PYROGEN

PYROINERT FIRE SUPPRESSION SYSTEM

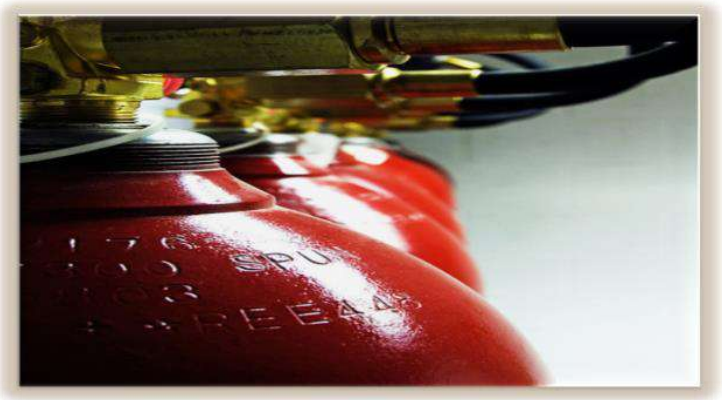
PRODUCT DATA SHEET

PYROinert

IG-541 INERT GAS FIRE SUPPRESSION SYSTEM

Overview:

PYROinert IG-541 comprises of gasses naturally available in the atmosphere with a composition of 50% Nitrogen, 42% Argon and 8% Carbon Dioxide. It has zero environmental impact with Zero Ozone Depletion Potential and Zero Global Warming Potential. The agent is chemically inert, non-conductive, colourless and odourless and has roughly the density of air.



The added Carbon Dioxide in the PYROinert IG-541 agent stimulates the human body to breathe faster, thus assisting the uptake of Oxygen. This may reduce the effects of lowered oxygen levels when personnel are inadvertently trapped in an enclosure with the agent deployed.

The agent is stored as a pressurised gas within seamless steel cylinders and is available at storage pressures of 200 Bar and 300 Bar. When discharged into a protected space, IG-541 is clear and does not obscure vision. It leaves no residue and has no heat related by-products.

PYROinert IG-541 Fire Suppression systems are based on the principle of reducing the oxygen concentration inside the protected hazard. The oxygen concentration is reduced to a level where combustion is no longer supported. Each system is pre-engineered so as to decrease oxygen to a specific level quickly and distributed uniformly within the enclosure, achieving design concentrations within 60 seconds.

Key Advantages of PYROinert:

- ***CLEAN***
- ***CHEMICALLY INERT***
- ***ENVIRONMENTALLY SAFE***
- ***ECONOMICAL REFILLING COSTS***
- ***300 Bar VERSATILLITY***

Applications of PYROinert:

PYROinert is very safe for use in occupied areas. During discharge, the visibility in the room would remain as normal and the discharged agent is non-toxic.

PYROinert is suitable for use in areas containing vital systems that support critical operations or high valued assets.

PYROGEN MANUFACTURING SDN. BHD.

PYROINERT FIRE SUPPRESSION SYSTEM

PRODUCT DATA SHEET

Specifications:

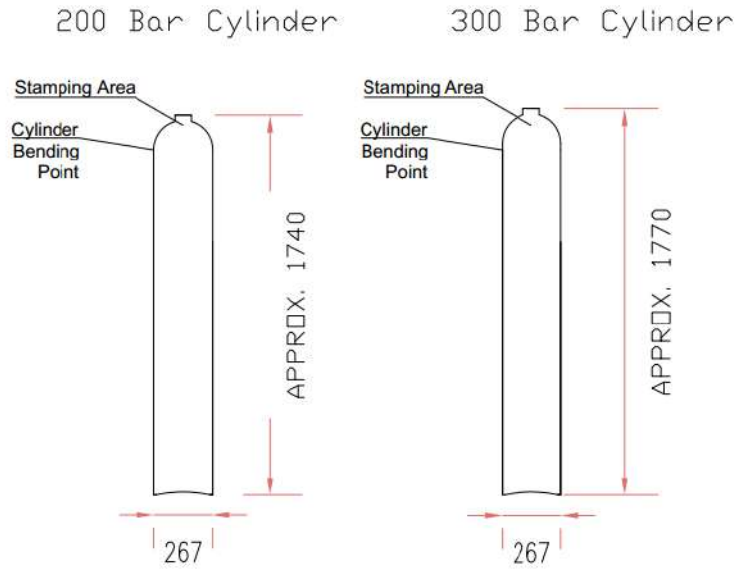
1.	**Model designation**	PYROinert IG-541 200Bar	PYROinert IG-541 **300**Bar
2.	**Storage Pressure**	**200 Bar (80L Cyl.)**	**300 Bar (80L Cyl.)**
3.	**Agent Type**	**IG-541**	
4.	**Agent Formula**	**Blend of 52% Nitrogen, 40% Argon & 8% Carbon Dioxide**	
5.	**Molecular Weight**	**34.0**	
6.	**Boiling point at 1.013 Bar**	**-196°C**	
7.	**NOAEL**	**43%**	
8.	**LOAEL**	**52%**	
9.	**Exposure Limitations (Normally Occupied Spaces)**	**Design Concentration (Oxygen Levels)**	**Maximum Exposure Time**
		up to 43% (12% minimum)	**5 mins.**
		43% to 52% (12% to 10%)	**3 mins.**
10.	**Approvals**	**VdS Germany**	
11.	**Compliance**	**NFPA 2001 & ISO 14520**	

*** Refer to the PYROinert Inert Gas Fire Suppression System - Design, Operation and Maintenance Manual for further details and Information.**

CYLINDER

General Description:

The high pressure seamless cylinders are designed to store highly pressurised gases (mixtures of Nitrogen, Argon and Carbon Dioxide) for PYROGEN® PYROINERT Fire Suppression System. The pressurised gases are secured by the means of cylinder valve. During release, the gases will be discharged through the cylinder valve into a manifold.



Specification:

1.	**Model designation**	**IGS-CY-200**	**IGS-CY-300**
2.	**Material**	**34CrMo**	**34CrMo4**
3.	**Water Capacity**	**80 L**	
4.	**Neck Thread**	**25 E**	
5.	**Filling pressure**	**200 bar**	**300 bar**
6.	**Test Pressure**	**300 bar**	**450 bar**
7.	**Filling contents**	**IG-01 –** 100% Argon**; IG-100 –** 100% Nitrogen**; IG-55 –** 50% Nitrogen & 50% Argon**; IG-541 –** 52% Nitrogen, 40% Argon & 8% Carbon Dioxide	
8.	**Compliance**	**DOT 3AA/ TPED 1999/36/CS or other International Standard**	

CYLINDER BRACKET

General Description:

The **PYROGEN PYROINERT** Fire Suppression System **cylinder bracket** is installed to secure the cylinders to a concrete/ bricked wall. The cylinder brackets are hot dip galvanized to provide corrosion resistance for long service life. The cylinder bracket and rail can be configured for single row and double row configurations.

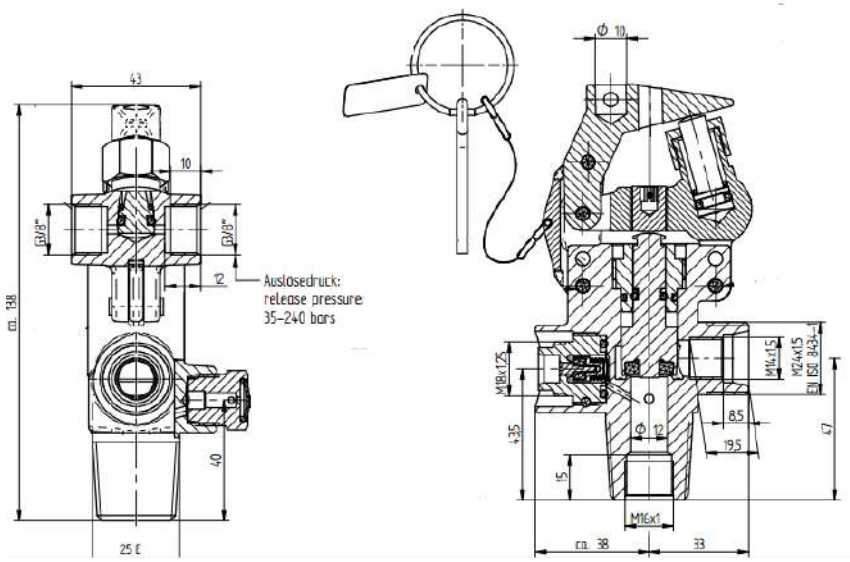
Specification:

