DELUGE VALVE, AUTOMATIC RESETTING, 2-1/2 INCH (65 mm)

MODEL F445 (THREAD x THREAD or GROOVE X GROOVE)

Port Locations:

A - 2-1/2" NPT
(ISO 7/1 on request)
Inlet

B - 2-1/2" NPT
(ISO 7/1 on request)
Outlet

C - 1-1/4" NPT
Main Drain

D - 1/2" NPT
Alarm &
Auxiliary Drain

E - 1/2" NPT
Diaphragm Supply &
Diaphragm Chamber
Pressure Gauge

F - 1/2" NPT
Alarm Test or
Water Supply
Pressure Gauge

G - 1/2" NPT
Alarm Test or
Water Supply
Pressure Gauge

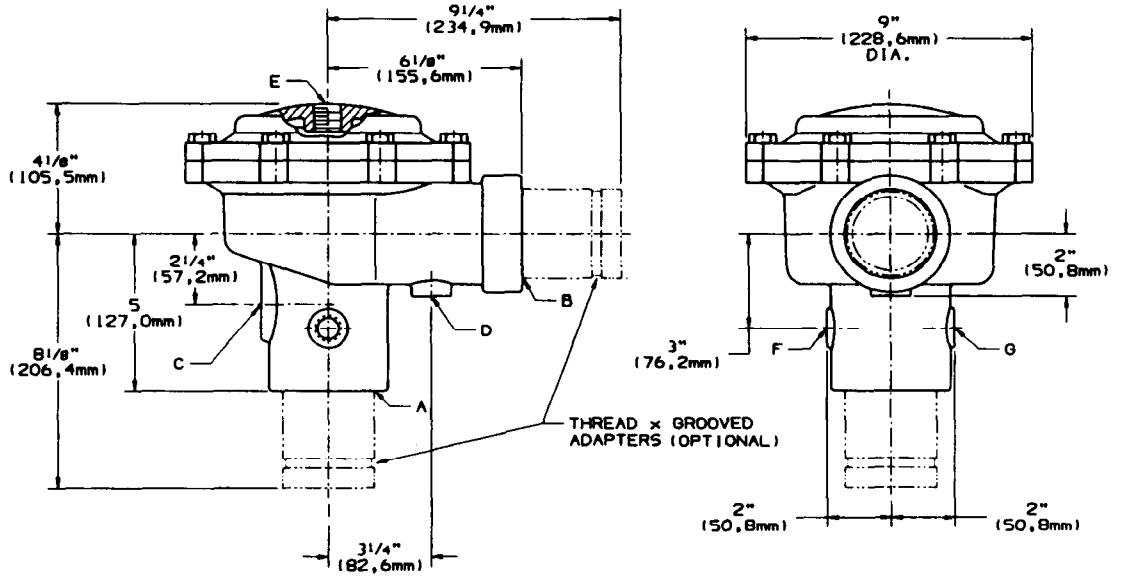


FIGURE A
MODEL F445 AUTOMATIC RESETTING DELUGE VALVE
THREAD x THREAD or GROOVE x GROOVE
— DIMENSIONS AND PORT LOCATIONS —

GENERAL DESCRIPTION

The 2-1/2 inch (65 mm), Model F445 Automatic Resetting Deluge Valve is a quick opening, hydraulically operated differential type valve designed for fire protection system service. It is used as an "automatic water control valve" in deluge, preaction, and special types of fire protection systems such as foam-water and double interlock. The F445 Valve also provides for actuation of fire alarms upon system operation.

The automatic resetting feature of the F445 provides for easy, external resetting, without having to open a valve handhole cover to manually reposition a clapper and latch mechanism.

Operation of the F445 Valve is provided by an actuation (detection) system that is separate from the normally dry system piping. Trim configuration options for automatic operation of the F445 include wet pilot actuation, dry pilot actuation, and electric actuation. Trim arrangements also provide for local emergency (manual) release of the F445 Valve.

The compact and easily installed trim arrangements have been designed so that the F445 Valve may be installed for either "flow left" or "flow right".

APPROVALS AND STANDARDS

The 2-1/2 inch (65 mm), Model F445 Automatic Resetting Deluge Valve is listed by Underwriters Laboratories Inc. and Underwriters' Laboratories of Canada. The F445 Valve is also approved by Factory Mutual Research Corporation and the Scientific Services Laboratory (Australia).

The Model F445 Deluge Valve with either wet or dry pilot actuation and galvanized trim is approved by the Loss Prevention Council (United Kingdom).

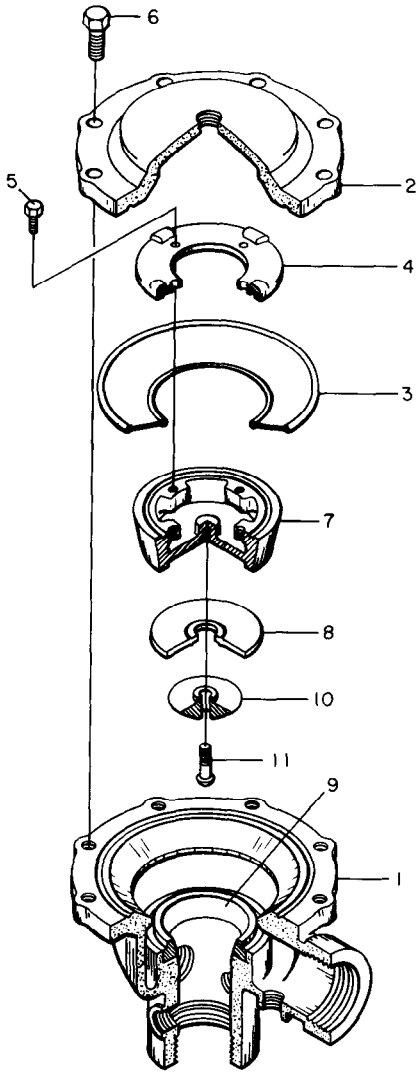
Inquiries concerning approval by the Verband der Schadeversicherer should be directed to Grinnell Sales & Distribution, Kopersteden 1, NL-7547 TJ Enschede, Netherlands, Tel. 31-534-283-434 / Fax. 31-534-283-377.

The Model F445 Deluge Valves are accepted by the City of New York under MEA 38-92-M.

WARNING

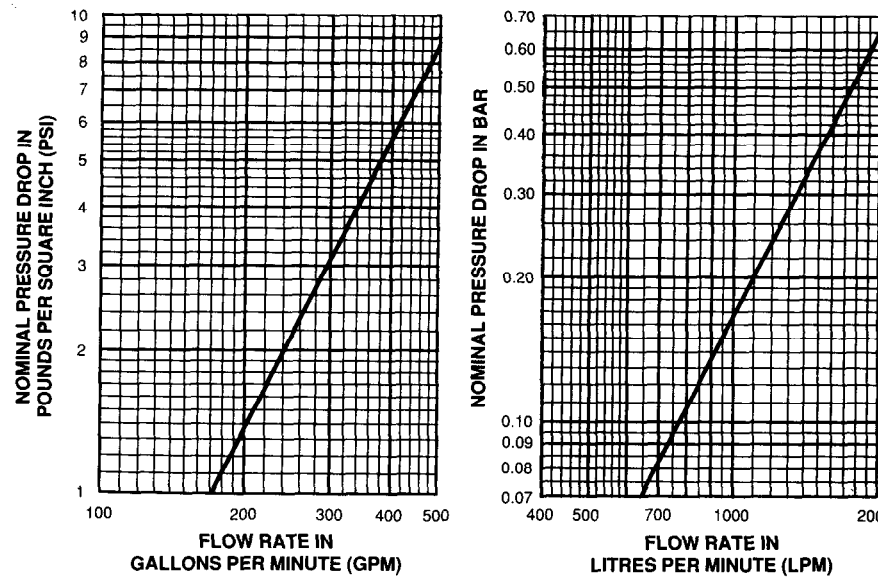
The Model F445 Deluge Valve described herein must be installed and maintained in compliance with this document, as well as with the applicable standards of the National Fire Protection Association, in addition to the standards of any other authorities having jurisdiction. Failure to do so may impair the integrity of this device.

The owner is responsible for maintaining their fire protection system and devices in proper operating condition. The installing contractor or manufacturer should be contacted relative to any questions.



1 - Body
2 - Cover
3 - Diaphragm
4 - Diaphragm Ring
5 - Cap Screw, 1/4"-20 UNC x 3/4" (4 req'd)
6 - Cap Screw, 1/2"-13 UNC x 7/8" (8 req'd)
7 - Center Valve
8 - Facing
9 - Seat Ring
10 - Facing Retainer
11 - Retainer Screw

FIGURE B
MODEL F445 AUTOMATIC RESETTING DELUGE VALVE
— ASSEMBLY —



1 Bar = 100 kPa

GRAPH A-1 and A-2
NOMINAL PRESSURE LOSS VERSUS FLOW

TECHNICAL DATA

Deluge Valve:

The 2-1/2 inch (65 mm), Model F445 Automatic Resetting Deluge Valve is rated for use at a maximum service pressure of 175 psi (12,1 bar). The Valve dimensions are shown in Figure A, and all of the ports are NPT threaded per ANSI Standard B1.20.1; however, the F445 Valve may be special ordered with inlet and outlet pipe thread connections per ISO 7/1. Grooved end connections for either ANSI or ISO pipe connections are cut in accordance with Gruvlok standard groove specifications for steel pipe, and they are suitable for use with grooved end pipe couplings that are listed or approved for fire protection system service.

