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SECURITY & SAFETY TRADING

FIRE FIGHTING SYSTEMS

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APPROVALS

FIREGUARD 200 TO 15000 LITERS

BLADDER TANK

PRODUCT OVERVIEW

LISTED
EX28439

FIREGUARD Bladder Tank Foam Proportioning System utilises the water pressure to inject foam concentrate into a water supply and automatically proportions foam concentrate over wide range of flow and pressure, with very low pressure drop. This system does not require a foam concentrate supply pump.

SPECIFICATIONS

The Bladder Tank Foam Proportioning System are available with vertical and horizontal bladder tanks. The carbon steel tanks are designed and constructed in accordance with ASME Code Section Vlll Div.1 for unfired pressure vessels.
The maximum working pressure is 12 Bar (175 PSI). The vertical tank assembly is supported by legs welded to tank with provision for anchoring. The horizontal tanks are supported by two saddles welded to the tank and drilled for anchoring. Tank is provided with lifting lugs.
The system is supplied with pressure vessel, bladder, fill and drain valve for water and foam concentrate, ratio controller and vent valve. Ladder and sight gauge assembly are supplied as optional items on request.
All valves are labeled showing normal working position and function.
All tanks are oversized for allowing thermal expansion of the foam concentrate, if any.

TECHNICAL DATA

TANK MOUNTING TYPE	Vertical or Horizontal
CONCENTRATE STORAGE CAPACITY	For Vertical Tank 200 liters to7500 liters (53 TO 2000 Gallon (US)) For Horizontal Tank 200 liters to 15000 liters (53 to 4000 Gallon (US))
MAXIMUM WORKING PRESSURE	12 Bar (175PSI) Standard Supply Higher pressure rating can be given on request
FACTORY HYDRO TEST PRESSURE	As per ASME code
VESSEL CONSTRUCTION	Carbon Steel as per ASME Code Section VIII Div 1, for unfired pressure vessels
"U" STAMP	Optional
BLADDER	Buna-N
CENTRE TUBE	Perforated PVC
EXTERNAL PIPING	Water side: Carbon Steel seamless pipe sch 40 Foam concentrate side: Stainless Steel sch 40
RATIO CONTROLLER	Wafer type with Stainless Steel 304/CF8 standard material Optional: Stainless steel 316/CF8M or Bronze
VENT AND DRAIN	Ball valve
APPROVALS	UL-Listed
OPTIONAL SUPPLY	Refer to page 3
FINISH	Red RAL 3000
ORDERING INFORMATION	Specify: 1) Tank type, vertical or horizontal 2) Storage capacity 3) Model number, size of ratio controller with flow and pressure 4) Type of foam concentrate to be used and percentage of induction required 5) Optional items

PRINCIPLE OF OPERATION

The instructions for filling are provided with the equipment. Once the main water flow is established and water inlet and foam outlet valves are opened, the water enters the area between vessel wall and bladder, applying pressure to the bladder. The foam concentrate is forced out of the bladder through the foam concentrate outlet pipe and into the ratio controller through metering orifice. The concentrate pressure and water inlet pressure at ratio controller will be same, as the main water supply pressure is utilised to expel the foam from the bladder. The water flowing through the ratio controller jet creates a low pressure area common both to down stream water and foam concentrate. This injects the concentrate in to the ratio controller through an accurate sized orifice proportioned to water venturi. This ensures correct proportioning over a wide range of flow condition.

The bladder tank proportioning system operates on same principle as that of a balance pressure proportioning system. In bladder system, the bladder is used as diaphragm to separate the water and foam concentrate within the tank. The foam concentrate is injected into the ratio controller utilising water pressure.

The system is also supplied with foam concentrate control valve as an optional item. The valve allows concentrate flow only when minimum of 2.1 kg/sq.cm. water pressure is established in the system. For pressure drop and flow characteristics refer catalogue of ratio controller.

SELECTION OF HORIZONTAL / VERTICAL BLADDER TANKS

Advantages of Horizontal bladder tanks

(i) Better stability than vertical tank in earthquake prone area

(ii) Easier to refill than vertical tanks

(iii) Easy to transport, store and install

(iv) Large Capacity

Advantages of Vertical bladder tanks

(i) Require less floor space than horizontal tanks

INSTALLATION, INSPECTION AND MAINTENANCE

An installation, inspection and maintenance manual is packed with each unit. The manual provides detail schematic, initial procedure, inspection and maintenance procedures. The instruction manual must be read carefully and followed during installation and commissioning of the system.

After few initial successful tests an authorised person must be trained to perform inspection and testing of the system. It is recommended to carry out physical inspection of the system regularly, the inspection should verify that no damages have taken place to any component and all the valves are in their proper position as per the system requirement. The system should be fully tested at least once in a year and in accordance with applicable NFPA code or in accordance to the guidelines of the organisation having local jurisdiction.

Do not turn off the system or any valve to repair or test the system, without placing a roving Fire Patrol in the area covered by the system. The patrol should continue until the system is put back in service. Also inform the local security personnel and the control room so that a false alarm is not signalled.

CAUTION

1) Do not weld on the tank as it may damage the bladder fitted inside the tank.

2) Release pressure before an inspection and maintenance of the system.

3) Sight gauge is not pressure tight, so before taking concentrate level reading, tank pressure must be released.

4) The bladder tank is to be installed under a shade to avoid direct sunlight on the equipment.

5) While designing a foam system, step shall be taken to allow for removal of the internal centre tube(s). The centre tubes are full length and/or height of the bladder tank.

6) ASME Code may require over pressure protection before pressurising the system. FIREGUARD does not supply an over pressure relief valve with the tanks. It shall be the owner's responsibility to provide over pressure protection for the tank in accordance to ASME Code.

7) Foam concentrate filling procedure must be followed. Incorrect filling procedure may damage the bladder. Fireguard product have limited warranty and incorrect fill procedure will void the warranty.

NOTE

1) The foam concentrate is to be filled in the bladder very carefully to avoid rupture of the bladder. The filling guidelines provided with the equipment must be strictly adhered.

2) Air supply with regulator (0 to 1.0 kg/sqcm) required during filling procedure, to be arranged by installer / user.

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3) Water supply at 0-1.5 kg/sqcm required for tank filling during commissioning, to be arranged by installer / user.

4) Concentrate fill pump need to be arranged by installer / user.

5) A minimum length of 5 (five) times the pipe diameter of unobstructed straight pipeline should be provided at the inlet and outlet of the ratio controller, where pipe diameter is the nominal size of the ratio controller.

OPTIONAL SUPPLY

- Sight gauge with shut off and drain valve (glass or polycarbonate material)
- Ladder
- Concentrate control valve
- Filling kit
- Stainless steel pipe for water supply side
- Stainless steel pipe & valve standard supply SS304/CF8. Optional is SS316/CF8M or SS316L
- Painting as per specific requirement
- Seismic designed tanks
- Custom designed for higher rating, material and dimension
- Coal Tar epoxy internal coated, standard supply or any other paint as per customer requirement
- Ratio controller material Bronze, Stainless steel CF8, CF8M
- Relief valve is not included in standard supply it is optional as per specific customer requirement

RELIEF VALVE (OPTIONAL SUPPLY)

(i) Thermal Relief valve

(ii) Full flow, as per ASME

(iii) Full flow, ASME "U" Stamped

LISTING & APPROVAL

1) Bladder tank proportioning system is UL-Listed as pre-piped system.

2) Listing and Approval is valid only when used in the manner as outlined in the applicable Listing and Approval.

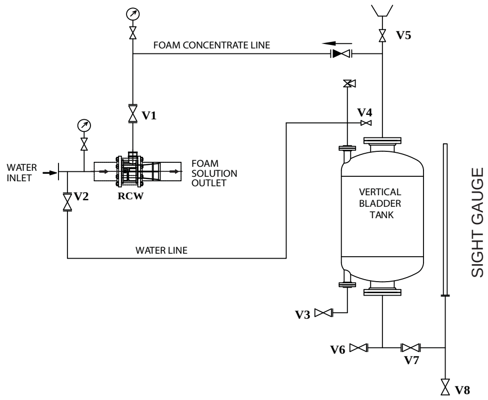
SHIPPING DETAILS

i) All the tank openings will be plugged for shipping.

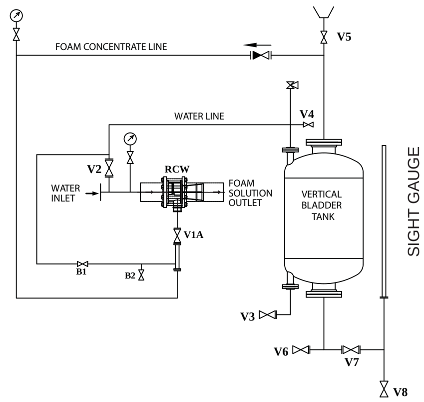
ii) All pre-piped pipes, valves, pressure gauges, sight gauge etc will be packed separately for shipping.

iii) Tank will be mounted on pallet with crate all over as standard packing system of FIREGUARD. For any custom packing requirement contact FIREGUARD Sales.

