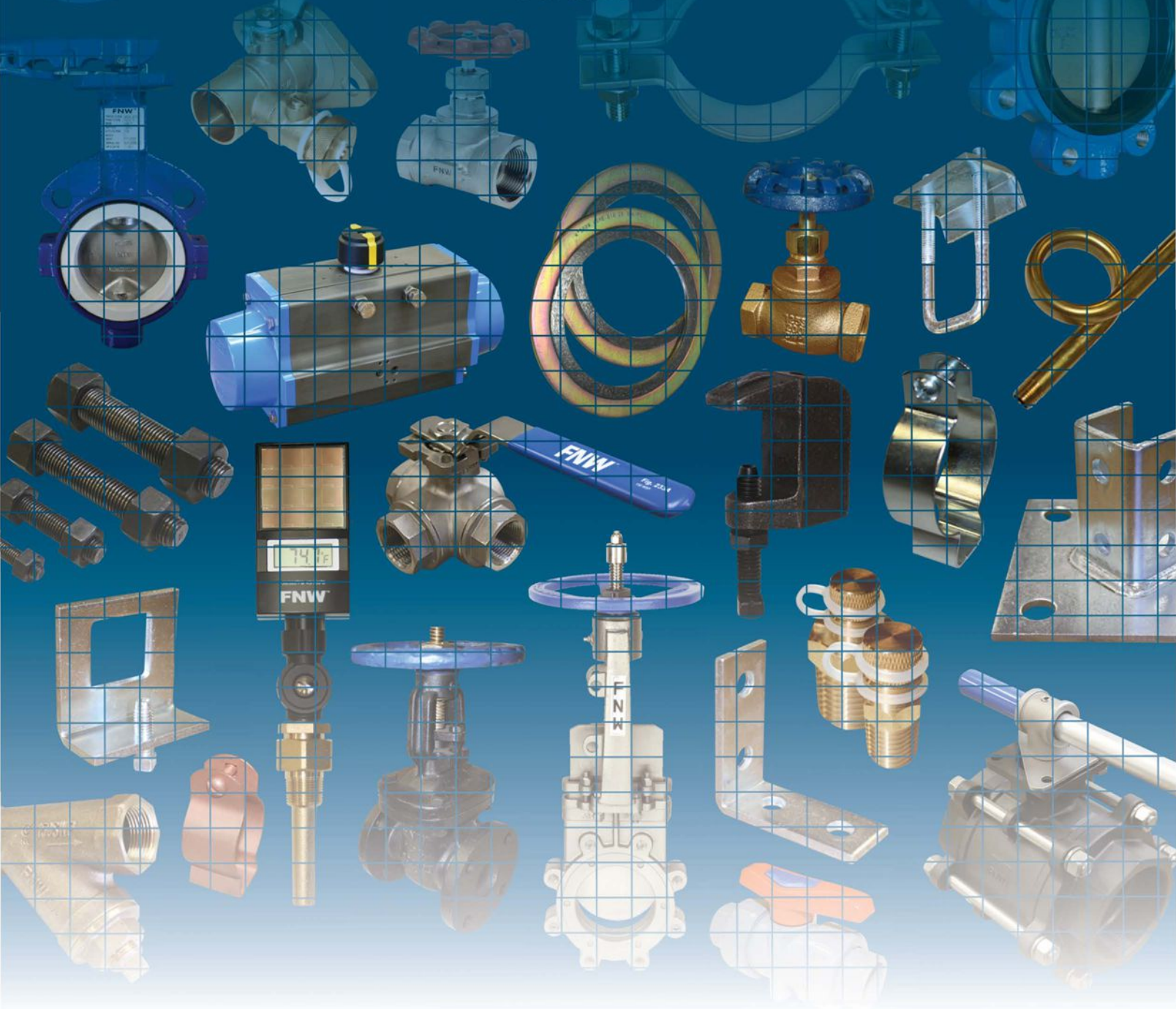


FNW™

PIPING PRODUCTS

Volume 4



www.fnw.com

What's **New!** at FNW

FNW continues to grow, adding new products and updating others. Here are just a few highlights.

Additional Hanger Products

Hangers for pipe and copper tube, epoxy plated finish for added corrosion resistance, starting on page 273



Figure 7006
Light Duty Clevis Hanger
Page 274

Figure 7015
Swivel Ring Hanger for Copper Tube
Page 277

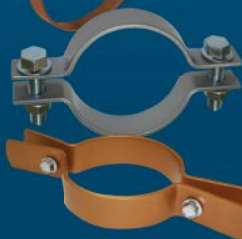


Figure 7022
Medium Split Horizontal Pipe Clamp
Page 279

Figure 7023
Riser Clamp for Copper Tube
Page 279



Figure 762
Lug Style
Page 132



Figure 761
Wafer Style
Page 132

New Butterfly Valves

PTFE seats for added corrosion resistance in many applications, split cast iron body, with single piece stainless steel disc and stem, locking lever to 6", gear operators on 8" and above, starting on page 132

Updated Ball Valves

Small body cast steel valves have been updated to the A-series, now steam rated to 150 wsp min., 2000 psi rated valves come standard with TFM seats, starting on page 79



Figure 221A
2-pc, 2000 psi, 150 wsp, Carbon Steel, TFM Seats
Page 79



Figure 320AC
3-pc, 2000 psi, 250 wsp, Stainless Steel, TFM Seats
Page 107

New Pump Isolation Ball Valves

Rotating pump flange by threaded or sweat end, 600 wog, with or without drain, includes tee handle, gasket, nuts and bolts, starting on page 63



Figure 495
Sweat End, no Drain
Page 63

Figure 490W
Threaded End, with Drain
Page 63

New Stud Bolt Sets

B7 grade stud bolts with two 2H grade hex nuts, assembled, sizes to cover 1/2" to 24" 150# and 300# flanges, starting on page 243



Figure B7
Page 243

Valve Automation Services Available

FNW products are distributed through Wolseley North American operating companies. These companies contain an extensive array of Valve Automation Centers throughout the region and provide services directly, or through your local branch. Each facility offers a variety of valve automation expertise for sizing, designing, sourcing, assembling, and testing. This expertise is available at any time from the engineering office to the job site.

To find out more about these services, contact your local Wolseley North American operating branch. For locations, visit www.ferguson.com or www.wolseleyinc.ca.



FNW™

Knife Gate Valves

Metal Seated, Resilient Seated, Special Service

Ball Valves

Brass Carbon Steel, Stainless Steel, Small Body, Flanged, ISO, 3-Way

Butterfly Valves

Resilient Seated, High Performance

Thermoplastic Valves

Ball, Butterfly, Check

Gate, Globe, and Check Valves

Bronze, Brass, Cast Iron, Carbon Steel, Stainless Steel, Small Body, Flanged

Strainers

Bronze, Cast Iron, Stainless Steel, Threaded, Sweat, Flanged

Actuation & Accessories

Actuators, Solenoids, Switches, Positioners

Piping Products

Gaskets, Bolt Packs, Bolt Insulators, Water PRV's, Water Hammer Arrestors, Flexible Connectors

Hangers, Clamps, and Strut Accessories

Pipe Hangers, Clamps, Mounts, Strut Accessories

Gauges, Thermometers, and Accessories

Pressure Gauges, Thermometers, Thermowells, Needle Valves, Pressure Snubbers, P/T Plugs

Engineering Data

Bolting Guides, Cv Charts, Material Data, Chemical Resistance Charts

Warranty and Terms & Conditions of Sale



Your Piping Products Source

Since FNW was established in 1979, we have been dedicated to providing quality products for industrial and commercial applications. With a basic philosophy to provide a product suited to the needs of the end user, FNW has built a product offering with an innovative approach to the market and has continued to grow its product range to meet those needs. If you do not see the type or size of item needed for your project, please contact us.

Phone (503) 287-8383, Fax (503) 281-9677
E-mail: FNW@Ferguson.com

We continue to add products that may not be reflected in this catalog. Therefore, please visit our web site at **www.FNW.com** for updates and the latest additions to our product offering.

DOC: FNWCAT-V4

© 2012 - FNW. All rights reserved.

The FNW logo is a trademark of Ferguson Enterprises, Inc., PL Sourcing, PO Box 2778, Newport News, VA 23609

The contents of this publication are presented for information purposes only, and while effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, expressed or implied, regarding the products or services described herein or their use or applicability. All sales are governed by our terms and conditions, which are available on request. We reserve the right to modify or improve the designs or specifications of our products at any time without notice. Always verify that you have the most recent product specifications or other documentation prior to the installation of these products.

KNIFE GATE VALVES	1-31	PIPING PRODUCTS	242-267
Metal Seated	1	Stud Bolt Sets	243
Resilient Seated	10	Bolt Packs	245
Special Service	20	Bolt Insulators	245
Options & Accessories	30	Nut, Bolt, Gasket Kits	246
BALL VALVES	32-119	Flange Gaskets	247
Small Body		Back-Up Flanges	251
Brass	33	Pressure Regulator Valves	253
Carbon Steel	79	Water Hammer Arrestors	255
Stainless Steel	91	Flexible Connectors	259
Flanged		Riser Gauge Kits	267
Carbon Steel	87	HANGERS, CLAMPS & STRUT	
Stainless Steel	111	ACCESSORIES	268-297
BUTTERFLY VALVES	120-139	Hangers and Clamps	272
Resilient Seated	121	Strut Accessories	282
PTFE Seated	132	Pipe Supports	284
High Performance	136	Insulation Protection Shields	297
THERMOPLASTIC VALVES	140-151	THERMOMETERS, GAUGES &	
Ball	141	ACCESSORIES	298-311
Butterfly	147	Thermometers	299
Check	149	Thermowells	302
GATE, GLOBE & CHECK VALVES	152-193	Pressure Gauges	304
Small Body		Syphons (Pig Tails)	306
Bronze	153	Brass Needle Valves	307
Brass	161	Pressure Snubbers	309
Stainless Steel	163	Pressure/Temperature Test Plugs	310
Wafer		ENGINEERING DATA	312-335
Cast Iron	169	Knife Gate Vibration Treatment	313
Flanged		Knife Gate Bolt Recommendations	315
IBBM (Iron Body Bronze Mounted)	173	Butterfly Bolt Recommendations	316
Carbon Steel	182	About Cv (Flow Coefficients)	318
Stainless Steel	188	Cast Steel Gate, Globe, & Check Cv	319
STRAINERS	194-207	Flanged Cast Steel Stem Data	320
Bronze	195	Resilient Seat/Seal Materials	322
Cast Iron	201	Thermoplastic Materials	323
Stainless Steel	205	Flange Dimensions	324
ACTUATION & ACCESSORIES	208-241	Metric Equivalents	325
Gear Operators	209	Material Codes	326
Cylinders	213	Material Markings	327
Rack & Pinion	219	Chemical Resistance Chart	328
Electric Actuators	226	WARRANTY, TERMS & CONDITIONS of	
Accessories	230	SALE	336-341
		Warranty Statement	337
		Terms & Conditions of Sale	338

Figure	Description	Page
14B	Strainer, threaded stainless	205
15B	Gate, threaded stainless	163
16B	Sing check, threaded stainless	167
17B	Globe, threaded stainless	165
100A	1-pc 1000 cwp ball, threaded stainless	91
1201	Water pressure regulator, brass	253
1211	NRS gate, threaded bronze	153
1212	NRS gate, sweat bronze	153
1221	RS gate, threaded bronze	155
1222	RS gate, sweat bronze	155
1231	Globe, threaded bronze	157
1232	Globe, sweat bronze	157
1241	Swing check, threaded bronze	159
1242	Swing check, sweat bronze	159
200A	2-pc 1000 cwp ball, threaded stainless	93
2000B	Knife gate, high performance	16
2000BTIV	Tank isolation knife gate, stainless	27
220A	2-pc ball, 2000 cwp threaded stainless	95
220AM	2-pc ball, 2000 cwp ISO mount stainless	97
220ASE	2-pc ball, 150 psi safety exhaust	99
221A	2-pc ball, 2000 cwp threaded carbon	79
233A	3-way ball, 1000cwp thrd ISO mnt carbon	101
30F	Flex connector, stainless braid flanged	259
30T	Flex connector, stainless braid MNPT	261
310A	3-pc ball, 1000 cwp thrd/sw stainless	103
310AM	3-pc ball, 1000 cwp thrd/sw ISO mnt	105
311A	3-pc ball, 1000 cwp thrd/sw carbon	81
311AM	3-pc ball, 1000 cwp threaded ISO mnt	83
320A	3-pc ball, 2000 cwp thrd/sw stainless	107
321A	3-pc ball, 2000 cwp thrd/sw carbon	85
330A	3-pc ball, 400 cwp clamp end ISO mnt	109
340N	PVC true-union ball, thrd/sw	141
340NF	PVC true-union ball, flanged	141
340NSE	PVC stem extension kit	145
345	PVC true-union check, thrd/sw	149
350N	CPVC true-union ball, thrd/sw	141
355	CPVC true-union check, thrd/sw	149
35S	Flex connector, braided copper swt	263
40	Flex connector, single sphere EPDM	265
400	2-pc ball, 600 wog threaded brass	33
401	2-pc ball, 600 wog sweat brass	35
410A	2-pc ball, 600 wog threaded brass	37
411A	2-pc ball, 600 wog sweat brass	39
413	3-way ball, 400 wog threaded brass	41
420	2-pc ball, 600 wog threaded brass	43
421	2-pc ball, 600 wog sweat brass	45
426A	2-pc cap/chain ball, 600 wog FNPT brass	47
427A	2-pc cap/chain ball, 600 wog sweat brass	47
428A	2-pc cap/chain ball, 600 wog MNPT brass	47
430	2-pc ball, 200 psi press end brass	49
431	2-pc check, 200 psi press end brass	161
435	2-pc gas ball, 125 psi press end brass	51
440	2-pc ball, 600 wog thrd ISO mnt brass	53
451	OS&Y Gate, 150# flanged stainless	188
452	OS&Y Gate, 300# flanged stainless	189
455	3-way ball, 400 wog thrd ISO T-port brass	55

Figure	Description	Page
461	Globe, 150# flanged stainless	190
462	Globe, 300# flanged stainless	191
465	3-way ball, 400 wog thrd ISO L-port brass	55
470	Pump isolation ball, 400 wog thrd brass	57
471	Swing check, 150# flanged stainless	192
472	Swing check, 300# flanged stainless	193
475	Pump isolation ball, 400 wog swt brass	57
480A	Compression end ball, 400wog brass	59
485	Push fit ball, 200 psi brass	61
490	Pump isolation ball, 600 wog thrd brass	63
495	Pump isolation ball, 600 wog swt brass	63
500	1-pc ball, 150# flanged stainless	111
501	1-pc ball, 150# flanged carbon	87
509	Strainer, 250 wog threaded bronze	195
510	Strainer, 400 wog sweat bronze	197
551	OS&Y Gate, 150# flanged carbon	182
552	OS&Y Gate, 300# flanged carbon	183
558A	Strainer, 125# flanged cast iron	201
559	Strainer, 400 wog threaded cast iron	203
561	Globe, 150# flanged carbon	184
562	Globe, 300# flanged carbon	185
571	Swing check, 150# flanged carbon	186
572	Swing check, 300# flanged carbon	187
600	2-pc ball, 150# flanged stainless	113
601	2-pc ball, 150# flanged carbon	89
60R	Knife gate, 100 psi resilient seated	20
61B	Knife gate, 150 psi stainless lined	1
62B	Knife gate, 150 psi resilient seat & lined	10
633	3-way ball, 150# flanged L-port stainless	115
634	3-way ball, 150# flanged T-port stainless	115
651A	IBBM OS&Y gate, 150# flanged	173
65B	Knife gate, 150 psi all stainless	4
660	2-pc ball, 150# flanged stainless	117
661	IBBM globe, 150# flanged	175
671	IBBM swing check, 150# flanged	177
67B	Knife gate, 150 psi all stainless	7
681	Wafer silent check, 200 psi cast iron	169
682	Wafer double-door check, 200 psi cast iron	171
68B	Knife gate, 150 psi resilient seat stainless	13
7001	Hanger, split ring malleable iron	272
7005	Hanger, standard duty adjustable clevis	273
7006	Hanger, light duty adjustable clevis	274
7008	Hanger, adjustable clevis for copper tube	275
7010	Hanger, adjustable swivel ring	276
7012	Hanger, adjustable swivel ring felt lined	276
7015	Hanger, adjustable swivel ring for copper	277
7020	Clamp, medium split horizontal	279
7022	Clamp, riser	280
7023	Clamp, riser for copper tube	280
7025	Hanger, adjustable "J"	278
7201	C-clamp, steel beam steel	281
7202	C-clamp, beam malleable iron	281
7203	Clamp, jr. beam malleable iron	281
7204	Clamp, wide mouth beam malleable iron	282
7250	Retaining strap for beam clamp	283
7310	Clamp, conduit pipe for Rigid/EMT	296

TABLE OF CONTENTS BY FIGURE NUMBER

Figure	Description	Page
7311	Clamp, conduit pipe for copper tube	296
7501	Beam connector, malleable iron	296
7502	Beam ceiling flange, malleable iron	296
7701	Pipe support, 50# with strut	284
7715	Pipe support, 150# with strut	284
7730	Pipe support, 300# with strut	284
7750	Shields, insulation protection, MSS	297
7751	Shields (dom), insulation protection, MSS	297
7753	Shields, insulation protection light duty	297
7801	Clamp, window strut to beam	282
7802	Spreader caps, strut to beam	282
7803	Clamp, square u-bolt to beam	283
7804	Clamp, square u-bolt to beam	283
7805	Clamp, notched type strut to beam	283
7806	Clamp, universal beam malleable iron	282
7811	Bracket, 2-hole 1-5/8" channel	284
7815	Strut clamp, pipe to strut cushioned	291
7816	Strut clamp, tube to strut cushioned	291
7818	Channel Nut, long spring	285
7819	Channel Nut, no spring	285
7820	Channel Nut, no spring	285
7821	Channel Nut, regular spring	285
7822	Channel Nut, short spring	285
7824	Channel Nut, top spring	285
7830	End cap, channel PVC	286
7831	End cap, channel	286
7835	Strut fitting, 1-hole square washer	288
7836	Strut fitting, 1-hole notched square washer	288
7837	Strut fitting, 2, 3, or 4-hole flat splice plate	289
7838	Strut fitting, 3-hole flat corner plate	289
7839	Strut fitting, 4-hole flat tee plate	289
7840	Strut fitting, 2-hole no-twist corner angle	286
7841	Strut fitting, 2, 3, or 4-hole corner angle	286
7842	Strut fitting, 2 or 3-hole cross corner angle	287
7843	Strut fitting, 3 or 4-hole cross corner 3-way	287
7844	Strut fitting, 7-hole gusset angle	287
7845	Strut fitting, 2-hole open 45deg angle	287
7846	Strut fitting, 2-hole closed 45deg angle	287
7847	Strut fitting, 4-hole open 45deg angle	288
7848	Strut fitting, 2-hole angle brace	288
7850	Strut base, 2-hole single channel	290
7851	Strut base, 2-hole single channel flush	290
7852	Strut base, 4-hole single channel standard	290
7853	Strut base, 4-hole single channel tall	290
7855	Strut base, 4-hole single channel short	290
7862	Pipe wrap, EPDM	295
7865	Roller trolley 4-bearing assembly	283
7868	Clamp, right angle pipe to beam	282
7870	Strut clamp, copper tube to strut	292
7871	Strut clamp, EMT to strut	292
7872	Strut clamp, O.D. pipe to strut	293
7873	Strut clamp, rigid to strut	294
7874	Strut clamp, universal	294
711	Butterfly, resilient seat wafer CI/DI x AB	121
712	Butterfly, resilient seat lug CI/DI x AB	121
721	PVC Butterfly, resilient seat wafer	147

Figure	Description	Page
731	Butterfly, resilient seat wafer CI/DI x SS	125
732	Butterfly, resilient seat lug DI x SS	125
752	Butterfly, resilient seat large OD U-body	129
761	Butterfly, PTFE seat wafer CI x SS	132
762	Butterfly, PTFE seat lug CI x SS	132
9101	Riser gauge kit, fire protection	267
9S	Thermometer, adjustable angle	299
B7	B7 stud bolt and 2H hex nut set	243
BGTM	Gear operator, multi-turn bevel	211
BNV	Needle, 600 psi brass	308
BTW	Thermowell, brass	302
BTWELL	Thermowell, brass	303
CBI	Bolt isolators	245
DIBUF	Ductile iron back-up flanges	251
ELKITC	Elevation kit for pipe support systems	284
EP5	4-20 mA electro-pneumatic positioner	230
F-series	Knife gate, fabricated series	23
G	4" mechanical contractor's gauge	305
G731	Gear operator, quarter-turn worm	209
HP	Butterfly, 150# high performance	136
LBB	Lugged butterfly valve bolt pack	245
LFG	2-1/2" liquid filled gauge	304
M4	Position switch, quarter turn	236
MLS4	Limit switch, mechanical	239
NA	Gasket, non-asbestos	247
NBG	Nut, bolt, gaskets set	246
NV	Needle, 400 psi brass	307
P5	3-15 psi pneumatic positioner	230
PLS4	Limit switch, proximity	238
PS	Pressure snubber, brass	309
PTS	Pig tail syphon, brass and steel	306
PTT	Pressure/temperature test plug	310
QV	Position switch, quarter turn	234
R	Gasket, red rubber	248
RP	Actuator, quarter-turn pneu rack & pinion	219
SC	Water hammer arrestor, MNPT brass	255
SDTH	Thermometer, adjustable angle digital	300
SWA	Water hammer arrestor, sweat brass	255
SWG	Gasket, spiral wound	249
V100E	4-20 mA electro-pneumatic positioner	232
V100P	3-15 psi pneumatic positioner	232
X410B	2-pc ball, 600 wog thrd lead free brass	65
X411B	2-pc ball, 600 wog sweat lead free brass	67
X420	2-pc ball, 600 wog thrd lead free brass	69
X421	2-pc ball, 600 wog sweat lead free brass	71
X430	2-pc ball, 200 psi press end lead free brass	73
X480	Comp. end ball, 400 wog lead free brass	75
X485	Push fit ball, 200 psi lead free brass	77
X509	Strainer, 250 wog thrd lead free bronze	199
X510	Strainer, 400 wog sweat lead free bronze	199
XSC	Water hammer arrestor, lead free brass	257
	Actuator, linear hydraulic cylinder	216
	Actuator, linear pneumatic cylinder	213
	Actuator, electric quarter-turn	226
	Solenoid valves	240

KNIFE GATE VALVES

METAL SEATED

Figure	Description	Page
61B.....	Stainless steel lined unidirectional	1
65B.....	All stainless steel unidirectional	4
67B.....	All stainless steel unidirectional	7

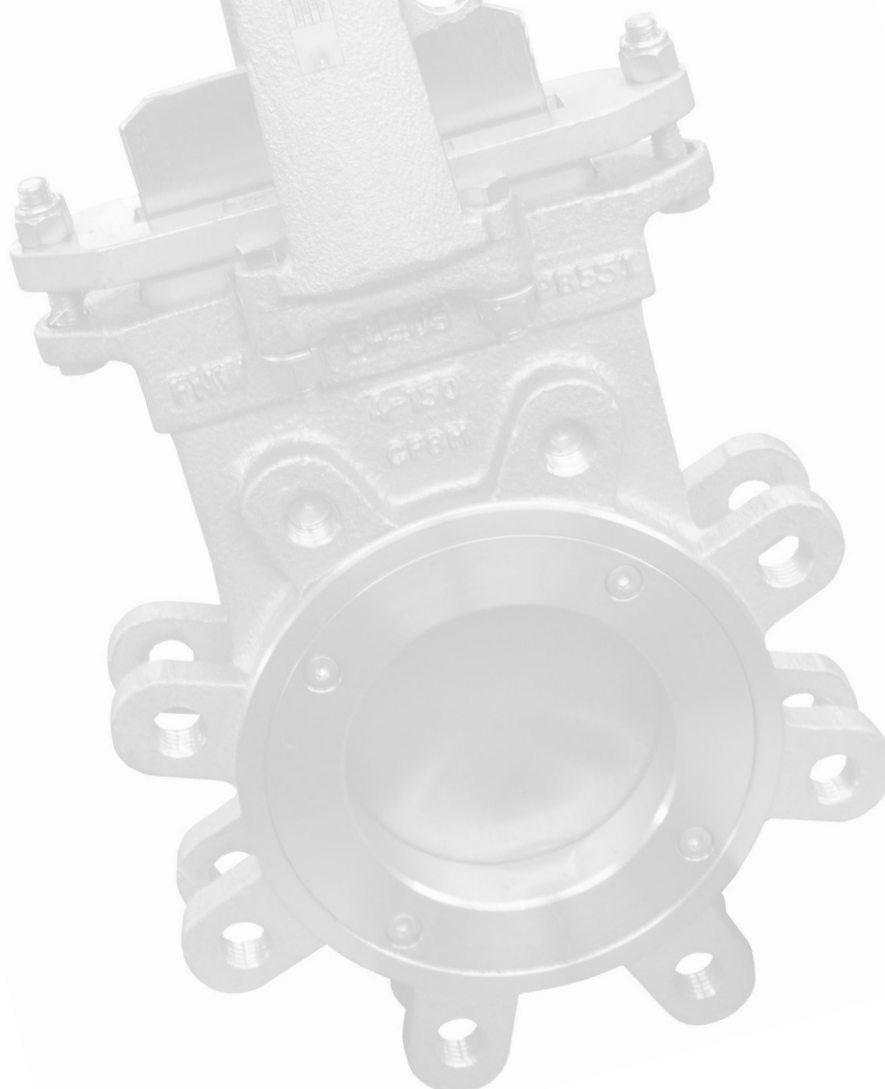
RESILIENT SEATED

Figure	Description	Page
62B.....	Stainless steel lined unidirectional	10
68B.....	All stainless steel bidirectional	13
2000B.....	All stainless steel bidirectional high performance	16

SPECIAL SERVICE

Figure	Description	Page
60R.....	Carbon steel resilient seated bidirectional	20
F-series	Fabricated series	23
2000BTIV	All stainless steel bidirectional high performance tank isolation	27

OPTIONS & ACCESSORIES	30
-----------------------------	----



STAINLESS STEEL LINED METAL SEATED KNIFE GATE VALVE

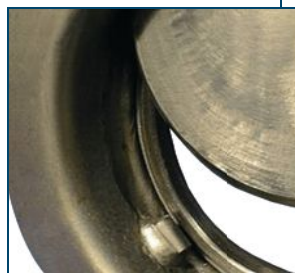
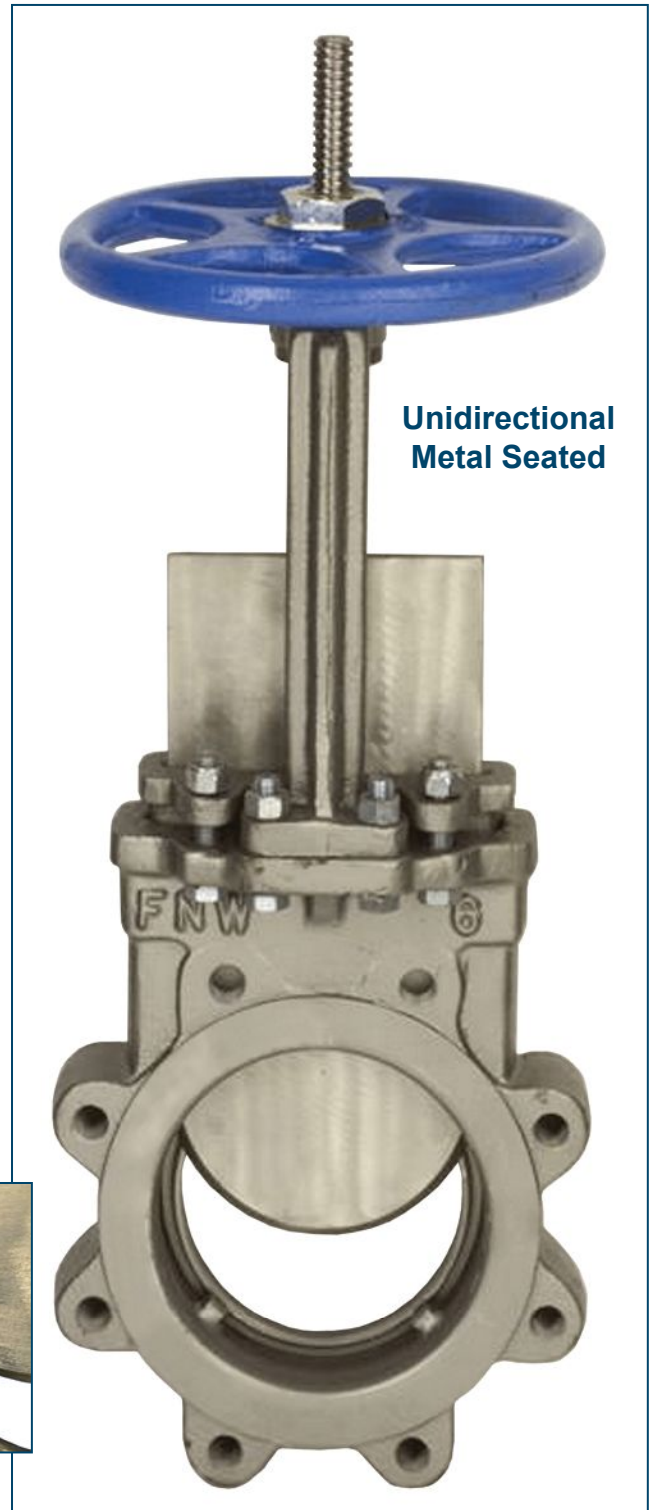
The figure 61B is a lined valve with the economy of a ductile iron body and the corrosion resistance of all stainless steel wetted parts. The 61B is designed for pulp and paper, chemicals, mining and petroleum industries to handle dense mixtures of stock and slurries. The shearing action of the knife gate cuts through solids and cleans the seat as it closes.

Features:

- Unidirectional Shut off
- Stainless Steel Lined Ductile Iron Body
- Thrust Ball Bearing Yoke Bushing (18" & Larger)
- Cast Iron Handwheel
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Corrosion Resistant Stainless Impregnated Coating
- Meets MSS SP-81 Specification for 150 PSI CWP
- Smooth Flow, Non-clogging Step Seat Design
- Available in sizes from 3" to 24"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Seat/Shell Test: MSS SP-81



Stainless Steel Lined

Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops for low ΔP or reverse operation applications, or to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Quick opening levers
- Gate scraper

Contact FNW for knife gate valve options.

Standard Materials

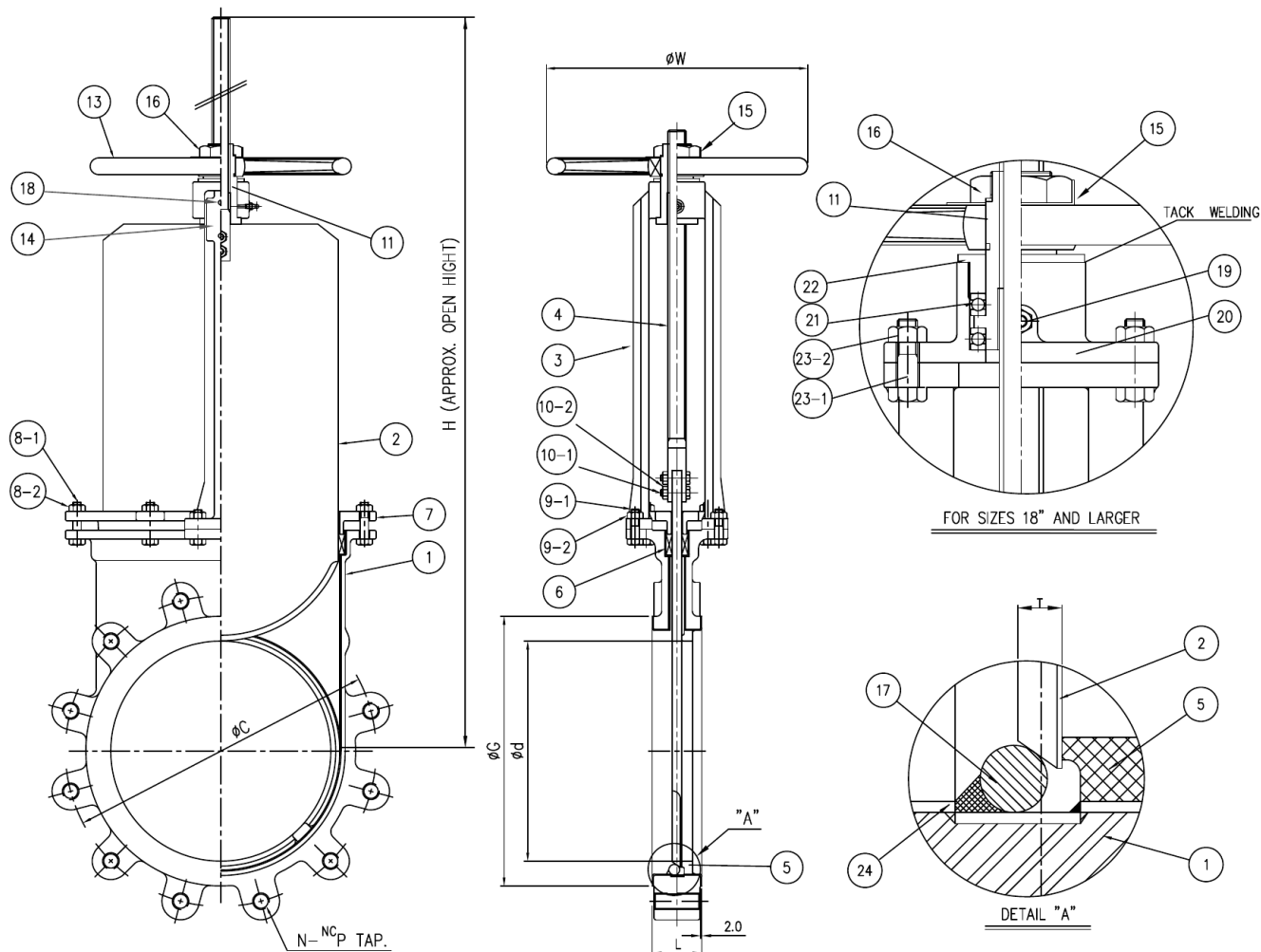
Ref. No.	Description	Material	Qty	Remarks
1	Body	Ductile Iron	1	
2	Knife	A240 316	1	
3	Yoke	A216 WCB	1	
4	Stem	A276 410	1	
5	Body Seat Ring	A240 316	1	Welding
6	Packing	PTFE Impregnated Fiber	1 Set	Non-Asbestos
7	Packing Gland	A216 WCB	1	
8-1	Gland Bolt	STEEL	1 Set	
8-2	Gland Nut	STEEL	1 Set	Nylon Lock Nut
9-1	Yoke Bolt	STEEL	4	
9-2	Yoke Nut	STEEL	4	
10-1	Clevis Bolt	A193 B8	2	
10-2	Clevis Nut	A194 8	2	Nylon Lock Nut
11	Yoke Sleeve	BRASS	1	
12	Thrust Washer	BRASS	1	
13	Hand Wheel	A338	1	
14	Name Plate	ALUMINUM	1	
15	Lock Washer	A240 304	1	
16	Wheel Nut	BRASS, STEEL	1	
17	Bottom Stopper	A240 316	2	Welding
18	Rivet	ALUMINUM	2	
19	Grease Nipple	ASS'Y	1	
20	Bearing Housing	A216 WCB	1	
21	Thrust Ball Bearing	ASS'Y	2	18" And Larger
22	Bearing Gland	A216 WCB	1	Tack Weld
23-1	Bearing Housing Bolt	STEEL	4	
23-2	Bearing Housing Nut	STEEL	4	
24	Body Liner	A240 316	1 Set	Welding

Packing Options

Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in ²)	Wt. (Lbs)
3	240	5.64	24
4	430	9.84	35
6	1,010	23.15	57
8	1,830	42.06	86
10	2,890	66.59	128
12	4,200	96.72	169
14	5,510	127.01	223
16	6,920	159.4	295
18	8,960	206.52	363
20	11,270	259.74	557
24	16,270	374.78	671



Dimensions (inches)

Size	L	Ød	ØG	ØC	N	NCP	T	ØW	H
3	2.00	2.68	5.00	6.00	4	5/8"-11	0.236	7.09	15.75
4	2.00	3.54	6.18	7.50	8	5/8"-11	0.276	7.87	18.90
6	2.25	5.43	8.50	9.50	8	3/4"-10	0.315	9.84	24.41
8	2.75	7.32	10.63	11.75	8	3/4"-10	0.315	11.81	31.50
10	2.75	9.21	12.76	14.25	12	7/8"-9	0.394	13.78	37.80
12	3.00	11.10	15.00	17.00	12	7/8"-9	0.394	15.75	43.31
14	3.00	12.72	16.26	18.75	12	1"-8	0.472	17.72	48.82
16	3.50	14.25	18.50	21.25	16	1"-8	0.472	19.69	53.94
18	3.50	16.22	20.98	22.75	16	1-1/8"-7	0.472	19.69	60.24
20	4.50	18.19	22.99	25.00	20	1-1/8"-7	0.591	21.65	67.72
24	4.50	21.85	27.24	29.50	20	1-1/4"-7	0.591	21.65	79.13

Figure Number Matrix

FNW 61 B Size		
SIZE CODE		
3 = M	10 = 10	18 = 18
4 = P	12 = 12	20 = 20
6 = U	14 = 14	24 = 24
8 = X	16 = 16	

STAINLESS STEEL METAL SEATED KNIFE GATE VALVE

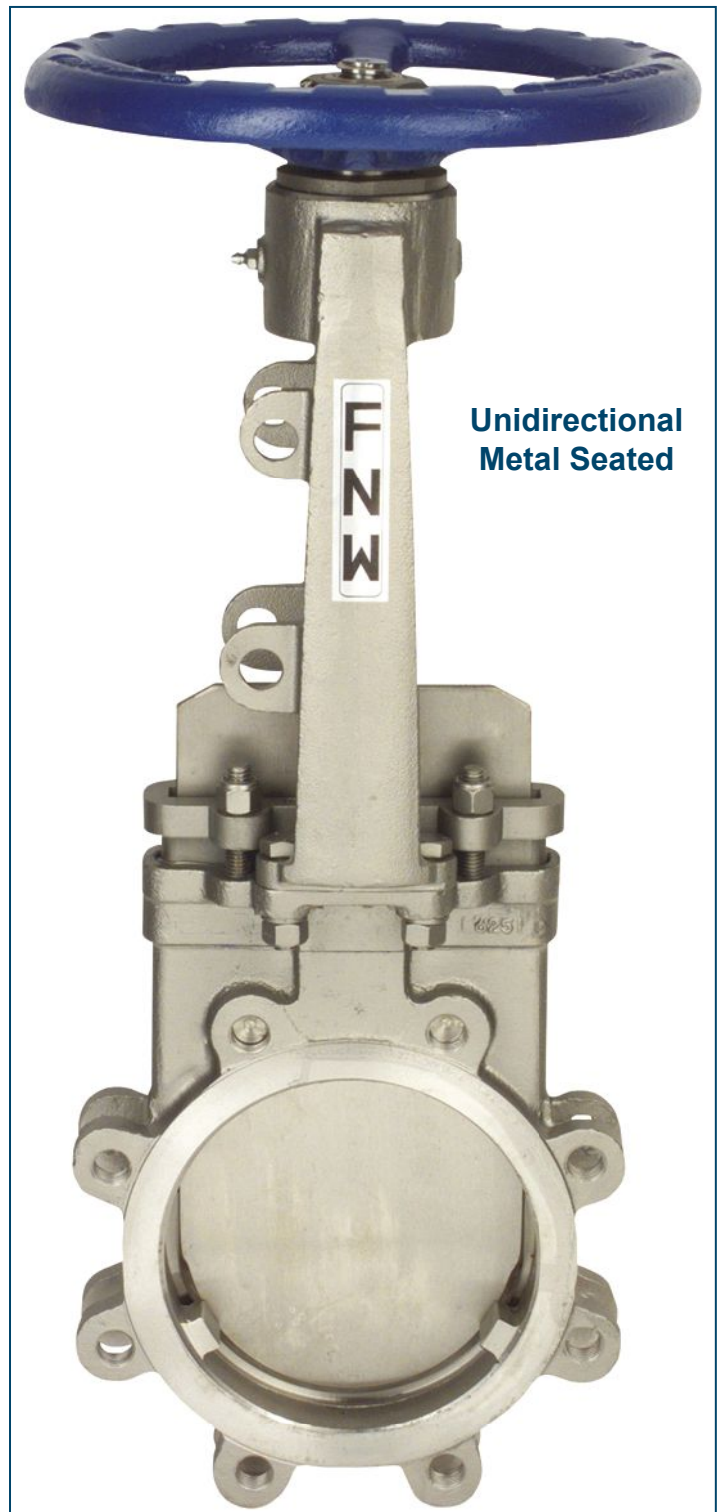
The figure 65B is an all cast stainless steel body and yoke with investment cast packing follower. The 65B is designed and engineered for the pulp and paper, chemical, mining, power, petroleum, and food process industries, as well as municipal water and waste treatment plants. It is ideal for handling dense mixtures of stock and slurries with unidirectional shut off. The shearing action of the knife gate cuts through solids and cleans the seat as it closes.

Features:

- Unidirectional Shut off
- Cast Stainless Steel Body, Yoke and Packing Gland
- Thrust Ball Bearing Yoke Bushing (6" & Larger)
- Ductile Iron Handwheel
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Meets MSS SP-81 Specification for 150 PSI CWP
- Cast Lugs in Yoke for Lockout in Closed Position or Optional Open Position (Lock Bar is Optional)
- Smooth Flow, Non-clogging Step Seat Design
- Available in sizes from 2" to 24"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Seat/Shell Test: MSS SP-81
- Material: ASME B16.34



Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops for low ΔP or reverse operation applications, or to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Quick opening levers
- Gate scraper

Contact FNW for knife gate valve options.

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	A351 CF8M	1	
5	Yoke	A351 CF8	1	
6	Knife	A240 316	1	
8	Gland Flange	A351 CF8M	1	
12	Sleeve Gland	A351 CF8	1	
14	Wheel Nut	A351 CF8	1	
15	Handwheel	A536 65-45-12	1	
16	Yoke Sleeve	A439 D2C	1	
18	Stem	A182 F304	1	
38	Sleeve Box	A351 CF8	1	12 - 24" Sizes Only
56	Yoke Bolt	A193 B8	1 Set	
57	Yoke Nut	A194 8	1 Set	
58	Gland Bolt	A193 B8	1 Set	
59	Gland Nut	A194 8	1 Set	
64	Washer	A276 304	1 Set	
64-1	Washer	A240 430	1	2 - 4" Sizes Only
69	Grease Nipple	A307 Gr. B	1	Cr. Plating
70	Set Screw	A193 B8	1	
71	Name Plate	A240 304	1	
73	Bearing	ASS'Y	2	6 - 24" Sizes Only
74	Key	A108 1045	2	
84	Pin Bolt	A193 B8	1	
85	Pin Nut	A194 8	1	
86	Sleeve Box Bolt	A193 B8	1 Set	12 - 24" Sizes Only
87	Sleeve Box Nut	A194 8	1 Set	12 - 24" Sizes Only
97	Packing	PTFE	1 Set	PTFE Impregnated Fiber
97-1	Packing / Wiper Seal	EPDM	1	

Packing Options

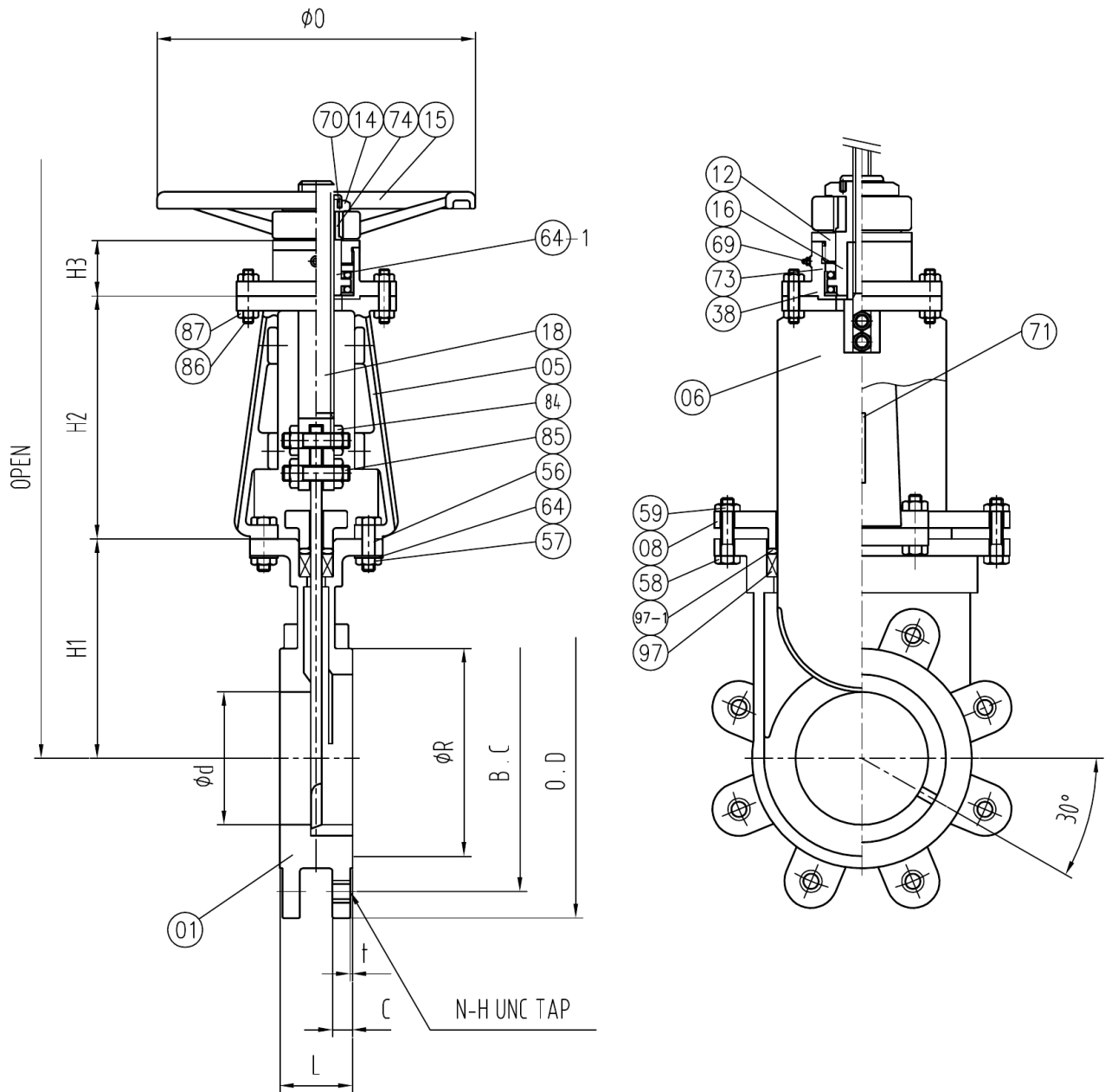
Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in ²)	Wt. (Lbs)
2	210	3.14	18
2-1/2	360	4.91	20
3	560	7.07	24
4	1,200	12.56	35
6	3,500	28.26	63
8	5,700	50.24	91
10	8,600	78.50	141
12	11,700	113.04	214
14	14,700	137.81	241
16	18,000	182.56	355
18	21,600	233.59	393
20	25,400	290.89	571
24	32,800	424.34	735

Figure Number Matrix

FNW 65 B Size		
SIZE CODE		
2 = K	8 = X	18 = 18
2-1/2 = L	10 = 10	20 = 20
3 = M	12 = 12	24 = 24
4 = P	14 = 14	
6 = U	16 = 16	



Dimensions (inches)

Size	L	d	Open	H1	H2	H3	O	Flange						
								O.D.	B.C.	R	C	t	N	H
2	1.88	2.00	13.86	4.21	5.49	-	7.09	6.00	4.75	3.62	0.50	0.06	4	5/8 - 11
2-1/2	2.00	2.50	15.33	4.72	5.94	-	7.09	7.00	5.50	4.12	0.50	0.06	4	5/8 - 11
3	2.00	3.00	16.95	5.00	6.67	-	7.87	7.50	6.00	5.00	0.50	0.06	4	5/8 - 11
4	2.00	4.00	20.50	6.10	7.81	-	9.84	9.00	7.50	6.19	0.50	0.06	8	5/8 - 11
6	2.25	6.00	28.37	7.42	12.26	-	11.81	11.00	9.50	8.50	0.63	0.06	8	3/4 - 10
8	2.75	8.00	35.55	9.76	14.54	-	13.78	13.50	11.75	10.62	0.63	0.06	8	3/4 - 10
10	2.75	10.00	42.56	11.93	17.00	-	15.75	16.00	14.25	12.75	0.75	0.06	12	7/8 - 9
12	3.00	12.00	49.84	14.06	16.93	3.24	17.72	19.00	17.00	15.00	0.75	0.06	12	7/8 - 9
14	3.00	13.25	57.02	15.47	19.94	3.48	19.69	21.00	18.75	16.25	0.81	0.06	12	1 - 8
16	3.50	15.25	64.17	18.11	22.28	3.67	21.65	23.50	21.25	18.50	0.88	0.06	16	1 - 8
18	3.50	17.25	69.94	19.92	24.19	3.67	21.65	25.00	22.75	21.00	0.94	0.06	16	1-1/8 - 7
20	4.50	19.25	77.54	22.36	27.18	3.67	21.65	27.50	25.00	23.00	1.00	0.06	20	1-1/8 - 7
24	4.50	23.25	89.62	26.30	31.31	3.67	21.65	32.00	29.50	27.25	1.00	0.06	20	1-1/4 - 7

STAINLESS STEEL METAL SEATED KNIFE GATE VALVE

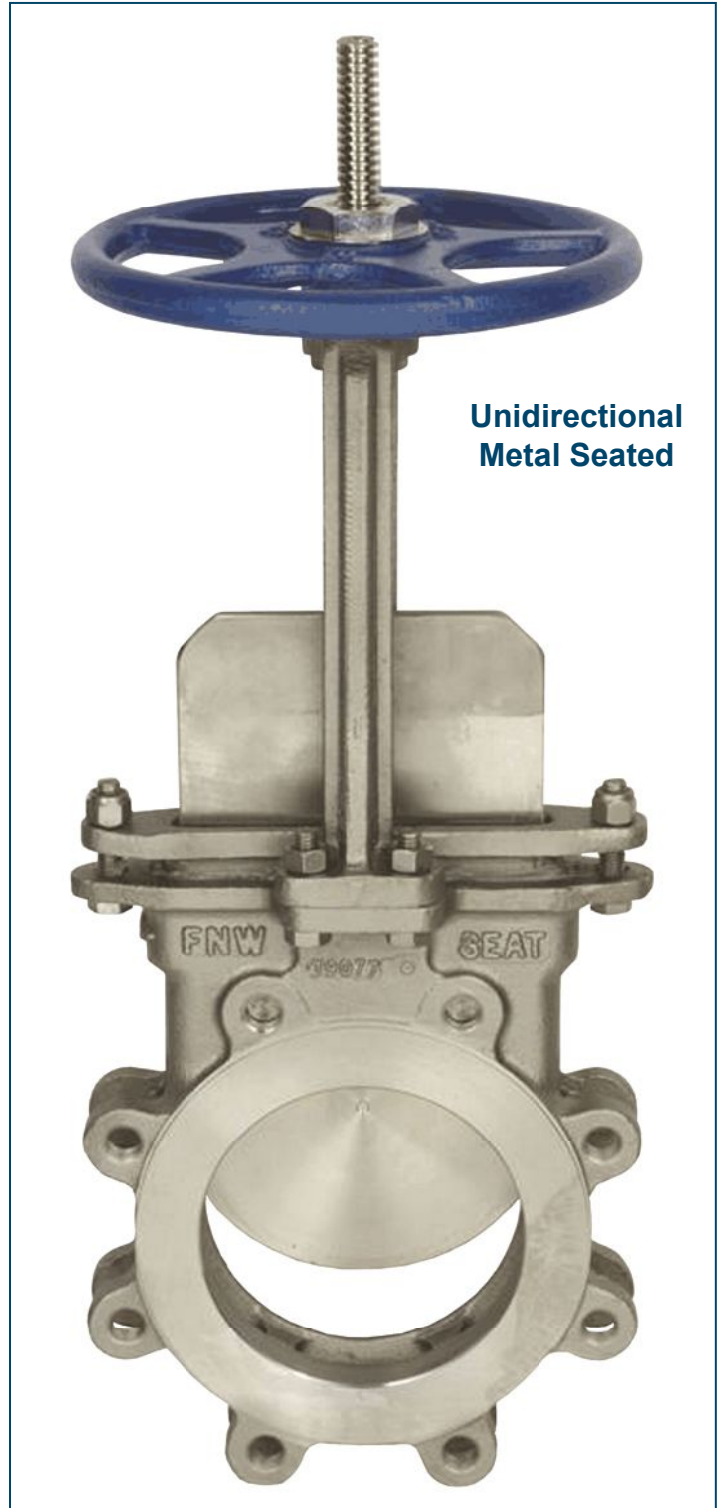
The figure 67B is an all cast stainless steel body and yoke design. The 67B is designed to handle dense mixtures of stock and slurries with unidirectional shut off. The shearing action of the knife gate cuts through solids and cleans the seat as it closes.

Features:

- Unidirectional Shut off
- Cast Stainless Steel Body, Yoke and Packing Gland
- Thrust Ball Bearing Yoke Bushing (14" & Larger)
- Ductile Iron Handwheel
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Meets MSS SP-81 Specification for 150 PSI CWP
- Smooth Flow, Non-clogging Step Seat Design
- Available in sizes from 3" to 30"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Seat/Shell Test: MSS SP-81
- Material: ASME B16.34



Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops for low ΔP or reverse operation applications, or to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Quick opening levers
- Gate scraper
- Open and close position lockout lugs

Contact FNW for knife gate valve options.

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	A351 CF8M	1	
2	Disc	A240 316SS	1	
3	Yoke	A351 CF8	1	
4	Stem	A276 304	1	
5	Body Seat	A351 CF8M		Integral
6	Packing	PTFE/FIBER	1 Set	Non-Asbestos
7	Packing Gland	A351 CF8	1	
8-1	Gland Bolt	A193 B8	1 Set	
8-2	Gland Nut	A194 8	1 Set	Nylon Lock Nut
9-1	Yoke Bolt	A193 B8	4	
9-2	Yoke Nut	A194 8	4	
10-1	Clevis Bolt	A193 B8	2	
10-2	Clevis Nut	A194 8	2	Nylon Lock Nut
11	Yoke Sleeve	BRASS	1	
12	Thrust Washer	BRASS	1	
13	Hand Wheel	DUCTILE IRON	1	
14	Name Plate	ALUMINUM	1	
15	Lock Washer	A240 304	1	
16	Wheel Nut	STEEL	1	
17	Bottom Wedge	A351 CF8M		Integral
18	Rivet	ALUMINUM	2	
19	Grease Nipple	ASS'Y	1	
20	Bearing Housing	A351 CF8	1	
21	Thrust Ball Bearing	ASS'Y	2	
22	Bearing Gland	A351 CF8	1	Tack Weld
23-1	Bearing Housing Bolt	A193 B8	4	
23-2	Bearing Housing Nut	A194 8	4	

Packing Options

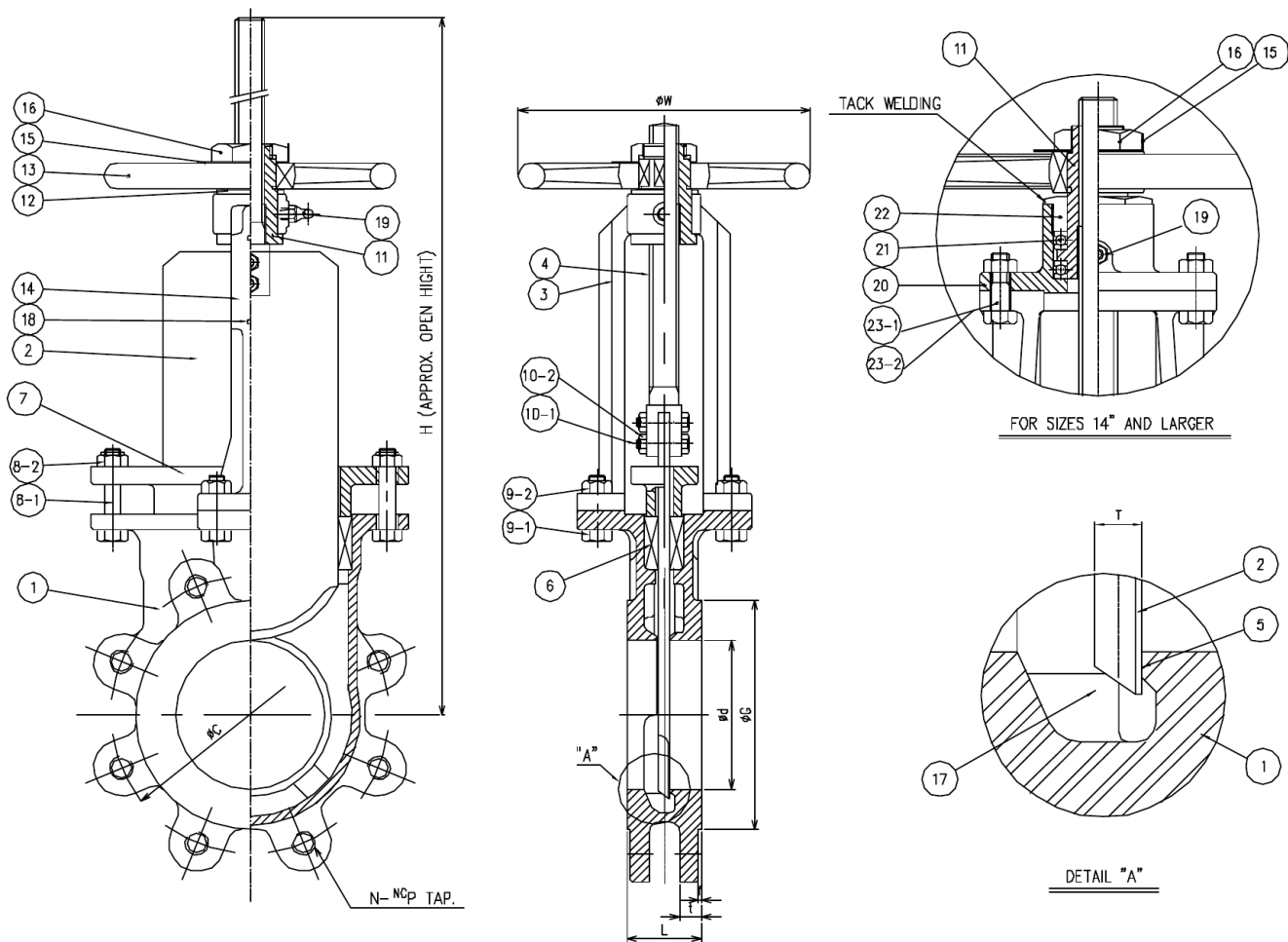
Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Figure Number Matrix

FNW 67 B Size		
SIZE CODE		
3 = M	10 = 10	18 = 18
4 = P	12 = 12	20 = 20
6 = U	14 = 14	24 = 24
8 = X	16 = 16	30 = 30

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in ²)	Wt. (Lbs)
3	290	6.65	24
4	550	12.69	36
6	1,220	28.07	47
8	2,070	47.76	70
10	3,250	74.78	116
12	4,880	112.48	153
14	5,960	137.4	204
16	7,830	180.41	305
18	10,130	233.32	364
20	12,580	289.68	534
24	18,380	423.61	680
30	29,150	671.62	1330



Dimensions (inches)

Size	L	Ød	ØG	ØC	N	NCP	t	f	T	ØW	H
3	2.00	2.91	5.00	6.00	4	5/8" - 11	0.59	0.08	0.315	7.09	17.32
4	2.00	4.02	6.18	7.50	8	5/8" - 11	0.59	0.08	0.315	9.84	20.51
6	2.25	5.98	8.50	9.50	8	3/4" - 10	0.63	0.10	0.315	9.84	25.91
8	2.75	7.80	10.63	11.75	8	3/4" - 10	0.75	0.10	0.315	11.81	31.42
10	2.75	9.76	12.76	14.25	12	7/8" - 9	0.83	0.10	0.39	13.78	38.94
12	3.00	11.97	15.00	17.00	12	7/8" - 9	0.87	0.10	0.39	15.75	45.16
14	3.00	13.23	16.26	18.75	12	1" - 8	0.94	0.12	0.55	15.75	50.63
16	3.50	15.16	18.50	21.25	16	1" - 8	1.06	0.12	0.55	19.69	58.19
18	3.50	17.24	20.98	22.75	16	1-1/8" - 7	1.06	0.12	0.55	19.69	64.29
20	4.50	19.21	22.99	25.00	20	1-1/8" - 7	1.18	0.12	0.71	21.65	71.30
24	4.50	23.23	27.24	29.50	20	1-1/4" - 7	1.18	0.12	0.71	21.65	82.76
30	4.75	29.25	33.74	36.00	28	1-1/4" - 7	1.26	0.12	0.71	23.62	104.33

STAINLESS STEEL LINED RESILIENT SEATED KNIFE GATE VALVE

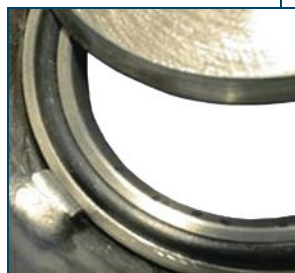
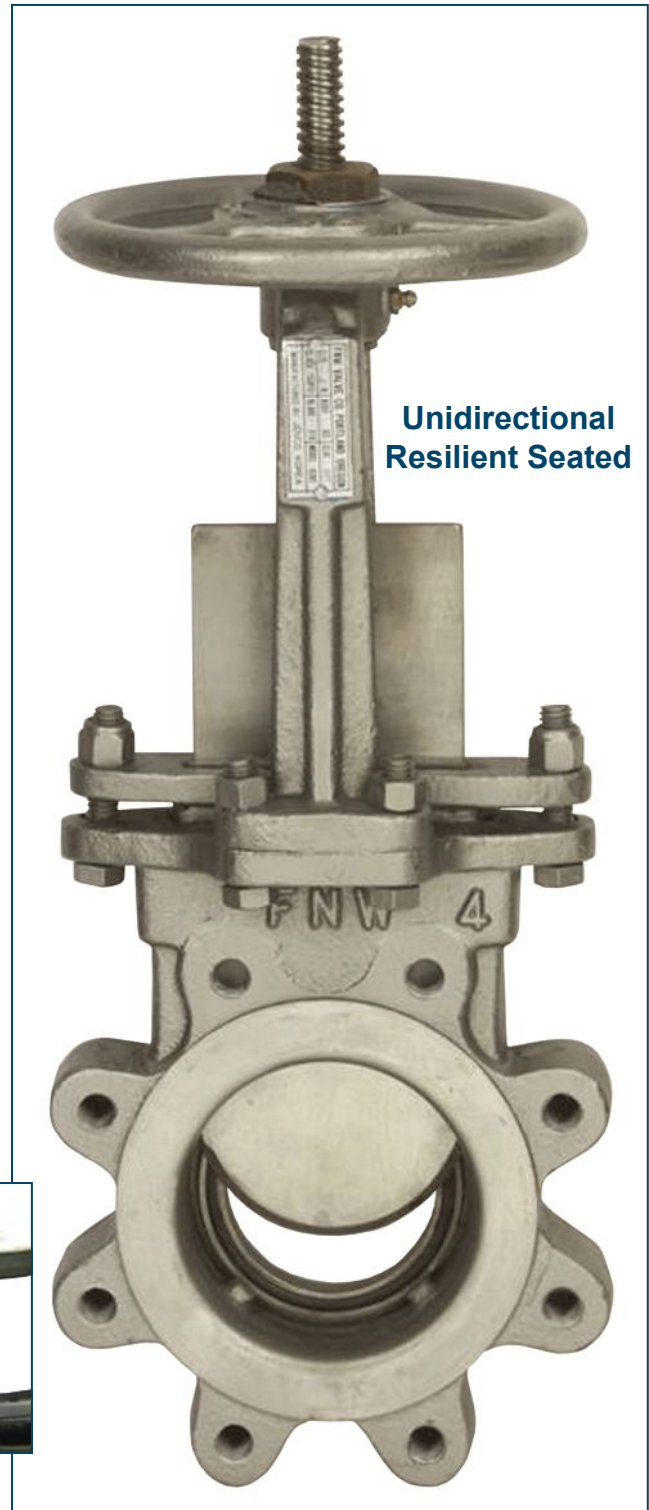
The figure 62B is a lined valve with the economy of a ductile iron body and the corrosion resistance of all stainless steel wetted parts. The 62B is designed for pulp and paper, chemicals, mining and petroleum industries to handle dense mixtures of stock and slurries where positive shut off is required. The shearing action of the knife gate cuts through solids and cleans the seat as it closes.

Features:

- Unidirectional Shut off
- Stainless Steel Lined Ductile Iron Body
- Thrust Ball Bearing Yoke Bushing (18" & Larger)
- EPDM Seat (Viton® optional)
- Cast Iron Handwheel
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Corrosion Resistant Stainless Impregnated Coating
- Meets MSS SP-81 Specification for 150 PSI CWP
- Smooth Flow, Non-clogging Step Seat Design
- Available in sizes from 3" to 24"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Seat/Shell Test: MSS SP-81



Stainless Steel Lined

Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops for low ΔP or reverse operation applications, or to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Quick opening levers
- Gate scraper
- Viton® seat

Contact FNW for knife gate valve options.

Standard Materials

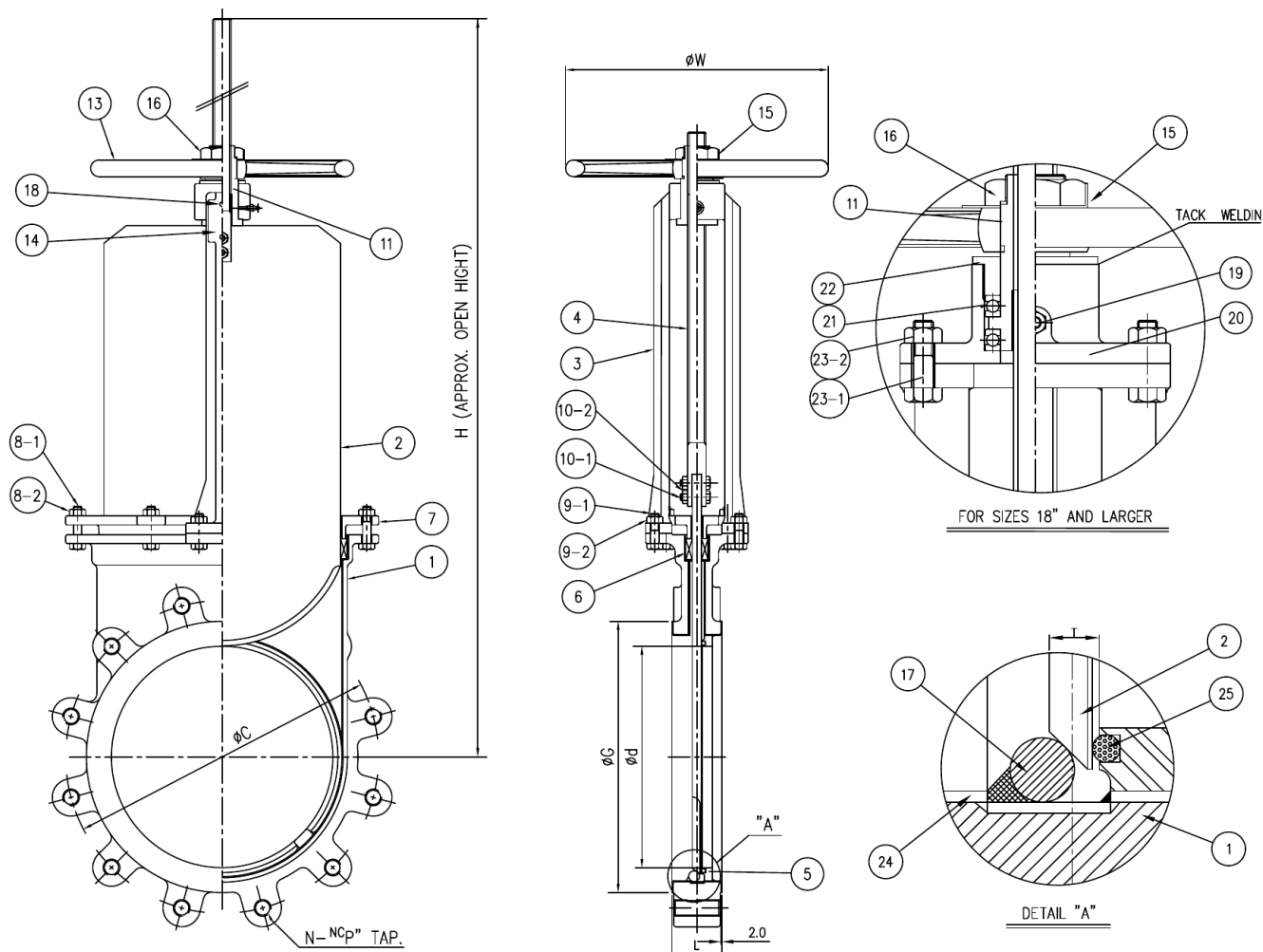
Ref. No.	Description	Material	Qty	Remarks
1	Body	Ductile Iron	1	
2	Knife	A240 316	1	
3	Yoke	A216 WCB	1	
4	Stem	A276 410	1	
5	Body Seat Ring	A240 316	1	Welding
6	Packing	PTFE Impregnated Fiber	1 Set	Non-Asbestos
7	Packing Gland	A216 WCB	1	
8-1	Gland Bolt	STEEL	1 Set	
8-2	Gland Nut	STEEL	1 Set	Nylon Lock Nut
9-1	Yoke Bolt	STEEL	4	
9-2	Yoke Nut	STEEL	4	
10-1	Clevis Bolt	A193 B8	2	
10-2	Clevis Nut	A194 8	2	Nylon Lock Nut
11	Yoke Sleeve	BRASS	1	
12	Thrust Washer	BRASS	1	
13	Hand Wheel	A338	1	
14	Name Plate	ALUMINUM	1	
15	Lock Washer	A240 304	1	
16	Wheel Nut	BRASS, STEEL	1	
17	Bottom Stopper	A240 316	2	Welding
18	Rivet	ALUMINUM	2	
19	Grease Nipple	ASS'Y	1	
20	Bearing Housing	A216 WCB	1	
21	Thrust Ball Bearing	ASS'Y	2	18" And Larger
22	Bearing Gland	A216 WCB	1	Tack Weld
23-1	Bearing Housing Bolt	STEEL	4	
23-2	Bearing Housing Nut	STEEL	4	
24	Body Liner	A240 316	1 Set	Welding
25	Seat O-ring	EPDM	1	

Packing Options

Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in ²)	Wt. (Lbs)
3	190	4.37	24
4	340	7.79	35
6	890	20.58	57
8	1,710	39.46	86
10	2,670	61.62	128
12	3,990	92.07	169
14	5,070	117.03	223
16	6,660	153.42	295
18	8,240	189.81	363
20	10,460	240.96	557
24	15,400	354.81	671



Dimensions (inches)

Size	L	Ød	ØG	ØC	N	NCP	T	ØW	H
3	2.00	2.36	5.00	6.00	4	5/8"-11	0.315	7.09	15.75
4	2.00	3.15	6.18	7.50	8	5/8"-11	0.315	7.87	18.90
6	2.25	5.12	8.50	9.50	8	3/4"-10	0.315	9.84	24.41
8	2.75	7.09	10.63	11.75	8	3/4"-10	0.315	11.81	31.50
10	2.75	8.86	12.76	14.25	12	7/8"-9	0.394	13.78	37.80
12	3.00	10.83	15.00	17.00	12	7/8"-9	0.394	15.75	43.31
14	3.00	12.21	16.26	18.75	12	1"-8	0.472	17.72	48.82
16	3.50	13.98	18.50	21.25	16	1"-8	0.472	19.69	53.94
18	3.50	15.55	20.98	22.75	16	1-1/8"-7	0.472	19.69	60.24
20	4.50	17.52	22.99	25.00	20	1-1/8"-7	0.591	21.65	67.72
24	4.50	21.26	27.24	29.50	20	1-1/4"-7	0.591	21.65	79.13

Figure Number Matrix

FNW 62 B Size		
SIZE CODE		
3 = M	10 = 10	18 = 18
4 = P	12 = 12	20 = 20
6 = U	14 = 14	24 = 24
8 = X	16 = 16	

STAINLESS STEEL RESILIENT SEATED KNIFE GATE VALVE

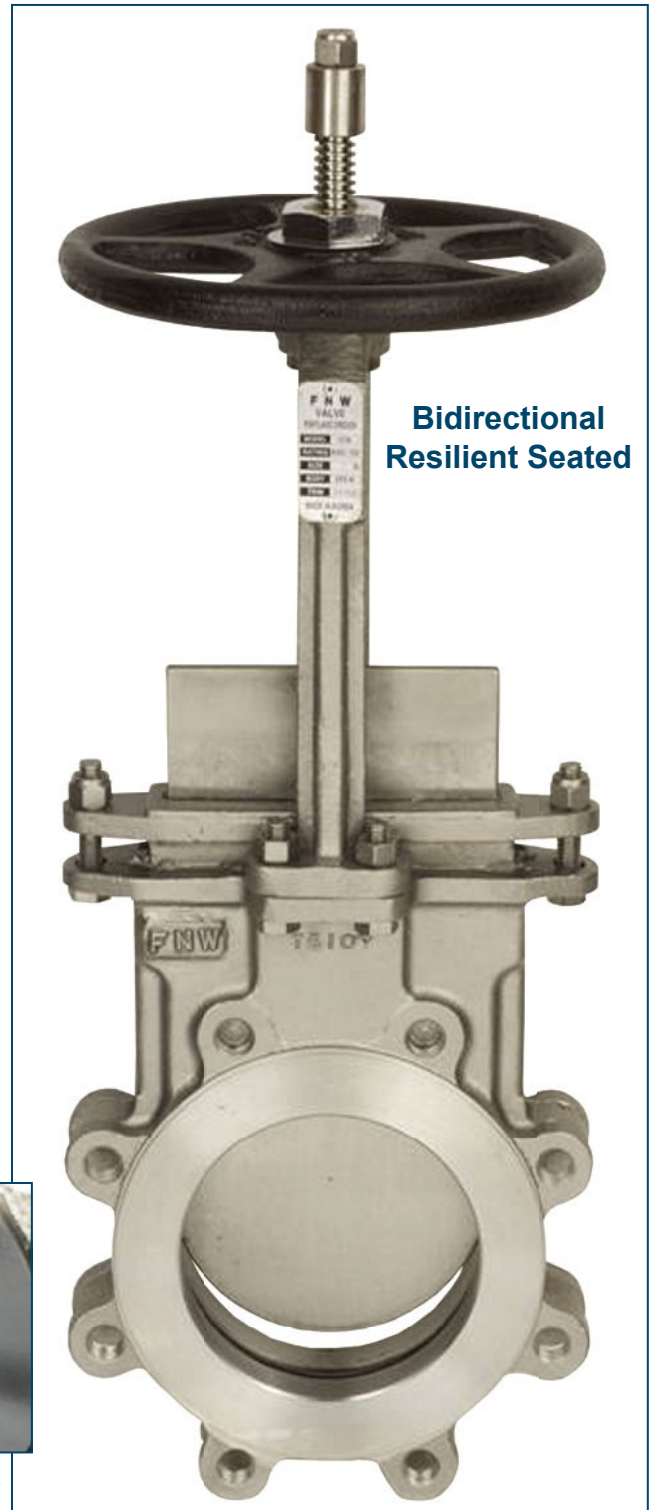
The figure 68B is a stainless steel body and yoke design. The 68B is designed to handle light mixtures of stock and slurries with bidirectional positive shut off.