1.	**Material**	**Steel, Hot Dip Galvanised**
2.	**Wall-Plugs**	**M8/ M10 Wall plugs**

QUICK RELEASE VALVE / CYLINDER VALVE

General Description:

PYROGEN® PYROinert uses the **VTI Quick Release Valve Series K85** as cylinder valve. The quick release valve's working pressure is 200/ 300 Bar. The valve can be released mechanically, electrically or pneumatically. All valves in any PYROGEN® PYROINERT system allocated for a zone are interconnected by using the pilot hose in order to have immediate release. Each valve is equipped with a pressure gauge to monitor the pressure of the extinguishing agent. Bursting device is fitted to all valves to indicate if a pressure operated release has taken place. The bursting device also acts as a pressure relief to prevent pressure build-up in case of a minor leak in the cylinder.



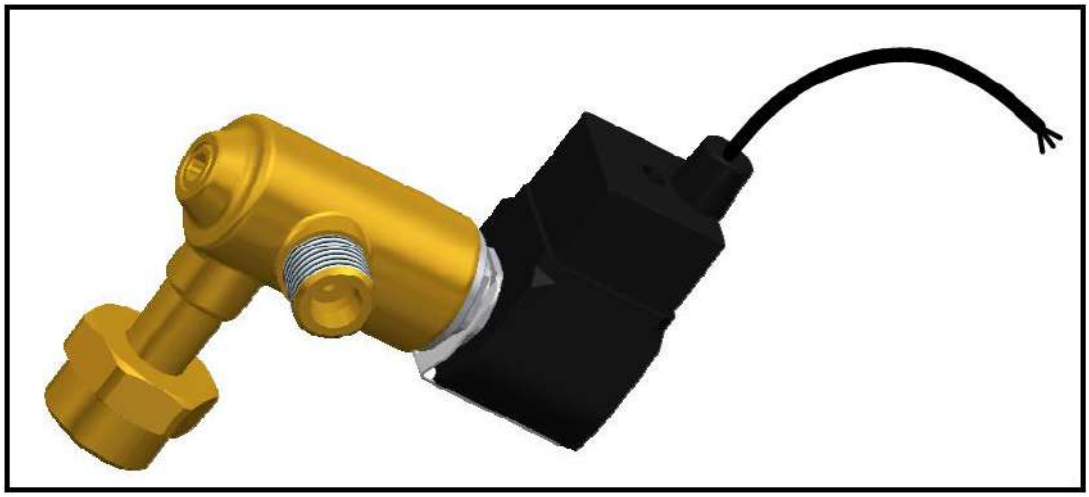
Specification:

1.	**Max. Working Pressure**	**360 Bar**
2.	**Actuation**	**Pneumatically & Electrically**
3.	**Pneumatic Release**	**35 – 240 Bar**
4.	**Working Temperature**	**-15°C to +50°C**
5.	**Connection**	**High Pressure Cylinder connection: 25E** **Discharge Hose connection: M24 x 1.5** **Pilot Hose connection: G3/8"**
6.	**Approval No.**	**VdS G392001**

ELECTROMAGNETIC RELEASE DEVICE

General Description:

The electromagnetic device is installed at the first cylinder valve/ master cylinder valve of an individual system. Extinguishing agent is released when the fire incident is detected by detection system and a continuous signal pulse (24V) is sent to trigger the electric pneumatic release unit.



