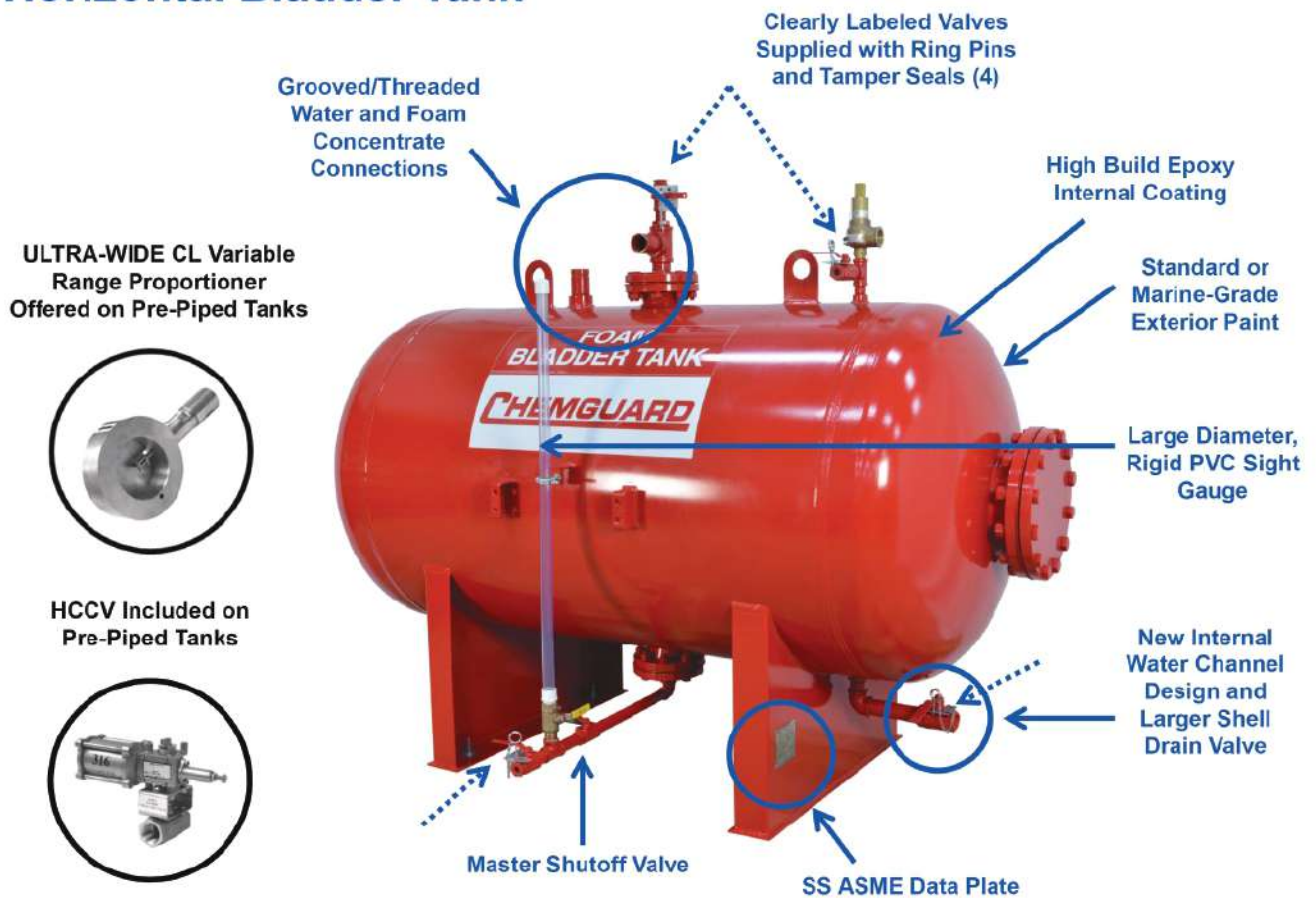


IMEN DATIS ASIA



Horizontal Bladder Tank



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INTRODUCTION OF BLADDER TANK SYSTEM

- Bladder (Diaphragm) Proportioning Tank system has been included in NFPA -11, Standard for Low-Expansion Foam.
- The Bladder Tank Foam Proportioning System utilizes 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 uses water pressure as a source of power with the added advantage of a collapsible bladder that physically separates the foam concentrate from the water supply.
- The reinforced elastomeric bladder can be used with all types of foam concentrates.
- One of the most common systems used for foam porportioning.
- Very efficient system ideal for range of foam discharge devices like foam chamber, sprinklers and monitors.

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FEATURES AND BENEFITS

- ✓ Ease of operation, systems require no outside source of power or pump other than flowing water under pressure for delivery of foam solution to the discharge devices.
- ✓ Supports wide range, of flow & pressure rates, without any adjustments.
- ✓ Very Low Pressure Drop
- ✓ Design simplicity minimizes system failure due to mechanical or operation error.
- ✓ Cost advantage as compared to foam pumps or foam dosing systems.
- ✓ Minimized installation costs compared to other proportioning methods.
- ✓ Reduced system size and water demand can be realized in certain applications.
- ✓ Easy retrofit into existing extinguishing systems.
- ✓ Tank manufactured as per ASME Section VIII Div 1, ASME Boiler and Pressure Vessel Code.
- ✓ UL Listed as Manual System & FM Approved as auto system
- ✓ With CE Mark
- ✓ Multiple proportioners can be connected to one bladder tank to support various Hazard locations.
- ✓ HD Bladder tanks come pre-piped with ratio controller mounted on the tanks.

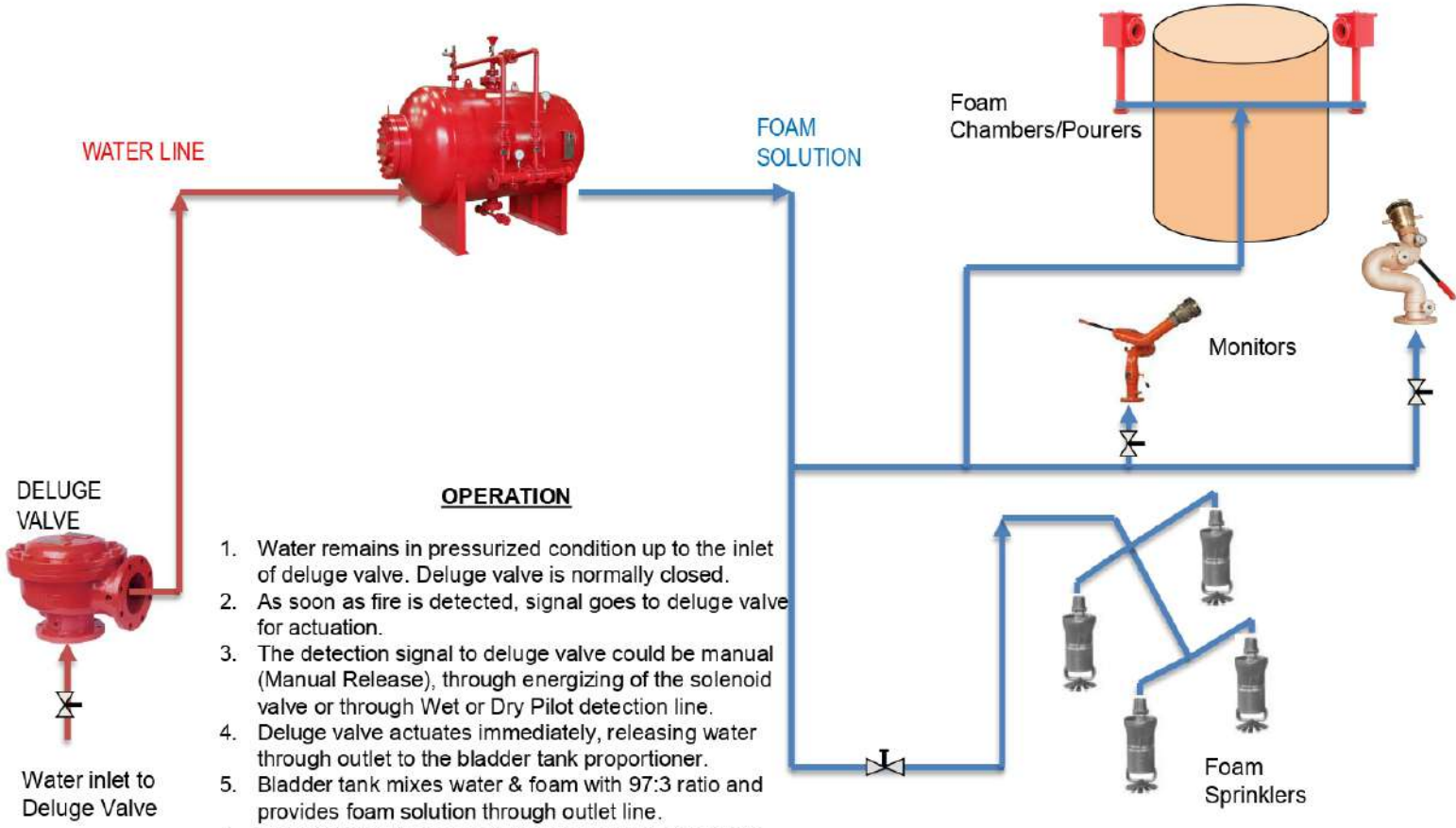
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TYPICAL SCHEMATIC & SEQUENCE OF OPERATION



OPERATION

1. Water remains in pressurized condition up to the inlet of deluge valve. Deluge valve is normally closed.
2. As soon as fire is detected, signal goes to deluge valve for actuation.
3. The detection signal to deluge valve could be manual (Manual Release), through energizing of the solenoid valve or through Wet or Dry Pilot detection line.
4. Deluge valve actuates immediately, releasing water through outlet to the bladder tank proportioner.
5. Bladder tank mixes water & foam with 97:3 ratio and provides foam solution through outlet line.
6. This foam solution can go to various foam discharge devices like foam sprinklers, monitors and foam pourers.

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HD ADVANTAGE



- ✓ Bladder tanks are designed by us as per latest standard of ASME Code
- ✓ Material complying to ASME
- ✓ Tank is provided with all accessories like sight glass, ladder, safety valve, proportioner, foam filling kit, etc.
- ✓ Complete in-house facility from designing, manufacturing to performance testing.
- ✓ Fabrication shop certified to manufacture ASME pressure vessels.
- ✓ **UL Listed or FM Approved, Optional CE Mark or ASME U Stamp.**
- ✓ HD has complete range of foam discharge devices like foam chamber, foam maker, foam sprinklers, foam monitors, etc.
- ✓ Complete technical support provided for site installations.



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BLADDER TANK PROPORTIONING SYSTEM PRE-PIPED



TECHNICAL DATA

| | |
|------------------------------|---|
| TANK MOUNTING TYPE | Vertical or Horizontal |
| CONCENTRATE STORAGE CAPACITY | For Vertical Tank: 140 litres to 7500 litres (36 TO 2000 gallon (US)) For Horizontal Tank: 140 litres to 15000 litres (36 to 4000 gallon (US)) |
| WORKING PRESSURE | 30 psi (2.1 bar) to 175 psi (12 bar) |
| OPERATING TEMPERATURE | 35.6°F (2°C) to 167°F (75°C) |
| FACTORY HYDRO TEST PRESSURE | As per ASME code |
| FLOW | Refer Ratio Controller Product Data Sheet-HD 263 |
| VESSEL CONSTRUCTION | Carbon Steel as per ASME Code Section VIII Div 1, for unfired pressure vessels |
| CE Mark | Optional |
| ASME "U" STAMP | Optional |
| BLADDER | Buna-N |
| 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 supply Optional: Stainless Steel 316/CF8M or Bronze Optional - Flanged Type |
| VENT AND DRAIN | Ball valve |
| APPROVALS | UL-Listed or FM Approved |
| OPTIONAL SUPPLY | Refer to page 3 |
| FINISH | Red RAL 3001 |
| 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 6. UL or FM Approval Requirement |



APPLICATION

The Bladder Tank Foam Proportioning System utilises water pressure to inject foam concentrate into 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.

SPECIFICATION

The Bladder Tank Foam Proportioning Systems are available with vertical and horizontal bladder tanks. The carbon steel tanks are designed and constructed in accordance with ASME Code Section VIII 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.

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 for 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.

HD FIRE Bladder tanks and proportioners are UL Listed and FM Approved with various HD foam concentrates, refer individual listing and approval data.

“U” stamp (The American Society of Mechanical Engineers- ASME) code stamp. This ASME certification is optional.

Bladder tanks 900 Liters and larger are CE marked on conformance with the European Pressure Equipment Directives. CE marking is optional.

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 inspector 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 shed 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. HD FIRE 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. HD 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 bladder. The filling guidelines provided with the equipment must be strictly adhered.
- 2) Air supply with regulator (0 to 1.0 kg/sq.cm) required during filling procedure, to be arranged by installer / user.
- 3) Water supply at 0-1.5 kg/sq.cm required for tank filling during commissioning, to be arranged by installer / user.
- 4) Concentrate fill pump is 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.
- 6) FM Approval of the Bladder tank is applicable as per FM Approved Low Expansion System, where FM Approved Foam Concentrate, Bladder tank, Ratio Controller/Foam Proportioner, Foam Discharge Devices/ Foam-Water Sprinklers are installed in the system.
- 7) Foam Concentrate Control Valve is requirement for FM Approval and is not permitted by UL. Hence Tanks will be either UL Listed or FM Approved.
- 8) Multiple Ratio Controllers cannot be used if it is UL Listed Bladder tank.
- 9) FM Approved Bladder tank can have maximum of two Ratio Controllers, two installed on different sides.
- 10) Each tank is designed & tested for specific type of foam concentrate, hence specify in order the concentrate type to be used.
- 11) The system is to be designed in accordance with latest standard of NFPA11, standard for Low, Medium and High Expansion Foam.

OPTIONAL SUPPLY

- Sight gauge with shut off and drain valve (glass or polycarbonate material)
- Ladder
- Pressure Gauges
- Concentrate control valve
- Filling kit with foam concentrate filling pump
- Stainless steel pipe for water supply side

- Stainless steel pipe & valve standard supply SS304/CF8. Optional is SS316/CF8M or SS316L/CF3M
- Painting as per specific requirement
- Seismic designed tanks
- Custom design for higher rating, material and dimension
- Internal surface is epoxy painted as standard supply, or any other paint as per customer requirement
- Ratio controller material Bronze, Stainless steel CF8M
- Relief valve is not included in standard supply it is optional as per specific customer requirement
- Tank design as per specific corrosion allowance.

RELIEF VALVE (OPTIONAL SUPPLY)

- (i) Thermal Relief valve
- (ii) Full flow, as per ASME
- (iii) Full flow, ASME "U" Stamped

LISTING & APPROVAL

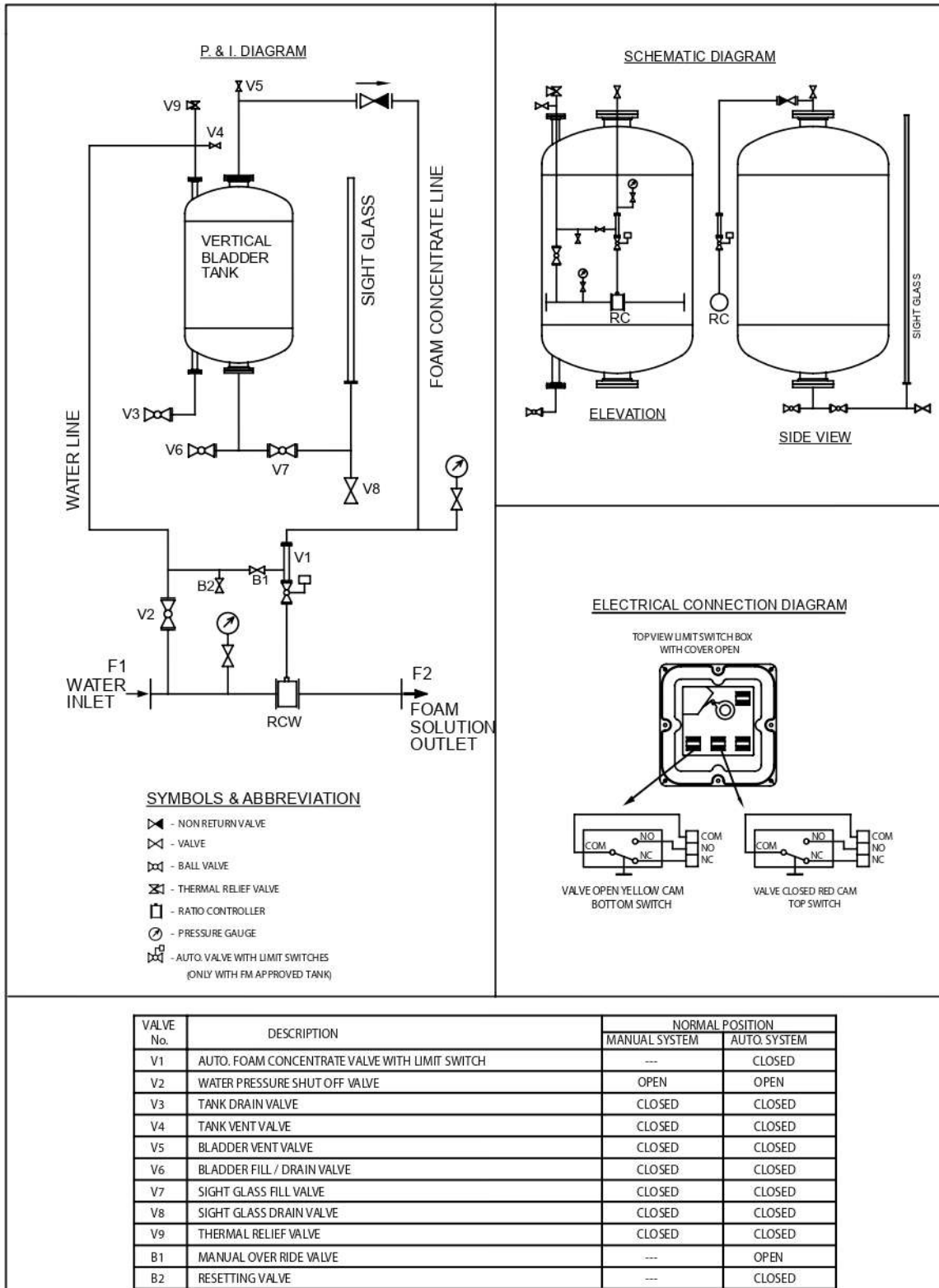
- 1) Bladder tank proportioning system is UL Listed or FM Approved as pre-piped system.
- 2) Listing and Approval is valid only when used in the manner as outlined in the applicable Listing and Approval.
- 3) Foam Concentrate Control Valve is standard supply with FM Approved Bladder tank.
- 4) CE marking is optional.
- 5) ASME "U" stamp is optional.

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 HD FIRE. For any custom packing requirement contact HD Sales.

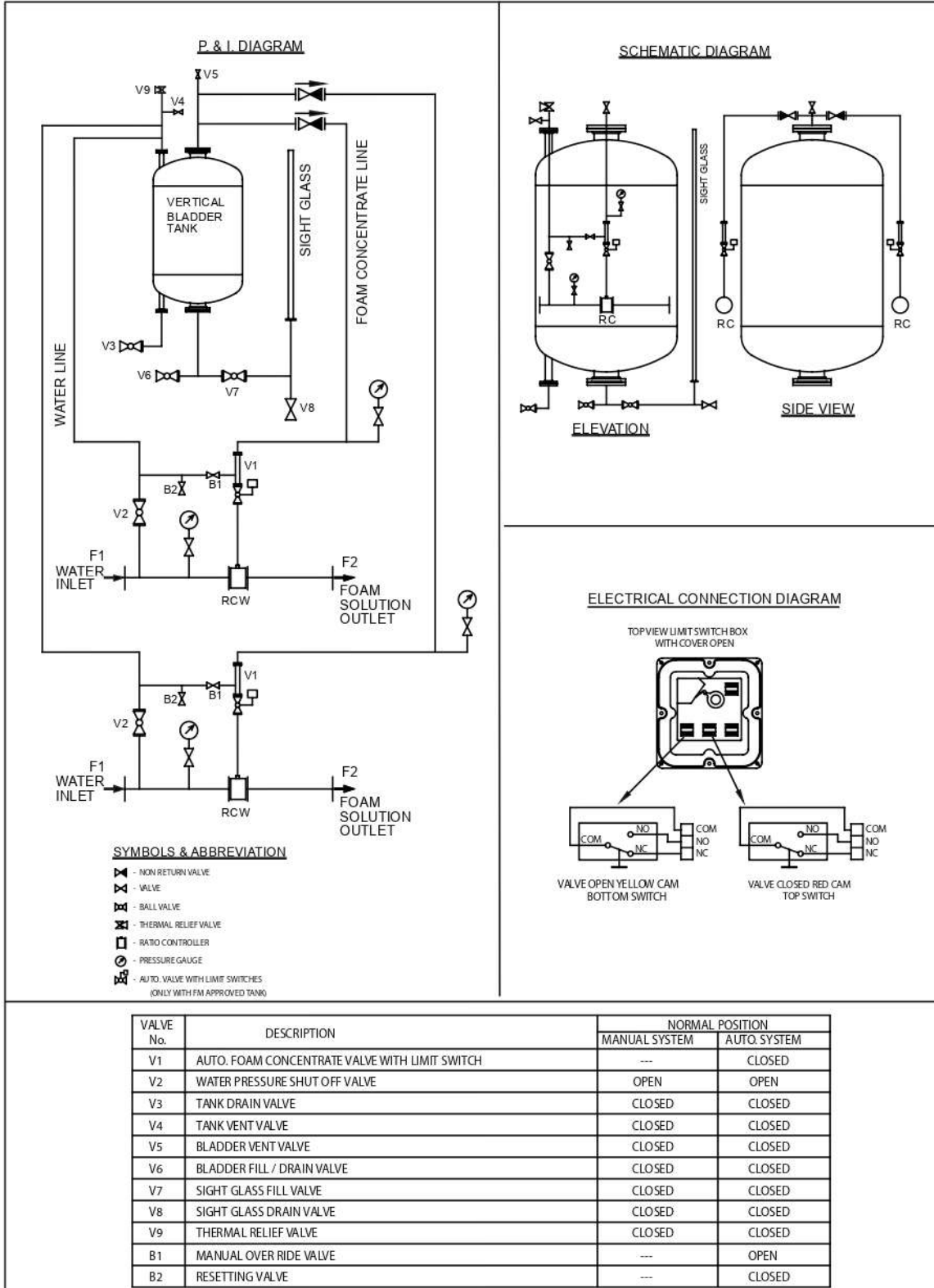


VERTICAL BLADDER TANK WITH SINGLE RATIO CONTROLLER



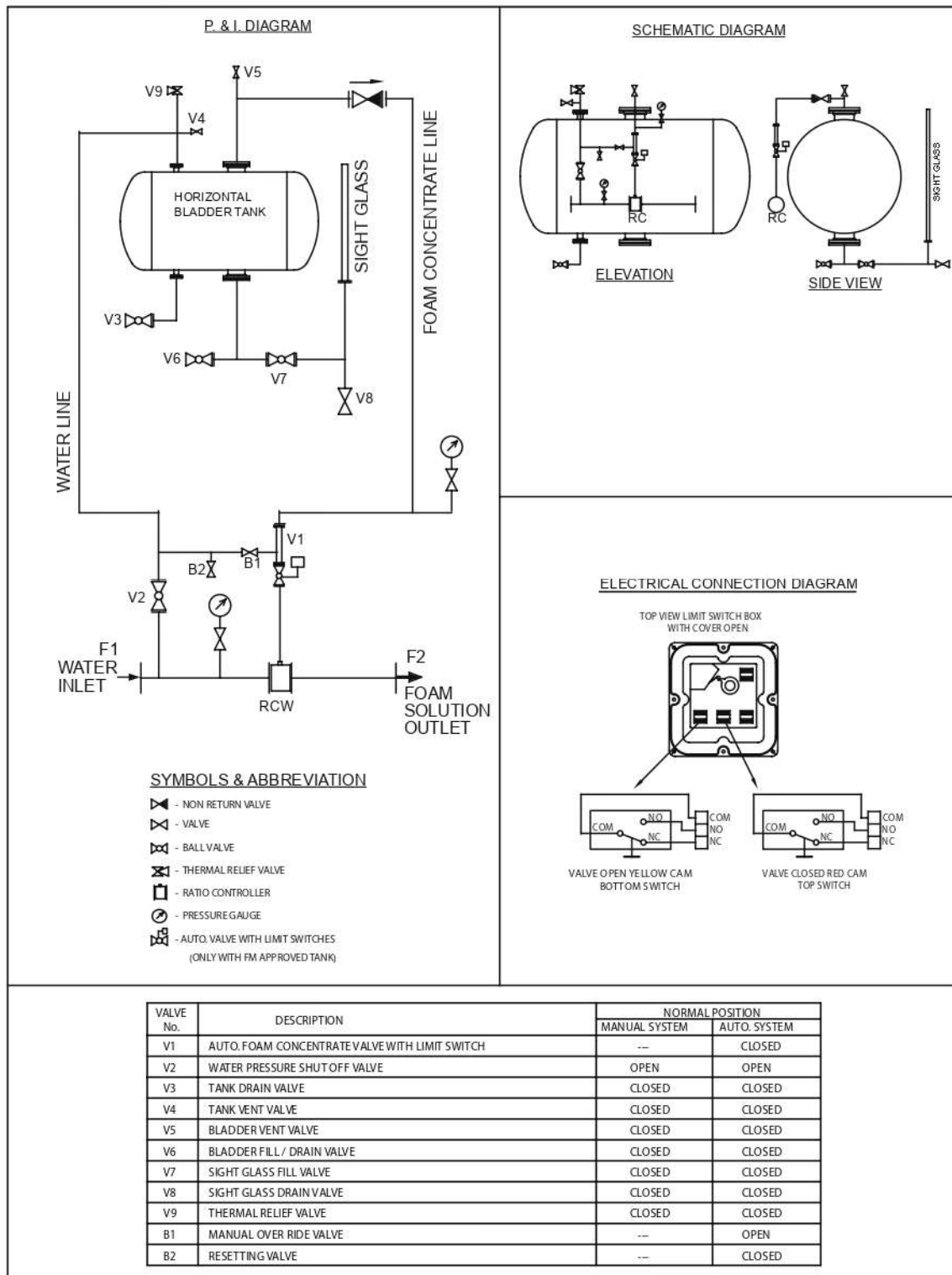


VERTICAL BLADDER TANK WITH TWO RATIO CONTROLLERS



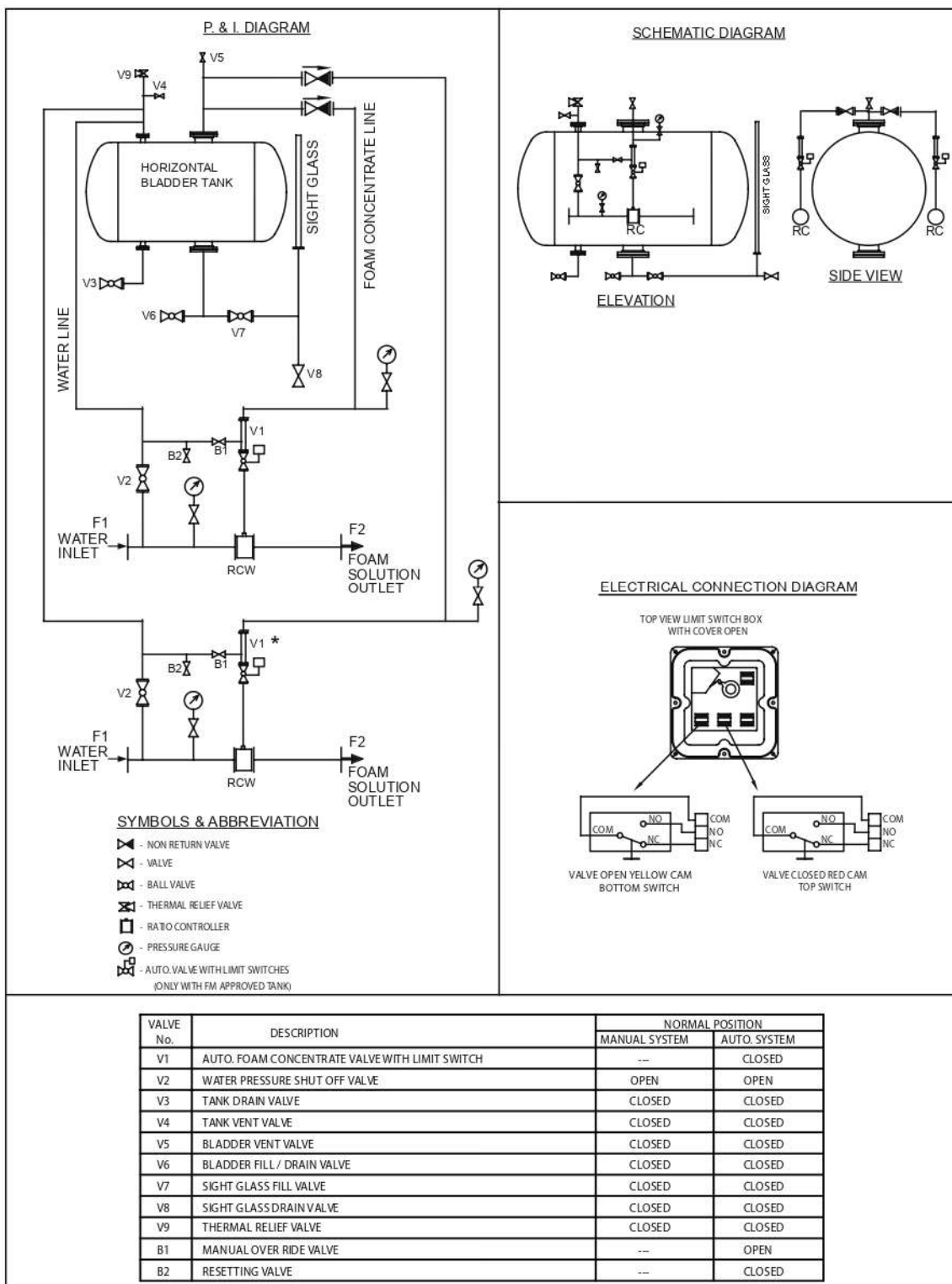


HORIZONTAL BLADDER TANK WITH SINGLE RATIO CONTROLLER



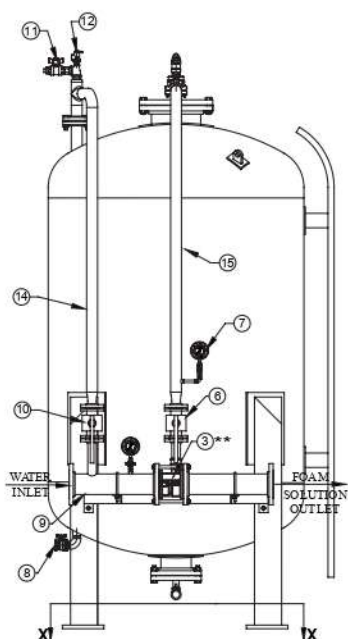


HORIZONTAL BLADDER TANK WITH TWO RATIO CONTROLLER

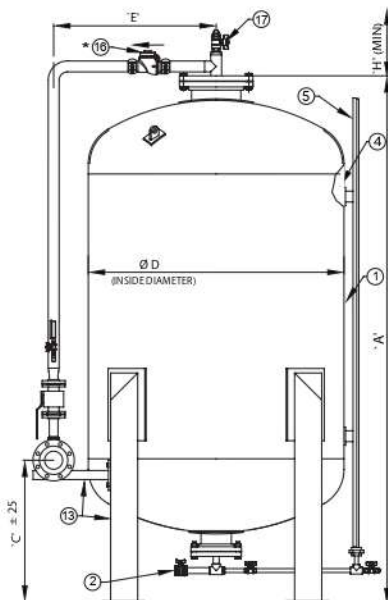




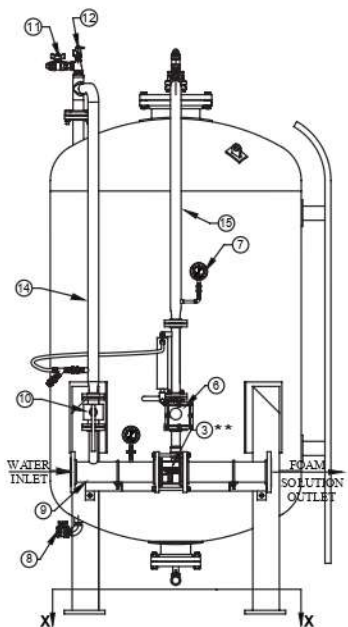
VERTICAL BLADDER TANK



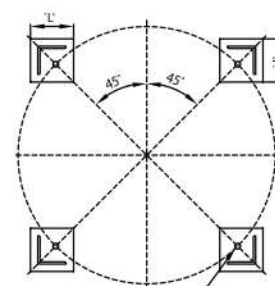
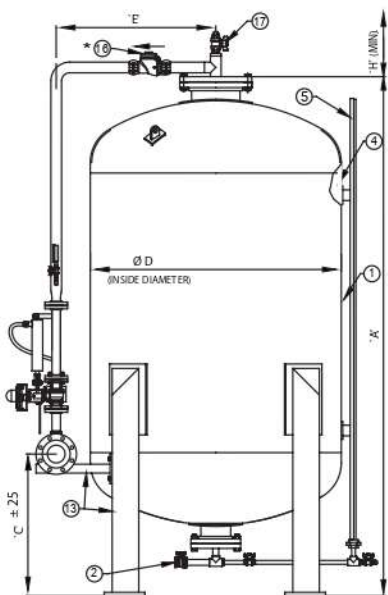
WITHOUT CONCENTRATE CONTROL VALVE



| SR. NO. | DESCRIPTION | MATERIAL SPECIFICATION |
|---------|-----------------------------|------------------------------|
| 1 | TANK | SA 516 GR.70 (OR EQUIVALENT) |
| 2 | BLADDER FILL / DRAIN VALVE | BRASS |
| 3 | RATIO CONTROLLER | SS 304 / BRONZE/ SS316 |
| 4 | BLADDER | BUNA-N |
| 5 | SIGHT GLASS | POLYCARBONATE |
| 6 | FOAM CONC. SHUT OFF VALVE | SS 304 |
| 7 | PRESSURE GAUGE | STD. 0 TO 300 PSI |
| 8 | TANK DRAIN VALVE | BRASS |
| 9 | SPOOL PIECE | A106 SEAMLESS, SCH.40 |
| 10 | WATER SHUT OFF VALVE | SS 304 |
| 11 | TANK VENT VALVE | BRASS |
| 12 | TANK SAFETY VALVE (THERMAL) | BRASS |
| 13 | SADDLE/ ANGLE LEGS SUPPORT | C.S. |
| 14 | WATER INLET LINE | A106 SEAMLESS, SCH.40 |
| 15 | FOAM CONCENTRATE LINE | SS 304, SCH.40 |
| 16 | CHECK VALVE | SS 304 |
| 17 | BLADDER VENT VALVE | BRASS |



WITH CONCENTRATE CONTROL VALVE



SECTION - X-X'

SELECTION OF FOAM CONCENTRATE CONTROL VALVE FOR HORIZONTAL & VERTICAL BLADDER TANK

| HD RATIO CONTROLLER | FOAM CONCENTRATE CONTROL VALVE SIZE |
|---------------------|-------------------------------------|
| 65 NB | 25 NB |
| 80 NB | 40 NB |
| 100 NB | 40 NB |
| 150 NB | 50 NB |
| 200 NB | 50 NB |

* GROOVED - STANDARD SUPPLY, FLANGED - OPTIONAL

** WAFER TYPE STANDARD SUPPLY, FLANGED - OPTIONAL

NOTE: CONCENTRATE CONTROL VALVE IS MANDATORY WITH FM APPROVED PRODUCT

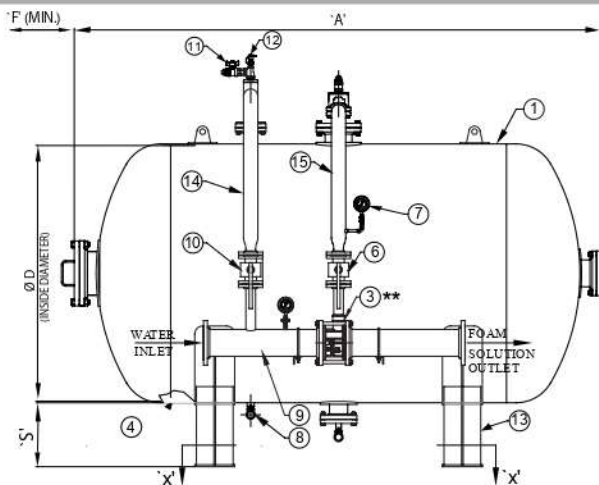


CAPACITY & DIMENSIONAL CHART FOR VERTICAL BLADDER TANK

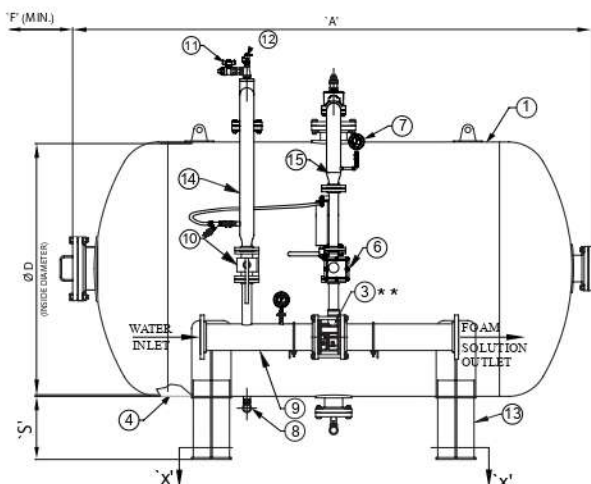
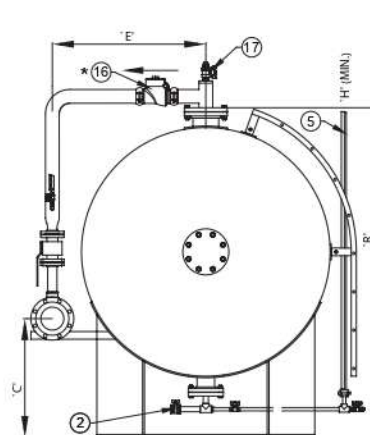
| CAPACITY | | Ø D (I.D.) | A | C | E | G | H (MIN.) | J | L | N |
|----------|---------|------------|------|-----|------|------|----------|-----|-----|------|
| LITERS | GALLONS | | | | | | | | | |
| 140 | 36 | 500 | 1418 | 525 | 500 | 462 | 1250 | 150 | 150 | Ø 25 |
| 150 | 38 | 500 | 1466 | 525 | 500 | 462 | 1250 | 150 | 150 | Ø 25 |
| 200 | 53 | 600 | 1423 | 575 | 500 | 560 | 1250 | 150 | 150 | Ø 25 |
| 250 | 66 | 600 | 1618 | 575 | 500 | 560 | 1450 | 150 | 150 | Ø 25 |
| 300 | 75 | 600 | 1811 | 575 | 500 | 560 | 1640 | 150 | 150 | Ø 25 |
| 350 | 92 | 600 | 2006 | 575 | 500 | 560 | 1835 | 150 | 150 | Ø 25 |
| 400 | 100 | 600 | 2200 | 575 | 500 | 560 | 2030 | 150 | 150 | Ø 25 |
| 450 | 120 | 750 | 1790 | 625 | 580 | 710 | 1625 | 200 | 200 | Ø 25 |
| 500 | 135 | 750 | 1915 | 625 | 580 | 710 | 1750 | 200 | 200 | Ø 25 |
| 550 | 145 | 750 | 2039 | 625 | 580 | 710 | 1875 | 200 | 200 | Ø 25 |
| 600 | 150 | 750 | 2164 | 625 | 580 | 710 | 2000 | 200 | 200 | Ø 25 |
| 650 | 175 | 850 | 1947 | 675 | 625 | 810 | 1780 | 200 | 200 | Ø 25 |
| 700 | 200 | 850 | 2044 | 675 | 625 | 810 | 1875 | 200 | 200 | Ø 25 |
| 750 | 200 | 850 | 2141 | 675 | 625 | 810 | 1975 | 200 | 200 | Ø 25 |
| 800 | 215 | 850 | 2237 | 675 | 625 | 810 | 2070 | 200 | 200 | Ø 25 |
| 850 | 225 | 850 | 2334 | 675 | 625 | 810 | 2165 | 200 | 200 | Ø 25 |
| 900 | 240 | 850 | 2431 | 675 | 625 | 810 | 2265 | 200 | 200 | Ø 25 |
| 950 | 250 | 850 | 2528 | 675 | 625 | 810 | 2360 | 200 | 200 | Ø 25 |
| 1000 | 265 | 1000 | 2112 | 750 | 700 | 960 | 1950 | 200 | 200 | Ø 30 |
| 1100 | 290 | 1000 | 2252 | 750 | 700 | 960 | 2090 | 200 | 200 | Ø 30 |
| 1200 | 300 | 1000 | 2392 | 750 | 700 | 960 | 2230 | 200 | 200 | Ø 30 |
| 1300 | 325 | 1000 | 2532 | 750 | 700 | 960 | 2370 | 200 | 200 | Ø 30 |
| 1400 | 350 | 1000 | 2672 | 750 | 700 | 960 | 2510 | 200 | 200 | Ø 30 |
| 1500 | 375 | 1000 | 2813 | 750 | 700 | 960 | 2650 | 200 | 200 | Ø 30 |
| 1600 | 400 | 1000 | 2953 | 750 | 700 | 960 | 2790 | 200 | 200 | Ø 30 |
| 1700 | 450 | 1000 | 3093 | 750 | 700 | 960 | 2930 | 200 | 200 | Ø 30 |
| 1800 | 475 | 1200 | 2502 | 800 | 800 | 1160 | 2330 | 230 | 230 | Ø 30 |
| 1900 | 500 | 1200 | 2599 | 800 | 800 | 1160 | 2430 | 230 | 230 | Ø 30 |
| 2000 | 530 | 1200 | 2696 | 800 | 800 | 1160 | 2525 | 230 | 230 | Ø 30 |
| 2200 | 580 | 1200 | 2891 | 800 | 800 | 1160 | 2720 | 230 | 230 | Ø 30 |
| 2400 | 600 | 1200 | 3085 | 800 | 800 | 1160 | 2915 | 230 | 230 | Ø 30 |
| 2600 | 700 | 1200 | 3280 | 800 | 800 | 1160 | 3110 | 230 | 230 | Ø 30 |
| 2800 | 750 | 1200 | 3474 | 800 | 800 | 1160 | 3300 | 230 | 230 | Ø 30 |
| 3000 | 800 | 1400 | 2927 | 800 | 900 | 1370 | 2750 | 230 | 230 | Ø 30 |
| 3250 | 850 | 1400 | 3106 | 800 | 900 | 1370 | 2930 | 230 | 230 | Ø 30 |
| 3500 | 900 | 1400 | 3284 | 800 | 900 | 1370 | 3110 | 230 | 230 | Ø 30 |
| 3750 | 1000 | 1400 | 3463 | 800 | 900 | 1370 | 3290 | 230 | 230 | Ø 30 |
| 4000 | 1050 | 1400 | 3642 | 800 | 900 | 1370 | 3465 | 230 | 230 | Ø 30 |
| 4250 | 1100 | 1600 | 3146 | 800 | 1000 | 1500 | 2975 | 300 | 300 | Ø 30 |
| 4500 | 1200 | 1600 | 3283 | 800 | 1000 | 1500 | 3110 | 300 | 300 | Ø 30 |
| 4750 | 1250 | 1600 | 3419 | 800 | 1000 | 1500 | 3250 | 300 | 300 | Ø 30 |
| 5000 | 1300 | 1600 | 3556 | 800 | 1000 | 1500 | 3385 | 300 | 300 | Ø 30 |
| 5250 | 1400 | 1600 | 3693 | 800 | 1000 | 1500 | 3525 | 300 | 300 | Ø 30 |
| 5500 | 1450 | 1725 | 3431 | 800 | 1060 | 1640 | 3255 | 300 | 300 | Ø 30 |
| 5750 | 1500 | 1725 | 3548 | 800 | 1060 | 1640 | 3370 | 300 | 300 | Ø 30 |
| 6000 | 1600 | 1725 | 3666 | 800 | 1060 | 1640 | 3490 | 300 | 300 | Ø 30 |
| 6250 | 1650 | 1725 | 3784 | 800 | 1060 | 1640 | 3610 | 300 | 300 | Ø 30 |
| 6500 | 1700 | 1725 | 3901 | 800 | 1060 | 1640 | 3720 | 300 | 300 | Ø 30 |
| 6750 | 1800 | 1725 | 4019 | 800 | 1060 | 1640 | 3850 | 300 | 300 | Ø 30 |
| 7000 | 1850 | 1725 | 4137 | 800 | 1060 | 1640 | 3960 | 300 | 300 | Ø 30 |
| 7250 | 1900 | 1725 | 4254 | 800 | 1060 | 1640 | 4080 | 300 | 300 | Ø 30 |
| 7500 | 2000 | 1725 | 4372 | 800 | 1060 | 1640 | 4200 | 300 | 300 | Ø 30 |



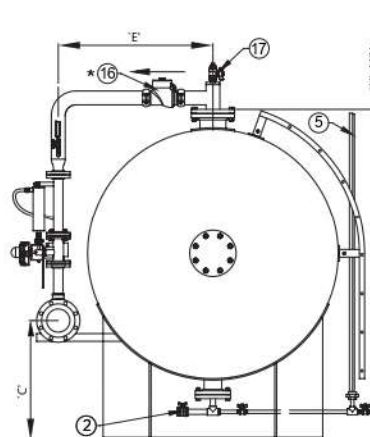
HORIZONTAL BLADDER TANK



WITHOUT CONCENTRATE CONTROL VALVE



WITH CONCENTRATE CONTROL VALVE

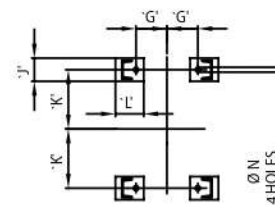


| SR.NO. | DESCRIPTION | MATERIAL SPECIFICATION |
|--------|-----------------------------|-------------------------------|
| 1 | TANK | SA 516 GR. 70 (OR EQUIVALENT) |
| 2 | BLADDER FILL/ DRAIN VALVE | BRASS |
| 3 | RATIO CONTROLLER ** | SS 304 / BRONZE / SS 316 |
| 4 | BLADDER | BUNA-N |
| 5 | SIGHT GLASS | POLYCARBONATE |
| 6 | FOAM CONC. SHUT OFF VALVE | SS 304 |
| 7 | PRESSURE GAUGE | STD. 0 TO 300 PSI |
| 8 | TANK DRAIN VALVE | BRASS |
| 9 | SPOOL PIECE | A106 SEAMLESS, SCH. 40 |
| 10 | WATER SHUT OFF VALVE | SS 304 |
| 11 | TANK VENT VALVE | BRASS |
| 12 | TANK SAFETY VALVE (THERMAL) | BRASS |
| 13 | SADDLE/ ANGLE LEGS SUPPORT | C. S. |
| 14 | WATER INLET LINE | A106 SEAMLESS, SCH. 40 |
| 15 | FOAM CONCENTRATE LINE | SS 304, SCH. 40 |
| 16 | CHECK VALVE | SS 304 |
| 17 | BLADDER VENT VALVE | BRASS |

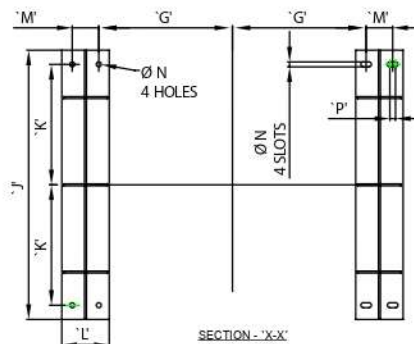
* GROOVED - STANDARD SUPPLY, FLANGED - OPTIONAL

** WAFER TYPE STANDARD SUPPLY, FLANGED - OPTIONAL

NOTE: CONCENTRATE CONTROL VALVE IS MANDATORY WITH FM APPROVED PRODUCT



SECTION - 'X-X'
FOUNDATION PLAN
(200 L TO 1700 L)



SECTION - 'X-X'
FOUNDATION PLAN
(1800 L TO 15000 L)



NOTE:

1. All dimensions are approximate and may vary slightly.
2. Ratio Controller supplied is wafer type, flanged end will be optional.
Stainless Steel CF8 (SS304) is standard supply. Bronze or CF8M (SS316) is optional supply.
3. For space requirement of Bladder Tank, provision must be made for removal of internal piping and bladder.
There are dimensions as marked and given in dimensional chart.
4. Manhole cover is not considered in standard supply and can be supplied at additional cost.
5. For tank exceeding shipping crate or container size, piping will be supplied in disassembled condition.
6. Level indicator is always supplied disassembled.
7. Large capacity Bladder Tank may require high roof or open roof for loading and unloading. Check with sales for details.
8. Optional sight glass level check may not indicate correct level with AR-AFFF foam concentrate.
9. Foam filling kit needs to be ordered separately.

LIMITED WARRANTY

HD FIRE PROTECT PVT. LTD. hereby referred to as HD FIRE warrants to the original purchaser of the fire protection products manufactured by HD FIRE and to any other person to whom such equipment is transferred, that such products will be free from defect in material and workmanship under normal use and care, for two (2) years from the date of shipment by HD FIRE. Products or Components supplied or used by HD FIRE, but manufactured by others, are warranted only to the extent of the manufacturer's warranty. No warranty is given for product or components which have been subject to misuse, improper installation, corrosion, unauthorized repair, alteration or un-maintained. HD FIRE shall not be responsible for system design errors or improper installation or inaccurate or incomplete information supplied by buyer or buyer's representatives. HD FIRE will repair or replace defective material free of charge, which is returned to our factory, transportation charge prepaid, provided after our inspection the material is found to have been defective at the time of initial shipment from our works. HD FIRE shall not be liable for any incidental or consequential loss, damage or expense arising directly or indirectly from the use of the product including damages for injury to person, damages to property and penalties resulting from any products and components manufactured by HD FIRE. HD FIRE shall not be liable for any damages or labour charges or expense in making repair or adjustment to the product. HD FIRE shall not be liable for any damages or charges sustained in the adaptation or use of its engineering data & services. In no event shall HD Fire's product liability exceed an amount equal to the sale price. The foregoing warranty is exclusive and in lieu of all other warranties and representation whether expressed, implied, oral or written, including but not limited to, any implied warranties or merchantability or fitness for a particular purpose. All such other warranties and representations are hereby cancelled.

NOTICE :

The equipment presented in this bulletin is to be installed in accordance with the latest publication standards of NFPA or other similar organisations and also with the provision of government codes or ordinances wherever applicable.

The information provided by us is to the best of our knowledge and belief, and consist of general guidelines only. Site handling and installation control is not in our scope. Hence we give no guarantee for result and take no liability for damages, loss or penalties whatsoever, resulting from our suggestion, information, recommendation or damages due to our product.

Product development is a continuous programme of HD FIRE PROTECT PVT. LTD. and hence the right to modify any specification without prior notice is reserved with the company.



Low Expansion Foam Systems

Foam Concentrates. Used as a component of foam systems. Concentrates are only Approved for use with the specific proportioning, bladder tank, and discharge devices listed below and the sprinklers listed in the Foam Water Sprinkler section of the Approval Guide.

Use of a concentrate with other devices or outside the listed ranges may result in solutions too lean or rich or may produce foam unable to provide the required extinguishing or sealing performance.

Concentrates below are compatible with both fresh water and sea water.

| Product | Company | Listing Country | Type of Equipment | For Use With | | | |
|-------------------|---------|-----------------|-------------------|-------------------|------------------------------|--|--------------------------------|
| | | | | Concentrate Name | Concentrate Percent in Water | Configurations | Approved Fuel Hazards |
| HD AFFF 3F-C6 | HD Fire | India | Concentrate | HD AFFF 3F-C6 | 3% | For use with HD Fire ratio controllers and bladder tanks specifically tested with this concentrate. Or Water Motor-Powered Positive Displacement Pumps within acceptable viscosity range only. May be used in a pre-mixed solution. For use with HD Fire discharge devices evaluated with the specific concentrate only. | Hydrocarbons |
| HD AR-AFFF 3x3-C6 | HD Fire | India | Concentrate | HD AR-AFFF 3x3-C6 | 3% | For use with HD Fire ratio controllers and bladder tanks specifically tested with this concentrate. Or Water Motor-Powered Positive Displacement Pumps within acceptable viscosity range only. May be used in a pre-mixed solution. For use with HD Fire discharge devices evaluated with the specific concentrate only. | Hydrocarbons IPA Ethanol |

Bladder tanks. For use with HD Fire Protect foam concentrates, proportioners, discharge devices, and foam water sprinklers within the specifications identified in the table below.

| Product | Company | Listing Country | Type of Equipment | For Use With | | | | | | | | Type | Maximum Operating Pressure | Sizes |
|-------------------------|---------------------------|-----------------|-------------------|-------------------|------------------------------|----------------|---------------------------|--------------------------------------|-------------------|-------------------------------------|----------------------------|-------------------------------|----------------------------|------------------------------------|
| | | | | Concentrate Name | Concentrate Percent in Water | Configurations | Approved Fuel Hazards | Hydraulic Concentrate Control Valves | | | | | | |
| | | | | | | | | Model Number | Size, inches (NB) | Minimum Actuator Operating Pressure | Maximum Operating Pressure | | | |
| Vertical Bladder Tank | HD Fire Protect Pvt. Ltd. | India | Bladder Tank | HD AFFF 3F-C6 | 3% | Vertical | Hydrocarbon | Model CV | 1 (25NB) | 30 PSI (2.1 Bar) | 175 PSI (12.1 Bar) | ASME Section VIII, Division 1 | 175 PSI (12 Bar) | 36 - 2000 USG (140 - 7500 Liters) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | Vertical | Hydrocarbon, IPA, Ethanol | | 1.5 (40NB) | | | | | |
| Horizontal Bladder Tank | HD Fire Protect Pvt. Ltd. | India | Bladder Tank | HD AFFF 3F-C6 | 3% | Horizontal | Hydrocarbon | Model CV | 1 (25NB) | 30 PSI (2.1 Bar) | 175 PSI (12.1 Bar) | ASME Section VIII, Division 1 | 175 PSI (12 Bar) | 36 - 4000 USG (140 - 15000 Liters) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | Horizontal | Hydrocarbon, IPA, Ethanol | | 1.5 (40NB) | | | | | |

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Proportioners. For use with HD Fire Protect foam concentrates and bladder tank systems (where applicable) within the specifications identified in the table below.

| Product | Company | Listing Country | Type of Equipment | For Use With | | | | Approved Flow Range | | Approved Pressure Range | | Connection | Finish | Sizes |
|--|---------------------------|-----------------|-------------------|-------------------|------------------------------|---|----------------------------|---------------------|--------------|-------------------------|---------------|---------------|-----------------------------------|--------------|
| | | | | Concentrate Name | Concentrate Percent in Water | Configurations | Approved Fuel Hazards | (gal/min) | (L/min) | (psi) | (bar) | | | |
| | | | | | | | | | | | | | | |
| Model RCW-B, RCW-S, RCF-B, and RCF-S Ratio Controllers | HD Fire Protect Pvt. Ltd. | India | Ratio Controller | HD AFFF 3F-C6 | 3% | For use with HD Fire Protect bladder tanks and discharge devices as appear in the FM Approval Guide only. | Hydrocarbons | 27 - 420 | 102 - 1590 | 30 - 175 | 2-12 | Wafer (RCW) | Bronze (B) or Stainless Steel (S) | 2.5" (65 NB) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | | Hydrocarbons, IPA, Ethanol | 132 - 272 | 500 - 1030 | | Flanged (RCF) | | | |
| Model RCW-B, RCW-S, RCF-B, and RCF-S Ratio Controllers | HD Fire Protect Pvt. Ltd. | India | Ratio Controller | HD AFFF 3F-C6 | 3% | For use with HD Fire Protect bladder tanks and discharge devices as appear in the FM Approval Guide only. | Hydrocarbons | 77 - 790 | 290 - 2990 | 30 - 175 | 2-12 | Wafer (RCW) | Bronze (B) or Stainless Steel (S) | 3" (80 NB) |
| Model RCW-B, RCW-S, RCF-B, and RCF-S Ratio Controllers | HD Fire Protect Pvt. Ltd. | India | Ratio Controller | HD AFFF 3F-C6 | 3% | For use with HD Fire Protect bladder tanks and discharge devices as appear in the FM Approval Guide only. | Hydrocarbons | 159 - 1598 | 600 - 6050 | 30 - 175 | 2-12 | Wafer (RCW) | Bronze (B) or Stainless Steel (S) | 4" (100 NB) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | | Hydrocarbons, IPA, Ethanol | 478 - 1622 | 1810 - 6140 | | Flanged (RCF) | | | |
| Model RCW-B, RCW-S, RCF-B, and RCF-S Ratio Controllers | HD Fire Protect Pvt. Ltd. | India | Ratio Controller | HD AFFF 3F-C6 | 3% | For use with HD Fire Protect bladder tanks and discharge devices as appear in the FM Approval Guide only. | Hydrocarbons | 317 - 3027 | 1200 - 11460 | 30 - 175 | 2-12 | Wafer (RCW) | Bronze (B) or Stainless Steel (S) | 6" (150 NB) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | | Hydrocarbons, IPA, Ethanol | 1321 - 3249 | 5000 - 12300 | | Flanged (RCF) | | | |
| Model RCW-BM, RCW-SM, RCF-BM, and RCF-SM Ratio Controllers | HD Fire Protect Pvt. Ltd. | India | Ratio Controller | HD AR-AFFF 3x3-C6 | 3% | For use with HD Fire Protect bladder tanks and discharge devices as appear in the FM Approval Guide only. | Hydrocarbons, IPA, Ethanol | 44 - 139 | 165 - 528 | 30 - 175 | 2-12 | Wafer (RCW) | Bronze (B) or Stainless Steel (S) | 2.5" (65 NB) |
| | | | | | | | | | | | | Flanged (RCF) | | |

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|--|---------------------------|-------|------------------|-------------------|----|---|----------------------------|-----------|------------|-------------|----------|------------------------------|-----------------------------------|--------------|
| Model RCW-BM, RCW-SM, RCF-BM, and RCF-SM Ratio Controllers | HD Fire Protect Pvt. Ltd. | India | Ratio Controller | HD AR-AFFF 3x3-C6 | 3% | For use with HD Fire Protect bladder tanks and discharge devices as appear in the FM Approval Guide only. | Hydrocarbons, IPA, Ethanol | 217 - 814 | 820 - 3080 | 30 - 175 | 2-12 | Wafer (RCW) Flanged (RCF) | Bronze (B) or Stainless Steel (S) | 3" (80 NB) |
| Model IE225-7B, IE225-7S, IE225-12B, IE225-12S Portable Inline Inductors | HD Fire Protect Pvt. Ltd. | India | Inline Inductor | HD AFFF 3F-C6 | 3% | For use with HD Fire Protect bladder tanks and ratio controllers as appear in the FM Approval Guide only. | Hydrocarbons | 59 or 119 | 225 or 450 | 100, or 175 | 7, or 12 | Hose Coupling | Bronze (B) or Stainless Steel (S) | 2.5" (65 NB) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | | Hydrocarbons, IPA, Ethanol | 59* | 225* | 100 or 175 | 7 or 12 | | | |
| Model IE450-7B, IE450-7S, IE450-12B, IE450-12S Portable Inline Inductors | HD Fire Protect Pvt. Ltd. | India | Inline Inductor | HD AFFF 3F-C6 | 3% | For use with HD Fire Protect bladder tanks and ratio controllers as appear in the FM Approval Guide only. | Hydrocarbons | 119 | 450 | 100, or 175 | 7, or 12 | Hose Coupling | Bronze (B) or Stainless Steel (S) | 2.5" (65 NB) |
| | | | | HD AR-AFFF 3x3-C6 | 3% | | Hydrocarbons, IPA, Ethanol | 119 | 450 | 175* | 12* | | | |

Note: Maximum static pressure is 200 PSI (13.8 Bar).

*Model IE450-7B and IE450-7S is not FM Approved for use with HD AR-AFFF 3x3-C6.