

VERTICAL BLADDER TANK

Balanced Pressure Proportioning System

NPR050

- Reliable Foam System Requiring Only Water Power
- Perfect For Tight Spaces
- UL & ULC Listed, ASME, National Board Registered
- Bladder-UL162 Approved, High Tensile Pressure Formed Seams
- Interior Strainers And Flow Path Devices
- Supplied With All Valves, Piping And Equipment Necessary For Operation
- Custom Designs Available

Description

The Bladder Tank Proportioning System is a balanced pressure proportioning system, requiring no external power other than an adequate water supply. A bladder tank, with an appropriate proportioner(s), injects foam concentrate into the water supply of a fire protection system and automatically proportions over a wide range of flows and pressures.

The Bladder Tank Proportioning System employs water to pressurize the bladder and force foam concentrate to the ratio controller. The water supply simultaneously feeds the ratio controller and the bladder tank. As water flows through the ratio controller the level of pressure reduction increases, thereby affecting a corresponding pressure drop across the foam concentrate metering orifice. The corresponding pressure drop results in foam concentrate flow that is proportionate to the water flow through the ratio controller. As both the water and foam concentrate flow into a common reduced pressure area, it is necessary only to maintain identical water and foam concentrate pressures at the respective inlets of the ratio controller.

During operation, the water outside the bladder gradually displaces the foam concentrate inside causing the bladder to collapse until the supply is exhausted. The bladder tank may then be isolated and the system allowed to discharge water only. Since the bladder tank is pressurized, the bladder cannot be refilled during operation.

Features

- Compatible with all foam concentrates
- Requires less floor space than horizontal tanks
- Bottom foam concentrate discharge keeps feed piping full, eliminating air pockets and preventing corrosion
- Permanently welded lifting lugs for safe tank movement and positioning

Applications

Frequently used in aircraft hangars, loading racks, sprinkler systems, and offshore platforms.

Technical Specifications

The National Foam bladder tank system shall be a complete self-contained proportioning system consisting of a bladder tank, ratio controller, and assembled piping. The bladder tank shall be an ASME code welded carbon steel pressure vessel with a working pressure of 175 psi (12 bar). The tank shall be supplied in the vertical configuration and shall be mounted on full skirt securely welded to tank shell, complete with four mounting clips. A flexible, thermoplastic vulcanized rubber internal bladder separates the foam concentrate from the incoming water. The bladder shall be manufactured with single piece nozzles and all seams shall be temperature/pressure high tensile strength using no adhesives. The tank shall have slotted PVC schedule 80 center discharge piping, located within the bladder, to ensure that foam concentrate flows to the bottom discharge. A section of 1-inch I.D. rubber hose installed between the bladder and tank shell, shall extend from the water vent to the



water drain connection, preventing bladder obstruction at these openings.

The ratio controller (RCF) shall be a flanged style for mounting in Schedule 40 pipe between two 150# flat or raised flanges of the same nominal size as the RCF. The RCF shall be cast bronze with stainless steel hardware and shall be rated for a working pressure of 250 psi (17 bar). The ratio controller shall incorporate a recovery section to minimize the pressure loss through the proportioner and reduce the straight pipe length required after the controller. A 1/4" (6.35 mm) female NPT port for sensing water pressure at the inlet to the ratio controller water orifice shall be incorporated into the casting. Each ratio controller shall automatically proportion over the range indicated on flow range chart without any manual adjustment. The foam concentrate inlet shall contain a foam concentrate metering orifice with field adjustment feature to allow user to fine tune proportioning.

The ratio controller shall be pre-piped to the bladder tank. All external piping shall be Schedule 40, and shall be brass for foam concentrate and carbon steel for water. Brass or bronze ball valves of the locking handle type, in accordance with NFPA requirements for valve supervision, shall be supplied, and shall be complete with identification labels on the handles. A ball check valve shall be installed in the foam concentrate line. Tank shall include all necessary drain and vent valves, concentrate fill piping, fill cup, and tank content/identification labels. External surfaces of tank and piping shall be coated with red high solids acrylic polyurethane finish.

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Approvals and Listings

- Underwriters Laboratories, Inc. (UL Listed)
- Underwriters Laboratories, Canada. (ULC Listed)
- ASME Section VIII Div 1

Technical Information

Materials of Construction:

Tank: Carbon steel, ASME code
 Bladder: Welded seam thermoplastic
 Internal Piping: Slotted PVC, Sch. 80
 External Piping:
 Water Side: Carbon Steel, Sch. 40, Screwed
 Fm. Conc. Side: Brass, Sch. 40, Screwed

Valves: Ball valve with locking handle, bronze body, and brass or chrome plated brass ball

Fill Funnel: Polyethylene, 7 1/2" diameter cup x 1" male NPT spout

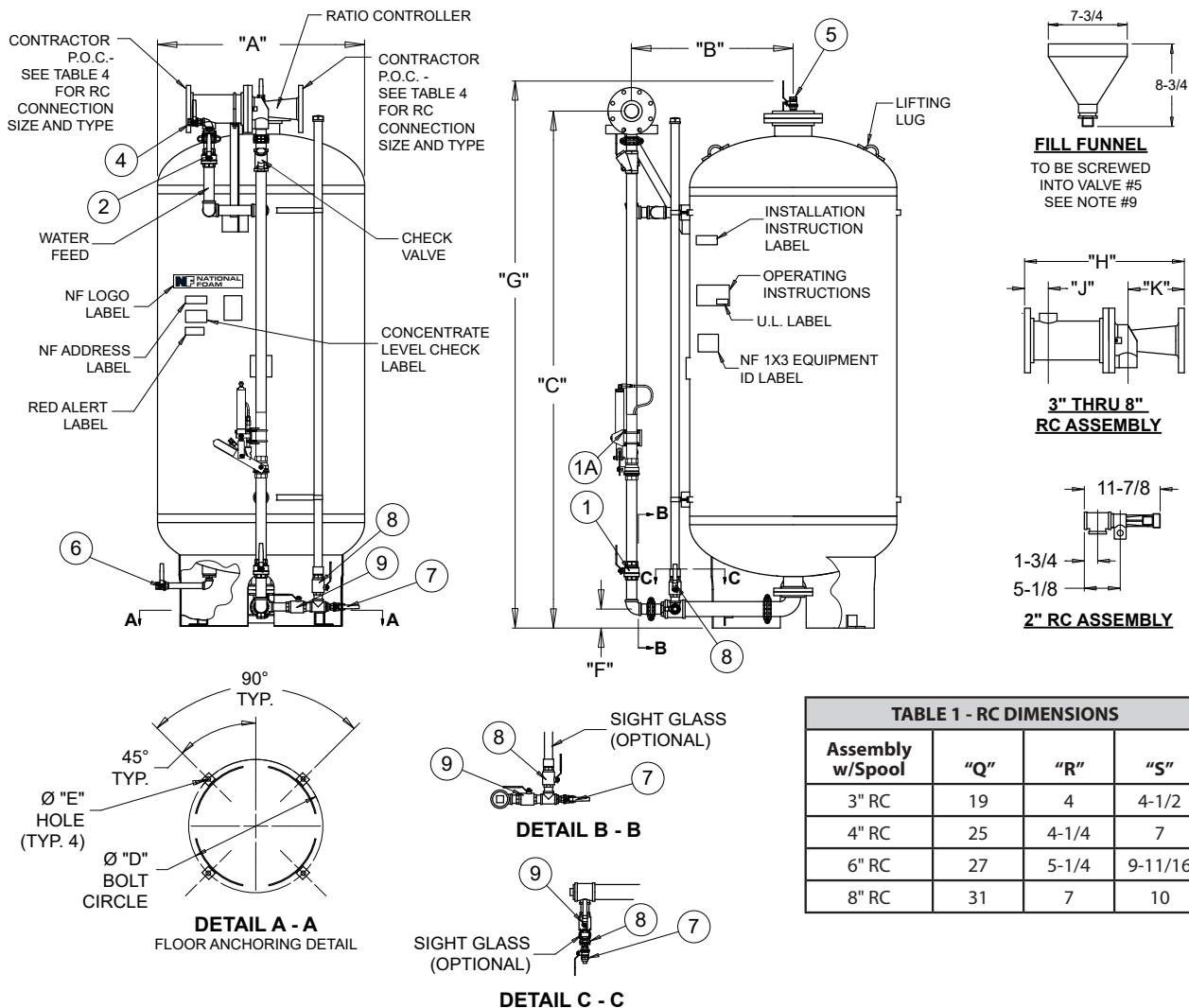
Ratio Controller:
 Cast Bronze (85-5-5-5), ASTM-B-584 alloy #83600

Exterior Finish:
 Red high solids acrylic polyurethane (NF Spec AS1-06-030)

Working Pressure:
 175 psi (12 bar)

Options

- Sight gauge: 1 1/2" (38 mm) O.D. polycarbonate with bronze ball shut-off valve
- Higher tank working pressures
- Coal tar epoxy internal coating
- Special finishes
- Pressure relief valve
- Type 304 or 316 stainless steel piping, screwed or welded
- Fill kit
- Automatic concentrate valve. Typically NF WPBV, also available as electrically or pneumatically actuated valve.
- Alternate style and multiple ratio controllers
- Reversed flow direction



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Valve No.	Description	Normal Position	
		Manual System	Auto. System
1	Concentrate Supply	Closed	Open
1A	Auto. Concentrate Supply (Optional)	---	Closed
2	Water Pressure Supply	Open	Open
4	Tank Water Vent	Closed	Closed
5	Concentrate Vent/Fill	Closed	Closed
6	Water Drain/Fill	Closed	Closed
7	Concentrate Drain/Fill	Closed	Closed
8	Sight Glass (Optional)	Closed	Closed
9	Sight Glass Supply (Optional)	Open	Open

TABLE 3 - SUGGESTED RATIO CONTROLLER SIZES FOR SYSTEM FLOWS

Ratio Controller Size in. (mm)	* Standard Flow Range gpm (lpm)	* Special Flow Range with AR-AFFF & 3% AR-Synthetic Foam Concentrate gpm (lpm)	Water & Concentrate Line Sizes in. (mm)	Ratio Controller Connections in. (mm)	
				Inlet	Outlet
2 (51)	25-260 (95-984)	60-260 (227-984)	<i>Line Sizes to be Determined by NF at System Design.</i>	2 (51) NPT (F)	2 (51) NPT (F)
3 (76)	70-730 (265-2763)	185-730 (700-2763)		3 (76) FF flg.	3 (76) FF flg.
4 (102)	60-1579 (227-5977)	334-1483 (1264-5614)		4 (102) FF flg.	4 (102) FF flg.
6 (152)	150-3024 (568-11447)	627-3024 (2373-11447)		6 (152) FF flg.	6 (152) FF flg.
8 (203)	760-5040 (2877-19078)	1000-5004 (3785-18942)		8 (203) FF flg.	8 (203) FF flg.

*Represents the overall flow range for all foam concentrates listed with respective ratio controller. Refer to UL directory for specific flow range for each foam concentrate.

NOTES:

- All dimensions are approximate and may vary slightly.
- Weights listed apply to empty tanks.
- All tank and valve openings will be plugged for shipping.
- Optional sight glass assembly includes:
 - Polycarbonate sight glass tube, 1½" (38) O.D. open to atmosphere (vented cap)
 - Ball shutoff valve
 - Split pipe clamp w/ threaded rod
- Fill funnel and optional sight glass tube will be packed and shipped separately.
- Optional sight glass level check cannot be performed with alcohol type AFFF concentrates. Refer to the operating and maintenance manual for further instructions.
- Contents label will be supplied to customer by NF with foam concentrate order and applied by customer.
- When designing a building to house bladder tanks, provisions must be to allow for the removal of the internal piping and bladder. These items are the full height of tank.
- Concentrate vent valve #5 will also be used to top off the concentrate level. A fill funnel will be provided with each tank for this purpose.
- For non-standard or special tanks, refer to the tank's specific outline assembly drawing for details.
- For tanks exceeding reasonable shipping crate sizes, piping will be supplied disassembled using grooved couplings for easy assembly at installation site.

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TABLE 2 - CAPACITY AND DIMENSIONS CHART

Capacity gal. (liters)	"A"	"B"	"C"	"D"	"E"	"F"	"G"	Empty Weight lb (kg)
25 (95)	20 (508)	22 (559)	46 (1168)	22-3/4 (578)	9/16 (14)	4 (102)	49 (1245)	350 (159)
36 (136)	24 (610)	24 (610)	46 (1168)	22-3/4 (578)	9/16 (14)	4 (102)	50 (1270)	420 (191)
50 (189)	24 (610)	24 (610)	46 (1168)	22-3/4 (578)	9/16 (14)	4 (102)	58 (1473)	507 (230)
100 (379)	24 (610)	24 (610)	85 (2159)	22-3/4 (578)	9/16 (14)	4 (102)	87 (2210)	665 (302)
150 (568)	30 (762)	27 (686)	82 (1561)	27-3/4 (705)	9/16 (14)	4 (102)	86 (2184)	820 (372)
200 (757)	30 (762)	27 (686)	100 (2540)	27-3/4 (705)	9/16 (14)	4 (102)	104 (2642)	957 (434)
300 (1136)	36 (914)	30 (762)	103 (2616)	32-3/4 (832)	9/16 (14)	4 (102)	108 (2743)	1301 (591)
400 (1514)	48 (1219)	36 (914)	83 (2108)	41-1/2 (1054)	11/16 (17)	4 (102)	91 (2311)	1704 (773)
500 (1892)	48 (1219)	36 (914)	97 (2464)	41-1/2 (1054)	11/16 (17)	4 (102)	105 (2667)	1760 (799)
600 (2271)	48 (1219)	36 (914)	112 (2845)	41-1/2 (1054)	11/16 (17)	4 (102)	120 (3048)	1869 (848)
700 (2649)	48 (1219)	37-1/2 (953)	126 (3200)	41-1/2 (1054)	11/16 (17)	4 (102)	134 (3404)	2099 (953)
750 (2839)	48 (1219)	37-1/2 (953)	134 (3404)	41-1/2 (1054)	11/16 (17)	4 (102)	142 (3607)	2200 (999)
800 (3028)	60 (1524)	43-1/2 (1105)	102 (2591)	51-1/2 (1308)	11/16 (17)	8 (203)	113 (2870)	2304 (1046)
900 (3407)	60 (1524)	43-1/2 (1105)	110 (2794)	51-1/2 (1308)	11/16 (17)	8 (203)	122 (3099)	2634 (1196)
1000 (3785)	60 (1524)	43-1/2 (1105)	120 (3048)	51-1/2 (1308)	13/16 (21)	8 (203)	132 (3353)	3030 (1375)
1100 (4164)	60 (1524)	43-1/2 (1105)	130 (3302)	51-1/2 (1308)	13/16 (21)	8 (203)	141 (3581)	4123 (1871)
1200 (4542)	60 (1524)	43-1/2 (1105)	140 (3556)	51-1/2 (1308)	13/16 (21)	8 (203)	150 (3810)	3521 (1598)
1300 (4921)	60 (1524)	43-1/2 (1105)	150 (3810)	51-1/2 (1308)	13/16 (21)	8 (203)	160 (4064)	3640 (1652)
1400 (5300)	60 (1524)	43-1/2 (1105)	158 (4013)	51-1/2 (1308)	13/16 (21)	8 (203)	169 (4293)	3759 (1706)
1500 (5678)	60 (1524)	43-1/2 (1105)	167 (4242)	51-1/2 (1308)	13/16 (21)	8 (203)	178 (4521)	3810 (1729)
1600 (6057)	72 (1829)	49-1/2 (1257)	134 (3404)	57-1/2 (1461)	13/16 (21)	8 (203)	144 (3658)	3900 (1770)
1700 (6435)	72 (1829)	49-1/2 (1257)	140 (3556)	57-1/2 (1461)	13/16 (21)	8 (203)	150 (3810)	4125 (1872)
1800 (6814)	72 (1829)	49-1/2 (1257)	147 (3734)	57-1/2 (1461)	13/16 (21)	8 (203)	157 (3988)	4250 (1929)
1900 (7192)	72 (1829)	49-1/2 (1257)	153 (3886)	57-1/2 (1461)	13/16 (21)	8 (203)	163 (4140)	4375 (1986)
2000 (7571)	72 (1829)	49-1/2 (1257)	160 (4064)	57-1/2 (1461)	13/16 (21)	8 (203)	170 (4318)	4500 (2043)
2100 (7949)	72 (1829)	49-1/2 (1257)	166 (4216)	57-1/2 (1461)	13/16 (21)	8 (203)	176 (4470)	4625 (2099)
2200 (8328)	72 (1829)	49-1/2 (1257)	173 (4394)	57-1/2 (1461)	13/16 (21)	8 (203)	183 (4648)	4750 (2156)
2300 (8706)	72 (1829)	49-1/2 (1257)	179 (4547)	57-1/2 (1461)	13/16 (21)	8 (203)	189 (4801)	4875 (2213)
2400 (9085)	72 (1829)	49-1/2 (1257)	186 (4724)	57-1/2 (1461)	13/16 (21)	8 (203)	196 (4978)	5000 (2270)