Specification:

1.	**Max. Working Pressure**	**360 Bar**
2.	**Burst Test Pressure**	**1080 Bar**
3.	**Working Temperature**	**-20°C to +65°C**
4.	**Input Power**	**24V ± 10% DC**
5.	**Power connection**	**3m PVC cable (3 x 1mm)**
6.	**Material**	**Brass**

PRESSURE GAUGE

General Description:

A pressure gauge is installed in every cylinder valve to indicate the cylinder pressure. The value on the pressure gauge can be monitored periodically to check if the agent is leaking out of the cylinder.

Specification:

1.	**Material**	**:**	**Case: Plastic (Black) & NS 100: Steel (Black)** **Pointer: Plastic (Black)** **Window: Plastic, crystal clear, snap fitted in case**	
2.	**Max Working Pressure**	**:**	**400Bar**	
3.	**Scale Range**	**:**	**200 bar System**	**300 bar system**
			0 – 315 bar	**0 – 400 bar**
4.	**Temperature Range**	**:**	**-20°C to +60°C**	
5.	**Connection**	**:**	**¼ NPT**	
6.	**Approval**	**:**	**VdS G 308005**	

DISCHARGE HOSE

General Description:

The discharge hose is a synthetic rubber hose with 4 high tensile steel wires braids reinforcement. The discharge hose has a working pressure of 360 Bar for discharging the agent from valve discharge outlet to the manifold non-return valve. The bursting pressure of the discharge hose is 1,080 Bar.

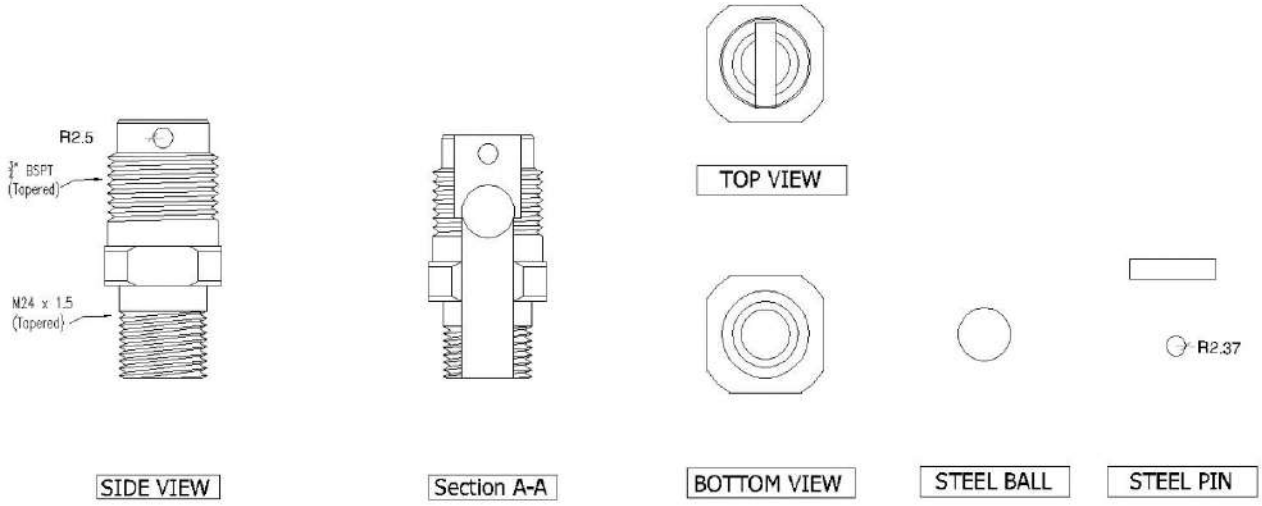
Specification:

1.	**Material**	**Synthetic Rubber Hose with 4 high tensile steel wire braids reinforcement**
2.	**Connection Material**	**Stainless Steel**
3.	**Max. Working Pressure**	**360 bar**
4.	**Bursting Pressure**	**1080 bar**
5.	**Temperature Range**	**-15°C to +50°C**
6.	**Hose Connection**	**Inlet Connection: M24 x 1.5** **Outlet Connection: M24 x 1.5**
7.	**Bend Radius**	**Max: 100mm**

CHECK VALVE

General Description:

The **PYROGEN PYROINERT** Fire Suppression System **check valve** is a joint between the discharge hose and the manifold. The function of the check valve is to prevent reverse flow of the extinguishing agent. This means that loss of gas is prevented should the system discharge. It also provides an increased level of human safety.