Features:

- Bidirectional Shut off
- Zero Pressure Differential Needed for Shut off
- Mechanically Retained Resilient Seat
- Wire Reinforced Seat Material
- Cast Stainless Steel Body, Yoke and Packing Gland
- Thrust Ball Bearing Yoke Bushing (14" & Larger)
- Ductile Iron Handwheel
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Meets MSS SP-81 Specification for 150 PSI CWP
- Smooth Flow, Non-clogging Step Seat Design
- Available in sizes from 3" to 30"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Shell Test: MSS SP-81
- Seat Test: Exceeds MSS SP-81



Positive Shut off Seat

Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest
- Quick opening levers
- Various seat materials
- Open and close position lockout lugs

Contact FNW for knife gate valve options.

Standard Materials

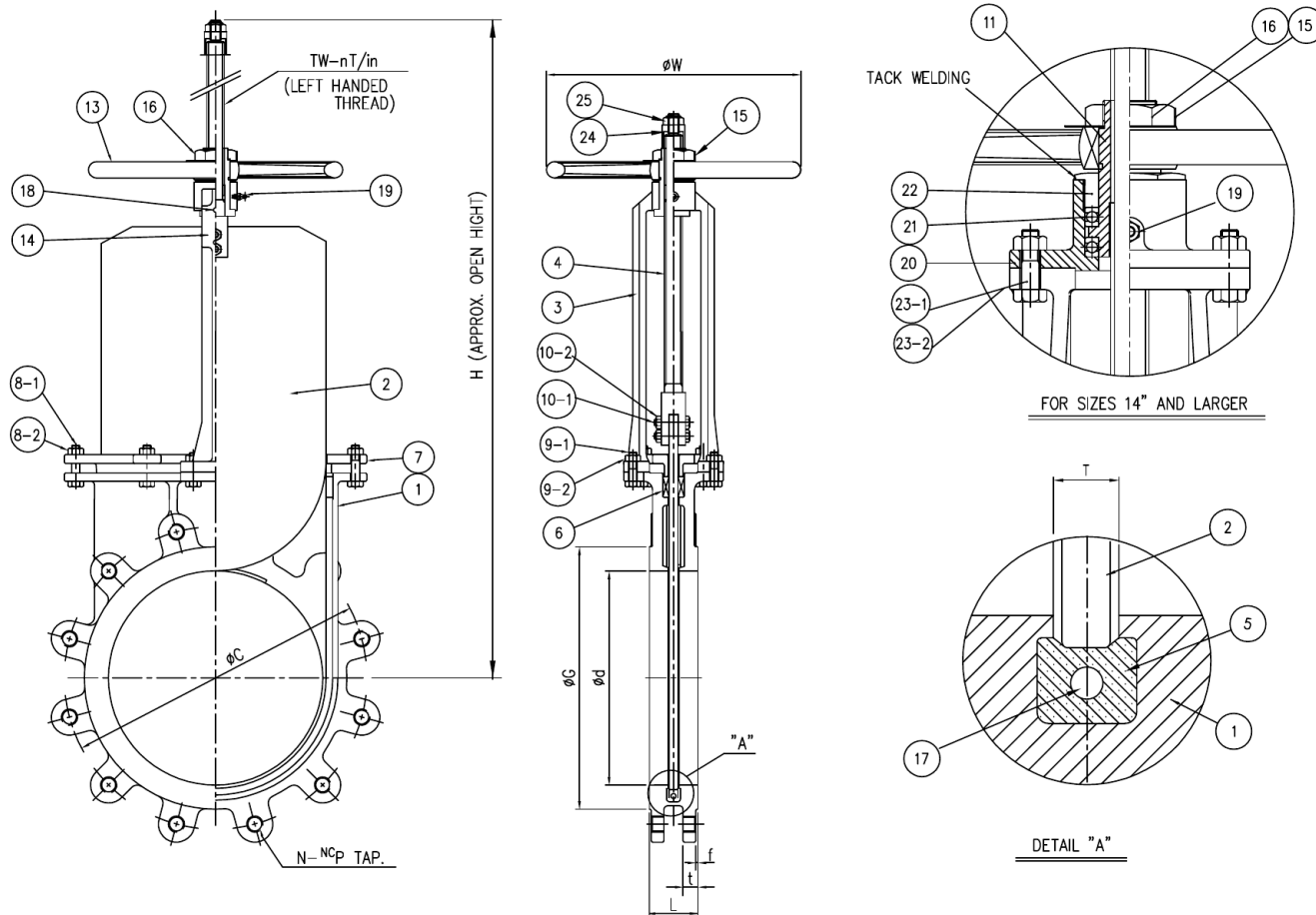
Ref. No.	Description	Material	Qty	Remarks
1	Body	A351 CF8M	1	
2	Disc	A240 316	1	
3	Yoke	A351 CF8	1	
4	Stem	A276 304	1	
5	Resilient Seat	BUNA		
6	Packing	PTFE/FIBER	1 Set	Non-Asbestos
7	Packing Gland	A351 CF8	1	
8-1	Gland Bolt	A193 B8	1 Set	
8-2	Gland Nut	A194 8	1 Set	Nylon Lock Nut
9-1	Yoke Bolt	A193 B8	4	
9-2	Yoke Nut	A194 8	4	
10-1	Clevis Bolt	A193 B8	2	
10-2	Clevis Nut	A194 8	2	Nylon Lock Nut
11	Yoke Sleeve	BRASS	1	
12	Thrust Washer	BRASS	1	
13	Hand Wheel	DUCTILE IRON	1	
14	Name Plate	ALUMINUM	1	
15	Lock Washer	A240 304	1	
16	Wheel Nut	STEEL	1	
17	Seat Wire	A276 304	1	
18	Rivet	ALUMINUM	2	
19	Grease Nipple	ASS'Y	1	
20	Bearing Housing	A351 CF8	1	14" & Larger
21	Thrust Ball Bearing	ASS'Y	2	14" & Larger
22	Bearing Gland	A351 CF8	1	Tack Weld
23-1	Bearing Housing Bolt	A193 B8	4	14" & Larger
23-2	Bearing Housing Nut	A194 8	4	14" & Larger
24	Lock Cap	A276-304	1	
25	Lock Cap Nut	A194-8	1	Nylon Lock Nut

Packing Options

Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in ²)	Wt. (Lbs)
3	290	6.65	26
4	530	12.19	37
6	1,160	26.68	51
8	2,110	48.62	77
10	3,300	76.01	123
12	4,820	110.98	170
14	6,100	140.74	234
16	8,200	188.84	348
18	10,220	235.49	415
20	12,680	292.10	600
24	18,380	423.61	781
30	28,920	666.12	1480



Dimensions (inches)

Size	L	Ød	ØG	ØC	N	NCP	t	f	T	ØW	H
3	2.00	2.91	5.00	6.00	4	5/8"-11	0.59	0.08	0.315	7.09	18.70
4	2.00	3.94	6.18	7.50	8	5/8"-11	0.59	0.08	0.315	9.84	20.27
6	2.25	5.83	8.50	9.50	8	3/4"-10	0.67	0.08	0.315	9.84	27.80
8	2.75	7.87	10.63	11.75	8	3/4"-10	0.71	0.08	0.315	11.81	34.13
10	2.75	9.84	12.76	14.25	12	7/8"-9	0.91	0.10	0.39	13.78	42.28
12	3.00	11.89	15.00	17.00	12	7/8"-9	0.91	0.10	0.39	15.75	48.98
14	3.00	13.39	16.26	18.75	12	1"-8	0.94	0.10	0.55	15.75	53.15
16	3.50	15.51	18.50	21.25	16	1"-8	1.06	0.10	0.55	19.68	60.24
18	3.50	17.32	20.98	22.75	16	1-1/8"-7	1.10	0.10	0.55	19.68	67.32
20	4.50	19.29	22.99	25.00	20	1-1/8"-7	1.18	0.10	0.71	21.65	75.20
24	4.50	23.23	27.24	29.50	20	1-1/4"-7	1.18	0.10	0.71	21.65	103.15
30	4.75	29.13	33.74	36.00	28	1-1/4"-7	1.26	0.12	0.71	23.62	108.15

Figure Number Matrix

FNW 68B B Size			
SEAT CODE		SIZE CODE	
B = BUNA (Standard)	3 = M	10 = 10	18 = 18
E = EPDM	4 = P	12 = 12	20 = 20
H = Hypalon	6 = U	14 = 14	24 = 24
V = Viton®	8 = X	16 = 16	30 = 30

STAINLESS STEEL HIGH PERFORMANCE RESILIENT SEATED KNIFE GATE VALVE

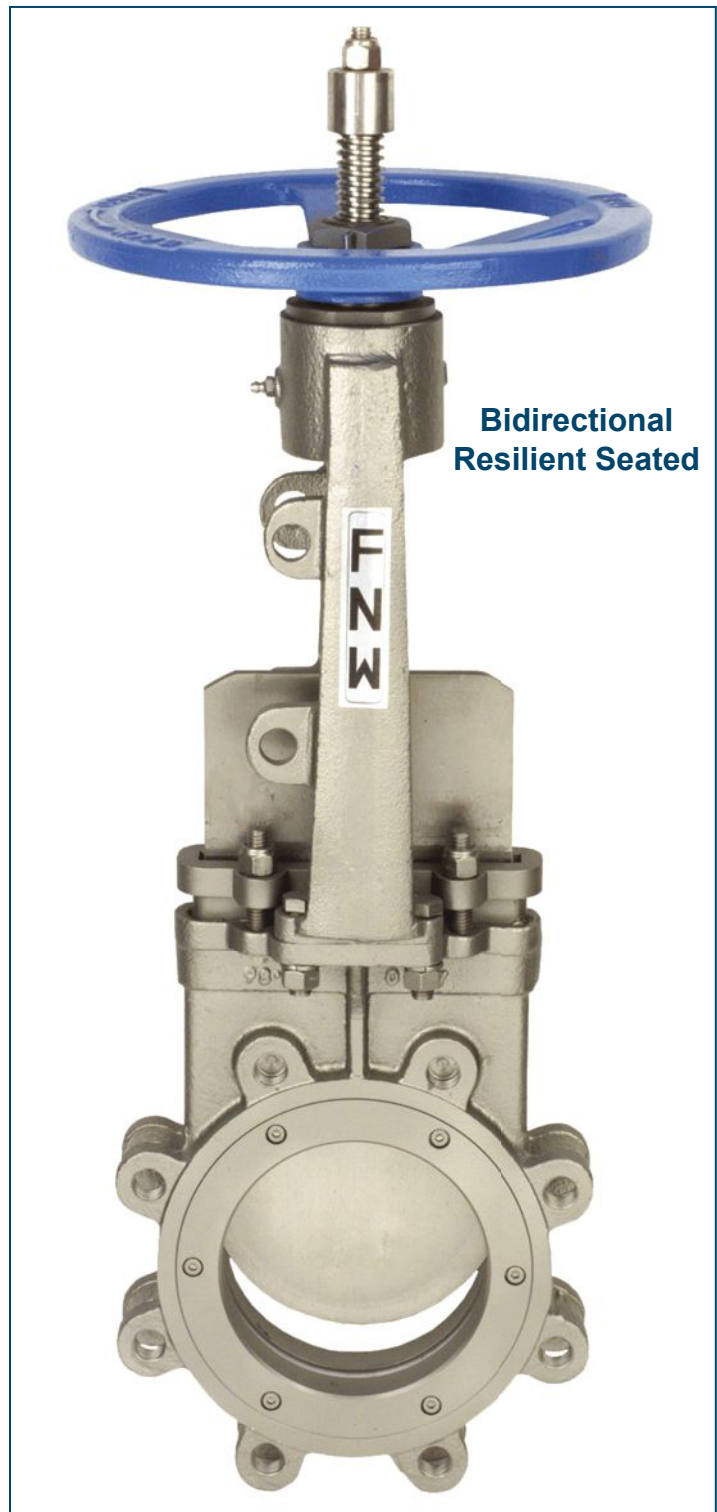
The figure 2000B is an all cast stainless steel body and yoke with investment cast packing follower. Reminiscent of high performance butterfly valves that utilize a retaining ring to secure the valve seat, the dual seat, bidirectional shut off of the 2000B is a unique design that performs in many applications not typical of knife gate valves.

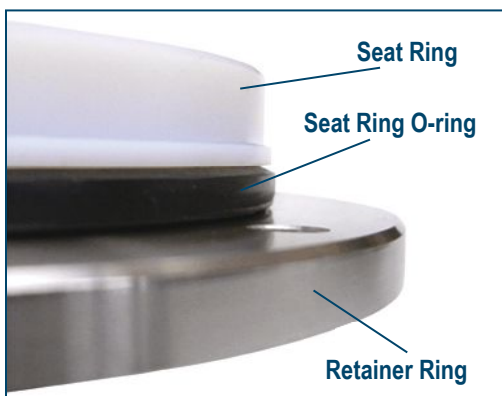
Features:

- Flex Teflon Seats for Positive Shut Off at Minimal Line Pressure
- Bidirectional Shut off
- Cast Stainless Steel Body, Yoke and Packing Gland
- Thrust Ball Bearing Yoke Bushing (6" & Larger)
- Ductile Iron Handwheel
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Meets MSS SP-81 Specification for 150 PSI CWP
- Cast Lugs in Yoke for Lockout in Closed Position or Optional Open Position (Lock Bar is Optional)
- Smooth Flow, Non-clogging Seat Design
- Available in sizes from 2" to 24"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Shell Test: MSS SP-81
- Seat Test: Exceeds MSS SP-81
- Material: ASME B16.34





Flex Teflon Seats

The FNW figure 2000B utilizes a seating design that provides positive shut off in both directions, even at low pressure differentials. Similar to high performance butterfly valve designs, the figure 2000B uses mechanically retained seat rings to hold the seats in place. The RTFE seats are carried on the retainer rings and are pre-compressed with o-rings to provide sealing pressure against the knife blade. These o-rings also act as the seal between the body and seat rings. Seat material can easily be replaced without disturbing the valve packing. This seat configuration also improves the longevity of the seat as it is not directly in the flow path.

Seat Rings

Made of RTFE, the seat rings are secured in place by an integral locator lip around its circumference, fitted into the valve body. Dual rings insure shut off in both directions.

Seat Ring O-ring

Behind each seat ring is a hefty EPDM o-ring. This o-ring not only provides sealing, but also maintains pressure behind the seat ring, ensuring a tight shut off.

Retainer Ring

Holding the seat rings and o-rings in place are the retainer rings. These heavy stainless steel rings make replacing the seats and o-ring quick and easy.

Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops for low ΔP or reverse operation applications, or to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Quick opening levers
- Gate scraper

Contact FNW for knife gate valve options.

Packing Options

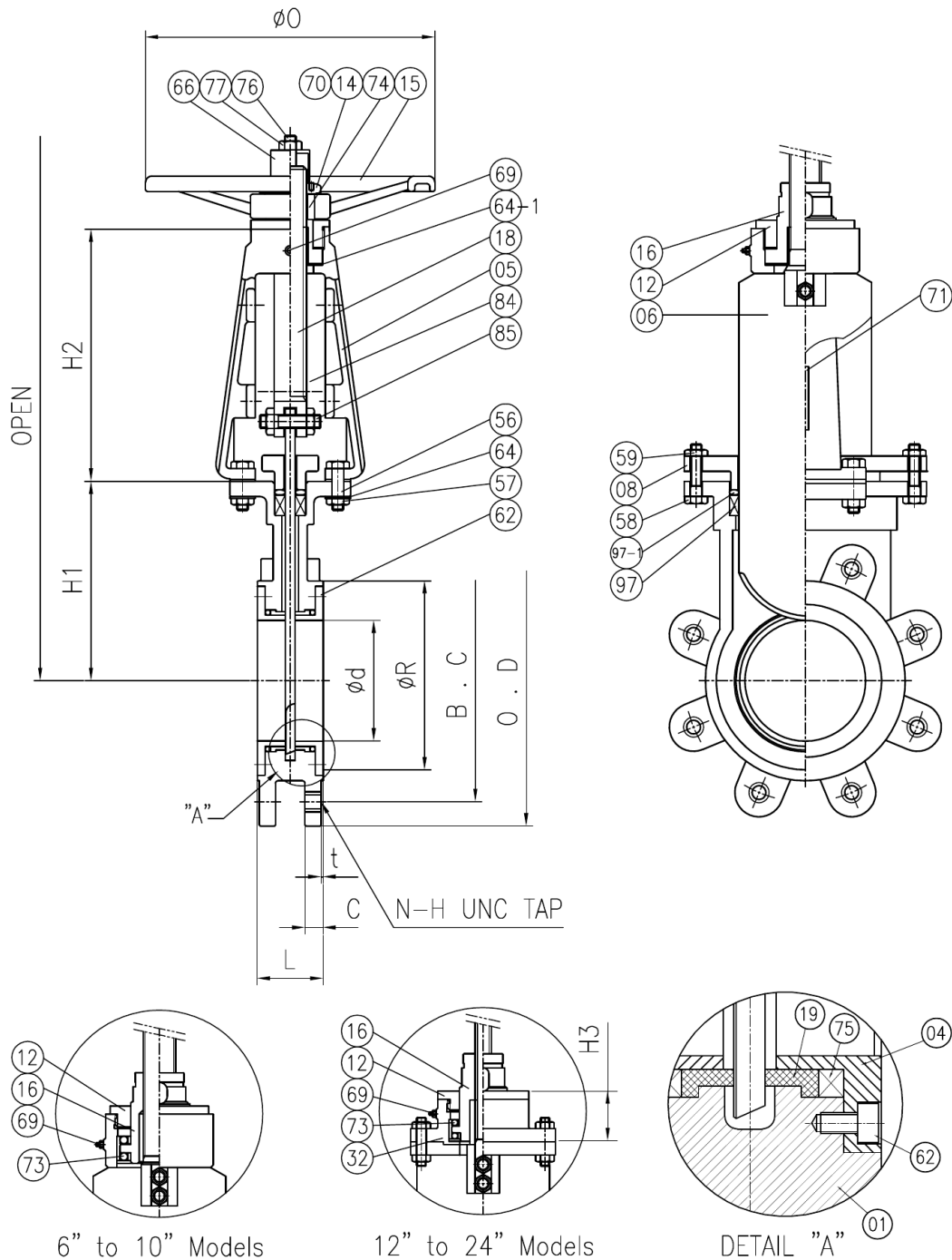
Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Figure Number Matrix

FNW 2000BT Size		
SIZE CODE		
2 = K	8 = X	18 = 18
2-1/2 = L	10 = 10	20 = 20
3 = M	12 = 12	24 = 24
4 = P	14 = 14	
6 = U	16 = 16	

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in ²)	Wt. (Lbs)
2	195	2.69	17.75
2-1/2	320	3.97	20.25
3	500	5.98	25.5
4	1,100	10.98	34.5
6	3,200	25.59	64
8	5,400	43.92	97
10	7,900	70.1	153
12	10,700	102.38	223
14	13,800	132.67	256
16	17,000	166.64	382
18	20,000	214.75	428
20	24,000	268.67	613
24	31,000	395.29	783



6" to 10" Models

12" to 24" Models

DETAIL "A"

Dimensions (inches)

Size	L	ϕd	Open	H1	H2	H3	O	Flange						
								O.D.	B.C.	ϕR	C	t	N	H
2	1.88	1.85	14.75	4.21	5.49	-	7.09	6.00	4.75	3.62	0.50	0.06	4	5/8 - 11
2-1/2	2.00	2.25	16.17	4.72	5.94	-	7.09	7.00	5.50	4.19	0.50	0.06	4	5/8 - 11
3	2.00	2.76	18.18	5.00	6.67	-	7.87	7.50	6.00	5.00	0.50	0.06	4	5/8 - 11
4	2.00	3.74	21.65	6.10	7.81	-	9.84	9.00	7.50	6.19	0.50	0.06	8	5/8 - 11
6	2.25	5.71	29.88	7.42	12.26	-	11.81	11.00	9.50	8.50	0.63	0.06	8	3/4 - 10
8	2.75	7.48	36.95	9.76	14.54	-	13.78	13.50	11.75	10.62	0.63	0.06	8	3/4 - 10
10	2.75	9.45	44.06	11.93	17.00	-	15.75	16.00	14.25	12.75	0.75	0.06	12	7/8 - 9
12	3.00	11.42	50.75	14.09	16.93	3.24	17.72	19.00	17.00	15.00	0.75	0.06	12	7/8 - 9
14	3.00	13.00	57.11	15.47	19.94	3.48	19.68	21.00	18.75	16.25	0.81	0.06	12	1 - 8
16	3.50	14.57	64.95	18.11	22.28	3.67	21.65	23.50	21.25	18.50	0.88	0.06	16	1 - 8
18	3.50	16.54	70.65	19.92	24.19	3.67	21.65	25.00	22.75	21.00	0.94	0.06	16	1-1/8 - 7
20	4.50	18.50	77.17	22.36	27.18	3.67	21.65	27.50	25.00	23.00	1.00	0.06	20	1-1/8 - 7
24	4.50	22.40	90.18	26.30	31.31	3.67	21.65	32.00	29.50	27.25	1.00	0.06	20	1-1/4 - 7

STAINLESS STEEL HIGH PERFORMANCE RESILIENT SEATED KNIFE GATE VALVE

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
01	Body	A351 CF8M	1	
04	Retainer	A351 CF8M	2	
05	Yoke	A351 CF8	1	
06	Knife	A240 316	1	
08	Gland Flange	A351 CF8M	1	
12	Sleeve Gland	A351 CF8	1	
14	Wheel Nut	A351 CF8	1	
15	Handwheel	A536 65-45-12	1	
16	Yoke Sleeve	A439 D2C	1	
18	Stem	A182 F304	1	
19	Seat Ring	RTFE	2	
38	Sleeve Box	A351 CF8	1	12 - 24" Sizes Only
56	Yoke Bolt	A193 B8	1 Set	
57	Yoke Nut	A194 8	1 Set	
58	Gland Bolt	A193 B8	1 Set	
59	Gland Nut	A194 8	1 Set	
62	Seat Ring Bolt	A193 B8M	1 Set	
64	Washer	A276 304	1 Set	
66	Stopper	A182 F304	1	
69	Grease Nipple	A307 Gr. B	1	Cr. Plating
70	Set Screw	A193 B8	1	
71	Name Plate	A240 304	1	
73	Bearing	Ass'y	2	6 - 24" Sizes Only
74	Key	A108 1045	2	
75	O-ring	EPDM	2	
76	Stopper Bolt	A193 B8	1	
77	Stopper Nut	A194 8	1	
84	Pin Bolt	A193 B8	1	
85	Pin Nut	A194 8	1	
86	Sleeve Box Bolt	A193 B8	1 Set	12 - 24" Sizes Only
87	Sleeve Box Nut	A194 8	1 Set	12 - 24" Sizes Only
97	Packing	PTFE	1 Set	PTFE Impregnated Fiber
97-1	Packing / Wiper Seal	EPDM	1	

Figure 60R KNIFE GATE VALVES

FNW™

RESILIENT SEATED KNIFE GATE VALVE

The figure 60R is a wafer flat-face flanged, bidirectional knife gate valve. It is suitable for a wide range of industrial applications, including abrasive slurry services. The full port design has no internal obstructions and provides a “blind flange” shut off when closed. The basic simplicity and open design of the valve invites an extremely wide range of options and accessories that can be tailored to specific applications.

Features:

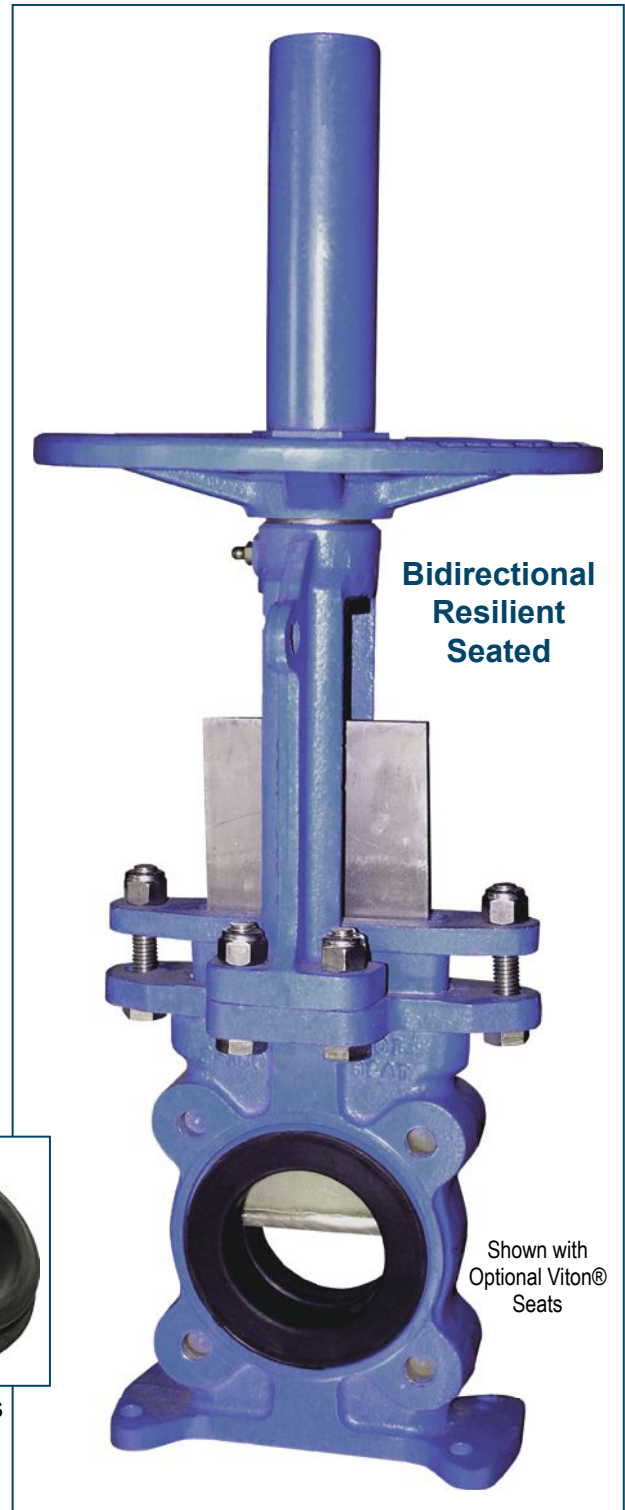
- Bidirectional Shut off
- Replaceable “Pop In” Seats Install Easily with Valve in Open Position
- Economical Cast Body, Yoke, & Packing Gland
- Thrust Ball Bearing Yoke Bushing (6" & Larger)
- Gum Rubber Seat, Standard (Viton® optional)
- Bonnetless, Outside Screw & Yoke with Stem Cover and Stem Boot
- Bottom Splash Guard with Clean Out, Standard
- For Applications Up to 100 PSI CWP
- Available in sizes from 3" to 30"

Standards:

- Face-to-Face Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Shell Test: MSS SP-81
- Seat Test: Exceeds MSS SP-81



“Pop In” Resilient Seats



Shown with
Optional Viton®
Seats

Design

The valve's sealing surface is between two thick resilient sleeves that are compressed into the valve housing. Two stainless steel stiffener rings are molded into the sleeves to locate it into the valve housing and to help the sleeves resist the high shearing forces present when the gate is driven between them. The body serves as an external guide to the knife gate blade. When in the open position, the stainless steel blade is completely withdrawn from the process flow and can be inspected, and replaced if necessary, without taking the valve out of service.



Options

FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Gate scraper
- Viton® seat

Contact FNW for knife gate valve options.

Seat Options

Type	Temperature Limit
Gum Rubber (Blue)	-22°F to 230°F
Viton® (Black)	14°F to 482°F

Note: Application temperature should be considered for selection of both seat and packing combinations.

Packing Options

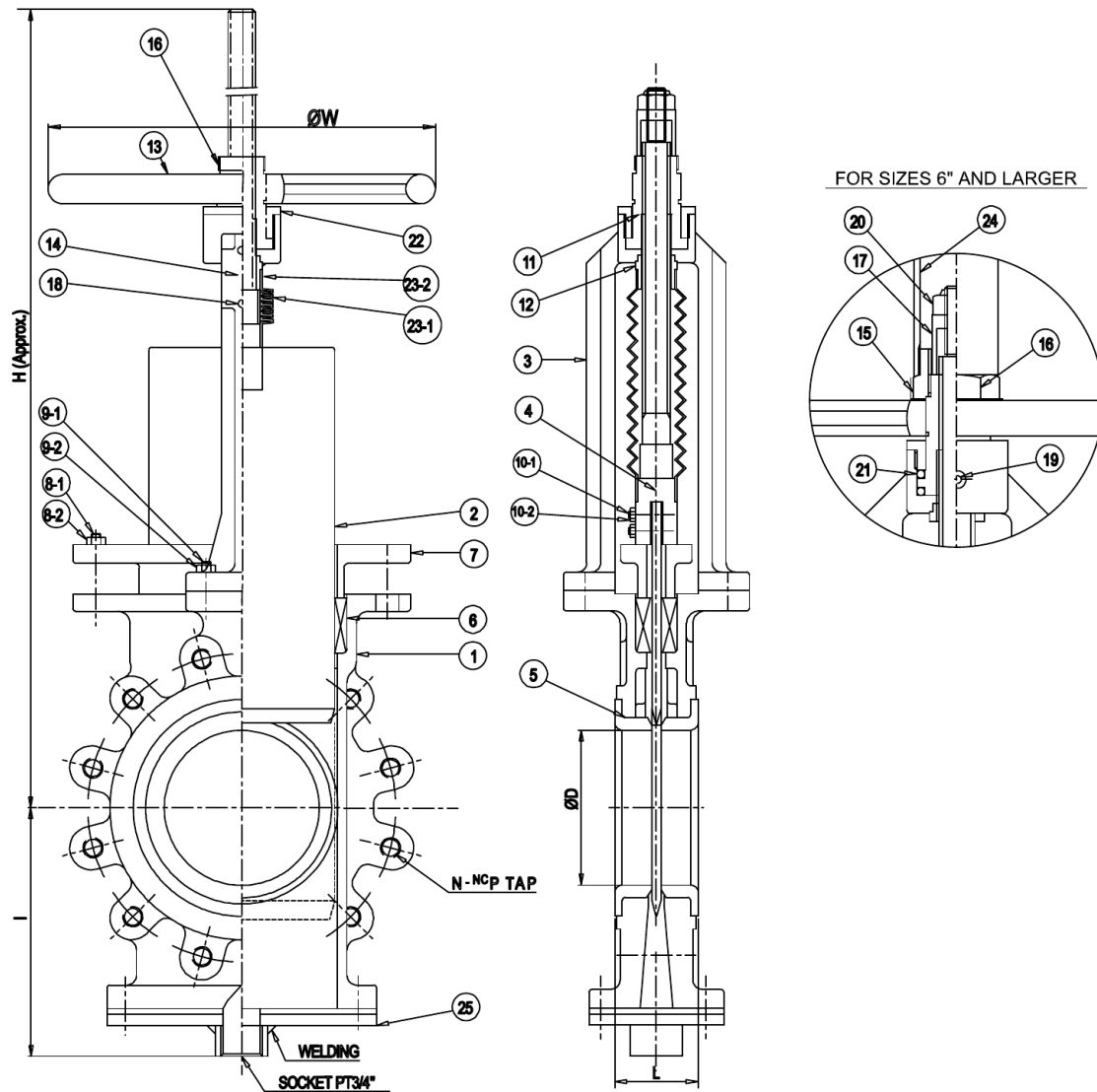
Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425°F
Pure TFE	425°F
TFE Fiber (Ultra)	500°F
Graphite Filament Yarn	1000°F

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	A216 WCB	1	
2	Blade	A240 316	1	
3	Yoke	A216 WCB	1	
4	Stem	A276 410	1	
5	Seat	GUM RUBBER	2	
6	Packing	PTFE Impregnated Fiber	1 Set	Non-Asbestos
7	Packing Gland	A216 WCB	1	30" is STEEL
8-1	Gland Bolt	STEEL	1 Set	
8-2	Gland Nut	STEEL	1 Set	Nylon Lock Nut
9-1	Yoke Bolt	STEEL	4	
9-2	Yoke Nut	STEEL	4	
10-1	Clevis Bolt	A193 B8	2	
10-2	Clevis Nut	A194 8	2	Nylon Lock Nut
11	Yoke Sleeve	BRASS	1	
12	Yoke Ring	A36	1	
13	Hand Wheel	A197	1	
14	Name Plate	ALUMINUM	1	
15	Lock Washer	A240 304	1	
16	Wheel Nut	BRASS	1	
17	Lock Cap	A276 304	1	
18	Rivet	ALUMINUM	2	
19	Grease Nipple	ASS'Y	1	
20	Lock Cap Nut	A194 8	1	Nylon Lock Nut
21	Thrust Ball Bearing	ASS'Y	1 Set	
22	Bearing Gland	A36	1	Tack Weld
23-1	Boot	GUM RUBBER	1	
23-2	Boot Clamp	A240 304	2	
24	Stem Cover	A120	1	
25	Bottom Cover	STEEL	1	

Flow Coefficients, Port Areas, & Weights

Size	Cv	Port Area (in²)	Wt. (Lbs)
3	310	6.29	36
4	530	11.22	51
6	1,220	26.32	73
8	2,160	47.15	137
10	3,330	73.71	177
12	4,780	105.81	210
14	6,290	139.90	382
16	8,240	184.00	479
18	10,360	232.23	554
20	12,780	286.08	693
24	18,510	416.35	827
30	29,070	659.27	1,590



Dimensions (inches)

Size	ØD	H	I	L		ØW	N	ncp
				Min.	Max.			
3	2.83	23.78	5.12	2.00	2.28	9.84	4	5/8"-11
4	3.78	28.07	5.67	2.00	2.28	11.81	8	5/8"-11
6	5.79	35.63	7.36	2.25	2.52	11.81	8	3/4"-10
8	7.75	40.75	8.66	2.75	3.03	15.75	8	3/4"-10
10	9.69	48.78	10.04	2.75	3.03	15.75	12	7/8"-9
12	11.61	55.35	11.34	3.00	3.27	15.75	12	7/8"-9
14	13.35	64.76	12.44	3.00	3.27	19.69	12	1"-8
16	15.31	69.84	13.94	3.50	3.78	21.65	16	1"-8
18	17.20	76.65	15.35	3.50	3.78	21.65	16	1-1/8"-7
20	19.09	79.25	16.61	4.50	4.68	23.62	20	1-1/8"-7
24	23.03	92.48	18.98	4.50	4.68	23.62	20	1-1/4"-7
30	28.98	112.20	22.83	4.75	5.0	30.70	28	1-1/4"-7

Figure Number Matrix

FNW 60 R Size		
SIZE CODE		
3 = M	10 = 10	18 = 18
4 = P	12 = 12	20 = 20
6 = U	14 = 14	24 = 24
8 = X	16 = 16	30 = 30

Replacement Seats (Order Separately)

FNW 60 <u>Material Size</u>			
<u>MATERIAL</u>		<u>SIZE CODE</u>	
GR = Gum Rubber	3 = M	10 = 10	18 = 18
VI = Viton®	4 = P	12 = 12	20 = 20
	6 = U	14 = 14	24 = 24
	8 = X	16 = 16	30 = 30

FABRICATED SLIDE AND KNIFE GATE VALVE

Valve Types

Expanding a versatile product offering, FNW offers fabricated slide and knife gate valves where special application requirements exist. The F-Series of valves include slide gate valves, metal to metal, and resilient seated knife gate valves. These valves can be configured with various metallurgy, connection types, sizes, pressure ratings, face-to-face dimensions, and actuators.

F150 Fabricated Slide Gate Valve

The figure F150 features a heavy-duty fully fabricated construction with heavy-gauge body walls and steel-plate body flanges. With a high shearing capability, the F150 slide gate is ideally suited for services such as cyclone and trash applications. It is also ideal for dense solutions and wet or dry abrasives and solids. The valve seat face is protected by the gate when the valve is in the full open position, providing longer service life under adverse conditions.

F65/F67 Fabricated Metal Seated Knife Gate Valve

The figure F65/F67 fabricated knife gate valve is modeled after the figure 65B (with lockout lugs) and 67B without lockout lugs) cast body valves. The F65/F67 is a metal to metal seated valve with unidirectional shut off. The F65/F67 is ideal for dense mixtures of stock and slurries. The shearing action of the knife blade cuts through solids and cleans the seat as it closes.

F68 Fabricated Resilient Seated Knife Gate Valve

The figure F68 fabricated knife gate valve is modeled after the figure 68B cast body valve. The F68 is a resilient seated valve with bidirectional shut off. The F68 achieves shut off by forcing the knife blade into the resilient seat that is channel mounted in the perimeter of the body around the blade. Positive shut off is not dependent on pressure differential across the valve.



Contact FNW to discuss your specific application requirements.

Customizable

Sizes

Standard sizes range from 3 to 24 inch ports. Larger valves are available over 24 inch including 30, 36, 42, 48, 54, or 60 inch valves. Custom sizes such as 28, 32, or 38 inch can also be fabricated. Any other size can be designed and fabricated based on customer specifications.

Pressure Ratings

The standard pressure rating for 3 to 24 inch valves is 150 PSI. Higher pressure valves are available for services above 150 PSI, or where a more robust construction is needed. For large body valves, more economical pressure ratings are available where suitable. Low pressure ratings include 25, 50, and 75 PSI.

Port Configurations

The F150 is available in either o-port, both up to open or down to open, for standard service or optional diamond-port for throttling services. V-ports are available for the F65/F67 and F68 valves. Custom porting is available including square ports or per customer specifications.

Materials

Beside the more standard materials such as carbon and stainless steel, more exotic metals and alloys are available for knife gate valve construction. Materials such as special alloy wetted parts and carbon steel externals can be combined to reduce overall costs but maintain performance.

Factory Tests

All valves receive a complete body, gate, and leakage test per MSS SP-81 where applicable, including full cycling of each valve to check for misalignment or binding. However, certified test reports are available on request (prior to fabrication) or testing to customer specifications.

Options & Accessories

For each of the standard F-series configurations, options and accessories are available based on application need. Options include, but are not limited to, the following:

- O-ring Assisted Seat (metal seats)
- Back Seat Stops/Supports
- V or Diamond Port
- Deflection Cone
- Live Loaded Packing
- Chest Buttons
- Gate Support Strips
- Purge Ports
- Gate Guard
- Extended Flange (Face-to-Face)
- Bonneted
- Stem Extensions
- Stem Guides
- Floor Pedestal
- Stem Boot
- Custom Stem Threading
- Gate Lock-Out
- Hand-wheel Locking Device
- Drive Sleeve Ball Bearing Set
- Gate Scraper
- Non-rising Stem Configuration
- By-pass Valve (with Ext. Flange)
- Bevel Gear Operator
- Chain-wheel Operator
- Pneumatic Cylinder
- Hydraulic Cylinder
- Electric Actuator
- Square Drive Nut
- Ratchet Operator
- Quick Opening Lever
- Mechanical & Proximity Switches
- Solenoids
- Positioners

Figure Number Matrix

FNW F Model Materials Size			
MODEL CODES		MATERIALS	SIZE CODE
F65 = METAL SEAT		A = CARBON STEEL	3 = M 12 = 12
F67 = METAL SEAT		B = 316SS	4 = P 14 = 14
F68 = RESILIENT SEAT		L = 316L	5 = S 16 = 16
F150 = 150# O-PORT/ SLIDE			6 = U 18 = 18
			8 = X 20 = 20
			10 = 10 24 = 24

Packing Options*

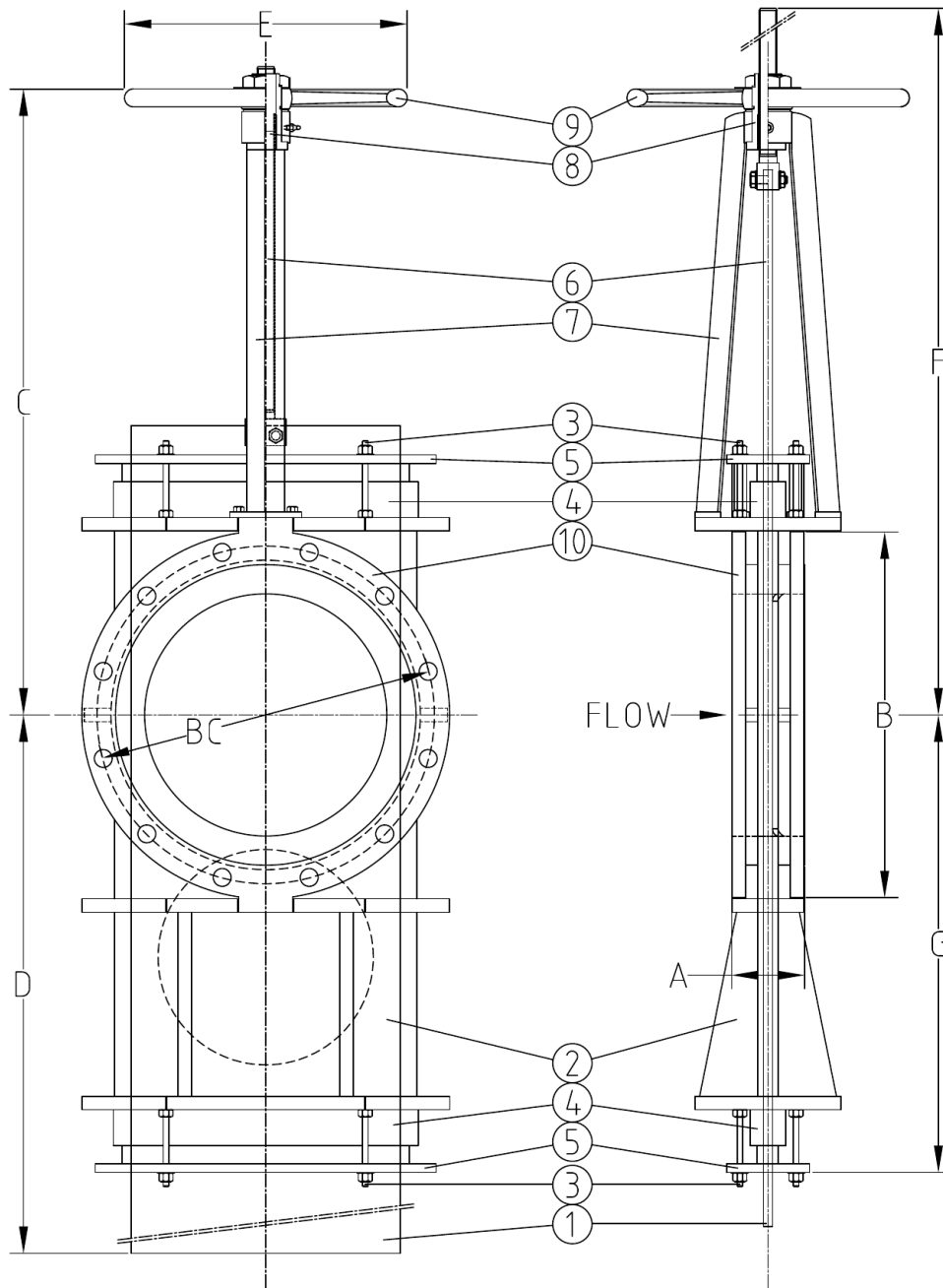
Type	Description	Temperature Limit	pH Range
PM1-S	Square Braid PTFE Impregnated Non-Asbestos Fiber	-170F to 500F	2-12
5889	Lattice Braid Continuous Filament PTFE Fiber	-400F to 500F	0-14**
1333-G	Flexible Graphite Yarn Reinforced w/Graphite Filament	-400F to 850F	0-14†

* F-series is standardized on Garlock Sealing Technologies products

** Not recommended for Chlorine service

† Except strong oxidizers

Example of Standard F150 Slide Gate



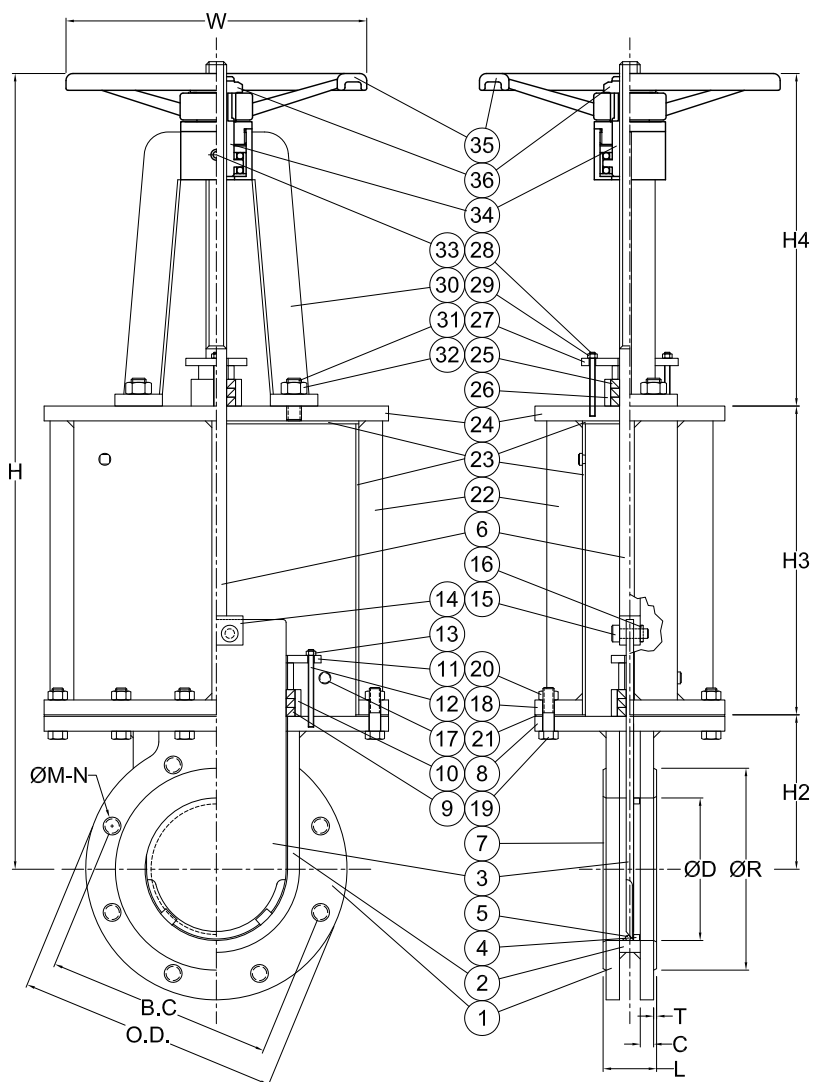
Dimensions (inches)

Ref.	Ref. Type	Size										
		3	4	6	8	10	12	14	16	18	20	24
A	Face to Face	2.00	2.00	2.25	2.75	2.75	3.00	3.00	3.50	3.50	4.50	4.50
B	Flange Diameter	7.50	9.00	11.00	13.50	16.00	19.00	21.00	23.50	25.00	27.50	32.00
C	Center to top (closed)	18	19	22	26	31	33	36	40	44	47	54
D	Center to Bottom (closed)	12	14	18	23	31	35	40	45	51	55	65
E	Handwheel Diameter	11	11	11	11	15	15	20	24	24	30	30
F	Center to Top (open)	21	23	28	34	41	45	50	56	62	67	78
G	Center to Bottom (open)	9	10	12	15	21	23	26	29	33	35	41
BC	Flange Bolt circle	6.00	7.50	9.50	11.75	14.25	17.00	18.75	21.25	22.34	25.00	29.50
Wt.	Lbs. (Approximately)	80	108	160	220	270	320	400	510	630	780	1190

Standard F150 Materials

Ref.	Description	Material		
		A	B	L
1	Gate	WCB	316SS	317L
2	Body Seal	WCB	316SS	317L
3	Bolts	Plated		
4	Packing	PTFE / Fiber		
5	Gland	WCB	316SS	317L
6	Stem Packing	304SS		
7	Yoke	WCB	316SS	317L
8	Stem Nut	Brass		
9	Handwheel	Ductile Iron		
10	Flanges	WCB	316SS	317L

Example of Special Alloy Bonneted F67



Dimensions (inches)

Size	L	ØD	H	H2	H3	H4	T	C	ØR	B.C.	O.D.	ØM	N	W
6	2.25	6	33.50	6.50	13.00	14.00	0.125	0.563	8.50	9.50	11.00	0.750	8	15.00
8	2.75	8	39.25	8.25	15.00	16.00	0.125	0.687	10.63	11.75	13.50	0.750	8	15.00
12	3.00	12	55.25	12.25	21.00	22.00	0.125	0.937	15.00	17.00	19.00	0.875	12	18.00

F67 Materials

Ref.	Description	Material	Qty
1	Port Flanges	Inconel 600	2
2	Body Can	Inconel 600	1
3	Blade	Inconel 600	1
4	Seat Ring	Inconel 600	1
5	Blade Stop	Inconel 600	2
6	Stem	Inconel 600	1
7	Raised Face	Inconel 600	2
8	Valve Top Flange	Inconel 600	1
9	Valve Packing	Graphite	3-4R
10	Valve Packing Box	Inconel 600	1
11	Valve Packing Gland	Inconel 600	1
12	Valve Packing Bolt	Inconel 600	2-4
13	Valve Packing Nut	Inconel 600	2-4
14	Clevis	Inconel 600	1
15	Clevis Stud	Inconel 600	2
16	Clevis Pin	Inconel 600	2
17	Clean-out Port/Plug	Inconel 600	2
18	Bonnet Bottom Flange	Inconel 600	1
19	Bonnet Bolt	CS / Zinc	12-16
20	Bonnet Nut	CS / Zinc	12-16
21	Bonnet Gasket	Graphite / SS316L	1
22	Bonnet Support	Carbon Steel	4-6
23	Bonnet Liner	Inconel 600	1
24	Bonnet Top Flange	Carbon Steel	1
25	Bonnet Packing	Graphite	3-4R
26	Bonnet Packing Box	Carbon Steel	1
27	Bonnet Packing Gland	Carbon Steel	1
28	Bonnet Packing Bolt	CS / Zinc	2
29	Bonnet Packing Nut	CS / Zinc	2
30	Yoke Arms	Carbon Steel	1
31	Yoke Bolt	CS / Zinc	4
32	Yoke Nut	CS / Zinc	4
33	Grease Fitting	CS / Zinc	1
34	Drive Sleeve	Bronze	1
35	Handwheel	Ductile Iron	1
36	Handwheel Nut	Carbon Steel	1
37	Paint	Black Enamel	Lot

STAINLESS STEEL HIGH PERFORMANCE TRANSMITTER ISOLATION VALVE

The figure 2000BTIV is an all cast stainless steel body and yoke with investment cast packing follower. Reminiscent of high performance butterfly valves that utilize a retaining ring to secure the valve seat, the dual seat design of the figure 2000BTIV provides bidirectional bubble-tight shut off.

Features:

- Flex Teflon Seats for Positive Shut Off at Minimal Line Pressure
- Bidirectional Shut off
- Cast Stainless Steel Body, Yoke and Packing Gland
- Reversible Ratchet Operator, Standard (Quick-Opening Lever or Handwheel Optional)
- 25° & 27° Offset Mounting Lugs Ease Tank-Side Connection
- Low Profile Yoke
- Acetal Yoke Washer Improves Ratchet Engagement
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Exceeds MSS SP-81 Specifications for 150 PSI CWP
- Smooth Flow, Non-clogging Seat Design
- Optional Purge Ports
- Available in size 3"

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Shell Test: MSS SP-81
- Seat Test: Exceeds MSS SP-81
- Material: ASME B16.34

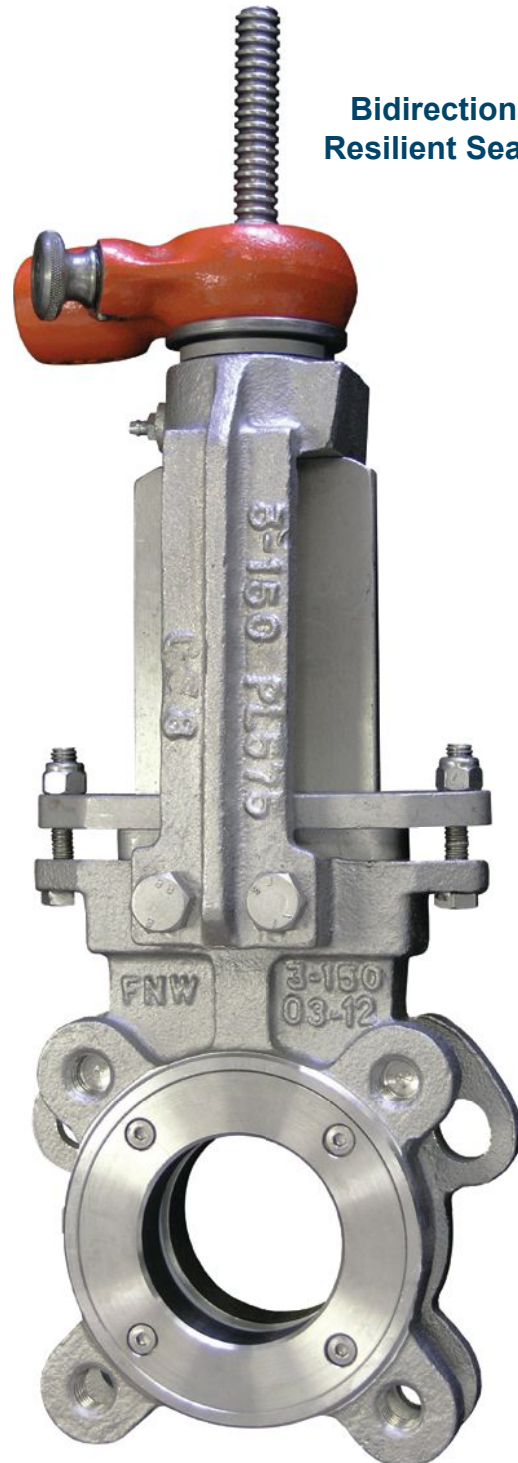
Part Number

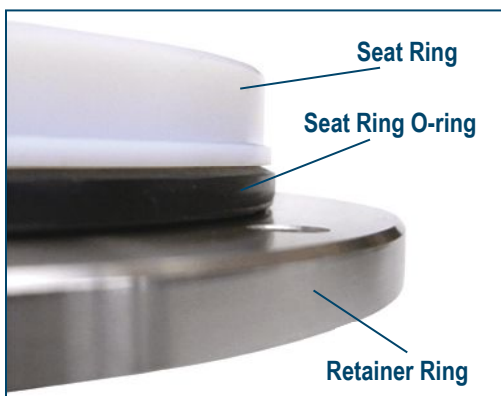
Size	Part Number
3"	FNW2000BTIVM

Flow Coefficient, Port Area, & Weight

Size	Cv	Port Area (in ²)	Wt. (Lbs)
3	500	5.98	25.5

**Bidirectional
Resilient Seated**





Flex Teflon Seats

The FNW figure 2000BTIV utilizes a seating design that provides positive shut off in both directions, even at low pressure differentials. Similar to high performance butterfly valve designs, the figure 2000BTIV uses mechanically retained seat rings to hold the seats in place. The RTFE seats are carried on the retainer rings and are pre-compressed with o-rings to provide sealing pressure against the knife blade. These o-rings also act as the seal between the body and seat rings. Seat material can easily be replaced without disturbing the valve packing. This seat configuration also improves the longevity of the seat as it is not directly in the flow path.

Seat Rings

Made of RTFE, the seat rings are secured in place by an integral locator lip around its circumference, fitted into the valve body. Dual rings insure shut off in both directions.

Seat Ring O-ring

Behind each seat ring is a hefty EPDM o-ring. This o-ring not only provides sealing, but also maintains pressure behind the seat ring, ensuring a tight shut off.

Retainer Ring

Holding the seat rings and o-rings in place are the retainer rings. These heavy stainless steel rings make replacing the seats and o-ring quick and easy.

Options

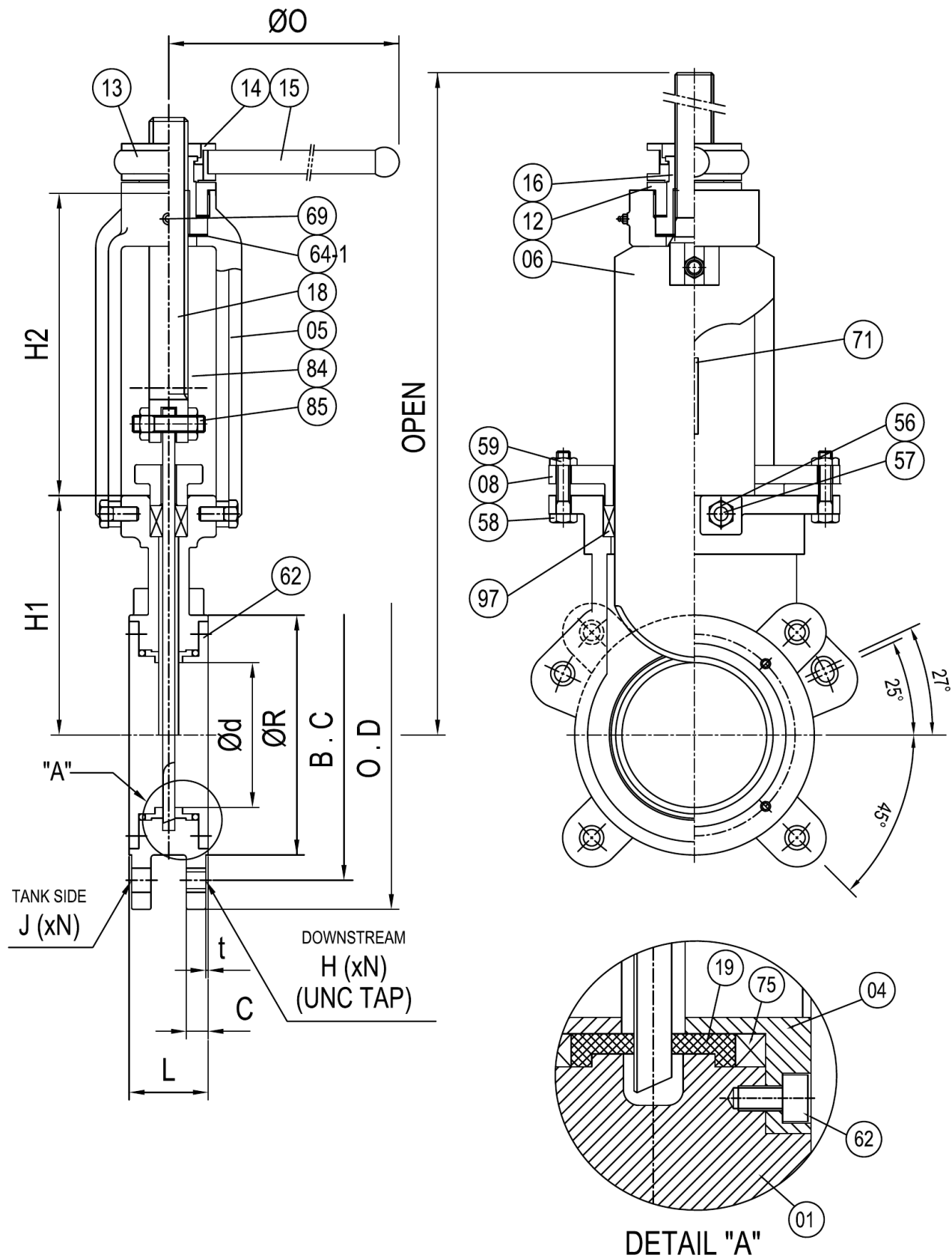
FNW Valve Company offers many options and modifications for valves. These include, but are not limited to:

- Actuation including ratchets, chain wheels, AWWA nuts, gear-operators, pneumatic & hydraulic cylinders, and electric actuators
- Packing options for pH and temperature requirements
- Back seat stops for low ΔP or reverse operation applications, or to prevent knife blade deflection
- V-ports for reduced plugging in metering applications
- Stem extensions in carbon and stainless steel
- Conversion to non-rising stem (NRS)
- Deflection cones in Ni-Hard and HDPE for added seat and gate protection in abrasive services
- Flush ports to clear suspended matter from the valve chest or seat pocket area
- Quick opening levers
- Gate scraper

Contact FNW for knife gate valve options.

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
01	Body	A351 CF8M	1	
04	Retainer	A351 CF8M	2	
05	Yoke	A351 CF8	1	
06	Knife	A240 316	1	
08	Gland Flange	A351 CF8M	1	
12	Sleeve Gland	A351 CF8	1	
13	Ratchet	Mfg Standard	1	Ridgid Model 00-R
14	Ratchet Drive Assembly	Steel	1	2-Piece
15	Ratchet Lever	Mfg Standard	1	Ridgid Model 00-R
16	Yoke Sleeve	A439 D2C	1	
18	Stem	A182 F304	1	
19	Seat Ring	RTFE	2	
56	Yoke Bolt	A193 B8	1 Set	
57	Yoke Nut	A194 8	1 Set	
58	Gland Bolt	A193 B8	1 Set	
59	Gland Nut	A194 8	1 Set	
62	Seat Ring Bolt	A193 B8M	1 Set	
64-1	Washer	Acetal	1	
69	Grease Nipple	A307 Gr. B	1	Cr. Plating
71	Name Plate	A240 304	1	
75	O-ring	EPDM	2	
84	Pin Bolt	A193 B8	1	
85	Pin Nut	A194 8	1	
97	Packing	PTFE	1 Set	TFE Impregnated Fiber
97-1	Packing / Wiper Seal	EPDM	1	



Dimensions (inches)

Size	L	$\varnothing d$	Open	H1	H2	O	Flange							
							O.D.	B.C.	$\varnothing R$	C	t	N	H	J
3	2.00	2.76	15.61	5.00	6.67	21.67	7.50	6.00	4.88	0.44	0.06	4	5/8 - 11	11/16

KNIFE GATE VALVE OPTIONS AND ACCESSORIES



BACK SEAT STOPS

Primarily for unidirectional knife gate valves, back seat stops can be added in applications where there is low pressure differential (less than 35 PSI) across the valve or where reverse pressure could unseat the valve. Back seat stops help maintain shut off by holding the blade close to the seat and prevent blade deflection in severe reverse flow.



RATCHETS

Where knife gate valves are closely mounted to tanks and other structures, large hand-wheels may not be appropriate. Ratchets can be adapted to knife gate valves to allow operation on the unobstructed side.



SQUARE DRIVE NUTS

In applications such as buried service or where access to valve operation needs to be limited, square drive nuts can be added in place of hand-wheels. Optional t-handles for rising stems or non-rising stems (see non-rising stem adapters) can be supplied upon request.



QUICK-OPENING LEVERS

For quick manual operation of knife gate valves, quick-opening levers are available. They are also used in areas where physical obstructions around the valve prohibit the use of other operators such as hand-wheels. Similar to ratchet operators, quick-opening levers are limited by valve size and thrust requirements. Contact FNW regarding specific applications.



V-PORTS

Most FNW knife gate valves can be supplied with v-ports for reduced plugging in throttling (metering) services. V-ports can be fabricated to the degree of angle desired for specific applications (60 degs. typical).



NON-RISING STEM ADAPTERS

For space limited applications, non-rising stem adapters can be fabricated for most knife gate valves. In this configuration, the stem is driven through a blade mounted nut. Non-rising stem adapters can be topped with a square drive nut, hand wheel, or multi-turn actuator.



STEM EXTENSIONS, PEDESTALS, & GUIDES

For remote mounted knife gate valve operators, FNW can supply stem extensions, floor mount pedestals, and stem guides. Stem extensions can be made in kit form for easy installation and can include stem guides and universal joints, depending on application requirements. Pedestals can be fabricated to specific mounting patterns for floor and direct actuator mounting.



DEFLECTION CONES

In abrasive services, deflection cones can be mounted between the upstream valve flange and the adjoining piping. Though reducing the port area slightly, they can increase the life of the seat and gate and are less expensive to replace than the entire valve. Deflection cones are available in Ni-Hard and HDPE materials.

PURGE PORTS

Often, knife gate valve applications have suspended matter that can build up in the chest and pocket cavities. Severe build up can interfere with the normal operation of the valve. Purge ports can keep this build up from happening by flushing the valve with liquid, gas, or in some cases, steam. Purge ports are typically placed on the sides of the valve chest and bottom of the valve.

GATE SCRAPER

To enhance protection of the valve packing and maintain packing seal, a Teflon® or metal gate scraper can be installed in the base of the packing well. The gate scraper can clear abrasive and sticky material from the blade as the valve opens, minimizing wear to the packing.

HARDENED SEATS and/or BLADE

In high abrasion applications, the valve seat and blade take the most abuse. For these services, FNW can supply hardened blades and/or metal seats to prolong the service life of these parts.

SEATS, SEALS, & PACKING

Different applications require different materials. FNW can supply custom materials for seats, seals, and packing depending on chemical compatibility, temperature, and acidity (pH).

MEDIUM & HIGH VIBRATION SERVICE

Post factory treatment is available for medium and high vibration service. Modification includes the use of thread lockers, nylon lock nuts, or tack welds where applicable.

STEM COVERS & BOOTS

In dirty and dusty environments, particulates on the stem can hasten wear of the stem and drive sleeve. Some knife gate valves can be retrofitted with stem protectors fabricated from various materials and/or with boot protectors to keep dirt out of the stem drive assembly.

Contact FNW regarding your specific knife gate valve needs.

Also see the actuation section of this catalog for additional information on gear operators, pneumatic cylinders, hydraulic cylinders, and electric actuators.

BALL VALVES

SMALL BODY

Brass

Figure	Description	Page
400	2-pc, full port, 600 wog, 150 wsp, threaded ends	33
401	2-pc, full port, 600 wog, 150 wsp, sweat ends	35
410A	2-pc, full port, 600 wog, 150 wsp, gas rated, threaded ends	37
411A	2-pc, full port, 600 wog, 150 wsp, sweat ends	39
413	3-way diverter, 400 wog, 150 wsp, L-port, threaded ends	41
420	2-pc, full port, 600 wog, 150 wsp, gas rated, threaded ends	43
421	2-pc, full port, 600 wog, 150 wsp, sweat ends	45
426A/427A/428A	2-pc, full port, 600 wog, cap & chain hose connection by FNPT, MNPT, or sweat	47
430	2-pc, full port, 200 psi, water service, press ends	49
435	2-pc, full port, 125 psi, gas service, press ends	51
440	2-pc, full port, 600 wog, 150 wsp, ISO 5211 mount, threaded ends	53
455/465	3-way, 400 wog, 100 wsp, ISO 5211 mount, L & T-port, threaded ends	55
470/475	2-pc, full port, 400 wog, pump isolation, fix flange by threaded or sweat ends	57
480A	2-pc, standard port, 400 wog, 150 wsp, compression ends	59
485	2-pc, full port, 200 psi, water or air service, push-fit ends	61
490/495	2-pc, full port, 600 wog, pump isolation, rotating flange by threaded or sweat ends	63
X410B	2-pc, full port, 600 wog, 150 wsp, certified lead free, gas rated, threaded ends	65
X411B	2-pc, full port, 600 wog, 150 wsp, certified lead free, sweat ends	67
X420	2-pc, full port, 600 wog, 150 wsp, certified lead free, gas rated, threaded ends	69
X421	2-pc, full port, 600 wog, 150 wsp, certified lead free, sweat ends	71
X430	2-pc, full port, 200 psi, water service, certified lead free, press ends	73
X480	2-pc, standard port, 400 wog, 150 wsp, certified lead free, compression ends	75
X485	2-pc, full port, 200 psi, water or air service, certified lead free, push-fit ends	77

Carbon Steel

Figure	Description	Page
221A	2-pc, full port, 2000 cwp, 150 or 250 wsp, threaded ends	79
311A	3-pc, full port, 1000 cwp, 150 wsp, threaded or socket weld ends	81
311AM	3-pc, full port, 1000 cwp, 150 wsp, ISO 5211 mount, threaded ends	83
321A	3-pc, full port, 2000 cwp, 150 or 250 wsp, ISO 5211 mount, threaded or sw ends	85

Stainless Steel

Figure	Description	Page
100A	1-pc, standard port, 1000 cwp, 150 wsp, threaded ends	91
200A	2-pc, full port, 1000 cwp, 150 wsp, threaded ends	93
220A	2-pc, full port, 2000 cwp, 150 or 250 wsp, threaded ends	95
220AM	2-pc, full port, 2000 cwp, 150 wsp, ISO 5211 mount, threaded ends	97
220ASE	2-pc, full port, 150 psi, safety exhaust, threaded ends	99
233A	3-way diverter, 1000 cwp, 150 wsp, ISO 5211 mount, L-port, threaded ends	101
310A	3-pc, full port, 1000 cwp, 150 wsp, threaded or socket weld ends	103
310AM	3-pc, full port, 1000 cwp, 150 wsp, ISO 5211 mount, threaded or sw ends	105
320A	3-pc, full port, 2000 cwp, 150 or 250 wsp, ISO 5211 mount, threaded or sw ends	107
330A	3-pc, 400 cwp, 150 wsp, ISO 5211 mount, sanitary clamp ends	109

FLANGED

Carbon Steel

Figure	Description	Page
501	1-pc (uni-body), standard port, 150 wsp, 150# flanged	87
601	2-pc (split-body), full port, 150 wsp, 150# flanged	89

Stainless Steel

Figure	Description	Page
500	1-pc (uni-body), standard port, 150 wsp, 150# flanged	111
600	2-pc (split-body), full port, 150 wsp, 150# flanged	113
633/634	3-way, full port, L & T-port, 150# flanged	115
660	2-pc (split-body), full port, 150 wsp, 150# flanged	117

Figure 400 BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT 600 WOG w/THREADED ENDS

Features:

- 600 WOG
- 150 WSP
- Full Port
- Meets NSF-61 Standards
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Double O-ring Stem Packing
- Threaded Ends (ANSI B1.20.1)
- Forged Brass Body & End Cap
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Optional Slide Lock Lever Meets OSHA 1910.147
- Uses The Same Handle Accessories As The Figure 420 Ball Valve



OPTIONS



Lock Lever



Stem Extension



Tee or Oval Handle



Memory Stop

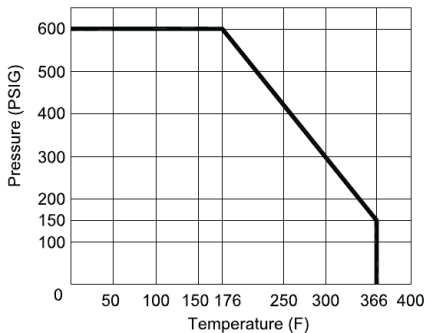


Figure Number Matrix

FNW 400 Lever Size

LEVER TYPES

BLANK = STANDARD

LL = LOCK LEVER*

SIZE CODE*

1/2 = D

3/4 = F

1 = G

1-1/4 = H

1-1/2 = J

2 = K

Kit Codes (Order Separately)

LOCKING LEVER

1/2 = FNW420LHKBD

3/4 - 1 = FNW420LHKFG

1-1/4 - 1-1/2 = FNW420LHKHJ

2 = FNW420LHKK

TEE HANDLES

1/2 = FNW420THKBD

3/4 - 1 = FNW420THKFG

EXTENSIONS

1/2 = FNW420SEBD

3/4 - 1 = FNW420SEFG

1-1/4 - 1-1/2 = FNW420SEHJ

2 = FNW420SEK

OVAL HANDLES

1/2 = FNW420OHKBCD

3/4 - 1 = FNW420OHKFG

1-1/4 - 1-1/2 = FNW420OHKHJ

2 = FNW420OHKK

MEMORY STOPS

1/2 = FNW420MSKBD

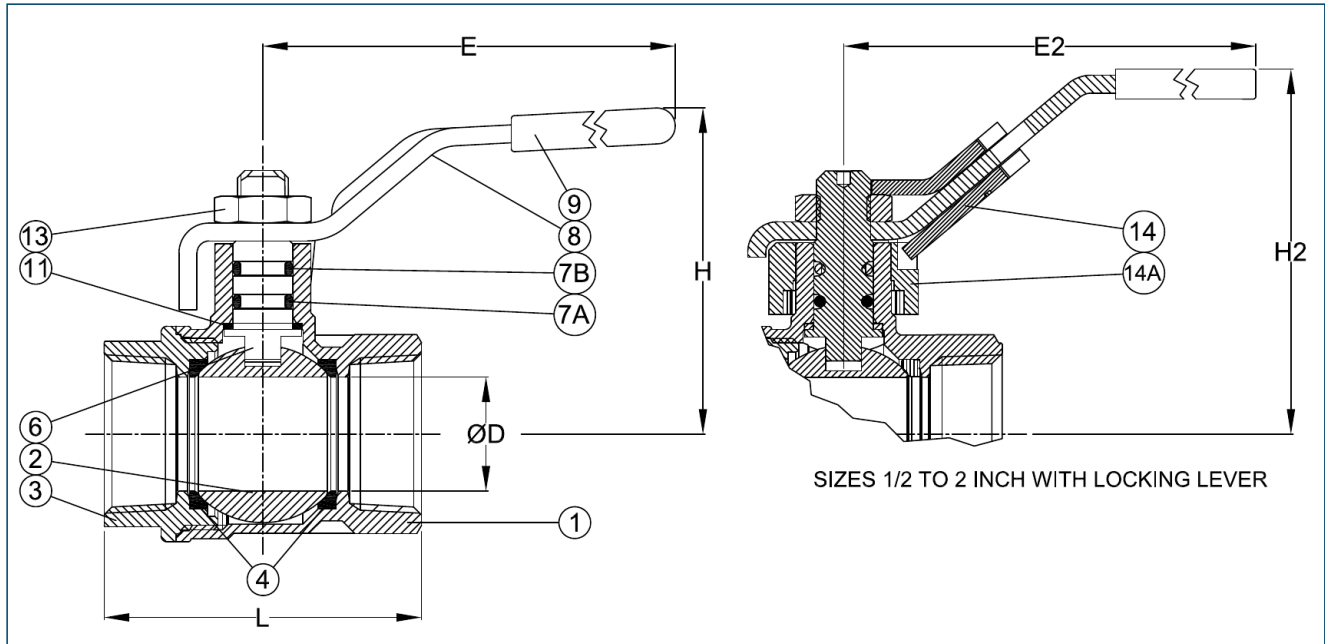
3/4 - 1 = FNW420MSKFG

1-1/4 - 1-1/2 = FNW420MSKHJ

2 = FNW420MSKK

* For standard 1/4" & 3/8" valves, use models FNW420B and FNW420C. For 1/4" & 3/8" valves with locking levers, use models FNW420LLB and FNW420LLC. The lockout collar can easily be converted to the OSHA style lockout by removing the handle, turning the collar 180 degrees and then reattaching the handle.