VERTICAL BLADDER TANK PROPORTIONING MANUAL SYSTEM



VERTICAL BLADDER TANK PROPORTIONING AUTO SYSTEM



VALVE NO.	DESCRIPTION	NORMAL POSITION	
		MANUAL SYSTEM	AUTO SYSTEM
V1	FOAM CONCENTRATE SHUT OFF VALVE	CLOSED	----
V1A	AUTO FOAM CONCENTRATE SHUT OFF VALVE	----	CLOSED
V2	WATER PRESSURE SHUT OFF VALVE	OPEN	OPEN
V3	TANK WATER DRAIN VALVE	CLOSED	CLOSED
V4	TANK WATER VENT VALVE	CLOSED	CLOSED
V5	CONCENTRATE VENT	CLOSED	CLOSED
V6	CONCENTRATE FILL / DRAIN VALVE	CLOSED	CLOSED
V7	SIGHT GAUGE FILL VALVE	CLOSED	CLOSED
V8	SIGHT GAUGE DRAIN VALVE	CLOSED	CLOSED
B1	MANUAL OVER RIDE VALVE	----	OPEN
B2	RESTING VALVE	----	CLOSED

SYMBOLS & ABBREVIATION

▶◁	NON RETURN VALVE	⊘	PRESSURE GAUGE
⋈	VALVE	Y	FUNNEL
⌧	SAFETY VALVE		RATIO CONTROLLER

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DELUGE VALVE MODEL-D1
(DUCTILE IRON)

TECHNICAL DATA

MODEL	D1-Ductile Iron ASTM A 536-77 GRADE 65-45-12
NOMINAL SIZE	200, 150, 100, 80 and 50 NB
SERVICE PRESSURE	1.4 to 17.5 Bar (20 to 250 PSI)
THREADED OPENING	BSPT
MOUNTING	Vertical or Horizontal mounting
FACTORY HYDROSTATIC TEST PRESSURE	35 Kg./sq.cm. (500 PSI)
FLANGE CONNECTION	ANSI B 16.5 #150 FF (RF-Optional)
WET PILOT SPRINKLER HEIGHT LIMITATION	As per graph in the catalogue
NET WEIGHT WITHOUT TRIM	200 NB - 153 Kg 150 NB - 79 Kg 100 NB - 50 Kg 80 NB - 35 Kg 50 NB - 32 Kg
FINISH	RAL 3000
APPROVAL	UL Listed
ORDERING INFORMATION	1. Size of valve 2. Flange specification 3. Valve trim vertical or horizontal 4. Trim type

DESCRIPTION

Deluge Valve is known as a system control valve in a deluge system, used for fast application of water in a spray system. Deluge valve protects areas such as power transformer installation, storage tank, conveyor protection and other industrial application etc. With the addition of foaming agent deluge valve can be used to protect aircraft hanger and inflammable liquid fire.

VALVE OPERATION

Deluge valve is a quick release, hydraulically operated diaphragm valve. It has three chambers, isolated from each other by the diaphragm operated clapper and seat seal. While in SET position, water pressure is transmitted through an external bypass check valve and restriction orifice from the system supply side to the top chamber, so that supply pressure in the top chamber act across the diaphragm operated clapper which holds the seat against the inlet supply pressure because of the differential pressure design.On detection of fire the top chamber is vented to atmosphere through the

outlet port via opened actuation devices. The top chamber pressure cannot be replenished through the restricted inlet port, and the upward force of the supply pressure lifts the clapper allowing the water flow to the system piping network and alarm devices.

TRIM DESCRIPTION

The trims are functionally termed as Dry Pilot Trim, Wet Pilot Trim, Electric Trim and Test and Alarm Trim as per the mehod of actuation of the deluge valve.

The functionality of these trims is described below..

a) DRY PILOT TRIM (PNEUMATIC RELEASE)

Dry pilot operation uses a pilot line of closed Sprinkles/QB detectors containing air under pressure, located in the areato be protected. It requires regulated dry air supply with main supply point through restricted orifice. The air pressure to bemaintained as specified in the catalogue of Dry Pilot Actuator. The pilot line is connected to air inlet side of actuator. The top chamber of the deluge valve is connected to water inlet side of actuator.

When there is an air pressure drop, or due to release of any of the release device on detection of fire, the diaphragm of actuator is lifted and allows the water to drain. This releases the water pressure in the top chamber of the deluge valve, allowing the deluge valve to open and water to flow into the system piping & alarm devices. Recommended air supply pressure for dry pilot trim system is 3.5 kg/sq.cm.

User must install non return valve at air supply connection to deluge valve trim.

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In dry pilot trim, an actuator (DPA) is provided. An optional Pneumatic Reset Device (PRD) can be provided, which acts as a manual reset device in the dry pilot line.

b) WET PILOT TRIM (HYDRAULIC RELEASE)

Wet pilot operation uses a pilot line of closed Sprinklers/QB detectors containing pressurized water, supplied through the upstream side of the Deluge valve, through a restricted orifice. All the release lines are connected to a common release line. Due to release of any one of the release device, the water pressure in the top chamber of the Deluge valve drops and the Deluge valve opens.

c) ELECTRIC RELEASE TRIM

To actuate a Deluge valve electrically, a solenoid valve is provided to drain the water from the top chamber of the Deluge valve. A pressure switch is provided to activate an electric alarm, to shut down the desired equipment or to give "Tripped" indication of the Deluge valve. In addition to this a pressure switch can also monitor "Low air pressure" and "Fire condition" when used in dry pilot air line.

d) TEST AND ALARM TRIM

This trim is supplied with a test valve is provided to test thenormal operation of the sprinkler alarm bell. The sprinkler alarmcan be supplied additionally, which bells on actuation of the Deluge valve.

e) DRAIN AND DRIP TRIM

This consists of main and system drain valve in addition with drip valve.

TRIM TYPES

The trims are designated as follwing.

W =Wet Pilot trim. D = Dry Pilot Trim

a) Type ET-W and ET-D

This type of trim is basic trim required to operate the deluge valve. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

b) Type ETW-D and ETD-D

This trim type is a combination of components of the ET trim along with the drip and drain trim. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

c) Type ETW-T and ETD-T

This trim type is a combination of components of the ET trims along with the test and alarm trim. In dry pilot trim, an actuator DPA-H1 is provided with optional Pneumatic Reset Device (PRD-1). A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

d) Type NT-W and NT-D

This trim type is a combination of components of the ET trim along with the test and alarm trim as well as the drip and drain trim. A solenoid valve for electric remote actuation and pressure switch for sensing & announciation are optional.

TRIM MODEL NO.	TRIM DESCRIPTION	MOUNTING	SCHEMATIC NO.
ETW	Basic Wet Pilot Trim	Vertical	Schematic 1
ETD	Basic Dry Pilot Trim	Vertical	Schematic 2
ETW-T	Basic Wet Pilot Trim with Test & Alarm Trim	Vertical	Schematic 3
ETD-T	Basic Dry Pilot Trim with Test & Alarm Trim	Vertical	Schematic 4
ETW-D	Basic Wet Pilot Trim with Drip & Drain Trim	Vertical	Schematic 5
ETD-D	Basic Dry Pilot Trim with Drip & Drain Trim	Vertical	Schematic 6
NTW	Basic Wet Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Vertical	Schematic 7
NTD	Basic Dry Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Vertical	Schematic 8
ETW	Basic Wet Pilot Trim	Horizontal	Schematic 9
ETD	Basic Dry Pilot Trim	Horizontal	Schematic 10
ETW-T	Basic Wet Pilot Trim with Test & Alarm Trim	Horizontal	Schematic 11
ETD-T	Basic Dry Pilot Trim with Test & Alarm Trim	Horizontal	Schematic 12
ETW-D	Basic Wet Pilot Trim with Drip & Drain Trim	Horizontal	Schematic 13
ETD-D	Basic Dry Pilot Trim with Drip & Drain Trim	Horizontal	Schematic 14
NTW	Basic Wet Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Horizontal	Schematic 15
NTD	Basic Dry Pilot Trim with Test & Alarm Trim and Drip & Drain Trim	Horizontal	Schematic 16

RESETTING PROCEDURE FOR THE DELUGE VALVE

(i) Close the upstream side stop valve provided below the deluge valve

ii) Open both the drain valves/ drain plugs and close when the flow of water has ceased

(iii) Close the release device/replace the Sprinkler if release was through Sprinkler/QB Detector

iv) Inspect and release if required, or close the section of the detection system subjected to "Fire condition"

(v) In case of dry pilot detection system, open the air supply valve to build-up air pressure. Open the priming valve fully. Open the upstream side of the stop valve provided below the Deluge valve. No water should flow into the system

vi) Where priming shut off valve is provided for resetting, in addition to above steps press the knob on actuator while resetting

CAUTION

(a) Do not close the priming valve, downstream and upstream stop valves, while the system is in service

(b) The releasing device must be maintained in the open position, when actuated, to prevent the deluge valve from closure if anti shut off valve is not provided

(c) While using a Deluge valve in the wet pilot system the height and the length of the wet pilot detection line is to be limited as shown in the wet pilot sprinkler height limitation graph

(d) Do not connect the Sprinkler Alarm outlet drain line to close a common drain as it may create back pressure and Sprinkler Alarm may not function

(e) Deluge valve must have support to absorb sudden opening or closing vibration shock to the piping

(f) To avoid water damage, take precautions when opening the water supply main control valve, since water will flow from all open system valves

(g) The responsibility of maintenance of the protection system and devices in proper operating condition lies with the owner of the system

SYSTEM TESTING PROCEDURE

(i) Keep the upstream side of the stop valve partially open. To avoid water flow to system side close the system side stop valve. This valve is to be kept in open position after the testing is completed

(ii) Let any of the release devices to trip. This will result in a sudden drop of water pressure in the deluge valve top chamber which in turn will open the deluge valve. Close the ups[illegible] stop valve immediately

(iii) Reset the valve as per the procedure given under heading "RESETTING PROCEDURE FOR THE DELUGE VALVE"

INSPECTION AND MAINTENANCE

Installed system piping network must be flushed properly before placing the Deluge valve in service.

