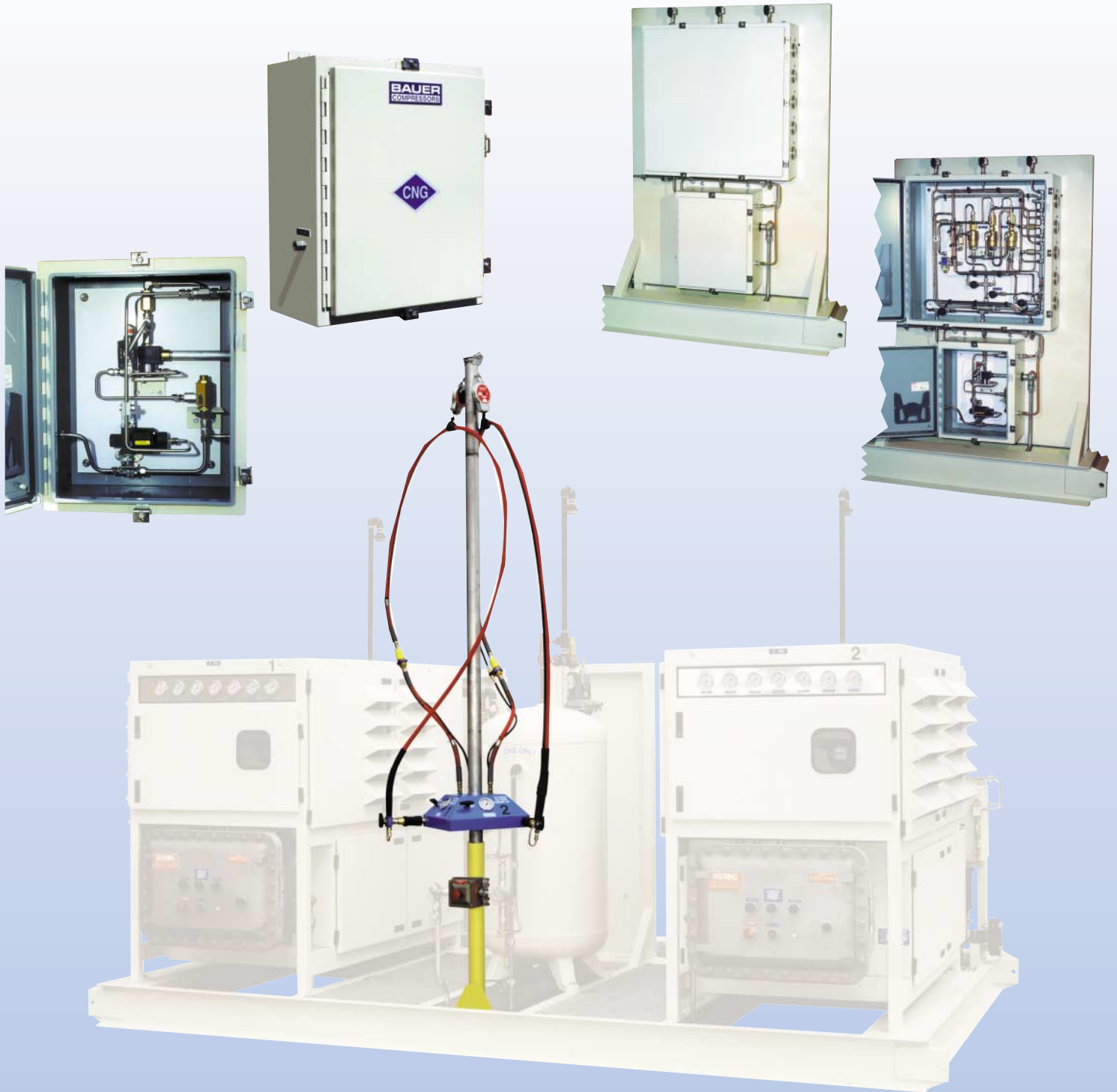


## Hose and Tubing

BAUER recommends the use of stainless steel tubing for all permanent high pressure connections. For temporary installations or where flexibility is required, high pressure hose can be used with suitable end connections. The use of hose should be limited to clean, noncorrosive environments and where it is possible to inspect the hose regularly for deterioration. BAUER recommends replacing all high pressure hoses annually or as recommended by the hose manufacturer. Hoses must be replaced immediately if wear or deterioration is evident or suspected.