2 PC FULL PORT 600 WOG w/THREADED ENDS



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164	1
7A	Stem O-ring	FKM (Viton®)	1
7B	Stem O-ring	NBR 75 Shore A	1
8	Handle	Steel Fe DD 11 UNI 10111	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
13	Handle Nut	Zinc Plated Steel 6S	1
14	Locking Pad	Fe P 11 UNI EN 10111	1
14A	Bushing	ZAMA G Zn A14 UNI EN1774	1

Dimensions (inches)

Size	ØD	E	L	H	E2	H2
1/2	0.55	3.78	1.87	1.77	3.78	1.93
3/4	0.75	4.76	2.08	2.22	4.84	2.38
1	0.94	4.76	2.58	2.32	4.84	2.48
1-1/4	1.18	5.94	3.01	2.87	5.94	3.03
1-1/2	1.49	5.94	3.50	3.09	5.94	3.23
2	1.85	6.30	4.05	3.66	6.30	3.72

Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	19	0.35
3/4	34	0.62
1	50	0.91
1-1/4	103	1.53
1-1/2	268	2.17
2	309	3.54

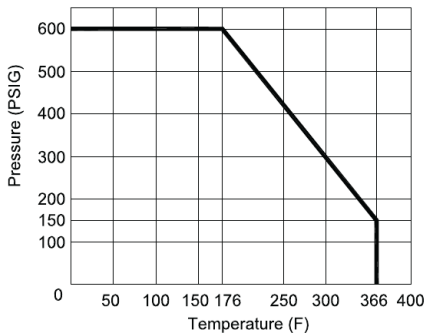
Figure 401 BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT 600 WOG w/SWEAT ENDS

Features:

- 600 WOG
- 150 WSP
- Full Port
- Meets NSF-61 Standards
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Double O-ring Stem Packing
- Sweat Ends (ANSI B16.18)
- Forged Brass Body & End Cap
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Uses The Same Handle Accessories As The Figure 420 Ball Valve



OPTIONS



Lock Lever



Stem Extension



Tee or Oval Handle



Memory Stop

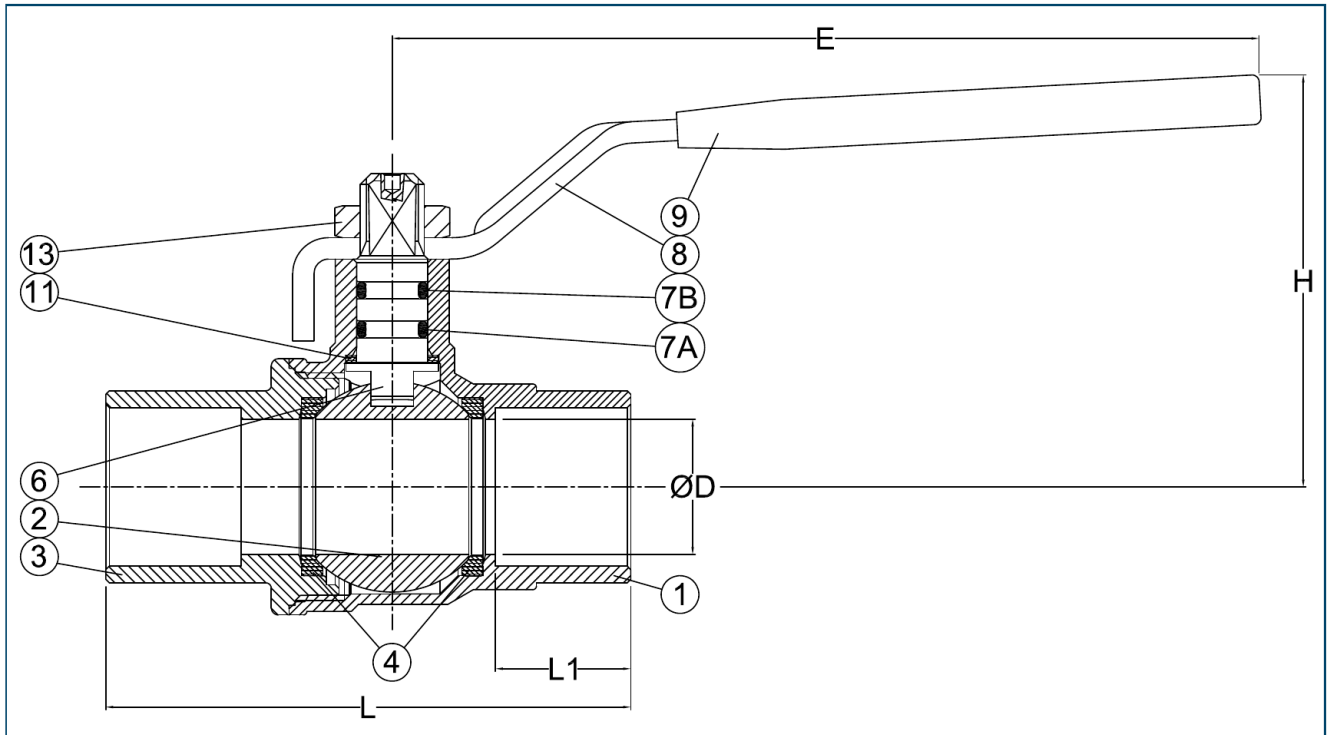


NSF 61

Figure Number Matrix

FNW 401 Size	Kit Codes (Order Separately)		
	LOCKING LEVER	EXTENSIONS	MEMORY STOPS
SIZE CODE			
1/2 = D	1/2 = FNW420LHKBD	1/2 = FNW420SEBD	1/2 = FNW420MSKBD
3/4 = F	3/4 - 1 = FNW420LHKFG	3/4 - 1 = FNW420SEFG	3/4 - 1 = FNW420MSKFG
1 = G	1-1/4 - 1-1/2 = FNW420LHKHJ	1-1/4 - 1-1/2 = FNW420SEHJ	1-1/4 - 1-1/2 = FNW420MSKHJ
1-1/4 = H	2 = FNW420LHKK	2 = FNW420SEK	2 = FNW420MSKK
1-1/2 = J			
2 = K			
	TEE HANDLES	OVAL HANDLES	
	1/2 = FNW420THKBD	1/2 = FNW420OHKBCD	
	3/4 - 1 = FNW420THKFG	3/4 - 1 = FNW420OHKFG	
		1-1/4 - 1-1/2 = FNW420OHKHJ	
		2 = FNW420OHKK	

2 PC FULL PORT 600 WOG w/SWEAT ENDS



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164	1
7A	Stem O-ring	FKM (Viton®)	1
7B	Stem O-ring	NBR 75 Shore A	1
8	Handle	Steel Fe DD 11 UNI 10111	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
13	Handle Nut	Zinc Plated Steel 6S	1

Dimensions (inches)

Size	ØD	E	L	L1	H
1/2	0.55	3.78	2.19	0.50	1.77
3/4	0.75	4.76	2.77	0.75	2.22
1	0.94	4.76	3.36	0.91	2.32
1-1/4	1.18	5.94	3.86	0.97	2.87
1-1/2	1.49	5.94	4.45	1.10	3.09
2	1.85	6.30	5.31	1.34	3.66

Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	19	0.40
3/4	34	0.62
1	50	0.95
1-1/4	103	1.64
1-1/2	268	2.33
2	309	3.77

Figure 410A BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT* 600 WOG

Features:

- Threaded Connection
- 600 WOG
- 150 WSP
- Full Port *
- PTFE Seats
- Meets MSS SP-110 Standards
- NSF 61-8 Certified
- UL Approved (Up to 2")
- FM & CSA Approved (1/2" to 2" only)
- Blow-out Proof Stem
- Adjustable Packing
- Stocked Configurations:
 - Standard Lever (1/4" to 4")
 - Oval Handle (1/4" to 1")
 - Tee Handle (1/2" to 1")
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit

* 4" Valve is Standard Port

Figure Number Matrix

FNW 410A	Handle	Size
	<u>HANDLE CODE</u>	<u>SIZE CODE</u>
	Standard Handle = Blank	1/4 = B 1-1/2 = J
	Oval Handle (1/4"~1") = O	3/8 = C 2 = K
	Tee Handle (1/2"~1") = T	1/2 = D 2-1/2 = L
		3/4 = F 3 = M
		1 = G 4 = P
		1-1/4 = H

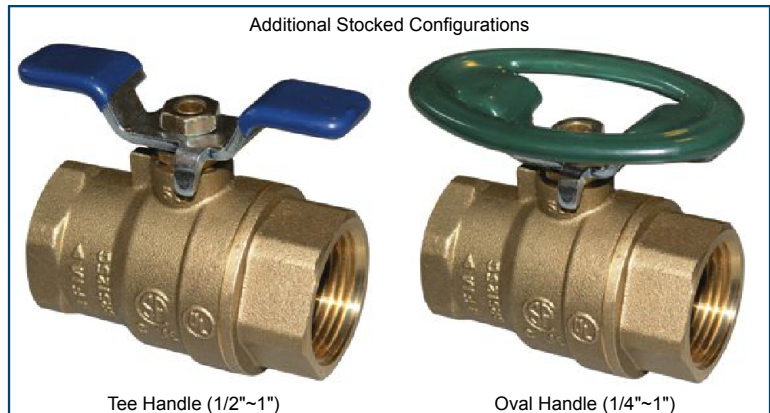
Kit Codes (Order Separately)

FNW 410A	Kit	Size
	<u>KIT TYPE</u>	<u>SIZE CODE</u>
	Replacement Handle = YLWH	1/4"~1/2" = BD
	Locking Lever = LHK	3/4"~1" = FG
	Stem Extension = SE	1-1/4"~1-1/2" = HJ
	Tee Handle* = THK	* 2"~4" = KP
	Oval Handle* = OHK	
	Memory Stop = MSK	

* NOTE: Due to the higher torque requirements of larger valves, use of Tee and Oval handles on valves larger than 1-1/2" can be difficult to operate.



Standard Lever (1/4"~4")



Tee Handle (1/2"~1")

Oval Handle (1/4"~1")



NSF 61-8



1/2"~2"



1/2"~2"

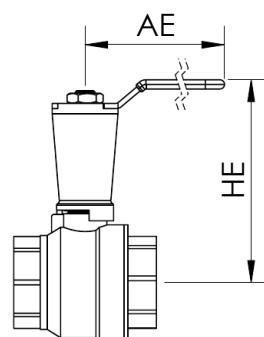
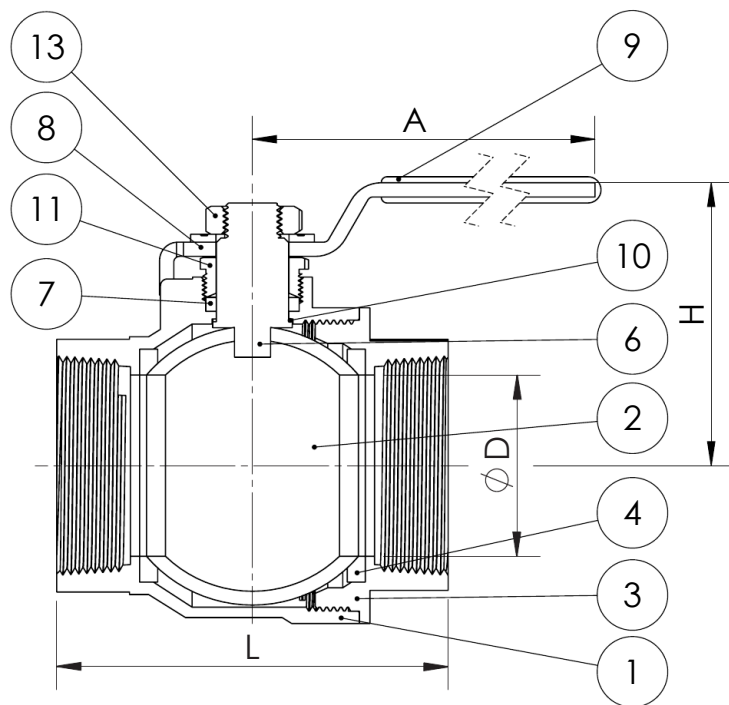


1/4"~2"

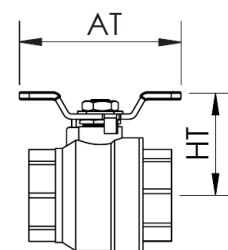
Gas Approvals

- CSA Class 3371-08, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F - 125°F
- CSA Class 3371-10, CGA 3.16, 125 PSIG, -40°F - 149°F
- CSA Class 3371-12, CGA CR91-002, 5 PSIG, -40°F - 125°F
- CSA Class 3371-88, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F - 125°F
- CSA Class 3371-92, ASME B16.44, 5 PSIG, -40°F - 125°F
- CSA Class 3371-94, ASME B16.33, 125 PSIG, -20°F - 150°F
- UL Class YRBX, ANSI/UL-842, 600 PSIG, -20°F - 125°F
- UL Class YSDT, ANSI/UL-125, 250 PSIG, -40°F - 130°F

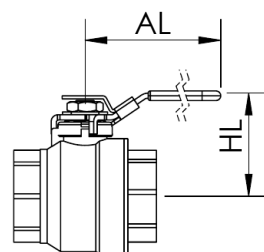
2 PC FULL PORT* 600 WOG



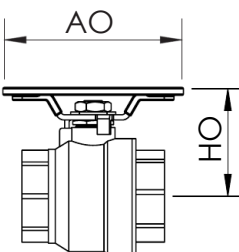
STEM EXTENSION KIT



TEE HANDLE KIT



LOCKING LEVER KIT



OVAL HANDLE KIT

Dimensions (inches) & Weights

SIZE	ØD	A	L	H	Wt. (Lbs)
1/4	0.35	1.97	1.69	1.26	0.2
3/8	0.39	2.95	1.81	1.46	0.3
1/2	0.50	2.95	2.13	1.50	0.4
3/4	0.75	3.94	2.48	1.85	0.6
1	0.98	3.94	2.99	2.05	0.9
1-1/4	1.26	4.92	3.35	2.36	1.5
1-1/2	1.50	4.92	3.62	2.56	2.0
2	1.97	7.87	4.25	3.11	3.8
2-1/2	2.48	7.87	5.16	3.50	6.3
3	2.95	7.87	5.91	3.86	9.3
4	2.95	7.87	6.26	3.86	12.1

SIZE	AL	HL	AO	HO	AT	HT	AE	HE
1/4	2.99	1.14	2.76	0.93	2.60	0.83	2.91	3.76
3/8	2.99	1.18	2.76	0.96	2.60	0.87	2.91	3.80
1/2	2.99	1.29	2.76	1.07	2.60	0.97	2.91	3.91
3/4	3.94	1.65	3.54	1.40	3.31	1.30	3.90	4.25
1	3.94	1.89	3.54	1.63	3.31	1.54	3.90	4.49
1-1/4	5.00	2.28	4.33	1.99	3.94	1.89	4.88	4.86
1-1/2	5.00	2.52	4.33	2.22	3.94	2.13	4.88	5.10
2	7.91	3.23	5.35	2.87	4.72	2.76	7.80	5.63
2-1/2	7.91	3.74	5.35	3.39	4.72	3.27	7.80	6.14
3	7.91	4.21	5.35	3.86	4.72	3.74	7.80	6.61
4	7.91	4.21	5.35	3.86	4.72	3.74	7.80	6.61

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	ASTM B124-C37700 Brass ASTM B584-C85700 Brass	1	1/4" to 1-1/2" 2" to 4"
2	Ball	ASTM B16-C36000 Brass (NC Plated) ASTM B124-C37700 Brass (NC Plated)	1	1/4" to 3/4" (Solid) 1" to 4" (Shell)
3	End Cap	ASTM B124-C37700 Brass	1	
4	Seat	PTFE	2	
6	Stem	ASTM B16-C36000	1	
7	Stem Packing	PTFE	1	
8	Handle	ASTM A283-D Steel	1	Zinc Plated
9	Handle Sleeve	Vinyl	1	
10	Thrust Washer	PTFE	1	2" to 4"
11	Packing Gland	ASTM B16-C36000	1	
13	Handle Nut	AISI-1010 Steel	1	Zinc Plated

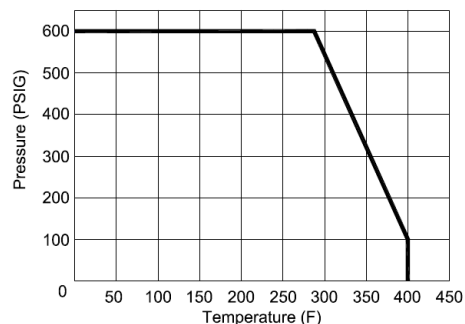


Figure 411A BRASS BODY BALL VALVES



2 PC FULL PORT 600 WOG

Features:

- Sweat Connection
- 600 WOG
- 150 WSP
- Full Port
- PTFE Seats
- Meets MSS SP-110 Standards
- NSF 61-8 Certified
- Blow-out Proof Stem
- Adjustable Packing
- Stocked Configurations:
 - Standard Lever (1/2" to 3")
 - Tee Handle (1/2" to 1")
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit



Figure Number Matrix

FNW 411A		Handle	Size
HANDLE CODE		SIZE CODE	
Standard Handle = Blank		1/2 = D	1-1/2 = J
Tee Handle (1/2"~1") = T		3/4 = F	2 = K
		1 = G	2-1/2 = L
		1-1/4 = H	3 = M

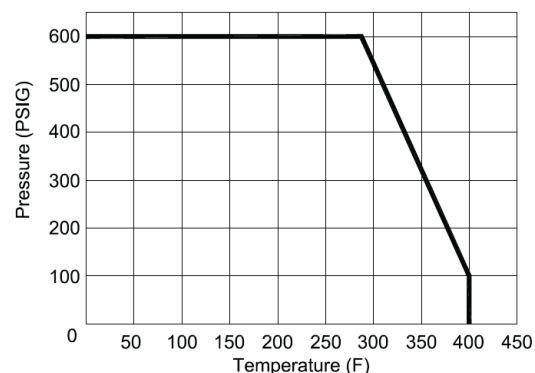


NSF 61-8

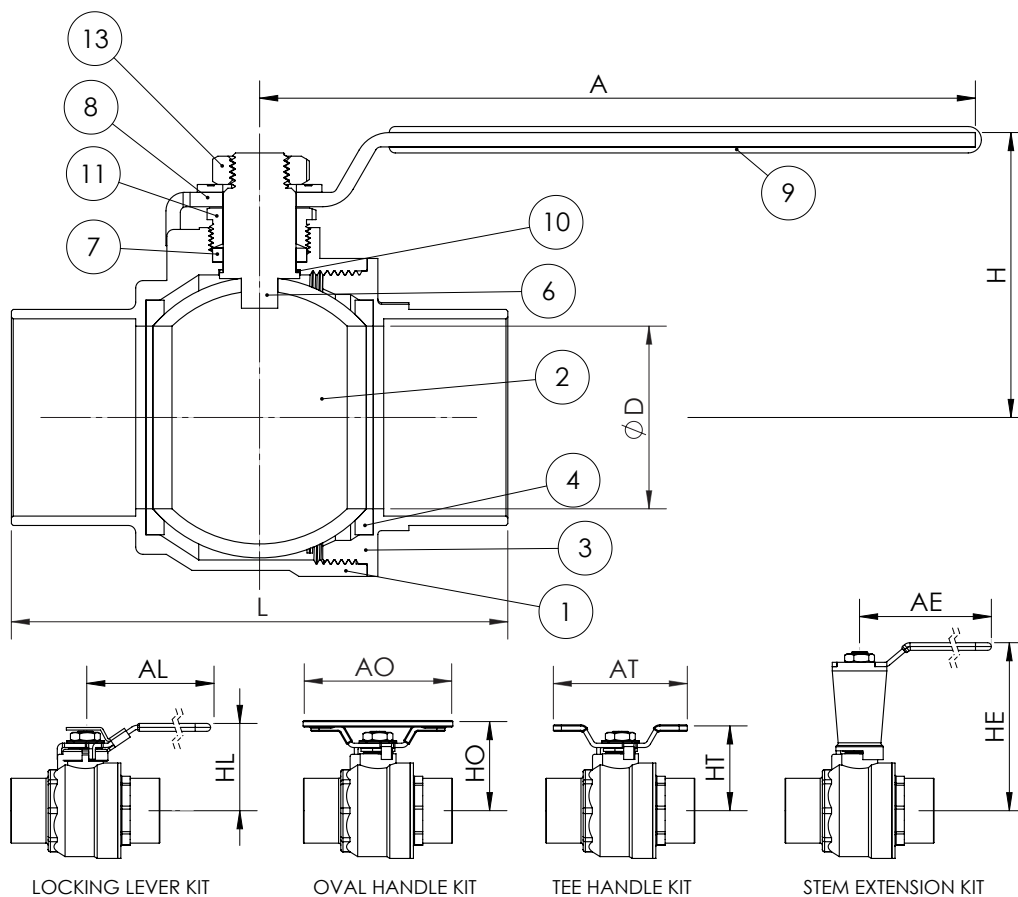
Kit Codes (Order Separately)

FNW 410A		Kit	Size
KIT TYPE		SIZE CODE	
Replacement Handle = YLWH		1/2" = BD	
Locking Lever = LHK		3/4"~1" = FG	
Stem Extension = SE		1-1/4"~1-1/2" = HJ	
Tee Handle* = THK		* 2"~3" = KP	
Oval Handle* = OHK			
Memory Stop = MSK			

* NOTE: Due to the higher torque requirements of larger valves, use of Tee and Oval handles on valves larger than 1-1/2" can be difficult to operate.



2 PC FULL PORT 600 WOG



Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	ASTM B124-C37700 Brass ASTM B584-C85700 Brass	1	1/2" to 1-1/2" 2" to 3"
2	Ball	ASTM B16-C36000 Brass (NC Plated) ASTM B124-C37700 Brass (NC Plated)	1	1/2" & 3/4" (Solid) 1" to 3" (Shell)
3	End Cap	ASTM B124-C37700 Brass	1	
4	Seat	PTFE	2	
6	Stem	ASTM B16-C36000	1	
7	Stem Packing	PTFE	1	
8	Handle	ASTM A283-D Steel	1	Zinc Plated
9	Handle Sleeve	Vinyl	1	
10	Thrust Washer	PTFE	1	2" to 3"
11	Packing Gland	ASTM B16-C36000	1	
13	Handle Nut	AISI-1010 Steel	1	Zinc Plated

Dimensions (inches) & Weights

SIZE	ØD	A	L	H	Wt. (Lbs)
1/2	0.50	2.95	1.93	1.50	0.4
3/4	0.75	3.94	2.72	1.85	0.6
1	0.98	3.94	3.31	2.05	0.9
1-1/4	1.26	4.92	3.78	2.36	1.5
1-1/2	1.50	4.92	4.29	2.56	2.0
2	1.97	7.87	5.35	3.11	3.8
2-1/2	2.48	7.87	6.18	3.50	6.3
3	2.95	7.87	7.09	3.86	9.3

SIZE	AL	HL	AO	HO	AT	HT	AE	HE
1/2	2.99	1.69	2.76	1.48	2.60	1.38	2.91	4.31
3/4	3.94	2.09	3.54	1.83	3.31	1.73	3.90	4.69
1	3.94	2.24	3.54	1.99	3.31	1.89	3.90	4.84
1-1/4	5.00	2.64	4.33	2.34	3.94	2.24	4.88	5.22
1-1/2	5.00	2.80	4.33	2.50	3.94	2.40	4.88	5.37
2	7.91	3.54	5.35	3.19	4.72	3.07	7.80	5.94
2-1/2	7.91	3.94	5.35	3.58	4.72	3.46	7.80	6.34
3	7.91	4.29	5.35	3.94	4.72	3.82	7.80	6.69

Figure 413 BRASS BODY BALL VALVE

FNW™

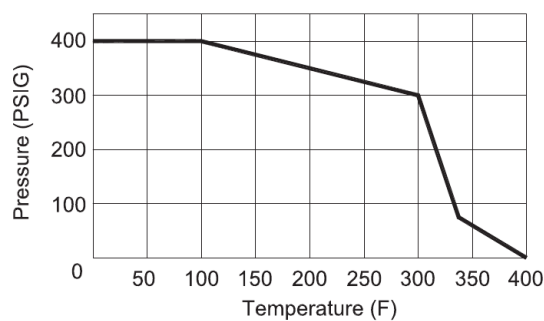
3-WAY 400 WOG DIVERTER

Features:

- 400 WOG
- 150 WSP
- L-Port Flow Pattern
- Threaded NPT Ends
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Actuator Mounting Pad

Standards:

- Design: MSS SP-110
- End Connections: ANSI B1.20.1



Cv & Weight

Size	Cv	Wt (Lbs)
1/4	36	0.42
3/8	38	0.43
1/2	53	0.64
3/4	74	0.97
1	99	1.87
1-1/4	116	2.26
1-1/2	149	3.53
2	188	5.47

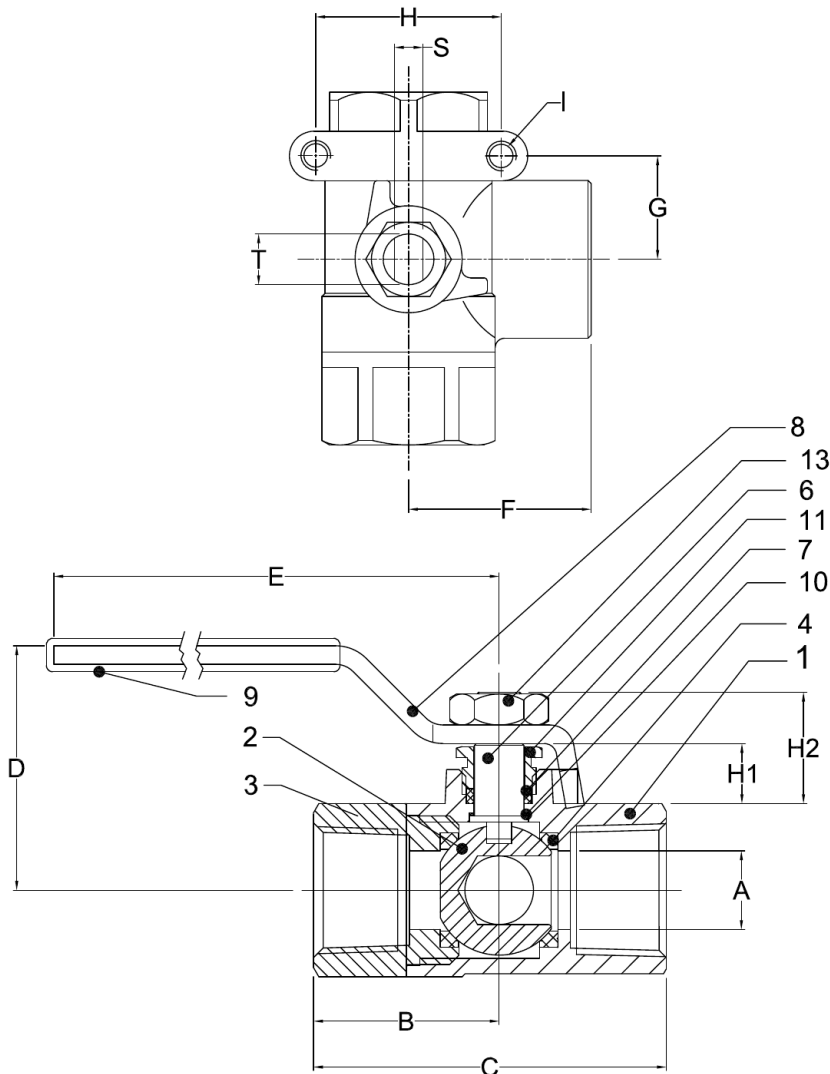
Torque

Size	Torque (in-lbs)
1/4	39
3/8	39
1/2	59
3/4	117
1	169
1-1/4	195
1-1/2	234
2	260

Figure Number Matrix

FNW 413 Size	
SIZE CODE	
1/4 = B	1 = G
3/8 = C	1-1/4 = H
1/2 = D	1-1/2 = J
3/4 = F	2 = K

3-WAY 400 WOG DIVERTER



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM B584 C89520	1
2	Ball	ASTM B124 C37700	1
3	End Cap	ASTM B124 C37700	1
4	Seat	RTFE	2
6	Stem	ASTM B16 C36000	1
7	Stem Packing	RTFE + CARBON FIBER	1
8	Handle	A36 CARBON STEEL (NICKEL PLATED)	1
9	Handle Cover	PLASTIC	1
10	Thrust Washer	RTFE	1
11	Gland Nut	ASTM B16 C36000	1
12	Handle Washer	A36 CARBON STEEL (ZINC PLATED)	1
13	Handle Nut	ASTM A283 SS41 (NICKEL PLATED)	1

90° L-PORT PATTERN

POSITION 1 MID-POSITION POSITION 2



FLOW PLAN A

Dimensions (inches or as indicated)

Size	A	B	C	D	E	F	G	H	H1	H2	I (UNC)	S	ØT (mm)
1/4	0.37	0.89	1.93	1.43	3.27	0.93	0.87	1.37	0.41	0.74	10-24	0.18	8
3/8	0.37	0.94	1.97	1.43	3.27	0.93	0.87	1.37	0.41	0.74	10-24	0.18	8
1/2	0.50	1.14	2.20	1.46	3.78	1.10	0.87	1.37	0.43	0.77	10-24	0.18	8
3/4	0.68	1.20	2.41	1.83	3.94	1.28	0.87	1.37	0.61	1.05	10-24	0.22	8.5
1	0.87	1.49	3.00	2.28	4.72	1.60	0.87	1.37	0.64	1.08	10-24	0.25	9.5
1-1/4	1.00	1.64	3.29	2.46	4.72	1.76	0.94	1.50	0.68	1.12	1/4-20	0.25	9.5
1-1/2	1.25	1.91	3.79	2.98	6.30	2.02	0.94	1.50	0.75	1.38	1/4-20	0.43	14
2	1.50	1.50	3.94	3.14	6.30	2.17	0.94	1.50	0.72	1.33	1/4-20	0.43	14

Figure 420 BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT 600 WOG

Features:

- Threaded Connection
- 600 WOG
- 150 WSP
- Full Port
- Threaded NPT Ends (ANSI B1.20.1)
- Forged Brass Body & EndCap
- 100% Electronically Tested in Open & Closed Position at 80 PSI
- Meets MSS SP-110 Standards
- NSF 61-8 Certified (to 2")
- FM, UL & CSA Approved (See Approval List Below)
- Blow-out Proof Stem
- Adjustable Packing
- Stocked Configurations:
 - Locking Handle (1/4"~2")
 - Stainless Steel Ball & Stem (Includes Locking Handle) (1/4"~2")
- Optional Lock Lever Kit (1/4"~4")
- Optional Stem Extension Kit (1/4"~4")
- Optional Tee Handle Kit (1/4"~1")
- Optional Oval Handle Kit (1/4"~2")
- Optional Memory Stop Kit (1/4"~2")
- Optional Stainless Handle (1/4"~2")



Accessories



Additional Stocked Configurations

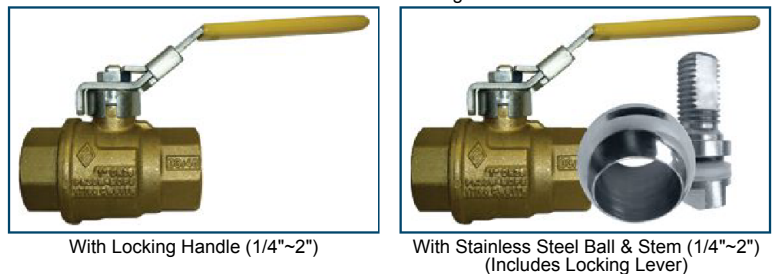


Figure Number Matrix

FNW 420 Configuration	Size
CONFIGURATION CODE	SIZE CODE
Standard Handle = Blank	1/4 = B 1-1/2 = J
Locking Handle = LL (1/4"~2")	3/8 = C 2 = K
SS Ball & Stem = SSLL w/Locking Handle (1/4"~2")	1/2 = D 2-1/2 = L
	3/4 = F 3 = M
	1 = G 4 = P
	1-1/4 = H

Kit Codes (Order Separately)

FNW 420 Kit	Size
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~1/2" = BD
Stem Extension = SE	3/4"~1" = FG
Tee Handle = THK	1-1/4"~1-1/2" = HJ
Oval Handle = OHK	2" = K
Memory Stop = MSK	2-1/2"~3" = LM
Stainless Handle = SSHK	4" = P

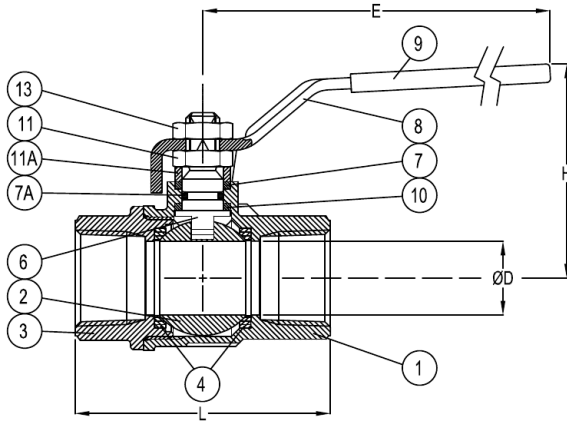


Gas Approvals

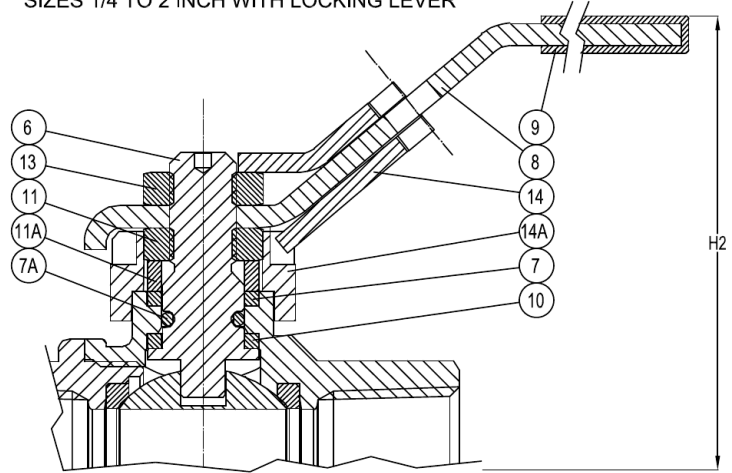
- CSA Class 3371-10, CGA 3.16, 125 PSIG, -40°F~149°F (1/4"~4")
- CSA Class 3371-88, ANSI Z21.15/CSA9.1, 1/2 PSIG, 32°F~188.6°F (1/2"~4")
- CSA Class 3371-90, ASME B16.33/b16.38, 125 PSIG, -40°F~149°F (1/4"~4")
- CSA Class 3371-92, ASME B16.44, 5 PSIG, -40°F~149°F (1/2"~2")
- CSA Class 3371-94, ASME B16.33, 125 PSIG, -40°F~149°F (1/2"~4")
- CSA Class 3371-97, UL-125, 250 PSIG, -40°F~130°F (1/4"~3/8")
- UL Class YRPV, ANSI/UL-842, 250 PSIG, -20°F~125°F (1/4"~4")
- UL Class YSDT, ANSI/UL-125, 250 PSIG, -40°F~130°F (1/4"~4")

2 PC FULL PORT 600 WOG

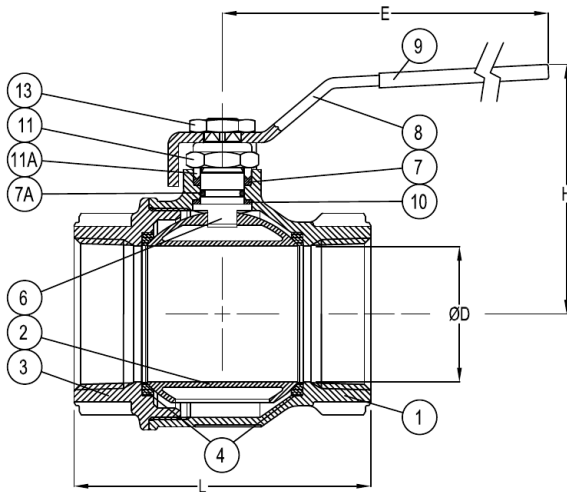
SIZES 1/4 TO 2 INCH



SIZES 1/4 TO 2 INCH WITH LOCKING LEVER



SIZES 2-1/2 TO 4 INCH



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164	1
7	Stem Packing	PTFE	1
7A	Stem O-ring	NBR 75 Shore A	1
8	Handle	Fe P 11 UNI 5867	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	Zinc Plated Steel 6S	1
11A	Packing Gland	Brass CW 614N UNI EN 12164	1
13	Handle Nut	Zinc Plated Steel 6S	1
14	Locking Pad	Fe P 11 UNI EN 10111	1
14A	Bushing	ZAMA G Zn A14 UNI EN1774	1

Dimensions (inches)

Size	ØD	E	L	H	H2
1/4	0.39	3.78	2.02	1.65	1.83
3/8	0.39	3.78	2.02	1.65	1.83
1/2	0.59	3.78	2.44	1.81	1.99
3/4	0.78	4.76	2.71	2.28	2.48
1	0.98	4.76	3.07	2.44	2.64
1-1/4	1.25	5.94	3.42	3.00	3.15
1-1/2	1.57	5.94	3.89	3.23	3.38
2	1.94	6.30	4.33	3.74	3.74
2-1/2	2.56	8.11	5.59	4.84	
3	3.15	8.11	6.45	5.23	
4	3.94	10.27	7.60	6.49	

Cv & Weights

Size	Cv	Wt. (Lbs)
1/4	6	0.3
3/8	7	0.3
1/2	19	0.5
3/4	34	0.7
1	50	1.1
1-1/4	104	2.0
1-1/2	268	3.1
2	309	4.2
2-1/2	629	8.0
3	1018	12.9
4	1622	22.0

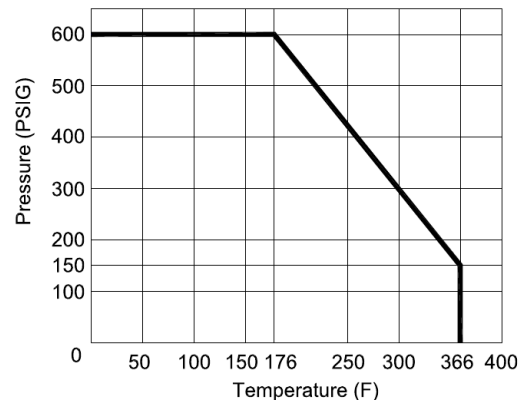


Figure 421 BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT 600 WOG w/SWEAT ENDS

Features:

- Sweat End Connections
- 600 WOG
- 150 WSP
- Full Port
- Sweat Ends (ANSI B16.18)
- Forged Brass Body & End Cap
- 100% Electronically Tested in Open & Closed Position at 80 PSI
- Meets MSS SP-110 Standards
- NSF 61-8 Certified (to 2")
- Blow-out Proof Stem
- Adjustable Packing
- Optional Lock Lever Kit (1/2"~4")
- Optional Stem Extension Kit (1/2"~4")
- Optional Tee Handle Kit (1/2"~1")
- Optional Oval Handle Kit (1/2"~2")
- Optional Memory Stop Kit (1/2"~2")
- Optional Stainless Handle (1/2"~2")



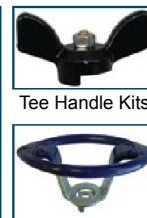
Accessories



Locking Handle Kits



Stem Extension Kits



Tee Handle Kits

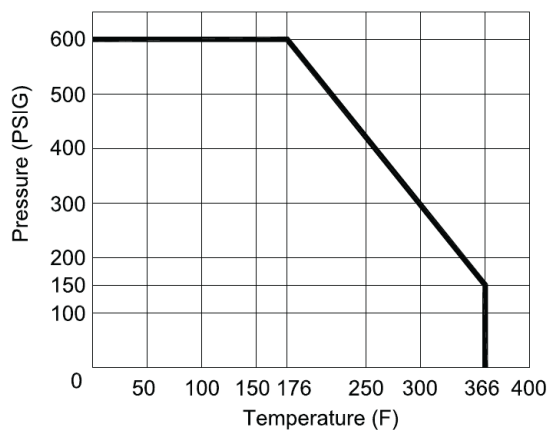
Oval Handle Kits



Memory Stops



Stainless Steel Handle



Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	19	0.5
3/4	34	0.7
1	50	1.1
1-1/4	103	2.0
1-1/2	266	3.1
2	307	4.2
2-1/2	624	8.0
3	1009	12.9
4	1607	22.0



Figure Number Matrix

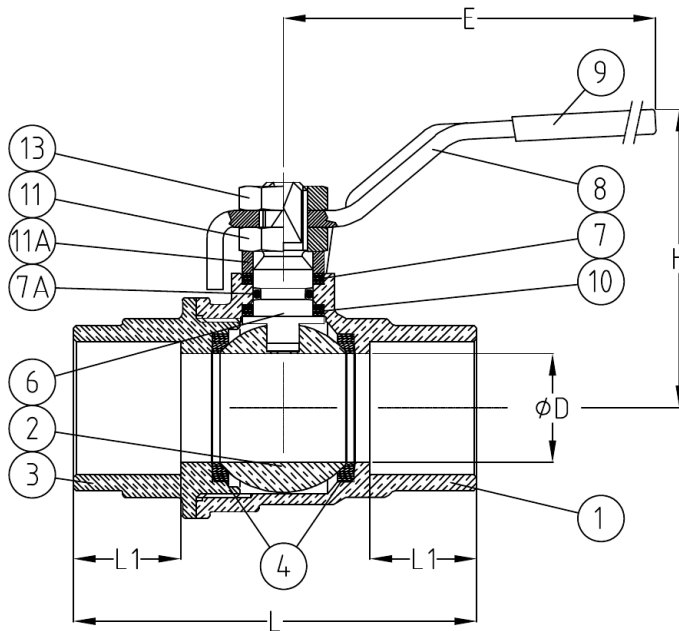
FNW 421 Size	
SIZE CODE	
1/2 = D	2 = K
3/4 = F	2-1/2 = L
1 = G	3 = M
1-1/4 = H	4 = P
1-1/2 = J	

Kit Codes (Order Separately)

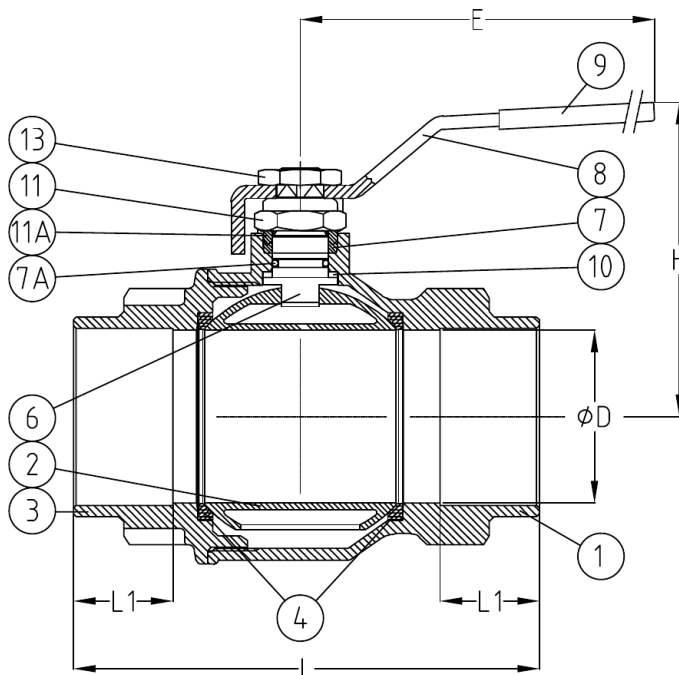
FNW 420 Kit Size	
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/2" = BD
Stem Extension = SE	3/4"~1" = FG
Tee Handle = THK	1-1/4"~1-1/2" = HJ
Oval Handle = OHK	2" = K
Memory Stop = MSK	2-1/2"~3" = LM
Stainless Handle = SSHK	4" = P

2 PC FULL PORT 600 WOG w/SWEAT ENDS

SIZES 1/2 TO 2 INCH



SIZES 2-1/2 TO 4 INCH



Dimensions (inches)

Size	ØD	E	L	L1	H
1/2	0.57	3.78	2.58	0.50	1.81
3/4	0.76	4.76	3.00	0.75	2.28
1	0.98	4.76	3.56	0.91	2.44
1-1/4	1.26	5.94	4.09	0.97	3.00
1-1/2	1.57	5.94	4.56	1.10	3.23
2	1.95	6.30	5.45	1.34	3.74
2-1/2	2.56	8.11	6.90	1.48	4.84
3	3.05	8.11	8.05	1.67	5.23
4	3.94	10.27	10.25	2.17	6.49

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164	1
7	Stem Packing	PTFE	1
7A	Stem O-ring	NBR 75 Shore A	1
8	Handle	ZP Steel Fe P 11 UNI 5867	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	Zinc Plated Steel 6S	1
11A	Packing Gland	Brass CW 614N UNI EN 12164	1
13	Handle Nut	Zinc Plated Steel 6S	1

Figure 426A, 427A, 428A BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT 600 WOG 3/4" HOSE CONNECTION BALL VALVE

Features:

- 3/4" Hose Connection by:
 - Female Pipe Thread (Fig. 426A)
 - Sweat End (Fig. 427A)
 - Male Pipe Thread (Fig. 428A)
- 600 WOG
- Full Port
- PTFE Seats
- Forged Brass Body & End Cap
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Includes Cap, Cap Gasket, and Chain
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit

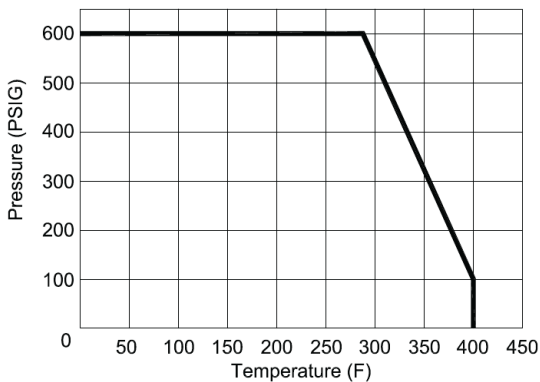


Figure 426A - FNPT



Figure 427A - SWEAT



Figure 428A - MNPT



Figure Number Matrix

FNW 4 2 End A Size	
END CONNECTION	SIZE CODE
FNPT = 6	1/2" = D
SWEAT = 7	3/4" = F
MNPT = 8	

Kit Codes (Order Separately)

FNW 410A Kit Size	
KIT TYPE	SIZE CODE
Replacement Handle = YLWH	1/2" = BD
Locking Lever = LHK	3/4" = FG
Stem Extension = SE	
Tee Handle = THK	
Oval Handle = OHK	
Memory Stop = MSK	

2 PC FULL PORT 600 WOG 3/4" HOSE CONNECTION BALL VALVE

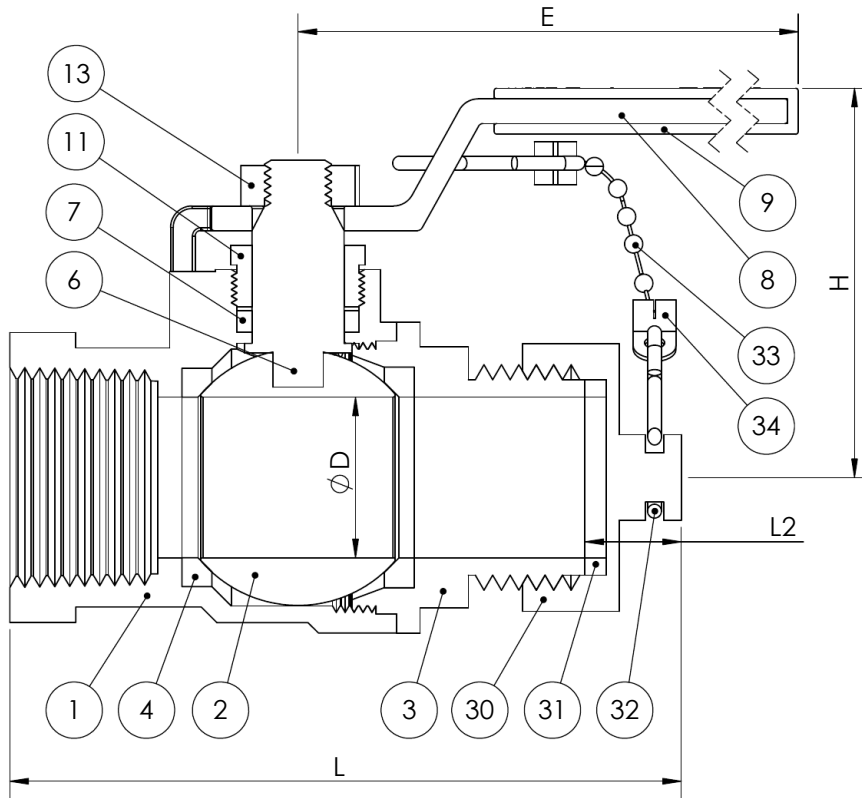


FIGURE 426A

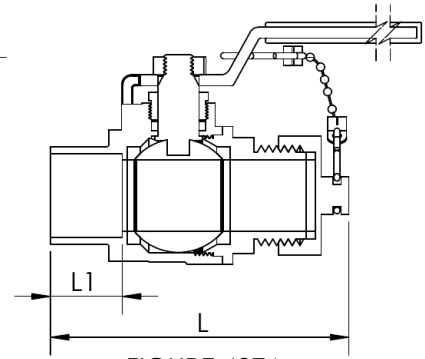


FIGURE 427A

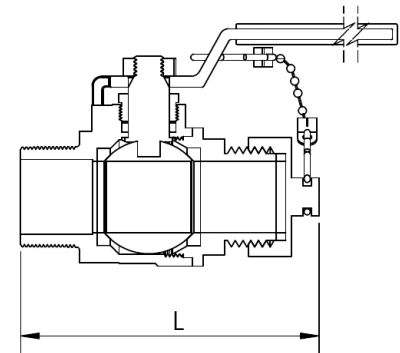


FIGURE 428A

Dimensions (inches) & Weights

Figure	Size	ØD	E	H	L	L1	L2	Wt. (Lbs)
426	1/2	0.50	2.95	1.50	2.83	0.50	0.44	0.52
	3/4	0.75	3.94	1.85	3.15	0.76	0.44	0.92
427	1/2	0.50	2.95	1.50	2.72	0.50	0.44	0.52
	3/4	0.75	3.94	1.85	3.27	0.76	0.44	0.92
428	1/2	0.50	2.95	1.50	2.87	0.50	0.44	0.52
	3/4	0.75	3.94	1.85	3.27	0.76	0.44	0.92

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM B124-C37700 Brass	1
2	Ball	ASTM B16-C36000 Brass (Nickel-Chrome Plated)	1
3	End Cap	ASTM B124-C37700 Brass	1
4	Seat	PTFE	2
6	Stem	ASTM B16-C36000 Brass	1
7	Stem Packing	PTFE	1
8	Handle	ASTM A283-D Steel (Zinc Plated)	1
9	Handle Sleeve	Vinyl	1
11	Packing Gland	ASTM B16-C36000 Brass	1
13	Handle Nut	AISI-1010 Steel (Zinc Plated)	1
30	Cap Nut	ASTM B124-C37700 Brass	1
31	Cap Nut Seal	NBR Rubber	1
32	Ring	ASTM S30400 Stainless	2
33	Chain	Brass (Plated)	1
34	Plate	ASTM S43000 Stainless	2

Figure 430 BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT WATER SERVICE VALVE w/PRESS ENDS

The FNW figure 430 press valve for water service is suggested for all applications where labor and time savings is a must. The figure 430 valve allows quick installation on copper pipelines meeting ASTM B88 standards. The structure of the valve, made in dezincification resistant brass, guarantees excellent corrosion resistance particularly in the connection areas of the pipeline.

Features:

- 200 PSI Max. Working Pressure
- 250°F Max. Temperature at Max. Pressure
- Full Port
- Press Ends
- Conforms to MSS SP-110 ¹
- NSF-61, FM, and UL Approved (up to 2")
- True 2-Piece Design
- No Soldered-In End Pieces
- Blow-out Proof Stem
- Adjustable Packing
- Secondary O-ring Stem Seal
- Forged Brass Body & End Cap
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Uses The Same Handle Accessories As The Figure 420 Ball Valve
- Sizes 1/2" to 4" ²
- 2-1/2" to 4" Available in XL ³ or XLC ⁴ End Connections

- ¹ The current specification SP-110-1996 does not address the new technology of press end connections. Other than this exception, the valve meets the design criteria of the specification.
- ² The FNW large body figure 430 press valves (2-1/2" to 4") are available in two distinct end types, XL and XLC which are for installation using crimp tools equipped with matching XL or XLC jaw sets.
- ³ 4" XL valves are for copper pipe or copper fittings only and should not be used on brass fittings or adapters.
- ⁴ All XLC valves are for copper pipe or copper XLC fittings only and should not be used on brass fittings or adapters.

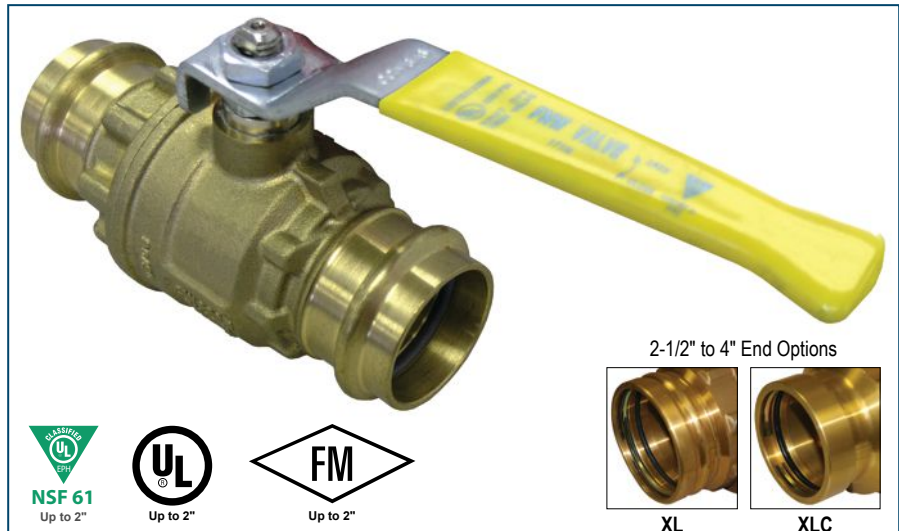


Figure Number Matrix

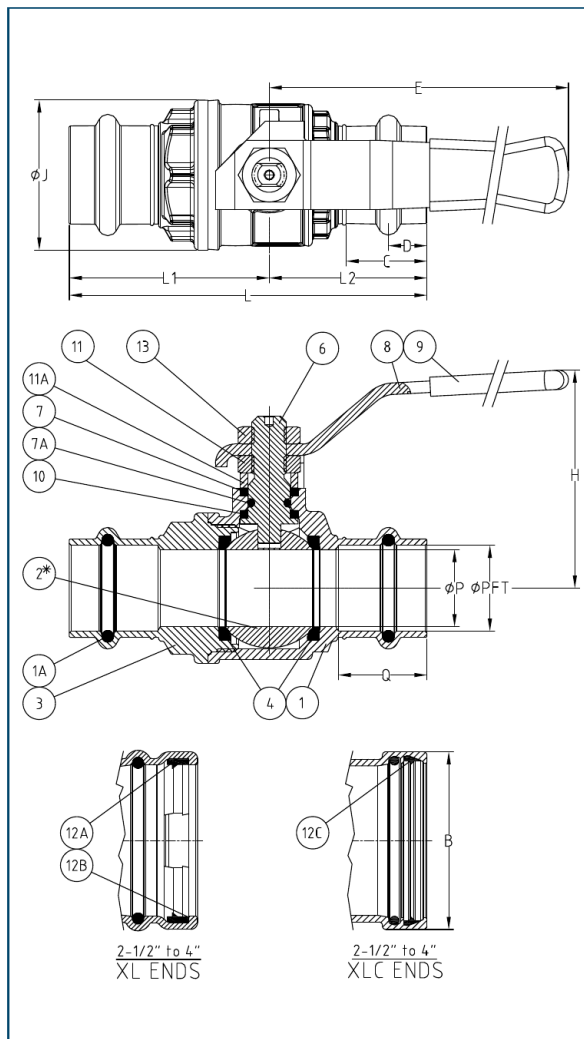
FNW 430				End	Size
CONFIGURATION CODE			SIZE CODE		
1/2" to 2" ONLY = Blank			1/2 = D	1-1/4 = H	2-1/2 = L
2-1/2" to 4" ONLY = XL			3/4 = F	1-1/2 = J	3 = M
2-1/2" to 4" ONLY = XLC			1 = G	2 = K	4 = P

Kit Codes (Order Separately)

FNW 420			Kit	Size
KIT TYPE		SIZE CODE		
Locking Handle = LHK		1/2" = BD		2" = K
Stem Extension = SE		3/4"~1" = FG		2-1/2"~3" = LM
Tee Handle = THK		1-1/4"~1-1/2" = HJ		4" = P
Oval Handle = OHK				
Memory Stop = MSK				
Stainless Handle = SSK				

2 PC FULL PORT WATER SERVICE VALVE w/PRESS ENDS

Standard Materials



Ref. No.	Description	Material	Qty
1	Body	Brass CW 602N UNI EN 12165	1
1A	O-ring	EPDM (EP851)	2
2*	Ball (1/2"-2")	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
	Ball (2-1/2"-4")	Brass CB 753-S UNI EN 1982 (Nickel-Chrome Plated)	
3	End Cap	Brass CW 602N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164	1
7	Stem Packing	PTFE	1
7A	Stem O-ring	NBR	1
8	Handle	Steel Fe DD11 UNI EN 10111	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	Steel, Class 4 ZP	1
11A	Packing Gland	Brass CW 614N UNI EN 12164	1
12A	Circlip	S235JR UNI EN 10025 (XL only)	2
12B	Backer Ring	Steel, Zinc Plated (XL only)	2
12C	Comp. Ring	Steel, Zinc Plated (XLC only)	2
13	Handle Nut	Steel, Class 4 ZP	1

* NOTE: Valve sizes 2-1/2" to 4" utilize a hollow ball

Standard Size Dimensions (Inches)

Size	E	H	ØJ	ØP	ØPFT	C	D	Q	L	L1	L2
1/2	3.86	1.89	1.30	0.59	0.63	0.67	0.31	0.71	3.13	1.71	1.42
3/4	4.80	2.28	1.54	0.79	0.88	0.83	0.39	0.91	3.66	2.05	1.61
1	4.80	2.44	1.93	0.98	1.13	0.83	0.39	0.94	4.13	2.32	1.81
1-1/4	6.02	3.07	2.32	1.26	1.38	0.83	0.39	1.02	4.41	2.44	1.97
1-1/2	6.02	3.35	2.87	1.57	1.63	1.02	0.49	1.42	5.63	2.91	2.72
2	6.38	3.80	3.39	1.95	2.13	1.18	0.57	1.57	6.48	3.39	3.09

Extended Size Dimensions (Inches)

Size	E	H	ØJ	ØP	ØPFT	XL Ends						XLC Ends				
						C	D	Q	L	L1	L2	ØB	Q	L	L1	L2
2-1/2	8.07	5.08	4.37	2.40	2.50	1.54	1.08	2.17	8.33	4.43	3.90	3.15	1.65	7.30	3.94	3.39
3	8.07	5.51	5.35	2.87	3.00	1.54	1.08	2.17	9.07	4.82	4.25	3.66	1.91	8.60	4.63	4.00
4	10.24	6.30	6.54	3.82	4.00	1.54	1.08	2.56	10.63	5.51	5.12	4.69	2.42	10.36	5.30	4.98

Cv & Weights

Size	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4
Cv	18	34	49	102	265	306	624	1001	1606
Wt. (Lbs)	0.49	0.86	1.23	2.34	3.48	4.61	-	-	-
	-	-	-	-	-	-	10.87	15.56	24.54
	-	-	-	-	-	-	9.04	14.55	22.99

Figure 435 BRASS BODY BALL VALVES

FNW™

2 PC FULL PORT GAS SERVICE VALVE w/PRESS ENDS

The FNW figure 435 press valve for gas service is suggested for all applications where labor and time savings is a must. The figure 435 valve allows quick installation on copper pipelines meeting ASTM B88 standards*. The structure of the valve, made in dezincification resistant brass, provides excellent corrosion resistance particularly in the connection areas of the pipeline.

* Note that the gas approvals covering this valve are for connection to copper pipe only.



Features:

- 125 PSI Max. Working Pressure for CSA Approval
- Full Port
- -4°F Minimum to 140°F Maximum Temperature at Maximum Pressure
- Press Ends
- Conforms to MSS SP-110 *
- CSA Certified for Gas Applications
- True 2-Piece Design
- No Soldered-In End Pieces
- Blow-out Proof Stem
- Adjustable Packing
- Secondary O-ring Stem Seal
- Forged Brass Body & End Cap
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Uses The Same Handle Accessories As The Figure 420 Ball Valve
- Sizes 1/2" to 2"

* The current specification SP-110-1996 does not address the new technology of press end connections. Other than this exception, the valve meets the design criteria of the specification.

It is recommended to use the valve in open/close applications, not mid or modulating services. In addition, the valve should be operated at least twice a year.



Figure Number Matrix

FNW 435 Size	
SIZE CODE	
1/2 = D	1-1/4 = H
3/4 = F	1-1/2 = J
1 = G	2 = K

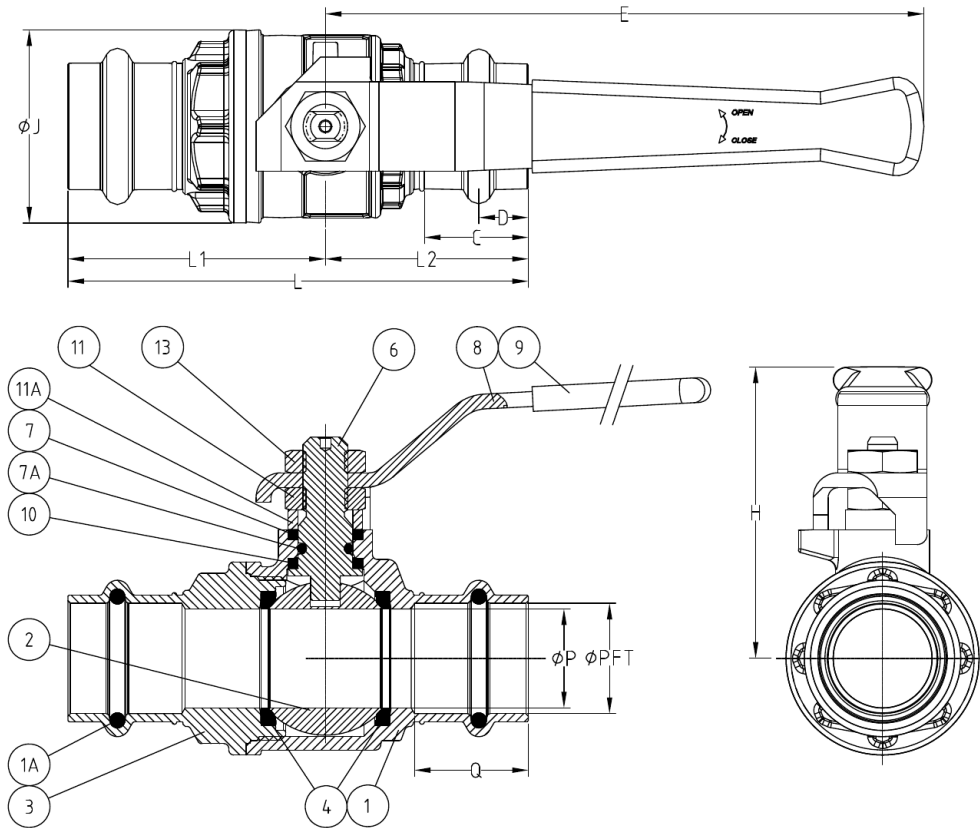
Cv & Weights

Size	Cv	Wt (Lbs)
1/2	18	0.49
3/4	34	0.82
1	49	1.25
1-1/4	102	1.98
1-1/2	265	3.40
2	306	4.50

Kit Codes (Order Separately)

FNW 420 Kit Size	
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/2" = BD
Stem Extension = SE	3/4"~1" = FG
Tee Handle = THK	1-1/4"~1-1/2" = HJ
Oval Handle = OHK	2" = K
Memory Stop = MSK	
Stainless Handle = SSHK	

2 PC FULL PORT GAS SERVICE VALVE w/PRESS ENDS



Standard Size Dimensions (Inches)

Size	E	H	ØJ	ØP	ØPFT	C	D	Q	L	L1	L2
1/2	3.86	1.89	1.30	0.59	0.63	0.67	0.31	0.71	3.13	1.71	1.42
3/4	4.80	2.28	1.54	0.79	0.88	0.83	0.39	0.91	3.66	2.05	1.61
1	4.80	2.44	1.93	0.98	1.13	0.83	0.39	0.94	4.13	2.32	1.81
1-1/4	6.02	3.07	2.32	1.26	1.38	0.83	0.39	1.02	4.41	2.44	1.97
1-1/2	6.02	3.35	2.87	1.57	1.63	1.02	0.49	1.42	5.63	2.91	2.72
2	6.38	3.80	3.39	1.95	2.13	1.20	0.59	1.57	6.52	3.41	3.11

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 602N UNI EN 12165	1
1A	O-ring	Rubber NBR	2
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 602N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164 NP	1
7	Stem Packing	PTFE	1
7A	Stem O-ring	NBR	1
8	Handle	Steel Fe DD11 UNI EN 10111 ZP	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	2
11	Gland Nut	Steel, Class 4 ZP	1
11A	Packing Gland	Brass CW 614N UNI EN 12164 NP	1
13	Handle Nut	Steel, Class 4 ZP	1

Figure 440 BRASS BODY BALL VALVES



2 PC FULL PORT 600 WOG w/ ISO MOUNTING PAD

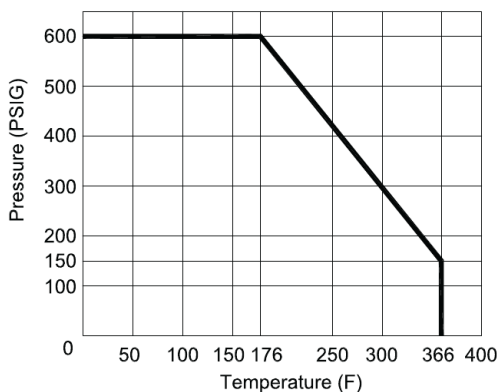
Features:

- 600 WOG
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Double Viton® O-ring Stem Seal with Additional PTFE Seal
- Threaded NPT Ends
- Forged Brass Body & End Cap
- O-ring Backed Seats for Reduced Operating Torque
- Mounting Pad for Direct Mount Actuation
- 100% Electronically Tested in Open & Closed Position at 80 PSI
- Sizes 1/4" to 4"

Standards:

- Design: MSS SP-110*
- End Connections: ANSI B1.20.1
- Seat/Shell Test: MSS SP-110
- Mounting Pad: ISO 5211

* The specification MSS SP-110 addresses valves design with handles. The 440 does not include a handle. Other than this exception, the valve meets the design criteria of the specification.



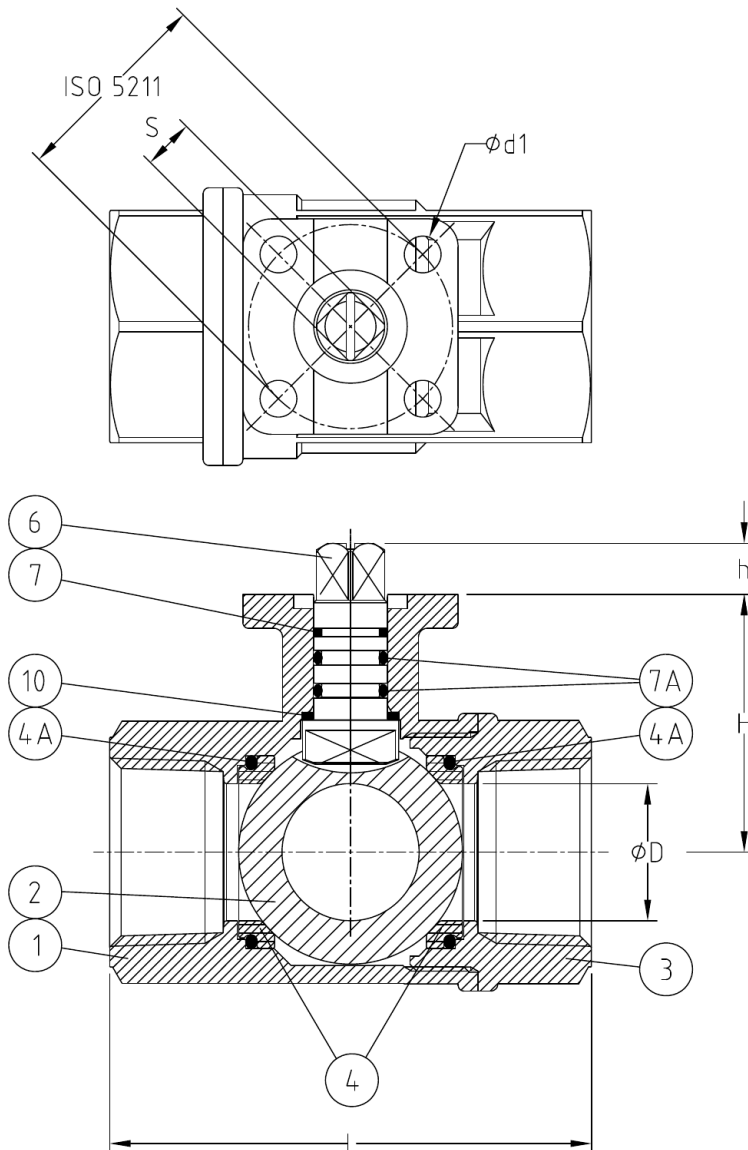
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	6	52	0.8
3/8	7	52	0.8
1/2	19	52	1.0
3/4	19	52	1.0
1	34	52	1.6
1-1/4	50	52	2.2
1-1/2	268	154	4.3
2	309	154	5.6
2-1/2	629	267	8.8
3	944	267	13.3
4	1493	658	21.5

Figure Number Matrix

FNW 440 Size	
SIZE CODE	
1/4 = B	1-1/2 = J
3/8 = C	2 = K
1/2 = D	2-1/2 = L
3/4 = F	3 = M
1 = G	4 = P
1-1/4 = H	

2 PC FULL PORT 600 WOG w/ ISO MOUNTING PAD



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	1
4	Seat	PTFE	2
4A	Seat Backing O-ring	Viton®	2
6	Stem	Brass CW 614N UNI EN 12164	1
7	Stem Seal	PTFE	1
7A	Stem O-ring	Viton®	2
10	Thrust Washer	PTFE	1

Dimensions (inches)

SIZE	ØD	L	H	h	S	ISO 5211	Ød1
1/4	0.39	2.64	1.28	0.35	0.354	1.42/F03	0.24
3/8	0.39	2.64	1.28	0.35	0.354	1.42/F03	0.24
1/2	0.56	2.64	1.28	0.35	0.354	1.42/F03	0.24
3/4	0.75	3.00	1.36	0.35	0.354	1.42/F03	0.24
1	0.95	3.35	1.79	0.35	0.354	1.42/F03	0.24
1-1/4	1.18	3.66	1.93	0.35	0.354	1.42/F03	0.24
1-1/2	1.49	4.13	2.52	0.43	0.433	1.97/F05	0.27
2	1.97	4.80	2.88	0.43	0.433	1.97/F05	0.27
2-1/2	2.52	6.10	3.48	0.59	0.551	2.76/F07	0.35
3	3.00	6.89	3.85	0.59	0.551	2.76/F07	0.35
4	3.74	8.03	4.59	0.69	0.669	2.76/F07	0.35

Figure 455 & 465 BRASS BODY BALL VALVES

FNW™

3-WAY DIVERTING 400 WOG w/ ISO PAD

Features:

- 400 WOG
- 100 PSI WSP
- T-Port 90° & 180° Flow Path (Fig. 455)
- L-Port 90° Flow Path (Fig. 465)
- Blow-out Proof Stem
- Double Viton® O-ring Stem Seal with Additional PTFE Seal
- Threaded NPT Ends (Per ANSI B1.20.1)
- Forged Brass Body & End Cap
- Four Seat Design
- O-ring Backed Seats for Reduced Operating Torque
- Mounting Pad for Direct Mount Actuation (Per ISO 5211)
- 100% Electronically Tested in Open & Closed Position at 80 PSI
- Handle Kit Included
- Sizes 1/4" to 2"

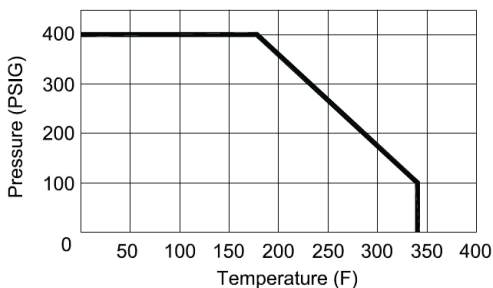


Figure Number Matrix

FNW 4 5 5 Size		
PORT TYPE	SIZE CODE	
T-PORT = 5	1/4 = B	1 = G
L-PORT = 6	3/8 = C	1-1/4 = H
	1/2 = D	1-1/2 = J
	3/4 = F	2 = K



90° L-PORT PATTERNS

FLOW PLAN A



90° T-PORT PATTERNS

FLOW PLAN D



FLOW PLAN E



FLOW PLAN F



FLOW PLAN G



180° T-PORT PATTERNS

FLOW PLAN H



FLOW PLAN I



FLOW PLAN J

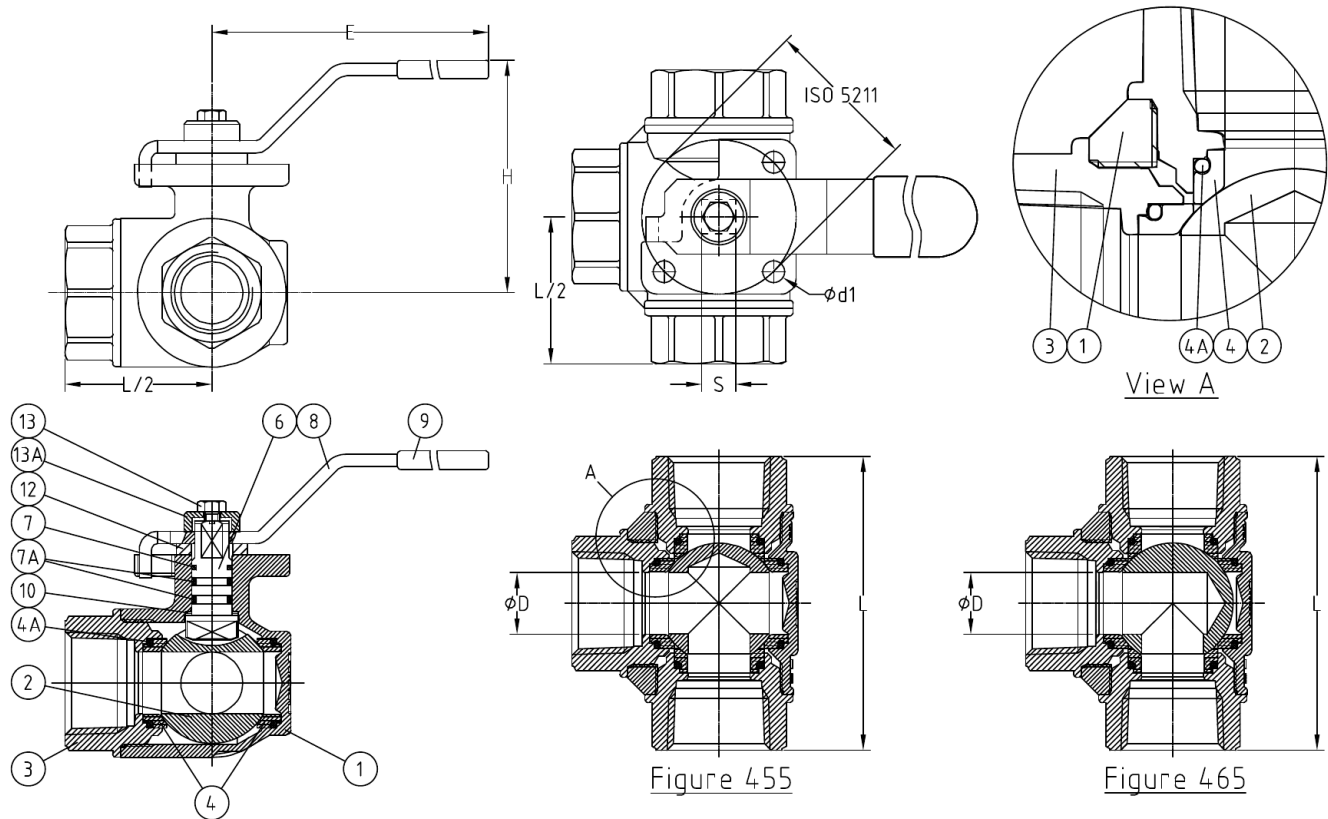


FLOW PLAN K



When requesting 3-way valves with actuation or limit switches from FNW, indicate which flow plan is desired by its associated letter.

