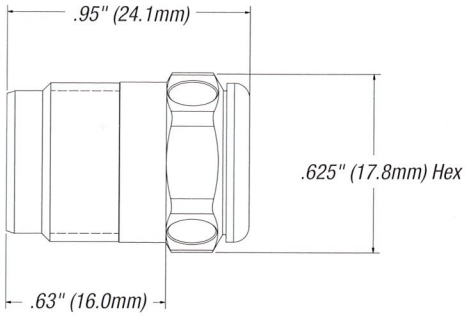
Pressure Relief Devices



P625-19X9-XXX

Ordering Information

Pressure Relief Device				Cylinder Working Pressure			Disc Rupture Range PSI @ 160° F	
CG-1 Frangible Disc No Fuse Metal	CG-4 * Frangible Disc 165° F Fuse Metal	CG-5 * Frangible Disc 212° F Fuse Metal	-XX	D.O.T. Spec 3A 3AA 3AL Cylinders PSI	D.O.T. Exemption Cylinders PSI	International Cylinders Bar	Min.	Max.
GV Low Pressure								
P625-19N9-26	P625-19C9-26M	P625-19C9-26W	-26	1665	—	—	2500	2775
P625-19N9-28	P625-19C9-28M	P625-19C9-28W	-28	1800	—	—	2700	3000
P625-19N9-32	P625-19C9-32M	P625-19C9-32W	-32	2015	—	—	3025	3360
P625-19N9-35	P625-19C9-35M	P625-19C9-35W	-35	2265	—	—	3400	3775
P625-19N9-38	P625-19C9-38M	P625-19C9-38W	-38	2400	—	—	3600	4000
P625-19N9-39	P625-19C9-39M	P625-19C9-39W	-39	—	—	200	3915	4350
P625-19N9-43	P625-19C9-43M	P625-19C9-43W	-43	2670	—	—	4005	4450
P625-19N9-46	P625-19C9-46M	P625-19C9-46W	-46	2900	—	—	4350	4833
P625-19N9-47	P625-19C9-47M	P625-19C9-47W	-47	2950	—	—	4425	4917
GVHM High Pressure								
P625-19N9H-48	—	P625-19C9H-48W	-48	3000	—	230	4500	5000
P625-19N9H-55	—	P625-19C9H-55W	-55	3500/3600	—	—	5250	5833
P625-19N9H-63	—	P625-19C9H-63W	-63	4000	—	—	6000	6665
P625-19N9H-65	—	P625-19C9H-65W	-65	—	4500	300	6075	6750
P625-19N9H-71	—	P625-19C9H-71W	-71	—	5000	—	6750	7500
P625-19N9H-78	—	P625-19C9H-78W	-78	5000	—	—	7500	8333
P625-19N9H-85	—	P625-19C9H-85W	-85	—	6000	—	8100	9000
P625-19N9H-95	—	P625-19C9H-95W	-95	6000	—	—	9000	10,000

** Copper disc must be used for hydrogen service.*

Pressure relief devices come standard with a copper disc. For nickel disc option with CG-4 and CG-5, use an "N" in place of the "C" in the part number.

For chrome-plated CG1 PRDs, add "1" before Part Number. For example, P625-19N9H-XX becomes 1-P625-19N9H-XX.

Pressure Relief Devices Technical Information

Almost all compressed gas containers are fitted with pressure relief devices. A pressure relief device is a pressure- and/or temperature-activated device used to prevent the pressure from rising above a predetermined maximum, and thereby prevent rupture of a normally charged cylinder when subjected to a standard fire test as required by Title 49 of the U.S. Code of Federal Regulations (49CFR 173.34(d)), or equivalent regulations of Transport Canada.

The Compressed Gas Association, in pamphlet CGA S-1.1, has classified pressure relief devices according to type using the letter designation CG followed by a numeral. Each of these types described are in the following subsections (reference CGA S-1.1).

Type CG-1 (Pressure Relief Rupture Disk)

A rupture disk (synonymous with the name burst disk within the industry) is a pressure-operated device which affords protection against development of excessive pressure in cylinders. This device is designed to sense excess pressure in a cylinder and will function when the cylinder is of sufficient magnitude to cause the rupture or bursting of the rupture disk element, thereby venting the contents of the cylinder. The rupturing of the rupture disk element results in a non-reclosing orifice.

Rupture disk devices installed on compressed gas cylinders may be either an integral part of the cylinder valve assembly or may be installed on the cylinder as an independent attachment. The materials of construction selected must be compatible with the fluid in the cylinder as well as the cylinder valve materials with which the rupture disk device comes in contact in order to minimize corrosion.