- Vapor Recovery Systems
- Dome Loaded Regulator Panels
- Emergency Shutoff Valve Panels
- Pneumatic Priority/Sequential Panels
- Electronic Priority/Sequential Panels
- PLC Based Station Controllers
- Fill Posts
- Metered Dispensers
- High Pressure Piping Components

# Stand-Alone or Skid Mounted



## of High Pressure Natural Gas



## Who to Contact

**BAUER can answer your questions pertaining to the planning and installation of a NGV refueling station, including questions specific to the requirements of NFPA 52.\***

*Refer to the latest edition of NFPA 52, Compressed Natural Gas (CNG) Vehicular Fuel Systems Code published by the National Fire Protection Association (NFPA). NFPA 52 applies to the design and installation of compressed natural gas (CNG) engine fuel systems on vehicles of all types, including original equipment manufacturers (OEM) and vehicle converters, and to compressed natural gas vehicle (NGV) refueling stations.*

- ☐ Contact the National Fire Protection Agency at [www.nfpa.org](http://www.nfpa.org) to purchase the latest edition of NFPA 52

*Identify and contact the Authority(s) Having Jurisdiction (AHJ) for the location of the refueling station and others who can provide assistance. Ascertain which local, county, state and federal codes and standards will be applicable.*

### Contact:

- ☐ Fire Marshall
- ☐ Zoning Board
- ☐ Electrical Inspector
- ☐ Building Inspector
- ☐ Other \_\_\_\_\_

### Contact the local gas utility.

- ☐ Confirm that gas is already at or available at the site and the gas pressure(s) available
- ☐ Confirm if the gas supply is from a gas utility and of pipeline quality, or if it is from a well. If well gas, ask for a gas analysis
- ☐ Confirm the quality of the gas, including moisture content
- ☐ Confirm if the existing gas line can support the gas demand of the station

### Contact the local electric utility.

- ☐ Confirm that power is already at or available at the site and the voltage(s) available
- ☐ Confirm if the existing power supply can support the electrical demand of the station

### Contact local contractors with experience in installing NGV refueling stations.

- ☐ Visit the planned site with a qualified contractor, AHJs and the BAUER Representative
- ☐ Inspect the planned site for suitability of installing a NGV refueling station. Use NFPA 52 as a guideline.

\*BAUER has held a position on the NFPA Technical Committee Vehicular Alternative Fuel Systems since 1995.

# Refueling Station

## Questions to Ask

*Contact **BAUER** to review the refueling needs of your fleet.*

- ☐ Describe the fleet (e.g. cars, pickups, vans, forklifts, school buses, courier service, municipal, utility, small transit bus/van, large transit bus, etc.)
- ☐ Confirm the size of the NGV fleet that will refuel at the station
- ☐ Confirm the fleet's current fuel type
- ☐ Confirm the fleet's daily, monthly or annual fuel consumption
- ☐ Confirm the fleet's current refueling schedule
- ☐ Confirm if any of the data will change for the NGV fleet
- ☐ Confirm the fill pressure(s) for the NGV fleet
- ☐ Confirm if the fleet will fill overnight (*slow fill*) or fast fill from storage or a combination of both overnight refueling and fast filling
- ☐ Describe the location of the planned refueling station in terms of ambient temperature extremes
- ☐ Describe the location of the planned refueling station in terms of its immediate surroundings (e.g. *city/town with businesses located nearby, residential, industrial park with other businesses close by, private property with no noise limitations, etc.*)
- ☐ Confirm if the station will be for a private fleet, public refueling or both