3-WAY DIVERTING 400 WOG w/ ISO PAD



Dimensions, Cv, Torque & Weight

Size	Dimensions (inches)						Cv		Torque (in-lbs)	Wt (lbs)
	ØD	L	H	S	ISO 5211	Ød1	455	465		
1/4	0.39	2.64	2.44	0.354	1.42/F03	0.23	3.50	3.26	54	1.3
3/8	0.43	2.64	2.44	0.354	1.42/F03	0.23	4.08	3.50	54	1.2
1/2	0.43	2.87	2.44	0.354	1.42/F03	0.23	5.02	4.20	54	1.3
3/4	0.59	3.19	2.52	0.354	1.42/F03	0.23	7.70	7.00	54	1.5
1	0.79	3.74	2.95	0.433	1.97/F05	0.27	14.24	12.83	151	2.7
1-1/4	0.98	4.39	3.17	0.433	1.97/F05	0.27	19.72	18.67	151	4.2
1-1/2	1.26	4.86	3.66	0.433	1.97/F05	0.27	30.69	29.75	260	6.1
2	1.57	5.73	4.43	0.551	2.76/F07	0.35	44.58	43.76	285	9.1

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	3
4	Seat	PTFE	4
4A	Seat Backing O-ring	Viton®	4
6	Stem	Brass CW 614N UNI EN 12164	1
7	Stem Seal	PTFE	1
7A	Stem O-ring	Viton®	2
8	Handle	Steel DD11 UNI EN 10111	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
12	Handle Washer	Nylon	1
13	Handle Screw	Steel	1
13A	Handle Bushing	Brass CW 614N UNI EN 12164	1

Figure 470 & 475 BRASS BODY BALL VALVES



2 PC FULL PORT 400 WOG PUMP ISOLATION VALVE

The FNW figure 470 (NPT connection) and 475 (Sweat end connection) pump isolation valve decreases installation time and the number of possible leak paths by its integral pump flange connection. Pump isolation valves make pump servicing easier by isolating the pump and providing ease of disconnect for pump removal.

Features:

- 400 WOG
- Full Port
- Flanged Pump Connection by:
 - Threaded End (Fig.470)
 - Sweat End (Fig. 495)
- Solid Integral Pump-Side Flange
- Blow-out Proof Stem
- Adjustable Packing
- Forged Brass Body & End Cap
- Includes T-handle, Gasket and Hardware



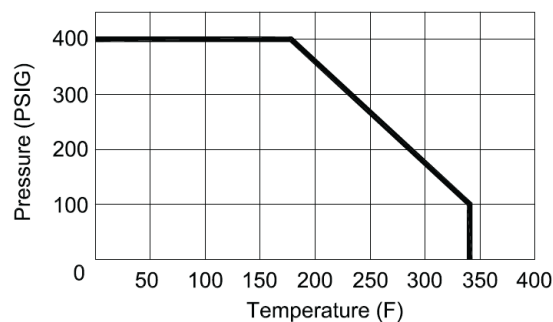
Figure 470 - Threaded End



Figure 475 - Sweat End



T-Handle, Gasket, & Hardware Included



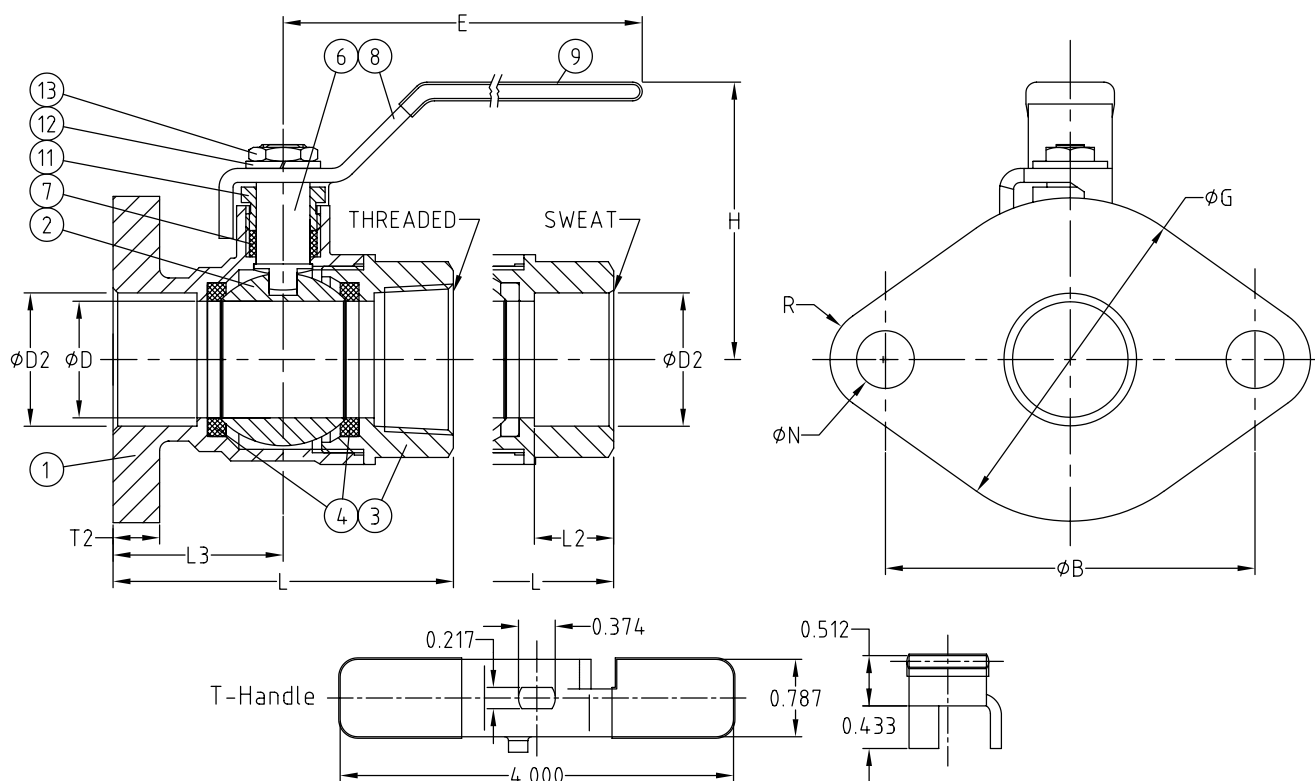
Weight (lbs)

Size	490	495
3/4	1.72	1.71
1	1.82	1.77
1-1/4	2.08	2.08
1-1/2	2.60	2.66

Figure Number Matrix

FNW 4 7 0 Size	
END TYPE	SIZE CODE
FNPT = 0	3/4 = F
Sweat Ends = 5	1 = G
	1-1/4 = H
	1-1/2 = J

2 PC FULL PORT 400 WOG PUMP ISOLATION VALVE



Dimensions (inches)

Size	ØB	ØD	ØD2	Threaded Dimensions	E	ØG	H	L		L1	L2	L3	ØN	R	T2
								470	475						
3/4	3.15	0.748	0.878	3/4" - 14 NPT	4.331	2.756	2.382	2.421	2.618	1.22	0.75	1.22	0.492	0.453	0.394
1	3.15	0.984	1.126	1" - 11-1/2 NPT	4.331	2.756	2.559	2.815	3.071	1.378	0.87	1.38	0.492	0.453	0.394
1-1/4	3.15	1.142	1.378	1-1/4" - 11-1/2 NPT	4.331	2.756	2.717	3.09	3.543	1.535	1.10	1.54	0.492	0.453	0.394
1-1/2	3.15	1.457	1.628	1-1/2" - 11-1/2 NPT	4.331	2.756	2.913	3.465	3.917	1.732	1.10	1.73	0.492	0.453	0.394

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass - C37700	1
2	Ball	Brass - C37700	1
3	End Cap	Brass - C37700	1
4	Seat	PTFE	2
6	Stem	Brass - C36000	1
7	Stem Packing	PTFE	1
8	Handle	Steel - AISI-1010	1
9	Handle Cover	Plastic	1

Ref. No.	Description	Material	Qty	Remarks
11	Gland Nut	Brass - C36000	1	
12	Handle Washer	ASTM G1566	1	
13	Handle Nut	Steel - AISI-1010	1	
14	Flange Bolt	Steel - AISI-1010	2	Not shown
15	Flange Nut	Steel - AISI-1010	2	Not shown
16	Flange Gasket	Rubber - NBR	1	Not shown
17	T-Handle	Steel - AISI-1010	1	

Figure 480A BRASS BODY BALL VALVES

FNW™

2 PC STANDARD PORT 400 WOG BALL VALVE w/COMPRESSION ENDS & DRAIN

Features:

- 400 WOG
- 150 WSP (to 366°F)
- Compression Ends
- Standard Port
- PTFE Seats
- NSF 61-8 Certified
- Forged Body & End Cap
- Blow-out Proof Stem
- Adjustable Packing
- Drain with Cap & Gasket
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit



With a body and end cap constructed of forged brass and bronze compression nuts, the FNW figure 480A ball valve can be used for liquids in many residential, commercial, and industrial applications and includes saturated steam service to 150 PSI (366°F). The compression ends reduce installation time and eliminate possible seat damage compared to solder end valves. They are equally easy to un-install for repair or replacement purposes.

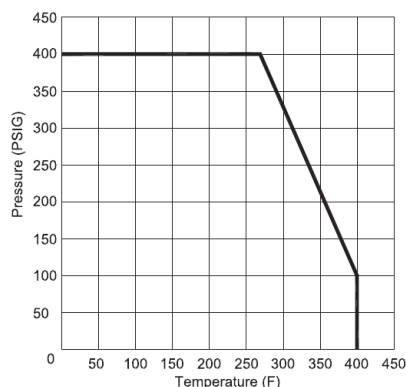


Figure Number Matrix

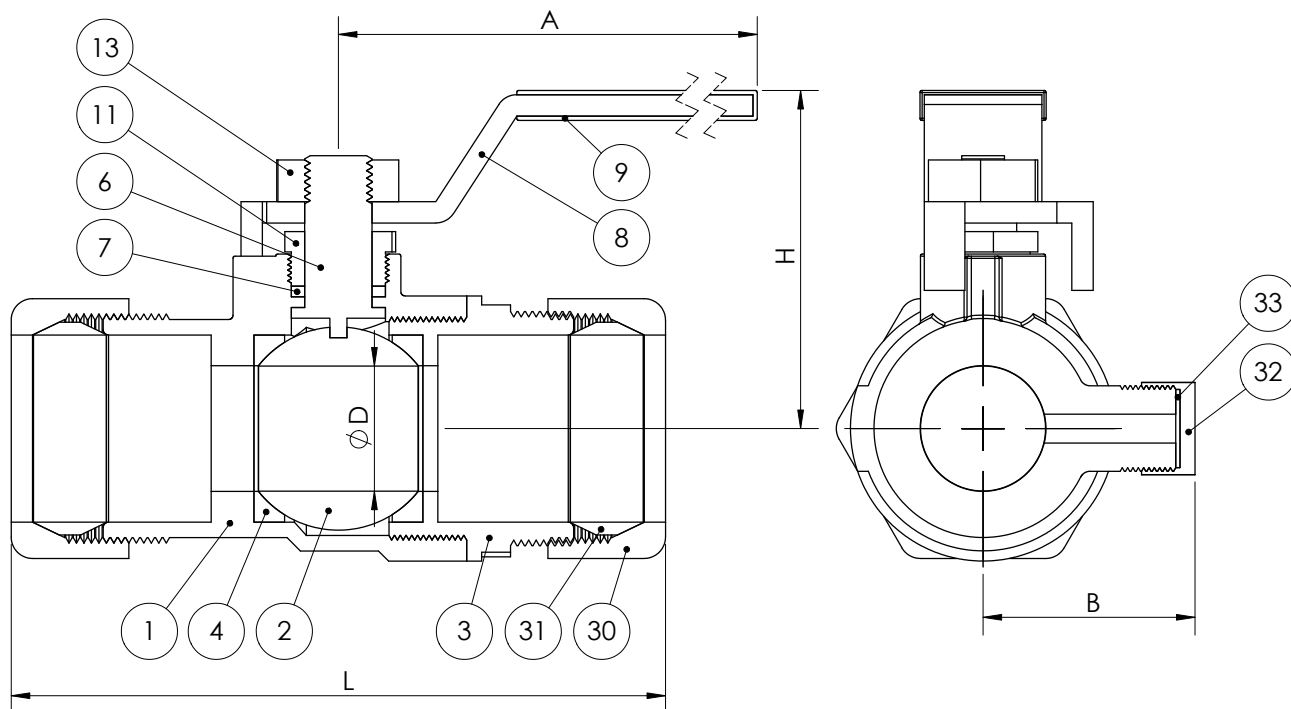
FNW	480A	Size
		SIZE CODE
		1/2 = D
		3/4 = F
		1 = G

Kit Codes (Order Separately)

FNW	410A	Kit	Size
		KIT TYPE	SIZE CODE
		Replacement Handle = YLWH	1/2" & 3/4" = BD*
		Locking Lever = LHK	1" = FG
		Stem Extension = SE	
		Tee Handle = THK	
		Oval Handle = OHK	
		Memory Stop = MSK	

* NOTE: Size code "BD" includes the 3/4" valve because the figure 480A is a standard port configuration.

2 PC STANDARD PORT 400 WOG BALL VALVE w/COMPRESSION ENDS & DRAIN



Dimensions (inches)

SIZE	ØD	L	H	A	B	Wt. (Lbs)
1/2	0.39	2.76	1.46	2.95	0.83	0.47
3/4	0.59	2.99	1.57	2.95	0.98	0.65
1	0.75	3.62	1.85	3.94	1.10	1.19

Cv & Weights

SIZE	Cv	Wt. (Lbs)
1/2	8	0.47
3/4	20	0.65
1	26	1.19

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM B124-C37700 Brass	1
2	Ball	ASTM B16-C36000 Brass (Chrome Plated)	1
3	End Cap	ASTM B124-C37700 Brass	1
4	Seat	PTFE	2
6	Stem	ASTM B16-C36000 Brass	1
7	Stem Packing	PTFE	1
8	Handle	ASTM A283-D Steel (Zinc Plated)"	1
9	Handle Sleeve	Vinyl	1
11	Packing Gland	ASTM B16-C36000 Brass	1
13	Handle Nut	AISI-1010 Steel (Zinc Plated)	1
30	Compression Nut	ASTM B548-C85700 Bronze	2
31	Compression Ring	ASTM B135-C26000 Brass	2
32	Drain Cap	ASTM S30400 Stainless	1
33	Drain Cap Seal	ASTM B16-C36000 Brass	1

Figure 485 BRASS BODY BALL VALVES

FNW™

FULL PORT PUSH-FIT VALVE FOR WATER OR AIR

Features:

- 200 PSI Max. Working Pressure (Non-Shock Water or Air)
- Push-Fit Ends
- For Copper, CPVC, and PEX* Pipe
- Full Port
- Solid Ball
- NSF 61-8 Approved
- Temperature Range: 33°F to 180°F (0.6°C to 82.2°C)
- Blow-out Proof Stem
- Adjustable Packing
- Includes Removal Tool



* Not for use with PEX-AL-PEX or PEX tubing with an oxygen barrier.

The FNW 485 Push-Fit ball valve saves valuable installation time. Its ability to connect to multiple pipe types reduces inventory levels by decreasing the number of different valves and fittings that would normally need to be stocked. Whether it's copper, CPVC, or PEX*, the 485 provides for an easy install. The push-fit valve connection is also just as easily removed using the tool provided with every valve.



Removal Tool Included



Weights

Size	Wt. (Lbs)
1/2	0.55
3/4	0.95
1	1.47

Figure Number Matrix

FNW 485 Size

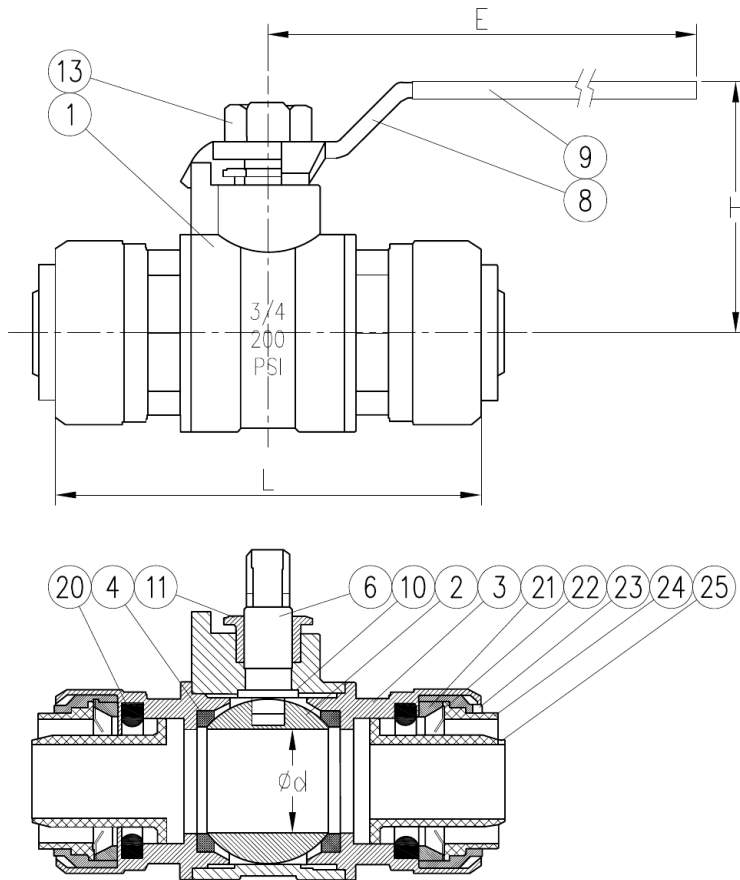
SIZE CODES

1/2 = D

3/4 = F

1 = G

FULL PORT PUSH-FIT VALVE FOR WATER OR AIR



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM B124 C37700	1
2	Ball	ASTM B124 C37700 CHROME PLATED	1
3	End Cap	ASTM B124 C37700	2
4	Seat	PTFE	2
6	Stem	ASTM B16 C36000	1
7	Stem Packing	PTFE	1 Set
8	Handle	Carbon Steel	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	ASTM B16 C36000	1
13	Handle Nut	SS41	1
20	O-ring	EPDM	2
21	Washer	POM	2
22	Snap Ring	SS301	2
23	Shield	POM	2
24	Guide	POM	2
25	Sustain Sheath	POM	2

Dimensions (inches)

Size	Ød	E	H	L
1/2	0.50	3.23	1.46	2.61
3/4	0.75	3.94	1.79	3.06
1	0.98	4.72	2.27	3.66

Flow Capacity

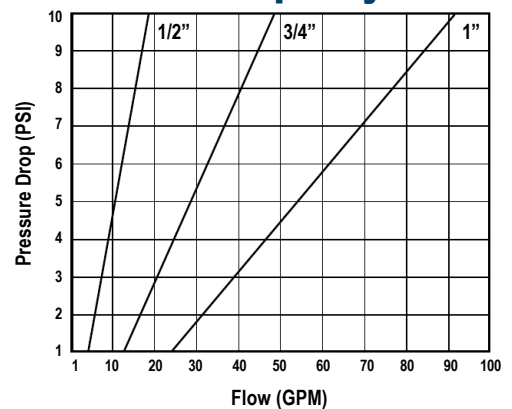


Figure 490 & 495 BRASS BODY BALL VALVES



2 PC FULL PORT 600 WOG BALL VALVE PUMP ISOLATION w/ROTATING FLANGE

Features:

- 600 WOG
- Full Port
- PTFE Seats
- Non-removable Rotating Flange
- Secondary O-ring Stem Seal
- Blow-out Proof Stem
- Adjustable Packing
- Stocked Configurations:
 - Fig. 490 - NPT End (3/4" TO 1-1/2")
 - Fig. 490D - NPT End w/Drain (3/4" TO 1-1/4")
 - Fig. 495 - Sweat End (3/4" TO 1-1/2")
 - Fig. 495D - Sweat End w/Drain (3/4" TO 1-1/4")
- Drain Features:
 - Dual O-ring Stem Seal
 - Slotted Stem Operation (Reduces Accidental Openings)
 - Knurled Brass Cap
 - Resilient Cap Gasket
 - Cap Retainer Strap
- Each Valve Includes:
 - Optional Tee Handle (except 1-1/2")
 - Resilient Flange Gasket
 - Flange Nuts & Bolts

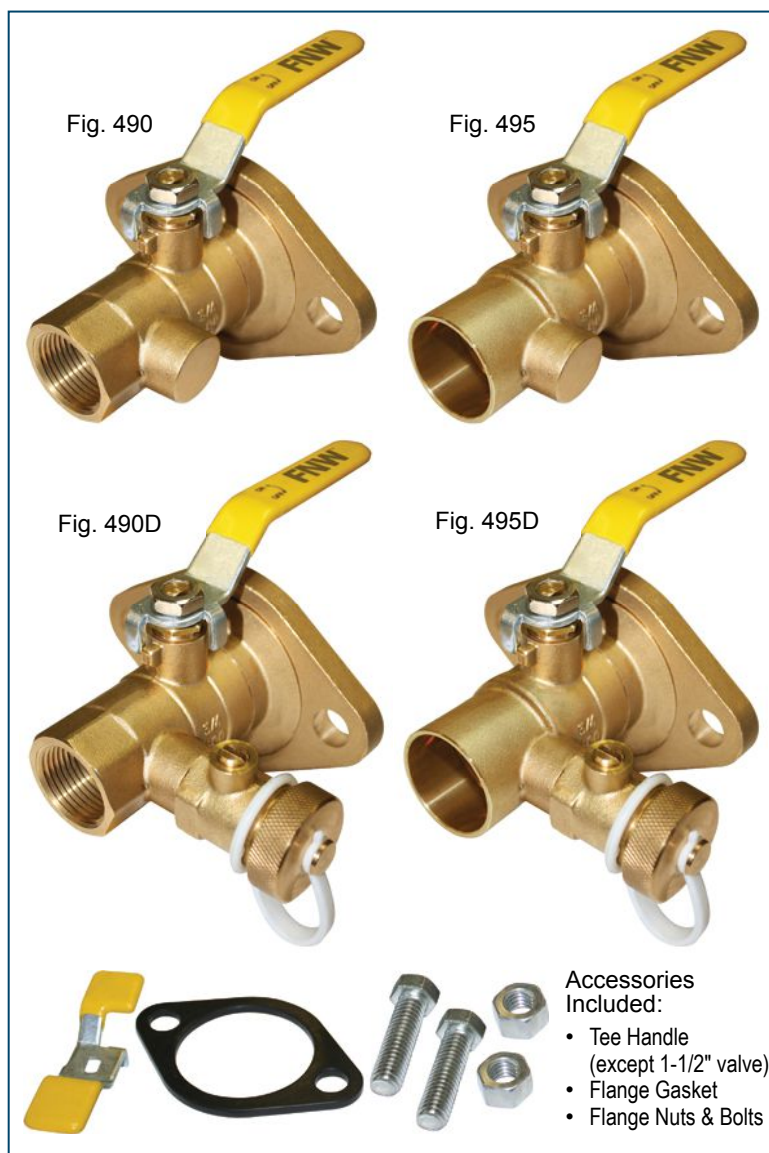
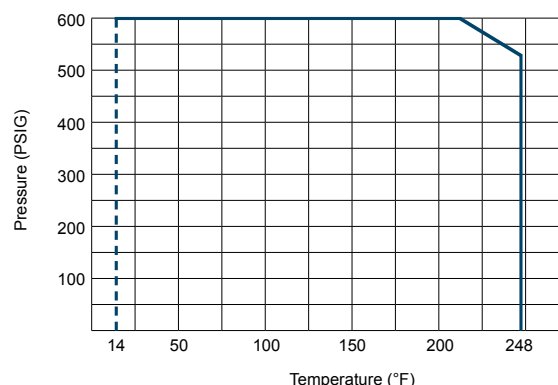


Figure Number Matrix

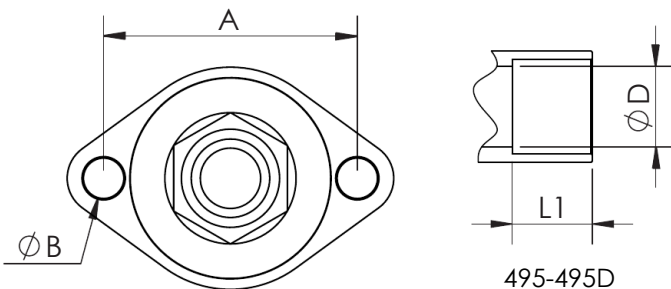
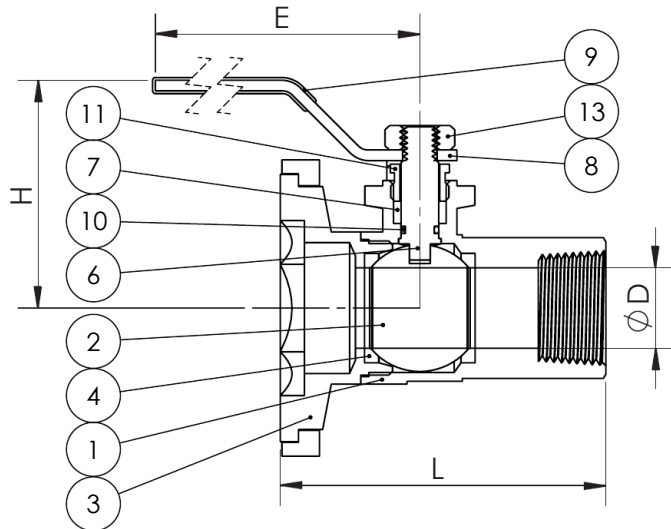
FNW 490 D Size		
END	CONFIGURATION	SIZE CODE
NPT = 490	Standard Valve = Blank	3/4 = F
Sweat = 495	With Drain = D	1 = G
		1-1/4 = H
		1-1/2 = J

Weight (lbs)

Size	490	490D	495	495D
3/4	1.47	1.66	1.40	1.57
1	1.89	2.06	1.73	1.92
1-1/4	2.41	2.59	2.17	2.37
1-1/2	3.00		2.82	

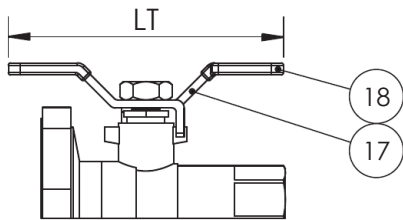


2 PC FULL PORT 600 WOG BALL VALVE PUMP ISOLATION w/ROTATING FLANGE



FLANGE VIEW

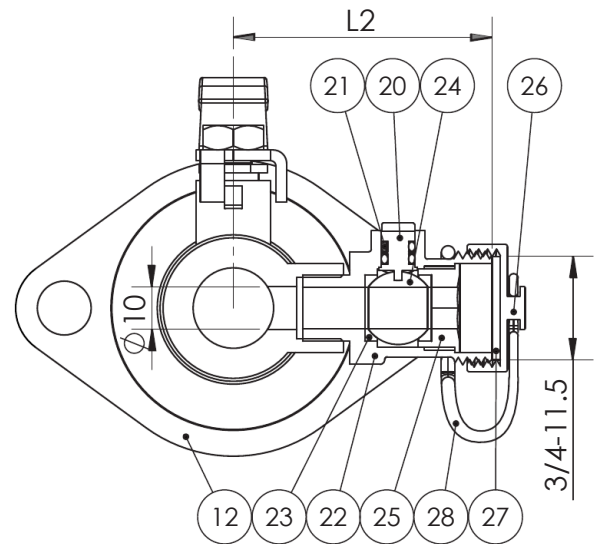
495-495D
SWEAT END
CONNECTION



TEE HANDLE (3/4" to 1-1/4" only)

Dimensions (inches)

SIZE	ØD	L		E	LT	L1 Sweat	L2 Drain	H	A	ØB
		NPT	Sweat							
3/4	0.75	3.03	3.13	3.62	3.43	0.75	2.52	2.11	3.13	0.50
1	0.96	3.39	3.50	4.33	3.50	0.91	2.66	2.46	3.13	0.50
1-1/4	1.18	3.66	3.86	5.41	3.62	0.96	2.80	3.05	3.13	0.50
1-1/2	1.46	4.27	4.65	5.41		1.10		3.15	3.13	0.50



490D-495D (WITH DRAIN)

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	HPb59-3 Brass	1	
2	Ball	HPb58-3 Brass	1	Chrome Pltd
3	Endcap	HPb59-3 Brass	1	
4	Seat	PTFE	2	
6	Stem	HPb58-3 Brass	1	
7	Packing	PTFE	1	
8	Handle	Steel	1	Zinc Plated
9	Handle Sleeve	Vinyl	1	
10	Stem O-ring	EPDM	1	
11	Packing Gland Nut	HPb58-3 Brass	1	
12	Flange	HPb59-3 Brass	1	
13	Handle Nut	Steel	1	Zinc Plated
14	Flange Bolt	Q235 Steel, ZP	2	Not Shown
15	Flange Nut	Q235 Steel, ZP	2	Not Shown
16	Flange Gasket	NBR	1	Not Shown
17	Tee Handle	Steel, Zinc Plated	1	Except 1-1/2"
18	Tee Handle Sleeve	Vinyl	1	Except 1-1/2"
20	Drain Stem	HPb58-3 Brass	1	With Drain
21	Drain Stem O-ring	EPDM	2	With Drain
22	Drain Body	HPb59-3 Brass	1	With Drain
23	Drain Seats	PTFE	2	With Drain
24	Drain Ball	HPb58-3 Brass	1	With Drain
25	Drain Carrier	HPb59-3 Brass	1	With Drain
26	Drain Cap	HPb58-3 Brass	1	With Drain
27	Drain Cap Gasket	EPDM	1	With Drain
28	Drain Cap Retainer	Plastic	1	With Drain

Figure X410B BRASS BODY BALL VALVES



LOW LEAD COMPLIANT 2 PC 600 WOG GAS APPROVED BALL VALVE

Features:

- 600 WOG
- 150 WSP
- Full Port
- NSF 61 Annex G Approved
- CSA Approved
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Threaded NPT Ends Per ANSI B 1.20.1



NSF 61 ANNEX G



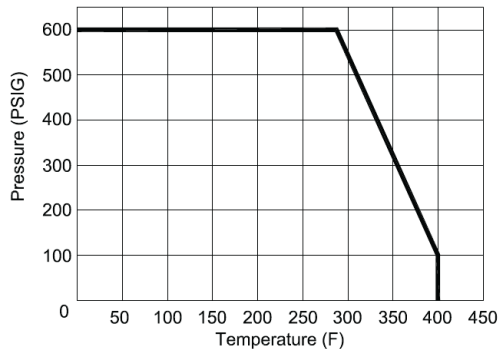
Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.
Source: California Health and Safety Code (116875).



Gas Approvals

- CSA Class 3371-08, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F - 125°F
- CSA Class 3371-10, CGA 3.16, 125 PSIG, -40°F - 149°F
- CSA Class 3371-12, CGA CR91-002, 2-5 PSIG, -40°F - 125°F
- CSA Class 3371-88, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F - 125°F
- CSA Class 3371-92, ASME B16.44, 5 PSIG, -40°F - 125°F
- CSA Class 3371-94, ASME B16.33, 125 PSIG, -20°F - 150°F



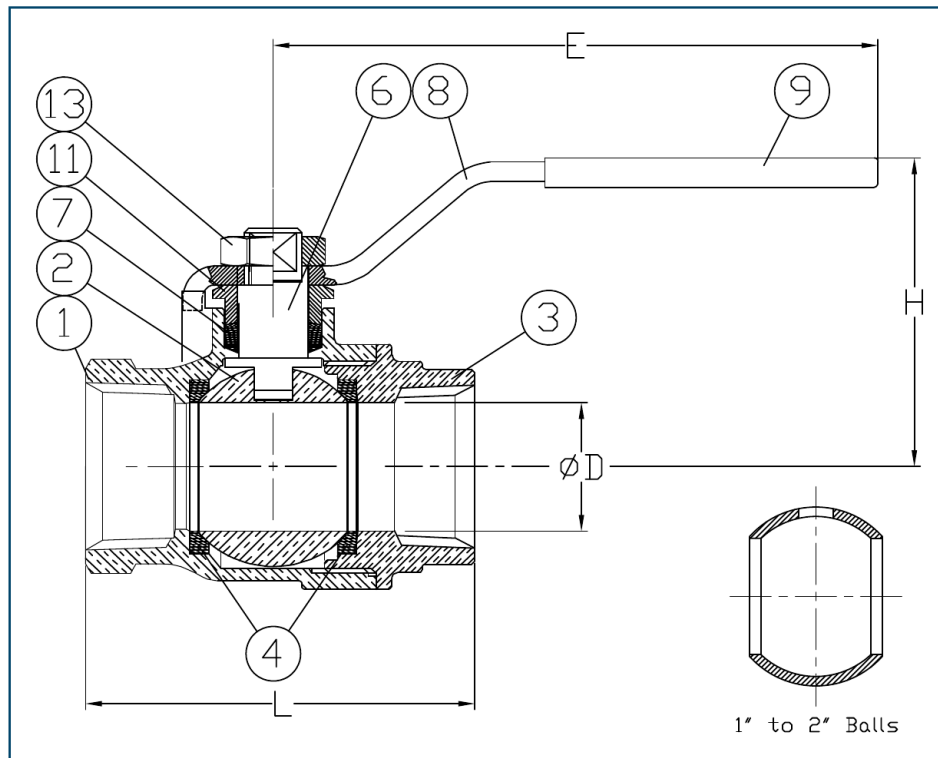
Weights

Size	Wt. (Lbs)
1/2	0.40
3/4	0.79
1	1.19
1-1/4	1.92
1-1/2	2.60
2	4.37

Figure Number Matrix

FNW X410B Size
SIZE CODE
1/2 = D
3/4 = F
1 = G
1-1/4 = H
1-1/2 = J
2 = K

LOW LEAD COMPLIANT 2 PC 600 WOG GAS APPROVED BALL VALVE



Dimensions (inches)

Size	ØD	E	H	L
1/2	0.50	2.95	1.50	2.13
3/4	0.75	3.94	1.85	2.48
1	0.98	3.94	2.05	2.99
1-1/4	1.26	4.92	2.36	3.35
1-1/2	1.50	4.92	2.56	3.62
2	1.97	7.87	3.11	4.25

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Low Lead Brass *	1
2	Ball	Low Lead Brass * (N.C. Plated)	1
3	End Cap	Low Lead Brass *	1
4	Seat	PTFE	2
6	Stem	ASTM B16 C36000	1
7	Stem Packing	PTFE	1 Set
8	Handle	ASTM A283-D	1
9	Sleeve	Plastic/Vinyl	1
11	Packing Gland	ASTM B16 C36000	1
13	Handle Nut	AISI 1010	1

* Chemical Content by Percentage is:

Cu	Bi	Pb	Sn	Ni	Fe	AL	Zn
58 - 61	< 2.0	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	Remainder

Figure X411B BRASS BODY BALL VALVES



LOW LEAD COMPLIANT 2 PC 600 WOG BALL VALVE

Features:

- 600 WOG
- 150 WSP
- Full Port
- NSF 61 Annex G Approved
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Sweat Ends Per ANSI B16.18



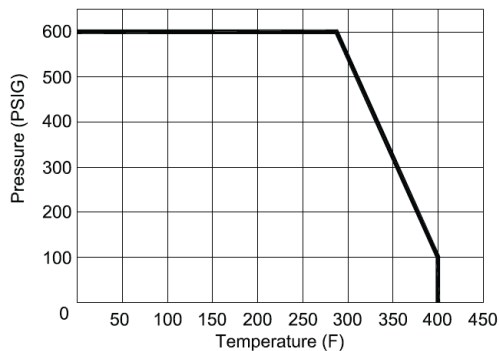
NSF 61 ANNEX G



Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.

Source: California Health and Safety Code (116875).



Weights

Size	Wt. (Lbs)
1/2	0.33
3/4	0.73
1	1.08
1-1/4	1.92
1-1/2	2.43
2	4.17

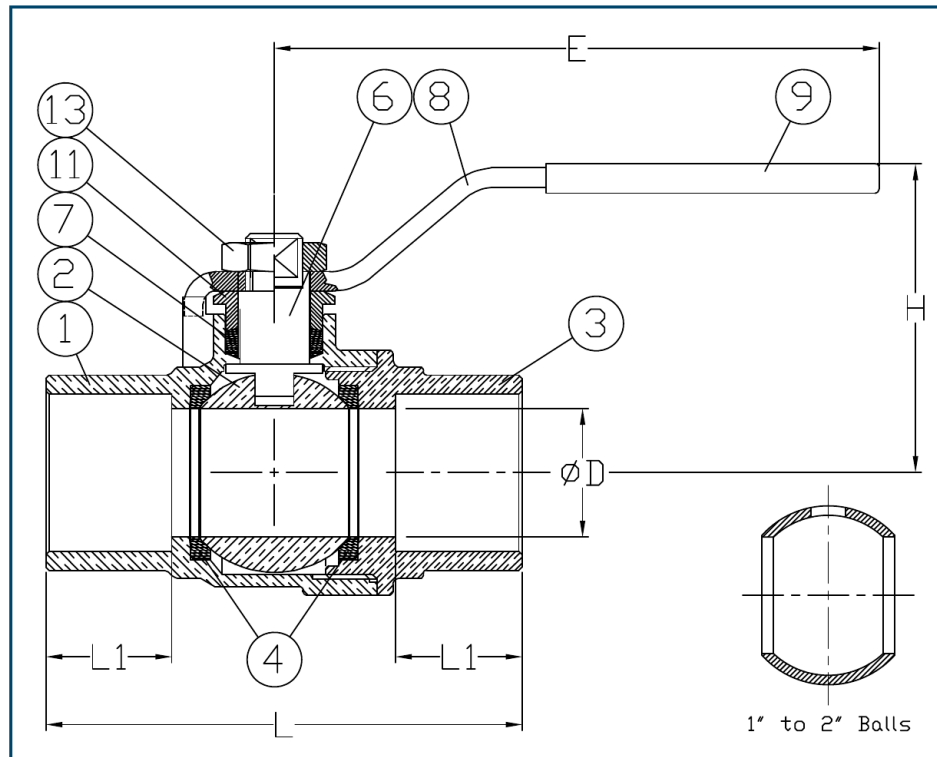
Figure Number Matrix

FNW X411B Size

SIZE CODE

1/2 = D
3/4 = F
1 = G
1-1/4 = H
1-1/2 = J
2 = K

LOW LEAD COMPLIANT 2 PC 600 WOG BALL VALVE



Dimensions (inches)

Size	ØD	E	H	L	L1
1/2	0.50	2.95	1.50	1.93	0.50
3/4	0.75	3.94	1.85	2.72	0.75
1	0.98	3.94	2.05	3.31	0.91
1-1/4	1.26	4.92	2.36	3.78	0.97
1-1/2	1.50	4.92	2.56	4.29	1.09
2	1.97	7.87	3.11	5.35	1.34

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Low Lead Brass *	1
2	Ball	Low Lead Brass * (N.C. Plated)	1
3	End Cap	Low Lead Brass *	1
4	Seat	PTFE	2
6	Stem	ASTM B16 C36000	1
7	Stem Packing	PTFE	1 Set
8	Handle	ASTM A283-D	1
9	Sleeve	Plastic/Vinyl	1
11	Packing Gland	ASTM B16 C36000	1
13	Handle Nut	AISI 1010	1

* Chemical Content by Percentage is:

Cu	Bi	Pb	Sn	Ni	Fe	AL	Zn
58 - 61	< 2.0	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	Remainder

Figure X420 BRASS BODY BALL VALVES

FNW™

LOW LEAD COMPLIANT 2 PC 600 WOG BALL VALVE

Features:

- 600 WOG
- 150 WSP
- Full Port
- NSF 61 Annex G Approved
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Threaded NPT Ends Per ANSI B 1.20.1
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Optional Lock Lever *
- Optional Stem Extension
- Optional Tee Handle (to 1")
- Optional Oval Handle
- Optional Memory Stop



OPTIONS



Lock Lever



Stem Extension



Tee or Oval Handle



Memory Stop



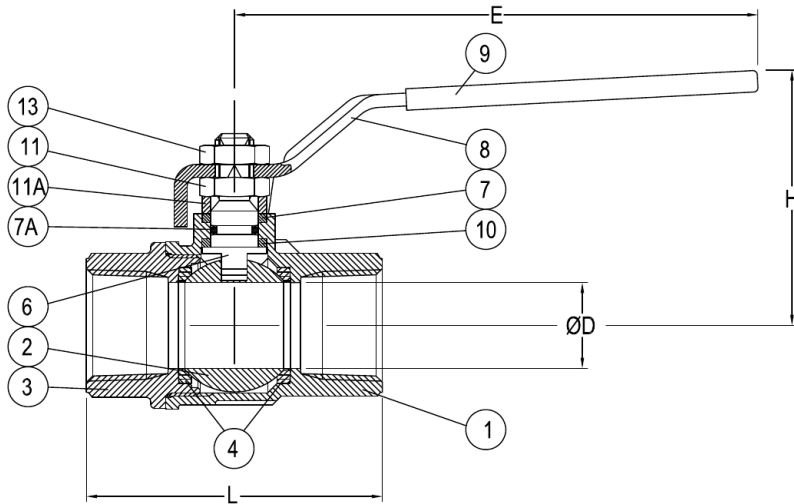
Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.
Source: California Health and Safety Code (116875).

Figure Number Matrix

FNW X420 Size	Kit Codes (Order Separately)		
SIZE CODE	LOCKING LEVER*	EXTENSIONS	MEMORY STOPS
1/2 = D	1/2 = FNW420LHKBD	1/2 = FNW420SEBD	1/2 = FNW420MSKBD
3/4 = F	3/4 - 1 = FNW420LHKFG	3/4 - 1 = FNW420SEFG	3/4 - 1 = FNW420MSKFG
1 = G	1-1/4 - 1-1/2 = FNW420LHKHJ	1-1/4 - 1-1/2 = FNW420SEHJ	1-1/4 - 1-1/2 = FNW420MSKHJ
1-1/4 = H	2 = FNW420LHKK	2 = FNW420SEK	2 = FNW420MSKK
1-1/2 = J	* Note: Locking lever kits are of the standard figure 420 yellow sleeve type.	OVAL HANDLES	TEE HANDLES
2 = K		1/2 = FNW420OHKBCD	1/2 = FNW420THKBD
		3/4 - 1 = FNW420OHKFG	3/4 - 1 = FNW420THKFG
		1-1/4 - 1-1/2 = FNW420OHKHJ	
		2 = FNW420OHKK	

LOW LEAD COMPLIANT 2 PC 600 WOG BALL VALVE



Dimensions (inches)

Size	ØD	E	H	L	L1
1/2	0.59	3.86	1.81	2.44	0.50
3/4	0.79	4.80	2.28	2.71	0.75
1	0.98	4.80	2.44	3.07	0.91
1-1/4	1.26	6.02	3.00	3.42	0.96
1-1/2	1.57	6.02	3.23	3.89	1.10
2	1.95	6.38	3.74	4.33	1.34

Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	19	0.48
3/4	34	0.79
1	50	1.22
1-1/4	103	2.14
1-1/2	266	3.20
2	307	4.08

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 510L*	1
2	Ball	Brass CW 510L* (Chrome-Plated)	1
3	End Cap	Brass CW 510L*	1
4	Seat	PTFE	2
6	Stem	Brass CW 510L*	1
7	Stem Packing	PTFE	1 Set
7A	Stem O-ring	NBR 75 Shore A	1
8	Handle	Steel DD11	1
9	Sleeve	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	Steel CL 04	1
11A	Packing Gland	Brass CW 614N UNI 12164	1
13	Handle Nut	Steel CL 04	1

* Chemical Content by Percentage is:

Cu	Ni	Sn	Pb	Fe	Al	Σ% Other	Zn
57 - 59	≤ 0.2	≤ 0.3	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.1	Remainder

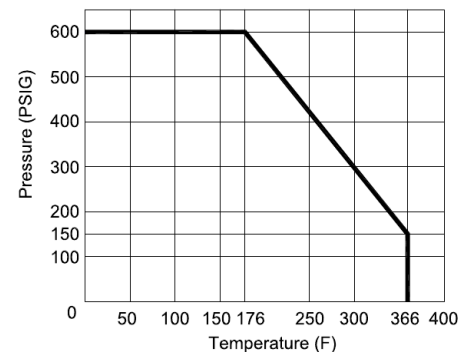


Figure X421 BRASS BODY BALL VALVES

FNW™

LOW LEAD COMPLIANT 2 PC 600 WOG BALL VALVE

Features:

- 600 WOG
- 150 WSP
- Full Port
- NSF 61 Annex G Approved
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Sweat Ends Per ANSI B 16.18
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Optional Lock Lever *
- Optional Stem Extension
- Optional Tee Handle (to 1")
- Optional Oval Handle
- Optional Memory Stop



OPTIONS



Lock Lever



Stem Extension



Tee or Oval Handle



Memory Stop



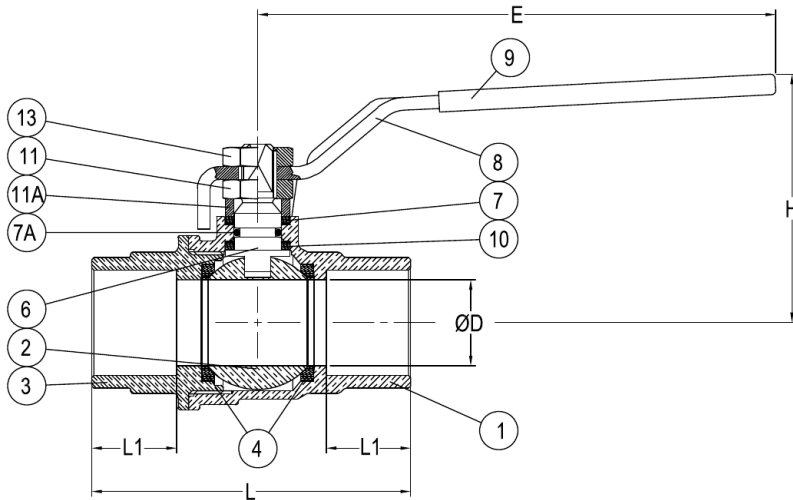
Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.
Source: California Health and Safety Code (116875).

Figure Number Matrix

FNW X421 Size	Kit Codes (Order Separately)		
	LOCKING LEVER*	EXTENSIONS	MEMORY STOPS
SIZE CODE			
1/2 = D	1/2 = FNW420LHKBD	1/2 = FNW420SEBD	1/2 = FNW420MSKBD
3/4 = F	3/4 - 1 = FNW420LHKFG	3/4 - 1 = FNW420SEFG	3/4 - 1 = FNW420MSKFG
1 = G	1-1/4 - 1-1/2 = FNW420LHKHJ	1-1/4 - 1-1/2 = FNW420SEHJ	1-1/4 - 1-1/2 = FNW420MSKHJ
1-1/4 = H	2 = FNW420LHKK	2 = FNW420SEK	2 = FNW420MSKK
1-1/2 = J	* Note: Locking lever kits are of the standard figure 420 yellow sleeve type.	OVAL HANDLES	TEE HANDLES
2 = K		1/2 = FNW420OHKBCD	1/2 = FNW420THKBD
		3/4 - 1 = FNW420OHKFG	3/4 - 1 = FNW420THKFG
		1-1/4 - 1-1/2 = FNW420OHKHJ	
		2 = FNW420OHKK	

LOW LEAD COMPLIANT 2 PC 600 WOG BALL VALVE



Dimensions (inches)

Size	ØD	E	H	L	L1
1/2	0.59	3.86	1.81	2.58	0.50
3/4	0.79	4.80	2.28	3.00	0.75
1	0.98	4.80	2.44	3.56	0.91
1-1/4	1.26	6.02	3.00	4.09	0.96
1-1/2	1.57	6.02	3.23	4.56	1.10
2	1.95	6.38	3.74	5.45	1.34

Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	19	0.50
3/4	34	0.77
1	50	1.19
1-1/4	103	2.20
1-1/2	266	3.24
2	307	4.21

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 510L*	1
2	Ball	Brass CW 510L* (Chrome-Plated)	1
3	End Cap	Brass CW 510L*	1
4	Seat	PTFE	2
6	Stem	Brass CW 510L*	1
7	Stem Packing	PTFE	1 Set
7A	Stem O-ring	NBR 75 Shore A	1
8	Handle	Steel DD11	1
9	Sleeve	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	Steel CL 04	1
11A	Packing Gland	Brass CW 614N UNI 12164	1
13	Handle Nut	Steel CL 04	1

* Chemical Content by Percentage is:

Cu	Ni	Sn	Pb	Fe	Al	Σ% Other	Zn
57 - 59	≤ 0.2	≤ 0.3	≤ 0.2	≤ 0.2	≤ 0.2	≤ 0.1	Remainder

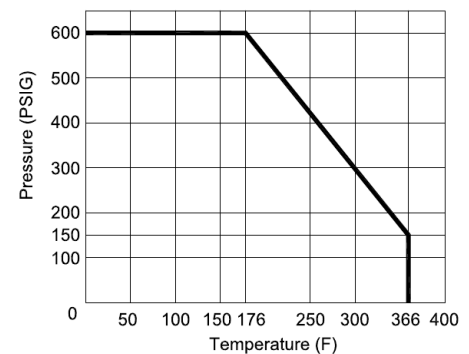


Figure X430 BRASS BODY BALL VALVES

FNW™

LOW LEAD COMPLIANT 2 PC FULL PORT WATER SERVICE VALVE w/PRESS ENDS

The FNW figure X430 press valve for water service is suggested for all applications where labor and time savings is a must. The valve allows quick installation on copper pipelines meeting ASTM B88 standards. The structure of the valve, made in dezincification resistant brass, guarantees excellent corrosion resistance particularly in the connection areas of the pipeline.

Features:

- 200 PSI Max. Working Pressure
- 250°F Max. Temperature at Max. Pressure
- Full Port
- Press Ends
- Conforms to MSS SP-110 *
- ANSI/NSF 61 Annex G Approved
- True 2-Piece Design
- No Soldered-In End Pieces
- Blow-out Proof Stem
- Adjustable Packing
- Secondary O-ring Stem Seal
- Forged Brass Body & End Cap
- 100% Electronically Tested in Open and Closed Position at 80 PSI
- Uses The Same Handle Accessories As The Figure 420 Ball Valve
- Sizes 1/2" to 2"

* The current specification SP-110 does not address the new technology of press end connections. Other than this exception, the valve meets the design criteria of the specification



Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25%. Source: California Health and Safety Code (116875).

OPTIONS



Lock Lever

Stem Extension

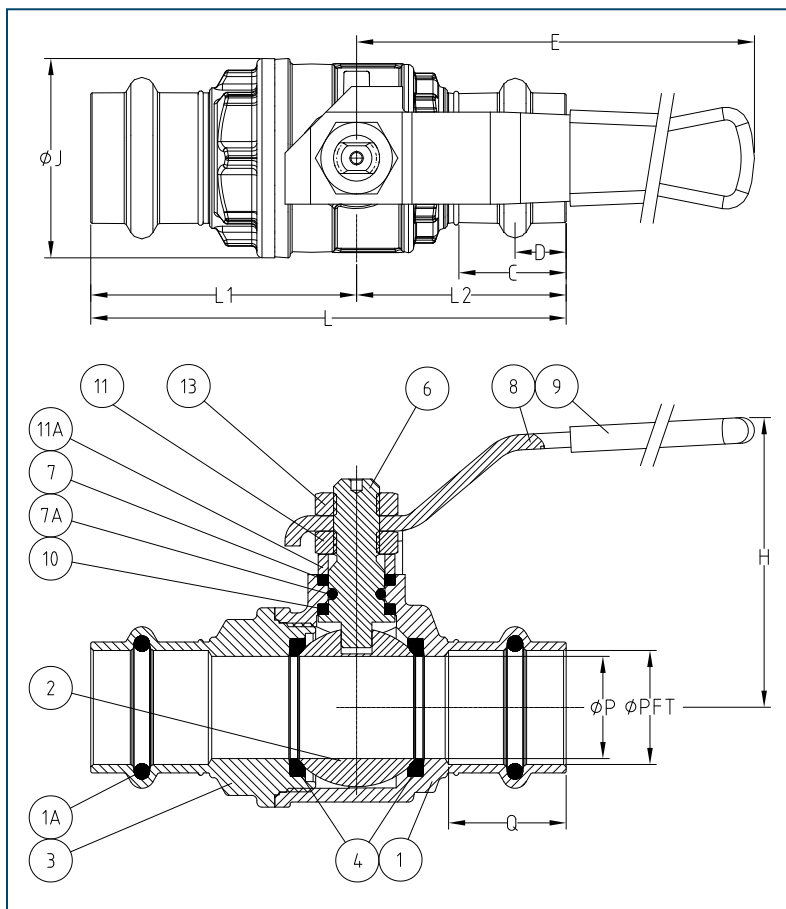
Tee or Oval Handle

Memory Stop

Figure Number Matrix

FNW X430 Size	Kit Codes (Order Separately)		
SIZE CODE	LOCKING LEVER*	EXTENSIONS	MEMORY STOPS
1/2 = D	1/2 = FNW420LHKBD	1/2 = FNW420SEBD	1/2 = FNW420MSKBD
3/4 = F	3/4 - 1 = FNW420LHKFG	3/4 - 1 = FNW420SEFG	3/4 - 1 = FNW420MSKFG
1 = G	1-1/4 - 1-1/2 = FNW420LHKHJ	1-1/4 - 1-1/2 = FNW420SEHJ	1-1/4 - 1-1/2 = FNW420MSKHJ
1-1/4 = H	2 = FNW420LHKK	2 = FNW420SEK	2 = FNW420MSKK
1-1/2 = J	* Note: Locking lever kits are of the standard figure 420 yellow sleeve type.	OVAL HANDLES	TEE HANDLES
2 = K		1/2 = FNW420OHKBCD	1/2 = FNW420THKBD
		3/4 - 1 = FNW420OHKFG	3/4 - 1 = FNW420THKFG
		1-1/4 - 1-1/2 = FNW420OHKHJ	
		2 = FNW420OHKK	

LOW LEAD COMPLIANT 2 PC FULL PORT WATER SERVICE VALVE w/PRESS ENDS



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 511L	1
1A	O-ring	EPDM (EP851)	
2	Ball	Brass CW 510L (Chrome-Plated)	1
3	End Cap	Brass CW 511L	1
4	Seat	PTFE	2
6	Stem	Brass CW 510L	1
7	Stem Packing	PTFE	1 Set
7A	Stem O-ring	NBR 75 Shore A	1
8	Handle	Steel DD11	1
9	Sleeve	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	Steel CL 04 ZP	1
11A	Packing Gland	Brass CW 614N UNI 12164	1
13	Handle Nut	Steel CL 04 ZP	1

Dimensions (Inches)

Size	E	H	ØJ	ØP	ØPFT	C	D	Q	L	L1	L2
1/2	3.86	1.89	1.30	0.59	0.63	0.67	0.31	0.71	3.13	1.71	1.42
3/4	4.80	2.28	1.54	0.79	0.88	0.83	0.39	0.91	3.66	2.05	1.61
1	4.80	2.44	1.93	0.98	1.13	0.83	0.39	0.94	4.13	2.32	1.81
1-1/4	6.02	3.07	2.32	1.26	1.38	0.83	0.39	1.02	4.41	2.44	1.97
1-1/2	6.02	3.35	2.87	1.57	1.63	1.02	0.49	1.42	5.63	2.91	2.72
2	6.38	3.80	3.39	1.95	2.13	1.18	0.57	1.57	6.48	3.39	3.09

Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	18	0.49
3/4	34	0.86
1	49	1.23
1-1/4	102	2.34
1-1/2	265	3.48
2	306	4.61

Figure X480 BRASS BODY BALL VALVES



LOW LEAD COMPLIANT 2 PC 400 WOG w/COMPRESSION ENDS

Features:

- 400 WOG
- 150 PSI WSP (366°F)
- Standard Port
- NSF 61 Annex G Approved
- Forged Brass Body & End Cap
- Blow-out Proof Stem
- Adjustable Packing
- Compression Ends
- Drain with Cap



NSF 61 ANNEX G

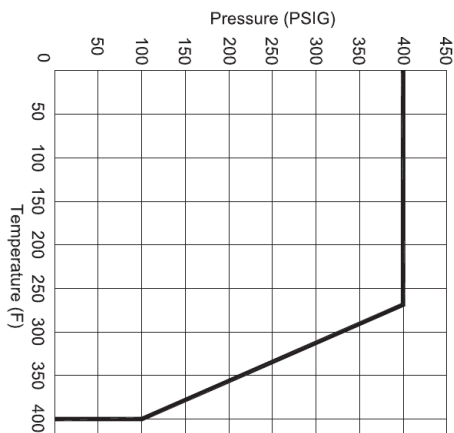


Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.
Source: California Health and Safety Code (116875).



Constructed with a low lead forged brass body and end cap and with bronze compression nuts, the FNW figure X480 compression end ball valve can be used for potable water service in residential, commercial, and industrial applications that require low lead content. Applications also include other liquids and saturated steam service to 150 PSI (366°F). The compression ends reduce installation time and eliminate possible seat damage compared to solder end valves. They are equally easy to uninstall for repair or replacement purposes.



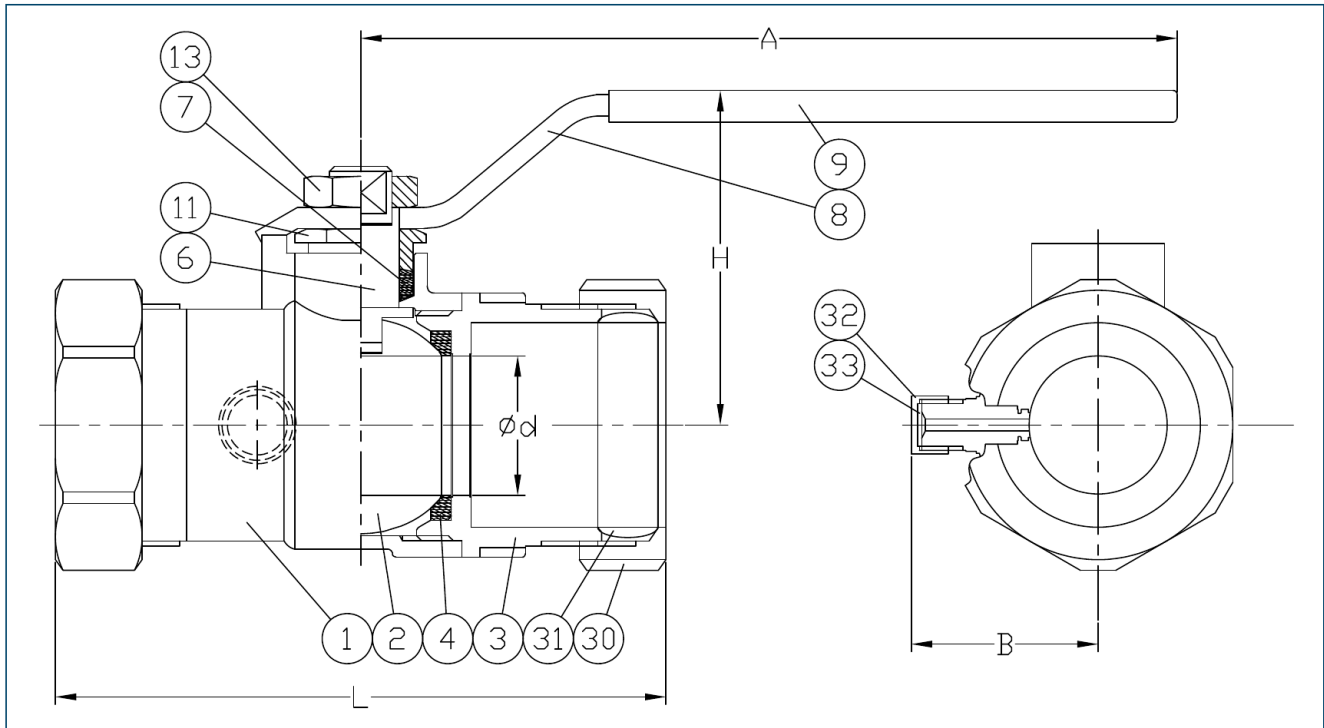
Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	8	0.57
3/4	20	0.84
1	26	1.48

Figure Number Matrix

FNW X480 Size
SIZE CODE
1/2 = D
3/4 = F
1 = G

LOW LEAD COMPLIANT 2 PC 400 WOG w/COMPRESSION ENDS



Dimensions (inches)

Size	Ød	B	A	L	H
1/2	0.39	0.83	2.95	2.76	1.46
3/4	0.59	0.98	2.95	2.99	1.57
1	.75	1.10	3.94	3.62	1.85

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Low Lead Brass *	1
2	Ball	Low Lead Brass * (Chrome Plated)	1
3	End Cap	Low Lead Brass *	1
4	Seat	PTFE	2
6	Stem	Brass, ASTM B16 C36000	1
7	Stem Packing	PTFE	1 Set
8	Handle	Steel, ASTM A283-D	1
9	Sleeve	Plastic	1
11	Packing Gland	Brass, ASTM B16 C36000	1
13	Handle Nut	Steel, AISI 1010	1
30	Compression Nut	Bronze, ASTM B584 C85700	2
31	Compression Ring	Brass, ASTM B135 C26000	2
32	Drain Cap	Brass, ASTM B16 C36000	1
33	Drain Cap Seal	Rubber, NBR	1

* Chemical Content by Percentage is:

Cu	Bi	Pb	Sn	Ni	Fe	AL	Zn
58 - 61	< 2.0	< 0.2	< 0.5	< 0.5	< 0.2	< 0.2	Remainder

Figure X485 BRASS BODY BALL VALVES

FNW™

LOW LEAD COMPLIANT PUSH-FIT VALVE FOR WATER OR AIR

Features:

- 200 PSI Max. Working Pressure (Non-Shock Water or Air)
- Push-Fit Ends
- For Copper, CPVC, and PEX* Pipe
- Full Port
- Solid Ball
- NSF 61 Annex G Approved
- Temperature Range: 33°F to 180°F (0.6°C to 82.2°C)
- Blow-out Proof Stem
- Adjustable Packing
- Includes Removal Tool

* Not for use with PEX-AL-PEX or PEX tubing with an oxygen barrier.



Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.
Source: California Health and Safety Code (116875).



The FNW X485 Push-Fit ball valve saves valuable installation time. Its ability to connect to multiple pipe types reduces inventory levels by decreasing the number of different valves and fittings that would normally need to be stocked. Whether it's copper, CPVC, or PEX*, the X485 provides for an easy install. The push-fit valve connection is also just as easily removed using the tool provided with every valve.



Removal Tool Included

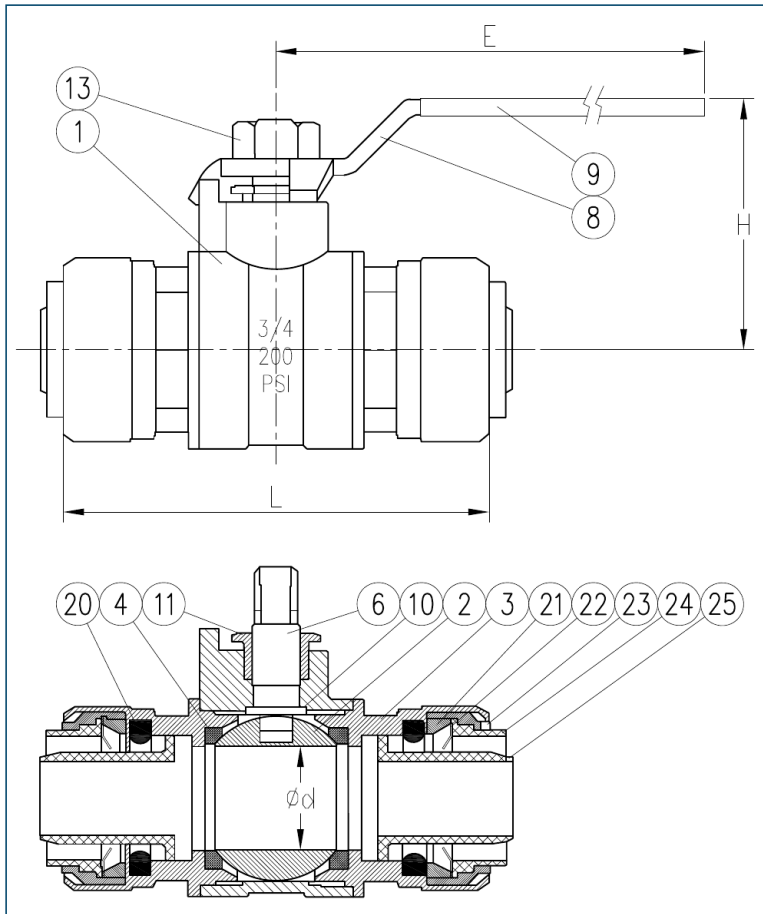
Weights

Size	Wt. (Lbs)
1/2	0.55
3/4	0.95
1	1.47

Figure Number Matrix

F N W X485 Size
SIZE CODES
1/2 = D
3/4 = F
1 = G

LOW LEAD COMPLIANT PUSH-FIT VALVE FOR WATER OR AIR



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Low Lead Brass*	1
2	Ball	ASTM B124 C37700 CHROME PLATED	1
3	End Cap	Low Lead Brass*	2
4	Seat	PTFE	2
6	Stem	ASTM B16 C36000	1
7	Stem Packing	PTFE	1 Set
8	Handle	Carbon Steel	1
9	Handle Cover	Vinyl	1
10	Thrust Washer	PTFE	1
11	Gland Nut	ASTM B16 C36000	1
13	Handle Nut	SS41	1
20	O-ring	EPDM	2
21	Washer	POM	2
22	Snap Ring	SS301	2
23	Shield	POM	2
24	Guide	POM	2
25	Sustain Sheath	POM	2

* Chemical Content by Percentage is:

Cu	Bi	Pb	Fe	Zn
> 58	< 3.5	0.1 Max.	0.2 Max.	Remainder

Dimensions (inches)

Size	Ød	E	H	L
1/2	0.50	3.23	1.46	2.61
3/4	0.75	3.94	1.79	3.06
1	0.98	4.72	2.27	3.66

Flow Capacity

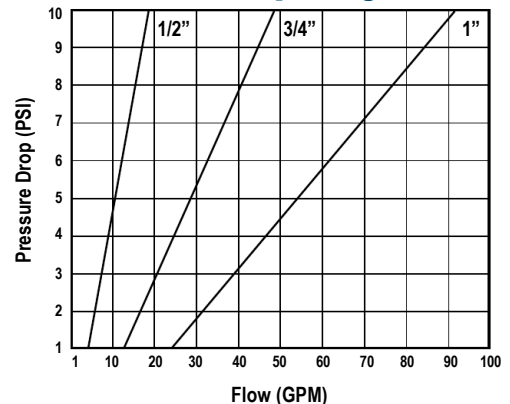


Figure 221A CARBON STEEL BALL VALVES

FNW™

2 PC FULL PORT 2000 CWP

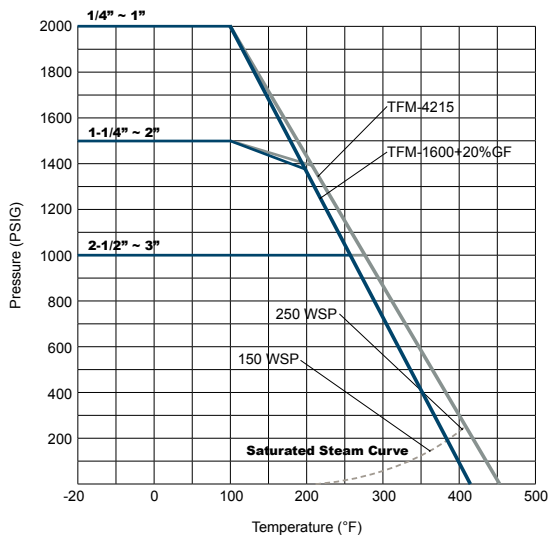
Features:

- 2000 PSI CWP* Non-Shock
- Working Steam Pressure (WSP)
 - 150 PSI - Fig. 221A
 - 250 PSI - Fig. 221AC
- Full Port
- Blow-out Proof Stem
- Adjustable Packing
- Anti-Static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- Threaded NPT Ends
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Seat/Shell Test: MSS SP-110

- * 1/4" to 1" - 2000 PSI CWP
- 1-1/4" to 2" - 1500 PSI CWP
- 2-1/2" to 3" - 1000 PSI CWP



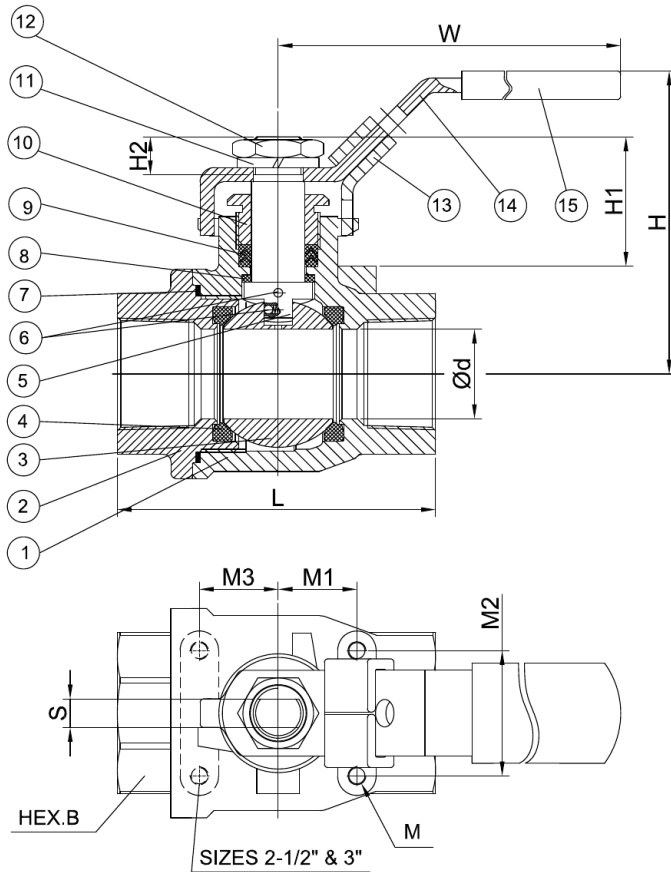
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	69	1.15
3/8	15	69	1.15
1/2	18	77	1.15
3/4	36	98	1.72
1	48	166	1.90
1-1/4	58	277	3.53
1-1/2	120	388	6.00
2	190	582	9.17
2-1/2	450	816	15.43
3	600	1395	19.18

Figure Number Matrix

FNW 221A		Seat/Seals	Size
SEAT/SEAL CODE		SIZE CODE	
Blank = Standard Temp (150 WSP)		1/4 = B	1-1/4 = H
C = High Temp (250 WSP)		3/8 = C	1-1/2 = J
		1/2 = D	2 = K
		3/4 = F	2-1/2 = L
		1 = G	3 = M

2 PC FULL PORT 2000 CWP



Standard Materials

Ref. No.	Description	Material		Qty
		Figure 221A	Figure 221AC	
1	Body	ASTM A216 Gr. WCB Carbon Steel		1
2	End Cap	ASTM A216 Gr. WCB Carbon Steel		1
3	Ball	316SS Stainless		1
4	Seat	TFM1600+20%GF	TFM4215	2
5	Stem	316SS Stainless		1
6	Anti-Static Device	316SS Stainless		2
7	Body Gasket	PTFE	PTFE + 20% CF	1
8	Thrust Washer	TFM4215		1
9	V-Ring Packing	PTFE	TFM1600	1 Set
10	Gland Nut	304SS Stainless		1
11	Handle Washer	304SS Stainless		1
12	Handle Nut	304SS Stainless		1
13	Locking Pad	304SS Stainless		1
14	Handle	304SS Stainless		1
15	Handle Cover	Vinyl Plastic		1

Dimensions (inches)

SIZE	Ød	L	H1	H2	H	W	S	M1	M3	M2	M (UNC)	B
1/4	0.42	2.17	1.34	0.40	2.52	3.74	0.314	0.50		1.12	10-24	1.06
3/8	0.50	2.17	1.34	0.40	2.52	3.74	0.314	0.50		1.12	10-24	1.06
1/2	0.59	2.55	1.34	0.40	2.52	4.92	0.314	0.50		1.12	10-24	1.06
3/4	0.79	3.03	1.52	0.43	2.64	4.92	0.314	0.88		1.38	10-24	1.26
1	0.98	3.46	1.46	0.42	3.27	5.51	0.314	0.88		1.38	10-24	1.61
1-1/4	1.26	4.01	2.09	0.83	3.50	5.51	0.314	1.00		1.50	1/4-20	1.97
1-1/2	1.50	4.33	2.44	1.12	3.93	7.87	0.472	1.00		1.50	1/4-20	2.20
2	1.97	4.92	2.36	1.09	4.25	7.87	0.472	1.00		1.50	1/4-20	2.76
2-1/2	2.50	6.45	2.24	0.93	5.91	9.84	0.472	1.18	1.38	2.76	1/4-20	3.27
3	2.99	7.12	2.12	0.93	6.34	9.84	0.472	1.28	1.28	2.76	1/4-20	4.02

Figure 311A CARBON STEEL BALL VALVES

FNW™

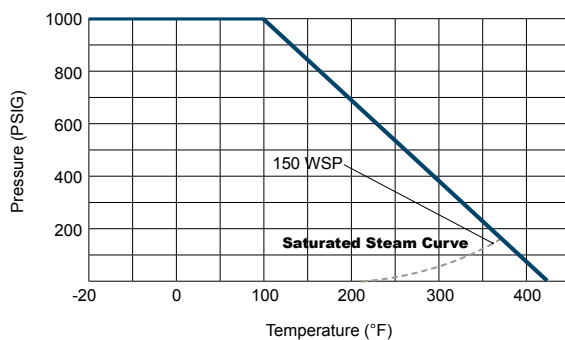
3 PC FULL PORT 1000 CWP

Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Adjustable Packing
- Investment Cast Body
- End Connections
 - Threaded
 - Socket Weld
- Stainless Steel Handle
- Locking Lever
- RTFE Seats
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections:
 - NPT - ASME B1.20.1
 - SW - ASME B16.11
- Seat/Shell Test: MSS SP-110



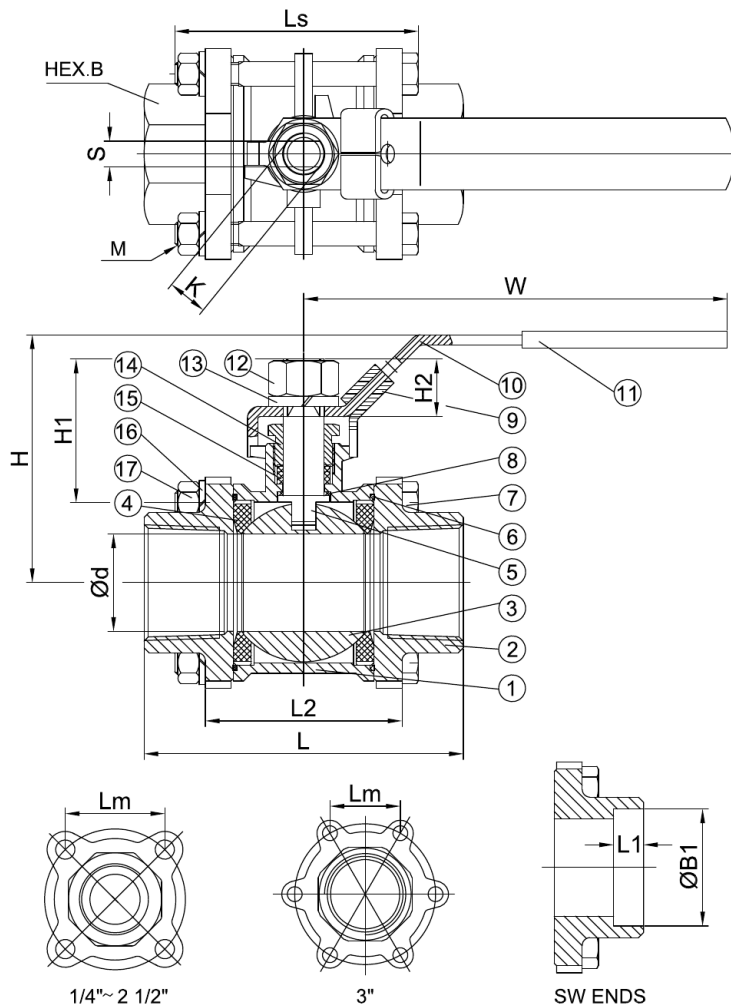
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)	
			NPT	SW
1/4	15	60	1.01	0.93
3/8	15	60	1.01	0.98
1/2	18	66	1.12	1.10
3/4	36	80	1.81	1.76
1	48	146	2.69	2.60
1-1/4	58	252	4.28	4.19
1-1/2	120	344	5.73	5.60
2	190	503	9.04	8.95
2-1/2	450	631	18.25	18.08
3	600	1337	25.57	25.88

Figure Number Matrix

FNW 311A			Ends	Size
			END CODE	SIZE CODE
			Blank = Threaded NPT	1/4 = B 1-1/4 = H
			SW = Socket Weld	3/8 = C 1-1/2 = J
				1/2 = D 2 = K
				3/4 = F 2-1/2 = L
				1 = G 3 = M
(For 4" valves, use FNW Figure number 311AM)				

3 PC FULL PORT 1000 CWP



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTMA216 Gr. WCB Carbon Steel	1
2	End Cap	ASTMA216 Gr. WCB Carbon Steel	2
3	Ball	316SS Stainless	1
4	Seat	RTFE	2
5	Stem	316SS Stainless	1
6	Body Gasket	PTFE	2
7	Body Bolt	ASTM A193-B8 Stainless	4
			6
8	Thrust Washer	PTFE	1
9	Locking Device	304SS Stainless	1
10	Handle	304SS Stainless	1
11	Handle Sleeve	Vinyl Plastic	1
12	Stem Nut	ASTM A194-8 Stainless	1
13	Stem Washer	304SS Stainless	1
14	Gland Nut	304SS Stainless	1
15	V-Ring Packing	PTFE	1 Set
16	Bolt Washer	SUS304 Stainless	4
			8
			12
17	Bolt Nut	ASTM A194-8 Stainless	4
			8
			12

Dimensions (inches)

SIZE	Ød	L	Lm	H1	H2	H	W	S	K (UNC)	Ls	L2	M (UNC)	B	L1	ØB1
1/4	0.42	2.57	1.14	1.20	0.43	2.26	3.94	0.197	5/16-18	1.98	1.46	1/4-20	0.93	0.39	0.56
3/8	0.50	2.57	1.14	1.20	0.43	2.26	3.94	0.197	5/16-18	1.98	1.46	1/4-20	0.93	0.39	0.69
1/2	0.59	2.74	1.21	1.11	0.38	2.26	3.94	0.197	5/16-18	2.13	1.63	1/4-20	1.10	0.39	0.86
3/4	0.79	3.15	1.52	1.30	0.49	2.50	5.08	0.256	3/8-16	2.44	1.82	5/16-18	1.36	0.51	1.07
1	0.98	3.54	1.76	1.61	0.62	2.97	6.14	0.314	7/16-14	2.79	2.10	5/16-18	1.65	0.51	1.34
1-1/4	1.26	4.33	2.13	1.61	0.55	3.19	6.14	0.314	7/16-14	3.37	2.68	3/8-16	2.05	0.63	1.69
1-1/2	1.50	4.72	2.42	2.12	0.89	3.70	7.19	0.394	5/8-11	3.81	3.05	3/8-16	2.30	0.63	1.93
2	1.97	5.51	2.95	2.19	0.89	4.11	7.19	0.394	5/8-11	4.36	3.59	3/8-16	2.81	0.67	2.42
2-1/2	2.50	7.28	3.62	2.69	0.93	5.16	9.92	0.472	3/4-10	5.75	4.36	9/16-12	3.41	0.67	2.91
3	2.99	8.07	2.93	2.75	0.93	5.47	9.92	0.472	3/4-10	6.34	4.93	9/16-12	3.98	0.67	3.54

Figure 311AM CARBON STEEL BALL VALVES



3 PC FULL PORT 1000 CWP w/ ISO MOUNTING PAD

Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-Static Design
- Investment Cast Body
- RTFE Seats
- Threaded NPT Ends (Socket Weld on Demand)
- 4" With Handle Standard (Lock-out Style)
- Direct Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)*
- Vented Ball
- Manufactured Silicone Free

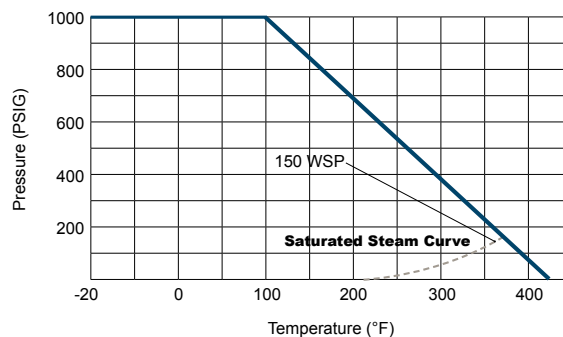
Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Mounting Pad: ISO 5211
- Seat/Shell Test: MSS SP-110

* Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



Fig. 311AM



Cv, Torque & Weight

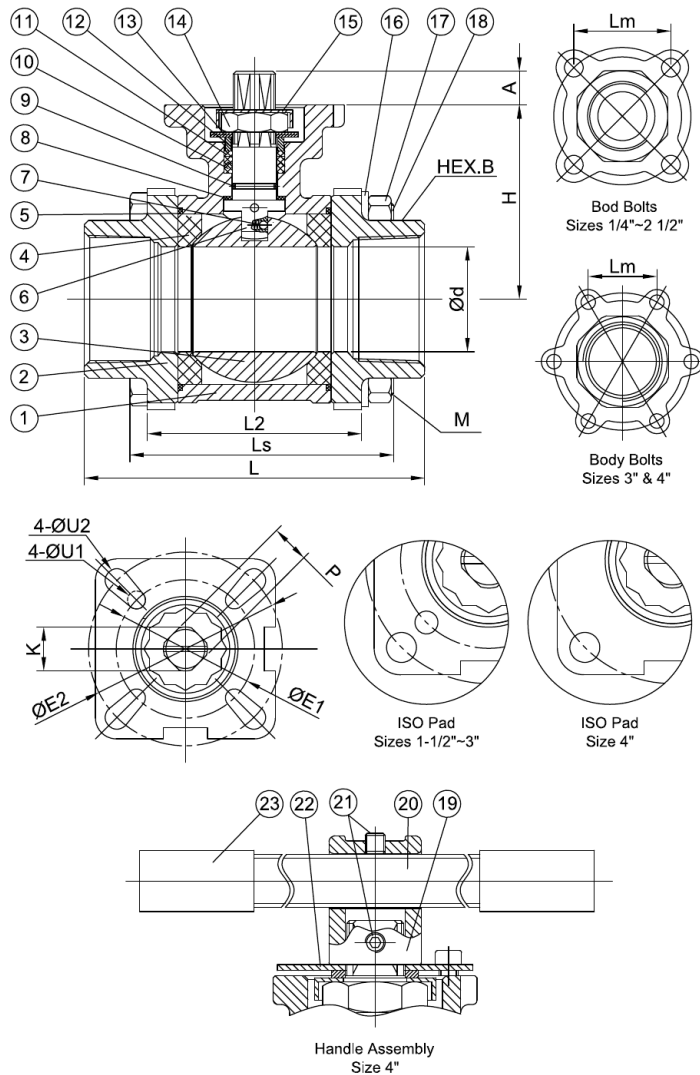
Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	60	1.01
3/8	15	60	1.03
1/2	18	66	1.05
3/4	36	80	1.73
1	48	146	2.33
1-1/4	58	242	4.30
1-1/2	120	344	5.21
2	190	503	9.09
2-1/2	450	631	17.31
3	600	1337	24.36
4	1100	1959	51.00

Figure Number Matrix

FNW 311AM Size		
SIZE CODE		
1/4 = B	1 = G	2-1/2 = L
3/8 = C	1-1/4 = H	3 = M
1/2 = D	1-1/2 = J	4 = P
3/4 = F	2 = K	

Socket weld ends available on demand.
Contact FNW for price & availability.

