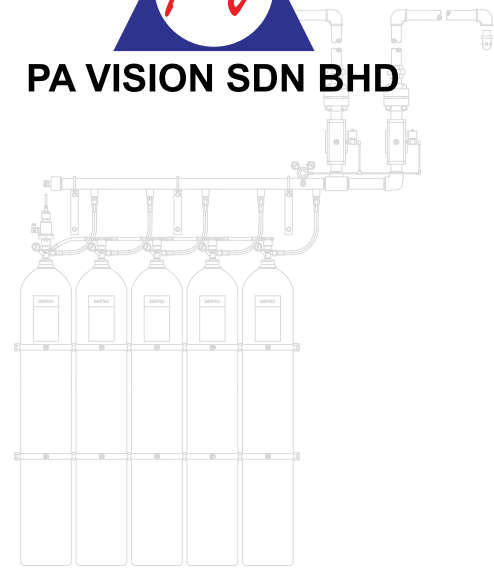


PA VISION SDN BHD

inertec[®]
FIRE SUPPRESSION SYSTEMS.
Nitrogen **100**



Switch to **GREEN** Nitrogen for
Safety, Low Refill Cost and
High Availability



SCHADENVERHÜTUNG
VdS Listed

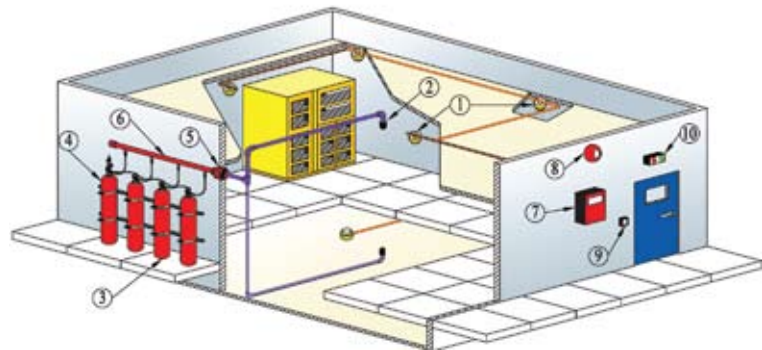
System Design and Operation

PA Vision **inertec 100** systems are designed, installed and maintained according to NFPA 2001 (Clean Agent Fire Extinguishing Systems and ISO 14520 Gaseous Fire Extinguishing Systems) standards.

inertec 100 is a total flooding system whereby the required amount of gas is discharged into an enclosed area to extinguish fire. The gas is stored as compressed gas at 200bar. The system can be actuated electrically from a control panel or manually from the cylinder bank, and the discharged gas pressure is reduced from 200bar to less than 60 bar after the manifold via the pressure reducing unit. The system is normally designed as such that 95% of the gas will be discharged into the protected area within 60 seconds.

Multiple storage options are possible with **inertec 100** as the system has been designed for long distance delivery. This means that the cylinder bank can be stored remotely from the risk area when storage space is a concern.

1. Smoke / heat detector
2. Nozzle
3. Slave cylinders
4. Master cylinder
5. Pressure reducer unit
6. Manifold
7. Control panel
8. Alarm bell
9. Manual Call Point (break glass)
10. Discharge light

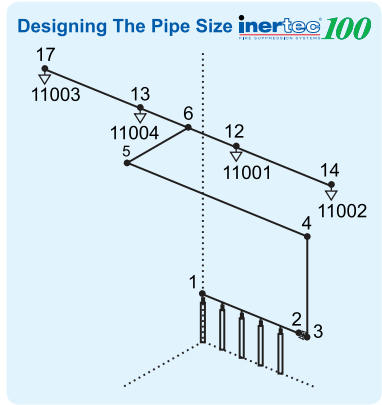


When two or more areas of protection do not require flooding of gas at the same time, directional or selector valves can be used to allow the same bank of cylinders to protect multiple areas. Such sub-systems can reduce substantial equipment costs and storage area for cylinders. Maintenance and inspection locations can also be reduced accordingly.