The F445 Valve is to be installed vertically, as shown in Figure A, with the inlet connection at the bottom and the outlet connection to the side. Exterior surfaces of the F445 Valve are painted red, and the year of manufacture is indicated on the Cover.

Components of the F445 Valve are shown in Figure B. The Body and Cover are ductile iron per ASTM A536, Grade 65-45-12 (UNS F33100). Both the Diaphragm and Facing are EPDM. The Diaphragm Ring and Center Valve are bronze per ASTM B62 (UNS C83600), and the Seat Ring is brass per ASTM B584 (UNS C84400 or C83600). The Facing Retainer is brass per ASTM B584 (UNS C84400). The Cap Screws and Facing Retainer Screw are Type 303 stainless steel.

The nominal pressure loss versus flow is shown in Graph A-1 and A-2. The approximate friction loss, based on the Hazen and Williams formula and expressed in equivalent length of Schedule 40 pipe with C = 120, is 10 feet. The equivalent length of pipe has been calculated on the basis of flow rates typically used with a 2-1/2 inch (65 mm) size valve.

Valve Trim:

The Wet Pilot Actuation Trim, Dry Pilot Actuation Trim, or Electric Actuation Trim illustrated in Figure F-1 form a part of the laboratory listings and approval of the F445 Valve and are necessary for proper operation of the F445 Valve.

The trim packages, may be installed on the F445 Valve with either "flow left" or "flow right", and each package includes the following items:

- Water Supply Pressure Gauge
- Diaphragm Chamber Pressure Gauge
- Diaphragm Chamber Connections
- Actuation Devices (as applicable)
- Main Drain Valve
- Alarm Test Valve
- Alarm Control Valve
- Automatic Drain Valve

To ease field assembly of the trim arrangements, the appropriate components required for Wet Pilot Actuation, Dry Pilot Actuation, or Electric Actuation are factory assembled as shown in Figure F-2.

Wet Pilot Actuation
(Figure F-1, Items 1 through 34)
The Wet Pilot Actuation Trim provides for connection of a detection system consisting of wet pilot sprinklers (heat detectors) and manual control stations interconnected with minimum 1/2 inch (15 mm) Schedule 40 steel pipe. The pilot line is connected to the "Wet Pilot Detection" connection shown in Figure F-1. Nominal installation dimensions for the Wet Pilot Actuation Trim are shown in Figure D.

Wet pilot sprinklers are to be minimum 1/2 inch (15 mm) orifice listed or approved automatic sprinklers. Manual Control Stations are to be either the Model F180 or F184 described in Technical Data Sheet TD121.

The maximum height of a wet pilot line above the F445 Valve must not exceed the limitations given in Graph B as a function of the minimum water supply pressure to the F445 Valve and the length of the pilot line to the most remote pilot sprinkler.

Provision must be made for installing a 1/2 inch (15 mm) orifice, Inspector's Test Connection at the most hydraulically demanding location of a wet pilot line (usually adjacent to the highest and most remote wet pilot sprinkler or manual control station).

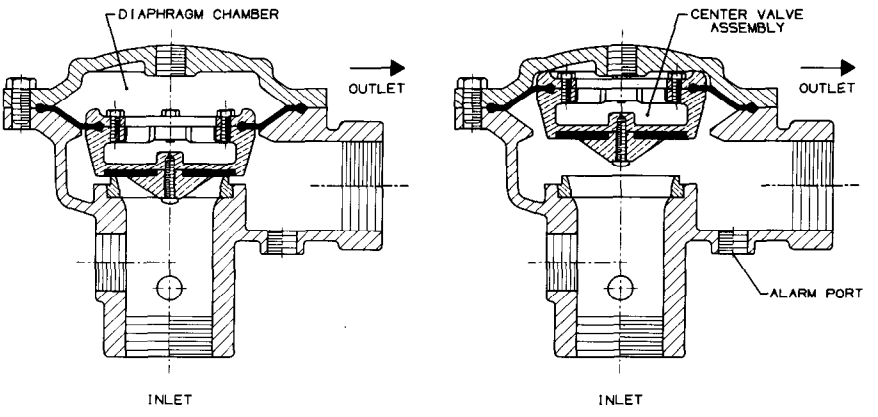
To determine the most hydraulically demanding location of a wet pilot line, when the choice between two or more locations is not readily apparent, determine for each location the elevation above the F445 Valve and the equivalent length of fittings plus pipe from the F445 Valve to the location. Then, using Graph B, determine the minimum system supply pressure required for the elevation and equivalent length of pipe at each location. Interpolate between the equivalent length plots as necessary. The location requiring the highest system supply pressure is the most hydraulically demanding location for the wet pilot line. (Reference: In no case should the required system supply pressure exceed the actual available minimum expected system supply pressure.)

Operation of a pilot sprinkler or opening of a manual control station results in a rapid pressure drop in the Diaphragm Chamber of the F445 Valve, and the force differential holding the F445 Valve in the set position is eliminated.

NOTES

Wet Pilot Lines must be maintained at a minimum temperature of 40°F/4°C.

It is recommended that internally galvanized pipe and cast iron fittings be used for wet pilot lines.



— Set Position — **— Open Position —**

FIGURE C
MODEL F445 AUTOMATIC RESETTING DELUGE VALVE
— OPEN AND SET POSITIONS —

When a manual control station is opened to operate the F445 Valve, the manual control station must remain open in order for the F445 Valve to remain open.

Dry Pilot Actuation
(Figure F-1, Items 1 through 34 plus Items D1 through D15)
The Dry Pilot Actuation Trim provides for installation of a detection system consisting of dry pilot sprinklers (heat detectors) and manual control stations interconnected with minimum 1/2 inch (15 mm) steel pipe. The pilot line, which is to be pressurized with air or nitrogen, is connected to the "Dry Pilot Detection" connection shown in Figure F. Provision must be made for a 1/2 inch (15 mm) orifice, Inspector's Test Connection at the most remote location from the F445 Valve. Nominal installation dimensions for Dry Pilot Actuation Trim are shown in Figure E.

The Dry Pilot Actuation Trim is provided with a listed and approved Model B-1 Dry Pilot Actuator, which is described in Technical Data Sheet TD117W. The Actuator is rated for use at a maximum pilot service pressure of 50 psi (3,4 bar) and a maximum water supply service pressure of 175 psi (12,1 bar).

Operation of a pilot sprinkler or opening of a manual control station releases pneumatic pressure from the pilot line. In turn, the Dry Pilot Actuator opens resulting in a rapid pressure drop in the Diaphragm Chamber of the F445 Valve, and the force differential holding the F445 Valve in the set position is eliminated.

Dry pilot sprinklers are to be minimum 1/2 inch (15 mm) orifice listed or approved automatic sprinklers. Manual Control Stations are to be either the Model F180 or F184 described in Technical Data Sheet TD121.

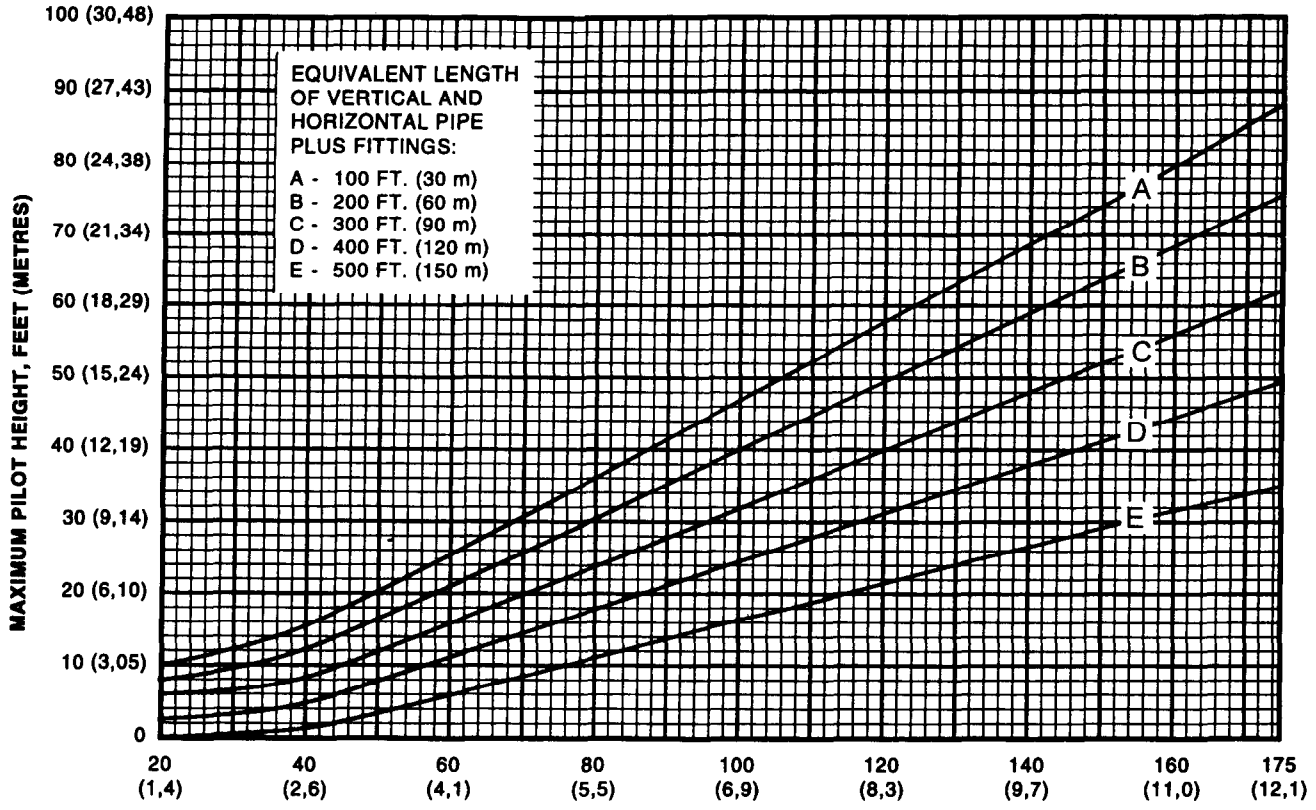
Graph C shows the "minimum pilot line service pressure" as a function of the water supply pressure. The pressure in the dry pilot actuation system must be automatically maintained using one of the following maintenance devices, as appropriate.