3 PC FULL PORT 1000 CWP



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A216 Gr. WCB Carbon Steel	1
2	End Cap	ASTM A216 Gr. WCB Carbon Steel	2
3	Ball	316SS Stainless	1
4	Seat	RTFE	2
5	Body Gasket	PTFE	2
6	Stem	316SS Stainless	1
7	Anti-Static Device	316SS Stainless	2
8	Thrust Washer	PTFE	1
9	O-ring	FKM	1
10	V-Ring Packing	PTFE	1 Set
11	Bushing	50% Stainless + 50% PTFE	1
12	Gland	316SS Stainless	1
13	Belleville Washer	301SS Stainless	2
14	Stem Nut	ASTM A194-8 Stainless	1
15	Stop-Lock-Cap	304SS Stainless	1
16	Bolt Washer	1/4\"~2"	4
		2-1/2"	8
		3\"~4"	12
17	Bolt Nut	1/4\"~2"	4
		2-1/2"	8
		3\"~4"	12
18	Body Bolt	1/4\"~3"	4
		4"	6
19	Handle Adapter 4"	ASTM A351 Gr. CF8 Stainless	1
20	Pipe Handle 4"	ASTM A53 Steel + Zinc Plating	1
21	Set Screw 4"	ASTM A193-B8 Stainless	1
22	Triangle Stopper 4"	420SS Stainless	1
23	Handle Sleeve 4"	Vinyl Plastic	1

Dimensions (inches)

SIZE	Ød	L	Lm	H	P	A	ØE1	ØE2	U1	U2	K (UNF)	Ls	L2	M (UNC)	B
1/4	0.42	2.95	1.30	1.65	0.35	0.35	1.42	1.65	0.24	0.24	7/16-20	2.23	1.71	1/4-20	1.10
3/8	0.50	2.95	1.30	1.65	0.35	0.35	1.42	1.65	0.24	0.24	7/16-20	2.23	1.71	1/4-20	1.10
1/2	0.59	2.95	1.30	1.65	0.35	0.35	1.42	1.65	0.24	0.24	7/16-20	2.23	1.71	1/4-20	1.10
3/4	0.79	3.15	1.52	1.91	0.35	0.35	1.42	1.97	0.24	0.28	7/16-20	2.44	1.82	5/16-18	1.36
1	0.98	3.54	1.76	2.30	0.43	0.43	1.65	1.97	0.24	0.28	9/16-18	2.79	2.10	5/16-18	1.65
1-1/4	1.26	4.33	2.13	2.48	0.43	0.43	1.65	2.76	0.24	0.35	9/16-18	3.37	2.68	3/8-16	2.05
1-1/2	1.50	4.72	2.42	2.81	0.55	0.55	1.97	2.76	0.28	0.35	3/4-16	3.81	3.05	3/8-16	2.30
2	1.97	5.51	2.95	3.08	0.55	0.55	1.97	2.76	0.28	0.35	3/4-16	4.36	3.59	3/8-16	2.81
2-1/2	2.50	7.28	3.62	3.94	0.67	0.67	2.76	4.02	0.35	0.43	7/8-14	5.75	4.36	9/16-12	3.41
3	2.99	8.07	2.93	4.27	0.67	0.67	2.76	4.02	0.35	0.43	7/8-14	6.34	4.93	9/16-12	3.98
4	3.95	9.45	3.76	5.51	0.87	0.87		4.02		0.43	1-1/8-12	7.87	6.26	5/8-11	5.20

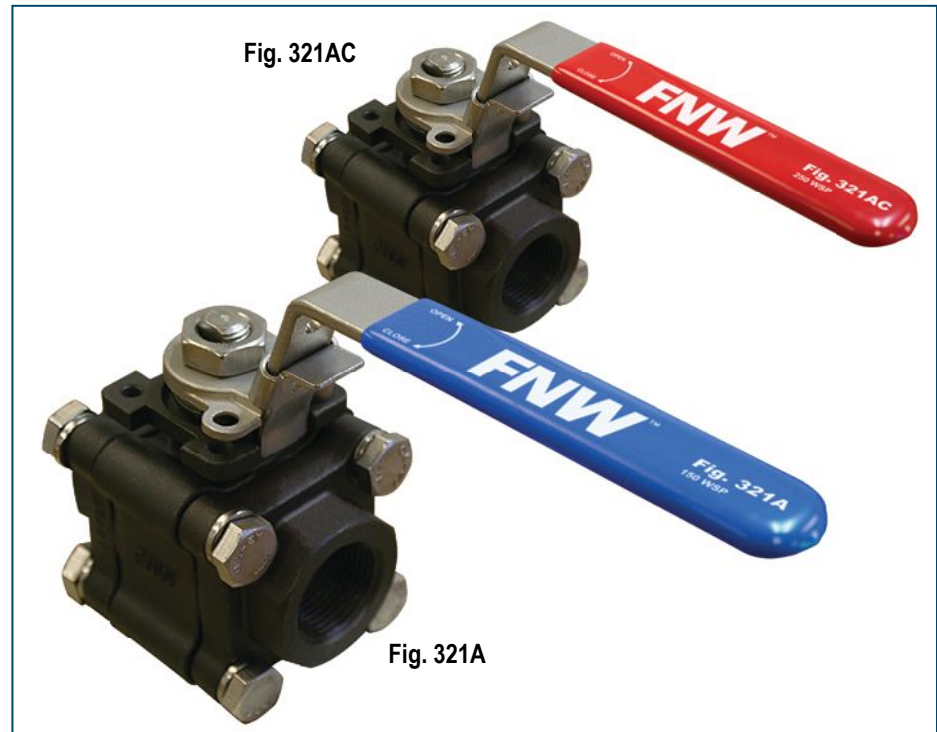
Figure 321A CARBON STEEL BALL VALVES

FNW™

3 PC FULL PORT 2000 CWP

Features:

- 2000 PSI CWP* Non-Shock
- Working Steam Pressure (WSP)
 - 150 PSI - Fig. 321A
 - 250 PSI - Fig. 321AC
- Full Port
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-Static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- End Connections
 - Threaded
 - Socket Weld
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)**
- Vented Ball
- Manufactured Silicone Free

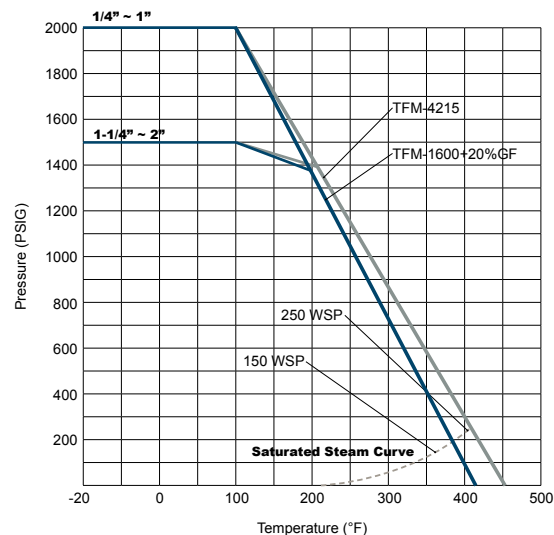


Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections:
 - NPT - ASME B1.20.1
 - SW - ASME B16.11
- Seat/Shell Test: MSS SP-110

* 1/4" to 1" - 2000 PSI CWP
1-1/4" to 2" - 1500 PSI CWP

** Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



Optional Socket Weld Ends

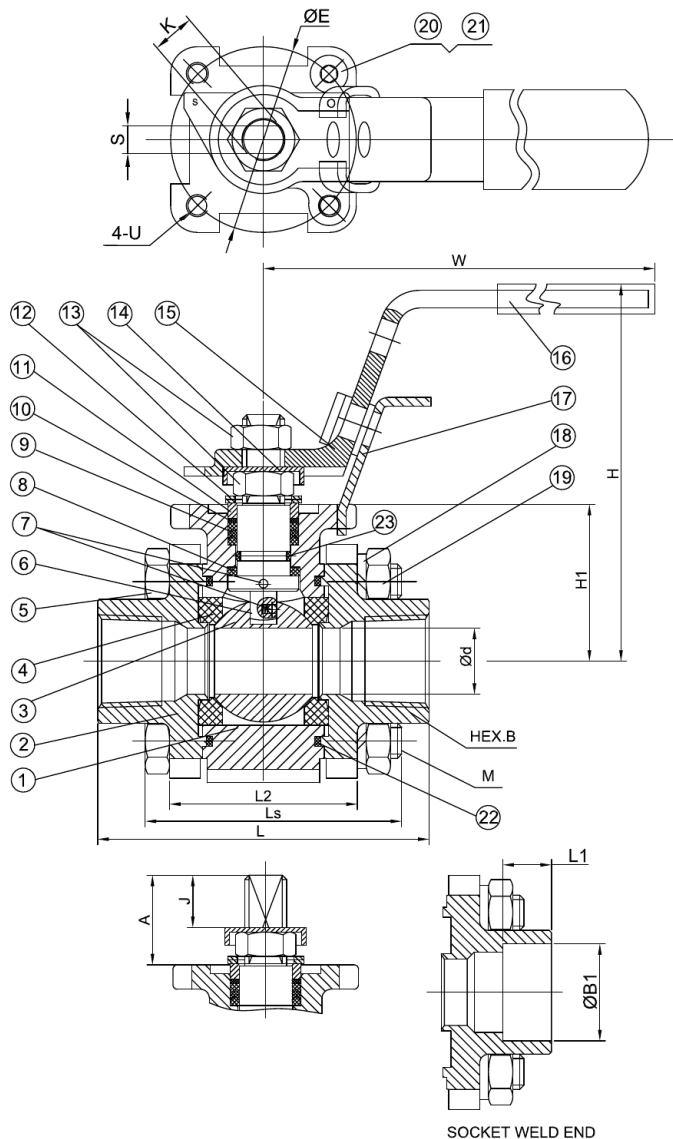
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)	
			NPT	SW
1/4	15	69	2.34	2.34
3/8	15	69	2.34	2.34
1/2	18	77	2.29	2.25
3/4	36	98	3.15	3.15
1	48	166	4.59	4.59
1-1/4	58	277	7.61	7.61
1-1/2	120	388	9.92	9.92
2	190	582	15.21	15.48

Figure Number Matrix

FNW 321A			Seat/Seals	Ends	Size
SEAT/SEAL CODE			END CODE		SIZE CODE
Blank = Standard Temp (150 WSP)			Blank = Threaded NPT		1/4 = B
C = High Temp (250 WSP)			SW = Socket Weld		3/8 = C
					1/2 = D
					3/4 = F
					1 = G
					1-1/4 = H
					1-1/2 = J
					2 = K

3 PC FULL PORT 2000 CWP



Standard Materials

Ref. No.	Description		Material		Qty
			Figure 321A	Figure 321AC	
1	Body		ASTM A216 Gr. WCB Carbon Steel		1
2	End Cap		ASTM A216 Gr. WCB Carbon Steel		2
3	Ball		316SS Stainless		1
4	Seat		TFM1600+20%GF	TFM4215	2
5	Body Bolt	1/4~1-1/4	ASTM A193-B8 Stainless		4
		1-1/2~2			8
6	Stem		316SS Stainless		1
7	Anti-Static Device		316SS Stainless		2
8	Thrust Washer		TFM4215		1
9	V-Ring Packing		PTFE	TFM1600	1 Set
10	Bushing		50% Stainless + 50% PTFE		1
11	Gland		316SS Stainless		1
12	Belleville Washer		301SS Stainless		2
13	Stem Nut		ASTM A194-8 Stainless		2
14	Stop-Lock-Cap		304SS Stainless		1
15	Handle		304SS Stainless		1
16	Handle Sleeve		Vinyl Plastic		1
17	Lock Device		304SS Stainless		1
18	Bolt Washer	1/4~1-1/4	304SS Stainless		4
		1-1/2~2			8
19	Bolt Nut	1/4~1-1/4	ASTM A194-8 Stainless		4
20	Stop Bolt		ASTM A193-B8 Stainless		1
21	Stop Washer		304SS Stainless		1
22	Body Gasket		PTFE	PTFE+20%CF	2
23	O-ring		FKM		1

Dimensions (inches)

SIZE	Ød	L	H1	H	W	ØE	S	U	A	J	K (UNF)	Ls	L2	M (UNC)	B	L1	ØB1
1/4	0.42	2.76	1.18	2.99	5.31	1.65	0.25	M5	0.68	0.41	3/8-24	2.13	1.61	1/4-20	0.93	0.43	0.55
3/8	0.50	2.76	1.18	2.99	5.31	1.65	0.25	M5	0.68	0.41	3/8-24	2.13	1.61	1/4-20	0.93	0.43	0.69
1/2	0.59	2.95	1.42	3.27	5.31	1.65	0.25	M5	0.80	0.46	3/8-24	2.44	1.83	5/16-18	1.10	0.43	0.86
3/4	0.79	3.15	1.56	3.27	5.31	1.65	0.25	M5	0.80	0.46	3/8-24	2.74	2.05	3/8-16	1.34	0.51	1.07
1	0.98	3.54	1.79	3.86	6.69	1.97	0.35	M6	0.92	0.49	9/16-18	3.18	2.36	3/8-16	1.81	0.51	1.34
1-1/4	1.25	4.33	1.97	4.06	6.69	1.97	0.35	M6	0.92	0.49	9/16-18	3.86	2.76	1/2-13	2.17	0.51	1.68
1-1/2	1.50	4.72	2.36	4.33	7.87	2.76	0.38	M8	1.18	0.59	5/8-18	4.12	3.24	1/2-13	2.24	0.51	1.91
2	1.95	5.51	2.68	4.69	7.87	2.76	0.38	M8	1.18	0.59	5/8-18	4.90	3.68	5/8-11	2.87	0.63	2.41

Figure 501 CARBON STEEL BALL VALVES

FNW™

1 PC STANDARD PORT 150# FLANGED

Features:

- Standard Port
- 150 WSP
- Flanged Connection
- RTFE Seats
- Stainless Steel Trim
- Anti-Static Design
- Blow-out Proof Stem
- Investment Cast Body
- Adjustable Packing
- Locking Device
- Actuator Mounting Pad
- Manufactured Silicone Free
- Sizes 2" to 6"

Standards:

- Design: ASME B16.34
- Pressure Test: API 598
- Flange Dimensions: ASME B16.5
- Materials: ASME B16.34
- Mounting Pad: ISO 5211

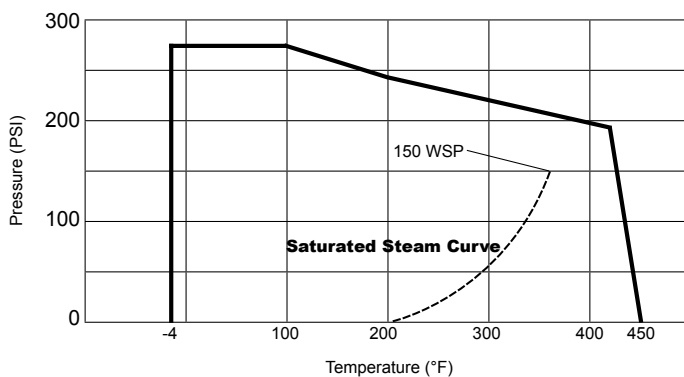


Figure Number Matrix

FNW 501 Size

SIZE CODE

- 2 = K
- 2-1/2 = L
- 3 = M
- 4 = P
- 6 = U

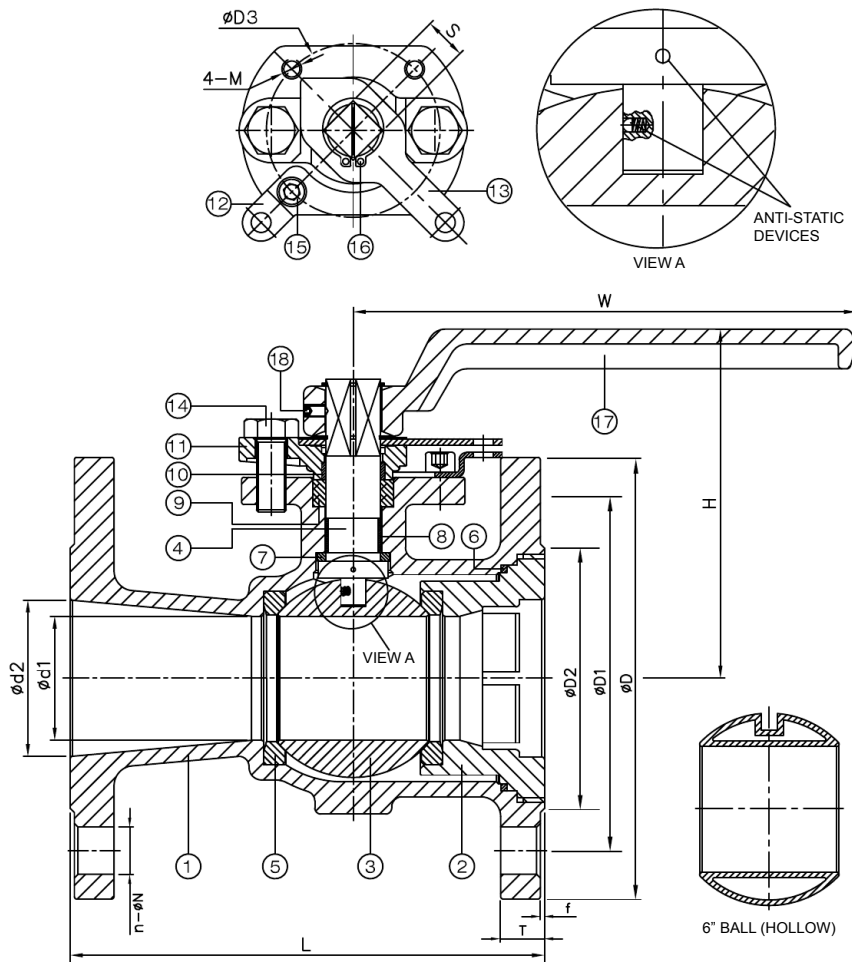
Cv & Weight

Size	Cv	Wt (lbs)
2	165	16.3
2-1/2	240	23.1
3	290	32.6
4	690	51.1
6	900	90.4

Torque

Size	Torque (in-lbs)
2	279
2-1/2	419
3	863
4	996
6	2,457

1 PC STANDARD PORT 150# FLANGED



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A216-WCB Carbon Steel	1
2	Insert	ASTM A216-WCB Carbon Steel	1
3	Ball	ASTM A351 Gr. CF8M Stainless	1
4	Stem	ASTM A276-316 Stainless	1
5	Seat	RTFE	2
6	Body Seal	PTFE	1
7	Thrust Washer	PTFE	1
8	Stem Bushing	PTFE	1
9	Packing	PTFE	1
10	Bearing	PTFE	1
11	Gland	AISI304 Stainless	1
12	Lock Out Plate	AISI304 Stainless	1
13	Stop Plate	AISI304 Stainless	1
14	Packing Bolt	AISI304 Stainless	2
15	Lock Plate Bolt	AISI304 Stainless	2
16	Snap Ring	AISI304 Stainless	2
17	Handle	ASTM A216-WCB Carbon Steel	1
18	Set Screw	AISI304 Stainless	1

Dimensions (inches)

Size	ØD	ØD1	ØD2	Ød1	Ød2	L	H	W	S	ØD3	M (UNC)	n	ØN	T	f
2	6.00	4.75	3.62	1.50	1.77	7.01	5.04	7.87	0.67	2.76	5/16"-18	4	0.62	0.62	0.06
2-1/2	7.00	5.50	4.12	1.97	2.48	7.48	5.51	7.87	0.67	2.76	5/16"-18	4	0.74	0.69	0.06
3	7.50	6.00	5.00	2.28	2.99	7.99	5.98	12.80	0.87	4.02	3/8"-16	4	0.74	0.75	0.06
4	9.00	7.50	6.19	3.15	3.86	9.02	6.93	12.80	0.87	4.02	3/8"-16	8	0.74	0.94	0.06
6	11.00	9.50	8.50	4.49	5.91	10.51	9.45	29.61	1.06	4.92	12"-13	8	0.86	1.00	0.06

Figure 601 CARBON STEEL BALL VALVES



2 PC FULL PORT 150# FLANGED

Features:

- Full Port
- 150 WSP
- Flanged Connection
- RTFE Seats
- Stainless Steel Trim
- Anti-Static Design
- Blow-out Proof Stem
- Investment Cast Body
- Adjustable Packing
- Locking Device
- Actuator Mounting Pad
- Manufactured Silicone Free
- Sizes 1/2" to 10"

Standards:

- Design: ASME B16.34
- Pressure Test: API 598
- Flange Dimensions: ASME B16.5
- Materials: ASME B16.34
- Mounting Pad: ISO 5211

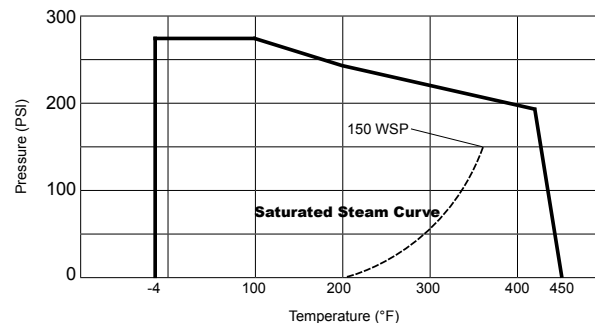


Figure Number Matrix

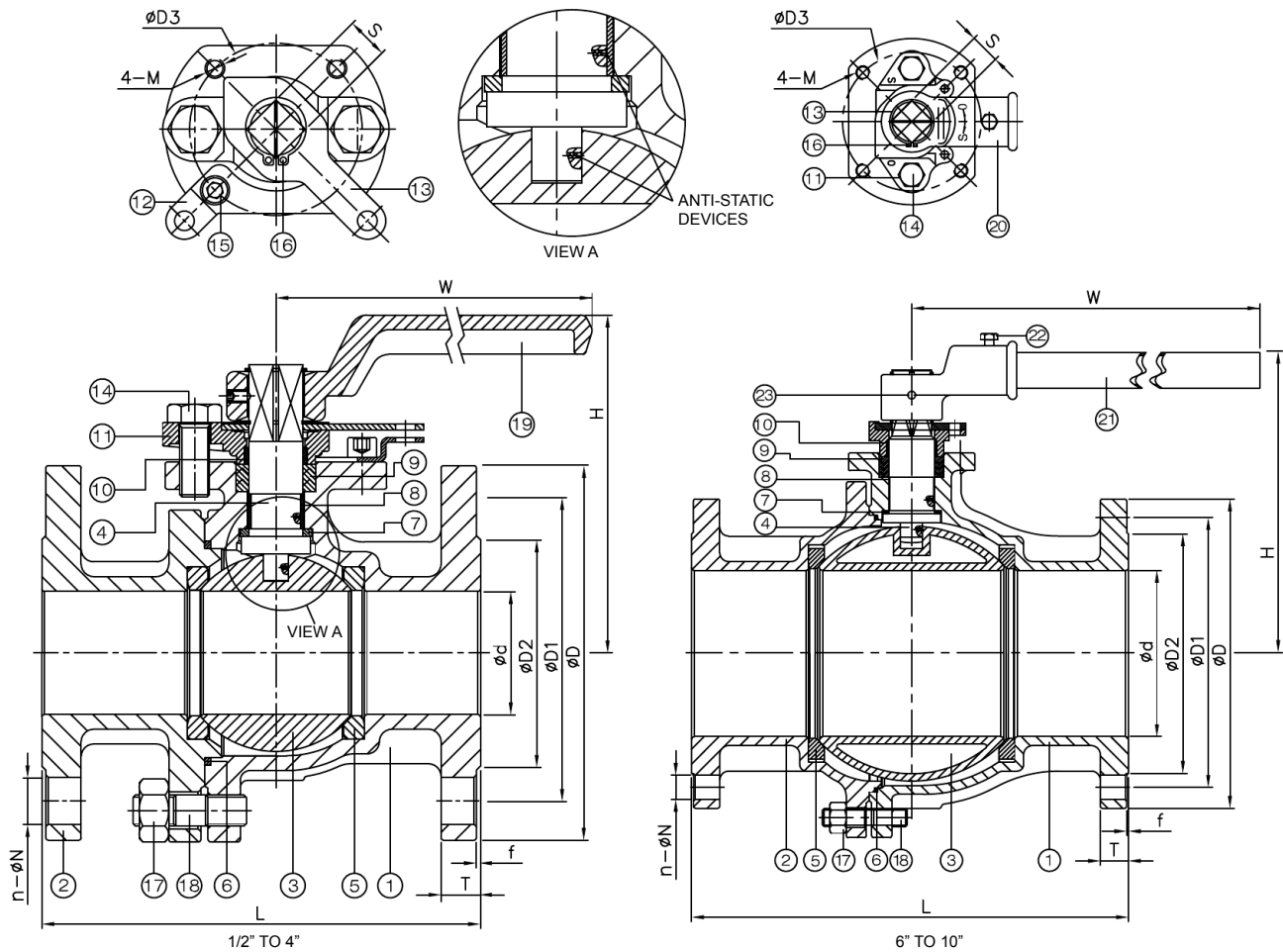
FNW 601 Size	
SIZE CODE	
1/2 = D	3 = M
3/4 = F	4 = P
1 = G	6 = U
1-1/2 = J	8 = X
2 = K	10 = 10
2-1/2 = L	

Cv & Weight

Size	Cv	Wt (lbs)
1/2	15	4.5
3/4	61	4.6
1	110	7.7
1-1/2	270	15
2	500	22
2-1/2	800	32
3	1,310	43
4	2,120	67
6	5,070	137
8	9,250	221
10	15,170	333

Torque

Size	Torque (in-lbs)
1/2	68
3/4	96
1	186
1-1/2	226
2	485
2-1/2	598
3	664
4	1,394
6	3,280
8	6,240
10	9,957



Dimensions (inches)

Size	ØD	ØD1	ØD2	Ød	L	H	W	S	ØD3	M (UNC)	n	ØN	T	f
1/2	3.50	2.38	1.38	0.59	4.25	3.07	5.12	0.43	1.65	1/4"-20	4	0.63	0.44	0.06
3/4	3.88	2.75	1.69	0.79	4.61	3.15	5.12	0.43	1.65	1/4"-20	4	0.63	0.44	0.06
1	4.25	3.12	2.00	0.98	5.00	3.86	6.38	0.55	1.97	1/4"-20	4	0.63	0.44	0.06
1-1/2	5.00	3.88	2.88	1.50	6.5	5.12	7.87	0.67	2.76	5/16"-18	4	0.63	0.56	0.06
2	6.00	4.75	3.62	1.97	7.01	5.39	7.87	0.67	2.76	5/16"-18	4	0.75	0.62	0.06
2-1/2	7.00	5.50	4.12	2.48	7.48	6.38	7.87	0.67	2.76	5/16"-18	4	0.75	0.69	0.06
3	7.50	6.00	5.00	3.15	7.99	7.01	12.80	0.87	4.02	3/8"-16	4	0.75	0.75	0.06
4	9.00	7.50	6.19	3.86	9.02	7.87	12.80	0.87	4.02	3/8"-16	8	0.88	0.94	0.06
6	10.98	9.50	8.50	5.91	15.51	10.30	29.25	1.06	4.92	1/2"-13	8	0.88	1.00	0.06
8	13.50	11.75	10.63	7.87	17.99	11.22	33.07	1.42	5.51	5/8"-11	8	0.88	1.13	0.06
10	15.98	14.25	12.76	9.84	20.98	13.19	40.94	1.81	6.50	3/4"-10	12	1.00	1.19	0.06

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A216-WCB Carbon Steel	1
2	End Cap	ASTM A216-WCB Carbon Steel	1
3	Ball	ASTM A351 Gr. CF8M Stainless	1
4	Stem	ASTM A276-316 Stainless	1
5	Seat	RTFE	2
6	Body Seal	PTFE	1
7	Thrust Washer	PTFE	1
8	Stem Bushing	PTFE	1
9	Packing	PTFE	1
10	Bearing	PTFE	1
11	Gland	AISI304 Stainless	1
12	Lock Out Plate	AISI304 Stainless	1

Ref. No.	Description	Material	Qty
13	Stop Plate	AISI304 Stainless	1
14	Packing Bolt	AISI304 Stainless	2
15	Lock Plate Bolt	AISI304 Stainless	2
16	Snap Ring	AISI304 Stainless	2
17	Body Nut	AISI304 Stainless	4-12
18	Body Stud	AISI304 Stainless	4-12
19	Handle	ASTM A216-WCB Carbon Steel	1
20	Handle Head	AISI304 Stainless	1
21	Handle Tube	AISI304 Stainless	1
22	Handle Bolt	AISI304 Stainless	1
23	Set Screw	AISI304 Stainless	1

Figure 100A STAINLESS STEEL BALL VALVES

FNW™

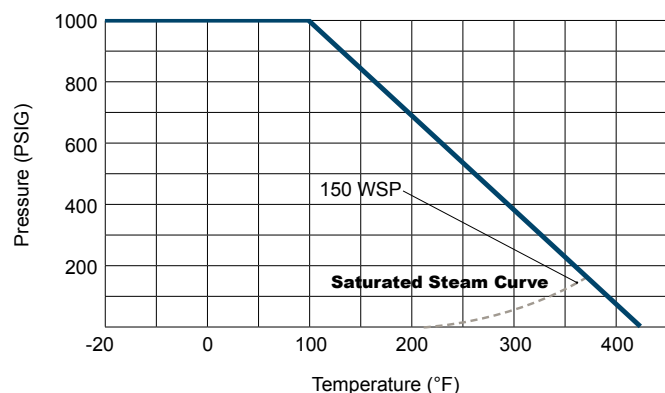
1 PC STANDARD PORT 1000 CWP

Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Blow-out Proof Stem
- Investment Cast Body
- Threaded NPT Ends
- Stainless Steel Handle
- Locking Lever
- RTFE Seats
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Seat/Shell Test: MSS SP-110



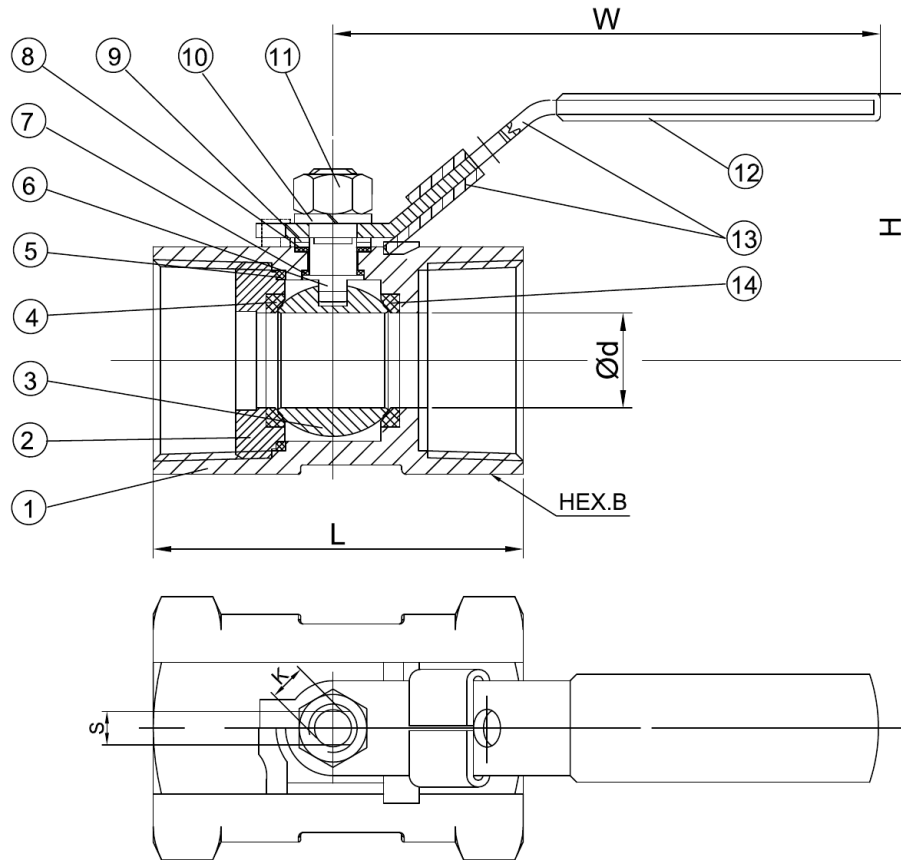
Cv & Weight

Size	Cv	Wt (Lbs)
1/4	10	0.15
3/8	10	0.25
1/2	12	0.43
3/4	16	0.64
1	18	1.00
1-1/4	36	1.52
1-1/2	48	1.98
2	58	3.27

Figure Number Matrix

FNW 100A Size	
SIZE CODE	
1/4 = B	1 = G
3/8 = C	1-1/4 = H
1/2 = D	1-1/2 = J
3/4 = F	2 = K

1 PC STANDARD PORT 1000 CWP



Dimensions (inches)

SIZE	Ød	L	H	W	K	S	B
1/4	0.20	1.63	1.34	2.76	M5x0.8	0.12	0.67
3/8	0.28	1.81	1.38	3.15	M6x1.0	0.16	0.83
1/2	0.36	2.28	1.73	3.62	M8x1.25	0.20	0.98
3/4	0.49	2.40	1.81	3.62	M8x1.25	0.20	1.26
1	0.59	2.89	2.01	4.53	M10x1.5	0.24	1.50
1-1/4	0.79	3.07	2.28	4.53	M10x1.5	0.24	1.89
1-1/2	0.98	3.35	2.60	5.00	M12x1.75	0.31	2.09
2	1.26	4.02	2.83	5.00	M12x1.75	0.31	2.60

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	1
3	Ball	316SS Stainless	1
4	Seat	RTFE	2
5	Body Gasket*	PTFE	1
6	Stem	316SS Stainless	1
7	Thrust Washer	PTFE	1
8	Stem Packing	PTFE	1
9	Gland	304SS Stainless	2
10	Stem Washer	304SS Stainless	1
11	Stem Nut	ASTM A194-8 Stainless	1
12	Handle Sleeve	Vinyl Plastic	1
13	Locking Handle	304SS Stainless	1

* 1-1/4"~2" only, gasket is integral to seat on smaller sizes.

Figure 200A STAINLESS STEEL BALL VALVES

FNW™

2 PC FULL PORT 1000 CWP

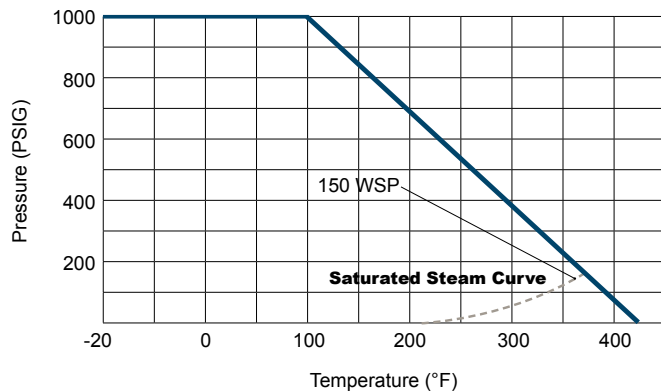
Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Adjustable Packing
- Investment Cast Body
- Threaded NPT Ends
- Stainless Steel Handle
- Locking Lever
- RTFE Seats
- Vented Ball
- Manufactured Silicone Free



Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Seat/Shell Test: MSS SP-110



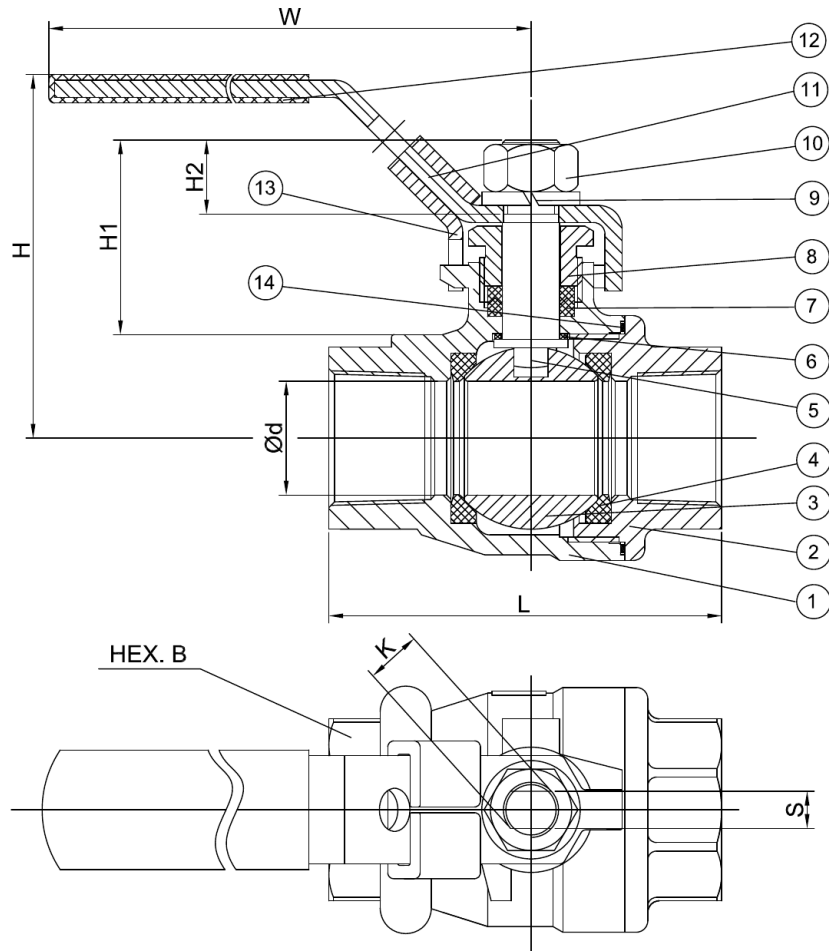
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	60	0.73
3/8	15	60	0.68
1/2	18	66	0.75
3/4	36	80	1.14
1	48	146	1.94
1-1/4	58	252	2.82
1-1/2	120	344	4.12
2	190	503	6.48

Figure Number Matrix

FNW 200A Size	
SIZE CODE	
1/4 = B	1 = G
3/8 = C	1-1/4 = H
1/2 = D	1-1/2 = J
3/4 = F	2 = K

2 PC FULL PORT 1000 CWP



Dimensions (inches)

SIZE	Ød	L	H1	H2	H	W	K (UNC)	S	B
1/4	0.42	2.28	1.13	0.43	2.28	3.94	5/16-18	0.197	0.93
3/8	0.47	2.28	1.13	0.43	2.28	3.94	5/16-18	0.197	0.93
1/2	0.59	2.44	1.05	0.38	2.28	3.94	5/16-18	0.197	0.98
3/4	0.79	2.85	1.35	0.49	2.52	5.08	3/8-16	0.256	1.26
1	0.98	3.35	1.51	0.62	3.03	6.14	7/16-14	0.314	1.61
1-1/4	1.26	3.70	1.46	0.55	3.27	6.14	7/16-14	0.314	1.97
1-1/2	1.50	4.13	1.96	0.89	3.78	7.19	5/8-11	0.394	2.20
2	1.97	4.92	1.91	0.89	4.02	7.19	5/8-11	0.394	2.76

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	1
3	Ball	316SS Stainless	1
4	Seat	RTFE	2
5	Stem	316SS Stainless	1
6	Thrust Washer	PTFE	1
7	V-Ring Packing	PTFE	1 Set
8	Gland Nut	304SS Stainless	1
9	Stem Washer	304SS Stainless	1
10	Stem Nut	ASTM A194-8 Stainless	1
11	Handle	304SS Stainless	1
12	Handle Sleeve	Vinyl Plastic	1
13	Locking Device	304SS Stainless	1
14	Body Gasket	PTFE	1

Figure 220A STAINLESS STEEL BALL VALVES



2 PC FULL PORT 2000 CWP

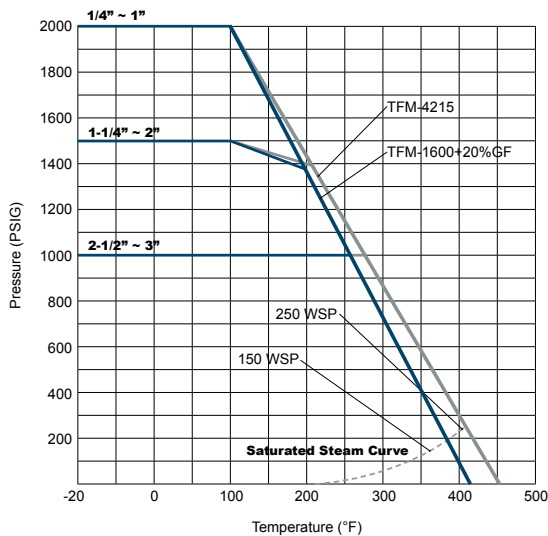
Features:

- 2000 PSI CWP* Non-Shock
- Working Steam Pressure (WSP)
 - 150 PSI - Fig. 220A
 - 250 PSI - Fig. 220AC
- Full Port
- Blow-out Proof Stem
- Adjustable Packing
- Anti-Static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- Threaded NPT Ends
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Seat/Shell Test: MSS SP-110

- * 1/4" to 1" - 2000 PSI CWP
- 1-1/4" to 2" - 1500 PSI CWP
- 2-1/2" to 3" - 1000 PSI CWP



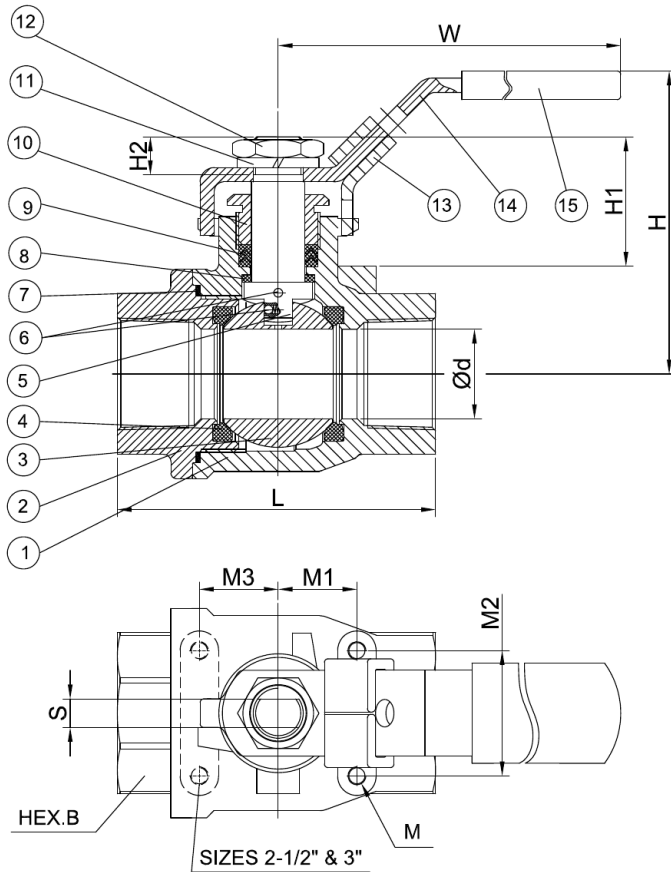
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	69	1.15
3/8	15	69	1.15
1/2	18	77	1.15
3/4	36	98	1.72
1	48	166	1.90
1-1/4	58	277	3.53
1-1/2	120	388	6.00
2	190	582	9.17
2-1/2	450	816	15.43
3	600	1395	19.18

Figure Number Matrix

FNW 220A		Seat/Seals	Size
SEAT/SEAL CODE		SIZE CODE	
Blank = Standard Temp (150 WSP)		1/4 = B	1-1/4 = H
C = High Temp (250 WSP)		3/8 = C	1-1/2 = J
		1/2 = D	2 = K
		3/4 = F	2-1/2 = L
		1 = G	3 = M

2 PC FULL PORT 2000 CWP



Standard Materials

Ref. No.	Description	Material		Qty
		Figure 220A	Figure 220AC	
1	Body	ASTM A351 Gr. CF8M Stainless		1
2	End Cap	ASTM A351 Gr. CF8M Stainless		1
3	Ball	316SS Stainless		1
4	Seat	TFM1600+20%GF	TFM4215	2
5	Stem	316SS Stainless		1
6	Anti-Static Device	316SS Stainless		2
7	Body Gasket	PTFE	PTFE + 20% CF	1
8	Thrust Washer	TFM4215		1
9	V-Ring Packing	PTFE	TFM1600	1 Set
10	Gland Nut	304SS Stainless		1
11	Handle Washer	304SS Stainless		1
12	Handle Nut	304SS Stainless		1
13	Locking Pad	304SS Stainless		1
14	Handle	304SS Stainless		1
15	Handle Cover	Vinyl Plastic		1

Dimensions (inches)

SIZE	Ød	L	H1	H2	H	W	S	M1	M3	M2	M (UNC)	B
1/4	0.42	2.17	1.34	0.40	2.52	3.74	0.314	0.50		1.12	10-24	1.06
3/8	0.50	2.17	1.34	0.40	2.52	3.74	0.314	0.50		1.12	10-24	1.06
1/2	0.59	2.55	1.34	0.40	2.52	4.92	0.314	0.50		1.12	10-24	1.06
3/4	0.79	3.03	1.52	0.43	2.64	4.92	0.314	0.88		1.38	10-24	1.26
1	0.98	3.46	1.46	0.42	3.27	5.51	0.314	0.88		1.38	10-24	1.61
1-1/4	1.26	4.01	2.09	0.83	3.50	5.51	0.314	1.00		1.50	1/4-20	1.97
1-1/2	1.50	4.33	2.44	1.12	3.93	7.87	0.472	1.00		1.50	1/4-20	2.20
2	1.97	4.92	2.36	1.09	4.25	7.87	0.472	1.00		1.50	1/4-20	2.76
2-1/2	2.50	6.45	2.24	0.93	5.91	9.84	0.472	1.18	1.38	2.76	1/4-20	3.27
3	2.99	7.12	2.12	0.93	6.34	9.84	0.472	1.28	1.28	2.76	1/4-20	4.02

Figure 220AM STAINLESS STEEL BALL VALVES



2 PC FULL PORT 2000 CWP w/ ISO MOUNTING PAD

Features:

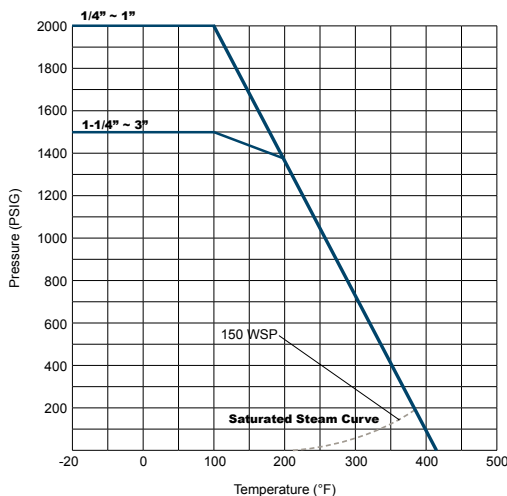
- 2000 PSI CWP* Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Live Loaded Packing
- Anti-Static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- Threaded NPT Ends
- Direct Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)**
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Seat/Shell Test: MSS SP-110
- Mounting Pad: ISO 5211

* 1/4" to 1" - 2000 PSI CWP
1-1/4" to 3" - 1500 PSI CWP

** Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



Cv, Torque & Weight

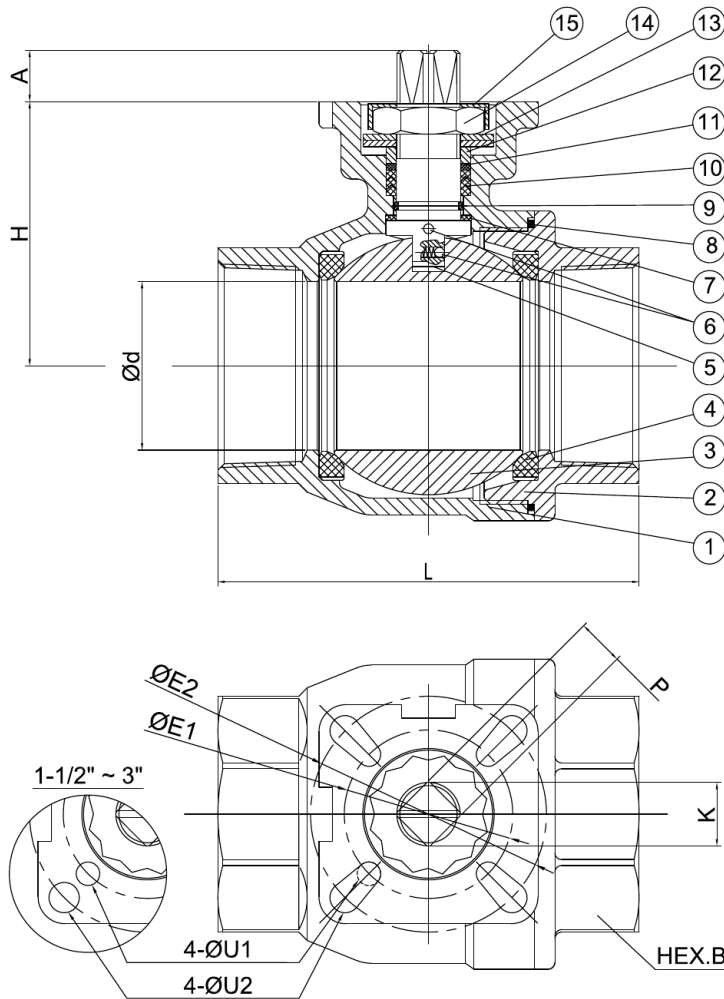
Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	69	1.19
3/8	15	69	1.21
1/2	18	77	1.34
3/4	36	98	1.81
1	48	166	3.06
1-1/4	58	277	3.79
1-1/2	120	388	6.11
2	190	582	10.03
2-1/2	450	897	16.20
3	600	1546	29.98

Figure Number Matrix

FNW 220AM Size	
SIZE CODE	
1/4 = B	1-1/4 = H
3/8 = C	1-1/2 = J
1/2 = D	2 = K
3/4 = F	2-1/2 = L
1 = G	3 = M

2 PC FULL PORT 2000 CWP w/ ISO MOUNTING PAD

Standard Materials



Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	1
3	Ball	316SS Stainless	1
4	Seat	TFM1600+20%GF	2
5	Stem	316SS Stainless	1
6	Anti-Static Device	316SS Stainless	2
7	Thrust Washer	TFM4215	1
8	Body Gasket	PTFE	1
9	O-ring	FKM	1
10	V-Ring Packing	PTFE	1 Set
11	Bushing	50% SS + 50% PTFE	1
12	Gland	316SS Stainless	1
13	Belleville Washer	301SS Stainless	2
14	Stem Nut	ASTM A194-8 Stainless	1
15	Stop-Lock-Cap	304SS Stainless	1

Dimensions (inches)

SIZE	Ød	L	H	ØE1	ØE2	ØU1	ØU2	P	A	ISO 5211	K (UNF)	B
1/4	0.42	2.44	1.70	1.42	1.65	0.24	0.24	0.35	0.35	F03/F04	7/16-20	1.06
3/8	0.50	2.44	1.70	1.42	1.65	0.24	0.24	0.35	0.35	F03/F04	7/16-20	1.06
1/2	0.59	2.95	1.70	1.42	1.65	0.24	0.24	0.35	0.35	F03/F04	7/16-20	1.06
3/4	0.79	3.15	2.00	1.42	1.97	0.24	0.28	0.35	0.35	F03/F05	7/16-20	1.26
1	0.98	3.54	2.28	1.65	1.97	0.24	0.28	0.43	0.43	F04/F05	9/16-18	1.61
1-1/4	1.26	4.33	2.48	1.65	1.97	0.24	0.28	0.43	0.43	F04/F05	9/16-18	1.97
1-1/2	1.50	4.72	2.91	1.97	2.76	0.28	0.35	0.55	0.55	F05/F07	3/4-16	2.20
2	1.97	5.51	3.27	1.97	2.76	0.28	0.35	0.55	0.55	F05/F07	3/4-16	2.76
2-1/2	2.50	7.28	4.03	2.76	4.02	0.33	0.41	0.67	0.67	F07/F10	7/8-14	3.54
3	2.99	8.07	4.36	2.76	4.02	0.33	0.41	0.67	0.67	F07/F10	7/8-14	4.02

Figure 220ASE STAINLESS STEEL BALL VALVES

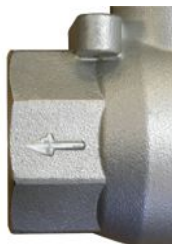


2 PC FULL PORT 150 PSI SAFETY EXHAUST VALVE

The figure 220ASE is an ideal safety option for compressed air applications with downstream pneumatic equipment. Conventional shut off valves can trap compressed air in pneumatic equipment, creating a potentially dangerous situation. With the 220ASE safety exhaust valve, down stream pressure is vented through the body when the valve is in the closed position. The full port design minimizes pressure drop and the all stainless steel construction provides robust corrosion resistance.

Features:

- 150 PSI Max. Pressure
- Full Port
- Blow-out Proof Stem
- Adjustable Packing
- Investment Cast Body
- TFM (Super TFE) Seats
- Threaded NPT Ends
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad for Actuation or Panel Mount Applications
- Non-Vented Ball
- Installation Arrow (Ensures proper installation by indicating downstream direction)



Standards:

- General Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1

Figure Number Matrix

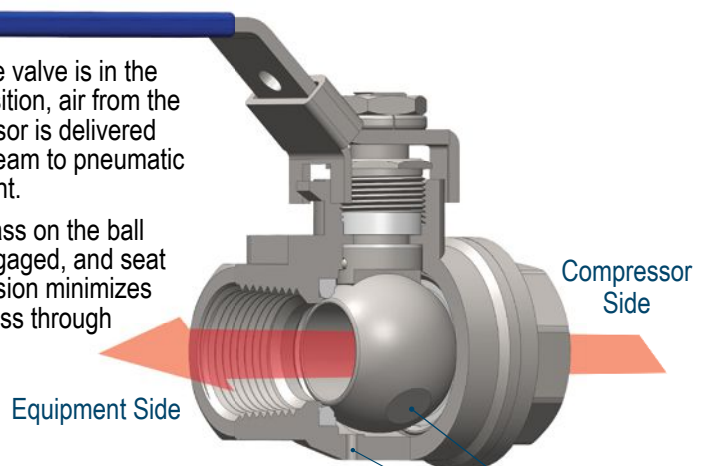
FNW 220A SE		Size
SIZE CODE		
1/4 = B		1 = G
3/8 = C		1-1/4 = H
1/2 = D		1-1/2 = J
3/4 = F		2 = K



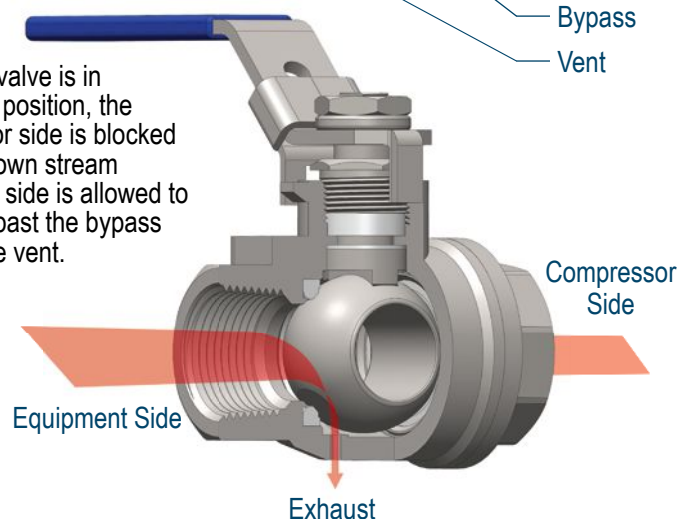
Design Principle

When the valve is in the open position, air from the compressor is delivered down stream to pneumatic equipment.

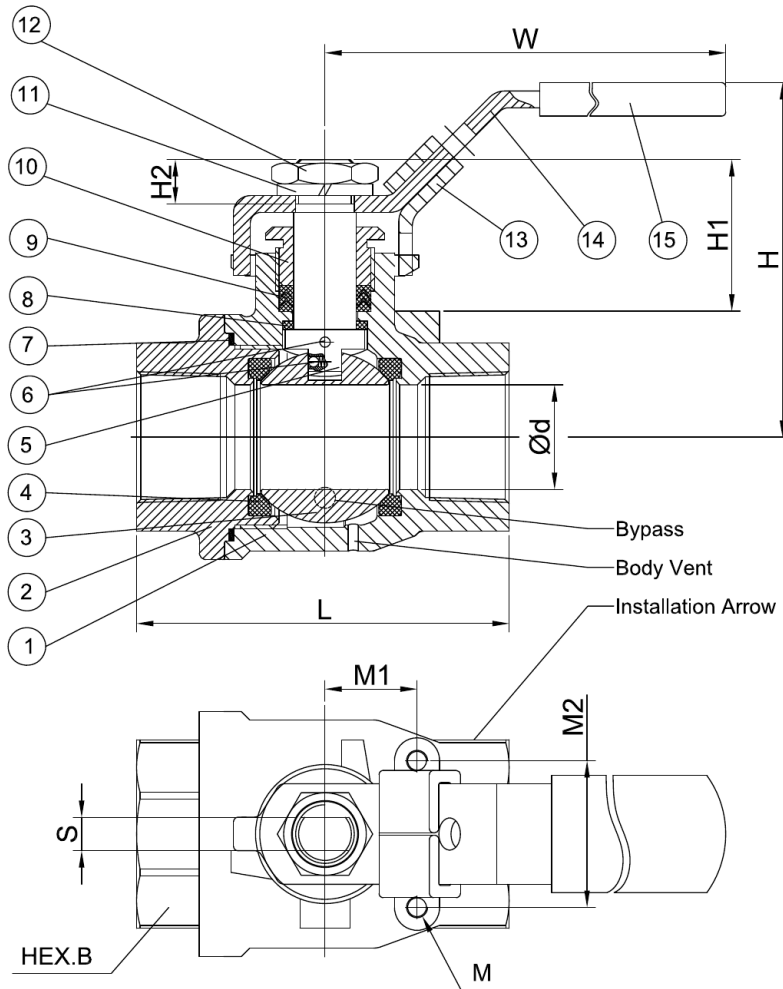
The bypass on the ball is not engaged, and seat compression minimizes any air loss through the body.



When the valve is in the closed position, the compressor side is blocked off. The down stream equipment side is allowed to flow back past the bypass and out the vent.