A qualified and trained person must commission the system. After few initial successful tests, an authorized person must be trained to perform inspection and testing of the system. It is recommended to have regular inspection and test run of the system as per NFPA guideline or in accordance to the organisation having local jurisdiction.

(i) WARNING

Inspection and testing is to be carried out only by authorised and trained personnel. DO NOT TURN OFF the water supply or close any valve to make repair(s) or test the valve, without placing a roving fire patrol in the area covered by the system. Also inform the local security personnel and central alarm station, so that there is no false alarm signal.

It is recommended to carry out physical inspection of the system at least twice in a week. The inspection should verify that all the control valves are in proper position as per the system requirement and that there are no damages to any component.

The frequency of inspections must be increased in the presence of contaminated water supplies, corrosive/ scaling water supplies, and corrosive atmospheres.

(ii) NORMAL CONDITION

(a) All main valves are open and are sealed with tamper proof seal

(b) Drain valves must be kept closed

(c) No leak or drip is detected from the drip valve

(d) All the gauges except the system side water pressure gauge, should show the required pressure

(e) There should be no leakage in the system

(iii) NORMAL CONDITION TEST

(a) The system should be checked for normal condition at least once in a week

(b) Test the sprinkler alarm bell or electric alarm by turning the alarm test valve to the test position. The alarm should sound. This test should be carried out at least once in a week

(c) Depress the drip valve knob. Significant accumulation indicates a possible seat leakage

(d) Conduct the water flow test as per the procedure of system testing at least once a month

(iv) PERIODIC CHECK

Conduct the water flow test by actuating few of the release devices provided in the system. Clean all strainer(s) and priming line restriction. This test is to be carried out at least once in three months.

ABNORMAL CONDITION

(i) ALARM FAILS TO SOUND

(a) Check for any obstruction in the alarm test line, make certain that the sprinkler alarm is free to operate

(b) If an electric alarm is provided, check the electrical circuitry to the alarm

(ii) FALSE TRIPS

(a) Check for clogging in priming line, restriction orifice check valve, priming valve & strainer

(b) Leakage in the release system

(c) The deluge air panel orifice clogged or low supply pressure

(iii) LEAKAGE THROUGH THE DELUGE VALVE

(a) Damaged deluge valve seat or obstruction on the seat face by foreign object

(b) Leakage in release system

(c) Partly clogged priming line restriction orifice check valve

(d) Low air pressure on release system line or leakage in release system

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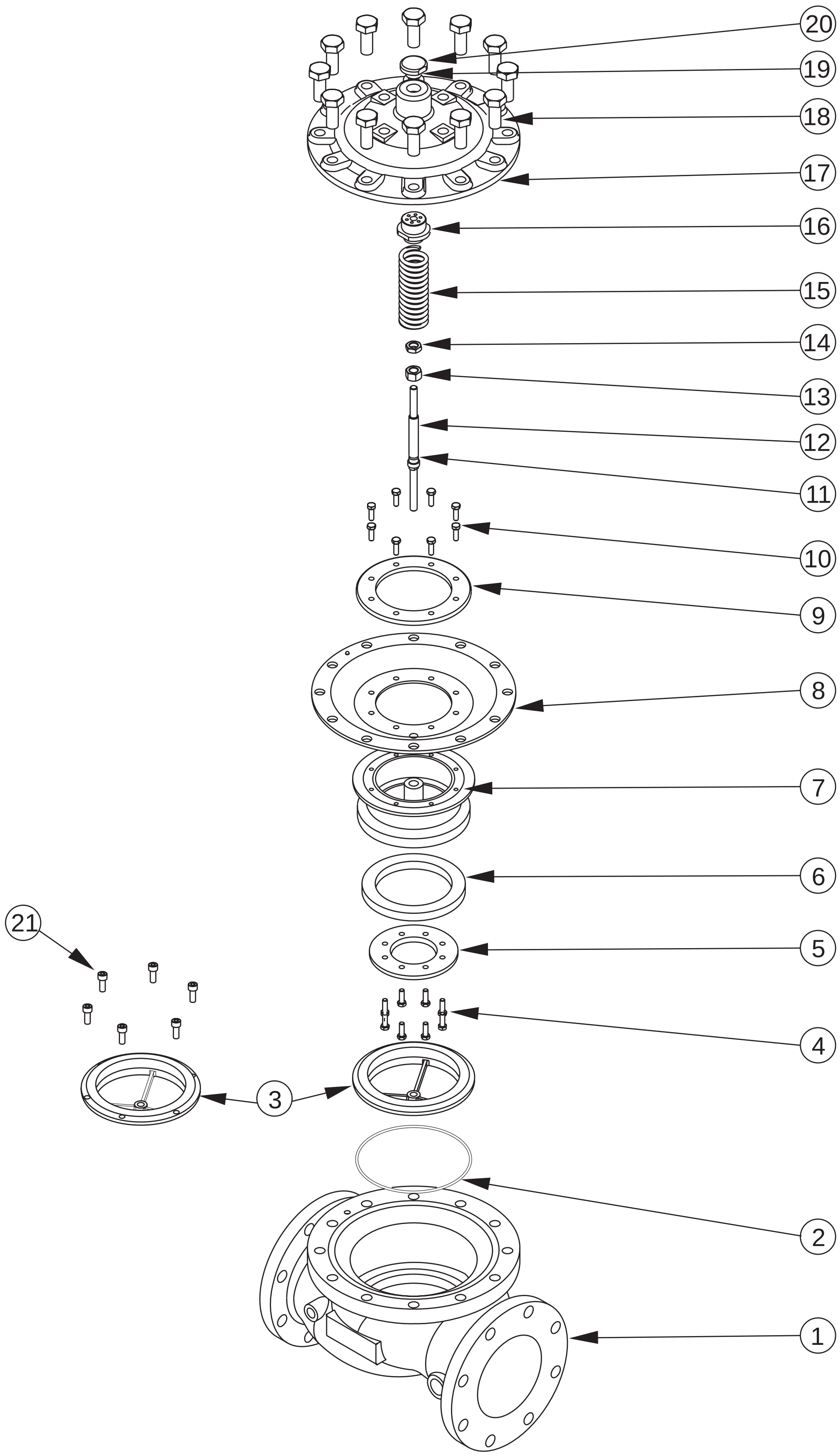
DELUGE VALVE MODEL - D1 SIZE 200 / 150 / 100 / 80/ 50 NB



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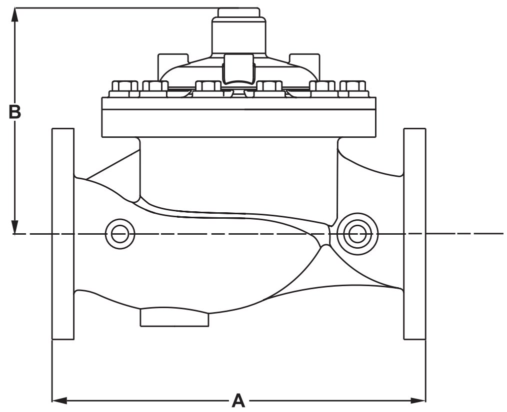

DIMENSION in millimeter (Approximate)

VALVE NOMINAL SIZE	A	B
200 NB	552	332
150 NB	462	282
100 NB	412	245
80 NB	372	232
50 NB	320	232

PART LIST

ITEM NO.	PART NO. 200 NB	150 NB	100 NB	80 NB	50 NB	DESCRIPTION	QTY. 200 NB	150 NB	100 NB	80/50 NB	MATERIAL SPECIFICATION
1	4024	3991	4001	4015	4039	HOUSING	1	1	1	1	DUCTILE IRON
2	8561	9783	9784	9791	9791	"O"RING	1	1	1	1	NEOPRENE RUBBER
3	4025	3993	4003	4017	4017	SEAT	1	1	1	1	BRONZE
4	9151	9112	9112	-	-	BOLT	8	4	4	-	STAINLESS STEEL
5	4026	3994	4004	4018	4018	RUBBER CLAMP	1	1	1	1	BRONZE
6	4027	4000	4005	4023	4023	RUBBER SEAT	1	1	1	1	NEOPRENE RUBBER
7	4034	3990	4011	4041	4041	CLAPPER	1	1	1	1	DUCTILE IRON /*
8	4035	2427	2786	2786	2786	DIAPHRGM	1	1	1	1	NEOPRENE RUBBER
9	4030	2424	2504	2788	2788	CLAMP RING	1	1	1	1	BRONZE
10	8806	9151	9151	9187	9187	BOLT	12	8	8	8	STAINLESS STEEL
11	9986	9986	9986	9986	9986	"O"RING	1	1	1	1	NEOPRENE RUBBER
12	4029	3996	4007	4020	4020	SPINDLE	1	1	1	1	STAINLESS STEEL
13	9185	8838	8838	9185	9185	NUT	1	1	1	1	STAINLESS STEEL
14	9186	9184	9184	9186	9186	LOCK NUT	1	1	1	1	STAINLESS STEEL
15	2980	2979	2978	2977	2977	SPRING	1	1	1	1	STAINLESS STEEL
16	4033	3998	4010	3983	3983	ADAPTOR	1	1	1	1	BRONZE
17	4032	3992	4002	4016	4016	COVER	1	1	1	1	CAST STEEL
18	9008	9049	9051	8692	8692	BOLT	16	12	12	12	CARBON STEE
19	9982	9982	9982	9982	9982	"O"RING	1	1	1	1	NEOPRENE RUBBER
20	2514	2514	2514	2514	2514	PLUG	1	1	1	1	STEEL PLATED
21	8843	-	-	-	-	ALLEN BOLT	6	-	-	-	STAINLESS STEEL

