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Hoffman Specialty®
General Catalog

Bell & Gossett
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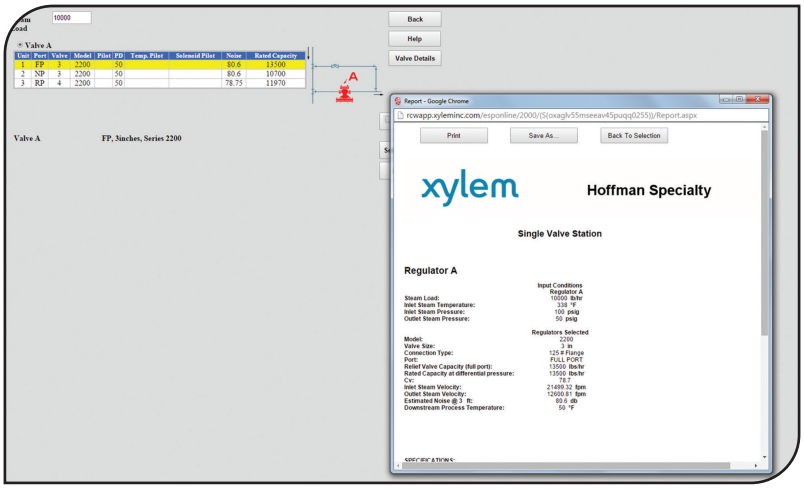
ESP-PLUS™

For computer aided selection of Steam Trap and Regulators, please refer to the *Steam Specialty Component Selectors* at http://bellgossett.com/selection-sizing-cad-tools/

For a stand-alone version of ESP-PLUS, contact your local Bell & Gossett Representative.



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Hoffman Specialty steam traps

Float and thermostatic steam traps

Series C, H, I and X BEAR TRAP®

The Series C, H, I and X float and thermostatic traps are designed for commercial and industrial heating applications such as steam main drip traps, unit heaters, tank coils, air make-up coils, shell and tube heat exchangers, or others that require frequent start ups and continuous modulating loads.

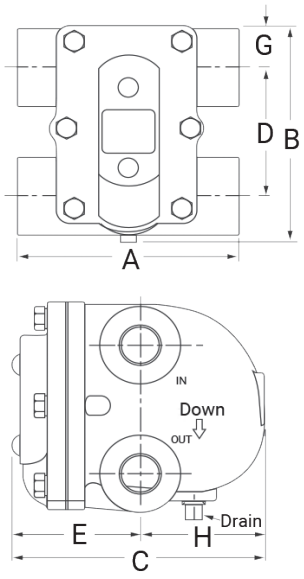
- Maximum operating pressure 175 psi (12.1 bar)
- Maximum capacity 60,000 lb./hr.
- Meets Mil specification WW-T-696-E Type VI, Class 1-5

Series	Maximum capacity		NPT connection sizes	Series features
	lb/hr	kg/hr	in.	
C	60,000	24,240	1¼ – 2½	Inlet and outlet in trap cover. High capacity units.
H	9,800	4,450	¾ - 2	4-port piping convenience. Cover assembly can be replaced without disturbing piping.
I	2,340	1,062	¾ – 1¼	Inline piping provides maximum return line elevation. Cover assembly can be replaced without disturbing piping.
X	24,000	10,896	2	Inlet and outlet in trap cover. Higher capacity than Series C 2.

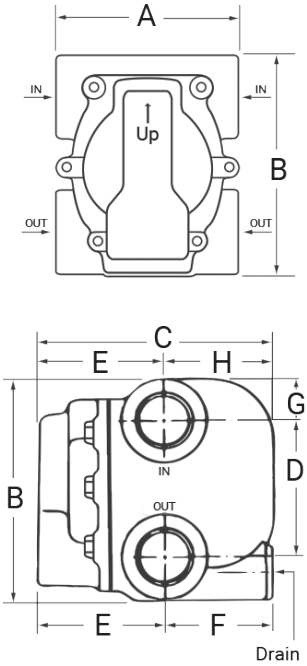
Float and thermostatic steam traps

Series H BEAR TRAP®

- Models ¾" – 2" feature Universal 4 - port tappings, (2 inlets, 2 outlets) that provide versatility to allow easy piping and system monitoring
- Sizes available
  - — ¾" NPT
  - — 1" NPT
  - — 1¼" NPT
  - — 1½" NPT
  - — 2" NPT
- Stainless steel internal components
- Resistant to water hammer and corrosion
- Below condensate level seat design prevents steam leakage
- Rugged thermostatic element eliminates air binding
- Maximum body design pressure
  - — 250 psig (17.3 bar) ¾" - 1¼"
  - — 175 psig (12.1 bar) 1½" – 2"
- Maximum operating pressure
  - — 175 psig (12.1 bar) ¾" – 2"
- Maximum temperature
  - — 406°F (208°C) ¾" - 1¼"
  - — 377°F (192°C) 1½" – 2"



¾", 1", 1¼"



1½", 2"

Materials of construction

Part	Specifications
Body and cover	Cast iron 30,000 psi tensile
Valve pin and seat	Stainless steel (hardened)
Float	Stainless steel
Lever assembly	Stainless steel
Thermostatic air vent	Stainless steel cage and thermal element
Cover bolts	Grade 5

Dimensions - in. (mm)

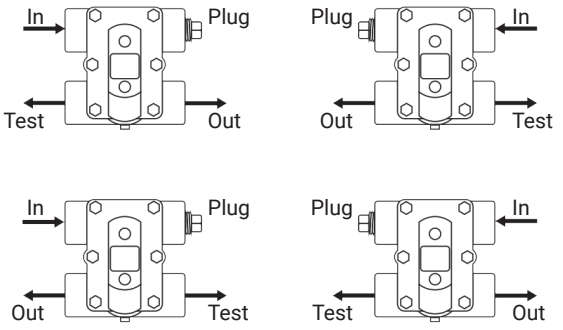
Size in.	A	B	C	D	E	F	G	H
¾	5½ (140)	5 19/32 (142)	6½ (165)	3 5/16 (84)	3 13/32 (86)	—	1 5/64 (27)	3 1/16 (78)
1	5½ (140)	5 19/32 (142)	6½ (165)	3 5/16 (84)	3 13/32 (86)	—	1 5/64 (27)	3 1/16 (78)
1¼	5½ (140)	5 19/32 (142)	6½ (165)	3 (76)	3 13/32 (86)	—	1 5/64 (27)	3 1/16 (78)
1½	6 3/8 (162)	7 11/16 (142)	8 7/32 (209)	5¼ (133)	4 13/32 (112)	3 13/16 (97)	1 11/32 (34)	3 13/16 (97)
2	6 (152)	11 (279)	9 5/32 (233)	7 15/32 (190)	4 17/32 (115)	4 7/32 (107)	1 5/8 (41)	4 5/8 (117)

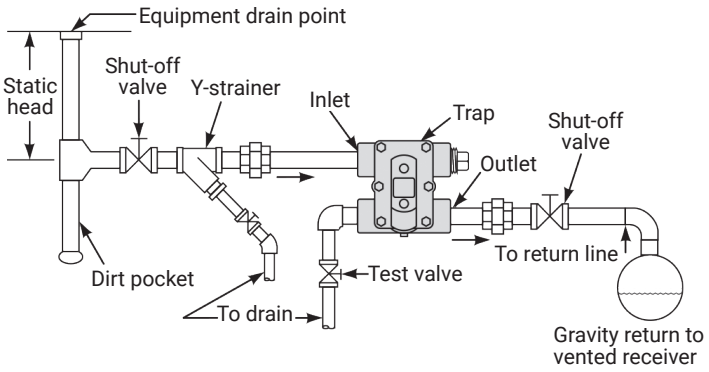
Series H additional inlet and outlet features

Models ¾" – 2"

- Allows positioning options for easy service
- Additional inlet provides a convenient location for vacuum breakers or separate external air vents. Vacuum breakers are required for systems with a modulating temperature regulating valve. External air vents are required when the trap discharges into a wet return line.
- Additional outlet provides a convenient location for a test valve, which eliminates the need for a costly trap test chamber and electronic monitors.

Series H piping options





Ordering information

To convert previously manufactured Hoffman Specialty F & T trap model numbers, see page 11.

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure rating psi (bar)	Weight lbs. (kg)
FT015H-3	¾	404200	15 (1)	250 (17.3)	11.7 (5.3)
FT015H-4	1	404210	15 (1)	250 (17.3)	11.7 (5.3)
FT015H-5	1¼	404220	15 (1)	250 (17.3)	11.7 (5.3)
FT015H-6	1½	401626	15 (1)	175 (12.1)	22 (10)
FT015H-8	2	401629	15 (1)	175 (12.1)	38 (17)
FT030H-3	¾	404202	30 (2.1)	250 (17.3)	11.7 (5.3)
FT030H-4	1	404212	30 (2.1)	250 (17.3)	11.7 (5.3)
FT030H-5	1¼	404222	30 (2.1)	250 (17.3)	11.7 (5.3)
FT030H-6	1½	401638	30 (2.1)	175 (12.1)	22 (10)
FT075H-3	¾	404204	75 (5.2)	250 (17.3)	11.7 (5.3)
FT075H-4	1	404214	75 (5.2)	250 (17.3)	11.7 (5.3)
FT125H-3	¾	404206	125 (8.6)	250 (17.3)	11.7 (5.3)
FT125H-4	1	404216	125 (8.6)	250 (17.3)	11.7 (5.3)
FT175H-3	¾	404208	175 (12.1)	250 (17.3)	11.7 (5.3)
FT175H-4	1	404218	175 (12.1)	250 (17.3)	11.7 (5.3)

Float and thermostatic steam traps (continued)

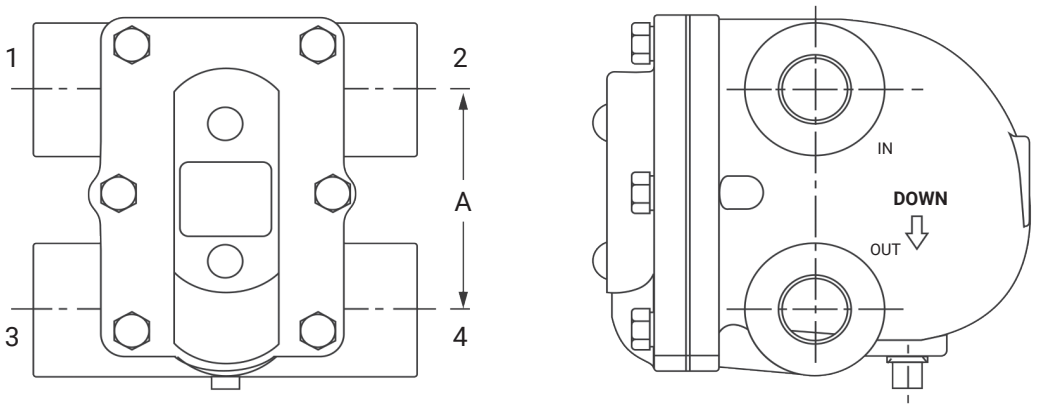
Series H BEAR TRAP®

- Determine the differential pressure across the trap (inlet pressure - outlet pressure). On applications where the steam is controlled by a modulating temperature regulator, the trap differential should be ½ psi (0.34 bar).
- Determine the capacity based on the differential pressure and the required capacity of the trap to open against the maximum inlet steam pressure.
- Apply a Safety Factor by multiplying required capacity by 1.5.

Capacities (gross ratings)

Model	Size in.	Orifice size in. (mm)	Pressure differential in pounds per square inch (bar)																	
			¼ (0.017)	½ (0.035)	1 (0.07)	2 (0.14)	5 (0.35)	10 (0.69)	15 (1.0)	20 (1.4)	25 (1.69)	30 (2.1)	40 (2.8)	50 (3.5)	60 (4.2)	75 (5.2)	100 (6.9)	125 (8.6)	150 (10.4)	175 (12.1)
			Capacities in pounds of condensate per hour (kg/hr.)																	
FT015H-3	¾	.253 (6.4)	390 (177)	500 (227)	680 (308)	910 (413)	1100 (500)	1450 (658)	1600 (725)											
FT015H-4	1	.253 (6.4)	390 (177)	500 (227)	680 (308)	910 (413)	1100 (500)	1450 (658)	1600 (725)											
FT015H-5	1¼	.312 (8)	600 (272)	770 (350)	980 (444)	1240 (562)	1640 (744)	2000 (907)	2340 (162)											
FT015H-6	1½	.500 (13)	1280 (581)	1700 (771)	2050 (930)	2550 (1157)	3500 (1588)	4400 (1996)	5300 (2404)											
FT015H-8	2	.687 (17)	2500 (1134)	3150 (1429)	4000 (1814)	5000 (2268)	6800 (3084)	8300 (3765)	9800 (4405)											
FT030H-3	¾	.235 (6)	380 (172)	470 (214)	630 (285)	870 (395)	1050 (475)	1380 (625)	1530 (695)	1700 (770)	1820 (825)	1900 (860)								
FT030H-4	1	.235 (6)	380 (172)	470 (214)	630 (285)	870 (395)	1050 (475)	1380 (625)	1530 (695)	1700 (770)	1820 (825)	1900 (860)								
FT030H-5	1¼	.253 (6.4)	420 (190)	550 (250)	740 (335)	1000 (450)	1200 (545)	1550 (700)	1760 (800)	1850 (840)	2000 (907)	2200 (1000)								
FT030H-6	1½	.438 (11)	580 (263)	800 (362)	1200 (544)	1680 (762)	2600 (1179)	3500 (1387)	4500 (2041)	5200 (2358)	5700 (2585)	6100 (2766)								
FT075H-3	¾	.166 (4.2)	160 (72)	210 (95)	280 (125)	360 (165)	520 (235)	700 (320)	800 (360)	870 (395)	930 (420)	970 (440)	1120 (510)	1230 (560)	1300 (590)	1450 (658)				
FT075H-4	1	.166 (4.2)	160 (72)	210 (95)	280 (125)	360 (165)	520 (235)	700 (320)	800 (360)	870 (395)	930 (420)	970 (440)	1120 (510)	1230 (560)	1300 (590)	1450 (658)				
FT125H-3	¾	.125 (3.2)	100 (45)	130 (60)	170 (77)	230 (104)	330 (150)	410 (186)	500 (225)	560 (255)	620 (280)	660 (300)	750 (340)	830 (375)	890 (400)	970 (440)	1100 (500)	1190 (540)		
FT125H-4	1	.125 (3.2)	100 (45)	130 (60)	170 (77)	230 (104)	330 (150)	410 (186)	500 (225)	560 (255)	620 (280)	660 (300)	750 (340)	830 (375)	890 (400)	970 (440)	1100 (500)	1190 (540)		
FT175H-3	¾	.106 (2.7)	70 (32)	80 (36)	110 (50)	140 (63)	220 (100)	280 (127)	340 (155)	380 (172)	400 (180)	420 (190)	460 (210)	480 (220)	520 (235)	580 (263)	690 (315)	850 (385)	960 (435)	1000 (454)
FT175H-4	1	.106 (2.7)	70 (32)	80 (36)	110 (50)	140 (63)	220 (100)	280 (127)	340 (155)	380 (172)	400 (180)	420 (190)	460 (210)	480 (220)	520 (235)	580 (263)	690 (315)	850 (385)	960 (435)	1000 (454)

Series H competitive dimensional comparison of distance between inlet and outlet pipes



Dimensions in. (mm)

Size	Manufacturer	Port tappings				A in. (mm)
		1	2	3	4	
¾" and 1"	Hoffman FT015H-3 / FT015H-4	Yes	Yes	Yes	Yes	3 5/16 (83)
	Hoffman 55	Yes	Yes	Yes	Yes	3⅛ (78)
	Spirax FT015	No	Yes	No	Yes	3 5/16 (83)
	Armstrong 15-B3 & 15-B4	Yes	Yes	No	Yes	3 (76)
	Mepco/Dunham Bush 40-215 & 40-415	No	Yes	No	Yes	3⅜ (86)
	Mepco/Dunham Bush 40-215 & 40-415	Yes	Yes	Yes	Yes	3⅜ (86)

Size	Manufacturer	Port tappings				A in. (mm)
		1	2	3	4	
1¼"	Hoffman FT015H-5	Yes	Yes	Yes	Yes	3 (76)
	Hoffman 55	Yes	Yes	Yes	Yes	4⅛ (104)
	Spirax FT015	No	Yes	No	Yes	3 (76)
	Armstrong 15-B5	Yes	Yes	No	Yes	3 (76)
	Mepco/Dunham Bush 40-515	No	Yes	No	Yes	3 (76)
	Mepco/Dunham Bush 44-515	Yes	Yes	Yes	Yes	3 (76)

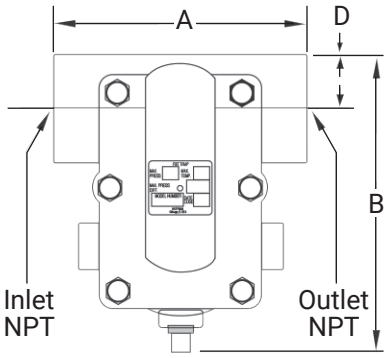
Size	Manufacturer	Port tappings				A in. (mm)
		1	2	3	4	
1½"	Hoffman FT015H-6	Yes	Yes	Yes	Yes	5¼ (133)
	Hoffman 55	Yes	Yes	Yes	Yes	5¼ (133)
	Armstrong 15-B6	Yes	Yes	No	Yes	4 3/16 (106)
	Mepco/Dunham Bush 40-715	No	Yes	No	Yes	3 (76)
	Mepco/Dunham Bush 44-715	Yes	Yes	Yes	Yes	3 (76)

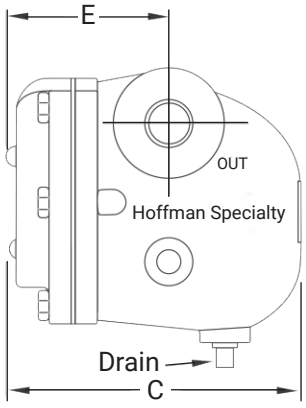
Size	Manufacturer	Port tappings				A in. (mm)
		1	2	3	4	
2"	Hoffman FT015H-8	Yes	Yes	Yes	Yes	7 15/32 (190)
	Hoffman 55	Yes	Yes	Yes	Yes	7 15/32 (190)
	Armstrong 15-B8	Yes	Yes	No	Yes	6 (152)

Float and thermostatic steam traps (continued)

Series I In-line BEAR TRAP®

- In-line piping design provides complete drainage while minimizing vertical height change
- Ideal for overhead applications
- For commercial and industrial applications such as air make-up coils, cooking kettles and unit heaters
- Sizes available
  - — ¾" NPT
  - — 1" NPT
  - — 1¼" NPT
- Below condensate level seat design prevents steam leakage
- Stainless steel internal components
- Rugged thermostatic element eliminates air binding
- Resistant to water hammer and corrosion
- Maximum design pressure 250 psig (17.3 bar)
- Maximum operating pressure 175 psig (12.1 bar)
- Maximum temperature 406°F (208°C)





Materials of construction

Part	Specifications
Body and cover	Cast iron 30,000 psi tensile
Valve pin and seat	Stainless steel (hardened)
Float	Stainless steel
Lever assembly	Stainless steel
Thermostatic air vent	Stainless steel cage and thermal element
Cover bolts	Grade 5

Dimensions - in. (mm)

Size in.	A	B	C	D	E
¾	5½ (140)	6⁹⁄₁₆ (167)	6⅝ (168)	1³⁄₁₆ (30)	3½ (89)
1					
1¼					

Float and thermostatic steam traps (continued)

Series I In-line BEAR TRAP®

- Determine the differential pressure across the trap (inlet pressure - outlet pressure). On applications where the steam is controlled by a modulating temperature regulator, the trap differential should be ½ psi (0.34 bar).
- Determine the capacity based on the differential pressure and the required capacity of the trap to open against the maximum inlet steam pressure.
- Apply a Safety Factor by multiplying required capacity by 1.5.

Capacities (gross ratings)

Model	Size in.	Orifice size in. (mm)	Pressure differential in pounds per square inch (bar)																	
			¼ (0.017)	½ (0.035)	1 (0.07)	2 (0.14)	5 (0.35)	10 (0.69)	15 (1.0)	20 (1.4)	25 (1.69)	30 (2.1)	40 (2.8)	50 (3.5)	60 (4.2)	75 (5.2)	100 (6.9)	125 (8.6)	150 (10.4)	175 (12.1)
			Capacities in pounds of condensate per hour (kg/hr.)																	
FT015I-3 FT015I-4	¾, 1	.253 (6.4)	390 (177)	500 (227)	680 (308)	910 (413)	1100 (500)	1450 (658)	1600 (725)											
FT015I-5	1¼	.312 (8)	600 (272)	770 (350)	980 (444)	1240 (562)	1640 (744)	2000 (907)	2340 (1062)											
FT030I-3 FT030I-4	¾, 1	.235 (6)	380 (172)	470 (214)	630 (285)	870 (395)	1050 (475)	1380 (625)	1530 (695)	1700 (770)	1820 (825)	1900 (860)								
FT030I-5	1¼	.253 (6.4)	420 (190)	550 (250)	740 (335)	1000 (450)	1200 (545)	1550 (700)	1760 (800)	1850 (840)	2000 (907)	2200 (1000)								
FT075I-3 FT075I-4	¾, 1	.166 (4.2)	160 (72)	210 (95)	280 (125)	360 (165)	520 (235)	700 (320)	800 (360)	870 (395)	930 (420)	970 (440)	1120 (510)	1230 (560)	1300 (590)	1450 (658)				
FT075I-5	1¼	.166 (4.2)	160 (72)	210 (95)	280 (125)	360 (165)	520 (235)	700 (320)	800 (360)	870 (395)	930 (420)	970 (440)	1120 (510)	1230 (560)	1300 (590)	1450 (658)				
FT125I-3 FT125I-4	¾, 1	.125 (3.2)	100 (45)	130 (60)	170 (77)	230 (104)	330 (150)	410 (186)	500 (225)	560 (255)	620 (280)	660 (300)	750 (340)	830 (375)	890 (400)	970 (440)	1100 (500)	1190 (540)		
FT125I-5	1¼	.125 (3.2)	100 (45)	130 (60)	170 (77)	230 (104)	330 (150)	410 186)	500 (225)	560 255)	620 (280)	660 300)	750 (340)	830 (375)	890 (400)	970 (440)	1100 (500)	1190 540)		
FT175I-3 FT175I-4	¾, 1	.106 (2.7)	70 (32)	80 (36)	110 (50)	140 (63)	220 (100)	280 (127)	340 (155)	380 (172)	400 (180)	420 (190)	460 (210)	480 (220)	520 (235)	580 (263)	690 (315)	850 (385)	960 (435)	1000 (454)
FT175I-5	1¼	.106 (2.7)	70 (32)	80 (36)	110 (50)	140 (63)	220 (100)	280 (127)	340 (155)	380 (172)	400 (180)	420 (190)	460 (210)	480 (220)	520 (235)	580 (263)	690 (315)	850 (385)	960 (435)	1000 (454)

Ordering information

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure rating psi (bar)	Weight lbs. (kg)
FT015I-3	¾	404270	15 (1.0)	250 (17.3)	11.7 (5.3)
FT015I-4	1	404271	15 (1.0)	250 (17.3)	11.7 (5.3)
FT015I-5	1¼	404272	15 (1.0)	250 (17.3)	11.7 (5.3)
FT030I-3	¾	404273	30 (2.1)	250 (17.3)	11.7 (5.3)
FT030I-4	1	404274	30 (2.1)	250 (17.3)	11.7 (5.3)
FT030I-5	1¼	404275	30 (2.1)	250 (17.3)	11.7 (5.3)
FT075I-3	¾	404276	75 (5.2)	250 (17.3)	11.7 (5.3)
FT075I-4	1	404277	75 (5.2)	250 (17.3)	11.7 (5.3)
FT075I-5	1¼	404278	75 (5.2)	250 (17.3)	11.7 (5.3)
FT125I-3	¾	404279	125 (8.6)	250 (17.3)	11.7 (5.3)
FT125I-4	1	404280	125 (8.6)	250 (17.3)	11.7 (5.3)
FT125I-5	1¼	404281	125 (8.6)	250 (17.3)	11.7 (5.3)
FT175I-3	¾	404282	175 (12.1)	250 (17.3)	11.7 (5.3)
FT175I-4	1	404283	175 (12.1)	250 (17.3)	11.7 (5.3)
FT175I-5	1¼	404284	175 (12.1)	250 (17.3)	11.7 (5.3)

Float and thermostatic steam traps (continued)

Series C and X BEAR TRAP®

- For large high capacity units
- Sizes available

Series C:	Series X:
1¼" NPT	2" NPT
1½" NPT	
2" NPT	
2½" NPT	

- Resistant to water hammer and corrosion
- Below condensate level seat design prevents steam leakage
- Rugged Stainless steel thermostatic element eliminates air binding
- Stainless steel internal components
- Can be serviced without dismantling piping
- Maximum operating pressure 175 psig (12.1 bar)
- Maximum temperature 377°F (192°C)

Materials of construction

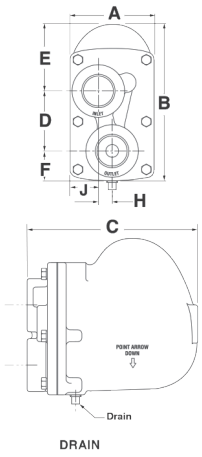
Part	Specifications
Body and cover	Cast iron 30,000 psi tensile
Valve pin and seat	Stainless steel (hardened)
Float	Stainless steel
Lever assembly	Stainless steel
Thermostatic air vent	Stainless steel cage and thermal element
Cover bolts	Grade 5
Baffle	Stainless steel (2½" units only)

Dimensions - in. (mm)

Size in.	A	B	C	D	E
1¼	4¼ (108)	8 5/16 (211)	8 9/16 (217)	3 (76)	3⅜ (86)
1½	4¼ (108)	8 5/16 (211)	8 9/16 (217)	3 (76)	3⅜ (86)
2-Std.	7 3/16 (183)	10⅛ (257)	10½ (267)	4 15/16 (379)	2 11/16 (68)
2–X	10 (254)	15 (381)	15½ (394)	6⅝ (168)	4¾ (121)
2½	14½ (368)	20¼ (514)	17⅜ (441)	9½ (241)	14 15/16 (379)

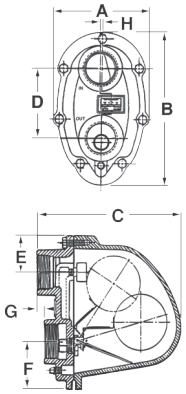
Size in.	F	G	H	J	K	L
1¼	2 (51)	–	45/64 (17.8)	1⅜ (35)	–	–
1½	2 (51)	–	45/64 (17.8)	1⅜ (35)	–	–
2-Std.	3¼ (83)	½ (12.7)	⅛ (3.2)	–	–	–
2–X	3½ (81)	–	–	–	–	–
2½	6¼ (159)	5 (127)	12 (305)	1⅝ (41)	4½ (114)	7 (178)

Series C
1¼" & 1½"

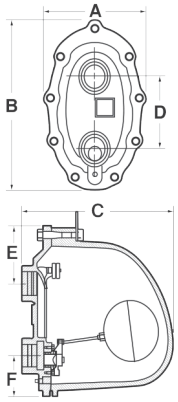


DRAIN

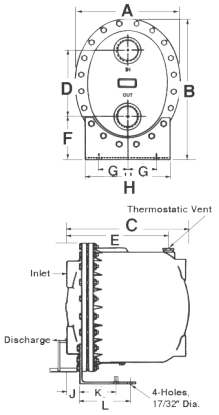
Series C
2"



Series X
2"



Series C
2 1/2"



Float and thermostatic steam traps (continued)

Series C and X BEAR TRAP®

Ordering information

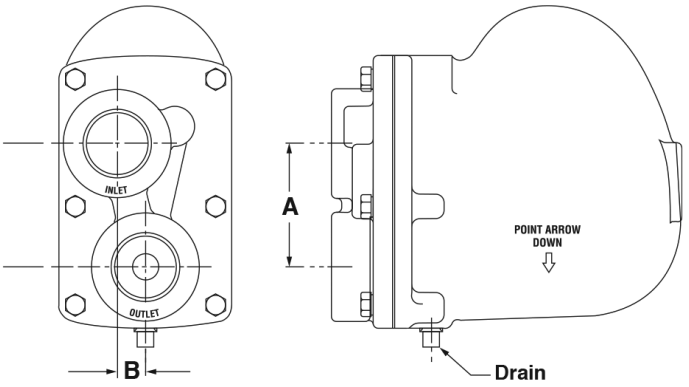
To convert previously manufactured Hoffman Specialty F & T trap model numbers, see page 11.

Model number	Size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure rating psi (bar)	Weight lbs. (kg)
FT015C-6	1½	404230	15 (1.0)	175 (12.1)	18 (8)
FT015C-8	2	404240	15 (1.0)	175 (12.1)	33 (15)
FT015X-8	2	404242	15 (1.0)	175 (12.1)	108 (49)
FT015C-10	2½	404244	15 (1.0)	175 (12.1)	175 (79)
FT030C-6	1½	404232	30 (2.1)	175 (12.1)	18 (8)
FT030C-8	2	401887	30 (2.1)	175 (12.1)	33 (15)
FT030X-8	2	401899	30 (2.1)	175 (12.1)	108 (49)
FT030C-10	2½	401875	30 (2.1)	175 (12.1)	175 (79)
FT075C-5	1¼	404224	75 (5.2)	175 (12.1)	18 (8)
FT075C-6	1½	404234	75 (5.2)	175 (12.1)	18 (8)
FT075C-8	2	401890	75 (5.2)	175 (12.1)	33 (15)
FT075X-8	2	401902	75 (5.2)	175 (12.1)	108 (49)
FT075C-10	2½	401878	75 (5.2)	175 (12.1)	175 (79)
FT125C-5	1¼	404226	125 (8.6)	175 (12.1)	18 (8)
FT125C-6	1½	404236	125 (8.6)	175 (12.1)	18 (8)
FT125C-8	2	401893	125 (8.6)	175 (12.1)	33 (15)
FT125X-8	2	401905	125 (8.6)	175 (12.1)	108 (49)
FT125C-10	2½	401881	125 (8.6)	175 (12.1)	175 (79)
FT175C-5	1¼	404228	175 (12.1)	175 (12.1)	18 (8)
FT175C-6	1½	404238	175 (12.1)	175 (12.1)	18 (8)
FT175C-8	2	401896	175 (12.1)	175 (12.1)	33 (15)
FT175X-8	2	401907	175 (12.1)	175 (12.1)	108 (49)
FT175C-10	2½	401884	175 (12.1)	175 (12.1)	175 (79)

Series C and X competitive dimensional comparison of distance between inlet and outlet pipes of traps with tappings in the cover

Dimensions in. (mm)

Size	Manufacturer/Model	A	B
1½"	Hoffman FT015C-6	3 (76)	23/32 (18)
	Spirax FT15	3 (76)	23/32 (18)
2"	Hoffman FT015C-8	4 15/16 (124)	⅛ (3)
	Mepco/Dunham Bush 30-8A	5⅜ (136)	1½ (38)
	Spirax FT15	4 15/16 (124)	⅛ (3)
2"	Hoffman FT015X-8	6⅝ (168)	0
	Armstrong 15-J8	6⅝ (168)	0
	Mepco/Dunham Bush SA30-815	6⅞ (175)	1⅜ (35)
	Spirax FTB-20	4½ (114)	½ (13)
2 1/2"	Hoffman FT015C-10	9½ (241)	0
	Armstrong 30-L10	11 5/16 (287)	0
	Mepco/Dunham Bush SA30-930A	4¼ (133)	1½ (38)
	Spirax FTB-125	7¼ (184)	1 7/16 (36)



Float and thermostatic steam traps (continued)

Capacities (Series C and X)

- Determine the differential pressure across the trap (inlet pressure - outlet pressure). On applications where the steam is controlled by a modulating temperature regulator, the trap differential should be ½ psi (0.34 bar).
- Determine the capacity based on the differential pressure and the required capacity of the trap to open against the maximum inlet steam pressure.
- Apply a Safety Factor by multiplying required capacity by 1.5.

Capacities (gross ratings)

Model	Size in.	Orifice size in. (mm)	Pressure differential in pounds per square inch (bar)																	
			¼ (0.017)	½ (0.035)	1 (0.07)	2 (0.14)	5 (0.35)	10 (0.69)	15 (1.0)	20 (1.4)	25 (1.69)	30 (2.1)	40 (2.8)	50 (3.5)	60 (4.2)	75 (5.2)	100 (6.9)	125 (8.6)	150 (10.4)	175 (12.1)
			Capacities in pounds of condensate per hour (kg/hr.)																	
FT015C-6	1½	.5 (12.7)	1100 (500)	1700 (770)	2400 (1090)	3300 (1500)	5000 (2270)	6600 (3000)	7600 (3450)											
FT015C-8	2	.687 (17.4)	2300 (1043)	2800 (1270)	3600 (1630)	4650 (2110)	6900 (3130)	9000 (4080)	10,900 (4948)											
FT015X-8	2	.970 (24.6)	6500 (2950)	8000 (3628)	9500 (4310)	10,800 (4900)	15,00 (7030)	20,900 (9480)	24,000 (10,885)											
FT015X-10	2½	1.875 (47.6)	17,000 (7710)	20,000 (9070)	27,000 (12,250)	36,000 (16,330)	46,000 (20,865)	55,000 (24,950)	60,000 (27,210)											
FT030C-6	1½	.390 (10)	1000 (450)	1300 (590)	1700 (770)	2300 (1040)	3400 (1540)	4600 (2085)	5500 (2495)	6000 (2720)	6600 (2995)	7000 (3178)								
FT030C-8	2	.563 (14)	1700 (771)	2500 (1134)	3100 (1406)	4100 (1859)	5800 (2630)	7650 (3470)	9000 (4082)	10,200 (4626)	11,100 (5034)	12,000 (5443)								
FT030X-8	2	.876 (22)	3400 (1543)	4600 (2088)	6400 (2905)	8400 (3813)	12,500 (5675)	16,900 (7672)	19,000 (8626)	21,500 (9761)	23,500 (10,669)	24,000 (10,896)								
FT030C-10	2½	1.625 (41)	14,000 (6356)	17,000 (7718)	20,900 (9488)	25,500 (11,577)	33,200 (15,072)	40,500 (18,387)	45,500 (20,657)	49,400 (22,427)	52,700 (23,925)	55,600 (25,242)								
FT075C-5	1¼	.312 (8)	600 (272)	800 (363)	1040 (470)	1410 (640)	2200 (1000)	3100 (1405)	3800 (1725)	4100 (1860)	4500 (2040)	4700 (2130)	5000 (2270)	5300 (2400)	5500 (2500)	5900 (2675)				
FT075C-6	1½	.312 (8)	600 (272)	800 (363)	1040 (470)	1410 (640)	2200 (1000)	3100 (1405)	3800 (1725)	4100 (1860)	4500 (2040)	4700 (2130)	5000 (2270)	5300 (2400)	5500 (2500)	5900 (2675)				
FT075C-8	2	.390 (10)	1000 (453)	1350 (612)	1700 (771)	2150 (975)	2950 (1338)	3600 (1632)	4300 (1950)	4850 (2199)	5400 (2449)	5800 (2630)	6600 (2993)	7200 (3265)	7850 (3560)	8500 (3855)				
FT075X-8	2	.585 (15)	2550 (1156)	3150 (1428)	4300 (1930)	5450 (2472)	7600 (3447)	10,400 (4717)	11,400 (5171)	12,500 (5670)	13,500 (5123)	14,250 (6463)	15,600 (7076)	17,150 (7779)	18,600 (8436)	20,500 (9298)				
FT075C-10	2½	1.031 (26)	5900 (2676)	7700 (3492)	10,000 (4536)	13,000 (5896)	18,600 (8436)	24,200 (10,977)	28,300 (12,836)	31,600 (14,333)	34,400 (15,603)	36,800 (16,692)	41,100 (18,642)	44,800 (20,321)	48,040 (21,790)	52,300 (23,723)				
FT125C-5	1¼	.246 (6.2)	430 (195)	540 (245)	700 (320)	940 (425)	1400 (635)	1800 (820)	2200 (1000)	2350 (1065)	2600 (1180)	2800 (1270)	3150 (1430)	3400 (1540)	3500 (1590)	3850 (1750)	4400 (2000)	4800 (2180)		
FT125C-6	1½	.246 (6.2)	430 (195)	540 (245)	700 (320)	940 (425)	1400 (635)	1800 (820)	2200 (1000)	2350 (1065)	2600 (1180)	2800 (1270)	3150 (1430)	3400 (1540)	3500 (1590)	3850 (1750)	4400 (2000)	4800 (2180)		
FT125C-8	2	.294 (7)	730 (331)	900 (408)	1180 (535)	1450 (657)	2000 (907)	2600 (1179)	3100 (1406)	3550 (1610)	3900 (1769)	4250 (1927)	4850 (2199)	5350 (2426)	5850 (2653)	6450 (2925)	7350 (3333)	8150 (3696)		
FT125X-8	2	.448 (11)	2300 (1043)	2800 (1270)	3450 (1564)	4200 (1905)	5450 (2472)	6600 (2993)	7450 (3379)	8050 (3651)	8600 (3900)	8950 (4059)	10,350 (4694)	11,950 (5420)	13,400 (6078)	15,600 (7076)	18,850 (8550)	21,800 (9888)		
FT125X-10	2½	.797 (20)	4000 (1814)	5300 (2404)	6900 (3129)	9100 (4127)	13,000 (5896)	17,100 (7756)	20,000 (9072)	22,400 (10,160)	24,500 (11,113)	26,300 (11,929)	29,400 (13,335)	32,100 (14,560)	34,650 (15,717)	37,600 (17,055)	42,100 (19,096)	46,000 (20,865)		
FT175C-5	1¼	.210 (5.3)	260 (120)	350 (160)	480 (220)	640 (290)	940 (425)	1190 (540)	1450 (660)	1560 (710)	1670 (760)	1750 (790)	1910 (865)	2040 (925)	2100 (950)	2300 (1040)	2500 (1135)	2900 (1315)	3140 (1425)	3240 (1470)
FT175C-6	1½	.210 (5.3)	260 (120)	350 (160)	480 (220)	640 (290)	940 (425)	1190 (540)	1450 (660)	1560 (710)	1670 (760)	1750 (790)	1910 (865)	2040 (925)	2100 (950)	2300 (1040)	2500 (1135)	2900 (1315)	3140 (1425)	3240 (1470)
FT175C-8	2	.244 (6)	520 (235)	660 (299)	820 (371)	1050 (476)	1450 (657)	1850 (839)	2250 (1020)	2600 (1179)	2900 (1315)	3100 (1406)	3600 (1632)	4050 (1837)	4400 (1995)	4800 (2177)	5600 (2540)	6250 (2835)	6800 (3084)	7500 (3402)
FT175X-8	2	.375 (10)	2100 (953)	2600 (1180)	3000 (1362)	3500 (1589)	4400 (1997)	4900 (2224)	5350 (2428)	5800 (2633)	6250 (2837)	6700 (3041)	7600 (3450)	8600 (3904)	9550 (4335)	11,000 (4994)	13,000 (5902)	14,750 (6696)	16,500 (7491)	18,000 (8172)
FT175C-10	2½	.688 (17)	2460 (1116)	3350 (1520)	4600 (2088)	6200 (2814)	9400 (4267)	12,80 (5811)	15,400 (6991)	17,500 (7945)	19,300 (8762)	21,000 (9534)	23,800 (10,805)	26,300 (11,940)	28,060 (12,739)	31,600 (14,346)	35,900 (16,298)	39,700 (18,023)	43,100 (19,567)	46,200 (20,974)

Conversion of previously manufactured Hoffman Specialty models to current model numbers

Previously manufactured			Current model		
Model number	**NPT Size in.**	**Part number**	**Model number**	**NPT size in.**	**Part number**
55	¾	401617	FT015H-3	¾	404200
55	1	401620	FT015H-4	1	404210
55	1¼	401623	FT015H-5	1¼	404220
55	1½	401626	FT015H-6	1½	401626
55	2	401629	FT015H-8	2	401629
550	1	401632	FT030H-4	1	404212
550	1¼	401635	FT030H-5	1¼	404222
550	1½	401638	FT030H-6	1½	401638
550	2	401887	FT030C-8	2	401887
551	1	401641	FT075H-4	1	404214
551	1¼	401644	FT075C-5	1¼	404224
551	1½	401647	FT075C-6	1½	404234
551	2	401890	FT075C-8	2	401890
552	1	401650	FT125H-4	1	404216
552	1¼	401653	FT125C-5	1¼	404226
552	1½	401656	FT125C-6	1½	404236
552	2	401893	FT125C-8	2	401893
553	1	401659	FT175H-4	1	404218
553	1¼	401662	FT175C-5	1¼	404228
553	1½	401665	FT175C-6	1½	404238
553	2	401896	FT175C-8	2	401896
590	¾	401668	FT030H-3	¾	404202
590	1	401671	FT030H-4	1	404212
590	1½	401674	FT030C-6	1½	404232
590	2	401899	FT030X-8	2	401899
590	2½	401875	FT030C-10	2½	401875
591	¾	401677	FT075H-3	¾	404204
591	1	401680	FT075H-4	1	404214
591	1½	401683	FT075C-6	1½	404234
591	2	401902	FT075X-8	2	401902
591	2½	401878	FT075C-10	2½	401878
592	¾	401686	FT125H-3	¾	404206
592	1	401689	FT125H-4	1	404216
592	1½	401692	FT125C-6	1½	404236
592	2	401905	FT125X-8	2	401905
592	2½	401881	FT125C-10	2½	401881
593	¾	401695	FT175H-3	¾	404208
593	1	401698	FT175H-4	1	404218
593	1½	401701	FT175C-5	1½	404228
593	2	401907	FT175X-8	2	401907
593	2½	401884	FT175C-10	2½	401884

Current model number designation code example

Model	Seat pressure	Series	Size
FT	015	H	3

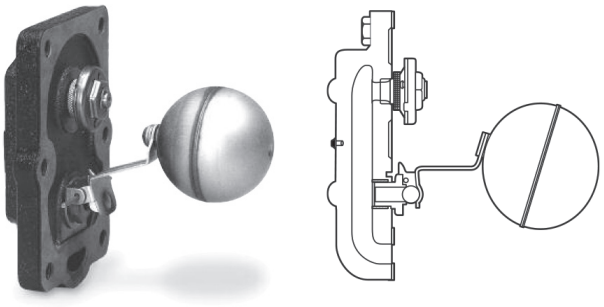
There are dimensional differences between some current models as compared to previous models. Please refer to dimensional diagrams for each trap.