One of the most common types of rupture disk devices consists of a gasket and a rupture disk and a rupture disk holder. These components are only supplied as factory-assembled devices designed to be replaced as a unit.

The gasket is the part which provides the proper seal to prevent leakage of the cylinder contents past the rupture disk assembly and may be constructed of metallic or nonmetallic materials.

The rupture disk is the operating part of the pressure relief device and, when installed in a proper rupture disk holder, is designed to burst at a predetermined pressure to permit discharge of the cylinder contents. Such disks are usually made of metallic materials and may be of flat, preformed, reinforced, grooved or scored construction. Nonmetallic materials are also used for specific applications.

The rupture disk holder is the part of the pressure relief device which contains the opening, against which the rupture disk mates. The rupture disk holder usually also contains the discharge porting or passages, beyond the operating parts of the device, through which fluid must pass to reach the atmosphere. In many cases, the discharge holder is provided with radial vent holes through which the fluid in the cylinder vents to the atmosphere. This radical discharge design provides an anti-recoil feature, which minimizes rocketing of compressed gas cylinders during discharge of the contents through the pressure relief device. Other types of discharge ports may also be provided in rupture disk holders to suit specific application requirements.

Most rupture disk devices are designed with holders having either sharp-edged or radius-edged orifices to which the rupture disk mates. The sharp-edged orifice produces a shear-type actuation mode whereby the disk ruptures in shear, producing a characteristic leaf-type configuration after functioning.

The radius-edged orifice produces a tension-type actuation made whereby the disc stretches over the radius-edge. This thins the center of the disc until it can no longer hold the pressure. This type of rupture produces a characteristic rose petal configuration after functioning.

Since the actuation modes of each type of holder described above are completely different, it is important that only original manufacturer's assemblies be used in the replacement of rupture disk devices.

⚠ WARNING The pressure relief rupture disk device is a primary safety component and hence the following precautions should be noted and adhered to:

A. Only trained personnel should be permitted to service pressure relief devices

B. Tightening of the rupture disk assembly to the cylinder valve or to the cylinder itself should be in accordance with the manufacturer's instructions. Tightening to a torque less than the manufacturer's recommendations may result in a leaking device or a device that may rupture at a lower pressure than specified. Conversely, over tightening can also result in disk actuation at a lower pressure than specified due to excessive twisting action, which may create wrinkles or distortions in the disk, which may cause premature failure of the disk and inadvertent release of the pressure contents. Either of these premature releases could cause serious injury or death.

⚠ WARNING Components of devices designed to rupture in shear are very similar in appearance to those designed to rupture in tension but are not interchangeable because they have completely different modes of actuation. If components are inadvertently interchanged, i.e. a disk designed to rupture in shear is installed in a rupture disk holder designed to rupture in tension, a serious cylinder failure incident could result that could lead to loss of life due to the significant increase in pressure required to rupture the disk. Conversely if a disk designed to rupture in tension is installed in a rupture disk holder designed to rupture in shear, premature rupture could occur with complete loss of contents due to significant reduction in rupture pressure of the disk. That may lead to fire, personal injury or death.

Limitations

A rupture disk is a pressure-operated device which affords protection against excessive pressure. It protects against excessive pressure when the properties of the gas, cylinder design, and percentage of charge in the cylinder are such that exposure to excessively high temperatures will cause an increase in internal pressure sufficient to actuate the rupture disk

Pressure Relief Devices Technical Information

before the cylinder loses its integrity and weakens. The rupture disk also protects against excessive pressure due to improper charging practices such as overfilling.

A rupture disk is a non-reclosing device. Once the disk has ruptured, there is no way to prevent the complete release of the contents of the cylinder.

This device does not provide good protection against pressures caused by exposure to excessively high temperatures when the cylinder is only partially charged. The pressure rise may not be sufficient to actuate the rupture disk before the cylinder loses its integrity and weakens.

Consideration should be given to environmental conditions to which the cylinder may be exposed. Severely corrosive atmospheres may contribute to premature rupture of the disk. To prevent corrosion of the rupture disk, care must be taken to select materials of construction that do not interact with either the contents of the cylinder or the anticipated environmental conditions.

Type CG-2 and CG-3 (Fusible Plugs)

A fusible plug is a thermally operated pressure relief device which affords protection against excessive pressure developed by exposure to excessive heat. Once sufficient heat melts the fusible alloy, the entire contents of the cylinder will be vented. The CG-2 fusible alloy has a nominal melt temperature of 165˚ F (73.9˚ C); the CG-3 fusible metal has a nominal melt temperature of 212˚ F (100˚ C).

Fusible plugs can be installed on the cylinder as independent devices or fusible alloy can be cast directly into a suitable orifice in the cylinder valve body. In some cases, a fusible plug may be installed as a separate device into the cylinder valve body.