*Contact Clean Cities. The U.S. Department of Energy's Clean Cities Program supports public-private partnerships that deploy alternative fuel vehicles and build supporting alternative fuel infrastructure. Clean Cities can provide information about local Clean Cities Coalitions and clean corridors, alternative fuel news and events, fleet success stories, support and **funding**, tips for starting a coalition in your area, available alternative fuel vehicles and more.*

- ☐ Contact Clean Cities at [www.ccities.doe.gov](http://www.ccities.doe.gov)

### NOTES:

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**Models 100 thru 150 Series**  
Standard Package Design  
*Shown with Optional Enclosure*

- **Designed in Compliance to NFPA 52 and ANSI NGV 4.8**
- **U.L. Listed Electrical Panel on Compressors with Electric Motor**



**Models 100 thru 150 Series**  
New CNS Style Package Design  
*Shown with Optional Enclosure*

- **Simplicity of Design**
- **Quality Standards to ISO 9001**
- **Quality Design and Craftsmanship**



**Models 100 thru 150 Series - Skid Mounted**  
In-Line Style Simplex Skid Design  
*Shown with Optional Enclosure for Compressor,  
Vapor Recovery System and Pneumatic  
Priority and Sequential Panel (3 banks, 2 independent fast fill)*



# By Fleets Worldwide



**Models 100 thru 150 Series - Skid Mounted**  
 In-Line Style Simplex Skid Design

*Shown with Optional Enclosure for Compressor,  
 Vapor Recovery System and High Pressure Dryer*

• **Factory Packaging**

• **Factory Testing**

• **Factory Warranty**



**Models 100 thru 150 Series - Skid Mounted**  
 Modified Enhanced Simplex Skid

*Shown with Optional Compressor Enclosure, Vapor Recovery System,  
 Electronic Priority and Sequential Panel (3 banks, 2 independent fast fill)  
 and Provision for a Small ASME 3-Pack and a Bolt-On Metered  
 Dispenser Island*

• **Versatile Designs for  
 One or Two Compressors**



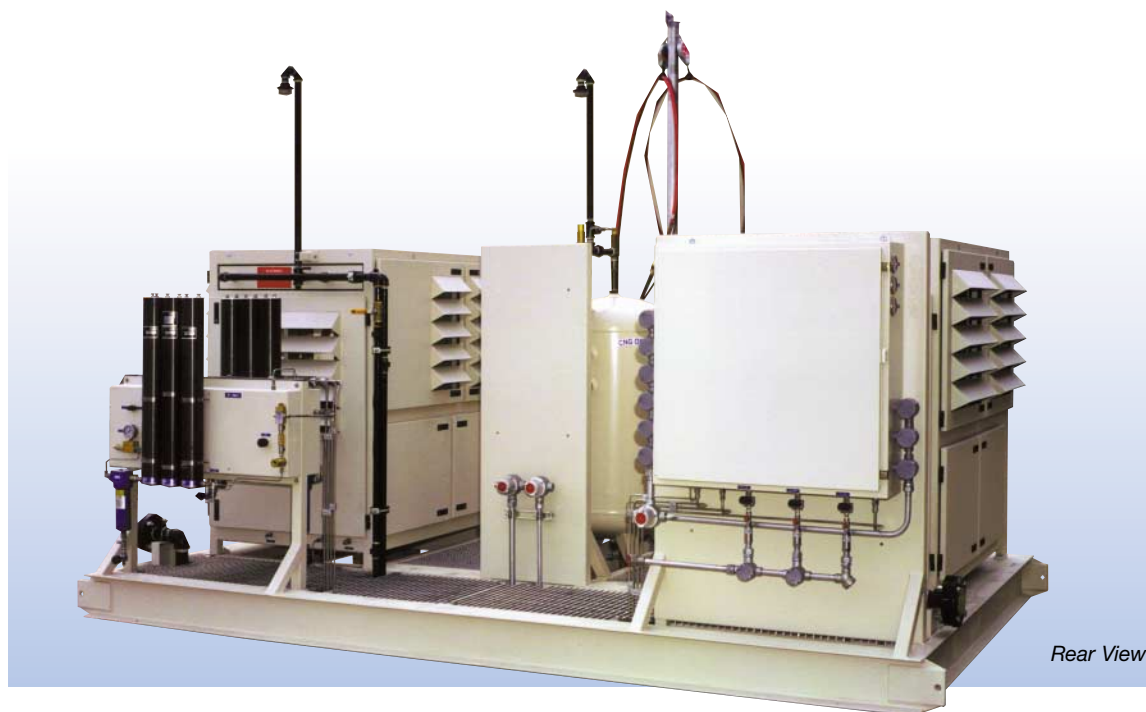
**Models 220 and 230 Series - Skid Mounted**  
 Duplex Style Skid Shown with One Compressor  
 with Room for an Additional Compressor

