



SERIES 2000 TEMPERATURE REGULATOR

APPLICATION DATA

DIRECT ACTING

- Bottle Washing Machinery
- Steam Tables
- Plating Tanks
- Heating Ducts
- Fuel Oil Heaters
- Cooking Vats
- Water Heaters
- Heat Exchangers
- Parts Washer

THREE-WAY MIXING

- Fire Tube Boiler
- Internal Combustion Engine

REVERSE ACTING

- Induction Furnaces
- Industrial Compressors
- Cold Storage Boxes
- Cooling Ducts
- Engine Jacket Cooling
- Liquid Chillers

GAS SERVICE

- Oil Treaters
- Line Heaters
- Separators
- Glycol Dehydrators
- Storage Tanks

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG (bar)	Temperature °F (°C)
Class 250 NPT	250 (17.2)	400 (204)

Canadian Registration # OC 0591.9C

SERIES 2000 TEMPERATURE REGULATOR

SIZES 1/2" – 2"
CONTROLS -25 to 400°F

- Self-actuated
- Two and Three Way Valve Bodies
- Single or Double Seat
- Overtemperature Protection
- Spring Loaded Teflon Chevron Type Packing Assembly
- Double Guided Stainless Steel Monolithic Disc Assembly
- Stainless Steel Seat Rings and Disc
- Adjusting Key Attached
- Galvanized Iron Union Ends
- Full Ported and Full Flow Bronze Body
- Copper Bulb with 8' Armored Capillary

MODELS

- Type 2010 — Single Seat, Direct Acting
- Type 2020 — Single Seat, Reverse Acting
- Type 2030 — Double Seat, Direct Acting
- Type 2040 — Double Seat, Reverse Acting
- Type 2050 — Three-way Mixing and Diverting
- Type 2060 — Gas Service-15 psig maximum. If pressure exceeds 15 psi, a pressure reducing regulator should be used ahead of the temperature regulator.

OPTIONS

- Dial Temperature Gage (Indicating)
- Stainless Steel Bulb
- Stainless Steel Armored Capillary
- Capillary lengths greater than 8'
- Extra Large Bulb
- Union Bushings & Wells

SERIES 2000 TEMPERATURE REGULATOR

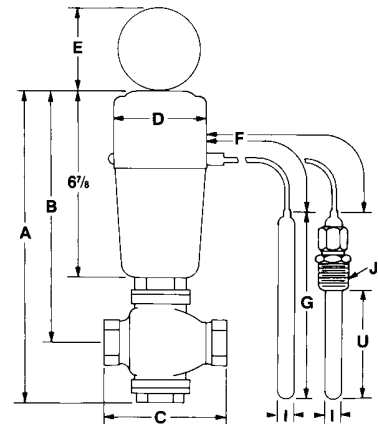
SPECIFICATION

The valve shall be self-operated, requiring no external energy source. It shall have single or double stainless steel seats with double guided monolithic disc assembly for proper alignment. The valve shall be direct acting (heating) or reverse acting (cooling) and have two way or three way operation. The packing assembly shall be spring loaded, self adjusting with chevron type teflon packing. The thermal system line and bulb assembly shall be partially filled with a liquid/gas combination and in a range selected for fast response. The valve rating shall be 250 PSIG at 400°F. Body materials shall be bronze.

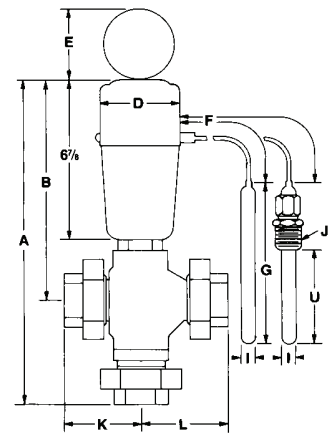
MODEL 2060 FOR GAS SERVICE ONLY: The valve shall be self-operated, requiring no external energy source and designed to control process temperature by regulating gas flow. It shall be normally open and close with increased temperature. "Bubble tight" dead end shutoff shall be provided by Buna-N vulcanized to disc backing. The packing assembly shall be spring loaded, self adjusting with chevron type teflon packing. The thermal system line and bulb assembly shall be partially filled with a liquid/gas combination and in a range selected for fast response. The valve rating shall be 15 PSIG. Body materials shall be nodular iron.

MATERIALS OF CONSTRUCTION

ITEM	TYPE 2010-2050	TYPE 2060
Body	Bronze ASTM B62 C83600	Ductile Iron ASTM A536 65-45-12
Trim	Stainless Steel	Buna-N
Packing	Teflon	Buna-N
Unions	Iron	Iron
Yoke	Steel	Steel
Cap	Aluminum	Aluminum
Bellows	Bronze	Bronze
Spring	Steel	Steel
Capillary	Copper	Copper
Bulb	Copper	Copper
Armor	Bronze	—
Stem	304 Stainless Steel	304 Stainless Steel
Disc	304 Stainless Steel	Buna-N
Seat	303 Stainless Steel	—



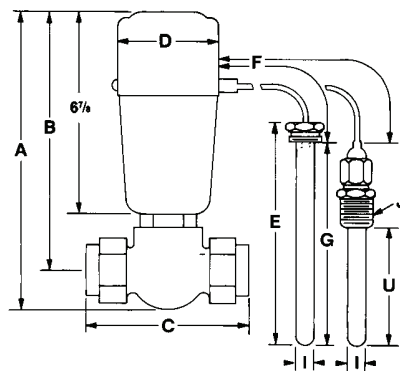
TYPE 2010-2040 DIRECT & REVERSE ACTING



TYPE 2050 THREE WAY

**TYPE 2010-2040 DIRECT & REVERSE ACTING
DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)**

Size	Type No.	Dimensions						Shipping Weight (Approx.)
		A	B	C	D	E	F†	
1/2" (A, B, C, D, E) 1/2, 3/4	2010 2020	9 3/4 (248)	8 1/2 (216)	5 1/2 (140)	3 1/2 (89)	2 13/16 (71)	8 Ft.	10 (4.5)
1/2" 3/4"	2030 2040	12 7/16 (316)	9 3/4 (248)	7 3/16 (182)	3 1/2 (89)	2 13/16 (71)	8 Ft.	13 (5.9)
1"	2010 2020	12 7/16 (316)	9 3/4 (248)	7 3/16 (182)	3 1/2 (89)	2 13/16 (71)	8 Ft.	13 (5.9)
1 1/4" 1 1/2" 2"	2030 2040	12 7/8 (327)	9 31/32 (253)	8 15/16 (227)	3 1/2 (89)	2 13/16 (71)	8 Ft.	20 (9.1) 25 (11) 30 (14)



TYPE 2060 GAS SERVICE

**TYPE 2060 GAS SERVICE DIMENSIONS
inches (mm) AND WEIGHTS pounds (kg)**

Size	Dimensions					Shipping Weight (Approx.)
	A	B	C	D	F†	
1/2" 3/4" 1"	9 3/4 (248)	8 1/2 (216)	5 5/8 (143)	3 1/2 (89)	10 Ft. (3 m.)	8 (3.6)

†See following pages for standard lengths, ranges, bulb sizes and maximum line lengths.

**TYPE 2050 THREE WAY
DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)**

Size	Dimensions						Shipping Weight (Approx.)
	A	B	D	F†	K	L	
1/2" 3/4" 1"	13 7/8 (352)	9 3/4 (248)	3 1/2 (89)	8 Ft.	3 5/16 (84)	3 5/8 (92)	12 (5.5) 12 (5.5) 13 (5.9)
1 1/4" 1 1/2"	14 21/32 (372)	9 31/32 (253)	3 1/2 (89)	8 Ft.	4 1/8 (105)	4 11/16 (119)	27 (12)
2"	14 7/8 (378)	9 31/32 (253)	3 1/2 (89)	8 Ft.	4 3/16 (106)	4 7/8 (124)	33 (15)