⚠ WARNING No attempt should be made to repair fusible plug devices. They are not repairable and attempts to repair will destroy the integrity of the fusible alloy causing leakage of gases that may lead to fire, personal injury or death.

Limitations:

Since the fusible plus is a thermally operated device, it is designed to function only when the fusible metal melts out. Hence, it does not protect against over pressure from improper charging practices. Sufficient heat to melt the fusible alloy is necessary for proper functioning of this type of device. Therefore, the location of such devices is an important consideration. Industry practice limits the application of these style fusible plugs to cylinders with 500 psig (3447 kPa) service pressure or less to minimize the possibility of cold flow or extrusion of the fusible alloy. A fusible device is a nonreclosing devices and when it functions, it releases the entire contents of the cylinder.

Type CG-4 and CG-5 (Combination Rupture Disk/Fusible Plug)

A combination rupture disk/fusible plug pressure relief device requires both excessive pressure and excessive temperature to cause it to operate. Sufficient heat is required to first melt out the fusible metal, after which the device will afford the same protection as the CG-1 rupture disk device.

The CG-4 combination device has fusible alloy with a nominal melt temperature of 165˚ F (73.9˚ C). The CG-5 combination device has fusible alloy with a nominal melt temperature of 212˚ F (100˚ C).

In this type of device, the rupture disk portion (CG-1) is directly exposed to the internal cylinder pressure, and so it is directly upstream of the fusible metal. In general, the same components that make up the CG-1 device are used and the vent portion or downstream side of the rupture disk is thus reinforced against rupturing by the fusible alloy, and the fusible alloy is reinforce against extrusion by the rupture disk.

NOTE: The same precautions noted for CG-1 devices should be adhered to for CG-4 and CG-5 device. See previous warnings.

Limitations:

CG-4 and CG-5 combination devices function only in the presence of both excessive heat and excessive pressure, and sufficient heat must be present first to melt the fusible metal. Therefore, this device does not offer protection against over pressure from improper charging practices.

Type CG-7 (Pressure Relief Valves)

A pressure relief valve is a spring-loaded pressure-operated device designed to relieve excessive cylinder pressure, reclose, and reseal to prevent further release of product from the cylinder after excessive pressure is removed and valve resealing pressure has been achieved.

The primary advantage of using the pressure relief valve is that functioning of this type of device may not release all of the contents of the cylinder but is designed to reseal after resealing pressure has been achieved. This characteristic, in fire conditions, will minimize feeding the fire in the case of flammable or combustible cylinder contents.

Limitations:

Pressure relief valves are designed to maintain the pressure in the cylinder at a limit as determined by the spring force. Therefore, such devices do not protect the cylinder against possible rupture when continued application of external heat or direct flame impingement weakens the cylinder wall to the point where its rupture pressure is less than the operating pressure of the relief valve.

If you require assistance in selecting a Pressure Relief or Safety device for a specific application, please contact Sherwood Customer Service at 888-508-2583 with the following information: Part number of the valve assembly being repaired, if applicable; Type of gas service in which cylinder will be used; and service or test pressure of the cylinder.

Pressure Relief Device Numbering Matrix: Unitized Plug Series

1	-	P625	X	-	19	X	X	9	XX	-	XX	X	X

Surface Finish

(BLANK)	=	No Plating
1	=	Chrome Plating

Thread Diameter

P625

Material

(BLANK)	=	Brass
M	=	Monel
S	=	316L SS

Pitch

19

Country

(BLANK)	=	None
E	=	European

Safety Disc

(BLANK)	=	None
C	=	Copper
N	=	Nickel

Type

(BLANK)	=	None
FL	=	Flare
H	=	High Pressure

Burst Pressure

18	=	2000 Max. PSI
22	=	2400 Max. PSI
26	=	2775 Max. PSI
27	=	2900 Max. PSI
28	=	3000 Max. PSI
32	=	3360 Max. PSI
35	=	3775 Max. PSI
38	=	4000 Max. PSI
39	=	4351 Max. PSI
43	=	4450 Max. PSI
46	=	4833 Max. PSI
47	=	4917 Max. PSI
48	=	5000 Max. PSI
55	=	5833 Max. PSI
63	=	6665 Max. PSI
65	=	6750 Max. PSI
78	=	8333 Max. PSI
85	=	9000 Max. PSI
95	=	10,000 Max. PSI
190	=	190 Bar
216	=	216 Bar
250	=	250 Bar
270	=	270 Bar
300	=	300 Bar

Cleaned for Oxygen Service

(BLANK)	=	None
B	=	Cleaned and Bagged

Fuse Metal

(BLANK)	=	None
H	=	255° F
M	=	165° F
W	=	212° F