Float and thermostatic steam traps (continued)

Cover assemblies for Spirax Sarco float & thermostatic steam traps

Spirax Sarco F&T trap model number	Pressure psi (bar)	Size in.	Hoffman Specialty cover assembly* part number
FT15	15 (1.1)	¾	604001
		1	604001
		1¼	604006
		1½	604011
FT30	30 (2.1)	¾	604002
		1	604002
		1¼	604007
		1½	604012
FT75	75 (5.3)	¾	604003
		1	604003
		1¼	604008
		1½	604013
FT125	125 (8.8)	¾	604004
		1	604004
		1¼	604009
		1½	604014

* Cover assembly includes cover casting, all internal components and cover gasket.



Cover assembly

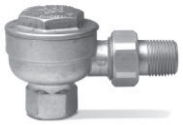
Notes

Thermostatic steam traps BEAR TRAP®

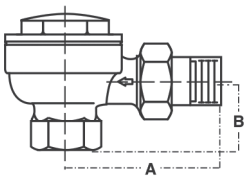
Series 17C balanced pressure

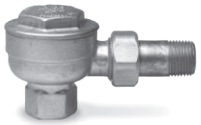
The Series 17C Balanced Pressure Thermostatic Steam Traps are for institutional, commercial and residential heating system applications such as schools, hospitals, apartment buildings, homes or others where low or moderate water hammer may occur.

- Sub-cooling for extremely efficient system operation and elimination of flash steam losses on low pressure systems
- Sizes available
  - ½” NPT angle, vertical
  - ½” NPT swivel
  - ¾” NPT angle, vertical
  - 1” NPT angle
- Replaceable Dura-Stat® module
- 3-year warranty
- Meets Mil specification A-A-60001 Type V, Style A, Class 1 and 2
- Stainless steel components
- Resistant to moderate water hammer and chemical attack
- Maximum operating pressure 25 psig (1.7 bar)

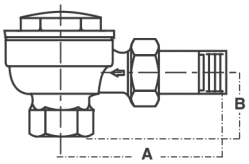


Model 17C angle (with short nipple)
½"

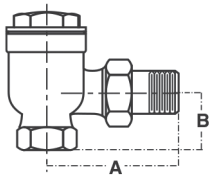




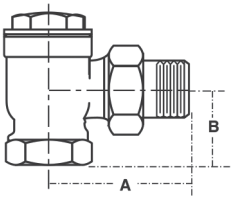
Model 17C angle
½"



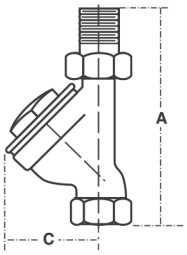
Model 17C angle
¾"



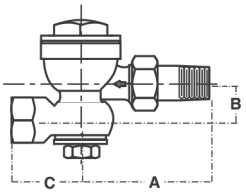
Model 17C angle
1"

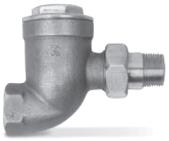


Model 17C vertical
½"

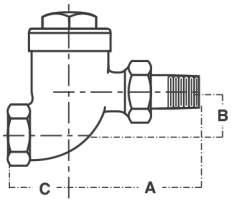


Model 17C swivel
½"





Model 17C straightaway
¾"



Series 17C balanced pressure BEAR TRAP®

Dimensions in. (mm)

Model	Pattern	Size in.	A	B	C
17C-AS-2-25	Angle (with short nipple)	½"	2 27/32 (72)	1¼ (32)	—
17C-A-2-25	Angle		3¼ (83)	1¼ (32)	—
17C-V-2-25	Vertical		4 23/32 (120)	—	2⅛ (54)
17C-SV-2-25	Swivel		3¼ (83)	15/16 (24)	1 13/16 (46)
17C-A-3-25	Angle	¾"	3⅛ (79)	1½ (38)	—
17C-S-3-25	Straightaway		3 5/32 (80)	1⅛ (29)	1⅝ (41)
17C-A-4-25	Angle	1"	3 7/32 (82)	1¾ (45)	—

Gross ratings

	Differential across trap psi (bar)								
Series 17C	¼ (.017)	½ (.034)	1 (.069)	1½ (.10)	2 (.14)	5 (.35)	10 (.7)	15 (1.0)	25 (1.7)
	Capacity lb/hr (kg/hr)								
	42 (19)	51 (23)	63 (29)	72 (33)	77 (35)	102 (46)	125 (57)	140 (64)	162 (73)

Series 17C capacities are based on 40ºF (22ºC) sub-cooling. Cold capacity is approximately 4 times capacity shown.

SHEMA

	Differential across trap psi								
Series 17C	¼	½	1	1½	2	5	10	15	25
	Capacity sq. ft. EDR*								
	85	120	165	200	235	370	530	640	800

* Ratings are in accordance with recommended standards established by the Steam Heating Equipment Manufacturers Association (SHEMA).

1 sq. ft. EDR is equivalent to a heat emission of 240 BTU per hour with 2 psig steam filling a radiator surrounded by 70ºF ambient air.

To convert sq. ft. EDR to lbs. of condensate, or steam per hour, divide the sq. ft. rating by 4.

Ordering information

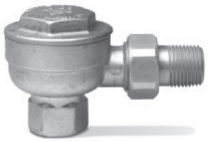
Model number	NPT size in.	Part number	Differential pressure rating psi (bar)	Weight lbs. (kg)
17C-AS-2-25 Angle (with short nipple)	½	401542	25 (1.7)	1.2 (.54)
17C-A 2-25 Angle		401536		
17C-V 2-25 Vertical		401551		
17C-SV-2-25 Swivel		401545		
17C-A-3-25 Angle	¾	402006		1.5 (.7)
17C-S-3-25 Straightaway		402011		1.3 (.6)
17C-A-4-25 Angle	1	402012		2.3 (1)

Thermostatic steam traps BEAR TRAP®

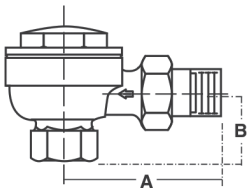
Series 8C balanced pressure

The Series 8C Balanced Pressure Thermostatic steam traps are for institutional and commercial heating system applications or others that require high capacity operation.

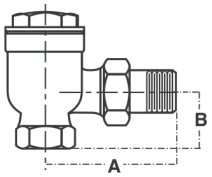
- Sizes available
  ½" NPT angle
  ¾" NPT angle or straightaway
- Sub-cooling for extremely efficient system operation and elimination of flash steam losses on low pressure systems
- Replaceable Dura-Stat® module
- 3-year warranty
- Meets Mil specification A-A-60001 Type V, Style A, Class 1 – 4
- Stainless steel components
- Resistant to moderate water hammer and chemical attack
- Maximum operating pressure 25 psig (1.7 bar)

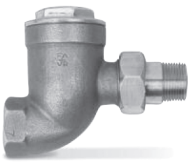


Model 8C angle
½"

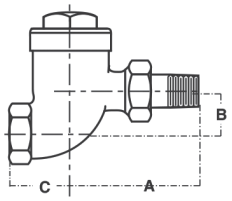


Model 8C angle
¾"





Model 8C straightaway
¾"



Dimensions in. (mm)

Model	Pattern	Size in.	A	B	C
8C	Angle	½"	2 27/32 (72)	1¼ (32)	—
	Angle	¾"	3⅛ (79)	1½ (38)	—
	Straightaway	¾"	3 5/32 (80)	1⅛ (29)	1⅝ (41)

Ordering information

Model number	NPT size in.	Part number	Differential pressure rating psi (bar)	Weight lbs. (kg)
8C-A-2-125 angle	½	402002	125 (8.6)	1.5 (.7)
8C-A 3-125 angle	¾	402003		
8C-S-3-125 straightaway	¾	402004		

Gross ratings

	Differential across trap psi (bar)											
Series 8C	¼ (.017)	½ (.034)	1 (.069)	1½ (.10)	2 (.14)	5 (.35)	10 (.7)	15 (1.0)	25 (1.7)	50 (3.5)	100 (6.9)	125 (8.6)
	Capacity lbs./hr (kg/hr)											
	110 (50)	150 (68)	210 (95)	255 (116)	300 (136)	480 (218)	760 (345)	950 (431)	1350 (612)	2100 (953)	3500 (1590)	4200 (1905)

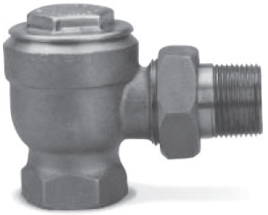
Series 8C capacities are based on 30ºF (17ºC) sub-cooling. Cold capacity is approximately 2 times capacity shown.

Thermostatic steam traps BEAR TRAP®

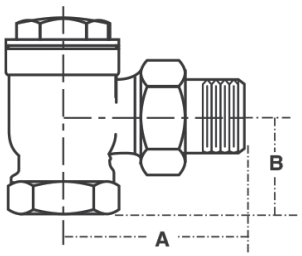
Series 9C balanced pressure

The Series 9C are for institutional and commercial heating system applications or others that require high capacity operation.

- Sub-cooling for extremely efficient system operation and elimination of flash steam losses on low pressure systems
- Sizes available: 1” NPT angle
- Replaceable Dura-Stat® module
- 3-year warranty
- Meets Mil specification A-A-60001 Type V, Style A, Class 1 – 4
- Stainless steel components
- Resistant to moderate water hammer and chemical attack
- Maximum operating pressure 125 psig (8.6 bar)



Model 9C angle
1" NPt



Dimensions in. (mm)

Model	Pattern	Size in.	A	B
9C	Angle	1”	3 7/32 (82)	1 3/4 (45)

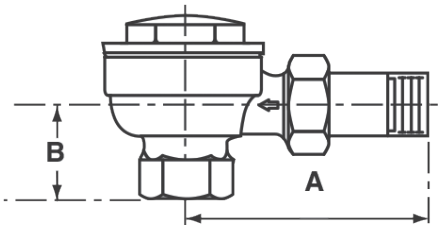
Ordering information

Model number	NPT size in.	Part number	Differential pressure rating psi (bar)	Weight lbs. (kg)
9C-A-4-125 Angle	1	402005	125 (8.6)	2.3 (1)

Gross ratings

	Differential across trap psi (bar)											
Series 9C	¼ (.017)	½ (.034)	1 (.069)	1½ (.10)	2 (.14)	5 (.35)	10 (.7)	15 (1.0)	25 (1.7)	50 (3.5)	100 (6.9)	125 (8.6)
	Capacity lbs./hr (kg/hr)											
	110 (50)	150 (68)	210 (95)	255 (116)	300 (136)	480 (218)	760 (345)	950 (431)	1350 (612)	2100 (953)	3500 (1590)	4200 (1905)

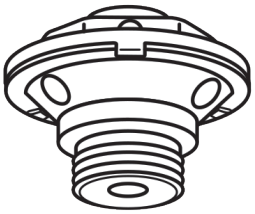
Thermostatic steam traps



Competitive brand changeover to Hoffman Specialty BEAR TRAP® Model 17C

Manufacturer	Model number	Dimensions in. (mm)		Hoffman Specialty Bear Trap part number
		A	B	
Barnes & Jones	122A	3 (76)	1¼ (32)	401536
Dunham Bush / Mepco	1E-AP	3⅛ (79)	1⅛ (29)	401536
Erwell	R30	3¼ (83)	1¼ (38)	401536
Illinois	1G, 1GS, 1MG	2⅞ (73)	1⅛ (29)	401542
Spirax Sarco	TS-25	2 13/16 (71)	1 3/16 (30)	401542
Sterling	7-50	3¼ (83)	1¼ (32)	401536
Trane	B1	3¼ (83)	1 1/16 (27)	401536
Warren Webster	502, 702	2¾ (70)	1⅛ (29)	401542
Hoffman Specialty	17C with standard nipple	3¼ (83)	1¼ (32)	401536
Hoffman Specialty	17C with short nipple	2 27/32 (72)	1¼ (32)	401542

BEAR TRAP® Dura-stat® Replacement Modules



For Barnes & Jones, Dunham-Bush, Illinois, Spirax-Sarco, and Hoffman Specialty Thermostatic Steam Traps. The all Stainless steel Dura-stat® Replacement Module should be used to upgrade thermostatic steam traps. The Dura-stat is durable and water hammer resistant.

Selection

Trap manufacturer	NPT size in.	Model number	BEAR TRAP® Dura-stat® Part number
Hoffman Specialty	½	17C	600084
Spirax-Sarco		TB-25, TH-25, TS-25, H	600056
Barnes & Jones		122	600053
Dunham-Bush/Mepco		1C, 1E	600052
Illinois		1G	600056
Warren Webster		02H, 502	600250

Notes

Inverted bucket steam traps

Series B0 BEAR TRAP®

The Series B inverted bucket traps are designed for a wide range of industrial applications including steam mains, laundry and dry cleaning plants, food processing and those that require a lift in the discharge lines.

Series B0 inverted bucket traps

The Series B0 inverted bucket traps are designed for a wide range of industrial applications including unit heaters, laundry and process equipment and steam line drip traps.

These cast iron inverted bucket traps operate efficiently for long periods of time to add solid energy savings by lowering replacement and labor costs. They are fully repairable for even bigger maintenance savings.

Typical applications

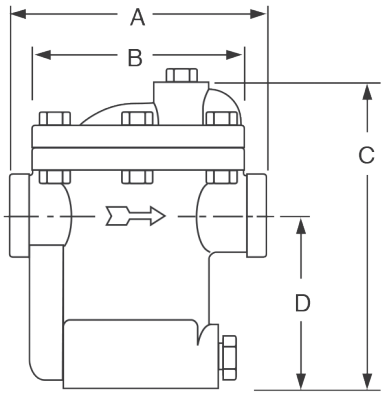
- Drip traps in steam lines
- Tracer lines
- Process equipment
- Steam cookers
- Steam kettles
- Steam heated vats
- Pressing machinery
- Unit heaters
- Commercial dishwashing

Features

- Available in sizes ½" and ¾" NPT
- Pressure ratings 20, 80, 125 and 150 psig (1.4, 5.5, 8.6 and 10.3 bar)
- Removable covers for easy in-line service
- Stainless steel internal components
- Resistant to moderate water hammer
- Optional built-in strainer to reduce the number of piping connections
- Maximum capacities to 690 lbs/hr (313 kg/hr)
- Maximum temperature 406°F (208°C)
- Maximum allowable pressure (vessel design) 250 psig (17.3 bar)
- Maximum operating pressure 150 psig (10.3 bar)

Materials of construction

Part	Specifications
Body and cover	Cast Iron
Valve pin and seat	Stainless steel (hardened)
Bucket	Stainless steel
Lever assembly	Stainless steel
Strainer	Stainless steel
Cover gasket	Non-asbestos fiber
Cover bolts	Grade 8



Dimensions in. (mm)

NPT Size	A	B (Dia.)	C	D
½ & ¾	5 1/16 (129)	3¾ (95)	6 3/16 (157)	3½ (89)

Hoffman Specialty steam traps

Capacities (gross ratings)

Series	Orifice size in. (mm)	Seat pressure psi (bar)	Differential across trap psi (bar)													
			½ (.035)	1 (.070)	5 (.35)	10 (.7)	15 (1.0)	20 (1.38)	30 (2.1)	40 (2.8)	50 (3.5)	60 (4.2)	80 (5.5)	100 (6.9)	125 (8.6)	150 (10.3)
			Capacity lbs./hr (kg/hr)													
B0	3/16 (4.7)	20 (1.4)	200 (91)	270 (122)	450 (204)	560 (254)	640 (290)	690 (313)								
	1/8 (3.2)	80 (5.5)	80 (36)	110 (50)	200 (91)	300 (136)	360 (163)	420 (190)	500 (227)	540 (245)	580 (263)	620 (281)	690 (313)			
	7/64 (2.8)	125 (8.6)		55 (25)	90 (41)	145 (66)	195 (88)	260 (118)	345 (156)	400 (181)	442 (200)	485 (220)	565 (256)	640 (290)	680 (308)	
	3/32 (2.4)	150 (10.3)			70 (32)	110 (50)	150 (68)	200 (91)	270 (122)	310 (141)	345 (156)	380 (172)	440 (200)	480 (218)	540 (245)	570 (259)

Ordering information (Specify the part number on your order)

Model (A) units are basic.

Model (S) units have built-in strainer.

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure psi (bar)	Weight lbs. (kg)
B0020A-2	½	404180	20 (1.4)	250 (17.3)	7 (3)
B0020S-2		404184	20 (1.4)		
B0080A-2		404181	80 (5.5)		
B0080S-2		404185	80 (5.5)		
B0125A-2		404182	125 (8.6)		
B0125S-2		404186	125 (8.6)		
B0150A-2		404183	150 (10.3)		
B0150S-2		404187	150 (10.3)		
B0020A-3	¾	404188	20 (1.4)		
B0020S-3		404192	20 (1.4)		
B0080A-3		404189	80 (5.5)		
B0080S-3		404193	80 (5.5)		
B0125A-3		404190	125 (8.6)		
B0125S-3		404194	125 (8.6)		
B0150A-3		404191	150 (10.3)		
B0150S-3		404195	150 (10.3)		

Inverted bucket steam traps

Series B1 & B2 BEAR TRAP®

The Series B inverted bucket traps are designed for a wide range of industrial applications including steam mains, laundry and dry cleaning plants, food processing and those that require a lift in the discharge lines.

Series B1 & B2 BEAR TRAP®

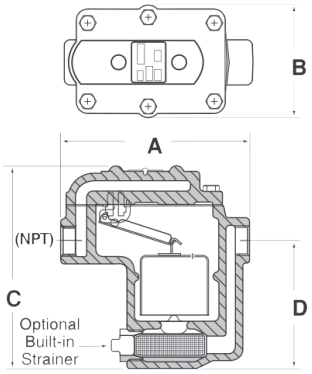
Series B1

- Available in sizes ½" and ¾" NPT
- Meets Mil specification WW-T-696-E type I, style B, class 1-7
- Removable covers for easy in-line service
- Erosion resistant covers
- Stainless steel internal components
- Resistant to moderate water hammer
- Optional built-in thermic vent for faster heating
- Optional built-in strainer to reduce the number of piping connections
- Maximum capacities to 1700 lbs/hr (771 kg/hr)
- Maximum temperature 406°F (208°C)
- Maximum operating pressure 250 psig (17.3 bar)

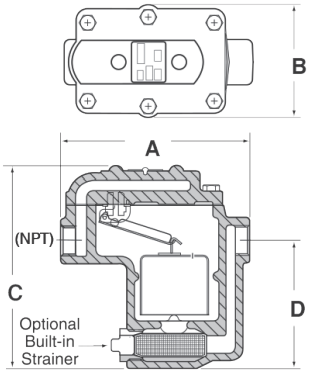
Series B2

- Available ¾" NPT
- Meets Mil specification WW-T-696-E type I, style B, class 1-7
- Removable covers for easy in-line service
- Erosion resistant covers
- Stainless steel internal components
- Resistant to moderate water hammer
- Optional built-in thermic vent for faster heating
- Optional built-in strainer to reduce the number of piping connections
- Maximum capacities to 2620 lbs/hr (1188 kg/hr)
- Maximum temperature 406°F (208°C)
- Maximum operating pressure 250 psig (17.3 bar)

Series B1



Series B2



Dimensions in. (mm)

Series	Size	A	B	C	D
B1	½, ¾	6 15/16 (177)	3 13/16 (97)	7¼ (184)	4⅜ (111)
B2	¾	6 15/16 (177)	3 13/16 (97)	9 1/16 (230)	6⅞ (158)

Materials of construction

Part	Specifications
Body and cover	Cast Iron 30,000 psi tensile
Valve pin and seat	Stainless steel (hardened)
Bucket	Stainless steel
Lever assembly	Stainless steel
Cover bolts	Grade 5 steel

Series B1 & B2 BEAR TRAP®

The trap capacity should be selected based on the minimum differential pressure between the inlet pressure and outlet pressure. The trap seat must be capable of opening against the maximum inlet steam pressure. When the traps are used on applications where the steam is controlled by a modulating temperature regulator, the trap is normally selected to handle the full condensate load including safety factor at ½ psi (.034 bar) differential pressure.

Capacities (gross ratings)

Series	Orifice size in. (mm)	Seat pressure psi (bar)	Differential across trap psi (bar)																
			½ (.035)	1 (.070)	2 (.14)	5 (.35)	10 (.7)	15 (1.0)	20 (1.38)	30 (2.1)	40 (2.8)	50 (3.5)	60 (4.2)	75 (5.2)	100 (6.9)	125 (8.6)	180 (12.4)	200 (13.8)	250 (17.3)
			Capacity lbs./hr (kg/hr)																
B1	.250 (6.4)	15 (1.0)	500 (227)	650 (295)	835 (379)	1145 (519)	1490 (676)	1700 (771)											
	.187 (4.7)	30 (2.1)	260 (118)	345 (156)	460 (209)	680 (308)	905 (411)	1060 (481)	1200 (544)	1440 (653)									
	.156 (4.0)	75 (5.2)	200 (91)	255 (116)	335 (152)	480 (218)	605 (274)	695 (315)	775 (352)	900 (408)	980 (445)	1070 (485)	1130 (513)	1200 (544)					
	.125 (3.2)	125 (8.6)	115 (52)	150 (68)	195 (88)	275 (125)	355 (161)	410 (186)	460 (209)	530 (240)	595 (270)	640 (290)	690 (313)	745 (338)	830 (376)	920 (417)			
	.094 (2.4)	180 (10.4)	80 (36)	105 (48)	140 (64)	205 (93)	275 (125)	320 (145)	360 (163)	425 (193)	480 (218)	520 (236)	560 (254)	620 (281)	705 (320)	780 (354)	930 (422)		
	.070 (1.8)	250 (17)	28 (13)	40 (18)	55 (25)	90 (41)	125 (57)	150 (68)	175 (79)	215 (98)	250 (113)	275 (125)	305 (138)	340 (154)	400 (181)	450 (204)	570 (259)	600 (272)	700 (318)
B2	.360 (9.1)	15 (1.0)	750 (340)	975 (447)	1255 (569)	1755 (796)	2280 (1034)	2620 (1188)											
	.282 (7.1)	30 (2.1)	650 (295)	810 (367)	1005 (456)	1350 (612)	1700 (771)	1950 (885)	2130 (966)	2400 (1089)									
	.250 (6.4)	75 (5.2)	490 (222)	600 (272)	740 (336)	980 (445)	1220 (553)	1340 (608)	1440 (653)	1600 (726)	1760 (798)	1910 (866)	2030 (921)	2170 (984)					
	.203 (5.2)	125 (8.6)	350 (159)	450 (204)	580 (263)	830 (376)	905 (411)	920 (417)	1020 (463)	1180 (535)	1310 (594)	1430 (649)	1540 (699)	1680 (762)	1920 (871)	2100 (953)			
	.156 (4.0)	180 (10.4)	200 (91)	255 (116)	330 (150)	460 (209)	580 (263)	675 (306)	740 (336)	840 (381)	930 (422)	1020 (463)	1090 (494)	1190 (540)	1350 (612)	1480 (671)	1725 (782)		
	.141 (3.6)	250 (17)	180 (82)	235 (107)	305 (138)	430 (195)	540 (245)	620 (281)	680 (308)	780 (354)	870 (395)	940 (426)	1000 (453)	1100 (499)	1270 (576)	1415 (642)	1650 (748)	1740 (789)	1890 (857)

Inverted bucket steam traps (continued)

Ordering information (specify the part number on your order)

Model (A) units are basic.
Model (B) units have a built-in strainer and thermic vent for fast venting.
Model (S) units have a built-in strainer.
Model (T) units have an optional thermic vent built-in for faster venting.

Example: Model number B1030A-2
B1 (Unit size selected from capacity table)
030 (Differential seat pressure rating)
A (Basic unit)
2 (Connection Size - ¼ of an inch)

Series B1 ordering information

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure psi (bar)	Weight lbs. (kg)
B1015A-2	½	404300	15 (1.0)	250 (17.3)	11 (5)
B1015S-2		404301			
B1015T-2		404302			
B1015B-2		404303			
B1015A-3	¾	404324			
B1015S-3		404325			
B1015T-3		404326			
B1015B-3		404327			
B1030A-2	½	404304	30 (2.1)		
B1030S-2		404305			
B1030T-2		404306			
B1030B-2		404307			
B1030A-3	¾	404328			
B1030S-3		404329			
B1030T-3		404330			
B1030B-3		404331			
B1075A-2	½	404308	75 (5.2)		
B1075S-2		404309			
B1075T-2		404310			
B1075B-2		404311			
B1075A-3	¾	404332			
B1075S-3		404333			
B1075T-3		404334			
B1075B-3		404335			
B1125A-2	½	404312	125 (8.6)		
B1125S-2		404313			
B1125T-2		404314			
B1125B-2		404315			
B1125A-3	¾	404336			
B1125S-3		404337			
B1125T-3		404338			
B1125B-3		404339			

Series B1 & B2 BEAR TRAP®

Series B1 ordering information (continued)

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure psi (bar)	Weight lbs. (kg)
B1180A-2	½	404316	180 (12.4)	250 (17.3)	11 (5)
B1180S-2		404317			
B1180T-2		404318			
B1180B-2		404319			
B1180A-3	¾	404340			
B1180S-3		404341			
B1180T-3		404342			
B1180B-3		404343			
B1250A-2	½	404320	250 (17.3)		
B1250S-2		404321			
B1250T-2		404322			
B1250B-2		404323			
B1250A-3	¾	404344			
B1250S-3		404345			
B1250T-3		404346			
B1250B-3		404347			

Series B2 ordering information

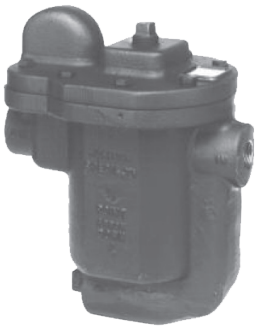
Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure psi (bar)	Weight lbs. (kg)
B2015A-3	¾	404348	15 (1.0)	250 (17.3)	12.5 (5.7)
B2015S-3		404349			
B2015T-3		404350			
B2015B-3		404351			
B2030A-3	¾	404352	30 (2.1)		
B2030S-3		404353			
B2030T-3		404354			
B2030B-3		404355			
B2075A-3	¾	404356	75 (5.2)		
B2075S-3		404357			
B2075T-3		404358			
B2075B-3		404359			
B2125A-3	¾	404360	125 (8.6)		
B2125S-3		404361			
B2125T-3		404362			
B2125B-3		404363			
B2180A-3	¾	404364	180 (12.4)		
B2180S-3		404365			
B2180T-3		404366			
B2180B-3	½	404367	250 (17.3)		
B2250A-3	¾	404368	250 (17.3)		
B2250S-3		404369			
B2250T-3		404370			
B2250B-3		404371			

Inverted bucket steam traps (continued)

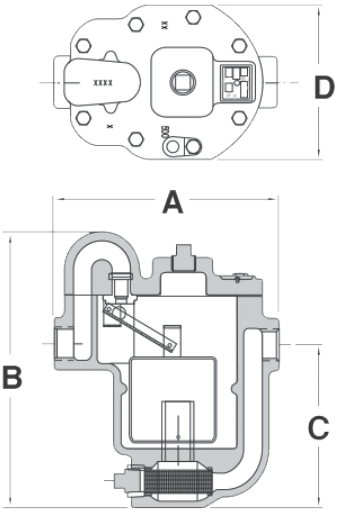
Series B3 BEAR TRAP®

Series B3

- Available in sizes ¾" and 1" NPT
- Meets Mil specification WW-T-696-E type I, style B, class 1-7
- Removable covers for easy in-line service
- Stainless steel internal components
- Resistant to moderate water hammer
- Optional built-in thermic vent for faster heating
- Optional built-in strainer to reduce the number of piping connections
- Maximum capacities to 5000 lbs/hr (2268 kg/hr)
- Maximum temperature 406ºF (208ºC)
- Maximum operating pressure 250 psig (17.3 bar)



Series B3



Series B3 BEAR TRAP®

Capacities (gross ratings)

Series	Orifice size in. (mm)	Seat pressure psi (bar)	Differential across trap psi (bar)																
			½ (.035)	1 (.070)	2 (.14)	5 (.35)	10 (.7)	15 (1.0)	20 (1.38)	30 (2.1)	40 (2.8)	50 (3.5)	60 (4.2)	75 (5.2)	100 (6.9)	125 (8.6)	180 (12.4)	200 (13.8)	250 (17.3)
			Capacity lbs./hr (kg/hr)																
B3	.500 (12.7)	15 (1.0)	1450 (658)	1850 (839)	2300 (1043)	3050 (1383)	3700 (1678)	4100 (1860)											
	.375 (9.53)	30 (2.1)	720 (327)	980 (435)	1340 (608)	2020 (916)	2760 (1252)	3300 (1497)	3750 (1701)	4470 (2028)									
	.281 (7.14)	75 (5.2)	500 (227)	680 (308)	915 (415)	1370 (621)	1860 (762)	2200 (998)	2500 (1134)	2980 (1352)	3370 (1529)	3720 (1687)	4050 (1837)	4460 (2023)					
	.250 (6.35)	125 (8.6)	435 (197)	590 (268)	800 (363)	1200 (544)	1630 (739)	1950 (885)	2220 (1007)	2665 (1209)	3020 (1370)	3325 (1508)	3600 (1633)	3970 (1801)	4540 (2059)	5000 (2268)			
	.219 (5.56)	180 (10.4)	300 (136)	415 (188)	570 (259)	870 (395)	1190 (540)	1440 (653)	1640 (744)	1970 (894)	2250 (1021)	2490 (1129)	2690 (1220)	2960 (1343)	3400 (1542)	3790 (1719)	4440 (2014)		
	.188 (4.78)	250 (17)	256 (116)	355 (161)	485 (220)	740 (336)	1010 (458)	1210 (549)	1390 (631)	1675 (760)	1900 (862)	2100 (953)	2285 (1036)	2535 (1150)	2890 (1311)	3200 (1452)	3780 (1715)	3980 (1805)	4340 (1969)

Ordering information
(Specify the part number on your order)

Model (A) units are basic.
Model (B) units have a built-in strainer and thermic vent for fast venting.
Model (S) units have a built-in strainer.
Model (T) units have an optional thermic vent built-in for faster venting.

Example: Model number B3030A-3
B3 (Unit size selected from capacity table)
030 (Differential seat pressure rating)
A (Basic unit)
3 (Connection Size - ¼ of an inch)

Series B3 ordering information

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure psi (bar)	Weight lbs. (kg)
B3015A-3	¾	404400	15 (1.0)	250 (17.3)	35 (16)
B3015S-3		404406			
B3015T-3		404412			
B3015B-3		404418			
B3015A-4	1	404424			
B3015S-4		404430			
B3015T-4		404436			
B3015B-4		404442			
B3030A-3	¾	404401	30 (2.1)		
B3030S-3		404407			
B3030T-3		404413			
B3030B-3		404419			
B3030A-4	1	404425			
B3030S-4		404431			
B3030T-4		404437			
B3030B-4		404443			

Inverted bucket steam traps (continued)

Series B3 BEAR TRAP®

Ordering information (Specify the part number on your order)

Model (A) units are basic.
Model (B) units have a built-in strainer and thermic vent for fast venting.
Model (S) units have a built-in strainer.
Model (T) units have an optional thermic vent built-in for faster venting.

Example: Model number B3030A-3
B3 (Unit size selected from capacity table)
030 (Differential seat pressure rating)
A (Basic unit)
3 (Connection Size - ¼ of an inch)

Series B3 ordering information (continued)

Model number	NPT size in.	Part number	Seat differential pressure rating psi (bar)	Body design pressure psi (bar)	Weight lbs. (kg)
B3075A-3	¾	404402	75 (5.2)	250 (17.3)	35 (16)
B3075S-3		404408			
B3075T-3		404414			
B3075B-3		404420			
B3075A-4	1	404426			
B3075S-4		404432			
B3075T-4		404438			
B3075B-4		404444			
B3125A-3	¾	404403	125 (8.6)		
B3125S-3		404409			
B3125T-3		404415			
B3125B-3		404421			
B3125A-4	1	404427			
B3125S-4		404433			
B3125T-4		404439			
B3125B-4		404445			
B3180A-3	¾	404404	180 (12.4)		
B3180S-3		404410			
B3180T-3		404416			
B3180B-3		404422			
B3180A-4	1	404428			
B3180S-4		404434			
B3180T-4		404440			
B3180B-4		404446			
B3250A-3	¾	404405	250 (17.3)		
B3250S-3		404411			
B3250T-3		404417			
B3250B-3		404423			
B3250A-4	1	404429			
B3250S-4		404435			
B3250T-4		404441			
B3250B-4		404447			

Notes

Thermodisc steam traps

Series TD BEAR TRAP®

The Series TD Thermodisc traps are designed for applications such as high pressure steam drips and tracer lines, or others with light to moderate loads.