SERIES 2000 TEMP.
REGULATOR

SERIES 2000 TEMPERATURE REGULATOR SELECTION

DIRECT & REVERSE ACTING & THREE WAY FLOW AND PRESSURE RATINGS psig (bar)

	Single Seat				Double Seat				Three Way		
Size	Type Number		Flow Coefficient C _v	Max. Upstream Pressure	Type Number		Flow Coefficient C _v	Max. Upstream Pressure	Type Number	Flow Coefficient C _v	Max. Difference Between Inlet Pressures*
	Direct	Reverse			Direct	Reverse					
1/2"C	2010	2020	.40	250 (17.2)	NOT AVAILABLE IN DOUBLE SEAT				NOT AVAILABLE IN THREE WAY		
1/2"D			1.00								
1/2"E			1.80								
1/2"A			3.29								
1/2"B			4.29	200 (13.8)	2030	2040	250 (17.2)	2050	5.22	140 (9.7)	
1/2"T			5.22	140 (9.7)							
3/4"T			6.85	90 (6.2)							10.4
1"T			9.15	65 (4.5)							12.9
1 1/4"T			14.3	40 (2.8)							20.6
1 1/2"T			15.1	30 (2.1)							24.8
2"T			17.2	20 (1.4)	33.0	17.2	20 (1.4)				

SIZING INFO
PAGE 95

How to Select Range & Bulb Size

- Select a temperature range with the control point in the upper half of the temperature range.
- Determine line length required (8' is standard).
- Use line length and temperature range to find correct bulb size in chart at right.

EXAMPLE:

Control point: 130°F.

Temperature range: 65/140°F.

Line length: 15'

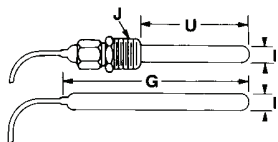
SOLUTION:

Bulb size: extra large – G = 15⁵/₈"

RANGES, BULB SIZES & MAXIMUM LINE LENGTHS

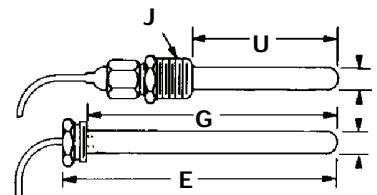
Short Ranges (Gold Spring)		Long Ranges (Silver Spring)		Bulb Size	†Max. Line Length	Maximum Over-Temperature	
°F	°C	°F	°C			°F	°C
-15 to 50	-26 to 10	-15 to 75	-26 to 24	X Large	40 Ft.	450	232
45 to 115	7.2 to 46	45 to 145	7.2 to 63	X Large	40 Ft.	450	232
65 to 140	18 to 60	65 to 170	18 to 77	Large X Large	15 Ft. 40 Ft.	450	232
120 to 200	49 to 93	120 to 230	49 to 110	Small	40 Ft.	300	149
240 to 310	116 to 154	240 to 340	116 to 171	Small	40 Ft.	350	177
280 to 375	138 to 190	280 to 415	138 to 212	Small	40 Ft.	450	232

†Standard line lengths are 25' and 40'.



BULB DIMENSIONS* inches (mm)

Bulb Sizes	G			U	I			J (NPT)
	Copper	Stain. Stl.	Coated		Plain	Union	Well	
Small	13 ³ / ₈ (340)	13 ¹ / ₄ (337)	11 ³ / ₈ (289)	10 ¹ / ₂ (267)	5/8 (16)	5/8 (16)	3/4 (19)	3/4 or 1
Large	15 ⁵ / ₈ (397)	15 ¹ / ₈ (384)	13 ¹ / ₄ (337)	12 ¹ / ₂ (317)	1 (25)	1 (25)	1 ¹ / ₈ (29)	1
Extra Large	19 (483)	18 ⁵ / ₈ (473)	19 (483)	16 (406)	1 (25)	1 (25)	1 ¹ / ₈ (29)	1



**GAS SERVICE BULB & WELL
DIMENSIONS** inches (mm)

E	G	I		U	J (NPT)
		Bulb	Well		
8 ¹ / ₄ (210)	7 ³ / ₈ (187)	25/32 (20)	15/16 (24)	7 ¹¹ / ₁₆ (195)	1

SERIES 2000 TEMPERATURE REGULATOR

CODE SELECTION CHART

Model				Orifice Size	Inlet Size	Line & Bulb Style	Mat'l	Range °F
2	0	1	0	T	C	- G	Q	K
1	2	3	4	5	6	7	8	9

Model -

Position 1, 2, 3 & 4
 2010 = Single Seat,
 Direct Acting
 2020 = Single Seat,
 Reverse Acting
 2030 = Double Seat,
 Direct Acting
 2040 = Double Seat,
 Reverse Acting
 2050 = Three Way

Orifice -

Position 5
 A
 B
 C
 D
 E
 T = Standard

Inlet Size -

Position 6
 C = 1/2
 D = 3/4
 E = 1
 F = 1 1/4
 G = 1 1/2
 H = 2

Line & Bulb Style -

Position 7
 G = Indicating
 N = Non-indicating

Material† -

Position 8
 Q = Copper Bz Armor 8'
 R = Copper Bz Armor 15'
 N = Copper Bz Armor 25'
 P = Copper Bz Armor 40'
 T = SS Unarmored 8'
 V = SS Unarmored 15'
 W = SS Unarmored 25'
 X = SS Unarmored 40'
 Z = Other

Range °F -

Position 9
 A = 15/50
 B = 15/75
 C = 45/115
 D = 45/145
 E = 65/140
 F = 65/170
 J = 120/200
 K = 120/230
 L = 240/310
 M = 240/340
 N = 280/375
 P = 280/415
 Z = Other

† For SS Armored Thermal Assembly Material, add (-TV) at the end of the code (ex.: 2010TC-NTH-TV)

† Small bulb standard for J-1 range and higher.

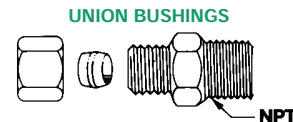
Extra large bulb standard for D range and lower.

Large bulb standard for E and F range



WELLS

Cat. No.	Bulb Size	Material	Inches (mm)			
			Bulb Dia.	NPT	U	Well Dia.
99A	S	Brass	5/8 (16)	3/4 (19)	10 1/2 (267)	3/4 (19)
99B	S	Brass		1 (25)		
99G	S	316 St. St.		3/4 (19)		
99H	S	316 St. St.		1 (25)		
99J	L	Brass	1 (25)	1 (25)	12 1/2 (318)	1 1/8 (29)
99K	X	Brass			16 (406)	
99Q	L	316 St. St.			12 1/2 (318)	
99R	X	316 St. St.			16 (406)	



UNION BUSHINGS

Cat. No.	Bulb Size	Material	Inches (mm)	
			Bulb Dia.	NPT
98A	S	Brass	5/8 (16)	3/4
98B	S	Brass		1
98C	S	St. St.		3/4
98D	S	St. St.		1
98E	L & X	Brass	1 (25)	1
98F	L & X	St. St.		1

Thermowells and union bushings are utilized as separate items and should be specified on separate lines.

RATED STEAM CAPACITY TABLE

SERIES 2000 TEMPERATURE REGULATOR

VALVE SIZE		SINGLE SEATED VALVES											DOUBLE SEATED VALVES					
Inlet Pressure PSIG	Outlet Pressure PSIG	½C	½D	½E	½A	½B	½	¾	1	1¼	1½	2	½	¾	1	1¼	1½	2
		DRY SATURATED STEAM—LBS. OF STEAM/HR																
5	UP to 9" HG. VAC. 6" HG. VAC. 2	12	30	53	97	130	155	200	270	420	450	510	235	305	380	610	735	975
		11	29	52	95	125	150	195	265	415	440	500	230	300	375	600	720	960
		8	21	38	70	90	110	145	195	305	320	365	170	220	275	440	525	700
10	UP to 3" HG. VAC. 3 7	15	35	65	120	160	195	255	340	530	565	635	295	385	480	765	920	1220
		13	33	60	110	145	175	230	305	480	510	575	265	345	430	690	830	1100
		10	24	44	80	105	125	165	220	345	370	415	190	250	310	500	600	800
20	UP to 4 10 15	21	52	95	170	225	270	355	475	745	790	895	415	540	670	1070	1290	1720
		19	47	85	155	200	245	325	430	675	715	810	375	490	610	970	1170	1550
		15	37	66	120	155	190	250	335	525	555	630	290	380	470	755	910	1200
30	UP to 10 15 25	27	67	120	220	290	350	460	615	960	1020		530	695	865	1380	1660	2210
		25	63	115	210	270	330	435	580	905	960		500	660	815	1300	1570	2090
		17	42	75	140	180	220	290	385	605	640		335	440	545	870	1050	1390
40	UP to 15 20 30	33	82	150	270	350	430	560	750	1170			650	885	1060	1690	2030	2710
		32	79	140	260	340	415	540	725	1130			625	820	1020	1630	1960	2610
		25	63	115	210	270	330	435	580	905			505	660	820	1300	1570	2090
50	UP to 20 30 40	39	97	175	320	415	505	665	890				770	1010	1250	2000	2400	3200
		36	90	160	295	385	470	615	820				710	935	1150	1850	2220	2960
		28	70	125	230	300	365	480	640				555	730	905	1440	1740	2310
60	UP to 25 30 50	45	112	200	370	480	585	770	1020				890	1160	1440	2310	2780	3700
		44	110	198	360	470	575	755	1000				870	1140	1410	2260	2720	3620
		30	75	135	250	325	400	525	700				605	795	985	1570	1890	2520
70	UP to 30 40 60	51	127	230	420	545	665	870					1010	1320	1640	2610	3150	4190
		49	122	220	400	520	635	830					965	1260	1570	2500	3010	4010
		33	82	150	270	350	430	560					650	855	1060	1690	2030	2700
80	UP to 35 50 70	57	140	255	465	610	740	975					1120	1470	1830	2920	3520	4690
		53	130	240	435	565	690	905					1050	1370	1705	2720	3280	4360
		35	85	155	285	375	455	600					690	910	1120	1800	2160	2880
90	UP to 41 60 90	65	155	285	515	675	820	1070					1240	1630	2020	3230	3890	5180
		57	140	255	465	610	740	975					1120	1470	1830	2790	3520	4680
		35	90	165	305	395	480	630					730	960	1190	1900	2290	3040
100	UP to 46 60 90	70	170	310	565	740	900						1360	1790	2220	3540	4260	5680
		65	165	295	540	705	855						1300	1700	2110	3380	4060	5410
		40	95	175	320	415	505						770	1010	1250	2000	2400	3200
110	UP to 52 70 90	75	185	335	615	800	975						1480	1940	2410	3850	4640	6170
		70	175	315	575	750	910						1380	1810	2250	3590	4330	5760
		55	135	245	450	590	715						1090	1430	1770	2830	3400	4530
120	UP to 57 80 100	80	200	365	665	865	1050						1600	2100	2600	4160	5010	6670
		75	185	330	605	790	965						1460	1920	2380	3800	4580	6090
		55	145	260	475	615	750						1140	1490	1850	2960	3560	4740
130	UP to 62 80 110	85	215	390	715	930	1130						1720	2250	2800	4470	5380	7160
		80	205	370	680	885	1080						1630	2140	2660	4250	5120	6810
		60	150	270	495	645	780						1190	1560	1930	3080	3710	4940
140	UP to 68 90 120	95	230	420	765	995	1215						1840	2410	2990	4780	5750	7660
		85	215	390	715	930	1130						1720	2250	2800	4470	5380	7160
		60	155	280	510	670	815						1230	1620	2010	3210	3860	5140
150	UP to 72 90 120	100	245	445	815	1060							1960	2570	3180	5090	6120	8150
		95	240	430	780	1020							1880	2470	3060	4900	5890	7840
		75	190	345	625	820							1510	1980	2460	3930	4730	6290
160	UP to 78 100 140	105	260	470	860	1120							2080	2720	3380	5400	6500	8650
		100	250	450	820	1070							1970	2590	3210	5120	6170	8210
		65	165	300	550	715							1320	1730	2150	3440	4140	5500
170	UP to 83 100 140	110	275	500	810	1190							2190	2880	3570	5700	6870	9140
		105	270	485	885	1150							2130	2790	3470	5540	6660	8870
		80	205	370	670	875							1620	2120	2630	4210	5070	6740
180	UP to 89 120 160	115	290	525	960	1250							2310	3030	3760	6010	7240	9640
		110	270	485	890	1150							2140	2800	3480	5550	6690	8900
		70	175	320	585	760							1400	1840	2290	3650	4400	5850
190	UP to 95 120 160	125	305	555	1010	1310							2430	3190	3960	6320	7610	10100
		115	290	525	960	1250							2310	3030	3760	6000	7220	9610
		85	215	390	715	930							1720	2260	2800	4470	5380	7160
200	UP to 100 120 180	130	320	580	1060	1380							2550	3350	4150	6630	7980	10600
		125	310	560	1020	1330							2470	3240	4010	6410	7720	10300
		75	185	335	615	805							1480	1940	2410	3850	4640	6180
210	UP to 105 120 180	135	335	605	1110								2670	3500	4350	6940	8360	11100
		130	330	595	1080								2620	3430	4260	6800	8190	10900
		90	230	415	755								1820	2380	2960	4720	5680	7560
220	UP to 110 140 200	140	350	635	1160								2790	3660	4540	7250	8730	11600
		135	335	600	1100								2640	3470	4300	6870	8270	11000
		80	195	355	645								1560	2040	2530	4050	4870	6480
230	UP to 115 140 200	145	365	660	1210								2910	3810	4730	7560	9100	12100
		140	355	635	1160								2800	3680	4560	7290	8780	11700
		95	240	435	790								1910	2500	3100	4960	5970	7940
240	UP to 120 160 200	155	380	690	1250								3030	3970	4930	7870	9470	12600
		140	355	640	1160								2810	3690	4570	7300	8790	11700
		110	280	500	915								2200	2890	3580	5720	6890	9170
250	UP to 126 160 220	160	395	715	1300								3150	4130	5120	8180	9840	13100
		150	375	675	1240								2980	3910	4850	7750	9330	12400
		100	250	455	830								1990	2620	3240	5180	6240	8300

SIZING SERIES 2000 TEMPERATURE REGULATORS

EXAMPLE FOR HEATING SERVICE

The maximum anticipated flow requirements for a regulator on heating service is 500 lbs. of steam per hour. The unit steam pressure is 50 psig and the downstream pressure is essentially zero because the steam downstream is discharged into an open drain.

ANSWER: Locate 50 psi on the inlet pressure scale on the left side of the Series 2000 Capacity Chart. Choose the outlet pressure line "up to 20" psig because the downstream pressure is essentially zero. Follow the "up to 20" outlet pressure line until you come to the value closest to 500 lbs. of steam per hour (in this case, 505). Read upward to the valve size and we see that the 1/2" single seated valve is the correct size. To size for three-way valves, use single seated capacities 1/2" through 2" size.

NOTE: FORMULAS FOR EXACT CALCULATIONS.

If the outlet pressure is equal to or less than 53% of the absolute inlet pressure:

$$Q (\text{lbs steam/hr}) = 1.5 \times C_v \times \text{inlet pressure (psia)}$$

If the outlet pressure is greater than 53% of the absolute inlet pressure:

$$Q (\text{lbs steam/hr}) = 3 \times C_v \times \sqrt{\text{pressure drop (psi)} \times \text{outlet pressure (psia)}}$$

STEAM FLOW REQUIREMENTS

Use the top chart on this page to determine the pounds of steam per hour required to raise the temperature in tank of known capacity to the required temperature. Determine the rise in temperature (control temp. - room temp.) on the left hand column, read the corresponding pounds of steam per hour under the corresponding gallons of water to be heated. Use the lbs. steam/hr. figure in the chart on the opposite page to determine valve size.

Formula for converting the length, width and depth of solutions (all measured in feet) to gallons of solution: Gallons=7.48 x length x width x depth.

EXAMPLE FOR COOLING SERVICE

Find the correct regulator valve size that will feed a compressor intercooler that requires 100 gallons of water per minute under maximum operating conditions. The supply (inlet) pressure (P1) is 60 psi and the downstream pressure (P2) under maximum flow conditions is 20 psi. The 20 psi pressure is required to force the full flow of water through the compressor's cooling system. Inlet pressure must not exceed maximum upstream pressure, per the Series 2000 Temperature Regulator Product Pages.

ANSWER: The pressure drop permitted across the regulator is P1 minus P2 (40 psi). In the Water Capacity Table (right), locate 40 psi in the differential pressure column and read across to the required gallons per minute. Read to the highest value (in this case, 130 GPM). The chart indicates that a 1 1/4" double seated valve is required. To size 3-way valve, use single seated capacities 1/2" through 2" size.

PERFORMANCE VARIABLE

30°F span from fully open to fully closed
Oversized valve can provide narrower spans—Consult Factory

CAPACITY CHART SEE PAGE 94

STEAM FLOW REQUIREMENTS

Temp. Rise °F	GALLONS OF WATER HEATED PER HOUR									
	25	50	75	100	150	200	300	400	500	1000
	LBS. OF STEAM PER HOUR									
10	2	4	6	8	12	17	25	33	42	83
20	4	8	12	17	25	33	50	67	83	167
30	6	12	19	25	37	50	70	100	120	250
40	9	17	25	33	50	66	100	130	170	330
50	11	21	31	42	63	84	125	170	210	420
60	13	25	37	50	75	100	150	200	250	500
80	17	33	50	67	100	130	200	270	330	670
100	21	42	63	83	120	170	250	330	420	830
120	25	50	75	100	150	200	300	400	500	1000
140	29	58	88	117	175	230	350	470	580	1170
160	33	66	100	133	200	270	400	530	660	1330

RATED WATER CAPACITY TABLE

PSIG	SINGLE SEATED VALVES						DOUBLE SEATED VALVES					
	1/2	3/4	1	1 1/4	1 1/2	2	1/2	3/4	1	1 1/4	1 1/2	2
Diff. Press.	WATER FLOW—U.S. GALLONS PER MINUTE											
5	12	15	20	32	34	38	18	23	29	46	55	74
10	17	22	29	45	48	54	25	33	41	65	78	104
15	20	27	35	55	59	67	31	40	50	80	96	128
20	23	31	41	64	68	77	35	47	58	92	111	148
25	26	34	46	72	76	86	40	52	65	103	124	165
30	29	38	50	78	83		43	57	71	113	136	181
40	33	43	58	90			50	66	82	130	157	209
50	37	48	65				56	74	91	146	175	233
60	40	53	71				61	81	100	160	192	256
70	44	57					66	87	108	172	207	276
80	47	61					71	93	115	184	222	295
90	50	65					75	99	122	195	235	313
100	52						79	104	129	206	248	330
110	55						83	109	135	216	260	346
120	57						87	114	141	226	272	361
130	60						90	119	147	235	283	376
140	62						94	123	153	244	293	390
150							97	127	158	252	304	404
160							100	132	163	261	314	417
170							103	136	168	269	323	430
180							106	140	173	276	333	443
190							109	143	178	284	342	455
200							112	147	182	291	351	467
210							115	151	187	299	359	478
220							118	154	191	306	368	489
230							120	158	196	312	376	500
240							123	161	200	319	384	511
250							125	164	204	326	392	522