*Shown with Optional Compressor Enclosure, Automatic Lead-Lag Compressor  
 Controller with Alternation, Pneumatic Priority and Sequential Panel (3 banks, 1 fast fill)  
 and Vapor Recovery System Sized for Both Compressors*



## **Models 100 thru 150 Series - Skid Mounted** Duplex Skid Shown with Two Compressors

*Shown with Optional Compressor Enclosures, Closed-Loop Vapor Recovery System, One High Pressure Dryer for Each Compressor, Electronic Priority and Sequential Panel (3 banks, 2 independent fast fill) and 2-Hose Fill Post with a Separate Gas Inlet for Each Hose*



# By Fleets Worldwide

- **Easy Access for Inspection and Maintenance**
- **Reduce Installation Costs**
- **Available with Remote Monitoring Capabilities**



**Model C280**  
Trailer Mounted  
*Trailer Mounted Natural Gas Engine Driven Natural Gas Compressor Package Shown without Enclosure*



**Model 150 Series - Engine Driven**  
*Fully Enclosed Natural Gas Engine Driven Natural Gas Compressor Package – Includes a Closed-Loop Vapor Recovery System within the Enclosure*

- **More Choices!**
- **Better Solutions!**

**...from the Manufacturer  
who is the Packager**



**Model C280**  
Trailer Mounted  
*Trailer Mounted Natural Gas Engine Driven Natural Gas Compressor Package Shown with Enclosure*



# **Products and Services**

*from the Air and Gas Experts*

- ***High Pressure Natural Gas Compressors and Accessories for Natural Gas Vehicle Refueling***
- ***Medium and High Pressure Air Compressors and Accessories for Industrial Applications***
- ***High Pressure Compressors and Accessories for Inert Gases***
- ***High Pressure Compressors and Accessories for Plastics Technology***
- ***High Pressure Compressors and Accessories for Breathing Air***
- ***Adsorption Dryers***
- ***Storage Systems***
- ***Distribution Panels***
- ***Training and Service***

The equipment advertised herein is not suitable for breathing air. To be suitable for breathing air a compressor must include, at a minimum, a purification system that is designed specifically to purify compressed air to meet all recognized standards for breathing air and be suitably labeled for such use. In the absence of such a purification system and labeling, the compressor shall be considered unsuitable for breathing air. If a compressor that does not include a breathing air purification system and labeling is used by the Purchaser and/or User for breathing air, the Purchaser/User assumes all liability resulting therefrom without any responsibility or liability assumed by Bauer Compressors, Inc.

The Purchaser/User should include the above statement in their terms of sale for any resale of the compressor.

**Disclaimer:** Bauer Compressors, Inc. continuously reviews their products' design and performance to better to serve our customer's needs. Therefore, information contained herein is subject to modification without notice or obligation.

Products contained herein are subject to the standard terms and conditions of sale and warranty of Bauer Compressors, Inc.  
A copy of the standard terms and conditions of sale and warranty are available on request.



**BAUER COMPRESSORS, INC.**  
Norfolk, Virginia is registered to ISO 9001:2000

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