2 PC FULL PORT 150 PSI SAFETY EXHAUST VALVE



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	1
3	Ball	316SS Stainless	1
4	Seat	TFM1600+20%GF	2
5	Stem	316SS Stainless	1
6	Anti-Static Device	316SS Stainless	2
7	Body Gasket	PTFE	1
8	Thrust Washer	TFM4215	1
9	V-Ring Packing	PTFE	1 Set
10	Gland Nut	304SS Stainless	1
11	Handle Washer	304SS Stainless	1
12	Handle Nut	304SS Stainless	1
13	Locking Pad	304SS Stainless	1
14	Handle	304SS Stainless	1
15	Handle Cover	Vinyl Plastic	1

Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	69	1.15
3/8	15	69	1.15
1/2	18	77	1.15
3/4	36	98	1.72
1	48	166	1.90
1-1/4	58	277	3.53
1-1/2	120	388	6.00
2	190	582	9.17

Dimensions (inches)

SIZE	Ød	L	H1	H2	H	W	S	M1	M2	M (UNC)	B
1/4	0.42	2.17	1.34	0.40	2.52	3.74	0.314	0.50	1.12	10-24	1.06
3/8	0.50	2.17	1.34	0.40	2.52	3.74	0.314	0.50	1.12	10-24	1.06
1/2	0.59	2.55	1.34	0.40	2.52	4.92	0.314	0.50	1.12	10-24	1.06
3/4	0.79	3.03	1.52	0.43	2.64	4.92	0.314	0.88	1.38	10-24	1.26
1	0.98	3.46	1.46	0.42	3.27	5.51	0.314	0.88	1.38	10-24	1.61
1-1/4	1.26	4.01	2.09	0.83	3.50	5.51	0.314	1.00	1.50	1/4-20	1.97
1-1/2	1.50	4.33	2.44	1.12	3.93	7.87	0.472	1.00	1.50	1/4-20	2.20
2	1.97	4.92	2.36	1.09	4.25	7.87	0.472	1.00	1.50	1/4-20	2.76

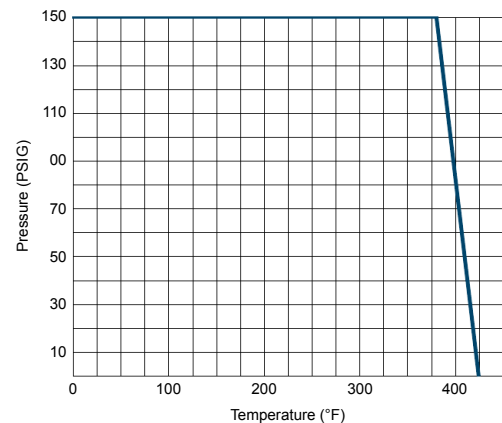


Figure 233A STAINLESS STEEL BALL VALVES



3-WAY DIVERTER STANDARD PORT 1000 CWP

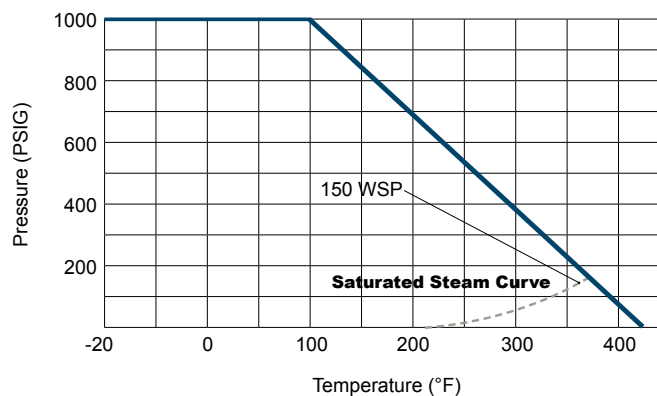
Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Standard Port
- Blow-out Proof Stem
- Live Loaded Packing
- Anti-Static Design
- Investment Cast Body
- Four Seat Design
- RTFE Seats
- Threaded NPT Ends
- Stainless Steel Handle
- Locking Lever
- Direct Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)*
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME B1.20.1
- Seat/Shell Test: MSS SP-110
- Mounting Pad: ISO 5211

* Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



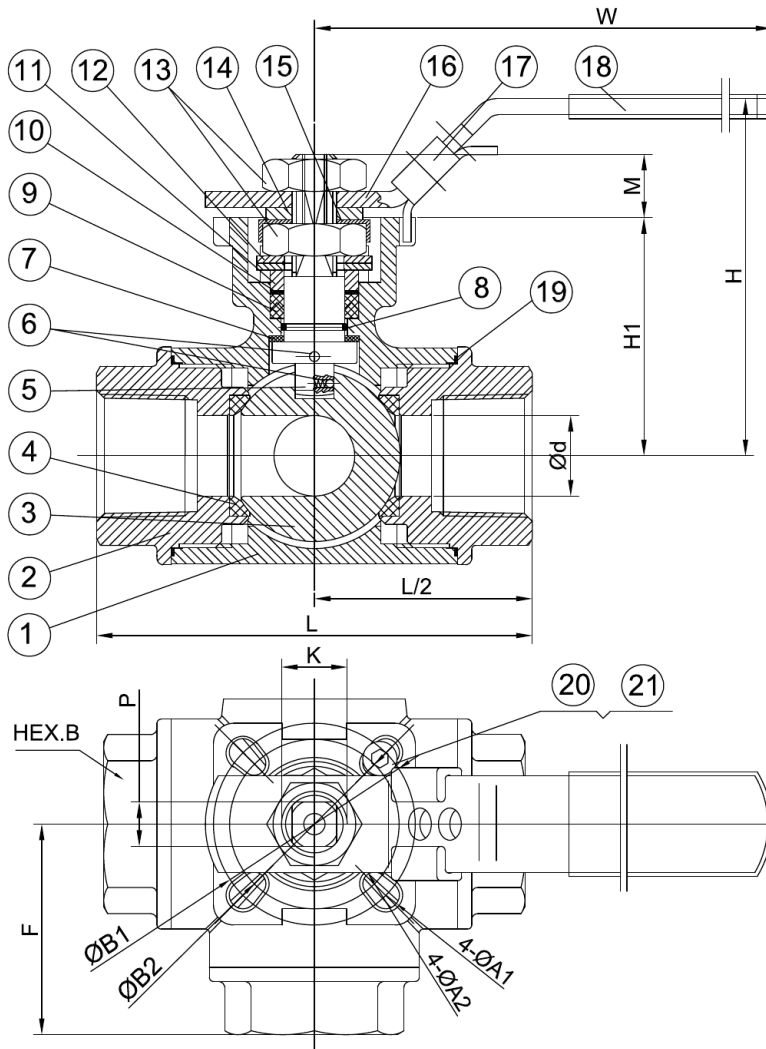
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/2	15	66	1.74
3/4	18	80	2.47
1	36	146	4.10
1-1/4	45	252	6.64
1-1/2	72	344	9.39
2	120	503	15.65

Figure Number Matrix

FNW 233A Size	
SIZE CODE	
1/2 = D	1-1/4 = H
3/4 = F	1-1/2 = J
1 = G	2 = K

3-WAY DIVERTER STANDARD PORT 1000 CWP



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	3
3	Ball	316SS Stainless	1
4	Seat	RTFE	4
5	Stem	316SS Stainless	1
6	Anti-Static Device	316SS Stainless	2
7	Thrust Washer	PTFE	1
8	O-ring	FKM	1
9	V-Ring Packing	PTFE	1 Set
10	Bushing	50% Stainless + 50% PTFE	1
11	Gland	316SS Stainless	1
12	Belleville Washer	301SS Stainless	2
13	Stem Nut	ASTM A194-8 Stainless	2
14	Handle Gland	304SS Stainless	1
15	Stop-Lock-Cap	304SS Stainless	1
16	Handle	304SS Stainless	1
17	Lock Device	304SS Stainless	1
18	Handle Sleeve	Vinyl Plastic	1
19	Body Gasket	PTFE	3
20	Stop Bolt	ASTM A193-B8 Stainless	1
21	Stop Nut	ASTM A194-8 Stainless	1

90° L-PORT PATTERN



FLOW PLAN A

Dimensions (inches)

SIZE	Ød	L	H1	H	M	W	ØB1	ØB2	ØA1	ØA2	F	P	ISO 5211	K (UNF)	B
1/2	0.43	3.11	1.65	2.76	0.35	5.79	1.65	1.42	0.24	0.24	1.56	0.35	F03/F04	7/16-20	1.06
3/4	0.59	3.46	1.93	3.03	0.35	5.79	1.97	1.42	0.28	0.24	1.73	0.35	F03/F05	7/16-20	1.34
1	0.79	4.25	2.34	3.43	0.43	6.95	1.97	1.65	0.28	0.24	2.13	0.43	F04/F05	9/16-18	1.61
1-1/4	0.98	4.88	2.48	3.66	0.43	6.95	2.76	1.65	0.35	0.24	2.44	0.43	F04/F07	9/16-18	1.97
1-1/2	1.26	5.31	2.89	4.06	0.55	8.46	2.76	1.97	0.35	0.28	2.66	0.55	F05/F07	3/4-16	2.20
2	1.57	6.46	3.26	4.45	0.55	8.46	2.76	1.97	0.35	0.28	3.23	0.55	F05/F07	3/4-16	2.76

Figure 310A STAINLESS STEEL BALL VALVES

FNW™

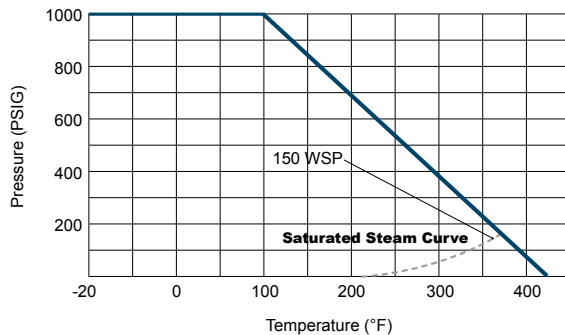
3 PC FULL PORT 1000 CWP

Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Adjustable Packing
- Investment Cast Body
- End Connections
 - Threaded
 - Socket Weld
- Stainless Steel Handle
- Locking Lever
- RTFE Seats
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections:
 - NPT - ASME B1.20.1
 - SW - ASME B16.11
- Seat/Shell Test: MSS SP-110



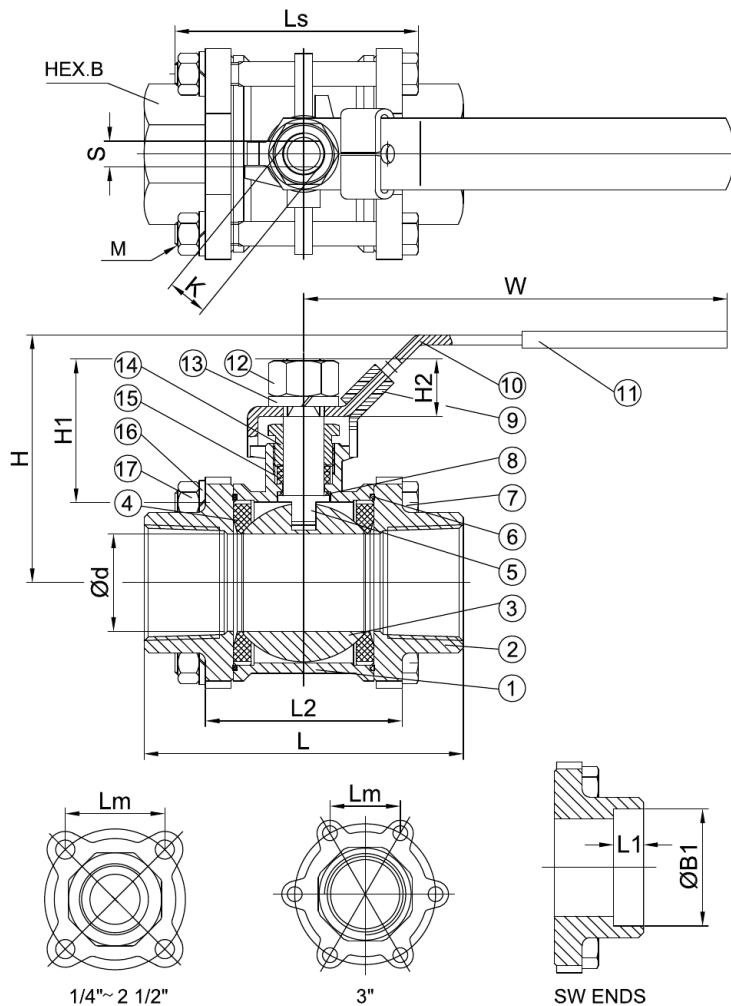
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)	
			NPT	SW
1/4	15	60	1.01	0.93
3/8	15	60	1.01	0.98
1/2	18	66	1.12	1.10
3/4	36	80	1.81	1.76
1	48	146	2.69	2.60
1-1/4	58	252	4.28	4.19
1-1/2	120	344	5.73	5.60
2	190	503	9.04	8.95
2-1/2	450	631	18.25	18.08
3	600	1337	25.57	25.88

Figure Number Matrix

FNW 310A Ends Size		
END CODE		SIZE CODE
Blank = Threaded NPT		1/4 = B 1-1/4 = H
SW = Socket Weld		3/8 = C 1-1/2 = J
		1/2 = D 2 = K
		3/4 = F 2-1/2 = L
		1 = G 3 = M
(For 4" valves, use FNW Figure number 310AM)		

3 PC FULL PORT 1000 CWP



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	NPT SW ASTM A351 Gr. CF8M Stainless ASTM A351 Gr. CF3M Stainless	2
3	Ball	316SS Stainless	1
4	Seat	RTFE	2
5	Stem	316SS Stainless	1
6	Body Gasket	PTFE	2
7	Body Bolt	1/4"~2-1/2" 3" ASTM A193-B8 Stainless	4 6
8	Thrust Washer	PTFE	1
9	Locking Device	304SS Stainless	1
10	Handle	304SS Stainless	1
11	Handle Sleeve	Vinyl Plastic	1
12	Stem Nut	ASTM A194-8 Stainless	1
13	Stem Washer	304SS Stainless	1
14	Gland Nut	304SS Stainless	1
15	V-Ring Packing	PTFE	1 Set
16	Bolt Washer	1/4"~2" 2-1/2" 3" SUS304 Stainless	4 8 12
17	Bolt Nut	1/4"~2" 2-1/2" 3" ASTM A194-8 Stainless	4 8 12

Dimensions (inches)

SIZE	Ød	L	Lm	H1	H2	H	W	S	K (UNC)	Ls	L2	M (UNC)	B	L1	ØB1
1/4	0.42	2.57	1.14	1.20	0.43	2.26	3.94	0.197	5/16-18	1.98	1.46	1/4-20	0.93	0.39	0.56
3/8	0.50	2.57	1.14	1.20	0.43	2.26	3.94	0.197	5/16-18	1.98	1.46	1/4-20	0.93	0.39	0.69
1/2	0.59	2.74	1.21	1.11	0.38	2.26	3.94	0.197	5/16-18	2.13	1.63	1/4-20	1.10	0.39	0.86
3/4	0.79	3.15	1.52	1.30	0.49	2.50	5.08	0.256	3/8-16	2.44	1.82	5/16-18	1.36	0.51	1.07
1	0.98	3.54	1.76	1.61	0.62	2.97	6.14	0.314	7/16-14	2.79	2.10	5/16-18	1.65	0.51	1.34
1-1/4	1.26	4.33	2.13	1.61	0.55	3.19	6.14	0.314	7/16-14	3.37	2.68	3/8-16	2.05	0.63	1.69
1-1/2	1.50	4.72	2.42	2.12	0.89	3.70	7.19	0.394	5/8-11	3.81	3.05	3/8-16	2.30	0.63	1.93
2	1.97	5.51	2.95	2.19	0.89	4.11	7.19	0.394	5/8-11	4.36	3.59	3/8-16	2.81	0.67	2.42
2-1/2	2.50	7.28	3.62	2.69	0.93	5.16	9.92	0.472	3/4-10	5.75	4.36	9/16-12	3.41	0.67	2.91
3	2.99	8.07	2.93	2.75	0.93	5.47	9.92	0.472	3/4-10	6.34	4.93	9/16-12	3.98	0.67	3.54

Figure 310AM STAINLESS STEEL BALL VALVES



3 PC FULL PORT 1000 CWP w/ ISO MOUNTING PAD

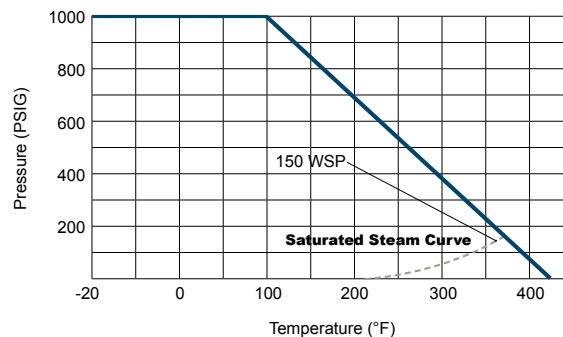
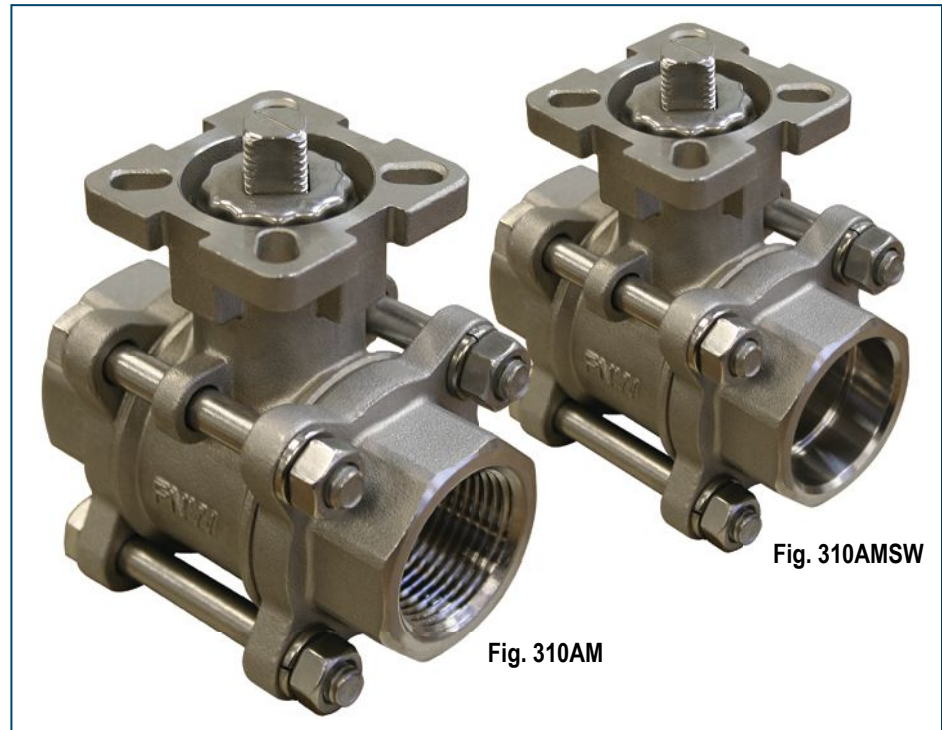
Features:

- 1000 PSI CWP Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-Static Design
- Investment Cast Body
- RTFE Seats
- End Connections
 - Threaded
 - Socket Weld
- 4" with Handle Standard (Lock-out Style)
- Direct Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)*
- Vented Ball
- Manufactured Silicone Free

Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections:
 - NPT - ASME B1.20.1
 - SW - ASME B16.11
- Mounting Pad: ISO 5211
- Seat/Shell Test: MSS SP-110

* Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



4" with Handle - Standard

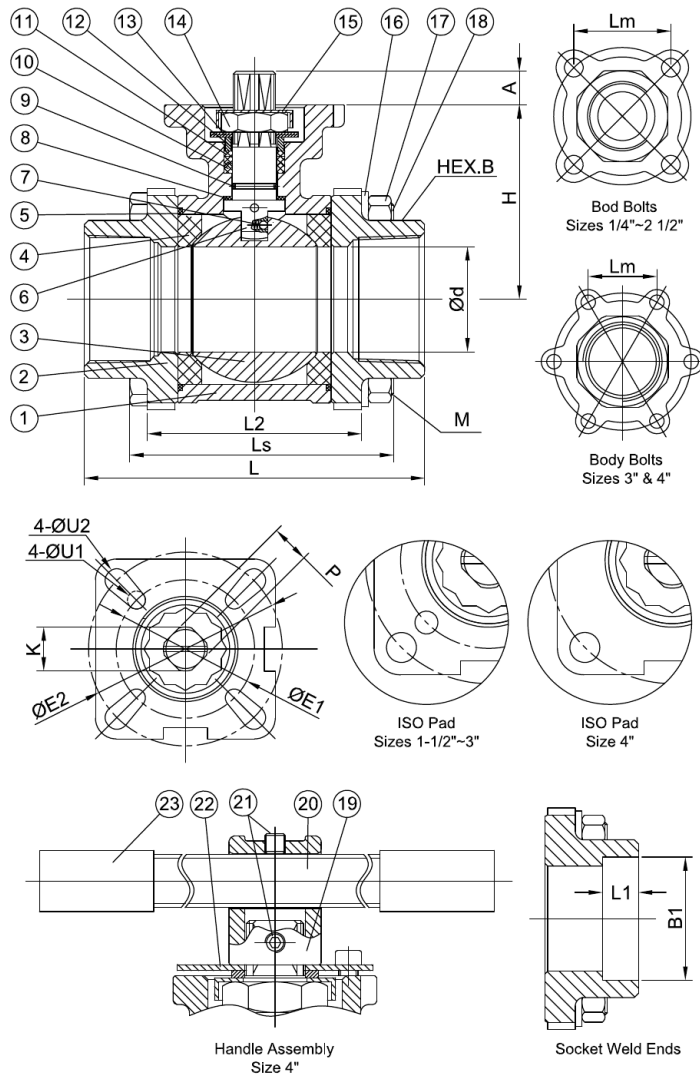
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/4	15	60	1.01
3/8	15	60	1.03
1/2	18	66	1.05
3/4	36	80	1.73
1	48	146	2.33
1-1/4	58	242	4.30
1-1/2	120	344	5.21
2	190	503	9.09
2-1/2	450	631	17.31
3	600	1337	24.36
4	1100	1959	51.00

Figure Number Matrix

FNW 310AM		Ends	Size
		SIZE CODE	
Blank = Threaded NPT	1/4 = B	1 = G	2-1/2 = L
SW = Socket Weld	3/8 = C	1-1/4 = H	3 = M
	1/2 = D	1-1/2 = J	4 = P
	3/4 = F	2 = K	

3 PC FULL PORT 1000 CWP



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	NPT ASTM A351 Gr. CF8M Stainless	2
		SW ASTM A351 Gr. CF3M Stainless	
3	Ball	316SS Stainless	1
4	Seat	RTFE	2
5	Body Gasket	PTFE	2
6	Stem	316SS Stainless	1
7	Anti-Static Device	316SS Stainless	2
8	Thrust Washer	PTFE	1
9	O-ring	FKM	1
10	V-Ring Packing	PTFE	1 Set
11	Bushing	50% Stainless + 50% PTFE	1
12	Gland	316SS Stainless	1
13	Belleville Washer	301SS Stainless	2
14	Stem Nut	ASTM A194-8 Stainless	1
15	Stop-Lock-Cap	304SS Stainless	1
16	Bolt Washer	1/4"~2"	4
		2-1/2"	8
		3"~4"	12
17	Bolt Nut	1/4"~2"	4
		2-1/2"	8
		3"~4"	12
18	Body Bolt	1/4"~3"	4
		4"	6
19	Handle Adapter 4"	ASTM A351 Gr. CF8 Stainless	1
20	Pipe Handle 4"	ASTM A53 Steel + Zinc Plating	1
21	Set Screw 4"	ASTM A193-B8 Stainless	1
22	Triangle Stopper 4"	420SS Stainless	1
23	Handle Sleeve 4"	Vinyl Plastic	1

Dimensions (inches)

SIZE	Ød	L	Lm	H	P	A	ØE1	ØE2	U1	U2	K (UNF)	Ls	L2	M (UNC)	B	L1	ØB1
1/4	0.42	2.95	1.30	1.65	0.35	0.35	1.42	1.65	0.24	0.24	7/16-20	2.23	1.71	1/4-20	1.10	0.39	0.56
3/8	0.50	2.95	1.30	1.65	0.35	0.35	1.42	1.65	0.24	0.24	7/16-20	2.23	1.71	1/4-20	1.10	0.39	0.70
1/2	0.59	2.95	1.30	1.65	0.35	0.35	1.42	1.65	0.24	0.24	7/16-20	2.23	1.71	1/4-20	1.10	0.39	0.86
3/4	0.79	3.15	1.52	1.91	0.35	0.35	1.42	1.97	0.24	0.28	7/16-20	2.44	1.82	5/16-18	1.36	0.51	1.07
1	0.98	3.54	1.76	2.30	0.43	0.43	1.65	1.97	0.24	0.28	9/16-18	2.79	2.10	5/16-18	1.65	0.51	1.34
1-1/4	1.26	4.33	2.13	2.48	0.43	0.43	1.65	2.76	0.24	0.35	9/16-18	3.37	2.68	3/8-16	2.05	0.63	1.69
1-1/2	1.50	4.72	2.42	2.81	0.55	0.55	1.97	2.76	0.28	0.35	3/4-16	3.81	3.05	3/8-16	2.30	0.63	1.93
2	1.97	5.51	2.95	3.08	0.55	0.55	1.97	2.76	0.28	0.35	3/4-16	4.36	3.59	3/8-16	2.81	0.67	2.42
2-1/2	2.50	7.28	3.62	3.94	0.67	0.67	2.76	4.02	0.35	0.43	7/8-14	5.75	4.36	9/16-12	3.41	0.67	2.91
3	2.99	8.07	2.93	4.27	0.67	0.67	2.76	4.02	0.35	0.43	7/8-14	6.34	4.93	9/16-12	3.98	0.67	3.54
4	3.95	9.45	3.76	5.51	0.87	0.87		4.02		0.43	1-1/8-12	7.87	6.26	5/8-11	5.20	0.79	4.53

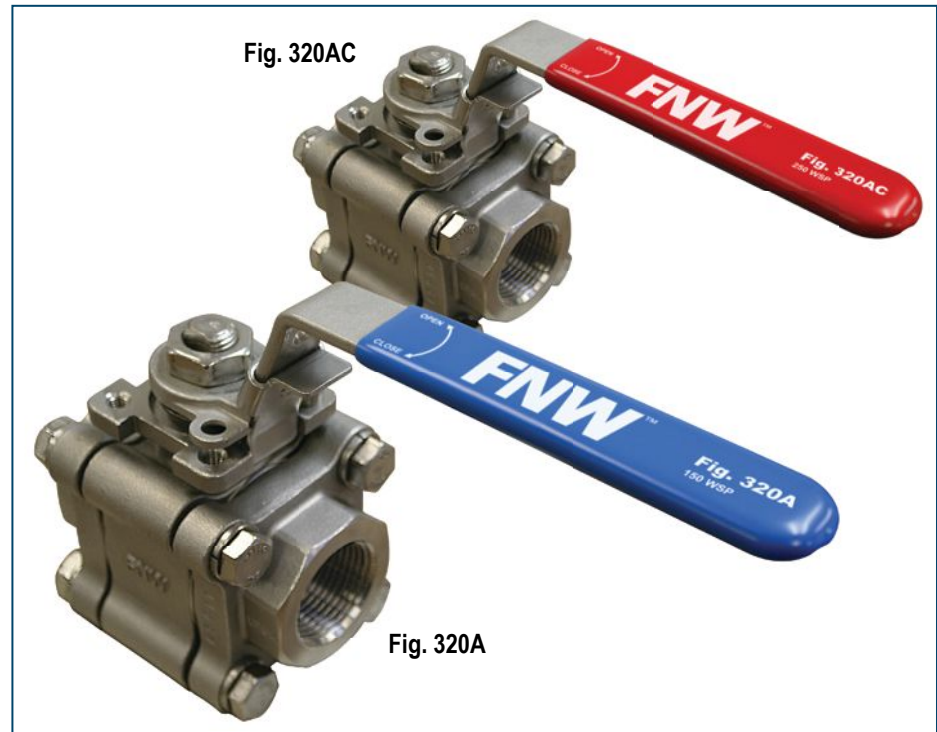
Figure 320A STAINLESS STEEL BALL VALVES

FNW™

3 PC FULL PORT 2000 CWP

Features:

- 2000 PSI CWP* Non-Shock
- Working Steam Pressure (WSP)
 - 150 PSI - Fig. 320A
 - 250 PSI - Fig. 320AC
- Full Port
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-Static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- End Connections
 - Threaded
 - Socket Weld
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)**
- Vented Ball
- Manufactured Silicone Free

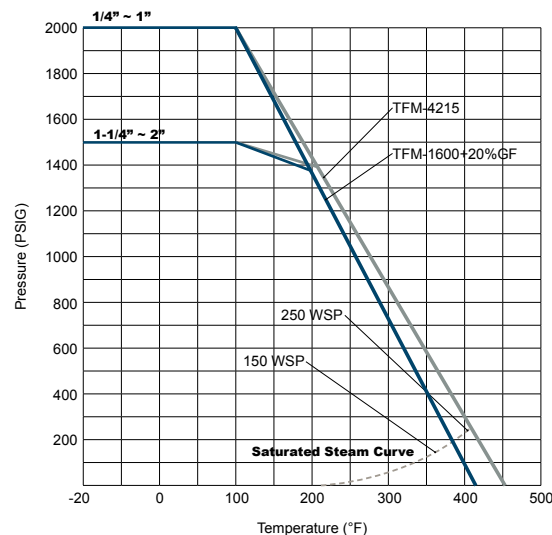


Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections:
 - NPT - ASME B1.20.1
 - SW - ASME B16.11
- Seat/Shell Test: MSS SP-110

* 1/4" to 1" - 2000 PSI CWP
1-1/4" to 2" - 1500 PSI CWP

** Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



Optional Socket Weld Ends

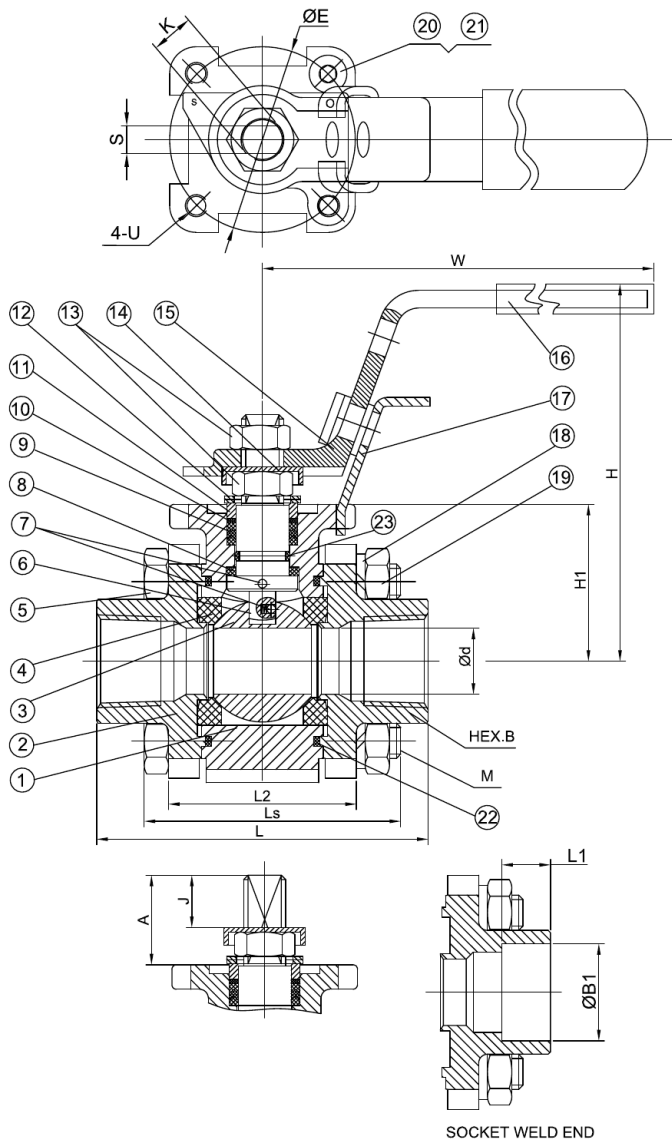
Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)	
			NPT	SW
1/4	15	69	2.34	2.34
3/8	15	69	2.34	2.34
1/2	18	77	2.29	2.25
3/4	36	98	3.15	3.15
1	48	166	4.59	4.59
1-1/4	58	277	7.61	7.61
1-1/2	120	388	9.92	9.92
2	190	582	15.21	15.48

Figure Number Matrix

FNW 320A			Seat/Seals	Ends	Size
SEAT/SEAL CODE			END CODE		SIZE CODE
Blank = Standard Temp (150 WSP)			Blank = Threaded NPT		1/4 = B
C = High Temp (250 WSP)			SW = Socket Weld		3/8 = C
					1/2 = D
					3/4 = F
					1 = G
					1-1/4 = H
					1-1/2 = J
					2 = K

3 PC FULL PORT 2000 CWP



Standard Materials

Ref. No.	Description		Material		Qty
			Figure 320A	Figure 320AC	
1	Body		ASTM A351 Gr. CF8M Stainless		1
2	End Cap	NPT	ASTM A351 Gr. CF8M Stainless		2
		SW	ASTM A351 Gr. CF3M Stainless		
3	Ball		316SS Stainless		1
4	Seat		TFM1600+20%GF	TFM4215	2
5	Body Bolt	1/4~1-1/4	ASTM A193-B8 Stainless		4
		1-1/2~2			8
6	Stem		316SS Stainless		1
7	Anti-Static Device		316SS Stainless		2
8	Thrust Washer		TFM4215		1
9	V-Ring Packing		PTFE	TFM1600	1 Set
10	Bushing		50% Stainless + 50% PTFE		1
11	Gland		316SS Stainless		1
12	Belleville Washer		301SS Stainless		2
13	Stem Nut		ASTM A194-8 Stainless		2
14	Stop-Lock-Cap		304SS Stainless		1
15	Handle		304SS Stainless		1
16	Handle Sleeve		Vinyl Plastic		1
17	Lock Device		304SS Stainless		1
18	Bolt Washer	1/4~1-1/4	304SS Stainless		4
		1-1/2~2			8
19	Bolt Nut	1/4~1-1/4	ASTM A194-8 Stainless		4
20	Stop Bolt		ASTM A193-B8 Stainless		1
21	Stop Washer		304SS Stainless		1
22	Body Gasket		PTFE	PTFE+20%CF	2
23	O-ring		FKM		1

Dimensions (inches)

SIZE	Ød	L	H1	H	W	ØE	S	U	A	J	K (UNF)	Ls	L2	M (UNC)	B	L1	ØB1
1/4	0.42	2.76	1.18	2.99	5.31	1.65	0.25	M5	0.68	0.41	3/8-24	2.13	1.61	1/4-20	0.93	0.43	0.55
3/8	0.50	2.76	1.18	2.99	5.31	1.65	0.25	M5	0.68	0.41	3/8-24	2.13	1.61	1/4-20	0.93	0.43	0.69
1/2	0.59	2.95	1.42	3.27	5.31	1.65	0.25	M5	0.80	0.46	3/8-24	2.44	1.83	5/16-18	1.10	0.43	0.86
3/4	0.79	3.15	1.56	3.27	5.31	1.65	0.25	M5	0.80	0.46	3/8-24	2.74	2.05	3/8-16	1.34	0.51	1.07
1	0.98	3.54	1.79	3.86	6.69	1.97	0.35	M6	0.92	0.49	9/16-18	3.18	2.36	3/8-16	1.81	0.51	1.34
1-1/4	1.25	4.33	1.97	4.06	6.69	1.97	0.35	M6	0.92	0.49	9/16-18	3.86	2.76	1/2-13	2.17	0.51	1.68
1-1/2	1.50	4.72	2.36	4.33	7.87	2.76	0.38	M8	1.18	0.59	5/8-18	4.12	3.24	1/2-13	2.24	0.51	1.91
2	1.95	5.51	2.68	4.69	7.87	2.76	0.38	M8	1.18	0.59	5/8-18	4.90	3.68	5/8-11	2.87	0.63	2.41

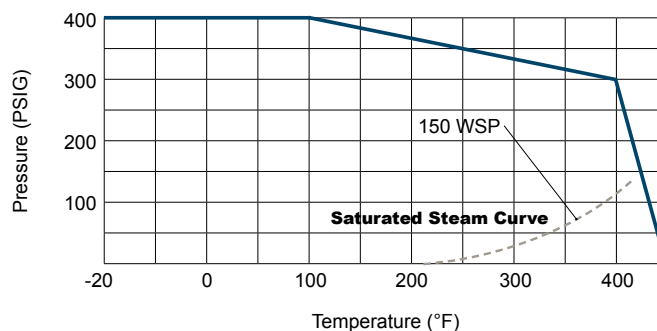
Figure 330A STAINLESS STEEL BALL VALVES



3 PC SANITARY 400 CWP w/CLAMP ENDS

Features:

- 400 PSI CWP Non-Shock
- 150 PSI WSP
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-Static Design
- Investment Cast Body
- Internal Polished Body & Ball Surface (Ra 32µin / 0.8µm)
- Double Stem Seal
- Cavity Filled TFM (Super TFE) Seat Design
- Clamp Ends
- Stainless Steel Handle
- Locking Lever
- Direct Mounting Pad
- Vacuum Rated to 26.967"Hg (75 Torr)*
- Manufactured Silicone Free



Standards:

- Design: ASME B16.34, MSS SP-110
- End Connections: ASME BPE
- Seat/Shell Test: MSS SP-110
- Mounting Pad: ISO 5211
- Face-To-Face: DIN 3202 Part 2 S13

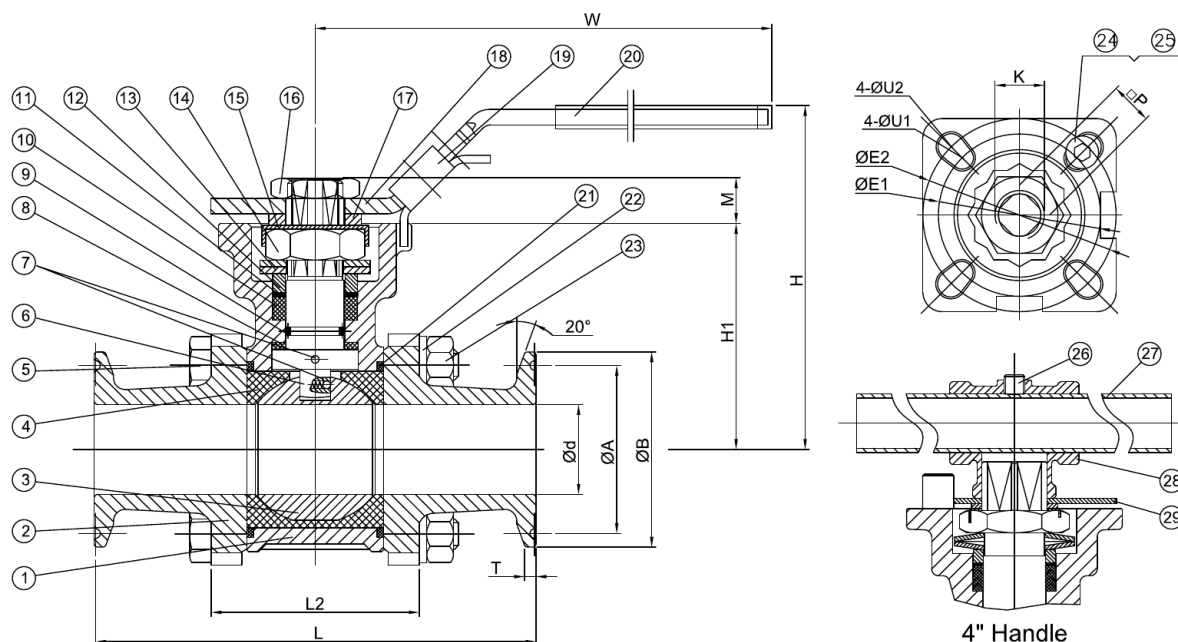
* Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.

Cv, Torque & Weight

Size	Cv	Torque (in-lbs)	Wt (lbs)
1/2	16	58	1.28
3/4	18	69	2.27
1	48	121	3.17
1-1/2	120	254	6.56
2	190	368	9.92
2-1/2	450	565	18.47
3	600	933	26.12
4	1100	1416	51.37

Figure Number Matrix

FNW 330A Size		
SIZE CODE		
1/2 = D	1-1/2 = J	3 = M
3/4 = F	2 = K	4 = P
1 = G	2-1/2 = L	



Dimensions (inches)

SIZE	Ød	L	H1	H	W	A	B	T	M	ØE1	ØE2	P	U1	U2	L2	K (UNF)
1/2	0.37	3.54	1.65	2.83	5.71	0.80	1.00	0.15	0.35	1.42	1.65	0.35	0.24	0.24	1.71	7/16-20
3/4	0.62	3.54	1.93	3.15	5.71	0.80	1.00	0.15	0.35	1.42	1.97	0.35	0.24	0.28	1.82	7/16-20
1	0.87	3.94	2.28	3.54	6.30	1.71	1.99	0.11	0.43	1.65	1.97	0.43	0.24	0.28	2.10	9/16-18
1-1/2	1.37	4.92	2.80	4.17	7.48	1.71	1.99	0.11	0.55	1.97	2.76	0.55	0.28	0.35	3.05	3/4-16
2	1.87	5.91	3.07	4.45	7.48	2.22	2.52	0.11	0.55	1.97	2.76	0.55	0.28	0.35	3.59	3/4-16
2-1/2	2.37	7.48	3.94	5.91	10.24	2.78	3.05	0.11	0.67	2.76	4.02	0.67	0.35	0.43	4.32	7/8-14
3	2.87	8.66	4.29	6.26	10.24	3.29	3.58	0.11	0.67	2.76	4.02	0.67	0.35	0.43	4.91	7/8-14
4	3.84	10.63	5.51	7.80	13.78	4.33	4.69	0.11	0.67	4.02	0.67		0.43		6.22	1-1/8-12

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	2
3	Ball	316SS Stainless	1
4	Seat	TFM1600	2
5	Body Bolt	ASTM A193-B8 Stainless	4
6	Stem	316SS Stainless	1
7	Anti-Static Device	316SS Stainless	2
8	Thrust Washer	PTFE	1
9	O-ring	FKM	1
10	V-Ring Packing	PTFE	1 Set
11	Bushing	50% Stainless + 50% PTFE	1
12	Gland	316SS Stainless	1
13	Belleville Washer	301SS Stainless	2
14	Stem Nut	304SS Stainless	1
15	Stop-Lock-Cap	304SS Stainless	1
16	Handle Nut	304SS Stainless	1
17	Square Washer	304SS Stainless	1
18	Handle	304SS Stainless	1
19	Lock Device	304SS Stainless	1
20	Handle Sleeve	Vinyl Plastic	1
21	Body Gasket	PTFE	2
22	Bolt Washer	304SS Stainless	4
23	Bolt Nut	304SS Stainless	4
24	Stop Bolt	304SS Stainless	1
25	Nut	304SS Stainless	1
26	Set Screw (4" only)	304SS Stainless	1
27	Handle (4" only)	ASTM A53 Steel + Zinc Plating	1
28	Adapter (4" only)	304SS Stainless	1
29	Stopper (4" only)	420SS Stainless	1

Figure 500 STAINLESS STEEL BALL VALVES

FNW™

1 PC STANDARD PORT 150# FLANGED

Features:

- Standard Port
- 150 WSP
- Flanged Connection
- RTFE Seats
- Stainless Steel Trim
- Anti-Static Design
- Blow-out Proof Stem
- Investment Cast Body
- Adjustable Packing
- Locking Device
- Actuator Mounting Pad
- Manufactured Silicone Free
- Sizes 2" to 6"

Standards:

- Design: ASME B16.34
- Pressure Test: API 598
- Flange Dimensions: ASME B16.5
- Materials: ASME B16.34
- Mounting Pad: ISO 5211

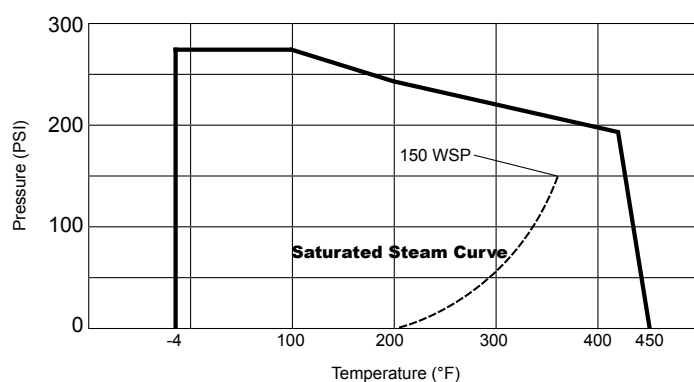


Figure Number Matrix

FNW 500 Size

SIZE CODE

- 2 = K
- 2-1/2 = L
- 3 = M
- 4 = P
- 6 = U

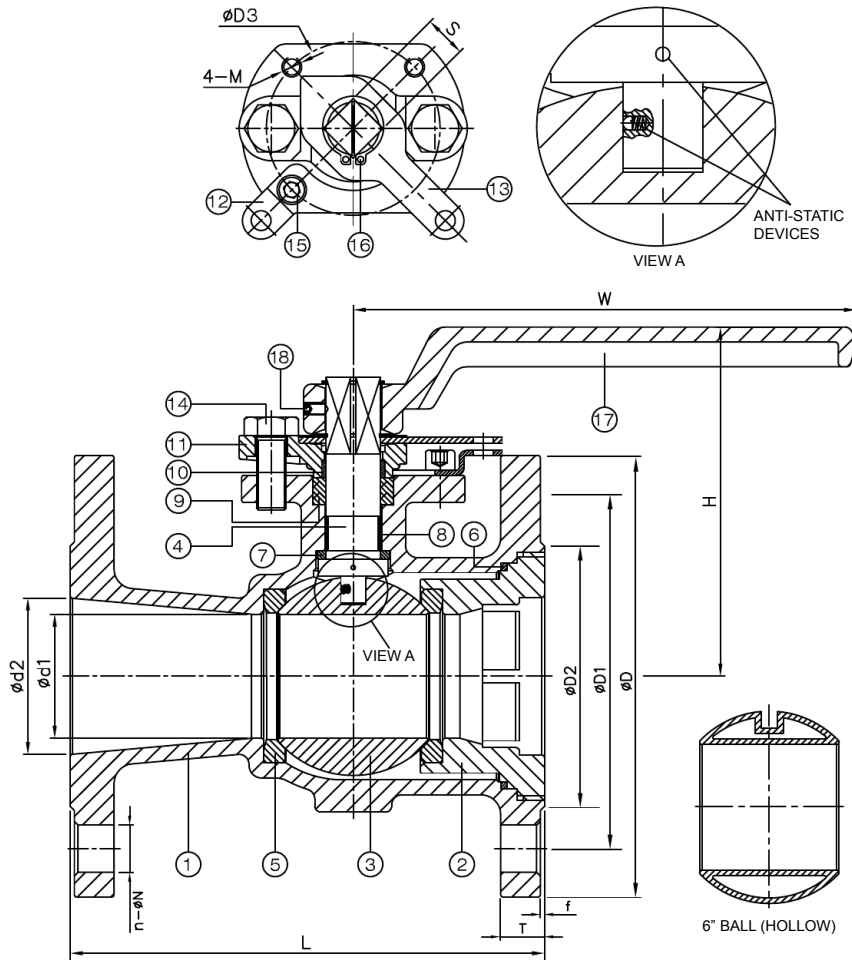
Cv & Weight

Size	Cv	Wt (lbs)
2	165	16.3
2-1/2	240	23.1
3	290	32.6
4	690	51.1
6	900	90.4

Torque

Size	Torque (in-lbs)
2	279
2-1/2	419
3	863
4	996
6	2,457

1 PC STANDARD PORT 150# FLANGED



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	Insert	ASTM A351 Gr. CF8M Stainless	1
3	Ball	ASTM A351 Gr. CF8M Stainless	1
4	Stem	ASTM A276-316 Stainless	1
5	Seat	RTFE	2
6	Body Seal	PTFE	1
7	Thrust Washer	PTFE	1
8	Stem Bushing	PTFE	1
9	Packing	PTFE	1
10	Bearing	PTFE	1
11	Gland	AISI304 Stainless	1
12	Lock Out Plate	AISI304 Stainless	1
13	Stop Plate	AISI304 Stainless	1
14	Packing Bolt	AISI304 Stainless	2
15	Lock Plate Bolt	AISI304 Stainless	2
16	Snap Ring	AISI304 Stainless	2
17	Handle	ASTM A216-WCB Carbon Steel	1
18	Set Screw	AISI304 Stainless	1

Dimensions (inches)

Size	ØD	ØD1	ØD2	Ød1	Ød2	L	H	W	S	ØD3	M (UNC)	n	ØN	T	f
2	6.00	4.75	3.62	1.50	1.77	7.01	5.04	7.87	0.67	2.76	5/16"-18	4	0.62	0.62	0.06
2-1/2	7.00	5.50	4.12	1.97	2.48	7.48	5.51	7.87	0.67	2.76	5/16"-18	4	0.74	0.69	0.06
3	7.50	6.00	5.00	2.28	2.99	7.99	5.98	12.80	0.87	4.02	3/8"-16	4	0.74	0.75	0.06
4	9.00	7.50	6.19	3.15	3.86	9.02	6.93	12.80	0.87	4.02	3/8"-16	8	0.74	0.94	0.06
6	11.00	9.50	8.50	4.49	5.91	10.51	9.45	29.61	1.06	4.92	12"-13	8	0.86	1.00	0.06

Figure 600 STAINLESS STEEL BALL VALVES

FNW™

2 PC FULL PORT 150# FLANGED

Features:

- Full Port
- 150 WSP
- Flanged Connection
- RTFE Seats
- Stainless Steel Trim
- Anti-Static Design
- Blow-out Proof Stem
- Investment Cast Body
- Adjustable Packing
- Locking Device
- Actuator Mounting Pad
- Manufactured Silicone Free
- Sizes 1/2" to 10"

Standards:

- Design: ASME B16.34
- Pressure Test: API 598
- Flange Dimensions: ASME B16.5
- Materials: ASME B16.34
- Mounting Pad: ISO 5211

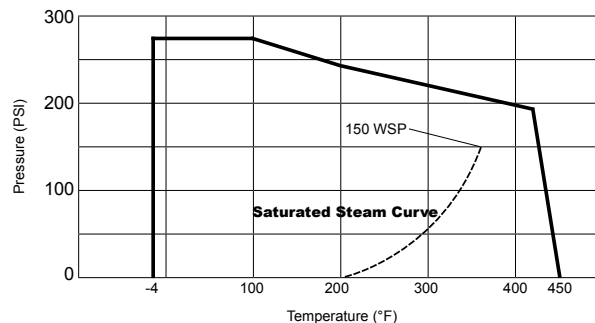


Figure Number Matrix

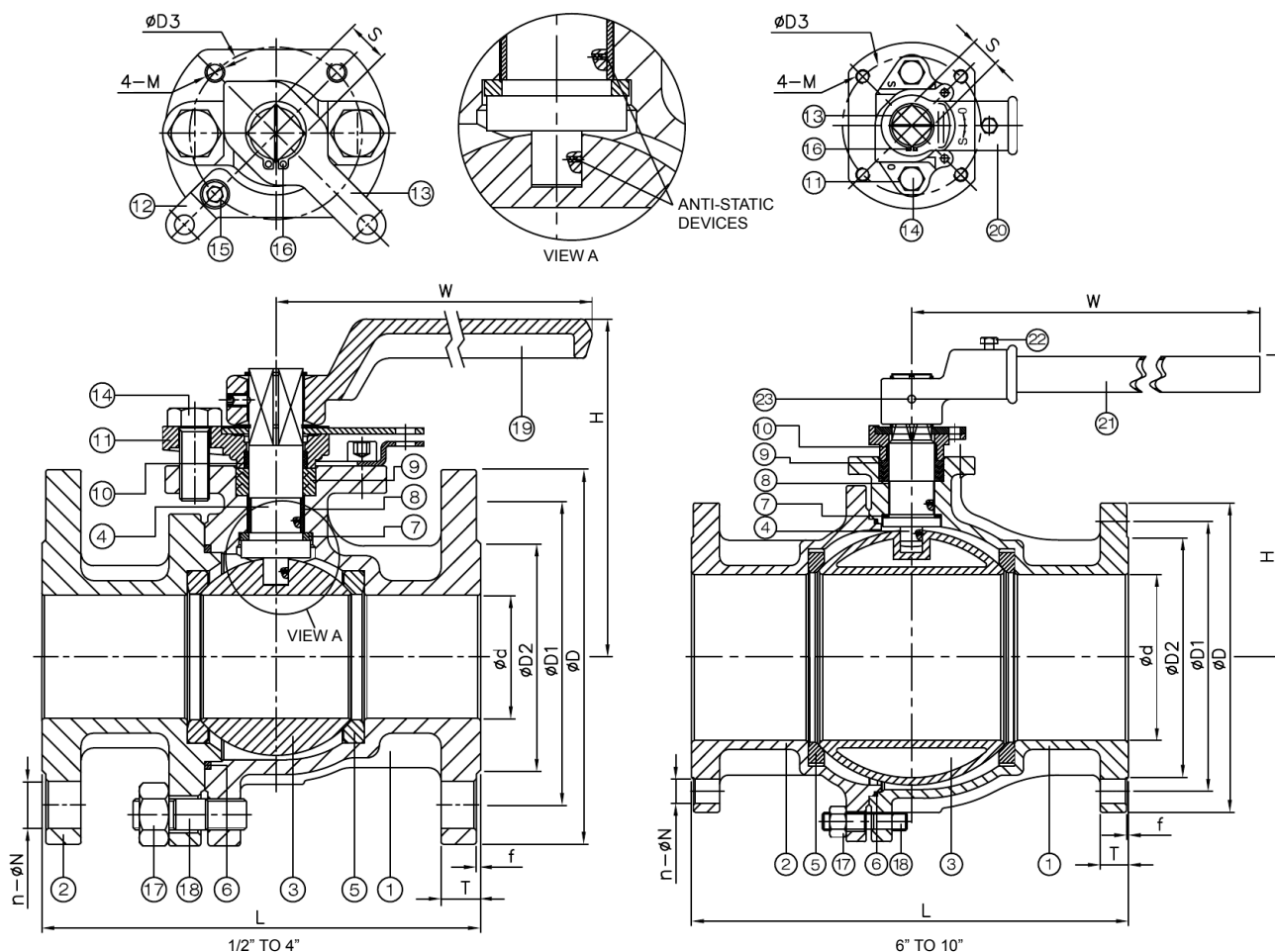
FNW 600 Size	
SIZE CODE	
1/2 = D	3 = M
3/4 = F	4 = P
1 = G	6 = U
1-1/2 = J	8 = X
2 = K	10 = 10
2-1/2 = L	

Cv & Weight

Size	Cv	Wt (lbs)
1/2	15	4.5
3/4	61	4.6
1	110	7.7
1-1/2	270	15
2	500	22
2-1/2	800	32
3	1,310	43
4	2,120	67
6	5,070	137
8	9,250	221
10	15,170	333

Torque

Size	Torque (in-lbs)
1/2	68
3/4	96
1	186
1-1/2	226
2	485
2-1/2	598
3	664
4	1,394
6	3,280
8	6,240
10	9,957



Dimensions (inches)

Size	ØD	ØD1	ØD2	Ød	L	H	W	S	ØD3	M (UNC)	n	ØN	T	f
1/2	3.50	2.38	1.38	0.59	4.25	3.07	5.12	0.43	1.65	1/4"-20	4	0.63	0.44	0.06
3/4	3.88	2.75	1.69	0.79	4.61	3.15	5.12	0.43	1.65	1/4"-20	4	0.63	0.44	0.06
1	4.25	3.12	2.00	0.98	5.00	3.86	6.38	0.55	1.97	1/4"-20	4	0.63	0.44	0.06
1-1/2	5.00	3.88	2.88	1.50	6.5	5.12	7.87	0.67	2.76	5/16"-18	4	0.63	0.56	0.06
2	6.00	4.75	3.62	1.97	7.01	5.39	7.87	0.67	2.76	5/16"-18	4	0.75	0.62	0.06
2-1/2	7.00	5.50	4.12	2.48	7.48	6.38	7.87	0.67	2.76	5/16"-18	4	0.75	0.69	0.06
3	7.50	6.00	5.00	3.15	7.99	7.01	12.80	0.87	4.02	3/8"-16	4	0.75	0.75	0.06
4	9.00	7.50	6.19	3.86	9.02	7.87	12.80	0.87	4.02	3/8"-16	8	0.88	0.94	0.06
6	10.98	9.50	8.50	5.91	15.51	10.30	29.25	1.06	4.92	1/2"-13	8	0.88	1.00	0.06
8	13.50	11.75	10.63	7.87	17.99	11.22	33.07	1.42	5.51	5/8"-11	8	0.88	1.13	0.06
10	15.98	14.25	12.76	9.84	20.98	13.19	40.94	1.81	6.50	3/4"-10	12	1.00	1.19	0.06

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	1
3	Ball	ASTM A351 Gr. CF8M Stainless	1
4	Stem	ASTM A276-316 Stainless	1
5	Seat	RTFE	2
6	Body Seal	PTFE	1
7	Thrust Washer	PTFE	1
8	Stem Bushing	PTFE	1
9	Packing	PTFE	1
10	Bearing	PTFE	1
11	Gland	AISI304 Stainless	1
12	Lock Out Plate	AISI304 Stainless	1

Ref. No.	Description	Material	Qty
13	Stop Plate	AISI304 Stainless	1
14	Packing Bolt	AISI304 Stainless	2
15	Lock Plate Bolt	AISI304 Stainless	2
16	Snap Ring	AISI304 Stainless	2
17	Body Nut	AISI304 Stainless	4-12
18	Body Stud	AISI304 Stainless	4-12
19	Handle	ASTM A216-WCB Carbon Steel	1
20	Handle Head	AISI304 Stainless	1
21	Handle Tube	AISI304 Stainless	1
22	Handle Bolt	AISI304 Stainless	1
23	Set Screw	AISI304 Stainless	1

Figure 633 & 634 STAINLESS STEEL BALL VALVES



3-WAY FULL PORT 150# FLANGED

Features:

- ANSI B16.5 150# Flanges
- Full Port
- All Stainless Steel Construction
- L-Port 90° Flow Path (Fig. 633)
- T-Port 90° & 180° Flow Path (Fig. 634)
- RTFE Seats
- Single-Piece Stem & Ball
- Trunnion Mounted
- Top Entry Body Design
- Adjustable Packing
- Pad Lockable Stem (up to 3")
- 4-Hole Actuator Mounting Pad
- Sizes 2" to 8"

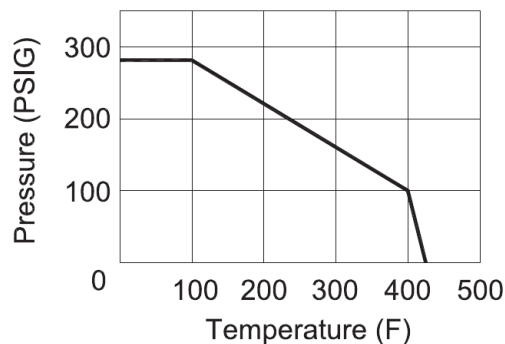


Figure Number Matrix

FNW 6 3 3 Size		
PORT TYPE	SIZE CODE	
L-PORT = 3	2 = K	4 = P
T-PORT = 4	2-1/2 = L	6 = U
	3 = M	8 = X

90° L-PORT PATTERNS

FLOW PLAN A



90° T-PORT PATTERNS

FLOW PLAN D



FLOW PLAN E



FLOW PLAN F



FLOW PLAN G



180° T-PORT PATTERNS

FLOW PLAN H



FLOW PLAN I



FLOW PLAN J



FLOW PLAN K



When requesting 3-way valves with actuation or limit switches from FNW, indicate which flow plan is desired by its associated letter.

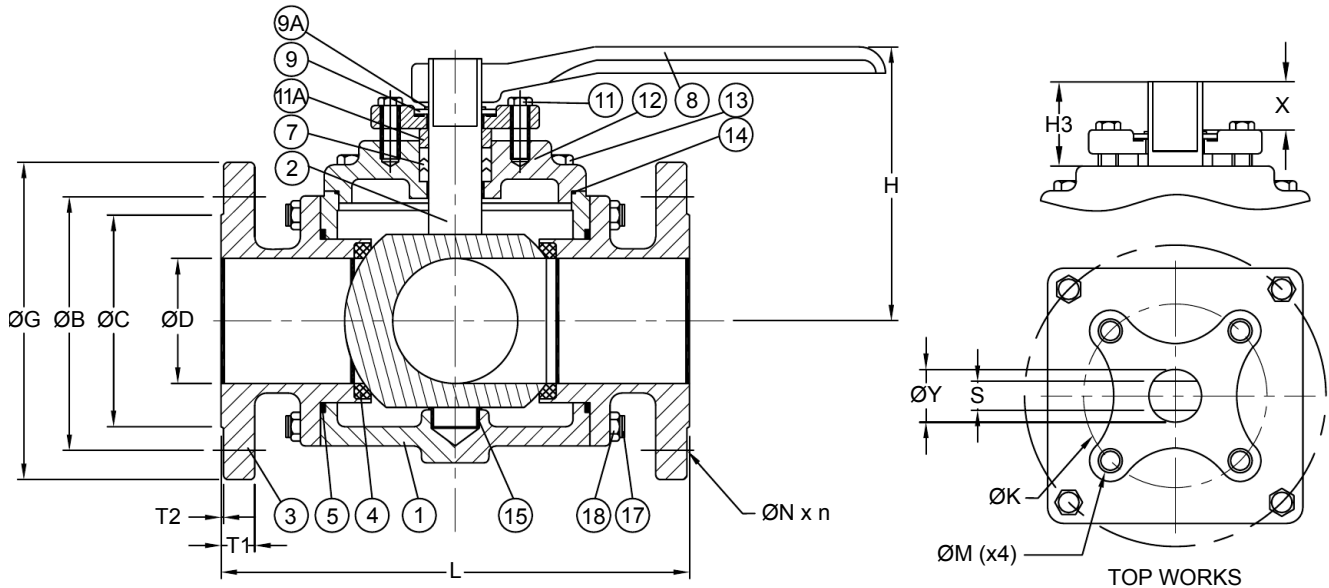
Cv & Weight

SIZE	Cv	Wt (Lbs)
2	153	36
2-1/2	275	56
3	364	75
4	662	122
6	1,575	300
8	2,889	530

Torque

SIZE	In-Lbs
2	800
2-1/2	1,200
3	1,800
4	3,100
6	10,000
8	18,000

3-WAY FULL PORT 150# FLANGED



Dimensions (inches)

Size	ØB	ØC	ØD	E	ØG	L	H	ØK	ØM	T1	T2	n	ØN	S	ØY	H3	X
Tolerance ±0.079																	
2	4.75	3.62	1.97	15.16	5.98	8.66	4.80	2.76	3/8	0.06	0.63	4	0.75	0.67	0.87	1.77	0.79
2-1/2	5.50	4.13	2.60	15.16	7.01	11.06	6.42	2.76	7/16	0.06	0.69	4	0.75	0.67	1.16	2.99	1.77
3	6.00	5.00	2.99	15.16	7.48	10.94	6.34	2.76	7/16	0.06	0.75	4	0.75	0.67	1.16	2.44	1.42
4	7.50	6.18	3.98	15.16	9.02	13.15	8.46	4.92	1/2	0.06	0.94	8	0.75	0.91	1.34	2.48	1.42
6	9.50	8.50	5.94	19.69	10.98	16.93	10.08	4.92	1/2	0.06	1.00	8	0.87	1.38	1.77	3.15	1.57
8	11.75	10.63	7.91	19.69	13.50	21.22	11.93	6.50	5/8	0.06	1.13	8	0.87	1.77	2.36	3.31	1.61

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M	1
2	Ball & Stem	ASTM A351 Gr. CF8M	1
3	Flanged End Cap	ASTM A351 Gr. CF8M	3
4	Seat	RTFE (PTFE+15% G.F.)	3
5	Body Seal	PTFE	3
7	Stem Packing	PTFE	1 Set
8	Handle	FCD45	1
9	Stopper	304SS	1
9A	Retainer Ring	S45C	1

Ref. No.	Description	Material	Qty
11	Gland Bolt	304SS	2
11A	Gland	CF8	1
12	Cover	ASTM A351 Gr. CF8M	1
13	Cover Bolt	304SS	1 Set
14	Cover Seal	PTFE	1
15	Stem Sleeve	PTFE	1
17	Body Stud	304SS	3 Sets
18	Body Nut	304SS	3 Sets

Figure 660 STAINLESS STEEL BALL VALVES



2 PC ECONOMY FULL PORT 150# FLANGED

Features:

- 150# Flanges
- Full Port
- Stainless Steel Trim
- RTFE Seats
- Blowout-Proof Stem
- Anti-Static Design
- Adjustable Packing
- Silicone Free

Standards:

- Flanges: ANSI B16.5
- Face to Face: ANSI B16.10
- Mounting Pad: ISO 5211
- Text & Inspection: API 598

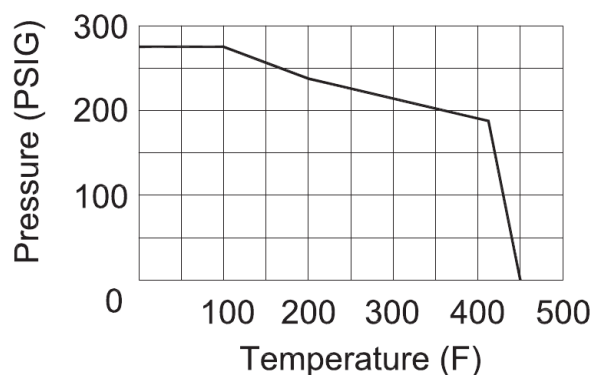


Figure Number Matrix

FNW 660 Size	
SIZE CODE	
2 = K	4 = P
2-1/2 = L	6 = U
3 = M	

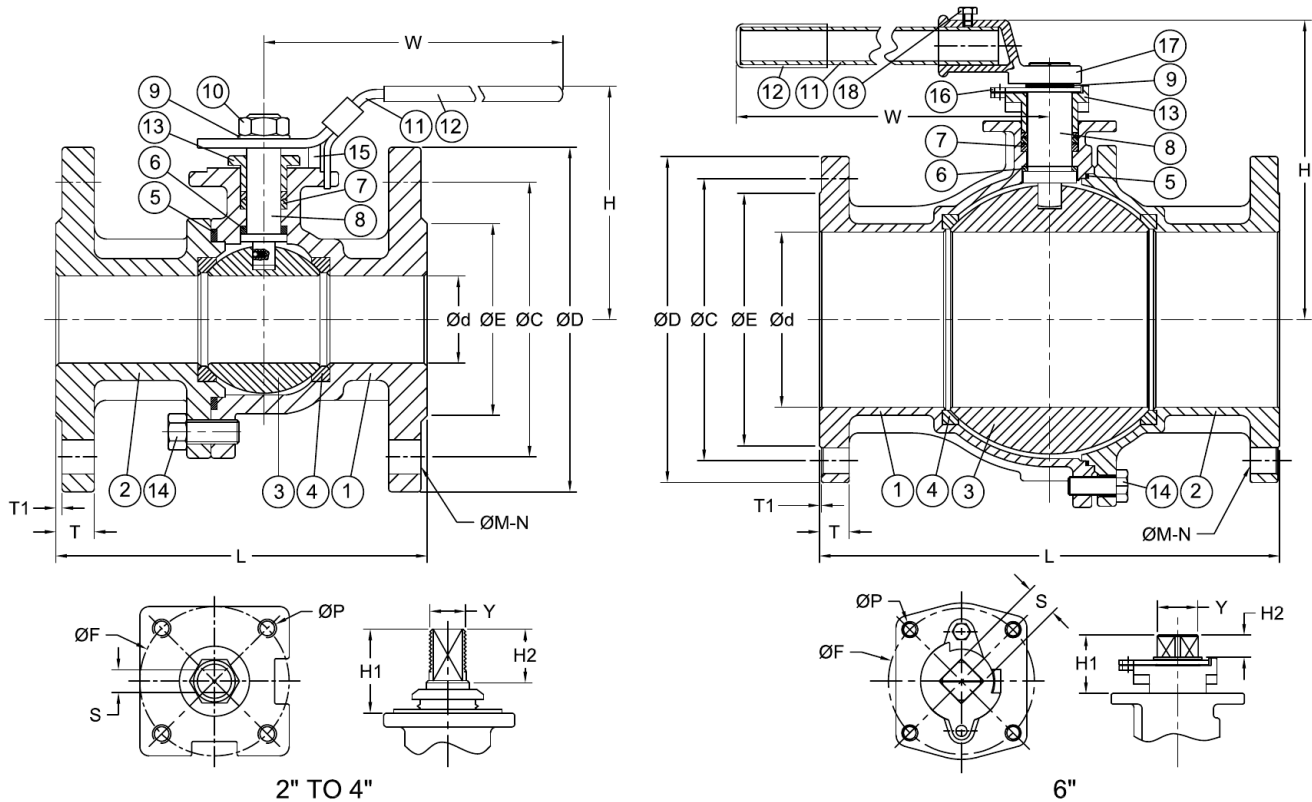
Cv & Weight

SIZE	Cv	Wt (Lbs)
2	386	19
2-1/2	497	28
3	702	40
4	1,402	62
6	4,600	149

Torque

SIZE	In-Lbs
2	337
2-1/2	448
3	519
4	576
6	2,129

2 PC ECONOMY FULL PORT 150# FLANGED



Dimensions (inches)

SIZE	Ød	L	W	H	C	D	E	ØF	N	ØM	T	T1	H1	H2	ØP	S	Y
2"	1.97	7.01	10.43	5.31	4.72	6.00	3.70	2.76	4	0.75	0.63	0.06	1.57	0.98	5/16-18	0.47	0.75
2-1/2"	2.56	7.52	15.35	5.71	5.49	7.01	4.29	2.76	4	0.75	0.69	0.06	1.60	0.98	5/16-18	0.47	0.75
3"	3.15	7.99	15.35	6.54	5.98	7.52	5.08	4.02	4	0.75	0.75	0.06	1.65	1.12	3/8-16	0.59	0.87
4"	3.94	9.02	15.35	7.13	7.50	9.02	6.26	4.02	8	0.75	0.94	0.06	1.65	1.12	3/8-16	0.59	0.87
6"	5.91	15.51	29.25	10.10	9.51	10.98	8.50	4.92	8	0.89	1.00	0.06	1.97	0.75	1/2-13	1.06	1.43

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351-CF8M	1
2	End Cap	ASTM A351-CF8M	1
3	Ball	ASTM A351-CF8M	1
4	Seat	RTFE	2
5	Body Seal	PTFE	1
6	Thrust Washer	PTFE	1
7	Packing	PTFE	1 Set
8	Stem	ASTM A276-316	1
9	Stem Washer / Clip	AISI304	1

Ref. No.	Description	Material	Qty
10	Stem Nut	AISI316	1
11	Handle	AISI304	1
12	Handle Sleeve	PVC	1
13	Packing Gland	AISI304	1
14	Body Bolt	AISI304	4-8
15	Stop Pin	AISI304	1
16	Stop Plate	AISI304	1
17	Handle Block w/ Set Screw	AISI304	1
18	Handle Bolt	AISI304	1

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

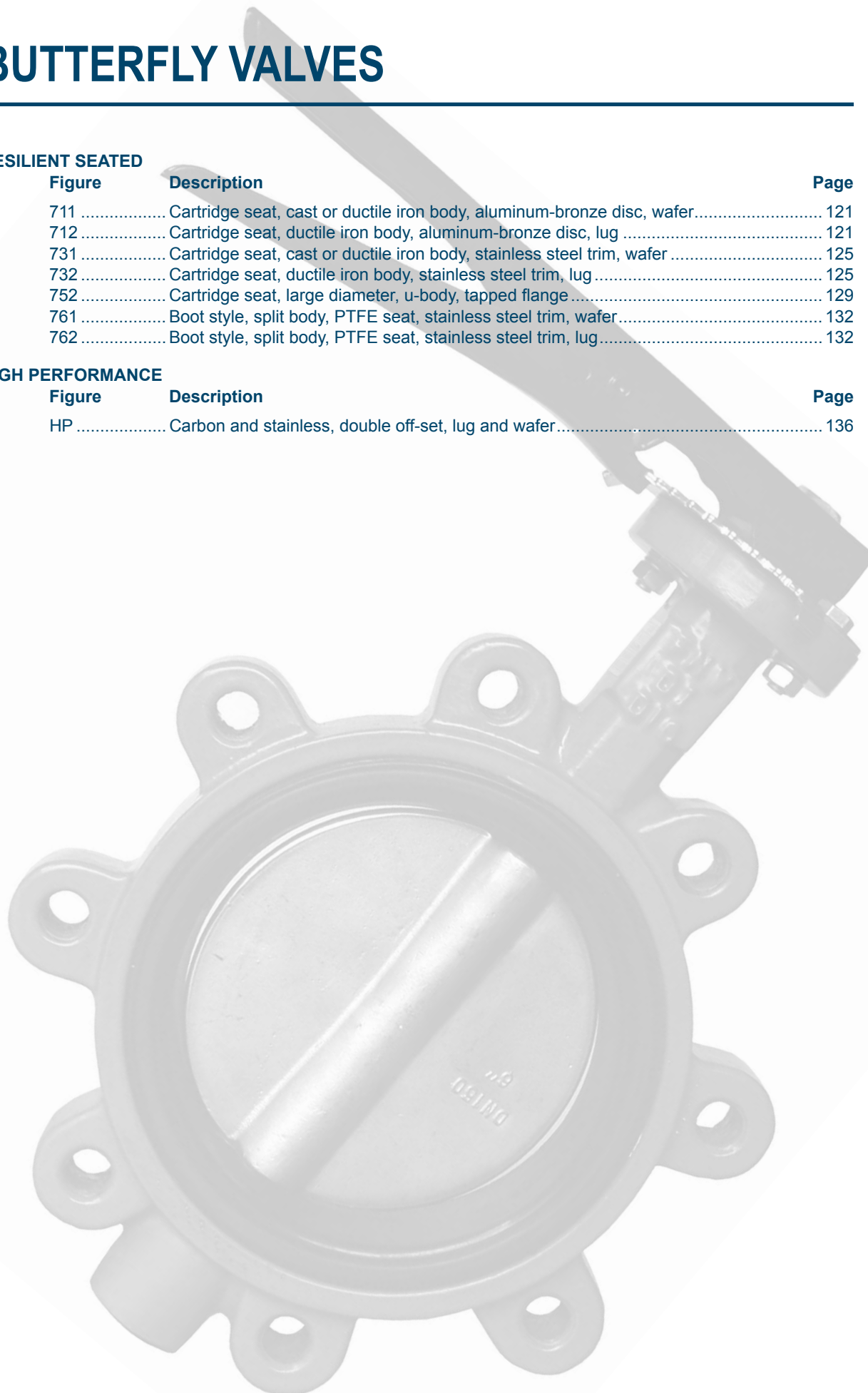
BUTTERFLY VALVES

RESILIENT SEATED

Figure	Description	Page
711	Cartridge seat, cast or ductile iron body, aluminum-bronze disc, wafer.....	121
712	Cartridge seat, ductile iron body, aluminum-bronze disc, lug	121
731	Cartridge seat, cast or ductile iron body, stainless steel trim, wafer	125
732	Cartridge seat, ductile iron body, stainless steel trim, lug	125
752	Cartridge seat, large diameter, u-body, tapped flange	129
761	Boot style, split body, PTFE seat, stainless steel trim, wafer.....	132
762	Boot style, split body, PTFE seat, stainless steel trim, lug	132

HIGH PERFORMANCE

Figure	Description	Page
HP	Carbon and stainless, double off-set, lug and wafer.....	136



RESILIENT SEATED BUTTERFLY VALVE

Valve Features

FNW cartridge style resilient seated butterfly valves are designed to meet the rigorous requirements of industrial applications such as pulp and paper, water purification, power and utilities, chemical/petrochemical, food and beverage, OEM and HVAC. Each valve is manufactured in accordance with independent standards specifications and is 100% tested in both directions of operation to assure bubble-tight service for many years.

Features:

- Designed for 125/150 lbs flanges
- Standard aluminum-bronze disc
- Mounting pad with square shaft permits direct mount actuation that reduces hysteresis and cost (2" TO 12")
- Secured stem retainer plate for blowout-proof protection and also allows operator removal with valve in line
- High strength two-piece stem eliminates taper pins and disc screws from flow path
- Rated to 200 PSI (2"-12"), 150 PSI (14"-24")
- Cartridge style seat permits easy change without special tools
- Molded o-ring eliminates the need for flange gasket
- Shell tested to 150% and seat tested to 110% of maximum working pressure
- Lug bodies for dead-end service rated at 150 PSI* (2"-12"), 100 PSI* (14"-24")
- Dual PTFE shaft bearings for reduced torque and improved stem alignment
- Vacuum rated to 29.9196"Hg (0.01 Torr)+
- Epoxy coated body
- Low maintenance design

Standards:

- Design: API 609A and MSS SP-67
- Shell and Seat Tested to: API 598 and MSS SP-61
- Top Flange to: ISO 5211



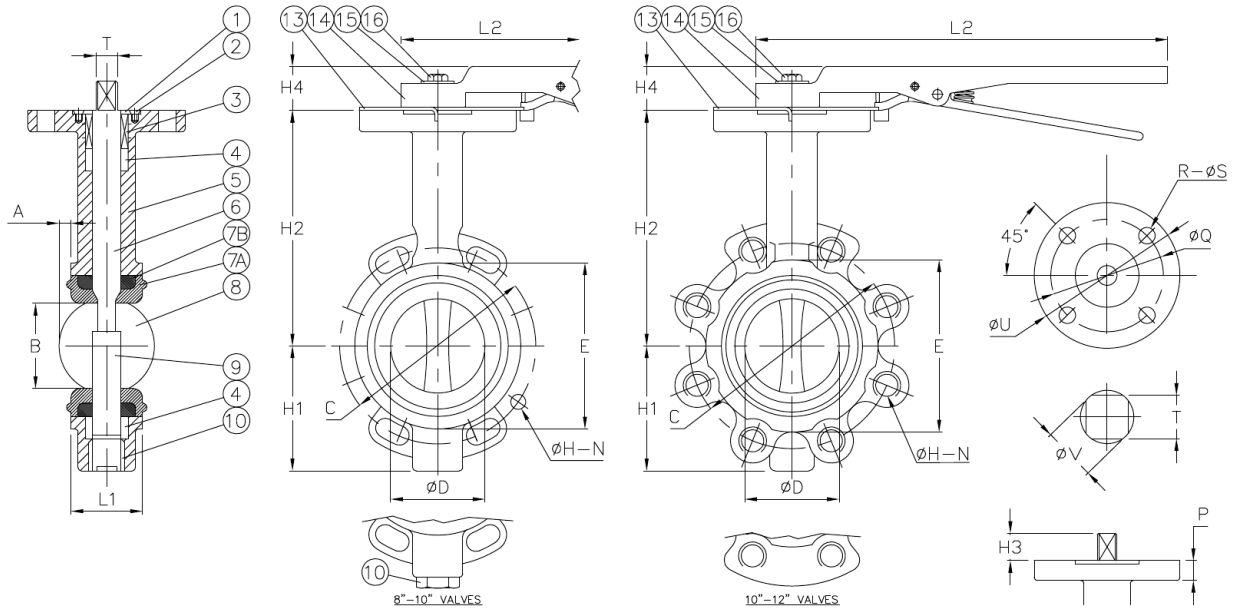
Fig. 712

Fig. 711

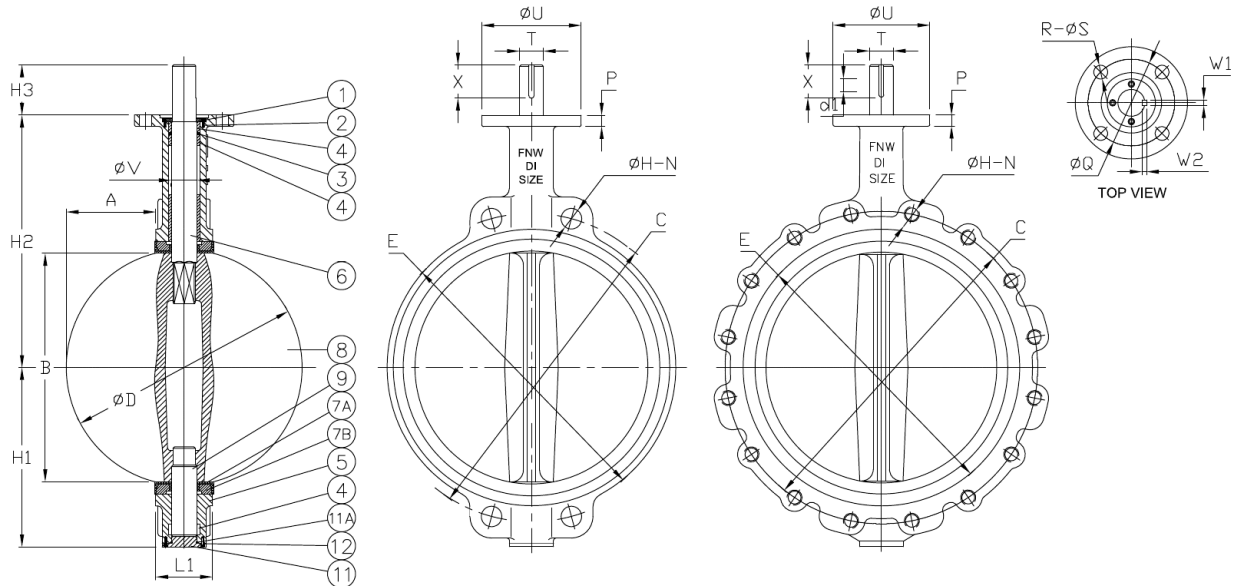
* Lugged valve for dead-end service may only be used with weld neck or socket flanges, for closed position only (no cycling). Not recommended for dead-end service of gas/air lines.

+ Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.

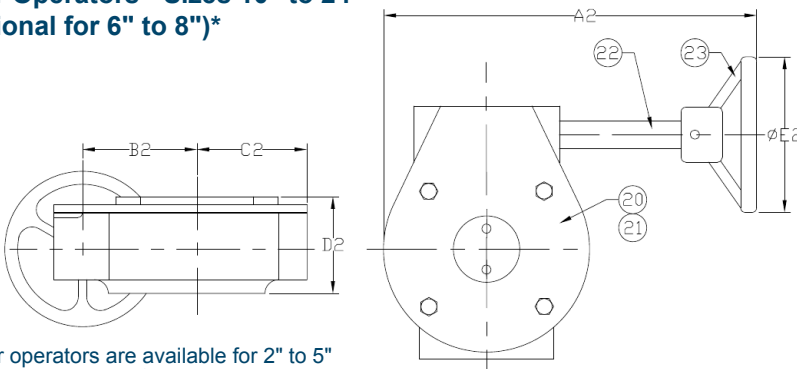
711 / 712 - Sizes 2" to 12"



711 / 712 - Sizes 14" to 24"



Gear Operators - Sizes 10" to 24" (optional for 6" to 8")*



* Gear operators are available for 2" to 5" valves upon request.

