Bronze Valve Selection Guide & Figure Number Index

CRANE® Figure No.	Catalog Page No.	Pressure Rating	Stem: RS or NRS	Bonnet/Cap: TB, UB, SC, UC	End Connections	Disc
Bronze Gate Valves						
428	9	Class 125	RS	TB	THD	SW
428UB	10	Class 125	RS	UB	THD	SW
438	11	Class 125	NRS	TB	THD	SW
1324	12	300 CWP	NRS	TB	SLD	SW
429	13	Class 150	NRS	TB	FLGD	SW
431	14	Class 150	RS	TB	THD	SW
431UB	15	Class 150	RS	UB	THD	SW
437	16	Class 150	NRS	TB	THD	SW
1320	17	200 CWP	NRS	TB	SLD	SW
1330	18	200 CWP	RS	TB	SLD	SW
422	19	Class 200	RS	UB	THD	SW
424	20	Class 200	RS	UB	THD	SW (SS Seat)
622E	21	Class 300	RS	UB	THD	SW
634E	22	Class 300	RS	UB	THD	SW (SS Seat)
636E	23	Class 300	NRS	UB	THD	SW (SS Seat)
Bronze Globe Valves						
1	24	Class 125	RS	TB	THD	BRZ
5TF	25	Class 125	RS	TB	THD	PTFE
7TF	26	Class 150	RS	UB	THD	PTFE
1310	27	300 CWP	RS	TB	SLD	PTFE
14 ½P	28	Class 150	RS	UB	THD	SS
212P	29	Class 200	RS	TB	THD	SS
88	30	Class 200	RS	TB	THD	Needle
382P	31	Class 300	RS	UB	THD	SS
Bronze Angle Valves						
17TF	32	Class 150	RS	UB	THD	PTFE
89	33	Class 200	RS	TB	THD	Needle
384P	34	Class 300	RS	UB	THD	SS
Bronze Swing Check Valves: Y- Pattern						
37	35	Class 125		SC	THD	BRZ
41TF	36	Class 125		SC	THD	PTFE
137	37	Class 150		SC	THD	BRZ
1342	38	300 CWP		SC	SLD	BRZ
141TF	39	Class 150		SC	THD	PTFE
36	40	Class 200		SC	THD	BRZ
1340	41	200 CWP		SC	SLD	BRZ
76E	42	Class 300		SC	THD	BRZ
Bronze Lift Check Valves						
27TF	43	Class 150		UC	THD	PTFE
366E	44	Class 300		UC	THD	BRZ
Bronze Swing Check Valves: Horizontal Pattern						
1707	45	Class 125		TB	THD	BRZ
1707S	46	200 CWP		TB	SLD	BRZ
Bronze Lead Free Valves						
LF438	48	200 CWP	NRS	TB	THD	SW
LF1320	49	200 CWP	NRS	TB	SLD	SW
LF1340	50	200 CWP			SLD	
LF37	51	200 CWP			THD	

CRANE

Cross Reference for Commonly Used Valves

BRONZE VALVES

GATE	CRANE®	NIBCO	Milwaukee	Stockham®
Class 125 RS-Threaded	428	T-111	148	B-100
Class 125 NRS-Threaded	438	T-113	105	B-103
Class 125 RS-Solder	1330	S-111	149	B-108
Class 125 NRS-Solder	1320	S-113	115	B-104
Class 150 Union Bonnet	431UB	T-134	1151	B-120
Class 300 SS Trim	634E	T-174-SS	1184	B-145
GLOBE				
Class 125	1	T-211-B	502	B-16
Class 300 SS Trim	382P	T-275	593A	B-74
CHECK				
Class 125 Threaded	37	T-413-BY	509	B-319Y
Class 125 Solder	1340	S-413-B	1509	B-309Y
Class 300 Swing Check	76E	T-473-B	507	B-375
Class 300 Lift Check	366E	----	----	B-367

IRON VALVES

GATE	CRANE®	NIBCO	Milwaukee	Powell	Walworth	Stockham®
Class 125 NRS	461	F-619	F2882 A	1787	W719F	G-612
Class 125 OS&Y	465 ½	F-617-0	F2885 A	1793	W726F	G-623
Class 250 OS&Y	7 ½E	F-667-0	F2894 A	1797	W786F	F-667
GLOBE						
Class 125	351	F-718-B	F2981 A	241	W906F	G-512
SWING CHECK						
Class 125	373	F-918-B	F2974 A	559	W928F	G-931
STOP CHECK						
Class 250 Straight-Way Y-Pattern	28E	----	-----	-----	----	F-540
Class 250 Angle Y-Pattern	30E	F-869-B	-----	-----	----	F-541

General Data

Advanced manufacturing techniques and equipment, ongoing engineering research and product development, skilled craftsman, and over fourteen decades of experience in flow control are behind the quality and dependability built into every CRANE® product.

This catalog presents some of these products, namely: bronze gate, globe and check valves. The information is presented in a comprehensive manner and includes material, construction, rating, principal dimensions, and weight data.

Hydrostatic and Shock Pressures
CRANE® valves are suitable for liquid working pressures specified on catalog pages only when used in hydraulic installations in which shock is absent or negligible. The sudden closure of a valve in a hydraulic system causes the body of liquid, which may be moving at a rate generally in excess of one foot per second, to stop instantaneously. As liquids are relatively incompressible, the sudden cessation of flow effects a rise in pressure considerably greater than the static working pressure. This pressure increase is termed “SHOCK” and may, in some cases, be sufficient to cause valves or piping to fail.

Pressure increase due to shock is not dependent upon the working pressure in the system but rather upon the velocity at which the liquid is flowing. This pressure surge severely limits design velocities; a fact readily understandable if it is remembered that pressure rise resulting from arrest of flow may be as high as 60 psi for each foot per second initial velocity. For example, installations of 100 psi and 1000 psi working pressures, with the same initial velocity of 10 feet per second, will be subject to the same increase in pressure (approximately 600 psi) due to instantaneous closure of a valve.

Shock generally prevails in lines equipped with check or quick-closing valves, or in lines supplied by reciprocating pumps. It may also be produced, to a lessor degree, by rapid closure of gate and globe valves. Therefore, care should be exercised when choosing valves installed in liquid lines.

Where shock is likely to occur, the maximum shock pressure should be added to the working pressure of the line to determine working pressure products in the line. In additon, hydraulic installations should be equipped with air chambers or other types of shock absorbers to eliminate, as much as possible, increase due to shock.

Testing
Bronze valves described in this section meet or exceed the MSS SP-80 specifications for testing.

Materials
The selection of materials for components of CRANE® valves is based upon expert metallurgical, engineering, foundry, and fabrication knowledge as well as on many years of usage experience. Considerations affecting materials of parts which come in contact with the conveyed fluid include pressure, temperature, and chemical composition of the fluid. The materials of moving parts that are subject to rubbing contact are selected on the basis of their resistance to wear, corrosion, seizing or galling, and on their frictional characteristics.

Utilization of materials to their full capability is assured by the use of stress analysis techniques that include extensive laboratory testing as well as the application of analytical theory. Stress levels for all materials used are maintained within the levels established by applicable codes, standards, and specifications.

Illustrations & Weights
This catalog shows equivalent metric values to the customary imperial units. The “soft” conversion was found by following MSS SP-86 guidelines.

Illustrations – Catalog illustrations are representative of a certain size of each line of product but do not necessarily represent all sizes in all details.

Material & design – We reserve the right to institute changes in materials, designs, dimensions, and specifications without notice in keeping with our policy of continuing product development.

Weights – shown are approximate and are not guaranteed. They represent the average weight of CRANE® valves products as made from patterns in use at time weights were compiled.

CRANE

CRANE® Copper Alloys

CHEMICAL REQUIREMENTS (%) MECHANICAL PROPERTIES																
	Copper	Tin	Lead	Iron	Nickel	Manganese	Aluminum	Zinc	Silicon	Other	Tensile Strength		Yield Strength		Elongation in 2" (50mm)	
	Cu	Sn	Pb	Fe	Ni	Mn	Al	Zn	Si		ksi	MPa	ksi	MPa	(%)	
STEAM OR VALVE BRONZE CASTINGS																**ASTM B61, C92200**
Min.	86.0	5.5	1.0					3.0			34	235	16	110	24	
Max.	90.0	6.5	2.0	0.25	1.0		0.005	5.0	0.005	0.05*						
COMPOSITION BRONZE CASTINGS																**ASTM B62, C83600**
Min.	84.0	4.0	4.0					4.0			30	205	14	95	20	
Max.	86.0	6.0	6.0	0.30	1.0		0.005	6.0	0.005	0.05*						
COPPER-ZINC SILICON ALLOY ROD																**ASTM B371, C69400**
Min.	80.0							remainder	3.5		80	550	40	250	15	
Max.	83.0		0.30	0.20					4.5							
LEADED SEMI-RED BRASS																**ASTM B584, C84400**
Min.	78.0	2.3	6.0					7.0			29	200	13	90	18	
Max.	82.0	3.5	8.0		1.0		0.005	10.0	0.005							
SILICONE BRASS CASTINGS																**ASTM B584, C87600**
Min.	88.0							4.0	3.5		60	414	30	207	16	
Max.			0.50					7.0	5.5							
FREE CUTTING BRASS ROD/BAR																**ASTM B16, C36000, H02**
Min.	60.0		2.5					remainder			+	+	+	+	+	
Max.	63.0		3.7	0.35						0.50**	+	+	+	+	+	
NAVAL BRASS ROD																**ASTM B16, C48200, H02**
Min.	59.0	0.5	0.4					remainder			+	+	+	+	+	
Max.	62.0	1.0	1.0	0.15						0.10**	+	+	+	+	+	
ALUMINUM SILICONE BRONZE ROD																**ASTM B150, C64200**
Min.	87.5						6.3		1.5		+	+	+	+	+	
Max.	92.5	0.20	0.05	0.30	0.25	0.10	7.6	0.50	2.2	0.50***	+	+	+	+	+	
LEADED RED BRASS CONTINUOUS CASTINGS																**ASTM B505, C83600**
Min.	84.0	4.0	4.0					4.0			36	248	19	131	15	
Max.	86.0	6.0	6.0	0.30	1.0		0.005	6.0	0.005							
BRASS PLATE/SHEET STRIP																**ASTM B36, C26000, H04**
Min.	68.5							remainder			71	489				
Max.	71.5		0.07	0.05							81	558				
BRASS WIRE																**ASTM B134, C26000, H02**
Min.	68.5							remainder			57	395				
Max.	71.5		0.07	0.05							67	460				
ALUMINUM SILICONE BRONZE FORGINGS																**ASTM B283, C64200**
Min.	88.7						6.3		1.5		+	+	+	+	+	
Max.	90.1	0.20	0.05	0.30	0.25	0.10	7.6	0.50	2.2	0.15***	+	+	+	+	+	
COPPER SILICON ALLOY ROD/BAR																**ASTM B98, C65100, H02**
Min.	96.0								0.80		55	379	20	138	11	
Max.			0.05	0.08		0.7		1.5	2.00							
SEAMLESS COPPER WATER TUBE																**ASTM B88, C12200**
Min.	99.9										30	207				
Max.																

* Also may include maximum of 0.05% phosphorus.
** Maximum percent of elements permissible other than those indicated.
*** Also may include maximum of 0.15% arsenic.
\+ Depends on diameter or thickness (surface to surface) of material: data on request.

Introduction to Ratings

A) Ratings for Class 125, 150, 200, and 300 bronze valves are indicated on page 8 in this catalog:

- PSI Steam, Basic Rating; i.e., the nominal rated pressure of the valve.
- PSI Cold Working Pressure; i.e., the maximum rated pressure of the valve at a temperature range of -20° to 150°F (-30° to 65°C).

B) Ratings for Class 125 and 150 bronze valves equipped with non-metallic discs are indicated on the relevant catalog pages in this manner:

- PSI Saturated Steam; where "Saturated Steam" is the maximum rated pressure of the valve at the corresponding temperature of saturated steam.
- PSI Cold Working Pressure; where "Cold Working Pressure" is the maximum rated pressure of the valve at a temperature range of -20°F to 150°F (-30°C to 65°C).

The full range of allowable pressures and temperatures for these valves is determined by referring to the Pressure-Temperature charts shown on page 8.

C) Ratings for bronze valves falling outside Class 125, 150, 200, and 300 are indicated in various ways on the relevant catalog pages. The full range of allowable pressures and temperatures for these valves is determined by referring to the relevant catalog page.

General
All ratings represent the maximum allowable non-shock pressure at the indicated temperature. If the temperature is different from indicated, the allowable pressure may be interpolated.

Rating Temperature
The operating temperature of the valve is considered the temperature of the media flowing through it. This temperature must not exceed the maximum allowable temperature as stated in the Pressure-Temperature chart on page 8.

The safe Pressure-Temperature rating of a solder joint piping system is dependent, not only on valve, fitting, and tubing strength but also on the composition of the solder used for joints. It shall be the responsibility of the user to select a solder composition that is compatible with the service conditions.

The safe Pressure-Temperature rating of valves fitted with non-metallic discs (some Globe, Angle Valves and Check Valves) is dependent upon the composition of the disc material. It shall be the responsibility of the user to specify the service application. PTFE discs are suitable for a maximum service temperature of 400°F (200°C), nitrile composition discs are suitable for a maximum service temperature of 200°F (90°C).

Adjusted Pressure-Temperature Ratings

Joints Made of Copper Tube and Solder End Valves (pounds per square inch) Extracted from MSS SP-80

Solder used in joints	Service Temperature Degrees F	Water, including other noncorrosive liquids and gases			Saturated Steam (psig)
		Valve Sizes			
		¼" - 1"	1 ¼" - 2"	2 ½" - 4"	Valves Sizes ¼" - 4"
50-50 Tin-Lead (ASTM B-32, Alloy Grade 50-A)	100	200	175	150	-
	150	150	125	100	-
	200	100	90	75	-
	250	85	75	50	15
95-5 Tin-Antimony	100	500	400	300	-
	150	400	350	275	-
	200	300	250	200	-
	250	200	175	150	15

Pressure-Temperature Ratings

IMPERIAL UNITS						
Press. Class	125	150		200	300	
End Conn.	THD	THD	FLG	THD	THD**	FLG
Temp °F	PRESSURE – PSI NON-SHOCK					
	ASTM B-62			ASTM B-61		
-20 to 150	200	300	225	400	1000	600
200	185	270	210	375	920	560
250	170	240	195	350	830	525
300	155	210	180	325	740	490
350	140	180	165	300	650	450
400	–	–	–	275	560	410
406	125	150	150	–	–	-
450	120*	145*	–	250	480	375
500	–	–	–	225	390	340
550	–	–	–	200	300	300

METRIC UNITS						
Press. Class	125	150		200	300	
End Conn.	THD	THD	FLG	THD	THD**	FLG
Temp °C	PRESSURE – kPa NON-SHOCK					
	ASTM B-62			ASTM B-61		
-30 to 70	1380	2070	1550	2760	6890	4140
90	1280	1860	1450	2590	6340	3860
120	1170	1660	1340	2410	5720	3620
150	1070	1450	1240	2240	5100	3380
180	970	1240	1140	2070	4490	3100
200	–	–	–	1800	3860	2830
208	860	1030	1030	-	–	-
230	830*	1000*	–	1720	3310	2590
260	–	–	–	1550	2690	2340
290	–	–	–	1380	2070	2070

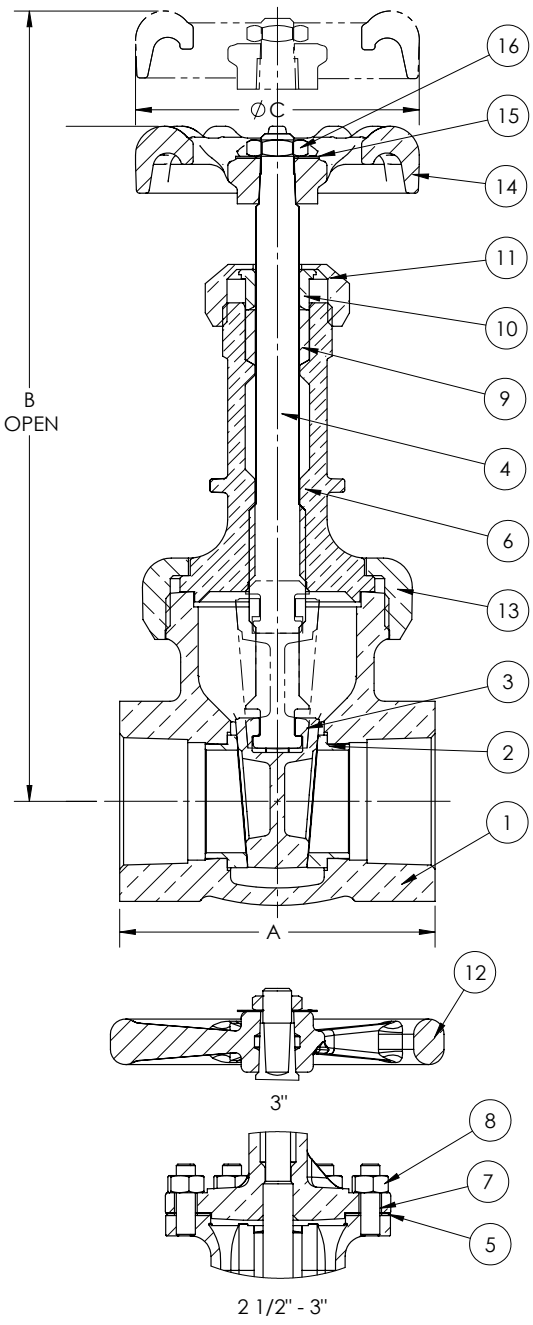
* Some codes (i.e. ASME BPVC, Section 1) limit the rating temperatures of the indicated material to 406°F (208°C).
** Alternative ratings for valve size 1/8" - 2" having threaded ends and union bonnet, when so indicated on the relevant catalogue pages.

Technical Data: Flow Data (Cv Values)

The flow coefficient Cv expresses flow rate in usg per minute of water at 60°F, with 1.0 psi pressure drop across the valve.

Bronze Gate Valves	**1/8"**	**¼"**	**3/8"**	**½"**	**¾"**	**1"**	**1 ¼"**	**1 ½"**	**2"**	**2 ½"**	**3"**
All	–	8	8	16	36	60	90	140	270	470	680
Globe and Angle Valves											
17TF	–	1.6	3.1	5.1	9.2	16	28	39	66	–	–
382P	–	1.1	2.1	3.3	6.0	10	18	26	44	64	100
384P	–	1.5	3.0	4.9	9.0	15	27	38	64	–	–
1310	–	–	2.1	3.8	5.9	11	21	28	49	–	–
7TF, 14 ½P, 212P	–	1.3	2.4	3.9	7.0	12	21	30	50	74	115
Check Valves											
29	–	1.3	2.5	4.1	7.6	13	23	31	54	78	125
27TF	–	0.9	1.8	3.0	5.4	9	16	22	39	–	–
366E	–	1.1	2.1	3.3	6.0	10	18	26	44	64	100
76E, 137, 1342, 141TF	–	2.3	4.3	7.2	13	22	39	56	92	135	215
Miscellaneous											
88, 89	0.3	0.6	1.1	1.9	3.4	–	–	–	–	–	–

424 Gate Valve



Materials of Construction

No.	Description	Material	ASTM Spec.
1	Body	Bronze	B-61 C92200
2	Body Seat Ring	Stainless Steel	A-276 Type 410
3	Disc	Bronze	B-61 C92200
4	Stem	Bronze	B-371 C69400
5	Gasket	Synthetic/Glass Fiber with Nitrile Binder	
6	Bonnet	Bronze	B-61 C92200
7	Stud	Steel Cadmium	A-109 C1144
8	Stud Nut	Mild Steel	A-563 GR A
9	Packing	Graphite (Asbestos Free)	
10	Gland	Brass	B-16 H02
11	Packing Nut	Brass	B-16 H02
12	Handwheel 3"	Ductile Iron	-
13	Union Bonnet Ring	Bronze	B-61 C92200
14	Handwheel	(¼" - 2 ½") Cast Iron	
15	ID Plate	Steel Zinc Plated	
16	Lock Nut	Steel Cadmium	

See page 8 for Pressure-Temperature Ratings.

Industry Standards
MSS SP-80, Type 2

Dimensions and Weights

Inches (millimeters) - Pounds (kilograms)

Valve Size	Dimensions			Wt.
	B	C	A	
¼	4.67	2.24	2.03	0.88
	(119)	(57)	(52)	(0.40)
⅜	4.67	2.24	2.13	0.90
	(119)	(57)	(54)	(0.41)
½	5.37	2.76	2.44	1.43
	(136)	(70)	(62)	(0.65)
¾	6.57	2.76	2.61	2.07
	(167)	(70)	(66)	(0.94)
1	7.60	2.76	3.06	3.23
	(193)	(70)	(78)	(1.47)
1 ¼	9.09	4.02	3.35	4.86
	(231)	(102)	(85)	(2.21)
1 ½	10.28	4.02	3.69	6.18
	(261)	(102)	(94)	(2.81)
2	12.17	4.02	3.96	10.36
	(309)	(102)	(101)	(4.71)
*2 ½	14.37	4.76	4.60	18.61
	(365)	(121)	(117)	(8.46)
*3	16.68	5.51	5.63	31.33
	(424)	(140)	(143)	(14.24)

* 2 ½" and 3" have Bolted Bonnet