- Model F324 Air Maintenance Device (pressure reducing type), refer to Technical Data Sheet TD111.
- Model F326 Air Maintenance Device (compressor control type), refer to Technical Data Sheet TD112.
- Model F328 Nitrogen Maintenance Device (high pressure reducing type), refer to Technical Data Sheet TD113.

NOTES

The dewpoint of the pilot line air pressure must be maintained below the lowest ambient temperature to which the dry pilot actuation system will be exposed. Accumulation of water in the pilot line connection to the Actuator will lower the air pressure at which the Actuator will open and possibly prevent proper operation. Also, introduction of moisture into the pilot lines exposed to freezing temperatures can create an ice buildup which could prevent proper operation of the Actuator.

An air dryer must be installed where the moisture content of the air supply is not properly controlled at less than the required value. The desiccant dryer with mounting accesories de-



NOTE: IF THE SUPPLY PRESSURE IS VARIABLE, ASSUME MINIMUM EXPECTED VALUE.

GRAPH B
WET PILOT LINE DESIGN CRITERIA

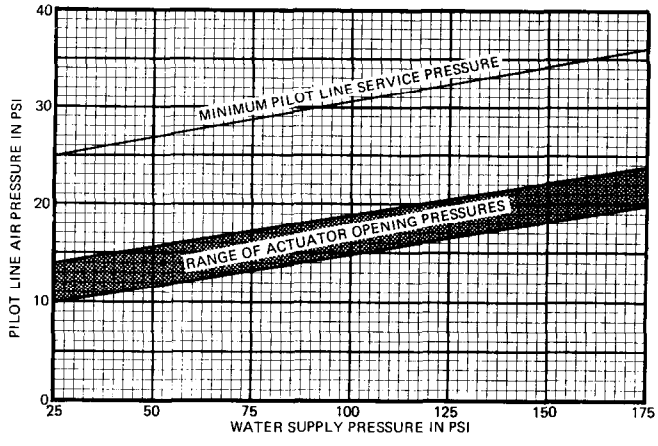
scribed in Technical Data Sheet TD135 is suitable for use with a maximum inlet pressure of 150 psi (10,3 bar) and for drying system air at a maximum pressure of 45 psi (3,1 bar) down to a dewpoint of less than -20°F/-29°C.

It is recommended that an F328 Nitrogen Maintenance Device be utilized in dry pilot actuation system applications where the dewpoint must be maintained below -20°F/-29°C. See Technical Data Sheet TD113.

It is recommended that internally galvanized pipe and cast iron fittings be used for dry pilot lines.

When a manual control station is opened to operate the F445 Valve, the manual control station must remain open in order for the F445 Valve to remain open.

Supervision of the pressure in the dry pilot actuation system and/or alarm which separately indicates operation of the detection system is recommended and may be required by the authority having jurisdiction. A dual setting low pressure alarm switch, such as the unit described in Technical Data Sheet TD210, is suitable for the service. The recommended pressure settings are as follows:



GRAPH C
DRY PILOT LINE PRESSURE REQUIREMENTS

- Low pressure alarm setting at approximately 6 psi (0,4 bar) below the minimum pilot line service pressure requirement shown in Graph C.
- Fire alarm setting at approximately 15 psi (1,0 bar) below the minimum pilot line service pressure requirement shown in Graph C.

The Pressure Relief Valve (Ref. Item D5 - Fig. F-1) is factory set to relieve at a pressure of approximately 45 psi (3,1 bar); however, it may be field adjusted to a lower pressure, if required.

Electric Actuation Trim (Figure F-1, Items 1 through 34 plus Items E1 through E5)
The Electric Actuation Trim is required for electric operation of the F445 Valve by a detection system consisting of electrical devices such as heat sensi-

tive thermostats, smoke detectors, and/or electric manual pull stations. Information on the various types of Solenoid Valves that may be used with this trim package is given in Technical Data Sheet TD119. A listed and approved, 24VDC Solenoid Valve for non-hazardous locations is supplied as standard. Nominal installation dimensions for the Electric Actuation Trim are shown in Figure D.

NOTE

Approval by Factory Mutual is contingent on the use of an FM Approved 24VDC Solenoid Valve. FM only approves solenoid valves for use in non-hazardous locations.

The Electric Actuation Trim is only to be used in conjunction with an electric deluge valve releasing panel (automatic control unit) that is listed or approved (as appropriate) for fire protection system releasing service. In addition, the deluge valve releasing panel is only to be operated by listed or approved (as approriate) fire detectors.

Operation of an electrical device such as heat sensitive thermostat, smoke detector, or electric manual pull station signals the deluge valve releasing panel to energize the Solenoid Valve. In turn, the energized Solenoid Valve opens resulting in a rapid pressure drop in the Diaphragm Chamber of the F445 Valve, and the force differential holding the F445 Valve in the set position is eliminated.

NOTES

Consult with the Authority Having Jurisdiction regarding installation criteria pertaining to electric actuation circuitry.

When a Solenoid Valve is energized to operate the F445 Valve, the Solenoid Valve must remain energized in order for the F445 Valve to remain open.

OPERATING PRINCIPLES

The F445 Valve is a differential valve which depends upon water pressure in the Diaphragm Chamber (Ref. Figure C) to hold the Center Valve Assembly closed against the water supply pressure. The nominal trip ratio is 2.5 to 1, i.e., the F445 Valve operates (opens) when the pressure in the Diaphragm Chamber is reduced to approximately 40 percent of the water supply pressure.

When the F445 Valve is set for service, the Diaphragm Chamber is pressurized through the trim connections from the inlet side of the system's main control valve, for example an O.S.&Y. gate valve or butterfly valve (Ref. Figure G-1, G-2, or G-3). Opening of an actuation device, for example the solenoid valve in the Electric Actuation Trim (Ref. Fig. G-3), releases water from the Diaphragm Chamber faster than it can be replenished through the 1/8" (3,2 mm) Restriction in the Diaphragm Chamber Supply Connection. This results in a rapid pressure drop in the Diaphragm Chamber and the force differential holding the Center Valve Assembly down in the set position is eliminated. The water supply pressure then forces the Center Valve Assembly open permitting water to flow into the system piping, as well as through the Alarm Port to actuate system alarms (Ref. Figure C).

NOTE

When an actuation device is opened to operate the F445 Valve (e.g., a solenoid valve or manual control station), the actuation device must remain open in order for the F445 Valve to remain open.

INSTALLATION

NOTES

Proper operation of the Model F445 Deluge Valve depends upon its trim being installed in accordance with the instructions given in this Technical Data Sheet. Failure to follow the appropriate trim diagram may prevent the F445 Valve from funtioning properly, as well as void listings, approvals, and the manufacturer's warranties.

The F445 Valve must be installed in a readily visable and accessible location.

The F445 Valve , associated trim, and wet pilot lines must be maintained at a minimum temperature of 40°F/4°C.

Heat tracing of the F445 Valve or its associated trim is not permitted. Heat tracing can result in the formation of hardened mineral deposits which are capable of preventing proper operation.

The F445 Valve is to be installed in accordance with the following criteria:

1. All nipples, fittings, and devices must be clean and free of scale and burrs before installation. Use pipe thread sealant sparingly on male pipe threads only.

   NOTE

   It is recommended that internally galvanized pipe and cast iron fittings be used for wet or dry pilot lines.

2. The F445 Valve must be trimmed in accordance with Figure F1 & F-2.

3. Care must be taken to make sure that check valves, strainers, globe valves, etc. are installed with the flow arrows in the proper direction.

4. Drain tubing to the drip funnel must be installed with smooth bends that will not restrict flow.

5. The main drain and drip funnel drain may be interconnected provided a check valve is located at least 12 inches (300 mm) below the drip funnel.

6. Suitable provision must be made for disposal of drain water. Drainage water must be directed such that it will not cause accidental damage to property or danger to persons.

7. Connect the Diaphragm Chamber Supply Control Valve to the inlet side of the system's main control valve ir order to facilitate setting of the F445

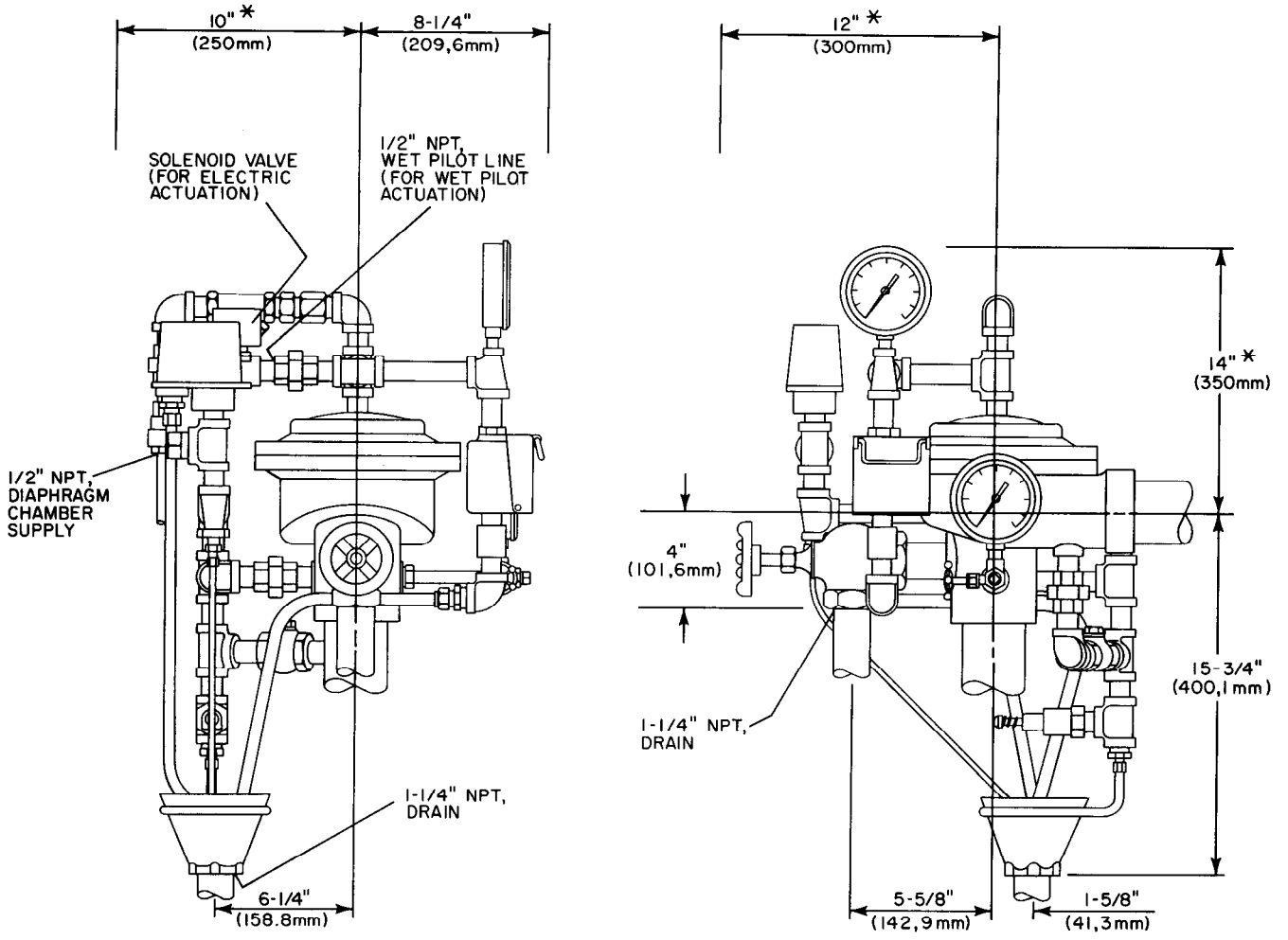


FIGURE D
NOMINAL INSTALLATION DIMENSIONS FOR
WET PILOT ACTUATION TRIM OR ELECTRIC ACTUATION TRIM

* MINIMUM CLEARANCE, ADDITIONAL 2" (50 mm) RECOMMENDED

Deluge Valve (Ref. Figure G-1, G-2, or G-3).

8. An Inspector's Test Connection, as described in the Technical Data section, must be provided for Wet or Dry Pilot Actuation.

9. An Air Maintenance Device, as described in the Technical Data Section, must be provided for Dry Pilot Actuation.

10. A desiccant dryer, when specified for Dry Pilot Actuation, is to be installed between a drip leg and the Air Maintenance Device.

11. The Low Pressure Alarm Switch for Dry Pilot Actuation is to be adjusted as follows:

    - Low pressure alarm setting at approximately 6 psi (0,4 bar) below the minimum pilot line service pressure requirement shown in Graph C.

    - Fire alarm setting at approximately 15 psi (1,0 bar) below the minimum pilot line service pressure requirement shown in Graph C.

12. Unused pressure alarm switch connections must be plugged.

13. The Pressure Relief Valve provided with the Dry Pilot Actuation Trim is factory set to relieve at a pressure of approximately 45 psi (3,1 bar), which can typically be used for a maximum normal dry pilot actuation system pressure of 40 psi (2,8 bar). The Pressure Relief Valve may be reset; however, it must be be reset to relieve at a pressure which is in accordance with the requirements of the authority havng jurisdiction.

    To reset the Pressure Relief Valve, first loosen the jam nut and then adjust the cap accordingly — clockwise for a higher pressure setting or counterclockwise for a lower pressure setting. After verifying the desired pressure setting, tighten the jam nut.

14. Conduit and electrical connections are to be made in accordance with the requirements of the authority having jurisdiction and/or the National Electric Code.

