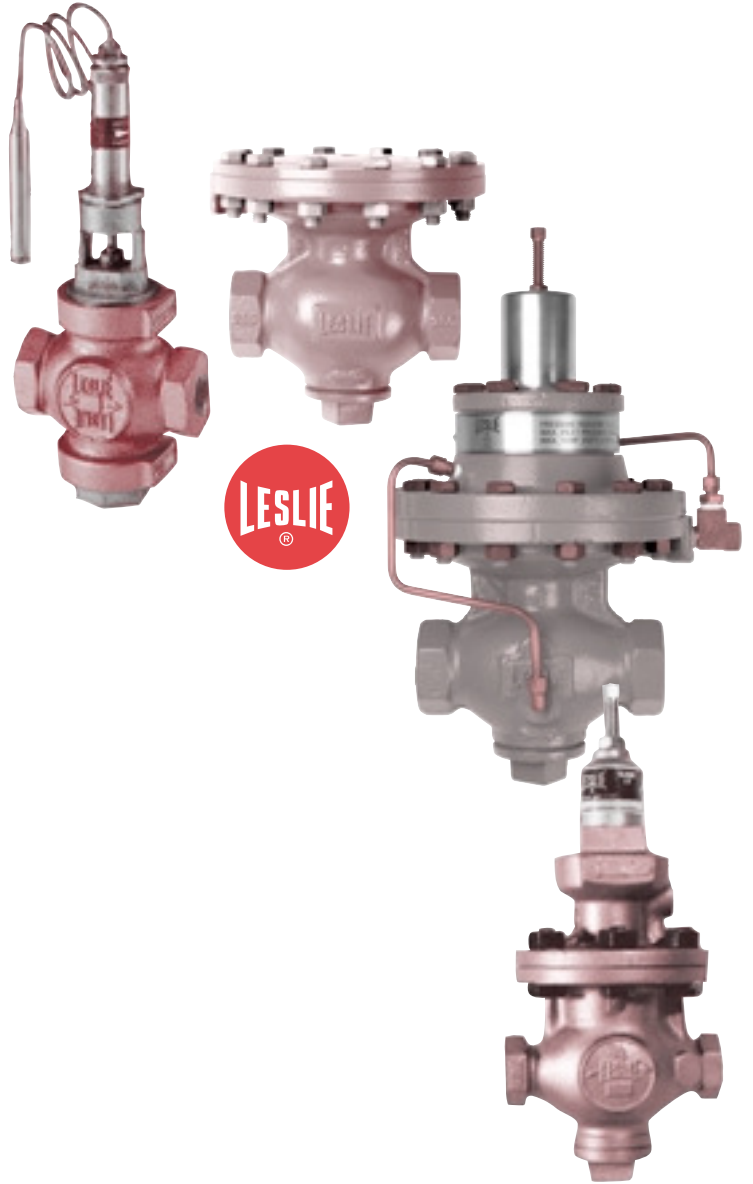
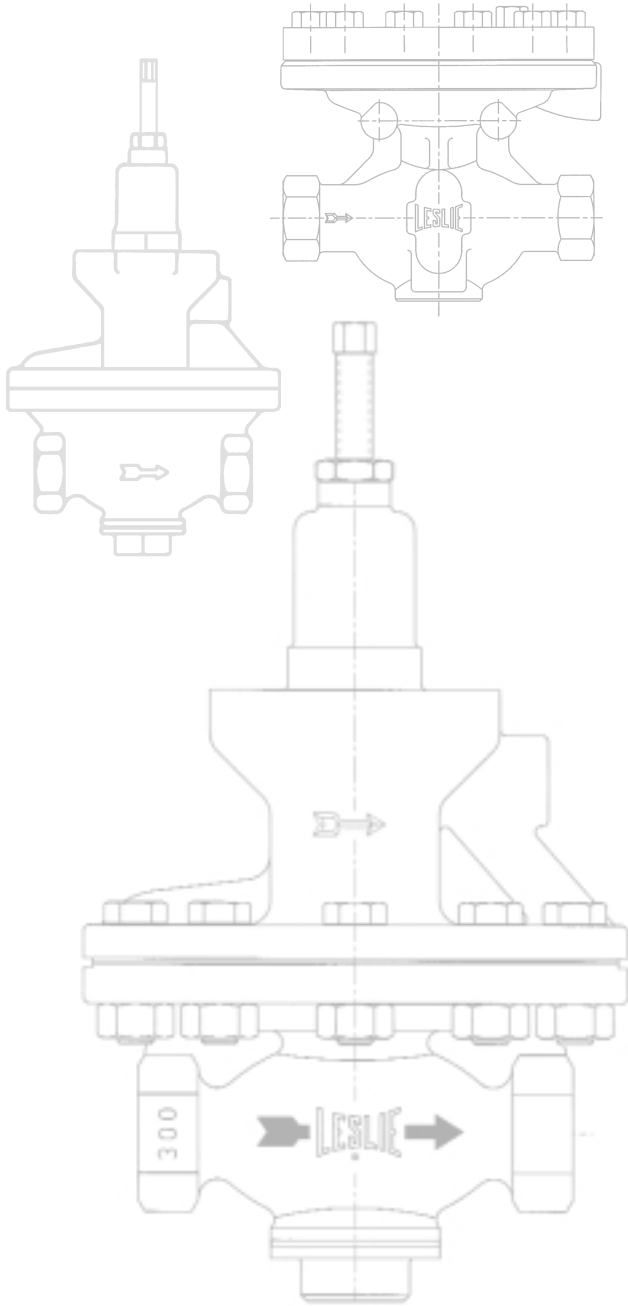




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# REGULATOR handbook



**LESLIE**  
 CONTROLS, INC.

A division of CIRCOR International, Inc.

Pressure & Temperature Regulators

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**GP SERIES**

# GP SERIES REDUCING VALVE

**SIZES 1/2" – 4"**

**PRESSURES to 600 PSIG at 600 °F**

- Steam, Air or Gas Service
- 95% Accuracy of Regulation\*\*
- 100:1 Rangeability<sup>3</sup>
- Packless Construction
- Exclusive Spiroflex® Diaphragm for Smooth Operation
- 3 Year Warranty<sup>4</sup>
- Air Loaded
  - Operates on As Little As 1/2 PSI Pressure Drop
  - Few Moving Parts Require Minimal Maintenance

## 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) <sup>1</sup>
B16.1 Class 125 Flanged	125 (8.6)	@ 450 (232) <sup>1</sup>
B16.1 Class 250 Flanged	250 (17.2)	@ 450 (232) <sup>1</sup>

### BRONZE

B16.1 Class 300 NPT/SWE	300 (21.0)	@ 550 (288) <sup>1</sup>
B16.1 Class 150 Flanged	150 (10.3)	@ 550 (288) <sup>1</sup>
B16.1 Class 300 Flanged	300 (21.0)	@ 550 (288) <sup>1</sup>

### CAST STEEL

B16.34 Class 300 NPT	300 (21.0)	@ 600 (316) <sup>1</sup>
B16.34 Class 150 Flanged	150 (10.3)	@ 600 (316) <sup>1</sup>
B16.34 Class 300 Flanged	300 (21.0)	@ 600 (316) <sup>1</sup>
B16.34 Class 600 Flanged	600 (41.4)	@ 600 (316) <sup>1</sup>

### STAINLESS STEEL

A217 Class 300 NPT/SWE	300(21.0)	@ 600 (316) <sup>1</sup>
A217 Class 150 Flanged	150 (10.3)	@ 600 (316) <sup>1</sup>
A217 Class 300 Flanged	300 (21.0)	@ 600 (316) <sup>1</sup>
A217 Class 600 Flanged	600 (41.4)	@ 600 (316) <sup>1</sup>

### DUCTILE IRON

A395 Class 300 NPT	250 (17.2)	@ 450 (232)
--------------------	------------	-------------

## 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"

## 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 <sup>5</sup>	3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3
	Ext <sup>6</sup>	5.67	10.0	15.7	21.9	29.1	29.1	65.7	84.6	103.0
GAS	Std <sup>5</sup>	3.4	5.6	11.7	17	28	30	45	64	90
	Ext <sup>6</sup>	5.3	9.2	16.9	24.8	38.3	41	82.6	97	124.8

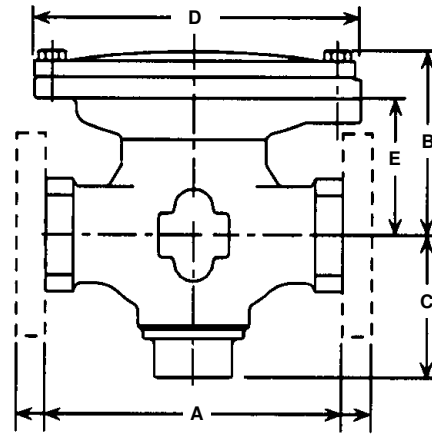
*For Air Loading Requirements  
see Page 38*

*For GP Series Capacity Tables  
see Pages 35, 36 & 41*

1. Units with "A" in model code limited to 180°F (82°C)
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. 2 1/2" - 4" Stainless Steel Trim with Stellite Hardfacing 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 .....ASTM A126 Cl. B  
 Body, Cast Bronze.....ASTM B61 UNS C92200  
 Body, Cast Steel .....ASTM A216 WCB  
 Body, Stainless Steel .....316 SS ASTM A351 CF8M  
 Trim, std. Steam<sup>1</sup> .....SS w/Resilient Insert  
 std. Gas .....Buna-n  
 opt. Steam .....SS w/Stellite®  
 Diaphragm, std. ....Spiroflex®  
 opt. ....Teflon® (Superflex)

## STANDARD SEAT VALVE WEIGHTS\* pounds (kg)

SIZE	Cl, Brz BODY				CS, SS BODY		
	NPT	125	250	300	NPT/ SWE	150	300
1/2 (15)	34 (15)	—	—	40 (18)	38 (17)	—	—
3/4 (20)	35 (16)	—	—	41 (19)	39 (18)	—	—
1 (25)	36 (16)	—	—	43 (20)	40 (18)	48 (22)	48 (22)
1 1/4 (32)	42 (19)	—	—	50 (23)	—	—	—
1 1/2 (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)
2 1/2 (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		125 Cl	150 CS/SS	250 Cl	300					
	Cl/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 3/8 (219)	3 3/8 (92)
3/4 (20)	6 1/2 (165)	8 1/2 (216)	—	—	—	5 1/8 (131)	—	5 1/2 (140)	3 3/8 (86)	8 3/8 (219)	3 3/8 (92)
1 (25)	7 1/4 (184)	8 1/2 (216)	—	8 1/2 (216)	—	5 7/16 (138)	8 1/2 (216)	5 1/8 (149)	3 3/8 (86)	8 3/8 (219)	4 (102)
1 1/4 (32)	7 3/8 (194)	—	—	—	—	5 1/4 (146)	—	6 1/4 (159)	4 (102)	8 3/8 (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)	5 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)	5 3/16 (148)	11 1/2 (292)	6 3/8 (162)	4 1/2 (114)	10 1/4 (260)	4 3/8 (111)
2 1/2 (65)	—	—	10 3/8 (276)	—	11 1/2 (292)	7 1/16 (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 3/8 (219)	12 1/2 (318)	9 (229)	6 1/4 (159)	16 (406)	4 15/16 (125)
4 (100)	—	—	13 3/8 (352)	13 3/8 (352)	14 1/2 (368)	9 5/16 (252)	14 1/2 (368)	10 1/4 (260)	7 3/8 (200)	16 (406)	6 1/4 (159)

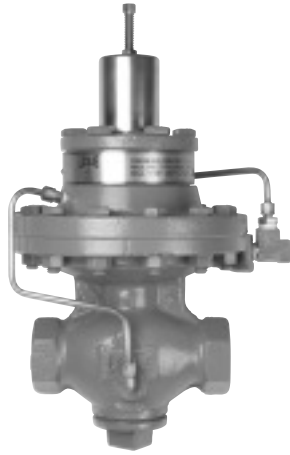
1. 1/2" - 2" size Stainless Steel Trim with resilient seat insert, Class VI shutoff. 2 1/2" - 4" Stainless Steel Trim with Stellite Hardfacing Class IV shutoff.

# 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
1/2 (15)	—	—	—	8 (203)	4 1/4 (124)	3 3/8 (86)	8 3/8 (219)	3 1/8 (79)	—	45 (20.4)
3/4 (20)	—	—	—	8 1/2 (206)	4 1/4 (124)	3 3/8 (86)	8 3/8 (219)	3 1/8 (79)	—	55 (24.9)
1 (25)	—	—	—	8 3/4 (210)	5 1/4 (133)	3 3/8 (79)	8 3/8 (219)	3 1/8 (79)	—	60 (27.2)
1 1/4 (32)	7 1/4 (184)	7 3/4 (197)	8 1/4 (210)	8 3/8 (225)	5 1/4 (133)	3 3/8 (79)	8 3/8 (219)	3 1/8 (79)	62 (28)	65 (29.5)
1 1/2 (40)	—	—	—	9 1/8 (251)	5 1/2 (148)	3 1/2 (89)	10 1/2 (267)	4 (102)	—	90 (40.8)
2 (50)	—	—	—	11 1/4 (286)	6 1/4 (159)	3 3/4 (95)	10 1/2 (267)	4 7/8 (113)	—	100 (45.4)
2 1/2 (65)	12 1/4 (311)	10 3/8 (276)	11 1/2 (292)	12 1/4 (311)	7 3/4 (197)	6 3/8 (175)	16 (406)	5 1/8 (130)	189 (85.7)	192 (87.1)
3 (80)	—	—	—	13 1/4 (337)	8 (203)	7 1/2 (191)	16 (406)	5 1/2 (140)	—	225 (102.1)
4 (100)	—	—	—	15 1/4 (387)	9 1/2 (241)	8 1/2 (216)	16 (406)	16 1/4 (430)	—	300 (136.1)

**NOTES:**



**GP SERIES**

# GP SERIES GPKP REDUCING VALVE

**SIZES 1/2" – 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

## 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)

<b>GPKP</b>	5-20	15-75	50-150
-------------	------	-------	--------

## MODELS

- GPKP—Internal Pilot, Cast Iron, ANSI 250, Steam Svc.

## OPTIONS

- SS Trim with Stellite®

*For Sizing Capacity Tables  
see Pages 35, 36 & 41*

## 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 <sup>1</sup>	3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3
	Ext <sup>2</sup>	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)

# 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.....ASTM A126 Cl. B

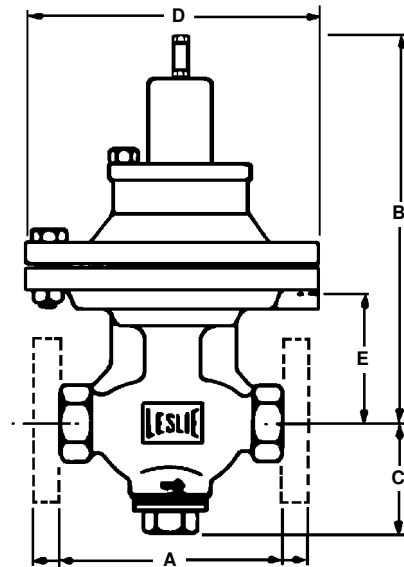
Trim, std. Steam.....

1/2"-2" Stainless Steel w/Resilient Insert

Buna-N

Stainless Steel w/Stellite®

Diaphragm, std. ....Spiroflex®



### VALVE DIMENSIONS inches (mm)

Size	125# THD.	A 250# Flange	All Flange	B All Bodies	C All Bodies	D All Bodies	E All Bodies
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 1 1/16	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 1/2	14 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	Cl, Brz BODY*				CS, SS BODY*		
	NPT	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



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

## 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 <sup>1</sup>	3.65	6.08	10.9	15.0	21.3	25.1	35.8	55.8	74.3

- 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

## MODELS

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

## OPTIONS

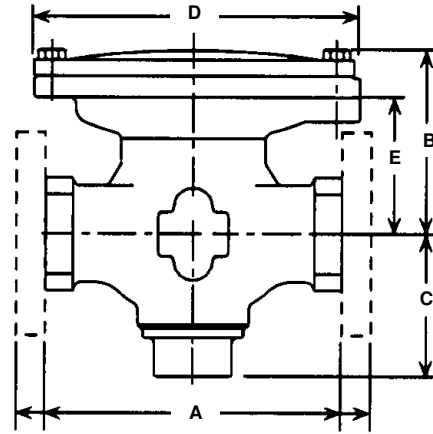
- SS Trim with Stellite®
- Teflon® Diaphragm for Rapid Cycling on all air loaded except gas service or ANSI 600 "T"
- Vacuum Breaker and Stem Seal "V"

*For Sizing Capacity Tables  
see Pages 35, 36 & 41*

1.95% accuracy (2 psi min. droop)

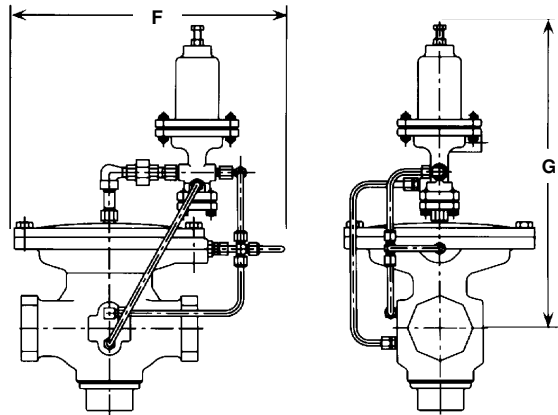
# GP SERIES GPS-1EP REDUCING VALVE SPECIFICATIONS

Valve shall be single stage, internal pilot 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 Steel .....ASTM A216 GR WCB  
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 WEIGHTS 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)	4 15/16 (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 for 1/2" - 2" sizes (separable flanges) and ANSI B16.10 for 3" - 4" sizes (integral flanges).



**L SERIES**

# L SERIES PRESSURE REDUCING & DIFFERENTIAL PRESSURE REGULATOR

**SIZES 1/2" – 4"**

**PRESSURES to 600 PSIG at 750 °F**

- **Steam, Air or Gas Service**
- **99% Accuracy of Regulation**
- **10:1 Rangeability**
- **Packless Construction**
- **One Valve Adjusts to All Ranges**
- **Pressure Reduction of 15 psi minimum**

## APPLICATION DATA

- HVAC Systems
- Process Control Systems for Food, Moulding, 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)
<b>CAST IRON</b>		
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)
<b>BRONZE</b>		
B16.24 Class 300 NPT	300 (21.0)	@ 500 (260)
B16.24 Class 150 Flanged	150 (10.3)	@ 500 (260)
B16.24 Class 300 Flanged	300 (21.0)	@ 500 (260)
<b>CAST STEEL</b>		
B16.34 Class 600 NPT	600 (41.4)	@ 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)

## MODELS<sup>1</sup>

- **L\_KY**–5-385 psi range<sup>2</sup>, Cast Iron, Steam Svc., Teflon® Piston Seal
- **LA\_K**–5-385 psi range<sup>2</sup>, Cast Iron, Air or Gas Svc., Neoprene O Ring
- **L\_Y**–10-285 psi range<sup>2</sup>, Bronze, Steam Svc., Teflon® Piston Seal
- **L\_3**–10-285 psi range<sup>2</sup>, Bronze, Steam Svc., Cast Iron Piston Ring
- **LA\_5**–5-385 psi range<sup>3</sup>, Bronze, Air or Gas Svc., Neoprene O Ring
- **L\_S**–25-400 psi range<sup>4</sup>, Cast Steel, Steam Svc, Cast Iron Piston Ring
- **L\_YS**–25-400 psi range<sup>4</sup>, Cast Steel, Steam Svc, Teflon® Piston Seal
- **LAAS**–5-385 psi range<sup>3</sup>, Cast Steel, Air or Gas Svc., Buna-N O-Ring\*

## OPTIONS<sup>1</sup>

- **E**–External Sensing Port for downstream pressures 25% below inlet pressures (Available on all except LAAS)
- **L**–Trim for alternate range - LKY, LY, L are 2-35 psi; LS is 10-50 psi
- **X**–Differential Pressure 5-40 psi range (Available on LKY, LY, LS)
- **T**–Remotely Adjusted 5-175 psi; 7:1 ratio reduced pressure to loading pressure

## RATED FLOW COEFFICIENTS (Cv)

	REGULATOR SIZE									
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
STEAM	1.8	3.4	5.6	10	13.7	23	33	51	69	89

*For Sizing Capacity Tables see Pages 38 & 43*

1. Insert letter code for options in model number as required.
2. For inlet pressures over 200 psi, minimum pressure is 5% of inlet pressure.
3. For inlet pressures over 100 psi, minimum pressure is 5% of inlet pressure.
4. For inlet pressures over 300 psi, minimum pressure is 8% of inlet pressure.

# L SERIES PRESSURE REDUCING & DIFFERENTIAL PRESSURE REGULATOR SPECIFICATIONS

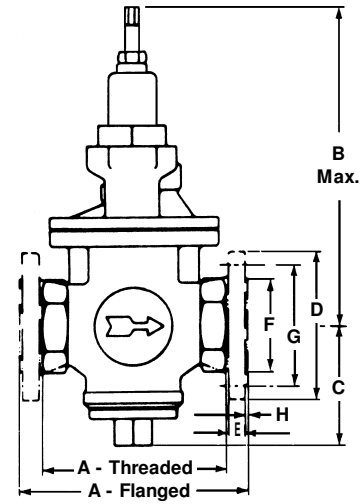
CAST IRON AND BRONZE REGULATORS shall be of the self-contained, internal pilot, piston operated type. Internal pilot valve and pilot valve seat shall be interchangeable in all sizes and contained wholly within the valve and entirely self draining. The main valve shall be made of stainless steel hardened 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 surface. 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 (0.7-20 bar) range.

STEEL REGULATORS shall be of the self-contained, 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, internal 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) (0.7-3.5 bar) or (25-400 psi) (1.7-28 bar) shall be contained within a steel spring case bolted to valve top cap.

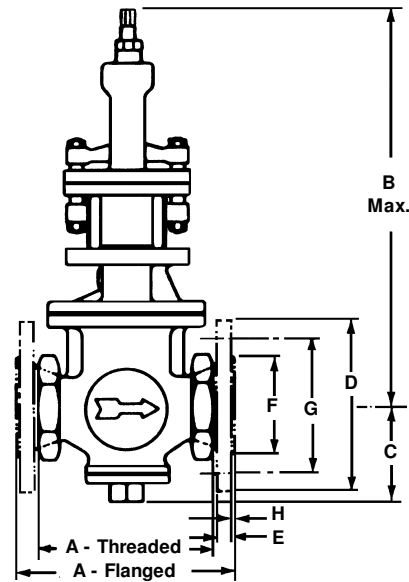
## MATERIALS OF CONSTRUCTION

Body, Cast Iron .....	ASTM A126 Cl. B
Body, Cast Bronze .....	ASTM B61 UNS C92200
Body, Cast Steel .....	ASTM A216 WCB
Seat Ring, std. ....	SS w/Stellite®
opt. ....	Bronze*
Main Valve Trim, std. ....	Hardened SS
opt. ....	SS w/Neoprene Disc*

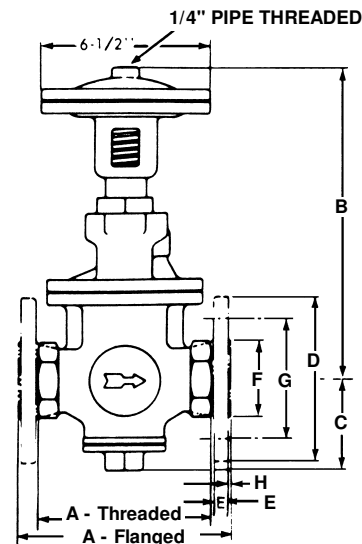
\*Installed in units with "A" in model code.



**STANDARD REGULATOR - L SERIES AND UL SERIES**  
See Dimensions Chart on page 14



**DIFFERENTIAL REGULATOR - LX SERIES**  
See Dimensions Chart on page 14



**T TOPWORKS**  
See Dimensions Chart on page 14

# UL SERIES BACK PRESSURE REGULATOR

SIZES 1/2" – 4"

PRESSURES to 300 PSIG at 500 °F



UL SERIES

- Steam, Air or Gas Service
- 99% Accuracy of Regulation
- 10:1 Rangeability
- Packless Construction
- One Valve Adjusts to All Ranges
- Pressure Differential 10 psi minimum

## APPLICATION DATA

- HVAC Systems
- Process Control Systems for Food, Moulding, 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

B16.1 Class 300 NPT	300 (21.0)	@ 500 (260)
B16.1 Class 150 Flanged	150 (10.3)	@ 500 (260)
B16.1 Class 300 Flanged	300 (21.0)	@ 500 (260)

## MODELS<sup>1</sup>

- UL\_KY–Cast Iron
- U\_Y–Bronze

## OPTIONS<sup>1</sup>

- L–Trim for 25-50 psi range
- M–Trim for 25-150 psi range
- H–Trim for 140-300 psi range<sup>2</sup>

*For Sizing Capacity Tables see Pages 38 & 43*

## RATED FLOW COEFFICIENTS (Cv)

	REGULATOR SIZE									
	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	3 1/2	4
STEAM	1.8	3.4	5.6	10	13.7	23	33	51	69	89

## ACCUMULATION AND BLOWDOWN DATA

PRESSURE RANGE PSI	SET PRESSURE PSI	ACCUMULATION <sup>3</sup> PSI	BLOWDOWN <sup>4</sup> PSI
25-150	25	6.5	3
	50	6	4
	100	5.5	4.5
	150	5	5
150-400	150	7	5
	200	7.5	5.5
	250	8	6
	300	8.5	6.5
25-50	25	4	3
	50	2.5	4

1. Insert letter code for options in model number as required.
2. Cast Iron Models maximum 250 psi
3. ACCUMULATION is the rise in pressure above set pressure to get full flow.
4. BLOWDOWN is pressure below set pressure to get tight shutoff.

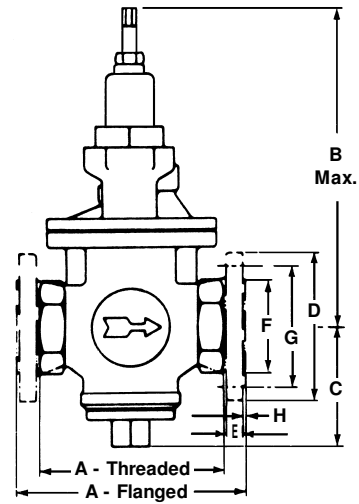
# UL SERIES BACK PRESSURE REGULATOR

## SPECIFICATIONS

CAST IRON AND BRONZE REGULATORS shall be of the self-contained, internal pilot, piston operated 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 surface. 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.

### MATERIALS OF CONSTRUCTION

Body, Cast Iron .....	ASTM A126 Cl. B
Body, Cast Bronze .....	ASTM B61 UNS C92200
Seat Ring .....	SS w/Stellite®
Main Valve Trim .....	Hardened SS



**STANDARD REGULATOR - L SERIES AND UL SERIES**

*See Dimensions Chart on page 14*

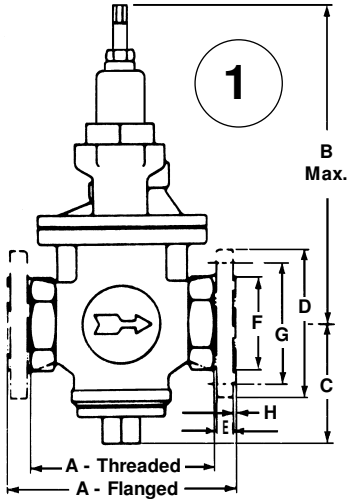
# L & UL SERIES

DIMENSIONS inches

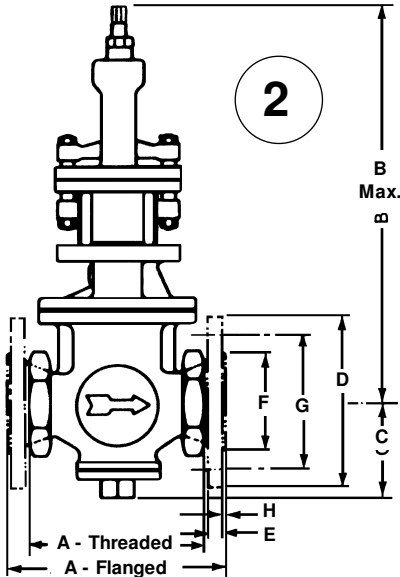
Size	① ② ③			C	D	E	F	Bolt Circle G	H	No. of Holes	Bolt Size	Bolt Hole
	A	B	B									
<b>THREADED, BRONZE &amp; IRON</b>												
1/2	5¾	10	13⅞	11⅞	2⅞	—	—	—	—	—	—	—
3/4	5¾	10	13⅞	11⅞	2⅞	—	—	—	—	—	—	—
1	5¾	10	13⅞	11⅞	2⅞	—	—	—	—	—	—	—
1¼	5¾	10¼	14¼	11⅜	3⅞	—	—	—	—	—	—	—
1½	6¼	10⅝	14½	11¾	3⅝	—	—	—	—	—	—	—
2	7½	11⅞	15	12¼	3½	—	—	—	—	—	—	—
<b>ANSI CLASS 125 CAST IRON FLANGED</b>												
1½	7½	10⅝	14½	11¾	4⅞	5	9/16	—	3⅞	—	4	1/2 5/8
2	8¾	11⅞	15	12¼	4⅝	6	5/8	—	4¾	—	4	5/8 3/4
2½	9¾	12	15¾	13⅞	5½	7	11/16	—	5½	—	4	5/8 3/4
3	11	12½	16⅜	13⅝	6½	7½	3/4	—	6	—	4	5/8 3/4
4	13½	14	15⅞	18⅞	7	9	15/16	—	7½	—	8	5/8 3/4
<b>ANSI CLASS 250 CAST IRON FLANGED</b>												
1½	8	10⅝	14½	11¾	4⅞	6⅞	3/4	3⅞	4½	1/16	4	3/4 7/8
2	9½	11⅞	15	12¼	4⅝	6½	13/16	4⅞	5	1/16	8	5/8 3/4
2½	10⅜	12	15¾	13⅞	5½	7½	15/16	4⅞	5⅞	1/16	8	3/4 7/8
3	11¾	12½	16⅜	13⅝	6½	8¼	1⅞	5⅞	6⅞	1/16	8	3/4 7/8
4	14⅞	14	15⅞	18⅞	7½	10	1⅞	6⅞	7⅞	1/16	8	3/4 7/8
<b>ANSI CLASS 150 BRONZE</b>												
1/2	6¾	10	13⅞	11⅞	2⅞	3½	9/16	—	2⅞	—	4	1/2 5/8
3/4	6¾	10	13⅞	11⅞	2⅞	3⅞	9/16	—	2¾	—	4	1/2 5/8
1	6¾	10	13⅞	11⅞	2⅞	4¼	9/16	—	3⅞	—	4	1/2 5/8
1¼	7	10¼	14¼	11⅜	3⅞	4⅝	9/16	—	3½	—	4	1/2 5/8
1½	7½	10⅝	14½	11¾	3⅞	5	9/16	—	3⅞	—	4	1/2 5/8
2	8¾	11⅞	14¾	12¼	3½	6	5/8	—	4¾	—	4	5/8 3/4
2½	9¾	12	15⅞	13⅞	4⅝	7	11/16	—	5½	—	4	5/8 3/4
3	11	12½	16⅜	13⅝	5¼	7½	3/4	—	6	—	4	5/8 3/4
4	13	14	15⅞	18⅞	7	9	11/16	—	7½	—	8	3/4 5/8
<b>ANSI CLASS 300 BRONZE FLANGED</b>												
1/2	6¾	10	13⅞	11⅞	2⅞	3¾	9/16	—	2⅝	—	4	1/2 5/8
3/4	6¾	10	13⅞	11⅞	2⅞	4⅝	9/16	—	3¼	—	4	5/8 3/4
1	6¾	10	13⅞	11⅞	2⅞	4⅞	9/16	—	3½	—	4	5/8 3/4
1¼	7	10¼	14¼	11⅜	3⅞	5¼	9/16	—	3⅞	—	4	5/8 3/4
1½	7½	10⅝	14½	11¾	3⅞	6⅞	9/16	—	4½	—	4	3/4 7/8
2	8¾	11⅞	14¾	12¼	3½	6½	5/8	—	5	—	8	5/8 3/4
2½	9¾	12	15⅞	13⅞	4⅝	7½	11/16	—	5⅞	—	8	3/4 7/8
3	11	12½	16⅜	13⅝	5¼	8¼	3/4	—	6⅞	—	8	3/4 7/8
4	13	14	15⅞	18⅞	7	10	11/16	—	7⅞	—	8	3/4 7/8
<b>ANSI CLASS 150 CAST STEEL FLANGED</b>												
1/2	7⅝	11⅞	15⅞	12⅞	3⅞	3½	5/16	1⅞	2⅞	1/16	4	1/2 5/8
3/4	7⅝	11⅞	15⅞	12⅞	3⅞	3⅞	3/8	1⅞	2¾	1/16	4	1/2 5/8
1	7½	11⅞	15⅞	12⅞	3⅞	4¼	3/8	2	3⅞	1/16	4	1/2 5/8
1¼	7⅞	11⅞	15⅞	12⅞	3⅞	4⅝	7/16	2½	3½	1/16	4	1/2 5/8
1½	8¾	12⅞	16⅞	13⅞	4⅞	5	1/2	2⅞	3⅞	1/16	4	1/2 5/8
2	10¼	11⅞	15¾	13	4½	6	9/16	3⅞	4¾	1/16	4	5/8 3/4
2½	11⅝	12⅞	16⅞	14	6	7	5/8	4⅞	5½	1/16	4	5/8 3/4
3	12½	13⅞	17⅞	14⅞	6⅞	7½	11/16	5	6	1/16	4	5/8 3/4
4	14⅞	14¾	18½	15⅞	7⅞	9	7/8	6⅞	7½	1/16	4	5/8 3/4
<b>ANSI CLASS 300 CAST STEEL FLANGED</b>												
1/2	8	11⅞	15⅞	12⅞	3⅞	3¾	½	1⅞	2⅞	1/16	4	1/2 5/8
3/4	8	11⅞	15⅞	12⅞	3⅞	4⅝	9/16	1⅞	3¼	1/16	4	5/8 3/4
1	8	11⅞	15⅞	12⅞	3⅞	4⅞	5/8	2	3½	1/16	4	5/8 3/4
1¼	8⅞	11⅞	15⅞	13⅞	3⅞	5¼	11/16	2½	3⅞	1/16	4	5/8 3/4
1½	8⅞	12⅞	16⅞	13⅞	4⅞	6⅞	¾	2⅞	4½	1/16	4	3/4 7/8
2	10¾	11⅞	15¾	13	4½	6½	13/16	3⅞	5	1/16	8	5/8 3/4
2½	12¼	12⅞	16⅞	14	6	7½	15/16	4⅞	5⅞	1/16	8	3/4 7/8
3	13¼	13⅞	17⅞	14⅞	6⅞	8¼	1⅞	5	6⅞	1/16	8	3/4 7/8
4	15	14¾	18½	15⅞	7⅞	10	1⅞	6⅞	7⅞	1/16	8	3/4 7/8
<b>ANSI CLASS 400 &amp; 600 CAST STEEL FLANGED</b>												
1/2	8½	11⅞	15⅞	12⅞	3⅞	3¾	9/16	1⅞	2⅞	1/4	4	1/2 5/8
3/4	8½	11⅞	15⅞	12⅞	3⅞	4⅝	5/8	1⅞	3¼	1/4	4	5/8 3/4
1	8½	11⅞	15⅞	12⅞	3⅞	4⅞	11/16	2	3½	1/4	4	5/8 3/4
1¼	9	11⅞	15⅞	13⅞	3⅞	5¼	13/16	2½	3⅞	1/4	4	5/8 3/4
1½	9½	12⅞	16⅞	13⅞	4⅞	6⅞	7/8	2⅞	4½	1/4	4	3/4 7/8
2	11½	11⅞	15¾	13	4½	6½	1	3⅞	5	1/4	8	5/8 3/4
2½	13	12⅞	16⅞	14	6	7½	1⅞	4⅞	5⅞	1/4	8	3/4 7/8
3	14	13⅞	17⅞	14⅞	6⅞	8¼	1¼	5	6⅞	1/4	8	3/4 7/8
4	16	14¾	18½	15⅞	7⅞	10¾	1½	6⅞	8½	1/4	8	7/8 1

# L & UL SERIES

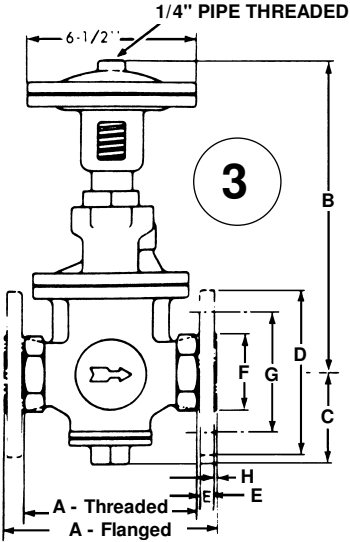
## DIMENSIONS DIAGRAMS



STANDARD REGULATOR - L SERIES AND UL SERIES



DIFFERENTIAL REGULATOR - LX SERIES



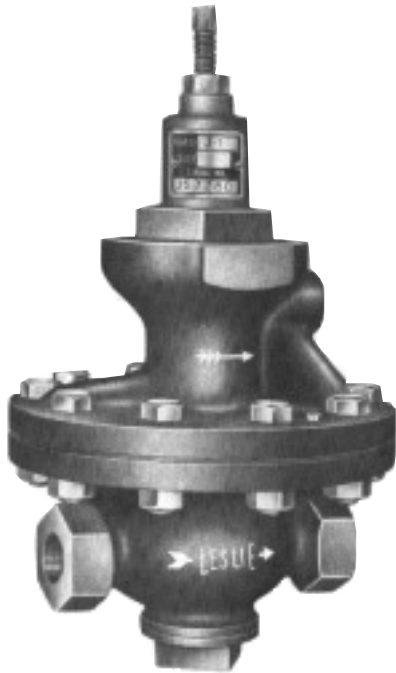
T TOPWORKS



# J SERIES PRESSURE REDUCING REGULATOR

SIZES 1/2"

PRESSURES to 300 PSIG at 550 °F



**J SERIES**

- Small Flow Steam, Air or Gas Service
- 85% Accuracy of Regulation, Steam
- 90% Accuracy of Regulation, Air or Gas
- 10:1 Rangeability
- Packless Construction
- One Valve Adjusts to All Ranges
- Pressure Reduction of 15 psi minimum

## MODELS<sup>1</sup>

- J\_-1-5-290 psi range<sup>2</sup>, Steam Svc.
- JA\_-2-5-290 psi range<sup>2</sup>, Air or Gas Svc.

## OPTIONS<sup>1</sup>

- L-Trim for 1-50 psi range<sup>3</sup>

## APPLICATION DATA

- HVAC Systems
- Process Control Systems for Food, Moulding, 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)
<b>BRONZE</b> B16.1 Class 300 NPT	300 (21.0)	@ 550 (288)

## RATED FLOW COEFFICIENTS (Cv)

STEAM	1
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*For Sizing Capacity Tables see Page 44*

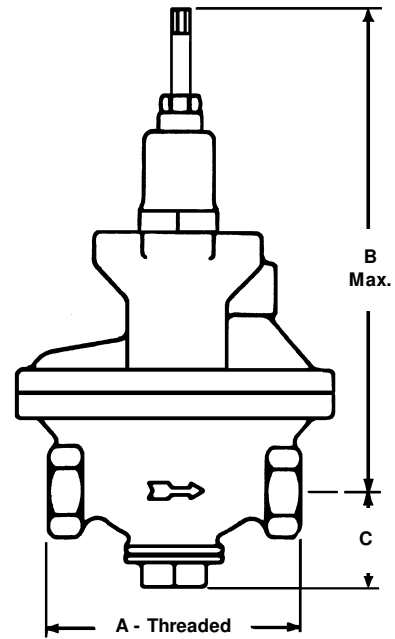
1. Insert letter code for options in model number as required.  
 2. For inlet pressures over 100 psi, minimum pressure is 5% of inlet pressure.  
 3. For inlet pressures over 100 psi, minimum pressure is 1% of inlet pressure.

# J SERIES PRESSURE REDUCING REGULATOR SPECIFICATIONS

Bronze body reducing valve shall be self contained, diaphragm actuated with internal pilot. Main valve shall be stainless steel hardened to a minimum of 500 Brinell. Valve shall have no stuffing box or bellows. Main valve seat ring shall be stainless steel with Stellite seating surface. All valve seats shall be renewable.

## MATERIALS OF CONSTRUCTION

Body, Cast Bronze .....ASTM B61 UNS C92200  
 Seat Ring, std. ....SS w/Stellite®  
 opt. ....Bronze  
 Main Valve Trim, J.....Hardened SS  
 JA. ....SS w/Neoprene Disc  
 Diaphragm, J .....Bronze  
 JA .....Rubber



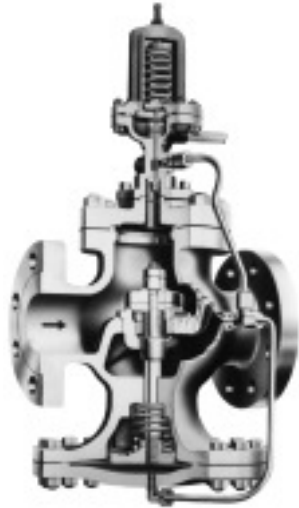
**DIMENSIONS** inches (mm)  
**and WEIGHTS** pounds (kg)

Size	A	B	C	Weight
1/2	4½	8¼	1¾	14
(12)	(114)	(210)	(44)	(6)

# VKP PILOT OPERATED REDUCING VALVE

SIZES 1/2" – 4"

PRESSURES to 250 PSIG at 450 °F



VKP PILOT OPERATED REDUCING VALVE

- Self Contained
- Normally Closed
- Single Seat
- Balanced Metal Diaphragms
- Protected Main Spring
- Fluid, Gas & Vapor Applications
- Accurate Regulation Unaffected by Service Conditions
- ANSI/FCI 70-2 Class IV Shutoff
- Virtually Frictionless for Long Service Life
- Packless Construction
- Easy In-line Maintenance
- Minimum Operating  $\Delta P$  10 psi (.7 bar)
- Rangeability 20:1

## APPLICATION DATA

- Pressure Regulating for Steam Distribution
- Regulating for Process Control (Temperature or Pressure)
- Maintain Back Pressure or Differential Pressure
- For use with Self-contained, Pneumatic or Electronic Pilots
- Single Point or Multiple Use Applications

## 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)

## PILOT PRESSURE RANGES (PSIG)

3-20	5-50	10-100	20-150
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*For Sizing Capacity Tables see Page 45*

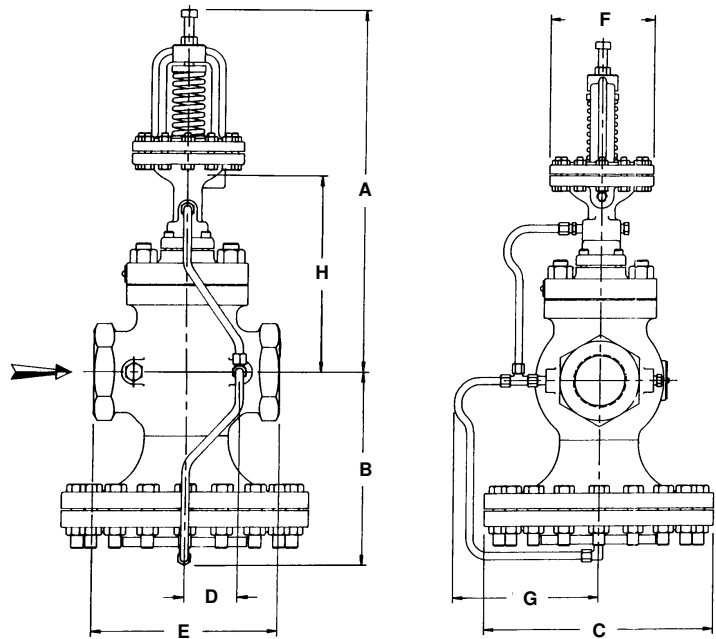
## RATED FLOW COEFFICIENTS (Cv)

REGULATOR SIZE													
1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12
2.8	5.4	8.8	14.1	19.8	31	44	74	109	169	248	444	706	1113

# VKP PILOT OPERATED REDUCING VALVE SPECIFICATION

The valve shall be self-operated, external pilot type, single seated, metal diaphragm actuated, normally closed design. The valve will function quickly and shut tight on dead end service. Internal parts including seats, discs, stems and diaphragms shall be of stainless steel. There shall be no springs in the steam space and no stuffing box. The valve shall be easy to maintain with all parts accessible without removal from the line.

The Pilot shall be mounted on top of the main valve and connected to it with a male union. The Pilot shall be normally closed design with packless construction. A strainer screen shall be built into the Pilot inlet. The Pilot shall be interchangeable on all sizes of main valves.



## MATERIALS OF CONSTRUCTION

Body, Cast Iron .....ASTM A126 Cl. B  
 Stem .....303 St. Stl. ASTM A582  
 Disc .....420 St. Stl. ASTM A743 CA-40  
 Seat .....420 St. Stl. ASTM A743 CA-40  
 Gasket .....Non-asbestos  
 Diaphragm .....Stainless Steel MIL-S-5059C  
 Spring .....Steel

## DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

SIZE	A	B	C	D	FACE TO FACE			F	G	H	APPROX. WT.		
					E						ANSI NPT	ANSI 125	ANSI 250
					ANSI NPT	ANSI 125	ANSI 250						
1/2 (12)	14 3/4 (375)	5 1/4 (133)	5 7/8 (149)	1 1/4 (32)	4 3/8 (111)	—	—	4 9/16 (116)	5 1/4 (133)	6 1/2 (165)	21 (9)	—	—
3/4 (19)	14 3/4 (375)	5 1/2 (140)	6 1/2 (165)	1 3/8 (35)	4 3/8 (111)	—	—	4 9/16 (116)	5 3/8 (137)	6 5/8 (168)	25 (11)	—	—
1 (25)	15 1/8 (384)	6 1/4 (159)	7 (178)	1 1/2 (38)	5 3/8 (137)	5 1/2 (140)	6 (152)	4 9/16 (116)	5 1/2 (140)	7 3/8 (187)	30 (13)	33 (15)	38 (17)
1 1/4 (32)	14 7/8 (378)	6 1/2 (165)	7 7/8 (200)	1 7/8 (48)	6 1/2 (165)	6 3/4 (171)	7 1/4 (184)	4 9/16 (116)	5 3/4 (146)	7 1/8 (181)	40 (18)	44 (20)	48 (22)
1 1/2 (38)	15 1/4 (387)	7 1/8 (181)	8 3/4 (222)	2 (51)	7 1/4 (184)	6 7/8 (175)	7 3/8 (187)	4 9/16 (116)	6 (152)	7 1/2 (191)	50 (23)	54 (24)	62 (28)
2 (51)	15 7/8 (403)	7 5/8 (194)	9 7/8 (251)	2 1/8 (54)	7 1/2 (191)	8 1/2 (216)	9 (229)	4 9/16 (116)	6 1/2 (165)	8 1/8 (206)	69 (31)	80 (36)	85 (38)
2 1/2 (64)	16 1/4 (413)	8 3/8 (213)	10 7/8 (276)	2 3/8 (60)	—	9 3/8 (238)	10 (254)	4 9/16 (116)	7 (178)	8 1/2 (216)	—	102 (46)	107 (48)
3 (76)	17 1/8 (435)	9 1/4 (235)	11 3/4 (298)	2 3/4 (70)	—	10 (254)	10 3/4 (273)	4 9/16 (116)	7 3/8 (187)	9 3/8 (238)	—	132 (60)	147 (67)
4 (102)	18 1/4 (464)	11 7/8 (302)	14 3/4 (375)	3 1/2 (89)	—	11 7/8 (302)	12 1/2 (318)	4 9/16 (116)	8 7/8 (275)	10 1/2 (267)	—	217 (98)	237 (108)

# AW SERIES REDUCING VALVE

SIZES 1/4"

PRESSURES to 200 PSIG at 150 °F

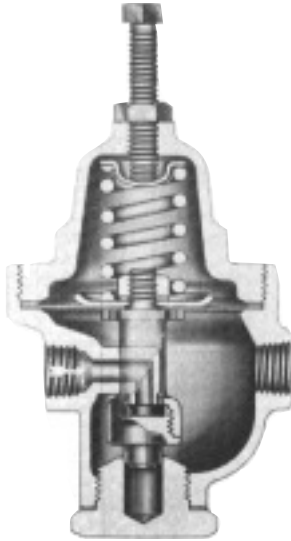
- Air or Liquid Service
- Tight Shutoff
- Quiet Operation

## MODELS

- AW\_\_\_ -5-95 psi Range, Bronze, Air or Liquid Service

## OPTIONS

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



## AW SERIES REDUCING VALVES

### APPLICATION DATA

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

### VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG (bar)	Temperature °F (°C)
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#### BRONZE

B16.24 Class	200 (13.8)	@	450 (232)
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### 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"	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	Threaded Ends	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.

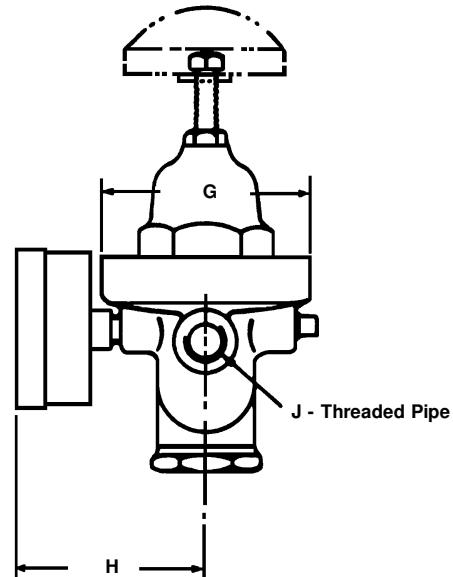
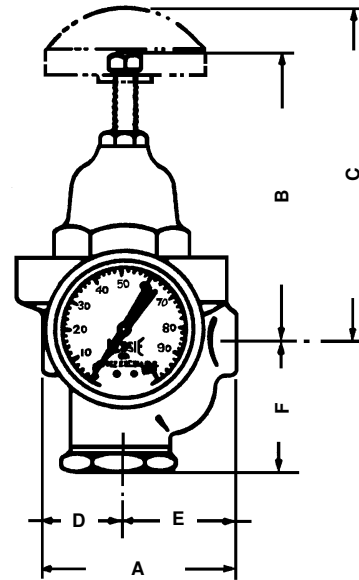
*For Sizing Capacity Tables see page 48*

# 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.....ASTM A283  
UNS Alloy C37700  
Seat .....Bronze  
Main Valve.....Bronze with Resilient Disc  
Diaphragm.....Resilient



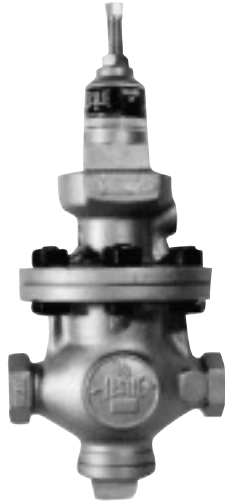
### DIMENSIONS inches (mm) AND WEIGHT pounds (kg)

SIZE	A	B		C		D	E	F	G	H	J	WT.
		AW & AWG	AWR & AWRG	D	E							
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



**LC SERIES  
REDUCING VALVE**

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

## MODELS

- See Table Below

*For Sizing Capacity Tables see page 46*

## APPLICATION DATA

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

## VALVE RATINGS

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

## 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 <sup>3</sup>	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	300/21	400/28	550/287	10/0.5	10-285/0.5-20		17-4-PH <sup>®</sup>	18-8 <sup>®</sup>	INCONEL <sup>®</sup>			
	LCC							Stainless, (hardened)	Stainless				
	LCD	17-4-PH <sup>®</sup> Stainless (hardened)	18-8 <sup>®</sup> Stainless	INCONEL <sup>®</sup>									
	LCLA				—	400/28		150/65	10/0.5	2-35/0.1-2.5	Bronze	Resilient	Bronze
	LCLB				300/21	400/28		550/287	10/0.5	2-35/0.1-2.5			
LCLC													
LCLD													
STEEL* Thru bolted Bonnet 1/2" bolted	LCBS	600/41	1000/69	750/398	10/0.5	25-400/2-28	1/4" (B) 5/16" (C) 1/8" (D)	17-4-PH <sup>®</sup> Stainless (hardened)	18-8 <sup>®</sup> Stainless	INCONEL <sup>®</sup>			
	LCCS												
	LCDS												
	LCLBS	600/41	1000/69	750/398	10/0.5	10-50/0.5-3.5							
	LCLCS												
	LCLDS												

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

<sup>3</sup> Soft seat configuration required for dead end service.

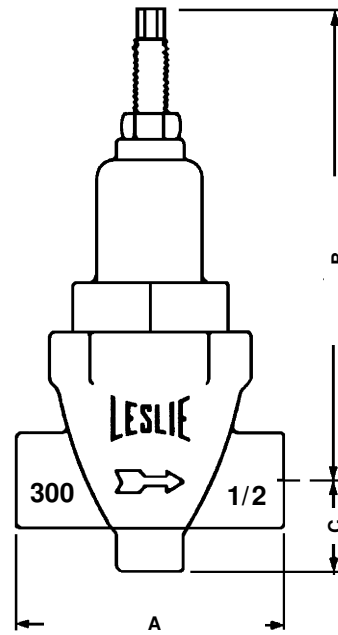
<sup>®</sup> See page 15 for listing of trademarks and their owners.

# LC SERIES REDUCING VALVE SPECIFICATION

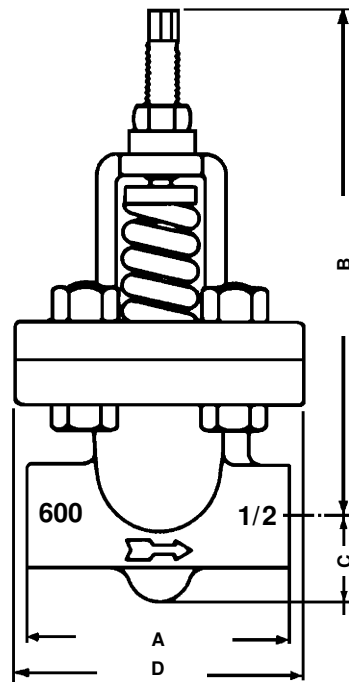
Spring and diaphragm pressure reducing valve are self contained and direct operated. Body is Cast Iron, Bronze, Cast Steel or Stainless Steel. Unit to be fully adjustable within operating range with changing springs. Unit comes without stuffing box or bellows seals.

## MATERIALS OF CONSTRUCTION

Body, Cast Iron .....ASTM A126 Cl. B  
 Body, Cast Bronze .....ASTM B-61 UNS C92200  
 Body, Cast Steel .....ASTM A216 WCB  
 Body, Stainless Steel.....ASTM 316 A351 CF8M  
 Trim .....17-4 PH PLUG, 18-8 Seat  
 'A' Trim .....Resilient  
 Diaphragm .....300 Series 316 Stainless Steel



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



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

## DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

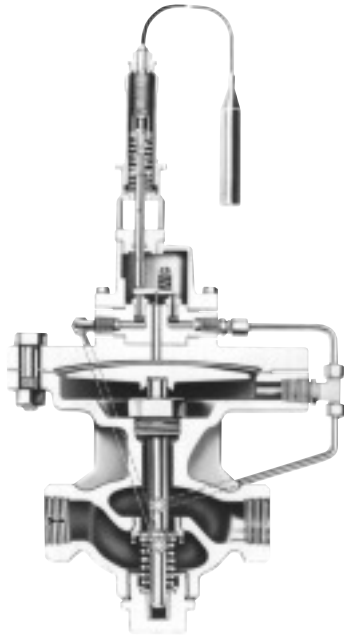
Size	A		B Maximum		C		D	Weight
	300	600	300	600	300	600		
1/2 (12)	4 <sup>3</sup> / <sub>16</sub> (106)	4 <sup>3</sup> / <sub>8</sub> (111)	6 <sup>13</sup> / <sub>16</sub> (173)	7 <sup>3</sup> / <sub>8</sub> (187)	1 <sup>5</sup> / <sub>16</sub> (33)	1 <sup>1</sup> / <sub>4</sub> (32)	4 <sup>3</sup> / <sub>8</sub> (111)	6 (.4)



# GT SERIES EVENTEMP TEMPERATURE REGULATOR

SIZES 1/2" – 4"

PRESSURES to 150 PSIG at 366°F<sup>1</sup>



GT SERIES

- 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

## APPLICATION DATA

- Storage Heating
- Storage Cooling

## VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG (bar)	Temperature <sup>1</sup> °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	

## RATED FLOW COEFFICIENTS (Cv)

REGULATOR SIZE								
1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	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

## 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

For Sizing Capacity Tables see Pages 42 & 51

## GT SELECTION TABLE

Model	Size Range (Inches)	End Connection	Maximum Inlet Pressure PSI	
			Steam	Water
<b>HEATING VALVES</b>				
GTK	1/2 - 2	THD	5-150	-
	2 1/2 - 4	125 ANSI FLG	5-125	-
	1 1/2 - 4	250 ANSI FLG	5-150	-
GTB	1/2 - 2	THD	5-150	-
	1 1/2 - 2	300 ANSI FLG	5-150	-
GTS	1/2 - 2	THD	5-150	-
	1/2 - 2	150 ANSI FLG	5-150	-
<b>COOLING VALVE</b>				
GTRK	1/2 - 2	THD	-	5-175
	2 1/2 - 4	125 ANSI FLG	-	5-175
	1 1/2 - 4	250 ANSI FLG	-	5-175

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

# GT SERIES EVENTEMP TEMPERATURE REGULATOR

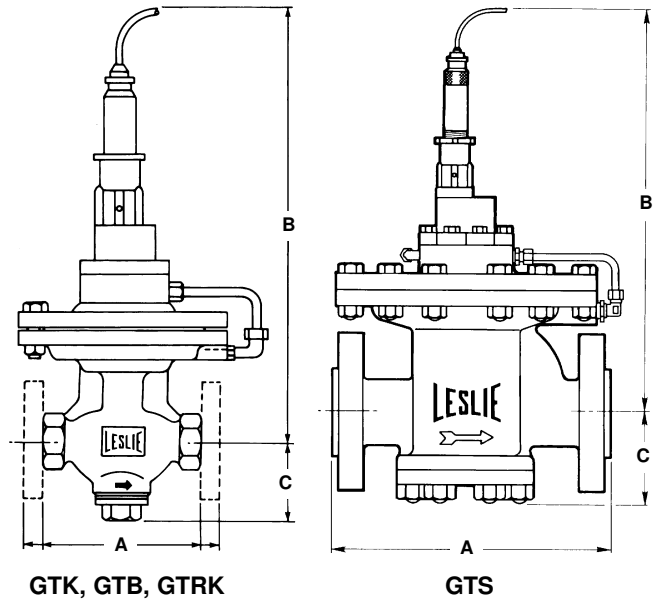
## SPECIFICATIONS

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 overstressing of the bellows for overrange 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 .....ASTM A126 Cl. B  
 Body, Cast Bronze .....ASTM B61 UNS C92200  
 Body, Cast Steel .....ASTM A216 WCB  
 Trim, GTK,GTB,GTRK .....SS w/Resilient Insert  
 GTS .....SS w/Stellite®  
 Diaphragm .....Spiroflex®  
 Bulb Casing, std .....Brass  
 opt. ....316 SS  
 opt. ....Monel  
 Thermal Element, std .....Copper  
 opt. ....316 SS  
 opt. ....Monel



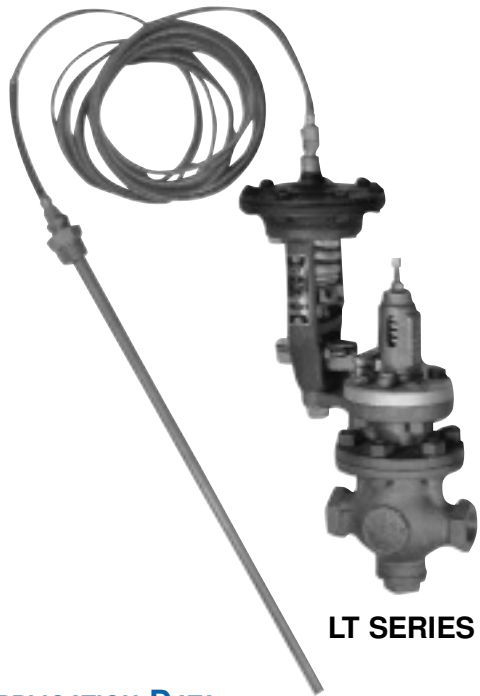
### DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

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	
½ (12)	6⅝ (156)	-	-	7⅞ (200)	15 <sup>13</sup> / <sub>16</sub> (402)	15¼ (387)	¾ (83)	3⅜ (86)	40 (18)	40 (18)	45 (20)	
¾ (19)	6½ (165)	-	-	7¼ (184)	15 <sup>13</sup> / <sub>16</sub> (402)	15¼ (387)	¾ (86)	3⅜ (86)	41 (19)	41 (19)	50 (23)	
1 (25)	7¼ (184)	-	-	7¼ (184)	15 <sup>7</sup> / <sub>8</sub> (403)	15 <sup>5</sup> / <sub>8</sub> (397)	¾ (98)	3⅝ (79)	43 (20)	43 (20)	55 (25)	
1¼ (32)	7 <sup>5</sup> / <sub>8</sub> (194)	-	-	8¾ (222)	16 <sup>7</sup> / <sub>16</sub> (417)	16⅞ (410)	4¼ (108)	3½ (89)	65 (30)	65 (30)	-	
1½ (38)	8½ (216)	-	10½ (267)	10 (254)	16 <sup>9</sup> / <sub>16</sub> (421)	16 <sup>5</sup> / <sub>8</sub> (422)	4 <sup>3</sup> / <sub>8</sub> (111)	3¾ (95)	80 (35)	80 (35)	65 (30)	
2 (51)	8½ (216)	-	10½ (267)	-	16 <sup>9</sup> / <sub>16</sub> (421)	-	4 <sup>3</sup> / <sub>8</sub> (111)	-	80 (35)	80 (35)	70 (32)	
2½ (64)	-	10 <sup>7</sup> / <sub>8</sub> (276)	11½ (292)	-	18⅞ (460)	-	5½ (140)	-	200 (91)	-	-	
3 (76)	-	11¾ (298)	12½ (318)	-	19 (483)	-	6¼ (159)	-	225 (102)	-	-	
4 (100)	-	13 <sup>7</sup> / <sub>8</sub> (352)	14½ (368)	-	20⅞ (511)	-	7 <sup>7</sup> / <sub>8</sub> (200)	-	266 (121)	-	-	

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

SIZES 1/2" – 3"

PRESSURES to 600 PSIG at 750 °F



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	

- 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

## MODELS<sup>1</sup>

- **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<sup>1</sup>

- **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

For Sizing Capacity Tables see Pages 44 & 53

## 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

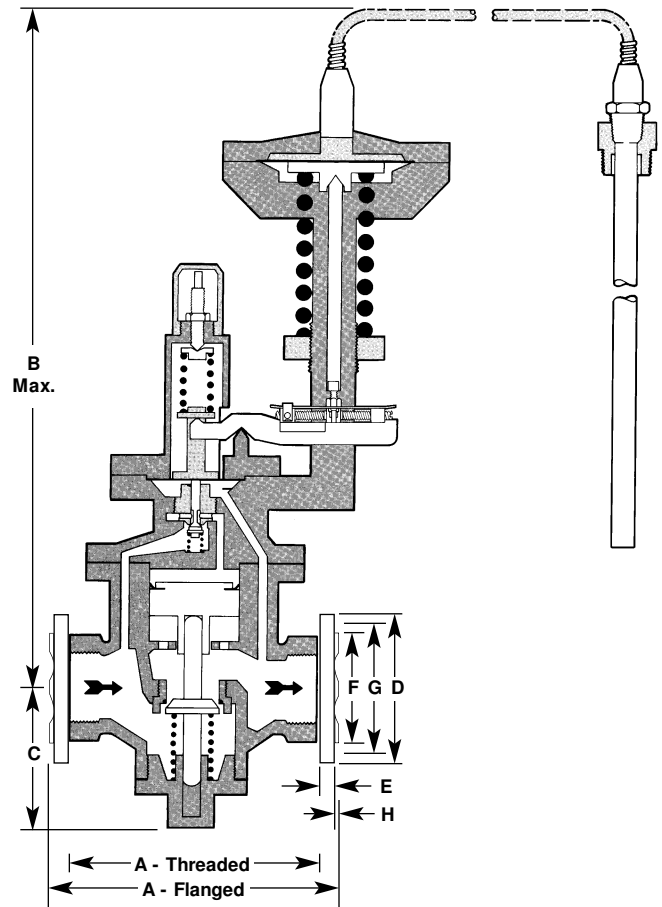
1. Insert letter code for options in model number as required.

# 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 Stellite seating surface. Cast steel body regulators shall have integral Stellite 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 .....	ASTM A126 Cl. B
Body, Cast Bronze .....	ASTM B61 UNS C92200
Body, Cast Steel .....	ASTM A216 WCB
Seat Ring .....	SS w/Stellite®
Main Valve Trim .....	Hardened SS
Bulb Casing, std. ....	Brass
opt. ....	316 SS
opt. ....	Monel
Thermal Element, std. ....	Brass
opt. ....	316 SS
opt. ....	Monel



See Dimensions Chart on page 28

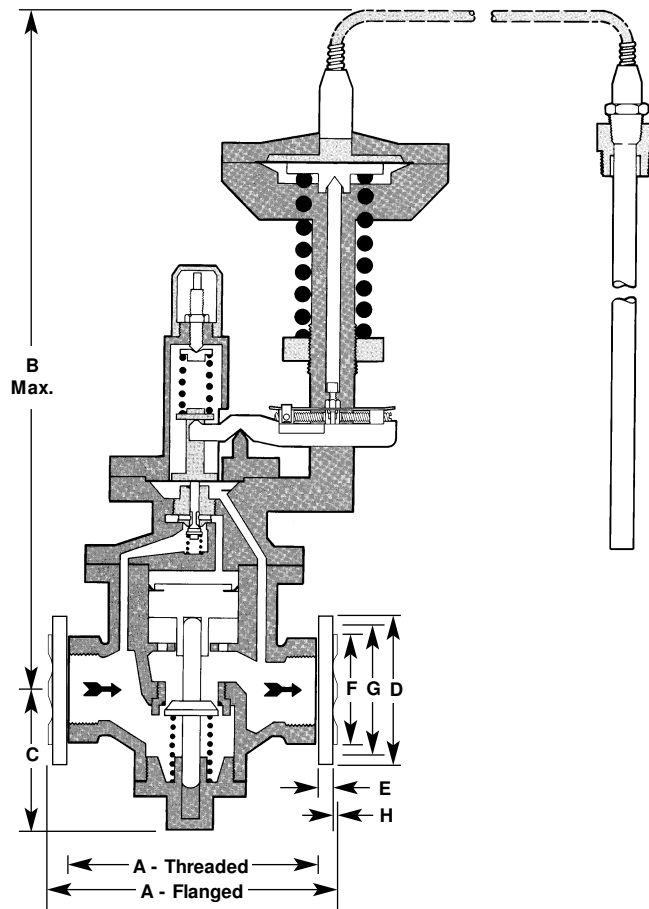
# LT/JT SERIES DUO-MATIC® REGULATOR

DIMENSIONS inches

Size	A	B	C	D	E	F	Circle G	H	Bolt No. of Holes	Bolt Size	Bolt Hole
<b>THREADED, BRONZE &amp; IRON</b>											
1/2	5 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	—	—	—	—	—	—	—	—
3/4	5 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	—	—	—	—	—	—	—	—
1	5 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	—	—	—	—	—	—	—	—
1 1/4	5 <sup>3</sup> / <sub>4</sub>	19 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>8</sub>	—	—	—	—	—	—	—	—
1 1/2	6 <sup>1</sup> / <sub>4</sub>	20	3 <sup>5</sup> / <sub>8</sub>	—	—	—	—	—	—	—	—
2	7 <sup>1</sup> / <sub>2</sub>	20 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	—	—	—	—	—	—	—	—
<b>ANSI CLASS 125 CAST IRON FLANGED</b>											
1 1/2	7 <sup>1</sup> / <sub>2</sub>	20	4 <sup>1</sup> / <sub>8</sub>	5	9/16	—	3 <sup>7</sup> / <sub>8</sub>	—	4	1/2	5/8
2	8 <sup>3</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>2</sub>	4 <sup>3</sup> / <sub>8</sub>	6	5/8	—	4 <sup>3</sup> / <sub>4</sub>	—	4	5/8	3/4
2 1/2	9 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	7	11/16	—	5 <sup>1</sup> / <sub>2</sub>	—	4	5/8	3/4
3	11	21 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	3/4	—	6	—	4	5/8	3/4
4	13 <sup>1</sup> / <sub>2</sub>	23 <sup>1</sup> / <sub>2</sub>	7	9	15/16	—	7 <sup>1</sup> / <sub>2</sub>	—	8	5/8	3/4
<b>ANSI CLASS 250 CAST IRON FLANGED</b>											
1 1/2	8	20	4 <sup>1</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>8</sub>	3/4	3 <sup>9</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>2</sub>	1/16	4	3/4	7/8
2	9 <sup>1</sup> / <sub>2</sub>	20 <sup>1</sup> / <sub>2</sub>	4 <sup>3</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	13/16	4 <sup>3</sup> / <sub>16</sub>	5	1/16	8	5/8	3/4
2 1/2	10 <sup>3</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	15/16	4 <sup>15</sup> / <sub>16</sub>	5 <sup>7</sup> / <sub>8</sub>	1/16	8	3/4	7/8
3	11 <sup>3</sup> / <sub>4</sub>	21 <sup>7</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>2</sub>	8 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>16</sub>	5 <sup>11</sup> / <sub>16</sub>	6 <sup>5</sup> / <sub>8</sub>	1/16	8	3/4	7/8
4	14 <sup>1</sup> / <sub>8</sub>	23 <sup>1</sup> / <sub>2</sub>	7 <sup>1</sup> / <sub>2</sub>	10	1 <sup>3</sup> / <sub>16</sub>	6 <sup>15</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	1/16	8	3/4	7/8
<b>ANSI CLASS 150 BRONZE</b>											
1/2	6 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>2</sub>	9/16	—	2 <sup>3</sup> / <sub>8</sub>	—	4	1/2	5/8
3/4	6 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	9/16	—	2 <sup>3</sup> / <sub>4</sub>	—	4	1/2	5/8
1	6 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>4</sub>	9/16	—	3 <sup>1</sup> / <sub>8</sub>	—	4	1/2	5/8
1 1/4	7	19 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	9/16	—	3 <sup>1</sup> / <sub>2</sub>	—	4	1/2	5/8
1 1/2	7 <sup>1</sup> / <sub>2</sub>	20	3 <sup>7</sup> / <sub>16</sub>	5	9/16	—	3 <sup>7</sup> / <sub>8</sub>	—	4	1/2	5/8
2	8 <sup>3</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	6	5/8	—	4 <sup>3</sup> / <sub>4</sub>	—	4	5/8	3/4
2 1/2	9 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>8</sub>	7	11/16	—	5 <sup>1</sup> / <sub>2</sub>	—	4	5/8	3/4
3	11	21 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	7 <sup>1</sup> / <sub>2</sub>	3/4	—	6	—	4	5/8	3/4
4	13	23 <sup>1</sup> / <sub>2</sub>	7	9	11/16	—	7 <sup>1</sup> / <sub>2</sub>	—	8	3/4	5/8
<b>ANSI CLASS 300 BRONZE FLANGED</b>											
1/2	6 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	3 <sup>3</sup> / <sub>4</sub>	9/16	—	2 <sup>5</sup> / <sub>8</sub>	—	4	1/2	5/8
3/4	6 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	4 <sup>5</sup> / <sub>8</sub>	9/16	—	3 <sup>1</sup> / <sub>4</sub>	—	4	5/8	3/4
1	6 <sup>3</sup> / <sub>4</sub>	19 <sup>3</sup> / <sub>8</sub>	2 <sup>7</sup> / <sub>8</sub>	4 <sup>7</sup> / <sub>8</sub>	9/16	—	3 <sup>1</sup> / <sub>2</sub>	—	4	5/8	3/4
1 1/4	7	19 <sup>5</sup> / <sub>8</sub>	3 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	9/16	—	3 <sup>7</sup> / <sub>8</sub>	—	4	5/8	3/4
1 1/2	7 <sup>1</sup> / <sub>2</sub>	20	3 <sup>7</sup> / <sub>16</sub>	6 <sup>1</sup> / <sub>8</sub>	9/16	—	4 <sup>1</sup> / <sub>2</sub>	—	4	3/4	7/8
2	8 <sup>3</sup> / <sub>4</sub>	20 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	5/8	—	5	—	8	5/8	3/4
2 1/2	9 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>8</sub>	7 <sup>1</sup> / <sub>2</sub>	11/16	—	5 <sup>7</sup> / <sub>8</sub>	—	8	3/4	7/8
3	11	21 <sup>7</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>4</sub>	8 <sup>1</sup> / <sub>4</sub>	3/4	—	6 <sup>5</sup> / <sub>8</sub>	—	8	3/4	7/8
4	13	23 <sup>1</sup> / <sub>2</sub>	7	10	11/16	—	7 <sup>7</sup> / <sub>8</sub>	—	8	3/4	7/8
<b>ANSI CLASS 150 CAST STEEL FLANGED</b>											
1/2	7 <sup>5</sup> / <sub>8</sub>	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>2</sub>	5/16	1 <sup>3</sup> / <sub>8</sub>	2 <sup>3</sup> / <sub>8</sub>	1/16	4	1/2	5/8
3/4	7 <sup>5</sup> / <sub>8</sub>	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	3 <sup>7</sup> / <sub>8</sub>	3/8	1 <sup>11</sup> / <sub>16</sub>	2 <sup>3</sup> / <sub>4</sub>	1/16	4	1/2	5/8
1	7 <sup>1</sup> / <sub>2</sub>	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	4 <sup>1</sup> / <sub>4</sub>	3/8	2	3 <sup>1</sup> / <sub>8</sub>	1/16	4	1/2	5/8
1 1/4	7 <sup>7</sup> / <sub>8</sub>	21	3 <sup>13</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	7/16	2 <sup>1</sup> / <sub>2</sub>	3 <sup>1</sup> / <sub>2</sub>	1/16	4	1/2	5/8
1 1/2	8 <sup>3</sup> / <sub>4</sub>	21 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	5	1/2	2 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>8</sub>	1/16	4	1/2	5/8
2	10 <sup>1</sup> / <sub>4</sub>	21 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	6	9/16	3 <sup>5</sup> / <sub>8</sub>	4 <sup>3</sup> / <sub>4</sub>	1/16	4	5/8	3/4
2 1/2	11 <sup>5</sup> / <sub>8</sub>	22 <sup>5</sup> / <sub>8</sub>	6	7	5/8	4 <sup>1</sup> / <sub>8</sub>	5 <sup>1</sup> / <sub>2</sub>	1/16	4	5/8	3/4
3	12 <sup>1</sup> / <sub>2</sub>	23 <sup>1</sup> / <sub>2</sub>	6 <sup>13</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	11/16	5	6	1/16	4	5/8	3/4
4	14 <sup>3</sup> / <sub>8</sub>	24 <sup>1</sup> / <sub>2</sub>	7 <sup>9</sup> / <sub>16</sub>	9	7/8	6 <sup>3</sup> / <sub>16</sub>	7 <sup>1</sup> / <sub>2</sub>	1/16	4	5/8	3/4
<b>ANSI CLASS 300 CAST STEEL FLANGED</b>											
1/2	8	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	1/2	1 <sup>3</sup> / <sub>8</sub>	2 <sup>5</sup> / <sub>8</sub>	1/16	4	1/2	5/8
3/4	8	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	9/16	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>4</sub>	1/16	4	5/8	3/4
1	8	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>8</sub>	5/8	2	3 <sup>1</sup> / <sub>2</sub>	1/16	4	5/8	3/4
1 1/4	8 <sup>3</sup> / <sub>8</sub>	21	3 <sup>13</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>4</sub>	11/16	2 <sup>1</sup> / <sub>2</sub>	3 <sup>7</sup> / <sub>8</sub>	1/16	4	5/8	3/4
1 1/2	8 <sup>7</sup> / <sub>8</sub>	21 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>8</sub>	3/4	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1/16	4	3/4	7/8
2	10 <sup>3</sup> / <sub>4</sub>	21 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	13/16	3 <sup>5</sup> / <sub>8</sub>	5	1/16	8	5/8	3/4
2 1/2	12 <sup>1</sup> / <sub>4</sub>	22 <sup>5</sup> / <sub>8</sub>	6	7 <sup>1</sup> / <sub>2</sub>	15/16	4 <sup>1</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	1/16	8	3/4	7/8
3	13 <sup>1</sup> / <sub>4</sub>	23 <sup>1</sup> / <sub>2</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>16</sub>	5	6 <sup>5</sup> / <sub>8</sub>	1/16	8	3/4	7/8
4	15	24 <sup>1</sup> / <sub>2</sub>	7 <sup>9</sup> / <sub>16</sub>	10	1 <sup>3</sup> / <sub>16</sub>	6 <sup>3</sup> / <sub>16</sub>	7 <sup>7</sup> / <sub>8</sub>	1/16	8	3/4	7/8
<b>ANSI CLASS 400 &amp; 600 CAST STEEL FLANGED</b>											
1/2	8 <sup>1</sup> / <sub>2</sub>	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	3 <sup>3</sup> / <sub>4</sub>	9/16	1 <sup>3</sup> / <sub>8</sub>	2 <sup>5</sup> / <sub>8</sub>	1/4	4	1/2	5/8
3/4	8 <sup>1</sup> / <sub>2</sub>	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	4 <sup>5</sup> / <sub>8</sub>	5/8	1 <sup>11</sup> / <sub>16</sub>	3 <sup>1</sup> / <sub>4</sub>	1/4	4	5/8	3/4
1	8 <sup>1</sup> / <sub>2</sub>	20 <sup>7</sup> / <sub>8</sub>	3 <sup>7</sup> / <sub>16</sub>	4 <sup>7</sup> / <sub>8</sub>	11/16	2	3 <sup>1</sup> / <sub>2</sub>	1/4	4	5/8	3/4
1 1/4	9	21	3 <sup>13</sup> / <sub>16</sub>	5 <sup>1</sup> / <sub>4</sub>	13/16	2 <sup>1</sup> / <sub>2</sub>	3 <sup>7</sup> / <sub>8</sub>	1/4	4	5/8	3/4
1 1/2	9 <sup>1</sup> / <sub>2</sub>	21 <sup>3</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	6 <sup>1</sup> / <sub>8</sub>	7/8	2 <sup>7</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	1/4	4	3/4	7/8
2	11 <sup>1</sup> / <sub>2</sub>	21 <sup>5</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>2</sub>	6 <sup>1</sup> / <sub>2</sub>	1	3 <sup>5</sup> / <sub>8</sub>	5	1/4	8	5/8	3/4
2 1/2	13	22 <sup>5</sup> / <sub>8</sub>	6	7 <sup>1</sup> / <sub>2</sub>	1 <sup>1</sup> / <sub>8</sub>	4 <sup>1</sup> / <sub>8</sub>	5 <sup>7</sup> / <sub>8</sub>	1/4	8	3/4	7/8
3	14	23 <sup>1</sup> / <sub>2</sub>	6 <sup>13</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	5	6 <sup>5</sup> / <sub>8</sub>	1/4	8	3/4	7/8
4	16	24 <sup>1</sup> / <sub>2</sub>	7 <sup>9</sup> / <sub>16</sub>	10 <sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>2</sub>	6 <sup>3</sup> / <sub>16</sub>	8 <sup>1</sup> / <sub>2</sub>	1/4	8	7/8	1

# LT/JT SERIES DUO-MATIC® REGULATOR

## DIMENSIONS DIAGRAM



# M SERIES TEMPERATURE REGULATOR

SIZES 1/2" – 1"

PRESSURES to 250 PSIG at 366°F<sup>1</sup>



**M SERIES**

## APPLICATION DATA

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

## VALVE RATINGS

Valve Ends ASME/ANSI	Pressure PSIG (bar)	Temperature <sup>2</sup> °F (°C)
<b>CAST IRON</b> B16.1 NPT	200 (13.8)	@ 366 (186)
<b>BRONZE</b> 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	

- 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

## MODELS

- **M\_\_** – 3/4"-1" Bronze, 100/100<sup>1</sup> PSI Max. Inlet, Heating
- **M\_K** – 3/4"-1" Cast Iron, 100/100<sup>1</sup> PSI Max. Inlet, Heating
- **ME\_** – 1/2" Bronze, 200/50<sup>1</sup> PSI Max. Inlet, Heating
- **MD\_** – 1/2" Bronze, 100/50<sup>1</sup> PSI Max. Inlet, Heating
- **MC\_** – 1/2" Bronze, 50/50<sup>1</sup> 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 54*

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

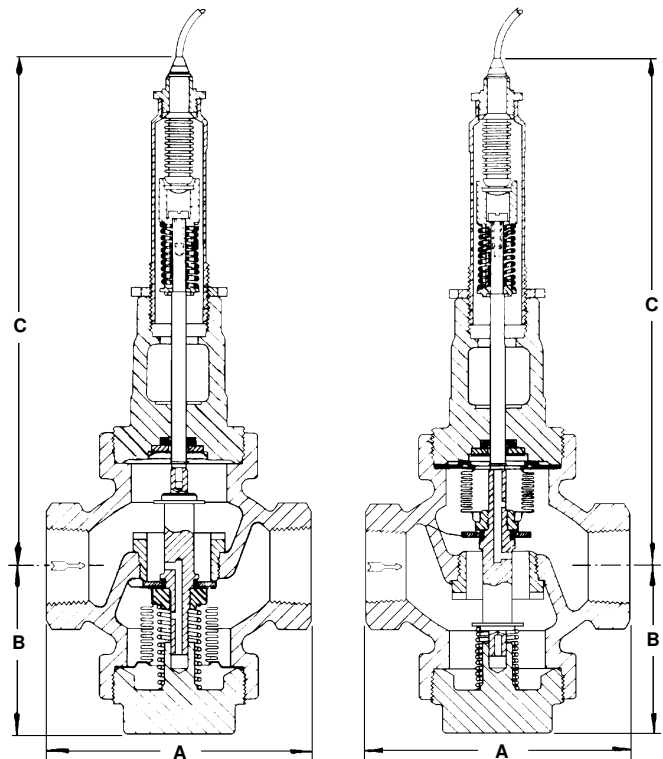
# M SERIES TEMPERATURE REGULATOR

## 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 overstressing 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 .....	ASTM A126 Cl. B
Body, Cast Bronze .....	ASTM B61 UNS C92200
Trim .....	SS
Bulb Casing, std .....	Brass
opt. ....	316 SS
opt. ....	Monel
Thermal Element, std .....	Copper
opt. ....	316 SS
opt. ....	Monel



COOLING VERSION

HEATING VERSION

### DIMENSIONS inches (mm) AND WEIGHTS pounds (kg)

Service	A	B	C	Weight
Cooling	4½ (114)	2⅞ (73)	8¾ (222)	8 (3.6)
Heating	4½ (114)	2⅞ (73)	8¾ (222)	8 (3.6)



# 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:

*Downstream pressure 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.

*Downstream pressure 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.

## **S P E C I F I C A T I O N S**

**Flow capacity @ 100 psig (700 kPa) supply, 20 psig (140 kPa) outlet:** 8 SCFM (13.4 m<sup>3</sup>/hr)

**Exhaust capacity @ downstream pressure 5 psig (35 kPa) above setpoint:** 0.1 SCFM (0.17 m<sup>3</sup>/hr)

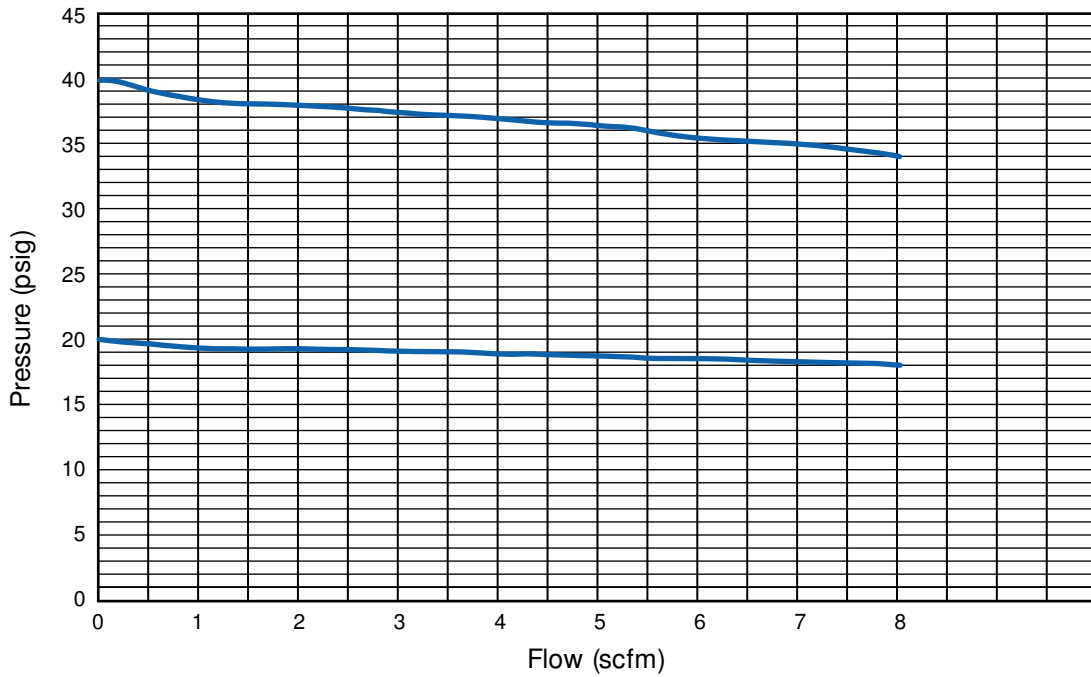
**Sensitivity:** 1” (2.5 cm) of water

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

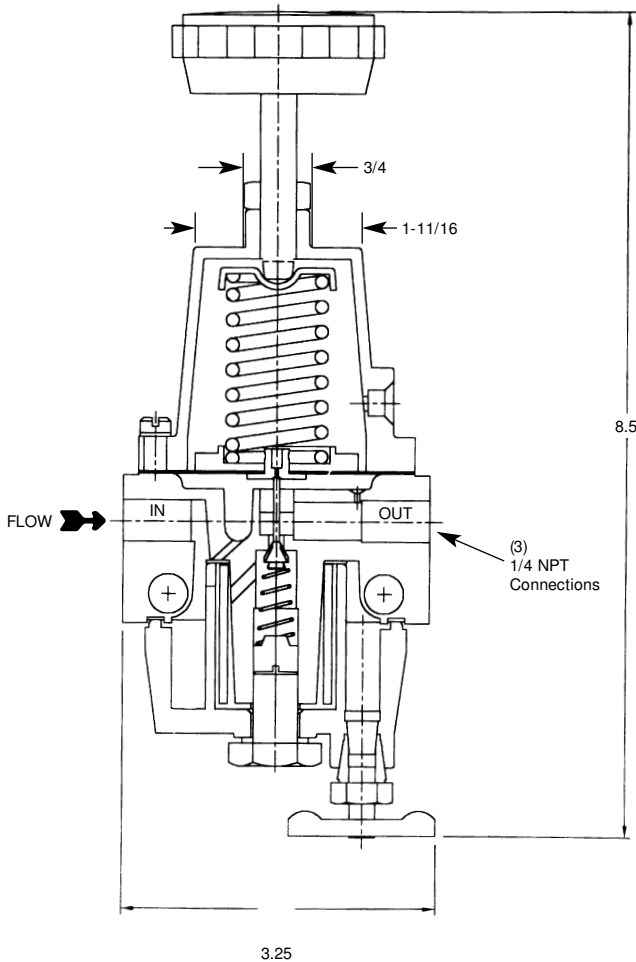
**Supply pressure:** 150 psig (1000 kPa) maximum

# AIRSET TYPE AS-1 SERIES ADJUSTABLE AIR REGULATOR

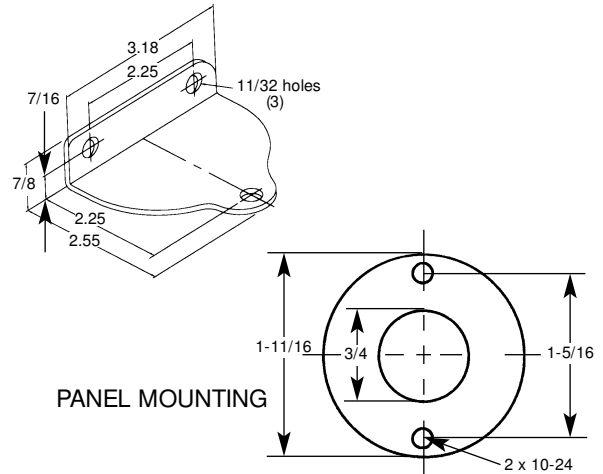
## DROOP CHARACTERISTICS



## SECTION



## MOUNTING BRACKET



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



### PANEL LOADERS

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

### 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

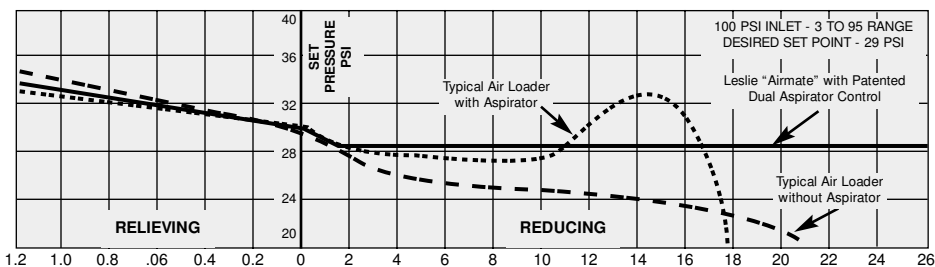
Maximum Inlet Pressure: .....200 psi  
Maximum Temperature: .....150 °F  
Reduces Pressure Ranges: .....2 to 30 psi  
3 to 60 psi  
30 to 150 psi<sup>1</sup>  
Minimum Pressure Drop: .....5 psi  
Maximum Ambient Temperature: .....150 °F  
Sympathetic Variations:.....65:1<sup>2</sup>  
Inlet and Outlet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

#### 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**	<b>AP-2</b>	2-30 psi 3-60 psi 30-150 psi†	 AIR LOADER WITH GAUGE
	<b>AG-2</b>	2-30 psi 3-60 psi 30-150 psi†	
 AIR LOADER WITH FILTER**	<b>AFP-2</b>	2-30 psi 3-60 psi 30-150 psi†	 AIR LOADER WITH FILTER AND GAUGE
	<b>AFG-2</b>	2-30 psi 3-60 psi 30-150 psi	
 BASIC PANEL LOADER	<b>P-2</b>	2-30 psi 3-60 psi 30-150 psi†	 PANEL LOADER WITH AIR GAUGE AND FILTER
	<b>PF-2</b>	2-30 psi 3-60 psi 30-150 psi†	
 PANEL LOADER WITH AIR GAUGE AND PROCESS GAUGE	<b>30 PP-1</b>	2-30 psi	 PANEL LOADER WITH AIR AND PROCESS GAUGES AND AIR FILTER
	<b>60 PP-1</b>	3-60 psi	
	<b>150 PP-1</b>	30-150 psi†	
	<b>30 PPF-1</b>	2-30 psi	
	<b>60 PPF-1</b>	3-60 psi	
	<b>150 PPF-1</b>	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

## HOW IT OPERATES

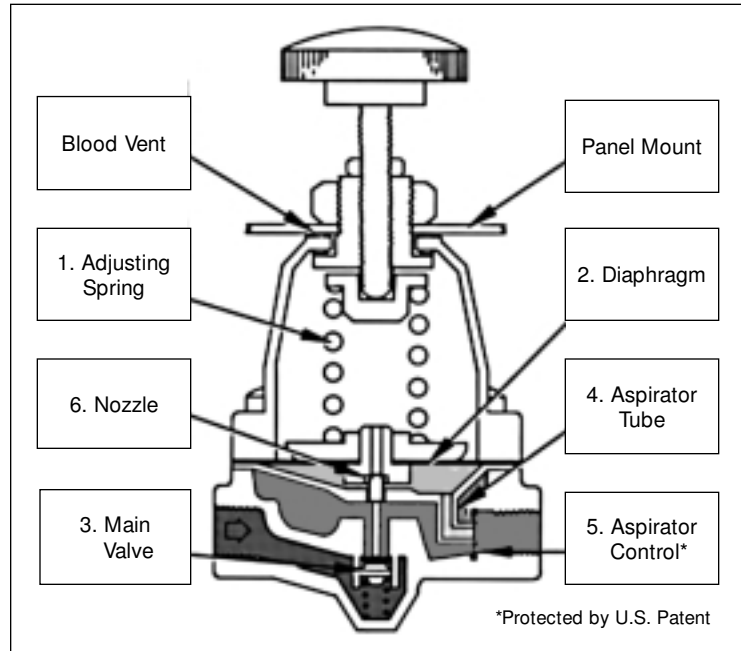
During pressure reduction, the main valve (3) is opened by the adjusting spring (1) acting on the diaphragm (2) allowing air to flow to the reduced pressure side. The adjusting spring force on the diaphragm is opposed by the aspirated outlet pressure, sensed through the aspirator tube (4), positioning 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 through 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	10.4
	8	9.7
100	8	12.8
	20 30	27.5 28

### 3-60 psi RANGE

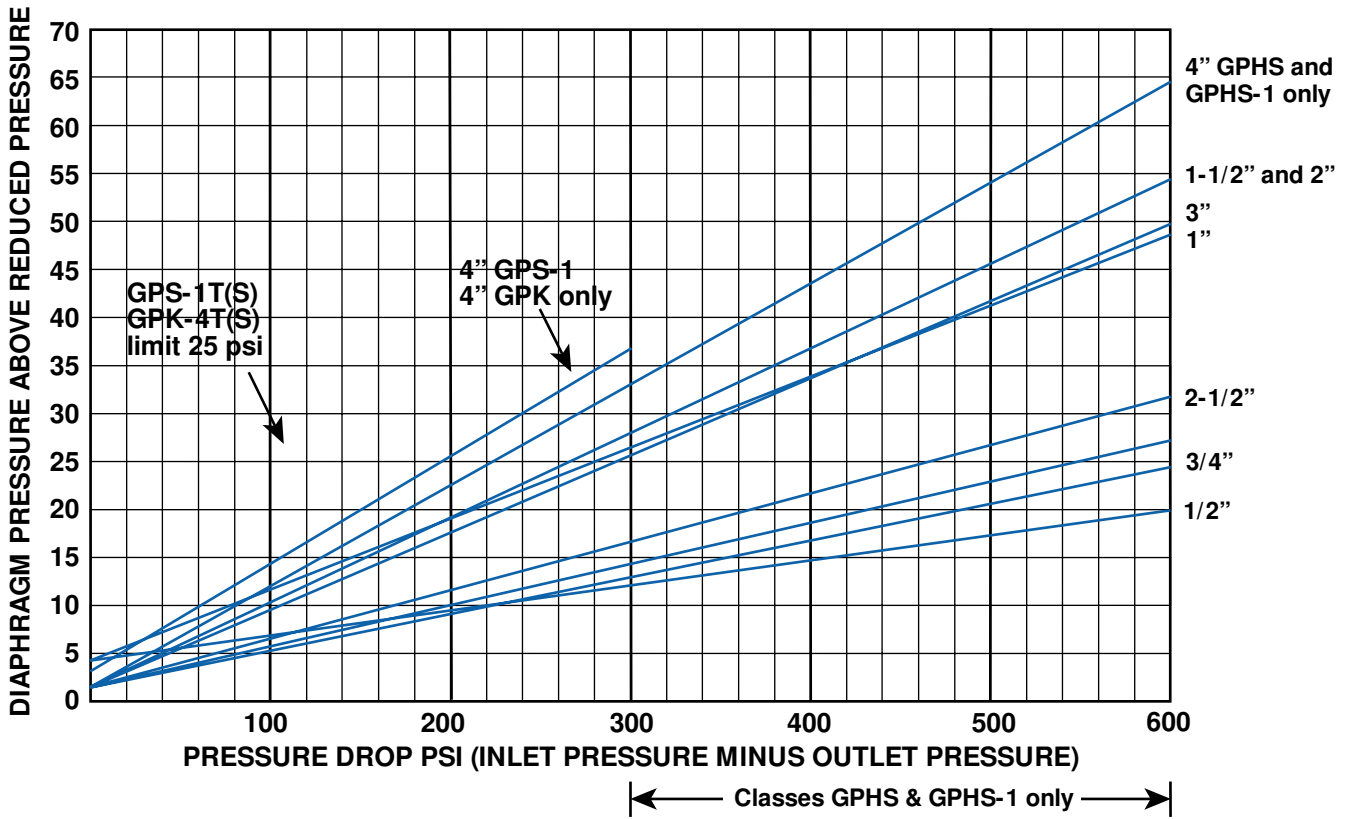
Classes A-2, AG-2, P-2 etc.

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

\*\* Based on 95% Accuracy of Regulation

# 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, GPK, 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, 44psig 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	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
10	0-2	135	225	400	555	785	925	1320	2060	2740
	5	115	190	340	470	665	785	1120	1750	2330
15	0-2	175	290	520	720	1020	1200	1710	2670	3550
	5	165	270	485	670	950	1120	1600	2490	3320
20	0-2	210	350	625	860	1220	1440	2050	3200	4260
	10	180	300	540	745	1050	1240	1770	2760	3670
25	0-5	235	395	710	980	1390	1630	2330	3630	4840
	10	225	370	665	920	1300	1530	2190	3410	4540
50	0-17	380	635	1140	1570	2230	2620	3740	5840	7780
	25	360	600	1070	1480	2100	2470	3530	5510	7330
75	0-30	520	870	1550	2150	3040	3580	5110	7980	10620
	40	495	825	1470	2040	2880	3390	4850	7570	10070
100	0-42	665	1110	1980	2730	3870	4550	6510	10150	13510
	50	645	1070	1920	2660	3760	4430	6320	9860	13130
	75	520	870	1550	2140	3040	3570	5110	7960	10600
125	0-55	800	1340	2390	3300	4680	5510	7870	12270	16340
	75	745	1240	2220	3060	4340	5100	7290	11370	15140
150	0-67	945	1570	2810	3880	5500	6470	9250	14430	19210
	100	830	1380	2480	3420	4850	5710	8150	12720	16930
175	0-80	1085	1800	3230	4460	6320	7430	10620	16570	22060
	125	915	1520	2720	3760	5320	6260	8950	13960	18580
200	0-92	1220	2040	3650	5040	7140	8410	12010	18730	24940
	125	1130	1880	3360	4640	6570	7730	11050	17230	22940
	150	990	1640	2940	4060	5750	6770	9670	15090	20090
225	0-105	1360	2270	4060	5610	7940	9350	13350	20830	27740
	150	1210	2020	3610	4990	7070	8320	11890	18550	24690
	175	1050	1760	3140	4340	6150	7240	10340	16140	21480
250	0-117	1500	2490	4460	6160	8730	10270	14670	22880	30460
	150	1410	2360	4220	5830	8250	9710	13870	21640	28810
	200	1120	1870	3340	4610	6530	7680	10980	17130	22800

**Capacities (lbs/hr) 90% Accuracy (3 1/2 psi min. droop)**

PRESSURE-psig		VALVE SIZE (inches)								
INLET	OUTLET	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
10	0-2	196	385	543	807	958	1061	1880	2621	3798
	5	167	325	462	683	812	901	1596	2227	3230
15	0-2	254	496	706	1046	1245	1377	2436	3397	4921
	5	240	462	659	974	1160	1285	2279	3168	4602
20	0-2	305	599	849	1250	1489	1652	2920	4072	5906
	10	261	513	733	1083	1282	1423	2522	3512	5088
25	0-5	341	676	964	1424	1697	1870	3319	4619	6710
	10	327	633	903	1337	1587	1756	3120	4339	6294
50	0-17	552	1086	1548	2282	2722	3006	5328	7431	10785
	25	523	1026	1453	2151	2563	2834	5029	7011	10161
75	0-30	755	1488	2105	3125	3711	4108	7280	10154	14722
	40	719	1411	1996	2965	3515	3890	6909	9632	13960
100	0-42	966	1899	2688	3968	4724	5221	9274	12915	18729
	50	937	1830	2607	3866	4590	5083	9003	12546	18202
	75	755	1488	2105	3110	3711	4096	7280	10128	14694
125	0-55	1162	2292	3245	4796	5713	6322	11211	15612	22652
	75	1082	2121	3014	4447	5298	5852	10385	14467	20988
150	0-67	1372	2686	3815	5639	6713	7424	13177	18361	26630
	100	1205	2361	3367	4970	5920	6552	11610	16185	23470
175	0-80	1575	3079	4386	6482	7715	8525	15129	21084	30581
	125	1329	2600	3693	5465	6494	7183	12750	17763	25757
200	0-92	1772	3489	4956	7325	8715	9650	17109	23832	34574
	125	1641	3216	4562	6743	8020	8869	15742	21923	31801
	150	1438	2805	3992	5901	7019	7768	13776	19201	27850
225	0-105	1975	3883	5513	8153	9692	10728	19018	26504	38455
	150	1757	3455	4902	7252	8630	9546	16938	23603	34227
	175	1525	3011	4263	6307	7507	8307	14730	20537	29777
250	0-117	2178	4259	6056	8953	10656	11784	20899	29113	42226
	150	2047	4037	5730	8473	10070	11141	19759	27535	39938
	200	1626	3199	4535	6700	7971	8812	15642	21796	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	39	63	139	201	331	355	533	758	1070
	5	33	53	117	170	280	300	450	639	899
15	0-2	53	82	181	264	434	465	697	992	1390
	5	49	76	169	245	403	432	648	922	1300
20	0-2	64	100	220	319	525	563	844	1200	1690
	10	54	85	187	272	448	480	720	1020	1440
25	0-5	73	113	250	363	598	641	961	1370	1920
	10	68	106	233	339	558	598	897	1280	1790
50	0-17	119	185	408	593	977	1050	1570	2230	3140
	25	111	173	382	556	915	981	1470	2090	2940
75	0-30	164	256	564	820	1350	1450	2170	3090	4390
	0-42	210	327	722	1050	1730	1850	2780	3950	5560
100	75	162	253	559	812	1340	1430	2150	3060	4300
	85	132	205	453	658	1080	1160	1740	2480	3480
125	0-55	255	398	879	1280	2100	2250	3380	4800	6760
	100	183	285	629	914	1510	1610	2420	3440	4840
150	0-67	301	470	1040	1510	2480	2660	3990	5670	7970
	100	263	410	905	1310	2160	2320	3480	4950	6960
	125	202	314	693	1010	1660	1780	2660	3790	5330
175	0-80	347	540	1190	1730	2850	3060	4590	6520	9170
	125	288	449	992	1440	2370	2540	3810	5430	7630
	150	218	340	751	1090	1800	1930	2890	4110	5780
200	0-92	393	611	1350	1960	3230	3460	5200	7390	10400
	125	359	558	1230	1790	2950	3160	4740	6740	9480
	150	311	486	1070	1560	2570	2750	4130	5870	8250
	175	234	365	805	1170	1930	2060	3100	4400	6190
225	0-105	438	683	1510	2190	3610	3860	5800	8240	11600
	150	386	602	1330	1930	3180	3410	5110	7270	10200
	175	333	520	1150	1670	2750	2940	4420	6280	8830
250	0-117	484	754	1660	2420	3990	4270	6410	9110	12800
	150	452	704	1560	2260	3720	3990	5980	8510	12000
	200	354	552	1220	1770	2920	3120	4690	6670	9370
300	0-167	554	863	1910	2770	4560	4890	7330	10400	14700
	200	510	795	1750	2550	4200	4500	6750	9590	13500
	250	392	611	1350	1960	3230	3460	5190	7380	10400
400	0-192	757	1180	2610	3790	6240	6690	10000	14300	20100
	300	610	951	2100	3050	5020	5380	8070	11500	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	61	103	200	293	453	486	981	1152	1487
	5	51	87	168	248	383	411	828	971	1250
15	0-2	83	134	261	385	594	637	1282	1508	1932
	5	76	125	243	358	551	592	1192	1401	1807
20	0-2	100	164	317	466	718	771	1553	1824	2349
	10	84	139	269	397	613	658	1325	1550	2002
25	0-5	114	185	360	530	818	878	1768	2082	2669
	10	106	174	336	495	763	819	1650	1946	2488
50	0-17	186	303	588	866	1337	1439	2889	3390	4365
	25	173	284	550	812	1252	1344	2705	3177	4087
75	0-30	164	399	925	1181	1971	1984	2973	5686	6673
	0-42	327	536	1040	1533	2367	2535	5115	6004	7728
100	75	253	415	805	1186	1833	1959	3956	4651	5977
	85	206	336	652	961	1477	1589	3202	3770	4837
125	0-55	398	653	1266	1869	2873	3083	6219	7296	9396
	100	285	467	906	1334	2066	2206	4453	5229	6728
150	0-67	469	771	1498	2205	3393	3644	7342	8618	11078
	100	410	672	1303	1913	2955	3178	6403	7524	9674
	125	315	515	998	1475	2271	2439	4894	5761	7409
175	0-80	541	886	1714	2526	3899	4192	8446	9910	12746
	125	449	736	1428	2102	3242	3480	7010	8254	10606
	150	340	558	1081	1591	2462	2644	5318	6247	8034
200	0-92	613	1002	1944	2862	4419	4740	9568	11233	14456
	125	560	915	1771	2613	4036	4329	8722	10245	13177
	150	485	797	1541	2278	3516	3768	7599	8922	11468
	175	365	599	1159	1708	2640	2822	5704	6688	8604
225	0-105	683	1120	2174	3197	4938	5288	10672	12525	16124
	150	602	987	1915	2818	4350	4672	9402	11050	14178
	175	519	853	1656	2438	3762	4028	8133	9546	12274
250	0-117	755	1237	2390	3533	5458	5850	11794	13847	17792
	150	705	1155	2246	3300	5089	5466	11003	12935	16680
	200	552	905	1757	2584	3995	4274	8630	10138	13024
300	0-167	864	1415	2750	4044	6238	6699	13487	15808	20433
	200	795	1304	2520	3723	5746	6165	12420	14577	18765
	250	611	1002	1944	2862	4419	4740	9550	11218	14456
400	0-192	1180	1935	3758	5533	8536	9165	18400	21736	27939
	300	951	1560	3024	4453	6867	7371	14849	17480	22379

# L & UL\* SERIES SATURATED STEAM CAPACITY TABLE

## Capacities (lbs/hr) 99% Accuracy

PRESSURE-psig		VALVE SIZE (inches)								
INLET	OUTLET	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	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	275	510	850	1520	2100	3500	5000	7800	13500
	75	250	460	765	1365	1875	3100	4500	7000	12200
	85	210	385	640	1150	1600	2650	3800	5920	10300
125	0-70	330	620	1020	1825	2500	4200	6000	9400	16300
	100	280	520	860	1530	2100	3500	5000	8000	13700
150	0-80	390	725	1200	2150	3000	4900	7000	11000	19000
	100	375	700	1150	2075	2800	4800	6800	10700	18500
	125	300	560	930	1610	2300	3800	5500	8600	15000
175	0-95	450	825	1360	2440	3350	5600	8000	12500	22000
	125	415	775	1280	2300	3150	5300	7600	11800	20000
	150	330	620	1025	1800	2500	4200	6000	9400	16000
200	1-110	500	925	1540	2750	3780	6300	9100	14200	24600
	125	490	910	1460	2700	3700	6200	13900	18700	22100
	150	450	835	1335	2475	3400	5700	8200	12700	22100
	175	350	650	1075	1925	2650	4400	6400	9900	17200
225	0-125	560	1050	1715	3060	4215	7000	10100	15800	27400
	150	540	1000	1700	2960	4075	6800	9800	15200	26500
	175	485	900	1500	2650	3600	6100	8800	13600	23800
250	0-135	610	1135	1880	3350	4625	7700	11100	17300	30100
	150	600	1120	1850	3300	4550	7600	11000	17000	29600
	200	515	950	1580	2800	3885	6500	9300	14500	25300
300	0-165	725	1340	2225	3975	5470	9100	13100	20500	36000
	200	700	1300	2160	3850	5300	8900	12700	19800	34000
	250	565	1050	1750	3100	4270	7200	10200	16000	28000
400	0-220	955	1760	2900	5200	7200	12000	17200	26900	47000
	300	860	1580	2600	4700	6500	11000	15500	23300	41300
450	0-250	1070	1980	3300	5900	8000	13500	19500	30000	53000
	300	1030	1910	3175	5700	7800	13000	18700	29000	51000
500	0-300	1190	2190	3610	6475	8960	14950	21500	33500	58500
600	0-350	1430	2630	4330	7770	10800	17900	25700	40200	70200
	400	1380	2530	4175	7490	10400	17250	24750	38700	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:  
 $\text{\#/hr.} / 2.9 = \text{SCFM @ 60}^\circ\text{F}$

CONVERSION TO GAS CAPACITIES:  
 $\text{SCFM} \times 2.9 / \text{SG} = \text{\#/hr.}$

# L & UL\* SERIES SATURATED STEAM CAPACITY TABLE

Capacities (lbs/hr) 95% Accuracy

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

$$\#/\text{hr.} / 2.9 = \text{SCFM @ } 60^\circ\text{F}$$

CONVERSION TO GAS CAPACITIES:

$$\text{SCFM} \times 2.9 / \text{SG} = \#/\text{hr.}$$

# 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

# VKP SERIES CAPACITY TABLES

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

PRESSURE-psig		VALVE SIZE (inches)								
INLET	REDUCED	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4
20	5-0	165	370	520	835	1175	1840	2610	4390	6470
25	10	185	350	575	920	1290	2025	2870	4830	7115
	5-0	190	365	595	955	1345	2105	2985	5025	7400
30	15	195	380	615	990	1390	2175	3085	5190	7645
	10-0	215	415	675	1080	1515	2370	3365	5655	8330
40	25	220	425	695	1115	1565	2450	3475	5850	8615
	20	250	480	780	1250	1760	2755	3905	6570	9680
	15-0	260	505	825	1320	1850	2900	4115	6920	10195
50	35	245	470	765	1225	1720	2695	3830	6435	9480
	30	275	530	865	1385	1945	3045	4320	7270	10705
	25	300	580	945	1515	2125	3325	4720	7940	11695
	20-0	310	600	975	1560	2190	3430	4870	8185	12060
60	45	265	510	830	1330	1865	2925	4150	6975	10280
	40	300	575	940	1505	2115	3310	4700	7905	11645
	35	330	630	1030	1650	2320	3630	5155	8665	12765
	30-0	350	680	1105	1770	2490	3895	5530	9300	13700
75	55	330	640	1045	1670	2350	3675	5215	8775	12925
	50	365	705	1150	1840	2585	4045	5740	9655	14220
	45	395	760	1235	1980	2785	4360	6185	10405	15325
	40-0	420	805	1315	2105	2955	4630	6570	11050	16275
100	75	420	810	1320	2115	2970	4655	6605	11110	16365
	60	510	985	1610	2575	3620	5665	8045	13525	19925
	50-0	550	1060	1725	2765	3885	6080	8630	14515	21380
125	100	470	905	1475	2360	3315	5190	7370	12395	18255
	75	630	1215	1980	3170	4455	6970	9895	16645	24515
	65-0	670	1290	2100	3370	4730	7405	10510	17680	26040
150	125	515	990	1610	2585	3625	5680	8060	13555	19970
	100	695	1340	2185	3500	4915	7695	10920	18370	27055
	80-0	790	1520	2480	3970	5575	8730	12390	20840	30700
175	150	555	1065	1740	2785	3915	6130	8695	14625	21545
	125	755	1455	2370	3800	5335	8355	11860	19945	29375
	100	890	1715	2790	4475	6285	9835	13960	23480	34585
	95-0	910	1750	2855	4575	6425	10055	14275	24005	35360
200	150	810	1560	2545	4080	5725	8965	12725	21405	31525
	125	960	1850	3015	4825	6780	10615	15065	25335	37320
	110-0	1030	1980	3230	5175	7265	11380	16150	27160	40005
225	175	860	1660	2710	4340	6095	9540	13540	22770	33540
	150	1025	1975	3220	5155	7240	11335	16090	27065	39865
	125-0	1145	2210	3600	5765	8100	12680	18000	30270	44585
250	200	910	1755	2860	4585	6440	10080	14305	24060	35440
	175	1085	2095	3410	5465	7675	12020	17060	28690	42255
	150	1220	2350	3830	6135	8615	13490	19145	32200	47435
	140-0	1265	2435	3970	6360	8930	13985	19845	33380	49165

# 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.

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

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

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

Accuracy of Regulation %	Multiply By
75	1.0
80	.85
85	.70
90	.55
95	.40

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

Degrees Superheat	Multiply By
50°F	.96
100°F	.93
150°F	.90
200°F	.87
200°F	.80

### 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 = 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	2.20	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 or other accuracies 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	Multiply 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 %	Multiply By
75	1.00
80	0.85
85	0.70
90	0.55
95	0.40



# 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:

<b>Inlet Pressure = 100 psi</b>	<b>Accuracy of Regulation = 75%</b>	
<b>Reduced Pressure Setting at Minimum Flow psi</b>	10	50
<b>Reduced Pressure Maintained at rated flow capacity psi</b>	7.5	37.5
<b>Drop in reduced pressure psi (which is opening force)</b>	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 = NM<sup>3</sup>/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	143	283	338	398	595	700	1380	1740	2620
	3	54	90	128	150	225	265	522	657	990
10	3	205	337	480	566	850	1000	1950	2460	3700
	5	180	300	426	502	752	885	1740	2190	3300
15	7	109	182	258	306	456	537	1057	1332	2005
	3	265	440	625	737	1105	1300	2560	3220	4850
15	5	255	423	600	707	1062	1250	2450	3090	4650
	10	200	330	470	558	833	980	1930	2430	3660
15	12	121	200	285	338	505	595	1200	1500	2200
	0-5	360	600	850	1005	1504	1770	3480	4380	6600
25	10	350	580	825	975	1457	1715	3375	4250	6400
	15	310	520	735	871	1300	1530	3010	3790	5710
25	22	142	235	333	394	590	695	1370	1725	2600
	0-17	585	975	1385	1635	2443	2875	5655	7120	10725
50	25	565	950	1345	1586	2375	2795	5495	6920	10425
	30	540	900	1280	1508	2256	2655	5220	6570	9900
50	45	310	520	735	871	1300	1530	3010	3790	5710
	0-30	810	1350	1920	2264	3383	3980	7830	9855	14850
75	50	725	1210	1720	2026	3034	3570	7020	8830	13310
	60	606	1010	1435	1691	2533	2980	5860	7370	11110
75	70	370	620	880	1035	1547	1820	3585	4510	6800
	0-42	1035	1780	2450	2890	4335	5100	10000	12600	19000
100	60	987	1645	2340	2756	3782	4450	9550	12000	18100
	80	785	1310	1860	2756	3281	3860	7600	9550	14400
100	90	583	972	1380	1629	2436	2867	5638	7095	10692
	0-55	1260	2100	2980	3516	5270	6200	12200	15320	23100
125	80	1180	1960	2780	3292	4930	5800	11400	14350	21600
	105	885	1470	2095	2465	3689	4340	8540	10710	16200
125	115	648	1080	1534	1810	2708	3186	6264	7884	11880
	0-67	1485	2470	3510	4142	6205	7300	14350	18100	27200
150	100	1370	2280	3230	3814	5703	6710	13000	16600	25000
	130	970	1620	2300	2711	4063	4780	9400	11800	17800
150	140	709	1182	1678	1981	2963	3487	6856	8629	13000

## GTS Capacities (lbs/hr)

PRESSURE-psig		VALVE SIZES-inches				
INLET	OUTLET	1/2	3/4	1	1½	2
5	1	78	143	238	535	700
	3	30	54	90	202	265
10	3	111	205	337	760	1000
	5	99	180	300	675	885
10	7	60	109	182	411	537
	3	146	265	440	990	1300
15	5	140	255	423	950	1250
	10	110	200	330	750	980
15	12	68	121	200	455	595
	0-5	198	360	600	1350	1770
25	10	192	350	580	1310	1715
	15	170	310	520	1170	1530
25	22	79	142	235	530	695
	0-17	321	585	975	2195	2875
50	25	310	565	950	2130	2795
	30	297	540	900	2025	2655
50	45	170	310	520	1170	1530
	0-30	445	810	1350	3040	3980
75	50	400	725	1210	2720	3570
	60	333	606	1010	2270	2980
75	70	204	370	620	1390	1820
	0-42	570	1035	1730	3880	5100
100	60	544	987	1645	3700	4450
	80	432	785	1310	2940	3860
100	90	320	583	972	2187	2867
	0-55	694	1260	2100	4720	6200
125	80	648	1180	1960	4420	5800
	105	486	885	1470	3310	4340
125	115	356	648	1080	2430	3186
	0-67	815	1485	2470	5560	7300
150	100	750	1370	2280	5120	6710
	130	535	970	1620	3640	4780
150	140	390	709	1182	2660	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	20.6	34.5	49.3	57.7	86.7	102	201	252	338
	7.5	17.4	29.1	41.5	48.6	73.1	86	170	213	323
20	0	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	10	19	31.6	45	52.8	79	93	185	231	350
30	0	32.4	54	77.5	90.8	136	160	317	396	600
	10	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	20	19	31.6	45	52.8	79	93	185	231	350
40	0	38	63.4	90	105.7	158.1	186	367	461	695
	20	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	30	19	31.6	45	52.8	79	93	185	231	350
60	0	46	77	111	129.6	193.8	228	450	564	855
	20	38	63.4	90	105.7	158.1	186	367	461	695
	30	32.4	54	77.5	90.8	136	160	317	396	600
	40	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	50	19	31.7	45	52.8	79.4	93.5	184	231	350
80	0	53	89	127	149	223.5	263	520	650	990
	30	42	70	100	119.2	176.8	208	410	515	780
	50	32.4	54	77.5	90.8	136	160	317	396	600
	60	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	70	19	31.7	45	52.8	79.4	93.5	184	231	350
100	0	59.5	99	142	166.8	249.9	294	580	726	1100
	20	53	89	127	149	223.5	263	520	650	990
	40	46	77	111	129.6	193.8	228	450	564	855
	70	32.4	54	77.5	90.8	136	160	317	396	600
	80	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	90	19	31.7	45	52.8	79.4	93.5	184	231	350
150	0	72	120	172	202.6	302.6	356	705	880	1340
	25	66.5	111	159	187.7	280.5	330	650	815	1230
	70	53	89	127	149	223.5	263	520	650	990
	110	38	63.4	90	105.7	158.1	186	367	461	695
	130	26.6	44.5	63.6	74.5	112.2	132	260	326	495
	140	19	31.7	45	52.8	79.4	93.5	185	231	350
175	0	79	131	188	222	331.5	390	770	962	1460
	50	66.5	111	159	187.7	280.5	330	650	815	1230
	95	53	89	127	149	223.5	263	520	650	990
	125	42	70	100	119.2	176.8	208	410	515	780
	145	32.4	54	77.5	90.8	136	160	317	396	600
	160	23.3	38.8	55	64.8	96.9	114	225	283	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	275	510	850	1520	2100	3500	5000	7800
	75	250	460	765	1365	1875	3100	4500	7000
	85	210	385	640	1150	1600	2650	3800	5920
125	0-70	330	620	1020	1825	2500	4200	6000	9400
	100	280	520	860	1530	2100	3500	5000	8000
150	0-80	390	725	1200	2150	3000	4900	7000	11000
	100	375	700	1150	2075	2800	4800	6800	10700
	125	300	560	930	1610	2300	3800	5500	8600
175	0-95	450	825	1360	2440	3350	5600	8000	12500
	125	415	775	1280	2300	3150	5300	7600	11800
	150	330	620	1025	1800	2500	4200	6000	9400
200	0-110	500	925	1540	2750	3780	6300	9100	14200
	125	490	910	1460	2700	3700	6200	8900	13900
	150	450	835	1335	2475	3400	5700	8200	12700
	175	350	650	1075	1925	2650	4400	6400	9900
225	0-125	560	1050	1715	3060	4215	7000	10100	15800
	150	540	1000	1700	2960	4075	6800	9800	15200
	175	485	900	1500	2650	3600	6100	8800	13600
250	0-135	610	1135	1880	3350	4625	7700	11100	17300
	150	600	1120	1850	3300	4550	7600	11000	17000
	200	515	950	1580	2800	3885	6500	9300	14500
300	0-165	725	1340	2225	3975	5470	9100	13100	20500
	200	700	1300	2160	3850	5300	8900	12700	19800
	250	565	1050	1750	3100	4270	7200	10200	16000
400	0-220	955	1760	2900	5200	7200	12000	17200	26900
	300	860	1580	2600	4700	6500	11000	15500	23300
450	0-250	1070	1980	3300	5900	8000	13500	19500	30000
	300	1030	1910	3175	5700	7800	13000	18700	29000
500	0-300	1190	2190	3610	6475	8960	14950	21500	33500
600	0-350	1430	2630	4330	7770	10800	17900	25700	40200
	400	1380	2530	4175	7490	10400	17250	24750	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	340	635	1060	1900	2620	4370	6250	9750
	75	310	575	950	1700	2340	3870	5620	8750
	85	260	480	800	1430	2000	3310	4750	7400
125	0-70	410	775	1270	2280	3120	5250	7500	11750
	100	350	650	1070	1910	2620	4370	6250	10000
150	0-80	485	900	1500	2680	3750	6120	8750	13750
	100	465	875	1430	2590	3500	6000	8500	13370
	125	375	700	1160	2010	2870	4750	6870	10750
175	0-95	560	1030	1700	3050	4180	7000	10000	15620
	125	515	960	1600	2870	3930	6620	9500	14750
	150	410	775	1280	2250	3120	5250	7500	11750
200	0-110	625	1150	1920	3430	4720	7870	11370	17750
	125	610	1130	1820	3370	4620	7750	11120	17370
	150	560	1040	1660	3090	4250	7120	10250	15870
	175	435	810	1340	2400	3310	5500	8000	12370
225	0-125	700	1310	2140	3820	5260	8750	12620	19750
	150	675	1250	2120	3700	5090	8500	12250	19000
	175	605	1120	1870	3310	4500	7620	11000	17000
250	0-135	760	1410	2350	4180	5780	9620	13870	21620
	150	750	1400	2310	4120	5680	9500	13750	21250
	200	640	1180	1970	3500	4850	8120	11620	18120
300	0-165	900	1670	2780	4960	6830	11370	16370	25620
	200	875	1620	2700	4810	6620	11120	15870	24750
	250	705	1310	2180	3870	5330	9000	12750	20000
400	0-220	1190	2200	3620	6500	9000	15000	21500	33620
	330	1090	1970	3250	5870	8120	13750	19370	29120
450	0-250	1330	2470	4120	7370	10000	16870	24370	37500
	300	1280	2380	3960	7120	9750	16250	23370	36250
500	0-300	1480	2730	4510	8090	11200	18680	26870	41870
600	0-350	1780	3280	5410	9710	13500	22370	34370	50250
	400	1720	3160	5210	9360	13000	21560	30930	48370

# JT SERIES SATURATED STEAM CAPACITY TABLE

## Capacities\*(lbs/hr)

INLET	VALVE SIZE-inches		
	1/4	3/8	1/2
25	25	50	75
50	35	75	120
75	50	100	160
100	65	125	200
150	85	175	290
175	100	200	330
200	110	225	365
250	135	275	450
300	160	325	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 1/2OR 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	5	11	15	33
	10	8	18	28	55
	20	13	32	46	94
10	5	7	15	22	58
	10	12	26	39	100
	20	20	45	66	165
15	5	9	19	27	80
	10	15	34	50	138
	20	25	58	87	228
20	5	10	22	32	100
	10	18	40	58	175
	20	29	68	101	285
25	5	12	26	37	118
	10	21	46	67	210
	20	34	78	116	340
30	5	12	27	40	135
	10	22	49	71	242
	20	37	82	120	393
35	5	13	30	44	153
	10	24	54	80	275
	20	41	92	133	438
40	5	15	34	49	170
	10	27	60	88	305
	20	46	102	147	490
45	5	16	36	53	185
	10	29	65	95	335
	20	49	110	160	540
50	5	18	40	58	200
	10	32	71	104	360
	20	54	120	174	590
60	5	22	41	-	230
	10	36	74	-	420
	20	57	123	-	680
70	5	25	47	-	260
	10	41	84	-	470
	20	65	140	-	765
80	5	27	52	-	290
	10	46	93	-	525
	20	72	155	-	845
90	5	31	58	-	320
	10	51	103	-	570
	20	80	173	-	950
100	5	34	64	-	345
	10	56	114	-	620
	20	88	190	-	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	0.7	1.1	4.5
	10	1.4	2.1	8.0
	20	2.5	3.7	13.0
10	5	1.0	1.5	6.4
	10	1.9	2.9	11.4
	20	3.3	5.2	18.8
15	5	1.1	1.7	7.7
	10	2.2	3.5	14.0
	20	3.8	6.1	23.0
20	5	1.3	2.0	8.9
	10	2.5	4.0	16.2
	20	4.4	7.0	26.6
25	5	1.5	2.3	10.0
	10	2.9	4.5	18.0
	20	5.2	7.9	29.6
30	5	1.6	2.5	11.0
	10	3.1	4.9	19.7
	20	5.4	8.6	32.5
35	5	1.7	2.7	11.8
	10	3.3	5.3	21.2
	20	5.8	9.3	35.0
40	5	1.8	2.9	12.7
	10	3.6	5.6	22.7
	20	6.2	9.9	37.5
45	5	2.0	3.0	13.4
	10	3.8	6.0	24.1
	20	6.6	10.1	40.0
50	5	2.1	3.2	14.2
	10	4.1	6.3	25.5
	20	7.1	10.4	42.0
75	5	2.6	-	17.0
	10	5.0	-	31.0
	20	8.7	-	51.6
100	5	3.0	-	20.0
	10	5.7	-	36.0
	20	9.9	-	59.4

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

# РЕШЕНИЯ



# GLOSSARY OF TERMS

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**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 H<sub>2</sub>O 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.

**ANSI 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 Buttwelding 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 hydrotesting 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) <sup>a</sup>	—	—	7/16	1/2	9/16	5/8	1 1/16	3/4	13/16	15/16	15/16	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

<sup>a</sup> 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	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) <sup>b</sup>	—	—	1 1/16	3/4	13/16	7/8	1	1 1/8	13/16	1 1/4	1 3/8	1 7/16	1 5/8	1 7/8	2
Diameter of Raised Face	—	—	2 1 1/16	3 1/16	3 9/16	4 3/16	4 15/16	5 1 1/16	6 5/16	6 15/16	8 5/16	9 1 1/16	11 5/16	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	8	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

<sup>b</sup> 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	3 1/2	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) <sup>c</sup>	5/16	11/32	3/8	13/32	7/16	1/2	9/16	5/8	1 1/16	1 1/16	3/4	13/16	15/16	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

<sup>c</sup> 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) <sup>d</sup>	1/2	17/32	19/32	5/8	1 1/16	3/4	13/16	29/32	3 1/32	1 1/16	1 1/8	13/16	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	—	—

<sup>d</sup> 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) <sup>e</sup>	—	—	7/16	1/2	9/16	5/8	1 1/16	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	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

<sup>e</sup> 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) <sup>f</sup>	—	—	1 1/16	3/4	13/16	7/8	1	1 1/8	13/16	1 1/4	1 3/8	1 7/16	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

<sup>f</sup> 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) <sup>g</sup>	9/16	5/8	1 1/16	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	2 1/8	2 1/4
Diameter of Raised Face	1 3/8	1 1 1/16	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	25/8	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

<sup>g</sup> 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	6 1/8	6 1/2	7 1/2	8 1/4	9	10 3/4	13	14	16 1/2	20	22
Thickness of Flange (min) <sup>h</sup>	9/16	5/8	1 1/16	13/16	7/8	1	1 1/8	1 1/4	1 3/8	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	1 1 1/16	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	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

<sup>h</sup> 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	Torrlicelli
-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	—	—	10S	.049	.307	1.27	.96	.074	.19	.032	.004	.00437	1/8
		STD	40	40S	.068	.269		.85	.057	.24	.025	.003	.00523	
		XS	80	80S	.095	.215		.68	.036	.31	.016	.002	.00602	
1/4	.540	—	—	10S	.065	.410	1.70	1.29	.132	.33	.057	.007	.01032	1/4
		STD	40	40S	.088	.364		1.14	.104	.42	.045	.005	.01227	
		XS	80	80S	.119	.302		.95	.072	.54	.031	.004	.01395	
3/8	.675	—	—	10S	.065	.545	2.12	1.71	.233	.42	.101	.012	.01736	3/8
		STD	40	40S	.091	.493		1.55	.191	.57	.083	.010	.0216	
		XS	80	80S	.126	.423		1.33	.141	.74	.061	.007	.0255	
1/2	.840	—	—	5S	.065	.710	2.64	2.23	.396	.54	.172	.021	.0285	1/2
		—	—	10S	.083	.674		2.12	.357	.67	.155	.019	.0341	
		STD	40	40S	.109	.622		1.95	.304	.85	.132	.016	.0407	
		XS	80	80S	.147	.546		1.72	.234	1.09	.102	.012	.0478	
		—	160	—	.187	.466		1.46	.171	1.31	.074	.009	.0527	
XXS	—	—	.294	.252	.79	.050	1.71	.022	.003	.0577				
3/4	1.050	—	—	5S	.065	.920	3.30	2.89	.665	.69	.288	.035	.0467	3/4
		—	—	10S	.083	.884		2.78	.614	.86	.266	.032	.0566	
		STD	40	40S	.113	.824		2.59	.533	1.13	.231	.028	.0706	
		XS	80	80S	.154	.742		2.33	.433	1.47	.188	.022	.0853	
		—	160	—	.219	.612		1.92	.296	1.94	.128	.015	.1004	
XXS	—	—	.308	.434	1.36	.148	2.44	.064	.008	.1103				
1	1.315	—	—	5S	.065	1.185	4.13	3.72	1.103	.87	.478	.057	.0760	1
		—	—	10S	.109	1.097		3.45	.945	1.40	.409	.049	.1151	
		STD	40	40S	.133	1.049		3.30	.864	1.68	.375	.045	.1328	
		XS	80	80S	.179	.957		3.01	.719	2.17	.312	.037	.1606	
		—	160	—	.250	.815		2.56	.522	2.84	.230	.027	.1903	
XXS	—	—	.358	.599	1.88	.282	3.66	.122	.015	.2136				
1 1/4	1.660	—	—	5S	.065	1.530	5.22	4.81	1.839	1.11	.797	.096	.1250	1 1/4
		—	—	10S	.109	1.442		4.53	1.633	1.81	.708	.085	.1934	
		STD	40	40S	.140	1.380		4.34	1.495	2.27	.649	.078	.2346	
		XS	80	80S	.191	1.278		4.02	1.283	3.00	.555	.067	.2913	
		—	160	—	.250	1.160		3.64	1.057	3.76	.458	.055	.3421	
XXS	—	—	.382	.896	2.81	.630	5.21	.273	.033	.4110				
1 1/2	1.900	—	—	5S	.065	1.770	5.97	5.56	2.461	1.28	1.066	.128	.1662	1 1/2
		—	—	10S	.109	1.682		5.28	2.222	2.09	.963	.115	.2598	
		STD	40	40S	.145	1.610		5.06	2.036	2.72	.882	.106	.3262	
		XS	80	80S	.200	1.500		4.71	1.767	3.63	.765	.092	.4118	
		—	160	—	.281	1.338		4.20	1.406	4.86	.608	.073	.5078	
XXS	—	—	.400	1.100	3.46	.950	6.41	.420	.049	.5977				
2	2.375	—	—	5S	.065	2.245	7.46	7.05	3.958	1.61	1.72	.206	.2652	2
		—	—	10S	.109	2.157		6.78	3.654	2.64	1.58	.190	.4204	
		STD	40	40S	.154	2.067		6.49	3.355	3.65	1.45	.174	.5606	
		XS	80	80S	.218	1.939		6.09	2.953	5.02	1.28	.153	.7309	
		—	160	—	.344	1.687		5.30	2.241	7.46	.97	.116	.9790	
XXS	—	—	.436	1.503	4.72	1.774	9.03	.77	.092	1.1040				
2 1/2	2.875	—	—	5S	.083	2.709	9.03	8.51	5.764	2.48	2.50	.299	.4939	2 1/2
		—	—	10S	.120	2.635		8.28	5.453	3.53	2.36	.283	.6868	
		STD	40	40S	.203	2.469		7.76	4.788	5.79	2.07	.249	1.064	
		XS	80	80S	.276	2.323		7.30	4.238	7.66	1.87	.220	1.339	
		—	160	—	.375	2.125		6.68	3.546	10.01	1.54	.184	1.638	
XXS	—	—	.552	1.771	5.56	2.464	13.69	1.07	.128	1.997				

# PIPE DATA TABLES CONT'D.

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

# PIPE DATA TABLES CONT'D.

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	—	—	5S	.156	12.438	40.06	39.08	121.50	20.98	52.65	6.31	19.2	12
		—	—	10S	.180	12.390		38.92	120.57	24.17	52.25	6.26	22.0	
		—	20	—	.250	12.250		38.48	117.86	33.38	51.07	6.12	30.2	
		—	30	—	.330	12.090		37.98	114.80	43.77	49.74	5.96	39.0	
		—	STD	—	.375	12.000		37.70	113.10	49.56	49.00	5.88	43.8	
		—	40	—	.406	11.938		37.50	111.93	53.52	48.50	5.81	47.1	
		—	XS	—	.500	11.750		36.91	108.43	65.42	46.92	5.63	56.7	
		—	60	—	.562	11.626		36.52	106.16	73.15	46.00	5.51	62.8	
		—	80	—	.688	11.374		35.73	101.64	88.63	44.04	5.28	74.6	
		—	100	—	.844	11.062		34.75	96.14	107.32	41.66	4.99	88.1	
		—	XXS	120	1.000	10.750		33.77	90.76	125.49	39.33	4.71	100.7	
		—	140	—	1.125	10.500		32.99	86.59	139.67	37.52	4.50	109.9	
		—	160	—	1.312	10.126		31.81	80.53	160.27	34.89	4.18	122.6	
14	14.000	—	—	5S	.156	13.688	43.98	43.00	147.15	23.07	63.77	7.64	23.2	14
		—	—	10S	.188	13.624		42.80	145.78	27.73	63.17	7.57	27.8	
		—	10	—	.250	13.500		42.41	143.14	36.71	62.03	7.44	36.6	
		—	20	—	.312	13.376		42.02	140.52	45.61	60.89	7.30	45.0	
		—	STD	30	.375	13.250		41.63	137.88	54.57	59.75	7.16	53.2	
		—	40	—	.438	13.124		41.23	135.28	63.44	58.64	7.03	61.3	
		—	XS	—	.500	13.000		40.84	132.73	72.09	57.46	6.90	69.1	
		—	60	—	.594	12.812		40.25	128.96	85.05	55.86	6.70	80.3	
		—	80	—	.750	12.500		39.27	122.72	106.13	53.18	6.37	98.2	
		—	100	—	.938	12.124		38.09	115.49	130.85	50.04	6.00	117.8	
		—	120	—	1.094	11.812		37.11	109.62	150.79	47.45	5.69	132.8	
		—	140	—	1.250	11.500		36.13	103.87	170.28	45.01	5.40	146.8	
		—	160	—	1.406	11.188		35.15	98.31	189.11	42.60	5.11	159.6	
16	16.000	—	—	5S	.165	15.670	50.27	49.23	192.85	27.90	83.57	10.02	32.2	16
		—	—	10S	.188	15.624		49.08	191.72	31.75	83.08	9.96	36.5	
		—	10	—	.250	15.500		48.69	188.69	42.05	81.74	9.80	48.0	
		—	20	—	.312	15.376		48.31	185.69	52.27	80.50	9.65	59.2	
		—	STD	30	.375	15.250		47.91	182.65	62.58	79.12	9.49	70.3	
		—	XS	40	.500	15.000		47.12	176.72	82.77	76.58	9.18	91.5	
		—	60	—	.656	14.688		46.14	169.44	107.50	73.42	8.80	116.6	
		—	80	—	.844	14.312		44.96	160.92	136.61	69.73	8.36	144.5	
		—	100	—	1.031	13.938		43.79	152.58	164.82	66.12	7.93	170.5	
		—	120	—	1.219	13.562		42.61	144.50	192.43	62.62	7.50	194.5	
		—	140	—	1.438	13.124		41.23	135.28	233.64	58.64	7.03	220.0	
		—	160	—	1.594	12.812		40.26	128.96	245.25	55.83	6.70	236.7	
		18	18.000	—	—	5S		.165	17.67	56.55	55.51	245.22	31.43	
—	—			10S	.188	17.62	55.37	243.95	35.76		105.71	12.67	46.4	
—	10			—	.250	17.50	54.98	240.53	47.39		104.21	12.49	61.1	
—	20			—	.312	17.38	54.59	237.13	58.94		102.77	12.32	75.5	
—	STD			30	.375	17.25	54.19	233.71	70.59		101.18	12.14	89.6	
—	40			—	.438	17.12	53.80	230.30	82.15		99.84	11.96	103.4	
—	XS			—	.500	17.00	53.41	226.98	93.45		98.27	11.79	117.0	
—	60			—	.562	16.88	53.02	223.68	104.87		96.93	11.62	130.1	
—	80			—	.750	16.50	51.84	213.83	138.17		92.57	11.11	168.3	
—	100			—	.938	16.12	50.66	204.24	170.92		88.50	10.61	203.8	
—	120			—	1.156	15.69	49.29	193.30	207.96		83.76	10.04	242.3	
—	140			—	1.375	15.25	47.91	182.66	244.14		79.07	9.49	277.6	
—	160			—	1.562	14.88	46.73	173.80	274.22		75.32	9.03	305.5	
—	160	—	1.781	14.44	45.36	163.72	308.50	70.88	8.50	335.6				

# PIPE DATA TABLES CONT'D.

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.)
20	20.00	—	—	5S	.188	19.62	62.83	61.65	302.46	39.78	131.06	15.71	57.4	20
		—	—	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	
		XS	40	—	.594	18.81		59.10	278.00	123.11	120.46	14.44	170.4	
		—	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	
22	22.00	—	—	5S	.188	21.62	69.12	67.93	367.25	43.80	159.14	19.08	69.7	22
		—	—	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	177.5	
		—	60	—	.875	20.25		63.62	322.06	197.41	139.56	16.73	295.0	
		—	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	
		24	24.00	—	—	5S		.218	23.56	75.40	74.03	436.10	55	
—	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	
—	40			—	.688	22.62	71.08	402.07	171		174.23	20.88	285.1	
—	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	
30	30.00	—	—	5S	.250	29.50	94.25	92.68	683.49	79	296.18	35.51	172.3	30
		—	10	10S	.312	29.38		92.29	677.71	99	293.70	35.21	213.8	
		STD	—	—	.375	29.25		91.89	671.96	119	291.18	34.91	255.3	
		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  $\geq$  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

<b>LIQUID WEIGHTS and MEASURES</b>		
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
<b>LINEAL MEASURES</b>		
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
<b>AREA</b>		
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

<b>CONVERSIONS of PRESSURE AND HEAD</b>					
To Convert	To	Multiply By	To Convert	To	Multiply By
Lbs. per Sq. In.	Lbs. per Sq. Ft.	144	Ins. of Mercury	Lbs. per Sq. In.	0.491154
Lbs. per Sq. In.	Atmospheres	0.06805	Ins. of Mercury	Lbs. per Sq. Ft.	70.7262
Lbs. per Sq. In.	Ins. of Water	27.728	Ins. of Mercury	Atmospheres	0.033421
Lbs. per Sq. In.	Ft. of Water	2.3106	Ins. of Mercury	Ins. of Water	13.6185
Lbs. per Sq. In.	Ins. of Mercury	2.03602	Ins. of Mercury	Ft. of Water	1.1349
Lbs. per Sq. In.	mm of Mercury	51.715	Ins. of Mercury	mm of Mercury	25.40005
Lbs. per Sq. In.	Bar	0.06895	Ins. of Mercury	Bar	0.033864
Lbs. per Sq. In.	kg per Sq. cm	0.070307	Ins. of Mercury	kg per Sq. cm	0.03453
Lbs. per Sq. In.	kg per Sq. M	703.070	Ins. of Mercury	kg per Sq. M	345.316
Lbs. per Sq. Ft.	Lbs. per Sq. In.	0.0069445	mm of Mercury	Lbs. per Sq. In.	0.019337
Lbs. per Sq. Ft.	Atmospheres	0.000473	mm of Mercury	Lbs. per Sq. Ft.	2.7845
Lbs. per Sq. Ft.	Ins. of Water	0.1926	mm of Mercury	Atmospheres	0.001316
Lbs. per Sq. Ft.	Ft. of Water	0.01605	mm of Mercury	Ins. of Water	0.53616
Lbs. per Sq. Ft.	Ins. of Mercury	0.014139	mm of Mercury	Ft. of Water	0.04468
Lbs. per Sq. Ft.	mm of Mercury	0.35913	mm of Mercury	Ins. of Mercury	0.03937
Lbs. per Sq. Ft.	Bar	0.000479	mm of Mercury	Bar	0.00133
Lbs. per Sq. Ft.	kg per Sq. cm	0.000488	mm of Mercury	kg per Sq. cm	0.00136
Lbs. per Sq. Ft.	kg per Sq. M	4.88241	mm of Mercury	kg per Sq. M	13.59509
Atmospheres	Lbs. per Sq. In.	14.696	kg per Sq. cm	Lbs. per Sq. In.	14.2233
Atmospheres	Lbs. per Sq. Ft.	2116.22	kg per Sq. cm	Lbs. per Sq. Ft.	2048.155
Atmospheres	Ins. of Water	407.484	kg per Sq. cm	Atmospheres	0.96784
Atmospheres	Ft. of Water	33.957	kg per Sq. cm	Ins. of Water	394.38
Atmospheres	Ins. of Mercury	29.921	kg per Sq. cm	Ft. of Water	32.865
Atmospheres	mm of Mercury	760	kg per Sq. cm	Ins. of Mercury	28.959
Atmospheres	Bar	1.01325	kg per Sq. cm	mm of Mercury	735.559
Atmospheres	kg per Sq. cm	1.0332	kg per Sq. cm	Bar	0.98067
Atmospheres	kg per Sq. M	10332.27	kg per Sq. cm	kg per Sq. M	10000
Ins. of Water	Lbs. per Sq. In.	0.03609	<p>Note: All weights and measures of water are based on temperature of 60°F.</p> <p>Note: Temperature of Water and Mercury is 68°F and 32°F respectively.</p> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><b>TEMPERATURE</b></p> <p style="text-align: center;">To convert Fahrenheit to Celsius: <math>\frac{^{\circ}\text{F} - 32}{1.8}</math></p> <p style="text-align: center;">To convert Celsius to Fahrenheit: <math>(1.8 \times ^{\circ}\text{C}) + 32</math></p> </div> <div style="border: 1px solid black; padding: 5px; margin: 10px 0;"> <p style="text-align: center;"><b>VELOCITY</b></p> <p style="text-align: center;">1 Ft per Sec. = 0.3048 M Per Sec.</p> <p style="text-align: center;">1 M per Sec. = 3.2808 Ft. per Sec.</p> </div>		
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			

# STEAM TABLE\*

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

Pres- sure psi (gage)	Temper- ature F° (sat.)	h v	Satur- ated Liquid	Satur- ated 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	1246.2 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														Temperature °F (sat.)	Pres- sure psi (gage)	
480	500	520	540	560	580	600	620	640	660	680	700	720	740			750
1277.6 37.96	1287.1 38.78	1296.6 39.60	1306.2 40.41	1315.7 41.23	1325.3 42.04	1334.8 42.86	1344.5 43.68	1354.2 44.49	1363.8 45.31	1373.5 46.12	1383.2 46.94	1393.0 47.75	1402.8 48.56	1407.7 48.97	h v	212 0
1277.1 27.86	1286.6 28.46	1296.2 29.06	1305.7 29.67	1315.3 30.27	1324.8 30.87	1334.4 31.47	1344.1 32.07	1353.8 32.67	1363.5 33.27	1373.2 33.87	1382.9 34.47	1392.7 35.07	1402.6 35.67	1407.5 35.96	h v	228 5
1276.6 22.26	1286.2 22.74	1295.8 23.22	1305.3 23.71	1314.9 24.19	1324.5 24.68	1334.1 25.16	1343.8 25.64	1353.5 26.12	1363.2 26.60	1372.9 27.08	1382.6 27.56	1392.5 28.04	1402.3 28.52	1407.2 28.76	h v	240 10
1276.2 18.528	1285.7 18.933	1295.3 19.337	1304.9 19.741	1314.5 20.144	1324.2 20.547	1333.8 20.95	1343.5 21.35	1353.2 21.75	1362.9 22.15	1372.6 22.56	1382.4 22.96	1392.3 23.36	1402.1 23.76	1407.0 23.96	h v	250 15
1275.7 15.862	1285.3 16.210	1294.9 16.558	1304.5 16.905	1314.1 17.251	1323.8 17.597	1333.5 17.943	1343.2 18.288	1352.9 18.633	1362.6 18.977	1372.3 19.322	1382.1 19.666	1391.9 20.01	1401.8 20.35	1406.7 20.52	h v	259 20
1275.2 13.862	1284.8 14.168	1294.5 14.473	1304.1 14.778	1313.8 15.082	1323.4 15.385	1333.1 15.688	1342.8 15.990	1352.5 16.293	1362.3 16.595	1372.1 16.896	1381.9 17.198	1391.7 17.499	1401.6 17.8001	1406.5 7.951	h v	267 25
1274.7 12.307	1284.4 12.580	1294.0 12.852	1303.7 13.123	1313.4 13.394	1323.1 13.665	1332.8 13.935	1342.5 14.204	1352.2 14.473	1362.0 14.742	1371.8 15.011	1381.6 15.279	1391.5 15.547	1401.4 15.815	1406.3 15.949	h v	274 30
1273.7 10.044	1283.4 10.269	1293.2 10.493	1302.9 10.717	1312.6 10.940	1322.4 11.162	1332.1 11.384	1341.9 11.605	1351.7 11.826	1361.5 12.047	1371.3 12.268	1381.1 12.488	1391.0 12.708	1400.9 12.927	1405.8 13.037	h v	287 40
1272.7 8.478	1282.5 8.670	1292.3 8.861	1302.1 9.051	1311.9 9.240	1321.7 9.429	1331.5 9.618	1341.3 9.806	1351.1 9.993	1360.9 10.181	1370.8 10.368	1380.6 10.555	1390.5 10.741	1400.4 10.928	1405.4 11.021	h v	298 50
1271.6 7.329	1281.5 7.496	1291.4 7.663	1301.3 7.829	1311.1 7.994	1321.0 8.159	1330.8 8.323	1340.6 8.486	1350.5 8.649	1360.3 8.812	1370.2 8.975	1380.1 9.138	1390.0 9.300	1399.9 9.462	1404.9 9.543	h v	308 60
1270.6 6.450	1280.6 6.599	1290.5 6.747	1300.5 6.894	1310.4 7.041	1320.2 7.187	1330.1 7.332	1340.0 7.477	1349.9 7.622	1359.8 7.766	1369.7 7.910	1379.6 8.054	1389.6 8.198	1399.5 8.341	1404.5 8.413	h v	316 70
1269.5 5.756	1279.6 5.891	1289.6 6.024	1299.6 6.156	1309.6 6.288	1319.5 6.419	1329.4 6.550	1339.4 6.680	1349.3 6.810	1359.3 6.940	1369.2 7.069	1379.1 7.199	1389.1 7.327	1399.0 7.456	1404.0 7.520	h v	324 80
1268.5 5.195	1278.6 5.317	1288.7 5.439	1298.8 5.559	1308.8 5.679	1318.8 5.799	1328.7 5.918	1338.7 6.036	1348.7 6.154	1358.6 6.272	1368.6 6.389	1378.5 6.506	1388.5 6.623	1398.5 6.740	1403.5 6.798	h v	331 90
1267.4 4.730	1277.7 4.843	1287.8 4.955	1297.9 5.066	1308.0 5.176	1318.0 5.285	1328.1 5.394	1338.1 5.503	1348.0 5.611	1358.0 5.719	1368.0 5.827	1378.0 5.934	1388.1 6.041	1398.1 6.148	1403.1 6.201	h v	338 100
1264.7 3.860	1275.2 3.954	1285.5 4.047	1295.8 4.140	1306.0 4.232	1316.2 4.323	1326.4 4.413	1336.5 4.503	1346.6 4.593	1356.6 4.683	1366.7 4.772	1376.8 4.861	1386.9 4.949	1397.0 5.038	1402.0 5.082	h v	353 125
1261.9 3.252	1272.6 3.334	1283.2 3.414	1293.6 3.494	1304.0 3.573	1314.3 3.652	1324.6 3.730	1334.8 3.807	1345.0 3.884	1355.2 3.960	1365.3 4.037	1375.4 4.113	1385.6 4.188	1395.8 4.264	1400.8 4.301	h v	366 150
1259.0 2.804	1270.0 2.877	1280.8 2.948	1291.4 3.019	1302.0 3.089	1312.4 3.157	1322.8 3.226	1333.2 3.294	1343.5 3.361	1353.7 3.429	1363.9 3.495	1374.2 3.562	1384.4 3.628	1394.6 3.694	1399.7 3.727	h v	378 175
1256.0 2.460	1267.3 2.525	1278.3 2.590	1289.2 2.653	1299.9 2.716	1310.5 2.777	1321.0 2.839	1331.4 2.900	1341.8 2.960	1352.2 3.019	1362.5 3.079	1372.8 3.139	1383.1 3.198	1393.3 3.256	1398.5 3.286	h v	388 200
1253.0 2.187	1264.5 2.247	1275.8 2.306	1286.9 2.364	1297.8 2.421	1308.5 2.477	1319.2 2.533	1329.8 2.587	1340.3 2.642	1350.7 2.696	1361.1 2.750	1371.5 2.804	1381.9 2.857	1392.2 2.910	1397.3 2.936	h v	397 225
1249.9 1.9654	1261.7 2.021	1273.2 2.076	1284.5 2.129	1295.6 2.181	1306.5 2.233	1317.3 2.284	1328.0 2.334	1338.7 2.384	1349.2 2.434	1359.7 2.483	1370.2 2.532	1380.6 2.580	1391.0 2.629	1396.2 2.653	h v	406 250
1246.6 1.7816	1258.8 1.8338	1270.6 1.8846	1282.1 1.9342	1293.4 1.9829	1304.5 2.031	1315.5 2.078	1326.3 2.125	1337.0 2.171	1347.7 2.217	1358.3 2.262	1368.8 2.307	1379.3 2.352	1389.8 2.396	1395.0 2.418	h v	414 275
1243.3 1.6266	1255.8 1.6759	1267.9 1.7237	1279.7 1.7703	1291.2 1.8159	1302.5 1.8607	1313.6 1.9048	1324.5 1.9483	1335.4 1.9912	1346.1 2.034	1356.8 2.076	1367.4 2.118	1378.0 2.159	1388.6 2.200	1393.8 2.220	h v	422 300
1236.4 1.3795	1249.6 1.4243	1262.4 1.4675	1274.7 1.5094	1286.6 1.5501	1298.2 1.5900	1309.7 1.6291	1320.9 1.6676	1332.0 1.7056	1343.0 1.7430	1353.9 1.7801	1364.7 1.8168	1375.4 1.8531	1386.1 1.8892	1391.4 1.9071	h v	436 350
1229.0 1.1908	1243.2 1.2325	1256.6 1.2724	1269.4 1.3108	1281.8 1.3480	1293.9 1.3842	1305.7 1.4196	1317.2 1.4544	1328.6 1.4885	1339.8 1.5222	1350.9 1.5554	1361.9 1.5883	1372.8 1.6207	1383.6 1.6529	1389.0 1.6689	h v	448 400
1221.2 1.0416	1236.3 1.0811	1250.5 1.1186	1264.0 1.1544	1276.9 1.1889	1289.4 1.2224	1301.6 1.2550	1313.5 1.2868	1325.1 1.3180	1336.5 1.3488	1347.8 1.3789	1359.0 1.4088	1370.1 1.4382	1381.1 1.4675	1386.5 1.4819	h v	460 450
1212.8 0.9204	1229.0 0.9584	1244.0 0.9941	1258.3 1.0280	1271.8 1.0604	1284.8 1.0917	1297.3 1.1221	1309.6 1.1516	1321.5 1.1805	1333.2 1.2088	1344.7 1.2367	1356.1 1.2641	1367.3 1.2913	1378.4 1.3180	1384.0 1.3313	h v	470 500
	1221.4 0.8565	1237.4 0.8909	1252.4 0.9234	1266.5 0.9542	1280.0 0.9838	1293.0 1.0124	1305.6 1.0401	1317.8 1.0671	1329.8 1.0935	1341.6 1.1195	1353.2 1.1449	1364.6 1.1700	1375.8 1.1947	1381.4 1.2070	h v	480 550
	1213.2 0.7703	1230.3 0.8040	1246.1 0.8353	1261.0 0.8649	1275.1 0.8931	1288.5 0.9203	1301.5 0.9465	1314.1 0.9720	1326.3 0.9968	1338.3 1.0211	1350.2 1.0450	1361.8 1.0684	1373.2 1.0916	1378.9 1.1030	h v	489 600

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



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