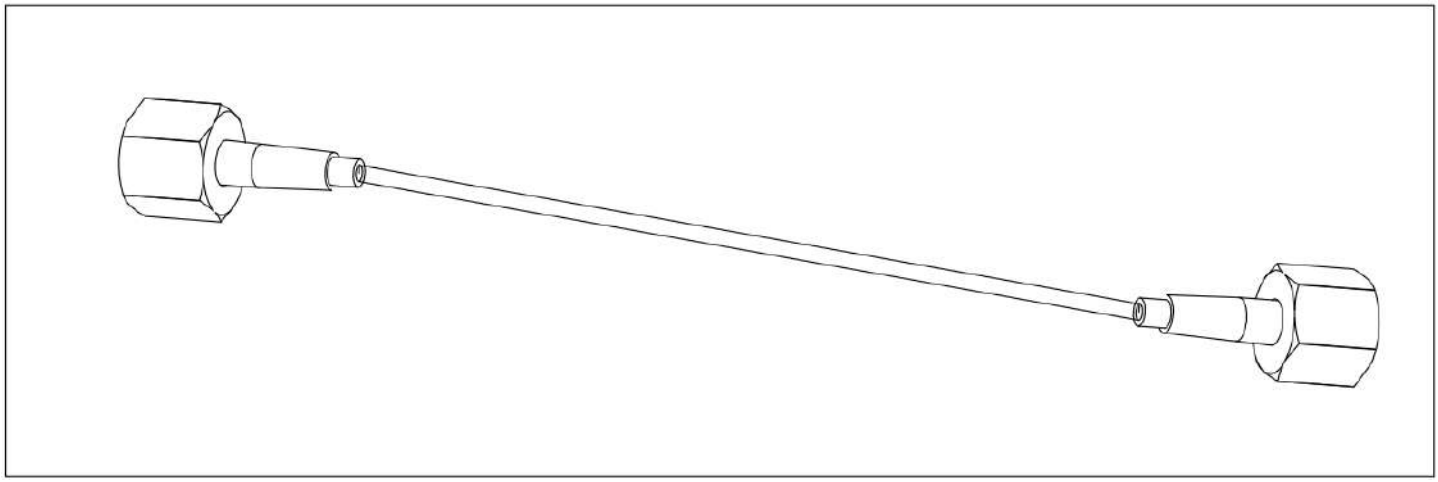
Specification:

1.	**Material**	**Body: Brass (Cu Zn 40 P B 2)** **Ball: Stainless Steel** **Pin: Stainless Steel**
2.	**Max Working Pressure**	**360 bar**
3.	**Temperature Range**	**-15°C to +50°C**
4.	**Hose connection**	**Manifold connection: ¾" BSPT** **Discharge Hose connection: M24 x 1.5**

PILOT HOSE

General Description:

A cylinder outlet containing a single operating valve with a screwed in throttle connected by means of a flexible hydraulic hose with two end fitting G3/8". This is then connected to a further cylinder outlet onto the next valve and so on. The screw plug have a gas pressure release throttle screwed into the outlet on the last valve.



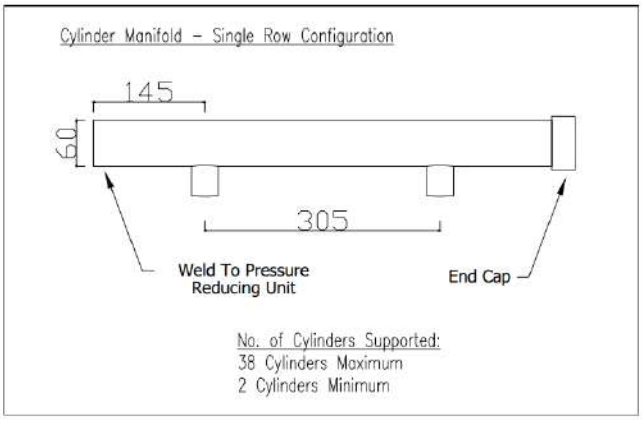
Specification:

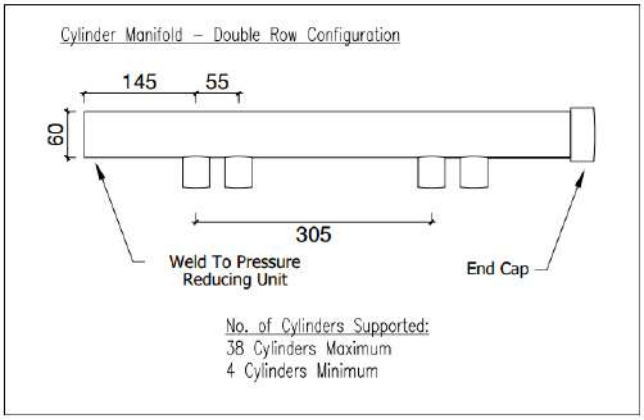
1.	**Material**	**Synthetic Rubber Hose with high tensile steel braids reinforcement**
2.	**Nominal Size**	**DN2**
3.	**Max. Working Pressure**	**360 Bar**
4.	**Bursting Pressure**	**1,900 Bar**
5.	**Bending Radius**	**20mm**
6.	**Inner Diameter**	**2mm**
7.	**Outer Diameter**	**5mm**
8.	**Working Temperature**	**-35°C to +100°C**
9.	**Hose Connection**	**M16 x 1.5**
10.	**Approval No.**	**VdS G315018**

DISCHARGE MANIFOLD (SINGLE ROW & DOUBLE ROW)

General Description:

The manifold is the means of connecting all the cylinders together for connection to the downstream piping. The working pressure of the manifold are 200/300 Bar. Schedule 160 Black Pipe or higher are used to manufacture the manifold. Manifold for single row and double row are manufactured based on the system requirement. At the end of the manifold is the pressure reduction unit which is to step-down the pressure from 200/ 300 Bar to ≤ 60 Bar.





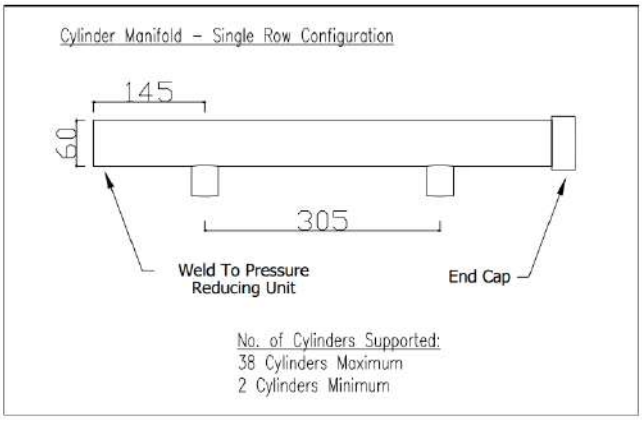
Specification:

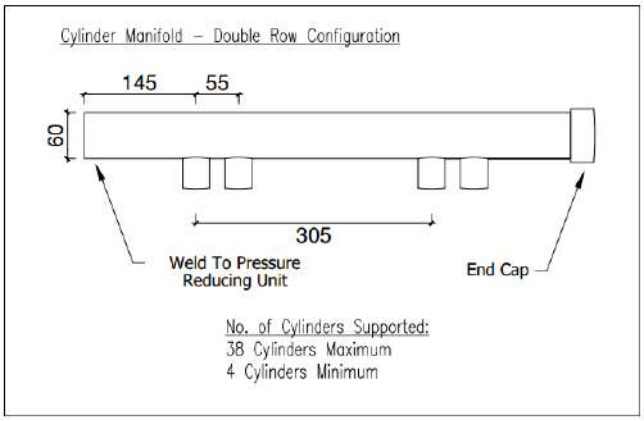
1.	**Material**	**2" Sch. 160 ASTM A106B or API 5L seamless pipe (Hot Dip Galvanized)**
2.	**Max.Working Pressure**	**360 bar**
3.	**Check Valve Connection**	**¾" BSPT**
4.	**Test Pressure**	**1080 bar**
5.	**Model Designation**	**IGS-MANI-SR (Single Row)** **IGS-MANI-DR (Double Row)**

DISCHARGE MANIFOLD (SINGLE ROW & DOUBLE ROW)

General Description:

The manifold is the means of connecting all the cylinders together for connection to the downstream piping. The working pressure of the manifold are 200/300 Bar. Schedule 160 Black Pipe or higher are used to manufacture the manifold. Manifold for single row and double row are manufactured based on the system requirement. At the end of the manifold is the pressure reduction unit which is to step-down the pressure from 200/ 300 Bar to ≤ 60 Bar.





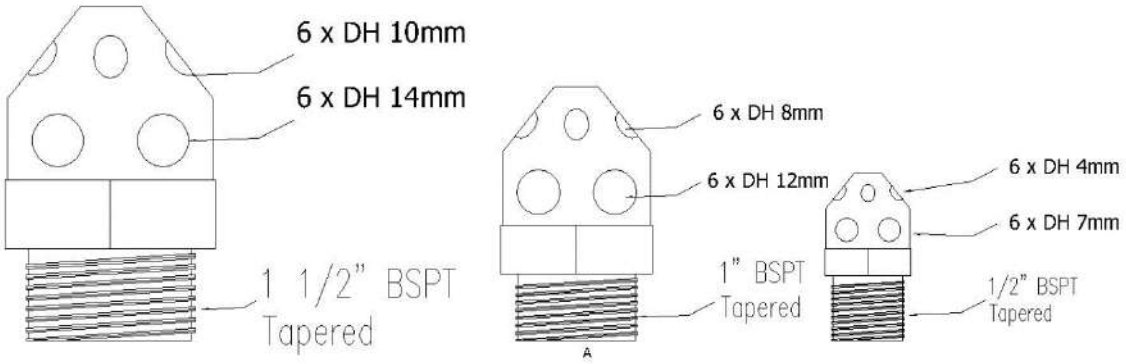
Specification:

1.	**Material**	**2" Sch. 160 ASTM A106B or API 5L seamless pipe (Hot Dip Galvanized)**
2.	**Max.Working Pressure**	**360 bar**
3.	**Check Valve Connection**	**¾" BSPT**
4.	**Test Pressure**	**1080 bar**
5.	**Model Designation**	**IGS-MANI-SR (Single Row)** **IGS-MANI-DR (Double Row)**

DISCHARGE NOZZLE

General Description:

The **PYROGEN PYROINERT** Fire Suppression System **discharge nozzle** is operated with multidirectional type for total flooding. The orifice plate is first decided with software calculation and drilled upon completion of the final design. The size of the orifice is individually marked/ stamped onto the nozzle for the ease of inspection.



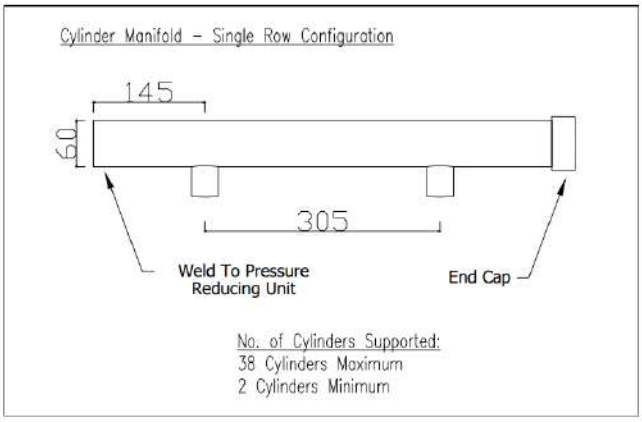
Specification:

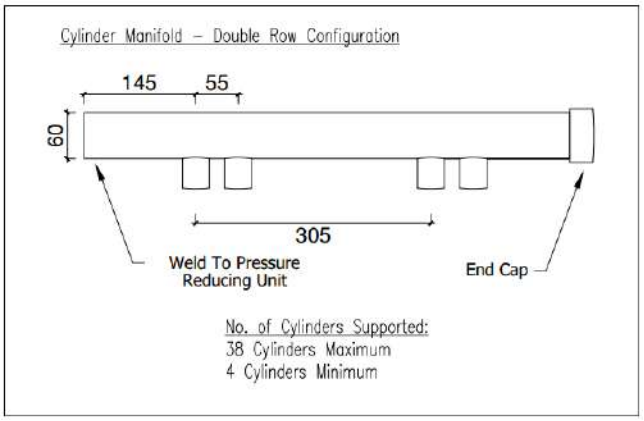
1.	**Material**	**a) Body: Brass** **b) Orifice Plate: Brass**
2.	**Working Pressure**	**a) Maximum: 60 Bar** **b) Minimum: 20 Bar**
3.	**Nozzle Connection**	**a) Type ½": ½" BSP** **b) Type 1": 1" BSP** **c) Type 1 ½": 1 ½" BSP**
4.	**Available Orifice Diameters**	**a) Type ½": 3mm-10mm (in 1mm increments)** **b) Type 1": 10mm-18mm (in 1mm increments)** **c) Type 1 ½": 15mm-26mm (in 1mm increments)**

DISCHARGE MANIFOLD (SINGLE ROW & DOUBLE ROW)

General Description:

The manifold is the means of connecting all the cylinders together for connection to the downstream piping. The working pressure of the manifold is 360 Bar. Schedule 160 Black Pipe or higher are used to manufacture the manifold. Manifold for single row and double row are manufactured based on the system requirement. At the end of the manifold is the pressure reduction unit which is to step-down the pressure from 300 Bar to ≤ 60 Bar.





Specification:

1.	**Material**	**2" Sch. 160 ASTM A106B**
2.	**Max.Working Pressure**	**360 bar**
3.	**Check Valve Connection**	**¾" BSPT**
4.	**Test Pressure**	**1080 bar**
5.	**Model Designation**	**IGS-MANI-SR (Single Row)** **IGS-MANI-DR (Double Row)**

PRESSURE REDUCTION DEVICE

General Description:

The Pressure Reduction Device is used to step down the pressure of the Fire Suppression System IG-55 from 360 Bar to less than 60 Bar by means of orifice restriction. The orifice size is drilled according to the size determine by the computer software calculation. The unit will be supplied completely assembled with the orifice size stamped of the body.

The Pressure Reduction Devices orifice size is varies from 3mm to 35mm.

Features and Functions

1. Corrosion-resistant material:
   - Flange: Carbon Steel
   - Bolts: Stainless Steel
   - Orifice Plate: Brass-Alloy C3604
2. Working Pressure: 360 Bar
3. Pressure stepped down: below 60Bar by means of orifice restriction
4. Size of Orifice is based on system application. (In 0.5mm increment)

Technical Specification

Specification of Pressure Reducing Device		
1.	Material of Flange	Carbon Steel
2.	Material of Bolts	Stainless Steel
3.	Material of Orifice Plate	Brass-Alloy C3604
4.	Total Length	139mm
5.	Depth	136mm
6.	Inlet	Short pipe with 2” NPT male thread or weld DN50 Manifold
7.	Outlet	Short pipe with 2” NPT male connection
8.	Orifice Size	Min: 3mm (in 0.5mm increments) Max: 35mm (in 0.5mm increments)
9.	Max. Working Pressure	360 Bar