



MONARCH™ INDUSTRIAL FIRE SUPPRESSION SYSTEM

UL LISTING

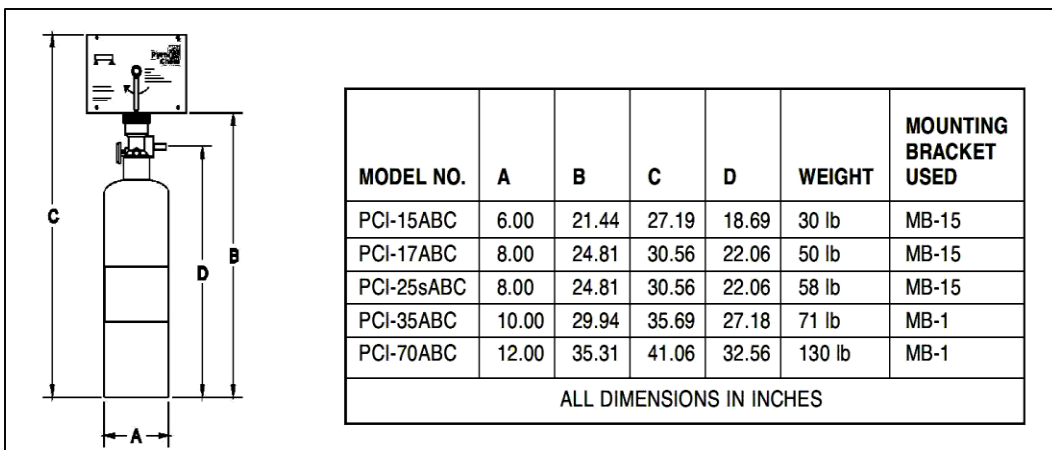
THE PYRO-CHEM VEHICLE PAINT BOOTH INDUSTRIAL FIRE SUPPRESSION SYSTEM HAS BEEN TESTED TO THE UL STANDARD FOR PRE-ENGINEERED DRY CHEMICAL EXTINGUISHING SYSTEM UNITS, UL1254 (REVISED SEPT. 29, 1998), AND LISTED BY UNDERWRITERS LABORATORIES, INC.

PYRO-CHEM VEHICLE PAINT SPRAY BOOTH AUTOMATIC DRY CHEMICAL FIRE SUPPRESSION SYSTEM IS OF THE PRE-ENGINEERED TYPE AS DEFINED BY THE NFPA STANDARD FOR DRY CHEMICAL EXTINGUISHING SYSTEMS, NFPA-17. THE EXTINGUISHING UNITS DESCRIBED ARE INTENDED TO BE INSTALLED, INSPECTED, AND MAINTAINED IN ACCORDANCE WITH NFPA-17. LIMITATIONS DETAILED HAVE BEEN ESTABLISHED THROUGH EXTENSIVE TESTING BY UNDERWRITERS LABORATORIES, INC. INSTALLATION AND MAINTENANCE OF THE SYSTEM MUST CONFORM TO THE LIMITATIONS DETAILED IN THE PYROCHEM MANUAL AND BE PERFORMED BY AN AUTHORIZED PYRO-CHEM DEALER.

THE PYRO-CHEM VEHICLE PAINT BOOTH SYSTEM UTILIZES A MONOAMMONIUM PHOSPHATE BASED DRY CHEMICAL AGENT (SPECIFICALLY DESIGNED TO SUPPRESS CARBONACEOUS SOLID, LIQUID, GAS OR ELECTRICAL FIRES). THE SYSTEM PROVIDES MECHANICAL OR ELECTRICAL AUTOMATIC ACTUATION AND CAN BE MANUALLY ACTUATED THROUGH A REMOTE MECHANICAL PULL STATION. UPON ACTUATION, THE SYSTEM DISCHARGES A PRE-DETERMINED AMOUNT OF AGENT TO THE HAZARD AREA.

THE SHUTDOWN OF FUEL AND POWER TO THE HAZARD AREA IS REQUIRED UPON SYSTEM ACTUATION. EXHAUST FAN(S) IN THE VENTILATION SYSTEM MUST BE SHUT OFF PRIOR TO SYSTEM DISCHARGE TO ALLOW THE PROPER CONCENTRATION OF AGENT TO BUILD UP IN THE HAZARD AREA.