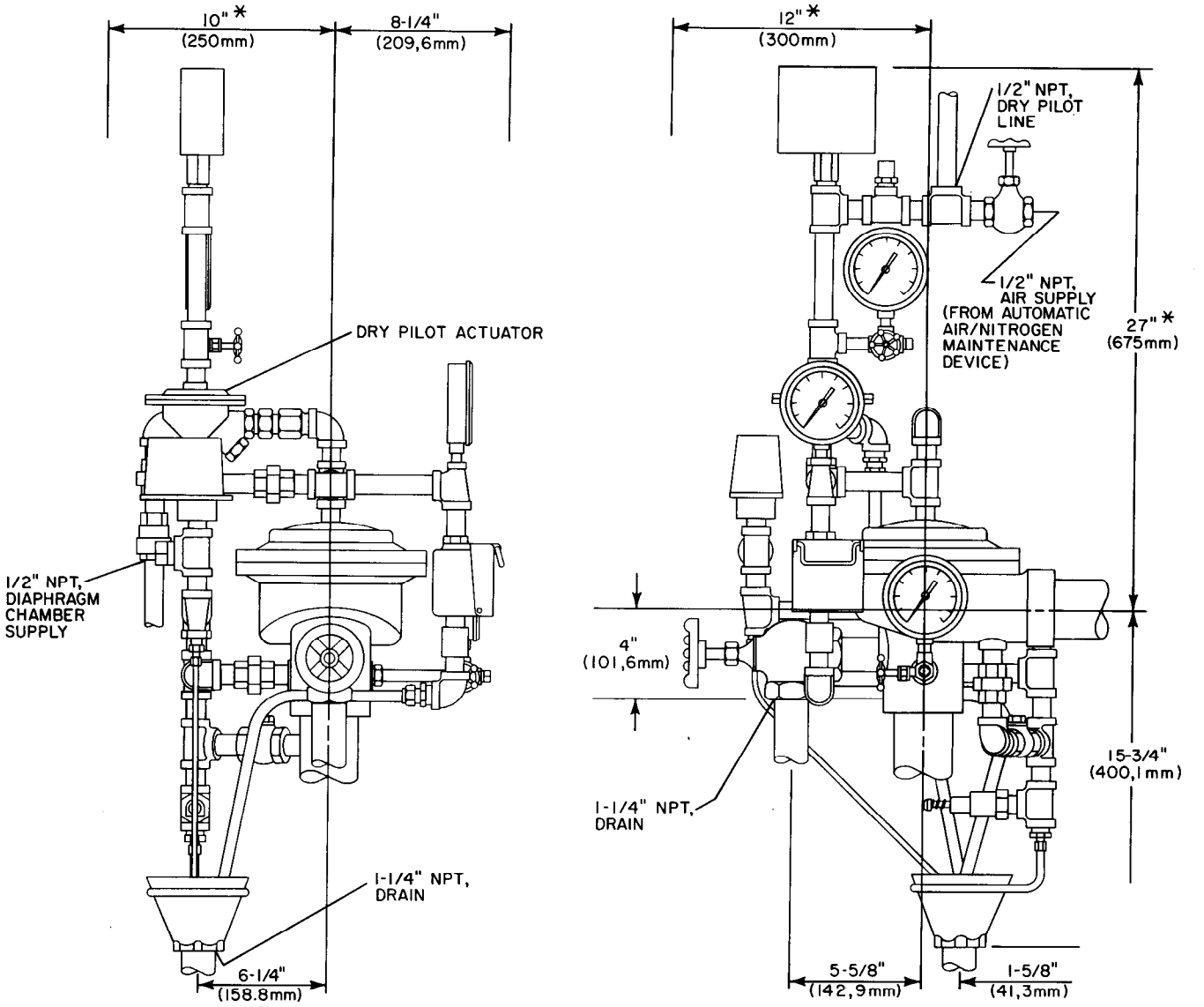


FIGURE E
NOMINAL INSTALLATION DIMENSIONS FOR DRY PLIOT ACTUATION TRIM

* MINIMUM CLEARANCE, ADDITIONAL 2" (50 mm) RECOMMENDED

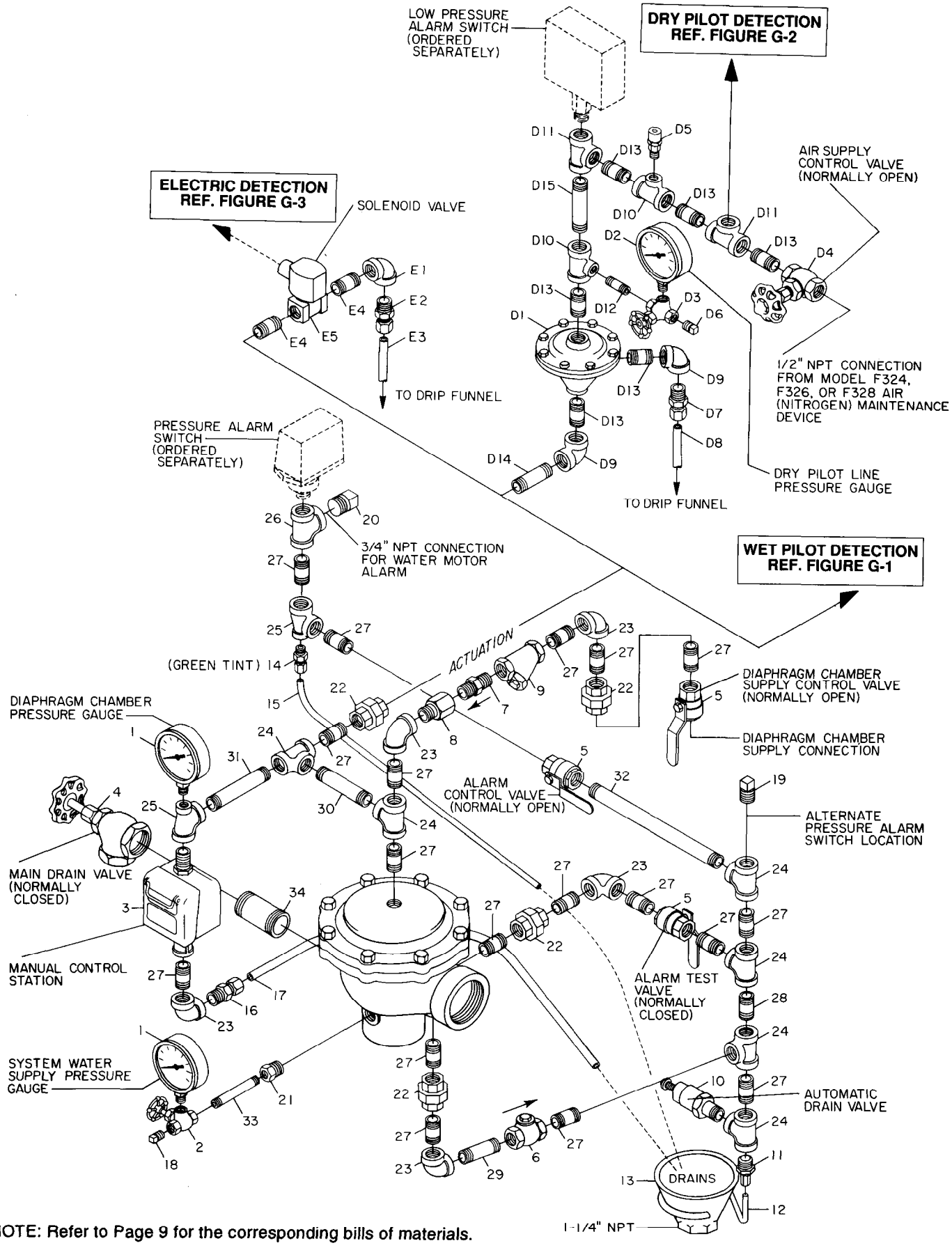
VALVE SETTING PROCEDURE

Steps 1 through 11 are to be performed when initially setting the F445 Valve; after an operational test of the fire sprinkler system; or, after system operation due to a fire.

1. Close the Diaphragm Chamber Supply Control Valve.
2. Close the Main Control Valve, and if the system is equipped with Dry Pilot Actuation, close the Air Supply Control Valve (Ref. Figure F-1).
3. Open the Main Drain Valve and all auxiliary drains in the system. Close the auxiliary drain valves after water ceases to discharge. Leave the Main Drain Valve open.
4. Depress the plunger of the Automatic Drain Valve to verify that it is open and that the F445 Valve is completely drained.
5. Clean the Strainer in the Diaphragm Chamber Supply connection by removing the clean-out plug and strainer basket. The Strainer may be flushed out by momentarily opening the Diaphragm Chamber Supply Control Valve.
6. Open the Alarm Control Valve (Fig. F), if it was closed to silence local alarms.

   It is recommended that the Alarm Control Valve be wire sealed in the open position with a No. 16 twisted wire, the ends of which are secured by a lead seal. The wire seal should be looped through the hole in the handle and tightly twisted around the pipe nipple adjacent to the handle.
7. Reset the actuation system.

   Manual Actuation — Push the operating lever up; however, do not close the hinged cover at this time.



NOTE: Refer to Page 9 for the corresponding bills of materials.

FIGURE F-1
VALVE TRIM ASSEMBLY

1 - 300 lb. Water Pressure Gauge (2 req'd)
2 - 1/4" Gauge Test Valve
3 - Model F180 Manual Control Station
4 - 1-1/4" Angle Valve
5 - 1/2" Ball Valve (3 req'd)
6 - 1/2" Swing Check Valve
7 - 1/2" Spring Loaded Check Valve
8 - Priming Supply Restriction
9 - 1/2" Y-Strainer
10 - Model F793 Automatic Drain Valve
11 - Drip Funnel Support Plug
12 - Drip Funnel Support
13 - Drip Funnel
14 - 3/32" Vent Fitting
15 - 1/4" Tube, 24" long
16 - 1/2" Tube Connector
17 - 1/2" Tube, 24" long
18 - 1/4" Plug
19 - 1/2" Plug
20 - 3/4" Plug
21 - 1/2" x 1/4" Bushing
22 - 1/2" Union (4 req'd)
23 - 1/2" 90° Elbow (5 req'd)
24 - 1/2" Tee (6 req'd)
25 - 1/2" x 1/4" x 1/2" Tee (2 req'd)
26 - 1/2" x 1/2" x 3/4" Tee
27 - 1/2" x 1-1/2" Nipple (18 req'd)
28 - 1/2" x 2" Nipple
29 - 1/2" x 2-1/2" Nipple
30 - 1/2" x 3-1/2" Nipple
31 - 1/2" x 4-1/2" Nipple
32 - 1/2" x 10-1/2" Nipple
33 - 1/4" x 3" Nipple
34 - 1-1/4" x 3" Nipple

D1 - Model B-1 Dry Pilot Actuator
D2 - 250 lb. Air Pressure Gauge
D3 - 1/4" Gauge Test Valve
D4 - 1/2" Globe Valve
D5 - 1/4" Pressure Relief Valve
D6 - 1/4" Plug
D7 - 1/2" Tube Connector
D8 - 1/2" Tube, 24" long
D9 - 1/2" 90° Elbow
D10 - 1/2" x 1/2" x 1/4" Tee (2 req'd)
D11 - 1/2" Tee (2 req'd)
D12 - 1/4" x 1-1/2" Nipple
D13 - 1/2" x 1-1/2" Nipple (6 req'd)
D14 - 1/2" x 2-1/2" Nipple
D15 - 1/2" x 5" Nipple

E1 - 1/2" 90° Elbow
E2 - 1/2" Tube Connector
E3 - 1/2" Tube, 24" long
E4 - 1/2" x 1-1/2" Nipple (2 req'd)
E5 - 24VDC Solenoid Valve

NOTES:

1. **Wet Pilot Actuation Trim** consists of Items 1 through 34.
2. **Dry Pilot Actuation Trim** consists of Items 1 through 34 plus Items D1 through D15.
3. **Electric Actuation Trim** consists of Items 1 through 34 plus E1 through E5.
4. The illustrated arrangement, shown on Page 8, is for "Flow Right". A "Flow Left" arrangement can be obtained using the same bill of materials.
5. The nipples utilized in the trim arrangements are Schedule 40 black steel per ASTM A53 or A135 and they are threaded per ANSI B1.20.1. Fittings are either malleable iron per ANSI B16.3 or cast iron per ANSI B16.4.

