REGULATOR HANDBOOK

PRESSURE & TEMPERATURE REGULATORS

CIRCOR | Leslie Controls

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REGULATOR HANDBOOK

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PRESSURE REGULATORS

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APPLICATION DATA

- HVAC Systems
- Process Control Systems for Food, Molding, Textile, Pulp, etc.
- Packaged OEM Systems for Heat Exchangers, Metal Cleaning, Vaporizers, etc.

VALVE RATINGS

VALVE ENDS ASME/ANSI	PRESSURE PSIG (BAR)		TEMPERATURE °F (°C)
CAST IRON			
B16.1 Class 250 NPT	250 (17.2)	@	450 (232)
B16.1 Class 125 Flanged	125 (8.6)	@	450 (232)
B16.1 Class 250 Flanged	250 (17.2)	@	450 (232)
BRONZE			
B16.24 Class 300 NPT/SWE	300 (21.0)	@	550 (288)
B16.24 Class 150 Flanged	150 (10.3)	@	550 (288)
B16.24 Class 300 Flanged	300 (21.0)	@	550 (288)
CAST STEEL			
B16.34 Class 300 NPT	300 (21.0)	@	600 (316)
B16.34 Class 150 Flanged	150 (10.3)	@	600 (316)
B16.34 Class 300 Flanged	300 (21.0)	@	600 (316)
B16.34 Class 600 Flanged	600 (41.4)	@	600 (316)
STAINLESS STEEL			
A351 Class 300 NPT/SWE	300(21.0)	@	600 (316)[1]
A351 Class 150 Flanged	150 (10.3)	@	600 (316)[1]
A351 Class 300 Flanged	300 (21.0)	@	600 (316)[1]
A351 Class 600 Flanged	600 (41.4)	@	600 (316)[1]
DUCTILE IRON			
A395 Class 300 NPT	250 (17.2)	@	450 (232)[1]

RATED FLOW COEFFICIENTS (Cv)

		REGULATOR SIZE								
		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
STEAM	Std[5]	3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3
	Ext[6]	5.67	10.0	15.7	21.9	29.1	29.1	65.7	84.6	103.0
GAS	Std[5]	3.4	5.6	11.7	17	28	30	45	64	90
	Ext[6]	5.3	9.2	16.9	24.8	38.3	41	82.6	97	124.8

PRESSURES TO 600 PSIG AT 600°F

- Steam, air or gas service
- 95% Accuracy of regulation**
- 100:1 Rangeability[3]
- Packless construction
- Exclusive Spiroflex® Diaphragm for Smooth Operation
- 3 Year Warranty[4]
- Air Loaded
  - Operates on as Little as 1/2 PSI pressure drop
  - Few moving parts req ire minimal maintenance

MODELS

GPK	Air Loaded, Cast Iron, ANSI 250, Steam Service
GPB	Air Loaded, Bronze, ANSI 300, Steam Service
GPS-1	Air Loaded, Cast Steel, ANSI 300, Steam Service
GPSS-1	Air Loaded, SS, ANSI 300, Steam Service
GPS	Air Loaded, Cast Steel, ANSI 600, Steam Service
GPAK	Air Loaded, Cast Iron, ANSI 250,Gas Service
GPAB	Air Loaded, Bronze, ANSI 300,Gas Service
GPHS	Air Loaded, Cast Steel, ANSI 600, Steam Service, Cage Trim
GPD	Air Loaded, Ductile Iron, ANSI 300, Steam Service

OPTIONS

- SS Trim with Stellite®
- Teflon® Diaphragm for Rapid Cycling on all air loaded except gas service or ANSI 600 "T"
- Vacuum Breaker and Stem Seal "V"

FOR AIR LOADING REQUIREMENTS
SEE PAGES 50 & 51

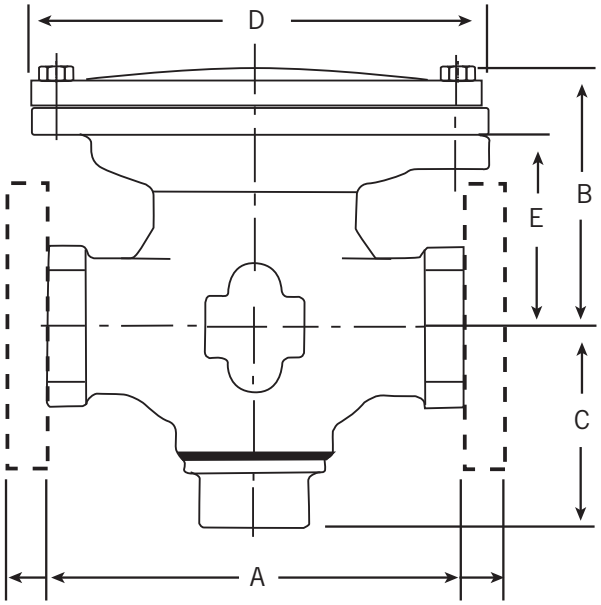
FOR GP SERIES CAPACITY TABLES
SEE PAGE 49

1. Units with "A" in model code limited to 180ºF (82ºC)
2. Ductile Iron 1/2"-3/4" only
3. Except GPS-1EP (rangeability is 30:1)
4. Except "T" Series which is 1 year warranty
5. 95% accuracy (2 psi min. droop)
6. 90% accuracy (31/2 psi min. droop)
7. 1/2" - 2" size Stainless Steel Trim with resilient seat insert, Class VI shutoff. 21/2" - 4" Stainless Steel Trim with Stellite Hard facing Class IV shutoff.

GP SERIES REDUCING VALVE

SPECIFICATIONS

Valve shall be single stage, air operated with 100:1 rangeability. Valve body shall be (cast iron, bronze, cast steel or stainless steel) and shall be renewable without removal from line. Seat ring shall be hardened stainless steel with (fluorocarbon insert or stellite). Diaphragm shall be (multiple leaf stainless steel rated for full travel or Teflon® composite). Valve shall have no stuffing box. Valve shall be warranted for three years.



MATERIALS OF CONSTRUCTION

Body, Cast Iron	ASTMA126 Cl. B
Body, Cast Bronze	ASTMB61 UNSC92200
Body, Cast Steel	ASTMA216 WCB
Body, Stainless Steel	316 SSASTMA351 CF8M
Trim, std. Steam[1] std. Gas opt. Steam	SS w/Resilient Insert Buna-n SSw/Stellite®
Diaphragm, std. opt.	Spiroflex® Teflon® (Superflex)

STANDARD SEAT VALVE WEIGHTS* pounds (kg)

SIZE	CI, BRZ BODY				CS, SS BODY		
	NPT	125	250	300	NPT/ SWE	150	300
½ (15)	34 (15)	—	—	40 (18)	38 (17)	—	—
¾ (20)	35 (16)	—	—	41 (19)	39 (18)	—	—
1 (25)	36 (16)	—	—	43 (20)	40 (18)	48 (22)	48 (22)
1¼ (32)	42 (19)	—	—	50 (23)	—	—	—
1½ (40)	66 (30)	—	74 (34	75 (34)	70 (32)	80 (36)	80 (36)
2 (50)	78 (35)	87 (39)	87 (40))	87 (39)	83 (37.6)	95 (43)	95 (43)
2½ (65)	—	195 (88)	195 (88)	195 (88)	—	—	—
3 (80)	—	252 (114)	252 (114)	252 (114)	—	267 (121)	267 (121)
4 (100)	—	295 (134)	295 (134)	295 (134)	—	335 (152)	335 (152)

VALVE DIMENSIONS inches (mm)

SIZE	A							B	C	D	E
	NPT		125CI	150 CS/SS	250 CI	300					
	CI/BRZ	CS/SS				BRZ	CS/SS				
1/2 (15)	6 1/8 (156)	8 1/2 (216)	—	—	—	5 1/8 (131)	—	5 1/2 (140)	3 3/8 (86)	8 5/8 (219)	3 5/8 (92)
3/4 (20)	6 1/2 (165)	8 1/2 (216)	—	—	—	5 1/8 (131)	—	5 1/2 (140)	3 3/8 (86)	85/8 (219)	3 5/8 (92)
1 (25)	7 1/4 (184)	8 1/2 (216)	—	8 1/2 (216)	—	5 7/16 (138)	8 1/2 (216)	5 7/8 (149)	3 3/8 (86)	8 5/8 (219)	4 (102)
1 1/4 (32)	7 5/8 (194)	— —	—	—	—	5 3/4 (146)	—	6 1/4 (159)	4 (102)	8 5/8 (219)	4 1/8 (105)
1 1/2 (40)	8 1/2 (216)	9 1/2 (241)	—	9 1/2 (241)	10 1/2 (267)	51 3/16 (148)	9 1/2 (241)	6 3/8 (162)	4 1/2 (114)	10 1/4 (260)	4 3/8 (111)
2 (50)	8 1/2 (216)	11 1/2 (292)	10 (254)	11 1/2 (292)	10 1/2 (267)	51 3/16 (148)	11 1/2 (292)	63/8 (162)	4 1/2 (114)	10 1/4 (260)	4 3/8 (111)
2 1/2 (65)	—	—	10 7/8 (276)	—	11 1/2 (292)	7 13/16 (198)	—	8 1/4 (210)	5 1/2 (140)	16 (406)	4 1/8 (105)
3 (80)	—	—	11 3/4 (298)	11 3/4 (298)	12 1/2 (318)	8 5/8 (219)	12 1/2 (318)	9 (229)	6 1/4 (159)	16 (406)	41 5/16 (125)
4 (100)	—	—	13 7/8 (352)	13 7/8 (352)	14 1/2 (368)	91 5/16 (252)	14 1/2 (368)	10 1/4 (260)	7 7/8 (200)	16 (406)	6 1/4 (159)

1. 1/2" - 2" size Stainless Steel Trim with resilient seat insert, Class VI shutoff. 21/2" - 4" Stainless Steel Trim with Stellite Hard facing Class IV shutoff.

GPS AND GPHS VALVES

GPS, GPHS VALVE

DIMENSIONS inches (mm) AND Weights pounds (kg)

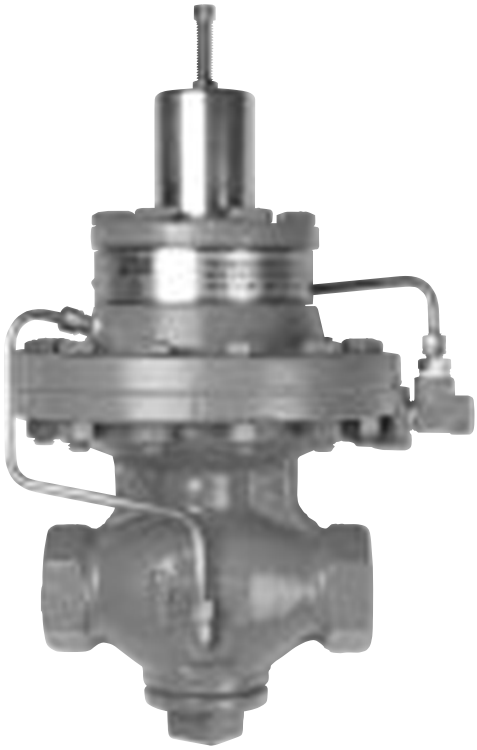
SIZE	A				B	C	D	E	WEIGHT	
	NPT/ SWE	150	300	600					NPT/ SWE	FLG
½ (15)	—	—	—	8 (203)	4⅞ (124)	3⅜ (86)	8⅝ (219)	3⅛ (79)	—	45 (20.4)
¾ (20)	—	—	—	8⅛ (206)	4⅞ (124)	3⅜ (86)	8⅝ (219)	3⅛ (79)	—	55 (24.9)
1 (25)	—	—	—	8¼ (210)	5¼ (133)	3⅛ (79)	8⅝ (219)	3½ (79)	—	60 (27.2)
1¼ (32)	7¼ (184)	7¾ (197)	8¼ (210)	8⅞ (225)	5¼ (133)	3⅛ (79)	8⅝ (219)	3½ (79)	62 (28)	65 (29.5)
1½ (40)	—	—	—	9⅞ (251)	5 13⁄16 (148)	3½ (89)	10½ (267)	4 (102)	—	90 (40.8)
2 (50)	—	—	—	11¼ (286)	6¼ (159)	3¾ (95)	10½ (267)	4 7⁄16 (113)	—	100 (45.4)
2½ (65)	12¼ (311)	10⅞ (276)	11½ (292)	12¼ (311)	7¾ (197)	6⅞ (175)	16 (406)	5⅛ (130)	189 (85.7)	192 (87.1)
3 (80)	—	—	—	13¼ (337)	8 (203)	7½ (191)	16 (406)	5½ (140)	—	225 (102.1)
4 (100)	—	—	—	15¼ (387)	9½ (241)	8½ (216)	16 (406)	16 15⁄16 (430)	—	300 (136.1)

NOTES:

GP SERIES GPKP REDUCING VALVE

SIZES1/2" – 4" PRESSURES TO 250 PSIG AT 450°F

- Steam Service
- 95% Accuracy of Regulation
- 100:1 Rangeability*
- Packless Construction
- Exclusive Spiroflex® Diaphragm for
- Smooth Operation
- 3 Year Warranty*
- GPKP Internal Pilot
  - Operates on As Little As 10 PSI Pressure Drop
  - Large Pilot Clearances and Non-Continuous Bleed Minimize Fouling



GP SERIES

APPLICATION DATA

- HVAC Systems
- Process Control Systems for Food, Molding, Textile, Pulp, etc.
- Packaged OEM Systems for Heat Exchangers, Metal Cleaning, Vaporizers, etc.

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG(bar)	Temperature °F (°C)
CAST IRON		
B16.1 Class 250 NPT	250 (17.2) @ 450 (232)	
B16.1 Class 125 Flanged	125 (8.6) @ 450 (232)	
B16.1 Class 250 Flanged	250 (17.2) @ 450 (232)	

SPRING PRESSURE RANGES (PSIG)

GPKP 5-20 15-75 50-150

MODELS

GPKP – Internal Pilot, Cast Iron, ANSI 250, Steam Svc.

OPTIONS

SS Trim with Stellite®

RATED FLOW COEFFICIENTS (Cv)

		REGULATOR SIZE								
		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
STEAM	Std[1]	3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3
	Ext[2]	5.67	10.0	15.7	21.9	29.1	29.1	65.7	84.6	103.0

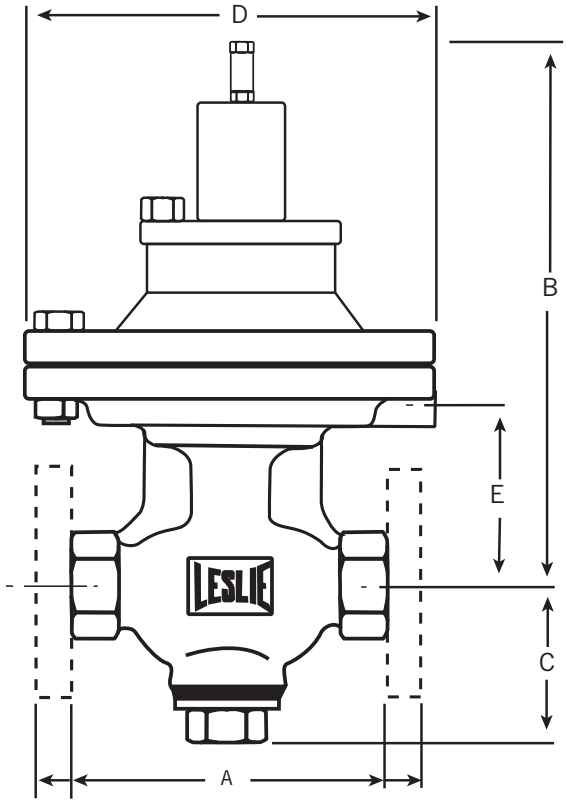
1. 95% accuracy (2 psi min. droop)
2. 90% accuracy (3 1/2 psi min. droop)

FOR SIZING CAPACITY TABLES SEE PAGES 23, 24 & 25

GP SERIES GPKP REDUCING VALVE

SPECIFICATIONS

Valve shall be single stage, internal pilot operated with 100:1 rangeability. Valve body shall be cast iron and shall be renewable without removal from line. Seat ring shall be hardened stainless steel with fluorocarbon insert (1⁄2"-2") or stellite (2 1⁄2"- 4"). Diaphragm shall be multiple leaf stainless steel rated for full travel. Valve shall have no stuffing box. Valve shall be warranted for three years.



MATERIALS OF CONSTRUCTION

Body, Cast Iron	ASTMA126 Cl. B
Trim, std. Steam	1⁄2"- 2" Stainless Steel w/Resilient Insert Buna-N Stainless Steel w/Stellite®
Diaphragm, std.	Spiroflex®

VALVE Dimensions inches (mm)

SIZE	A			B ALL BODIES	C ALL BODIES	D ALL BODIES	E ALL BODIES
	THD.	125# FLANGE	250# FLANGE				
1⁄2	6 1/8	—	—	13 5/8	2 1/4	8 5/8	3 5/8
3⁄4	6 1/2	—	—	13 5/8	2 1/4	8 5/8	3 5/8
1	7 1/4	—	—	13 3/4	2 1/4	8 5/8	4
1 1/4	7 5/8	—	—	14	2 11/16	10 1/4	4
1 1/2	8 1/2	—	10 1/2	14 1/4	—	10 1/4	4 1/4
2	8 1/2	10	10 1/2	4 15/16	3 1/4*	10 1/4	4 3/8
2 1/2	—	10 7/8	11 1/2	15 3/4	5 1/2	16	5 3/8
3	—	11 3/4	12 1/2	16 1/2	6 1/4	16	6 3/16
4	—	13 7/8	14 1/2	17 7/8	7 15/16	16	7 1/2

STANDARD SEAT VALVE WEIGHTS* pounds (kg)

SIZE	CI, BRZ BODY*				CS, SS BODY*		
	THD	125	250	300	NPT/ SWE	150	300
1⁄2 (15)	46 (21)	—	—	52 (18)	50 (23)	—	—
3⁄4 (20)	47 (21)	—	—	53 (19)	51 (23)	—	—
1 (25)	48 (22)	—	—	55 (20)	52 (24)	60 (27)	60 (27)
1 1⁄4 (32)	54 (24)	—	—	62 (23)	—	—	—
1 1⁄2 (40)	78 (35)	—	86 (39)	87 (39)	82 (37)	92 (42)	92 (42)
2 (50)	90 (41)	99 (45)	99 (45)	99 (45)	95 (43)	107 (49)	107 (49)
2 1⁄2 (65)	—	207 (94)	207 (94)	207 (94)	—	—	—
3 (80)	—	264 (120)	264 (120)	264 (120)	—	279 (127)	279 (127)
4 (100)	—	307 (139)	307 (139)	307 (139)	—	347 (157)	347 (157)

* Add 12 pounds to body weight for Internal or External Pilot Models. All weights are approximate.

GP SERIES GPS-1EP REDUCING VALVE

SIZES 1/2" – 4" PRESSURES TO 300 PSIG AT 600°F

- Steam Service
- 95% Accuracy of Regulation
- 30:1 Rangeability
- Packless Construction
- Exclusive Spiroflex® Diaphragm for Smooth Operation
- 3 Year Warranty (valve only) ;
- External Pilot
  - Operates on As Little As 15 PSI Pressure Drop

GP SERIES

APPLICATION DATA

- HVAC Systems
- Process Control Systems for Food, Molding, Textile, Pulp, etc.
- Packaged OEM Systems for Heat Exchangers, Metal Cleaning, Vaporizers, etc.

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG(bar)	Temperature °F (°C)
CAST STEEL		
B16.34 Class 300 NPT	300 (21.0) @ 600 (316)	
B16.34 Class 150 Flanged	150 (10.3) @ 600 (316)	
B16.34 Class 300 Flanged	300 (21.0) @ 600 (316)	
B16.34 Class 600 Flanged	600 (41.4) @ 600 (316)	
STAINLESS STEEL		
A217 Class 300 NPT/SWE	300(21.0) @ 600 (316)	
A217 Class 150 Flanged	150 (10.3) @ 600 (316)	
A217 Class 300 Flanged	300 (21.0) @ 600 (316)	
A217 Class 600 Flanged	600 (41.4) @ 600 (316)	

SPRING PRESSURE RANGES (PSIG)

GPS-1EP 3-20	5-50	10-100	20-150	100-300

MODELS

- GPS-1EP–External Pilot, Cast Steel, ANSI 300, Steam Service

OPTIONS

- SS Trim with Stellite®
- Teflon® Diaphragm for Rapid Cycling on all air loaded except gas service or ANSI 600 "T" Vacuum Breaker and Stem Seal "V"

RATED FLOW COEFFICIENTS (Cv)

		REGULATOR SIZE								
		1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
STEAM	Std1	3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3

FOR SIZING CAPACITY TABLES SEE PAGES 23, 24 & 25

1.95% accuracy (2 psi min. droop)

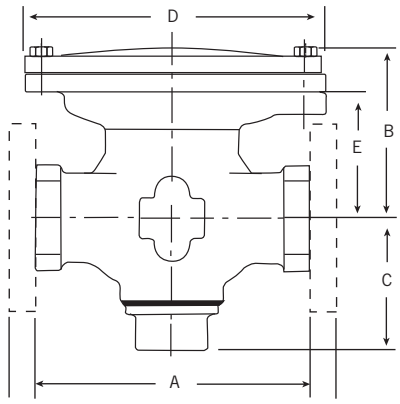
GP SERIES GPS-1EP REDUCING VALVE

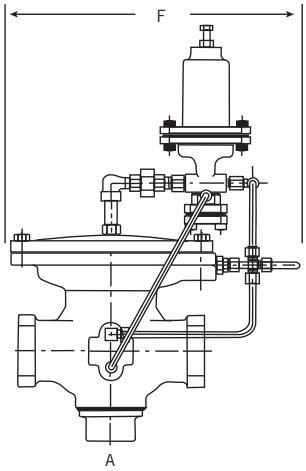
SPECIFICATIONS

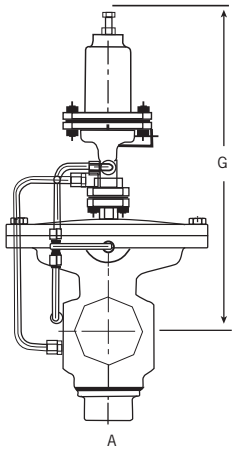
Valve shall be single stage, external pilot operated with 100:1 rangeability. Valve body shall be cast steel and shall be renewable without removal from line. Seat ring shall be hardened stainless steel with (fluorocarbon insert or stellite). Diaphragm shall be (multiple leaf stainless steel rated for full travel or Teflon® composite). Valve shall have no stuffing box. Valve shall be warranted for three years.

MATERIALS OF CONSTRUCTION

Body, Cast Steel	ASTMA216GRWCB
Trim, std. Steam	1/2"-2" Stainless Steel w/Resilient Insert Buna-N 2 1/2"- 4" Stainless Steel w/Stellite®
Diaphragm, std.	Spiroflex®







Dimensions inches (mm) and Weight pounds (kg)

SIZE	A			B	C	D	E	F	G	WEIGHT		
	THD/ SWE	150 FLG	300 FLG							THD/ SWE	150 FLG	300 FLG
1/2 (15)	8 1/2 (216)	—	—	5 1/2 (140)	3 3/8 (86)	8 5/8 (219)	3 5/8 (92)	13 5/8 (346)	16 1/8 (410)	38 (17)	—	—
3/4 (20)	8 1/2 (216)	—	—	5 1/2 (140)	3 3/8 (86)	8 5/8 (219)	3 5/8 (92)	13 5/8 (346)	16 1/8 (410)	39 (18)	—	—
1 (25)	8 1/2 (216)	8 1/2 (216)	8 1/2 (216)	5 7/8 (149)	3 3/8 (86)	8 5/8 (219)	4 (102)	13 5/8 (346)	16 1/8 (410)	40 (18)	48 (22)	48 (22)
1 1/2 (40)	9 1/2 (241)	9 1/2 (241)	9 1/2 (241)	6 3/8 (162)	4 1/2 (114)	10 1/4 (260)	4 3/8 (111)	14 1/2 (368)	17 (432)	70 (32)	80 (36)	80 (36)
2 (50)	11 1/2 (292)	11 1/2 (292)	11 1/2 (292)	6 3/8 (162)	4 1/2 (114)	10 1/4 (260)	4 3/8 (111)	14 1/2 (368)	17 (432)	83 (38)	95 (43)	95 (43)
3 (80)	—	11 3/4 (298)	12 1/2 (318)	9 (229)	6 1/4 (159)	16 (406)	41 5/16 (125)	19 (483)	19 5/8 (498)	—	267 (121)	267 (121)
4 (100)	—	13 7/8 (352)	14 1/2 (368)	10 1/4 (260)	7 7/8 (200)	16 (406)	6 1/4 (159)	19 (483)	19 5/8 (498)	—	335 (152)	335 (152)

NOTE: All inlet and outlet flange dimensions are per ANSI B16.5. Face-to-face dimensions are per ISA SP75.08 for½" - 2" sizes (separable flanges) and ANSI B16.10 for 3" - 4" sizes (integral flanges).

SELF-CONTAINED REDUCING VALVES

The Leslie reducing valves and regulators described in this bulletin are the result of over 80 years of experience and leadership in producing equipment for industrial, marine and railroad service.

Developed to provide an accuracy of regulation comparable to instrument control, this equipment provides long, trouble-free service, and maximum resistance to corrosion and wear. Ease of maintenance, by design, has resulted in wide recognition that Leslie quality means:

LOWEST OVERALL ANNUAL OPERATING COST.

WHAT IS A REDUCING VALVE?

A pressure reducing valve is an automatic fluid pressure regulating device which maintains down stream pressure at a preset value which is lower than the upstream pressure source.

The Reducing valves described here are self-contained. This means that the valve may be operated without the use of additional equipment or an external power source.

Spring loaded, direct operated, and internal pilot, piston-operated reducing valves are described in this bulletin. They are designed for steam, air, gas, and small flow liquid service for initial pressures up to 1000 psi (69 bar), temperatures up to 750°F (398°C), and reduced pressures from 2 to 400 psi (0.1 to 28 bar).

WHERE TO USE REDUCING VALVES

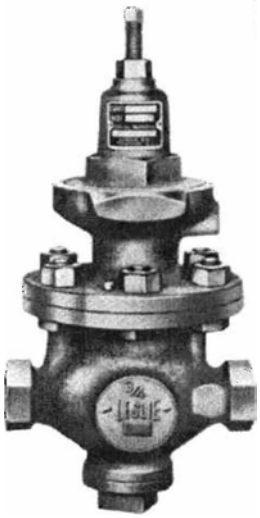
Leslie reducing valves are designed for accurate regulation under one or more of the following conditions:

- Small flow service, steam, air, gas and liquids
- Positive dead-end service
- Frequent load changes from minimum to rated flow
- Sudden load changes requiring fast valve action

OTHER LESLIE REGULATORS DESCRIBED IN THIS BULLETIN ARE:

REMOTELY ADJUSTED REDUCING VALVES for convenient resetting of controlled pressure.

DIFFERENTIAL PRESSURE REGULATORS to re respond to pressure variations of a fluid other than the one passing through the body and to maintain a differential pressure between the two fluids.



SELF-CONTAINED REDUCING VALVES

QUICK REFERENCE TABLES

Use the Quick Reference Tables below to determine which valve or regulator class is designed to handle your specific operating conditions. Locate the red box under the Inlet Pressure Range you desire. Moving to the right you will find another red box in the Adjustable Reduced Pressure Range area which indicates the reduced pressure range available for the inlet pressure range you chose. Continue moving to the right to determine valve class and size. Page numbers are given for the location of detailed data.

SMALL FLOW REDUCING VALVES (DIRECT AND PILOT OPERATED)

INLET PRESSURE RANGE PSI (BAR)							ADJUSTABLE REDUCED PRESSURE RANGE PSI (BAR)								CLASS	SIZE (IN.)
STEAM			AIR & GAS													
20-300 (1.5-21)	15-300 (1-21)	20-600 (0.5-41)	10-200 (0.5-14)	20-400 (1.5-28)	15-400 (1-28)	20-1000 (1.5-69)	1-50 (0.1-3.5)	2-35 (1.5-2.5)	5-95 (0.3-6.5)	5-290 (0.3-20)	10-50 (0.5-3.5)	10-285 (0.5-20)	5-175† (0.3-12)	25-400 (2-28)		
■							■								JL	1/2
■										■					J-1	1/2
	■							■							LCL(*)	1/2
	■											■			LC(*)	1/2
		■				■					■				LCL(*)S	1/2
		■				■								■	LC(*)S	1/2
			■						■						AW, AWG	1/2
			■						■						AWR, AWRG	1/2
				■			■								JAL-2	1/2
				■						■					JA-2	1/2
■													■		JT†	1/2
				■											JAT†	1/2
					■			■							LCLA	1/2
					■							■			LCA	1/2

SMALL FLOW REDUCING VALVES (PILOT OPERATED)

INLET PRESSURE RANGE PSI (BAR)					ADJUSTABLE REDUCED PRESSURE RANGE PSI (BAR)							CLASS	SIZE (IN.)
STEAM			AIR & GAS										
25-250 (2-17)	25-300 (2-21)	40-1000 (3-60)	25-400 (2-28)	40-1000 (3-69)	2-35 (0.1-2.5)	5-385 (0.3-27)	10-50 (0.5-3.5)	5-175† (0.3-12)	10-235 (0.5-16)	10-285 (0.5-20)	5-175† (0.3-12)	25-400 (2-28)		
■									■				LKY, LEKY	1/2-4
■					■								LLKY	1/2-4
	■				■								LLY, LL-3	1/2-3
	■									■			LY, LEY	1/2-3
		■		■			■						LLS-5, LLYS-1	1/2-3
		■			■							■	LS-5, LYS-1, LES-5, LEYS-1	1/2-3
■								■					LKTY†	1/2-4
	■							■					LTY†	1/2-3
		■		■							■		LTS-5†	1/2-3
			■			■							KAK, LAEK	1/2-4
			■			■							LA-5, LAE-5	1/2-3
			■								■		LAKT†	1/2-4
			■					■					LAT†	1/2-3
			■			■							LAAS-1	1/2-2

DIFFERENTIAL PRESSURE REGULATORS

Differential Pressure Range: 5-40 psi (0.3-2.8 bar)
Min. Inlet/Outlet Differential: 30 psi (2.1 bar)

INLET PRESSURE RANGE PSI (BAR)					CLASS	SIZE (IN.)
STEAM			AIR & GAS			
40-250 (3-17)	40-300 (3-21)	40-600 (3-41)	40-200 (3-14)	40-400 (3-28)		
■			■		LXKY	1/2-3"
	■		■		LXY	1/2-3"
		■		■	LXS-5	1/2-3"

INTERNAL PILOT, PISTON OPERATED REDUCING VALVES

CLASS LKY, LEKY, LLKY IRON BODY, FOR STEAM SERVICE; LAK, LAEK IRON BODY FOR AIR, GAS SERVICE

FEATURES

SINGLE SEATED - closing with inlet pressure for positive dead-end shut-off.[3]

ACCURACY OF REGULATION - comparable to instrument control with full flow for equivalent pipe size.

WIDE ADJUSTABLE RANGE - from minimum to maximum of reduced pressure range with easy adjusting screw. No springs or diaphragms to change.

FULLY GUIDED MAIN VALVE - prevents rubbing or binding of internal parts.

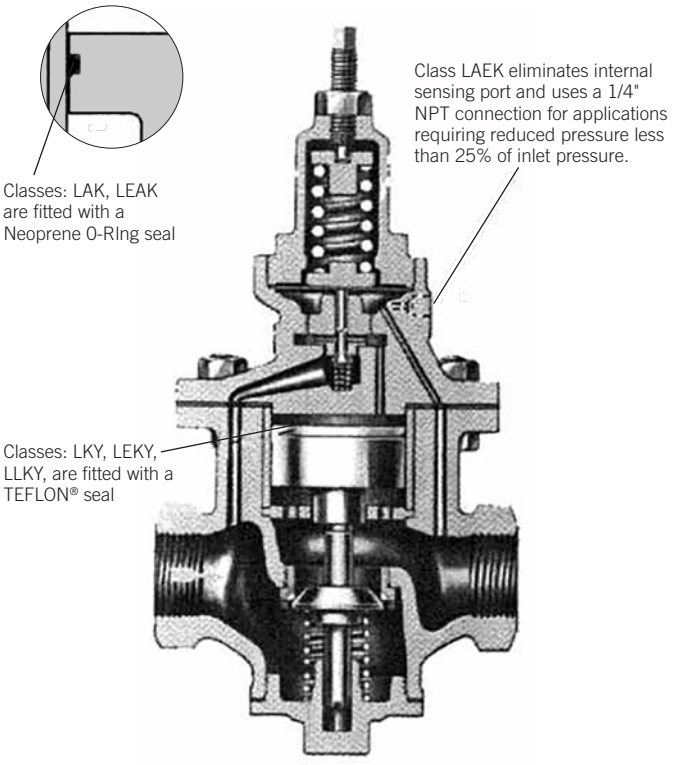
PISTON WITH TEFLON SEAL - for temperatures up to 450°F (232°G) gives continuous wiping action, keeping liner clean, improving reliability and reducing maintenance.

SENSITIVE STAINLESS STEEL DIAPHRAGM responds instantly to any flow change and eliminates stuffing boxes and bellows seals. Full travel less than its own thickness minimizes stress.

RENEWABLE, INTERCHANGEABLE PARTS - machined to close tolerances; complete overhaul without machining or removing valve body from the line.

REMOTE ADJUSTMENT SUPERSTRUCTURE for convenient adjustment by air loading. See page 10 for details.

GRADUAL OPENING PORTED MAIN VALVE - in sizes 2 1/2" and larger for improved throttling control under low flow conditions.