THE PYRO-CHEM VEHICLE PAINT BOOTH SYSTEM IS DESIGNED TO ACCOMMODATE A MANDATORY FACTORY PRE-SET TIME DELAY. THIS TIME DELAY IS REQUIRED BASED ON THE UL 1254 COMPLIANCE TESTING



	Johnson Controls Fire Protection 540 Civic Blvd #105 Raleigh, NC 27610			
	BAKER'S AUTOMOTIVE PAINT & BODY SHOP 1317 SPENCE MILL ROAD FUQUAY-VARINA, NC 27526			
SIZE	DWG #	DWG		REV
		IND FIRE SYSTEM		1
SCALE	N/A	2/10/2020	SHEET	1 OF 9

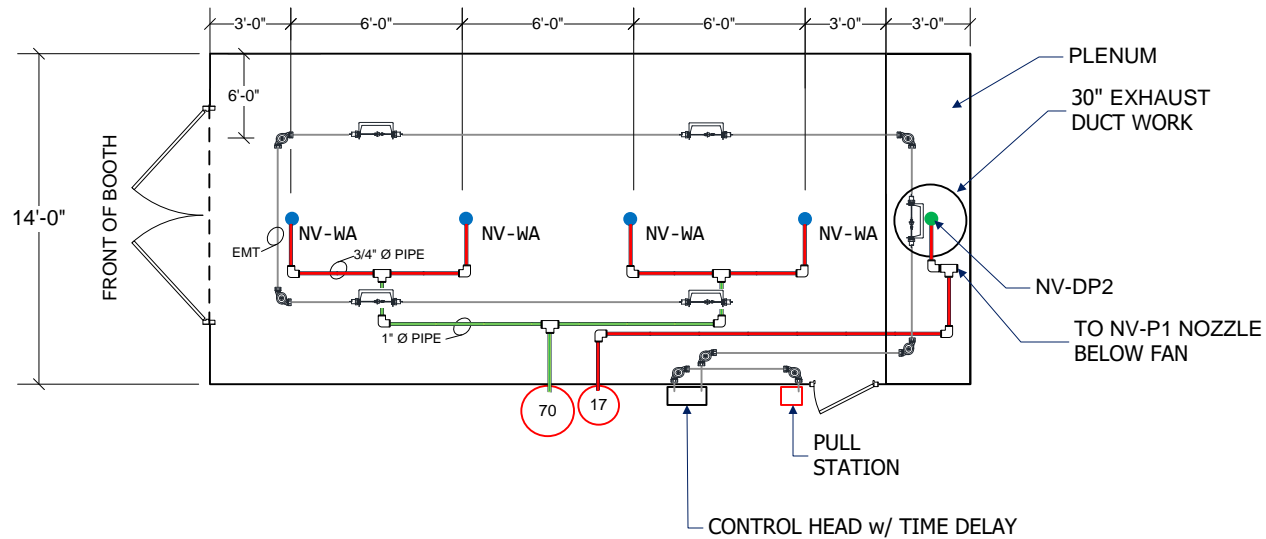


**MONARCH™ INDUSTRIAL
FIRE SUPPRESSION
SYSTEM**

NV-WA NOZZLE COVERAGE
VOLUME MAX = 1920 CU FT
BOOTH = 3024 CU FT
4 TF NOZZLES PROVIDED

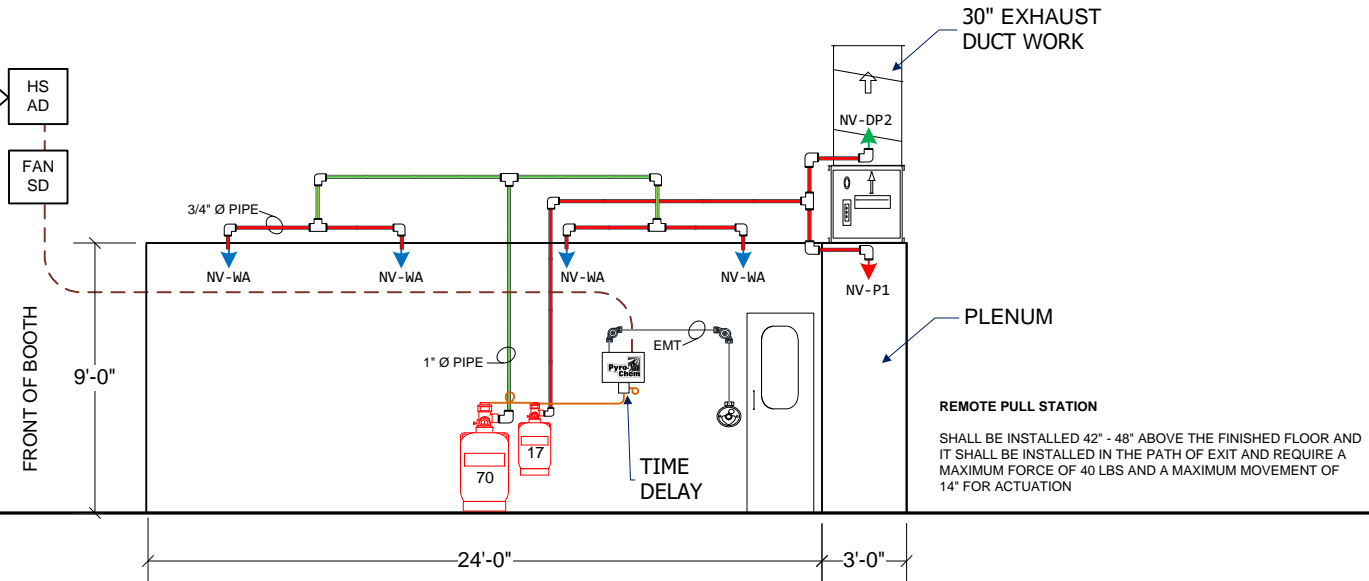
FUSIBLE LINKS RATED
AT 165 DEG F

PLAN VIEW



CONNECTION TO HORN STROBE / AUDIBLE DEVICE
OR F.A.C.P. ACTIVATES UPON SYSTEM DISCHARGE
(SUPPLIED & INSTALLED BY OTHERS)

CONNECTION TO EXHAUST FAN SHUT DOWN. FAN
SHALL SHUT DOWN UPON ACTIVATION
(CONNECTION BY OTHERS)



SIDE VIEW

NOZZLE LEGEND

↓	DUCT NOZZLE - NV-DP2
↓	TOTAL FLOOD NOZZLE - NV-WA
↓	PLENUM NOZZLE - NV-P1

OVERHEAD NOZZLE LOCATIONS:
2 FT MAX OFF-CENTER LONGEST AND SHORTEST SIDE
0" - 6" OFF CEILING

PIPE SIZES	
—	3/4" Ø PIPE
—	1" Ø PIPE

PRE-ENGINEERED SYSTEM SHOP DRAWING ONLY - NOT TO SCALE

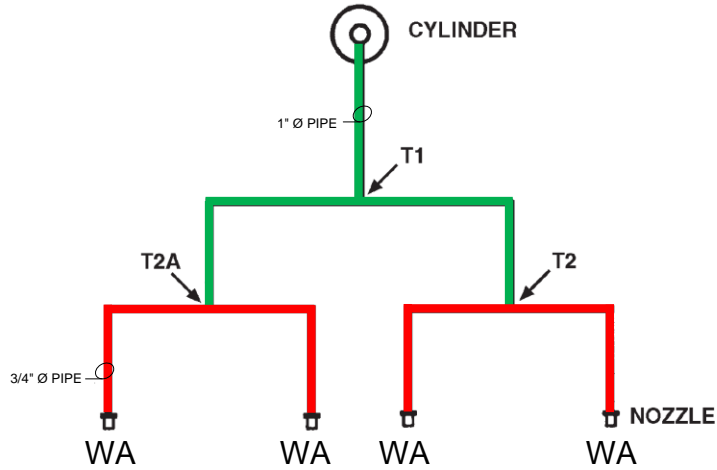


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PCI-70ABC with 4 nozzles



PIPE SIZES

— 3/4" Ø PIPE

— 1" Ø PIPE

Cylinder Size	Maximum Nozzle Quantity	Nozzle Type	Piping Section	Size	Length Maximum	Elbows Maximum
PCI-70ABC	4	NV-WA or NV-SW	Cylinder to T1	1 in.	40 ft (12.2 m)	4
			T1 to T2	1 in.	18 ft (5.5 m)	2
			T2 to Nozzle	3/4 in.	9 ft (2.7 m)	2

Cylinder Size	Maximum Nozzle Quantity	Nozzle Type	Piping Section	Size	Length Maximum	Elbows Maximum
PCI-70ABC	4	3 - NV-WA or NV-SW and 1 of: NV-P1 (See Note 5) NV-UF NV-DP2	Cylinder to T1	1 in.	40 ft (12.2 m)	4
			T1 to T2	1 in.	18 ft (5.5 m)	2
			T2 to Nozzle	3/4 in.	9 ft (2.7 m)	2

e. Nozzle Placement:

The nozzle is to be mounted in the center (See Note) of the protected area, with the discharge holes in the nozzle no greater than six (6) inches from the ceiling. For duct protection, the nozzle is to be mounted in the center. **See Figure 3-1.**

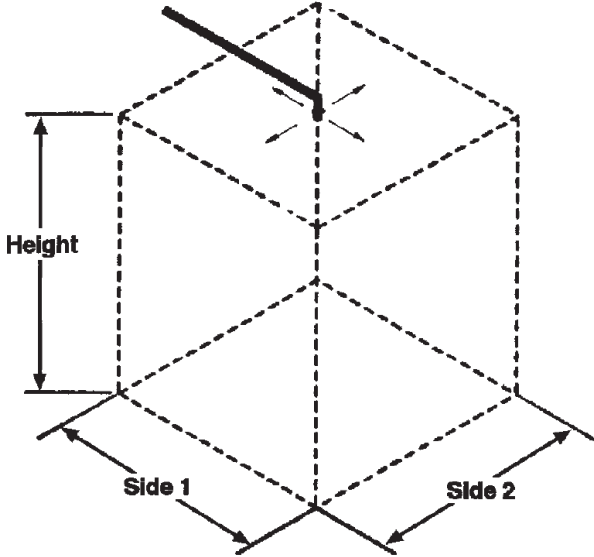


Figure 3-1. Nozzle Location

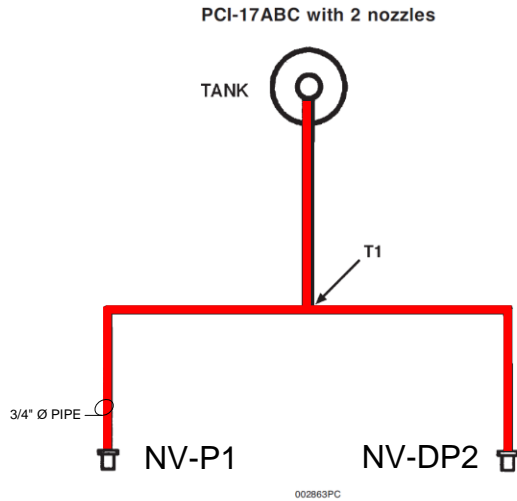
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Cylinder Size	Maximum Nozzle Quantity	Nozzle Type	Piping Section	Size	Length Maximum	Elbows Maximum
PCI-17ABC	2	NV-UF, or any combination of NV-PI (See Note 5), NV-DP2, N-PLU	Cylinder to T1	3/4 in.	36 ft (10.9 m)	7
			T1 to Nozzle	3/4 in.	14 ft (4.3 m)	4

NOTE:

- ▶ 1. These limitations apply to PCI-17ABC using two nozzles (any combination of either NV-P1, NV-DP2, or N-PLU).
- 2. System piping must be balanced. Balanced piping is that in which the difference between the shortest actual pipe length from T1 to nozzle and the longest actual pipe length from T1 to nozzle does not exceed 10% of the longest actual pipe length from T1 to nozzle. The number and type of fittings for all T1 to nozzle sections must be equal.
- 3. A Main/Reserve Swing Check Valve, Part No. 417788, may be located between the cylinder and T1.
- 4. All systems protecting vehicle paint spray booths require a factory pre-set time delay.
- 5. When using an NV-P1 nozzle, the two largest discharge orifices in the nozzle body must be positioned parallel to the longest dimension of the hazard being protected.
- 6. Maximum height of nozzle from base of tank to nozzle – 20 ft (6.1 m).

Duct Nozzle Placement:

1. The maximum duct perimeter is 12 ft (3.7 m). See Figure 3-2b. **Note:** Longest side of a square or rectangular duct cannot exceed 36 in. (91 cm).

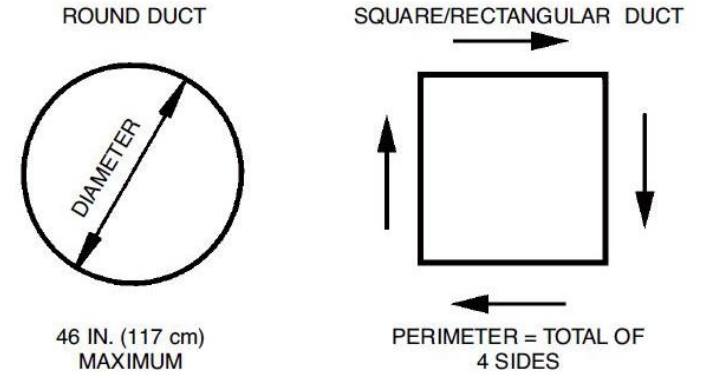


Figure 3-2b.

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	Johnson Controls Fire Protection 540 Civic Blvd #105 Raleigh, NC 27610			
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Total Flooding

a. Cylinders:

The Models PCI-15ABC, PCI-17ABC, PCI-25sABC, PCI-35ABC, and PCI-70ABC cylinders can be used for total flooding vehicle paint spray booth applications.

b. Nozzles:

▶ Seven nozzles are available for use in protecting vehicle paint spray booths:

Nozzle	Application
NV-WA	Work Area/Plenum/Pit (Overhead Position)
NV-SW	Work Area/Plenum/Pit (Sidewall Position)
NV-P1	Backdraft/Pit (Overhead Position)
NV-UF	Under Floor (Overhead Position)
NV-DP2	Pit/Duct (End Position – Horizontal)
N-DCT	Duct Only*
▶ N-PLU	Three-Way Nozzle (Pits, Plenums, Under Floor Trenches)

* Can be used with PCI-15ABC and PCI-25sABC cylinders only

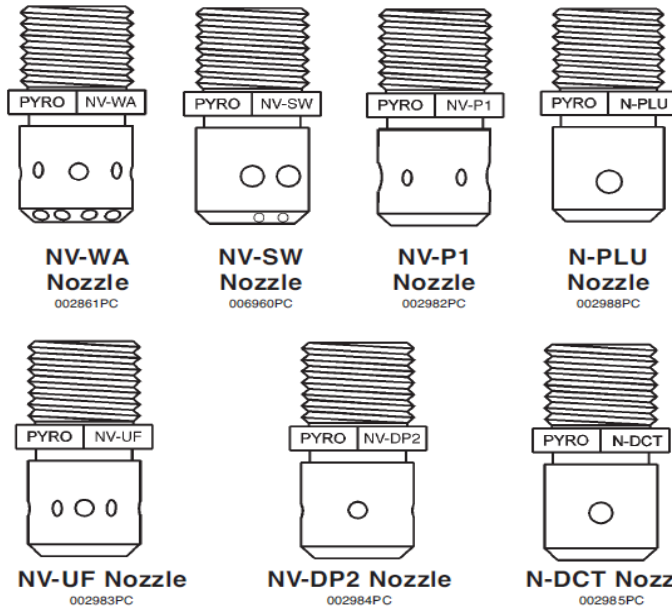


Figure 2-3 Nozzles

NOZZLE SELECTION

Protection	Nozzle	Protection Zone/Nozzle L W Ht	Specifications Maximum	Nozzle Location within Protection Zone	Nozzle Offset ³	Nozzle Orientation
Work Area ¹	NV-WA	See Table 3-1	Volume 1920 cu ft Area 160 sq ft Diagonal 18.86 ft	2 ft maximum off center (each side)	0 to 6 in.	Vertical pointing down
Work Area ¹	NV-SW	See Table 3-1A	Volume 1920 cu ft Area 160 sq ft Diagonal 12.8 ft (to farthest corner)	2 ft maximum off center (each side)	0 to 6 in.	Vertical pointing down (orifices in direction of arrow)
Backdraft Plenum	NV-P1	4 ft 14 ft 12 ft	Volume 672 cu ft Area 56 sq ft Side 14 ft	Shortest side-center Longest side-3 inch off center (each side)	0 to 6 in.	Vertical
Pant Leg Plenum ²	NV-P1	4 ft 16 ft 20 ft	Volume 1280 cu ft Area 64 sq ft Side 16 ft	Shortest side-center Longest side-3 inch off center (each side)	0 to 6 in.	Vertical
Pit (Option 1)	NV-P1	24 ft 4 ft 4 ft	Volume 384 cu ft Area 96 sq ft Side 24 ft	Shortest side-center Longest side-center	0 to 6 in.	Vertical
Pit (Option 2)	NV-DP2	24 ft 4 ft 4 ft	Volume 384 cu ft Area 96 sq ft Side 24 ft	Shortest side-center Height-center	2 to 8 in.	Horizontal
Under Floor Plenum	NV-UF	16 ft 14 ft 4 ft	Volume 896 cu ft Area 224 sq ft Side 16 ft	Shortest side-center Longest side-center	0 to 6 in.	Vertical
Exhaust Duct	NV-DP2	3 ft 3 ft 24 ft (Round Duct 3 ft 10 in. diameter)	Volume 216 cu ft Area 9 sq ft Side 3 ft	Shortest side (cross section) – center Longest side (cross section)	0 to 6 in.	Horizontal for horizontal ducts Vertical for vertical ducts
Exhaust Duct ⁴	N-DCT	12 ft Perimeter or 3 ft 10 in. diameter 24 ft length		Length – center Width – center	0 to 6 in.	Horizontal for horizontal ducts Vertical for vertical ducts

¹ NV-WA and NV-SW nozzles can be used for plenum, pit, or under floor protection. The nozzle maximum specifications must be followed.

² Pant leg dimensions 4 inch minimum x 48 inch maximum.

³ Nozzle offset is the maximum distance from the tip of the nozzle to the closest edge of the protection zone.

⁴ Single nozzle application on a PCI-15ABC or two nozzle application on a PCI-25sABC only.

Note: If the exhaust duct is greater than 46 in. in diameter or 12 ft perimeter, the use of total flood protection can be utilized.

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TOTAL FLOODING (DETECTOR SPACING) – FUSIBLE LINKS

<u>Ceiling Height</u>	<u>Spacing</u>
Up to 12 ft (3.66 m) Height	12 ft (3.66 m) maximum detectors 6 ft (1.83 m) max. from a wall* 144 sq ft (13.38 sq m) max. coverage per detector
Greater than 12 ft (3.66 m) up to 16 ft (4.88 m) height	10 ft (3.05 m) max. between detectors 5 ft (1.52 m) max. from wall 100 sq ft (9.29 sq m) max. coverage per detector
Greater than 16 ft (4.88 m) up to 20 ft (6.1 m) height	8 ft (2.44 m) max. between detectors 4 ft (1.22 m) max. from wall 64 sq ft (5.95 sq m) max. coverage per detector

Note: For sloped ceiling (peaked type or shed type) installations, refer to NFPA-72, "National Fire Alarm Code" for detailed spacing requirements.


LOCAL APPLICATION – OVERHEAD (DETECTOR SPACING) – Maximum spacing per fusible link detector is 36 ft² (3.3 m²) or 3 ft (0.9 m) from edge of hazard and 6 ft (1.8 m) between fusible link detectors.

When a detector(s) is mounted more than 1 ft (0.3 m) below ceiling or in an open area, heat trap(s) is recommended. Detectors should be mounted overhead at nozzle height or as close to the hazard as possible without interference, not to exceed 10 ft (3 m).

Detectors should not be located where they will be susceptible to damage during the normal work operation.

LOCAL APPLICATION – TANKSIDE (DETECTOR SPACING) – Detectors can be located either near the inner tank wall and flammable liquid surface or above the tank. If located above the tank, the rules for local application overhead would apply. If located on the tank wall, the detectors can be mounted horizontally or vertically in the freeboard area but must be protected from damage during normal working operation. Detectors should be located at a maximum spacing per detector of 3 ft (0.9 m) from edge of hazard and 6 ft (1.8 m) between detectors on the long side of the tank.

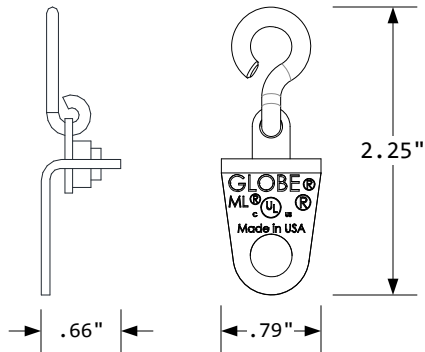
*For 14 ft (4.3 m) wide booths with maximum height of 12 ft (3.7 m), the detector location off the side wall can be a maximum of 7 ft (2.1 m), and 10 ft (3 m) maximum distance between detectors.

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SYSTEM SHALL UTILIZE GLOBE ML[®]™ FUSIBLE LINKS FOR AUTOMATIC SYSTEM ACTIVATION.

FUSIBLE LINKS ARE DESIGNED TO SEPARATE AT SPECIFIC TEMPERATURES, RELEASING TENSION FROM THE FUSIBLE LINK DETECTION LINE AND CAUSING SYSTEM ACTUATION.

CORRECT FUSIBLE LINK SELECTION IS AN ESSENTIAL ELEMENT IN THE DESIGN OF ANY FIRE SUPPRESSION SYSTEM. AFTER PERFORMING A TEMPERATURE STUDY TO DETERMINE THE MAXIMUM AMBIENT TEMPERATURE AT THE FUSIBLE LINK LOCATION, THE CORRECT FUSIBLE LINK SHOULD BE SELECTED FROM THE FOLLOWING CHART:



TEMPERATURE RATING		MAX AMBIENT TEMPERATURE		LOAD RATING	
°F	°C	°F	°C	MIN	MAX
135°	57°	100°	38°	10 LBS	40 LBS
165°	74°	100°	38°	10 LBS	40 LBS
212°	100°	150°	66°	10 LBS	40 LBS
280°	138°	225°	107°	10 LBS	40 LBS
360°	182°	300°	149°	10 LBS	40 LBS
450°	232°	375°	191°	10 LBS	40 LBS
500°	260°	430°	217°	10 LBS	40 LBS

- UL LISTED TO UL 33, HEAT RESPONSIVE LINKS FOR FIRE PROTECTION SERVICE
- DATE STAMPED WITH YEAR OF MANUFACTURE
- CORROSION RESISTANT CONSTRUCTION
- STAINLESS STEEL COMPONENTS
- FLEXIBLE EYE HOOK CONNECTION
- 21/64" MOUNTING HOLE DIAMETER
- LISTED FOR USE IN ALL FIRE PROTECTION SYSTEMS

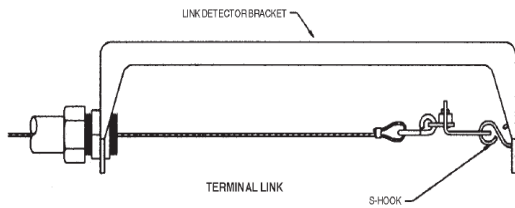


Figure 4-6. Terminal Link Installation.
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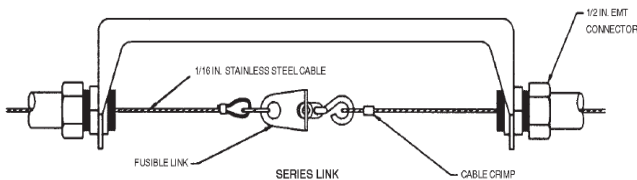


Figure 4-7. Series Link Installation.
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PIPE AND NOZZLE INSTALLATION

General Piping Requirements

1. Use Schedule 40 black iron (if used in a relatively non-corrosive atmosphere), galvanized, chrome-plated, or stainless steel pipe conforming to ASTM A120, A53, or A106. Fittings must be a minimum of 150 lb. Class. However, the PCI 35, 50, and 70 lb. cylinders must have a minimum of two (2) nozzles per cylinder to utilize the 150 lb. Class fittings. If the PCI 35, 50, or 70 lb. cylinder has one (1) nozzle, then a 300 lb. Class fitting must be used. The remaining Monarch cylinders have no limitations for the 150 lb. Class fittings. Distribution pipe sizes are 3/4 in. or 1 in. depending on number of nozzles.
2. Pipe unions are acceptable.
3. Use reducing tees for all pipe splits.
4. Reducing bushings are not acceptable.
5. Cast iron pipe and fittings are not acceptable.
6. **Pipe thread sealant or pipe joint compound is not allowed for distribution piping.**
7. Bell Reducer or any non-restrictive fittings are allowed.
8. Before assembling the pipe and fittings, make certain all ends are carefully reamed and blown clear of chips and scale. Inside of pipe and fittings must be free of oil and
9. If Teflon tape is used on threaded ends, start at the second male thread and wrap the tape clockwise around the threads, away from the pipe opening.
10. All system piping must comply with Section A-5-9.1 of NFPA-17.

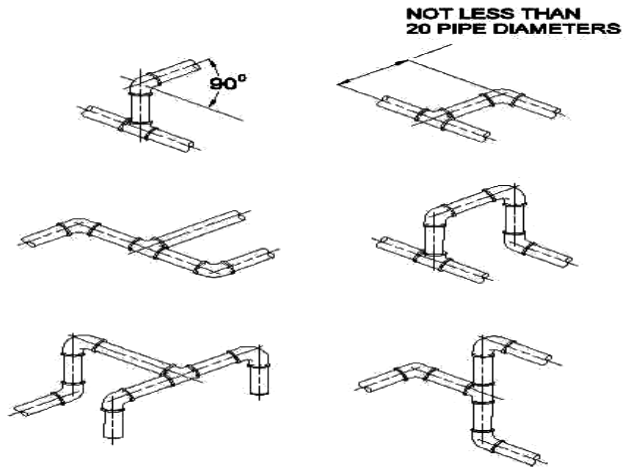


Figure 4-25. Acceptable Piping Methods.
002965PC

CAUTION

Do not apply Teflon tape to cover or overlap the pipe opening, as the pipe and nozzles could become blocked and prevent the proper flow of agent

TIME DELAY

The Model TD-10 Time Delay is required to be installed on all Pyro-Chem Vehicle Paint Spray Booth Fire Suppression Systems. The Model T-10 Time Delay is a factory pre-set mechanical time delay which retards the system discharge for a period of 10-20 seconds after actuation to allow for exhaust fan wind-down. The time delay is field mounted between the PYRO-CHEM control head (Models MCH3, NMCH3, ECH3-24, or ECH3-120) and the discharge valve assembly of the agent cylinder(s) and/or pneumatic actuating cylinder(s). See Figure 2-24.

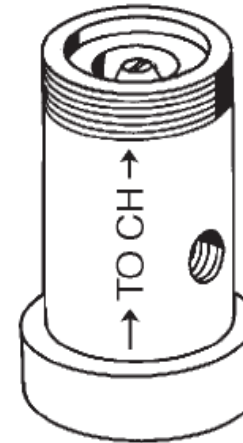


Figure 2-24. Time Delay

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ELECTRICAL SWITCHES

The electrical switches are intended for use with electric gas valves, alarms, contactors, lights, contractor supplied electric power shut-off devices and other electrical devices that are designed to shut off or turn on when the system is actuated.

Switches are available in kits: One Switch Kit, Part No. 551154; Two Switch Kit, Part No. 551155; Three Switch Kit, Part No. 551156, and Four Switch Kit, Part No. 551157. Mounting hardware and 12 in. wire assemblies are provided with each kit. Each switch has a set of single-pole, double-throw contacts rated:

UL/cUL/CSA Rating

250 VAC, 21A Resistive
 250 VAC, 2 HP
 125 VAC, 1 HP

ENEC Rating

IE4T105 μ Approved
 250V, 21A Resistive
 8A Motor Load

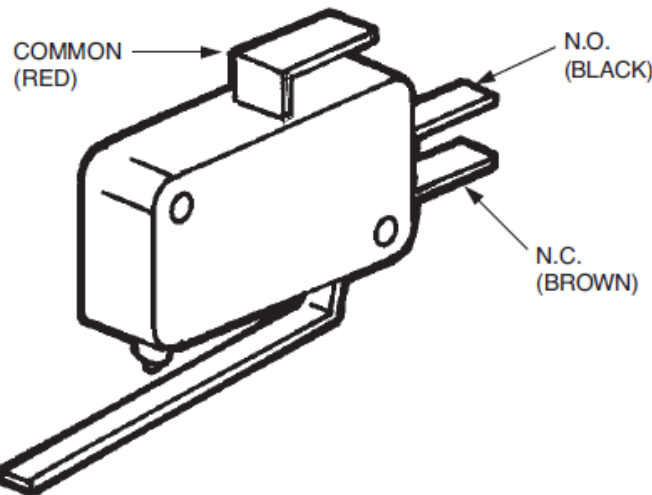


Figure 2-20a. Model MS-SPDT Micro Switch.

001612

MODEL RPS-M – REMOTE MECHANICAL PULL STATION

Remote manual control for system releasing devices is provided by the Model RPS-M remote mechanical pull station. It is connected to the system releasing device by stainless steel cable. This cable is enclosed in 1/2 in. EMT conduit with corner pulleys at each change in direction. The remote mechanical pull station shall be located at the point of egress from the hazard area. See Figure 2-13.

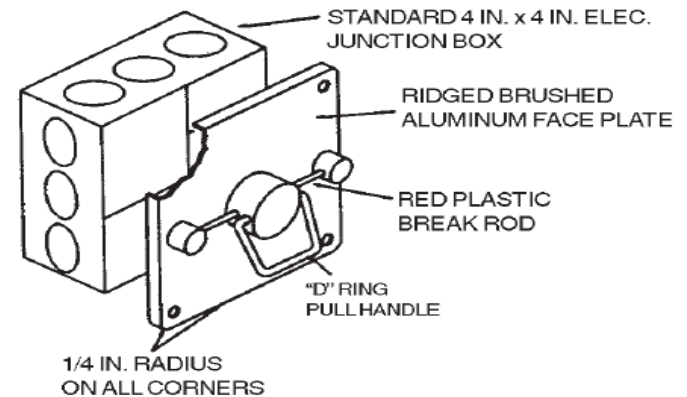
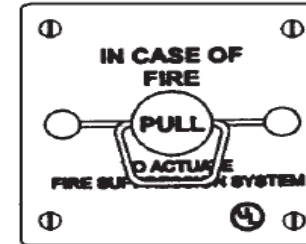


Figure 2-13. Model RPS-M Mechanical Pull Station.

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