Typical applications for thermodisc traps include:

- Drip traps on steam mains and supply lines
- Tracer lines
- Laundry and kitchen equipment
- Super heated steam applications
- Outdoor installations that are subject to freezing

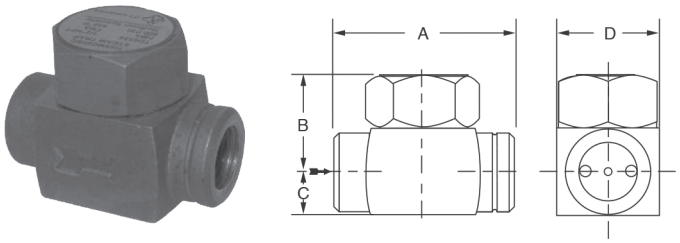
Series TD thermodisc traps

- Stainless steel construction resists both internal and external corrosion
  - Stainless cast body
  - Hardened Stainless steel disc is the only moving part
  - Resists water hammer
- Unaffected by super heated steam
- Simplified installation
  - Traps operate in any orientation (horizontal preferred)
  - Freeze resistant when trap is piped in vertical orientation due to self-draining design
- Easy to monitor trap operation – audible discharge cycle makes checking operation simple
- Operate over wide pressure range from 2 to 600 psig (0.14 to 41.4 bar)
- Operates with back pressure up to 80% of line pressure
- Internal parts mounted on cover for easy service
- Maximum Pressure – PMO/PMA 600 psig (41.4 bar)
- Maximum Temperature – TMO/TMA 800ºF (426ºC)

Materials of construction

Part	Specifications
Body	420F Stainless steel ASTM A743 CA40F
Cap	420 Stainless steel ASTM A743 CA40
Disc	420 Stainless steel ASTM A743 CA40

Series TD6520 thermodisc trap

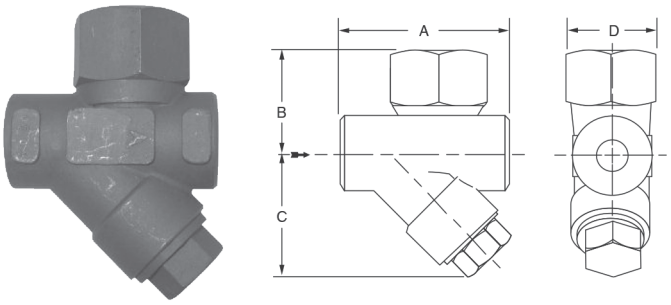


- Capacities to 4700 lbs/hr (2132 kg/hr)

Dimensions in. (mm)

Series	Size in.	A	B	C	D
TD6523	⅜	2 (51)	13/16 (21)	9/16 (14)	1½ (38)
TD6524	½	2¾ (70)	1⅜ (35)	⅝ (16)	1½ (38)
TD6526	¾	2¾ (70)	1⅝ (41)	13/16 (21)	2 (51)
TD6528	1	3¼ (83)	1 15/16 (49)	15/16 (24)	2 (51)

Series TD6420 thermodisc trap with integral strainer



- Integral strainer to protect trap from contamination
- Capacities to 2200 lbs/hr (998 kg/hr)

Dimensions in. (mm)

Series	Size in.	A	B	C	D
TD6423	⅜	3 1/16 (78)	1⅞ (48)	2⅜ (60)	1 11/16 (43)
TD6424	½	3 1/16 (78)	1⅞ (48)	2⅜ (60)	1 11/16 (43)
TD6426	¾	3 1/16 (78)	1⅞ (48)	2⅜ (60)	1 11/16 (43)
TD6428	1	3 1/4 (82)	2⅛ (54)	2½ (64)	1 11/16 (43)

Series TD BEAR TRAP® (continued)

Capacities (gross ratings) - at 10°F below saturation

Model	Size in.	Pressure differential psig (bar)													
		2 (0.14)	5 (0.35)	10 (0.69)	25 (1.7)	50 (3.5)	75 (5.2)	100 (6.9)	150 (10.4)	200 (13.8)	250 (17.3)	300 (20.7)	400 (27.6)	500 (34.5)	600 (41.4)
		Capacity lbs./hr (kg/hr)													
TD6523	⅜	180 (82)	185 (84)	190 (86)	210 (95)	255 (116)	315 (143)	375 (170)	500 (227)	610 (277)	700 (318)	790 (358)	955 (433)	1105 (501)	1250 (567)
TD6524	½	290 (132)	310 (141)	345 (156)	440 (200)	580 (263)	710 (322)	810 (367)	995 (451)	1140 (517)	1275 (578)	1405 (637)	1630 (739)	1825 (828)	2000 (907)
TD6526	¾	395 (179)	420 (191)	465 (211)	600 (272)	815 (370)	1000 (454)	1160 (526)	1440 (653)	1675 (760)	1895 (860)	2095 (950)	2430 (1102)	2750 (1247)	3050 (1383)
TD6528	1	620 (201)	660 (299)	730 (331)	920 (417)	1215 (551)	1490 (676)	1740 (789)	2195 (996)	2585 (1173)	2910 (1320)	3230 (1465)	3770 (1710)	4245 (1926)	4700 (2132)
TD6423	⅜			315 (143)	370 (168)	425 (193)	520 (236)	575 (261)	800 (363)	900 (408)	1080 (490)	1280 (581)	1380 (626)	1480 (671)	1650 (748)
TD6424	½			315 (143)	370 (168)	425 (193)	520 (236)	575 (261)	800 (363)	900 (408)	1080 (490)	1280 (581)	1380 (626)	1480 (671)	1650 (748)
TD6426	¾			650 (295)	740 (336)	800 (363)	1000 (454)	1100 (499)	1400 (635)	1540 (699)	1630 (739)	1760 (798)	1930 (875)	2070 (939)	2200 (998)
TD6428	1			650 (295)	740 (336)	800 (363)	1000 (454)	1100 (499)	1400 (635)	1540 (699)	1630 (739)	1760 (798)	1930 (875)	2070 (939)	2200 (998)

Ordering information

Equipped	Model number	NPT Size in.	NPT Part number	Weight lbs. (kg)
Without strainer	TD6523	⅜	405151	0.8 (0.36)
	TD6524	⅜	405152	1.3 (0.59)
	TD6526	¾	405153	2.1 (0.95)
	TD6528	1	405154	3.2 (1.45)
With strainer	TD6423	⅜	405155	2.4 (1.1)
	TD6424	½	405156	2.4 (1.1)
	TD6426	¾	405157	2.7 (1.2)
	TD6428	1	405158	3.3 (1.5)

Pressure pilot operated steam regulators

Series 2000

The Hoffman Specialty Series 2000 consists of main valves, pilot valves, wells and hardware kits. They are designed to meet a wide range of pressure and capacity requirements and provide accurate, dependable, low maintenance operation. The Series 2000 regulators meet MIL Spec MIL-V-16733D (Type IV) and MIL-V-18433B (Type I, Style A, Class 2).

Main valve with pressure control spring pilot

Main valves

- Sizes available: ½" – 6" (150 mm)
- Cast iron body with 30,000 tensile
- Maximum rating 250 psig (17.3 bar) at 450ºF (232ºC)
- Full, normal and reduced ports available

Pilots

- Spring

Basic selection data

Select main valve based on required sizing information.

Select type of pilots required.

Select hardware package based on main valve size and type of pilots used.

Example

For a 1½" full port valve using a spring pilot with 5-60 psig (0.14-4.1 bar) range.

Specify on purchase order	
402412	Main valve full port
400278	SPS-60 spring pilot
400641	Hardware kit

*** Contact your local Hoffman Specialty representative for information on noise silencers for steam regulators.**

Series 2000 main valves

The Series 2000 main valve is rugged and stable in response for trouble free, dependable operation over a wide range of conditions and applications.

- For continuous or dead end service within .01% leakage of the valve's rated capacity
- Packless construction eliminates many service problems
- Complete range of port sizes:
  - — Full
  - — Normal
  - — Reduced

  } High pressure models 2100, 2200 & 2300
  - — Low pressure {models 2150 & 2250}
- Positive travel stop and back up of diaphragm prevents over pressurizing from low pressure side
- Maintains accurate and stable control of pressure or temperature
- Two-ply Stainless steel diaphragm provides greater accuracy of control over the entire capacity range and a longer life
- Minimum differential pressure:

  Model 2100, 2200 & 2300 ..... 15 psi (1.0 bar)

  Model 2150, 2250.....3 psi (.2 bar)
- Maximum differential pressure150 psi (10.3 bar). A two-stage reduction should be used for pressure drops greater than 150 psi (10.3 bar). Models 2150 & 2250 have maximum 30 psi differential pressure.
- Maximum temperature 450ºF (232ºC)

Materials of construction

Part	Specifications
Body	Cast iron ASTM A126B or ductile Iron ASTM A536
Stem	Stainless steel ASTM A581, A582
Seat	Stainless steel ASTM A582
Plug	Stainless steel ASTM A582
Diaphragm	Stainless steel ASTM A240
Gaskets	Non-asbestos ASTM F-104
Nuts/bolts	ASTM A325 Grade 5
Copper tubing	ASTM B75 Alloy 122

Selection Guide

Main valve body styles					
Size in.	Model number				
	2100 screwed NPT max. pressure 250 psig (17.3 bar)	2150 screwed NPT max. pressure 30 psig (2.1 bar)	2200 ANSI 125 flanged max. pressure 125 psig (8.6 bar)	2250 ANSI 125 flanged max. pressure 30 psig (2.1 bar)	2300 ANSI 250 flanged max. pressure 250 psig (17.3 bar)
½	X				
¾	X	X			
1	X	X			
1¼	X	X			
1½	X	X			
2	X	X	X	X	X
2½			X	X	X
3			X	X	X
4			X	X	X
6			X	X	X

Pressure and/or temperature pilot operated steam regulators (continued)

Series 2000 main valves

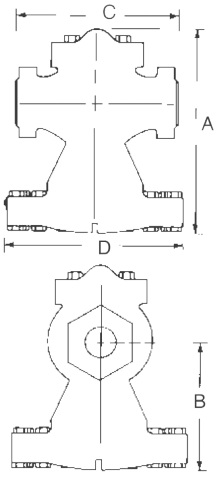
Dimensions (main valves)

Model 2100 and 2150 screwed NPT ends — Maximum pressure 250 psig (17.3 bar)

Dimensions in. (mm)

NPT valve size in.	A	B	C	D
½	7⅞ (200)	4¾ (121)	5⅛ (130)	7 (178)
¾	7⅞ (200)	4¾ (121)	5⅛ (130)	7 (178)
1	7⅞ (200)	4¾ (121)	5⅛ (130)	7 (178)
1¼	9½ (241)	5¾ (146)	7½ (191)	8¾ (222)
1½	9½ (241)	5¾ (146)	7½ (191)	8¾ (222)
2	11¾ (298)	7⅝ (194)	9¼ (235)	10 (254)

Model 2100 & 2150 screwed NPT ends

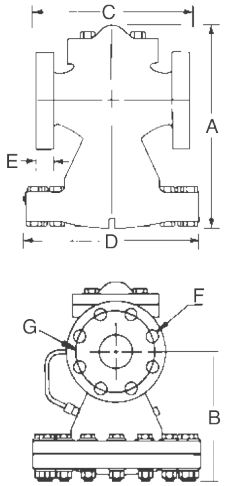


Model 2200 and 2250 flanged ends — Maximum pressure 125 psig (8.6 bar)

Dimensions in. (mm)

Valve size in. (mm)	A	B	C	D	E	Bolt holes		
						Hole dia. in. (mm) F	No. of holes	Bolt circ. in. (mm) G
2 (50)	11¾ (298)	7⅝ (194)	8 (203)	10 (254)	⅝ (16)	¾ (19)	4	4¾ (121)
2½ (65)	15⅝ (397)	9⅝ (244)	9⅜ (238)	12 (305)	11/16 (17)	¾ (19)	4	5½ (140)
3 (80)	16 9/16 (421)	10 3/16 (259)	10 (254)	13⅛ (333)	¾ (19)	¾ (19)	4	6 (152)
4 (100)	19 (483)	12 (305)	11⅞ (302)	16⅝ (422)	15/16 (23.8)	¾ (19)	8	7½ (191)
6 (150)	24 3/16 (614)	15⅝ (397)	15⅛ (384)	22¾ (578)	1 (25)	⅞ (22)	8	9½ (241)

Model 2200 & 2250 flanged ends

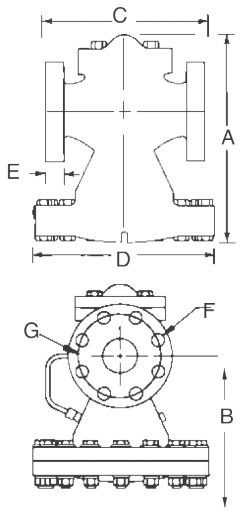


Model 2300 flanged ends — Maximum pressure 250 psig (17.3 bar)

Dimensions in. (mm)

Valve size in. (mm)	A	B	C	D	E	Bolt holes		
						Hole dia. in. (mm) F	No. of holes	Bolt circ. in. (mm) G
2 (50)	11¾ (298)	7⅝ (194)	8½ (216)	10 (254)	⅞ (22)	¾ (19)	8	5 (127)
2½ (65)	15⅝ (397)	9⅝ (244)	10 (254)	12 (305)	1 (25)	⅞ (22)	8	5⅞ (149)
3 (80)	16 9/16 (421)	10 3/16 (259)	10¾ (273)	13⅛ (333)	1⅛ (29)	⅞ (22)	8	6⅝ (168)
4 (100)	19 (483)	12 (305)	12½ (318)	16⅝ (422)	1¼ (32)	⅞ (22)	8	7⅞ (200)
6 (150)	24 3/16 (614)	15⅝ (397)	16 (406)	22¾ (578)	17/16 (37)	⅞ (22)	12	10⅝ (270)

Model 2300 flanged ends



Series 2000 main valves

Steam capacities — full port lbs./hr. (kg./hr.) Models 2100, 2200, 2300

Pressure psig (bar)		Main valve size									
		NPT size, in.					Flanged valves, in. (mm)				
IN	OUT††	½"	¾"	1"	1¼"	1½"	2"	2½" (65)	3" (80)	4" (100)	6" (150)
Cv		3.9	8.3	10.6	20.2	24.2	34.2	50.3	78.7	139.6	302.2
20† (1.4)	0-5 (0-0.34)	220 (100)	260 (118)	360 (168)	660 (299)	850 (386)	1200 (544)	2020 (916)	3000 (1361)	5160 (2341)	11870 (5384)
25† (1.7)	10 (0.7)	250 (113)	300 (136)	410 (186)	800 (363)	1000 (454)	1420 (644)	2300 (1043)	3300 (1497)	6200 (2812)	14000 (6350)
	0-5 (0-0.34)	260 (118)	410 (186)	470 (213)	900 (408)	1100 (499)	1730 (785)	2900 (1315)	4000 (1814)	7000 (3175)	16300 (7394)
30† (2.1)	15 (1.0)	290 (132)	320 (145)	460 (209)	950 (431)	1100 (499)	1900 (862)	3000 (1361)	3500 (1588)	6800 (3984)	14500 (6577)
	0-10 (0-0.7)	300 (136)	460 (209)	530 (240)	1100 (499)	1240 (562)	2060 (934)	3450 (1565)	4600 (2087)	8300 (3765)	18500 (8392)
40 (2.8)	25 (1.7)	320 (145)	410 (186)	650 (295)	1200 (544)	1150 (522)	1300 (590)	3250 (1474)	3800 (1724)	7500 (3402)	17200 (7802)
	0-20 (0-1.4)	370 (168)	480 (218)	720 (327)	1250 (567)	1500 (680)	2120 (962)	3800 (1724)	4800 (2177)	9400 (4264)	19650 (8913)
50 (3.5)	35 (2.4)	370 (168)	700 (318)	770 (349)	1250 (567)	1500 (680)	2500 (1134)	3500 (1588)	4800 (2177)	9500 (4309)	20000 (9072)
	30 (2.1)	410 (186)	760 (345)	850 (386)	1550 (703)	1850 (839)	2900 (1315)	4500 (2041)	5700 (2586)	11500 (5216)	23500 (10660)
	0-25 (0-1.7)	420 (191)	800 (363)	890 (404)	1650 (748)	2050 (930)	3050 (1383)	4900 (2223)	6500 (2948)	11900 (5398)	24200 (10977)
60 (4.2)	45 (3.1)	420 (191)	760 (345)	840 (381)	1350 (612)	1700 (771)	2700 (1225)	4400 (1996)	5800 (2631)	11000 (4990)	25800 (11703)
	40 (2.8)	450 (204)	850 (386)	1000 (454)	1650 (748)	2000 (907)	3050 (1383)	4800 (2177)	6800 (3084)	13500 (6124)	27500 (12474)
	35 (2.4)	470 (213)	920 (417)	1100 (499)	1750 (794)	2200 (998)	3250 (1474)	5600 (2540)	7400 (3357)	14000 (6350)	29000 (13154)
	0-30 (0-2.1)	480 (218)	980 (445)	1140 (517)	1850 (839)	2350 (1066)	3600 (1633)	5950 (2699)	8400 (3810)	14700 (6668)	30500 (13835)
75 (5.2)	55 (3.8)	550 (249)	830 (376)	1200 (544)	2000 (907)	2300 (1043)	3750 (1701)	5800 (2631)	8500 (3856)	15100 (6849)	31000 (14062)
	50 (3.5)	570 (259)	1060 (481)	1320 (599)	2250 (1021)	2560 (1161)	3900 (1769)	6100 (2767)	8900 (4037)	16300 (7394)	34000 (15422)
	45 (3.1)	580 (263)	1120 (508)	1380 (626)	2400 (1089)	2800 (1270)	4300 (1950)	6450 (2926)	9500 (4309)	17800 (8074)	37000 (16783)
	0-40 (0-2.8)	490 (268)	1200 (544)	1400 (635)	2600 (1179)	3200 (1452)	4500 (2041)	6750 (3062)	10000 (4536)	18100 (8210)	38800 (17600)
100 (6.9)	75 (5.2)	600 (272)	1150 (522)	1480 (671)	2400 (1089)	3100 (1406)	4900 (2223)	7800 (3538)	10800 (4899)	20500 (9299)	40800 (18507)
	60 (4.2)	670 (304)	1300 (590)	1800 (816)	3000 (1361)	3900 (1769)	5350 (2427)	8900 (4037)	12200 (5534)	21750 (9866)	48000 (21773)
	0-50 (0-3.5)	690 (313)	1480 (671)	1850 (839)	3400 (1542)	4400 (1996)	5850 (2654)	9100 (4128)	13500 (6124)	22960 (10415)	50000 (22680)
125 (8.6)	100 (6.9)	650 (295)	1300 (590)	1700 (771)	3150 (1429)	3550 (1610)	5300 (2404)	8650 (3924)	12200 (5534)	22000 (9979)	49200 (22317)
	75 (5.2)	750 (340)	1700 (771)	2000 (907)	4000 (1814)	4600 (2087)	6750 (3062)	10500 (4763)	15400 (6985)	26800 (12156)	61350 (27828)
	0-50 (0-3.5)	800 (363)	1770 (803)	2100 (953)	4200 (1905)	5600 (2540)	7500 (3402)	11400 (5171)	16800 (7620)	27720 (12574)	62600 (28395)
150 (10.3)	125 (8.6)	810 (367)	1600 (726)	2050 (930)	3800 (1724)	4450 (2019)	6200 (2812)	9900 (4491)	15000 (6804)	26200 (11884)	56700 (25719)
	100 (6.9)	930 (422)	1860 (844)	2450 (1111)	4500 (2041)	5350 (2427)	7500 (3402)	11900 (5398)	17800 (8074)	31000 (14061)	69300 (31434)
	0-75 (0-5.2)	950 (431)	2100 (953)	2700 (1225)	4900 (2223)	6150 (2790)	8000 (3629)	13200 (5988)	18600 (8437)	32950 (14946)	73800 (33475)
175 (12.1)	150 (10.3)	920 (417)	1850 (839)	2250 (1021)	4100 (1860)	5000 (2268)	6900 (3130)	11400 (5171)	16100 (7303)	28940 (13127)	63600 (28849)
	125 (8.6)	1050 (476)	2150 (975)	2700 (1225)	5000 (2268)	6200 (2812)	8600 (3901)	13300 (6033)	20220 (9172)	34800 (15785)	77000 (24927)
	100 (6.9)	1100 (499)	2280 (1034)	3000 (1361)	5500 (2495)	6900 (3130)	9500 (4309)	14700 (6668)	21900 (9934)	37500 (17010)	85000 (38556)
	0-75 (0-5.2)	1150 (522)	2400 (1089)	3100 (1406)	5800 (2631)	7400 (3357)	9750 (4423)	15600 (7076)	22070 (10011)	38000 (17237)	86000 (39010)
200 (13.8)	150 (10.3)	1130 (513)	2400 (1089)	2850 (1293)	5500 (2495)	6700 (3039)	9200 (4173)	14400 (6532)	22440 (10179)	38000 (17237)	84600 (38375)
	125 (8.6)	1200 (544)	2600 (1179)	3200 (1452)	6000 (2722)	7600 (3447)	10450 (4740)	15600 (7076)	25170 (11417)	43000 (19505)	95900 (43500)
	0-100 (0-6.9)	1250 (567)	2680 (1216)	3400 (1542)	6500 (2948)	7800 (3538)	11000 (4990)	16200 (7348)	25340 (11494)	43350 (19664)	97330 (44149)
225 (15.5)	175 (12.1)	1260 (572)	2480 (1125)	3080 (1397)	5980 (2713)	7180 (3257)	10150 (4604)	15850 (7189)	24300 (11022)	41221 (18697)	91600 (41549)
	150 (10.3)	1370 (621)	2790 (1266)	3540 (1606)	6840 (3103)	8370 (3797)	11600 (5262)	17770 (8060)	27250 (12360)	46200 (20956)	104600 (47446)
	0-125 (0-8.6)	1430 (649)	3000 (1361)	3770 (1710)	7200 (3266)	9120 (4137)	12200 (5534)	18450 (8368)	28300 (12836)	47980 (21763)	108600 (49260)
250 (17.3)	200 (13.8)	1350 (612)	2670 (1211)	3250 (1474)	6480 (2939)	7340 (3329)	10920 (4953)	17050 (7734)	20400 (9253)	44330 (20108)	98500 (44680)
	175 (12.1)	1480 (671)	3000 (1361)	3700 (1678)	7350 (3334)	8650 (3924)	12370 (5611)	19100 (8664)	29250 (13268)	49600 (22499)	112400 (50985)
	150 (10.3)	1550 (703)	3250 (1474)	4150 (1882)	7970 (3615)	9650 (4377)	13360 (6060)	20400 (9253)	31250 (14175)	53000 (24041)	120000 (54432)
	0-125 (0-8.6)	1550 (703)	3280 (1488)	4300 (1950)	8050 (3651)	9960 (4518)	13720 (6223)	20400 (9253)	31250 (14175)	53000 (24041)	120000 (54432)

Note: Capacity based on saturated steam at valve inlet. Pressure differential must be at least 15 psi (6.9 bar) for valve to operate.
† For inlet pressures below 30 psig (2.1 bar), refer to the Low Pressure Steam Capacity Chart, Models 2150 and 2250, page 38.
†† When the outlet steam pressure is 50% or less of the inlet pressure, always use the lowest outlet pressure shown in the capacity table.

Series 2000 main valves

Steam capacities — normal port lbs./hr. (kg./hr.) Models 2100, 2200, 2300

Pressure psig (bar)		Main valve size									
		NPT size, in.					Flanged valves, in. (mm)				
IN	OUT††	½"	¾"	1"	1¼"	1½"	2"	2½" (65)	3" (80)	4" (100)	6" (150)
Cv		2.7	5.9	8.3	16.2	20.2	26.7	38.5	66.7	95.8	239.4
20† (1.4)	0-5 (0-0.34)	140 (64)	260 (118)	280 (127)	620 (281)	660 (299)	980 (445)	1480 (671)	2370 (1075)	3860 (1751)	9500 (4309)
25† (1.7)	10 (0.7)	160 (73)	300 (136)	300 (136)	700 (318)	800 (363)	1140 (517)	1700 (771)	2750 (1247)	4500 (2041)	10930 (4958)
	0-5 (0-0.34)	165 (75)	410 (186)	410 (186)	780 (354)	900 (408)	1290 (585)	1900 (862)	3600 (1633)	5100 (2313)	12900 (5851)
30† (2.1)	15 (1.0)	175 (79)	320 (145)	430 (195)	800 (363)	950 (431)	1250 (567)	1950 (885)	3100 (1406)	4800 (2177)	12500 (5670)
	0-10 (0-0.7)	185 (84)	460 (209)	460 (209)	920 (417)	1100 (499)	1530 (694)	2450 (1111)	4200 (1905)	5800 (2631)	14700 (6668)
40 (2.8)	25 (1.7)	200 (91)	360 (163)	410 (186)	950 (431)	1200 (544)	1550 (703)	2200 (998)	3650 (1656)	5600 (2540)	14000 (6350)
	0-20 (0-1.4)	221 (100)	480 (218)	480 (218)	1150 (522)	1250 (567)	1750 (794)	2600 (1179)	4100 (1860)	7000 (3175)	17500 (7938)
50 (3.5)	35 (2.4)	238 (108)	480 (218)	700 (318)	1150 (522)	1250 (567)	1950 (885)	2350 (1066)	4500 (2041)	5900 (2676)	16300 (7394)
	30 (2.1)	250 (113)	530 (240)	760 (345)	1400 (635)	1550 (703)	2100 (953)	2900 (1315)	5300 (2404)	7300 (3311)	19500 (8845)
	0-25 (0-1.7)	266 (121)	580 (263)	800 (363)	1460 (662)	1650 (748)	2400 (1089)	3500 (1588)	5600 (2540)	8400 (3810)	21200 (9616)
60 (4.2)	45 (3.1)	275 (125)	530 (240)	760 (345)	1300 (590)	1350 (612)	2100 (953)	3150 (1429)	4750 (2155)	8200 (3720)	18600 (8437)
	40 (2.8)	288 (131)	610 (277)	850 (386)	1600 (726)	1650 (748)	2300 (1043)	3600 (1633)	5500 (2495)	8700 (3946)	21500 (9752)
	35 (2.4)	310 (141)	660 (299)	920 (417)	1720 (780)	1750 (794)	2600 (1179)	3800 (1724)	6300 (2858)	9300 (4218)	22800 (10342)
	0-30 (0-2.1)	320 (145)	680 (308)	980 (445)	1820 (826)	1850 (839)	2700 (1225)	4200 (1905)	6900 (3130)	9900 (4491)	25500 (11567)
75 (5.2)	55 (3.8)	335 (152)	720 (327)	830 (376)	1990 (903)	2000 (907)	2850 (1293)	4150 (1882)	6700 (3039)	10200 (4627)	26200 (11884)
	50 (3.5)	351 (159)	750 (340)	1060 (481)	2030 (921)	2250 (1021)	3100 (1406)	4450 (2019)	7500 (3402)	10800 (4899)	28000 (12701)
	45 (3.1)	370 (168)	800 (363)	1120 (508)	2120 (962)	2400 (1089)	3350 (1520)	4700 (2132)	7800 (3538)	11900 (5398)	29000 (13154)
	0-40 (0-2.8)	385 (175)	860 (390)	1300 (590)	2200 (998)	2600 (1179)	3550 (1610)	4900 (2223)	8000 (3629)	12100 (5489)	31450 (14266)
100 (6.9)	75 (5.2)	440 (200)	900 (408)	1150 (522)	2450 (1111)	2500 (1134)	3700 (1678)	5300 (2404)	8700 (3946)	13200 (5988)	33000 (14969)
	60 (4.2)	460 (209)	980 (445)	1300 (590)	2750 (1247)	3000 (1361)	4650 (2109)	6000 (2722)	10000 (4536)	15200 (6895)	38000 (17237)
	0-50 (0-3.5)	475 (215)	1000 (454)	1480 (671)	2880 (1306)	3400 (1542)	4700 (2132)	6550 (2971)	10700 (4854)	16000 (7258)	39300 (17826)
125 (8.6)	100 (6.9)	525 (238)	1000 (454)	1300 (590)	2700 (1225)	3150 (1429)	4200 (1905)	6250 (2835)	10200 (4627)	15000 (6804)	38300 (17373)
	75 (5.2)	545 (247)	1200 (544)	1700 (771)	3250 (1474)	4000 (1814)	5400 (2449)	7600 (3447)	12500 (5670)	18300 (8301)	48900 (22181)
	0-50 (0-3.5)	570 (259)	1230 (558)	1770 (803)	3400 (1542)	4200 (1905)	5850 (2654)	8350 (3788)	13400 (6078)	19700 (8936)	50200 (22771)
150 (10.3)	125 (8.6)	565 (256)	1200 (544)	1600 (726)	3250 (1474)	3800 (1724)	5150 (2336)	7500 (3402)	11800 (5352)	17200 (7802)	44000 (19958)
	100 (6.9)	660 (299)	1400 (635)	1860 (844)	3850 (1746)	4500 (2041)	6300 (2858)	8650 (3924)	14400 (6532)	20800 (9435)	55600 (25220)
	0-75 (0-5.2)	680 (308)	1480 (671)	2100 (953)	4000 (1814)	4900 (2223)	6800 (3084)	9500 (4309)	15600 (7076)	22800 (10342)	59200 (26853)
175 (12.1)	150 (10.3)	636 (288)	1400 (635)	1850 (839)	3600 (1633)	4100 (1860)	5900 (2676)	8250 (3742)	13600 (6169)	18800 (8528)	49500 (22453)
	125 (8.6)	755 (342)	1570 (712)	2150 (975)	4360 (1978)	5000 (2268)	7000 (3175)	9700 (4400)	16650 (7552)	23200 (10524)	61000 (27670)
	100 (6.9)	800 (363)	1640 (744)	2280 (1034)	4600 (2087)	5500 (2495)	7600 (3447)	10600 (4808)	18500 (8392)	26000 (11794)	68000 (30845)
	0-75 (0-5.2)	810 (367)	1680 (762)	2400 (1089)	4650 (2109)	5800 (2631)	7900 (3583)	11250 (5103)	18820 (8537)	27200 (12338)	68300 (30981)
200 (13.8)	150 (10.3)	815 (370)	1650 (748)	2400 (1089)	4600 (2087)	5500 (2495)	7700 (3493)	10700 (4854)	18540 (8410)	25700 (11658)	66700 (30255)
	125 (8.6)	865 (392)	1850 (839)	2600 (1179)	5000 (2268)	6000 (2722)	8400 (3810)	11800 (5352)	21150 (9594)	29900 (13563)	76600 (34746)
	0-100 (0-6.9)	880 (399)	1900 (862)	2680 (1216)	5200 (2359)	6500 (2948)	8600 (3901)	12400 (5625)	21490 (9748)	30850 (13994)	77100 (34973)
225 (15.5)	175 (12.1)	910 (413)	1750 (794)	2480 (1125)	5150 (2336)	5980 (2713)	8260 (3747)	11800 (5352)	20080 (9108)	28200 (12792)	72220 (32759)
	150 (10.3)	983 (446)	2000 (907)	2790 (1266)	5730 (2599)	6840 (3103)	9250 (4196)	13420 (6087)	22900 (10387)	32370 (14683)	81700 (37059)
	0-125 (0-8.6)	1020 (463)	2050 (930)	3000 (1361)	5950 (2699)	7200 (3266)	9640 (4373)	14150 (6418)	24000 (10886)	34440 (15622)	86100 (39055)
250 (17.3)	200 (13.8)	980 (445)	1520 (689)	2670 (1211)	5500 (2495)	6480 (2939)	8850 (4014)	12890 (5947)	21970 (9966)	30300 (13744)	77660 (35227)
	175 (12.1)	1080 (490)	1880 (853)	3000 (1361)	6150 (2790)	7350 (3334)	9900 (4491)	14600 (6623)	25600 (11612)	34760 (15767)	87750 (39803)
	150 (10.3)	1130 (513)	2150 (975)	3250 (1474)	6600 (2994)	7970 (3615)	10640 (4826)	15620 (7085)	26250 (11907)	37500 (17010)	94600 (42911)
	0-125 (0-8.6)	1140 (517)	2250 (1021)	3280 (1488)	6650 (3016)	8050 (3651)	10680 (4844)	15750 (7144)	26500 (12020)	38000 (17237)	95000 (43092)

Note: Capacity based on saturated steam at valve inlet. Pressure differential must be at least 15 psi (6.9 bar) for valve to operate.
† For inlet pressures below 30 psig (2.1 bar), refer to the Low Pressure Steam Capacity Chart, Models 2150 and 2250, page 38.
†† When the outlet steam pressure is 50% or less of the inlet pressure, always use the lowest outlet pressure shown in the capacity table.

Series 2000 main valves

Steam capacities — reduced port lbs./hr. (kg./hr.) Models 2100, 2200, 2300

Pressure psig (bar)		Main valve size									
		NPT size, in.					Flanged valves, in. (mm)				
IN	OUT††	½"	¾"	1"	1¼"	1½"	2"	2½" (65)	3" (80)	4" (100)	6" (150)
Cv		1.0	3.9	5.9	10.6	16.2	21.1	28.3	41.3	70.2	163.0
20† (1.4)	0-5 (0-0.34)	50 (23)	220 (100)	280 (127)	480 (218)	620 (281)	860 (390)	1360 (617)	1840 (835)	3090 (1402)	7120 (3230)
25† (1.7)	10 (0.7)	57 (26)	250 (113)	300 (136)	550 (249)	700 (317)	970 (439)	1560 (708)	2100 (953)	3670 (1665)	8200 (3720)
	0-5 (0-0.34)	58 (26)	260 (118)	400 (181)	620 (281)	780 (353)	1080 (489)	1630 (739)	2240 (1016)	3940 (1787)	8500 (3856)
30† (2.1)	15 (1.0)	62 (28)	290 (132)	430 (195)	700 (318)	800 (363)	1100 (499)	1710 (776)	2400 (1089)	4000 (1814)	9500 (4309)
	0-10 (0-0.7)	65 (29)	300 (136)	460 (209)	780 (354)	920 (417)	1180 (535)	1835 (832)	2520 (1143)	4500 (2041)	10170 (4613)
40 (2.8)	25 (1.7)	72 (33)	320 (145)	360 (163)	730 (331)	950 (431)	1260 (572)	2050 (930)	2500 (1134)	4650 (2109)	10000 (4536)
	0-20 (0-1.4)	78 (35)	370 (168)	480 (218)	840 (381)	1150 (522)	1380 (626)	2250 (1021)	3000 (1361)	5400 (2449)	11500 (5216)
50 (3.5)	35 (2.4)	81 (37)	370 (168)	480 (218)	900 (408)	1150 (522)	1450 (658)	2300 (1043)	3200 (1452)	5200 (2359)	11100 (5035)
	30 (2.1)	93 (42)	410 (185)	530 (240)	1050 (476)	1400 (635)	1680 (762)	2700 (1225)	3520 (1597)	6100 (2767)	13000 (5897)
	0-25 (0-1.7)	100 (45)	420 (190)	580 (263)	1100 (499)	1460 (662)	1800 (816)	2800 (1270)	3700 (1678)	6640 (3012)	14000 (6350)
60 (4.2)	45 (3.1)	95 (43)	420 (191)	530 (240)	1000 (453)	1300 (590)	1650 (748)	2650 (1202)	3350 (1520)	5800 (2631)	14000 (6350)
	40 (2.8)	104 (47)	450 (204)	610 (277)	1100 (499)	1600 (726)	1850 (839)	3000 (1361)	3860 (1751)	6800 (3084)	15200 (6895)
	35 (2.4)	111 (50)	470 (213)	660 (299)	1150 (522)	1720 (780)	1970 (894)	3150 (1429)	4200 (1905)	7300 (3311)	15800 (7167)
	0-30 (0-2.1)	115 (52)	480 (218)	680 (308)	1200 (544)	1820 (826)	2200 (998)	3300 (1497)	4450 (2019)	7800 (3538)	17100 (7757)
75 (5.2)	55 (3.8)	118 (53)	550 (249)	720 (327)	1350 (612)	1900 (862)	2150 (975)	3400 (1542)	4800 (2177)	8000 (3629)	16200 (7348)
	50 (3.5)	127 (57)	570 (259)	750 (340)	1400 (635)	2030 (921)	2400 (1089)	3500 (1588)	5050 (2291)	8500 (3856)	16700 (7575)
	45 (3.1)	134 (60)	580 (264)	800 (363)	1430 (649)	2120 (962)	2550 (1157)	3650 (1656)	5300 (2404)	9100 (4128)	17800 (8074)
	0-40 (0-2.8)	138 (62)	590 (268)	860 (390)	1450 (658)	2200 (998)	2650 (1202)	3750 (1701)	5520 (2504)	9300 (4218)	20000 (9072)
100 (6.9)	75 (5.2)	151 (68)	600 (272)	900 (408)	1740 (789)	2450 (1111)	3100 (1406)	4300 (1950)	6200 (2812)	10400 (4717)	21200 (9616)
	60 (4.2)	174 (78)	670 (304)	990 (449)	1830 (830)	2750 (1247)	3450 (1565)	5000 (2268)	7000 (3175)	11300 (5126)	25000 (11340)
	0-50 (0-3.5)	177 (80)	690 (312)	1000 (454)	1870 (848)	2880 (1306)	3600 (1633)	5100 (2313)	7300 (3311)	11970 (5430)	27000 (12247)
125 (8.6)	100 (6.9)	175 (79)	650 (295)	1000 (453)	1900 (862)	2700 (1225)	3350 (1520)	4950 (2245)	7000 (3175)	12000 (5443)	24000 (10886)
	75 (5.2)	213 (97)	750 (340)	1200 (544)	2150 (975)	3250 (1474)	4300 (1950)	6000 (2722)	8350 (3788)	14000 (6350)	30000 (13608)
	0-50 (0-3.5)	215 (98)	800 (363)	1230 (558)	2200 (998)	3400 (1542)	4400 (1996)	6100 (2767)	8700 (3946)	14600 (6623)	32200 (14606)
150 (10.3)	125 (8.6)	198 (90)	810 (367)	1200 (544)	2300 (1043)	3250 (1474)	4100 (1860)	5750 (2608)	8000 (3629)	13600 (6169)	27800 (12610)
	100 (6.9)	240 (109)	930 (422)	1400 (635)	2750 (1247)	3850 (1746)	4800 (2177)	6900 (3130)	9500 (4309)	16300 (7399)	35700 (16194)
	0-75 (0-5.2)	254 (115)	950 (431)	1480 (671)	2760 (1252)	4000 (1814)	5200 (2359)	7100 (3221)	10400 (4717)	17200 (7802)	39500 (17917)
175 (12.1)	150 (10.3)	220 (100)	920 (417)	1400 (635)	2600 (1179)	3600 (1633)	4500 (2041)	6600 (2994)	9300 (4218)	15300 (6940)	31150 (14129)
	125 (8.6)	226 (103)	1050 (476)	1570 (712)	3000 (1361)	4360 (1978)	5320 (2413)	7600 (3447)	10800 (4898)	18200 (8255)	40150 (18212)
	100 (6.9)	290 (132)	1100 (499)	1640 (744)	3100 (1406)	4600 (2087)	5800 (2631)	7900 (3583)	11700 (5307)	19960 (9053)	45700 (20729)
	0-75 (0-5.2)	295 (134)	1150 (522)	1680 (762)	3200 (1452)	4650 (2109)	5800 (2631)	8000 (3629)	11750 (5329)	20100 (9117)	46400 (21047)
200 (13.8)	150 (10.3)	291 (132)	1130 (513)	1650 (748)	3100 (1406)	4600 (2087)	5800 (2630)	8400 (3810)	11380 (5162)	16900 (7666)	44500 (20185)
	125 (8.6)	327 (148)	1200 (544)	1850 (839)	3250 (1474)	5000 (2268)	6500 (2948)	9100 (4128)	13100 (5942)	20100 (9117)	52200 (23678)
	0-100 (0-6.9)	330 (150)	1250 (567)	1900 (862)	3300 (1497)	5200 (2359)	6800 (3084)	9100 (4128)	13300 (6033)	22600 (10251)	52500 (23814)
225 (15.5)	175 (12.1)	315 (143)	1260 (572)	1750 (794)	3150 (1429)	5150 (2336)	6400 (2903)	8800 (3992)	12330 (5593)	21500 (9752)	45800 (20775)
	150 (10.3)	355 (161)	1370 (621)	2000 (907)	3650 (1656)	5730 (2599)	7150 (3243)	9870 (4477)	14000 (6350)	24080 (10923)	53300 (24177)
	0-125 (0-8.6)	370 (168)	1430 (649)	2050 (930)	4020 (1823)	5950 (2699)	7500 (3402)	10300 (4672)	14760 (6695)	25400 (11521)	58640 (26599)
250 (17.3)	200 (13.8)	339 (154)	1350 (612)	1880 (853)	3400 (1542)	5500 (2495)	6850 (3107)	9090 (4123)	13260 (6015)	23110 (10483)	50400 (22861)
	175 (12.1)	380 (172)	1480 (671)	2150 (975)	3970 (1801)	6150 (2799)	7680 (3483)	10400 (4717)	15050 (6827)	25860 (11730)	58500 (26536)
	150 (10.3)	405 (184)	1550 (703)	2250 (1021)	4440 (2014)	6600 (2994)	8300 (3765)	11300 (5126)	16300 (7394)	27800 (12610)	63400 (28758)
	0-125 (0-8.6)	410 (186)	1550 (703)	2250 (1021)	4500 (2041)	6650 (3016)	8330 (3778)	11360 (5153)	16400 (7439)	28100 (12746)	64300 (29166)

Note: Capacity based on saturated steam at valve inlet. Pressure differential must be at least 15 psi (6.9 bar) for valve to operate.
† For inlet pressures below 30 psig (2.1 bar), refer to the Low Pressure Steam Capacity Chart, Models 2150 and 2250, page 38.
†† When the outlet steam pressure is 50% or less of the inlet pressure, always use the lowest outlet pressure shown in the capacity table.

Series 2000 main valves

Steam capacities — low pressure lbs./hr. (kg./hr.) Models 2150, 2250

Pressure psig (bar)			Main valve size								
			NPT size, in.				Flanged valves, in. (mm)				
IN	OUT††		¾"	1"	1¼"	1½"	2"	2½" (65)	3" (80)	4" (100)	6" (150)
Cv			6.1	10.5	21.5	26.8	43	53.2	63.8	127.1	347.9
5 (.35)	2	(.14)	100 (45)	200 (91)	450 (204)	500 (227)	750 (340)	950 (431)	1050 (476)	2350 (1066)	7600 (3447)
	0-1	(0-.07)	140 (64)	240 (109)	490 (222)	550 (249)	850 (386)	1075 (488)	1200 (544)	2500 (1134)	7700 (3493)
6 (.42)	3	(.21)	105 (48)	210 (95)	470 (213)	540 (245)	800 (363)	1075 (488)	1150 (522)	2400 (1089)	7700 (3493)
	0-1	(0-.07)	160 (73)	295 (134)	540 (635)	660 (299)	1050 (476)	1200 (544)	1350 (612)	2600 (1179)	8000 (3629)
7 (.49)	4	(.28)	115 (52)	215 (98)	485 (220)	570 (259)	870 (395)	1150 (522)	1300 (590)	2450 (1111)	7900 (3583)
	0-2	(0-.14)	175 (79)	325 (147)	560 (254)	760 (345)	1200 (544)	1300 (590)	1500 (680)	2800 (1270)	8300 (3765)
8 (.56)	6	(.42)	120 (54)	220 (100)	500 (227)	600 (272)	940 (426)	1200 (544)	1400 (635)	2550 (1157)	8150 (3697)
	4	(.28)	180 (82)	340 (154)	630 (286)	800 (363)	1250 (567)	1350 (612)	1550 (703)	3250 (1474)	9243 (4162)
	0-2	(0-.14)									
9 (.62)	6	(.42)	125 (57)	230 (104)	520 (236)	630 (286)	1000 (454)	1350 (612)	1550 (703)	2800 (1270)	8400 (3810)
	4	(.28)	190 (86)	350 (159)	650 (295)	815 (370)	1320 (599)	1500 (680)	1800 (816)	3350 (1520)	9600 (4355)
	0-2	(0-.14)	230 (104)	405 (184)	720 (327)	940 (426)	1500 (680)	1600 (726)	1900 (862)	3550 (1610)	9700 (4400)
10 (0.7)	7	(.49)	130 (59)	240 (109)	540 (245)	670 (304)	1050 (476)	1500 (680)	1650 (748)	3000 (1361)	10300 (4672)
	5	(.35)	200 (91)	350 (159)	730 (331)	860 (390)	1400 (635)	1750 (794)	1900 (862)	3450 (1565)	11300 (5126)
	0-2	(0-.14)	250 (113)	420 (191)	820 (372)	1040 (472)	1600 (726)	1800 (816)	2100 (953)	3600 (1633)	12000 (5443)
12 (.83)	9	(.62)	140 (64)	250 (113)	570 (259)	700 (318)	1100 (499)	1750 (794)	1800 (816)	3300 (1497)	10700 (4854)
	7	(.49)	210 (95)	360 (163)	750 (340)	800 (363)	1460 (662)	2000 (907)	2300 (1043)	3600 (1633)	11200 (5080)
	5	(.35)	250 (113)	410 (186)	900 (408)	1050 (476)	1700 (771)	2150 (975)	2650 (1202)	4000 (1814)	12000 (5443)
	0-2	(0-.14)	300 (136)	480 (218)	940 (426)	1200 (544)	1850 (839)	2300 (1043)	2700 (1225)	4400 (1996)	12500 (5670)
15 (6.9)	12	(.83)	150 (68)	270 (122)	600 (272)	740 (336)	1170 (531)	1800 (816)	1900 (862)	3600 (1633)	11000 (4990)
	10	(.7)	215 (98)	385 (175)	800 (363)	920 (417)	1500 (680)	2250 (1021)	2550 (1157)	4200 (1905)	12500 (5670)
	8	(.56)	260 (118)	450 (204)	940 (426)	1100 (499)	1750 (794)	2400 (1089)	2900 (1315)	4800 (2177)	14000 (6350)
	5	(.35)	315 (143)	510 (231)	1000 (454)	1250 (567)	2020 (916)	2550 (1157)	3200 (1452)	5400 (2449)	14300 (6486)
	0-2.5	(0-.17)	345 (156)	540 (245)	1040 (472)	1360 (617)	2200 (998)	2600 (1179)	3300 (1497)	6000 (2722)	14500 (6577)
20 (1.4)	17	(1.2)	160 (73)	290 (132)	640 (290)	800 (363)	1300 (590)	1450 (658)	2000 (907)	3800 (1724)	14000 (6350)
	15	(1.0)	220 (100)	400 (181)	835 (379)	1140 (517)	1850 (839)	2000 (907)	3100 (1406)	5000 (2268)	16000 (7258)
	10	(.7)	360 (163)	600 (272)	1150 (522)	1420 (644)	2300 (1043)	2500 (1134)	3950 (1792)	7200 (3266)	16500 (7484)
	0-5	(0-.35)	400 (181)	670 (304)	1250 (567)	1630 (739)	2650 (1202)	2650 (1202)	4550 (2064)	7300 (3311)	17000 (7711)
25 (1.7)	22	(1.5)	170 (77)	320 (145)	670 (304)	870 (395)	1400 (635)	1750 (794)	2200 (998)	4000 (1814)	12000 (5443)
	20	(1.4)	230 (104)	420 (191)	865 (392)	1100 (499)	1800 (816)	2400 (1089)	3300 (1497)	6000 (2722)	14000 (6350)
	15	(1.0)	335 (160)	650 (295)	1215 (551)	1490 (676)	2400 (1089)	2700 (1225)	4000 (1814)	8200 (3720)	16500 (7484)
	10	(.7)	430 (195)	720 (327)	1325 (601)	1700 (771)	2800 (1270)	3000 (1361)	4600 (2087)	8300 (3765)	19500 (8845)
	0-5	(0-.35)	460 (209)	770 (349)	1380 (626)	1900 (862)	3100 (1406)	3200 (1452)	5000 (2268)	8300 (3765)	20000 (9072)
30 (2.1)	27	(1.9)	180 (82)	330 (150)	690 (313)	935 (424)	1500 (680)	2000 (907)	2200 (998)	4200 (1905)	12500 (5670)
	25	(1.7)	240 (109)	430 (195)	885 (401)	1225 (556)	1900 (862)	2450 (1111)	3380 (1533)	7020 (3184)	14700 (6668)
	20	(1.4)	375 (170)	670 (304)	1250 (567)	1550 (703)	2500 (1134)	2750 (1247)	4070 (1846)	8800 (3992)	17300 (7847)
	15	(1.0)	450 (204)	760 (345)	1375 (624)	1770 (803)	2950 (1338)	3150 (1429)	4660 (2114)	9080 (4119)	20000 (9072)
	0-10	(0-.7)	520 (236)	870 (395)	1575 (714)	2100 (953)	3400 (1542)	3600 (1633)	5480 (2486)	9300 (4218)	21300 (9662)

Note: Capacity based on saturated steam at valve inlet. Maximum inlet pressure 30 psig (2.1 bar)
Capacity based on 1 psi (.07 bar) accuracy of control. Pressure differential must be at least 3 psi (.21 bar) in order for valve to operate.

Series 2000 main valve ordering information

Series 2000 main valves, pilots, wells and hardware kits MUST BE ORDERED as separate line items.

Model number	Part number	NPT size in. (mm)	Port	End connections	Maximum pressure psig (bar)	Weight lbs. (kg)
2100	402439	½	Full	Screwed NPT	250 (17.3)	23 (10.4)
	402436		Normal			
	402433		Reduced			
	402442	¾	Full			
	402457		Normal			
	402460		Reduced			
	402445	1	Full			
	402463		Normal			
	402466		Reduced			
	402409	1¼	Full			44 (20)
	402469		Normal			
	402472		Reduced			
	402412	1½	Full			
	402475		Normal			
	402478		Reduced			
	402448	2	Full			64 (29)
	402451		Normal			
	402454		Reduced			
2200	402592	2 (50)	Full	Flanged	125 (8.6)	67 (30)
	402595		Normal			
	402598		Reduced			
	402541	2½ (65)	Full			175 (79)
	402544		Normal			
	402547		Reduced			
	402523	3 (80)	Full			215 (98)
	402526		Normal			
	402529		Reduced			
	402505	4 (100)	Full			297 (135)
	402508		Normal			
	402511		Reduced			
	402487	6 (150)	Full			535 (243)
	402490		Normal			
	402493		Reduced			
2300	402601	2 (50)	Full		250 (17.3)	70 (32)
	402604		Normal			
	402607		Reduced			
	402532	2½ (65)	Full			181 (82)
	402535		Normal			
	402538		Reduced			
	402514	3 (80)	Full			221 (100)
	402517		Normal			
	402520		Reduced			
	402496	4 (100)	Full			305 (138)
	402499		Normal			
	402481	6 (150)	Full			552 (250)
	402484		Reduced			
2150	402664	¾	NA	Screwed NPT	30 (2.1)	22.5 (10.2)
	402667	1				
	402649	1¼				42 (19)
	402652	1½				
	402655	2				62 (28)
2250	402658	2 (50)		Flanged		67 (30)
	400751	2½ (65)				175 (79)
	400752	3 (80)				215 (98)
	400754	4 (100)				297 (135)
	400757	6 (150)				535 (243)

Hardware kit ordering information One kit per main valve is required to connect the pilot valve(s).

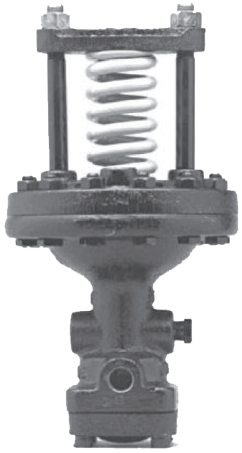
Part number	Description	Size in.	Wt. (approx.) lbs. (kg)
400641	Kit used when main valve has a spring or air pressure pilot or in combination with temperature or solenoid pilots	½ - 2 NPT and 2" (50 mm)	1 (0.5)
400643	Kit used when main valve has a spring or air pressure pilot or in combination with temperature or solenoid pilots	2½ - 6 (65 - 150 mm)	2 (1.0)

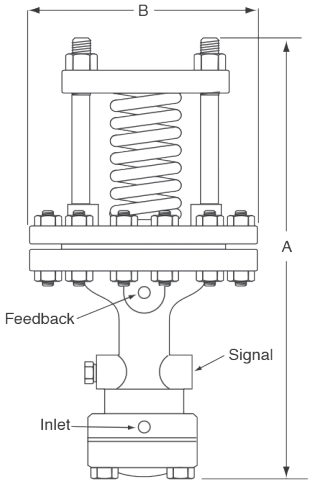
Pressure pilot operated steam regulators (continued)

Series SPS spring pressure control pilots

The Series SPS Spring pilot valves are designed for applications such as steam to hydronic converters, domestic hot water, manufacturing process, or others that require constant outlet pressure.

- Tight shut-off provided by hardened Stainless steel disc and seat
- Packless construction eliminates seals that wear out and leak
- Travel stop and cover on diaphragm helps prevent over pressurization damage
- Removable strainer helps prevent debris from entering pilot
- Maximum temperature 450ºF (232ºC)
- Maximum inlet operating temperature 250 psig (17.3 bar)
- Outlet pressure
  - Minimum 2 psig (0.1 bar)
  - Maximum 175 psig (11.9 bar)
- Normal accuracy ±1 psig (0.07 bar)





Dimensions in. (mm)

Model	A	B
SPS-30	8¾ (222)	4⅝ (117)
SPS-60		
SPS-175		

Materials of construction

Part	Specifications
Body	Cast Iron ASTM A126
Stem	Stainless steel ASTM A582
Seat ring	Stainless steel ASTM A582
Diaphragm screw	Steel ASTM A108
Pusher plate	Steel ASTM A108
Adjusting spring	Steel ASTM A229
Strainer	Stainless steel ASTM A167
Diaphragm	Stainless steel ASTM A666
Gaskets	Grafoil
Disc	Stainless steel ASTM A276

Ordering information - Spring pilots

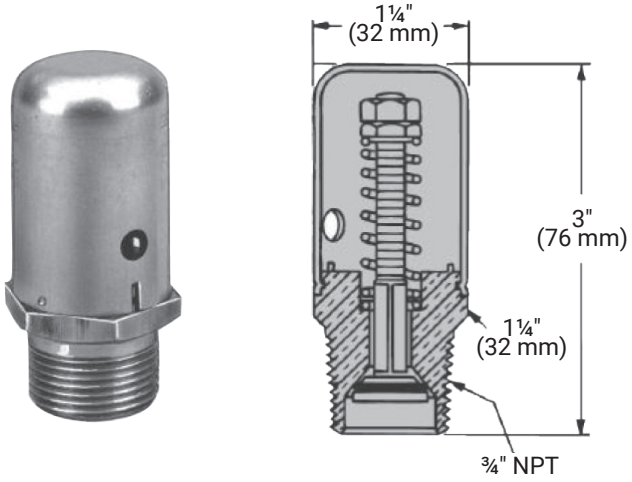
Model number	Part number	Outlet pressure range psig (bar)	Maximum pressure psig (bar)	Weight (approx.) lbs. (kg)	Spring color
SPS-30	400277	2 – 30 (0.1-2.0)	250 (17.3)	7 (3.2)	Blue
SPS-60	400278	5 – 60 (0.3-4.1)			Red
SPS-175	400280	20 – 175 (1.4-11.9)			Gold

Note: When Spring pilots are used with Safety Relief valves, the Safety Relief valve must be at least 5 psi (.35 bar) higher than the desired steam operating pressure.

Vacuum breakers

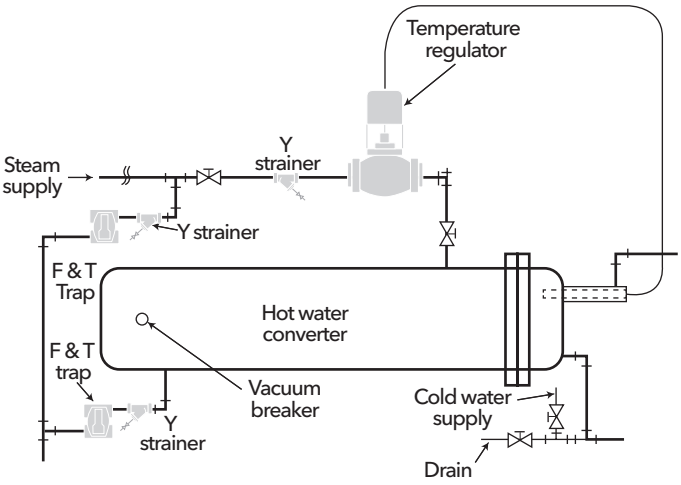
Model 62 • Part no 401446

- For use on closed vessels and piping systems to control induced vacuum within safe limits
- Adjustable from ¼" – 20" (8 – 508 mm) hg vacuum – factory set at 2" (51 mm) Hg vacuum
- ¾" NPT straight shank
- Maximum operating temperature: 366°F (186°C)
- Maximum operating pressure: 150 psig (10.3 bar)

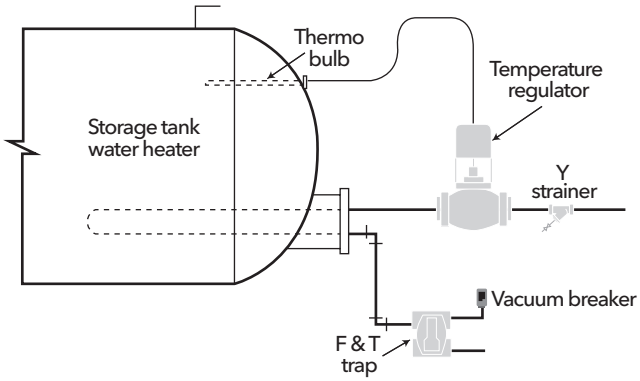


Typical installations

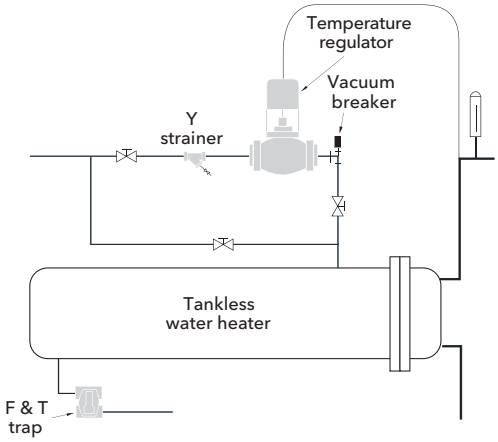
Hot water converter



Storage tank water heater



Tankless water heater



Notes

Main steam vents

How to select steam vents

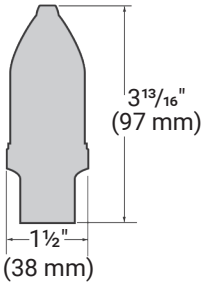
Model number	Radiator (angle type)	Convector (bottom inlet)	Unit heater	Mains	Thermostatic vent (only)	Remarks
1A	X					Adjustable orifice
40	X					Fixed orifice
41		X				Fixed orifice
43		X				Fixed orifice
45		X				Fixed orifice
508		X				Moisture type
4A				X		Small systems
75				X		Low pressure
75H				X		High pressure
76				X		Vacuum systems
74			X			Unit heaters
4					X	Small systems
8C					X	high pressure

Model 4A • part no 401413

Air valve (non-vacuum)

- Float-type thermostatic vent
- For residential or small one-pipe or two-pipe systems
- Single non-adjustable port
- ½" NPT female and ¾" NPT male straight shank
- Install 6-10" (150-250 mm) above horizontal return and 18" (450 mm) above the boiler water line
- Maximum operating pressure: 2 psig (0.13 bar)*
- Maximum pressure: 10 psig (0.7 bar)

Air valve model 4A

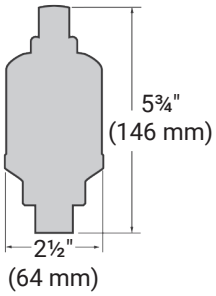


Model 75 • Part no 401434
Model 75H • Part no 401437

Air valve (non-vacuum)

- Float-type thermostatic vent
- For medium and large systems
- Single non-adjustable port
- ½" NPT female and ¾" NPT male straight shank
- Maximum operating pressure*
  - — Model 75 – 3 psig (0.2 bar)
  - — Model 75H – 10 psig (0.7 bar)
- Maximum pressure: 15 psig (1.0 bar)

Air valve model 75 & 75H



* Drop away pressure (maximum pressure against which the vent can open).

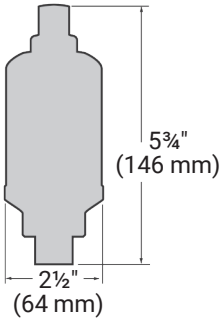
Main steam vents

Model 76 • Part no 401432

Vacuum valve

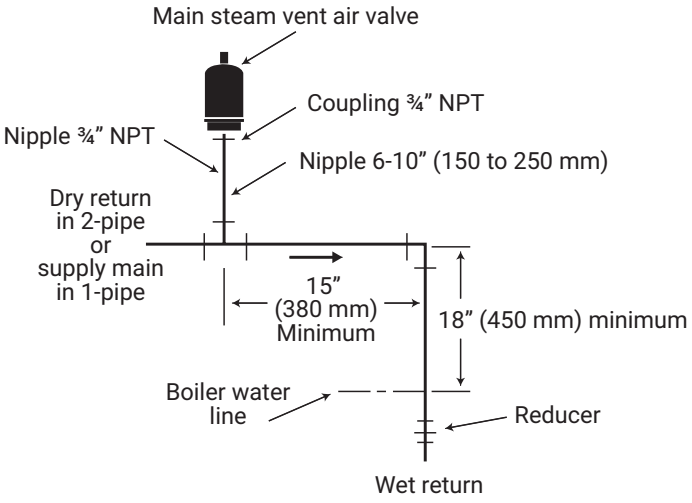
- Float-type thermostatic vent
- For medium and large one-pipe vacuum systems
- Single non-adjustable port
- ½" NPT female and ¾" NPT male straight shank
- Install 6-10" (150-250 mm) above horizontal return and 18" (450 mm) above the boiler water line
- Maximum operating pressure: 3 psig (0.2 bar)
- Maximum pressure: 15 psig (1.0 bar)

Vacuum valve Model 76



Installation

To prevent steam vents from sputtering water or damage from water hammer, observe the minimum elevations shown.



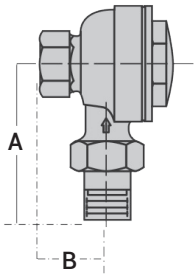
High pressure steam vent

Model 8C angle • Part no 402002

High pressure balanced pressure air valve

- Thermostatic vent (no float)
- Install at the high point in piping or on equipment to quickly vent air from the steam space.
- Discharge may be piped to a safe area or into vented return line.
- ¼" (6 mm) orifice
- Inlet ½" NPT male union connection
- Outlet ½" NPT female
- Bronze body and cap
- Stainless steel element
- Maximum operating pressure: 125 psig (8.6 bar)

Model 8C angle
½" NPT

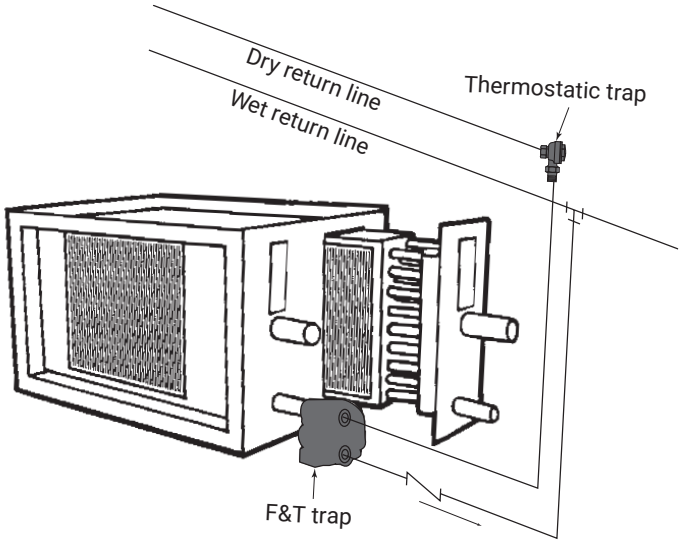


Dimensions in. (mm)

Model	Pattern	NPT size	A	B
8C-2	Angle	½	2 27/32 (72)	1¼ (32)

Air make up coil with F&T float & thermostatic trap draining into a wet return line

Note: A separate thermostatic trap is added to vent air into the dry return line.

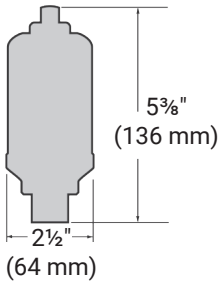


Model 74 • part no 401429

Steam unit heater air valve

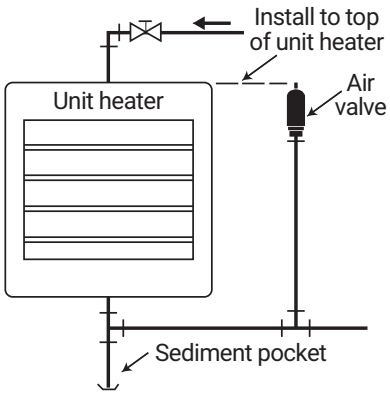
- Float-type thermostatic vent
- Single non-adjustable port
- ½" NPT female and ¾" NPT male straight shank
- Install 6-10" (150-250 mm) above horizontal return and 18" (450 mm) above the boiler water line
- Maximum operating pressure: 35 psig (2.4 bar)*
- Maximum pressure: 35 psig (2.4 bar)

Steam unit heater air valve
Model 74



Installation

Model 74



Model 4 • part no 401416

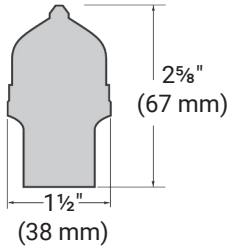
Quick valve

- Thermostatic air vent
- For steam systems and process equipment
- Operates on temperature change only; does not close against water
- Must be installed 6-10" (150-250 mm) above horizontal return and 18" (450 mm) above the boiler water line
- ½" NPT female and ¾" NPT male straight shank
- Maximum operating pressure: 25 psig (1.7 bar)*
- Maximum pressure: 25 psig (1.7 bar)

To prevent steam vents from sputtering water or damage from water hammer, observe the minimum elevations shown.

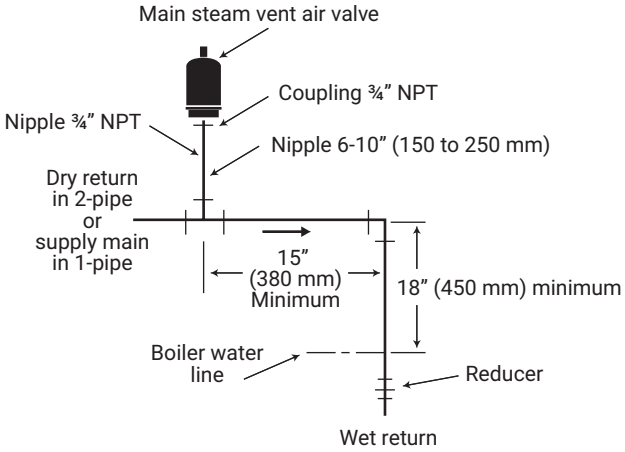
* Drop away pressure (maximum pressure against which the vent can open).

Quick valve
Model 4



Installation

Model 4



Radiator steam vents

Model 1A • part no 401422

Air valve (non-vacuum)

- Float-type vent
- Adjustable port for true proportional venting — 6 port settings from slow (1) to fast (6)
- ⅛" NPT angle connection
- Maximum operating pressure: 1½ psig (0.1 bar)*
- Maximum pressure: 10 psig (0.7 bar)

Air valve
Model 1A

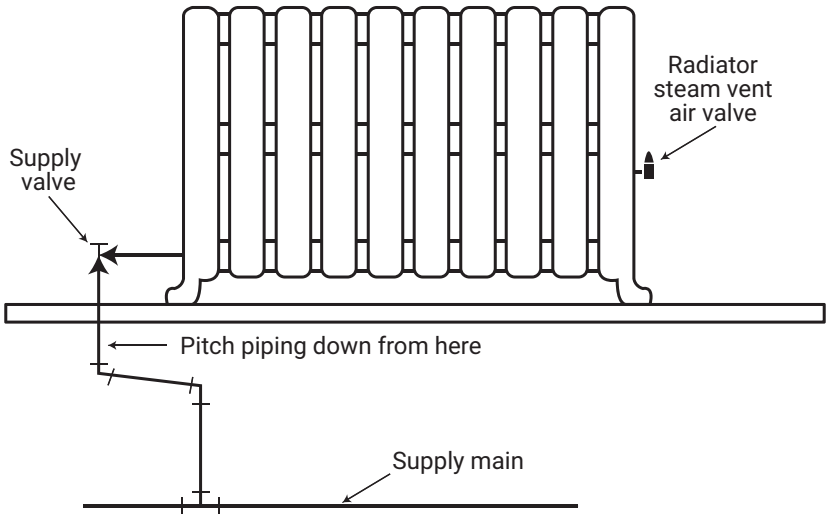
Model 40 • part no 401440

Air valve (non-vacuum)

- Float-type vent
- For ordinary one-pipe system that doesn't require proportional venting
- Single non-adjustable port
- ⅛" NPT angle connection
- Maximum operating pressure: 6 psig (0.4 bar)*
- Maximum pressure: 10 psig (0.7 bar)

Air valve
Model 40

Typical installation



* Drop away pressure (maximum pressure against which the vent can open).

Convector steam vents

Model 41 • Part no 401455
Model 43 • Part no 401458
Model 45 • Part no 401461

Air valve
Model 41, 43, 45

Air valve (non-vacuum)

- Single non-adjustable port
- For small steam systems
- Telescopic siphon tube with angle cut assures drainage
- ⅛" NPT straight shank (41)
  ¼" NPT straight shank (43)
  ½" NPT female and ¾" NPT male straight shank (45)
- Maximum operating pressure: 6 psig (0.4 bar)*
- Maximum pressure: 10 psig (0.7 bar)

* Drop away pressure (maximum pressure against which the vent can open).

Water vents

How to select water vents

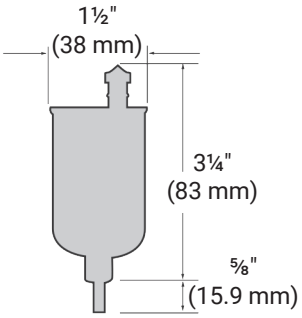
Model number	Radiator	Convector	Mains	Built-in vacuum check	Maximum operating pressure - psig (bar)	Remarks
77	X	X			50 (3.5)	Small systems
78			X	X	150 (10.3)	High pressure
79			X	X	75 (5.2)	Low pressure
792			X		250 (17.3)	Cast iron body
550		X			100 (6.9)	Air chamber
508	X	X			50 (3.5)	Moisture type

Model 77 • part no 401497

Water vent valve

- For efficient releasing of air in hydronic heating systems, such as baseboard radiators, convector radiators and small heating units
- ⅛" NPT straight shank
- Maximum operating pressure: 50 psig (3.5 bar)*
- Maximum temperature: 240ºF (116ºC)

Water vent valve
Model 77

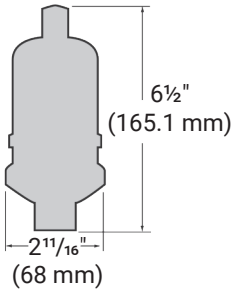


Model 78 • part no 401485

Water main vent valve

- For use on high pressure hot or cold water or glycol mains and process applications with specific gravity greater than 0.7
- Cast brass body
- Tapped at top for ⅛" NPT safety drain connection for discharging moisture
- Body unscrews for easy cleaning
- Built-in check valve
- ¾" NPT straight shank
- Maximum operating pressure: 150 psig (10.3 bar)*
- Maximum hydrostatic pressure: 450 psig (31.1 bar)
- Maximum temperature: 250ºF (121ºC)

Water main vent valve
Model 78

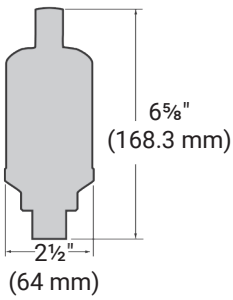


Model 79 • part no 401488

Water main vent valve

- For use on hot or cold water or glycol water mains and process applications with specific gravity greater than 0.7
- Tapped at top for ⅛" NPT safety drain connection for discharging moisture
- Removable top
- Built-in check valve
- ½" NPT female and ¾" NPT male straight shank
- Maximum operating pressure: 75 psig (5.2 bar)*
- Maximum hydrostatic pressure: 200 psig (13.8 bar)
- Maximum temperature: 250ºF (121ºC)

Water main vent valve
Model 79



* Drop away pressure (maximum pressure against which the vent can open).

Water vents

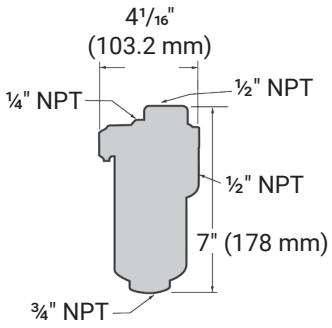
Model 792 • Part no 401494

High pressure water vent valve

- For releasing air from hot or cold water or glycol mains, hydronic heating and chilling systems, storage and processing tank filters, centrifugal pumps with specific gravity greater than 0.7
- Cast iron body and cover, Stainless steel interior
- Maximum operating pressure: 250 psig (17.3 bar)*
- Maximum hydrostatic pressure: 350 psig (24.2 bar)
- Maximum temperature: 300ºF (149ºC)

High pressure water vent valve

Model 792



Model 792 capacity

Water pressure psig (bar)	Air discharge to atmosphere cu. ft./min. (cu. m/min.)
100 (6.9)	10 (.28)
150 (10.3)	15 (.42)
200 (13.8)	20 (.57)
250 (17.3)	25 (.70)

* Maximum pressure against which the vent can open.

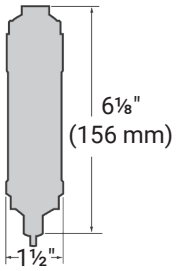
Water vents

Model 550 • part no 401476

Air chamber

- For use on convectors which are not provided with built-in air chambers or air collection fittings
- Brass construction
- ¼" NPT straight shank connection tapped at the top for ⅛" NPT connection
- 6 cubic inch (98.3 cm) volume
- Maximum water pressure: 100 psig (6.9 bar)
- Maximum steam pressure: 25 psig (1.7 bar)

Air chamber
Model 550



Model 508 • part no 401475

Water vent valve

- For automatic or manual venting systems
- Ideal for use with model 550 air chamber
- Disc-type vent
- Built-in check valve
- Cartridge with discs can be replaced without draining the system
- ⅛" NPT straight shank
- Maximum water pressure: 50 psig (3.5 bar)
- Maximum pressure: 50 psig (3.5 bar)

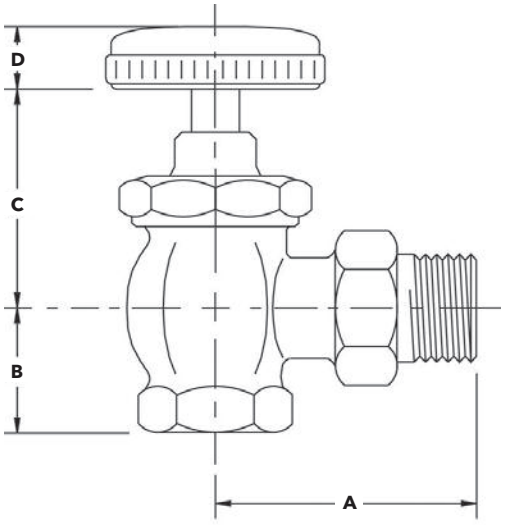
Water vent valve
Model 508

Supply valves

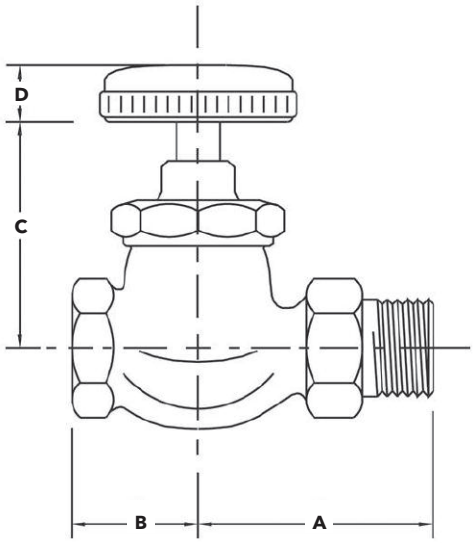
Model 185C

Radiator supply valve

- Suitable for hot water, cold water or steam
- Brass / bronze construction
- Non-rising stem; packless construction
- Available in angle and straight pattern design
- Sizes from ½" to 2"
- Maximum working pressure: 150 psig
- Maximum temperature: 400ºF



Angle pattern



Straight pattern

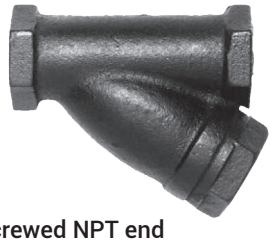
Model 185C dimensional data (inches)

Part number	Style	Size	A	B	C	D
405099	Angle	½	2⅜	1 3/16	2 3/16	⅞
405102		¾	2⅞	1 3/16	2 3/16	⅞
405105		1	3⅛	1½	2 5/16	1
405108		1¼	3½	1¾	2⅝	1
405111		1½	3⅞	1 15/16	2 13/16	1⅛
405114	Straight	½	2⅜	1⅜	2 11/16	⅞
405117		¾	2⅞	1⅜	2 13/16	⅞
405120		1	3⅛	1 11/16	3 1/16	1
405123		1¼	3½	2	3 9/16	1
407051		2	4⅜	2¾	4½	1⅛

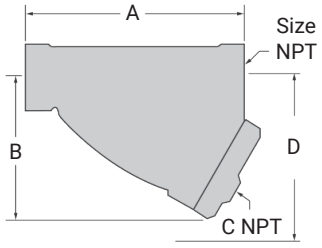
Notes

Y-strainers

Y-Strainers are designed for steam, oil or water lines. Strainers should be installed ahead of temperature regulating and/or pressure reducing valves and steam traps to protect their moving parts from dirt, this is particularly important for new installations.



Screwed NPT end Y-strainer



Screwed NPT end

Model 415C

- Cast iron body
- Maximum pressure:
  — 250 psig (17.3 bar) for steam service
  — 400 psig (27.6 bar) for water service
- Available in sizes from ½" to 3" NPT

Model 420C

- Cast brass body
- Maximum pressure:
  — 300 psig (20.6 bar) for steam service
  — 400 psig (27.6 bar) for water service
- Available in sizes from ½" to 3" NPT

Ordering information

Model number	Part number	NPT size in.	Weight lbs. (kg)
415C	405000	½	1 (0.5)
	405003	¾	2.5 (1.1)
	405006	1	3.5 (1.6)
	405009	1¼	5.5 (2.5)
	405012	1½	8 (3.6)
	405015	2	13 (5.9)
	405018	2½	22 (10)
	405022	3	30 (13.6)
420C	405024	½	1 (0.5)
	405027	¾	1.6 (0.7)
	405030	1	2.1 (1)
	405033	1¼	2.8 (1.3)
	405036	1½	4.5 (2.0)
	405039	2	7 (3.2)
	405042	2½	2 (0.9)
	405045	3	35 (16)

Dimensions in. (mm)

Model 415C

Part number	A	B	NPT C	D Service dimensions
405000	3¼ (83)	2⅛ (54)	¼	3¼ (83)
405003	3¾ (95)	2⁹⁄₁₆ (65)	⅜	3 (76)
405006	4¹⁄₃₂ (102)	2⁵⁄₁₆ (58)	⅜	3¼ (83)
405009	5¹⁄₃₂ (128)	3¼ (83)	¾	6 (152)
405012	5¾ (146)	3⅞ (98)	¾	6 (152)
405015	7¹⁄₁₆ (179)	4¾ (121)	1	6¾ (171)
405018	9¹⁵⁄₁₆ (237)	5⅞ (149)	1¼	7⅞ (200)
405022	10 (254)	6¹⁄₃₂ (153)	1¼	8 (203)

Model 420C

Part number	A	B	NPT C	D
405024	2¹⁵⁄₁₆ (71)	1¹³⁄₁₆ (30)	¼	3 (76)
405027	3⅝ (92)	2 (51)	¼	4 (102)
405030	4⁷⁄₁₆ (113)	2⅝ (67)	⅜	4½ (114)
405033	5⅛ (130)	3⅜ (86)	⅜	5 (127)
405036	5¾ (146)	3⁷⁄₁₆ (87)	½	5¾ (146)
405039	7¼ (184)	4¾ (121)	½	½ (165)
405042	8¼ (210)	6¾ (171)	1¼	—
405045	9⅝ (244)	6¼ (159)	1¼	—

Specifications

Model	Body material	Steam service			Water service		
		Pressure psig (bar)	Temperature °F (°C)	Screen material mesh SS	Pressure psig (bar)	Temperature °F (°C)	Screen material mesh SS
415C	Cast Iron	250 (17.3)	400 (204)	20	400 (28)	150 (66)	20
420C	Cast Brass	300 (20.6)	400 (204)	20	400 (28)	150 (66)	20

Y-strainers (continued)

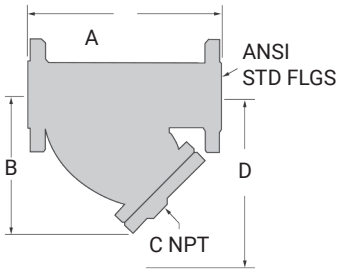
Flanged end

Model 450C

- Cast iron body
- Maximum pressure:
  — 125 psig (8.6 bar) for steam service
  — 200 psig (13.8 bar) for water service
- Available in sizes 2½" to 8" (65-200 mm)

Model 460A, 460B

- Cast iron body
- Maximum pressure:
  — 250 psig (17.3 bar) for steam service
  — 500 psig (35 bar) for water service
- Available in sizes 2½" to 8" (65-200 mm)



Flanged end Y-strainer

Ordering information

Model number	Part number	Flanged size in. (mm)	Weight approx. lbs. (kg)
450C	405324	2½ (65)	33 (15)
	405327	3 (80)	47 (21)
	405330	4 (100)	80 (36)
	405333	5 (125)	109 (49)
	405336	6 (150)	152 (69)
	405339	8 (200)	247 (112)
460B	405303	2½ (65)	45 (21)
	405306	3 (80)	61 (28)
460A	405309	4 (100)	100 (45)
	405317	5 (125)	150 (68)
	405315	6 (150)	210 (95)
	405318	8 (200)	350 (159)

Dimensions in. (mm)

Model 450C

Part number	A	B	NPT C	D Service dimensions
405324	10 (254)	6½ (165)	1	9¾ (248)
405327	10⅛ (257)	6¾ (171)	1	10 (254)
405330	12⅛ (307)	8 (203)	1½	12 (305)
405333	15⅝ (397)	10½ (267)	2	15½ (394)
405336	18½ (470)	13½ (343)	2	20 (508)
405339	21⅝ (549)	15¼ (387)	2	22¾ (578)

Model 460B

Part number	A	B	NPT C	D
405303	11⅛ (283)	7 (178)	1	10¼ (260)
405306	12¾ (324)	8¼ (210)	1¼	12¼ (311)

Model 460A

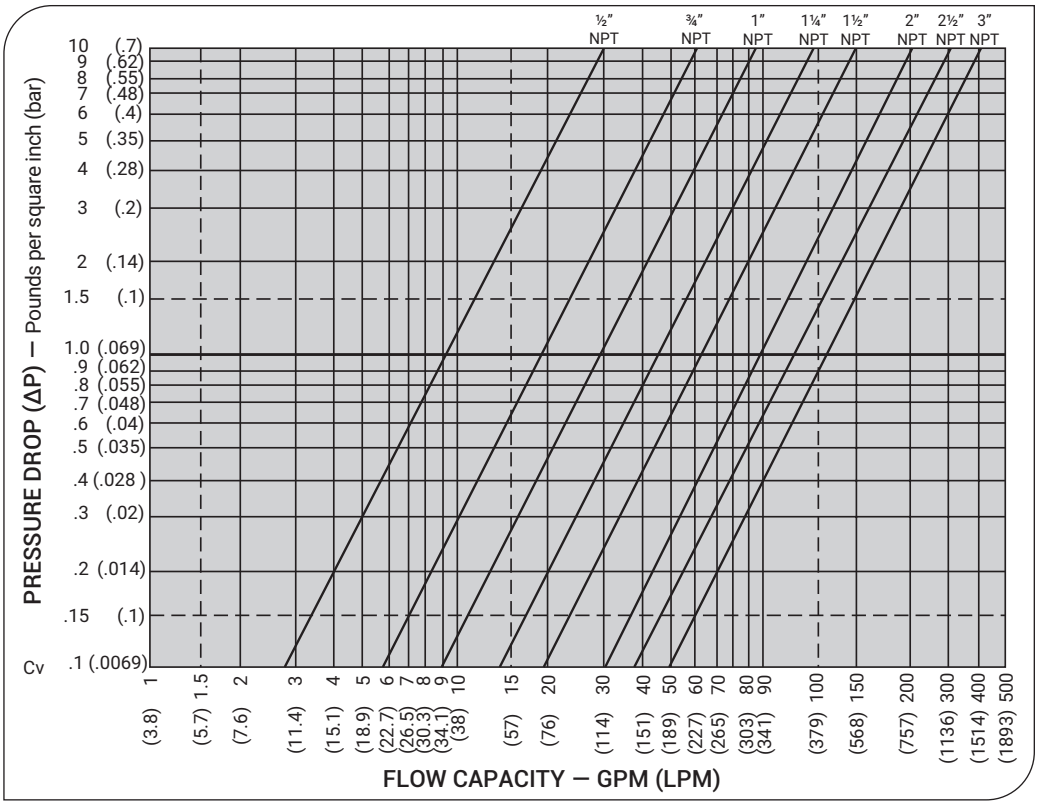
Part number	A	B	NPT C	D
405309	15¼ (387)	10½ (267)	1½	15¼ (387)
405317	17⅝ (448)	12¾ (324)	2	19 (483)
405315	19⅝ (498)	14½ (368)	2	22½ (572)
405318	25 (635)	16 (406)	2	23½ (597)

Specifications

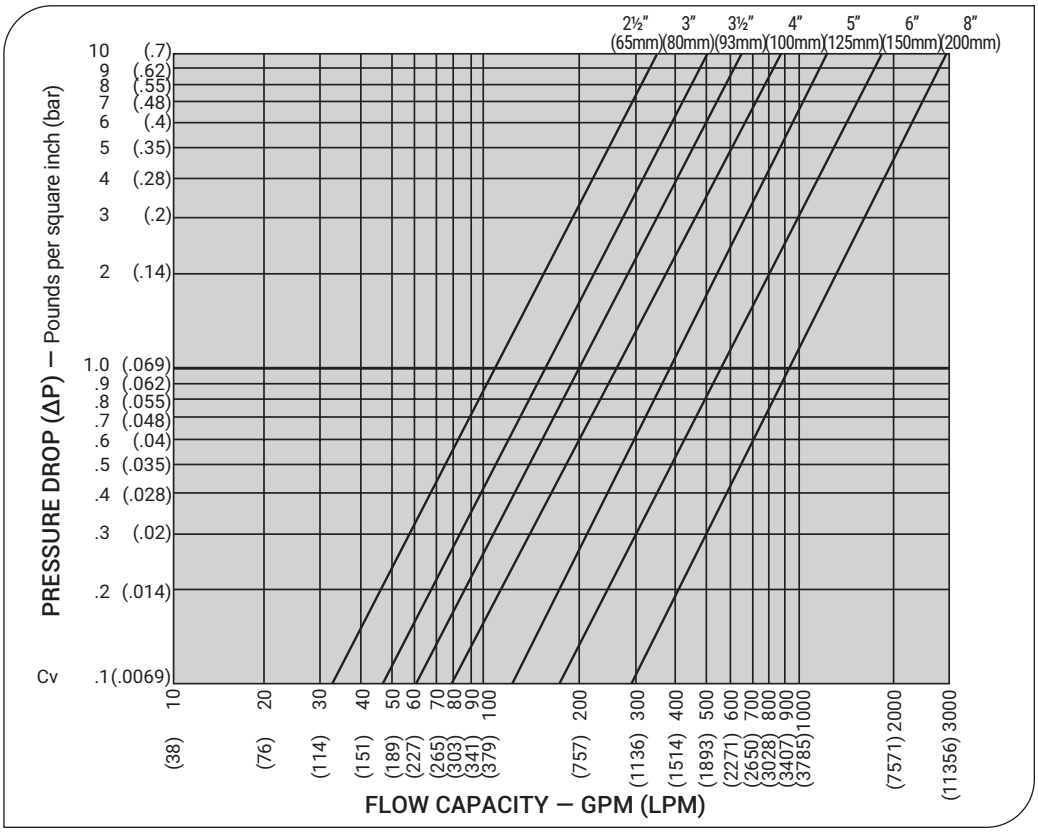
Model	Flanged size in. (mm)	Flanged rating psig (bar)	Body material	Steam service			Water service		
				Pressure psig (bar)	Temp. °F (°C)	Screen material Perf. SS in. (mm)	Pressure psig (bar)	Temp. °F (°C)	Screen material perf. SS in. (mm)
450C	2½ - 4 (65-100)	125 (8.6)	Cast Iron	125 (8.6)	450 (232)	.045 (1.1)	200 (13.8)	150 (66)	.062 (1.6)
	5 - 8 (125-200)					.062 (1.6)			.125 (3.2)
460B	2½ - 3 (65-80)	250 (17.3)		250 (17.3)			500 (35)		.062 (1.6)
460A	4 (100)								.062 (1.6)
	5 - 8 (125-200)								.125 (3.2)

Capacities — water flow vs. pressure drop

Screwed end y-strainers



Flanged end y-strainers



Notes

Reference tables and formulas

Table 1 — properties of saturated steam

in Hg Vacuum

Pressure psig	Temp. °F	Heat in BTU/lb.			Specific volume cu. ft. per lb.
		Sensible	Latent	Total	
25	**134**	**102**	**1017**	**1119**	**142**
20	162	129	1001	1130	73.9
15	179	147	990	1137	51.3
10	192	160	982	1142	39.4
5	203	171	976	1147	31.8
0	**212**	**180**	**970**	**1150**	**26.8**
1	215	183	968	1151	25.2
2	219	187	966	1153	23.5
3	222	190	964	1154	22.3
4	224	192	962	1154	21.4
5	**227**	**195**	**960**	**1155**	**20.1**
6	230	198	959	1157	19.4
7	232	200	957	1157	18.7
8	233	201	956	1157	18.4
9	237	205	954	1159	17.1
10	**239**	**207**	**953**	**1160**	**16.5**
12	244	212	949	1161	15.3
14	248	216	947	1163	14.3
16	252	220	944	1164	13.4
18	256	224	941	1165	12.6
20	**259**	**227**	**939**	**1166**	**11.9**
22	262	230	937	1167	11.3
24	265	233	934	1167	10.8
26	268	236	933	1169	10.3
28	271	239	930	1169	9.85
30	**274**	**243**	**929**	**1172**	**9.46**
32	277	246	927	1173	9.10
34	279	248	925	1173	8.75
36	282	251	923	1174	8.42
38	284	253	922	1175	8.08
40	**286**	**256**	**920**	**1176**	**7.82**
42	289	258	918	1176	7.57
44	291	260	917	1177	7.31
46	293	262	915	1177	7.14
48	295	264	914	1178	6.94
50	**298**	**267**	**912**	**1179**	**6.68**
55	300	271	909	1180	6.27
60	307	277	906	1183	5.84
65	312	282	901	1183	5.49
70	316	286	898	1184	5.18
75	**320**	**290**	**895**	**1185**	**4.91**
80	324	294	891	1185	4.67
85	328	298	889	1187	4.44
90	331	302	886	1188	4.24
95	335	305	883	1188	4.05
100	**338**	**309**	**880**	**1189**	**3.89**
105	341	312	878	1190	3.74
110	344	316	875	1191	3.59
115	347	319	873	1192	3.46
120	350	322	871	1193	3.34
125	**353**	**325**	**868**	**1193**	**3.23**
130	356	328	866	1194	3.12
140	361	333	861	1194	2.92
145	363	336	859	1195	2.84
150	**366**	**339**	**857**	**1196**	**2.74**

Pressure psig	Temp. °F	Heat in BTU/lb.			Specific volume cu. ft. per lb.
		Sensible	Latent	Total	
155	368	341	855	1196	2.68
160	371	344	853	1197	2.60
165	373	346	851	1197	2.54
170	375	348	849	1197	2.47
175	**377**	**351**	**847**	**1198**	**2.41**
180	380	353	845	1198	2.34
185	382	355	843	1198	2.29
190	384	358	841	1199	2.24
195	386	360	839	1199	2.19
200	**388**	**362**	**837**	**1199**	**2.14**
205	390	364	836	1200	2.09
210	392	366	834	1200	2.05
215	394	368	832	1200	2.00
220	396	370	830	1200	1.96
225	**397**	**372**	**828**	**1200**	**1.92**
230	399	374	827	1201	1.89
235	401	376	825	1201	1.85
240	403	378	823	1201	1.81
245	404	380	822	1202	1.78
250	**406**	**382**	**820**	**1202**	**1.75**
255	408	383	819	1202	1.72
260	409	385	817	1202	1.69
265	411	387	815	1202	1.66
270	413	389	814	1203	1.63
275	**414**	**391**	**812**	**1203**	**1.60**
280	416	392	811	1203	1.57
285	417	394	809	1203	1.55
290	418	395	808	1203	1.53
295	420	397	806	1203	1.49
300	**421**	**398**	**805**	**1203**	**1.47**
305	423	400	803	1203	1.45
310	425	402	802	1204	1.43
315	426	404	800	1204	1.41
320	427	405	799	1204	1.38
325	**429**	**407**	**797**	**1204**	**1.36**
330	430	408	796	1204	1.34
335	432	410	794	1204	1.33
340	433	411	793	1204	1.31
345	434	413	791	1204	1.29
350	**435**	**414**	**790**	**1204**	**1.28**
355	437	416	789	1205	1.26
360	438	417	788	1205	1.24
365	440	419	786	1205	1.22
370	441	420	785	1205	1.20
375	**442**	**421**	**784**	**1205**	**1.19**
380	443	422	783	1205	1.18
385	445	424	781	1205	1.16
390	446	425	780	1205	1.14
395	447	427	778	1205	1.13
400	**448**	**428**	**777**	**1205**	**1.12**
450	460	439	766	1205	1.00
500	470	453	751	1204	0.89
550	479	464	740	1204	0.82
600	489	475	728	1203	0.74

Reference tables and formulas

Table 1A — properties of saturated steam (metric)

Absolute pressure kPa	Temp. °C	Heat in kJ/kg			Specific volume cu. m. per kg.
		Sensible	Latent	Total	
5	**33**	**138**	**2424**	**2562**	**28.192**
20	60	251	2358	2610	4.649
30	69	289	2336	2625	5.229
40	76	318	2319	2304	3.993
50	81	340	2305	2294	3.240
60	**86**	**360**	**2294**	**2653**	**2.732**
70	90	377	2283	2660	2.365
80	94	392	2274	2666	2.087
90	97	405	2266	2671	1.869
100	100	417	2258	2675	1.694
101.3	**100**	**419**	**2257**	**2676**	**1.673**
110	102	427	2252	2679	1.562
120	105	438	2246	2683	1.438
130	107	447	2239	2686	1.333
140	109	480	2233	2713	1.245
150	**111**	**455**	**2228**	**2682**	**1.169**
160	113	474	2222	2696	1.103
170	115	481	2217	2698	1.056
180	116	488	2212	2701	0.992
190	118	495	2208	2703	0.945
200	**120**	**503**	**2203**	**2706**	**0.895**
210	121	509	2199	2708	0.857
220	123	515	2195	2710	0.823
230	124	521	2191	2712	0.784
240	126	527	2187	2714	0.757
250	**127**	**533**	**2183**	**2715**	**0.731**
260	128	538	2179	2717	0.701
270	129	544	2176	2719	0.679
280	131	549	2172	2721	0.653
290	132	554	2169	2722	0.635
300	**133**	**559**	**2165**	**2724**	**0.612**
320	135	568	2159	2727	0.576
340	137	577	2152	2730	0.545
360	139	586	2146	2732	0.517
380	141	594	2140	2735	0.492
400	**143**	**602**	**2135**	**2737**	**0.467**
420	145	609	2130	2739	0.448
440	146	617	2124	2741	0.428
460	148	624	2119	2743	0.410
480	150	630	2114	2745	0.395
500	**151**	**637**	**2109**	**2747**	**0.378**
520	**153**	**644**	**2105**	**2749**	**0.365**

Absolute pressure kPa	Temp. °C	Heat in kJ/kg			Specific volume cu. m. per kg.
		Sensible	Latent	Total	
540	155	650	2101	2750	0.353
560	156	656	2096	2752	0.339
580	157	662	2092	2753	0.330
600	158	667	2088	2755	0.320
650	**161**	**681**	**2078**	**2759**	**0.296**
700	164	695	2067	2762	0.275
750	167	706	2058	2764	0.259
800	170	718	2049	2767	0.243
850	172	729	2041	2769	0.230
900	**175**	**739**	**2032**	**2772**	**0.217**
950	177	749	2024	2774	0.206
1000	179	759	2017	2776	0.196
1050	181	768	2009	2777	0.187
1100	**183**	**777**	**2002**	**2779**	**0.179**
1150	185	786	1994	2780	0.172
1200	187	795	1987	2782	0.165
1250	189	803	1981	2783	0.159
1300	191	811	1974	2785	0.152
1350	**192**	**819**	**1968**	**2786**	**0.147**
1400	194	826	1961	2787	0.142
1500	197	841	1948	2789	0.133
1600	200	855	1937	2791	0.125
1700	203	868	1925	2793	0.118
1800	**206**	**880**	**1914**	**2795**	**0.111**
1900	209	893	1903	2795	0.105
2000	211	904	1893	2797	0.100
2100	214	915	1882	2798	0.0955
2200	216	926	1872	2799	0.0912
2300	**219**	**937**	**1863**	**2800**	**0.0872**
2400	221	947	1853	2800	0.0836
2500	223	957	1844	2801	0.0802
2600	225	967	1834	2801	0.0771
2700	227	976	1825	2801	0.0743
2800	**229**	**986**	**1816**	**2802**	**0.0716**
2900	231	995	1808	2802	0.0689
3000	233	1004	1799	2802	0.0666
3500	241	1045	1758	2802	0.0568
4000	249	1082	1719	2801	0.0495
4200	252	1096	1704	2800	0.0470
4400	**255**	**1110**	**1689**	**2799**	**0.0447**

Reference tables and formulas (continued)

Table 2 — weights and specific heats of liquids at 60°F

Liquid	Weight lbs./gal.	Specific heat BTU per lb. per °F
Fuel oil (No. 6)	7.909 to 8.448	0.4 to 0.5
Heat transfer oil (Light)	8.17	0.82
Mineral oil	7.67	0.65
Olive oil	7.67	0.47
Petroleum oil	6.84	0.50
Water	8.337	1.00

Steam flow requirements for heating water

Table 3 — lbs. of steam per hour to heat water

Temp. rise (°F)	Gallons of water heated per hour																			
	25	50	75	100	150	200	300	400	500	750	1000	1500	2000	3000	4000	5000	7500	10000	15000	20000
	Lbs. of Steam Per Hour																			
10	2	4	6	9	13	17	25	33	42	63	83	125	170	250	330	420	630	830	1250	1700
20	4	8	12	17	25	34	50	68	83	125	166	250	340	500	700	830	1250	1700	2500	3400
30	6	12	19	25	37	50	70	100	120	190	250	370	500	700	1000	1200	1900	2500	3700	5000
40	9	17	25	34	50	68	100	135	165	250	335	500	700	1000	1350	1650	2500	3350	5000	7000
50	11	21	31	42	63	84	125	170	210	310	420	630	840	1250	1680	2100	3100	4200	6300	8400
60	13	25	37	50	75	100	150	200	250	375	500	750	1000	1500	2000	2500	3750	5000	7500	10000
80	17	33	50	67	100	135	200	270	330	500	670	1000	1400	2000	2700	3300	5000	6700	10000	14000
100	21	42	63	83	125	166	250	330	420	630	830	1300	1700	2500	3300	4200	6300	8300	13000	17000
120	25	50	75	100	150	200	300	400	500	750	1000	1500	2000	3000	4000	5000	7500	10000	15000	20000
140	29	58	88	116	175	235	350	470	580	880	1160	1800	2400	3500	4700	5800	8800	11600	18000	24000
160	33	68	100	135	200	270	400	540	660	1000	1350	2000	2800	4000	5400	6600	10000	13500	20000	28000

Table 3A — kg. of steam per hour to heat water

Temp. rise (°C)	Liters of water heated per hour																			
	95	189	284	379	568	757	1136	1514	1893	2839	3785	5678	7570	11355	15140	18925	28388	37850	56775	75700
	Kg. of Steam Per Hour																			
5.6	1	2	3	4	6	8	11	15	19	29	38	57	77	113	150	191	286	376	567	771
11.1	2	4	5	8	11	15	23	31	38	57	75	113	154	227	318	376	567	771	1134	1542
16.7	3	5	9	11	17	23	32	45	54	86	113	168	227	318	454	544	862	1134	1678	2268
22.2	4	8	11	15	23	31	45	61	75	113	152	227	318	454	612	748	1134	1520	2268	3175
27.8	5	10	14	19	29	38	57	77	95	141	191	286	381	567	762	953	1406	1905	2858	3810
33.3	6	11	17	23	34	45	68	91	113	170	227	340	454	680	907	1134	1701	2268	3402	4536
44.4	8	15	23	30	45	61	91	122	150	227	304	454	635	907	1225	1497	2268	3039	4536	6350
55.6	10	1[9]	29	38	57	75	113	150	191	286	376	590	771	1134	1497	1905	2858	3765	5897	7711
66.6	11	23	34	45	68	91	136	181	227	340	454	680	907	1361	1814	2268	3402	4536	6804	9072
77.8	13	2[6]	40	53	79	107	159	213	263	399	526	816	1089	1588	2132	2631	3992	5262	8165	10886
88.9	15	31	45	61	91	122	181	245	299	454	612	907	1270	1814	2449	2994	4536	6124	9072	12701

Reference tables and formulas (continued)

Table 4 — physical properties of liquid and gases

	sp gr	sp ht BTU / lb - F
Butanol	0.885	0.654
Dowtherm G	1.130	0.351
Dowtherm HT	1.020	0.320
Dowtherm J	0.891	0.410
Dowtherm LF	1.314	0.361
Dowtherm SR-1	1.151	0.536
Ethanol	0.813	0.547
Ethyl glycol	1.125	0.602
Freon 11	1.576	0.206
Freon 113	1.659	0.200
Freon 114	1.582	0.211
Freon 12	1.450	0.212
Freon 21	1.464	0.253
Freon 22	1.352	0.271
I-Pentene	0.672	0.494
I-Propanol	0.858	0.446
Isobutanol	0.825	0.497
Methanol	0.844	0.558
n-Heptane	0.715	0.493
n-Hexane	0.682	0.507
No. 1 fuel oil	0.921	0.404
No. 2 fuel oil	0.842	0.423
No. 3 fuel oil	0.874	0.415
No. 5A fuel oil	0.932	0.402
No. 5B Fuel Oil	0.958	0.396
No. 6 Fuel Oil	0.980	0.392
n-Octane	0.731	0.495
n-Pentane	0.668	0.517
Propanol	0.852	0.651
Quench oil	0.922	0.404
SAE 10	0.898	0.409
SAE 20	0.913	0.406
SAE 30	0.918	0.405
SAE 40	0.922	0.404
SAE 50	0.925	0.403
SAE 60	0.932	0.402
SAE 70	0.937	0.401
Sea water	1.032	0.943
Steam	1.006	1.014
Therminal-44	0.952	0.443
Therminal-55	0.907	0.431
Therminal-60	1.027	0.367
Therminal-66	1.033	0.347
Therminal-75	1.138	0.348
Toluene	0.861	0.397
Trichlorethylene	1.646	0.222
Water	0.995	1.003

General usage formulas

Heating water with steam	Lbs./hr. condensate = $\frac{\text{GPM}}{2}$ x temperature rise ºF
Heating fuel oil with steam	Lbs./hr. condensate = $\frac{\text{GPM}}{4}$ x temperature rise ºF
Heating air with steam coils	Lbs./hr. condensate = $\frac{\text{CFM}}{900}$ x temperature rise ºF
Radiation conversion	Lbs./hr. condensate = $\frac{\text{sq. ft. EDR}}{4}$
Heating liquids other than water with steam	Lbs./hr. condensate = $\frac{(R) \times (W) \times (\Delta T) \times (H)}{1{,}000}$ where: (R) = Rate of flow of fluid to be heated (gal./hr.) (W) = Weight of fluid (lbs./hr.) (ΔT) = Fluid temperature rise ºF (H) = Specific heat of fluid being heated (BTU/lb./ºF)
Cv (valve coefficient) for steam, when: P_1 = Inlet pressure in psia P_2 = Outlet pressure in psia P = Pressure drop (P_1 - P_2)	When $P_2 \le 0.58\ P_1$: $Cv = \frac{\text{lbs./hr.}}{1.71 \times P_1}$ When $P_2 > 0.58\ P_1$: $Cv = \frac{\text{lbs./hr.}}{2.1\sqrt{\Delta P \times (P_1 + P_2)}}$
Cv (valve coefficient) for liquid	$Cv = \frac{\text{GPM}\ \sqrt{\text{Specific gravity}}}{\sqrt{\text{Pressure drop}}}$
Steam velocity	V = $\frac{\text{2.4 x Steam flow (lbs./hr.) x Specific volume (ft}^3\text{/lbs.)}}{\text{Area of pipe (in.}^2\text{)}}$

Conversion factors

Multiply	By	To get
Boiler hp	33,475	BTU / hr.
Boiler hp	34.5	Lbs. / hr / steam at 0 psig
Boiler hp	140	Sq. ft. EDR
1000 sq. ft. EDR	0.5	GPM condensate
EDR (sq. ft.)	0.25	Lbs. / hr. condensate
EDR (sq. ft.)	240	BTU / hr. for psig steam filling radiator with 70ºF air surrounding radiator
lbs. / hr.	960	BTU / hr.
lbs. / in.²	2.307	Feet water column (cold)
lbs. / in.²	2.41	Feet water column (hot)
lbs. / in.²	2.036	in. Hg
lbs. / in.²	0.069	bar
lbs. steam / hr.	0.454	kg. steam / hr.

Steam traps

Selecting and sizing steam traps

Selecting the proper steam trap is important in effective operation of steam systems. Steam traps are automatic valves that open to pass condensate and close to prevent the flow of steam. The functions of a steam trap in a steam system are to:

- Vent air from the system so steam can enter
- Hold steam in the system until the steam latent heat is removed
- Drain condensate from the system as it is formed after the latent heat is removed.

Removing condensate from piping helps prevent erosion and water hammer. Removing condensate from heat exchangers is required to make room for new steam for the heating process.

There are many types of steam traps. The Steam Trap Selection Guide Chart points out system conditions that may be encountered and suggests the trap type(s) that may best handle the requirement. Several types of traps may be used for a specific application.

Factors to consider in selecting the type of trap include:

- Constant or modulating condensate load
- Constant or fluctuating pressure
- Speed of air venting required
- Trap location

Trap sizing

1. Determine the maximum condensate load (capacity) requirement for the trap by one of the following:
   - Referring to the manufacturers' specifications for the system equipment.
   - Approximating condensate loads using the "General Usage Formulas".
   - Using the "CalcLoad" Load Calculator available through "Steam Specialty Component Selector" on the Hoffman Specialty website or ESP-Plus.
2. Determine the available steam inlet pressure at the trap (This pressure could be different than supply pressure at boiler.)
3. Determine the outlet pressure (back pressure) at the trap discharge. (Pressure against the outlet can be due to static pressure in return line or due to lifting to an overhead return).
4. Determine the pressure differential across the trap. (inlet pressure - outlet pressure = differential pressure).
5. Determine a Safety Factor. The Safety Factor will depend on accuracy in determining condensate load, inlet and outlet pressures. Recommendations:
   - Float & thermostatic trap 1.5 to 2.5
   - Bucket trap 2 to 4
   - Thermostatic trap 2 to 4
   - Thermodisc trap 1 to 1.2
6. Multiply normal maximum condensate load (as determined above) by Safety Factor.
7. Use the Capacity Tables for the selected type of trap to determine the trap model number.
8. Use Ordering information Charts to determine the Part number.

Guidelines:

- The trap seat rating must always be higher than the maximum inlet pressure at the trap.
- When a modulating control valve controls the inlet to equipment, select a trap size with a pressure rating greater than the maximum inlet pressure at the trap.
- Trap capacity should be checked at the minimum differential pressure to assure complete condensate removal under all possible conditions.

Inverted bucket trap operating pressure selection:

- Bucket traps are offered with various orifice sizes that determine the maximum operating pressure rating.
- A trap with a lower seat pressure rating has a larger sized orifice than a trap with a higher seat pressure rating. The larger orifice provides a larger condensate rating. When the actual operating pressure is higher than the seat rating, the pressure differential across the seat will prevent the trap from opening. Thus, an inverted bucket trap must be selected for the maximum differential pressure that will be encountered by the trap.
- Trap Capacity Tables show trap capacities at lower differential pressures than the trap rating. This allows selection of a trap at various operating points. A trap with a higher seat pressure rating may be used at lower pressure differentials. However, the capacity rating at that pressure differential will be less than the same size trap with a lower seat pressure rating.

Steam traps (continued)

Selecting and sizing steam traps (continued)

Lifting condensate to overhead return

Condensate must be lifted in applications where the trap is installed below the return line.

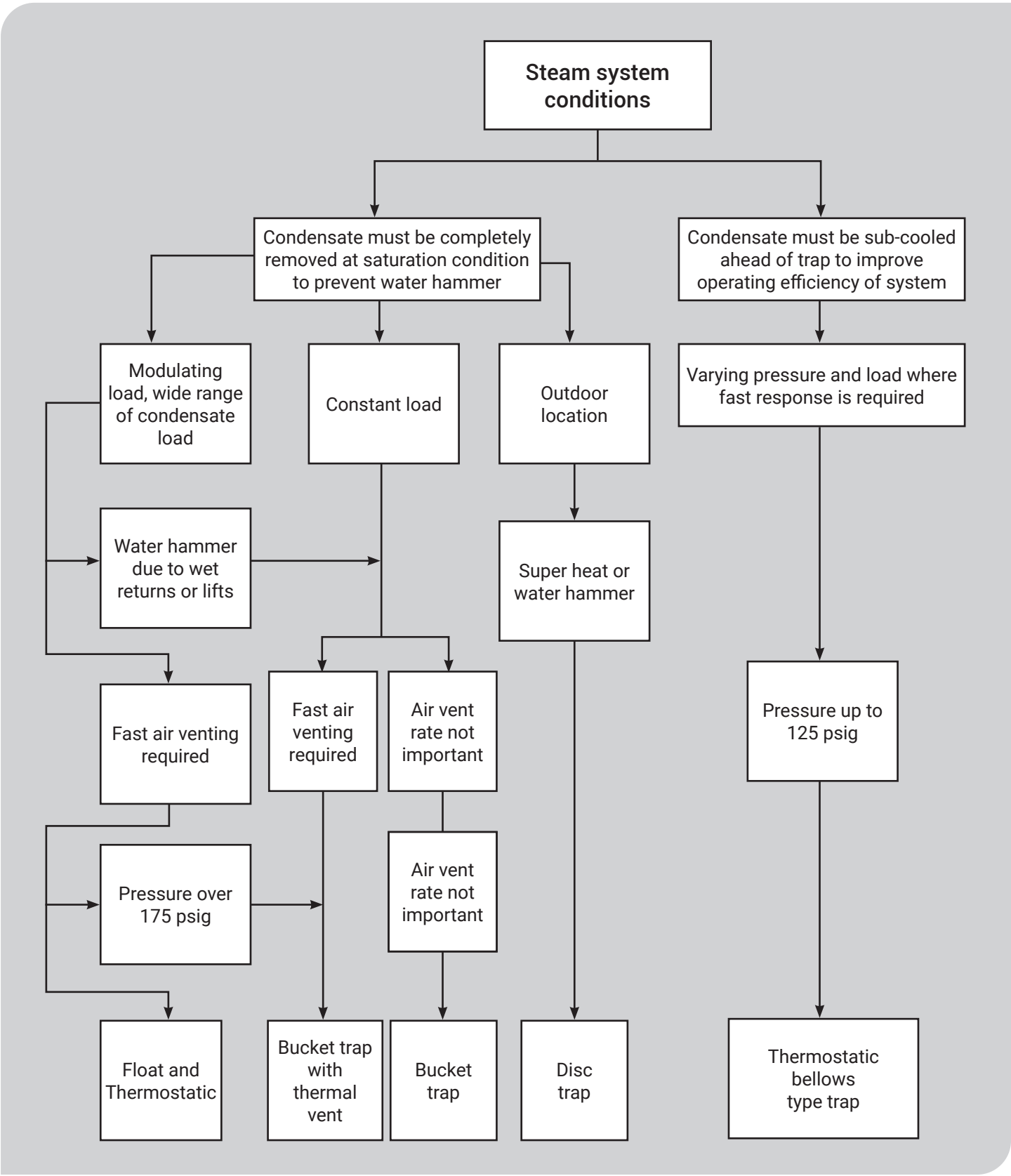
Guidelines:

- Steam pressure at the trap inlet lifts the condensate. Differential steam pressure across the steam trap of 1 psi (0.07 bar) will lift condensate 2 ft. (0.6 m).
- Do not return condensate to an overhead return if modulating control valves are installed. Modulating control valves may cause the inlet pressure to modulate to 0 psi (0 bar). This condition will result in no differential pressure to push the condensate into the overhead return. When this happens, condensate will back up into the steam chamber and result in water hammer. Use a Hoffman condensate unit to collect condensate.

Steam trap criteria comparison

Criteria	F&T	Inverted bucket	Thermostatic	Thermodisc
Response to load changes	Fast	Moderate	Moderate	Slow
Air venting	Medium / high	Low	High	Low
Thermal efficiency	Medium / high	Medium	High	Medium
Primary applications	Drip legs process equip.	Drip legs process equip.	Drip legs process equip. tracing	Drip legs tracing
Affected by ambient temperatures	No (susceptible to freezing)		No	Yes (unless insulated)
Relative cost	Medium / high	Medium / low	Low	Low
Capacity	High	High / hr.	Medium	Low
Pressure range	To 250 psig (17.3 bar)	To 250 psig (17.3 bar)	To 125 psig (8.6 bar)	To 600 psig (41.4 bar)
Size vs. capacity	Large	Large	Small	Medium
Ease of maintenance	Moderate	Moderate	Very easy	Very easy
Orientation limits	Yes	Yes	No	No

Steam trap selection guide chart



Steam traps (continued)

Steam trap application guide

This application guide is designed to help in the selection of the type of steam trap for the type of application. The choices are based upon common usage. However, the specific choice of trap type should be based upon variations in the individual system and personal preference. This chart should serve only as a guide.

Application	F&T	Inverted bucket	Thermostatic	Thermodisc
Mains & tracing lines				
Steam mains				
to 30 psig (2.1 bar)	2	3	1	
to 250 psig (17.3 bar)	1	2		3
to 600 psig (41.4 bar)				1
Steam tracing lines				
Critical	2	2	2	1
Non-critical	2	2	1	2
HVAC				
Heat exchangers				
to 20 psig (1.4 bar)	1	2	2	
to 125 psig (8.6 bar)	1	2	2	
to 250 psig (17.3 bar)	1	2		
Radiators				
Unit heaters	2	2	2	1
Air heating coils				
to 15 psig (1.0 bar)	1	3	2	
to 60 psig (4.1 bar)	1	2	2	
Absorption chiller	1	2	2	
Process equipment				
Process vats	1			2
Tank heating				
Storage tanks	2		1	
Line heaters	1		2	
Reboiler	1	2		
Rotating cylinders	1	2		
Evaporators	1	2		
Sterilizer	1		2	
Pressing	1	2	1	
Cooker / Reactor				
to 15 psig (1.0 bar)	1	3	2	
to 60 psig (4.1 bar)	1	2	1	
to 150 psig (10.1 bar)	1	2		

Key: 1 = first choice
2 = second choice
3 = third choice
Blank = not recommended

Series 2000

Pressure and/or temperature pilot operated steam regulators

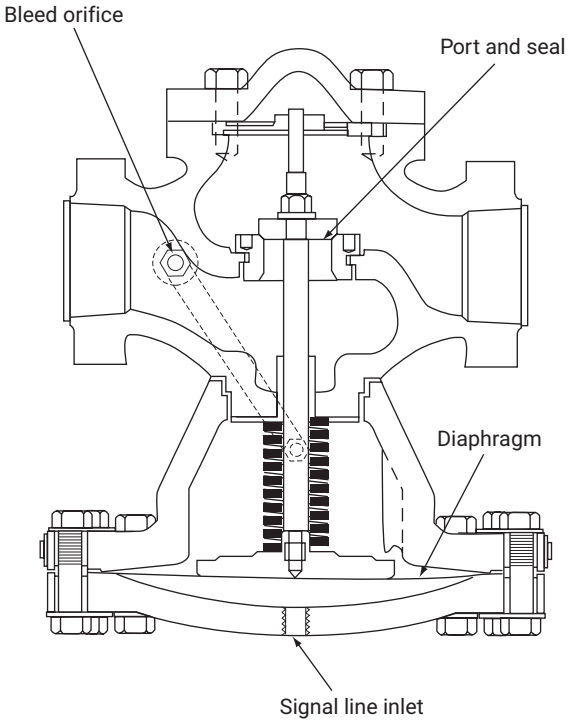
Series 2000 pilot-operated regulators consist of a main valve that is controlled by a single or combination of pilot control valves.

There are a number of types of pilot control valves available:

- **Series SPS spring pressure control pilots** — for self-contained pressure regulation
- **Series AP air pressure control pilots[1]** — for remote pressure control using air pressure
- **Series 315 PNT and Series 240 PNT pneumatic temperature control pilots[1]** — for rapidly changing load requirement applications.

Different types of pilot valves can be used in combination to control more than one function or as a safety override. For example, a temperature pilot may be used in conjunction with a spring pressure pilot to control both temperature and pressure. Or, a temperature pilot may be used with a solenoid pilot to provide automatic shutdown when an over-temperature condition occurs.

[1]Product is discontinued and is no longer available to order.



Operation of Series 2000 pilot-operated regulator main valve

The regulator main valve is held closed by the pressure on the diaphragm from an internal main spring. Pilot control valves control steam flow from the upstream supply side of the main valve to the underside of the diaphragm of the main valve. When the pilot valve opens, steam flows through the pilot and pressure builds in the signal line, applying pressure under the main valve diaphragm. This pressure force compresses the main vale spring and the main valve opens.

Under constant steam demand, the pilot and main valve remain relatively motionless. As the system approaches the pilot set point, the pilot valve begins to close. Less steam passes through the pilot and through the signal line. Pressure in the signal line decreases as steam passes through a small bleed orifice on the main valve. With lower steam pressure under the main valve diaphragm, the main valve spring forces the main valve to close.

Series 2000

Pressure and/or temperature pilot operated steam regulators

Operation — main valve with a spring or air pilot[1]

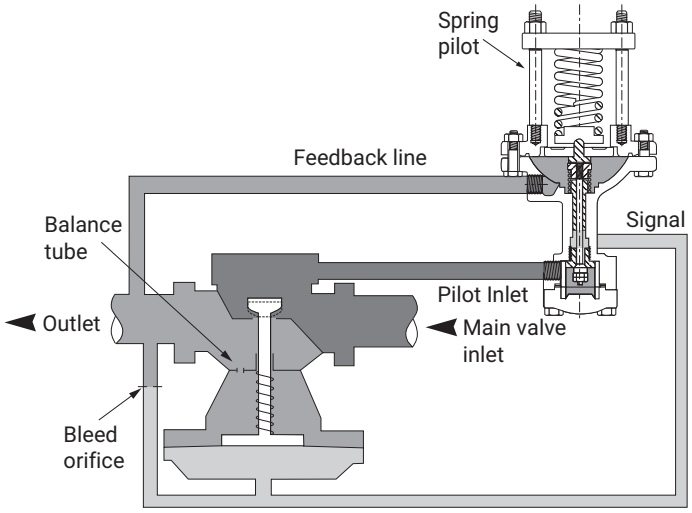
Pressure may be controlled by use of either a spring pilot or an air pilot. The only functional difference is that a spring pilot uses a spring to apply loading force to the pilot diaphragm and the air pilot uses air pressure.

Downstream pressure is sensed and fed back to the pilot through the feedback line to the underside of the pilot diaphragm. The downstream pressure balances against the spring (or air pressure) force in the pilot, causing the pilot valve to move. This movement opens or closes the pilot valve. When the downstream pressure is below the pilot set point, the force from the spring or air opens the pilot vale and inlet steam flows through the pilot. The open pilot valve allows the flow of steam through the pilot seat and signal line, and on to the underside of the main valve diaphragm. The force from the steam pressure pushes against the main valve spring to control the main valve position. The main valve opens or closes in response to its diaphragm movement.

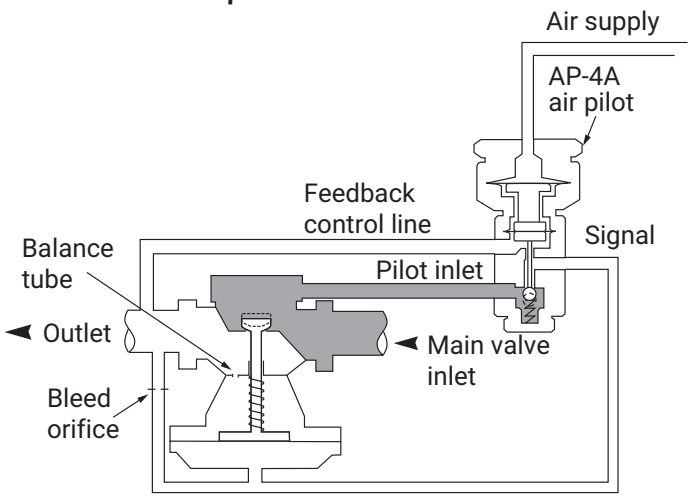
Under constant steam demand, the pilot and main valve remain relatively motionless. As steam demand decreases, the downstream pressure will rise. When the downstream pressure rises, the pilot valve senses the change relative to the spring or air loading force and the pilot begins to close. Less steam flows through the pilot and signal line to the underside of the main valve diaphragm. The steam trapped under the main valve diaphragm bleeds off through an orifice, allowing the main valve to close.

[1]Product is discontinued and is no longer available to order.

Main valve with spring pilot



Main valve with air pilot[1]



Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

Operation — main valve with a self-contained temperature pilot[1]

Self-contained temperature control pilots use a liquid-filled bulb and bellows. The actuating force for the pilot results from the volumetric expansion of the liquid as the bulb temperature increases. The expansion or contraction of the liquid controls the position of the pilot seat.

The sensing bulb is completely inserted into a downstream heated fluid to sense the fluid temperature. The sensing bulb is connected to a bellows by a capillary tube. When the bulb temperature is below the set point, a spring in the pilot keeps the pilot valve open and allows steam to flow from the pilot inlet through the signal line, and on to the underside of the main valve diaphragm. The force from the steam pressure pushes against the main valve spring to control the main valve position. The main valve opens or closes in response to its diaphragm movement.

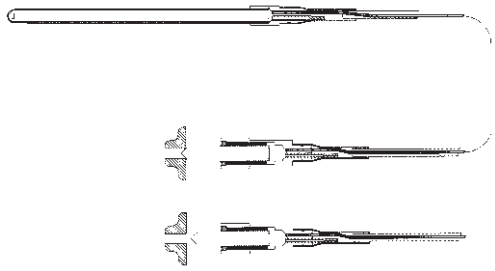
Under constant steam demand, the pilot and main valve remain relatively motionless. As the bulb temperature increases and the liquid expands, the expansion is transmitted through the capillary tube, creating an actuating force on the bellows. The bellows expand to close the pilot valve, shutting down the flow of steam through the pilot seat and signal line to the underside of the main valve diaphragm. The steam trapped under the main valve diaphragm bleeds off through an orifice, allowing the main valve to close.

Operation — main valve with a combination of pilots

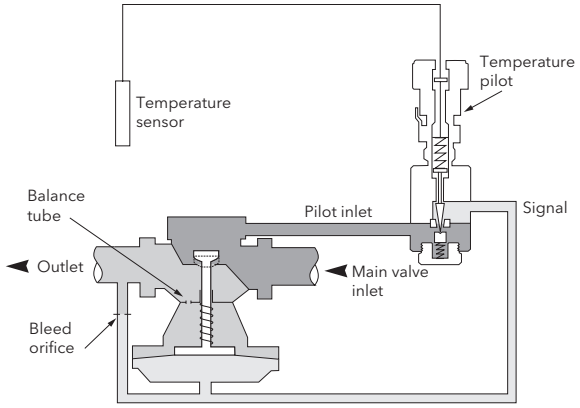
When a temperature pilot is installed in series with a pressure pilot, the pilots perform their functions separately and concurrently. Each pilot regulation cycle is exactly the same as if used alone. When both pilots are open, the main valve will open, if either pilot closes, the main valve will close. The pressure pilot essentially acts to limit the maximum pressure as the temperature pilot cycles to control temperature.

[1]Product is discontinued and is no longer available to order.

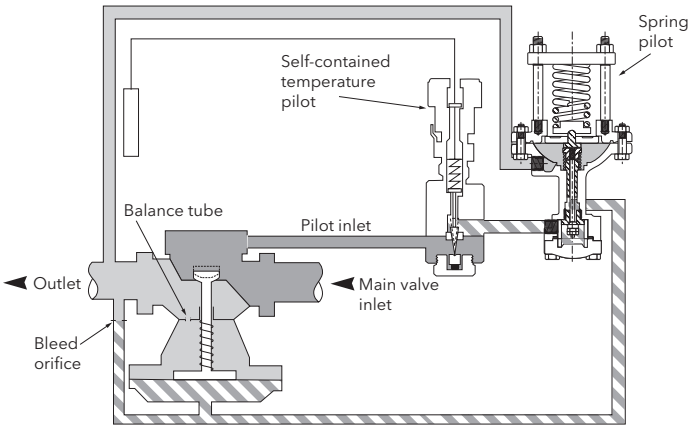
Temperature pilot operation



Main valve with temperature pilot



Main valve with temperature and pressure pilot



Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

Operation — main valve with pneumatic temperature pilots[1]

The air pilot and pneumatic temperature pilot combination is used to control temperature in systems with rapid changes in the required heat load. An air PRV is used to limit the pressure of air supplied to the pneumatic temperature pilot. Limiting this supply pressure limits the air pilot loading force and hence the main valve downstream pressure.

When the pneumatic temperature pilot senses a temperature below the set point, it delivers an air signal to the air pilot based on the sensed temperature. This air signal becomes the air pilot loading force. If the pressure downstream from the main valve is below the air pilot loading force, the pilot valve diaphragm pressure is no longer balanced. The pilot valve opens and inlet steam is passed through the air pilot to the signal line. Steam flowing through applies pressure on the lower side of the main valve diaphragm. This force from the steam compresses the main valve spring and the main valve opens.

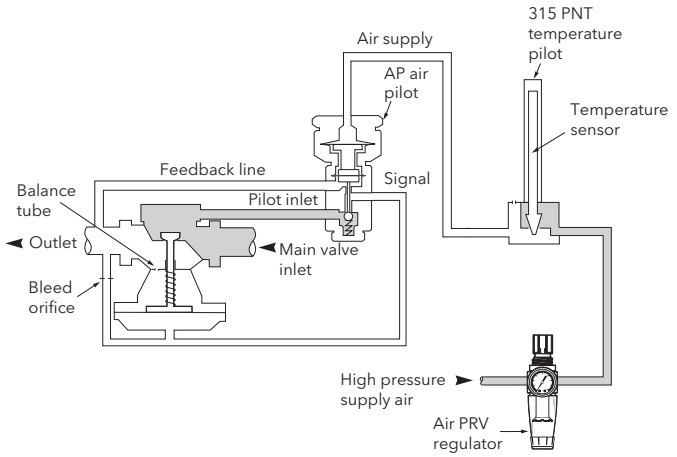
Under constant steam demand, the pilot and main valve remain relatively motionless. As temperature rises to the pneumatic temperature pilot set point, the temperature pilot lowers the loading force to the air pilot. When the loading force decreases below the force produced by the downstream pressure, the air pilot begins to close. Less steam flows through the air pilot and signal line to the underside of the main valve diaphragm bleeds off through an orifice, allowing the main valve to close.

Operation with the GT610-IP Electro-Pneumatic Transducer is similar with the exception that the sensed temperature is represented by an electronic signal which the transducer converts to a pneumatic control signal for the air pilot.

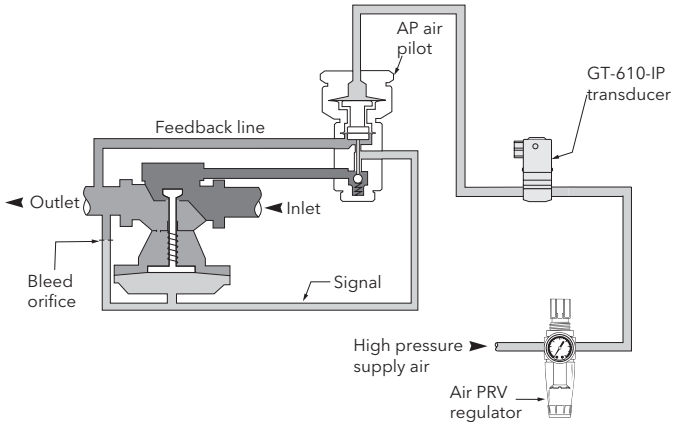
These arrangements give rapid response for heat load changes and it also limits main valve downstream pressure.

[1]Product is discontinued and is no longer available to order.

Main valve with pneumatic temperature pilot and air pilot



Main valve with electro-pneumatic transducer and air pilot

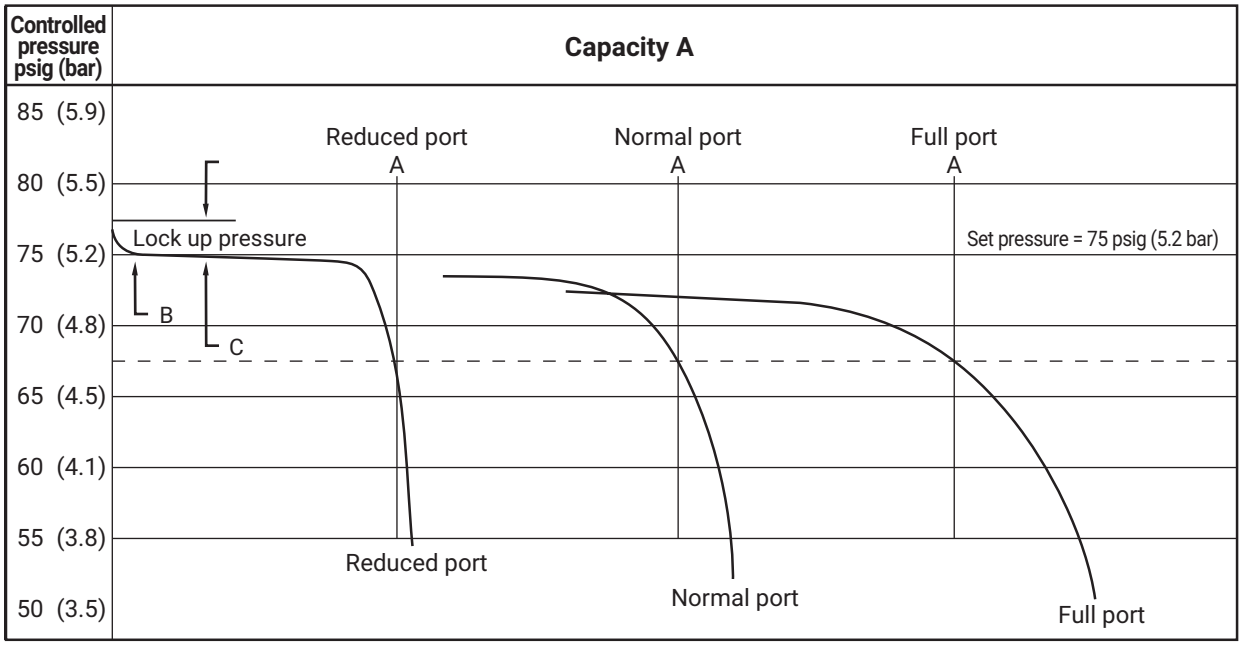


Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

Accuracy of control — regulator steam capacities

Hoffman Specialty Series 2000 Regulator capacities, shown in the flow capacity charts on pages 47 - 50 in the Series 2000 Ordering information section, are based on test data. The chart data indicates flow capacity values derived from plots of test data that show the drop away (droop) from the set pressure as shown in the graph below. The rated flow capacity (A) is where the curve passes a pressure droop of 10% of set pressure below the set pressure (B) [i.e., 75 psi x 0.1 = 7.5 psi (5.2 bar x 0.1 = .52 bar) below the set pressure of 75 psig (5.2 bar)]. The curves in the graph below demonstrate how the reduction in trim size affects performance. As a general rule, it is best to use the smallest valve and trim possible that provides adequate flow capacity.



Capacity units are not shown. Curves are typical for all Main Valve sizes.

A. Flow at which port will be rated 10% droop [i.e., 75 psig x .1 = 7.5 psig (5.2 bar x .1 = .52 bar)] from set pressure.

B. Minimum controllable flow.

C. Pressure rise above set pressure upon closing.

Capacity vs controlled pressure for typical main valve with spring pilot

Regulator saturated steam capacities are tabulated in charts on pages near the Series 2000 Regulator Ordering information. Note that all valves are available in several trim sizes to allow flexible selections. These capacities have been determined as outlined in PTC 19.5; 4-1959 "Chapter 4 Flow Measurement, ASME Power Test Code." The capacities conform to Fluid Controls Institute, Inc. specification FCI-58-1, "Definitions of Regulator Capacities." The capacities are based on a 10% accuracy of regulation [2 psig (.14 bar) minimum] with the set point at minimum controllable flow, defined as 2% of maximum flow. Capacities are the same for whichever pilot is utilized.

When using the capacity tables remember:

- Values shown are maximum flow with minimum piping restriction.
- Maximum single stage reduction 150 psi (10.3 bar) (100 psi (6.9 bar) recommended).
- Values are for saturated steam; super heated steam requires a correction factor.
- Outlet pressures lower than the lowest shown will have a capacity equal to the lowest shown.
- All valves have 3 capacity ports available.
- Multi-stage reductions will have a flow capacity equal to the lower flow capacity of the two.

Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

How to size series 2000 main valves

Selecting the proper Series 2000 Pilot-Operated Regulator provides accuracy and efficiency in the control and operation of steam systems and their components. Series 2000 Regulator main valves are controlled by pilot valves. Pilot valves of different types can be used individually or in combination to:

— Control downstream steam pressure

— Control process temperature

— Control both downstream pressure and process temperatures in system components

— Provide a safety override

A complete Series 2000 Regulator consists of:

— Main valve

— Control pilot or combination of pilots

— Hardware kit

Main valve sizing

1. Determine the available steam inlet pressure.
2. Determine the reduced steam outlet pressure.
3. Determine the capacity required by referring to the manufacturer's specifications for your equipment.
4. Apply the specifications (as determined in steps 1-3) to the Full Port Steam Capacity Table to determine the main valve size. If steam inlet pressure is below 30 psig (2.1 bar) use the Low Pressure Steam Capacity Table for Models 2150 or 2250 Main Valves.

Guidelines:

— To prevent seat damage and maintain control and accuracy, do not oversize the main valve. Select a regulator main valve that will operate between 50 - 100% of its capacity rating. If necessary, use Normal or Reduced Port Steam Capacity Tables.

— A Normal or Reduced Port Main Valve is recommended for systems that will expand in the future.

— The maximum recommended pressure drop across a single valve is 100 psig (6.9 bar). Operating with more than a 100 psig (6.9 bar) pressure drop may cause wire draw in the seat and excessive noise.

— Although not recommended, a Series 2000 Main Valve may be used for pressure drops up to 150 psi (10.4 bar).

— Main Valve noise data is available through "Steam Specialty Component Selectors" on the Hoffman Specialty website, ESP-Plus or upon request.

— To prevent excessive relief valve popping, the relief valve set point pressure must be capable of being set as follows:

Downstream system pressure at no load pressure	Relief valve set point pressure = downstream pressure plus
≤ 35 psig	5 psig
> 36 psig	10 psig

5. Use the Main Valve Body Style Chart to select a model number (based on size and pressure).
6. Use the Ordering information Chart to determine the Part number (based on the model number).
7. Size inlet and outlet piping for velocity:

   For heating or indoor applications — 4,000 - 6,000 ft./min. (1,219 - 1,828 m/min.)

   For industrial or outdoor applications — 8,000 - 12,000 ft./min. (2,438 - 3,657 m/min.)

   Note Main Valve noise data available through ESP-Plus, or upon request.
8. Install drip traps ahead of regulators to drain condensate from steam lines.

Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

Sizing examples

Example 1

Conditions:
In this example, the steam supply to the process equipment in the installation (system) will be regulated by one Series 2000 pressure regulator. Assume all equipment will be operating at the same time at a constant load.

Problem:
Calculate the steam load requirements for all of the equipment in the process system by referring to the equipment name plate. Then select a Series 2000 pressure regulator from the Steam Capacity Tables to determine the specific model pressure regulator and valve size needed.

Known data
Inlet Pressure 75 psi (5.3 bar)

Equipment identification	Operating pressure psi (bar)	Maximum pressure psi (bar)	Equipment steam loads requirements lbs./hr. (kg/hr.)	Pipe size In.
A	20 (1.4)	40 (2.8)	300 (136)	½
B		30 (2.1)	600 (272)	¾
C		25 (1.75)	400 (181)	¾
D			800 (363)	1
E			500 (227)	½
F		50 (2.5)	600 (272)	¾
Total capacity 3200 lbs./hr. (1453 kg/hr.)				

Procedure:
For this problem assume:

1. An inlet pressure of 75 psi (5.2 bar).
2. An outlet pressure of 20 psi (1.4 bar).
3. The steam load adds up to 3200 lbs./hr. (1453 kg/hr.) as shown above.
4. Be sure to review the recommendations for good practice in selecting pressure regulators.
5. Refer to the Full Port Capacity Table page 45 first for the selection. The normal and reduced trim capacity tables should be used if there is a possibility the system will be expanded in the future.
6. Select the smallest regulator possible that will handle the steam load requirements. Typically it can be found in the Full Port Capacity Table.
7. When the outlet steam pressure is 50% or less of the inlet pressure, use the lowest outlet pressure shown in the capacity table.

Answer:

1. Referring to the Full Port Capacity Table, with the conditions given above under procedure, the correct valve to select would be a Model 2100 1½" Main Valve-Full Port.
2. Since in this example there is no supply of compressed air in the plant nor a need to also control temperature, a spring pilot would be selected to handle the outlet pressure requirements. This would be a Model SPS-30 with an adjustable range of 2 to 30 psi (.14 to 2.0 bar). Adjust the pilot to 20 psi (1.4 bar). A model SPS-60 pilot with an adjustable range of 5 to 60 psi (0.3 to 4.1 bar) could also be used.

Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

Typical guidelines for selection of temperature regulators

The degree of temperature variation depends on load change.
The chart below is based on 0% through 100% load change.

Type of heater	Application	Type of regulator
Instantaneous heater	Domestic hot water	Series 2000 with pneumatic pilot for ± 4ºF (± 2.2ºC). Must be used with anti-scald protection.
	Process fluids	Series 2000 with pneumatic pilot for ± 4ºF (± 2.2ºC).
	Wash down stations	Same as process fluids (Pneumatic recommended if available)
	Steam to water converters	Series 2000 with either direct or pneumatic operated pilots. ± 10ºF (± 5.6ºC) accuracy.
Semi-instantaneous heater or storage heater	Domestic hot water	Series 2000 with pneumatic temperature pilot ± 4ºF (± 2.2ºC) accuracy. Must be used with anti-scald protection.
	Process fluids	Series 2000 with pneumatic temperature pilot ± 4ºF (± 2.2ºC) accuracy. Direct-operated pilots ± 10ºF (± 5.6ºC) accuracy.
	Wash down stations	Same as process fluids

Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

A complete Series 2000 regulator consists of:

— Main valve

— Control pilot or combination of pilots

— Hardware kit

There are a number of types of pilot control valves available:

- **Series SPS spring pressure control pilots —** for self-contained pressure regulation.
- **Series AP air pressure control pilots[1] —** for remote pressure control using air pressure (requires an air pressure signal).
- **Series 315 PNT and Series 240 PNT pneumatic temperature control pilots[1] —** for rapidly changing load requirement applications (requires an air pressure signal and an AP Air Pressure Control Pilot).
- **Series SLD solenoid pilots[1] —** for remote control or safety overrides.

Different types of pilot valves can be used in combination to control more than one function or as a safety override. For example, a temperature pilot may be used in conjunction with a spring pressure pilot to control both temperature and pressure. Or, a temperature pilot may be used with a solenoid pilot to provide automatic shutdown when an over-temperature condition occurs.

How to select Series 2000 pilots

Series SPS spring pressure control pilots
— for self-contained pressure regulation.

1. Determine the reduced steam outlet pressure to be maintained downstream of main valve.
2. Use the Spring Pilot Ordering information chart to:
   a. Select a model number (based on the outlet pressure determined above).
   b. Determine the part number (based on the model number).

Series AP air pressure control pilots[1] — for remote pressure control using air pressure (Air PRV Regulator is also required)

1. Determine the reduced steam outlet pressure to be maintained downstream of main valve.
2. Determine the air loading pressure available from the Air PRV or Pneumatic Temperature Pilot.
3. Use the Air Loading Data Graph to select a model number that meets the requirements of the outlet steam pressure and available air loading pressure as determined above.
4. Use the Air Pilot Ordering information chart to determine the part number (based on the model number).
5. Use the Air PRV Regulator Ordering information chart to determine the part number.

[1]Product is discontinued and is no longer available to order.

Series 2000

Pressure and/or temperature pilot operated steam regulators (continued)

How to select series 2000 pilots (continued)

Series 315 PNT pneumatic temperature pilot[1]
— For shop quality air

1. Determine the process temperature of the fluid whose temperature is being controlled.
2. Determine bulb material compatible with process fluid.
3. Use Model 315 PNT Pneumatic Temperature Pilot Ordering information to select model (based on temperature range and bulb material as determined above).
4. (Optional) Use the well ordering information chart to:
   a. Select a model number (based on bulb material).
   b. Determine the part number (based on the model number).
5. Determine the reduced steam outlet pressure to be maintained downstream of main valve.
6. Determine the air loading pressure available from the Air PRV or Pneumatic Temperature Pilot.
7. Use the air loading data graph to select a model number that meets the requirements of the outlet steam pressure and available air loading pressure as determined above.
8. Use the air pilot ordering information chart to determine the part number (based on the model number).
9. Use the air PRV Regulator ordering information chart to determine the part number.

Series 240 PNT pneumatic temperature control pilot[1]
— For Control Quality Air

1. Use Model 240 PNT Pneumatic Temperature Pilot Ordering information to determine part number.
2. Determine the reduced steam outlet pressure to be maintained downstream of main valve.
3. Determine the air loading pressure available from the Air PRV or Pneumatic Temperature Pilot.
4. Use the air loading data graph to select a model number that meets the requirements of the outlet steam pressure and available air loading pressure as determined above.
5. Use the air pilot ordering information chart to determine the part number (based on the model number).
6. Use the air PRV regulator ordering information chart to determine the part number.

Electro-pneumatic transducer[1]

1. Use the electro-pneumatic transducer ordering information chart to determine the part number.
2. Use the air loading graph to select a model number that meets your desired outlet steam pressure (based on your available air loading pressure).
3. Use the air PRV regulator ordering information chart to determine the part number.

Solenoid pilots for on/off control[1]

1. Determine which operating mode, "normally open" or "normally closed", is better suited for your application by reading the descriptive information.
2. Use the ordering information chart to:
   a. Select a model number (based on the operating mode and the inlet steam pressure operating range).
   b. Determine the part number (based on the model number).

Solenoid pilots for on/off control[1]

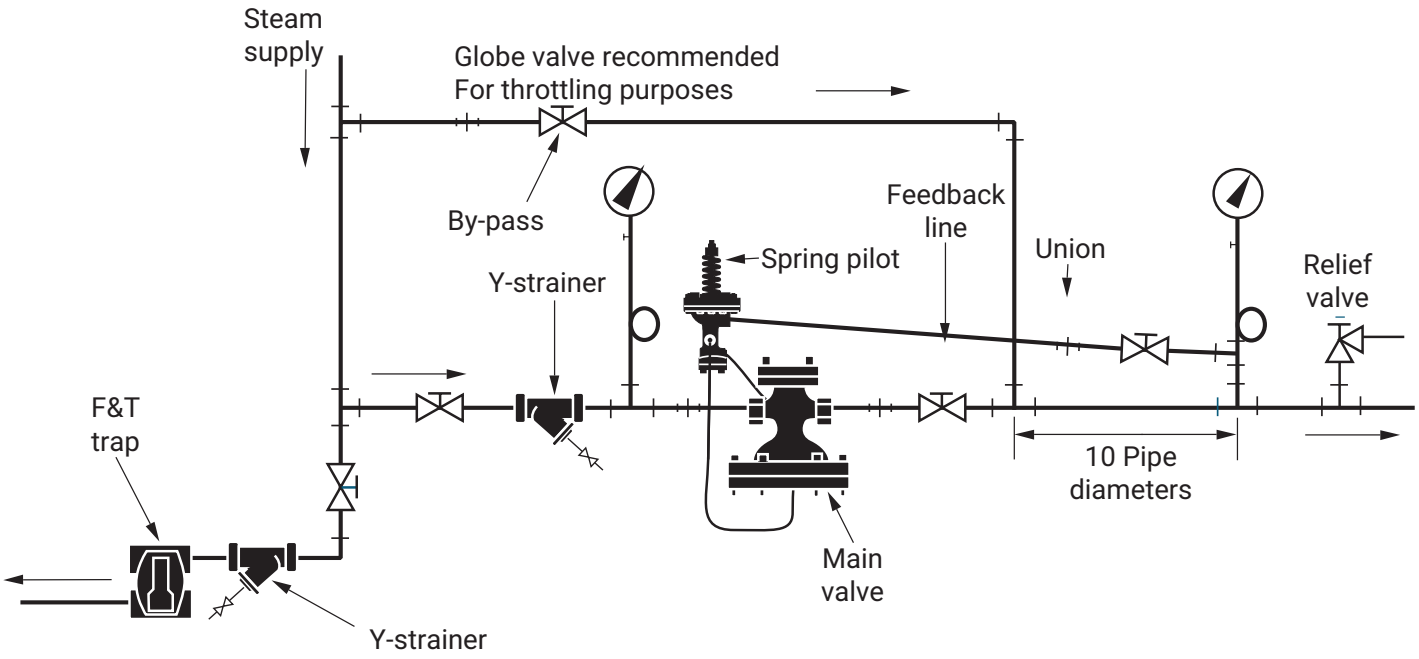
1. Use the hardware kit ordering information chart to:
   a. Select a kit (based on the main valve size and the type of pilot(s) used).
   b. Determine the part number (based on the kit selected).

[1]Product is discontinued and is no longer available to order.

Series 2000 typical applications

Typical Series 2000 pressure pilot installation

Description: Series 2000 main valve and a spring pilot are used to reduce steam pressure. The maximum pressure drop should not exceed 150 psig (10.3 bar). For longer life of the valve seat and reduced noise level 100 psig (6.9 bar) is the maximum recommended pressure drop.

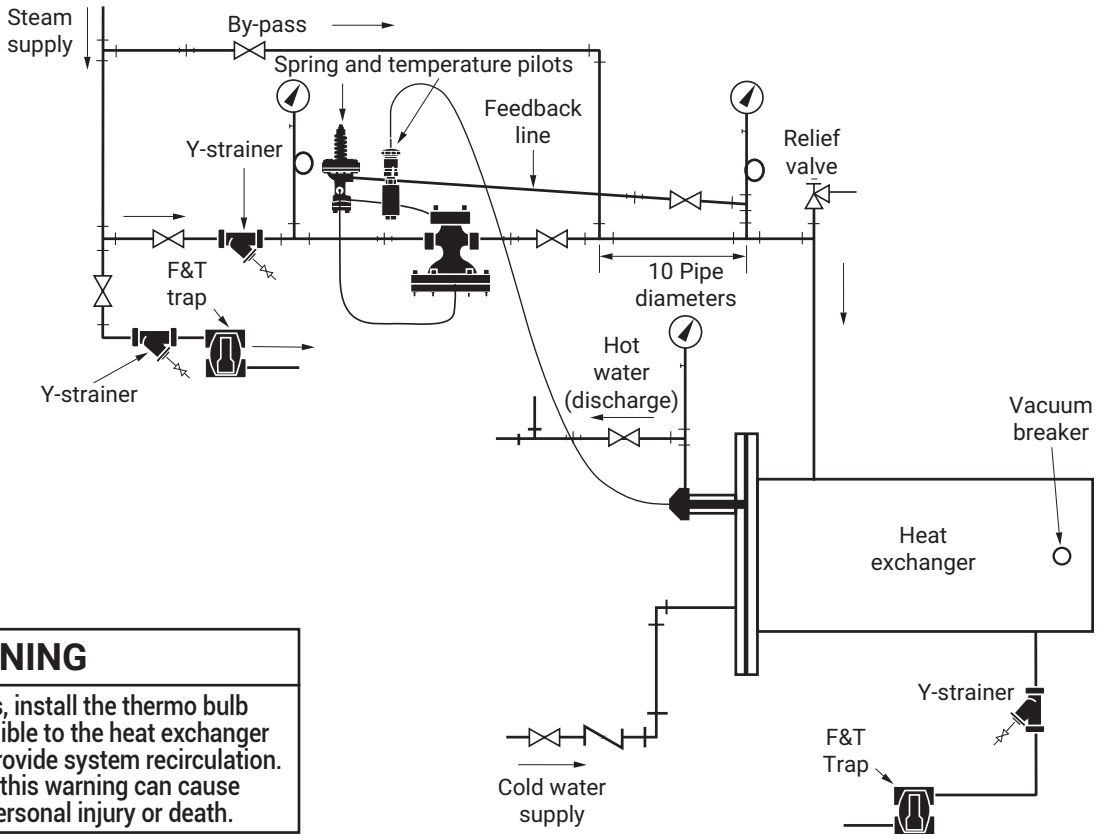


The relief valve should be sized for maximum capacity. A by-pass line and drip trap are always recommended for pressure regulator installations. The sensing line should be at least 10 pipe diameters downstream from the gate valve.

Series 2000 typical applications (continued)

Typical Series 2000 combination pressure-temperature pilot to control water heater exchanger

Description: Series 2000 main valve used to control temperature of fluid from shell and tube heat exchanger. A pressure pilot may also be added to limit the steam pressure in the heat exchanger shell. A by-pass and a drip leg are recommended for proper control.

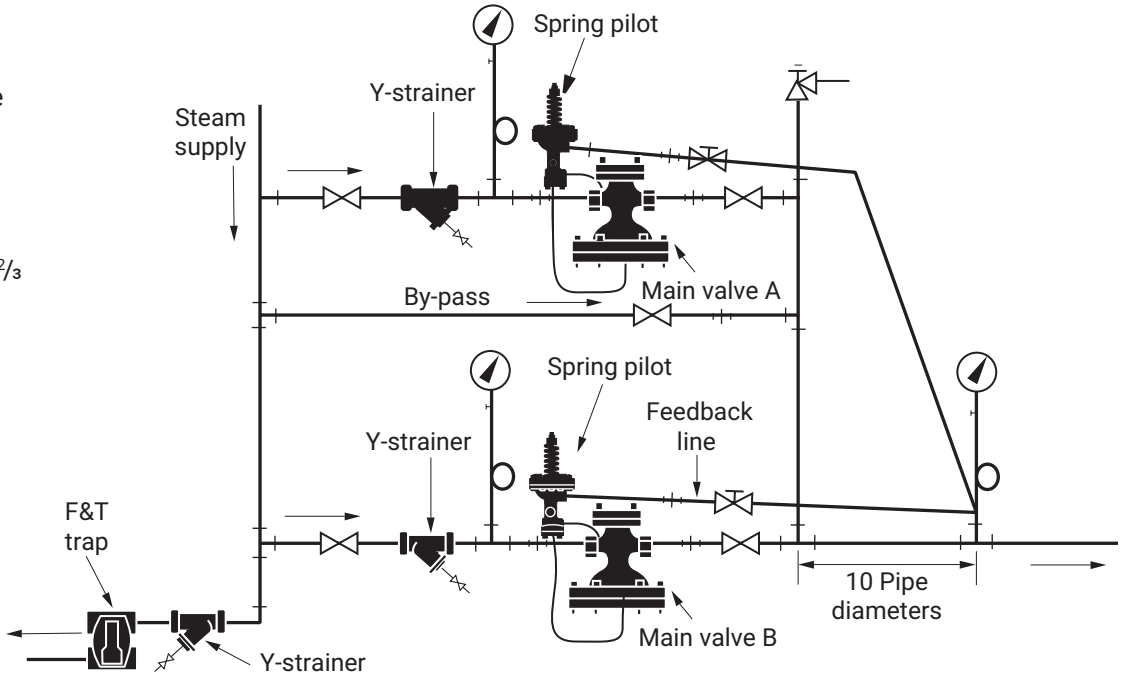


⚠ WARNING

To prevent burns, install the thermo bulb as close as possible to the heat exchanger discharge and provide system recirculation. Failure to follow this warning can cause serious burns, personal injury or death.

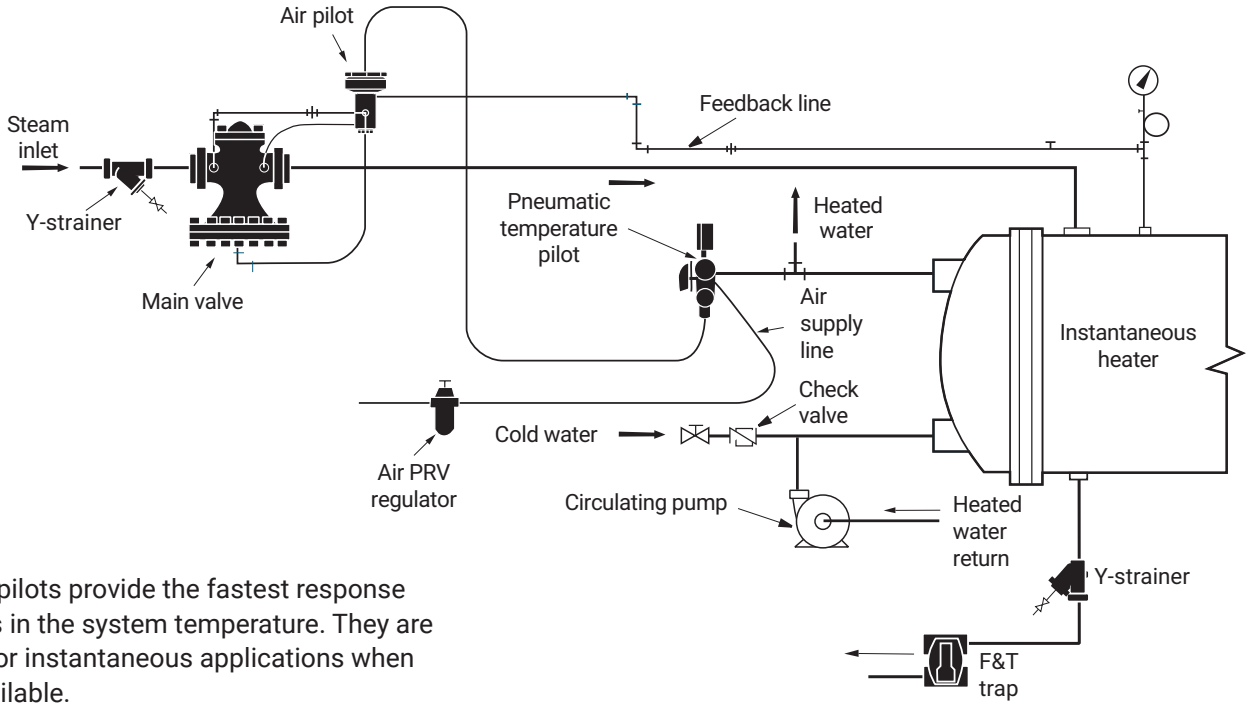
Typical parallel pressure regulator station

Description: Used when the load requirements widely vary. Main valve "A" is sized based on 1/3 the total load for normal operation. Main valve "B" is sized based on 2/3 the total load for peak duty operation.



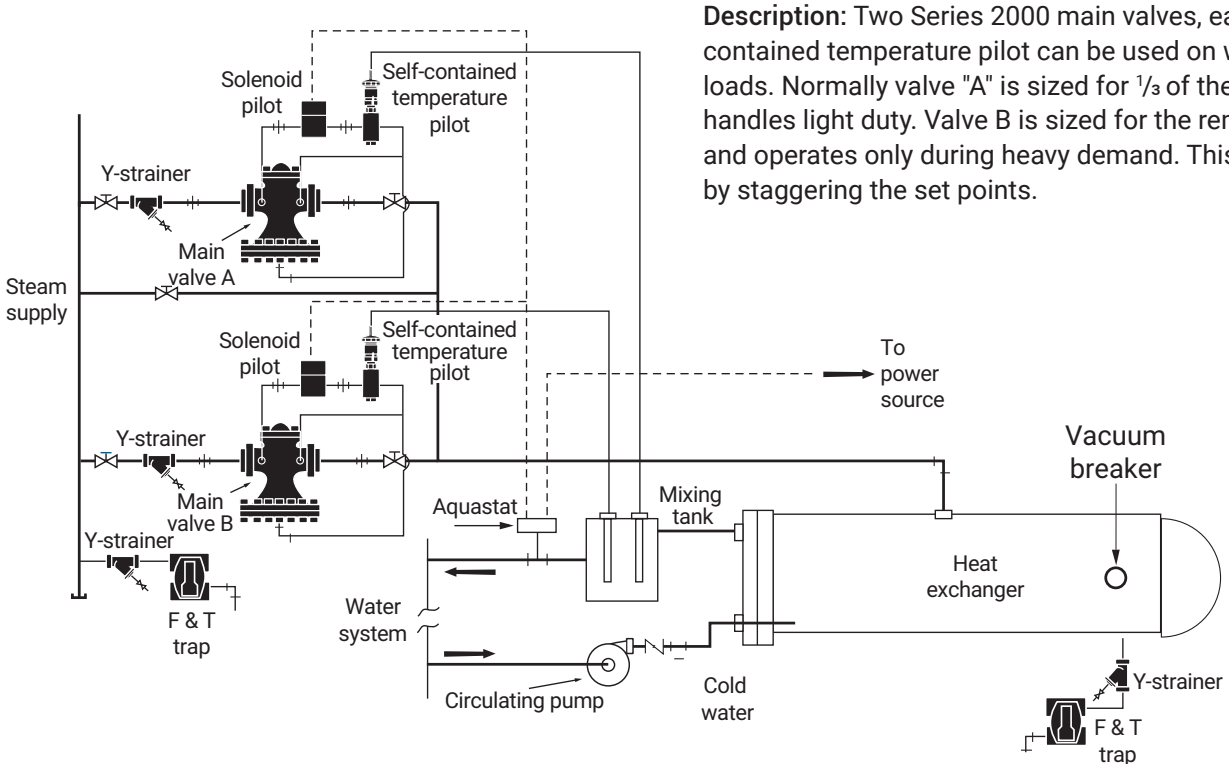
Series 2000 typical applications (continued)

Pneumatic temperature control on instantaneous heater



Description: Air pilots provide the fastest response to rapid changes in the system temperature. They are recommended for instantaneous applications when control air is available.

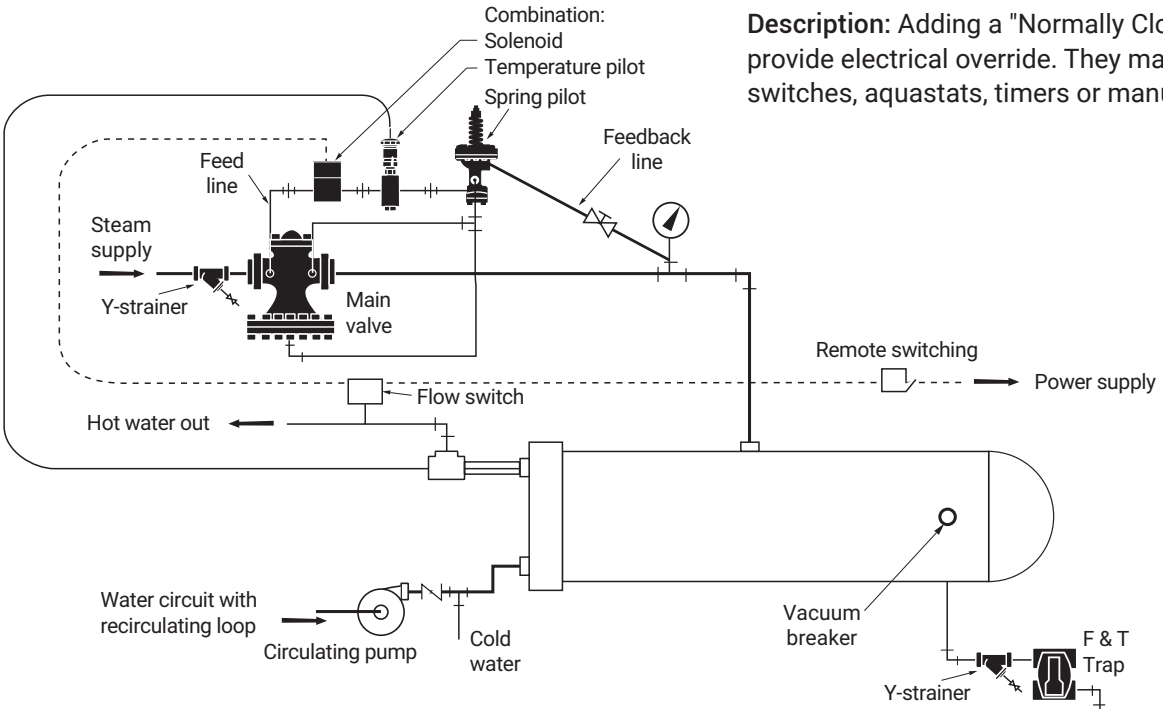
Temperature regulators used in parallel to control widely varying flow rates



Description: Two Series 2000 main valves, each with a self-contained temperature pilot can be used on widely varying loads. Normally valve "A" is sized for ⅓ of the total load and handles light duty. Valve B is sized for the remaining ⅔ load and operates only during heavy demand. This is accomplished by staggering the set points.

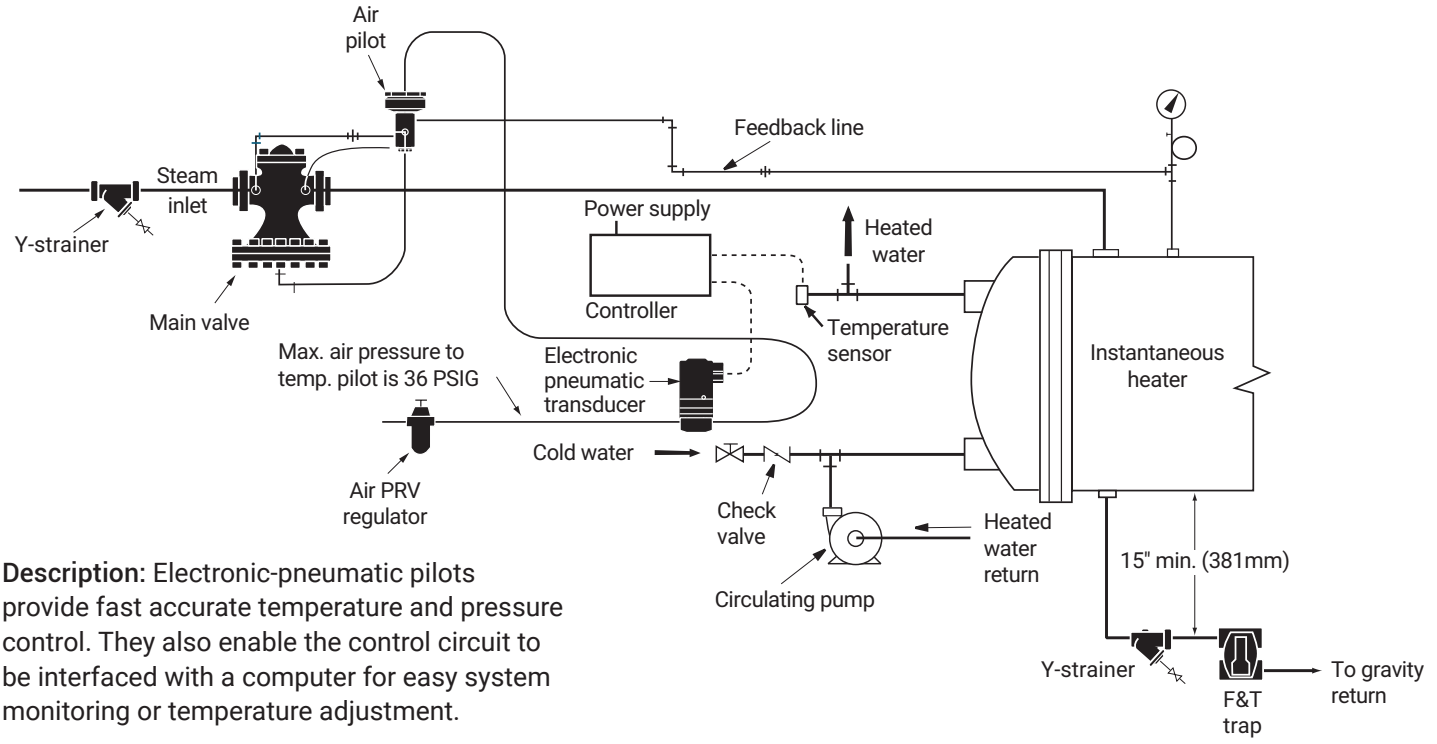
Series 2000 typical applications (continued)

Automatic control of heat exchanger with high limit safety control



Description: Adding a "Normally Closed" solenoid pilot can provide electrical override. They may be wired into flow switches, aquastats, timers or manual switches.

Electronic-pneumatic temperature pilot for instantaneous heater recirculation system

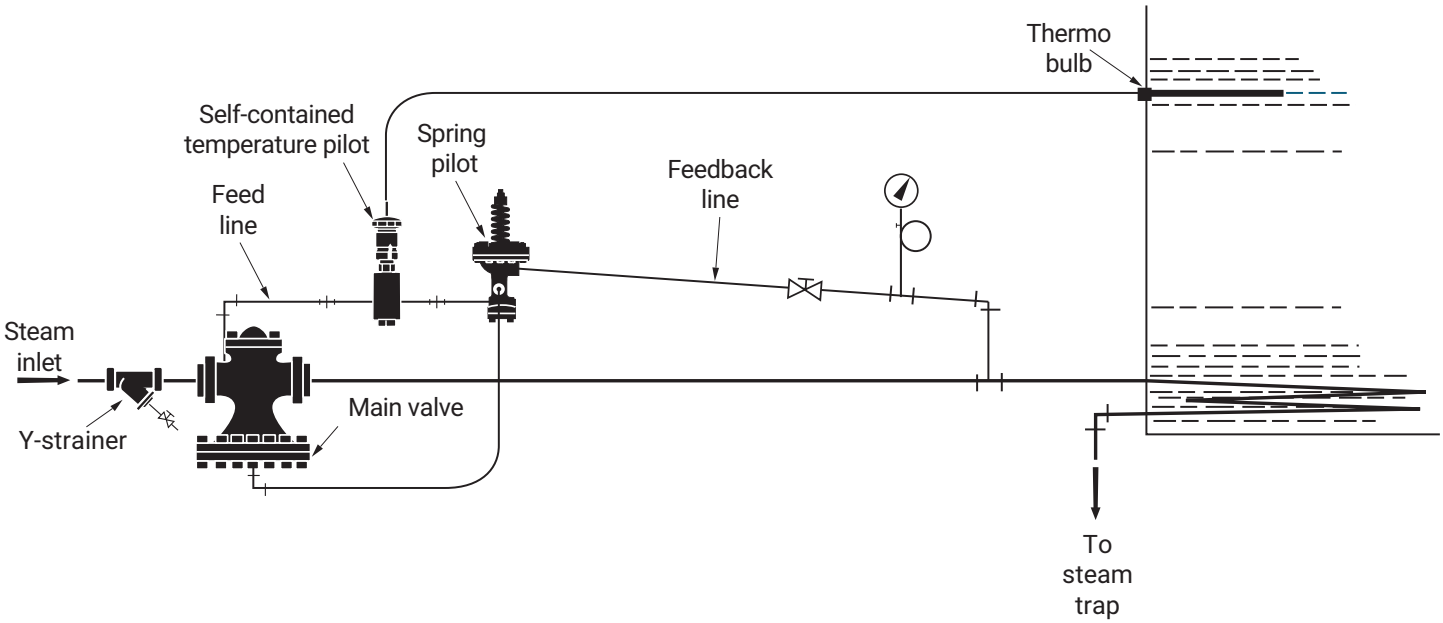


Description: Electronic-pneumatic pilots provide fast accurate temperature and pressure control. They also enable the control circuit to be interfaced with a computer for easy system monitoring or temperature adjustment.

Series 2000 typical applications (continued)

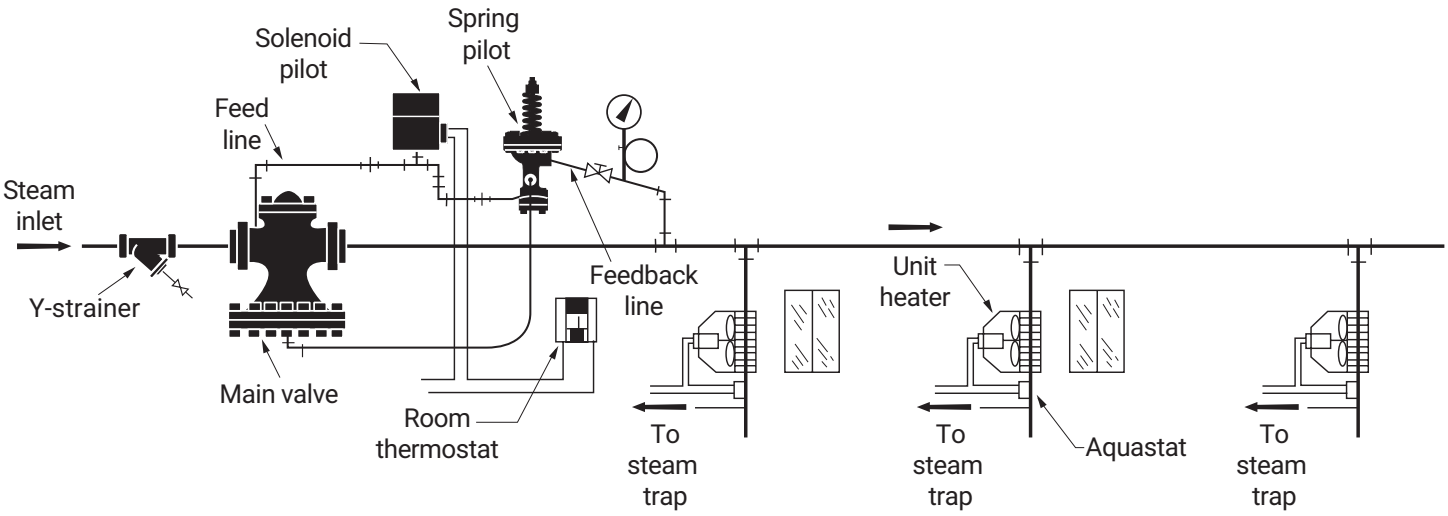
Temperature control for tank farm fuel oil storage

Description: A Series 2000 main valve with a self-contained temperature pilot and a spring pressure pilot are used to control the temperature in an oil storage tank.



Pressure and temperature control for unit heaters

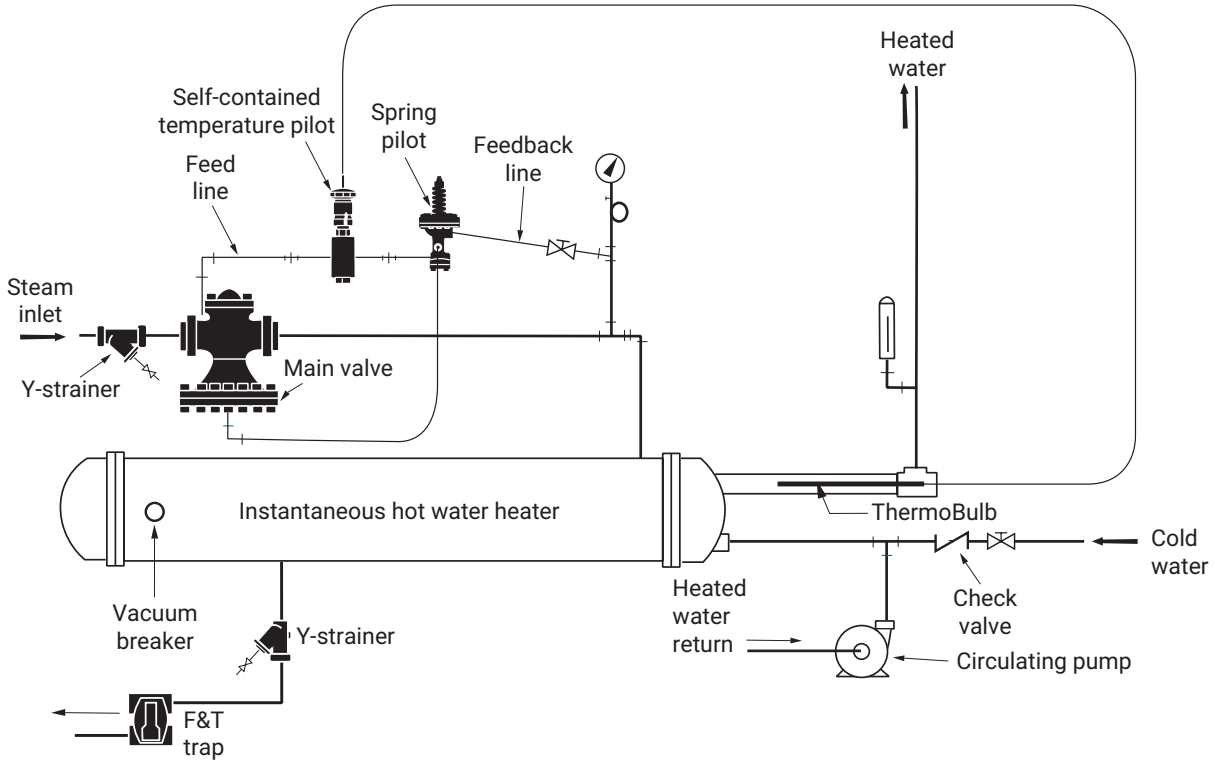
Description: Unit heaters will radiate approximately 7% of their capacity when the fan is off, use of a solenoid pilot controlled by a room thermostat eliminates energy waste when heat is not required.



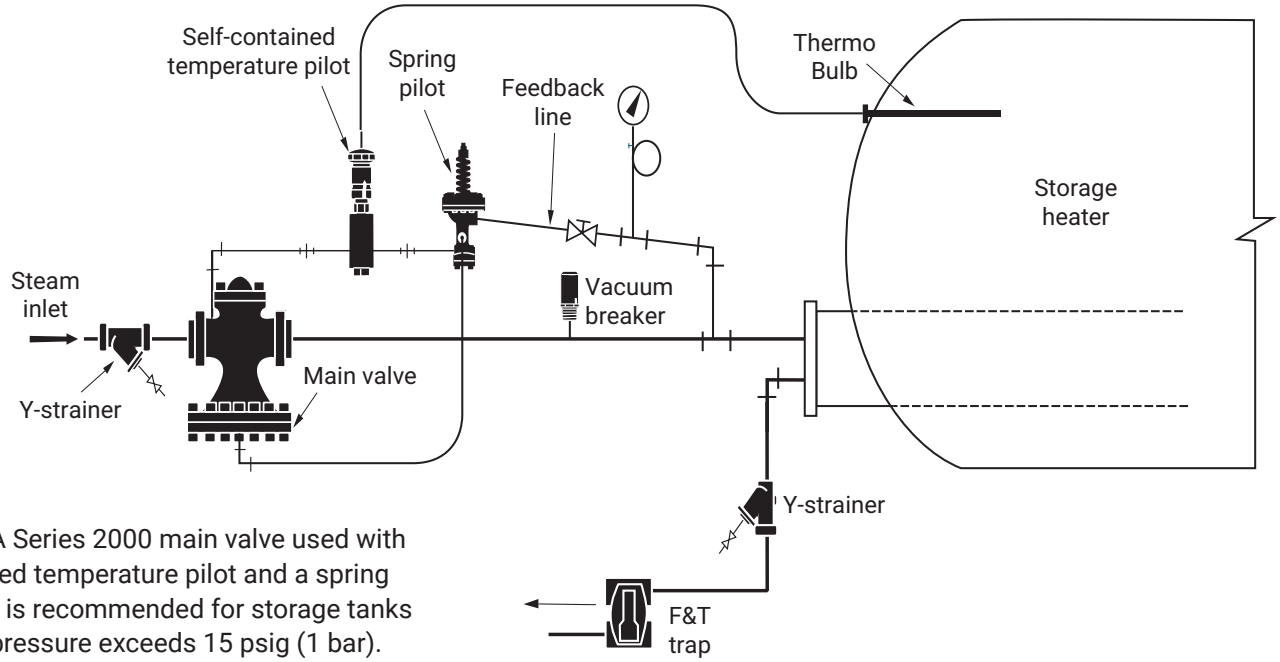
Series 2000 typical applications (continued)

Instantaneous heater domestic hot water

Description: Direct acting pilots may be used to control instantaneous heat exchangers when control air is not available (use in conjunction with fail safe valves for domestic hot water applications). (Must be used to circulate water across bulb to prevent temperature build-up in the heat exchangers tube.)



Storage heater for domestic hot water



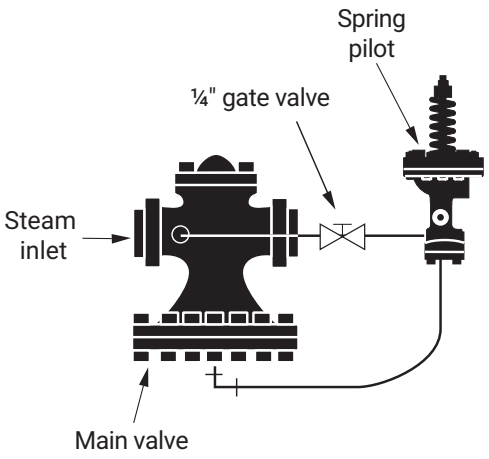
Description: A Series 2000 main valve used with a self-contained temperature pilot and a spring pressure pilot is recommended for storage tanks when steam pressure exceeds 15 psig (1 bar).

Series 2000 typical applications (continued)

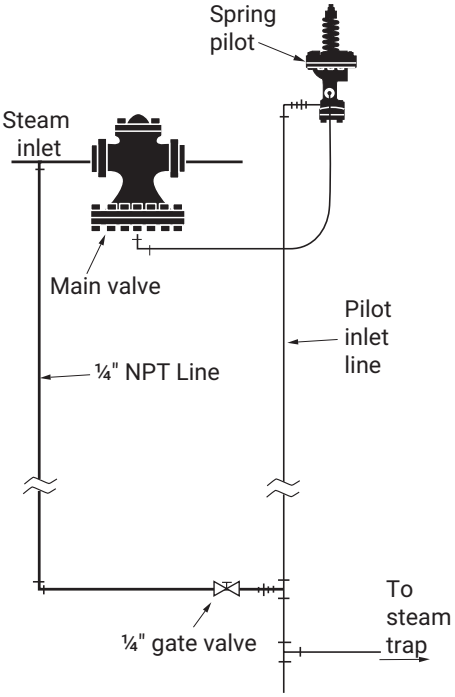
Manual system shut-off

Description: A ¼" NPT gate valve may be added in the feed line to allow manual shutdown of the main valve.

For operation at regulator

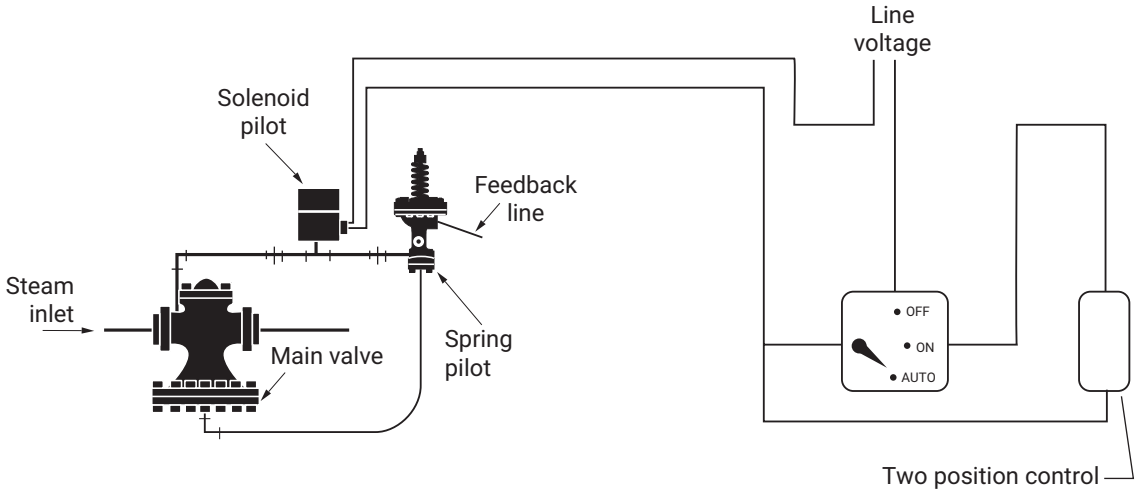


For remote operation up to 50' (15.2 m) with ½" NPT



Remote electrical shut-off

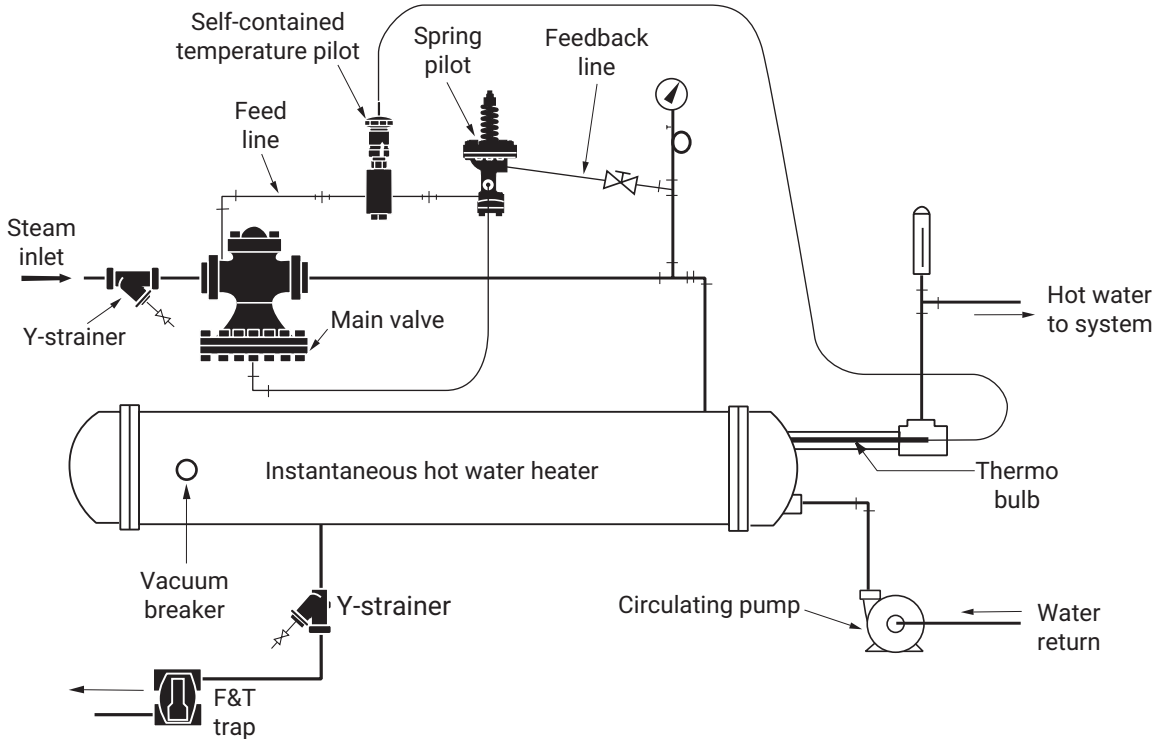
Description: A Solenoid pilot is used to electronically shutdown the flow of steam to the pilot, which will close the Main Valve.



Series 2000 typical applications (continued)

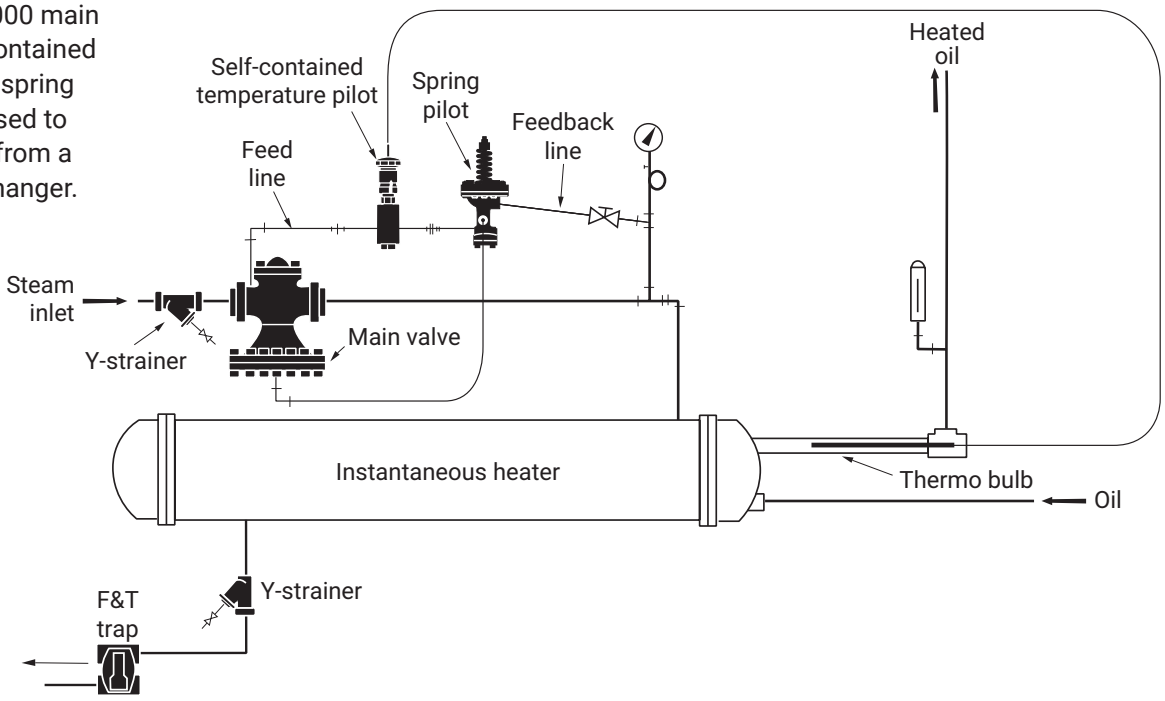
Heating converter steam to hydronic

Description: A Series 2000 main valve used with a self-contained temperature pilot and a spring pressure pilot, provide economical control for steam to water converters.



Oil pre-heater temperature control

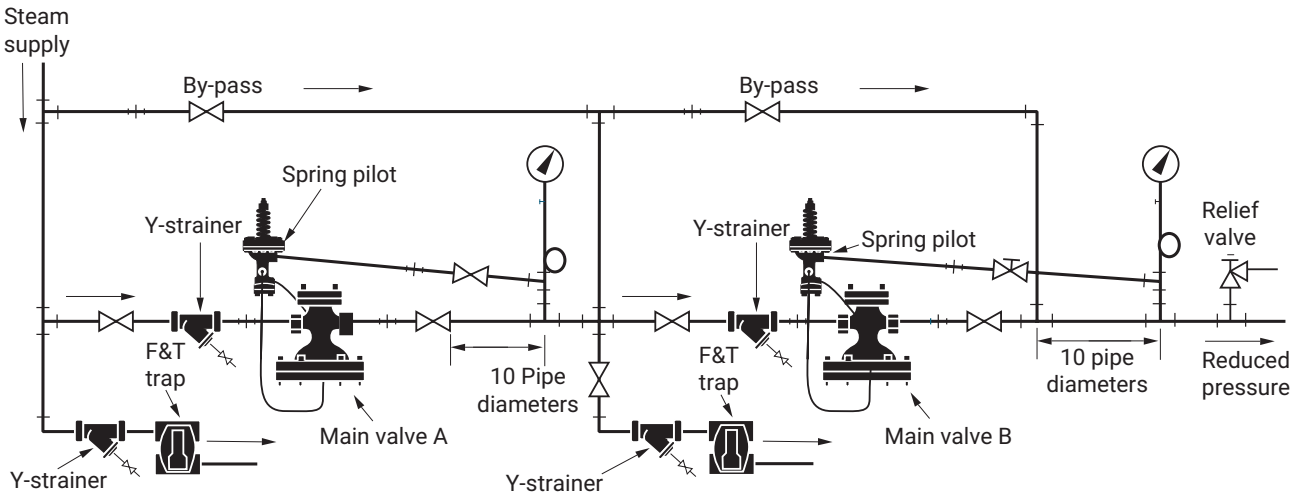
Description: A Series 2000 main valve used with a self-contained temperature pilot and a spring pressure pilot may be used to control oil temperature from a shell and tube heat exchanger.



Series 2000 typical applications (continued)

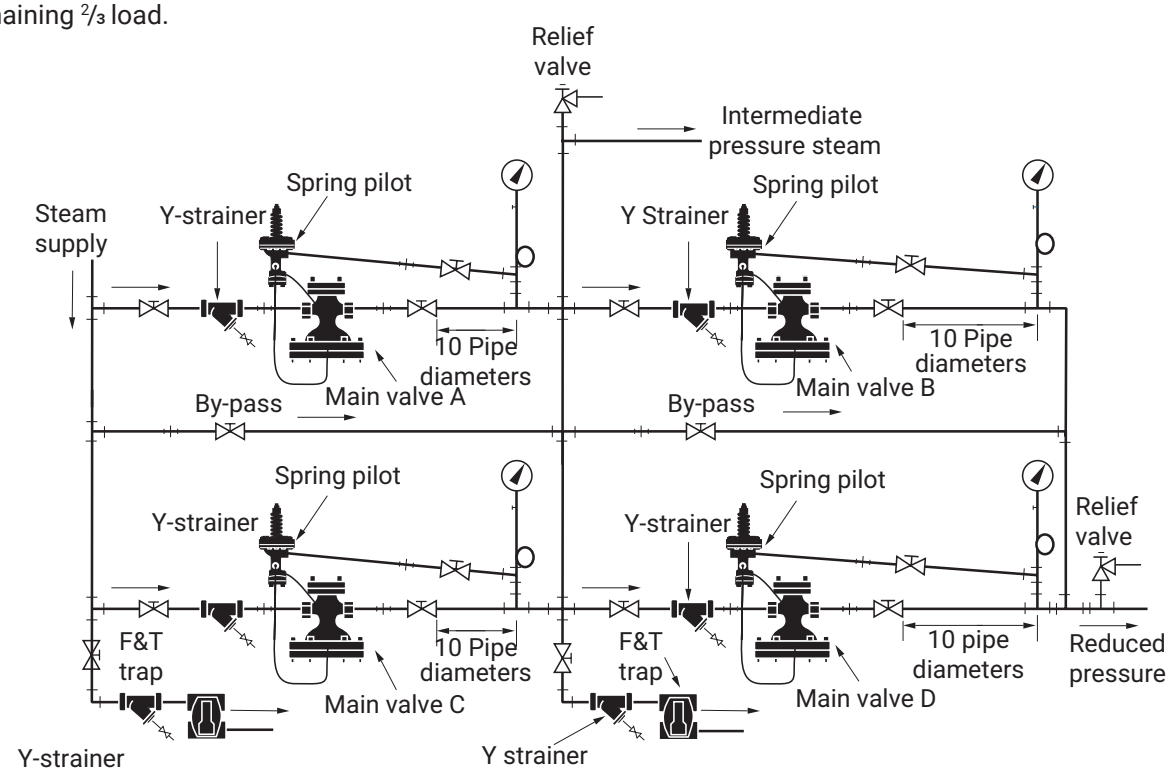
Typical two stage pressure regulating station with by-pass

Description: The maximum pressure reduction for one valve is 150 psig (10.3 bar) although 100 psig (6.9 bar) is recommended. Two stage reduction should be used for pressure drops greater than 100 psig (6.9 bar).



Typical two stage parallel pressure reduction with intermediate pressure available

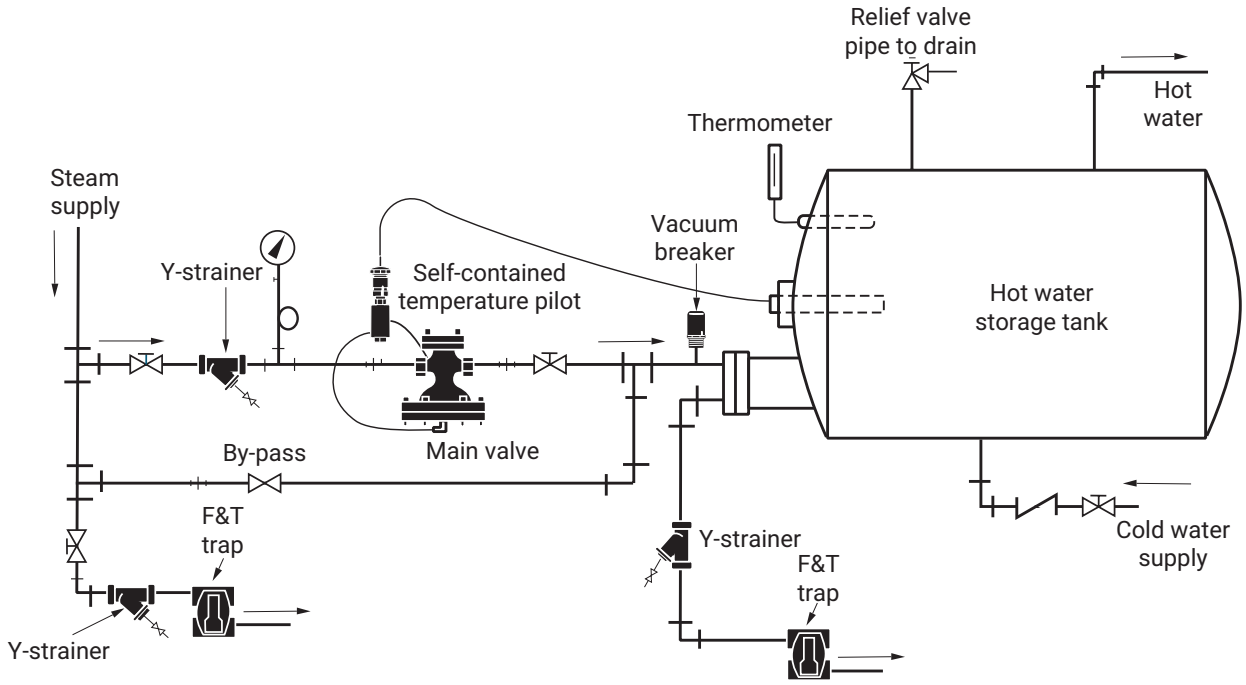
Description: Used when the load varies and the maximum pressure reduction is greater than 150 psig (10.3 bar) and 100 psig (6.9 bar) is the maximum recommended pressure reduction. Main valve A is sized for ⅓ the load ½ of the pressure reduction. Main valve B is sized for ⅓ the load and the other ½ of the pressure reduction. Main valves C and D are sized for the remaining ⅔ load.



Series 2000 typical applications (continued)

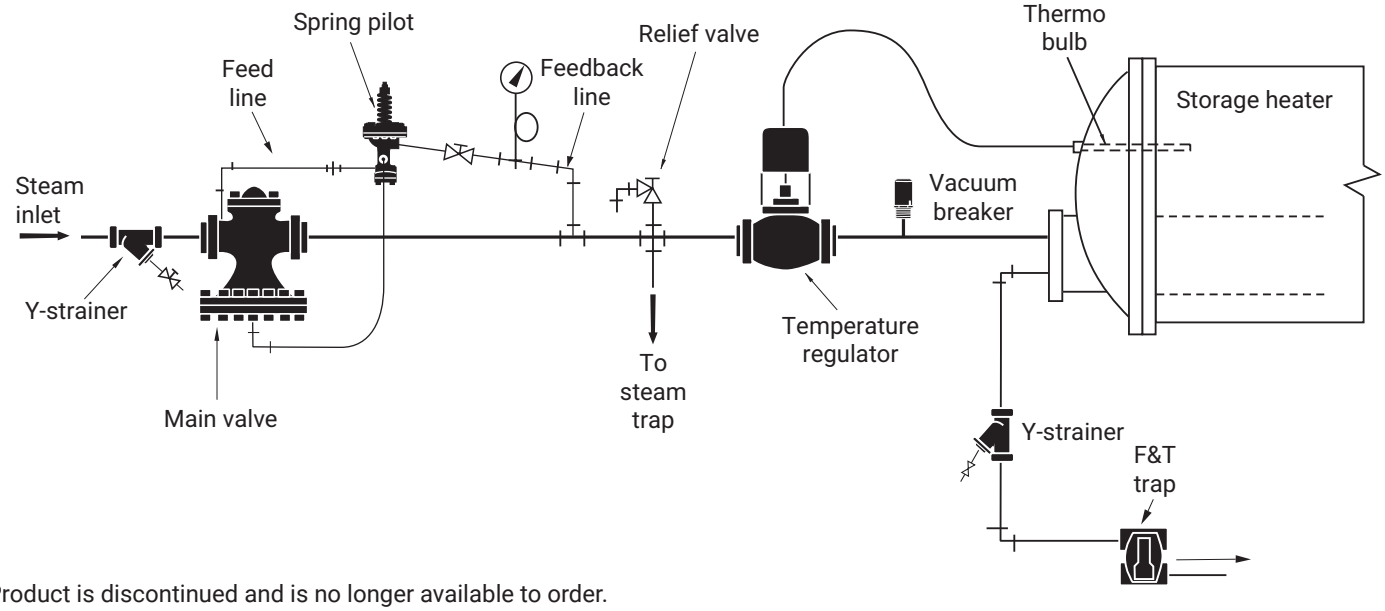
Control of temperature for storage tanks

Description: A Series 2000 main valve may be used to control temperature in a hot water storage tank. for low pressure steam applications use a self-contained temperature pilot. for high pressure steam applications use a self-contained temperature pilot and a spring pressure pilot.



Control of temperature for storage tanks

Description: A Series 2000 main valve and a spring pressure pilot may be used to reduce steam pressure to a direct-acting temperature regulator[1].



[1]Product is discontinued and is no longer available to order.

Steam and water vents

Selection guidelines — steam vents

Steam vents are used in one-pipe steam heating systems. As such, steam vents are primarily replacement items. Information required for sizing and selection:

1. Type of service

Determine the type of service where the vent is to be installed

a) Radiator vent

b) Convector vent

c) Main vent

Model number	Radiator (angle type)	Convector (bottom inlet)	Unit heater	Mains	Thermostatic vent (only)
1A	X				
4					X
4A				X	
8C					X
40	X				
41		X			
43		X			
45		X			
74			X		
75				X	
75H				X	
76				X	
508		X			

2. System operating pressure

Determine the operating pressure of the steam system.

a) The rated operating pressure of the vent must be higher than the maximum operating pressure in the steam system. When the system pressure exceeds the vent operating pressure rating, the vent operating pressure rating, the vent cannot open and air will remain in the system. Air in the system produces inefficient steam system operation.

b) On steam systems with pressures up to 125 psig, Thermostatic Traps such as Model 8C and 9C may be used as air vents.

c) Determine if the vent is to be installed in a vacuum system. The Model 76 main vent is for vacuum service. It should be used on systems with a vacuum pump or a vapor system with a coal or wood fired boiler. Systems converted from coal or wood fired to oil or gas should use non-vacuum vents such as the Model 75.

3. Connection size

Determine the NPT connection size where the vent is to be installed.

Steam and water vents (continued)

Selection guidelines — water vents

Water vents are used in hydronic heating systems and chilled water systems to vent air out of the system. Information required for sizing and selection:

1. **Type of service**

   Determine the type of service where the vent is to be installed

   a) Radiator vent

   b) Convector vent

   c) Main vent

Model number	Radiator	Convector	Mains	Built-in vacuum check	Remarks
77	X	X			Small systems
78			X	X	High pressure
79			X	X	Low pressure
792			X		Cast iron body
508	X	X			Moisture type
550		X			Air chamber

2. **System operating pressure**

   Determine the operating pressure of the system. The rated operating pressure of the vent must be higher than the maximum operating pressure in the steam system. When the system pressure exceeds the vent operating pressure rating, the vent will remain closed and air will remain in the system.

3. **Connection size**

   Determine the NPT connection size where the vent is to be installed.

4. **Capacity**

   Vent capacity determines the speed that air is initially vented from the system. Once the system is initially filled with water, very little air should re-enter the system. Thus water vent capacity is relatively unimportant.

5. **Additional features**

   The Model 792 water vent has a ¼ NPT outlet in the cover. This allows the installation of a ¼-inch gate valve for manual venting or testing of the vent.

Hoffman Specialty glossary of terms

Glossary of terms

The definitions given in this section are only those applying to heating and particularly as used in this catalog. Some do not define the terms for all usages.

Absolute humidity: The weight of water vapor in grains actually contained in one cubic foot of the mixture of air and moisture.

Absolute pressure: The actual pressure above zero. It is the atmospheric pressure added to the gauge pressure. It is expressed as a unit pressure such as lbs. per sq. in. absolute.

Absolute temperature: The temperature of a substance measured above absolute zero. To express a temperature as absolute temperature add 460º to the reading of a Fahrenheit thermometer or 273º to the reading of a Centigrade.

Absolute zero: The temperature (-460ºF approx.) at which all molecular motion of a substance ceases, and at which the substance contains no heat.

Air: An elastic gas. It is a mechanical mixture of oxygen and nitrogen and slight traces of other gases. It may also contain moisture known as humidity. Dry air weighs 0.075 lbs. per cu. ft.

One BTU will raise the temperature of 55 cu. ft. of air one degree F.

Air expands or contracts approximately 1/490 of its volume for each degree of rise or fall in temperature from 32ºF.

Air change: The number of times in an hour the air in a room is changed either by mechanical means or by the infiltration of outside air leaking into the room through cracks around doors and windows, etc.

Air cleaner: A device designed for the purpose of removing air-borne impurities such as dust, fumes, and smokes. (Air cleaners include air washers and air filters.)

Air conditioning: The simultaneous control of the temperature, humidity, air motion, and air distribution within an enclosure. When human comfort and health are involved, a reasonable air purity with regard to dust, bacteria, and odors is also included. The primary requirement of a good air conditioning system is a good heating system.

Air infiltration: The leakage of air into a house through cracks and crevices, doors, windows, and other openings, caused by wind pressure and/or temperature difference.

Air valve: See Vent valve.

Atmospheric pressure: The weight of a column of air, one square inch in cross section and extending from the earth to the upper level of the blanket of air surrounding the earth, This air exerts a pressure of 14.7 pounds per square inch at sea level, where water will boil at 212ºF. High altitudes have lower atmospheric pressure with correspondingly lower boiling point temperatures.

Boiler: A closed vessel in which steam is generated or in which water is heated by fire.

Boiler feed pump: A that is governed by a control that monitors the actual boiler water level; and only adds water to the boiler when the boiler needs it. The pump controller is mounted on the boiler.

Boiler feed unit: A pre-packaged system consisting of a tank, pump, and makeup water line that returns condensate to the boiler.

Boiler heating surface: The area of the heat transmitting surfaces in contact with the water (or steam) in the boiler on one side and the fire or hot gases on the other.

Boiler horsepower: The equivalent evaporation of 34.5 lbs. of water per hour at 212ºF to steam at 212ºF. This is equal to a heat output of 33,475 BTU per hour, which is equal to approximately 140 sq. ft. of steam radiation (EDR).

British thermal unit (BTU): The quantity of heat required to raise the temperature of 1 lb. of water 1ºF. This is somewhat approximate but sufficiently accurate for any work discussed in this catalog.

BSPT: British Standard Pipe Thread

Bucket trap (Inverted): A float trap with an open float. The float or bucket is open at the bottom. When the air or steam in the bucket has been replaced by condensate the bucket loses its buoyancy and when it sinks it opens a valve to permit condensate to be pushed into the return.

Calorie (small): The quantity of heat required to raise 1 gram of water 1ºC (approx.)

Calorie (large): The quantity of heat required to raise 1 kilogram of water 1ºC (approx.)

Cavitation: Term used to describe when condensate flashes into steam as it passes through a negative pressure in the eye of a centrifugal pump impeller. Steam pockets may form in the impeller eye and then implode as they enter a positive pressure in the impeller passage.

Centigrade: A thermometer scale at which the freezing point of water is 0º and its boiling is 100º.

Central fan system: A mechanical indirect system of heating, ventilating, or air conditioning consisting of a central plant where the air is heated and/or conditioned and then circulated by fans or blowers through a system of distributing ducts.

Chimney effect: The tendency in a duct or other vertical air passage for air to rise when heated due to its decrease in density.

Coefficient of heat transmission (Over-all)-U-: The amount of heat (BTU) transmitted from air to air in one hour per square foot of the wall, floor, roof, or ceiling for a difference in

Glossary of terms (continued)

temperature of one degree Fahrenheit between the air on the inside and outside of the wall, floor, roof, or ceiling.

Column radiator: A type of direct radiator. This radiator has not been sold by manufacturers since 1926.

Comfort line: The effective temperature at which the largest percentage of adults feel comfortable.

Comfort zone (average): The range of effective temperatures over which the majority of adults feel comfortable.

Concealed radiator: See Convector.

Condensate: Water formed by cooling steam. The capacity of traps, pumps, etc., is sometimes expressed in lbs. of condensate they will handle per hour. One pound of condensate per hour is equal to approximately 4 sq. ft. of steam heating surface (240 BTU per hour per sq. ft.).

Condensate pump: A pump that is controlled by a switch mounted on the condensate tank. It adds water to the boiler when the condensate tank becomes full, whether the boiler needs water or not.

Condensate return rate: The rate at which condensate is returned to the boiler.

Condensate return (unit): A pre-packaged system consisting of a tank, pump, and usually a float switch that is used to pump condensate back to the boiler or boiler feed unit.

Conductance (thermal)-c-: The amount of heat (BTU) transmitted from surface to surface, in one hour through one square foot of a material or construction for the thickness or type under consideration for a difference in temperature of one degree Fahrenheit between the two surfaces.

Conduction (thermal): The transmission of heat through and by means of matter.

Conductivity (thermal)-k-: The amount of heat (BTU) transmitted in one hour through one square foot of a homogeneous material one inch thick for a difference in temperature of one degree Fahrenheit between the two surfaces of the material.

Conductor (thermal): A material capable of readily transmitting heat by means of conduction.

Convection: The transmission of heat by the circulation (either natural or forced) of a liquid or a gas such as air. If natural, it is caused by the difference in weight of hotter and colder fluid.

Convector: A concealed radiator. An enclosed heating unit located either within, adjacent to, or exterior to the room or space to be heated, but transferring heat to the room or space mainly by the process of convection. A shielded heating unit is also termed a convector. If the heating unit is located exterior to the room or space to be heated, the heat is transferred through one or more ducts or pipes.

Converter: A piece of equipment for heating water with steam without mixing the two. It may be used for supplying hot water for domestic purposes or for a hot water heating system.

Cooling leg: A length of uninsulated pipe through which the condensate flows to a trap and which has sufficient cooling surface to permit the condensate to dissipate enough heat to prevent flashing when the trap opens. A thermostatic trap may require a cooling leg to permit the condensate to drop enough in temperature to permit the trap to open.

Degree-day: (Standard) A unit which is the difference between 65ºF and the daily average temperature when it is below 65ºF. The "degree day" on any given day is equal to the number of degrees F that the average temperature for that day is below 65ºF.

Dew-point temperature: The air temperature corresponding to saturation (100 percent relative humidity) for a given moisture content. It is the lowest temperature at which air can retain water vapor.

Direct-indirect heating unit: A heating unit located in the room or space to be heated which is fully or partially closed. The enclosed portion is used to heat air which enters from outside the room.

Direct radiator: Same as radiator.

Domestic hot water: Hot water used for purposes other than house heating such as laundering, dish washing, bathing, etc.

Down-feed one-pipe riser (steam): A pipe which carries steam downward to the heating units and into which heating units drain condensation.

Down-feed system (steam): A steam heating system in which the supply mains are above the level of the heating units which they serve.

Dry-bulb temperature: The temperature of the air as determined by an ordinary thermometer.

Dry-return (steam): A return pipe in a steam heating system which carries both condensation and air.

Dry saturated steam: Saturated steam containing no water in suspension.

Equivalent direct radiation (E.D.R.): The amount of heating surface which will give off 240 BTU per hour when filled with a heating medium at 215ºF and surrounded by air at 70ºF. The equivalent square foot of heating surface may have no direct relation to the actual surface area.

Extended heating surface: Heating surface consisting of ribs, fins, or extended surfaces which receive heat by conduction from the prime surface.

Glossary of terms (continued)

Extended surface heating unit: A heating unit having a relatively large amount of extended surface which may be integral with the core containing the heating medium or assembled over a core, making good thermal contact by pressure, or by being soldered to the core or b both pressure and soldering. An extended surface heating unit is usually placed within an enclosure and functions as a convector.

Fahrenheit: A thermometer scale at which the freezing point of water is 32º and its boiling point is 212º above zero.

Flash (steam): The rapid passing into steam of water at a high temperature when the pressure it is under is reduced so that its temperature is above that of its boiling point for the reduced pressure. For example: If hot condensate is discharged by a trap into a low pressure return or into the atmosphere, a certain percentage of the water will be immediately transformed into steam. It is also called re-evaporation.

Float & thermostatic trap: A float trap with a thermostatic element for permitting the escape of air into the return line.

Float switch: A mechanical switch activated by a float on the end of a rod. This device is used in controlling the condensate pump, makeup valve, low water cutoff, etc.

Float trap: A steam trap which is operated by a float. When enough condensate has drained (by gravity) into the trap body the float is lifted. In turn, the pin lifts off its seat. This permits the condensate to flow into the return until the float has been sufficiently lowered, to close the port. Temperature does not affect the operation of a float trap.

Furnace: That part of a boiler or warm air heating plant in which combustion takes place. Complete heating unit of a warm air heating system.

Gauge pressure: The pressure above that of the atmosphere. It is the pressure indicated on an ordinary pressure gauge. It is expressed as a unit pressure such as lbs. per sq. in. gauge.

Head: Unit pressure usually expressed in ft. of water or mil-inches of water.

Heat: That form of energy into which all other forms may be changed. Heat always flows from a body of higher temperature to a body of lower temperature. See also: Latent Heat, Sensible Heat, Specific Heat, Total Heat, Heat of the Liquid.

Heat of the liquid: The heat (BTU) contained in a liquid due to its temperature. The heat of the liquid for water is zero at 32ºF and increases 1 BTU approximately for every degree rise in temperature.

Heat unit: In the foot-pound-second system, the British Thermal Unit (BTU) in the centimeter-gram-second system, the calorie (cal.).

Heating medium: A substance such as water, steam, or air used to convey heat from the boiler, furnace, or other source of heat to the heating units from which the heat is dissipated.

Heating surface: The exterior surface of a heating unit. See also Extended Heating Surface.

Heating unit: Radiators, convectors, base boards, finned tubing, coils embedded in floor, wall, or ceiling, or any device which transmits the heat from the heating system to the room and its occupants.

Horsepower: A unit to indicate the time rate of doing work equal to 550 ft.-lb. per second, or 33,000 ft.-lb. per minute. One horsepower equals 2545 BTU per hour or 746 watts.

Hot water heating system: A heating system in which water is used as the medium by which heat is carried through pipes from the boiler to the heating units.

Humidistat: An instrument which controls the relative humidity of the air in a room.

Humidity: The water vapor mixed with air.

Insulation (thermal): A material having a high resistance to heat flow.

Latent heat of evaporation: The heat (BTU per pound) necessary to change 1 pound of liquid into vapor without raising its temperature. In round numbers this is equal to 960 BTU per pound of water.

Latent heat of fusion: The heat necessary to melt one pound of a solid without raising the temperature of the resulting liquid. The latent heat of fusion of water (melting 1 pound of ice) is 144 BTU.

Low pressure steam: As defined by ASME, low pressure steam is 15 PSIG or less.

Low water cutoff: Float switch inside the boiler feed receiver set to prevent pumps from operating at low water level conditions.

Mechanical equivalent of heat: The mechanical energy equivalent to 1 BTU which is equal to 778 ft.-lb.

Mil-Inch: One one-thousandth of an inch (0.001").

NPSHR and NPSHA: Are short for Net Positive Suction Head Required and Net Positive Suction Head Available. NPSHR curves for centrifugal pumps are needed because all centrifugal pumps operate at a lower pressure in the impeller eye than the pressure existing at the pump suction flange. The curve identifies the pressure over and above fluid flash point or vaporization pressure, which is needed at the pump impeller eye and takes into account decreased pressures within the pump.

NPT: National Pipe Thread

Glossary of terms (continued)

One-pipe supply riser (steam): A pipe which carries steam to a heating unit and which also carries the condensation from the heating unit. In an up feed riser steam travels upwards and the condensate downward while in a down feed both steam and condensate travel down.

One-pipe system (hot water): A hot water heating system in which one pipe serves both as a supply main and as a return main. The heating units have separate supply and return pipes but both are connected to the same main.

One-pipe system (steam): A steam heating system consisting of a main circuit in which the steam and condensate flow in the same pipe. There is one connection to each heating unit which serves as both the supply and the return.

Overhead system: Any steam or hot water system in which the supply main is above the heating units. With a steam system the return must be below the heating units; with a water system, the return may be above the heating units.

Panel heating: A method of heating involving the installation of the heating units (pipe coils) in the walls, floor or ceiling of the room.

Panel radiator: A heating unit placed on, or flush with, a flat wall surface and intended to function as a radiator. Do not confuse with panel heating system.

Pilot valve: A valve that uses a small valve to control a large valve.

Pressure: Force per unit area such as lb. per sq. inch. Unless otherwise qualified, it refers to unit static gauge pressure. See Static, Velocity, Total, Gauge and Absolute Pressures.

Pressure powered pump: Motorless pump that uses steam or air pressure to move condensate back to the boiler room.

Pressure reducing valve: A device used to decrease the pressure of a gas or liquid.

Prime surface: A heating surface with the heating medium on one side and air (or extended surface) on the other.

Radiant heating: A heating system in which the heating is by radiation only. Sometimes used in a Panel Heating System.

Radiation: The transmission of heat in a straight line through space.

Radiator: A heating unit located in the room to be heated and exposed to view. A radiator transfers heat by radiation to objects "it can see" and by conduction to the surrounding air which in turn is circulated by natural convection.

Recessed radiator: A heating unit recessed in a wall but not enclosed.

Reducing valve: See Pressure Reducing Valve.

Re-evaporation: See Flash.

Refrigeration, ton of: See Ton of refrigeration.

Relative humidity: The amount of moisture in a given quantity of air compared with the maximum amount of moisture the same quantity of air could hold at the same temperature. It is expressed as a percentage.

Return mains: The pipes which return the heating medium from the heating units to the source of heat supply.

Reverse-return system (hot water): A two-pipe hot water heating system in which the water from several heating units is returned along paths so that all radiator circuits of the system are of equal length.

Sensible heat: Heat which increases the temperature of objects as opposed to latent heat.

Specific heat: In the foot-pound-second system, the amount of heat (BTU) required to raise one pound of a substance one degree Fahrenheit. In the centimeter-gram-second system, the amount of heat (cal.) required to raise one gram of a substance one degree C. The specific heat of water is 1.

Split system: A system in which the heating is accomplished by radiators or convectors and ventilation by separate apparatus.

Sparge tube: Slotted tube inserted in the condensate return tank or boiler feed tank that injects steam to preheat the condensate. Normally uses waste steam to improve efficiency of the system.

Square foot of heating surface: Equivalent direct radiation (EDR). By definition, that amount of heating surface which will give off 240 BTU per hour when filled with a heating medium at 215ºF and surrounded by air at 70ºF. The equivalent square foot of heating surface may have no direct relation to the actual surface area.

Static pressure: The pressure at which a pipe will burst. It is used to overcome the frictional resistance to flow through the pipe. It is expressed as a unit pressure and may be in absolute or gauge pressure. It is frequently expressed in feet of water column or in the case of pipe friction in mil-inches of water column per ft. of pipe.

Steam: Water in the vapor phase. The vapor formed when water has been heated to its boiling point, corresponding to the pressure it is under. See also Dry Saturated Steam, Wet Saturated Steam, Superheated Steam.

Steam heating system: A heating system in which the heating unit gives up their heat to the room by condensing the steam furnished to them by a boiler or other source.

Steam trap: A device for allowing the passage of condensate and air but preventing the passage of steam. See Thermostatic, Float and Thermostatic, Bucket Trap, Thermodisc Traps.

Glossary of terms (continued)

Storage capacity: The volume of condensate that the condensate receiver is capable of holding.

Superheated steam: Steam heated above the temperature corresponding to its pressure.

Supply mains: The pipes through which the heating medium flows from the boiler or source of supply to the runouts and risers leading to the heating units.

Tank regulator: See Temperature Regulator.

Temperature regulator: A device for controlling the admission of steam to a hot water or liquid heating device in correct quantities so that the temperature of the liquid will remain constant.

Thermostat: An instrument which responds to changes in temperature and which directly or indirectly controls the room temperature.

Thermodisc trap: A steam trap that operates by the cycling of a free-floating disc. The disc cycles in reaction to the inlet pressure of condensate and air against the bottom of the disc and pressure from flash steam that is trapped between the top of the disc and the trap cap chamber. Inlet pressure forces the disc off its seat. Flash steam, created from hot condensate reacting to the lower downstream pressure, builds pressure of top of the disc in the cap chamber and forces the disc down onto its seating surfaces. Pressure in the cap chamber drops due to cooling from natural heat losses. When the inlet pressure becomes greater than the cap chamber pressure, the cycle repeats.

Ton of refrigeration: The heat which must be extracted from one ton (2,000 lbs.) of water at 32ºF to change it into ice at 32ºF in 24 hours. It is equal to 288,000 BTU/24 hours, 12,000 BTU/hour, or 200 BTU/minute.

Total heat: The latent heat of vaporization added to the heat of the liquid with which it is in contact.

Total pressure: The sum of the static and velocity pressures. It is also used as the total static pressure over an entire area, that is, the unit pressure multiplied by the area on which it acts.

Trap: See steam trap, thermostatic trap, float trap, bucket trap, float and thermostatic trap and thermodisc trap.

Tube bundle: A single tube (pipe) formed into a tight array so as to present a large surface area in a small space.

Two-pipe system (steam or water): A heating system in which one pipe is used for the supply main and another for the return main. In a two-pipe hot water system each heating unit receives a direct supply of the heating medium.

Unit heater: A heating unit consisting of a heat transfer element, housing, fan with motor, and outlet deflectors or diffusers. It is usually suspended from the ceiling and its heat output is controlled by starting and stopping the fan by a room thermostat. The circulation of the heating medium (steam or hot water) is usually continuous. It is used primarily for industrial heating.

Unit pressure: Pressure per unit area as lbs. per sq. in.

Up-feed system (hot water or steam): A heating system in which the supply mains are below the level of the heating units which they serve.

Vacuum heating system (steam): A one- or two-pipe heating system equipped with the necessary accessory apparatus to permit the pressure in the system to go below atmospheric.

Vapor: Any substance in the gaseous state.

Vapor heating system (steam): A two-pipe heating system which operates at or near atmospheric pressure and returns the condensation to the boiler or receiver by gravity.

Velocity pressure: The pressure used to create the velocity of flow in a pipe. It is expressed as a unit pressure.

Ventilation: Air circulated through a room for ventilating purposes. It may be mechanically circulated with a blower system or through circulation with an open window, etc.

Vent valve (steam): A device that permits air to be forced out of a heating or pipe and closes against water and steam.

Vent valve (water): A device that permits air to be forced out of a heating unit or pipe and closes against water.

Warm air heating system: A warm air heating plant consists of a heating unit (fuel-burning furnace) enclosed in a casing, from which the heated air is distributed to the various rooms of the building through ducts. If the motive head producing flow depends on the difference in weight between the heated air leaving the casing and the cooler air entering the bottom of the casing, it is termed a gravity system. A booster fan may, however, be used in conjunction with a gravity designed system. If a fan is used to produce circulation and the system is designed especially for fan circulation, it is termed a fan furnace system or a central fan furnace system. A fan furnace system may include air washer, filters, etc.

Wet bulb temperature: The lowest temperature which a water-wetted body will attain when exposed to an air current.

Wet return (steam): That part of the return main of a steam heating system which is completely filled with water of condensation.

Wet saturated steam: Saturated steam containing some water particles in suspension.

Date code information

Hoffman Specialty products manufactured after 1972 feature a stamped date code, so you can easily check the life expectancy and recommended replacement intervals. **If a product has no date stamp or does not have the Bell & Gossett logo on it — consider replacing it.**

Below are guides to help you translate the date code on Hoffman Specialty products.

Bell & Gossett
xylem

Product Date Code Translation

Month	Year	Example
A = January B = February C = March D = April E = May F = June G = July H = August J = September K = October L = November M = December	97 = 1979 08 = 1980 18 = 1981 28 = 1982 38 = 1983 48 = 1984 58 = 1985 68 = 1986 78 = 1987 88 = 1988 98 = 1989 09 = 1990 19 = 1991 29 = 1992 39 = 1993 49 = 1994 59 = 1995	**K09** Translates to **October 1990**
	96 = 1996 97 = 1997 98 = 1998 99 = 1999 00 = 2000 01 = 2001 02 = 2002 03 = 2003 04 = 2004 05 = 2005 06 = 2006 07 = 2007 08 = 2008	Between 1996 and 2008 month designer proceeded year and year designator was not reversed. **96K** Translates to **October 1996**
	09 = 2009 01 = 2010 11 = 2011 21 = 2012 31 = 2013 41 = 2014 51 = 2015 61 = 2016 71 = 2017 81 = 2018 91 = 2019 02 = 2020 12 = 2021 22 = 2022 32 = 2023 42 = 2024 52 = 2025 62 = 2026	Beginning 2009 month designator proceeds year and year designator is again reversed. **K11** Translates to **October 2011**

Warranty policy

Bell & Gossett warrants for a period of two (2) years from the date of manufacture or one (1) year from date of installation, whichever comes first, that all Bell & Gossett and all Hoffman Specialty products furnished by it are free from defects in materials and workmanship.

Bell & Gossett's liability for any breach of this Warranty shall be limited solely to replacement or repair at the sole option of Bell & Gossett, of any part or parts found to be defective during the Warranty Period providing the Product is properly installed and is being used for its intended purpose. Buyer must notify Bell & Gossett of any breach of this warranty, within the aforementioned Warranty Period by notifying the Bell & Gossett representative with responsibility for servicing the Buyer's account. Further, product alleged to be defective must be shipped by buyer to Bell & Gossett's representative, transportation charges prepaid.

It is expressly agreed that this shall be the sole and exclusive remedy of the buyer, under no circumstances shall Bell & Gossett be liable for any costs, loss, expense, damages, special damages, incidental damages or consequential damages arising directly or indirectly form the design, manufacture, sale, or use or repair of the product whether based upon warranty, contract, negligence or strict liability. In no event will liability exceed the purchase price of the product.

The warranty and limits of liability contained herein are in lieu of all other warranties and liabilities expressed or implied. All implied warranties or merchantability and fitness for a particular purpose are hereby disclaimed by Bell & Gossett and excluded from the warranty.

Bell & Gossett neither assumes nor authorizes any person to assume for it, any other Warranty obligation in connection with the sale of the Product. This Warranty shall not apply to any product or parts of products which (a) have been repaired or altered outside of authorized Bell & Gossett facilities; (b) have been subject to misuse, negligence or accident; or (c) have been used in a manner contrary to Bell & Gossett instructions.

In the case of Products not manufactured by Bell & Gossett, there is no warranty from Bell & Gossett, but Bell & Gossett will extend to the buyer any Warranty from Bell & Gossett's supplier of such products.

Return goods policy

Unused material may be returned for credit only with the written or oral consent of Bell & Gossett. This consent is in the form of an RGA number issued by Bell & Gossett, and is subject to the following conditions.

1. Materials must be unused, of current design, and in original cartons.
2. Credit will be issued based upon either a referenced invoice or product date code if an invoice is not referenced. Requester is to supply copy of the referenced invoice if requested.
3. A 25% restocking charge will apply.
4. Unauthorized material returned to Bell & Gossett will be either refused or sent back to the sender freight collect by a carrier chosen by Bell & Gossett.
5. If material is received but subsequently found not to have met the above conditions, it will be sent back to the sender freight collect by a carrier chosen by Bell & Gossett.
6. Products which are obsolete or made to special order are not returnable.

Warranty procedure

Return product to place of purchase or contact our local manufacturer's representative.

The Little Red Schoolhouse® – Training the industry

Bell & Gossett has long been known for its dedication to training. Since its inception in 1954, more than 70,000 engineers, contractors and other hydronic HVAC and plumbing professionals have been educated at the "Little Red Schoolhouse."

Known as the industry's educator, Bell & Gossett's Little Red Schoolhouse sets itself apart from other educational facilities in the industry by emphasizing a systems-based concept of teaching, rather than focusing on product features and benefits.

Training modules are frequently updated to support advancements in equipment design and operation, along with the evolving focus on sustainability, decarbonization and electrification of hydronic systems.

What to expect:

- No cost to attend training.*
- Student learning environment is technical in nature, with no sales or marketing influences.
- Training taught by full-time instructors focused on education.
- Training has a long-standing reputation and high degree of credibility among industry professionals.
- Accreditation by IACET to provide globally accepted Continuing Education Units (CEU) for all courses.
- Students are eligible to receive 1.7 CEUs (17 hours) provided they attend and participate in the full seminar; no partial credits will be given.
- Course subject matter is accessible via multiple media forms, including web-based instruction, recorded webinars and downloadable PDF documents.

Classroom amenities:

- Classroom-style seating for 40.
- State-of-the-art audio-visual equipment to maximize knowledge retention.
- Hands-on, working demonstrations of numerous hydronic systems.
- All seminars include a tour of Xylem's manufacturing facilities.

How to enroll:

Bell & Gossett Representatives in your area will have scheduled class dates and can assist with arrangements. Or, visit www.bellgossett.com/LRSH for a calendar listing of all in-person Schoolhouse course offerings and online registration.

Seminars currently offered include:

- Modern hydronic heating systems: basic seminar
- Design & application of hydronic commercial heating systems
- Large chilled water system design
- Steam systems design and application
- Plumbing systems design
- Service & maintenance of hydronic system equipment

** Students are responsible for travel costs to and from Morton Grove, Illinois, as well as all lodging costs during their stay.*

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HS-900J 6/25

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