FIGURE F
VALVE TRIM ASSEMBLY

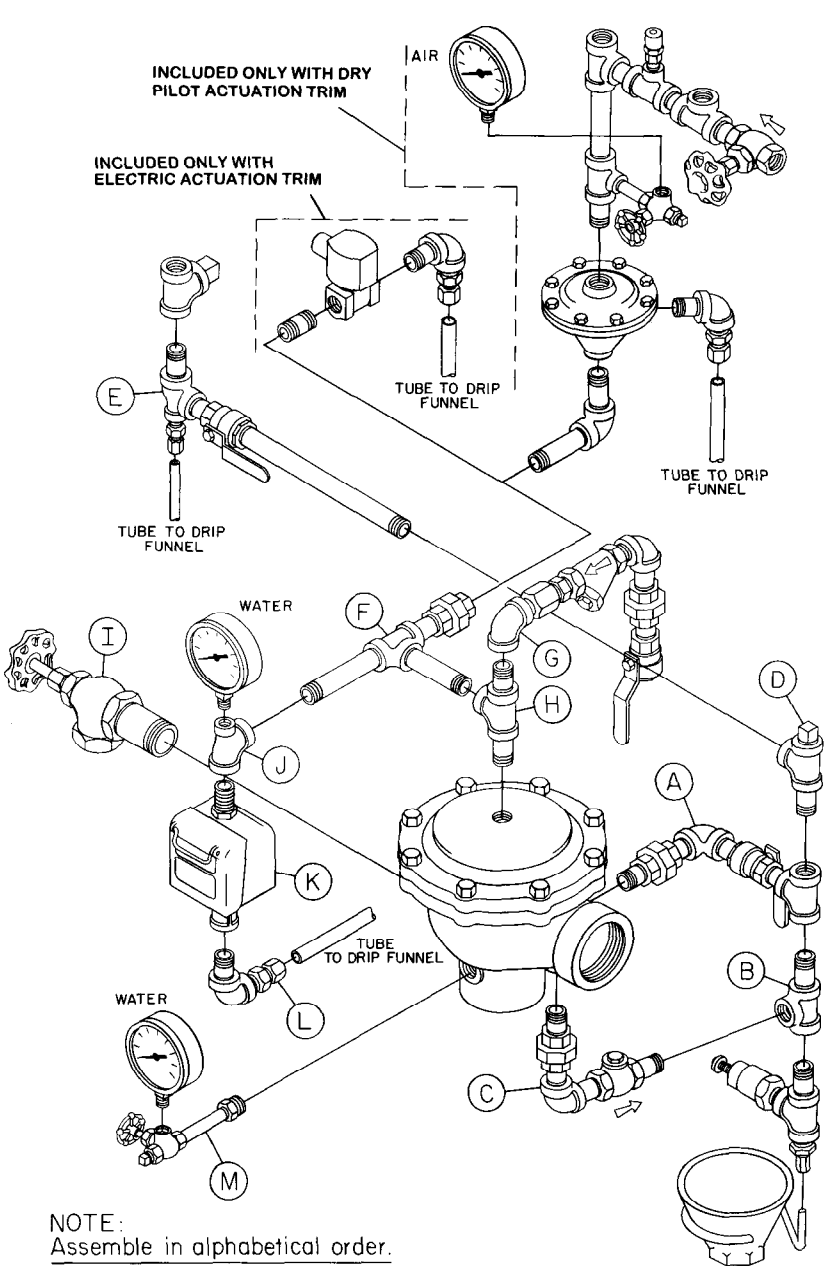


FIGURE F-2
"STANDARD ORDER" FACTORY ASSEMBLED VALVE TRIM

Wet Pilot Actuation — Replace operated pilot sprinklers and/or reset the manual control stations.

Dry Pilot Actuation — Replace operated pilot sprinklers and/or reset the manual control stations. Re-establish dry pilot pneumatic pressure.

Electric Actuation — Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the solenoid valve.

NOTE

In order to prevent the possibility of a subsequent operation of an overheated solder type sprinkler, any solder type sprinklers which were possibly exposed to a temperature greater than their maximum rated ambient must be replaced.

8. Open the Diaphragm Chamber Supply Control Valve and allow time for full pressure to build up in the Diaphragm Chamber.
9. Operate (open) the Manual Control Station to vent trapped air from the Diaphragm Chamber. If necessary, first open the hinged cover, and then fully pull down on the operating lever. SLOWLY close the operating lever, by pushing it up, after aerated water ceases to discharge from the

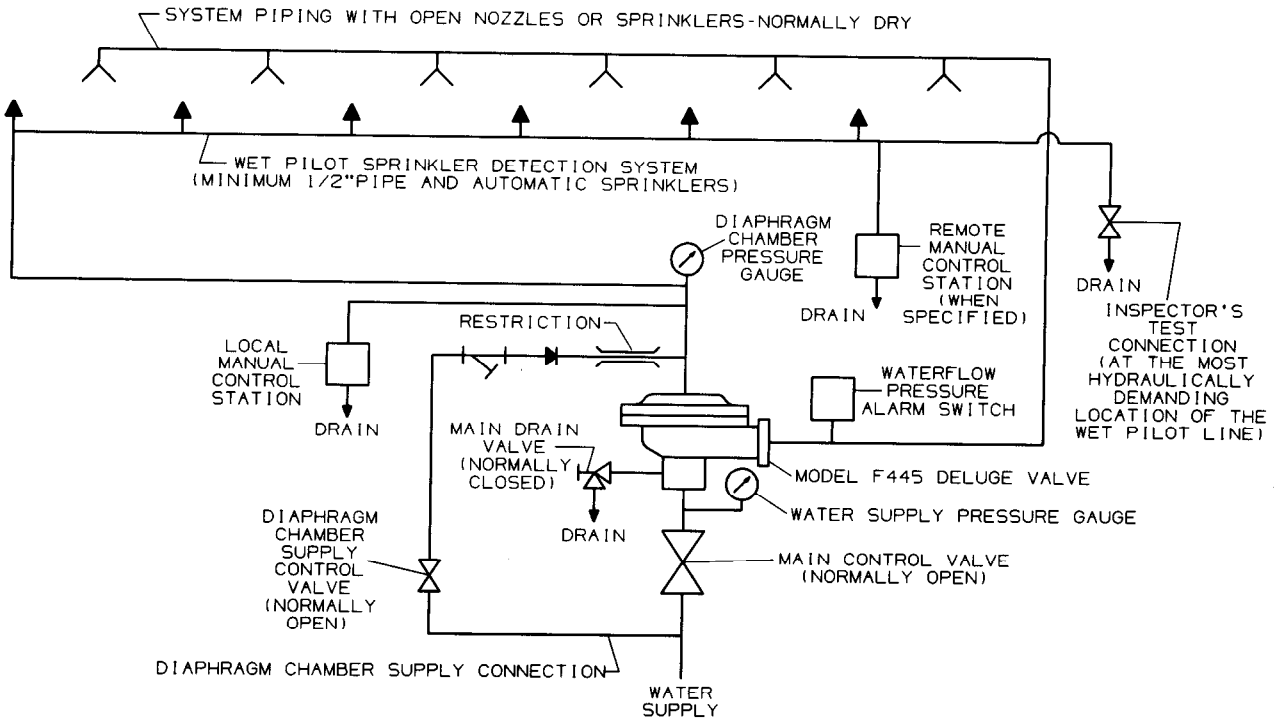


FIGURE G-1
DELUGE VALVE SYSTEM SCHEMATIC
— WET PILOT ACTUATION—

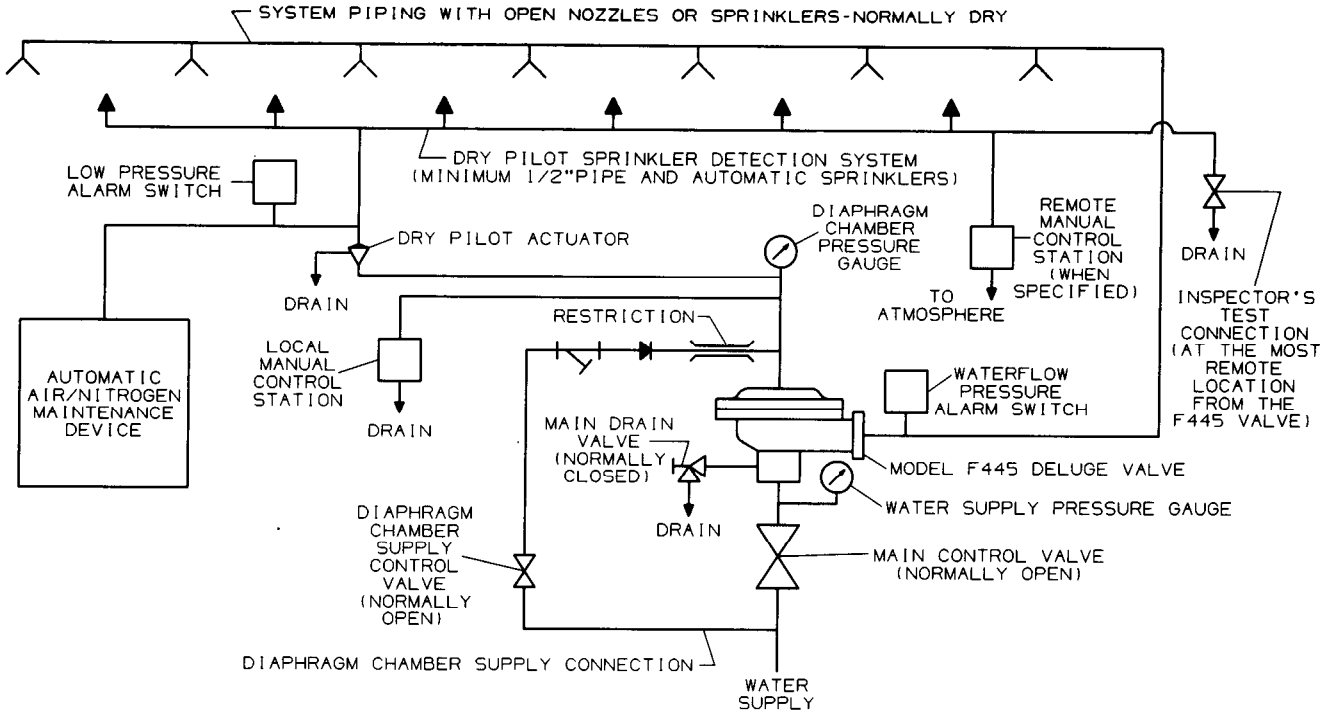


FIGURE G-2
DELUGE VALVE SYSTEM SCHEMATIC
— DRY PILOT ACTUATION—

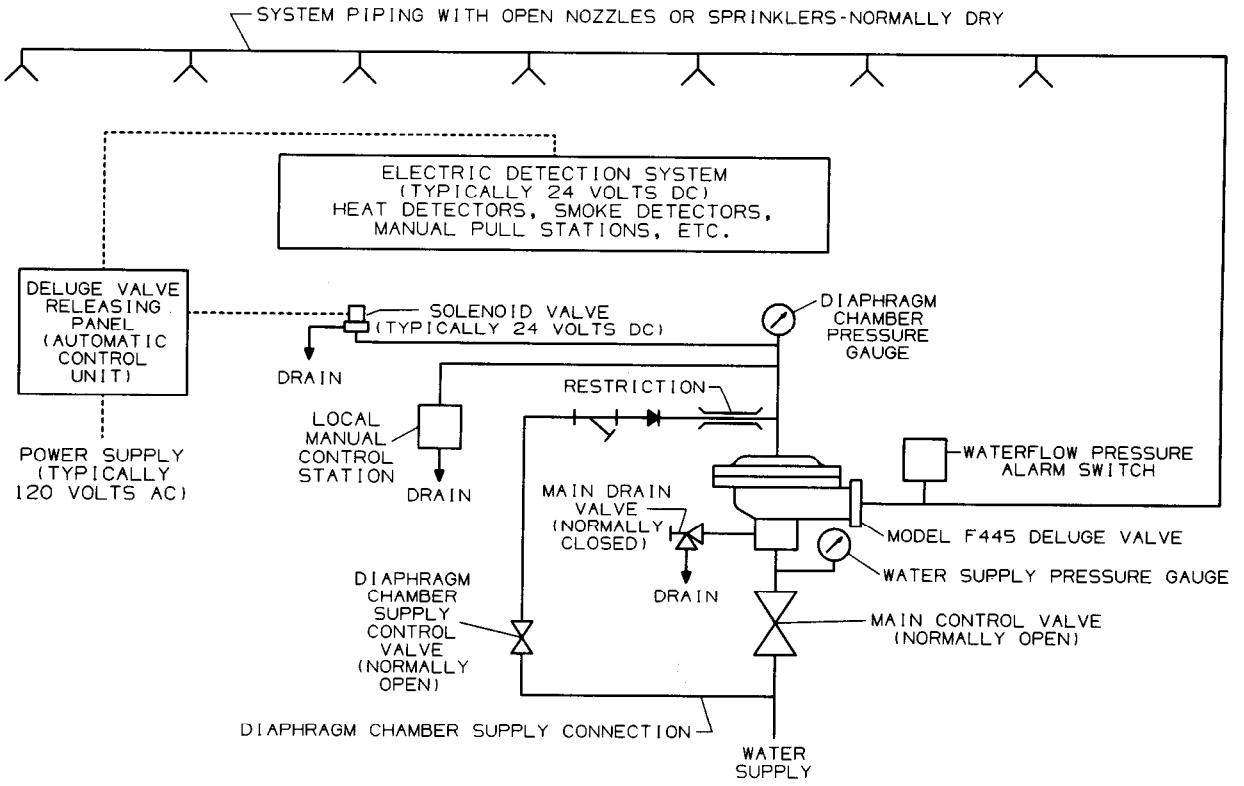


FIGURE G-3
DELUGE VALVE SYSTEM SCHEMATIC
— ELECTRIC ACTUATION—

Manual Control Station drain tubing. Close the hinged cover and insert a new break rod in the small hole through the top of the enclosing box.

If wet pilot actuation is being used, crack open the Inspector's Test Connection and any other vent valves, to relieve trapped air. After the discharge of air has stopped, close the vent valves and the Inspector's Test Connection.

10. Inspect drain connections from the Manual Control Station, Solenoid Valve, Dry Pilot Actuator, and Alarm Devices, as applicable. Any leaks must be corrected before proceeding to the next step.

11. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the F445 Valve is ready to be placed in service and the Main Control Vave must then be fully opened.

NOTE
After setting a fire protection system, notify the proper authorities and advise those responsible for monitoring proprietary and/or central station alarms.

CARE AND MAINTENANCE

The following procedures and inspections should be perform as indicated, in addition to any specific requirements of the NFPA, and any impairment must be immediately corrected. It is also recommended that fire protection systems be inspected by a qualified Inspection Service.

NOTES

The operational test procedure, waterflow pressure alarm test procedure, and low pressure alarm test procedure will result in operation of the associated alarms. Consequently, notification must be given to the owner and the fire department, central station, or other signal station to which the alarms are connected.

Before closing a fire protection system main control valve for maintenance work on the fire protection system which it controls, permission to shut down the effected fire protection systems must first be obtained from the proper authorities and all personnel who may be affected by this decision must be notified.

Annual Operation Test Procedure

Proper operation of the F445 Valve (i.e., opening of the F445 Valve as during a fire condition) should be verified at least once a year as follows:

1. If water must be prevented from flowing beyond the riser, perform the following steps.
   a. Close the Main Control Valve.
   b. Open the Main Drain Valve.
   c. Open the Main Control Valve one turn beyond the position at which water just begins to flow from the Main Drain Valve.
   d. Close the Main Drain Valve.
2. Determine the type of actuation/detection system, and operate the F445 Valve accordingly.

   NOTE

   Be prepared to quickly perform Steps 3, 4, and 5, if water must be prevented from flowing beyond the riser.

   Wet Pilot Actuation — Open the Inspector's Test Connection.

   Dry Pilot Actuation — Open the Inspector's Test Connection.

   Electric Actuation — Test the deluge releasing panel (automatic control unit) in accordance with the manufacturer's instructions to energize the solenoid valve.
3. Verify that the F445 Valve has tripped, as indicated by the flow of water into the system.
4. Close the Diaphragm Chamber Supply Control Valve.
5. Close the system's Main Control Valve.
6. Reset the F445 Deluge Valve in accordance with the Valve Setting Procedure.

Five Year Internal Valve Inspection

Once every five years during the annual operation procedure and prior to the F445 Valve being reset, the internal parts of the F445 valve should be cleaned and inspected for wear and damage. Special consideration should be given to the condition of the Diaphragm. The Diaphragm should be replaced if there are any sign of deterioration due to age or chemicals in the water. If the water supply contains chemicals which tend to attack an EPDM type rubber, then the frequency of the Diaphragm inspection should be increased to at least annually.

Worn or damaged parts must be replaced and the F445 Valve must be reassembled in accordance with Figure B. The Cap Screws securing the Cover should be uniformly tightened using a cross-draw sequence.

Quarterly Solenoid Valve Test Procedure For Electric Actuation

Proper operation of the Solenoid Valve for electric actuation should be verified at least quarterly as follows:

1. Close the Main Control Valve.
2. Open the Main Drain Valve.
3. Test the automatic control unit (deluge releasing panel) in accordance with the manufacturer's instructions to energize the solenoid valve.
4. Verify that the flow of water from the Solenoid Valve drain connection increases to a full flow.
5. Verify that the Diaphragm Chamber pressure has decreased to below 25% of the water supply pressure.
6. Reset the electric detection system in accordance with the manufacturer's instructions to de-energize the solenoid valve. Check the Solenoid Valve drain for leaks. Any leaks must be corrected before proceeding to the next step.
7. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the F445 Valve is ready to be placed in service and the Main Control Vave must then be fully opened.