Example of typical calculation for **inertec 100 total flooding requirement:**

Dimensions of room to be protected = 10.0m x 5.3m x 3.0m (H)
 Volume of room to be protected = 159.0m³
 Design Temperature = 20°C
 Extinguishing Design Concentration = (NFPA 2001) 37.2% (for Class A & C hazards)
 Flooding Factor = (NFPA 2001) **0.4652**

Therefore,
 Agent required = Volume of room to be protected x Flooding Factor
 = 73.97m³
 Agent capacity per 80 litre cylinder = 15.2m³ (17.5kg)
 Number of cylinders required = Agent required / Agent capacity per cylinder
 = 73.97 / 15.2
 = 4.87
 = 5
 Round up to next integer = 5
Therefore the number of cylinders required = 5 numbers of 80L cylinders of **inertec 100**



Gas Flow & Pipe Sizing Table

Inert Gas Flow Rate (m ³ / min) min	Inert Gas Flow Rate (m ³ / min) max	Normal Pipe Size DN (mm)	Normal Pipe Size Inches
1	15	15	1/2
15	30	20	3/4
30	50	25	1
50	90	32	1 1/4
90	120	40	1 1/2
120	220	50	2
220	410	65	2 1/2
410	720	80	3
720	1200	100	4

Deciding The Flow Rate

- Each 80 Litre contains 15.2 m³ Volume Nitrogen Gas
- 1 -> 2 = 15.2 X 5 = 76 m³
- 2 -> 3 = 76 m³
- 3 -> 4 = 76 m³
- 4 -> 5 = 76 m³
- 5 -> 6 = 76 m³
- 6 -> 12,13 = 76 ÷ 2 = 38 m³
- 12 -> 14 = 38 m³
- 13 -> 17 = 38 m³

From Pipe Sizing Table

► From Sizing Table ► Section 1-6 should use 1 1/4" ► Section 12-17 should use 1"

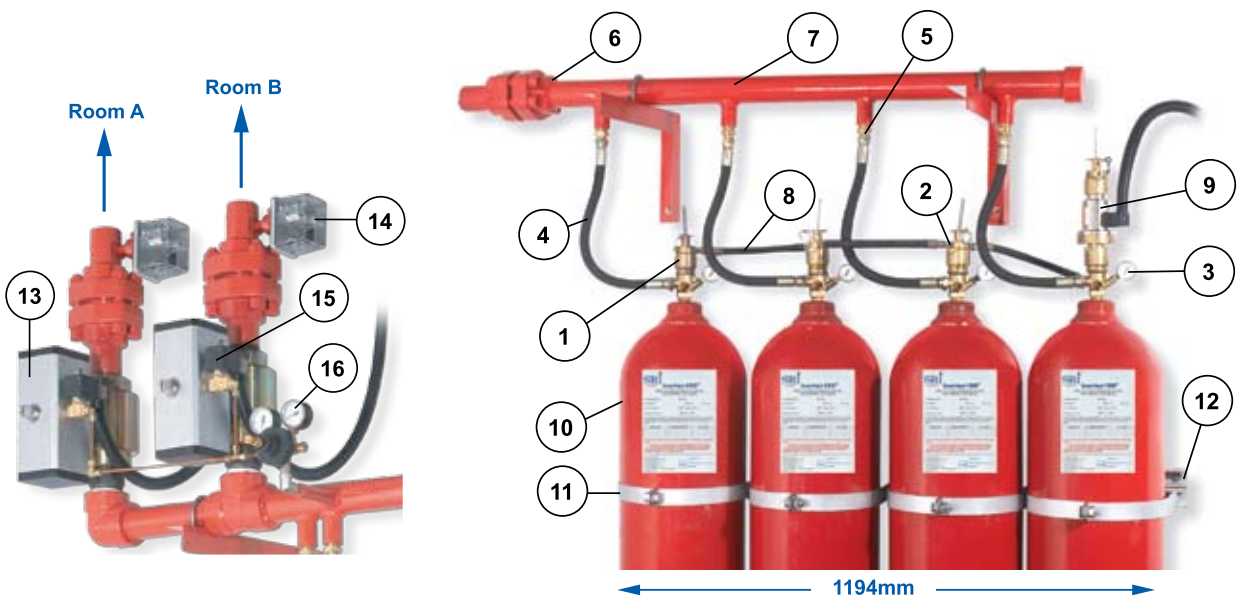
Note : The above is just estimate, the actual pipe size shall be determined using Vds Software. Please contact PA Vision for Vds calculation. Each Nozzle can Cover 5 x 6 metre area.