Class LKY

PRESSURE RANGES AND CONSTRUCTION

Capacity Data see pages 23, 24 & 25

BODY MAT'L	CLASS	SIZE	INLET PRESSURE & TEMP.	REDUCED PRESSURE RANGE-PSI/BAR[1]		END CONNECTIONS	TRIM PARTS AND MATERIALS					
				MIN. 2	MAX.		SEAT RING	MAIN VALVES	CNTROLLING VALVE	CYLINDER LINER	CONTROLLING VALVE SEAT	LOWER DIA-PHRAGM
CAST IRON	LKY LEKY	1/2 - 4"	25-250 PSI (2-17 BAR) 450°F MAX. (232°C MAX.)	10/0.5*	235/16	1/2-2" 250 LB THREADED 1/2-4" 125 OR 250 LB FLANGED	400 SERIES STAINLESS STEEL, STELLITE®	400 SERIES STAINLESS STEEL, HARDENED	400 SERIES STAINLESS STEEL, HARDENED	CAST BRONZE WITH TEFLON® SEAL	18-8 STAINLESS STEEL TEFLON® SEAL	CAST BRONZE WITH
	LLKY			20/0.1**	35/2.5							
	LAK LAEK	1/2 - 4"	25-400 PSI (2-28 BAR) 150°F MAX. (65°C MAX.)	5/0.3*	385/27	1/2-4" 125 AND 250 LB FLANGED	CAST BRONZE	18-18 STAINLESS STEEL STEM NEOPRENE SEATING DISC	PHOSPHOR BRONZE AND MONEL®	BRONZE	PHOSPHOR BRONZE WITH PLASTIC SEATING SURFACE	CAST BRONZE WITH NEOPRENE O-RING

* 5% of inlet pressure over 200 psi (14 bar)
** 5% of inlet pressure over 100 psi (7 bar)

[1] Minimum differential between inlet and outlet pressure is 15 psi (1 bar)
[2] Models with external sensing line required for reduced pressure less than 25% of inlet pressure.
[3] Soft seat configuration required for dead end service.
See page 26 for listing of trademarks and their owners.

INTERNAL PILOT, PISTON OPERATED REDUCING VALVES

CLASSES LY, LEY, LLY, L-3, LE-3, LL-3 BRONZE BODY FOR STEAM SERVICE; LA-5, LAE-5 BRONZE BODY FOR AIR SERVICE

FEATURES

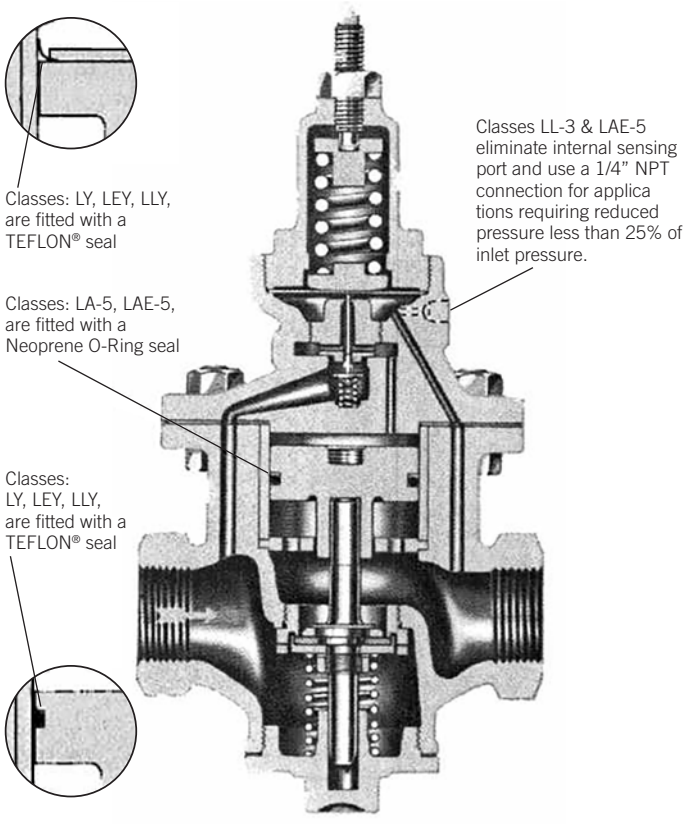
FEATURES FOR CLASSES: LY, LEY, LLY, L-3, LE-3, LA-5, and LAE-5 are the same as those of Class LKY.

INTERNAL SPRINGS - of INCONEL ® are non-corrod ing and heat resistant.

OPTIONAL FEAJURES

FOR LOW REDUCED PRESSURES OR EXPANDED OUTLET PIPING - Use Class LLY (2-35 psi) (0.1-2.5 bar) or LEY (10-285 psi) (0.5-20 bar) similar to LY except fitted with 1/4" external control pipe connec tion (no internal control port). External control pipe eliminates effect of turbulence at outlet body throat due to high pressure drop, increasing capacity under heavy flow conditions. Effective only if outlet piping is expanded. Expand to twice valve size when reducing to 25% or less of the inlet pressure. Use taper expander if possible.

REMOTE ADJUSTMENT SUPERSTRUCTURE for convenient adjustment by air loading. See page 21 for details.



Class LA-5

PRESSURE RANGES AND CONSTRUCTION

Capacity Data see pages 23, 24 & 25

BODY MAT'L	CLASS	SIZE	INLET PRESSURE & TEMP.	REDUCED PRESSURE RANGE-PSI/BAR[1]		END CONNECTIONS	TRIM PARTS AND MATERIALS					
				MIN. 2	MAX.		SEAT RING	MAIN VALVES	CNTROLLING VALVE	CYLINDER LINER	CONTROLLING VALVE SEAT	LOWER DIA-PHRAGM
BRONZE	LY LEY	1/2 - 3"	25-300 PSI (1.5-21 BAR) 500°F MAX.2 (260°C MAX.2)	10/0.5*	285/20	1/2-2" 250 LB THREADED 1/2-4" 150 & 300 LB FLANGED	400 SERIES STAINLESS STEEL, STELLITE®	400 SERIES STAINLESS STEEL, HARDENED	400 SERIES STAINLESS STEEL, HARDENED	18-8* STAINLESS STEEL	BRONZE	CAST BRONZE WITH TEFLON® SEAL
	LE-3			20/0.1***	35/2.4							CAST BRONZE WITH STEEL PISTON RING
	LL-3 LLY											
	A-5 LAE-5		25-400 PSI (2-17 BAR) 150°F MAX. (65°C MAX.)	5/0.3**	385/27	1/2-2" 300 LB THREADED 1/2-4" 150 & 300 LB FLANGED	CAST BRONZE	18-18* STAINLESS STEEL STEM NEOPRENE SEATING DISC	PHOSPHOR BRONZE AND MONEL®	BRONZE	PHOSPHOR BRONZE WITH PLASTIC SEATING SURFACE	CAST BRONZE WITH NEOPRENE O-RING

* 5% of inlet pressure over 200 psi (14 bar)
** 5% of Inlet pressure over 100 psi (I bar)
*** 2% of Inlet pressure over 100 psi (I bar)

[1] Minimum differential between inlet and out1et pressures is 15 psi (1 bar).
[2] Classes L-3, LE-3, LL-3, are fitted with a piston ring instead of TEFLON" seal and are suitable for max. temp of 5SO'F(260"C)
[3] Soft seat configuration required for dead end service.
See page 26 for listing of trademarks and theIr owners.

INTERNAL PILOT, PISTON OPERATED, REDUCING VALVES

CLASSES LS-5*, LYS-1 , LES-5, LEYS-1*; LLS-5, LLYS-1, LAAS-1
STEEL BODY FOR STEAM, AIR OR GAS SERVICE

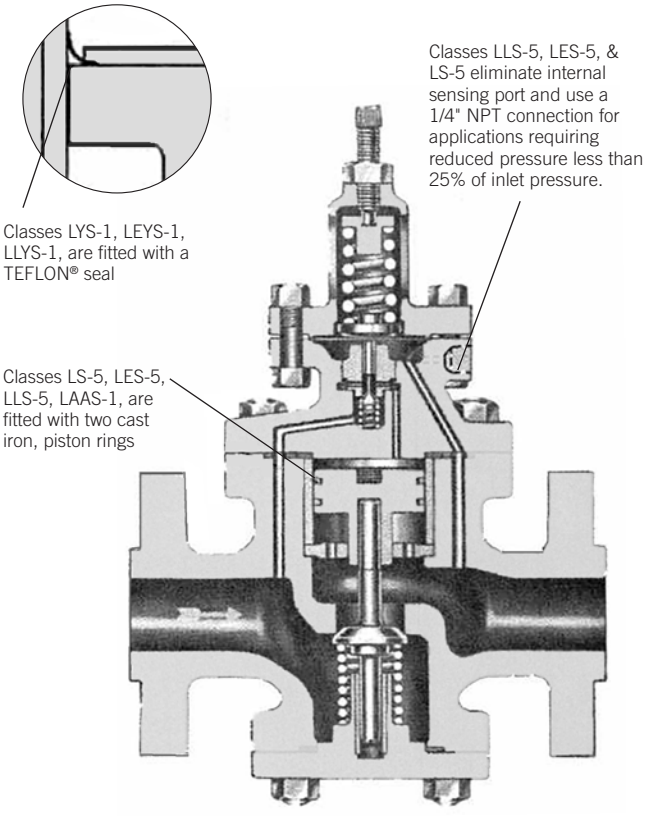
FEATURES FOR CLASSES LS-5, LYS-1, LES-5, LEYS-1, LLS-5, LLYS-1, and LAAS-1 are the same as those of Class LKY (see page 4) except for the following features.

INTERNAL SPRINGS OF INCONEL® are noncorroding and heat resistant.

OPTIONAL FEATURES

FOR LOW REDUCED PRESSURES OR EXPANDED OUTLET PIPING - Use Class LLS-5 (10-50 psi) (0.5-3.5 bar) or LES-5 (25-400 psi) (2-28 bar) similar to LS-5 except fitted with 1/4" external control pipe connection (no internal con trol port). External control pipe eliminates effect of tur bulence at outlet body throat due to high pressure drop, increasing capacity under heavy flow conditions. Effec tive only if outlet piping is expanded. Expand to twice valve size whenever reducing to 25% or less of the inlet pressure. Use taper expander if possible.

REMOTE ADJUSTMENT SUPERSTRUCTURE may be supplied for convenient adjustment by air loading device including pressure limit control if desired. See page 21 for details.



Class LS-5

PRESSURE RANGES AND CONSTRUCTION

Capacity Data see pages 23, 24 & 25

BODY MAT'L	CLASS	SIZE	INLET PRESSURE & TEMP.[2]	REDUCED PRESSURE RANGE-PSI/BAR[1]		END CONNECTIONS	TRIM PARTS AND MATERIALS		
				MIN. [2]	MAX.		SEATING SURFACE	MAIN & CONTROLLING VALVES; CONTROLLING VALVE SEAT & CYLINDER LINER	PISTON
CAST STEEL	S-5 LYS-1† LES-5 LEYS-1†	1/2 - 3*	40-1000 PSI (3-69 BAR) 750˚F MAX.† (398˚C MAX.†)	25/2*	400/28	1/2-2" 600 LB THREADED 1/2-3" 150, 300 & 600 LB FLANGED	INTEGRAL STELLITE®	400 SERIES STAINLESS STEEL, HARDENED	400 SERIES STAINLESS STEEL, WITH CAST IRON PISTON RINGS †
	LS-5 LLYS-1†			10/0.5**	50/3.5				
	LAAS-1	1/2 - 2*	25-400 PSI (2-28 BAR) 180˚F MAX. (82˚C MAX.)	5/0.3***	385/27	1/2-2" SWE, THD 150, 300& 600 LB FLANGED W/ TEFLON® INSERT	416 STAINLESS STEEL/TEFLON® INSERT	300 SERIES STAINLESS STEEL EXCEPT MAIN VALVE: 420 STAINLESS STEEL CYLINDER LINER: BRONZE	PHOSPHOR BRONZE & MONEL®

* 8 % of inlet pressure over 300 psi (21 bar)
** 4% of inlet pressure over 250 psi (17 bar)
*** 5 % of inlet pressure over 100 psi (7 bar)

† LYS-1, LEYS-1, LLYS-1 are fitted with a TEFLON® piston cup washer for steam service up to 500°F (260°C).
[1] Minimum differential between inlet and outlet pressures is 15 psi (1 bar).
[2] 1000 psi, 665°F (69 bar, 351°C) maximums in air and gas service

See page 26 for listing of trademarks and their owners.

DIRECT OPERATED REDUCING VALVES

CLASSES LC(*), LCL(*) BRONZE BODY; LC(**)S, LCL(**)S STEEL BODY LC(**)SS, LCL(**)SS STAINLESS STEEL BODY

FEATURES

COMPACT DESIGN - Simple, direct operated design has screwed or bolted adjusting spring assembly, providing easy access to controlling valve and seat. No stuffing boxes or bellows seals.

FOUR SIZES OF CONTROLLING VALVES - 3/32" (A), 1/4" (B), 5/16" (C), and 1/8" (D). (A) is bronze with resilient seat for air and gas service. Available in bronze body only. (B), (C), and (D) are hardened stain less steel machined and ground to a high finish for smooth action and reduced wear.

CORROSION RESISTANT METAL DIAPHRAGM for long service. Provides simple gasketless seal.

WIDE RANGE OF ADJUSTMENT - Minimum to maxi mum reduced pressure accomplished by simple handwheel adjustment. No need to change springs.

INTERNAL SPRINGS of INCONEL are non-corroding, heat resistant.

PRECISION MACHINED, INTERCHANGEABLE, PARTS - no further machining of body or replacement parts is necessary. New parts always fit perfectly.

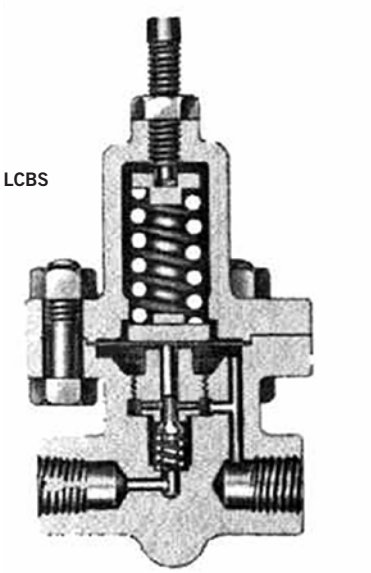
APPLICATIONS

Leslie small flow reducing valves are used in pilot plant operations, plastic molding presses, laboratory units, gland sealing, steam sterilization and atomizer units and wherever control of small flows of steam, air, gas or non-corrosive liquids are a problem.

HOW THEY OPERATE

The handwheel compresses the adjusting spring against a metallic diaphragm, opening the controlling valve and admitting pressure to the reduced pressure system. Reduced pressure acting on the underside of the diaphragm increases until it balances compres sion of the adjusting spring at the set value. Load or flow change results in an immediate pressure change under the diaphragm, instantly repositioning control ling valve. Flow increase creates a slight drop in reduced pressure permitting the controlling valve to open more. Flow decrease acts to raise the reduced pressure closing the controlling valve. Reduced pres sure is proportional to the flow change.

Class LCBS



PRESSURE RANGES AND CONSTRUCTION

Capacity Data see pages 23, 24 & 25

BODY MATERIALS & CONSTURCITON	CLASS	MAX. INLET PRESS PSI/BAR		MAX. TEMP. °F/°C	MIN PRESS DROP PSI/BAR	REDUCED PRESS RANGE PSI/BAR	TRIM PARTS & MATERIALS			
		STEAM					ORIFICE SIZE & DESIGNATION	CONTROLLING VALVE MATERIAL	VALVE SEAT[3]	VALVE SPRING
BRONZE SCREWED BONNET 1/2" THREADED	LCA	—	400/28	150/65	10/0.5	5-285/0.3-2	3/32" (A) 1/4" (B) 5/16" (C) 1/8" (D)	BRONZE	RESILIENT	BRONZE
	LCB LCC LCD	300/21	400/28	550/287	10/0.5	5-285/0.3-2		17-4-PH* STAINLESS (HARDENED)	18-8* STAINLESS	INCONEL®
	LCLA	—	400/28	150/65	10/0.5	2-35/0.1-2.5		BRONZE	RESILIENT	BRONZE
	LCLB LCLC LCLD	300/21	400/28	550/287	10/0.5	2-35/0.1-2.5		17-4-PH* STAINLESS (HARDENED)	18-8* STAINLESS	INCONEL®
STEEL* THRU BOLTED BONNET 1/2" BOLTED	LCBS LCCS LCDS	600/41	1000/69	750/398	10/0.5	25-400/2-28	1/4" (B) 5/16" (C) 1/8" (D)			
	LCLBS LCLCS LCLDS	600/41	1000/69	750/398	10/0.5	10-50/0.5-3.5				

* Also available in 316 stainless steel. Add "S" to class designation LCBSS, etc.

[3] Soft seat configuration required for dead end service.

See page 26 for listing of trademark and their owners.

PILOT OPERATED REDUCING VALVES

CLASSES J-1, JL BRONZE BODY FOR STEAM SERVICE; JA-2, JAL-2, BRONZE BODY FOR AIR OR GAS SERVICE

FEATURES

SINGLE-SEATED - closing with inlet pressure for pos itive dead-end service.[3]

ACCURACY OF REGULATION - comparable to instru ment control with full flow for equivalent pipe size. See page 14 for capacity data.

WIDE SPRING RANGE - minimum to maximum reduced pressure, 5-290 psi (0.3-20 bar) or 1-50 psi (0.1-3.5 bar), with easy handwheel adjustment. No springs or diaphragms to change.

LONG GUIDING SURFACES - with high finishes on all moving parts to assure true alignment, prevent cock ing or binding.

CORROSION RESISTANT MATERIALS - move freely even after prolonged tight shut-off. Internal springs are non-corroding, heat resistant INCONEL®.

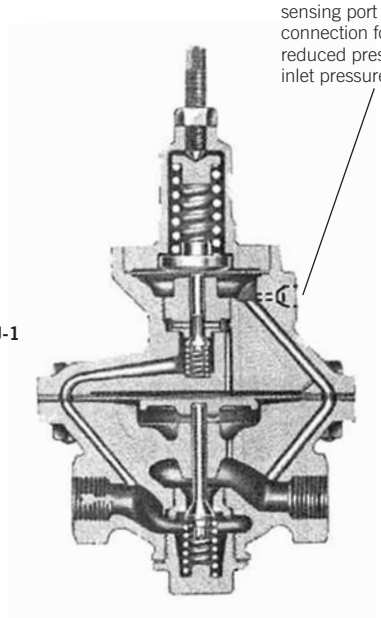
RENEWABLE, INTERCHANGEABLE PARTS are ma chined to close tolerances. Overhaul completely, with out machining or removing valve body from the line. OPTIONAL FEATURES

FOR LOW REDUCED PRESSURES, 1-50 psi (0.1-3.5 bar) - Use Class JL similar to J-1, and JAL-2 similar to JA-2, except fitted with 1/4" external control pipe connection (no internal port for reduced pressure).

External control pipe eliminates the effect of turbu lence at outlet body throat, increasing capacity under heavy flow conditions. Effective if outlet piping has been expanded.

REMOTE ADJUSTMENT SUPERSTRUCTURE may be supplied for convenient remote adjustment by air loading device including pressure limit control if de sired. See page 21 for details.

Classes JL & JAL-2 eliminate internal sensing port and use a 1/4" NPT connection for applications requiring reduced pressure less than 25% of inlet pressure.



Class J-1

PRESSURE RANGES AND CONSTRUCTION

Capacity Data see pages 23, 24 & 25

BODY MAT'L	CLASS	INLET PRESSURE & SIZE	REDUCED PRESSURE RANGE-PSI/BAR[1] TEMPERATURE			TRIM PARTS AND MATERIALS				
				MIN.	MAX.	CON. SEAT RING[3]	TROLLING MAIN VALVE	CON. LOWER TROLLING VALVE	VALVE SEAT	DIA-PHRAGM
BRONZE	J-L JL	1/2" THREADED ENDS	20-300 PSI (1.5-20 BAR) 500°F MAX. (287°C MAX.) STEAM	5/0.3* 1/0.1**	290/20 50/3.5	400 SERIES STAINLESS STEEL, STELLITE®	400 SERIES STAINLESS STEEL, HARDENED	400 SERIES STAINLESS STEEL, HARDENED	TYPE 302 STAINLESS STEEL	PHOSPHOR BRONZE
	JA-2 JAL-2		25-400 PSI (2-15 BAR) 150°F MAX. (65°C MAX.) AIR	5/0.3* 1/0.1**	290/20 50/3.5	BRONZE WITH PLASTIC INSERT	400 SERIES STAINLESS STEEL, HARDENED	PHOSPHOR BRONZE AND MONEL®	BRONZE WITH PLASTIC SEATING SURFACE	SYNTHETIC RUBBER

* 5% of inlet pressure over 100 psi.
** 1 % of inlet pressure over 100 psi
[1] Minimum differential between inlet and outlet pressures-1 O psi
[3] Soft seat configuration required for dead end service.

See page 26 for listing of trademarks and their owners.

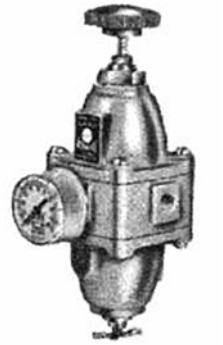
SMALL FLOW REDUCING VALVES AND LOADERS

LESLIE AIRMATE FOR AIR PRESSURE REDUCING VALVES

The Leslie-Airmate is an extremely stable, high ca pacity air loader/regulator which is ideal for instrument air control and for a variety of small flow (up to 32 SCFM) (0.9 NM3/min.) air systems. Our patented aspira tor tube in the valve provides exceptional accuracy over the entire flow range.

Maximum inlet pressure, 200 psi (14 bar), tempera tures to 150°F (65°C); reduced pressure ranges, 2-30, 3-60, 30-150 psi (0.1-2, 0.2-4, 2-10 bar); continuous bleed .04 SCFM (0.001 NM3/min.); die cast aluminum body and spring case.

Complete data available in Leslie Bulletin 30/1 .1 .1



Leslie-Airmate Class AFG

Air Loading Panel Class 60-PPF-1

CLASSES AW, AWG, FOR PRESSURE REDUCING; AIR OR WATER AWR, AWRG FOR PRESSURE REDUCING AND RELIEF; AIR

FEATURES

DURABLE, HIGH QUALITY CONSTRUCTION - 200 psig rated cast bronze body. Corrosion and wear resistant parts are renewable and fully interchangeable in the field. Diaphragm and seat insert are rubber. Adjusting spring has square-ground ends to assure straightline valve travel.

COMPACT DESIGN - Simple, direct operated design has a screwed adjusting spring assembly for easy access to internal parts.

QUIET OPERATION - even at minimum pressure drops and low reduced pressures.

FOR PRESSURE REDUCING OR RELIEF - Classes AW and AWG (G for Gage) for pressure reducing only. Class es AWA and AWRG (R for Relief) for combined pressure reduction and relief (supplied with handwheel).

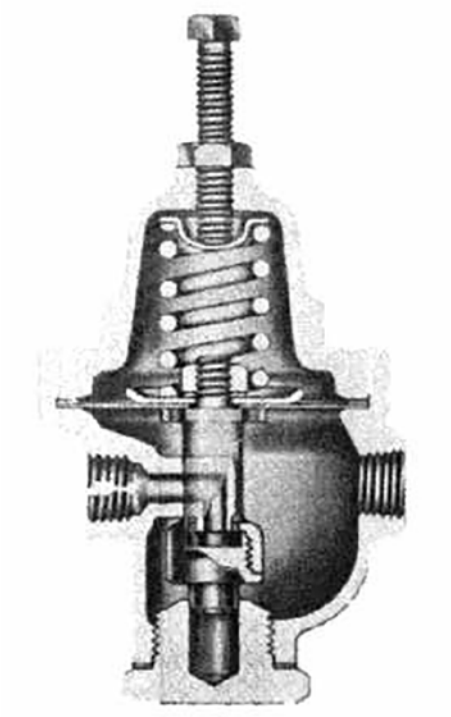
PRESSURE RANGES* AND TRIM MATERIALS

CLASS	BODY MAT'L & SIZE	INLET PRESS. & TEMP.	REDUCED PRESS. PSI/BAR	BODY & SEAT	MAIN VALVE	MAIN VALVE SPRING	DIA-PHRAGM
AW AWG	BRONZE 1/4" THREADED ENDS	10-200 PSI (0.5-14 BAR) 150°F (65°C)	5-95 (0.3-6.5)	BRONZE	BRONZE WITH RUBBER DISC	——	RUBBER
AWR AWRG		10-200 PSI (0.5-14 BAR) 150°F (65°C)	5-95 (0.3-6.5)			INCONEL®	

* Minimum differential inlet and outlet pressure 5 psi.

APPLICATIONS

Air, gas, water, and light oil service for controllers, instruments, loading and pilot devices, machine tools, testing and laboratory equipment, process machinery, and many others. Suitable for panel mounting.

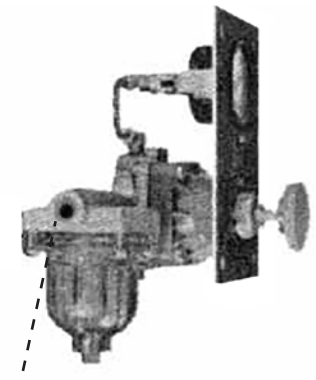


Class AW

REMOTELY ADJUSTED REDUCING VALVES

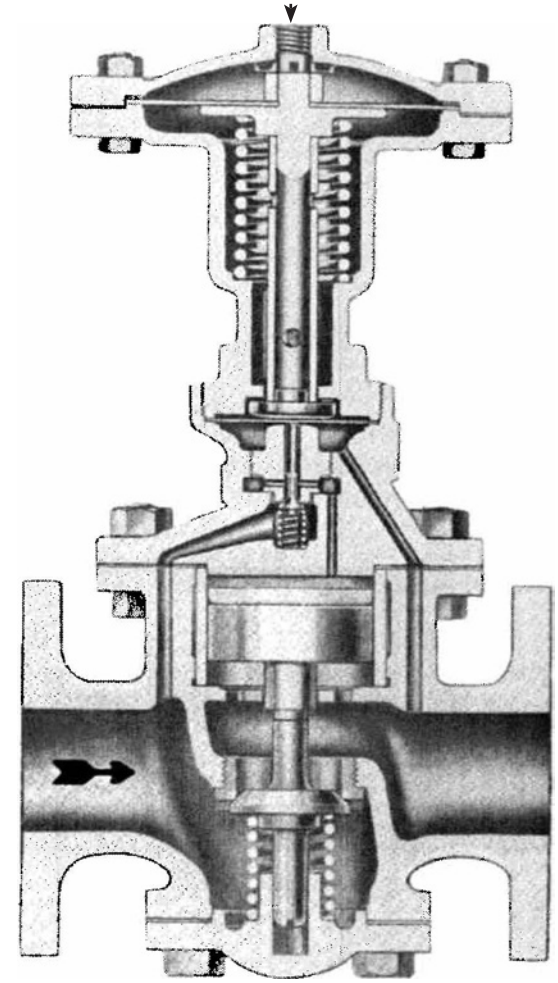
CLASSES JT, JAT, LKTY, LTV, LAKT, LAT, LTS-5, LTYS-1

Leslie remotely adjusted reducing valves are similar in construction and characteristics to corresponding classes of handwheel adjusted reducing valves. See table below. Remote adjustment is accomplished by air loading the upper diaphragm that replaces the spring case and handwheel assembly, and is designated by adding "T" to reducing valve class. See illustration.



Air Loading Panel
Class 60-PF-1

Type "T" Superstructure mounted on Class LKY reducing valve body becomes Class LKTY remotely adjusted reducing valve.



EASY CONVERSION IN THE FIELD

Most Leslie manually adjusted reducing valves of the general types previously described may be easily converted in the field to a remotely operated valve. See table below for conversion class designations.

PRINCIPLE OF OPERATION

The reducing valve is adjusted to the desired pres sure setting by air pressure from a Type P-1 air loading panel. The constant loading force on the upper dia phragm opens the pilot valve and is balanced by a con stant reduced pressure proportional to the loading force.

The air loading panel eliminates hazardous or in convenient adjustments and also provides a fast way to readjust reduced pressure to meet changing require ments.

CONVERSION CLASS DESIGNATIONS FOR REMOTELY OPERATED VALVES CORRESPONDING

CORRESPONDING CLASS OF MANUALLY ADJUSTED VALVE	PAGE REFERENCE	CLASS OF REMOTELY ADJUSTED VALVE	REDUCE PRESSURE RANGE PSI (BAR)
LKY	X	LKTY	10-175 (0.5-12)*
JA-1	X	JT	5-175 (0.3-12)**
JA-2	X	JAT	5-175 (0.3-12)**
LY	X	LTY	10-175 (0.5-12)*
LA-5	X	LAT	5-175 (0.3-12)**
LAK	X	LAKT	5-175 (0.3-12)**
LS-5	X	LTS-5	25-175 (2-12)***
LYS-1	X	LTYS-1	25-175 (2-12)***

* 5% of inlet pressure over 200 psi (14 bar)
** 5% of Inlet pressure over 100 psi (J bar)
*** 8% of inlet pressure over 300 psi (21 bar)

NOTE: Ratio of increase in reduced pressure to increase in loading pressure is 7:1. 8-10 psi (0.4-0.5 bar) loading pressure required to open valve. Maximum allowable loading pressure is 35 psi (2.5 bar).

PILOT OPERATED DIFFERENTIAL PRESSURE REGULATORS

CLASSES LXKY, LXV, LXS-5 CAST IRON, BRONZE AND CAST STEEL REGULATORS

FEATURES

SINGLE-SEATED - closing with inlet pressure for tight shut-off.

ACCURACY OF REGULATION - comparable to instrument control with full flow for equivalent pipe size.

WIDE ADJUSTABLE RANGE - from minimum to maximum reduced pressure range with easy handwheel adjustment. No springs or diaphragms to change.

NEW TYPE PISTON WITH TEFLON® SEAL - for tempera tures up to 500°F {450°F for cast iron regulators) gives con tinuous wiping action, keeping liner clean, improving oper ating reliability and reducing maintenance. Piston rings can be furnished for temperatures over 500°F in bronze and steel regulators.

FULLY GUIDED MAIN VALVE - prevents rubbing or binding of internal parts.

GRADUAL OPENING PORTED MAIN VALVE {Classes LXKY, LXY, LXS-5 Cast Iron, Bronze and Cast Steel Regulators ONLY) - in sizes 2 1/2" and larger for improved throttling control under low flow conditions.

SENSITIVE STAINLESS STEEL DIAPHRAGM responds instantly to any flow change and eliminates stuffing boxes and bellow seals. Full travel less than its own thickness reduces stress to a minimum.

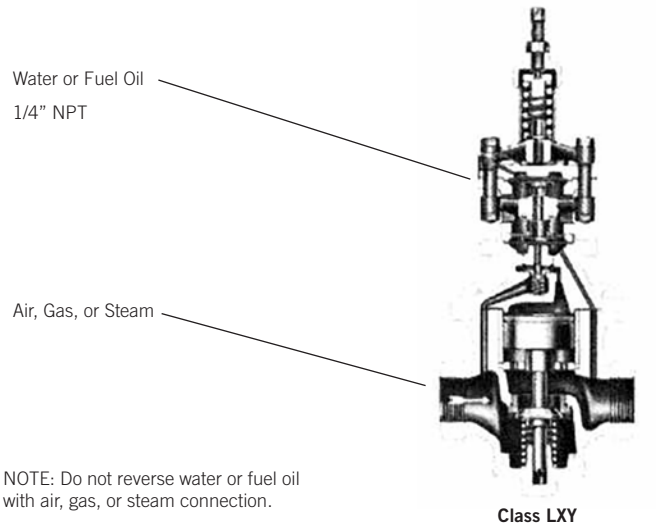
INTERNAL SPRINGS of INCONEL® are non-corroding, heat resistant.

RENEWABLE INTERCHANGEABLE PARTS - machined to close tolerances; complete overhaul without machining or removing valve body from the line.

HOW THEY OPERATE

Differential Pressure Regulators maintain a constant differ ential between the air, gas or steam pressure passing through the regulator and any other liquid or gas pressure whose rela tionship to the regulator outlet pressure should be a constant, regardless of operating variations.

External fluid pressure acts on upper diaphragm and yoke to open the controlling valve and the main valve. Regulator outlet pressure increases and balances the external pressure by acting upward under the lower diaphragm. By adding or subtracting adjusting spring force with the handwheel to the external fluid pressure, a higher or lower regulator outlet pres sure is created. Changes in either pressure due to flow result in the constant differential setting being maintained.



NOTE: Do not reverse water or fuel oil with air, gas, or steam connection.

Class LXY

PRESSURE RANGES AND CONSTRUCTION

Capacity Data see pages 23, 24 & 25

BODY MAT'L	CLASS	INLET PRESSURE & TEMPURATURE	PRESSURE RANGE PSI/BAR[1]	DIFFERENTIAL		MAIN & CON END CONNECTION	TRIM AND MATERIALS			
				MIN.	MAX.		CONTROLLING SEAT RING	CYLINDER LINER TROLLING VALVES	VALVE SEAT	PISTON
BRONZE	LXY	1/2-3" 500°F MAX. (260°C MAX.)	40-300 PSI (3-21 BAR)	5/0.3	40/3	1/2-2" 300 LB THREADED 1/2-3" 150 & 300 LB FLANGED	400 SERIES STAINLESS STEEL, STELLITE®	400 SERIES STAINLESS STEEL, HARDENED	TYPE 302 STAINLESS STEEL	BRONZE WITH TEFLON® PISTON SEAL
CAST IRON	LXKY	1/2-3" 450°F MAX. (232°C MAX.)	40-250 PSI (3-17 BAR)	5/0.3	40/3	1/2-2" 250 LB THREADED 1 1/2-3" 125 LB FLANGED 1 1/2-3" 250 LB FLANGED				
CAST STEEL	LXS-5	1/2-3" 750°F MAX. (398°C MAX.)	40-600 PSI (3-41 BAR)	5/0.3	40/3	1/2-2" 150, 300, 400 & 600 LB FLANGED	INTEGREAL STELLITE® SEATING SURFACE		400 SERIES STAINLESS STEEL	400 SERIES STAINLESS STEEL

* Ratings for air or clean gas (150'F) 40-400 psi 250 lb. cast iron and 300 lb. bronze regulators, 40-1000 psi at 665'F for cast steel.

[1] Minimum differential between inlet and outlet pressures Is 30 psi

See page 26 for listing of trademarks and their owners.