Dimensions (inches)

Size	A2	B2	C2	D2	ØE2
6"	8.74	1.77	2.13	2.83	5.79
8"	10.51	2.60	2.99	3.31	11.81
10"	10.51	2.60	2.99	3.31	11.81
12"	10.51	2.60	2.99	3.31	11.81
14"	13.62	3.05	3.09	3.49	11.81
16"	13.62	3.05	3.09	3.49	11.81
18"	13.62	3.05	3.09	3.49	15.55
20"	17.32	5.31	5.12	4.33	15.55
24"	17.32	5.31	5.12	4.33	15.55

Dimensions (Inches) Sizes 2 to 12

SIZE	A	B	ØD	E	H1	H2		H3	H4	L1	L2	C	ØH		N	P	ØQ	R	ØS	T	ØU	ØV
						731	732						731	732								
2"	0.18	1.93	1.99	3.66	2.77	5.06	4.94	0.60	1.06	1.69	11.37	4.75	0.75	5/8"-11	4	0.55	2.76	4	0.35	0.43	3.54	0.55
2-1/2"	0.41	2.52	2.61	4.25	2.95	5.36	5.20	0.60	1.06	1.81	11.37	5.50	0.75	5/8"-11	4	0.55	2.76	4	0.35	0.43	3.54	0.55
3"	0.67	3.03	3.11	4.96	3.67	5.64	6.07	0.60	1.06	1.81	11.37	6.00	0.75	5/8"-11	4	0.55	2.76	4	0.35	0.43	3.54	0.55
4"	0.94	3.82	3.92	5.91	4.18	6.41	6.54	0.70	1.06	2.05	11.37	7.50	0.75	5/8"-11	8	0.63	2.76	4	0.35	0.55	3.54	0.63
5"	1.36	4.80	4.89	6.97	4.69	7.34	7.13	0.70	1.06	2.20	11.37	8.50	0.87	3/4"-10	8	0.63	2.76	4	0.35	0.55	3.54	0.75
6"	1.86	5.83	5.89	8.19	5.48	7.98	7.84	0.75	1.06	2.20	11.37	9.50	0.87	3/4"-10	8	0.63	2.76	4	0.35	0.55	3.54	0.75
8"	2.69	7.62	7.70	10.20	6.51	9.34	9.26	0.81	1.02	2.36	17.83	11.75	0.87	3/4"-10	8	0.67	2.76	4	0.35	0.67	3.54	0.87
10"	3.52	9.65	9.72	12.48	7.86	11.13	10.50	0.81	1.02	2.68	17.83	14.25	0.98	7/8"-9	12	0.79	4.02	4	0.43	0.87	4.92	1.00
12"	4.28	11.54	11.63	14.61	9.47	12.27	12.15	0.95	1.02	3.07	17.83	17.00	0.98	7/8"-9	12	0.79	4.02	4	0.43	0.87	4.92	1.10

Dimensions (Inches) Sizes 14 to 24

SIZE	A	B	ØD	E		H1	H2	H3	L1	C	ØH		N	P	ØQ	R	ØS	T	ØU		ØV	W1	W2	X
				731	732						731	732							731	732				
14"	5.06	12.68	13.12	17.17	15.97	10.51	14.49	2.76	3.00	18.75	1.14	1"-8	12	0.748	4.02	4	0.47	1.10	4.92	5.51	1.24	0.39	0.20	2.36
16"	5.70	14.96	15.34	19.21	18.50	12.17	15.75	2.95	3.94	21.25	1.14	1"-8	16	0.787	5.51	4	0.71	1.26	6.89	7.76	1.49	0.39	0.20	2.36
18"	6.47	16.85	17.34	21.22	20.51	12.91	16.61	2.95	4.41	22.75	1.26	1-1/8"-7	16	0.787	5.51	4	0.71	1.50	6.89	7.76	1.69	0.47	0.20	2.36
20"	7.11	18.62	19.36	23.35	22.24	14.21	18.90	3.35	5.13	25.00	1.26	1-1/8"-7	20	0.866	6.50	4	0.87	1.77	8.27	8.27	1.80	0.47	0.20	2.76
24"	8.68	22.52	23.33	32.44	27.28	18.07	22.13	3.35	5.96	29.50	1.38	1-1/4"-7	20	0.866	6.50	4	0.87	2.13	8.27	8.27	2.13	0.55	0.20	2.76

Standard Materials

ITEM	DESCRIPTION	MATERIAL	QTY	REMARKS
1	RETAINING PLATE	ASTM A283D-A36, STEEL	1	GALVANIZED
2	RETAINING PLATE SCREW	ASTM A283D-A36, STEEL	2	GALVANIZED
			4	14" & LARGER, GALVANIZED
3	O-RING PACKING	SAME AS SEAT MATERIAL	2	MOLDED IN 1 PIECE
			3	8" TO 24", MOLDED 1 PIECE
	STEM O-RING	ASTM D2000, NBR	1	14 TO 24"
4	STEM BUSHING	PTFE	2	2" TO 2-1/2", 1 UPPER, 1 LOWER
			3	3" & 14" - 24", 2 UPPER, 1 LOWER
			4	4" TO 12", 2 UPPER, 2 LOWER
5	BODY	ASTM A126, CAST IRON	1	FIG 711, 2" TO 10"
		ASTM A536 65-45-12, DUCTILE IRON		FIG 711, 12" TO 24" FIG 712, ALL SIZES
6	UPPER STEM	416SS, STAINLESS STEEL	1	STANDARD
7A	SEAT	EPDM OR BUNA	1	STANDARD
7B	SEAT SUPPORT RING	ASTM D2000, PHENOL	1	2" TO 14", INTEGRAL TO SEAT
		ASTM B275, ALUMINUM	1	16 TO 24", INTEGRAL TO SEAT
8	DISC	JIS H 5114, ALUMINUM BRONZE	1	STANDARD
9	LOWER STEM	416SS, STAINLESS STEEL	1	STANDARD
10	PLUG	ASTM A283D-A36, CARBON STEEL	1	2" TO 12"
11	BOTTOM PLATE	ASTM A536 65-45-12, DUCTILE IRON	1	14" TO 24"
11A	BOTTOM PLATE O-RING	ASTM D2000, NBR	1	14" TO 24"
12	BOTTOM PLATE SCREW	ASTM A283D-A36, STEEL	2	QTY 4 ON 24"
13	LEVER STOP PLATE	ASTM A283D-A36, STEEL, NP	1	FOR 2 TO 12"
14	LEVER	ASTM A47 GRD 32510, MALLEABLE IRON	1	2 TO 12"
15	LEVER WASHER	ASTM A283D-A36, STEEL	1	2 TO 8", ZINC COATED
16	LEVER BOLT	ASTM A283D-A36, STEEL	1	2 TO 8", ZINC COATED
20	GEAR CASE	ASTM A126, CAST IRON	1	10" TO 24" STANDARD
21	DRIVE GEAR	ASTM A536 65-45-12, DUCTILE IRON	1	NOT SHOWN
22	INPUT SHAFT	STEEL	1	NICKEL PLATED
23	HAND WHEEL	ASTM A126, CAST IRON	1	STANDARD WITH GEAR OPERATOR

Seat Temperatures

Seat Material	Working Temperature
EPDM	-22° to 230°F (-30°C to 110°C)
Buna-N	-4° to 194°F (-20°C to 90°C)

Options

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, square drive nuts, worm-gear operators, and pneumatic and electric operators, control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

Weight (Lbs)

SIZE	WAFER / LEVER	WAFER / GEAR	LUG / LEVER	LUG / GEAR
2"	8.1	-	10.6	-
2-1/2"	9.4	-	10.5	-
3"	9.6	-	11.2	-
4"	11.8	-	16.4	-
5"	16.0	-	21.1	-
6"	20.1	30.5	23.5	33.9
8"	34.1	46.5	38.0	50.4
10"	-	72.4	-	77.5
12"	-	87.9	-	106.8
14"	-	165.5	-	188.5
16"	-	260.5	-	336.5
18"	-	330.7	-	407.7
20"	-	507.7	-	614.7
24"	-	659.7	-	767.7

Torque (In-Lbs)

SIZE	EPDM & BUNA SEAT
2"	324
2-1/2"	324
3"	424
4"	524
5"	574
6"	858
8"	1,677
10"	3,543
12"	4,092
14"	10,296
16"	13,466
18"	18,109
20"	22,366
24"	36,036

1. All unseating torques based on non-corrosive clean, wet or lubricating service at ambient temperatures. Contact FNW for dry or application specific torque.
 2. For line velocities greater than 15 FPS, dynamic torque must be taken into consideration.
 3. All torques are based on maximum pressure differential for the valve.

Cv (Flow Coefficient)

SIZE	DEGREES of DISC OPENING							
	20°	30°	40°	50°	60°	70°	80°	90°
2"	8	9	18	28	55	72	110	135
2-1/2"	10	15	27	44	85	110	168	210
3"	15	23	39	65	130	165	250	310
4"	27	41	71	115	230	300	465	540
5"	58	86	150	245	480	610	980	1,100
6"	96	140	245	400	785	1,010	1,615	1,910
8"	165	245	410	685	1,275	1,715	2,670	3,185
10"	255	380	650	1,130	2,100	2,700	4,250	4,900
12"	370	540	950	1,570	3,050	3,950	5,950	7,350
14"	450	750	1,300	2,210	4,080	5,610	8,078	11,200
16"	640	900	1,720	2,790	5,000	7,650	10,770	12,900
18"	730	1,250	2,295	3,700	7,050	9,180	13,900	17,500
20"	910	1,595	2,850	4,630	8,600	11,500	17,540	22,400
24"	1,250	2,290	4,000	6,090	12,500	16,500	23,590	28,300

Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F.

Figure Number Matrix

FNW 7 1 1 E G X				
CONFIGURATION	BODY TYPE	SEAT	OPERATOR	SIZE CODES
1 = ALUMINUM BRONZE DISC	1 = WAFER 2 = LUG	E = EPDM B = BUNA-N	BLANK = 10 POSITION LEVER (2"-8") G = GEAP OPERATOR (6"-24") A = ACTUATED (SPECIFY SEPARATELY) S = STEM EXTENSION (SPECIFY SEPARATELY) N = SQUARE OPERATING NUT (SPECIFY SIZE) C = CHAIN WHEEL OPERATOR (ON GEAR-OP)	2 = K 10 = 10 2-1/2 = L 12 = 12 3 = M 14 = 14 4 = P 16 = 16 5 = S 18 = 18 6 = U 20 = 20 8 = X 24 = 24

RESILIENT SEATED BUTTERFLY VALVE

FNW cartridge style resilient seated butterfly valves are designed to meet the rigorous requirements of industrial applications such as pulp and paper, water purification, power and utilities, chemical/petrochemical, food and beverage, OEM and HVAC. Each valve is manufactured in accordance with independent standards specifications and is 100% tested in both directions of operation to assure bubble-tight service for many years.

Features:

- Designed for 125/150 lbs flanges
- Standard stainless steel disc and stem offer superior strength and chemical resistance
- Mounting pad with square shaft permits direct mount actuation that reduces hysteresis and cost (2" TO 12")
- Secured stem retainer plate for blowout-proof protection and also allows operator removal with valve in line
- High strength two-piece stem eliminates taper pins and disc screws from flow path
- Rated to 255 PSI (2"-12"), 188 PSI (14"-24")
- Cartridge style seat permits easy change without special tools
- Molded o-ring eliminates the need for flange gaskets*
- Shell tested to 150% and seat tested to 110% of maximum working pressure
- Lug bodies for dead-end service rated at 150 PSI** (2"-12"), 100 PSI** (14"-24")
- Wafer bodies cast iron to 10", ductile iron 12" to 24", and ductile iron lug bodies to 24"
- Lever operated to 12" or gear operated
- Dual PTFE shaft bearings for reduced torque and improved stem alignment
- Vacuum rated to 29.9196"Hg (0.01 Torr)†
- Epoxy coated body
- Low maintenance design
- Sizes 2" to 24"

Standards:

- Design: API 609A and MSS SP-67
- Seat Tested: MSS SP-61
- Top Flange: ISO 5211

Options:

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, square drive nuts, worm-gear operators, and pneumatic and electric operators, control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

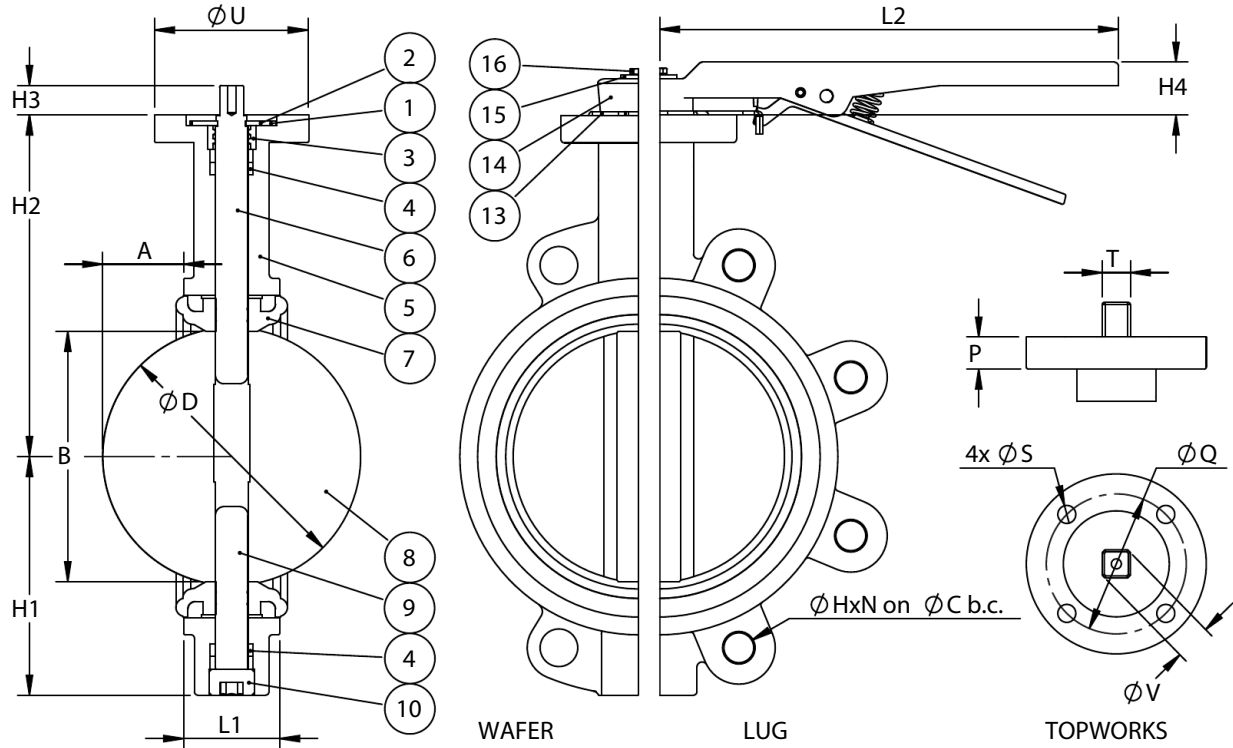


* Pressed collar style angle face rings (typically sizes 2" to 6") are not recommended due to the large radius of the inner diameter. Cast type angle face rings or stub ends should be used with light wall stainless steel piping. Prior to installation, always verify that the connecting piping flange face fully engages the valve seat face.

** Lugged valve for dead-end service may only be used with weld neck or socket flanges, for closed position only (no cycling). Not recommended for dead-end service of gas/air lines.

† Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.

731 Wafer / 732 Lugged - Sizes 2" to 12" (also available with gear)



731 Wafer / 732 Lugged - Sizes 14" to 24"

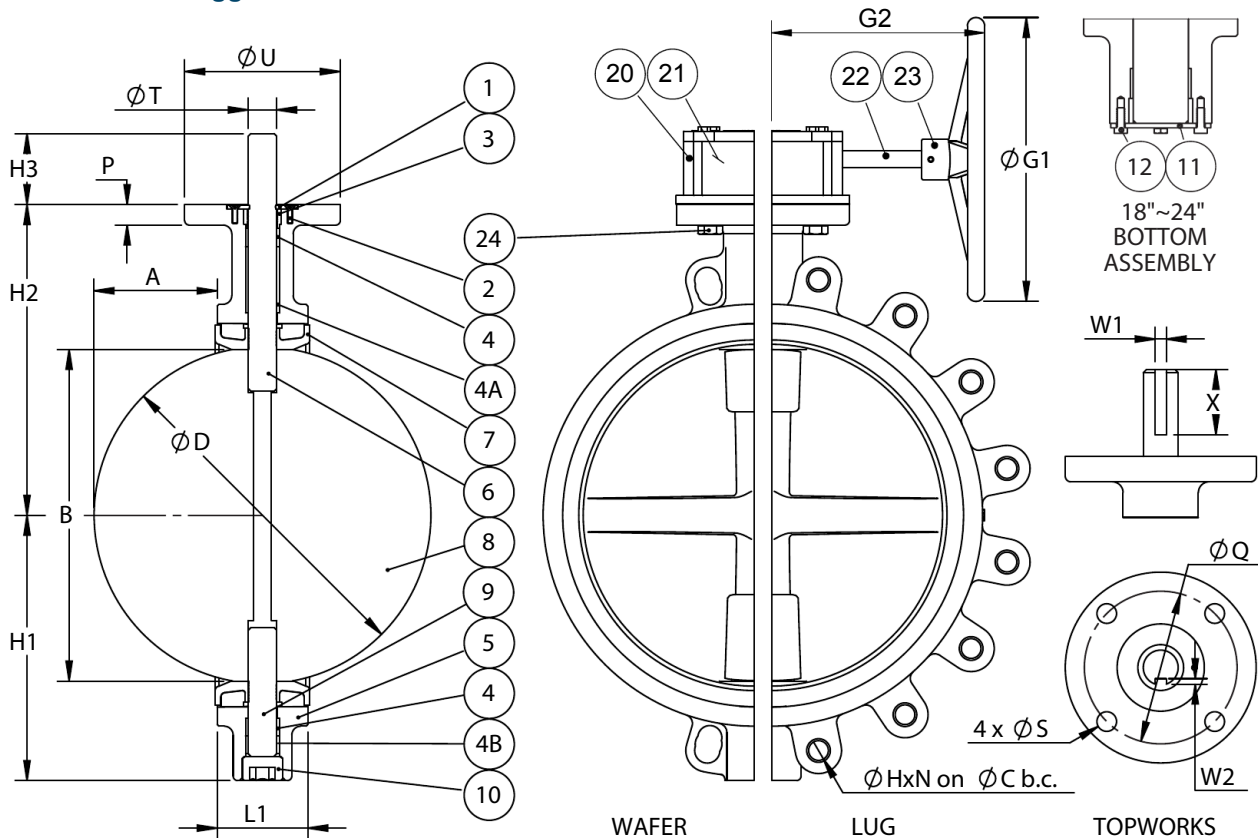


Figure 731 & 732 BUTTERFLY VALVES



Dimensions (Inches) Sizes 2 to 12

Size	A	B	ØD	H1	H2		H4	L1	L2	G1	G2	ØC	ØH	N	H3	ØU	P	ØQ	ØS	T	ØV
					731	732															
2"	0.18	1.93	2.05	2.77	5.06	4.94	1.06	1.69	11.37	5.79	6.22	4.75	5/8"-11	4	0.60	3.54	0.55	2.76	0.35	0.43	0.55
2-1/2"	0.41	2.52	2.64	2.95	5.36	5.20	1.06	1.81	11.37	5.79	6.22	5.49	5/8"-11	4	0.60	3.54	0.55	2.76	0.35	0.43	0.55
3"	0.67	3.03	3.15	3.67	5.64	6.07	1.06	1.81	11.37	5.79	6.22	6.00	5/8"-11	4	0.60	3.54	0.55	2.76	0.35	0.43	0.55
4"	0.94	3.82	3.94	4.18	6.41	6.54	1.06	2.05	11.37	5.79	6.22	7.50	5/8"-11	8	0.70	3.54	0.63	2.76	0.35	0.55	0.63
5"	1.36	4.80	4.92	4.69	7.34	7.13	1.06	2.20	11.37	5.79	6.22	8.50	3/4"-10	8	0.70	3.54	0.63	2.76	0.35	0.55	0.71
6"	1.86	5.83	5.93	5.48	7.98	7.84	1.06	2.20	11.37	5.79	6.22	9.51	3/4"-10	8	0.70	3.54	0.63	2.76	0.35	0.55	0.71
8"	2.69	7.62	7.74	6.51	9.34	9.26	1.06	2.36	17.83	11.81	8.07	11.75	3/4"-10	8	0.81	3.54	0.67	2.76	0.35	0.67	0.87
10"	3.52	9.62	9.72	7.86	11.13	10.50	1.02	2.68	17.83	11.81	8.07	14.25	7/8"-9	12	0.81	4.92	0.79	4.02	0.43	0.87	1.00
12"	4.28	11.54	11.63	9.47	12.27	12.15	1.02	3.07	17.83	11.81	8.46	17.00	7/8"-9	12	0.95	4.92	0.79	4.02	0.79	0.87	1.10

Dimensions (Inches) Sizes 14 to 24

Size	A	B	ØD	H1	H2	G1	G2	L1	ØC	ØH	N	H3	ØU	P	ØQ	ØS	ØT	W1	W2	X
14"	4.96	12.83	12.99	10.41	13.60	11.81	8.46	3.07	18.75	1"-8	12	2.81	4.92	0.79	4.02	0.47	1.10	0.39	0.20	2.36
16"	5.45	14.82	14.92	11.75	13.76	11.81	8.86	4.02	21.25	1"-8	16	3.15	6.89	0.91	5.51	0.71	1.26	0.39	0.20	2.36
18"	6.36	17.09	17.20	13.78	15.75	15.55	8.86	4.49	22.75	1-1/8"-7	16	3.15	6.89	0.91	5.51	0.71	1.50	0.47	0.20	2.36
20"	7.15	19.13	19.29	14.96	17.32	15.55	10.12	5.00	25.00	1-1/8"-7	20	3.54	8.27	0.91	6.50	0.87	1.77	0.47	0.20	2.76
24"	8.28	22.46	22.62	17.32	20.08	15.55	10.12	6.06	29.50	1-1/4"-7	20	3.74	8.27	0.91	6.50	0.87	2.17	0.55	0.20	2.76

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Retaining Plate	ASTM A283D-A36 STEEL	1	Galvanized
2	Retaining Plate Screw	ASTM A283D-A36 STEEL	2	Galvanized
			3	
3	Ingress Stem Seal	SAME AS SEAT MATERIAL	1	
4	Stem Bushing	PTFE	2	1 Upper, 1 Lower, Sizes 2"~3", 14"~24"
			4	2 Upper, 2 Lower, Sizes 4"~12"
4A	Upper Hard Bushing	ASTM B584 C83600 BRONZE	1	Sizes 14"~24"
4B	Lower Hard Bushing	ASTM B584 C83600 BRONZE	1	Sizes 14"~24"
5	Body	ASTM A126 CAST IRON	1	Fig 731, Sizes 2"~10"
		ASTM A536 65-45-12 DUCTILE IRON		Fig 731, Sizes 12" & Up, Fig 732 All
6	Upper Stem	ASTM A276 SUS 316 STAINLESS	1	
7	Seat	EPDM or BUNA	1	Sizes 2"~12" Only
		VITON®		
8	Disc	ASTM A351 CF8M, STAINLESS	1	
9	Lower Stem	ASTM A276 SUS 316 STAINLESS	1	
10	Plug	ASTM A283D-A36 STEEL	1	Sizes 2"~16"
11	Bottom Plate	ASTM A283D-A36 STEEL	1	Zinc Plated, Sizes 18"~24"
12	Bottom Plate Screw	ASTM A283D-A36 STEEL	4	Zinc Plated, Sizes 18"~24"
13	Lever Stop Plate	ASTM A283D-A36 STEEL	1	Nickel Plated, Sizes 2"~12"
14	Lever	ASTM A47 Gr 32510 MALLEABLE IRON	1	Sizes 2"~12"
15	Lever Washer	ASTM A283D-A36 STEEL	1	Zinc Plated, Sizes 2"~8"
16	Lever Bolt	ASTM A283D-A36 STEEL	1	Zinc Plated, Sizes 2"~8"
20	Gear Housing	ASTM A126 CAST IRON	1	Sizes 14"~24"
21	Gear Drive	ASTM A536 65-45-12 DUCTILE IRON	1	Sizes 14"~24"
22	Gear Input Shaft	STEEL	1	Nickel Plated, Sizes 14"~24"
23	Hand Wheel	ASTM A126 CAST IRON	1	Sizes 14"~24"
24	Gear Mounting Bolt	ASTM A283D-A36 STEEL	4	Zinc Plated, Sizes 14"~24"

Standard configurations are with levers up to 12" and gear operators 14" to 24". Gear operators for valves 12" and smaller are available upon request.

Visit us at www.fnw.com

Weight (Lbs)

Size	Wafer/Lever	Wafer/Gear	Lug/Lever	Lug/Gear
2"	8.1	17.8	10.6	20.3
2-1/2"	9.4	19.1	10.5	20.2
3"	9.6	19.4	11.2	21.0
4"	11.8	21.6	16.4	26.2
5"	16.0	25.8	21.1	30.9
6"	20.1	30.5	23.5	33.9
8"	34.1	46.5	38.0	50.4
10"	51.2	72.4	56.3	77.5
12"	66.7	87.9	85.6	106.8
14"	-	165.5	-	188.5
16"	-	260.5	-	336.5
18"	-	330.7	-	407.7
20"	-	507.7	-	614.7
24"	-	659.7	-	767.7

Torque (In-Lbs)

Size	EPDM & BUNA Seat
2"	324
2-1/2"	324
3"	424
4"	524
5"	574
6"	858
8"	1,677
10"	3,543
12"	4,092
14"	10,296
16"	13,466
18"	18,109
20"	22,366
24"	36,036

1. All unseating torques based on non-corrosive clean, wet or lubricating service at ambient temperatures. Contact FNW for dry or application specific torque.
2. For line velocities greater than 15 FPS, dynamic torque must be taken into consideration.
3. All torques are based on maximum pressure differential for the valve.

Cv (Flow Coefficient)

SIZE	DEGREES of DISC OPENING							
	20°	30°	40°	50°	60°	70°	80°	90°
2"	8	9	18	28	55	72	110	135
2-1/2"	10	15	27	44	85	110	168	210
3"	15	23	39	65	130	165	250	310
4"	27	41	71	115	230	300	465	540
5"	58	86	150	245	480	610	980	1,100
6"	96	140	245	400	785	1,010	1,615	1,910
8"	165	245	410	685	1,275	1,715	2,670	3,185
10"	255	380	650	1,130	2,100	2,700	4,250	4,900
12"	370	540	950	1,570	3,050	3,950	5,950	7,350
14"	450	750	1,300	2,210	4,080	5,610	8,078	11,200
16"	640	900	1,720	2,790	5,000	7,650	10,770	12,900
18"	730	1,250	2,295	3,700	7,050	9,180	13,900	17,500
20"	910	1,595	2,850	4,630	8,600	11,500	17,540	22,400
24"	1,250	2,290	4,000	6,090	12,500	16,500	23,590	28,300

Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F.

Figure Number Matrix

FNW 7 3 1 E G X			
BODY TYPE	SEAT	OPERATOR	SIZE CODES
1 = Wafer	E = EPDM	Blank = 10 Position Lever	2 = K 10 = 10
2 = Lug	B = BUNA-N	(2"-12")	2-1/2 = L 12 = 12
	V = Viton®	G = Gear Operator	3 = M 14 = 14
		(2"-24")	4 = P 16 = 16
			5 = S 18 = 18
			6 = U 20 = 20
			8 = X 24 = 24

Seat Temperatures

Seat Material	Working Temperature
EPDM	-22° to 230°F (-30°C to 110°C)
Buna-N	-4° to 194°F (-20°C to 90°C)
Viton®	-14° to 320°F (-25°C to 160°C)

LARGE DIAMETER U-BODY RESILIENT SEATED BUTTERFLY VALVE

Features:

- Maximum Working Pressure of 150 PSI
- Compatible with ANSI 125/150 Flanges
- Bidirectional Bubble Tight Shut Off
- Cartridge Seat Design
- High Strength Stainless Steel Taper Pins Securing Disc to Stem
- Primary & Secondary Seals (Interference Fit of Disc to Seat and Stem Through Seat)
- Available with Ductile Iron (Nickel Plated) or Cast Stainless Steel Discs*
- Available with EPDM or NBR (Buna) Seat Material
- Two-Stage Gear Operator Standard
- Dead-End Service Capable to 100 PSI**

Standards:

- Flange Design: ANSI B16.1
- Face to Face Dimension: MSS SP-67
- Pressure Tested to:
 - Seat: 165 PSI
 - Shell: 225 PSI

Options

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, square drive nuts, and pneumatic and electric operators. Also available are various control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

* Other materials and configurations are available by special order. Contact FNW for further assistance.

** Dead-end service capability is limited to the valve in the closed position only. Opening the valve without a downstream flange can cause the seat to shift.



Standard Materials

Ref. No.	Description	Material		Qty
		Ductile Iron Disc	Stainless Steel Disc	
1	Gear Operator	Case, A126 Cl. B, Gear, ASTM A536 65-45-12		1
2	Bottom Plate	Ductile Iron, ASTM A536 65-45-12		1
3	Bottom Plate Screw	Steel, ASTM A283D A36		4
4	Bottom Plate O-ring	Rubber, ASTM D2000 NBR		1
5	Gasket	Steel		1
6	Bearing	Bronze ASTM B584 C83600		1
7	Lower Bushing	Bronze ASTM B584 C83600		1
8	Body	Ductile Iron, ASTM A536 65-45-12		1
9	Seat	Rubber, ASTM D2000 EPDM or NBR		1
10	Lower Shaft	Stainless, ASTM A582 S41600	Stainless, ASTM A276 S31600	1
11	Disc	Ductile Iron, ASTM A536 65-45-12 (Nickel Plated)	Stainless, ASTM A351 CF8M	1
12	Taper Pin	Stainless, ASTM A564 S17400		3
13	Upper Shaft	Stainless, ASTM A582 S41600	Stainless, ASTM A276 S31600	1
14	Long Bushing	ASTM A584 C83600		1
15	Name Plate	Aluminum		1
16	Short Bushing	Bronze ASTM B584 C83600		4
17	O-ring	Rubber, ASTM D2000 EPDM		3
18	Key	Steel		2

Seat Temperatures

Seat Material	Working Temperature
EPDM	-22° to 230°F (-30°C to 110°C)
Buna-N	-4° to 194°F (-20°C to 90°C)

Figure Number Matrix

F N W 7 5 2 E D S G 30				
<u>SEAT</u>	<u>DISC MATERIAL</u>	<u>STEM MATERIAL</u>	<u>OPERATOR</u>	<u>SIZE CODE</u>
E = EPDM B = Buna-N	D = Ductile Iron S = Stainless Steel	S = 416SS w/DI Disc 316SS w/SS Disc	G = Gear Operator (STANDARD)	28 = K 30 = L 32 = M 36 = P 40 = S 42 = U 48 = X
Other materials and operators are available on a price-on-availability basis. Contact FNW for additional assistance.				

Weights

Size	Weight (Lbs)
28	1,272
30	1,279
32	1,715
36	1,984
40	2,712
42	2,923
48	3,505

Torque

Size	Torque (in-lbs)
28	28,958
30	33,336
32	38,124
36	46,528
40	78,993
42	79,864
48	111,112

- When sizing actuators, application specific multipliers should be considered.
- High pressure differentials should take dynamic torque into consideration.

Cv (Flow Coefficients)

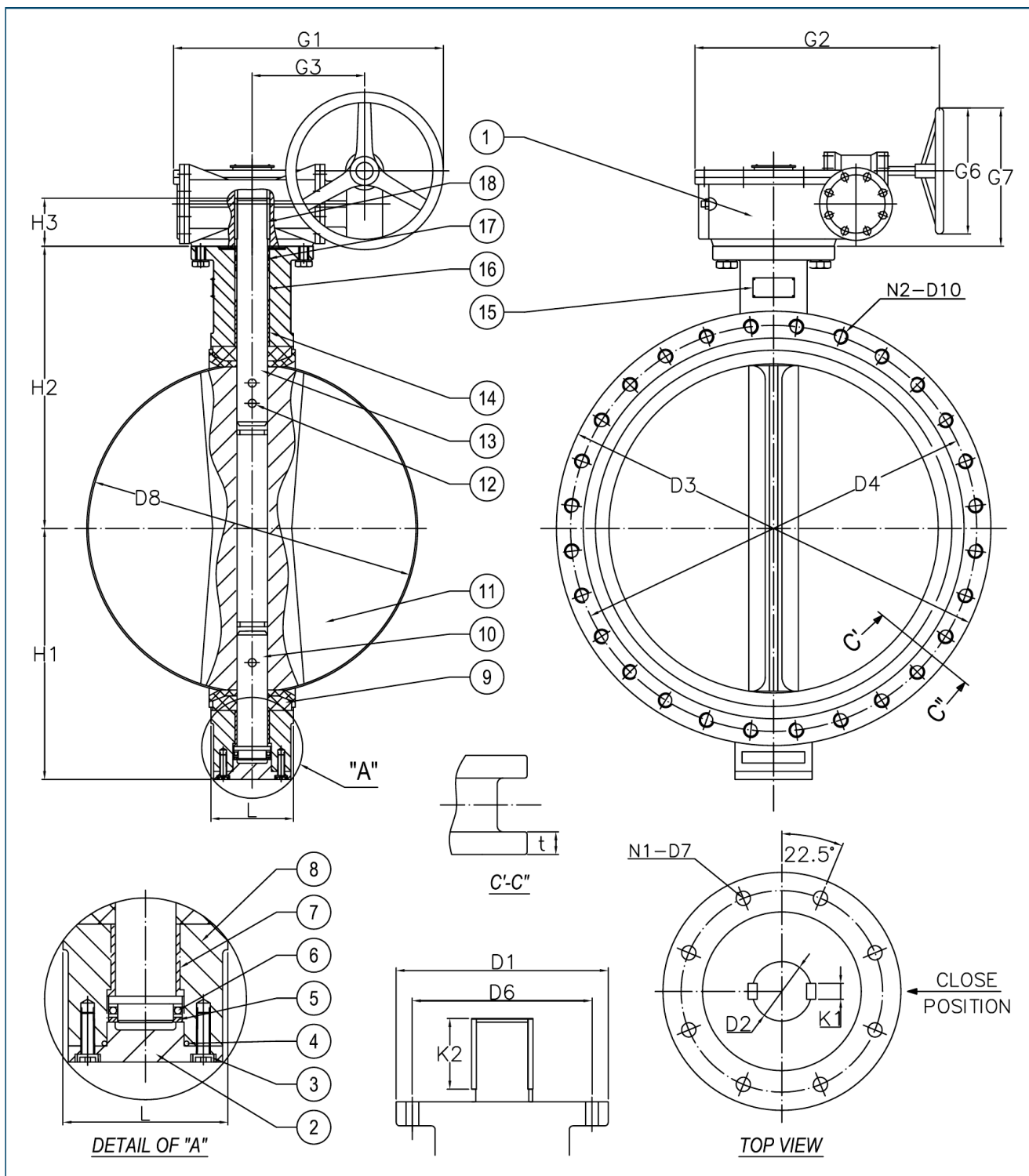
The size of butterfly valve used for control purposes should be calculated on the basis of the operating characteristics. In order to achieve optimum control, the flow coefficient (Cv) of a valve needs to be considered. Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F. Flow for a given Cv is typically calculated from the following formula.

$$Q = C_v \times \sqrt{\frac{\Delta P \times 62.4}{D}}$$

Where:

- Q = Valve flow rate in gallons per minute (US GPM)
- ΔP = Pounds per square inch (PSI) pressure drop across valve
- 62.4 = Conversion factor for fluids computed in relation to water
- D = Density of fluids in pounds per cubic foot

Size	Cv by Disc Degrees Open								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
28	30	1,663	3,522	7,630	12,599	20,036	30,482	46,899	58,696
30	35	1,912	4,050	8,142	13,152	20,411	31,226	47,562	63,328
32	45	2,387	4,791	8,736	13,788	20,613	31,395	48,117	68,250
36	60	3,021	6,063	11,055	17,449	26,086	39,731	60,895	86,375
40	84	4,183	8,395	15,307	24,159	36,166	55,084	84,425	119,750
42	93	4,601	9,235	16,838	26,575	39,783	60,592	92,868	131,725
48	121	5,981	12,001	21,890	34,548	51,718	78,770	120,728	171,243



Dimensions (inches)

Size	D1	D2	D3	D4	N2	D10 (UNC-2B)	D6	N1	D7	D8	L	H1	H2	H3	t	K1	K2	G1	G2	G3	G6	G7
28	11.81	2.49	36.50	34.00	24	1-1/4-7	10.00	8	0.71	27.36	6.42	20.47	24.57	2.60	2.13	0.71	2.48	21.28	19.13	7.66	15.75	13.54
30	11.81	2.49	38.74	36.00	28	1-1/4-7	10.00	8	0.71	29.29	6.57	22.05	25.98	2.60	2.13	0.71	2.48	21.28	19.13	7.66	15.75	13.54
32	11.81	2.49	41.73	38.50	24	1-1/2-6	10.00	8	0.71	31.30	7.40	23.27	26.46	2.60	2.40	0.71	2.48	21.28	19.13	7.66	15.75	13.54
36	11.81	2.95	45.98	42.76	32	1-1/2-6	10.00	8	0.71	34.06	7.99	25.83	28.35	4.65	2.40	0.79	3.94	24.96	21.65	9.72	15.75	15.24
40	11.81	3.35	50.75	47.25	28	1-1/2-6	10.00	8	0.71	37.99	8.50	28.39	31.50	5.91	2.52	0.79	3.94	24.96	21.65	9.72	15.75	15.24
42	13.78	3.74	52.99	49.49	36	1-1/2-6	11.73	8	0.87	40.55	9.88	30.59	33.78	5.91	2.64	0.98	5.51	31.89	25.59	12.60	17.72	18.62
48	13.78	4.13	59.49	56.00	44	1-1/2-6	11.73	8	0.87	45.67	10.87	34.02	37.05	5.91	2.76	1.10	5.51	31.89	25.59	12.60	17.72	18.62

SPLIT BODY PTFE SEATED BUTTERFLY VALVE

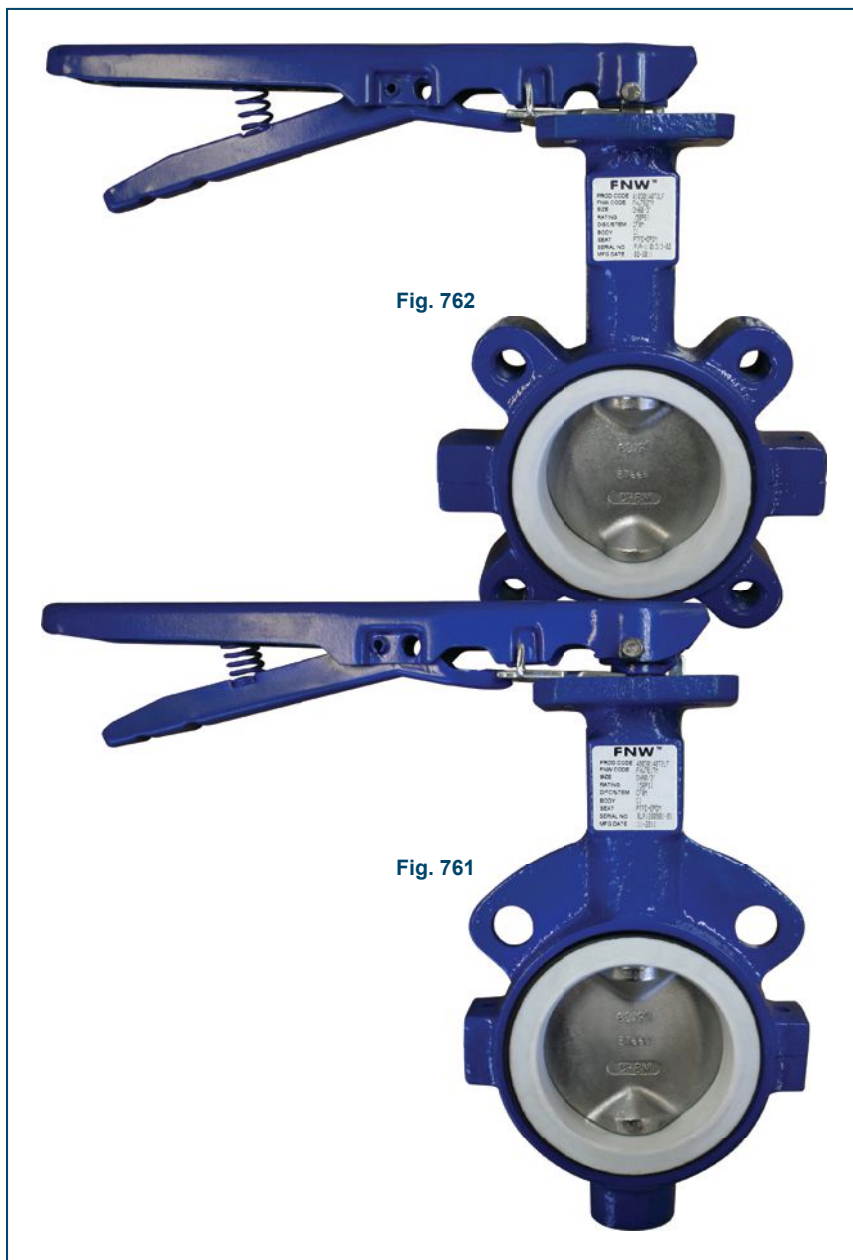
The figure 761/762 series valve is a split body boot seated butterfly valve designed for bubble tight service on corrosive applications. The PTFE lined seat and stainless steel disc/stem provide superior corrosion resistance, but with the economy of a cast iron body.

Features:

- Rated to 150 PSI
- Designed for 125/150 Lbs Flanges
- Locating Flange Holes on All Wafer Models (Fig. 761)
- Split Body for Easy Maintenance
- Heavy-duty Square Groove Boot Seat
- Lug Bodies for Dead-End Service Rated to 75 PSI Without Downstream Flange*
- Vacuum Rated to 29.92"Hg (0.00075 Torr)**
- Shell Tested to 150% & Seat Tested to 110% of Maximum Working Pressure
- Two Layer Epoxy/Polyurethane Body Coating
- Low Maintenance Design
- Sizes 2" to 12"

Standards:

- Design: API 609
- Flange Connection: ANSI B16.5
- Testing: API 596
- Mounting Pad: ISO 5211

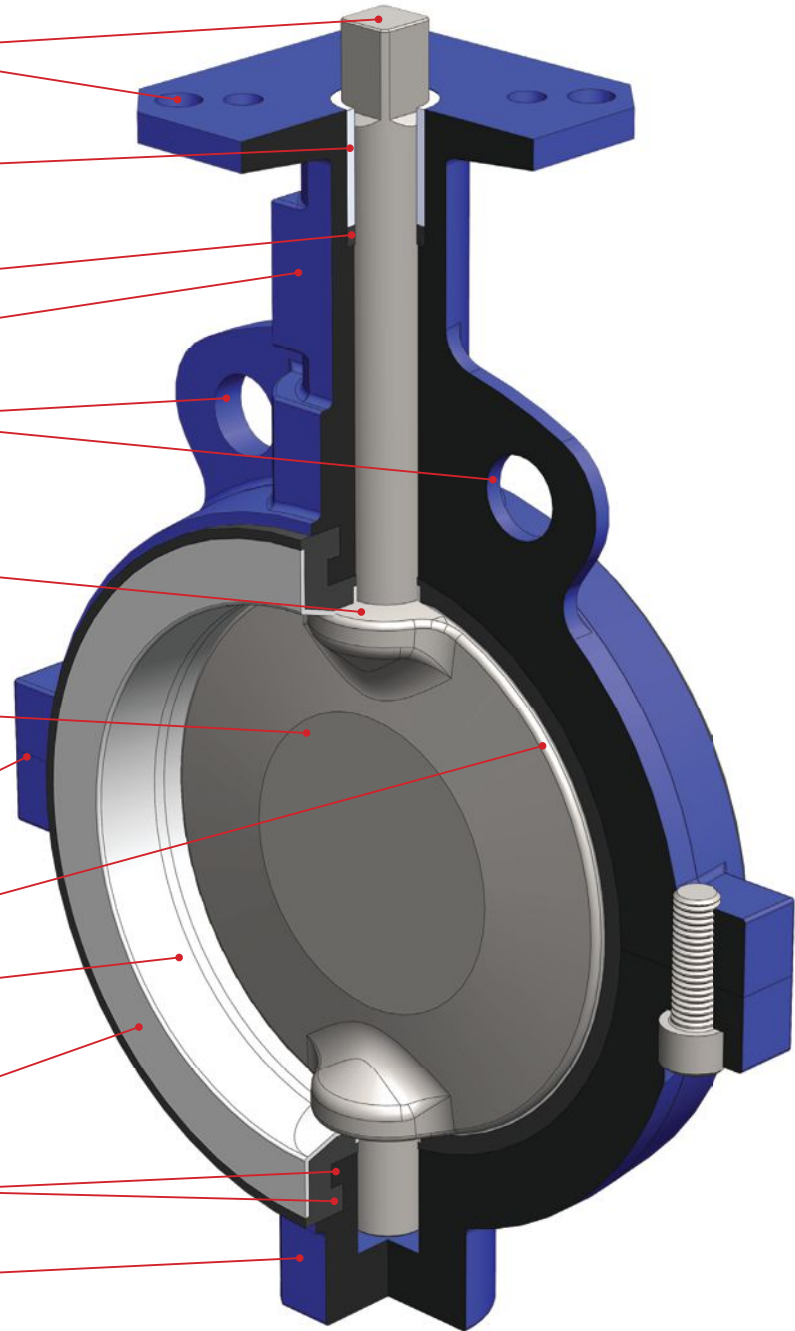


* Dead-end service with downstream flange is rated to the valve's full 150 PSI capacity.

** Leakage rate not exceeding 1×10^{-6} cc/sec. Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.

Design Features:

- ISO 5211 actuator mounting pad with square stem for direct mounted actuation
- Heavy-duty polyacetal bushing absorbs side load forces created by pressure on the stem/disc
- Bidirectional "U" cup stem seal
- Extended neck accommodates 2" piping insulation
- Wafer valves include two flange locating holes meeting ANSI B16.5 for 125/150 lbs flanged for easy alignment during installation
- Precision machined wide radius on upper and lower disc hubs provide a superior primary seal between disc and stem
- Single-piece stainless steel disc and stem provides corrosion resistance, strength, and a thin profile to flow
- Heavy-duty cast iron split body for easier maintenance
- Disc edge and hubs are hand polished for improved seal ability
- PTFE seat with EPDM backing provides corrosion resistance and seat resiliency
- A resilient flange face acts as flange gasket for installation
- Heavy-duty square groove locks boot seat in place
- Two layer coating starting with Epoxy Zinc Phosphate Primer followed by a Polyurethane top coat



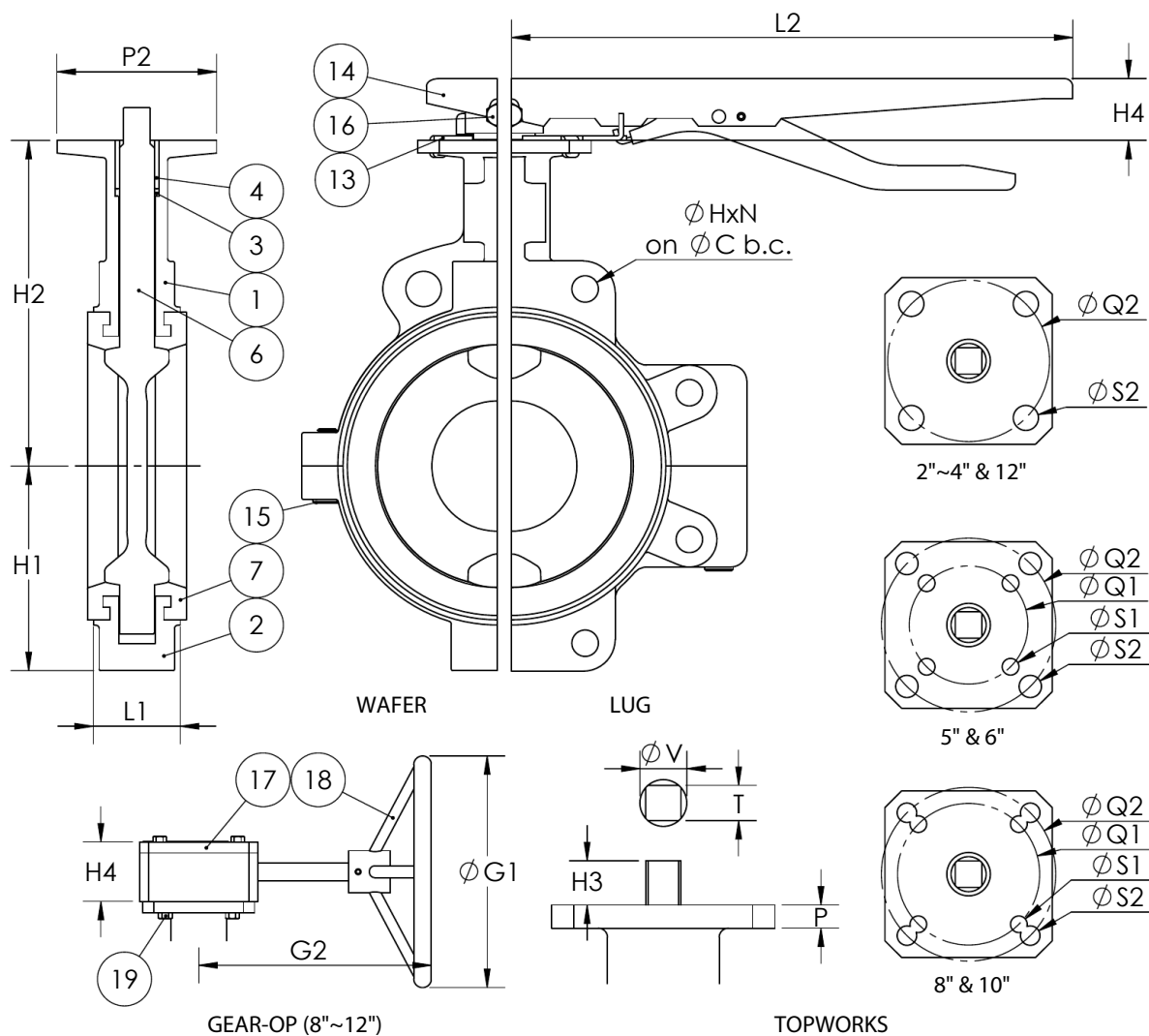
Standard Materials

Options:

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, square drive nuts, worm-gear operators, pneumatic and electric operators, control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

Ref. No.	Description	Material	Qty	Remarks
1	Upper Body	ASTM A126 Gr. B CAST IRON	1	
2	Lower Body	ASTM A126 Gr. B CAST IRON	1	
3	Stem Seal	NITRILE	1	
4	Stem Bushing	POLYACETAL	1	
6	Disc / Stem	ASTM A351 CF8M / SS316 SH STAINLESS STEEL	1	
7	Seat	PTFE LINED EPDM	1	
8	Body Locating Pins	CARBON STEEL En8	2	Zinc Plated, Not Shown
13	Stop Plate	CARBON STEEL ZINC PLATED	1	Zinc Plated
14	Lever	CARBON STEEL	1	2"~6", Powder Coated
15	Body Screw	304SS STAINLESS STEEL	2	
16	Lever Bolt	CARBON STEEL	1	Zinc Plated
17	Gear Operator	CAST IRON	1	8"~12"
18	Handwheel	CARBON STEEL	1	8"~12", Fabricated
19	Gear Mtg Bolt	CARBON STEEL	4	8"~12", Zinc Plated

Visit us at www.fnw.com



Dimensions (inches)

Size	H1		H2	H3	H4	L1	L2	ØG1	G2	P	P2	ØQ1	ØQ2	ØS1	ØS2	ØV	T	Lug Only		
	Wafer	Lug																ØH (UNC)	N	ØC
2	2.76	2.76	5.51	0.63	1.22	1.63	10.23			0.39	3.15		2.76		0.39	0.56	0.43	5/8"-11	4	4.75
2-1/2	2.95	2.95	5.98	0.63	1.22	1.75	10.23			0.39	3.15		2.76		0.39	0.56	0.43	5/8"-11	4	5.50
3	3.35	3.35	6.30	0.63	1.22	1.75	10.23			0.39	3.15		2.76		0.39	0.56	0.43	5/8"-11	4	6.00
4	4.13	4.09	7.09	0.75	1.20	2.01	10.23			0.39	3.15		2.76		0.39	0.71	0.55	5/8"-11	8	7.50
5	4.80	4.72	7.56	0.81	1.54	2.15	13.85			0.45	3.94	2.76	4.01	0.39	0.47	0.87	0.67	3/4"-10	8	8.50
6	5.31	5.31	8.07	0.81	1.54	2.15	13.85			0.45	3.94	2.76	4.01	0.39	0.47	0.87	0.67	3/4"-10	8	9.50
8	6.69	6.69	9.49	0.94	2.52	2.49		9.84	9.84	0.49	4.72	4.01	4.92	0.47	0.55	0.99	0.75	3/4"-10	8	11.75
10	8.07	7.87	10.75	0.94	2.87	2.55		11.81	10.87	0.49	4.72	4.01	4.92	0.47	0.55	1.11	0.87	7/8"-9	12	14.25
12	9.26	9.06	12.24	1.14	3.11	2.99		17.71	13.19	0.49	4.72		4.92		0.55	1.43	1.06	7/8"-9	12	17.00

Figure Number Matrix

F N W 7 6 1 T G X									
BODY TYPE		SEAT	OPERATOR				SIZE CODES		
1 = WAFER		T = PTFE (EPDM	BLANK = 10 POSITION LEVER (2"-6")				2 = K	4 = P	8 = X
2 = LUG		BACKER)	G = GEAR OPERATOR (8"-12")				2-1/2 = L	5 = S	10 = 10
							3 = M	6 = U	12 = 12

Torque & Weight

SIZE	Torque (in-lbs)	Wt (Lbs)	
		Wafer	Lug
2	133	6.2	7.9
2-1/2	196	6.9	9.0
3	264	7.9	10.0
4	410	12.0	17.5
5	660	16.1	23.8
6	873	18.5	27.6
8	1,660	52.2	62.8
10	2,526	68.3	86.0
12	3,928	85.1	116.5

SPLIT BODY PTFE SEATED BUTTERFLY VALVE

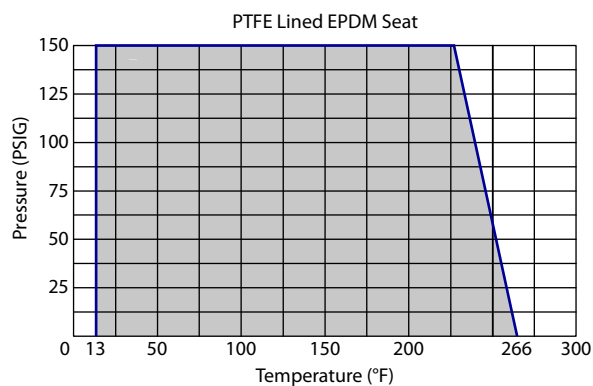
Cv (Flow Coefficient)

SIZE	DEGREES of DISC OPENING								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
2"	1	4	11	19	34	59	92	120	127
2-1/2"	2	6	21	38	67	117	181	238	251
3"	2	7	30	58	102	177	275	360	381
4"	3	8	32	73	136	222	348	538	724
5"	4	13	82	142	223	357	646	955	1,147
6"	4	19	94	203	340	539	800	1,196	1,454
8"	10	85	201	351	567	901	1,552	2,368	2,763
10"	16	135	318	556	897	1,425	2,457	3,771	4,525
12"	23	196	463	838	1,328	2,136	3,661	5,609	6,731

Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F.

Butterfly valves used for throttling service is limited to a maximum pressure drop of 20% of the inlet pressure at maximum open position.

Recommended control angles are between 25° and 70°. Preferred angle for control valve sizing is 60° to 65° open.



HIGH PERFORMANCE BUTTERFLY VALVE

Features:

- Bidirectional Bubble-tight Shut Off
- Suitable for Saturated Steam Service to 150 PSI
- Double Off-Set Configuration with Conical Angled Disc
- Available in Wafer (3" to 12") or Lug (3" to 24")
- Stocked in Carbon by Stainless and All Stainless Steel Configurations
- Dead-end Service Rated to Full 285 PSI Pressure Differential in the Preferred Flow Direction *
- Vacuum rated to 29.91"Hg (0.3750 Torr) +
- Easy access reverse packing gland (up to 12")
- ISO Top-works for Manual or Direct Mount Actuation (up to 12")
- Low Maintenance
- Manufactured in ISO 9001 Facility

Standards:

- Design: API 609
- Mounting Pad: ISO 5211
- End Flange: ASME B16.5
- Wall Thickness: ASME B16.34
- Face to Face: API 609
- Pressure/Temp Rating: ANSI B16.34
- Material Rating: ANSI B16.34
- Shell/Seat Test: API 598
 - Body: CS - 3.2 MPa (464 PSI)
 - SS - 3.0 MPa (435 PSI)
 - Seat Hydro: 2.3 MPa (333 PSI)
 - Seat Air: 0.6 MPa (87 PSI)

Options

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, square drive nuts, worm-gear operators, and pneumatic and electric operators. Also available are various control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

* Preferred Flow Direction is defined as having the seat retainer ring facing upstream. For non-preferred flow direction (seat retainer ring facing downstream), a downstream flange is required on 10 inch and larger valves for full 285 PSI differential. Without a downstream flange, dead-end service in the non-preferred flow direction is limited to 230 PSI for 10 and 12 inch valves, 150 PSI for 14 inch and larger valves. Pressures listed are for non-shock ambient temperatures.

+ Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.



Standard Materials

Ref. No.	Description	Material		Qty	Remarks
		CS Body	SS Body		
1	Body	A216 WCB	A351 CF8M	1	
2	Retainer Ring	A105	A351 CF8M	1	
3	Seat	RTFE (25%GF)		1	
4	Disc	A351 CF8M		1	
5	Stem	A 564 630 (UNS S17400)		1	17-4PH
6	Stem Pin	A 564 630 (UNS S17400)		1 Set	17-4PH
7	Retaining Ring Washer	AISI 1066	A276 321	1 Set	
8	Retaining Ring Bolt	A193 B8		1 Set	
9	Spacer	A182 316		1	
10	Packing Gland Stud	A193 B7	A193 B8	2	
11	Packing Gland Nut	A194 2H	A194 8	2	
12	Packing Gland Washer	AISI 1066	A276 321	2	
13	Packing	PTFE		1	
14	Packing Gland Ring	A182 316		1	
15	Packing Gland Flange	A105	A182 F316	1	
16	Lever Plate Bolt	A193 B7	A193 B8	2	
17	Lever Plate Nut	A194 2H	A194 8	2	
18	Lever Plate Washer	AISI 1066	A276 321	2	
19	Lever	A536, GR. 65-45-12		1	
20	Rivet	A182 304		2	
21	Nameplate	A182 304		1	

Ref. No.	Description	Material		Qty	Remarks
		CS Body	SS Body		
22	Upper Stem Bearing	316+PTFE		1	
23	Lower Stem Bearing	316+PTFE		1	
24	Disc Washer	A182 316		2	
25	Disc Spring	A182 316		1	
26	Gasket	PTFE		1	8-24 Inch
27	Lower Gland Flange	A105	A182 F316	1	8-24 Inch
28	Lower Gland Bolt	A193 B7	A193 B8	4	8-24 Inch
29	Lower Gland Washer	AISI 1066	A276 321	4	8-24 Inch
30	Lower Bracket Nut	A194 2H	A194 8	8	14-24 Inch
31	Lower Bracket Washer	AISI 1066	A276 321	8	14-24 Inch
32	Lower Bracket Bolt	A193 B7	A193 B8	8	14-24 Inch
33	Bracket	AISI 1020		1	14-24 Inch
34	Upper Bracket Bolt	A193 B7	A193 B8	4	14-24 Inch
35	Upper Bracket Washer	AISI 1066	A276 321	4	14-24 Inch
36	Key	AISI 1045	A182 F321	2	14-24 Inch
37	Pin	A276 321		2	14-24 Inch
38	Gear Operator	WCB		1	6-24 Inch
39	Lever Reating Washer	AISI 1066		1	
40	Lever Retaining Bolt	A193 B7		1	
41	Notched Lever Plate	Steel (Cr Plated)		1	3-4 Inch

Dimensions (inches)

Size ¹	Ød	ØG	ØC	Lug		Wafer		L	A	B	L1	L2	L3	W	ØP mm (ISO)	M-Øn mm	H	ØX	K	K1
				N ²	E ³	N ²	E													
3	3.39	5.00	6.00	4	5/8"-11UNC	2	0.75	1.89	7.09	3.15	10.51				Ø102 (F10)	4-Ø12	0.63	0.63	0.55	
4	4.33	6.18	7.50	8	5/8"-11UNC	2	0.75	2.13	7.87	4.09	10.51				Ø102 (F10)	4-Ø12	0.75	0.79	0.67	
5	5.16	7.32	8.50	8	3/4"-10UNC	2	0.87	2.24	9.25	4.68	12.21				Ø102 (F10)	4-Ø12	0.83	0.95	0.75	
6	6.14	8.35	9.50	8	3/4"-10UNC	2	0.87	2.24	9.92	5.31		2.44	7.87	9.84	Ø102 (F10)	4-Ø12	0.83	0.98	0.75	
8	7.99	10.63	11.75	8	3/4"-10UNC	2	0.87	2.52	12.21	7.48		2.48	9.05	11.81	Ø125 (F12)	4-Ø14	1.18	1.10	0.87	
10	10.00	12.76	14.25	12	7/8"-9UNC	2	0.95	2.80	13.94	9.84		2.48	9.05	11.81	Ø125 (F12)	4-Ø14	1.18	1.26	1.06	
12	12.01	15.00	17.00	12	7/8"-9UNC	2	0.95	3.19	17.72	11.42		3.15	10.63	15.75	Ø140 (F14)	4-Ø18	1.18	1.38	1.06	
14	13.27	16.26	18.75	12	1"-8UNC			3.62	18.90	11.81		4.72	16.54	19.69	Ø165 (F16)	4-Ø22	3.74	1.38	1.50	0.39
16	15.24	18.5	21.25	16	1"-8UNC			4.02	19.88	13.39		4.72	16.54	19.69	Ø165 (F16)	4-Ø22	4.09	1.58	1.65	0.47
18	17.24	20.98	22.76	16	1-1/8"-8UN			4.49	23.62	14.96		4.96	18.11	23.62	Ø254 (F25)	8-Ø18	3.23	1.81	1.95	0.55
20	19.25	22.99	25.00	20	1-1/8"-8UN			5.00	29.13	15.35		5.43	20.08	23.62	Ø254 (F25)	8-Ø18	3.27	1.97	2.11	0.55
24	23.27	27.24	29.50	20	1-1/4"-8UN			6.06	33.86	18.50		5.43	20.47	29.92	Ø254 (F25)	8-Ø18	4.13	2.36	2.52	0.71

1. 6" and larger valves are standard with gear operator. Gear operators for 4" and smaller valves are available upon request.

2. The N value for lug valves is tapped holes per side. For wafer valves, the number represents through holes.

3. Large body valves have blind tapped holes at the top and bottom of the valve, near the stem. For high performance butterfly valves, ANSI B16.5 requires all bolts, 1-1/8" and larger, have an 8-UN thread series.

Cv (Flow Coefficients)

Size	Disc Opening								
	10°	20°	30°	40°	50°	60°	70°	80°	90°
3	6	16	24	36	52	76	113	146	162
4	15	37	55	80	117	172	256	329	365
6	39	98	147	215	313	460	685	880	978
8	70	176	264	387	563	827	1,232	1,584	1,760
10	131	328	492	722	1,050	1,542	2,296	2,952	3,280
12	196	490	735	1,078	1,568	2,303	3,430	4,410	4,900
14	214	536	804	1,179	1,715	2,519	3,752	4,824	5,360
16	307	768	1,152	1,690	2,458	3,610	5,376	6,912	7,680
18	380	950	1,425	2,090	3,040	4,465	6,650	8,550	9,500
20	537	1,342	2,013	2,952	4,294	6,307	9,394	12,078	13,420
24	752	1,880	2,820	4,136	6,016	8,836	13,160	16,920	18,800

The size of butterfly valve used for control purposes should be calculated on the basis of the operating characteristics. In order to achieve optimum control, the flow coefficient (Cv) of a valve needs to be considered. Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F. Flow for a given Cv is typically calculated from the following formula.

$$Q = C_v \times \sqrt{\frac{\Delta P \times 62.4}{D}}$$

Where:

Q = Valve flow rate in gallons per minute (US GPM)

ΔP = Pounds per square inch (PSI) pressure drop across valve

62.4 = Conversion factor for fluids computed in relation to water

D = Density of fluids in pounds per cubic foot

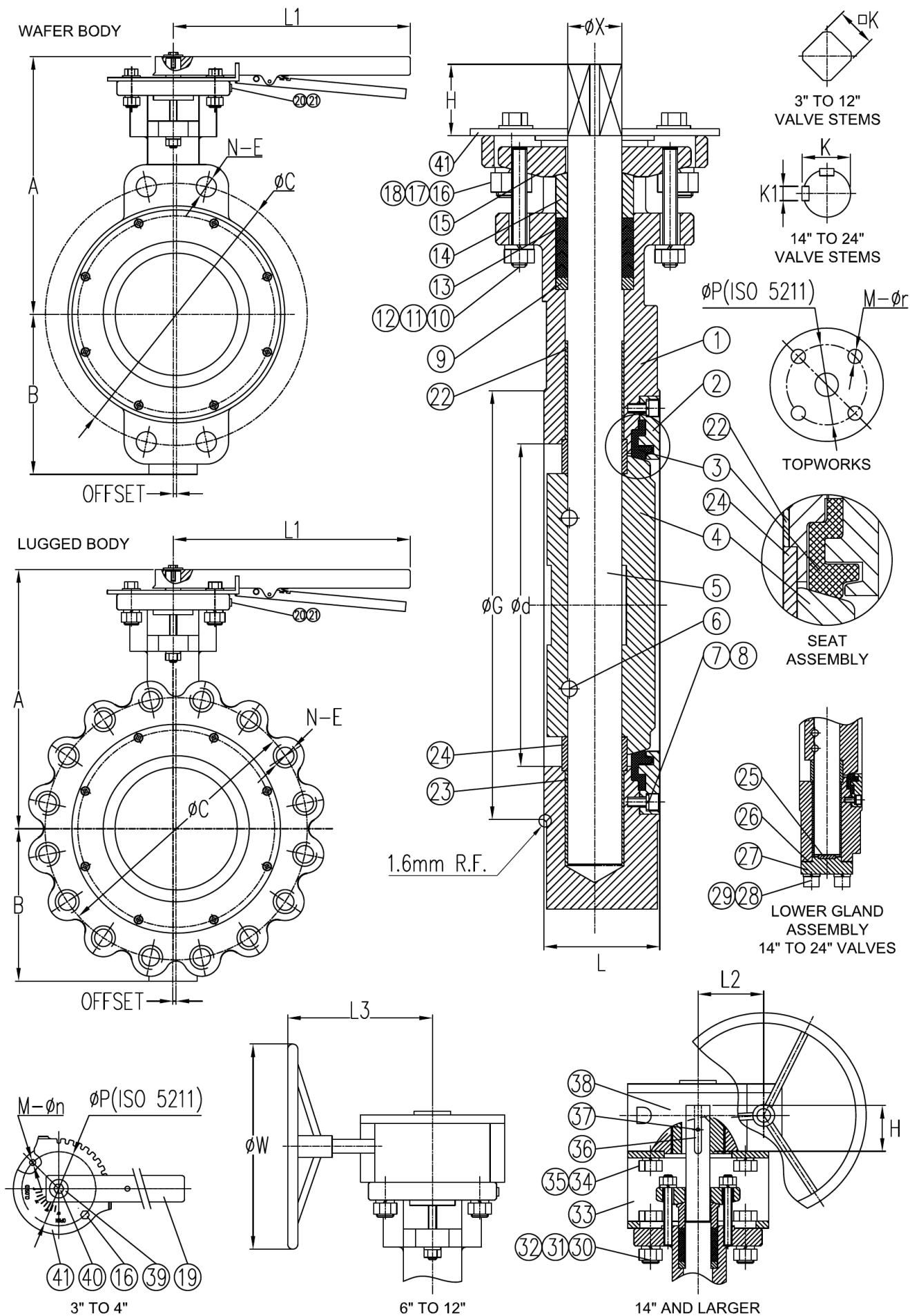
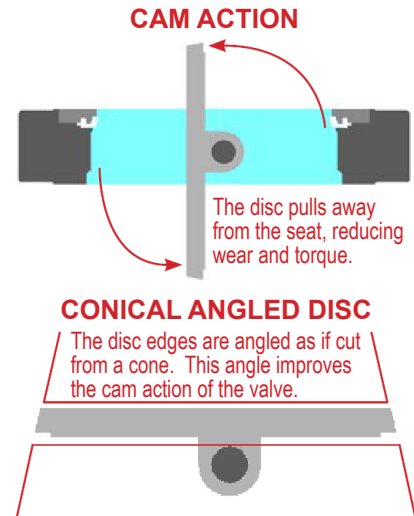
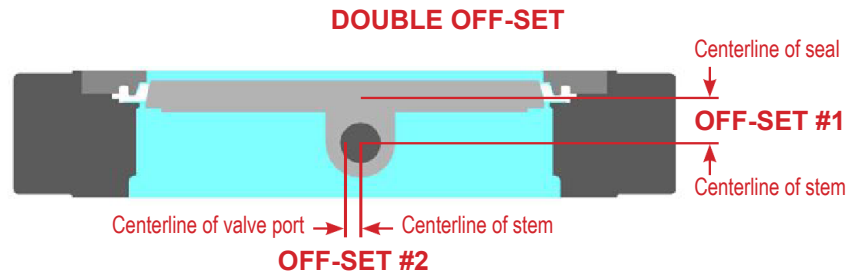


Figure HP BUTTERFLY VALVES

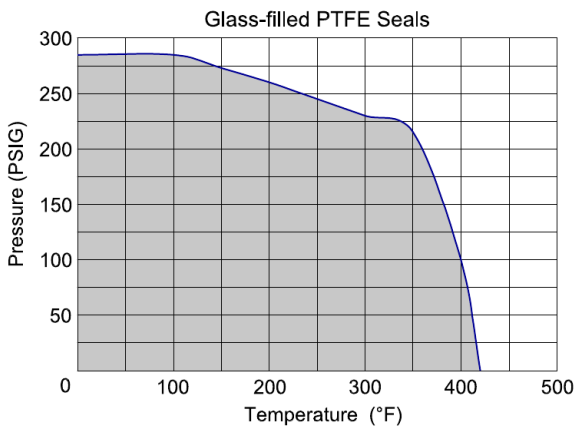


Double Off-Set Design

The valve is designed with two offsets. The first offset is between the seat sealing surface and the centerline of the valve stem, putting the stem behind the sealing surface. Since the stem does not penetrate the sealing surface, there is a complete, uninterrupted, 360° seat seal. The second offset is between the centerline of the valve stem and the centerline of the valve port. This double-offset creates an eccentric seating action that reduces seat wear and torque. The disc cams into the seat for a bubble tight shut off. The cam action is improved by the conical angle of the valve disc.



Pressure/Temperature



Weight (Lbs)

Size	Wafer	Lug
3	18	22
4	24	29
5	35	40
6	59	70
8	79	95
10	110	130
12	148	189
14		291
16		383
18		498
20		661
24		991

Torque (in-lbs)

Size	Differential Pressure*	
	150 PSI	285 PSI
3	270	338
4	436	578
5	657	858
6	962	1,292
8	1,726	2,359
10	2,616	3,683
12	3,878	5,567
14	5,555	7,942
16	7,415	10,708
18	9,494	13,965
20	13,868	20,108
24	21,522	31,919

* Torques shown are for the preferred flow direction (valve retaining ring facing upstream pressure).

Figure Number Matrix

F N W H P 1 L S T G X						
CLASS	CONNECTION	BODY MATERIAL	SEAT	OPERATOR	SIZE CODES	
1 = 150#	W = WAFLER L = LUG	C = WCB - CARBON STEEL S = CF8M - STAINLESS STEEL	T = RTFE	L = LEVER (STANDARD TO 4") G = GEAR (STANDARD ON 6" TO 24")	3 = M	12 = 12
					4 = P	14 = 14
					5 = S	16 = 16
					6 = U	18 = 18
					8 = X	20 = 20
					10 = 10	24 = 24

THERMOPLASTIC VALVES

BALL VALVES

Figure	Description	Page
340N.....	PVC, true-union, full port, 150 psi, threaded or socket weld ends	141
340NF.....	PVC, true-union, full port, 150 psi, 150# flanged	141
350N.....	CPVC, true-union, full port, 150 psi, threaded or socket weld ends	141

BALL VALVE ACCESSORIES

Figure	Description	Page
340NSE.....	PVC stem extension kit for figure 340(N) and 350(N) ball valve.....	145

BUTTERFLY VALVES

Figure	Description	Page
721	PVC, EPDM or FPM (Viton®) seat and seals, wafer	147

CHECK VALVES

Figure	Description	Page
345	PVC, ball check, true-union, 150 psi, EPDM or FPM (Viton®) seat/seals NPT/SW	149
355	CPVC, ball check, true-union, 150 psi, EPDM or FPM (Viton®) seat/seals NPT/SW.....	149

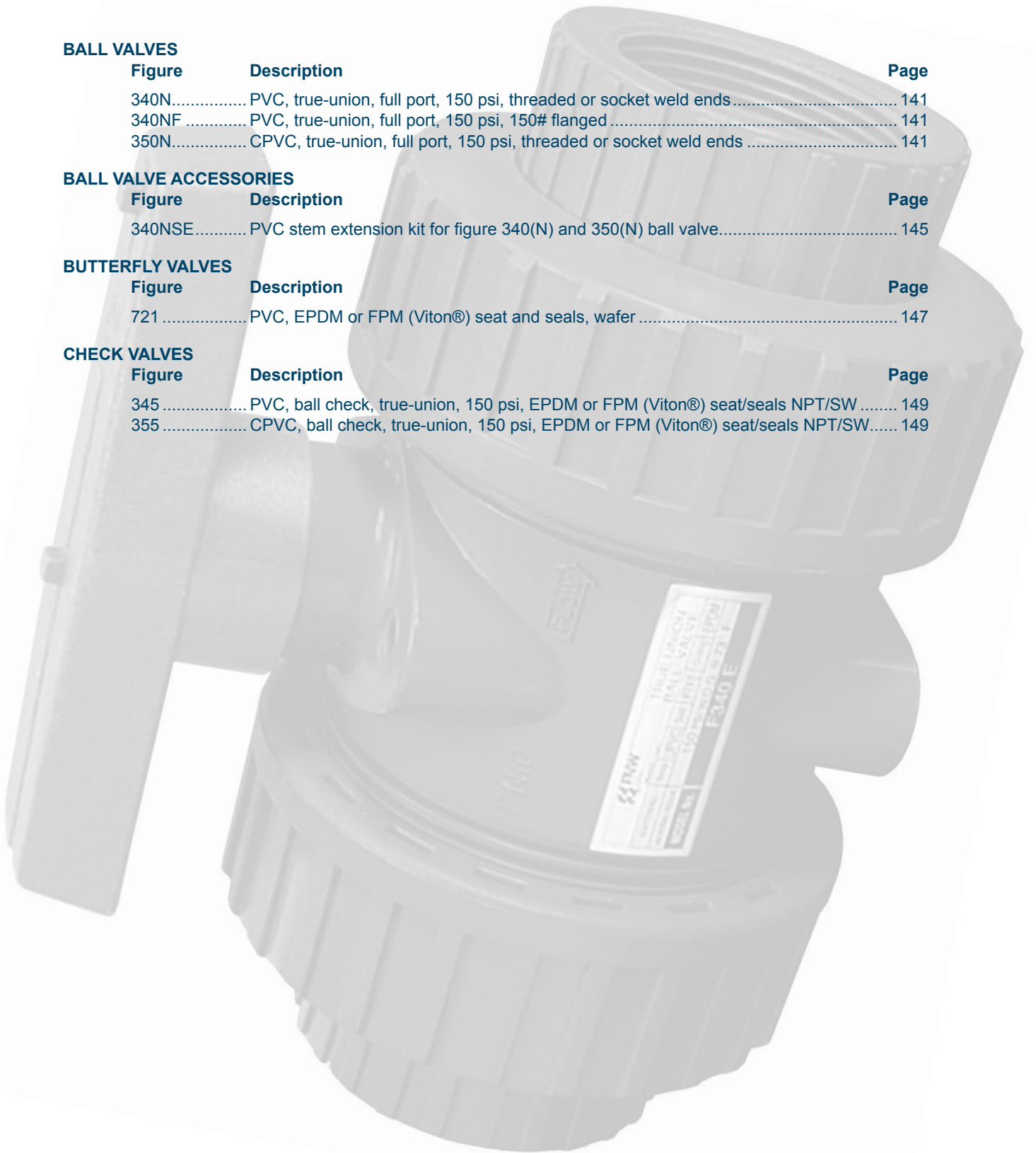


Figure 340N, 340NF, and 350N THERMOPLASTIC VALVES



FULL PORT TRUE-UNION BALL VALVE

Figure 340N - PVC with NPT and SW Ends*

Figure 340NF - PVC with 150# Flanges

Figure 350N - CPVC with NPT and SW Ends*

SW only on sizes over 2". NPT is available upon request.