Quarterly Dry Pilot Actuator Test Procedure For Dry Pilot Actuation

Proper operation of the Dry Pilot Actuator for dry pilot actuation should be verified at least quarterly as follows:

1. Close the Main Control Valve.
2. Open the Main Drain Valve.
3. Open the Inspector's Test Connection on the Dry Pilot Line.
4. Verify that the flow of water from the Dry Pilot Actuator drain connection increases to a full flow.
5. Verify that the Diaphragm Chamber pressure has decreased to below 25% of the water supply pressure.
6. Close the Inspector's Test Connection and allow the dry pilot line pressure to re-establish. Check the Dry Pilot Actuator drain for leaks. Any leaks must be corrected before proceeding to the next step.
7. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, the F445 Valve is ready to be placed in service and the Main Control Vave must then be fully opened.

Quarterly Waterflow Alarm Test Procedure

Testing of the the system waterflow alarms should be performed quarterly. To test the waterflow alarm, open the Alarm Test Valve, which will allow a flow of water to the Pressure Alarm Switch and/or Water Motor Alarm. Upon satisfactory completion of the test, close the Alarm Test Valve.

Quarterly Low Pressure Alarm Test Procedure And Condensate Drain Procedure For Dry Pilot Actuation

For Dry Pilot Actuation, testing of the Low Pressure Alarm Switch and drain-

age of the pilot line condensate should be performed quarterly as follows.

1. Close the Diaphragm Chamber Supply Control Valve.
2. Close the Main Control Valve.
3. Open the Main Drain Valve.
4. Drain the dry pilot line condensate as follows.
   a. Close the Gauge Test Valve located below the Dry Pilot Line Pressure Gauge.
   b. Remove the 1/4" Plug from the Gauge Test Valve.
   c. Crack Open the Gauge Test Valve and allow all condensate, if any, to drain out.
   d. Close the Gauge Test Valve, replace the Plug, and then open the Gauge Test Valve.
5. Open the Inspector's Test Connection, and slowly relieve pneumatic pressure. Verify that the Low pressure Alarm Switch is operational and that the low pressure set points are as follows:
   - Low pressure alarm setting at approximately 6 psi (0,4 bar) below the minimum pilot line service pressure requirement shown in Graph C.
   - Fire alarm setting at approximately 15 psi (1,0 bar) below the minimum pilot line service pressure requirement shown in Graph C.
6. Close the Inspector's Test Connection, and allow the Dry Pilot Line to automatically repressurize.
7. Open the Diaphragm Chamber Supply Control Valve.
8. Slowly open the Main Control Valve. Close the Main Drain Valve as soon as water discharges from the drain connection. Observe the Automatic Drain Valve for leaks. If there are leaks, determine/correct the cause of the leakage problem. If there are no leaks, fully open the Main Control Valve.

WARRANTY

Seller warrants for a period of one year from the date of shipment (warranty period) that the products furnished hereunder will be free from defects in material and workmanship.

For further details on Warranty, see Price List.

ORDERING PROCEDURE

All orders for Model F445 Valves, trim, accessories, and replacement parts must include the description and Product Symbol Number (PSN), where applicable.

ANSI Pipe Connection Valves:

Specify: 2-1/2 inch, (specify Thread x Thread or Groove x Groove), Model F445 Automatic Resetting Deluge Valve for ANSI Pipe Connection, PSN (specify).

Thread x Thread (NPT)	PSN 52-445-1-001
Groove x Groove (73.0 mm O.D.)	PSN 52-445-1-002

ISO Pipe Connection Valves:

Specify: 2-1/2 inch, (specify Tapered Thread x Thread; Parallel Thread x Thread; or, Groove x Groove), Model F445 Automatic Resetting Deluge Valve for ISO Pipe Connection, PSN (specify).

Tapered Thread x Thread (ISO 7/1)	PSN 52-445-4-001
Parallel Thread x Thread (ISO 7/1)	PSN 52-445-4-002
Groove x Groove (76.1 mm O.D.)	PSN 52-445-4-003

Trim:

Unless otherwise specified, all trim arrangements are provided factory assembled as shown in Figure F-2. Unassembled trim packages as shown in Figure F-1 can be provided on "special order". Product Symbol Numbers (PSN) need not be specified when ordering unassembled trim.

"Standard Order" Factory Assembled Black Trim:

Specify: (specify type trim) for use with the Model F445 Automatic Resetting Deluge Valve, PSN (specify).

Wet Pilot Actuation Trim	PSN 52-445-1-101
Dry Pilot Actuation Trim	PSN 52-445-1-102
Electric Actuation Trim With 24VDC Solenoid Valve	PSN 52-445-1-103

"Special Order" Factory Assembled Galvanized Trim:

Specify: (specify type trim) for use with the Model F445 Automatic Resetting Deluge Valve, PSN (specify).

Wet Pilot Actuation Trim	PSN 52-445-2-101
Dry Pilot Actuation Trim	PSN 52-445-2-102
Electric Actuation Trim With 24VDC Solenoid Valve	PSN 52-445-2-103

"Special Order" Electric Actuation Trim With Separately Ordered Solenoid Valve Trim:

Specify: (specify Factory assembled or Unassembled), (specify black or galvanized) Electric Actuation Trim With Separately Ordered Solenoid Valve for use with the Model F445 Automatic Resetting Deluge Valve.

When ordering "Electric Actuation Trim With Separately Ordered Solenoid Valve", refer to Technical Data Sheet TD119 for information on separately ordered, UL Listed Solenoid Valves that may be suitable for use in hazardous locations or that have voltage ratings other than 24VDC.

NOTE

Factory Mutual Approval for electric actuation of the F445 Valve is contingent on the use of the FM Approved 24VDC Solenoid Valve provided with the "Standard Order" Electric Actuation Trim, PSN 52-445-1-103 or PSN 52-445-2-103.

Accessories:

Refer to the following Technical Data Sheets (TD), as applicable.

Pressure Alarm Switch	TD213
Low Pressure Alarm Switch	TD210
Model F324 Air Maintenance Device	TD111
Model F326 Air Maintenance Device	TD112
Model F328 Nitrogen Maintenance Device	TD113
Desiccant Dryer	TD135
Model F180 or F184 Manual Control Stations	TD121

Replacement Valve Parts (Fig. B):

Specify: (description) for use with Model F445 Automatic Resetting Deluge Valve, PSN (specify).

2 - Cover ..... PSN 92-445-1-002
3 - Diaphragm ..... PSN 92-445-1-003
4 - Diaphragm Ring ..... PSN 92-445-1-004
5 - Cap Screw, 1/4"-20 UNC x 3/4" ..... PSN 62-634-1-104
6 - Cap Screw, 1/2"-13 UNC x 7/8" ..... PSN 62-634-1-111
7 - Center Valve ..... PSN 92-445-1-005
8 - Facing ..... PSN 92-445-1-006
10 - Facing Retainer ..... PSN 92-445-1-008
11 - Retainer Screw ..... PSN 62-679-1-012

Replacement Trim Parts (Fig. F-1):

Specify: (description) for use with Model F445 Automatic Resetting Deluge Valve, PSN (specify).

1 - 300 lb. Water Pressure Gauge ..... PSN 92-343-1-005
2 - 1/4" Gauge Test Valve ..... PSN 46-005-1-002
3 - F180 Manual Control Station ..... PSN 52-289-1-001
4 - 1-1/4" Angle Valve ..... PSN 46-048-1-007
5 - 1/2" Ball Valve ..... PSN 46-050-1-004
6 - 1/2" Swing Check Valve ..... PSN 46-049-1-004
7 - 1/2" Spring Loaded Check Valve ..... PSN 92-322-1-002
8 - Priming Supply Restriction ..... PSN 92-020-1-009
9 - 1/2" Y-Strainer ..... PSN 52-353-1-005
10 - F793 Automatic Drain Valve ..... PSN 52-793-1-004
11 - Drip Funnel Support Plug ..... PSN 92-211-1-005
12 - Drip Funnel Support ..... PSN 92-211-1-003
13 - Drip Funnel ..... PSN 92-343-1-007
14 - 3/32" Vent Fitting ..... PSN 92-032-1-002
D1 - B-1 Dry Pilot Actuator ..... PSN 52-280-1-001
D2 - 250 lb. Air Pressure Gauge ..... PSN 92-343-1-012
D3 - 1/4" Gauge Test Valve ..... PSN 46-005-1-002
D4 - 1/2" Globe Valve ..... PSN 46-047-1-004
D5 - 1/4" Pressure Relief Valve ..... PSN 92-343-1-020
E5 - 24VDC Solenoid Valve ..... PSN 52-287-1-024

WEIGHTS

The following are the nominal weights for the valves and trim:

2-1/2" Thread x Thread Model F445 Deluge Valve .... 41 lbs. (18,6 kg)
2-1/2" Groove x Groove Model F445 Deluge Valve .... 44 lbs. (20,0 kg)
Wet Pilot Actuation Trim ..... 24 lbs. (10,9 kg)
Dry Pilot Actuation Trim ..... 34 lbs. (15,4 kg)
Electric Actuation Trim With 24VDC Solenoid Valve .. 27 lbs. (12,2 kg)