SIZING AND CAPACITY DATA

Reliability in a service and maintenance expense are greatly de-pendent on correct sizing and installation. Maximum steam flow must be calculated with full information and based on accurate data for each steam consumer including con densation losses. See Leslie Bulletin 5/0.1.1 for helpful information in figuring flows for steam, air and gas equipment or estimating steam flow. Use caution in making allowances in your maximum flow for overloads or future requirements.

Reducing Valves should be sized to operate as closely as possi ble to their rated capacities and in no case to operate continuously at less than 10% of their rated capacity although they will throttle accurately to no flow during load changes. To properly size a reducing valve the following information should be available:

- Maximum and minimum inlet pressures
- Superheat, if any
- Reduced pressure or range
- Maximum and minimum continuous flow in lbs. of steam per hour or cu. ft. of free air or gas per minute to be delivered

In the table find Inlet Pressure corresponding to your mini mum inlet pressure. Select outlet pressure column closest to your reduced pressure requirements. Find capacity figure equal to your estimated maximum or slightly greater. The reducing valve size is shown in the left hand column horizontally opposite this figure.

CORRECTIONS FOR SUPERHEAT: Multiply figure from capacity table by proper factor below:

INLET PRESSURE	°F SUPERHEAT					
	50	100	150	200	300	400
TO 600 PSI	0.92	0.85	0.80	0.75	0.65	0.59
600 TO 1500 PSI	0.85	0.79	0.73	0.69	0.62	0.56
500 TO 2000 PSI	0.78	0.72	0.66	0.61	0.54	0.49

CONVERSION TO AIR CAPACITIES: #/hr. I 2.9 = SCFM @ 60°F

CONVERSION TO GAS CAPACITIES: SCFM x 2.9 / SG = #/hr.

CAPACITIES IN LBS. OF SATURATED STEAM PER HOUR (LBS./HR. X 2.2 = KG/HR.)

PRESS. PSI	INLET	25 (267°F)	50 (298°F)	75 (320°F)	100 (338°F)			125 (353°F)	
	OUTLET	0-14	0-27	0-40	0-55	75	85	0-70	100
VALVE SIZE, INCHES	½ ¾ 1	102 190 316	160 300 500	220 400 675	275 510 850	250 460 765	210 385 640	330 620 1020	260 520 860
	1 ¼ 1 ½ 2	560 770 1290	885 1215 2035	1200 1650 2770	1520 2100 3500	1365 1875 3100	1150 1600 2650	1825 2500 4200	1530 2100 3500
	2 ½ 3	1850 2880	2915 4550	3960 6180	5000 7800	4500 7000	3800 5920	6000 9400	5000 8000
	3 ½	3880	6125	8325	10500	9500	7980	12600	10600
	4	5000	7900	10800	13500	12200	10300	16300	13700

PRESS. PSI	INLET	150 (366°F)			175 (378°F)			200 (388°F)				225 (397°)		
	OUTLET	0-80	100	125	0-95	126	150	1-110	125	150	175	0-125	150	175
VALVE SIZE, INCHES	½ ¾ 1	390 725 1200	375 700 1150	300 560 930	450 825 1360	415 775 1280	330 620 1025	500 925 1540	490 910 14600	450 835 1335	350 650 1075	560 1050 1715	540 1000 1700	485 900 1500
	1 ¼ 1 ½ 2	2150 3000 4900	2075 2800 4800	1610 2300 3800	2440 3350 5600	2300 3150 5300	1800 2500 4200	2750 3780 6300	2700 3700 6200	2475 3400 5700	1925 2650 4400	3060 4215 7000	2960 4075 6800	2650 3600 6100
	2 ½ 3	7000 11000	6800 10700	5500 8600	8000 1250	7600 11800	6000 9400	9100 14200	13900 18700	8200 12700	6400 9900	10100 15800	9800 15200	8800 13600
	3 ½	15000	14400	11500	17000	16000	13000	19000	17100	17100	13300	21200	20500	23800
	4	19000	18500	15000	22000	20000	16000	24600	22100	22100	17200	27400	26500	23800

PRESS. PSI	INLET	250 (406°F)			300 (421°F)			400 (448°F) 450 (459°F)				500 (469°) 600 (490°F)		
	OUTLET	0-135	150	200	0-165	200	250	0-220	300	0-250	300	0-300	0-350	400
VALVE SIZE, INCHES	½ ¾ 1	610 1135 1880	600 1120 1850	515 950 1580	725 1340 2225	700 1300 2160	565 1050 1750	955 1760 2900	860 1580 2600	1070 1980 3300	1030 1910 3175	1190 2190 3175	1430 2630 4330	1380 2530 4175
	1 ¼ 1 ½ 2	3350 4625 7700	3300 4550 7600	2800 3885 6500	3975 5470 9100	3850 5300 8900	3100 4270 7200	5200 7200 12000	4700 6500 11000	5900 8000 13500	5700 7800 13000	6475 8960 14950	7770 10800 17900	7490 10400 17250
	2 ½ 3	11100 17300	11000 17000	9300 14500	13100 20500	12700 19800	10200 16000	17200 26900	15500 23300	19500 30000	18700 29000	21500 33500	25700 40200	24750 38700
	3 ½	23300	2300	19500	27500	26700	21500	36000	32500	41000	39000	44800	53800	51800
	4	30100	29600	25300	36000	34000	28000	47000	41300	53000	51000	58500	70200	87700

PRESS. PSI	INLET	700 (505°F)			800 (520°F)			900 (534°F)		1000 (548°F)	
	OUTLET	0-390	450	560	0-440	500	600	0-500	600	0-550	600
VALVE SIZE, INCHES CLASSES HS-8, 18-4	½ ¾ 1	2200 4180 6775	2160 4110 6650	1850 3510 5700	2550 4800 7825	2510 4725 7700	2285 4300 7000	2870 5400 8875	2750 5175 8500	3200 6000 10000	3170 5940 9800
	1 ¼ 1 ½ 2	12300 20500 27100	12100 20150 26600	10650 17200 22800	14000 23600 31300	13800 23200 30800	12550 21150 28200	16000 27000 35400	15320 25850 34000	17800 30000 40000	17600 29700 39800
	2 ½ 3	38900 60500	38200 59400	32700 50900	44900 69900	44200 68800	40600 63000	50800 79000	48800 75900	57400 89300	56800 84800

- All pressures are in pounds per square inch (psig).
- Rated capacities do not increase for lower reduced pressures than shown for each inlet pressure.
- Rated capacities are based on 99% Accuracy of Regulation.

Shaded areas are discontinued - for reference only

SIZING AND CAPACITY DATA

SIZING AND CAPACITY DATA

To correctly and accurately give the capacity of this type of reducing valve, it is required that capacity be stated in terms of accu racy of regulation. Self-operated, spring loaded reducing valves obtain opening force from a drop in reduced pressure and should be adjusted while passing a minimum flow (not dead-end). The reduced pressure obtained by slowly increasing the flow to rated capacity is a measure of Accuracy of Regulation. Therefore, a reducing valve set to deliver 20 psi pressure at minimum flow has a 75% accuracy of reg ulation if it delivers 15 psi at rated capacity. For example:

INLET PRESSURE = 100 PSI ACCURACY OF REGULATOR = 75%		
REDUCED PRESSURE MAINTAINED AT RATED FLOW CAPACITY PSI	10	50
REDUCED PRESSURE MAINTAINED AT RATED FLOW CAPACITY PSI	7.5	37.5
DROP IN REDUCED PRESSURE PSI (WHICH IS OPENING FORCE)	2.5	12.5

Even though the total pressure differential across the reducing valve is less in the second case, which would appear to reduce the capacity, the greater opening force obtained at 75% of the 50 psi reduced pressure produces a greater valve opening, therefore, a greater capacity than at 75% of 10 psi.

CLASSES AW, AWR, AWG, AWRG (Capacities based on 75% Accuracy of Regulation) (SCFM/35.3 = NM3/min)

AIR CAPACITIES (CFM)												
		INLET PRESSURE (PSI)										
		10	15	20	30	50	75	100	125	150	200	
OUTLET PRESSURE (PSI)	5	2.8	4.3	5.0	6.0	8.3	10.8	11.2	11.5	12.0	12.5	
	10	—	5.0	6.2	7.7	10.5	13.3.	14.2	15.3	16.7	17.5	
	15	—	—	6.8	9.2	12.5	15.8	17.5	18.8	20.2	21.3	
	20	—	—	—	9.7	14.3	18.3	20.3	22.0	23.8	25.0	
	25	—	—	—	10.2	16.2	20.6	23.3	25.5	27.5	29.2	
	30	—	—	—	—	17.5	22.0	25.8	28.3	31.0	33.0	
	35	—	—	—	—	18.0	23.3	28.8	31.3	34.3	37.0	
	45	—	—	—	—	18.3	25.5	32.3	37.3	41.4	44.6	
	50	—	—	—	—	—	26.5	33.8	39.8	44.6	48.6	
	65	—	—	—	—	—	26.0	34.5	42.4	49.0	57.2	
	70	—	—	—	—	—	25.3	34.6	43.2	50.0	59.0	
	75	—	—	—	—	—	—	34.6	44.0	51.2	60.6	

WATER CAPACITIES (CFM)												
		INLET PRESSURE (PSI)										
		10	15	20	30	50	75	100	125	150	200	
OUTLET PRESSURE (PSI)	5	0.6	0.9	1.0	1.4	1.4	1.5	1.5	1.5	1.5	1.5	
	10	—	1.1	1.2	1.7	1.7	1.8	1.8	1.8	1.9	1.9	
	15	—	—	1.3	1.8	2.0	2.1	2.2	2.3	2.3	2.4	
	20	—	—	—	1.8	2.3	2.5	2.6	2.7	2.8	2.8	
	25	—	—	—	1.8	2.4	2.8	3.0	3.1	3.2	3.3	
	30	—	—	—	—	2.5	3.0	3.3	3.5	3.5	3.6	
	35	—	—	—	—	2.5	3.1	3.6	3.8	3.8	4.0	
	45	—	—	—	—	2.2	3.3	4.0	4.3	4.4	4.6	
	50	—	—	—	—	—	3.2	4.1	4.5	4.6	4.9	
	65	—	—	—	—	—	2.9	3.8	4.6	4.8	5.5	
	70	—	—	—	—	—	2.8	3.7	4.4	4.8	5.7	
	75	—	—	—	—	—	—	3.5	4.3	4.7	5.9	

LIQUID CAPACITIES – SMALL FLOW REDUCING VALVES

GPM -(SpG = 1; 31.5 SSU) – CLASSES LCB, LCLB, LCBS, LCLBS, etc.* (GPM/0.0044 = litres/hr.)

CLASS	REDUCED PRESSURE SETTING	25	50	75	100	125	150	175	200	250	300	400	500	600
LCB*	10	—	0.24	0.29	0.32	0.38	0.40	0.42	0.46	0.50	0.54	—	—	—
	20	—	0.38	0.47	0.54	0.60	0.65	0.70	0.75	0.85	0.82	—	—	—
	30	—	0.58	0.71	0.82	0.92	1.00	1.10	1.20	1.30	1.40	—	—	—
	40	—	0.70	0.86	1.00	1.10	1.25	1.40	1.50	1.60	1.80	—	—	—
	50	—	1.00	1.20	1.40	1.60	1.80	2.00	2.10	2.40	2.60	—	—	—
	75	—	—	1.30	1.50	1.70	1.90	2.10	2.20	2.50	2.80	—	—	—
	100	—	—	—	1.60	1.80	2.00	2.20	2.30	2.60	2.90	—	—	—
	125	—	—	—	—	2.00	2.20	2.40	2.60	2.90	3.30	—	—	—
	150	—	—	—	—	—	2.40	2.60	2.80	3.20	3.50	—	—	—
	175	—	—	—	—	—	—	2.30	2.40	2.70	3.00	—	—	—
	200	—	—	—	—	—	—	—	2.20	2.50	2.80	—	—	—
	250	—	—	—	—	—	—	—	—	1.80	2.00	—	—	—
	285	—	—	—	—	—	—	—	—	—	1.10	—	—	—
LCLB*	2	0.08	0.11	0.13	0.15	0.17	0.19	0.20	0.21	0.23	0.25	—	—	—
	5	0.13	0.17	0.21	0.24	0.26	0.29	0.30	0.32	0.36	0.38	—	—	—
	10	0.52	0.71	0.80	1.00	1.10	1.20	1.30	1.40	1.50	1.70	—	—	—
	15	0.64	0.92	1.10	1.30	1.50	1.70	1.80	1.90	2.20	2.40	—	—	—
	20	0.75	1.10	1.30	1.60	1.80	2.00	2.2.0	2.40	2.70	2.90	—	—	—
	25	—	1.30	1.50	1.90	2.20	2.40	2.40	2.80	3.20	3.50	—	—	—
	30	—	1.50	1.80	2.20	2.60	2.80	3.00	3.30	3.70	4.10	—	—	—
	35	—	1.50	1.80	2.20	2.60	2.80	3.00	3.30	3.70	4.10	—	—	—
LCBS*	25	—	0.29	0.38	0.43	0.43	0.52	0.56	0.60	0.66	0.72	0.82	0.90	1.00
	50	—	0.56	0.74	0.84	0.92	1.00	1.10	1.20	1.30	1.40	1.60	1.70	1.90
	75	—	—	1.00	1.20	1.30	1.40	1.50	1.60	1.70	1.90	2.20	2.40	2.60
	100	—	—	—	1.40	1.50	1.70	1.80	1.90	2.10	2.30	2.60	2.90	3.20
	150	—	—	—	—	—	1.80	1.90	2.00	2.30	2.50	2.90	3.20	3.50
	200	—	—	—	—	—	—	—	2.10	2.40	2.60	3.00	3.30	3.60
	250	—	—	—	—	—	—	—	—	2.50	2.70	3.10	3.40	3.80
	300	—	—	—	—	—	—	—	—	—	2.60	3.00	3.30	3.60
	400	—	—	—	—	—	—	—	—	—	—	2.90	3.20	3.50
LCLBS*	10	—	0.32	0.38	0.43	0.48	0.52	0.55	0.58	0.65	0.70	0.80	0.86	0.93
	20	—	0.36	0.43	0.49	0.54	0.59	0.63	0.67	0.73	0.80	0.91	0.98	1.10
	30	—	—	0.50	0.57	0.63	0.68	0.73	0.78	0.86	0.94	1.10	1.20	1.30
	40	—	—	0.64	0.73	0.80	0.86	0.93	1.00	1.10	1.20	1.30	1.50	1.60
	50	—	—	0.75	0.85	0.93	1.00	1.10	1.20	1.30	1.40	1.60	1.80	1.90

* Capacities for classes with "B" (1/4") orifice are shown. For other classes, multiply capacity given by the correction factor for controlllng valve size from table at right.

FIGURING LIQUID CAPACITES

Capacity data is based on the 1/4" control ling valve and is the result of actual tests based on an accuracy of regulation of 75%. For capac ities of other controlling valves or other accura cies of regulation follow these steps:

1. Enter the liquid capacity table for applicable conditions.
2. Select the controlling valve size for desired capacity.

CONTROLLING VALVE SIZE		MULITPLY BY
A	3/32"	0.19
B	1/4"	1.00
C	5/16"	1.22
D	1/8"	0.22

3. If accuracy above 75% is required, use correction factor below.

ACCURACY OF REGULATION %	MULITPLY BY
75	0.19
80	1.00
85	1.22
90	0.55
95	0.40

SIZING AND CAPACITY DATA

FIGURING STEAM CAPACITIES

Capacity data is based on the 1 /4" controlling valve and is the result of actual tests based on an accuracy of regulation of 75%. For capacities of other controlling valves, other accuracies of regulation or superheat, follow these steps:

1. Enter steam capacity table for applicable conditions.

2. Select controllling valve size for desired capacity.

CONTROLLING VALVE SIZE		MULITPLY BY
A	3/32"	0.19
B	1/4"	1.00
C	5/16"	1.22
D	1/8"	0.22

* For air, gas or liquid service in bronze body only.

3. If accuracy above 75% is required, use correction factor below.

ACCURACY OF REGULATION %	MULITPLY BY
75	1.0
80	.85
85	.70
90	0.55
95	0.40

4. If superheated, correct for superheat as shown below.

DEGREES SUPERHEAT	MULITPLY BY
50˚F	.96
100˚F	.93
150˚F	.90
200˚F	.87
200˚F	.80

SATURATED STEAM CAPACITIES – LBS. STEAM PER HR. (LBS/HR. X 2.2 = KG/HR.) CLASSES LCB, LCLB, LCBS, LCLBS*

CLASS	REDUCED PRESSURE SETTING	INLET PRESSURE – PSI (BLACK FIGURES) STEAM SATURATION – ˚F (RED FIGURES)												
		25 267	50 296	75 320	100 338	125 353	150 386	175 378	200 388	250 406	300 421	400 46	500 469	600 490
LCB*	5	—	5	6	7	8	9	10	11	12	12	—	—	—
	10	—	9	11	13	14	16	17	18	20	22	—	—	—
	20	—	15	18	22	25	27	29	31	34	41			
	30	—	20	24	28	33	36	38	42	46	39	—	—	—
	40	—	24	30	36	41	46	48	54	59	64	—	—	—
	50	—	28	36	42	49	54	58	64	70	86	—	—	—
	75	—	—	45	55	64	71	75	85	95	105	—	—	—
	100	—	—	—	63	74	85	90	104	116	127	—	—	—
	125	—	—	—	—	83	95	102	118	131	143	—	—	—
	150	—	—	—	—	—	103	115	127	142	154	—	—	—
	175	—	—	—	—	—	—	125	133	147	160	—	—	—
	200	—	—	—	—	—	—	—	133	148	163	—	—	—
	250	—	—	—	—	—	—	—	—	149	164	—	—	—
	285	—	—	—	—	—	—	—	—	—	165	—	—	—
	300	—	—	—	—	—	—	—	—	—	165			
LCLB*	2	10	13	15	17	19	20	21	22	24	25	—	—	—
	5	15	19	23	25	27	29	31	33	36	38	—	—	—
	10	20	26	30	34	37	40	42	44	48	52	—	—	—
	15	23	30	36	40	45	47	50	52	57	61	—	—	—
	20	25	34	40	44	50	52	56	58	64	69	—	—	—
	25	—	36	46	52	59	65	70	75	85	94			
	30	—	39	50	58	65	72	78	84	95	105	—	—	—
	35	—	42	54	63	70	77	83	90	100	110	—	—	—
LCBS*	25	—	10	13	15	18	20	22	24	28	32	38	44	50
	50	—	15	19	23	27	30	33	36	42	46	57	65	73
	75	—	—	25	30	35	40	44	48	54	62	74	86	96
	100	—	—	—	36	42	46	52	56	65	72	86	100	115
	150	—	—	—	—	—	58	64	68	80	90	108	121	138
	200	—	—	—	—	—	—	—	78	90	101	120	140	158
	250	—	—	—	—	—	—	—	—	99	112	129	150	170
	300	—	—	—	—	—	—	—	—	—	124	150	169	180
	400	—	—	—	—	—	—	—	—	—	—	155	178	200
LCLBS*	5	—	4	5	6	7	8	9	10	11	12	14	16	17
	10	—	8	10	12	13	15	17	18	21	23	27	32	34
	20	—	13	16	19	21	23	26	28	31	34	40	46	50
	30	—	17	21	25	29	32	35	38	40	44	50	56	62
	40	—	21	26	31	36	40	43	47	51	55	63	71	78
	50	—	24	30	36	42	47	51	55	60	66	76	85	93

* Capactties for classes wtth "B" (1/4") orifice are shown. For other classes, multiply capactty given by the correction factor for controlling valve size.

CLASS J-1, JL
SATURATED STEAM CAPACITIES – LBS. STEAM PER HR.

INLET	INLET OUTLET	INLET PRESSURE (PSI)								
		25 0 -14	50 0 - 27	75 0 - 40	100 0 -14	5 0 - 55	150 0 -80	200 0 -110	250 0 -135	300 0 -165
VALVE SIZE	1/4"	25	35	50	65	65	85	110	135	160
	3/8"	50	75	100	125	125	175	225	275	325
	1/2"	75	120	160	200	200	290	365	450	530

* Reducing bushing supplied by customer

SIZING FOR AIR OF GAS

Size for air or gas by mulitplying required air or gas flow in SCFM @ 600˚F by 2.9 times the square root of the specific gravity to obtain equivalent flow of saturated steam; then size directly from steam tables. Correct by applicable factors for controlling valve size and accuacy of regulation.

Capacities are based on the following accuracies of regulation:

STEAM (Classes J-1, JL) – 85%

AIR (Classes JA-2, JAL-2) – 90%

For air capacities, divide figures in table by 2 to obtain cubic feet of air per minute at 60˚F.

SELECTING, SPECIFYING, ORDERING

SPECIFICATION

CAST IRON AND BRONZE REDUCING VALVES shall be of the self-contained, internal pilot, piston op erated type. Internal pilot valve and pilot valve seat shall be interchangeable in all sizes and contained wholly within the valve and entirely self draining. The main valve shall be made of stainless steel hardened to at least 500 Brinell. No stuffing boxes or bellows will be permitted. All valve seats shall be renewable. Main valve seat ring to be stainless with STELLITE® seating suriace. Pistons in steam pressure regulating service shall be of bronze with a TEFLON® seal. All regulators for over 500°F (260°C) service shall have cylinder liners of stainless steel hardened to 500 Brinell, and bronze pistons with cast iron rings. In air service, piston and liner shall be of bronze with a rubber "O" ring seal. Internal pilot valve to be stainless steel hardened to at least 500 Brinell, with ground finish. Adjusting spring shall cover 2-35 psi (0.1-2.5 bar) or 10-285 psi (0.5-20 bar) range.

STEEL REDUCING VALVES shall be of the self*con tained, internal pilot, piston operated type. Internal pilot valve and pilot valve seat shall be interchangeable in all sizes and for all pressure conditions, contained wholly within the valve and entirely self-draining. The main valve shall be made of stainless steel hardened to at least 500 Brinell. No stuffing boxes, rubber diaphragms or bellows will be permitted. Main valve seat to be STELLITE® welded integral with body. Main valve, inter nal pilot valve and renewable piston cylinder shall be made of stainless steel hardened to at least 500 Brinell. The pilot valve and piston cylinder shall have ground finish. Wide range adjusting spring (10-50 psi) (0.5-3.5 bar) or (25-400 psi) (2-28 bar) shall be contained within a steel spring case bolted to valve top cap.

SMALL FLOW VALVES shall be the direct operated, spring loaded type with three sizes of inner valve for steam or liquid service and one size for air or gas ser vice. Inner valve and seat shall be corrosion resistant stainless steel for steam or liquid service. Metal diaphragm and adjusting spring shall cover wide range, 10-285 psi (0.5-20 bar), 25-400 psi (2-28 bar), 5-290 psi (0.3-20 bar) or 2-35 psi (0.1-2.5 bar). Steel valves to have bolted spring case.

HOW TO ORDER

The following data is essential when ordering and should accompany each order to insure getting the best valve for the job. For reducing valves give:

1. Maximum and minimum inlet pressure.
2. Superheat, if any.
3. Reduced pressure or range desired.
4. Kind of service (steam, air or gas).
5. Maximum and minimum flow in lbs. of steam per hour, standard cu. ft. per minute of air or gas to be delivered, or information leading to same.
6. Threaded or flanged connections. Flanges are furnished drilled when flange standard is specified.

For differential pressure regulators, state pressure of second fluid and differential to be maintained.

For remotely adjusted reducing valves, state air pressure available for loading and order air loading panel if required.

ORDERING PARTS

When ordering parts, submit the following information:

1. Part name and part reference number from parts list on applicable drawing.
2. Quantity of each part.

or

1. Serial number, class and size of valve.
2. Part name. (See parts list on applicable drawing).
3. Quantity of each part.

For all Navy valves, in addition, give Navy drawing number from which parts are ordered.

AW SERIES REDUCING VALVE

SIZES 1/4" PRESSURES TO 200 PSIG AT 150°F

- Air or Liquid Service
- Tight Shutoff
- Quiet Operation

APPLICATION DATA

- Pilot Plants
- Pressure Reduction
- Laboratory Equipment
- Process Machinery

VALVE RATINGS

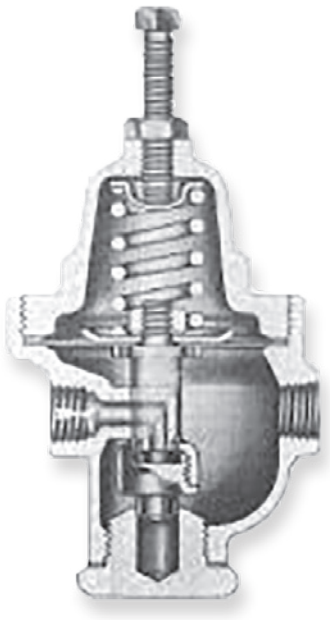
- SIZES1/4"
- Pressures to 200 PSIG at 150°F

MODELS

- AW___ –5-95psi Range, Bronze, Air or Liquid Service

OPTIONS

- G — Pressure Gauge
- R — Relief Feature
- RG — Relief Feature and Gauge



AW SERIES REDUCING VALVES

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG(bar)		Temperature °F (°C)
Bronze			
B16.24 Class	200 (13.8)	@	450 (232)

FOR SIZING CAPACITY TABLES SEE PAGES 57 & 58

SPRING PRESSURE RANGES* AND TRIM MATERIAL

CLASS	BODY MAT'L & SIZE	INLET PRESS. & TEMP	REDUCED PRESS. PSI/BAR	BODY & SEAT	MAIN VALVE	MAIN VALVE SPRING	DIAPHRAGM
AW AWG	Bronze 1/4" Threaded Ends	10-200 psi (0.5-14 bar) 150°F (65°C)	5-95 (0.3-6.5) 5-95 (0.3-6.5)	Bronze	Bronze with rubber disc	—	Rubber
AWR AWRG		10-200 psi (0.5-14 bar) 150°F (65°C)				Inconel®	

* Minimum differential inlet and outlet pressure 5 psi.

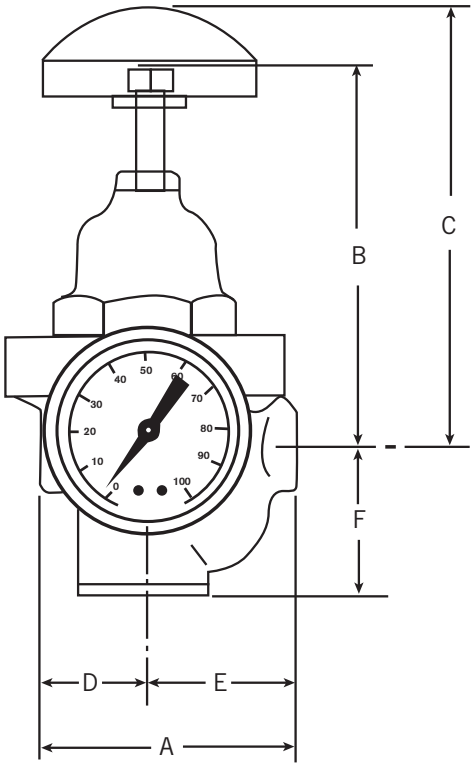
AW SERIES REDUCING VALVE

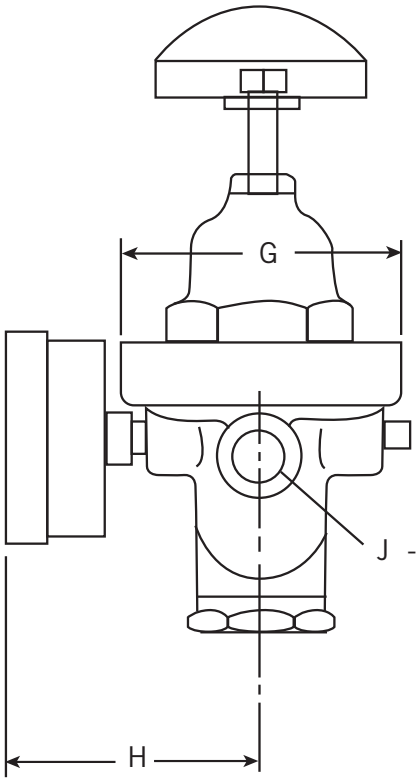
SPECIFICATIONS

Valve shall be single stage, self contained, spring and diaphragm construction. Parts to be corrosion and wear resistant, renewable and fully interchangeable in the field.

MATERIALS OF CONSTRUCTION

Body	ASTMA283 UNS Alloy C37700
Seat	Bronze
Main Valve	Bronze with Resilient Disc
Diaphragm	Resilient





DIMENSIONS inches (mm) AND WEIGHT pounds (kg)

SIZE	A	B AW & AWG	C AWR & AWRG	D	E	F	G	H	J	WT.
1/4 (6)	2 13/16 (71)	4 (102)	4 7/8 (124)	1 1/16 (27)	1 3/4 (44)	1 7/8 (48)	3 (76)	2 5/8 (67)	1/4 (6)	10 (4.5)

LC SERIES REDUCING VALVE

SIZES 1/2" PRESSURES TO 1000 PSIG AT 750°F

- Steam, Air, Gas and Liquid Service
- Packless Construction
- Four Trim Sizes
- Corrosion Resistant Diaphragm
- 75% Accuracy of Regulation

LC SERIES REDUCING VALVE

APPLICATION DATA

- Plastic Molding Presses
- Steam Sterilization
- Laboratory Units
- Pilot Plants

VALVE RATINGS

Valve Ends	Pressure		Temperature
ASME/ANSI	PSIG(bar)		°F (°C)
B16.24 Class 300 NPT	300 (21.0)	@	550 (288)
B16.34 Class 600 NPT	500 (41.4)	@	750 (400)

FOR SIZING CAPACITY TABLES SEE PAGES 55 & 56

MODELS

- See Table Below

PRESSURE RANGES AND CONSTRUCTION

BODY MATERIALS AND CONSTRUCTION	CLASS	MAX. INLET PRESSURE PSI/BAR		MAX. TEMP. °F/°C	MIN. PRESSURE DROP PSI/BAR	REDUCED PRESSURE RANGE PSI/BAR	TRIM PARTS AND MATERIALS			
		STEAM	COLD LIQUID AIR OR GAS				ORIFICE SIZE AND DESIGNATION	CONTROLLING VALVE MATERIAL	VALVE SEAT[3]	VALVE SPRING
BRONZE Screwed Bonnet 1/2" Threaded	LCA	—	400/28	150/65	10/0.5	5-285/0.3-20	3/32" (A) 1/4" (B) 5/16" (C) 1/8" (D)	Bronze	Resilient	Bronze
	LCB LCC LCD	300/21	400/28	550/287	10/0.5	10-285/0.5-20		17-4-PH® Stainless, (hardened)	18-8® Stainless	INCONEL®
	LCLA	—	400/28	150/65	10/0.5	2-35/0.1-2.5		Bronze	Resilient	Bronze
	LCLB LCLC LCLD	300/21	400/28	550/287	10/0.5	2-35/0.1-2.5		17-4-PH® Stainless (hardened)	18-8® Stainless	INCONEL®
STEEL* Thru bolted Bonnet 1/2" bolted	LCBS LCCS LCDS	600/41	1000/69	750/398	10/0.5	25-400/2-28	1/4" (B) 5/16" (C) 1/8" (D)			
	LCLBS LCLCS LCLDS	600/41	1000/69	750/398	10/0.5	10-50/0.5-3.5				

* Also available in 316 stainless steel. Add "S" to class designation - LCBSS, etc.
3Soft seat configuration required for dead end service.

LC SERIES REDUCING VALVE

SPECIFICATIONS

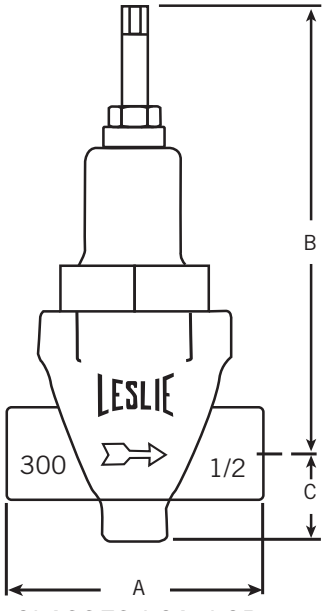
Spring and diaphragm pressure reducing valve are self contained and direct operated. Body is cast iron, bronze, cast steel or stainless steel unit to be fully adjustable within operating range with changing springs. Unit comes without stuffing box or bellows seals.

MATERIALS OF CONSTRUCTION

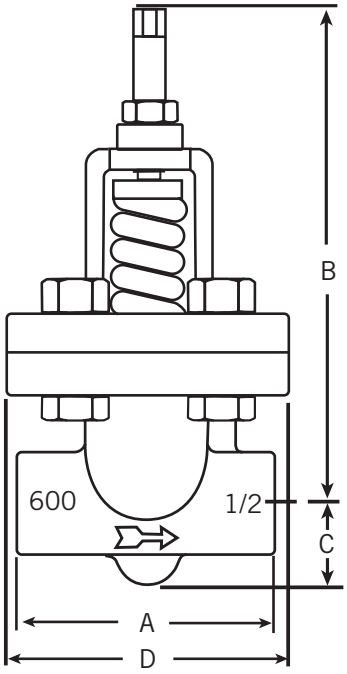
Body, Cast Iron	ASTMA126 Cl. B
Body, Cast Bronze	ASTMB-61 UNSC92200
Body, Cast Steel	ASTMA216 WCB
Body, Stainless Steel	ASTM A351 CF8M
Trim	17-4 PH PLUG, 18-8 Seat
'A' Trim	Resilient
Diaphragm	316 Stainless Steel

DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

SIZE	A		B MAXIMUM		C		D	WEIGHT
	300	600	300	600	300	600	600	
1/2 (12)	4 3/16 (106)	4 3/8 (111)	6 13/16 (173)	7 3/8 (187)	1 5/16 (33)	1 1/4 (32)	4 3/8 (111)	6 (.4)



CLASSES LCA, LCB, LCC, LCD, LCLA, LCLB, LCLC and LCLD



CLASSES LCAS, LCBS, LCCS, LCDS, LCLAS, LCLBS, LCLCS and LCLDS

AIRSET TYPE AS-1 SERIES ADJUSTABLE AIR REGULATOR

AIRSET TYPE ASG-1

- Superior Regulation Characteristics
- Adjusting Knobs Included
- Rugged, Corrosion-Resistant Construction
- Excellent Stability and Repeatability
- Self-Relieving
- Low Droop at High Flow
- Several Mounting Options
- Low Cost

DESCRIPTION

Leslie Airset AS-1 pressure regulators are reliable precision units for instrumentation and general purpose.