Valve Features

- Full Port Design
- Pressure Rating: 150 PSI
- Temperature Range:
 - PVC: 41°F to 122°F (5°C to 50°C)
 - CPVC: 32°F to 194°F (0°C to 90°C)
- Certified to NSF 61 Annex G
- EPDM or FPM (Viton®) Seals
- O-ring Energized Seats (up to 2")
- Bidirectional Flow *
- Adjustable Seat Tightness
- Easy Disassembly with Handle
- Easy Replacement Reduces Down Time
- Can Be Modified for Actuator Installation

* Note that the valve has a preferred flow direction indicated by the embossed arrow on the body. The preferred flow direction orients the carrier upstream so that downstream piping can be removed with valve closed.

Standards

Figure 340N Connections:

- Threaded: ASTM D-2464, ref. ANSI B1.20.1
- Socket: ASTM D-2467

Figure 340NF Connections:

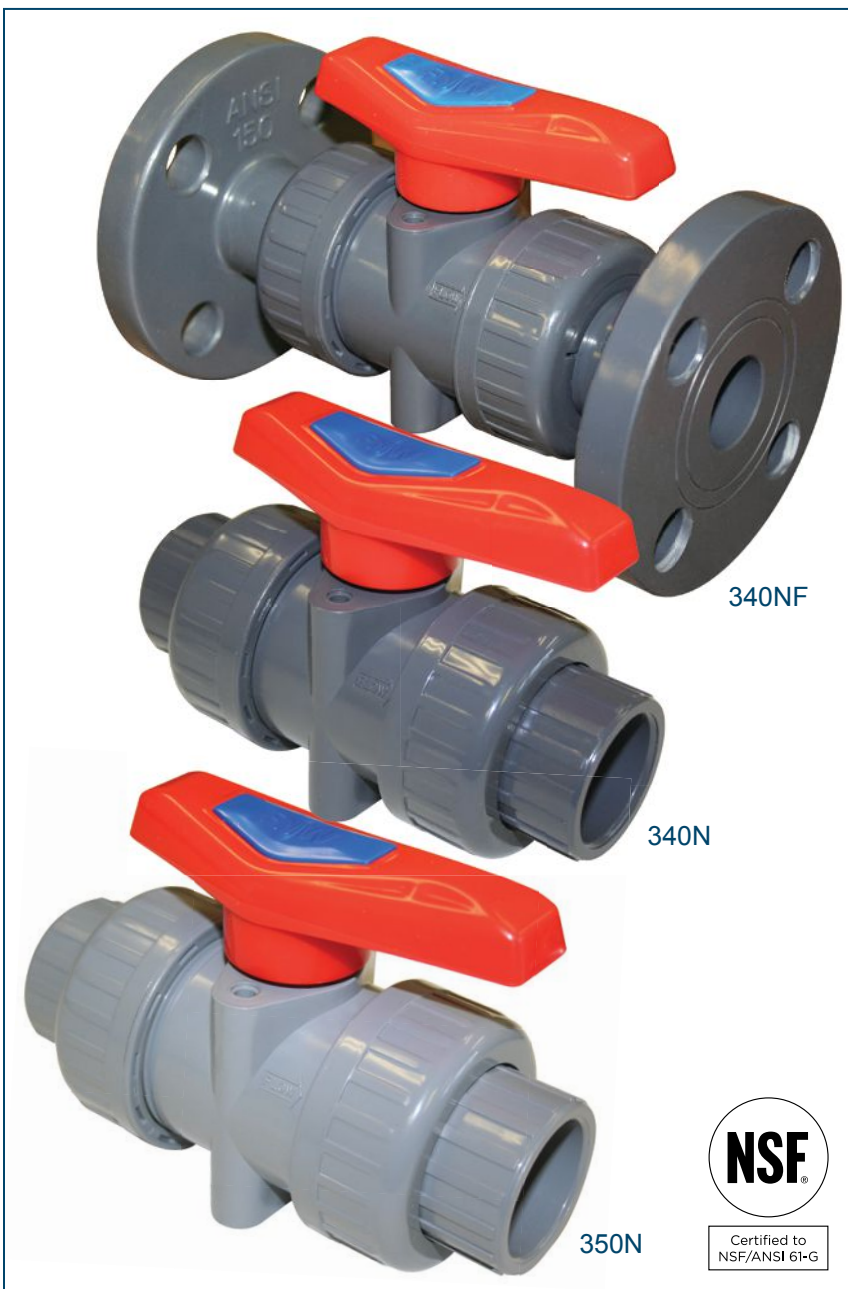
- Flanged: ANSI B16.5, Class 150

Figure 350N Connections:

- Threaded: ASTM F437
- Socket: ASTM F439

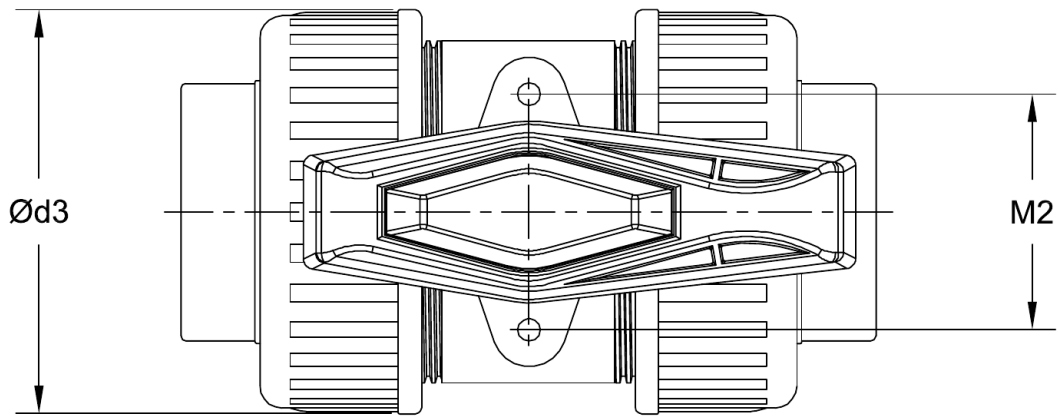
Materials:

- PVC: Cell Classification 12454 per ASTM D1784 (formerly Type I, Grade 1)
- CPVC: Cell Classification 23447 per ASTM D1784 (formerly Type IV, Grade 1)

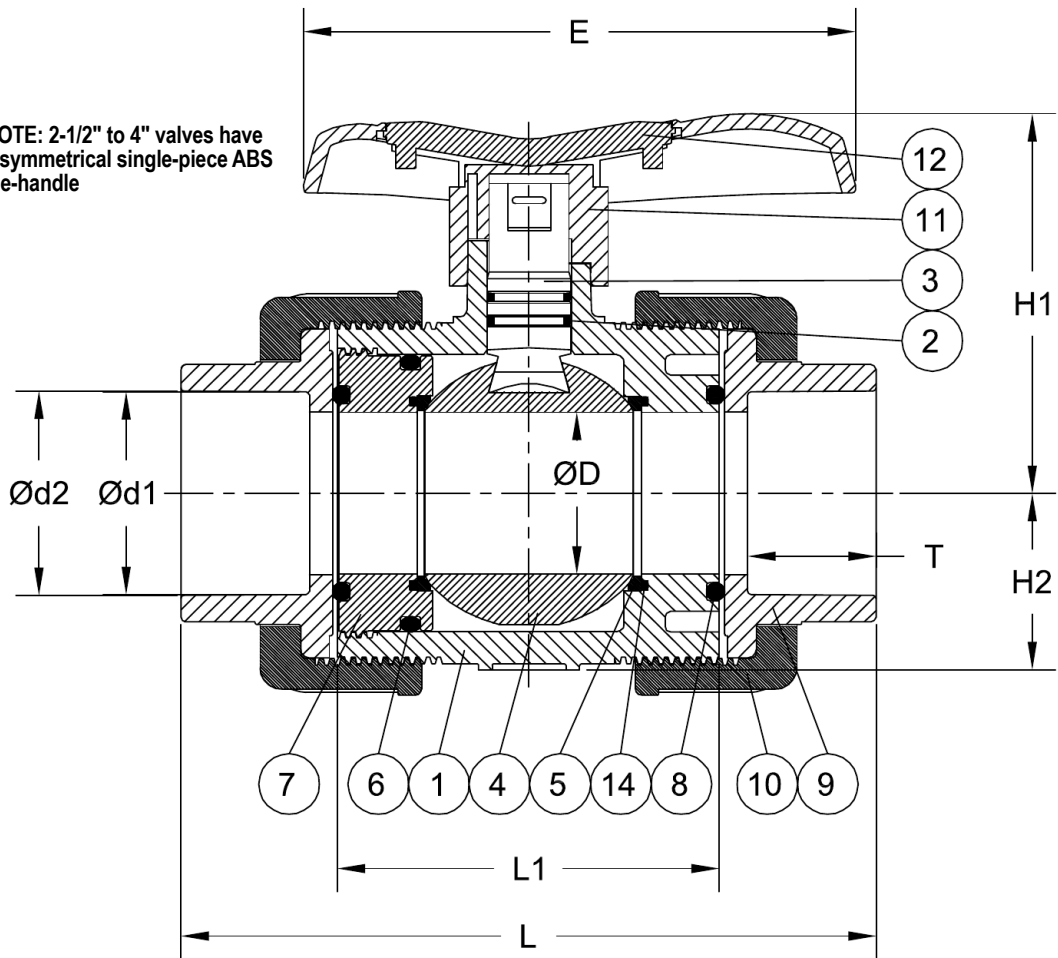


Options

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, worm gear operators, pneumatic and electric operators, control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.



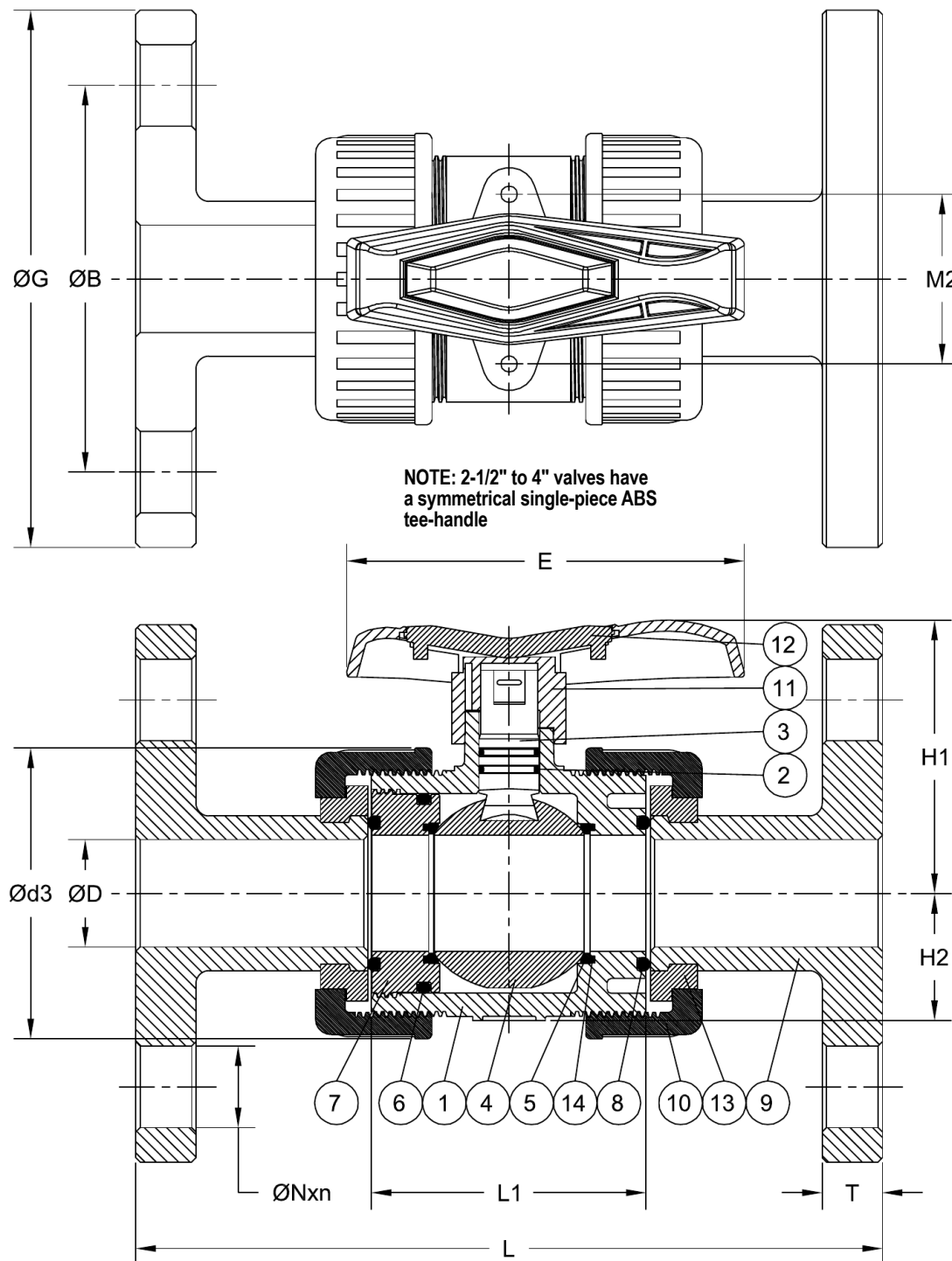
NOTE: 2-1/2" to 4" valves have a symmetrical single-piece ABS tee-handle



Dimensions (inches) Figure 340N and 350N

Size	ØD	E	L	L1	Ød1	Ød2	Ød3	T	H1	H2	M2
1/2	0.512	3.03	4.49	2.36	0.84	0.85	1.82	0.87	1.81	0.83	1.18
3/4	0.709	3.74	5.31	2.87	1.05	1.06	2.19	1.00	2.24	1.02	1.30
1	0.906	4.33	5.87	3.11	1.31	1.32	2.62	1.13	2.76	1.30	1.57
1-1/4	1.181	5.00	6.69	3.46	1.66	1.67	3.23	1.25	2.95	1.54	1.85
1-1/2	1.496	5.63	6.93	3.74	1.89	1.91	3.88	1.38	3.70	1.61	2.05
2	1.890	6.46	8.15	4.49	2.37	2.39	4.72	1.50	4.45	2.09	2.76
2-1/2	2.402	7.09	10.83	5.35	2.87	2.89	5.51	1.75	4.57	*	*
3	2.717	8.82	11.97	6.22	3.49	3.52	6.30	1.88	5.12	*	*
4	3.898	10.94	13.07	6.93	4.49	4.52	8.86	2.25	7.01	*	*

* 2-1/2" to 4" valves do not have bosses for mounting pad. Saddle mounts, sold separately, are available for actuation purposes.



Dimensions (inches) Figure 340NF

Size	$\varnothing D$	E	L	L1	$\varnothing d1$	$\varnothing d2$	$\varnothing d3$	T	H1	H2	M2	$\varnothing N$	n
1/2	0.512	3.03	5.63	2.36	2.40	3.50	1.82	0.51	1.81	0.83	1.18	0.63	4
3/4	0.709	3.74	6.77	2.87	2.76	3.86	2.19	0.55	2.24	1.02	1.30	0.63	4
1	0.906	4.33	7.36	3.11	3.11	4.25	2.62	0.55	2.76	1.30	1.57	0.63	4
1-1/4	1.181	5.00	7.48	3.46	3.50	4.61	3.23	0.63	2.95	1.54	1.85	0.63	4
1-1/2	1.496	5.63	8.35	3.74	3.90	5.00	3.88	0.63	3.70	1.61	2.05	0.63	4
2	1.890	6.46	9.21	4.49	4.76	5.98	4.72	0.63	4.45	2.09	2.76	0.75	4
2-1/2	2.402	7.09	10.20	5.35	5.51	7.01	5.51	0.71	4.57	*	*	0.75	4
3	2.717	8.82	11.97	6.22	5.98	7.52	6.30	0.71	5.12	*	*	0.75	4
4	3.898	10.94	14.65	6.93	7.52	9.02	8.86	0.71	7.01	*	*	0.75	8

* 2-1/2" to 4" valves do not have bosses for mounting pad. Saddle mounts, sold separately, are available for actuation purposes.

About PVC

Unplasticised Polyvinyl Chloride, or PVC, is the most widely used of all plastics and commonly used for pressure pipes, fittings, and valves. It is rigid, suitable for above and below ground applications. PVC has good chemical resistance and is odorless and tasteless. It is for use with liquids and gases with temperatures +32°F to +140°F* (for higher temperatures see CPVC) at a wide range of operating pressures. Some poorer quality PVC can leach chemicals into water which can build up in recirculation systems, however most modern pipe is built to specific standards (e.g. BS3505/6, ASTM D 1785, ASTM D2241, DIN 8061/2, KIWA 49, BS4346 PART 1, DIN 8063) to control this. ASTM D1784 controls the compounds for rigid PVC and CPVC.

* **Note:** Other materials within valves besides PVC and CPVC can have an affect on the temperature limits of the valve. Temperatures noted above are for the thermoplastic material alone.

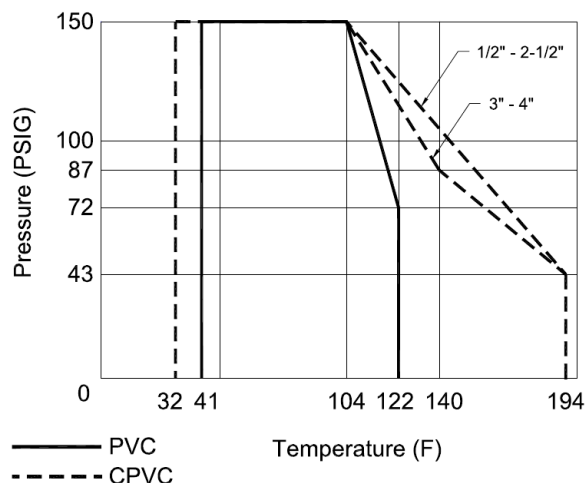
About CPVC

Chlorinated Polyvinyl Chloride, or CPVC, has been offering the process industry superior corrosion resistance, mechanical strength, and excellent life-cycle economics in a single package. Conceptually, CPVC is a PVC homopolymer that has been subjected to a chlorination reaction. It is generally inert to most mineral acids, bases, salts, and paraffinic hydrocarbon solutions. CPVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters, or ketones. The upper temperature limit on CPVC is 200°F*. There is no lower temperature limit on CPVC and the material will withstand pressure. However, at very cold temperatures, the material will become brittle and the impact strength will decline.

Standard Materials

Ref. No.	Description	Material				Qty
		340N & 340NF		350N		
		EPDM Seals	Viton Seals	EPDM Seals	Viton Seals	
1	Body	PVC		CPVC		1
2	Stem O-ring	EPDM	FPM (Viton®)	EPDM	FPM (Viton®)	2
3	Stem	PVC		CPVC		1
4	Ball	PVC		CPVC		1
5	Seat	PTFE				2
6	Carrier O-ring	EPDM	FPM (Viton®)	EPDM	FPM (Viton®)	1
7	Carrier	PVC		CPVC		1
8	Union O-ring	EPDM	FPM (Viton®)	EPDM	FPM (Viton®)	2
9	End Connector/ Flange	PVC		CPVC		2
10	Union Nut	PVC		CPVC		2
11	Handle	ABS				1
12	Handle Insert	ABS				1
13	Set Ring (340F only)	PVC		CPVC		2
14	Seat O-ring (up to 2" only)	EPDM	FPM (Viton®)	EPDM	FPM (Viton®)	2

Pressure/Temperature



Torques, Cv & Weights

Size	Torque (in-lbs)	Cv	Wt. (Lbs.)
1/2	18	12.5	0.48
3/4	27	28	0.73
1	36	50.9	0.99
1-1/4	54	81	1.39
1-1/2	71	150	2.27
2	106	230	3.41
2-1/2	178	360	7.13
3	230	485	11.97
4	371	768	11.97

Figure Number Matrix

F N W 340N E G			
BODY TYPE		SEALS	SIZE CODES
340N = PVC w/ NPT & SW ends to 2" (SW only over 2", NPT upon request)		E = EPDM	1/2 = D 2 = K
340NF = PVC w/ FLANGED ENDS		V = FPM (VITON®)	3/4 = F 2-1/2 = L
350N = CPVC w/ NPT & SW ends to 2" (SW only over 2", NPT upon request)			1 = G 3 = M
			1-1/4 = H 4 = P
			1-1/2 = J

STEM EXTENSION KIT FOR FIGURE 340(N) & 350(N) BALL VALVE

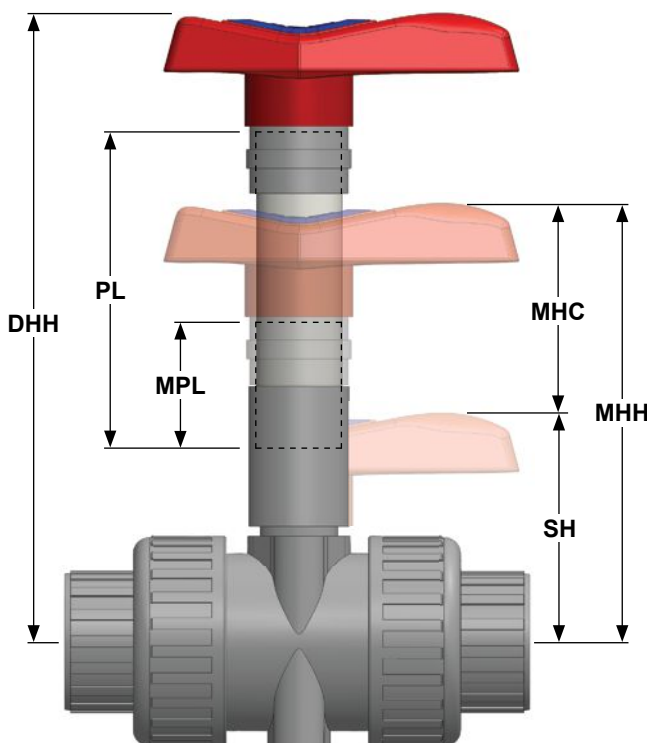
Features:

- Simple Two-Piece Design
- Uses Valve's Existing Handle (sold separately) & PVC Schedule 80 Pipe (by others)
- Sizes Available for All FNW Thermoplastic Ball Valves (Figure 340, 340N, 340F, 340NF, 350, & 350N)
- Corrosion Resistant PVC Material
- Kit Contains 1 Handle Adapter & 1 Stem Adapter

Extension Length Table:

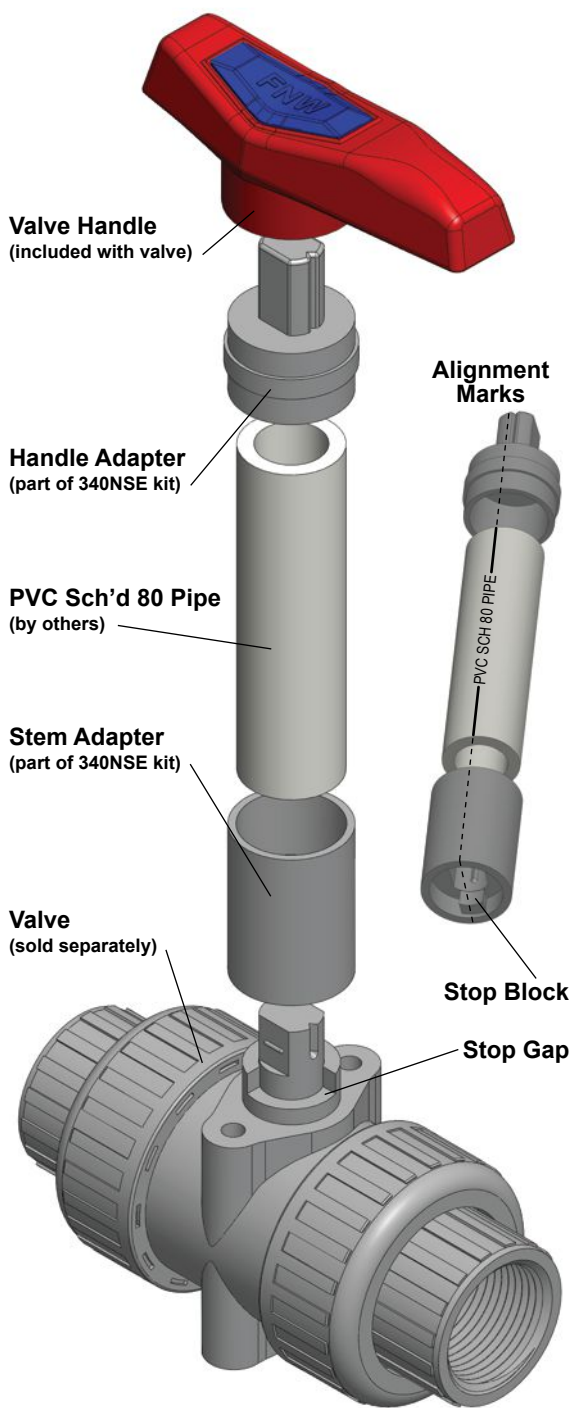
Since the figure 340NSE uses PVC schedule 80 pipe between the kits two adapter pieces, any Desired Handle Height (DHH) between minimum and maximum can be achieved. Minimum heights are indicated in the table. Maximum recommended handle height is 48 inches. To determine the Pipe Length (PL) needed to achieve the Desired Handle Height (DHH), deduct the (SUBTRACT) value in the table from the Desired Handle Height, or...

$$PL = DHH - SUBTRACT$$



Valve Size	PVC Schedule 80 Pipe Diameter	(MPL) Minimum Pipe Length	(MHH) Minimum Handle Height from (MPL)	(MHC) Minimum Height Change from Standard Height (SH)	(SUBTRACT) Amount to Subtract from Desired Handle Height (DHH) for needed Pipe Length (PL)
FRACTION (Inches)					
1/2	3/4	1-1/2	4-1/16	2-1/4	2-5/8
3/4		1-1/2	4-9/16	2-3/8	3-1/8
1		1-1/2	5-3/8	2-9/16	3-7/8
1-1/4	1	1-5/8	5-5/8	2-11/16	4
1-1/2		1-5/8	6-5/8	2-7/8	5
2		1-5/8	7-1/2	3	5-7/8
2-1/2		1-5/8	7-3/4	3-3/16	6-1/8
3		1-5/8	8-3/8	3-1/4	6-7/8
4	1-1/2	2-1/4	11-3/8	4-3/8	9-3/16
Valve Size	PVC Schedule 80 Pipe Diameter	(MPL) Minimum Pipe Length	(MHH) Minimum Handle Height from (MPL)	(MHC) Minimum Height Change from Standard Height (SH)	(SUBTRACT) Amount to Subtract from Desired Handle Height (DHH) for needed Pipe Length (PL)
DECIMAL (Inches)					
1/2	3/4	1.500	4.063	2.250	2.625
3/4		1.500	4.563	2.325	3.125
1		1.500	5.375	2.563	3.875
1-1/4	1	1.625	5.625	2.688	4.000
1-1/2		1.625	6.625	2.875	5.000
2		1.625	7.500	3.000	5.875
2-1/2		1.625	7.750	3.188	6.125
3		1.625	8.375	3.250	6.875
4	1-1/2	2.250	11.375	4.375	9.188

STEM EXTENSION KIT FOR FIGURE 340(N) & 350(N) BALL VALVE



Part Numbers

Valve Size	Part Number
1/2"	FNW340NSED
3/4"	FNW340NSEF
1"	FNW340NSEG
1-1/4"	FNW340NSEH
1-1/2"	FNW340NSEJ
2"	FNW340NSEK
2-1/2"	FNW340NSEL
3"	FNW340NSEM
4"	FNW340NSEP

Installation Requirements

- Correct Size Figure 340NSE Stem Extension Kit
- Tools for Cutting PVC Schedule 80 Pipe (Recommend Saw & Miter Box or Wheel-Type Cutter)
- PVC Primer & Solvent Cement
- Length of PVC Schedule 80 Pipe (See Chart for Determining Needed Length for Desired Handle Height)
- Marker
- Ruler

Installation Procedure

1. Select the proper diameter of PVC schedule 80 pipe.
2. From the Extension Length Table, determine the needed length of pipe for the desired handle height and then mark the length of pipe needed.
3. Using a saw and miter box, or a wheel-type cutter, cut the pipe to length. The pipe must be cut square.
4. To ensure a clean fit, bevel and de-burr the pipe ends.
5. Using a ruler and marker, draw an alignment line straight down the extension pipe piece (end-to-end) to ensure that the handle and adapters are aligned properly. The printing on the pipe can be used for this purpose if it is straight.
6. Dry fit the adapter pieces and pipe together to determine that they fit and are aligned properly. Do not attach the assembly to the valve yet.
7. Follow the manufacturer's recommendations for using the PVC primer and Solvent Cement to join the adapter pieces to the pipe, making sure that the pieces are straight according to the alignment marks or pipe printing.
8. Allow the solvent to cure per manufacturer's recommendations.
9. With the valve closed, remove the handle by pulling it up while gently rocking it back and forth. Push the handle onto the top of the extension. Do NOT use solvent cement.
10. Locate the position of the stop block on the extension piece. Make sure it is located over the stop gap on the valve and lower the assembly onto the valve stem. Push the assembly down while slightly twisting the handle back and forth. Do NOT use solvent cement. For larger valves (over 2"), it may be necessary to use a rubber mallet to tap the extension onto the stem.

Figure 721 THERMOPLASTIC VALVES

FNW™

WAFER STYLE BUTTERFLY VALVE

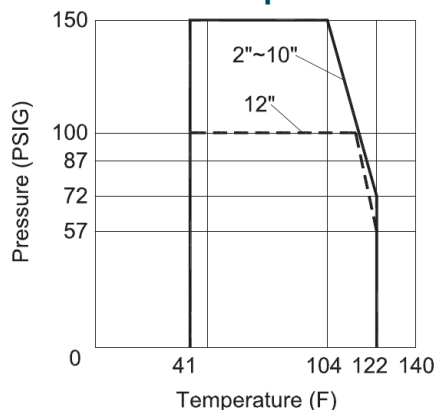
Features

- Compact Design
- Pressure Rating:
 - 150 PSI (2" to 10")
 - 100 PSI (12")
- Temperature Range: 41°F to 122°F (5°C to 50°C)
- EPDM or FPM (Viton®) Seat/Seals
- Wafer Style with Guide Holes Drill to 125/150# Flanges
- Bubble Tight Shut Off
- Ideally Suited for Limited Piping Spaces
- Can Be Modified for Actuator Installation
- Lever Operated (2" to 8")
- Gear Operated (8" to 12")

Options

FNW offers many options and modifications for valves. These include, but are not limited to: Actuation including chain wheels, worm gear operators, pneumatic and electric operators, control accessories, stem extensions, and custom mounting hardware. Contact FNW with your specific application needs.

Pressure/Temperature



Cv & Torque

Size	Cv	Torque (in-lbs)
2	100	107
2-1/2	265	185
3	390	248
4	500	460
5	660	735
6	1160	825
8	1995	1,042
10	3570	2,400
12	5048	3,400

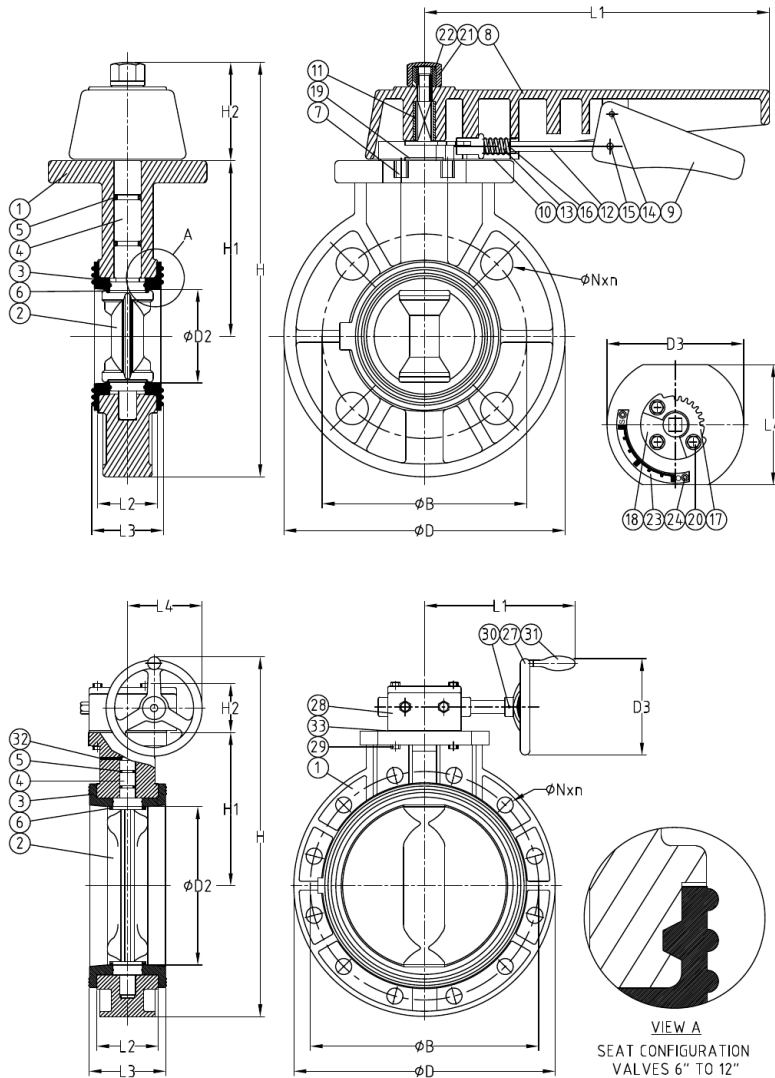
Weights

Size	Wt. (Lbs.)
2	2.75
2-1/2	3
3	4
4	5
5	8
6	12
8	14
Gear Operated	
8	34.5
10	46
12	70

Figure Number Matrix

FNW 7 2 1 E G X		
SEAT/SEALS	OPERATOR	SIZE CODES
E = EPDM	BLANK = LEVER (2"-8")	2 = K 6 = U
V = FPM (VITON®)	G = GEAR (8"-12")	2-1/2 = L 8 = X
		3 = M 10 = 10
		4 = P 12 = 12
		5 = S

WAFER STYLE BUTTERFLY VALVE



Standard Materials

Ref. No.	Description	Material		Qty
		EPDM Seat	Viton® Seat	
1	Body	UPVC		1
2	Disc	UPVC		1
3	Seat	EPDM	Viton®	1
4	Stem	410SS		1
5	Stem O-ring	EPDM	Viton®	2
6	Disc O-ring	EPDM	Viton®	2
7	Insert Nut	C3604		3
8	Handle	PP		1
9	Release Lever	PP		1
10	Spring Lock	PP		1
11	Handle Insert	Stainless Steel		1
12	Handle Lever	304SS		1
13	Spring	304SS		1
14	Upper Spring Pin	304SS		1
15	Lower Spring Pin	304SS		1
16	Washer	304SS		1
17	Locking Plate	304SS		1
18	Gear Seat	UPVC		1
19	Stem Washer (2" to 5")	304SS		1
20	Locking Plate Bolt	304SS		3
21	Handle Nut	UPVC		1
22	Handle Nut Insert	C3604		1
23	Position Scale	304SS		1
24	Rivet	Stainless Steel		2
27	Hand Wheel	FC 20		1
28	Gear Box	CI		1
29	Bolt and Washer	304SS		4
30	Spring Pin	Steel		1
31	Handwheel Handle	Steel		1
32	Pin	Stainless Steel		1
33	Packing	EPDM		1

Dimensions (inches)

Size	ØD2	L1	L2	L3	ØB	ØD	H	H1	H2	ØN	n	D3	L4
2	2.22	7.83	1.38	1.69	4.76	6.50	9.78	4.06	2.48	0.75	4	4.13	3.70
2-1/2	2.74	7.83	1.42	1.81	5.51	7.28	10.53	4.45	2.44	0.75	4	4.72	3.70
3	3.13	7.83	1.42	1.81	5.98	7.87	10.91	4.53	2.44	0.75	4	4.84	3.70
4	4.04	9.92	1.85	2.20	7.52	9.02	12.44	5.33	2.60	0.75	8	5.31	3.94
5	5.12	11.69	2.24	2.72	8.50	10.12	14.70	6.50	3.15	0.87	8	6.46	4.33
6	6.02	11.69	2.44	2.78	9.49	11.22	15.93	6.97	3.27	0.87	8	6.65	3.94
8	7.99	11.69	2.99	3.35	11.73	13.50	18.29	8.27	3.27	0.87	8	7.91	4.80
Gear Operated Figure 721													
8	7.99	11.20	2.99	3.35	11.73	13.50	20.67	8.27	3.05	0.87	8	7.95	6.34
10	10.04	11.20	3.76	4.29	14.25	16.18	23.27	9.53	3.05	0.98	12	7.95	6.34
12	12.19	12.99	4.59	5.24	17.01	19.29	27.80	11.89	2.99	0.98	12	9.84	7.28

Figure 345 & 355 THERMOPLASTIC VALVES



TRUE-UNION BALL CHECK VALVE

Figure 345 - PVC with NPT and SW Ends

Figure 355 - CPVC with NPT and SW Ends

Valve Features

- Pressure Rating: 150 PSI
- 5 PSI Minimum Shut Off
- Temperature Range:
 - PVC: 41°F to 122°F (5°C to 50°C)
 - CPVC: 32°F to 194°F (0°C to 90°C)
- EPDM or FPM (Viton®) Seals
- Both NPT & Sweat Ends Included
- For Vertical & Horizontal Installation*
- With Flow Direction Arrow
- Machined & Tumbled Ball for Hermetic Seal
- Easy Maintenance

* For vertical up flow only, not down flow. In horizontal installations, standard line drop typically will not allow the ball to seat (a back pressure differential of 5 PSI minimum is needed for shut off).



Standards

Connections:

- Threaded: ASTM D-2464, ref. ANSI B1.20.1
- Socket: ASTM D-2467

Materials:

- PVC: Cell Classification 12454 per ASTM D1784 (formerly Type I, Grade 1)
- CPVC: Cell Classification 23447 per ASTM D1784 (formerly Type IV, Grade 1)

Pressure/Temperature

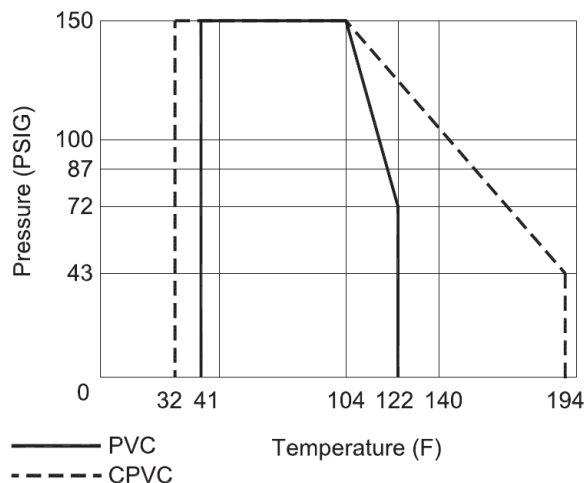


Figure Number Matrix

FNW 345EG			
BODY TYPE	SEALS	SIZE CODES	
4 = PVC	E = EPDM	1/2 = D	1-1/4 = H
5 = CPVC	V = FPM (VITON®)	3/4 = F	1-1/2 = J
		1 = G	2 = K

Cv & Weights

Size	Cv	Wt. (Lbs.)
1/2	10	0.37
3/4	26	0.55
1	37	0.83
1-1/4	40	1.52
1-1/2	80	2.11
2	152	3.86

TRUE-UNION BALL CHECK VALVE

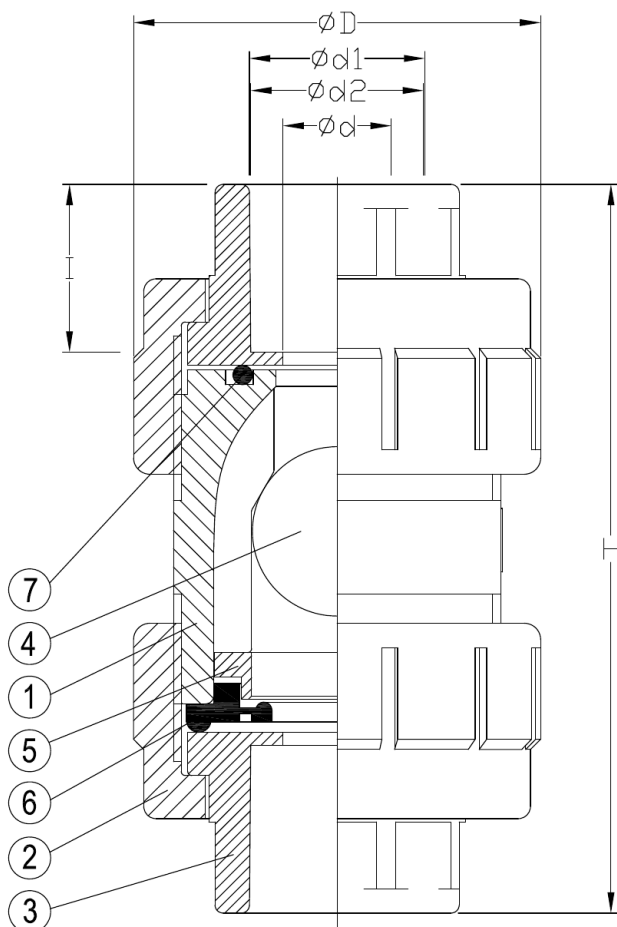
About PVC

Unplasticised Polyvinyl Chloride, or PVC, is the most widely used of all plastics and commonly used for pressure pipes, fittings, and valves. It is rigid, suitable for above and below ground applications. PVC has good chemical resistance and is odorless and tasteless. It is for use with liquids and gasses with temperatures +32°F to +140°F* (for higher temperatures see CPVC) at a wide range of operating pressures. Some poorer quality PVC can leach chemicals into water which can build up in recirculation systems, however most modern pipe is built to specific standards (e.g. BS3505/6, ASTM D 1785, ASTM D2241, DIN 8061/2, KIWA 49, BS4346 PART 1, DIN 8063) to control this. ASTM D1784 controls the compounds for rigid PVC and CPVC.

About CPVC

Chlorinated Polyvinyl Chloride, or CPVC, has been offering the process industry superior corrosion resistance, mechanical strength, and excellent life-cycle economics in a single package. Conceptually, CPVC is a PVC homopolymer that has been subjected to a chlorination reaction. It is generally inert to most mineral acids, bases, salts, and paraffinic hydrocarbon solutions. CPVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters, or ketones. The upper temperature limit on CPVC is 200°F*. There is no lower temperature limit on CPVC and the material will withstand pressure. However, at very cold temperatures, the material will become brittle and the impact strength will decline.

* Note: Other materials within valves besides PVC and CPVC can have an affect on the temperature limits of the valve. Temperatures noted above are for the thermoplastic material alone.



Standard Materials

Ref. No.	Description	Material				Qty
		345		355		
		EPDM Seals	Viton Seals	EPDM Seals	Viton Seals	
1	Body	PVC		CPVC		1
2	Union Nut	PVC		CPVC		2
3	End Connector	PVC		CPVC		1
4	Ball	PVC		CPVC		1
5	Gland	PVC		CPVC		1
6	Seat	EPDM	FPM (Viton®)	EPDM	FPM (Viton®)	1
7	O-ring	EPDM	FPM (Viton®)	EPDM	FPM (Viton®)	1

Dimensions (inches)

Size	Ød2	Ød1	I	d	D	H	Thd./In (NPT)
1/2	0.84	0.85	0.875	0.63	1.97	3.52	14
3/4	1.05	1.06	1.000	0.79	2.44	4.39	14
1	1.31	1.33	1.125	0.98	2.84	5.09	11.5
1-1/4	1.66	1.67	1.250	0.98	3.82	6.16	11.5
1-1/2	1.89	1.91	1.375	1.58	3.82	6.60	11.5
2	2.37	2.39	1.500	1.97	4.21	7.54	11.5

[illegible]

GATE, GLOBE & CHECK VALVES

SMALL BODY

Bronze

Figure	Description	Page
1211/1212	Gate, non-rising stem, 125#, threaded or sweat ends	153
1221/1222	Gate, rising stem, 125#, threaded or sweat ends	155
1231/1232	Globe, rising stem, 125#, threaded or sweat ends	157
1241/1242	Check, swing, 150#, threaded or sweat ends	159

Brass

Figure	Description	Page
431	Check, inline, 2-pc, 200 psi, water service, press ends	161

Stainless Steel

Figure	Description	Page
15B	Gate, non-rising stem, 200 wog, threaded ends	163
17B	Globe, rising stem, 200 wog, threaded ends	165
16B	Check, swing, 200 wog, threaded ends	167

WAFER

Cast Iron

Figure	Description	Page
681	Check, silent, 200 psi, resilient seat, bronze & stainless steel internals	169
682	Check, double-door, 200 psi, resilient seat, stainless steel internals	171

FLANGED

Cast Iron (IBBM)

Figure	Description	Page
651A	Gate, 200 wog, 125 wsp, bronze trim, 125# flanged	173
661	Globe, 200 wog, 125 wsp, bronze trim, 125# flanged	175
671	Check, swing, 200 wog, 125 wsp, bronze trim, 125# flanged	177

Carbon Steel

Figure	Description	Page
551	Gate, OS&Y, 150# flanged	182
552	Gate, OS&Y, 300# flanged	183
561	Globe, 150# flanged	184
562	Globe, 300# flanged	185
571	Check, swing, 150# flanged	186
572	Check, swing, 300# flanged	187

Stainless Steel

Figure	Description	Page
451	Gate, OS&Y, 150# flanged	188
452	Gate, OS&Y, 300# flanged	189
461	Globe, 150# flanged	190
462	Globe, 300# flanged	191
471	Check, swing, 150# flanged	192
472	Check, swing, 300# flanged	193

Figure 1211 & 1212 BRONZE GATE VALVES



NON-RISING STEM 125# FEDERAL SPECIFICATION

Features:

- 200 WOG
- 125 PSI Saturated Steam (1211 Only)
- Non-Rising Stem
- Solid Wedge Disc
- Back Seat Design
- NPT Ends
 - Fig. 1211 - Sizes 1/4" to 3"
- Solder Ends
 - Fig. 1212 - Sizes 1/2" to 3"
- Conforms to MSS SP-80
- Body Markings Comply with MSS SP-25
- NPT Ends Comply with ANSI/ASME B1.20.1
- Solder Ends Comply with ANSI B16.18

Note: Before installing solder end valves, be sure the solder or brazing alloy melting point is sufficient to withstand the line pressure and temperature and is compatible with the media through the valve.

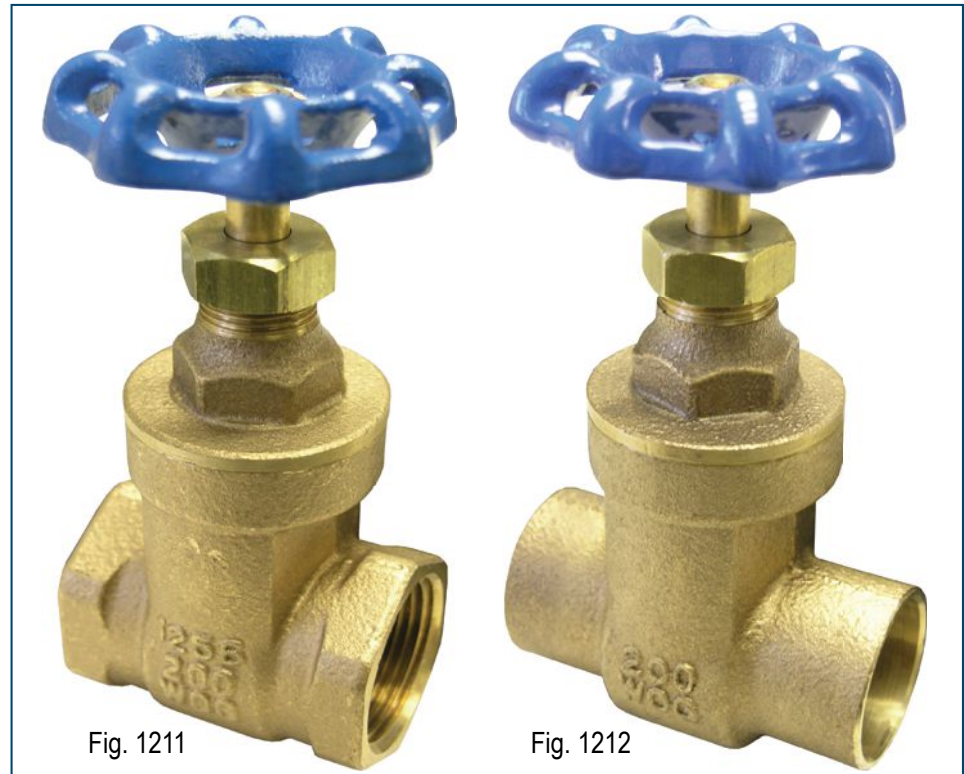


Fig. 1211

Fig. 1212

Weights (lbs.)

Size	1211	1212
1/4	0.50	
3/8	0.50	
1/2	0.63	0.55
3/4	0.92	0.88
1	1.49	1.43
1-1/4	2.13	1.91
1-1/2	2.76	2.48
2	4.41	4.23
2-1/2	7.72	6.89
3	11.02	10.47

Figure Number Matrix

FNW 1 2 1 1 Size		
END TYPE	SIZE CODE	
1 = NPT Ends	1/4 = B	1-1/4 = H
2 = Solder Ends	3/8 = C	1-1/2 = J
	1/2 = D	2 = K
	3/4 = F	2-1/2 = L
	1 = G	3 = M

NON-RISING STEM 125# FEDERAL SPECIFICATION

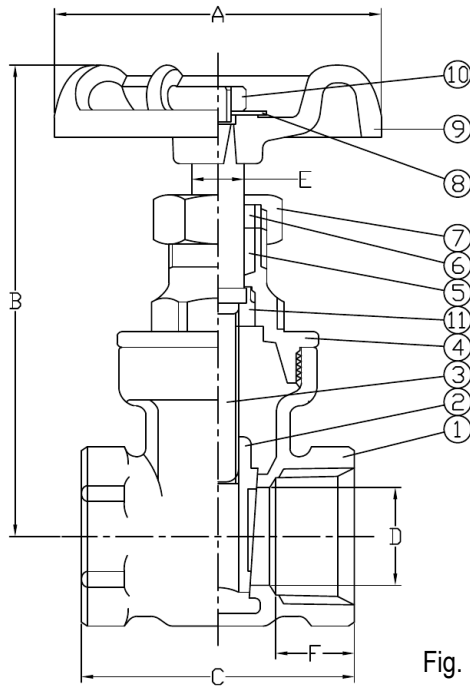


Fig. 1211

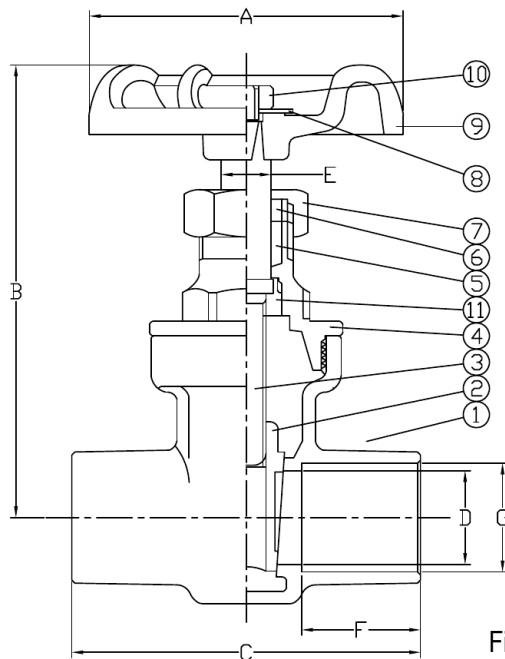


Fig. 1212

Dimensions (inches)

Size	Model	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
A	1211	2.13	2.13	2.13	2.13	2.40	3.03	3.07	3.27	4.13	5.20
	1212			2.13	2.40	3.03	3.03	3.27	4.13	4.41	5.20
B	1211	2.95	2.95	3.03	3.58	4.21	4.69	5.47	6.69	7.87	9.01
	1212			3.03	3.58	4.21	4.69	5.47	6.69	7.87	9.01
C	1211	1.65	1.65	1.97	2.01	2.36	2.68	2.84	3.27	4.02	4.57
	1212			1.89	2.36	2.80	3.15	3.47	4.09	4.72	5.35
ØD	1211	0.39	0.39	0.50	0.75	1.00	1.25	1.50	2.00	2.50	3.00
	1212			0.50	0.75	1.00	1.25	1.50	2.00	2.50	3.00
E	1211	0.31	0.31	0.31	0.35	0.39	0.43	0.48	0.53	0.59	0.67
	1212			0.31	0.35	0.39	0.43	0.48	0.53	0.59	0.67
F	1211	0.43	0.43	0.54	0.57	.70	0.75	0.75	0.91	1.14	1.20
	1212			0.52	0.75	0.91	0.97	1.09	1.34	1.47	1.66
G	1212			0.63	0.88	1.13	1.38	1.63	2.13	2.63	3.13

Standard Materials

Ref. No.	Description	Material
1	Body	BRONZE ASTM B62 C-83600
2	Disc	BRONZE ASTM B62 C-83600
3	Stem	BRONZE ASTM B62 C-83600
4	Bonnet	BRONZE ASTM B62 C-83600
5	Packing	NEOPRENE LK 35ANF
6	Packing Gland	BRASS ASTM B16-C36000
7	Packing Nut	BRASS ASTM B16-C36000 (1/4" - 1")
		B62 C-83600 (1-1/4" - 3")
8	I.D. Plate	ALUMINUM
9	Handwheel	POWDER COATED ALUMINUM ASTM B85
10	Handwheel Nut	STEEL
11	Lock Nut	BRASS ASTM B16-C36000

Figure 1221 & 1222 BRONZE GATE VALVES



RISING STEM 125# FEDERAL SPECIFICATION

Features:

- 200 WOG
- 125 PSI Saturated Steam (1221 Only)
- Rising Stem
- Solid Wedge Disc
- Back Seat Design
- NPT Ends
 - Fig. 1221 - Sizes 1/2" to 3"
- Solder Ends
 - Fig. 1222 - Sizes 1/2" to 3"
- Conforms to MSS SP-80
- Body Markings Comply with MSS SP-25
- NPT Ends Comply with ANSI/ASME B1.20.1
- Solder Ends Comply with ANSI B16.18

Note: Before installing solder end valves, be sure the solder or brazing alloy melting point is sufficient to withstand the line pressure and temperature and is compatible with the media through the valve.

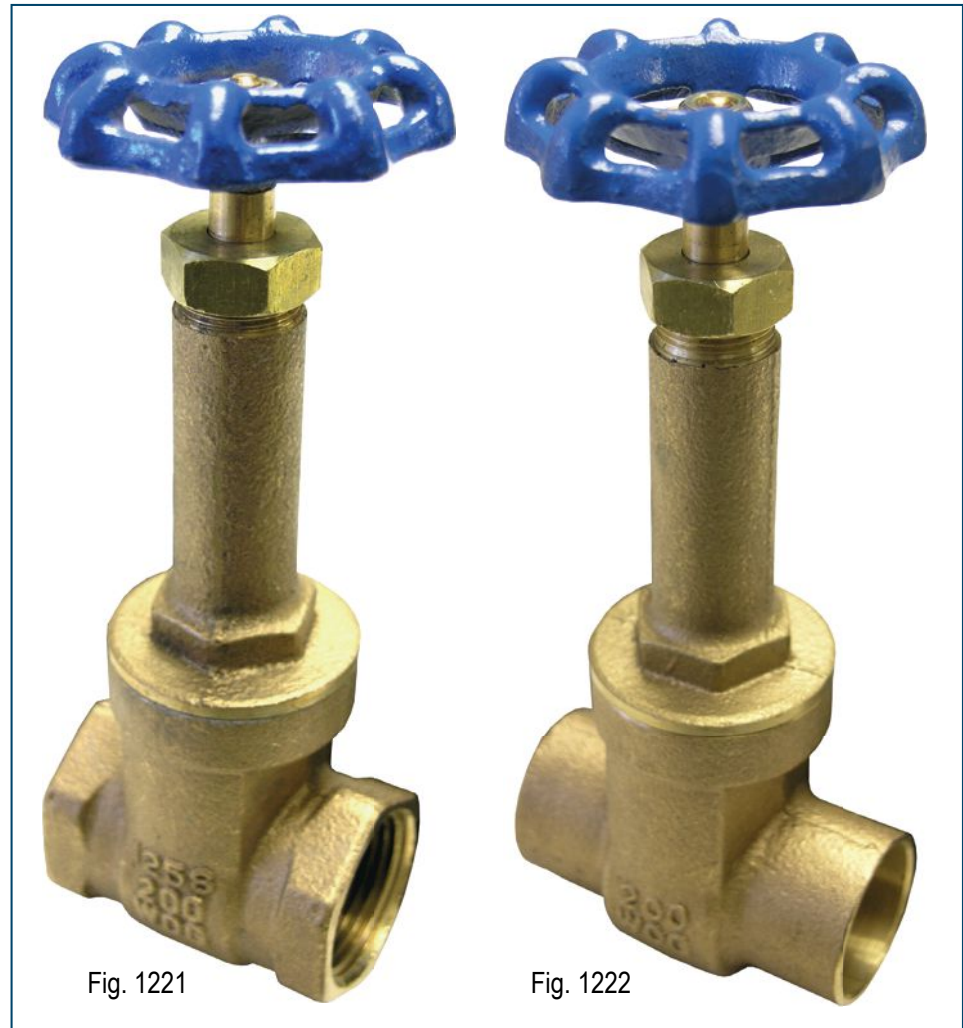


Fig. 1221

Fig. 1222

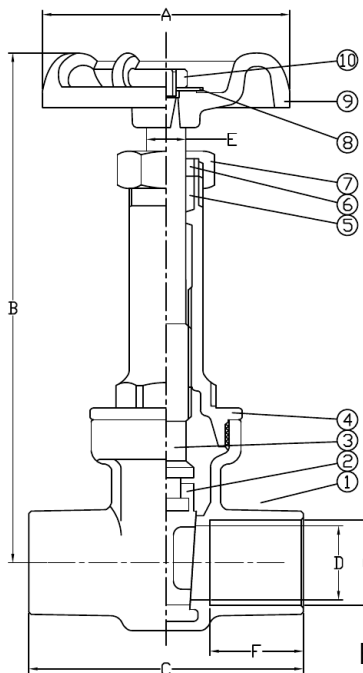
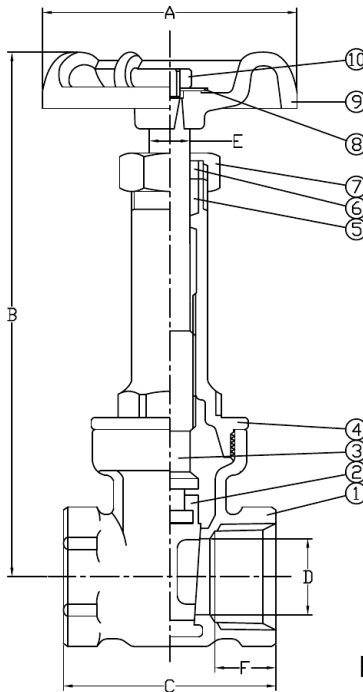
Weights (lbs.)

Size	1221	1222
1/2	0.77	0.72
3/4	1.10	1.03
1	1.76	1.71
1-1/4	2.35	2.13
1-1/2	3.12	2.94
2	4.96	4.78
2-1/2	8.82	7.99
3	12.68	12.13

Figure Number Matrix

FNW 1 2 2 1 Size		
END TYPE	SIZE CODE	
1 = NPT Ends	1/2 = D	1-1/2 = J
2 = Solder Ends	3/4 = F	2 = K
	1 = G	2-1/2 = L
	1-1/4 = H	3 = M

RISING STEM 125# FEDERAL SPECIFICATION



Dimensions (inches)

Size	Model	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
A	1221, 1222	2.13	2.13	2.40	3.03	3.03	3.27	4.13	5.20
B	1221, 1222	4.29	5.00	6.02	6.73	7.84	9.49	11.18	12.91
C	1221	1.97	2.01	2.36	2.68	2.84	3.27	4.02	4.57
	1222	1.89	2.36	2.80	3.15	3.47	4.09	4.72	5.35
ØD	1221, 1222	0.50	0.75	1.00	1.25	1.50	2.00	2.50	3.00
E	1221, 1222	0.31	0.35	0.39	0.43	0.48	0.53	0.59	0.67
F	1221	0.54	0.57	.70	0.75	0.75	0.91	1.14	1.20
	1222	0.52	0.75	0.91	0.97	1.09	1.34	1.47	1.66
G	1222	0.63	0.88	1.13	1.38	1.63	2.13	2.63	3.13

Standard Materials

Ref. No.	Description	Material
1	Body	BRONZE ASTM B62 C-83600
2	Disc	BRONZE ASTM B62 C-83600
3	Stem	BRONZE ASTM B62 C-83600
4	Bonnet	BRONZE ASTM B62 C-83600
5	Packing	NEOPRENE LK 35ANF
6	Packing Gland	BRASS ASTM B16-C36000
7	Packing Nut	BRASS ASTM B16-C36000 (1/2" - 1")
		B62 C-83600 (1-1/4" - 3")
8	I.D. Plate	ALUMINUM
9	Handwheel	POWDER COATED ALUMINUM ASTM B85
10	Handwheel Nut	STEEL
11	Lock Nut	BRASS ASTM B16-C36000

Figure 1231 & 1232 BRONZE GLOBE VALVES



RIISING STEM 125# GLOBE VALVE FEDERAL SPECIFICATION

Features:

- 200 WOG
- 125 PSI Saturated Steam (1231 Only)
- Rising Stem
- Resilient Disc
- NPT Ends
 - Fig. 1231 - Sizes 1/4" to 3"
- Solder Ends
 - Fig. 1232 - Sizes 1/2" to 2"
- Conforms to MSS SP-80
- Body Markings Comply with MSS SP-25
- NPT Ends Comply with ANSI/ASME B1.20.1
- Solder Ends Comply with ANSI B16.18

Note: Before installing solder end valves, be sure the solder or brazing alloy melting point is sufficient to withstand the line pressure and temperature and is compatible with the media through the valve.



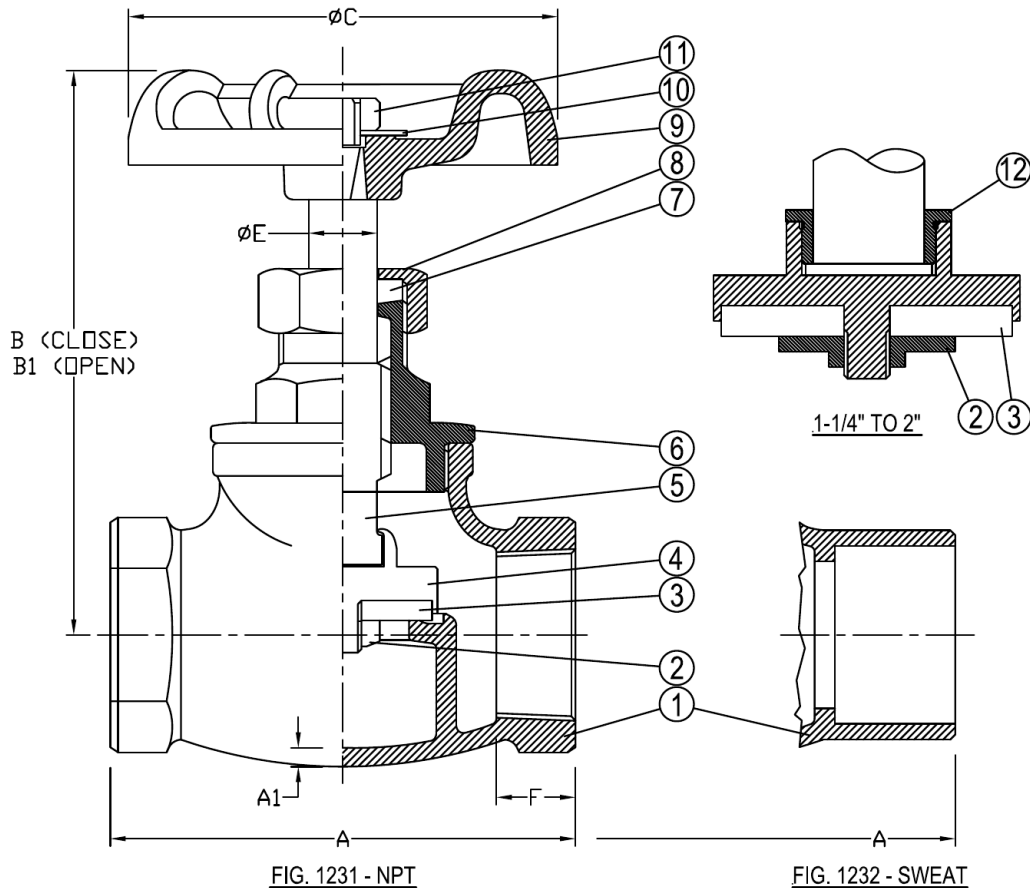
Cv & Weights (lbs.)

Size	Cv	1231	1232
1/4	1.31	0.57	
3/8	2.40	0.60	
1/2	3.82	0.93	0.88
3/4	6.96	1.42	1.33
1	11.77	2.13	2.00
1-1/4	20.82	3.19	3.25
1-1/2	29.01	4.25	4.25
2	50.26	6.33	6.66
2-1/2	73.68	11.67	
3	113.76	16.00	

Figure Number Matrix

FNW 1 2 3 1 Size		
END TYPE	SIZE CODE	
1 = NPT Ends (1/4"~3")	1/4 = B	1-1/4 = H
	3/8 = C	1-1/2 = J
2 = Solder Ends (1/2"~2")	1/2 = D	2 = K
	3/4 = F	2-1/2 = L
	1 = G	3 = M

RISING STEM 125# GLOBE VALVE FEDERAL SPECIFICATION



Dimensions (inches)

Size	A		A1	B	B1	C	E	F	
	1231	1232						1231	1232
1/4	1.87		0.09	2.64	2.83	2.56	0.31	0.35	
3/8	1.87		0.09	2.64	2.83	2.56	0.31	0.35	
1/2	2.28	2.87	0.1	3.31	3.62	2.56	0.37	0.43	0.52
3/4	2.83	3.62	0.1	3.66	4.25	2.56	0.37	0.51	0.75
1	3.46	4.37	0.12	4.25	4.65	2.76	0.43	0.59	0.91
1-1/4	4.02	5.12	0.12	4.92	5.39	3.27	0.49	0.67	0.98
1-1/2	4.53	5.79	0.14	5.98	6.38	3.66	0.53	0.75	1.10
2	5.35	7.09	0.16	5.98	6.54	4.41	0.59	0.75	1.34
2-1/2	5.83		0.18	6.85	7.87	5.12	0.71	0.87	
3	6.93		0.2	7.83	9.21	5.12	0.71	0.94	

Standard Materials

Ref. No.	Description	Material	Remarks
1	Body	BRONZE ASTM B62 C83600	
2	Seat Lock Nut	BRASS ASTM B16 C36000	Sizes 1/2" to 1"
		BRASS ASTM B124 C37700	Sizes 1-14" to 2"
3	Seat	TEFLON (PTFE)	
4	Disc	BRASS ASTM B124 C37700	
5	Stem	BRASS ASTM B21 C48200	
6	Bonnet	BRONZE ASTM B62 CB3600	
7	Stem Packing	TEFLON (PTFE)	
8	Packing Nut	BRASS ASTM B16 C36000	
9	Handwheel	CAST IRON A48 CLASS #35	
10	Nameplate	COMMERCIAL ALUMINUM	
11	Handwheel Nut	STEEL AISI-1010	
12	Disc Lock Nut	BRASS ASTM B16 C36000	Sizes 1-14" to 2"

Figure 1241 & 1242 BRONZE CHECK VALVES



150# Y-PATTERN SWING CHECK VALVE FEDERAL SPECIFICATION

Features:

- 300 WOG
- 150 PSI Saturated Steam
- Resilient Disc
- NPT Ends
 - Fig. 1241 - Sizes 1/2" to 3"
- Solder Ends
 - Fig. 1242 - Sizes 1/2" to 3"
- Conforms to MSS SP-80
- Body Markings Comply with MSS SP-25
- NPT Ends Comply with ANSI/ASME B1.20.1
- Solder Ends Comply with ANSI B16.18

Note: Before installing solder end valves, be sure the solder or brazing alloy melting point is sufficient to withstand the line pressure and temperature and is compatible with the media through the valve.



Fig. 1242

Fig. 1241

Cv & Weights (lbs.)

Size	Cv	1241	1242
1/2	4.8	0.60	0.56
3/4	14.3	0.91	0.80
1	24	1.35	1.30
1-1/4	43	2.18	1.95
1-1/2	60	3.06	2.70
2	102	4.57	4.45
2-1/2	150	7.70	7.68
3	238	11.00	9.15

Figure Number Matrix

FNW 1 2 4 1 Size		
END TYPE	SIZE CODE	
1 = NPT Ends	1/2 = D	1-1/2 = J
2 = Solder Ends	3/4 = F	2 = K
	1 = G	2-1/2 = L
	1-1/4 = H	3 = M

150# Y-PATTERN SWING CHECK VALVE FEDERAL SPECIFICATION

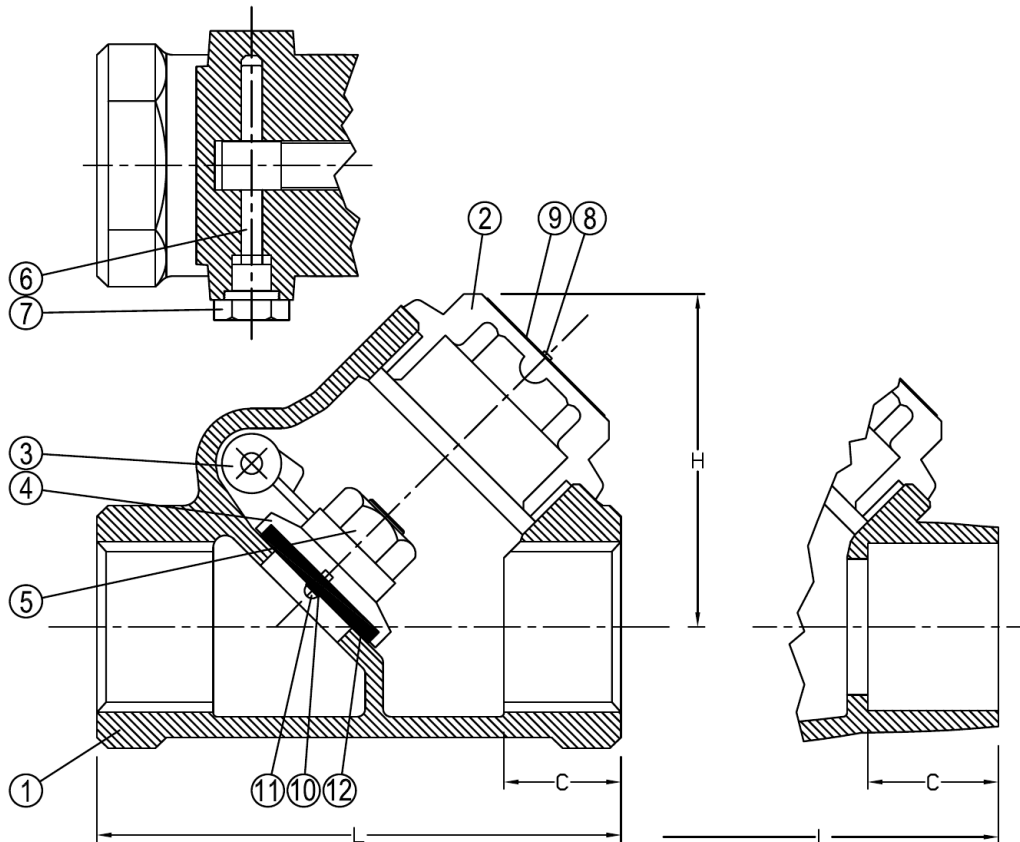


FIG. 1241 - NPT

FIG. 1242 - SWEAT

Dimensions (inches)

SIZE	L		C		H	
	1241	1242	1241	1242	1241	1241
1/2	2.36	2.60	0.54	0.50	1.77	1.77
3/4	2.76	3.39	0.57	0.75	1.97	1.97
1	3.40	4.09	0.70	0.91	2.28	2.28
1-1/4	3.78	4.72	0.71	0.97	2.67	2.67
1-1/2	4.57	5.39	0.75	1.09	2.95	2.95
2	5.35	6.69	0.79	1.34	3.70	3.70
2-1/2	6.72	7.64	1.14	1.47	4.65	4.55
3	7.55	8.74	1.18	1.66	5.47	5.37

Standard Materials

Ref. No.	Description	Material
1	Body	BRONZE ASTM B62 C83600
2	Cap	BRONZE ASTM B62 C83600
3	Hanger	BRONZE ASTM B62 C83600
4	Disc Holder	BRONZE ASTM B62 C83600
5	Hanger Nut	BRASS ASTM B16 C36000
6	Hanger Pin	BRASS ASTM B16 C36000
7	Side Plug	BRASS ASTM B16 C36000
8	Rivet	MILD STEEL
9	Name Plate	COMMERCIAL ALUMINUM
10	Washer	BRASS ASTM B16 C36000
11	Screw	BRASS ASTM B16 C36000
12	Disc	TEFLON (PTFE)

Figure 431 BRASS BODY CHECK VALVES



HIGH CAPACITY WATER SERVICE IN-LINE CHECK VALVE w/PRESS ENDS

The FNW figure 431 press check valve for water service is suggested for all applications where labor and time savings is a must. The figure 431 allows quick installation on copper pipelines meeting ASTM B88 standards. The structure of the valve, made in dezincification resistant brass, guarantees excellent corrosion resistance particularly in the connection areas of the pipeline.

Features:

- 200 PSI Max. Working Pressure
- Temperature Range from 10°F to 250°F
- Press Ends
- High Capacity
- NSF 61-8 Certified
- True 2-Piece Design
- No Soldered-In End Pieces
- Low 1/2 PSI Cracking Pressure
- Patented Obstructor Guide Prevents Side Loading
- