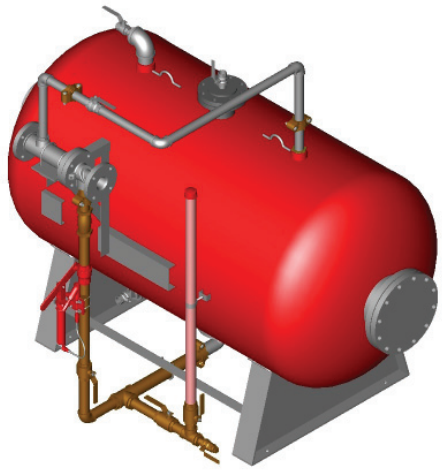
HORIZONTAL BLADDER TANK

Balanced Pressure Proportioning System

NPR040

- Reliable Foam System Requiring Only Water Power
- Perfect For Low Ceilings
- UL 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
- Easier to refill than vertical bladder tanks
- Bottom foam concentrate discharge keeps feed piping full, eliminating air pockets and preventing corrosion
- Better stability than vertical tanks in earthquake-prone areas
- Permanently welded lifting lugs for easy 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 horizontal configuration and shall be mounted on two permanently attached saddle supports with holes for mounting bolts. 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 perforated 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 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 ¼" (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

Technical Information

Materials of Construction:
Tank: Carbon steel, ASME code
Bladder: Welded seam thermoplastic
Internal Piping:
Perforated 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, 7½" diameter cup x 1" male NPT spout

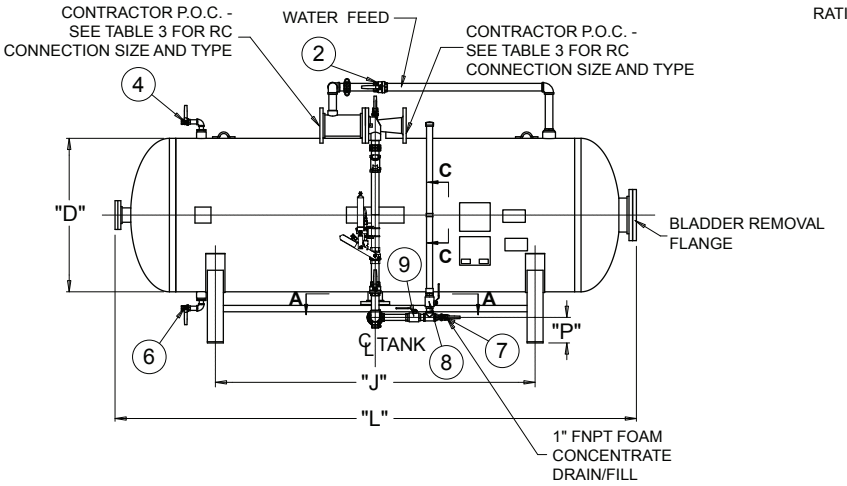
Ratio Controller:
Cast Bronze (85-5-5-5), ASTM-B-584 alloy #83600

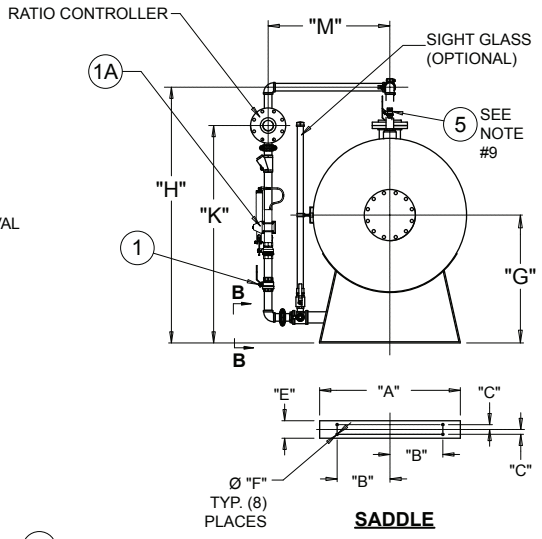
Exterior Finish:
Red high solids acrylic polyurethane

Working Pressure:
175 psi (12 bar)

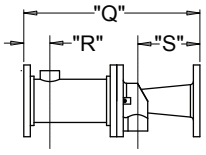
Options

- Sight gauge: 1½" (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.
- Seismic supports
- Alternate style and multiple ratio controllers
- Reverse flow direction

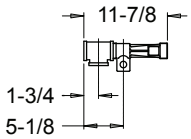




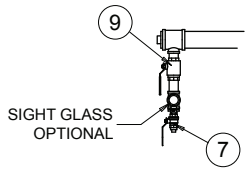
SADDLE



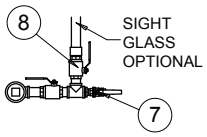
3" THRU 8" RC ASSEMBLY



2" RC ASSEMBLY

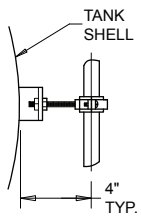


DETAIL A - A

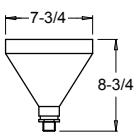


DETAIL B - B

TABLE 1 - RC DIMENSIONS			
Assembly w/Spool	**"Q"**	**"R"**	**"S"**
3" RC	19	4	4-1/2
4" RC	25	4-1/4	7
6" RC	27	5-1/4	9-11/16
8" RC	31	7	10



DETAIL C - C



FILL FUNNEL
TO BE SCREWED INTO VALVE #5 SEE NOTE #9

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TABLE 2 - VALVE DESCRIPTION			
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 Foam Concentrate gpm (lpm)	Water & Concentrate Line Sizes in. (mm)	Ratio Controller Connections in. (mm)	
				Inlet	Outlet
2 (51)	30-180 (114-681)	60-180 (227-681)	***Line Sizes to be Determined by NF at System Design.***	2 (51) NPT (F)	2 (51) NPT (F)
3 (76)	70-450 (265-1703)	170-450 (644-1703)		3 (76) FF flg.	3 (76) FF flg.
4 (102)	150-1200 (568-4542)	320-1200 (1211-4542)		4 (102) FF flg.	4 (102) FF flg.
6 (152)	300-2500 (1136-9463)	700-2500 (2650-9463)		6 (152) FF flg.	6 (152) FF flg.
8 (203)	850-5000 (3218-18925)	1400-5000 (5300-18927)		8 (203) FF flg.	8 (203) FF flg.

NOTES:

1. All dimensions are approximate and may vary slightly.
2. Weights listed apply to empty tanks.
3. All tank and valve openings will be plugged for shipping.
4. 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
5. Fill funnel and optional sight glass tube will be packed and shipped separately.
6. Optional sight glass level check cannot be performed with alcohol type AFFF concentrates. Refer to the operating and maintenance manual for further instructions.
7. Contents label will be supplied to customer by NF and applied by customer to area provided on caution label.
8. 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.
9. 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.
10. For non-standard or special tanks, refer to the tank's specific outline assembly drawing for details.
11. 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 4 - CAPACITY AND DIMENSIONS CHART

Capacity gal. (liters)	"A"	"B"	"C"	"D"	"E"	"F"	"G"	"H"	"J"	"K"	"L"	"M"	"P"	Empty Weight lb (kg)
50 (189)	20 (508)	7 (178)	7/8 (22)	20 (508)	3 (76)	9/16 (14)	22 (559)	51 (1295)	14 (356)	36 (914)	55-1/2 (1410)	24 (610)	4 (103)	560 (254)
100 (379)	24 (610)	9 (229)	7/8 (22)	24 (610)	3 (76)	9/16 (14)	24 (610)	56 (1422)	22 (559)	40 (1016)	72 (1129)	26 (660)	4 (103)	851 (386)
150 (568)	30 (762)	11 (279)	1-1/8 (29)	30 (762)	4 (102)	9/16 (14)	27 (686)	62 (1575)	36 (914)	46 (1168)	71 (1803)	29 (737)	4 (103)	1140 (517)
200 (757)	30 (762)	11 (279)	1-1/8 (29)	30 (762)	4 (102)	9/16 (14)	27 (686)	62 (1575)	34 (864)	46 (1168)	89 (2261)	29 (737)	4 (103)	1337 (606)
300 (1136)	34 (864)	13 (330)	1-1/8 (29)	36 (914)	4 (102)	9/16 (14)	30 (762)	68 (1727)	36 (914)	52 (1321)	93 (2362)	32 (813)	4 (103)	1754 (796)
400 (1514)	40 (1016)	15 (381)	1-3/8 (35)	42 (1067)	5 (127)	11/16 (17)	33 (838)	74 (1880)	50 (1270)	58 (1473)	93 (2362)	35 (889)	4 (103)	2070 (939)
500 (1893)	40 (1016)	15 (381)	1-3/8 (35)	42 (1067)	5 (127)	11/16 (17)	33 (838)	74 (1880)	48 (1219)	58 (1473)	112 (2845)	35 (889)	4 (103)	2330 (1057)
600 (2271)	40 (1016)	15 (381)	1-3/8 (35)	42 (1067)	5 (127)	11/16 (17)	33 (838)	74 (1880)	60 (1524)	58 (1473)	131 (3327)	35 (889)	4 (103)	2437 (1105)
700 (2650)	44 (1118)	17 (432)	1-3/8 (35)	48 (1219)	5 (127)	11/16 (17)	40 (1016)	84 (2134)	50 (1270)	68 (1727)	119 (3023)	38 (965)	8 (203)	2844 (1290)
800 (3028)	44 (1118)	17 (432)	1-3/8 (35)	48 (1219)	5 (127)	11/16 (17)	40 (1016)	84 (2134)	60 (1524)	68 (1727)	134 (3404)	38 (965)	8 (203)	3498 (1587)
900 (3407)	44 (1118)	17 (432)	1-3/8 (35)	48 (1219)	5 (127)	11/16 (17)	40 (1016)	84 (2134)	70 (1778)	68 (1727)	148 (3759)	38 (965)	8 (203)	3855 (1749)
1000 (3785)	44 (1118)	17 (432)	1-3/8 (35)	48 (1219)	5 (127)	11/16 (17)	40 (1016)	84 (2134)	94 (2388)	68 (1727)	163 (4140)	38 (965)	8 (203)	4072 (1847)
1100 (4164)	44 (1118)	17 (432)	1-3/8 (35)	48 (1219)	5 (127)	11/16 (17)	40 (1016)	84 (2134)	100 (2540)	68 (1727)	177 (4496)	38 (965)	8 (203)	4456 (2021)
1200 (4542)	54 (1372)	22 (559)	1-3/4 (44)	60 (1524)	6 (152)	11/16 (17)	46 (1168)	94 (2438)	58 (1473)	80 (2032)	131 (3327)	44 (1118)	8 (203)	4523 (2052)
1300 (4921)	54 (1372)	22 (559)	1-3/4 (44)	60 (1524)	6 (152)	11/16 (17)	46 (1168)	94 (2438)	60 (1524)	80 (2032)	141 (3581)	44 (1118)	8 (203)	4826 (2189)
1400 (5300)	54 (1372)	22 (559)	1-3/4 (44)	60 (1524)	6 (152)	11/16 (17)	46 (1168)	94 (2438)	76 (1930)	80 (2032)	151 (3835)	44 (1118)	8 (203)	5113 (2319)
1500 (5678)	54 (1372)	22 (559)	1-3/4 (44)	60 (1524)	6 (152)	11/16 (17)	46 (1168)	94 (2438)	80 (2032)	80 (2032)	159 (4039)	44 (1118)	6 (152)	5494 (2492)
1600 (6057)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	44 (1118)	90 (2286)	125 (3175)	50 (1270)	6 (152)	4891 (2219)
1700 (6435)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	50 (1270)	90 (2286)	131 (3327)	50 (1270)	6 (152)	5073 (2301)
1800 (6814)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	56 (1422)	90 (2286)	138 (3505)	50 (1270)	6 (152)	5254 (2383)
1900 (7192)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	60 (1524)	90 (2286)	144 (3658)	50 (1270)	6 (152)	5479 (2485)
2000 (7571)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	70 (1778)	90 (2286)	151 (3835)	50 (1270)	6 (152)	5704 (2587)
2100 (7949)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	76 (1930)	90 (2286)	157 (3988)	50 (1270)	6 (152)	5896 (2674)
2200 (8328)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	80 (2032)	90 (2286)	164 (4166)	50 (1270)	6 (152)	6087 (2761)
2300 (8706)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	80 (2032)	90 (2286)	170 (4318)	50 (1270)	6 (152)	6293 (2854)
2400 (9085)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	80 (2032)	90 (2286)	177 (4496)	50 (1270)	6 (152)	6499 (2948)
2500 (9464)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	100 (2540)	90 (2286)	183 (4648)	50 (1270)	6 (152)	6699 (3038)
2600 (9842)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	100 (2540)	90 (2286)	189 (4801)	50 (1270)	6 (152)	6899 (3129)
2700 (10221)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	100 (2540)	90 (2286)	196 (4978)	50 (1270)	6 (152)	7089 (3216)
2800 (10599)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	100 (2540)	90 (2286)	202 (5131)	50 (1270)	6 (152)	7278 (3301)
2900 (10978)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	100 (2540)	90 (2286)	209 (5309)	50 (1270)	6 (152)	7478 (3392)
3000 (11356)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	215 (5461)	50 (1270)	6 (152)	7678 (3483)
3100 (11735)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	222 (5639)	50 (1270)	6 (152)	7879 (3574)
3200 (12113)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	228 (5791)	50 (1270)	6 (152)	8080 (3665)
3300 (12492)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	234 (5944)	50 (1270)	6 (152)	8300 (3765)
3400 (12870)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	241 (6121)	50 (1270)	6 (152)	8500 (3856)
3500 (13249)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	247 (6274)	50 (1270)	6 (152)	8700 (3946)
3600 (13627)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	254 (6452)	50 (1270)	6 (152)	8900 (4037)
3700 (14006)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	260 (6604)	50 (1270)	6 (152)	9100 (4128)
3800 (14385)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	267 (6782)	50 (1270)	6 (152)	9300 (4218)
3900 (14763)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	273 (6934)	50 (1270)	6 (152)	9500 (4309)
4000 (15142)	64 (1626)	28 (711)	2-3/4 (70)	72 (1829)	8 (203)	1-1/16 (27)	50 (1270)	106 (2692)	120 (3048)	90 (2286)	280 (7112)	50 (1270)	6 (152)	9700 (4400)

NOTE: All dimensions are in inches (millimeters).

NATIONAL FOAM

HORIZONTAL BLADDER TANK

Balanced Pressure Proportioning System

NPR040

ORDERING INFORMATION

Capacity		Part Number (with or without sight gauge)	Approx. Shipping Weight		Approx. Shipping Package Dimensions					
					L		W		H	
gal.	liters		lb	kg	in.	mm	in.	mm	in.	mm
50	189	*Tanks with prepiped ratio*	960	436	65	1651	**36**	**914**	**59**	**1499**
100	379	*controllers are custom to*	1245	565	81	2057	40	1016	63	1600
150	568	*customer request.*	1530	694	80	2032	46	1168	69	1753
200	757	*Please contact*	1730	785	98	2489	46	1168	69	1753
300	1136	*National Foam Inc. for*	2135	969	102	2591	52	1321	75	1905
400	1514	*part numbers and pricing.*	2450	1112	102	2591	58	1473	81	2057
500	1893		2600	1180	121	3073	58	1473	81	2057
600	2271		2750	1248	130	3302	58	1473	81	2057
700	2650		3300	1498	128	3251	64	1626	91	2311
800	3028		3545	1609	143	3632	64	1626	91	2311
900	3407		3790	1720	157	3988	64	1626	91	2311
1000	3785		4035	1831	172	4369	64	1626	91	2311
1100	4164		4280	1943	186	4724	64	1626	91	2311
1200	4542		5320	2415	140	3556	76	1930	100	2540
1300	4921		5670	2574	150	3810	76	1930	100	2540
1400	5299		6000	2723	160	4064	76	1930	100	2540
1500	5678		6420	2914	168	4267	76	1930	100	2540
1600	6056		6825	3098	134	3404	88	2235	113	2870
1700	6435		7055	3202	140	3556	88	2235	113	2870
1800	6813		7295	3311	147	3734	88	2235	113	2870
1900	7192		7560	3431	153	3886	88	2235	113	2870
2000	7570		7825	3552	160	4064	88	2235	113	2870
2100	7949		8065	3661	166	4216	88	2235	113	2870
2200	8327		8300	3767	173	4394	88	2235	113	2870
2300	8706		8560	3885	179	4547	88	2235	113	2870
2400	9084		8815	4001	186	4724	88	2235	113	2870
2500	9464		9060	4112	192	4877	88	2235	113	2870
2600	9841		9300	4221	198	5029	88	2235	113	2870
2700	10221		9540	4330	205	5207	88	2235	113	2870
2800	10598		9775	4437	211	5359	88	2235	113	2870
2900	10978		10020	4548	218	5537	88	2235	113	2870
3000	11355		10265	4659	224	5690	88	2235	113	2870
3100	11735		10510	4770	231	5867	88	2235	113	2870
3200	12112		10755	4882	237	6020	88	2235	113	2870
3300	12492		11005	4995	243	6172	88	2235	113	2870
3400	12870		11250	5106	250	6350	88	2235	113	2870
3500	13249		11495	5218	256	6502	88	2235	113	2870
3600	13627		11740	5329	263	6680	88	2235	113	2870
3700	14006		11985	5440	269	6833	88	2235	113	2870
3800	14385		12230	5551	276	7010	88	2235	113	2870
3900	14763		12475	5662	282	7163	88	2235	113	2870
4000	15142		12720	5774	289	7341	88	2235	113	2870

HORIZONTAL BLADDER TANK
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