Test data for these regulators shows excellent performance characteristics. The regulators are generally superior in regulated pressure vs. flow, forward-to-reverse flow offset, supply pressure sensitivity, repeatability and stability. They are sturdily designed and constructed with housings of die cast aluminum. Every regulator is pressure and leak tested prior to shipment from the factory.

Careful design and quality materials throughout assure long, trouble free operation in the most difficult industrial environments. A rubberized, soft seat valve stem provides positive shutoff and "forgives" dirt or other foreign matter. An aspirator maintains downstream pressure and compensates for droop when high flow occurs. The full flow gauge port is convenient for gauge installation and also can be used as an additional full flow outlet. The regulator includes a unique sintered bronze filter that can be easily removed for cleaning.

The design of these regulators is especially well suited to pilot controllers, instruments, actuators and a wide range of industrial pneumatic systems and equipment.

MODELS

AS-1 - Adjustable Air Regulator

ASG-1 - includes gauge

PRINCIPLE OF OPERATION

Once set to a desired pressure the Leslie Airset AS-1 maintains this setting until re-adjusted. The range spring, which is compressed by the adjustment screw, causes the pin to move downward, opening the supply valve and allowing air flow. The downstream pressure builds up against the control diaphragm forcing it up until the supply valve closes. This is the equilibrium or set pressure, which is closely maintained under changes in operating conditions in the following manner:

Downstreampressure drop — A drop in downstream pressure reduces the diaphragm pressure force, upsetting the equilibrium condition. This unbalance causes the supply valve to open until the pressure builds up once more to the equilibrium condition.

Downstreampressure increase — Any increase in downstream pressure acts on the diaphragm, causing the relief seat in the diaphragm assembly to lift and open. The excess pressure drops almost instantaneously to the equilibrium value, at which point the relief valve closes.

Changes in forward flow — Under forward flow conditions, the range spring force is balanced by the diaphragm pressure force, with the supply valve open just enough to maintain the required equilibrium pressure. When high flow occurs,a specially designed aspirator helps maintain downstream pressure and compensates for droop.

SPECIFICATIONS

Flow capacity @ 100 psig (700 kPa) supply, 20 psig (140 kPa) outlet: 8 SCFM (13.4 m3/hr)

Exhaust capacity @ downstream pressure 5 psig (35 kPa) above setpoint: 0.1 SCFM (0.17 m3/hr)

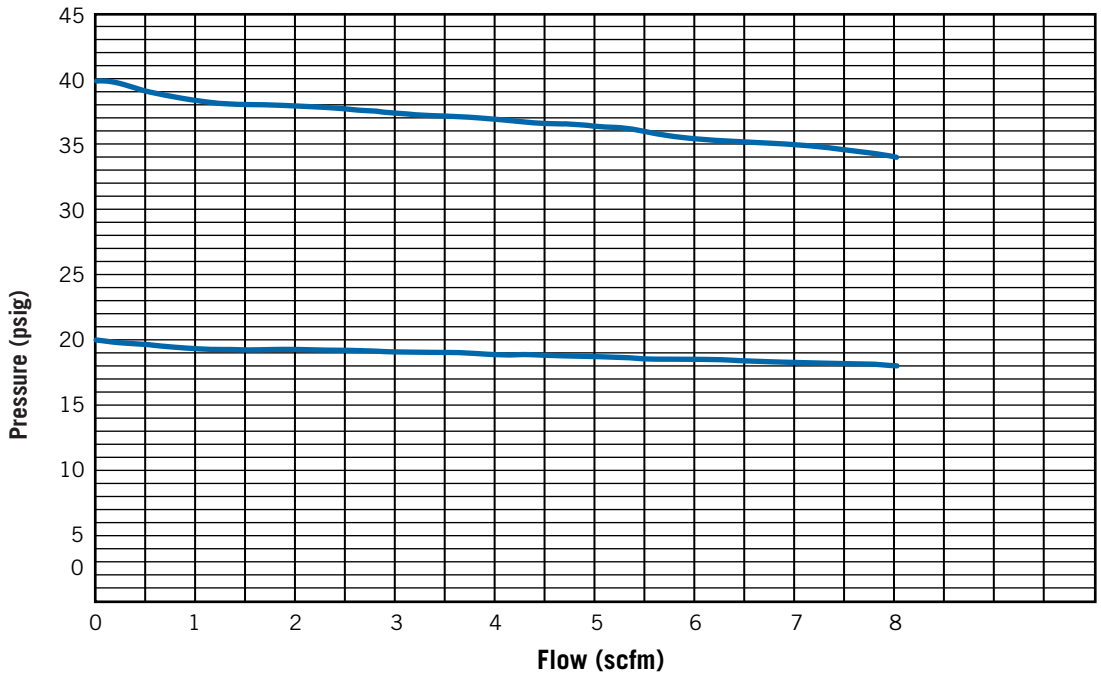
Sensitivity: 1" (2.5 cm) of water

Effect of supply pressure variation: Less than .2 psig (1.4 kPa) for 25 psig (170 kPa)

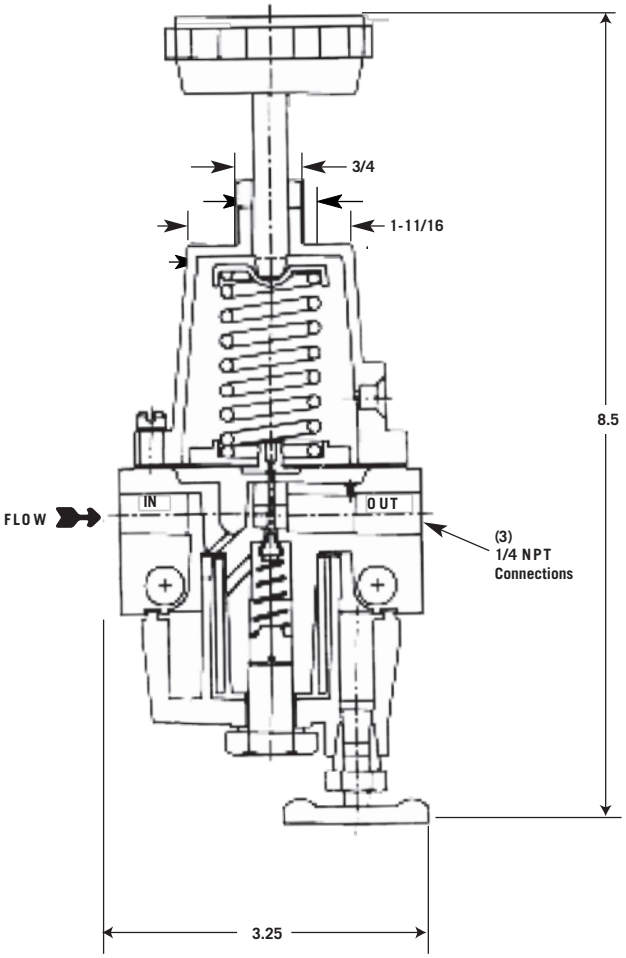
Supply pressure: 150 psig (1000 kPa) maximum

AIRSET TYPE AS-1 SERIES ADJUSTABLE AIR REGULATOR

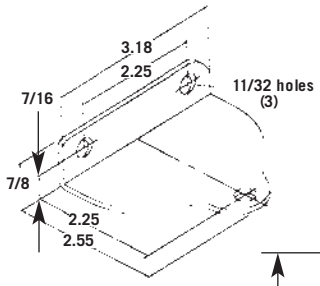
DROOP CHARACTERISTICS



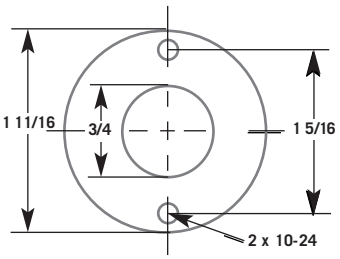
SECTION



MOUNTING BRACKET



PANEL MOUNTING



The filter element is readily accessible by removing the dripwell bowl and can be cleaned by dipping in kerosene or any similar solvent. The Airset has a drain cock at the bottom edge of the dripwell which permits drainage when the unit is mounted in vertical or panel-mounted horizontal position.

PART NUMBER	RANGE
AS-1 A80472	0.5-30 psi
AS-1 A80473	0.5-60 psi
AS-1 A80474	0.5-100 psi
ASG-1 A81070	0.5-30 psi
ASG-1 A81071	0.5-60 psi
ASG-1 A81072	0.5-100 psi

AIRMATE® TYPE AFG-2 AIR LOADERS AND PANELS

FOR CONSTANT AIR PRESSURE LOADING

HOW AIRMATE'S PATENTED DUAL ASPIRATOR CONTROL GIVES YOU CONTROLLED PERFORMANCE OVER THE ENTIRE FLOW RANGE:

A comparison of capacity/regulation curves of other leading air loaders with those of Airmate clearly demonstrate Airmate's superior performance. Airmate produces a flatter curve and supplies more accurate pressure regulation over a greater flow range during performance tests at flow rates from 0 to 40 scfm. From no flow to rated flow, deviations from the set point are insignificant. Override and droop problems, common to ordinary regulators, are eliminated.

MATERIALS OF CONSTRUCTION

Basic Air Loaders	Die cast aluminum body and spring case
Filter	Die cast aluminum bowl with drain cock filter
Material	Phenolic resin-impregnated cellulose

PRESSURE AND TEMPERATURE RANGES

BASIC AIR LOADERS	
Maximum Inlet Pressure	200 psi Maximum
Temperature	150°F
Reduces Pressure Ranges	2 to 30 psi 3to 60 psi 30 to 150 psi[1]
Minimum Pressure Drop	5 psi
Maximum Ambient Temperature	150°F
Sympathetic Variations	65:1[2]
Inlet and Outlet Connections	1/4" NPT Continuous Bleed .04 SCFM

PANEL LOADERS

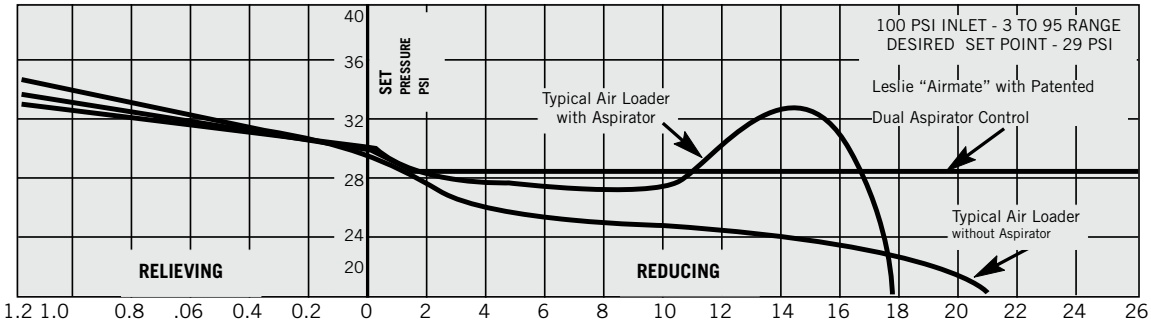
Basic air loader and flush gages mounted on enameled aluminum plate suitable for flush or surface console mounting. Optional air filter available, connected to air loader inlet connection.

FILTER

Filtration	Rated for 10 microns, maximum

MAXIMUM PRESSURE

Drop at 50%fouled	1/4 psi
Filter Area	4.3 sq. in.
Rating of Filter Area to Normal Flow Area	88:1
Filter Bowl Capacity	4.5 cu. in.



1. For applications where accuracy of regulation is not critical, range may be extended to 10 to 150 psi.

2. The change in reduced pressure for an inlet pressure variation is inverse. A 65 psi increase in inlet pressure will produce a 1 psi decrease in reduced pressure.

AIRMATE® AIR LOADERS AND PANELS

DESCRIPTION	CLASS DESIGNATION	ADJUSTABLE RANGES*	DESCRIPTION
 BASIC AIR LOADER**	**AP-2**	2-30 psi 3-60 psi 30-150 psi†	 AIR LOADER WITH GAUGE
	AG-2	2-30 psi 3-60 psi 30-150 psi†	
 AIR LOADER WITH FILTER**	**AFP-2**	2-30 psi 3-60 psi 30-150 psi†	 AIR LOADER WITH FILTER AND GAUGE
	AFG-2	2-30 psi 3-60 psi 30-150 psi†	
 BASIC PANEL LOADER	**P-2**	2-30 psi 3-60 psi 30-150 psi†	 PANEL LOADER WITH AIR GAUGE AND FILTER
	PF-2	2-30 psi 3-60 psi 30-150 psi†	
 PANEL LOADER WITH AIR GAUGE AND PROCESS GAUGE	**30 PP-1**	2-30 psi	 PANEL LOADER WITH AIR AND PROCESS GAUGES AND AIR FILTER
	60 PP-1	3-60 psi	
	150 PP-1	30-150 psi†	
	30 PPF-1	2-30 psi	
	60 PPF-1	3-60 psi	
	150 PPF-1	30-150 psi†	

CHOICE OF FEATURES TO SUIT YOUR SYSTEM:

Airmate loaders offer a wide range of flexibility for selecting units to fit most system design requirements. The basic loader, protected by U.S. patents, offers several distinct benefits over ordinary air pressure regulators:

- **High flow capacity** with minimum droop — the result of Leslie-Airmate's exclusive dual aspirator.
- **Reduced air waste** — Leslie-Airmate has a minimum continuous bleed.
- **Rugged construction** for long service life.
- **Accurate pressure regulation** through the entire range — from no flow to maximum rated flow. The set point is not exceeded at high flow rates.
- **No significant change of set point** pressure when shifting from loading to unloading conditions.

The basic unit is a rugged, all aluminum, die cast body and spring case to which gauges, filters and panel mountings are added to meet system requirements. The table at left show frequently used combinations, most of which are in stock.

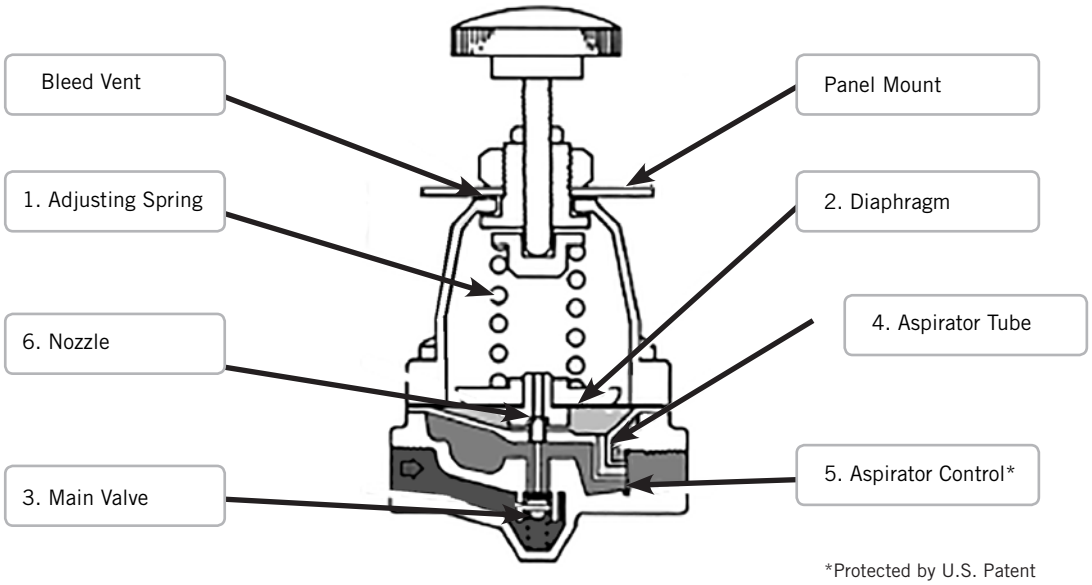
When ordering, specify reduced pressure range required. Units fitted with gauges have these gauge ranges:

LOADER ADJUSTABLE RANGE	GAUGE RANGE
2-30 psi 3-60 psi 30-150 psi †	0-30 psi 0-60 psi 0-160 psi

AFP-2 is AFG-2 less gauge, with plugged gauge taps for future gauge. (AP-2, AFP-2).

† For applications where accuracy of regulation is not critical, range may be extended to 10 to 150 psi.

AIRMATE® AIR LOADERS AND PANELS



*Protected by U.S. Patent

HOW IT OPERATES

During pressure reduction, the main valve (3) is opened by the adjusting spring (1) acting on the diaphragm (2) allowing air to flow to the reduced pressure side. The adjusting spring force on the diaphragm is opposed by the aspirated outlet pressure, sensed through the aspirator tube (4), positioning the main valve (3).

The patented dual aspirator control gives you the high accuracy of regulation that is exclusive to Airmate. The signal transmitted through the aspirator tube (4) is self-regulated with respect to changing flows by means of the aspirator control disc (5). The function of this control disc is to maintain a properly varied aspirator signal, regardless of the volume of flow.

When an increased demand occurs, the flow past the aspirator tube (4) increases. The aspiration reduces the pressure under the diaphragm (2) creating an "artificial droop" in the diaphragm chamber. This drop in pressure immediately upsets the balance with the adjusting spring (1), repositioning the main valve (3) to maintain the set pressure with increased flow rate.

Under steady flow conditions, the regulated flow through the aspirator tube (4) maintains the balance between the adjusting spring (1) and the pressure under the diaphragm to hold the set loading pressure.

During the relief cycle, the excess outlet pressure is transmitted through aspirator tube (4) increasing the pressure under the diaphragm. This allows the main valve (3) to close and the excess pressure raises the diaphragm (2). The excess is vented though the nozzle (6) and out the top of the spring case to atmosphere. The valve will relieve until a balance is achieved, when the outlet pressure reaches the set point and is maintained.

LOADING CAPACITY DATA

2-30 psi RANGE Classes A-2, AG-2, P-2 etc.

INLET PRESSURE (PSI)	OUTLET PRESSURE (PSI)	FLOW SCFM**
30	2 8	10.4 9.7
100	8 20 30	12.8 27.5 28

3-60 psi RANGE

Classes A-2, AG-2, P-2 etc.

INLET PRESSURE (PSI)	OUTLET PRESSURE (PSI)	FLOW SCFM**
60	10 20 30	16 16 12
100	20 30 60	27.5 28 24
140	30 40 60	32.5 35 34

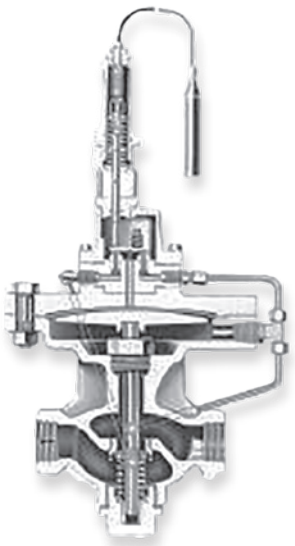
** Based on 95% Accuracy of Regulation

TEMPERATURE REGULATORS

GT SERIES EVENTEMP TEMPERATURE REGULATOR

SIZES 1/2" – 4" PRESSURES TO 150 PSIG AT 366°F

- Storage Tank Heating and Cooling
- Steam or Liquid Service
- Liquid Filled Thermal Element
- Adjusting Sleeve
- Exclusive Spiroflex® Diaphragm for
- Smooth Operation
- Top and Bottom Guided
- Unaffected by Inlet Pressure Changes
- Large Internal Ports Minimize Clogging
- Easy Out Cage Trim on GTS Model



GT SERIES

APPLICATION DATA

- Storage Heating
- Storage Cooling

RATED FLOW COEFFICIENTS (Cv)

REGULATOR SIZE								
1/2	3/4	1	11/4	11/2	2	21/2	3	4
3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3
5.67	10.0	15.7	21.9	29.1	29.1	65.7	84.6	103.0
3.4	5.6	11.7	17	28	30	45	64	90
5.3	9.2	16.9	24.8	38.3	41	82.6	97	124.8

FOR SIZING CAPACITY TABLES SEE PAGES 59 & 60

MODELS

- GTK– Cast Iron, Heating, Steam Svc.
- GTB–Bronze, Heating, Steam Svc.
- GTS–Cast Steel, Heating, Steam Svc.
- GTRK–Cast Iron, Cooling, Liquid Svc.

OPTIONS

- Calibrated Dial
- Alternate Bulb Casings
- Armored Capillary

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG (bar)		Temperature[1] °F (°C)
CAST IRON			
Class 125 NPT	125 (8.6)	@	366 (186)
B16.1 Class 125 Flanged	125 (8.6)	@	366 (186)
B16.1 Class 250 Flanged	150 (10.3)	@	366 (186)
BRONZE			
B16.1 Class 150 NPT	150 (10.3)	@	366 (186)
B16.1 Class 300 Flanged	150 (10.3)	@	366 (186)
CAST STEEL			
B16.34 Class 150 NPT	150 (10.3)	@	366 (186)
B16.34 Class 150 Flanged	150 (10.3)	@	366 (186)

TEMPERATURE RANGES (°F)

20-120	70-120	120-220	150-200	220-270
50-250	70-170	120-170	170-220	270-370
50-400	100-150	170-270	220-320	

GT SELECTION TABLE

MODEL	SIZE RANGE (INCHES)	END CONNECTION	MAXIMUM INLET PRESSURE PSI	
			STEAM	WATER
HEATING VALVES				
GTK	1/2 - 2 2 1/2 - 4 1 1/2 - 4	THD 125 ANSI FLG 250 ANSI FLG	5-150 5-125 5-150	- - -
GTB	1/2 - 2 1 1/2 - 2	THD 300 ANSI FLG	5-150 5-150	- -
GTS	1/2 - 2 1/2 - 2	THD 150 ANSI FLG	5-150 5-150	- -
COOLING VALVE				
GTRK	1/2 - 2 2 1/2 - 4 1 1/2 - 4	THD 125 ANSI FLG 250 ANSI FLG	- - -	5-175 5-175 5-175

1. For temperatures above 366°F, consult factory.

GT SERIES EVENTEMP TEMPERATURE REGULATOR

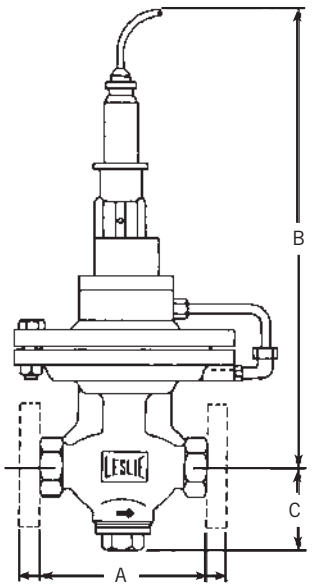
SPECIFICATIONS

The temperature regulator shall be self-contained with internal pilot and diaphragm-operated, single seated main valve. A two-ply metal diaphragm shall be free of bolt holes and shall be preformed with permanent spiral impressions for long travel and low unit stress.

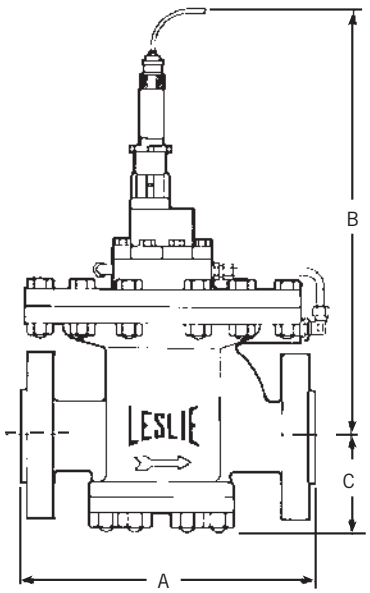
The thermostatic system shall be a completely liquid-filled type consisting of a bulb and bellows unit of small size. A yielding spring shall prevent over stressing of the bellows for over range temperatures up to 25% of range. The valve stem shall be sealed with a low-friction, single-ring seal requiring no adjustment. Easy replacement of the thermostatic element shall be possible without shutting off the process.

MATERIALS OF CONSTRUCTION

Body, Cast Iron	ASTMA126 Cl. B
Body, Cast Bronze	ASTMB61 UNSC92200
Body, Cast Steel	ASTMA216 WCB
Trim,GTK,GTB,GTRK GTS	SS w/Resilient Insert SS w/Stellite®
Diaphragm	Spiroflex®
Bulb Casing, std opt. opt.	Brass 316 SS Monel
Thermal Element, std. opt. opt.	Copper 316 SS Monel



GTK, GTB, GTRK



GTS

DIMENSIONS INCHES (MM) AND WEIGHTS POUNDS (KG)

SIZE	A				B		C		WEIGHTS		
	THD.	125# FLG.	250# FLG. ALL BUT GTS	250# FLG. GTS	GTK,GTB GTRK	GTS	GTK,GTB GTRK	GTS	GTK GTRK	GTB	GTS
1/2 (12)	6 1/8 (156)	-	-	7 1/8 (200)	15 13/16 (402)	15 1/4 (387)	3 1/4 (83)	3 3/8 (86)	40 (18)	40 (18)	45 (20)
3/4 (19)	6 1/2 (165)	-	-	7 1/4 (184)	15 13/16 (402)	15 1/4 (387)	3 3/8 (86)	3 3/8 (86)	41 (19)	41 (19)	50 (23)
1 (25)	7 1/4 (184)	-	-	7 1/4 (184)	15 7/8 (403)	15 5/8 (397)	3 7/8 (98)	3 1/8 (79)	43 (20)	43 (20)	55 (25)
1 1/4 (32)	7 5/8 (194)	-	-	8 3/4 (222)	16 7/16 (417)	16 1/8 (410)	4 1/4 (108)	3 1/2 (89)	65 (30)	65 (30)	-
1 1/2 (38)	8 1/2 (216)	-	10 1/2 (267)	10 (254)	16 9/16 (421)	16 5/8 (422)	4 3/8 (111)	3 3/4 (95)	80 (35)	80 (35)	65 (30)
2 (51)	8 1/2 (216)	-	10 1/2 (267)	-	16 9/16 (421)	-	4 3/8 (111)	-	80 (35)	80 (35)	70 (32)
2 1/2 (64)	-	10 7/8 (276)	11 1/2 (292)	-	18 1/8 (460)	-	5 1/2 (140)	-	200 (91)	-	-
3 (76)	-	11 3/4 (298)	12 1/2 (318)	-	19 (483)	-	6 1/4 (159)	-	225 (102)	-	-
4 (100)	-	13 7/8 (352)	14 1/2 (368)	-	20 1/8 (511)	-	7 7/8 (200)	-	266 (121)	-	-

M SERIES TEMPERATURE REGULATOR

SIZES 1/2" – 1" PRESSURES TO 250 PSIG AT 366°F1

- Steam or Liquid Service
- Liquid Filled Thermal Element
- Adjusting Sleeve
- Models M and MK Easily Switched between Heating and Cooling
- Ideal for Small Flow Applications
- Unaffected by Inlet Pressure Changes
- Large Internal Ports Minimize Clogging
- Easy Out Cage Trim on GTS Model

M SERIES

APPLICATION DATA

- Small Flow Storage Heating
- Small Flow Storage Cooling
- Instantaneous Heaters

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG (bar)		Temperature[2] °F (°C)
CAST IRON B16.1 NPT	200 (13.8)	@	366 (186)
BRONZE B16.1 NPT	200 (13.2)	@	366 (186)

TEMPERATURE RANGES (°F)

20-120	70-120	120-220	150-200	220-270
50-250	70-170	120-170	170-220	270-370
50-400	100-150	170-270	220-320	

MODELS

- **M_ _**– 3/4"-1" Bronze, 100/100[1] PSI Max. Inlet, Heating
- **M_K_**– 3/4"-1" Cast Iron, 100/100[1] PSI Max. Inlet, Heating
- **ME_**– 1/2" Bronze, 200/50[1] PSI Max. Inlet, Heating
- **MD_ _**– 1/2" Bronze, 100/50[1] PSI Max. Inlet, Heating
- **MC_ _**– 1/2" Bronze, 50/50[1] PSI Max. Inlet, Heating

OPTIONS

- **R**–Cooling (all except ME)
- **C**–Cooling (all except ME)
- Alternate Bulb Casings
- Alternate Thermal Element
- Armored Capillary
- Calibrated Dial

FOR SIZING CAPACITY TABLES SEE PAGE 63

1. Insert letter code for options in model number as required.

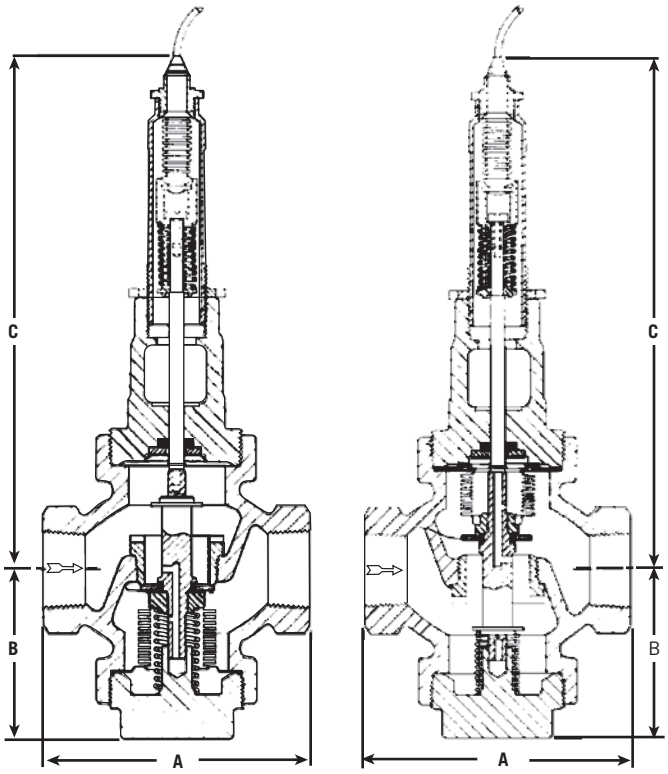
M SERIES TEMPERATURE REGULATOR

SPECIFICATIONS

The temperature regulator shall be self-contained, direct actuated and respond to changes in sensed temperature as little as 1/4°F. Thermostatic system shall be solid liquid filled compact bulb and bellows unit. Yielding spring shall prevent bellows over stressing at temperatures up to 25% over range. Thermostatic element shall be easily replaceable without shutting off the process. Valve travel per degree of temperature change shall be uniform throughout entire adjustable range. Valve stem shall be sealed with low friction, single ring seal requiring no adjustment.

MATERIALS OF CONSTRUCTION

Body, Cast Iron	ASTMA126 Cl. B
Body, Cast Bronze	ASTMB61 UNSC92200
Trim	SS
Bulb Casing, std. opt. opt.	Brass 316 SS Monel
Thermal Element, std. opt. opt.	Copper 316 SS Monel



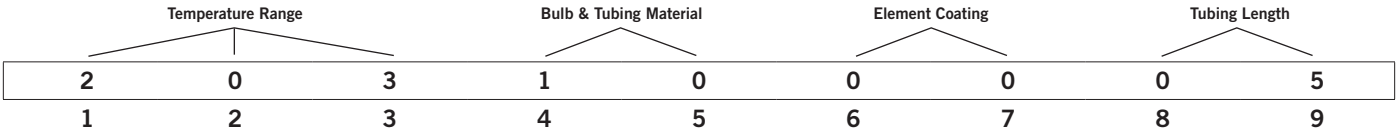
COOLING VERSION HEATING VERSION

Dimensions inches (mm) and weights pounds (kg)

SERVICE	A	B	C	WEIGHT
Cooling	4 1⁄2 (114)	2 7⁄8 (73)	8 3⁄4 (222)	8 (3.6)
Heating	4 1⁄2 (114)	2 7⁄8 (73)	8 3⁄4 (222)	8 (3.6)

ELEMENT & BULB SELECTION

BP, M & GT CODE SELECTION CHART



TEMPERATURE RANGE – POSITION 1, 2 & 3
7 3/8" BULB LENGTH
103 = 70-120 104 = 100-150 105 = 120-170 106 = 150-200 107 = 170-220 108 = 220-270
4" BULB LENGTH
137 = 20-120 138 = 50-150 139 = 70-170 141 = 120-220 143 = 170-270 151 = 220-320 156 = 270-370
2 1/8" BULB LENGTH
187 = 50-250
4 13/16" BULB LENGTH
199 = 50-400[1]

BP, M & GT ELEMENT COMPONENTS

SIZE CLASS/RANGE
BULB & TUBING MATERIAL
Copper Bulb, Brass Tubing & Bellows 316 SST Bulb & Tubing, Brass Bellows Copper Bulb, Brass Armored Tubing, Brass Bellows 316 SST Bulb & Armored Tubing, Brass Bellows
ELEMENT COATING
No coating Polyvinylchloride – 5 to 10 feet each additional 10 feet Tubing Length First 10 feet
TUBING LENGTH
Plain Brass Tubing each additional 10 feet Armored Brass Tubing each additional 10 feet Plain 316 SST Tubing each additional 10 feet Armored 316 SST Tubing each additional 10 feet

BP, M & GT BULB CASING[1]

MATERIAL	SIZE	CLASS/RANGE	PROD. REF. #
BRASS	7 3/8 4	50 100	A13435 A21503
COLD ROLLED STEEL	4	50	A21689
316 SS	7 3/8 4	50 100	A15294 A27767
MOENL	7 3/8	50	A21690

[1] Use with Bulb Guard only.
[2] Select a Bulb Casing OR Stuffing Box
*Consult factory

BULB & TUBING MATERIAL – POSITION 4 & 5
10 = Copper Bulb, Brass Tubing & Bellows 14 = 316 SST Bulb & Tubing, Brass Bellows 22 = Copper Bulb, Brass Armored Tubing, Brass Bellows 26 = 316 SST Bulb & Armored Tubing & Brass Bellows
ELEMENT COATING – POSITION 6 & 7
00 = No coating 22 = Polyvinylchloride
TUBING LENGTH – POSITION 8 & 9
OS = 5* 10 = 10* 20 = 20* 30 = 30* 40 = 40*

Use these prices only when ordering Element as part of a complete unit.