Comparative table - inert and chemical gases

Comparison Chart - Alternatives Fire Suppression Agents to Halon 1301

Agent	Chemical Formula	ODP	GWP (100 Years Time Horizon)	Atmospheric Lifetime (years)	Noael (%)	Loael (%)	Storage Pressure	Minimum design concentration
Halon 1301	CF3Br	10	6,900	65	5	7.5	25/42 Bar	5
Inertec100	100% N2	0	0	0	43	52	200 Bar	32
INERGEN	52% N2 40% Ar 8% CO2	0	< 1	0	43	52	150/200Bar	35
Carbon Dioxide	CO2	0	1	0	-	CO2 in design concentration kills people	58 Bar at 20°C	34
FM-200 HFC 227 ea	CF3CHF2CF3	0	2,050	31-42	9	10.5	25/42 Bar	7
FE-13 HFC 23	CHF3	0	9,000	280	50	-	25/42 Bar	16
NAF S III	82% HCFC-22 4.75% HCFC-123 9.5% HCFC-124 3.75% organic substance	0.05	1,600	16	10	> 10.0	25/42 Bar	8.6

"Scientific Assessment of Ozone Depletion : 1998." World Meteorological Organisation, Global Ozone Research and Monitoring Project. Report No.44 : 1998.



Item	Part No.	Description	Material
1	ING011	Valve series B 0480 1	Brass
2	ING012	Pneumatic and Manual actuator B 0480 1	Brass
3	ING017	Pressure gauge B 0297 2	Plastic
	ING018	Pressure gauge c/w leakage monitoring switch B 02972	
4	ING008	Discharge hose DN12	Wire braided rubber hose
5	ING001	Check valve 3/4"	Brass Alloy 352
6	ING009	Pressure reducer unit, DN50	Steel Alloy
7	ING038	Manifold single socket	Sch 160
	ING039	Manifold double socket	Sch 160
8	ING010	Pilot hose DN8	Wire braided rubber hose
9	ING013	Electromagnetic Actuator B 0480 1	Brass
10	ING024	80L/140L, TPED CE or DOT Cylinder	Chromium Molybdenum Steel
11	ING046	Cylinder Strap	Steel
12	ING044	Cylinder wall bracket	Steel Alloy
13	ING027	Selector Valve DN50 GB2	Aluminium Alloy
14	ING026	Discharge pressure switch model FF4	Brass
15	CO2003-AD6112	Solenoid valve 2way model AD6112	Brass
16	ING033	Pressure regulator model 0-300 Bar, Output -8 Bar	

Inertec System Components



INERTEC VALVE SERIES B0480 1

Material

Valve Body	: Brass
Max. Working Pressure	: 250 Bar
Temperature Range	: - 15°C to + 50°C
Inlet Connection	: W 28.8 x 1/14" DIN
Outlet Connection	: W 21.8 x 1/14" DIN
Release Device	
Connection	: M 42 x 1.5
Pressure Gauge	
Connection	: M 10 X1
Burst Disc	: 270 Bar
Approval	: VdS
Approval No	: G302023 Typ B0480 1 208 – Inert Gases 200 Bar
Part No	: ING014