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ORDERING INFORMATION										
Capacity		Part Number (with or without sight gauge)	Approx. Shipping Weight		Approx. Shipping Package Dimensions					
gal.	liters		lb	kg	L		W		H	
					in.	mm	in.	mm	in.	mm
25	95	<i>Tanks with prepiped ratio</i>	760	345	34	864	34	864	55	1397
36	136	<i>controllers are custom to</i>	770	350	36	914	36	914	56	1422
50	189	<i>customer request.</i>	800	363	36	914	36	914	64	1626
100	379	<i>Please contact</i>	950	431	93	2362	41	1041	50	1270
150	568	<i>National Foam Inc. for</i>	1095	497	92	2337	38	965	52	1321
200	757	<i>part numbers and pricing.</i>	1225	556	110	2794	38	965	52	1321
300	1136		2000	908	114	2896	43	1092	57	1448
400	1514		2200	999	97	2464	55	1397	69	1753
500	1892		2350	1067	109	2769	55	1397	69	1753
600	2271		2500	1135	124	3150	55	1397	69	1753
700	2649		2650	1203	138	3505	55	1397	69	1753
750	2839		2800	1271	146	3708	55	1397	69	1753
800	3028		2900	1316	119	3023	67	1702	82	2083
900	3407		3250	1475	128	3251	67	1702	82	2083
1000	3785		3600	1634	138	3505	67	1702	82	2083
1100	4164		3950	1793	147	3734	67	1702	82	2083
1200	4542		4300	1952	156	3962	67	1702	82	2083
1300	4921		4650	2111	166	4216	67	1702	82	2083
1400	5300		5000	2270	175	4445	67	1702	82	2083
1500	5678		5350	2428	184	4674	67	1702	82	2083
1600	6057		5550	2519	150	3810	79	2007	94	2388
1700	6435		5750	2610	156	3962	79	2007	94	2388
1800	6814		5950	2701	163	4140	79	2007	94	2388
1900	7192		6150	2791	169	4293	79	2007	94	2388
2000	7571		6350	2882	176	4470	79	2007	94	2388
2100	7949		6550	2973	182	4623	79	2007	94	2388
2200	8328		6750	3064	189	4801	79	2007	94	2388
2300	8706		6950	3155	195	4953	79	2007	94	2388
2400	9085		7150	3245	202	5131	79	2007	94	2388

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National Foam

350 East Union Street, West Chester, PA 19382, USA
24hr **RED ALERT**® : 610-363-1400 • Fax: 610-431-7084
www.nationalfoam.com

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