BP, M & GT BULB CASING W/INSUL. EXT.[2]

	SIZE	CLASS/RANGE	PROD. REF. #
BRASS THICK WALL	ALL	50/100	A27276
COLD ROLLED STEEL THICK WALL	ALL	50/100	A27279
316 STAINLESS STEEL THICK WALL	ALL	50/100	A27278
MOENL THICK WALL	ALL	50/100	A27277

BP, M & GT 2000 PSI BULB CASING[2]

	SIZE	CLASS/RANGE	PROD. REF. #
CADMIUM PLATED STEEL THICK WALL	ALL	50/100	A21649
316 STAINLESS STEEL THICK WALL	ALL	50/100	A22612

BP, M & GT STUFFING BOX[2]

	SIZE	CLASS/ RANGE	PROD. REF. #
BRASS			
THICK WALL	ALL	ALL	A13437
THICK WALL	ALL	ALL	A13436
316 STAINLESS STEEL			
THICK WALL	ALL	ALL	A22690
THICK WALL	ALL	ALL	A22692

BP, M & GT BULB GUARD

	SIZE	CLASS/RANGE	PROD. REF. #
BRASS			
THICK WALL	3/4" X 8 3/4"	ALL	A17866
THICK WALL	1" X 8 3/4"	ALL	A38149
316 STAINLESS STEEL			
THICK WALL	3/4" X 8 3/4"	ALL	A43270
THICK WALL	1" X 8 3/4"	ALL	A43272

LT/JT SERIES DUO-MATIC® TEMPERATURE & PRESSURE REGULATOR

SIZES 1/2" – 3" PRESSURES TO 600 PSIG AT 750°F

- Steam Service
- 10:1 Rangeability
- One Valve Controls Both Temperature and Pressure
- Adjustable Pressure: Temperature Proportional Band 0.8:1 to 4:1 Standard
- Vapor Filled Thermal Element
- Packless Construction
- One Valve Adjusts to All Ranges
- Pressure Reduction of 15 psi minimum
- Interchangeable Elements

LT SERIES

APPLICATION DATA

- Heat Exchangers
- Fuel Oil Heaters
- Storage Heating

VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG(bar)		Temperature °F (°C)
CAST IRON			
B16.1 Class 250 NPT	250 (17.2)	@	450 (232)
B16.1 Class 125 Flanged	125 (8.6)	@	450 (232)
B16.1 Class 250 Flanged	250 (17.2)	@	450 (232)
BRONZE			
B16.1 Class 300 NPT	300 (21.0)	@	550 (288)
B16.1 Class 150 Flanged	150 (10.3)	@	550 (288)
B16.1 Class 300 Flanged	300 (21.0)	@	550 (288)
CAST STEEL			
B16.34 Class 300 NPT	300 (21.0)	@	750 (400)
B16.34 Class 150 Flanged	150 (10.3)	@	750 (400)
B16.34 Class 300 Flanged	300 (21.0)	@	750 (400)
B16.34 Class 600 Flanged	600 (41.4)	@	750 (400)

TEMPERATURE RANGES (°F)

20-120	120-220	220-320	325-425
50-170	170-270	250-350	

MODELS[1]

- **LTC_PKY**–10-50 psi range, Cast Iron, Teflon®Piston Seal, to 450°F
- **LTC_P_**–10-250 psi range, Bronze, Cast Iron Piston Ring, to 550°F
- **LTC_P_S**–25-250 psi range, Cast Steel, Cast Iron Piston Ring, to 750°F
- **JTCP**–10-250 psi range, Bronze, Diaphragm Operation, to 550°F

OPTIONS[1]

- **L**–2-15 pressure range proportional band 0.2:1 to 1:1
- **Y**–Teflon®Piston Seal (to 500°F) replaces Cast Iron Piston Ring

[1] Insert letter code for options in model number as required.

FOR SIZING CAPACITY TABLES SEE PAGES 61 & 62

RATED FLOW COEFFICIENTS (Cv)

ACCURACY	REGULATOR SIZE									
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
95%	1.8	3.4	5.6	10	13.7	23	33	51	69	89
99%	1.5	2.8	4.6	8.2	11.4	19	27	42	57	73

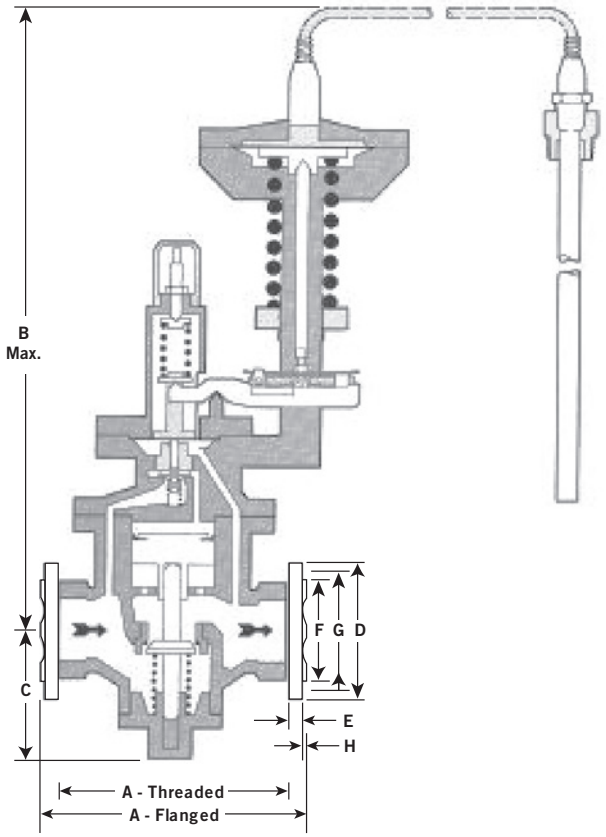
LT/JT SERIES DUO-MATIC® TEMPERATURE & PRESSURE REGULATOR

SPECIFICATIONS

Regulator shall function as steam temperature regulating valve with adjustments for temperature and maximum steam pressure delivered. A thermostatic element shall automatically adjust pressure reducing valve for delivered steam pressures in adjustable proportion to temperature change. Only one pilot valve shall be contained within the regulator. Main valve shall have hardened stainless steel single seat. Cast iron and bronze body regulators shall have renewable stainless steel seat rings with Stellited seating surface. Cast steel body regulators shall have integral Stellited seats. Thermostatic shall be vapor pressure with metal diaphragm wafer able to withstand 50° over range. Thermostat shall be replaceable without removing regulator or shutting off steam.

MATERIALS OF CONSTRUCTION

Body, Cast Iron	ASTMA126 Cl. B
Body, Cast Bronze	ASTMB61 UNSC92200
Body, Cast Steel	ASTMA216 WCB
Seat Ring	SS w/Stellite®
Main Valve Trim	Hardened SS
Bulb Casing, std. opt. opt.	Brass 316 SS Monel
Thermal Element, std. opt. opt.	Brass 316 SS Monel



SEE DIMENSIONS CHART ON PAGES 44 & 45

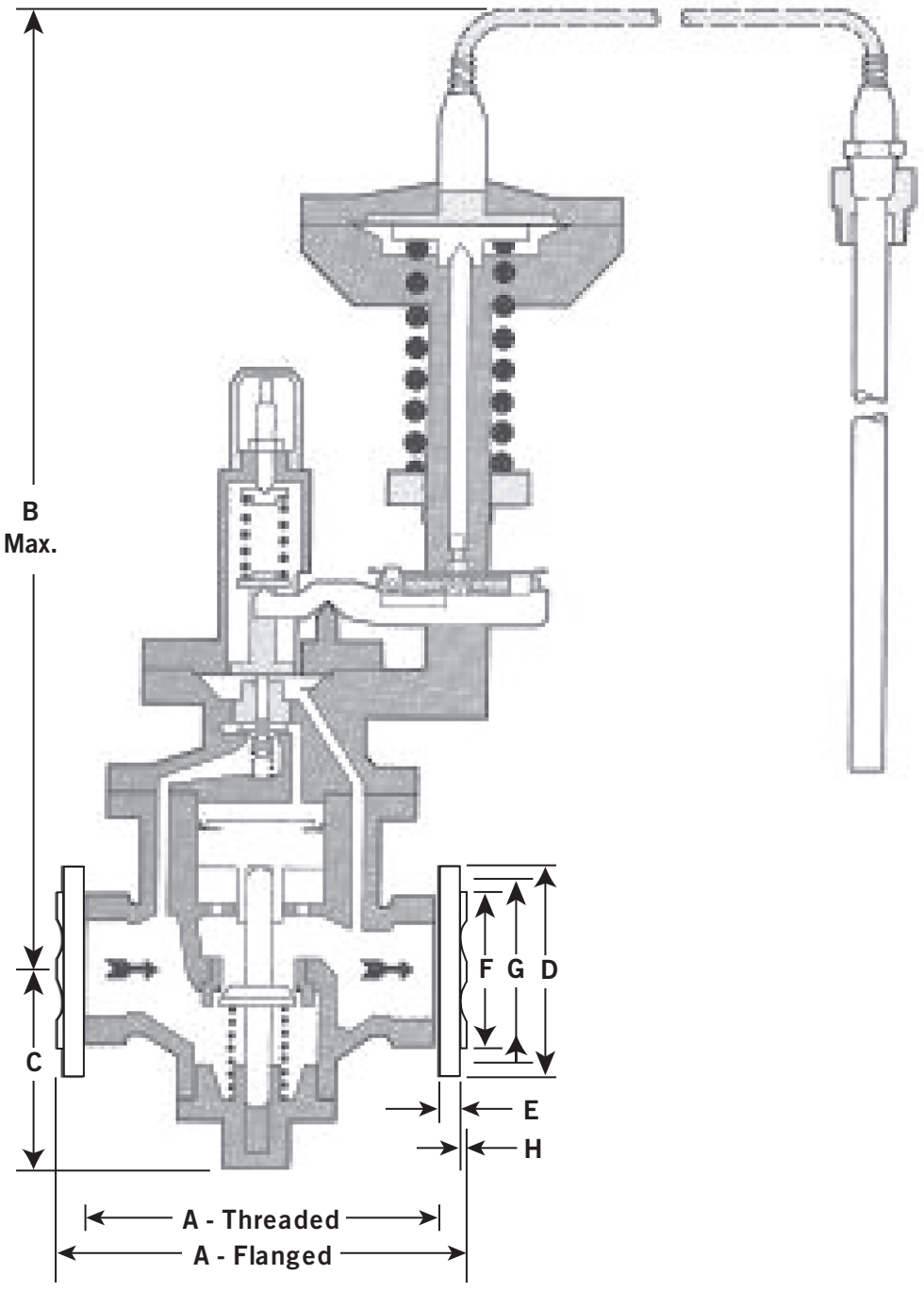
LT/JT SERIES DUO-MATIC® REGULATOR

DIMENSIONS inches

SIZE	A	B	C	D	E	F	CIRCLE G	H	BOLT NO. OF HOLES	HOLES SIZE	BOLT HOLE
THREADED, BRONZE & IRON											
1/2	5 3/4	19 3/8	2 7/8	—	—	—	—	—	—	—	—
3/4	5 3/4	19 3/8	2 7/8	—	—	—	—	—	—	—	—
1	5 3/4	19 3/8	2 7/8	—	—	—	—	—	—	—	—
1 1/4	5 3/4	19 5/8	3 1/8	—	—	—	—	—	—	—	—
1 1/2	6 1/4	20	3 5/8	—	—	—	—	—	—	—	—
2	7 1/2	20 1/2	3 1/2	—	—	—	—	—	—	—	—
ANSI CLASS 125 CAST IRON FLANGED											
1 1/2	7 1/2	20	4 1/8	5	9/16	—	3 7/8	—	4	1/2	5/8
2	8 3/4	20 1/2	4 3/8	6	5/8	—	4 3/4	—	4	5/8	3/4
2 1/2	9 3/4	21 3/8	5 1/2	7	1 1/16	—	5 1/2	—	4	5/8	3/4
3	11	21 7/8	6 1/2	7 1/2	3/4	—	6	—	4	5/8	3/4
4	13 1/2	23 1/2	7	9	15/16	—	7 1/2	—	8	5/8	3/4
ANSI CLASS 250 CAST IRON FLANGED											
1 1/2	8	20	4 1/8	6 1/8	3/4	3 9/16	4 1/2	1/16	4	3/4	7/8
2	9 1/2	20 1/2	4 3/8	6 1/2	13/16	4 3/16	5	1/16	8	5/8	3/4
2 1/2	10 3/8	21 3/8	5 1/2	7 1/2	15/16	4 15/16	5 7/8	1/16	8	3/4	7/8
3	11 3/4	21 7/8	6 1/2	8 1/4	1 1/16	5 11/16	6 5/8	1/16	8	3/4	7/8
4	14 1/8	23 1/2	7 1/2	10	1 3/16	6 15/16	7 7/8	1/16	8	3/4	7/8
ANSI CLASS 150 BRONZE											
1/2	6 3/4	19 3/8	2 7/8	3 1/2	9/16	—	2 3/8	—	4	1/2	5/8
3/4	6 3/4	19 3/8	2 7/8	3 7/8	9/16	—	2 3/4	—	4	1/2	5/8
1	6 3/4	19 3/8	2 7/8	4 1/4	9/16	—	3 1/8	—	4	1/2	5/8
1 1/4	7	19 5/8	3 1/8	4 5/8	9/16	—	3 1/2	—	4	1/2	5/8
1 1/2	7 1/2	20	3 7/16	5	9/16	—	3 7/8	—	4	1/2	5/8
2	8 3/4	20 1/2	3 1/2	6	5/8	—	4 3/4	—	4	5/8	3/4
2 1/2	9 3/4	21 3/8	4 3/8	7	11/16	—	5 1/2	—	4	5/8	3/4
3	11	21 7/8	5 1/4	7 1/2	3/4	—	6	—	4	5/8	3/4
4	13	23 1/2	7	9	11/16	—	7 1/2	—	8	3/4	5/8
ANSI CLASS 300 BRONZE FLANGED											
1/2	6 3/4	19 3/8	2 7/8	3 3/4	9/16	—	2 5/8	—	4	1/2	5/8
3/4	6 3/4	19 3/8	2 7/8	4 5/8	9/16	—	3 1/4	—	4	5/8	3/4
1	6 3/4	19 3/8	2 7/8	4 7/8	9/16	—	3 1/2	—	4	5/8	3/4
1 1/4	7	19 5/8	3 1/8	5 1/4	9/16	—	3 7/8	—	4	5/8	3/4
1 1/2	7 1/2	20	3 7/16	6 1/8	9/16	—	4 1/2	—	4	3/4	7/8
2	8 3/4	20 1/2	3 1/2	6 1/2	5/8	—	5	—	8	5/8	3/4
2 1/2	9 3/4	21 3/8	4 3/8	7 1/2	11/16	—	5 7/8	—	8	3/4	7/8
3	11	21 7/8	5 1/4	8 1/4	3/4	—	6 5/8	—	8	3/4	7/8
4	13	23 1/2	7	10	11/16	—	7 7/8	—	8	3/4	7/8
ANSI CLASS 150 CAST STEEL FLANGED											
1/2	7 5/8	20 7/8	3 7/16	3 1/2	5/16	1 3/8	2 3/8	1/16	4	1/2	5/8
3/4	7 5/8	20 7/8	3 7/16	3 7/8	3/8	1 11/16	2 3/4	1/16	4	1/2	5/8
1	7 1/2	207/8	3 7/16	4 1/4	3/8	2	3 1/8	1/16	4	1/2	5/8
1 1/4	7 7/8	21	3 13/16	4 5/8	7/16	2 1/2	3 1/2	1/16	4	1/2	5/8
1 1/2	8 3/4	21 3/8	4 1/8	5	1/2	2 7/8	3 7/8	1/16	4	1/2	5/8
2	10 1/4	21 5/8	4 1/2	6	9/16	3 5/8	4 3/4	1/16	4	5/8	3/4
2 1/2	11 5/8	22 5/8	6	7	5/8	4 1/8	5 1/2	1/16	4	5/8	3/4
3	12 1/2	23 1/2	6 13/16	7 1/2	11/16	5	6	1/16	4	5/8	3/4
4	14 3/8	24 1/2	7 9/16	9	7/8	6 3/16	7 1/2	1/16	4	5/8	3/4
ANSI CLASS 300 CAST STEEL FLANGED											
1/2	8	20 7/8	3 7/16	3 3/4	1/2	1 3/8	2 5/8	1/16	4	1/2	5/8
3/4	8	20 7/8	3 7/16	4 5/8	9/16	1 11/16	3 1/4	1/16	4	5/8	3/4
1	8	20 7/8	3 7/16	4 7/8	5/8	2	3 1/2	1/16	4	5/8	3/4
1 1/4	8 3/8	21	3 13/16	5 1/4	1 1/16	2 1/2	3 7/8	1/16	4	5/8	3/4
1 1/2	8 7/8	21 3/8	4 1/8	6 1/8	3/4	2 7/8	4 1/2	1/16	4	3/4	7/8
2	10 3/4	21 5/8	4 1/2	6 1/2	13/16	3 5/8	5	1/16	8	5/8	3/4
2 1/2	12 1/4	22 5/8	6	7 1/2	15/16	4 1/8	5 7/8	1/16	8	3/4	7/8
3	13 1/4	23 1/2	6 13/16	8 1/4	11/16	5	6 5/8	1/16	8	3/4	7/8
4	15	24 1/2	7 9/16	10	13/16	6 3/16	7 7/8	1/16	8	3/4	7/8
ANSI CLASS 400 & 600 CAST STEEL FLANGED											
1/2	8 1/2	20 7/8	3 7/16	3 3/4	9/16	1 3/8	2 5/8	1/4	4	1/2	5/8
3/4	8 1/2	20 7/8	3 7/16	4 5/8	5/8	1 11/16	3 1/4	1/4	4	5/8	3/4
1	8 1/2	20 7/8	3 7/16	4 7/8	11/16	2	3 1/2	1/4	4	5/8	3/4
1 1/4	9	21	3 13/16	5 1/4	13/16	2 1/2	3 7/8	1/4	4	5/8	3/4
1 1/2	9 1/2	21 3/8	4 1/8	6 1/8	7/8	2 7/8	4 1/2	1/4	4	3/4	7/8
2	11 1/2	21 5/8	4 1/2	6 1/2	1	3 5/8	5	1/4	8	5/8	3/4
2 1/2	13	22 5/8	6	7 1/2	1 1/8	4 1/8	5 7/8	1/4	8	3/4	7/8
3	14	23 1/2	6 13/16	8 1/4	1 1/4	5	6 5/8	1/4	8	3/4	7/8
4	16	24 1/2	7 9/16	10 3/4	1 1/2	6 3/16	8 1/2	1/4	8	7/8	1

LT/JT SERIES DUO-MATIC® REGULATOR

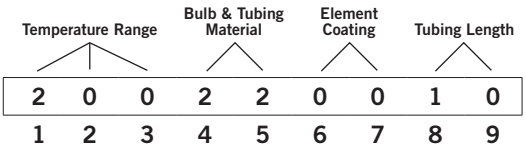
DIMENSIONS DIAGRAM



ELEMENT & BULB SELECTION

DUOMATIC ELEMENT CODE SELECTION CHART

USE THESE PRICES ONLY
WHEN ORDERING ELEMENT AS PART OF A
DUOMATIC ELEMENT CODE SELECTION CHART



TEMPERATURE RANGE -POSITION 1, 2 & 3
20 1/2" BULB LENGTH
200 = 20-120 202 = 50-170 205 = 120-220 207 = 170-270 208 = 220-320 209 = 250-350
7 1/4" BULB LENGTH
220 -20-120 222 -50-170 225 =120-220 227 = 170-270 228 = 220-320 229 = 250-350
21 1/2" BULB LENGTH
270 = 20-120 272 = 50-170 275 = 120-270 277 = 170-270 278 = 220-320 279 = 250-350
BULB & TUBING MATERIAL – POSITION 4 & 5
22 = Brass Bulb & Tubing 26 = 316 SST Bulb & Tubing 27 = 316 SST Bulb, Brass Tubing 30 = Cold Rolled Steel Bulb, Brass Tubing
ELEMENT COATING -POSITION 6 & 7
00 = No coating 22 = Polyvinylchloride
TUBING LENGTH -POSITION 8 & 9
05 = 5* 10 = 10* 20 = 20* 30 = 30* 40 = 40* 50 = 50* 60 = 60* 70 = 70*

*Consult factory

CONFIDENTIAL - INTERNAL USE ONLY (DO NOT DISTRIBUTE)

DUOMATIC ELEMENT COMPONENTS

	SIZE CLASS/RANGE
BULB & TUBING MATERIAL	Brass Bulb & Tubing 316 SST Bulb & Tubing w/7V4" or 2011211 Bulb w/21VI." Bulb 316 SST Bulb, Brass Tubing w/7V4" or 20VI." Butb w/21VI." Bulb Colld Rolled Steel Bulb, Brass Tubing w/7V4" or 201/2" Bulb w/211/211 Bulb
ELEMENT COATING	No coating Polyvinylchloride - 5 to 10 feet each additional10 feet
TUBING LENGTH	First 10 feet Brass Tubing each additional 10 feet 316 SST Tubing each additional 10 feet
MOENL	7 1/4 20 1/2 21 1/2

DUOMATIC BULB CASING

	SIZE	CLASS/RANGE	PROD. REF. #
BRASS	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A19961 A13760 A18848
COLD ROLLED STEEL	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A47331 A47325 A47328
MOENL	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A47329 A47323 A47326
316 STAINLESS STEEL	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A47330 A47324 A47327

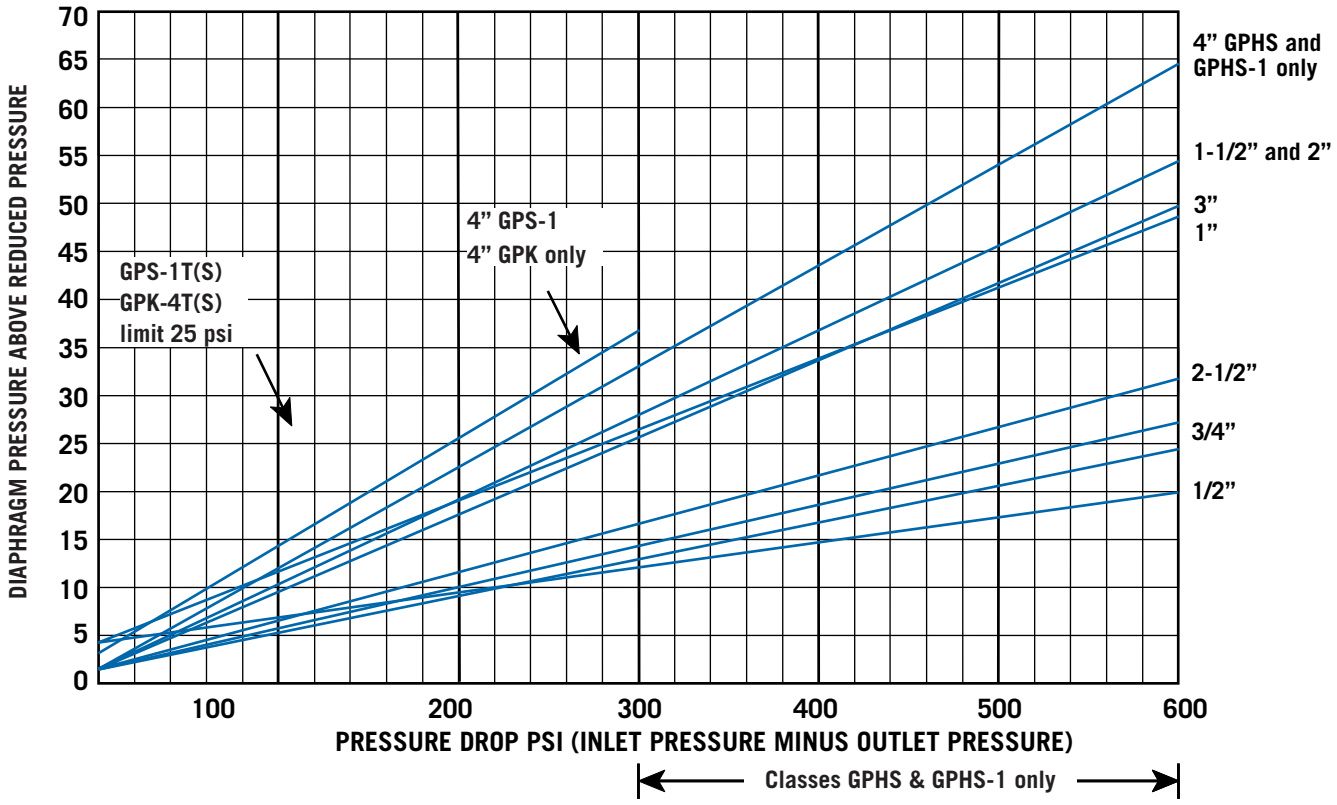
DUOMATIC BULB CASING

	SIZE	CLASS/RANGE	PROD. REF. #
BRASS	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A27257 A27269 A27261
COLD ROLLED STEEL	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A27260 A27272 A27264
MOENL	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A27258 A27270 A27262
316 STAINLESS STEEL	7 1/4 20 1/2 21 1/2	60CC 60CC 200CC	A27259 A27273 A27263

SIZING

DIAPHRAGM LOADING CHARACTERISTICS, REDUCING

VALVES CLASSES GPK, GPB, GP(H)S(S)-1



The above curves indicate the loading pressures above the outlet pressure required for each size class GPK, GPAK, GPB, GPS, GPS-1, GPHS-1 and variants for all pressure differentials across the valves.

EXAMPLE

If a 3" GPB reducing valve is required to reduce steam from 300 psig to 20 psig, 44 psig air loading is required. This is determined as follows: enter the chart at 280 psi pressure drop and read up to the 3" size. Read across to 24 psi, which must be added to the outlet pressure to determine the required loading pressure.

NOTE

Maximum diaphragm joint pressure is 300 psig. Loading pressure (reduced pressure plus diaphragm pressure above reduced pressure) must not exceed 300 psig.

CLASS	MAXIMUM INLET*& MAXIMUM ΔP
GPK GPB	250 300
GPS GPS-1	300 300
GPHS GPHS-1	600 600
GPAK GPAS-1	400 400

* Subject to valve body limitations.

G SERIES SATURATED STEAM CAPACITY TABLES

Capacities (lbs/hr) 95% Accuracy (2 psi min. droop)

PRESSURE-PSIG		VALVE SIZE (INCHES)								
INLET	OUTLET	½	¾	1	1¼	1½	2	2½	3	4
10	0-2 5	135 115	225 190	400 340	555 470	785 665	925 785	1320 1120	2060 1750	2740 2330
15	0-2 5	175 165	290 270	520 485	720 670	1020 950	1200 1120	1710 1600	2670 2490	3550 3320
20	0-2 10	210 180	350 300	625 540	860 745	1220 1050	1440 1240	2050 1770	3200 2760	4260 3670
25	0-5 10	235 225	395 370	710 665	980 920	1390 1300	1630 1530	2330 2190	3630 3410	4840 4540
50	0-17 25	380 360	635 600	1140 1070	1570 1480	2230 2100	2620 2470	3740 3530	5840 5510	7780 7330
75	0-30 40	520 495	870 825	1550 1470	2150 2040	3040 2880	3580 3390	5110 4850	7980 7570	10620 10070
100	0-42 50 75	665 645 520	1110 1070 870	1980 1920 1550	2730 2660 2140	3870 3760 3040	4550 4430 3570	6510 6320 5110	10150 9860 7960	13510 13130 10600
125	0-55 75	800 745	1340 1240	2390 2220	3300 3060	4680 4340	5510 5100	7870 7290	12270 11370	16340 15140
150	0-67 100	945 830	1570 1380	2810 2480	3880 3420	5500 4850	6470 5710	9250 8150	14430 12720	19210 16930
175	0-80 125	1085 915	1800 1520	3230 2720	4460 3760	6320 5320	7430 6260	10620 8950	16570 13960	22060 18580
200	0-92 125 150	1220 1130 990	2040 1880 1640	3650 3360 2940	5040 4640 4060	7140 6570 5750	8410 7730 6770	12010 11050 9670	18730 17230 15090	24940 22940 20090
225	0-105 150 175	1360 1210 1050	2270 2020 1760	4060 3610 3140	5610 4990 4340	7940 7070 6150	9350 8320 7240	13350 11890 10340	20830 18550 16140	27740 24690 21480
250	0-117 150 200	1500 1410 1120	2490 2360 1870	4460 4220 3340	6160 5830 4610	8730 8250 6530	10270 9710 7680	14670 13870 10980	22880 21640 17130	30460 28810 22800

Capacities (lbs/hr) 90% Accuracy (31/2 psi min. droop)

PRESSURE-PSIG		VALVE SIZE (INCHES)								
INLET	OUTLET	½	¾	1	1¼	1½	2	2½	3	4
10	0-2 5	196 167	385 325	543 462	807 683	958 812	1061 901	1880 1596	2621 2227	3798 3230
15	0-2 5	254 240	496 462	706 659	1046 974	1245 1160	1377 1285	2436 2279	3397 3168	4921 4602
20	0-2 10	305 261	599 513	849 733	1250 1083	1489 1282	1652 1423	2920 2522	4072 3512	5906 5088
25	0-5 10	341 327	676 633	964 903	1424 1337	1697 1587	1870 1756	3319 3120	4619 4339	6710 6294
50	0-17 25	552 523	1086 1026	1548 1453	2282 2151	2722 2563	3006 2834	5328 5029	7431 7011	10785 10161
75	0-30 40	755 719	1488 1411	2105 1996	3125 2965	3711 3515	4108 3890	7280 6909	10154 9632	14722 13960
100	0-42 50 75	966 937 755	1899 1830 1488	2688 2607 2105	3968 3866 3110	4724 4590 3711	5221 5083 4096	9274 9003 7280	12915 12546 10128	18729 18202 14694
125	0-55 75	1162 1082	2292 2121	3245 3014	4796 4447	5713 5298	6322 5852	11211 10385	15612 14467	22652 20988
150	0-67 100	1372 1205	2686 2361	3815 3367	5639 4970	6713 5920	7424 6552	13177 11610	18361 16185	26630 23470
175	0-80 125	1575 1329	3079 2600	4386 3693	6482 5465	7715 6494	8525 7183	15129 12750	21084 17763	30581 25757
200	0-92 125 150	1772 1641 1438	3489 3216 2805	4956 4562 3992	7325 6743 5901	8715 8020 7019	9650 8869 7768	17109 15742 13776	23832 21923 19201	34574 31801 27850
225	0-105 150 175	1975 1757 1525	3883 3455 3011	5513 4902 4263	8153 7252 6307	9692 8630 7507	10728 9546 8307	19018 16938 14730	26504 23603 20537	38455 34227 29777
250	0-117 150 200	2178 2047 1626	4259 4037 3199	6056 5730 4535	8953 8473 6700	10656 10070 7971	11784 11141 8812	20899 19759 15642	29113 27535 21796	42226 39938 31607

G SERIES AIR, GAS, VAPOR CAPACITY TABLES

Capacities (SCFM) 95% Accuracy (2 psi min. droop)

PRESSURE-PSIG		VALVE SIZE (INCHES)								
INLET	OUTLET	1/2	3/4	1	1¼	1½	2	2½	3	4
10	0-2 5	39 33	63 53	139 117	201 170	331 280	355 300	533 450	758 639	1070 899
15	0-2 5	53 49	82 76	181 169	264 245	434 403	465 432	697 648	992 922	1390 1300
20	0-2 10	64 54	100 85	220 187	319 272	525 448	563 480	844 720	1200 1020	1690 1440
25	0-5 10	73 68	113 106	250 233	363 339	598 558	641 598	961 897	1370 1280	1920 1790
50	0-17 25	119 111	185 173	408 382	593 556	977 915	1050 981	1570 1470	2230 2090	3140 2940
75	0-300-42	164 210	256 327	564 722	820 1050	1350 1730	1450 1850	2170 2780	3090 3950	4390 5560
100	75 85	162 132	253 205	559 453	812 658	1340 1080	1430 1160	2150 1740	3060 2480	4300 3480
125	0-55 100	255 183	398 285	879 629	1280 914	2100 1510	2250 1610	3380 2420	4800 3440	6760 4840
150	0-67 100 125	301 263 202	470 410 314	1040 905 693	1510 1310 1010	2480 2160 1660	2660 2320 1780	3990 3480 2660	5670 4950 3790	7970 6960 5330
175	0-80 125 150	347 288 218	540 449 340	1190 992 751	1730 1440 1090	2850 2370 1800	3060 2540 1930	4590 3810 2890	6520 5430 4110	9170 7630 5780
200	0-92 125 150 175	393 359 311 234	611 558 486 365	1350 1230 1070 805	1960 1790 1560 1170	3230 2950 2570 1930	3460 3160 2750 2060	5200 4740 4130 3100	7390 6740 5870 4400	10400 9480 8250 6190
225	0-105 150 175	438 386 333	683 602 520	1510 1330 1150	2190 1930 1670	3610 3180 2750	3860 3410 2940	5800 5110 4420	8240 7270 6280	11600 10200 8830
250	0-117 150 200	484 452 354	754 704 552	1660 1560 1220	2420 2260 1770	3990 3720 2920	4270 3990 3120	6410 5980 4690	9110 8510 6670	12800 12000 9370
300	0-167 200 250	554 510 392	863 795 611	1910 1750 1350	2770 2550 1960	4560 4200 3230	4890 4500 3460	7330 6750 5190	10400 9590 7380	14700 13500 10400
400	0-192 300	757 610	1180 951	2610 2100	3790 3050	6240 5020	6690 5380	10000 8070	14300 11500	20100 16100

G SERIES AIR, GAS, VAPOR CAPACITY TABLES

Capacities (SCFM) 90% Accuracy (2 psi min. droop)

PRESSURE-PSIG		VALVE SIZE (INCHES)								
INLET	OUTLET	1/2	3/4	1	1¼	1½	2	2½	3	4
10	0-2 5	61 51	103 87	200 168	293 248	453 383	486 411	981 828	1152 971	1487 1250
15	0-2 5	83 76	134 125	261 243	385 358	594 551	637 592	1282 1192	1508 1401	1932 1807
20	0-2 10	100 84	164 139	317 269	466 397	718 613	771 658	1553 1325	1824 1550	2349 2002
25	0-5 10	114 106	185 174	360 336	530 495	818 763	878 819	1768 1650	2082 1946	2669 2488
50	0-17 25	186 173	303 284	588 550	866 812	1337 1252	1439 1344	2889 2705	3390 3177	4365 4087
75	0-300-42	164 327	399 536	925 1040	1181 1533	1971 2367	1984 2535	2973 5115	5686 6004	6673 7728
100	75 85	253 206	415 336	805 652	1186 961	1833 1477	1959 1589	3956 3202	4651 3770	5977 4837
125	0-55 100	398 285	653 467	1266 906	1869 1334	2873 2066	3083 2206	6219 4453	7296 5229	9396 6728
150	0-67 100 125	469 410 315	771 672 515	1498 1303 998	2205 1913 1475	3393 2955 2271	3644 3178 2439	7342 6403 4894	8618 7524 5761	11078 9674 7409
175	0-80 125 150	541 449 340	886 736 558	1714 1428 1081	2526 2102 1591	3899 3242 2462	4192 3480 2644	8446 7010 5318	9910 8254 6247	12746 10606 8034
200	0-92 125 150 175	613 560 485 365	1002 915 797 599	1944 1771 1541 1159	2862 2613 2278 1708	4419 4036 3516 2640	4740 4329 3768 2822	9568 8722 7599 5704	11233 10245 8922 6688	14456 13177 11468 8604
225	0-105 150 175	683 602 519	1120 987 853	2174 1915 1656	3197 2818 2438	4938 4350 3762	5288 4672 4028	10672 9402 8133	12525 11050 9546	16124 14178 12274
250	0-117 150 200	755 705 552	1237 1155 905	2390 2246 1757	3533 3300 2584	5458 5089 3995	5850 5466 4274	11794 11003 8630	13847 12935 10138	17792 16680 13024
300	0-167 200 250	864 795 611	1415 1304 1002	2750 2520 1944	4044 3723 2862	6238 5746 4419	6699 6165 4740	13487 12420 9550	15808 14577 11218	20433 18765 14456
400	0-192 300	1180 951	1935 1560	3758 3024	5533 4453	8536 6867	9165 7371	18400 14849	21736 17480	27939 22379

L & UL* SERIES SATURATED STEAM CAPACITY TABLE

Capacities (lbs/hr) 99% Accuracy

PRESSURE-PSIG		VALVE SIZE (INCHES)								
INLET	OUTLET	½	¾	1	1¼	1½	2	2½	3	4
25	0-14	102	190	316	560	770	1290	1850	2880	5000
50	0-27	160	300	500	885	1215	2035	2915	4550	7900
75	0-40	220	400	675	1200	1650	2770	3960	6180	10800
100	0-55 75 85	275 250 210	510 460 385	850 765 640	1520 1365 1150	2100 1875 1600	3500 3100 2650	5000 4500 3800	7800 7000 5920	13500 12200 10300
125	0-70 100	330 280	620 520	1020 860	1825 1530	2500 2100	4200 3500	6000 5000	9400 8000	16300 13700
150	0-80 100 125	390 375 300	725 700 560	1200 1150 930	2150 2075 1610	3000 2800 2300	4900 4800 3800	7000 6800 5500	11000 10700 8600	19000 18500 15000
175	0-95 125 150	450 415 330	825 775 620	1360 1280 1025	2440 2300 1800	3350 3150 2500	5600 5300 4200	8000 7600 6000	12500 11800 9400	22000 20000 16000
200	1-110 125 150 175	500 490 450 350	925 910 835 650	1540 1460 1335 1075	2750 2700 2475 1925	3780 3700 3400 2650	6300 6200 5700 4400	9100 13900 8200 6400	14200 18700 12700 9900	24600 22100 22100 17200
225	0-125 150 175	560 540 485	1050 1000 900	1715 1700 1500	3060 2960 2650	4215 4075 3600	7000 6800 6100	10100 9800 8800	15800 15200 13600	27400 26500 23800
250	0-135 150 200	610 600 515	1135 1120 950	1880 1850 1580	3350 3300 2800	4625 4550 3885	7700 7600 6500	11100 11000 9300	17300 17000 14500	30100 29600 25300
300	0-165 200 250	725 700 565	1340 1300 1050	2225 2160 1750	3975 3850 3100	5470 5300 4270	9100 8900 7200	13100 12700 10200	20500 19800 16000	36000 34000 28000
400	0-220 300	955 860	1760 1580	2900 2600	5200 4700	7200 6500	12000 11000	17200 15500	26900 23300	47000 41300
450	0-250 300	1070 1030	1980 1910	3300 3175	5900 5700	8000 7800	13500 13000	19500 18700	30000 29000	53000 51000
500	0-300	1190	2190	3610	6475	8960	14950	21500	33500	58500
600	0-350 400	1430 1380	2630 2530	4330 4175	7770 7490	10800 10400	17900 17250	25700 24750	40200 38700	70200 67700

*UL Series maximum inlet pressure 300 psig.

INLET PRESSURE	°F SUPERHEAT					
	50	100	150	200	300	400
To 600 psi	0.92	0.85	0.80	0.75	0.65	0.59
600 to 1500 psi	0.85	0.79	0.73	0.69	0.62	0.56
1500 to 2000 psi	0.78	0.72	0.66	0.61	0.54	0.49

CONVERSION TO AIR CAPACITIES: #/hr. / 2.9 = SCFM @ 60°F

CONVERSION TO GAS CAPACITIES: SCFM x 2.9 / SG = #/hr.

L & UL* SERIES SATURATED STEAM CAPACITY TABLE

Capacities (lbs/hr) 95% Accuracy

PRESSURE-PSIG		VALVE SIZE (INCHES)								
INLET	OUTLET	½	¾	1	1¼	1½	2	2½	3	4
25	0-14	125	235	395	700	960	1610	2310	3600	6250
50	0-27	200	375	625	1100	1510	2540	3640	5680	9875
75	0-40	275	500	840	1500	2060	3460	4950	7720	13500
100	0-55 75 85	340 310 260	635 575 480	1060 950 800	1900 1700 1430	2620 2340 2000	4370 3870 3310	6250 5620 4750	9750 8750 7400	16870 15250 12870
125	0-70 100	410 350	775 650	1270 1070	2280 1910	3120 2620	5250 4370	7500 6250	11750 10000	20370 17120
150	0-80 100 125	485 465 375	900 875 700	1500 1430 1160	2680 2590 2010	3750 3500 2870	6120 6000 4750	8750 8500 6870	13750 13370 10750	23750 23120 18750
175	0-95 125 150	560 515 410	1030 960 775	1700 1600 1280	3050 2870 2250	4180 3930 3120	7000 6620 5250	10000 9500 7500	15620 14750 11750	27500 25000 20000
200	0-110 1256 150 175	625 610 560 435	1150 1130 1040 810	1920 1820 1660 1340	3430 3370 3090 2400	4720 4620 4250 3310	7870 7750 7120 5500	11370 11120 10250 8000	17750 17370 15870 12370	30750 30120 27620 21500
225	0-125 150 175	700 675 605	1310 1250 1120	2140 2120 1870	3820 3700 3310	5260 5090 4500	8750 8500 7620	12620 12250 11000	19750 19000 17000	34250 33120 29750
250	0-135 150 200	760 750 640	1410 1400 1180	2350 2310 1970	4180 4120 3500	5780 5680 4850	9620 9500 8120	13870 13750 11620	21620 21250 18120	37620 37000 31620
300	0-165 200 250	900 875 705	1670 1620 1310	2780 2700 2180	4960 4810 3870	6830 6620 5330	11370 11120 9000	16370 15870 12750	25620 24750 20000	45000 42500 35000
400	0-220 300	1190 1070	2200 1970	3620 3250	6500 5870	9000 8120	15000 13750	21500 19370	33620 29120	58750 51620
450	0-250 300	1330 1280	2470 2380	4120 3960	7370 7120	10000 9750	16870 16250	24370 23370	37500 36250	66250 63750
500	0-300	1480	2730	4510	8090	11200	18680	26870	41870	73120
600	0-350 400	1780 1720	3280 3160	5410 5210	9710 9360	13500 13000	22370 21560	34370 30930	50250 48370	87520 84620

*UL Series maximum inlet pressure 300 psig.

INLET PRESSURE	°F SUPERHEAT					
	50	100	150	200	300	400
To 600 psi	0.92	0.85	0.80	0.75	0.65	0.59
600 to 1500 psi	0.85	0.79	0.73	0.69	0.62	0.56
1500 to 2000 psi	0.78	0.72	0.66	0.61	0.54	0.49

CONVERSION TO AIR CAPACITIES: #/hr. / 2.9 = SCFM @ 60°F

CONVERSION TO GAS CAPACITIES: SCFM x 2.9 / SG = #/hr.

J SERIES CAPACITY TABLES

Saturated Steam Capacities (lbs/hr) 85% Accuracy

PRESSURE-PSIG		VALVE SIZE (INCHES)		
INLET	OUTLET	1/4	3/8	1/2
25	0-14	25	50	75
50	0-27	35	75	120
75	0-40	50	100	160
100	0-55	65	125	200
150	0-80	85	175	290
200	0-110	110	225	365
250	0-135	135	275	450
300	0-165	160	325	530

Air Capacities (scfm) @ 60°F, 90% Accuracy

PRESSURE-PSIG		VALVE SIZE (INCHES)		
INLET	OUTLET	1/4	3/8	1/2
25	0-14	13	25	38
50	0-27	18	38	60
75	0-40	25	50	80
100	0-55	33	63	100
150	0-80	43	88	145
200	0-110	55	113	183
250	0-135	68	138	225
300	0-165	80	163	265

LC SERIES STEAM CAPACITY TABLES

SATURATED STEAM CAPACITIES

lbs. steam per hr. (lbs/hr. x 2.2 = kg/hr.) — Classes LCB, LCLB, LCBS, LCLBS*

CLASS	REDUCED PRESSURE SETTING	INLET PRESSURE — PSI (BLACK FIGURES)								STEAM SATURATION — °F (BLUE FIGURES)				
		25 267	50 298	75 320	100 338	125 353	150 366	175 378	200 388	250 406	300 421	400 448	500 469	600 490
LCB*	5	—	5	6	7	8	9	10	11	12	13	—	—	—
	10	—	9	11	13	14	16	17	18	20	22	—	—	—
	20	—	15	18	22	25	27	29	31	34	41	—	—	—
	30	—	20	24	28	33	36	38	42	46	49	—	—	—
	40	—	24	30	36	41	46	48	54	59	64	—	—	—
	50	—	28	36	42	49	54	58	64	70	86	—	—	—
	75	—	—	45	55	64	71	75	85	95	105	—	—	—
	100	—	—	—	63	74	85	90	104	116	127	—	—	—
	125		—	—	—	83	95	102	118	131	143	—	—	—
	150	—	—	—	—	—	103	115	127	142	154	—	—	—
	175	—	—	—	—	—	—	125	133	147	160	—	—	—
	200	—	—	—	—	—	—	—	133	148	163	—	—	—
	250	—	—	—	—	—	—	—	—	149	164	—	—	—
	285	—	—	—	—	—	—	—	—	—	165	—	—	—
	300	—	—	—	—	—	—	—	—	—	165	—	—	—
LCLB*	2	10	13	15	17	19	20	21	22	24	25	—	—	—
	5	15	19	23	25	27	29	31	33	36	38	—	—	—
	10	20	26	30	34	37	40	42	44	48	52	—	—	—
	15	23	30	36	40	45	47	50	52	57	61	—	—	—
	20	25	34	40	44	50	52	56	58	64	69	—	—	—
	25	—	36	46	52	59	65	70	75	85	94	—	—	—
	30	—	39	50	58	65	72	78	84	95	105	—	—	—
	35	—	42	54	63	70	77	83	90	100	110	—	—	—
LCBS*	25	—	10	13	15	18	20	22	24	28	32	38	44	50
	50	—	15	19	23	27	30	33	36	42	46	57	65	73
	75	—	—	25	30	35	40	44	48	54	62	74	86	96
	100	—	—	—	36	42	46	52	56	65	72	86	100	115
	150	—	—	—	—	—	58	64	68	80	90	108	121	138
	200	—	—	—	—	—	—	—	78	90	101	120	140	158
	250	—	—	—	—	—	—	—	—	99	112	129	150	170
	300	—	—	—	—	—	—	—	—	—	124	150	169	180
	400	—	—	—	—	—	—	—	—	—	—	155	178	200
LCLBS*	5	—	4	5	6	7	8	9	10	11	12	14	16	17
	10	—	8	10	12	13	15	17	18	21	23	27	32	34
	20	—	13	16	19	21	23	26	28	31	34	40	46	50
	30	—	17	21	25	29	32	35	38	40	44	50	56	62
	40	—	21	26	31	36	40	43	47	51	55	63	71	78
	50	—	24	30	36	42	47	51	55	60	66	76	85	93

*Capacities for classes with "B" (1/4") orifice are shown. For other classes, multiply capacity given by the correction factor for controlling valve size.

FIGURING STEAM CAPACITIES

Capacity data is based on the 1/4" controlling valve and is the result of actual tests based on an accuracy of regulation of 75%. For capacities of other controlling valves, other accuracies of regulation or superheat, follow these steps:

1. Enter steam capacity table for applicable conditions.
2. Select controlling valve size for desired capacity.
3. If accuracy above 75% is required, use correction factor below.
4. If superheated, correct for super heat as shown below.

CONTROLLING VALVE SIZE	MULTIPLY BY
* A 3/32"	0.19
B 1/4"	1.0
C 5/16"	1.22
D 1/8"	0.22

ACCURACY OF REGULATION %	MULTIPLY BY
75	1.0
80	.85
85	.70
90	.55
95	.40

DEGREES SUPERHEAT	MULTIPLY BY
50°F	.96
100°F	.93
150°F	.90
200°F	.87
200°F	.80

*For air, gas, or liquid service in bronze body only.

SIZING FOR AIR OR GAS

Size for air or gas by multiplying required air or gas flow in SCFM @ 600°F by 2.9 times the square root of the specific gravity to obtain equivalent flow of saturated steam; then size directly from steam tables. Correct by applicable factors for controlling valve size and Accuracy of Regulation.

LC SERIES LIQUID CAPACITY TABLES

LIQUID CAPACITIES — SMALL FLOW REDUCING VALVES

GPM — (SpG = 1; 31.5 SSU) — CLASSES LCB, LCLB, LCBS, LCLBS, etc.* (GPM/0.0044 = liters/hr.)

CLASS	REDUCED PRESSURE SETTING	INLET PRESSURE — PSI												
		25	50	75	100	125	150	175	200	250	300	400	500	600
LCB*	10	—	0.24	0.29	0.32	0.38	0.40	0.42	0.46	0.50	0.54	—	—	—
	20	—	0.38	0.47	0.54	0.60	0.65	0.70	0.75	0.85	0.82	—	—	—
	30	—	0.58	0.71	0.82	0.92	1.00	1.10	1.20	1.30	1.40	—	—	—
	40	—	0.70	0.86	1.00	1.10	1.25	1.40	1.50	1.60	1.80	—	—	—
	50	—	1.00	1.20	1.40	1.60	1.80	2.00	2.10	2.40	2.60	—	—	—
	75	—	—	1.30	1.50	1.70	1.90	2.10	2.20	2.50	2.80	—	—	—
	100	—	—	—	1.60	1.80	2.00	2.20	2.30	2.60	2.90	—	—	—
	125	—	—	—	—	2.00	2.20	2.40	2.60	2.90	3.30	—	—	—
	150	—	—	—	—	—	2.40	2.60	2.80	3.20	3.50	—	—	—
	175	—	—	—	—	—	—	2.30	2.40	2.70	3.00	—	—	—
	200	—	—	—	—	—	—	—	2.20	2.50	2.80	—	—	—
	250	—	—	—	—	—	—	—	—	1.80	2.00	—	—	—
	285	—	—	—	—	—	—	—	—	—	1.10	—	—	—
LCLB*	2	0.08	0.11	0.13	0.15	0.17	0.19	0.20	0.21	0.23	0.25	—	—	—
	5	0.13	0.17	0.21	0.24	0.26	0.29	0.30	0.32	0.36	0.38	—	—	—
	10	0.52	0.71	0.80	1.00	1.10	1.20	1.30	1.40	1.50	1.70	—	—	—
	15	0.64	0.92	1.10	1.30	1.50	1.70	1.80	1.90	2.20	2.40	—	—	—
	20	0.75	1.10	1.30	1.60	1.80	2.00	2.20	2.40	2.70	2.90	—	—	—
	25	—	1.30	1.50	1.90	2.20	2.40	2.60	2.80	3.20	3.50	—	—	—
	30	—	1.50	1.80	2.20	2.60	2.80	3.00	3.30	3.70	4.10	—	—	—
	35	—	1.50	1.80	2.20	2.60	2.80	3.00	3.30	3.70	4.10	—	—	—
LCBS*	25	—	0.29	0.38	0.43	0.48	0.52	0.56	0.60	0.66	0.72	0.82	0.90	1.00
	50	—	0.56	0.74	0.84	0.92	1.00	1.10	1.20	1.30	1.40	1.60	1.70	1.90
	75	—	—	1.00	1.20	1.30	1.40	1.50	1.60	1.70	1.90	2.20	2.40	2.60
	100	—	—	—	1.40	1.50	1.70	1.80	1.90	2.10	2.30	2.60	2.90	3.20
	150	—	—	—	—	—	1.80	1.90	2.00	2.30	2.50	2.90	3.20	3.50
	200	—	—	—	—	—	—	—	2.10	2.40	2.60	3.00	3.30	3.60
	250	—	—	—	—	—	—	—	—	2.50	2.70	3.10	3.40	3.80
	300	—	—	—	—	—	—	—	—	—	2.60	3.00	3.30	3.60
	400	—	—	—	—	—	—	—	—	—	—	2.90	3.20	3.50
LCLBS*	10	—	0.32	0.38	0.43	0.48	0.52	0.55	0.58	0.65	0.70	0.80	0.86	0.93
	20	—	0.36	0.43	0.49	0.54	0.59	0.63	0.67	0.73	0.80	0.91	0.98	1.10
	30	—	—	0.50	0.57	0.63	0.68	0.73	0.78	0.86	0.94	1.10	1.20	1.30
	40	—	—	0.64	0.73	0.80	0.86	0.93	1.00	1.10	1.20	1.30	1.50	1.60
	50	—	—	0.75	0.85	0.93	1.00	1.10	1.20	1.30	1.40	1.60	1.80	1.90

* Capacities for classes with "B" (1/4") orifice are shown. For other classes, multiply capacity given by the correction factor for controlling valve size from table at right.

FIGURING LIQUID CAPACITIES

Capacity data is based on the 1/4" controlling valve and is the result of actual tests based on an accuracy of regulation of 75%. For capacities of other controlling valves, other accuracies of regulation or superheat, follow these steps:

1. Enter liquid capacity table for applicable conditions.
2. Select controlling valve size for desired capacity.
3. If accuracy above 75% is required, use correction factor below.

CONTROLLING VALVE SIZE	MULTIPLY BY
* A 3/32"	0.19
B 1/4"	1.0
C 5/16"	1.22
D 1/8"	0.22

ACCURACY OF REGULATION %	MULTIPLY BY
75	1.0
80	.85
85	.70
90	.55
95	.40

AW SERIES REDUCING VALVE

SIZING AND CAPACITY DATA

CAPACITY AND ACCURACY OF REGULATION

To correctly and accurately give the capacity of this type of reducing valve, it is required that capacity be stated in terms of accuracy of regulation. Self-operated, spring loaded reducing valves obtain opening force from a drop in reduced pressure and should be adjusted while passing a minimum flow (not dead-end). The reduced pressure obtained by slowly increasing the flow to rated capacity is a measure of Accuracy of Regulation. Therefore, a reducing valve set to deliver 20 psi pressure at minimum flow has a 75% accuracy of regulation if it delivers 15 psi at rated capacity. For example:

INLET PRESSURE = 100 PSI	ACCURACY OF REGULATION = 75%	
Reduced Pressure Setting at Minimum Flow psi	**10**	**50**
Reduced Pressure Maintained at rated flow capacity psi	**7.5**	**37.5**
Drop in reduced pressure psi (which is opening force)	**2.5**	**12.5**

Even though the total pressure differential across the reducing valve is less in the second case, which would appear to reduce the capacity, the greater opening force obtained at 75% of the 50 psi reduced pressure produces a greater valve opening, therefore, a greater capacity than at 75% of 10 psi.

AW SERIES REDUCING VALVE

SIZING AND CAPACITY DATA

CLASSES AW, AWR, AWG, AWRG (CAPACITIES BASED ON 75% ACCURACY OF REGULATION)

(SCFM/35.3 = NM3/min)

AIR CAPACITIES (CFM)

OUTLET PRESSURE (PSIG)	INLET PRESSURE (PSIG)									
	10	15	20	30	50	75	100	125	150	200
5	2.8	4.3	5.0	6.0	8.3	10.8	11.2	11.5	12.0	12.5
10	—	5.0	6.2	7.7	10.5	13.3	14.2	15.3	16.7	17.5
15	—	—	6.8	9.2	12.5	15.8	17.5	18.8	20.2	21.3
20	—	—	—	9.7	14.3	18.3	20.3	22.0	23.8	25.0
25	—	—	—	10.2	16.2	20.6	23.3	25.5	27.5	29.2
30	—	—	—	—	17.5	22.0	25.8	28.3	31.0	33.0
35	—	—	—	—	18.0	23.3	28.8	31.3	34.3	37.0
45	—	—	—	—	18.3	25.5	32.3	37.3	41.4	44.6
50	—	—	—	—	—	26.5	33.8	39.8	44.6	48.4
65	—	—	—	—	—	26.0	34.5	42.4	49.0	57.2
70	—	—	—	—	—	25.3	34.6	43.2	50.0	59.0
75	—	—	—	—	—	—	34.6	44.0	51.2	60.6

WATER CAPACITIES (CFM)

OUTLET PRESSURE (PSIG)	INLET PRESSURE (PSIG)									
	10	15	20	30	50	75	100	125	150	200
5	0.6	0.9	1.0	1.4	1.4	1.5	1.5	1.5	1.5	1.5
10	—	1.1	1.2	1.7	1.7	1.8	1.8	1.8	1.9	1.9
15	—	—	1.3	1.8	2.0	2.1	2.2	2.3	2.3	2.4
20	—	—	—	1.8	2.3	2.5	2.6	2.7	2.8	2.8
25	—	—	—	1.8	2.4	2.8	3.0	3.1	3.2	3.3
30	—	—	—	—	2.5	3.0	3.3	3.5	3.5	3.6
35	—	—	—	—	2.5	3.1	3.6	3.8	3.8	4.0
45	—	—	—	—	2.2	3.3	4.0	4.3	4.4	4.6
50	—	—	—	—	—	3.2	4.1	4.5	4.6	4.9
65	—	—	—	—	—	2.9	3.8	4.6	4.8	5.5
70	—	—	—	—	—	2.8	3.7	4.4	4.8	5.7
75	—	—	—	—	—	—	3.5	4.3	4.7	5.9

GT SERIES SATURATED STEAM CAPACITY TABLES

GTK and GTB Capacities (lbs/hr)

PRESSURE PSIG		VALVE SIZES-INCHES								
INLET	OUTLET	1/2	3/4	1	1¼	1½	2	2½	3	4
5	1 3	143 54	283 90	338 128	398 150	595 225	700 265	1380 522	1740 657	2620 990
10	3 5 7	205 180 109	337 300 182	480 426 258	566 502 306	850 752 456	1000 885 537	1950 1740 1057	2460 2190 1332	3700 3300 2005
15	3 5 10 12	265 255 200 121	440 423 330 200	625 600 470 285	737 707 558 338	1105 1062 833 505	1300 1250 980 595	2560 2450 1930 1200	3220 3090 2430 1500	4850 4650 3660 2200
25	0-5 10 15 22	360 350 310 142	600 580 520 235	850 825 735 333	1005 975 871 394	1504 1457 1300 590	1770 1715 1530 695	3480 3375 3010 1370	4380 4250 3790 1725	6600 6400 5710 2600
50	0-17 25 30 45	585 565 540 310	975 950 900 520	1385 1345 1280 735	1635 1586 1508 871	2443 2375 2256 1300	2875 2795 2655 1530	5655 5495 5220 3010	7120 6920 6570 3790	10725 10425 9900 5710
75	0-30 50 60 70	810 725 606 370	1350 1210 1010 620	1920 1720 1435 880	2264 2026 1691 1035	3383 3034 2533 1547	3980 3570 2980 1820	7830 7020 5860 3585	9855 8830 7370 4510	14850 13310 11110 6800
100	0-42 60 80 90	1035 987 785 583	1780 1645 1310 972	2450 2340 1860 1380	2890 2756 2756 1629	4335 3782 3281 2436	5100 4450 3860 2867	10000 9550 7600 5638	12600 12000 9550 7095	19000 18100 14400 10692
125	0-55 80 105 115	1260 1180 885 648	2100 1960 1470 1080	2980 2780 2095 1534	3516 3292 2465 1810	5270 4930 3689 2708	6200 5800 4340 3186	12200 11400 8540 6264	15320 14350 10710 7884	23100 21600 16200 11880
150	0-67 100 130 140	1485 1370 970 709	2470 2280 1620 1182	3510 3230 2300 1678	4142 3814 2711 1981	6205 5703 4063 2963	7300 6710 4780 3487	14350 13000 9400 6856	18100 16600 11800 8629	27200 25000 17800 13000

GTS Capacities (lbs/hr)

PRESSURE PSIG		VALVE SIZES-INCHES				
INLET	OUTLET	1/2	3/4	1	1½	2
5	1 3	78 30	143 54	238 90	535 202	700 265
10	3 5 7	111 99 60	205 180 109	337 300 182	760 675 411	1000 885 537
15	3 5 10 12	146 140 110 68	265 255 200 121	440 423 330 200	990 950 750 455	1300 1250 980 595
25	0-5 10 15 22	198 192 170 79	360 350 310 142	600 580 520 235	1350 1310 1170 530	1770 1715 1530 695
50	0-17 25 30 45	321 310 297 170	585 565 540 310	975 950 900 520	2195 2130 2025 1170	2875 2795 2655 1530
75	0-30 50 60 70	445 400 333 204	810 725 606 370	1350 1210 1010 620	3040 2720 2270 1390	3980 3570 2980 1820
100	0-42 60 80 90	570 544 432 320	1035 987 785 583	1730 1645 1310 972	3880 3700 2940 2187	5100 4450 3860 2867
125	0-55 80 105 115	694 648 486 356	1260 1180 885 648	2100 1960 1470 1080	4720 4420 3310 2430	6200 5800 4340 3186
150	0-67 100 130 140	815 750 535 390	1485 1370 970 709	2470 2280 1620 1182	5560 5120 3640 2660	7300 6710 4780 3487

Bulbs with 100°F span reach capacity at 7°F change.

Bulbs with 50°F span reach capacity at 3.5°F change.

GT SERIES WATER CAPACITY TABLE

GTRK Capacities (gpm)

PRESSURE PSIG		VALVE SIZES-INCHES								
INLET	OUTLET	1/2	3/4	1	1¼	1½	2	2½	3	4
15	3 7.5	20.6 17.4	34.5 29.1	49.3 41.5	57.7 48.6	86.7 73.1	102 86	201 170	252 213	338 323
20	0 10	26.6 19	44.5 31.6	63.6 45	74.5 52.8	112.2 79	132 93	260 185	326 231	495 350
30	0 10 20	32.4 26.6 19	54 44.5 31.6	77.5 63.6 45	90.8 74.5 52.8	136 112.2 79	160 132 93	317 260 185	396 326 231	600 495 350
40	0 20 30	38 26.6 19	63.4 44.5 31.6	90 63.6 45	105.7 74.5 52.8	158.1 112.2 79	186 132 93	367 260 185	461 326 231	695 495 350
60	0 20 30 40 50	46 38 32.4 26.6 19	77 63.4 54 44.5 31.7	111 90 77.5 63.6 45	129.6 105.7 90.8 74.5 52.8	193.8 158.1 136 112.2 79.4	228 186 160 132 93.5	450 367 317 260 184	564 461 396 326 231	855 695 600 495 350
80	0 30 50 60 70	53 42 32.4 26.6 19	89 70 54 44.5 31.7	127 100 77.5 63.6 45	149 119.2 90.8 74.5 52.8	223.5 176.8 136 112.2 79.4	263 208 160 132 93.5	520 410 317 260 184	650 515 396 326 231	990 780 600 495 350
100	0 20 40 70 80 90	59.5 53 46 32.4 26.6 19	99 89 77 54 44.5 31.7	142 127 111 77.5 63.6 45	166.8 149 129.6 90.8 74.5 52.8	249.9 223.5 193.8 136 112.2 79.4	294 263 228 160 132 93.5	580 520 450 317 260 184	726 650 564 396 326 231	1100 990 855 600 495 350
150	0 25 70 110 130 140	72 66.5 53 38 26.6 19	120 111 89 63.4 44.5 31.7	172 159 127 90 63.6 45	202.6 187.7 149 105.7 74.5 52.8	302.6 280.5 223.5 158.1 112.2 79.4	356 330 263 186 132 93.5	705 650 520 367 260 185	880 815 650 461 326 231	1340 1230 990 695 495 350
175	0 50 95 125 145 160	79 66.5 53 42 32.4 23.3	131 111 89 70 54 38.8	188 159 127 100 77.5 55	222 187.7 149 119.2 90.8 64.8	331.5 280.5 223.5 176.8 136 96.9	390 330 263 208 160 114	770 650 520 410 317 225	962 815 650 515 396 283	1460 1230 990 780 600 427

Capacity reached at 8.5 psig pressure drop.

LT SERIES SATURATED STEAM CAPACITY TABLE

Reduced Noise Capacities (lbs/hr)

PRESSURE PSIG		VALVE SIZE-INCHES							
INLET	OUTLET	1/2	3/4	1	1¼	1½	2	2½	3
25	0-14	102	190	316	560	770	1290	1850	2880
50	0-27	160	300	500	885	1215	2035	2915	4550
75	0-40	220	400	675	1200	1650	2770	3960	6180
100	0-55 75 85	275 250 210	510 460 385	850 765 640	1520 1365 1150	2100 1875 1600	3500 3100 2650	5000 4500 3800	7800 7000 5920
125	0-70 100	330 280	620 520	1020 860	1825 1530	2500 2100	4200 3500	6000 5000	9400 8000
150	0-80 100 125	390 375 300	725 700 560	1200 1150 930	2150 2075 1610	3000 2800 2300	4900 4800 3800	7000 6800 5500	11000 10700 8600
175	0-95 125 150	450 415 330	825 775 620	1360 1280 1025	2440 2300 1800	3350 3150 2500	5600 5300 4200	8000 7600 6000	12500 11800 9400
200	0-110 125 150 175	500 490 450 350	925 910 835 650	1540 1460 1335 1075	2750 2700 2475 1925	3780 3700 3400 2650	6300 6200 5700 4400	9100 8900 8200 6400	14200 13900 12700 9900
225	0-125 150 175	560 540 485	1050 1000 900	1715 1700 1500	3060 2960 2650	4215 4075 3600	7000 6800 6100	10100 9800 8800	15800 15200 13600
250	0-135 150 200	610 600 515	1135 1120 950	1880 1850 1580	3350 3300 2800	4625 4550 3885	7700 7600 6500	11100 11000 9300	17300 17000 14500
300	0-165 200 250	725 700 565	1340 1300 1050	2225 2160 1750	3975 3850 3100	5470 5300 4270	9100 8900 7200	13100 12700 10200	20500 19800 16000
400	0-220 300	955 860	1760 1580	2900 2600	5200 4700	7200 6500	12000 11000	17200 15500	26900 23300
450	0-250 300	1070 1030	1980 1910	3300 3175	5900 5700	8000 7800	13500 13000	19500 18700	30000 29000
500	0-300	1190	2190	3610	6475	8960	14950	21500	33500
600	0-350 400	1430 1380	2630 2530	4330 4175	7770 7490	10800 10400	17900 17250	25700 24750	40200 38700

LT SERIES SATURATED STEAM CAPACITY TABLE

Maximum Capacities (lbs/hr)

PRESSURE-PSIG		VALVE SIZE-INCHES							
INLET	OUTLET	1/2	3/4	1	1¼	1½	2	2½	3
25	0-14	125	235	395	700	960	1610	2310	3600
50	0-27	200	375	625	1100	1510	2540	3640	5680
75	0-40	275	500	840	1500	2060	3460	4950	7720
100	0-55 75 85	340 310 260	635 575 480	1060 950 800	1900 1700 1430	2620 2340 2000	4370 3870 3310	6250 5620 4750	9750 8750 7400
125	0-70 100	410 350	775 650	1270 1070	2280 1910	3120 2620	5250 4370	7500 6250	11750 10000
150	0-80 100 125	485 465 375	900 875 700	1500 1430 1160	2680 2590 2010	3750 3500 2870	6120 6000 4750	8750 8500 6870	13750 13370 10750
175	0-95 125 150	560 515 410	1030 960 775	1700 1600 1280	3050 2870 2250	4180 3930 3120	7000 6620 5250	10000 9500 7500	15620 14750 11750
200	0-110 125 150 175	625 610 560 435	1150 1130 1040 810	1920 1820 1660 1340	3430 3370 3090 2400	4720 4620 4250 3310	7870 7750 7120 5500	11370 11120 10250 8000	17750 17370 15870 12370
225	0-125 150 175	700 675 605	1310 1250 1120	2140 2120 1870	3820 3700 3310	5260 5090 4500	8750 8500 7620	12620 12250 11000	19750 19000 17000
250	0-135 150 200	760 750 640	1410 1400 1180	2350 2310 1970	4180 4120 3500	5780 5680 4850	9620 9500 8120	13870 13750 11620	21620 21250 18120
300	0-165 200 250	900 875 705	1670 1620 1310	2780 2700 2180	4960 4810 3870	6830 6620 5330	11370 11120 9000	16370 15870 12750	25620 24750 20000
400	0-220 330	1190 1090	2200 1970	3620 3250	6500 5870	9000 8120	15000 13750	21500 19370	33620 29120
450	0-250 300	1330 1280	2470 2380	4120 3960	7370 7120	10000 9750	16870 16250	24370 23370	37500 36250
500	0-300	1480	2730	4510	8090	11200	18680	26870	41870
600	0-350 400	1780 1720	3280 3160	5410 5210	9710 9360	13500 13000	22370 21560	34370 30930	50250 48370

JT SERIES SATURATED STEAM CAPACITY TABLE CAPACITIES*(LBS/HR)

INLET	VALVE SIZE-INCHES		
	1/4	3/8	1/2
25 50 75	25 35 50	50 75 100	75 120 160
100 150 175	65 85 100	125 175 200	200 290 330
200 250 300	110 135 160	225 275 325	365 450 530

*Outlet pressure less than half of inlet pressure.

M SERIES CAPACITY TABLES

Saturated Steam Capacities (lbs/hr)

INLET STEAM PRESSURE (PSIG)	TEMP. CHANGE AT BULB (°F)	OUTLET PRESSURE 1/20R LESS OF INLET PRESSURE (50° ELEMENT)*			
		1/2" ME-2	1/2" MD-2	1/2" MC-2	3/4", 1" M & MK
5	5 10 20	5 8 13	11 18 32	15 28 46	33 55 94
10	5 10 20	7 12 20	15 26 45	22 39 66	58 100 165
15	5 10 20	9 15 25	19 34 58	27 50 87	80 138 228
20	5 10 20	10 18 29	22 40 68	32 58 101	100 175 285
25	5 10 20	12 21 34	26 46 78	37 67 116	118 210 340
30	5 10 20	12 22 37	27 49 82	40 71 120	135 242 393
35	5 10 20	13 24 41	30 54 92	44 80 133	153 275 438
40	5 10 20	15 27 46	34 60 102	49 88 147	170 305 490
45	5 10 20	16 29 49	36 65 110	53 95 160	185 335 540
50	5 10 20	18 32 54	40 71 120	58 104 174	200 360 590
60	5 10 20	22 36 57	41 74 123	- - -	230 420 680
70	5 10 20	25 41 65	47 84 140	- - -	260 470 765
80	5 10 20	27 46 72	52 93 155	- - -	290 525 845
90	5 10 20	31 51 80	58 103 173	- - -	320 570 950
100	5 10 20	34 56 88	64 114 190	- - -	345 620 1000

Water Capacities (gpm)

PRESSURE DIFFERENTIAL (PSIG)	TEMP. CHANGE AT BULB (°F)	(50° ELEMENT)		
		1/2" MD-2	1/2" MC-2	3/4", 1" M & MK
5	5 10 20	0.7 1.4 2.5	1.1 2.1 3.7	4.5 8.0 13.0
10	5 10 20	1.0 1.9 3.3	1.5 2.9 5.2	6.4 11.4 18.8
15	5 10 20	1.1 2.2 3.8	1.7 3.5 6.1	7.7 14.0 23.0
20	5 10 20	1.3 2.5 4.4	2.0 4.0 7.0	8.9 16.2 26.6
25	5 10 20	1.5 2.9 5.2	2.3 4.5 7.9	10.0 18.0 29.6
30	5 10 20	1.6 3.1 5.4	2.5 4.9 8.6	11.0 19.7 32.5
35	5 10 20	1.7 3.3 5.8	2.7 5.3 9.3	11.8 21.2 35.0
40	5 10 20	1.8 3.6 6.2	2.9 5.6 9.9	12.7 22.7 37.5
45	5 10 20	2.0 3.8 6.6	3.0 6.0 10.1	13.4 24.1 40.0
50	5 10 20	2.1 4.1 7.1	3.2 6.3 10.4	14.2 25.5 42.0
75	5 10 20	2.6 5.0 8.7	- - -	17.0 31.0 51.6
100	5 10 20	3.0 5.7 9.9	- - -	20.0 36.0 59.4

* Capacities shown are for 50°F span. For 100°F span, double temperature change for equivalent flow.

REFERENCE

GLOSSARY OF TERMS

REPRINTED COURTESY FLUID CONTROLS INSTITUTE

ACCURACY OF REGULATION is the value of controlled variable (pressure, or differential pressure) expressed as a percentage of the set value (at minimum controllable flow) when with a constant supply pressure the flow through the regulator is increased from the minimum controllable flow to the rated capacity (also equal to 100%minus the offset (droop) %).

BACK PRESSURE REGULATOR - A device that controls and responds to change in its inlet pressure.

BALANCED - A regulator style featuring a pressure balanced plug. May be single or double seated.

DEAD BAND - The range through which the controlled variable can reverse direction without and observable regulator response.

DIAPHRAGM ACTUATED REGULATOR - A regulator utilizing a diaphragm as the position actuator.

DIFFERENTIAL PRESSURE REGULATOR - A device that maintains a constant differential pressure between a reference pressure and the pressure of the controlled fluid.

DIRECT ACTION - A regulator that decreases its output as the measured variable increases.

DIRECT OPERATED - A regulator that uses a temperature thermal system to directly provide the power to move the plug.

DRIFT - A change in set point over an extended period of time.

DROOP - See accuracy of regulation.

FLOW COEFFICIENT (Cv) is the regulator capacity in GPM of H2O at 20 degrees C with one PSI pressure drop at full rated travel. Refer to ISA S75.01 and S75.02 for Testing Procedures and Sizing Equations.

MINIMUM CONTROLLABLE FLOW is the lowest flow at which a steady regulated condition of the controlled variable can be maintained.

PACKLESS - A construction that does not employ a dynamic seal isolating internal fluid from ambient or atmosphere.

PILOT OPERATED - A regulator that uses a temperature thermal system to power a pilot mechanism which generates an amplified signal to position the plug of the regulator. The pilot may be internal or external.

PRESSURE REDUCING REGULATOR - A device that controls and responds to changes in its outlet pressure.

PRESSURE REGULATOR - A self-operated device, either pilot or direct operated, in which power to position the valve closure member is provided by the pressure of the controlled variable.

PRESSURE TEMPERATURE - A dual function piloted regulator combining the control of both temperature and pressure. Control of pressure and temperature may be by a single pilot or multiple pilots. Pilot(s) may be internal or external or these functions in combination may be available.

PUMP PRESSURE REGULATOR - A device that controls the speed of a pump in response to changes in pump discharge pressure.

REPEATABILITY - Ability to return to any defined point within stated limits of regulation within a specified tolerance.

REVERSE ACTION - A regulator that increases its output as the measured variable increases.

TEMPERATURE REGULATOR - A self operated device in which the energy to position valve closure member(s) is provided by changes of temperature energy of the controlled variable.

UNBALANCED - A regulator where the plug closure number is not pressure balanced. Generally a single regulator.

INDUSTRY STANDARDS

APPLICABLE INDUSTRY STANDARDS

All Leslie control valves are 100% factory tested and serialized. Leslie Controls' quality assurance program is accredited and certified to ISO 9001†. All Leslie control valves are also designed, built and tested to meet the following industry standards.

ANSI B1.20.1 Pipe Threads - Conforms to pipe thread requirements.

ANSI B16.1 Cast Iron Flanges and Flanged Fittings - Conforms to wall thickness, flange dimensions, materials, pressure/temperature ratings, markings and hydrostatic test requirements.

A**NSI B16.11 Socketweld Ends** - Conforms to socketweld end requirements.

ANSI B16.5 Pipe Flanges and Flanged Fittings - Conforms to flange thickness, diameter and drilling requirements.

ANSI B16.10 Face-To-Face Dimensions - Conforms to globe style control valve face-to-face dimension requirements.

ANSI B16.25 Butt welding Ends - Conforms to requirements of Schedule 40 or Schedule 80 pipe, without backing rings.

ANSI B16.34 Valves, Flanged and Butt-weld - Integral flanged and BWE valve conforms to wall thickness, materials, pressure/temperature ratings, markings, and hydrostatic test requirements.

ANSI B16.37 Hydrotesting of Control Valves - Conforms to hydro testing requirements.

ANSI/ISA 70-2 Control Valve Seat Leakage - Conforms to Class III, IV, and V shutoff requirements.

ISA S75.01 FLOW EQUATIONS FOR SIZING CONTROL VALVES

ISA S75.02 Control Valve Capacity Test Procedure - Conforms to flow capacity test procedure requirements.

ISA S75.03 Uniform Face-To-Face Dimensions for Flanged Globe Style Control Valves - Conforms to face-to-face dimension requirements.

ISA S75.12 Face-To-Face Dimensions for Socketweld End and Screwed End Globe Style Control Valves - Conforms to face-to-face dimension requirements.

ISA S75.15 Face-To-Face Dimensions for Butt-weld End Globe Style Control Valves - Conforms to face-to-face dimension requirements.

MSS SP25 Standard Marking System for Valves, Fittings, Flanges, and Unions - Conforms to marking requirements for flanged, screwed and weld end fittings.

MSS SP84 Steel Valves, Socketweld End and Threaded End - Conforms to end connection requirements.

IN ADDITION, WHEN REQUIRED, CONTROL VALVES CAN BE MANUFACTURED AND TESTED IN COMPLIANCE WITH:

CAN 3 Z299.3

ANSI N45.2

MIL-I-STD-45662

MIL-I-45208

B 31.1

† Assessed and certified by ABS, Houston, Texas

FLANGE STANDARDS

125 lb. CAST IRON ANSI STANDARD B16.1

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	—	—	4 1/4	4 5/8	5	6	7	7 1/2	8 1/2	9	10	11	13 1/2	16	19
Thickness of Flange (min)[a]	—	—	7/16	1/2	9/16	5/8	11/16	3/4	13/16	1 5/16	1 5/16	1	1 1/8	13/16	1 1/4
Diameter of Bolt Circle	—	—	3 1/8	3 1/2	3 7/8	4 3/4	5 1/2	6	7	7 1/2	8 1/2	9 1/2	11 3/4	14 1/4	17
Number of Bolts	—	—	4	4	4	4	4	4	8	8	8	8	8	12	12
Diameter of Bolts	—	—	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8

a 125 lb. cast iron flanges have plain faces.

250 lb. CAST IRON ANSI STANDARD B16.1

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	—	—	4 7/8	51/4	61/8	61/2	71/2	81/4	9	10	11	12 1/2	15	17 1/2	20 1/2
Thickness of Flange (min)[b]	—	—	1 1/16	3/4	13/16	7/8	1	11/8	13/16	11/4	13/8	1 7/16	1 5/8	1 7/8	2
Diameter of Raised Face	—	—	2 11/16	3 1/16	3 9/16	4 3/16	4 15/16	5 11/16	6 5/16	6 15/16	8 5/16	9 11/16	11 15/16	14 1/16	16 7/16
Diameter of Bolt Circle	—	—	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	7 1/4	7 7/8	9 1/4	10 5/8	13	15 1/4	17 3/4
Number of Bolts	—	—	4	4	4	8	8	8	8	8	8	12	12	16	16
Diameter of Bolts	—	—	5/8	5/8	3/4	5/8	3/4	3/4	3/4	3/4	3/4	3/4	7/8	1	1 1/8

b 250 lb. cast iron flanges have a 1/16" raised face which is included in the flange thickness dimensions.

150 lb. BRONZE ANSI STANDARD B16.24

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	31/2	3 7/8	4 1/4	4 5/8	5	6	7	7 1/2	8 1/2	9	10	11	13 1/2	16	19
Thickness of Flange (min)[c]	5/16	1 1/32	3/8	13/32	7/16	1/2	9/16	5/8	11/16	11/16	3/4	13/16	1 5/16	1	1 1/16
Diameter of Bolt Circle	2 3/8	2 3/4	3 1/8	3 1/2	3 7/8	4 3/4	5 1/2	6	7	7 1/2	8 1/2	9 1/2	11 3/4	14 1/4	17
Number of Bolts	4	4	4	4	4	4	4	4	8	8	8	8	8	12	12
Diameter of Bolts	1/2	1/2	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8

c 150 lb. bronze flanges have plain faces with two concentric gasket-retaining grooves between the port and the bolt holes.

300 lb. BRONZE ANSI STANDARD B16.24

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 3/4	4 5/8	4 7/8	5 1/4	6 1/2	6 1/2	7 1/2	8 1/4	9	10	11	12 1/2	15	—	—
Thickness of Flange (min)[d]	1/2	17/32	19/32	5/8	11/16	3/4	13/16	29/32	31/32	1 1/16	1 1/8	1 3/16	1 3/8		
Diameter of Bolt Circle	2 5/8	3 1/4	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	7 1/4	7 7/8	9 1/4	10 5/8	13		
Number of Bolts	4	4	4	4	4	8	8	8	8	8	8	12	12		
Diameter of Bolts	1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	3/4	3/4	3/4	3/4	7/8		

d 300 lb. bronze flanges have plain faces with two concentric gasket-retaining grooves between the port and the bolt holes.

150 lb. STEEL ANSI STANDARD B16.5

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	—	—	4	4 5/8	5	6	7	7 1/2	8 1/2	9	10	11	13 1/2	16	19
Thickness of Flange (min)[e]	—	—	7/16	1/2	9/16	5/8	11/16	3/4	13/16	15/16	15/16	1	1 1/8	13/16	1 1/4
Diameter of Raised Face	—	—	2	2 1/2	2 7/8	3 5/8	4 1/8	5	5 1/2	6 3/16	7 5/16	8 1/2	10 5/8	12 3/4	15
Diameter of Bolt Circle	—	—	3 1/8	3 1/2	3 7/8	4 3/4	5 1/2	6	7	7 1/2	81/2	9 1/2	11 3/4	14 1/4	17
Number of Bolts	—	—	4	4	4	4	4	4	8	8	8	8	8	12	12
Diameter of Bolts	—	—	1/2	1/2	1/2	5/8	5/8	5/8	5/8	5/8	3/4	3/4	3/4	7/8	7/8

e 150 lb. steel flanges have a 1/16" raised face which is included in the flange thickness dimensions.

300 lb. STEEL ANSI STANDARD B16.5

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	—	—	4 7/8	5 1/4	6 1/8	6 1/2	7 1/2	8 1/4	9	10	11	12 1/2	15	17 1/2	20 1/2
Thickness of Flange (min)[f]	—	—	11/16	3/4	13/16	7/8	1	1 1/8	13/16	1 1/4	1 3/8	17/16	1 5/8	1 7/8	2
Diameter of Raised Face	—	—	2	2 1/2	2 7/8	3 5/8	4 1/8	5	5 1/2	6 3/16	7 5/16	8 1/2	10 5/8	12 3/4	15
Diameter of Bolt Circle	—	—	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	7 1/4	7 7/8	9 1/4	10 5/8	13	15 1/4	17 3/4
Number of Bolts	—	—	4	4	4	8	8	8	8	8	8	12	12	16	16
Diameter of Bolts	—	5/8	5/8	3/4	5/8	3/4	3/4	3/4	3/4	3/4	3/4	3/4	7/8	1	1 1/8

f 300 lb. steel flanges have a 1/16" raised face which is included in the flange thickness dimensions.

400 lb. STEEL ANSI STANDARD B16.5

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 3/4	4 5/8	4 7/8	5 1/4	6 1/8	6 1/2	7 1/2	8 1/4	9	10	11	12 1/2	15	17 1/2	20 1/2
Thickness of Flange (min)[g]	9/16	5/8	11/16	13/16	7/8	1	1 1/8	1 1/4	1 3/8	1 3/8	1 1/2	1 5/8	1 7/8	21/8	2 1/4
Diameter of Raised Face	1/38	1 11/16	2	2 1/2	2 7/8	3 5/8	4 1/8	5	5 1/2	6 3/16	7 5/16	8 1/2	10 5/8	12 3/4	15
Diameter of Bolt Circle	2 5/8	3 1/4	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	7 1/4	7 7/8	9 1/4	10 5/8	13	15 1/4	17 3/4
Number of Bolts	4	4	4	4	4	8	8	8	8	8	8	12	12	16	16
Diameter of Bolts	1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	7/8	7/8	7/8	7/8	1	1 1/8	1 1/4

g 400 lb. steel flanges have a 1/4" raised face which is included in the flange thickness dimensions.

600 lb. STEEL ANSI STANDARD B16.5

PIPE SIZE	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12
Diameter of Flange	3 3/4	4 5/8	4 7/8	5 1/4	61/8	6 1/2	7 1/2	8 1/4	9	10 3/4	13	14	16 1/2	20	22
Thickness of Flange (min)[h]	9/16	5/8	1 1/16	13/16	7/8	1	1 1/8	1 1/4	8	1 1/2	1 3/4	1 7/8	2 3/16	2 1/2	2 5/8
Diameter of Raised Face	1 3/8	11 1/16	2	2 1/2	2 7/8	3 5/8	4 1/8	5	51/2	6 3/16	7 5/16	8 1/2	10 5/8	12 3/4	15
Diameter of Bolt Circle	2 5/8	3 1/4	3 1/2	3 7/8	4 1/2	5	5 7/8	6 5/8	71/4	8 1/2	10 1/2	11 1/2	13 3/4	17	19 1/4
Number of Bolts	4	4	4	4	4	8	8	8	8	8	8	12	12	16	20
Diameter of Bolts	1/2	5/8	5/8	5/8	3/4	5/8	3/4	3/4	7/8	7/8	1	1	1 1/8	1 1/4	1 1/4

h 600 lb. steel flanges have a 1/4" raised face which is included in the flange thickness dimensions.

PRESSURE TO VACUUM

Gage Indicated		Absolute Pressure		
PSIG	Inches of Hg	PSIA	Inches of Hg	Torricelli
-14.70000	29.92000	0.0	0.0	0.0
-14.69998	29.91996	0.00002	0.00004	0.001
-14.69996	29.91992	0.00004	0.00008	0.002
-14.69994	29.91988	0.00006	0.00012	0.003
-14.69992	29.91984	0.00008	0.00016	0.004
-14.69990	29.91980	0.00010	0.00020	0.005
-14.69981	29.91961	0.00019	0.00039	0.010
-14.69961	29.91921	0.00039	0.00079	0.020
-14.69942	29.91882	0.00058	0.00118	0.030
-14.69923	29.91843	0.00077	0.00157	0.040
-14.69903	29.91803	0.00097	0.00197	0.050
-14.69806	29.91606	0.00194	0.00394	0.100
-14.69613	29.91212	0.00387	0.00788	0.200
-14.69449	29.90818	0.00551	0.01182	0.300
-14.69226	29.90424	0.00774	0.01576	0.400
-14.69032	29.90030	0.00968	0.01970	0.500
-14.68066	29.88063	0.01934	0.03937	1.000
-14.66698	29.84126	0.03302	0.07874	2.000
-14.64197	29.80189	0.05803	0.11811	3.000
-14.62262	29.76252	0.07738	0.15748	4.000
-14.60329	29.72315	0.09671	0.19685	5.000
-14.50658	29.52630	0.19342	0.39370	10.000
-14.40980	29.32940	0.29020	0.59060	15.000
-14.31320	29.13260	0.38680	0.78740	20.000
-14.21840	28.93570	0.48160	0.98430	25.000
-14.20870	28.920	0.49130	1.000	25.400
-14.11970	28.740	0.58030	1.181	30.000
-13.75700	28.000	0.94330	1.920	48.770
-12.28300	25.000	2.41700	4.920	124.970
-10.31800	21.000	4.38200	8.920	226.570
-8.84400	18.000	5.85600	11.920	302.770
-7.37000	15.000	7.320	14.920	378.970
-5.89600	12.000	8.804	17.920	455.770
-4.91300	10.000	9.787	19.920	505.970
-3.93000	8.000	10.770	21.920	556.770
-2.94800	6.000	11.752	23.920	607.570
-1.96500	4.000	12.735	25.920	658.370
-0.98300	2.000	13.732	27.920	709.170
-0.49100	1.000	14.209	28.920	733.570
-0.24600	0.500	14.454	29.420	747.270
ATMOSPHERIC				
0.0	**0.0**	**14.700**	**29.920**	**760.000**
+0.30		15.000	30.540	775.720
+1.00		15.700	31.970	811.910
+2.00		16.700	34.000	863.630
+10.00		24.700	50.290	277.35

PROPERTIES OF WATER

Water Temp.	Saturation Pressure	Weight	Weight Density	Specific Volume
Deg. F	PSIA	lbs/Gallon	lbs/Cu. Ft.	Cu. Ft./lb
32	0.0886	8.344	62.414	0.016022
40	0.1216	8.345	62.426	0.016019
50	0.1780	8.343	62.410	0.016023
60	0.2561	8.338	62.371	0.016033
70	0.3629	8.329	62.305	0.016050
80	0.5068	8.318	62.220	0.016072
90	0.6981	8.304	62.116	0.016099
100	0.9492	8.288	61.996	0.016130
110	1.2750	8.270	61.862	0.016165
120	1.6927	8.250	61.713	0.016204
130	2.2230	8.228	61.550	0.016247
140	2.8892	8.205	61.376	0.016293
150	3.7184	8.180	61.188	0.016343
160	4.7414	8.154	60.994	0.016395
170	5.9926	8.126	60.787	0.016451
180	7.5110	8.097	60.569	0.016510
190	9.340	8.067	60.343	0.016572
200	11.526	8.035	60.107	0.016637
210	14.123	8.002	59.862	0.016705
212	14.696	7.996	59.812	0.016719
220	17.186	7.969	59.613	0.016775
240	24.968	7.898	59.081	0.016926
260	35.427	7.823	58.517	0.017089
280	49.200	7.743	57.924	0.017264
300	67.005	7.661	57.307	0.01745
350	134.604	7.431	55.586	0.01799
400	247.259	7.172	53.648	0.01864
450	422.55	6.880	51.467	0.01943
500	680.86	6.543	48.948	0.02043
550	1045.43	6.143	45.956	0.02176
600	1543.2	5.655	42.301	0.02364
650	2208.4	4.999	37.397	0.02674
700	3094.3	3.651	27.307	0.03662

NOTE:
Weight of water per gallon is based on 7.48052 gallons per cubic foot.
Specific gravity of water @ 60°F = 1.00

PIPE DATA TABLES

PIPE SIZE (IN.)	OUTSIDE DIAMETER (IN.)	WEIGHT CLASS	CARBON STEEL SCHED.	STAINLESS STEEL SCHED.	WALL THICKNESS (IN.)	INSIDE DIAMETER (IN.)	CIRCUM. (EXT.) (IN.)	CIRCUM (INT.) (IN.)	FLOW AREA (SQ. IN.)	WEIGHT OF PIPE (LBS/FT.)	WEIGHT OF WATER (LBS/FT.)	GALLONS OF WATER PER FT.	SECTION MODULUS	PIPE SIZE (IN.)
1/8	.405	— STD XS	— 40 80	10S 40S 80S	.049 .068 .095	.307 .269 .215	1.27	.96 .85 .68	.074 .057 .036	.19 .24 .31	.032 .025 .016	.004 .003 .002	.00437 .00523 .00602	1/8
1/4	.540	— STD XS	— 40 80	10S 40S 80S	.065 .088 .119	.410 .364 .302	1.70	1.29 1.14 .95	.132 .104 .072	.33 .42 .54	.057 .045 .031	.007 .005 .004	.01032 .01227 .01395	1/4
3/8	.675	— STD XS	— 40 80	10S 40S 80S	.065 .091 .126	.545 .493 .423	2.12	1.71 1.55 1.33	.233 .191 .141	.42 .57. 74	.101 .083 .061	.012 .010 .007	.01736 .0216 .0255	3/8
1/2	.840	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.065 .083 .109 .147 .187 .294	.710 .674 .622 .546 .466 .252	2.64	2.23 2.12 1.95 1.72 1.46 .79	.396 .357 .304 .234 .171 .050	.54 .67 .85 1.09 1.31 1.71	.172 .155 .132 .102 .074 .022	.021 .019 .016 .012 .009 .003	.0285 .0341 .0407 .0478 .0527 .0577	1/2
3/4	1.050	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.065 .083 .113 .154 .219 .308	.920 .884 .824 .742 .612.434	3.30	2.89 2.78 2.59 2.33 1.92 1.36	.665 .614 .533 .433 .296 .148	.69 .86 1.13 1.47 1.94 2.44	.288 .266 .231 .188 .128.064	.035 .032 .028 .022 .015 .008	.0467 .0566 .0706 .0853 .1004 .1103	3/4
1	1.315	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.065 .109 .133 .179 .250 .358	1.185 1.097 1.049 .957 .815 .599	4.13	3.72 3.45 3.30 3.01 2.56 1.88	1.103 .945 .864 .719 .522 .282	.87 1.40 1.68 2.17 2.84 3.66	.478 .409 .375 .312 .230 .122	.057 .049 .045 .037 .027 .015	.0760 .1151 .1328 .1606 .1903 .2136	1
1¼	1.660	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.065 .109 .140 .191 .250 .382	1.530 1.442 1.380 1.278 1.160 .896	5.22	4.81 4.53 4.34 4.02 3.64 2.81	1.839 1.633 1.495 1.283 1.057.630	1.11 1.81 2.27 3.00 3.76 5.21	.797 .708 .649 .555 .458 .273	.096 .085 .078 .067 .055 .033	.1250 .1934 .2346 .2913 .3421 .4110	1¼
1½	1.900	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.065 .109 .145 .200 .281 .400	1.770 1.682 1.610 1.500 1.338 1.100	5.97	5.56 5.28 5.06 4.71 4.20 3.46	2.461 2.222 2.036 1.767 1.406.950	1.28 2.09 2.72 3.63 4.86 6.41	1.066 .963 .882 .765 .608 .420	.128 .115 .106 .092 .073 .049	.1662 .2598 .3262 .4118 .5078 .5977	1½
2	2.375	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.065 .109 .154 .218 .344 .436	2.245 2.157 2.067 1.939 1.687 1.503	7.46	7.05 6.78 6.49 6.09 5.30 4.72	3.958 3.654 3.355 2.953 2.241 1.774	1.61 2.64 3.65 5.02 7.46 9.03	1.72 1.58 1.45 1.28 .97 .77	.206 .190 .174 .153 .116 .092	.2652 .4204 .5606 .7309 .9790 1.1040	2
2½	2.875	— — STD XS — XXS	— — 40 80 160—	5S 10S 40S 80S — —	.083 .120 .203 .276 .375 .552	2.709 2.635 2.469 2.323 2.125 1.771	9.03	8.51 8.28 7.76 7.30 6.68 5.56	5.764 5.453 4.788 4.238 3.546 2.464	2.48 3.53 5.79 7.66 10.01 13.69	2.50 2.36 2.07 1.87 1.54 1.07	.299 .283 .249 .220 .184 .128	.4939 .6868 1.064 1.339 1.638 1.997	2½

PIPE DATA TABLES CONTINUED

PIPE SIZE (IN.)	OUTSIDE DIAMETER (IN.)	WEIGHT CLASS	CARBON STEEL SCHED.	STAINLESS STEEL SCHED.	WALL THICKNESS (IN.)	INSIDE DIAMETER (IN.)	CIRCUM. (EXT.) (IN.)	CIRCUM (INT.) (IN.)	FLOW AREA (SQ. IN.)	WEIGHT OF PIPE (LBS/FT.)	WEIGHT OF WATER (LBS/FT.)	GALLONS OF WATER PER FT.	SECTION MODULUS	PIPE SIZE (IN.)
3	3.500	— — STD XS — XXS	— — 40 80 160 —	5S 10S 40S 80S — —	.083 .120 .216 .300 .438 .600	3.334 3.260 3.068 2.900 2.624 2.300	11.00	10.47 10.24 9.64 9.11 8.24 7.23	8.730 8.347 7.393 6.605 5.408 4.155	3.03 4.33 7.58 10.25 14.32 18.58	3.78 3.62 3.20 2.86 2.35 1.80	.454 .434 .384 .343 .281 .216	.744 1.041 1.724 2.225 2.876 3.424	3
4	4.500	— — STD XS — — XXS	— — 40 80 120 160 —	5S 10S 40S 80S — — —	.083 .120 .237 .337 .438 .531 .674	4.334 4.260 4.026 3.826 3.624 3.438 3.152	14.14	13.62 13.38 12.65 12.02 11.39 10.80 9.90	14.75 14.25 12.73 11.50 10.31 9.28 7.80	3.92 5.61 10.79 14.98 19.00 22.51 27.54	6.39 6.18 5.50 4.98 4.47 4.02 3.38	.766 .740 .661 .597 .536 .482 .405	1.249 1.761 3.214 4.271 5.178 5.898 6.791	4
5	5.563	— — STD XS — — XXS	— — 40 80 120 160 —	5S 10S 40S 80S — — —	.109 .134 .258 .375 .500 .625 .750	5.345 5.295 5.047 4.813 4.563 4.313 4.063	17.48	16.79 16.63 15.86 15.12 14.34 13.55 12.76	22.44 22.02 20.01 18.19 16.35 14.61 12.97	6.36 7.77 14.62 20.78 27.04 32.96 38.55	9.72 9.54 8.67 7.88 7.09 6.33 5.61	1.17 1.14 1.04 .945 .849 .759 .674	2.498 3.029 5.451 7.431 9.250 10.796 12.090	5
6	6.625	— — STD XS — — XXS	— — 40 80 120 160 —	5S 10S 40S 80S — — —	.109 .134 .280 .432 .562 .719 .864	6.407 6.357 6.065 5.761 5.501 5.187 4.897	20.81	20.13 19.97 19.05 18.10 17.28 16.30 15.38	32.24 31.74 28.89 26.07 23.77 21.15 18.84	7.60 9.29 18.97 28.57 36.39 45.35 53.16	13.97 13.75 12.51 11.29 10.30 9.16 8.16	1.68 1.65 1.50 1.35 1.24 1.10 .978	3.576 4.346 8.496 12.22 14.98 17.81 20.02	6
8	8.625	— — — — STD — XS — — — XXS —	— — 20 30 40 60 80 100 120 140 — 160	5S 10S — — 40S — 80S — — — — —	.109 .148 .250 .277 .322 .406 .500 .594 .719 .812 .875 .906	8.407 8.329 8.125 8.071 7.981 7.813 7.625 7.437 7.187 7.001 6.875 6.813	27.10	26.41 26.17 25.53 25.36 25.07 24.55 23.95 23.36 22.58 21.99 21.60 21.40	55.51 54.48 51.85 51.16 50.03 47.94 45.66 43.46 40.59 38.50 37.12 36.46	9.93 13.40 22.36 24.70 28.55 35.64 43.39 50.95 60.71 67.76 72.42 74.69	24.06 23.61 22.47 22.17 21.70 20.77 19.78 18.83 17.59 16.68 16.10 15.80	2.88 2.83 2.69 2.66 2.60 2.49 2.37 2.26 2.11 2.00 1.93 1.89	6.131 8.212 13.39 14.69 16.81 20.58 24.51 28.14 32.58 35.65 37.56 38.48	8
10	10.750	— — — — STD XS — — — XXS —	— — 20 30 40 60 80 100 120 140 160	5S 10S — — 40S 80S — — — — —	.134 .165 .250 .307 .365 .500 .594 .719 .844 1.000 1.125	10.482 10.420 10.250 10.136 10.020 9.750 9.562 9.312 9.062 8.750 8.500	33.77	32.93 32.74 32.20 31.84 31.48 30.63 30.04 29.25 28.47 27.49 26.70	86.29 85.28 82.52 80.69 78.86 74.66 71.84 68.13 64.53 60.13 56.75	15.19 18.65 28.04 34.24 40.48 54.74 64.43 77.03 89.29 104.13 115.64	37.39 36.95 35.76 34.96 34.20 32.35 31.13 29.53 27.96 26.06 24.59	4.48 4.43 4.29 4.19 4.10 3.88 3.73 3.54 3.35 3.12 2.95	11.71 14.30 21.15 25.57 29.90 39.43 45.54 53.22 60.32 68.43 74.29	10

PIPE DATA TABLES CONTINUED

PIPE SIZE (IN.)	OUTSIDE DIAMETER (IN.)	WEIGHT CLASS	CARBON STEEL SCHED.	STAINLESS STEEL SCHED.	WALL THICKNESS (IN.)	INSIDE DIAMETER (IN.)	CIRCUM. (EXT.) (IN.)	CIRCUM (INT.) (IN.)	FLOW AREA (SQ. IN.)	WEIGHT OF PIPE (LBS/FT.)	WEIGHT OF WATER (LBS/FT.)	GALLONS OF WATER PER FT.	SECTION MODULUS	PIPE SIZE (IN.)
12	12.750	— — — — STD — XS — — — XXS ——	— — 20 30 — 40 — 60 80 100 120 140 160	5S 10S — — 40S — 80S — — — — — —	.156 .180 .250 .330 .375 .406 .500 .562 .688 .844 1.000 1.125 1.312	12.438 12.390 12.250 12.090 12.000 11.938 11.750 11.626 11.374 11.062 10.750 10.500 10.126	40.06	39.08 38.92 38.48 37.98 37.70 37.50 36.91 36.52 35.73 34.75 33.77 32.99 31.81	121.50 120.57 117.86 114.80 113.10 111.93 108.43 106.16 101.64 96.14 90.76 86.59 80.53	20.98 24.17 33.38 43.77 49.56 53.52 65.42 73.15 88.63 107.32 125.49 139.67 160.27	52.65 52.25 51.07 49.74 49.00 48.50 46.92 46.00 44.04 41.66 39.33 37.52 34.89	6.31 6.26 6.12 5.96 5.88 5.81 5.63 5.51 5.28 4.99 4.71 4.50 4.18	19.2 22.0 30.2 39.0 43.8 47.1 56.7 62.8 74.6 88.1 100.7 109.9 122.6	12
14	14.000	— — — — STD — XS — — — — ——	— 10 20 30 40 — 60 80 100 120 140 160	5S 10S — — — — — — — — — — —	.156 .188 .250 .312 .375 .438 .500 .594 .750 .938 1.094 1.250 1.406	13.688 13.624 13.500 13.376 13.250 13.124 13.000 12.812 12.500 12.124 11.812 11.500 11.188	43.98	43.00 42.80 42.41 42.02 41.63 41.23 40.84 40.25 39.27 38.09 37.11 36.13 35.15	147.15 145.78 143.14 140.52 137.88 135.28 132.73 128.96 122.72 115.49 109.62 103.87 98.31	23.07 27.73 36.71 45.61 54.57 63.44 72.09 85.05 106.13 130.85 150.79 170.28 189.11	63.77 63.17 62.03 60.89 59.75 58.64 57.46 55.86 53.18 50.04 47.45 45.01 42.60	7.64 7.57 7.44 7.30 7.16 7.03 6.90 6.70 6.37 6.00 5.69 5.40 5.11	23.2 27.8 36.6 45.0 53.2 61.3 69.1 80.3 98.2 117.8 132.8 146.8 159.6	14
16	16.00	— — — — STD XS — — — — — —	— — 10 20 30 40 60 80 100 120 140 160	5S 10S — — — — — — — — — —	.165 .188 .250 .312 .375 .500 .656 .844 1.031 1.219 1.438 1.594	15.670 15.624 15.500 15.376 15.250 15.000 14.688 14.312 13.938 13.562 13.124 12.812	50.27	49.23 49.08 48.69 48.31 47.91 47.12 46.14 44.96 43.79 42.61 41.23 40.26	192.85 191.72 188.69 185.69 182.65 176.72 169.44 160.92 152.58 144.50 135.28 128.96	27.90 31.75 42.05 52.27 82.58 82.77 107.50 136.61 164.82 192.43 233.64 245.25	83.57 83.08 81.74 80.50 79.12 76.58 73.42 69.73 66.12 62.62 58.64 55.83	10.02 9.96 9.80 9.65 9.49 9.18 8.80 8.36 7.93 7.50 7.03 6.70	32.2 36.5 48.0 59.2 70.3 91.5 116.6 144.5 170.5 194.5 220.0 236.7	16
18	18.00	— — — — STD — XS — — — — — ——	— — 10 20 — 30 — 40 60 80 100 120 140 160	5S 10S — — — — — — — — — — — —	.165 .188 .250 .312 .375 .438 .500 .562 .750 .938 1.156 1.375 1.562 1.781	17.67 17.62 17.50 17.38 17.25 17.12 17.00 16.88 16.50 16.12 15.69 15.25 14.88 14.44	56.55	55.51 55.37 54.98 54.59 54.19 53.80 53.41 53.02 51.84 50.66 49.29 47.91 46.73 45.36	245.22 243.95 240.53 237.13 233.71 230.30 226.98 223.68 213.83 204.24 193.30 182.66 173.80 163.72	31.43 35.76 47.39 58.94 70.59 82.15 93.45 104.87 138.17 170.92 207.96 244.14 274.22 308.50	106.26 105.71 104.21 102.77 101.18 99.84 98.27 96.93 92.57 88.50 83.76 79.07 75.32 70.88	12.74 12.67 12.49 12.32 12.14 11.96 11.79 11.62 11.11 10.61 10.04 9.49 9.03 8.50	40.8 46.4 61.1 75.5 89.6 103.4 117.0 130.1 168.3 203.8 242.3 277.6 305.5 335.6	18

PIPE DATA TABLES CONTINUED

PIPE SIZE (IN.)	OUTSIDE DIAMETER (IN.)	WEIGHT CLASS	CARBON STEEL SCHED.	STAINLESS STEEL SCHED.	WALL THICKNESS (IN.)	INSIDE DIAMETER (IN.)	CIRCUM. (EXT.) (IN.)	CIRCUM (INT.) (IN.)	FLOW AREA (SQ. IN.)	WEIGHT OF PIPE (LBS/FT.)	WEIGHT OF WATER (LBS/FT.)	GALLONS OF WATER PER FT.	SECTION MODULUS	PIPE SIZE (IN.)
		—	—	5S	.188	19.62		61.65	302.46	39.78	131.06	15.71	57.4	
		—	—	10S	.218	19.56		61.46	300.61	46.06	130.27	15.62	66.3	
		—	10	—	.250	19.50		61.26	298.65	52.73	129.42	15.51	75.6	
		—	20	—	.375	19.25		60.48	290.04	78.60	125.67	15.12	111.3	
		STD	30	—	.500	19.00		59.69	283.53	104.13	122.87	14.73	145.7	
20	20.00	XS	40	—	.594	18.81	62.83	59.10	278.00	123.11	120.46	14.44	170.4	20
		—	60	—	.812	18.38		57.73	265.21	166.40	114.92	13.78	225.7	
		—	80	—	1.031	17.94		56.35	252.72	208.87	109.51	13.13	277.1	
		—	100	—	1.281	17.44		54.78	238.83	256.10	103.39	12.41	331.5	
		—	120	—	1.500	17.00		53.41	226.98	296.37	98.35	11.79	375.5	
		—	140	—	1.750	16.50		51.84	213.82	341.09	92.66	11.11	421.7	
		—	160	—	1.969	16.06		50.46	202.67	379.17	87.74	10.53	458.5	
		—	—	5S	.188	21.62		67.93	367.25	43.80	159.14	19.08	69.7	
		—	—	10S	.218	21.56		67.75	365.21	50.71	158.26	18.97	80.4	
		—	10	—	.250	21.50		67.54	363.05	58.07	157.32	18.86	91.8	
		STD	20	—	.375	21.25		66.76	354.66	86.61	153.68	18.42	135.4	
		XS	30	—	.500	21.00		65.97	346.36	114.81	150.09	17.99	117.5	
22	22.00	—	60	—	.875	20.25	69.12	63.62	322.06	197.41	139.56	16.73	295.0	22
		—	80	—	1.125	19.75		62.05	306.35	250.81	132.76	15.91	366.4	
		—	100	—	1.375	19.25		60.48	291.04	302.88	126.12	15.12	432.6	
		—	120	—	1.625	18.75		58.90	276.12	353.61	119.65	14.34	493.8	
		—	140	—	1.875	18.25		57.33	261.59	403.00	113.36	13.59	550.3	
		—	160	—	2.125	17.75		55.76	247.45	451.06	107.23	12.85	602.4	
		—	—	5S	.218	23.56		74.03	436.10	55	188.98	22.65	96.0	
		—	10	10S	.250	23.50		73.83	433.74	63	187.95	22.53	109.6	
		STD	20	—	.375	23.25		73.04	424.56	95	183.95	22.05	161.9	
		XS	—	—	.500	23.00		72.26	415.48	125	179.87	21.58	212.5	
		—	30	—	.562	22.88		71.86	411.00	141	178.09	21.35	237.0	
24	24.00	—	40	—	.688	22.62	75.40	71.08	402.07	171	174.23	20.88	285.1	24
		—	60	—	.969	22.06		69.31	382.35	238	165.52	19.86	387.7	
		—	80	—	1.219	21.56		67.74	365.22	297	158.26	18.97	472.8	
		—	100	—	1.531	20.94		65.78	344.32	367	149.06	17.89	570.8	
		—	120	—	1.812	20.38		64.01	326.08	430	141.17	16.94	652.1	
		—	140	—	2.062	19.88		62.44	310.28	483	134.45	16.12	718.9	
		—	160	—	2.344	19.31		60.67	292.98	542	126.84	15.22	787.9	
		—	—	5S	.250	29.50		92.68	683.49	79	296.18	35.51	172.3	
		—	10	10S	.312	29.38		92.29	677.71	99	293.70	35.21	213.8	
30	30.00	STD	—	—	.375	29.25	94.25	91.89	671.96	119	291.18	34.91	255.3	30
		XS	20	—	.500	29.00		91.11	660.52	158	286.22	34.31	336.1	
		—	30	—	.625	28.75		90.32	649.18	196	281.31	33.72	414.9	

LIQUID BODY VELOCITY LIMITATION

Carbon Steel (WCB)

Continuously Modulating or DP > 500 psi	20 ft/sec
Intermittent Modulating or DP < 500 psi	30 ft/sec
2% Intermittent Flow	40 ft/sec

Alloy or Stainless Steel

Continuously Modulating or DP > 500 psi	45 ft/sec
Intermittent Modulating or DP < 500 psi	60 ft/sec
2% Intermittent Flow	90 ft/sec

Notes: Use Alloy or SS if flashing or cavitation exists
Body erosion and noise will occur above these limits

Compressible Velocity

Noise cannot be predicted >=Mach .5
Carbon Steel Limit is .35 Mach
Alloy or SS Limit is .9 Mach

INSULATION DECIBEL REDUCTION

THICKNESS	TYPE	DECIBEL REDUCTION
1”	Thermal	-4
2”	Thermal	-8
3.5”	Thermal	-10.5
5”	Thermal	-13
	Cladding	add -5

NOISE ATTENUATION

PIPE SIZE	PIPE SCHEDULE												
	10	20	30	40	60	80	100	120	140	160	STD	XS	XXS
1	—	—	—	0	—	-3	—	—	—	-6	0	-3	—
1.5	—	—	—	0	—	-3	—	—	—	-6	0	-3	-9
2	—	—	—	0	—	-3	—	—	—	-7	0	-3	-9
3	—	—	—	0	—	-3	—	—	—	-9	0	-3	-9
4	—	—	—	0	—	-5	—	-6	—	-7	0	-6	-9
6	—	—	—	0	—	-4	—	-6	—	-8	0	-6	-10
8	—	+2	+1	0	-2	-4	-6	-7	-8	-9	0	-4	-9
10	—	+3	+1	0	-3	-4	-6	-8	-9	-10	0	-3	—
12	—	+3	+1	-1	-3	-5	-7	-9	-10	-11	0	-3	—
14	+3	+1	0	-2	-4	-6	-8	-10	-11	-12	0	-3	—
16	+3	+1	0	-3	-5	-7	-9	-10	-12	-13	0	-3	—
18	+3	+1	-2	-4	-6	-8	-10	-11	-13	-14	0	-3	—
20	+3	0	-3	-4	-7	-9	-10	-12	-14	-15	0	-3	—
24	+3	0	-4	-6	-9	-10	-12	-14	-15	-16	0	-3	—
30	+1	-3	-5	—	—	—	—	—	—	—	0	-3	—

CONVERSION TABLES

LIQUID WEIGHTS AND MEASURES

TO CONVERT	TO	MULTIPLY BY
Gallons	Liters	3.7853
Gallons	Cu. Inches	231
Gallons	Cu. Feet	0.1337
Gallons	Cu. Meters	0.00379
Gallons	Lbs. of Water	8.339
Liters	Gallons	0.26418
Liters	Cu. Inches	61.025
Liters	Cu. Feet	0.0353
Liters	Cu. Meters	0.001
Liters	Lbs. of Water	2.202
Cu. Inches	Gallons	0.00433
Cu. Inches	Liters	0.01639
Cu. Inches	Cu. Feet	0.00058
Cu. Inches	Cu. Meters	0.000016
Cu. Inches	Lbs. of Water	0.0362
Cu. Feet	Gallons	7.48052
Cu. Feet	Liters	28.316
Cu. Feet	Cu. Inches	1728
Cu. Feet	Cu. Meters	0.0283
Cu. Feet	Lbs. of Water	62.371
Cu. Meters	Gallons	264.17
Cu. Meters	Liters	999.972
Cu. Meters	Cu. Inches	61023.74
Cu. Meters	Cu. Feet	35.3145
Cu. Meters.	Lbs. of Water	2202.61
Lbs. of Water	Gallons	0.11992
Lbs. of Water	Liters	0.45419
Lbs. of Water	Cu. Inches	27.643
Lbs. of Water	Cu. Feet	0.01603
Lbs. of Water	Cu. Meters	0.000454

LINEAL MEASURES

Inches	mm	25.4
Inches	cm	2.54
Inches	Meters	0.0254
Feet	cm	30.48
Feet	Meters	0.3048
mm	Inches	0.03937
mm	Feet	0.00328
cm	Inches	0.3937
cm	Feet	0.03281
Meters	Feet	3.28

AREA

Sq. Inches	Sq. Feet	0.006944
Sq. Inches	Sq. cm	6.4516
Sq. Feet	Sq. Inches	144
Sq. Feet	Sq. cm	929.03
Sq. Feet	Sq. Meters	0.0929
Sq. cm	Sq. Inches	0.155
Sq. cm	Sq. Feet	0.00108
Sq. cm	Sq. Meters	0.0001
Sq. Meter	Sq. Inches	1550
Sq. Meter	Sq. Feet	10.76

CONVERSIONS OF PRESSURE AND HEAD

TO CONVERT	TO	MULTIPLY BY
Lbs .per Sq .In.	Lbs. per Sq. Ft.	144
Lbs. per Sq. In.	Atmospheres	0.06805
Lbs. per Sq. In.	Ins. of Water	27.728
Lbs. per Sq. In.	Ft. of Water	2.3106
Lbs. per Sq. In.	Ins. of Mercury	2.03602
Lbs. per Sq. In.	mm of Mercury	51.715
Lbs. per Sq. In.	Bar	0.06895
Lbs. per Sq. In.	kg per Sq. cm	0.070307
Lbs. per Sq. In.	kg per Sq. M	703.070
Lbs. per Sq. Ft.	Lbs. per Sq. In.	0.0069445
Lbs. per Sq. Ft.	Atmospheres	0.000473
Lbs. per Sq. Ft.	Ins. of Water	0.1926
Lbs. per Sq. Ft.	Ft. of Water	0.01605
Lbs. per Sq. Ft.	Ins. of Mercury	0.014139
Lbs. per Sq. Ft.	mm of Mercury	0.35913
Lbs. per Sq. Ft.	Bar	0.000479
Lbs. per Sq. Ft.	kg per Sq. cm	0.000488
Lbs. per Sq. Ft.	kg per Sq. M	4.88241
Atmospheres	Lbs. per Sq. In.	14.696
Atmospheres	Lbs. per Sq. Ft.	2116.22
Atmospheres	Ins. of Water	407.484
Atmospheres	Ft. of Water	33.957
Atmospheres	Ins. of Mercury	29.921
Atmospheres	mm of Mercury	760
Atmospheres	Bar	1.01325
Atmospheres	kg per Sq. cm	1.0332
Atmospheres	kg per Sq. M	10332.27
Ins. of Water	Lbs. per Sq. In.	0.03609
Ins. of Water	Lbs. per Sq. Ft.	5.1972
Ins. of Water	Atmospheres	0.002454
Ins. of Water	Ft. of Water	0.08333
Ins. of Water	Ins. of Mercury	0.07343
Ins. of Water	mm of Mercury	1.8651
Ins. of Water	Bar	0.00249
Ins. of Water	kg per Sq. cm	0.00253
Ins. of Water	kg per Sq. M	25.375
Ft. of Water	Lbs. per Sq. In.	0.432781
Ft. of Water	Lbs. per Sq. Ft.	63.3205
Ft. of Water	Atmospheres	0.029449
Ft. of Water	Ins. of Water	12
Ft. of Water	Ins. of Mercury	0.88115
Ft. of Water	mm of Mercury	22.3813
Ft. of Water	Bar	0.029839
Ft. of Water	kg per Sq. cm	0.03043
Ft. of Water	kg per Sq. M	304.275
Ins. of Mercury	Lbs. per Sq. In.	0.491154
Ins. of Mercury	Lbs. per Sq. Ft.	70.7262
Ins. of Mercury	Atmospheres	0.033421
Ins. of Mercury	Ins. of Water	13.6185
Ins. of Mercury	Ft. of Water	1.1349
Ins. of Mercury	mm of Mercury	25.40005
Ins. of Mercury	Bar	0.033864
Ins. of Mercury	kg per Sq. cm	0.03453
Ins. of Mercury	kg per Sq. M	345.316
mm of Mercury	Lbs. per Sq. In.	0.019337
mm of Mercury	Lbs. per Sq. Ft.	2.7845
mm of Mercury	Atmospheres	0.001316
mm of Mercury	Ins. of Water	0.53616
mm of Mercury	Ft. of Water	0.04468
mm of Mercury	Ins. of Mercury	0.03937
mm of Mercury	Bar	0.00133
mm of Mercury	kg per Sq. cm	0.00136
mm of Mercury	kg per Sq. M	13.59509
kg per Sq. cm	Lbs. per Sq. In.	14.2233
kg per Sq. cm	Lbs. per Sq. Ft.	2048.155
kg per Sq. cm	Atmospheres	0.96784
kg per Sq. cm	Ins. of Water	394.38
kg per Sq. cm	Ft. of Water	32.865
kg per Sq. cm	Ins. of Mercury	28.959
kg per Sq. cm	mm of Mercury	735.559
kg per Sq. cm	Bar	0.98067
kg per Sq. cm	kg per Sq. M	10000

NOTE: All weights and measures of water are based on temperature of 60°F.

NOTE: Temperature of Water and Mercury is 68°F and 32°F respectively.

TEMPERATURE

To convert Fahrenheit to Celsius: $\frac{°F - 32}{1.8}$

To convert Celsius to Fahrenheit: (1.8 x °C) +32

VELOCITY

1 Ft per Sec. = 0.3048 MPer Sec.

1 Mper Sec. = 3.2808 Ft. per Sec.

STEAM TABLE*

h = Total heat of steam, Btu per pound **v** = Specific volume, cubic feet per pound

PRESSURE PSI (GAGE)	TEMP. F° (SAT.)		SATURATED LIQUID	SATURATED VAPOR	TOTAL TEMPERATURE °F												
					220	240	260	280	300	320	340	360	380	400	420	440	460
0	212	h v	180.1 0.0167	1150.4 26.80	1154.4 27.15	1164.2 28.00	1173.8 28.85	1183.3 29.70	1192.8 30.53	1202.3 31.37	1211.7 32.20	1221.1 33.03	1230.5 33.85	1239.9 34.68	1249.3 35.50	1258.8 36.32	1268.2 37.14
5	228	h v	196.2 0.0168	1156.3 20.089		1162.3 20.48	1172.2 21.11	1182.0 21.74	1191.6 22.36	1201.2 22.98	1210.8 23.60	1220.3 24.21	1229.7 24.82	1239.2 25.43	1248.7 26.04	1258.2 26.65	1267.6 27.25
10	240	h v	208.4 0.0169	1160.6 16.303			1170.7 16.819	1180.6 17.330	1190.5 17.836	1200.2 18.337	1209.8 18.834	1219.4 19.329	1229.0 19.821	1238.5 20.31	1248.1 20.80	1257.6 21.29	1267.1 21.77
15	250	h v	218.8 0.0170	1164.1 13.746			1169.1 13.957	1179.3 14.390	1189.3 14.816	1199.1 15.238	1208.9 15.657	1218.6 16.072	1228.3 16.485	1237.9 16.897	1247.5 17.306	1257.0 17.714	1266.6 18.121
20	259	h v	227.9 0.0171	1167.1 11.898			1167.5 11.911	1177.9 12.288	1188.1 12.659	1198.1 13.025	1208.0 13.387	1217.8 13.746	1227.5 14.103	1237.2 14.457	1246.8 14.810	1256A 15.162	1266.1 15.512
25	267	h v	236.0 0.0171	1169.7 10.498				1176.5 10.711	1186.8 11.040	1197.0 11.364	1207.0 11.684	1216.9 12.001	1226.7 12.315	1236.5 12.628	12462 12.938	1255.9 13.247	1265.5 13.555
30	274	h v	243.4 0.0172	1172.0 9.401				1175.0 9.484	1185.6 9.781	1195.9 10.072	1206.0 10.359	1216.0 10.643	1225.9 10.925	1235.8 11.204	1245.6 11.482	1255.3 11.758	1265.0 120033
40	287	h v	256.3 0.0173	1175.9 7.787					1183.0 7.947	1193.6 8.192	1204.0 8.432	1214.3 8.668	1224.4 8.902	1234.3 9.134	1244.3 9.364	1254.1 9.592	1263.9 9.819
50	298	h v	267.5 0.0174	1179.1 6.655					1180.3 6.676	1191.3 6.889	1202.0 7.096	1212.5 7.300	1222.7 7.501	1232.9 7.700	1242.9 7.896	1252.9 8.091	1262.8 8.285
60	308	h v	277.4 0.0175	1181.9 5.816						1188.9 5.9321	1199.9 6.116	1210.6 6.296	1221.1 6.473	1231.4 6.648	1241.6 6.820	1251.7 6.991	1261.7 7.161
70	316	h v	286.4 0.0176	1184.2 5.168						1186.4 5.200	1197.7 5.366	1208.7 5.528	1219.4 5.687	1229.9 5.843	1240.2 5.997	1250.4 6.150	1260.6 6.301
80	324	h v	294.6 0.0177	1186.2 4.652							1195.5 4.773	1206.7 4.921	1217.7 5.065	1228.3 5.207	1238.8 5.347	1249.2 5.485	1259.4 5.621
90	331	h v	302.1 0.0178	1188.1 4.232							1193.2 4.292	1204.7 4.429	1215.9 4.562	1226.7 4.693	1237.4 4.821	1247.9 4.947	1258.2 5.071
100	338	h v	309.1 0.0178	1189.7 3.882							1190.8 3.895	1202.7 4.022	1214.1 4.146	1225.2 4.267	1236.0 4.385	1246.6 4.502	1257.1 4.617
125	353	h v	324.8 0.0180	1193.0 3.220								1197.3 3.258	1209.4 3.365	1211.1 3.468	1232.3 3.569	1243.3 3.667	1254.1 3.764
150	366	h v	338.5 0.0182	1195.6 2.752									1204.5 2.818	1216.7 2.910	1228.4 2.998	1239.8 3.085	1251.0 3.169
175	378	h v	350.8 0.0183	1197.6 2.404									1199.3 2.414	1212.2 2.498	1224.5 2.577	1236.3 2.655	1247.8 2.730
200	388	h v	361.9 0.0185	1199.3 2.134										1207.4 2.180	1220.3 2.253	1232.6 2.324	1244.5 2.393
225	397	h v	372.1 0.0186	1200.6 1.9183										1202.5 1.9276	1216.0 1.9964	1228.8 2.062	1241.1 2.126
250	406	h v	381.6 0.0187	1201.7 1.7422											1211.5 1.7870	1224.9 1.8488	1237.6 1.9081
275	414	h v	390.5 0.0188	1202.6 1.5954											1206.8 1.6130	1220.8 1.6717	1234.0 1.7277
300	422	h v	398.8 0.0190	1203.2 1.4711												1216.5 1.5222	1230.3 1.5755
350	436	h v	414.1 0.0192	1204.1 1.2720												1207.5 1.2831	1222.4 1.3326
400	448	h v	428.1 0.0194	1204.6 1.1194													1214.0 1.1468
450	460	h v	440.9 0.0196	1204.6 0.9985													
500	470	h v	452.9 0.0198	1204.2 0.9004													
550	480	h v	464.1 0.0200	1203.7 0.8191													
600	489	h v	474.7 0.0202	1203.0 0.7503													

*Adapted with permission from "Thermodynamic Properties of Steam", Keenan and Keyes, published by John Wiley & Sons, Inc.

STEAM TABLE*

h = Total heat of steam, Btu per pound **v** = Specific volume, cubic feet per pound

TOTAL TEMPERATURE °F																TEMP. °F (SAT.)	PRESSURE PSI (GAGE)
480	500	520	540	560	580	600	620	640	660	680	700	720	740	750			
1277.6	1287.1	1296.6	1306.2	1315.7	1325.3	1334.8	1344.5	1354.2	1363.8	1373.5	1383.2	1393.0	1402.8	1407.7	h	212	0
37.96	38.78	39.60	40.41	41.23	42.04	42.86	43.68	44.49	45.31	46.12	46.94	47.75	48.56	48.97	v		
1277.1	1286.6	1296.2	1305.7	1315.3	1324.8	1334.4	1344.1	1353.8	1363.5	1373.2	1382.9	1392.7	1402.6	1407.5	h	228	5
27.86	28.46	29.06	29.67	30.27	30.87	31.47	32.07	32.67	33.27	33.87	34.47	35.07	35.67	35.96	v		
1276.6	1286.2	1295.8	1305.3	1314.9	1324.5	1334.1	1343.8	1353.5	1363.2	1372.9	1382.6	1392.5	1402.3	1407.2	h	240	10
22.26	22.74	23.22	23.71	24.19	24.68	25.16	25.64	26.12	26.60	27.08	27.56	28.04	28.52	28.76	v		
1276.2	1285.7	1295.3	1304.9	1314.5	1324.2	1333.8	1343.5	1353.2	1362.9	1372.6	1382.4	1392.3	1402.1	1407.0	h	250	15
18.528	18.933	19.337	19.741	20.144	20.547	20.95	21.35	21.75	22.15	22.56	22.96	23.36	23.76	23.96	v		
1275.7	1285.3	1294.9	1304.5	1314.1	1323.8	1333.5	1343.2	1352.9	1362.6	1372.3	1382.1	1391.9	1401.8	1406.7	h	259	20
15.862	16.210	16.558	16.905	17.251	17.597	17.943	18.288	18.633	18.977	19.322	19.666	20.01	20.35	20.52	v		
1275.2	1284.8	1294.5	1304.1	1313.8	1323.4	1333.1	1342.8	1352.5	1362.3	1372.1	1381.9	1391.7	1401.6	1406.5	h	267	25
13.862	14.168	14.473	14.778	15.082	15.385	15.688	15.990	16.293	16.595	16.896	17.198	17.499	17.8001	7.951	v		
1274.7	1284.4	1294.0	1303.7	1313.4	1323.1	1332.8	1342.5	1352.2	1362.0	1371.8	1381.6	1391.5	1401.4	1406.3	h	274	30
12.307	12.580	12.852	13.123	13.394	13.665	13.935	14.204	14.473	14.742	15.011	15.279	15.547	15.815	15.949	v		
1273.7	1283.4	1293.2	1302.9	1312.6	1322.4	1332.1	1341.9	1351.7	1361.5	1371.3	1381.1	1391.0	1400.9	1405.8	h	287	40
10.044	10.269	10.493	10.717	10.940	11.162	11.384	11.605	11.826	12.047	12.268	12.488	12.708	12.927	13.037	v		
1272.7	1282.5	1292.3	1302.1	1311.9	1321.7	1331.5	1341.3	1351.1	1360.9	1370.8	1380.6	1390.5	1400.4	1405.4	h	298	50
8.478	8.670	8.861	9.051	9.240	9.429	9.618	9.806	9.993	10.181	10.368	10.555	10.741	10.928	11.021	v		
1271.6	1281.5	1291.4	1301.3	1311.1	1321.0	1330.8	1340.6	1350.5	1360.3	1370.2	1380.1	1390.0	1399.9	1404.9	h	308	60
7.329	7.496	7.663	7.829	7.994	8.159	8.323	8.486	8.649	8.812	8.975	9.138	9.300	9.462	9.543	v		
1270.6	1280.6	1290.5	1300.5	1310.4	1320.2	1330.1	1340.0	1349.9	1359.8	1369.7	1379.6	1389.6	1399.5	1404.5	h	316	70
6.450	6.599	6.747	6.894	7.041	7.187	7.332	7.477	7.622	7.766	7.910	8.054	8.198	8.341	8.413	v		
1269.5	1279.6	1289.6	1299.6	1309.6	1319.5	1329.4	1339.4	1349.3	1359.3	1369.2	1379.1	1389.1	1399.0	1404.0	h	324	80
5.756	5.891	6.024	6.156	6.288	6.419	6.550	6.680	6.810	6.940	7.069	7.199	7.327	7.456	7.520	v		
1268.5	1278.6	1288.7	1298.8	1308.8	1318.8	1328.7	1338.7	1348.7	1358.6	1368.6	1378.5	1388.5	1398.5	1403.5	h	331	90
5.195	5.317	5.439	5.559	5.679	5.799	5.918	6.036	6.154	6.272	6.389	6.506	6.623	6.740	6.798	v		
1267.4	1277.7	1287.8	1297.9	1308.0	1318.0	1328.1	1338.1	1348.0	1358.0	1368.0	1378.0	1388.1	1398.1	1403.1	h	338	100
4.730	4.843	4.955	5.066	5.176	5.285	5.394	5.503	5.611	5.719	5.827	5.934	6.041	6.148	6.201	v		
1264.7	1275.2	1285.5	1295.8	1306.0	1316.2	1326.4	1336.5	1346.6	1356.6	1366.7	1376.8	1386.9	1397.0	1402.0	h	353	125
3.860	3.954	4.047	4.140	4.232	4.323	4.413	4.503	4.593	4.683	4.772	4.861	4.949	5.038	5.082	v		
1261.9	1272.6	1283.2	1293.6	1304.0	1314.3	1324.6	1334.8	1345.0	1355.2	1365.3	1375.4	1385.6	1395.8	1400.8	h	366	150
3.252	3.334	3.414	3.494	3.573	3.652	3.730	3.807	3.884	3.960	4.037	4.113	4.188	4.264	4.301	v		
1259.0	1270.0	1280.8	1291.4	1302.0	1312.4	1322.8	1333.2	1343.5	1353.7	1363.9	1374.2	1384.4	1394.6	1399.7	h	378	175
2.804	2.877	2.948	3.019	3.089	3.157	3.226	3.294	3.361	3.429	3.495	3.562	3.628	3.694	3.727	v		
1256.0	1267.3	1278.3	1289.2	1299.9	1310.5	1321.0	1331.4	1341.8	1352.2	1362.5	1372.8	1383.1	1393.3	1398.5	h	388	200
2.460	2.525	2.590	2.653	2.716	2.777	2.839	2.900	2.960	3.019	3.079	3.139	3.198	3.256	3.286	v		
1253.0	1264.5	1275.8	1286.9	1297.8	1308.5	1319.2	1329.8	1340.3	1350.7	1361.1	1371.5	1381.9	1392.2	1397.3	h	397	225
2.187	2.247	2.306	2.364	2.421	2.477	2.533	2.587	2.642	2.696	2.750	2.804	2.857	2.910	2.936	v		
1249.9	1261.7	1273.2	1284.5	1295.6	1306.5	1317.3	1328.0	1338.7	1349.2	1359.7	1370.2	1380.6	1391.0	1396.2	h	406	250
1.9654	2.021	2,076	2.129	2.181	2.233	2.284	2.334	2.384	2.434	2.483	2.532	2.580	2.629	2.653	v		
1246.6	1258.8	1270.6	1282.1	1293.4	1304.5	1315.5	1326.3	1337.0	1347.7	1358.3	1368.8	1379.3	1389.8	1395.0	h	414	275
1.7816	1.8338	1.8846	1.9342	1.9829	2.031	2.078	2.125	2.171	2.217	2.262	2.307	2.352	2.396	2.418	v		
1243.3	1255.8	1267.9	1279.7	1291.2	1302.5	1313.6	1324.5	1335.4	1346.1	1356.8	1367.4	1378.0	1388.6	1393.8	h	422	300
1.6266	1.6759	1.7237	1.7703	1.8159	1.8607	1.9048	1.9483	1.9912	2.034	2.076	2.118	2.159	2.200	2.220	v		
1236.4	1249.6	1262.4	1274.7	1286.6	1298.2	1309.7	1320.9	1332.0	1343.0	1353.9	1364.7	1375.4	1386.1	1391.4	h	436	350
1.3795	1.4243	1.4675	1.5094	1.5501	1.5900	1.6291	1.6676	1.7056	1.7430	1.7801	1.8168	1.8531	1.8892	1.9071	v		
1229.0	1243.2	1256.6	1269.4	1281.8	1293.9	1305.7	1317.2	1328.6	1339.8	1350.9	1361.9	1372.8	1383.6	1389.0	h	448	400
1.1908	1.2325	1.2724	1.3108	1.3480	1.3842	1.4196	1.4544	1.4885	1.5222	1.5554	1.5883	1.6207	1.6529	1.6689	v		
1221.2	1236.3	1250.5	1264.0	1276.9	1289.4	1301.6	1313.5	1325.1	1336.5	1347.8	1359.0	1370.1	1381.1	1386.5	h	460	450
1.0416	1.0811	1.1186	1.1544	1.1889	1.2224	1.2550	1.2868	1.3180	1.3488	1.3789	1.4088	1.4382	1.4675	1.4819	v		
1212.8	1229.0	1244.0	1258.3	1271.8	1284.8	1297.3	1309.6	1321.5	1333.2	1344.7	1356.1	1367.3	1378.4	1384.0	h	470	500
0.9204	0.9584	0.9941	1.0280	1.0604	1.0917	1.1221	1.1516	1.1805	1.2088	1.2367	1.2641	1.2913	1.3180	1.3313	v		
	1221.4	1237.4	1252.4	1266.5	1280.0	1293.0	1305.6	1317.8	1329.8	1341.6	1353.2	1364.6	1375.8	1381.4	h	480	550
	0.8565	0.8909	0.9234	0.9542	0.9838	1.0124	1.0401	1.0671	1.0935	1.1195	1.1449	1.1700	1.1947	1.2070	v		
	1213.2	1230.3	1246.1	1261.0	1275.1	1288.5	1301.5	1314.1	1326.3	1338.3	1350.2	1361.8	1373.2	1378.9	h	489	600
	0.7703	0.8040	0.8353	0.8649	0.8931	0.9203	0.9465	0.9720	0.9968	1.0211	1.0450	1.0684	1.0916	1.1030	v		

*Adapted with permission from "Thermodynamic Properties of Steam", Keenan and Keyes, published by John Wiley & Sons, Inc.

NOTES:

FABRICATION, SERVICE & REPAIR COMMITMENT TO EXCELLENCE

MANUFACTURING, TESTING, PROACTIVE MAINTENANCE, AND CUSTOMER TRAINING

Consistency in Operation and Quality of Products is paramount in the function of your operating system. Leslie Controls meets these needs with Regulators calibrated for high performance control. Our Engineers are trained to help you solve operating issues and our Machinists use years of experience to manufacture Regulators for your every need.

CIRCOR International operates service centers across the nation where Regulators are returned to original factory specifications and given a new service warranty at a fraction of the original purchase cost. In addition to handling factory repairs, each service center has available factory trained Field Service Technicians to provide on-site repairs and preventative maintenance where removal is impractical or extended shutdown is unacceptable.

Service centers also provide custom tailored, in-depth, hands-on training programs in operation, instrumentation and maintenance of all supported equipment. Training is conducted at one of our specially designed, fully equipped repair facilities or at your location using your own equipment.

Service is a fundamental part of the Leslie operating philosophy and we urge you to request additional documentation and descriptive material.

Here at CIRCOR we have been an industry leader in quality fluid control equipment. We have developed a full line of engineered products to suit your requirements, including diaphragm control valves, control instrumentation, pressure and temperature regulators and steam water heaters.

CIRCOR | Leslie Controls

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