ELECTROMAGNETIC RELEASE DEVICE FOR SERIES B0480 1

Material

Body	: Brass, Stainless Steel
Actuating Pin	: Stainless Steel
Nominal Voltage	: 24 Vdc
Nominal Current	: 1.2 A
Valve Connection	: M 42 x 1.5
Approval	: VdS
Approval No	: G302023 Typ B04420575
Part No	: ING013



PNEUMATIC RELEASE DEVICE FOR SERIES B0480 1

Material

Body	: Brass
Min. Actuating Pressure	: 15 Bar
Max. Working Pressure	: 250 Bar
Valve Connection	: M 42 x 1.5
Pneumatic Connection	: 1/8" BSP
Approval	: VdS
Approval No	: G302023 Typ B04420066
Part No	: ING019



DISCHARGE HOSE TYP DN12

Material	: Synthetic rubber Hose with 2 high tensile steel wire braids reinforcement
Max. Working Pressure	: 280 Bar
Temperature Range	: - 15°C to + 50°C
Hose Connections	: W 21.8 x 1/14" DIN
Approval	: VdS
Approval No	: G304026 Typ DN12
Part No	: ING008



MANUAL / PNEUMATIC RELEASE DEVICE FOR SERIES B0480 1

Material

Body	: Brass
Lever	: Stainless Steel
Safety Pin	: Stainless Steel
Min. Actuating Pressure	: 15 Bar
Max. Working Pressure	: 250 Bar
Valve Connection	: M 42 x 1.5
Pneumatic Connection	: 1/8" BSP
Approval	: VdS
Approval No	: G302023 Typ B04420065
Part No	: ING012

PILOT LINE HOSE TYP DN08

Material	: Synthetic rubber Hose with 2 high tensile steel wire braids reinforcement
Max. Working Pressure	: 350 Bar
Temperature Range	: - 15°C to + 50°C
Hose Connections	: 1/8" BSP
Fitting Connections	: 1/8" BSP
Adapter Connection (used on pilot cylinder only)	
Inlet	: W 21.8 x 1/14" DIN
Outlet	: 1/8" BSP
Approval	: VdS
Approval No	: G304027 Typ DN08
Part No	: ING010 - Hose, ING022 - Adapter

Inertec System Components



80 LITER INERTEC CYLINDER

Material

Cylinder	: Chromium Molybdenum Steel
Filling	: 15.8m ³ / 22.2kg – IG55 15.2m ³ / 17.5kg – IG100 17.1m ³ / 27.4kg – IG01
Filling Pressure	: 200 Bar @ 20°C
Test Pressure	: minimum 300 Bar
Approx. Weight	: 115 kg (Tare), 137 kg (gross)
Standard of Compliance	: DOT 3AA / TPED 1999/36/CS or according to International Standards
Colour	: Red or Grey according to National Regulation
Part No	: ING014-CS-080



DN50 CYLINDER MANIFOLD

Material

Pipe	: 2" Sch.160 ASTM A106B or API 5L seamless pipe, galvanized
Check Valve Connection	: 3/4" BSPT
Max. Working Pressure	: 240 Bar
Test Pressure	: 360 Bar
Aproximate Weight	: 11.5kg / m
Part No	: ING038-CS-002 to ING038-CS-019



INERTEC PRESSURE GAUGE WITH INTEGRATED PRESSURE SWITCH

Temperature Range	: -15°C to + 50°C
Connection to Valve	: M 10 X 1
Indication Range	: 180 - 360 Bar
Nominal Size	: 50mm
Electrical Data	: -
Contact Pin and Lug	: Gold Plated
Switch Voltage	: 4.5 to 24 VDC / VAC
Switch Current	: 5 mA to 100 mA
Contact Load	: max 3 W
Switch Point	: nominal 180 Bar
Setting	: increasing pressure max 185 bar decreasing pressure min 160 bar
Series	: B 02972
Part No	: ING018



INERTEC SELECTOR / DIRECTIONAL VALVE

Type	: Ball valve GB2: 2way;
Body	: round
Material	: A105
Size	: GB2: from DN32 up to DN50
O-Rings	: NBR, FPM, MQV, EPDM, FFKM
Operating Pressure	: GB2: 350 Bar
Temp Range	: -10°C to + 100°C depending on seal materials selected
Air for actuator	: 5.6 Bar
Part No	: ING027-GM-050
SOLENOID VALVE	
Operating voltage	: 24VDC,0:75A
Part No	: CO2003-AD6112



DISCHARGE NOZZLE TYP 1/2" AND TYP 1"

Material

Body	: Brass
Orifice Plate	: Brass
Max. Area Coverage/	
Nozzle	: 30m ² (5m x 6m)
Max. Height	: 5m
Working Pressure	: 20 Bar (min), 60 Bar (max)
Available Orifice Diameter	
1/2" Nozzle	: 3mm - 10mm (in 1mm increments)
1" Nozzle	: 11mm - 20mm (in 1mm increments)
Approval	: VdS
Approval No	: G 305005
Part No	: ING002 - 1/2" Nozzle, ING004 - 1" Nozzle



INERTEC PRESSURE GAUGE

Type	: Spring Tube Manometer Temperature
Range	: -15°C to + 50°C
Connection to Valve	: M 10 X 1
Series	: B 02972
Part No	: ING017

Approval

The **inertec 100** gas extinguishing system is approved by VdS Schadenverhütung (Loss Prevention) Germany to VDS 2452 Gas Extinguishing System Requirements and Test Methods.

All **inertec 100** gas extinguishing system equipment such as manifold, valve, actuator, pressure reducer, nozzle, discharge hose and check valves are certified by VdS.

VdS is a company of the German Insurance Association Gesamtverband der Deutschen Versicherungswirtschaft (GDV). For further details visit www.vds.de



Why Nitrogen Gas Suppression Is Considered The Ultimate Choice?

inertec 100 The Natural Solution.

PA Vision introduced the **inertec 100** fire suppression systems which meets all three objectives of a responsible and modern fire protection system ; *Protect Lives, Protect Properties and Protect the Environment.*

▶ **Safe for Human**

Nitrogen is a natural gas which occupies the biggest percentage (78 %) of atmospheric air. It produces no toxic or corrosive decomposition by-products, and no post-fire hazard. The discharge of nitrogen does not impair visibility which is necessary for the safe evacuation of occupants.

▶ **GREEN**

It is 100 % environment friendly, it has zero Ozone Depletion Potential (ODP) and zero Global Warming Potential (GWP). The use of **inertec 100** is in line with the current global Green Initiatives for buildings e.g, Green Building Index (GBI) in Malaysia.

▶ **Limited Professional Liability**

The whole system, all its components including manifolds and the hydraulic software has gone through rigorous tests and validations by in-house R & D and also listed by independent certification body e.g, VdS Germany, which is compulsory in order to comply to NFPA 2001. A peace of mind solution in terms of potential exposure to professional liability.

▶ **Safe For Sensitive Equipment**

Since it is inert in nature, nitrogen is electrically non-conductive and does not leave residue or damage the protected equipment. There is no condensation of moisture in the air upon discharge of the agent. It is the safest solution without secondary damage.

▶ **Advantages for Owner & Contractor**

Nitrogen gas, elements of the **inertec 100** fire suppressant is readily available everywhere and is affordable. There is no dependency on specialised authorised suppliers. System discharge tests can be carried out regularly by facility managers to ensure system functionality

▶ **Low Cost Refills**

It is the cheapest gas for refilling due to any accidental or false discharge. Its refill cost is about 3-5 times cheaper than premixed inert gas and more than 10 times cheaper compared with genuine halocarbon gas.

Sole Distributor:



PA VISION SDN BHD (662605-K)

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Tel: **603-7783 6512** Fax: **603-7783 6510**

Email: pavision@streamyx.com

Website: www.pavision.com.my

Reseller :