* Optional Bronze

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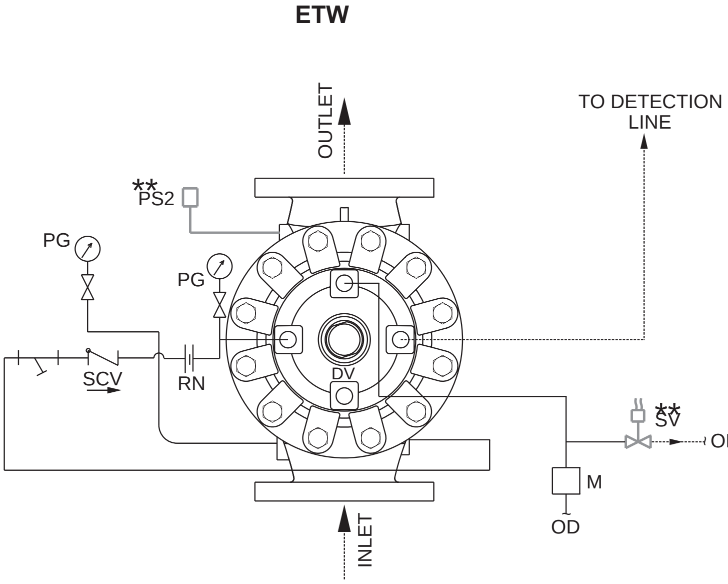
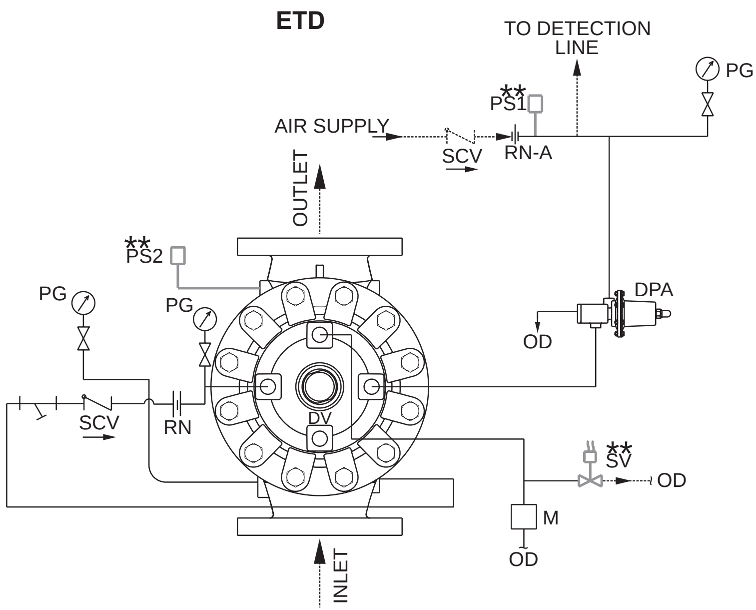
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING



SCHEMATIC 1

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING



SCHEMATIC 2

DV – DELUGE VALVE
OD – OPEN DRAIN
– STRAINER
DR.V – DRIP VALVE
PS2 – WATER FLOW PRESSURE ALARM SWITCH
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOID VALVE
--- – BY USER
– SWING CHECK VALVE
RN – RESTRICTION NOZZLE (PRIMING LINE)
– ANGLE VALVE
PS1 – LOW AIR ALARM PRESSURE SWITCH
RN-A – RESTRICTION NOZZLE (AIR LINE)
M – EMERGENCY RELEASE STATION
DPA – DRY PILOT ACTUATOR
PG – PRESSURE GAUGE
** – OPTIONAL

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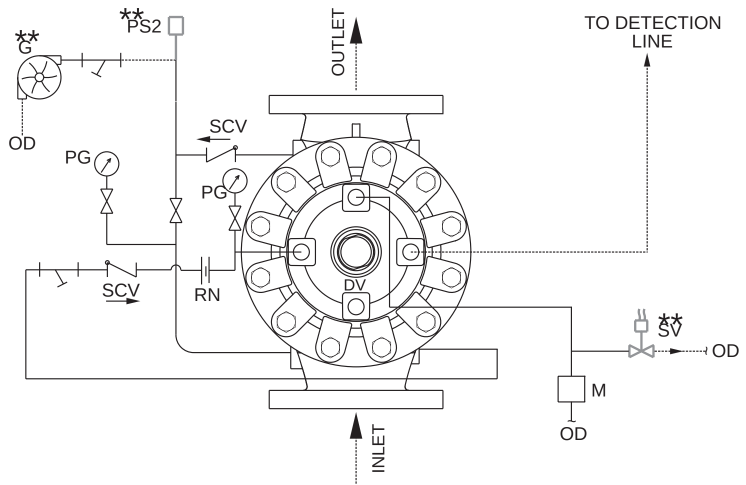
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING

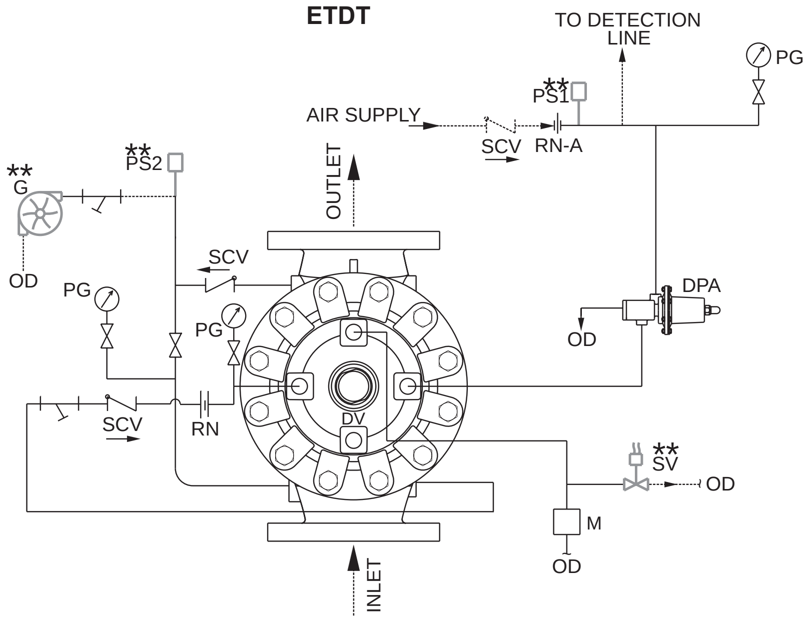
ETWT



SCHEMATIC 3

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING

ETDT



SCHEMATIC 4

DV – DELUGE VALVE	G – SPRINKLER ALARM (WMG)	– SWING CHECK VALVE	M – EMERGENCY RELEASE STATION
OD – OPEN DRAIN	– VALVE	RN – RESTRICTION NOZZLE (PRIMING LINE)	DPA – DRY PILOT ACTUATOR
– STRAINER	SV – SOLENOID VALVE	– ANGLE VALVE	PG – PRESSURE GAUGE
DR.V – DRIP VALVE	--- – BY USER	PS1 – LOW AIR ALARM PRESSURE SWITCH	** – OPTIONAL
PS2 – WATER FLOW PRESSURE ALARM SWITCH		RN-A – RESTRICTION NOZZLE (AIR LINE)	

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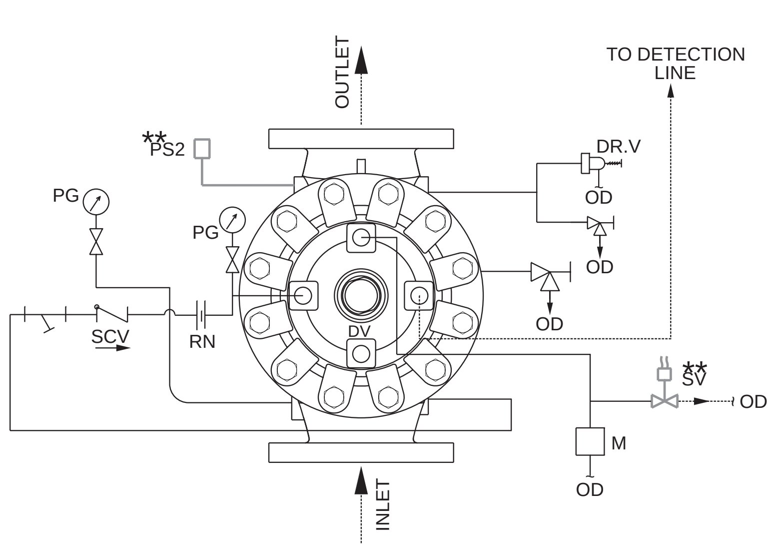
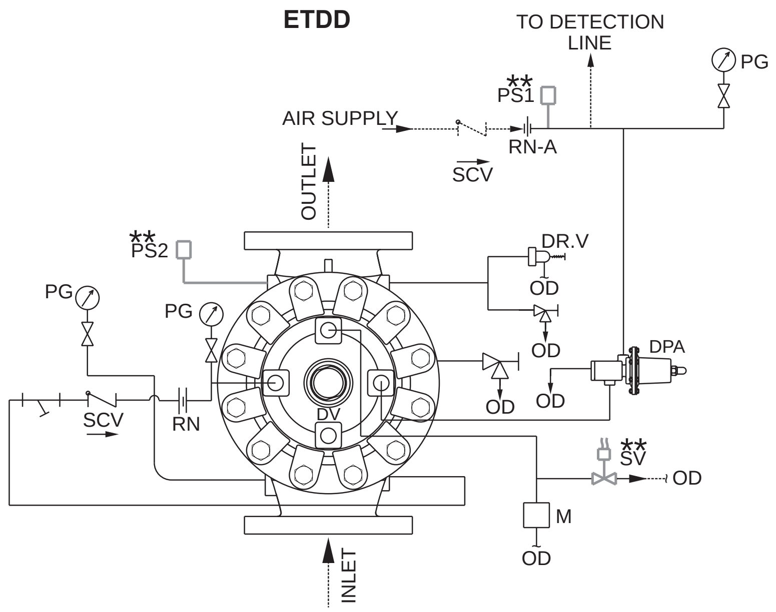
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING



SCHEMATIC 5

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING



SCHEMATIC 6

DV – DELUGE VALVE
OD – OPEN DRAIN
– STRAINER
DR.V – DRIP VALVE
PS2 – WATER FLOW PRESSURE ALARM SWITCH
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOID VALVE
--- – BY USER
– SWING CHECK VALVE
RN – RESTRICTION NOZZLE (PRIMING LINE)
– ANGLE VALVE
PS1 – LOW AIR ALARM PRESSURE SWITCH
RN-A – RESTRICTION NOZZLE (AIR LINE)
M – EMERGENCY RELEASE STATION
DPA – DRY PILOT ACTUATOR
PG – PRESSURE GAUGE
** – OPTIONAL

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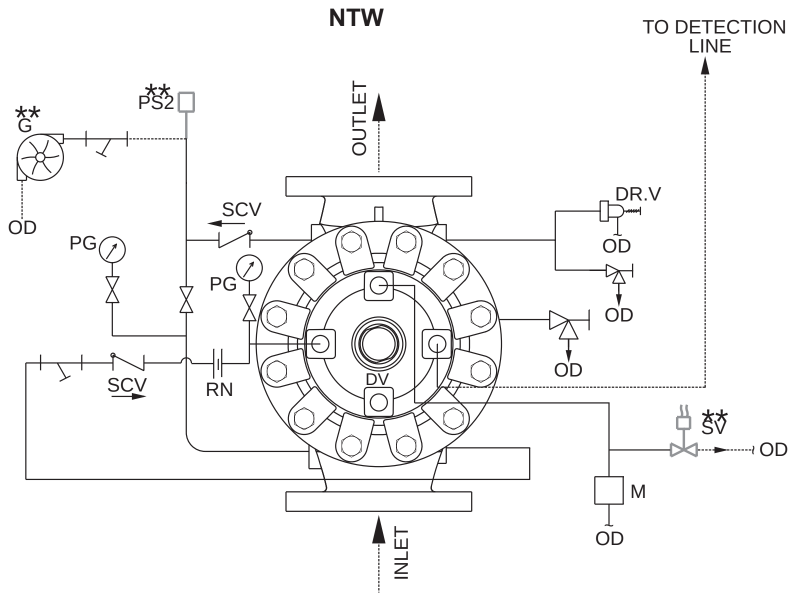
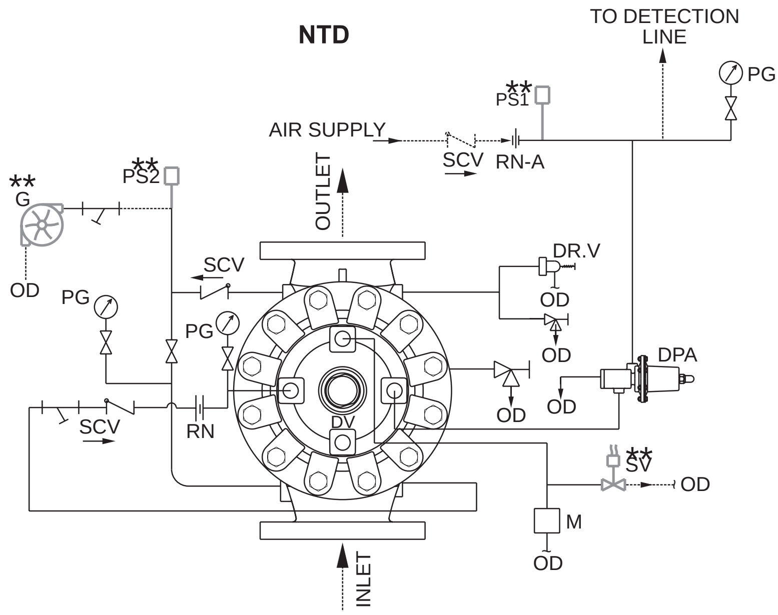
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING



SCHEMATIC 7

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR VERTICAL MOUNTING



SCHEMATIC 8

DV – DELUGE VALVE	G – SPRINKLER ALARM (WMG)	SWING CHECK VALVE	M – EMERGENCY RELEASE STATION
OD – OPEN DRAIN	VALVE	RN – RESTRICTION NOZZLE (PRIMING LINE)	DPA – DRY PILOT ACTUATOR
STRAINER	SV – SOLENOID VALVE	ANGLE VALVE	PG – PRESSURE GAUGE
DR.V – DRIP VALVE	--- – BY USER	PS1 – LOW AIR ALARM PRESSURE SWITCH	** – OPTIONAL
PS2 – WATER FLOW PRESSURE ALARM SWITCH		RN-A – RESTRICTION NOZZLE (AIR LINE)	

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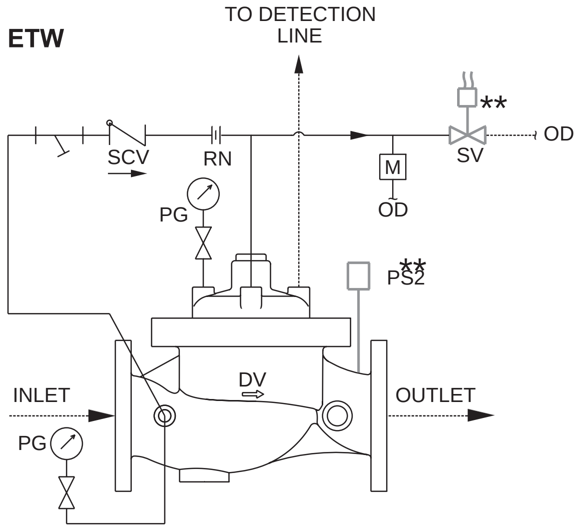
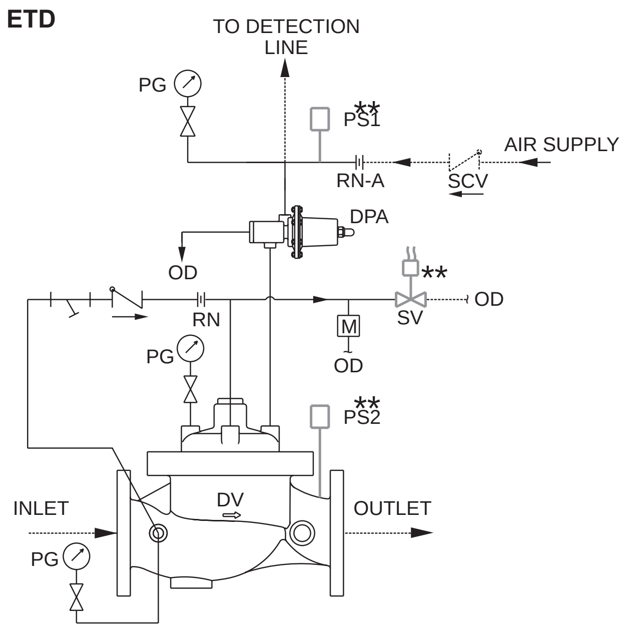
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 9

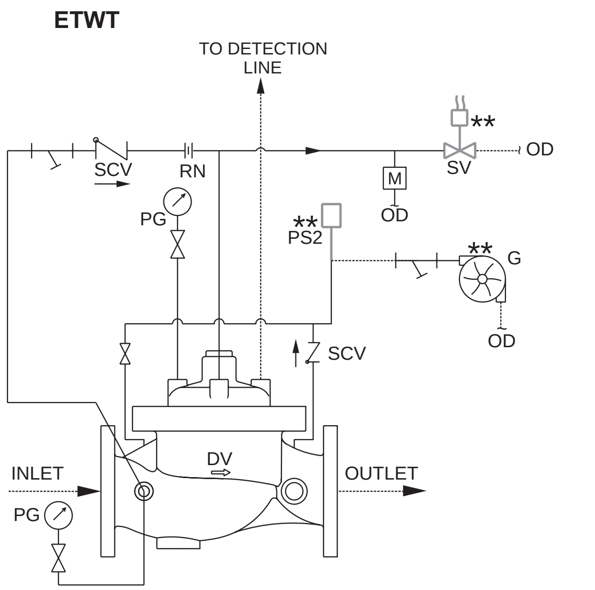
SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 10

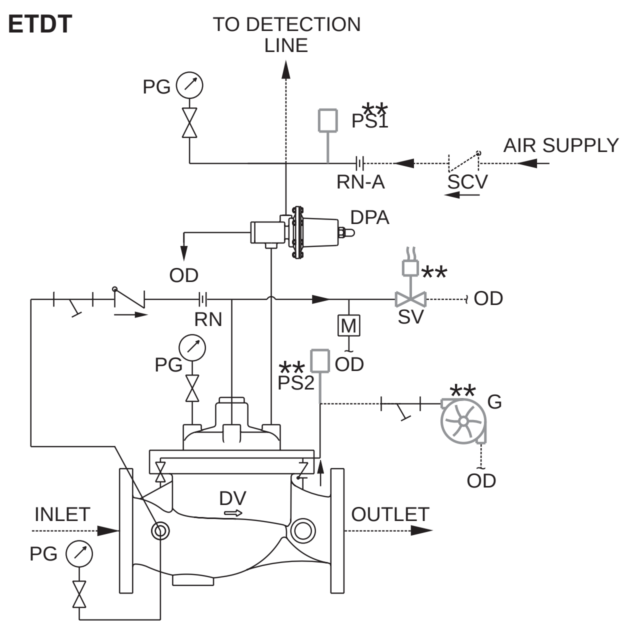
DV – DELUGE VALVE	G – SPRINKLER ALARM (WMG)	– SWING CHECK VALVE	M – EMERGENCY RELEASE STATION
OD – OPEN DRAIN	– VALVE	RN – RESTRICTION NOZZLE (PRIMING LINE)	DPA – DRY PILOT ACTUATOR
– STRAINER	SV – SOLENOID VALVE	– ANGLE VALVE	PG – PRESSURE GAUGE
DR.V – DRIP VALVE	--- – BY USER	PS1 – LOW AIR ALARM PRESSURE SWITCH	** – OPTIONAL
PS2 – WATER FLOW PRESSURE ALARM SWITCH		RN-A – RESTRICTION NOZZLE (AIR LINE)	

SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 11

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 12

DV – DELUGE VALVE
OD – OPEN DRAIN
– STRAINER
DR.V – DRIP VALVE
PS2 – WATER FLOW PRESSURE ALARM SWITCH
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOID VALVE
--- – BY USER
– SWING CHECK VALVE
RN – RESTRICTION NOZZLE (PRIMING LINE)
– ANGLE VALVE
PS1 – LOW AIR ALARM PRESSURE SWITCH
RN-A – RESTRICTION NOZZLE (AIR LINE)
M – EMERGENCY RELEASE STATION
DPA – DRY PILOT ACTUATOR
PG – PRESSURE GAUGE
** – OPTIONAL

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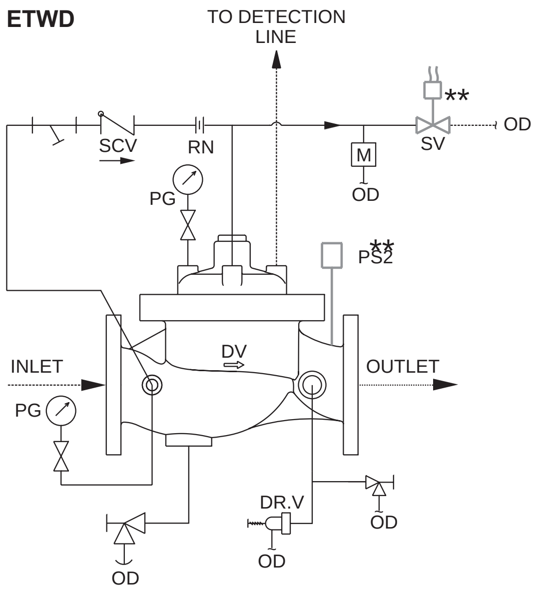
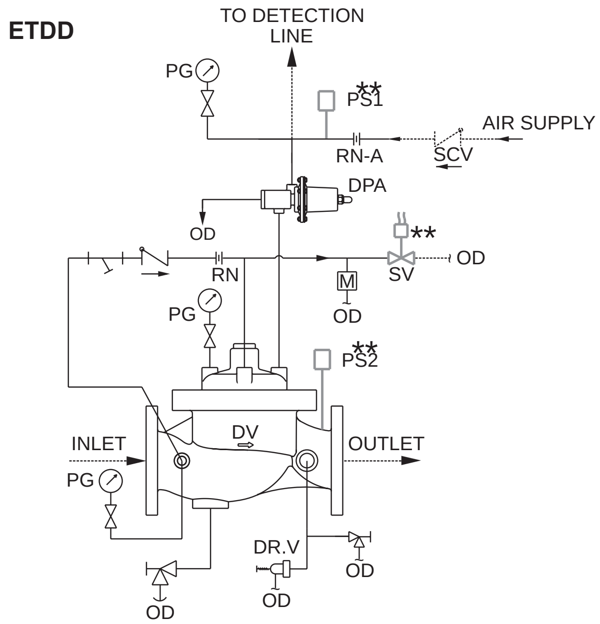
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 13

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 14

DV – DELUGE VALVE	G – SPRINKLER ALARM (WMG)	– SWING CHECK VALVE	M – EMERGENCY RELEASE STATION
OD – OPEN DRAIN	– VALVE	RN – RESTRICTION NOZZLE (PRIMING LINE)	DPA – DRY PILOT ACTUATOR
– STRAINER	SV – SOLENOID VALVE	– ANGLE VALVE	PG – PRESSURE GAUGE
DR.V – DRIP VALVE	--- – BY USER	PS1 – LOW AIR ALARM PRESSURE SWITCH	** – OPTIONAL
PS2 – WATER FLOW PRESSURE ALARM SWITCH		RN-A – RESTRICTION NOZZLE (AIR LINE)	

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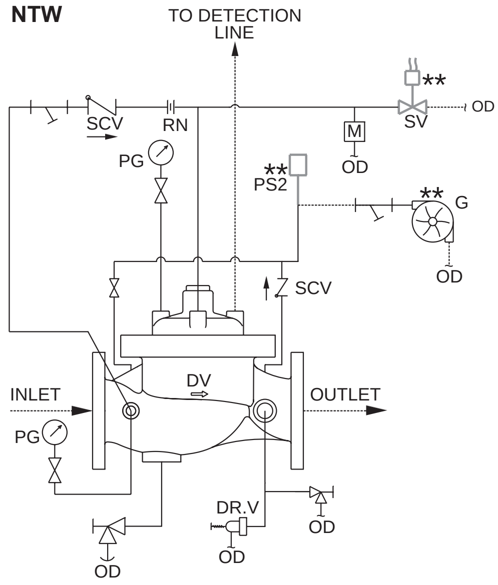
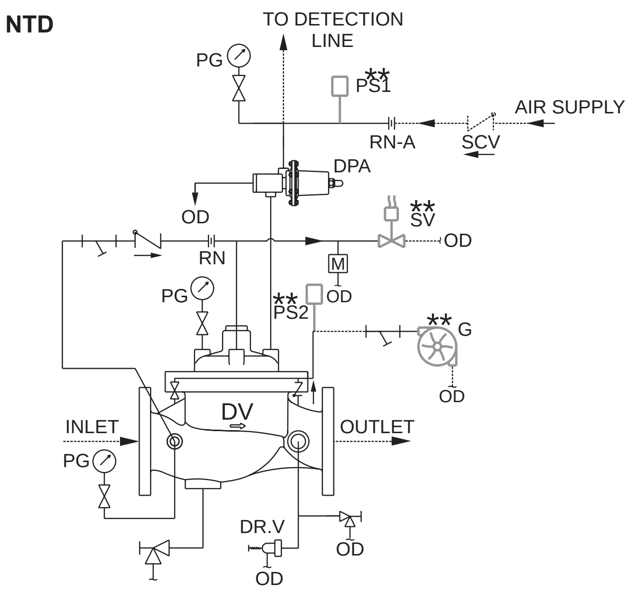
SCHEMATIC FOR WET PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 15

SCHEMATIC FOR DRY PILOT BASIC TRIM FOR DELUGE VALVE MODEL - D1 FOR HORIZONTAL MOUNTING



SCHEMATIC 16

DV – DELUGE VALVE
OD – OPEN DRAIN
– STRAINER
DR.V – DRIP VALVE
PS2 – WATER FLOW PRESSURE ALARM SWITCH
G – SPRINKLER ALARM (WMG)
– VALVE
SV – SOLENOID VALVE
--- – BY USER
– SWING CHECK VALVE
RN – RESTRICTION NOZZLE (PRIMING LINE)
– ANGLE VALVE
PS1 – LOW AIR ALARM PRESSURE SWITCH
RN-A – RESTRICTION NOZZLE (AIR LINE)
M – EMERGENCY RELEASE STATION
DPA – DRY PILOT ACTUATOR
PG – PRESSURE GAUGE
** – OPTIONAL

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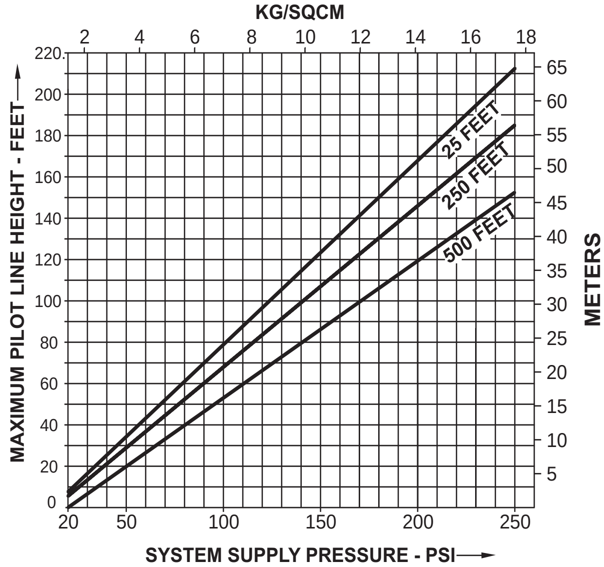
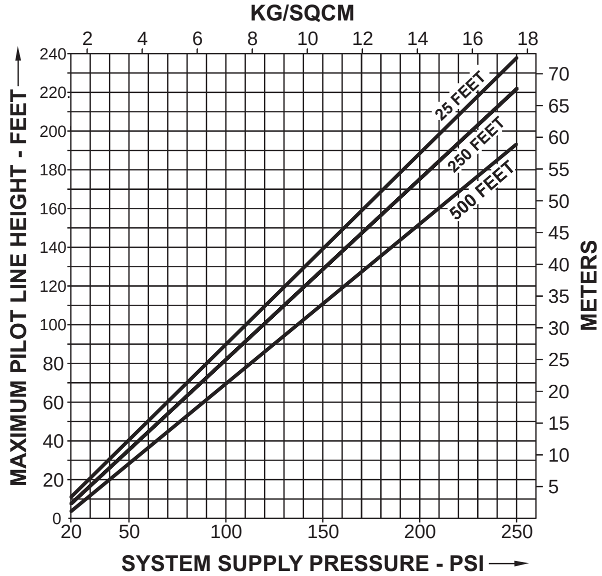
SPRINKLER HEIGHT LIMITATION

DV 200NB



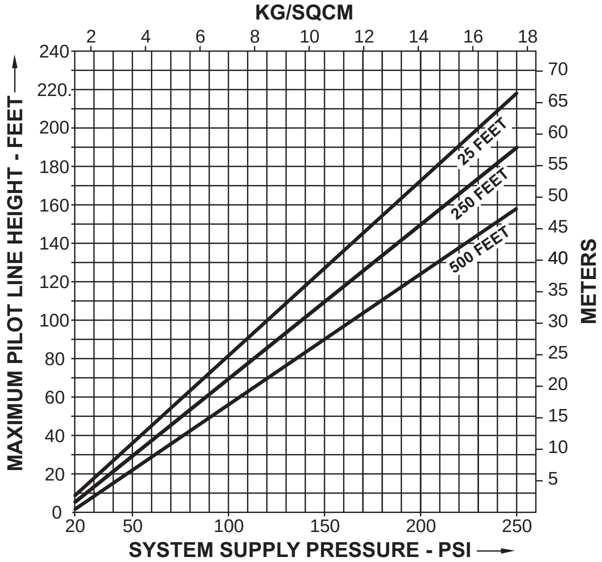
EQUIVALENT LENGTH BASED ON 1/2" SCHEDULE 40 PIPE WITH C = 120

DV 150NB



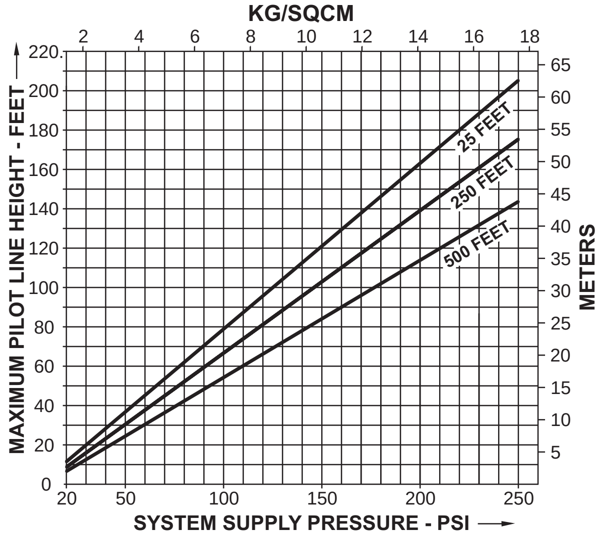
EQUIVALENT LENGTH BASED ON 1/2" SCHEDULE 40 PIPE WITH C = 120

DV 100NB



EQUIVALENT LENGTH BASED ON 1/2" SCHEDULE 40 PIPE WITH C = 120

DV 80NB



EQUIVALENT LENGTH BASED ON 1/2" SCHEDULE 40 PIPE WITH C = 120

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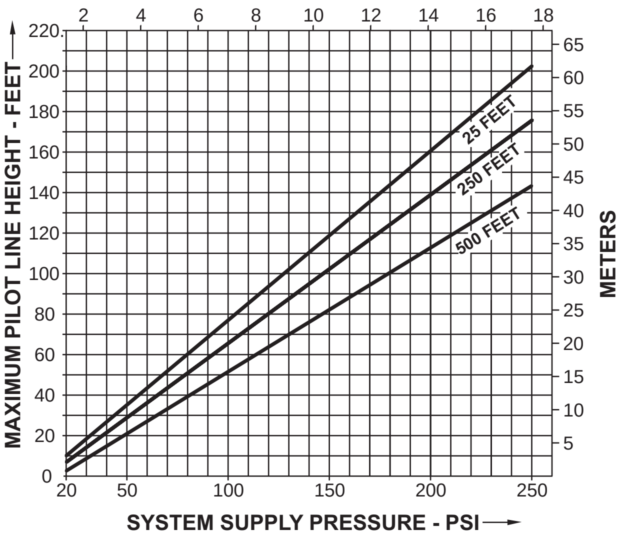
SPRINKLER HEIGHT LIMITATION

DV - 50NB

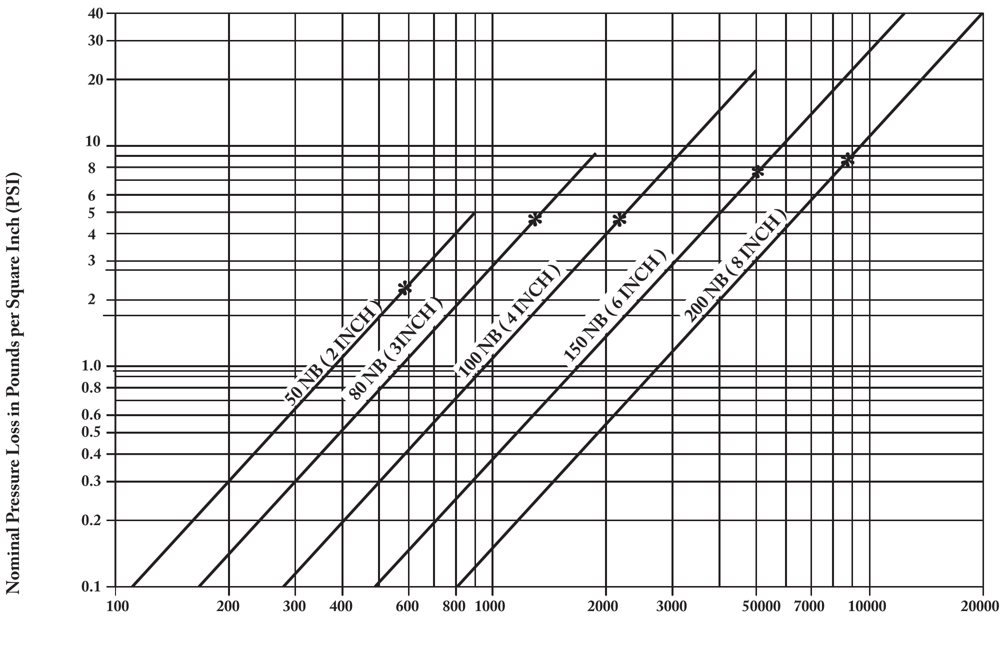


EQUIVALENT LENGTH BASED ON 1/2" SCHEDULE 40 PIPE WITH C = 120

DELUGE VALVE MODEL D1

Nominal Pressure Loss vs Flow

(* flow at 15 feet per second (4.57 meter per second)



* 2.3 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 594 LPM
* 4.7 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 1308 LPM
* 4.7 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 2255 LPM
* 7.5 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 5117 LPM
* 8.4 PSI pressure loss @ 15 feet per second (4.57 met/sec) velocity having flow of 8854 LPM

FIREGUARD ECO^{C6} AFFF 3%

AQUEOUS FILM FORMING FOAM

PRODUCT OVERVIEW

FIREGUARD ECO^{C6} AFFF-3% is a superior quality firefighting foam concentrate for extinguishing and securing flammable hydrocarbon and select oxygenated fuel based fires. It is mainly formulated by hydrocarbon surfactants, C6 based fluorocarbon surfactants, solvents, preservatives and buffers that are used to effectively extinguish hydrocarbon fuel based fires and have a secondary benefit of preventing re-ignition

FEATURES:

>It is formulated with environmental benign C6 fluorocarbon surfactants free of PFOA & PFOS.Hence it is environment friendly

>It produced a thin aqueous film which spreads across the surface of the fuel, separating the fuel from oxygen. It has superior knock down, burn back properties and post fire security.

>It is suitable for extinguishing & securing flammable hydrocarbon fuel fires as 3%

>It can be used with fresh, brackish & sea water. It is compatible with all dry chemical powders extinguishing agent.

APPLICATIONS:

It is used in high risk areas where various types of hydrocarbon fuels and chemicals are stored, processed, or transported. Typical applications include fuel storage tanks, process areas, power stations, marine terminals and offshore platforms.

PROPORTIONING:

FIREGUARD ECO^{C6} AFFF 3%,can be correctly proportioned using most conventional, properly calibrated, in-line proportioning equipment such as:

- Balanced and in-line balanced pressure pump proportioners
- Balanced pressure bladder tanks and ratio flow controllers
- Around-the-pump type proportioners
- Fixed or portable in-line venturi type proportioners
- Hand line nozzles with fixed eductor/pick-up tubes

TYPICAL PHYSICAL & CHEMICAL PROPERTIES:

- Appearance : Amber liquid
- pH : 6.5 – 8.5
- Expansion : >8.0
- 25% drainage time : > 100 sec
- Viscosity : < 10 cst
- Spreading coefficient : > 3.0
- Fire performance : Passes as per relevant specification

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MIXING RATIO: FIREGUARD ECO^{C6} AFFF 3%,shall be diluted with water as 97 parts water & 3 parts AFFF

ENVIRONMENTAL IMPACT:

FIREGUARD ECOC6 AFFF 3%,is biodegradable, low in toxicity. It and can be treated in sewage treatment plants in consultation with relevant local authority.

STORAGE & HANDLING:

The storage place shall be free from dampness and shall be well ventilated and the containers shall not be directly exposed to the sunrays. The HDPE container (20/30 ltr capacity) shall be preferably stacked in single layer and shall not exceed more than 2 layers.

RECOMMENDED STORAGE TEMPERATURE : (-) 50^{0}C to 49^{0}C
Storage tanks for bulk storage: Foam concentrates are suitable for transferring into bulk storage tank for long term storage but these should be normally be kept full, with space (5-10% of tank volume) should be maintained for thermal expansion coefficient of material of construction and foam concentrate. Inlet pipe work should be located at the base of storage tank to avoid excessive foaming during filling. Outlet pipe work should be located above the base of the tank to avoid clogging in the event of sediment that might have formed.

MATERIALS OF CONSTRUCTION
Storage tank should be fabricated or based with the following materials:

- Mild Steel (Uncoated): Not recommended as foam concentrates will cause initial etching which affect the tank to some extent.

- Stainless Steel: 304 and 316 (HIGHLY RECOMMENDED)

- Glass Reinforced Plastic (GRP) : Fiberglass with Isophthalic Polyester Resin, Expoxy Resin or Vinylester Resin (Premium).Not recommended for foam systems involving pressure displacement

- Polyethylene : High density cross linked polyethylene (HDPE) (HIGHLY RECOMMENDED)

MARKING/APPROVAL:
UL, EN, LR as per IMO, BIS & IRS.

CONFORMING STANDARD:
US-MIL, ICAO, FM, DEF.STAN

PACKING:
20 L, 30 L, 200 L HDPE containers or as per customer requirements

MODEL	DESCRIPTION
FIREGUARD ECO^{C6} AFFF 3%	AQUEOUS FILM FOAM FORMING 3%

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Email: Info@Fireguard-Uk.com
www.fireguard-Uk.com

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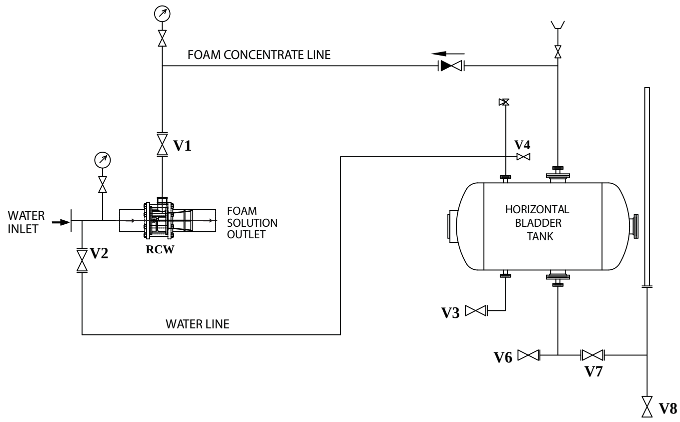
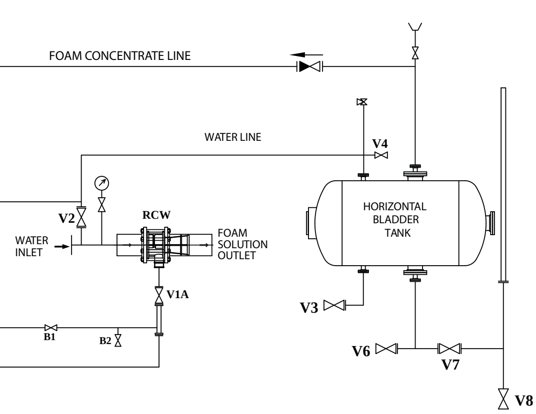
Willenhall · WV13 1NX · United Kingdom

HORIZONTAL BLADDER TANK PROPORTIONING MANUAL SYSTEM



HORIZONTAL BLADDER TANK PROPORTIONING AUTO SYSTEM



VALVE NO.	DESCRIPTION	NORMAL POSITION	
		MANUAL SYSTEM	AUTO SYSTEM
V1	FOAM CONCENTRATE SHUT OFF VALVE	CLOSED	----
V1A	AUTO FOAM CONCENTRATE SHUT OFF VALVE	----	CLOSED
V2	WATER PRESSURE SHUT OFF VALVE	OPEN	OPEN
V3	TANK WATER DRAIN VALVE	CLOSED	CLOSED
V4	TANK WATER VENT VALVE	CLOSED	CLOSED
V5	CONCENTRATE VENT	CLOSED	CLOSED
V6	CONCENTRATE FILL / DRAIN VALVE	CLOSED	CLOSED
V7	SIGHT GAUGE FILL VALVE	CLOSED	CLOSED
V8	SIGHT GAUGE DRAIN VALVE	CLOSED	CLOSED
B1	MANUAL OVER RIDE VALVE	----	OPEN
B2	RESTING VALVE	----	CLOSED

SYMBOLS & ABBREVIATION

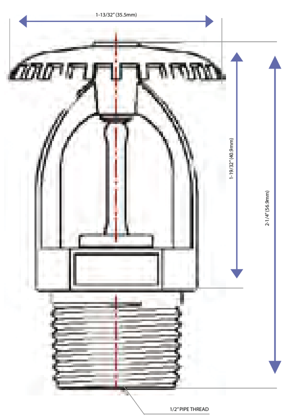
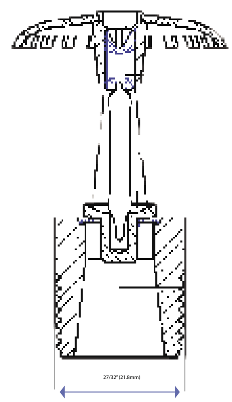
▶◁	NON RETURN VALVE	⊘	PRESSURE GAUGE
▷◁	VALVE	Y	FUNNEL
▷⊠◁	SAFETY VALVE		RATIO CONTROLLER

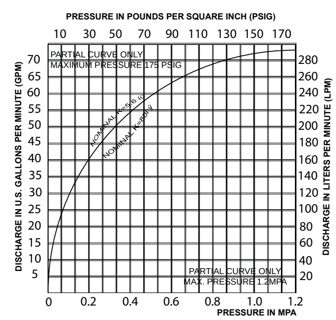
al rayan
SECURITY & SAFETY TRADING
الريان
لتجارة معدات الامن و السلامة
Al Qusais Industrial Area 4, Dubai, UAE
Tel. 00971 4 2630396, Email: rayandxb@eim.ae

FA003U / FA004U
UPRIGHT SPRINKLER HEAD
STANDARD / QUICK RESPONSE

VNIV.
EX15141

Technical Dimension:



Nominal Discharge Curve

Technical Specification:

Model & Sprinkler I.D. No.	FA003U	FA004U
Style	Upright	
Response & Bulb Nominal Dia.	Standard response, Ø5mm	Quick response, Ø3mm
Temperature Classification	Ordinary	Ordinary
Nominal Temp. Rating	135°F / 57°C	155°F / 68°C
Max. Ambient Temp. Allowed²	115°F / 46°C	135°F / 57°C
Max. Recommended Ambient Temp³	100°F / 38°C	100°F / 38°C
Glass Bulb	Orange	Red
Thread Size (optional)	□NPT 1/2 OR □R 1/2⁵	
Nominal Orifice Size	1/2 Inch	
Nominal K-factor¹	5.6 (U.S.) / 80 (metric)	
Max. working pressure	175 psig / 1.2 Mpa (12 bar)	
Factory Hydrostatic Test	100% @ 500 psig (3.4MPa)	
Min. Operating Pressure	7 psig / 0.048 Mpa (0.48 bar)	
Sprinkler Finish (optional)	□ Natural Brass or □ Chrome Plated	
Escutcheon Finish	Chrome Plated or Color coated in any color	
Listings and Approvals	UL (United States)	

CONTACT US

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Tel: +971 4 2525333
Email: rayandxb@eim.ae
www.alrayandxb.com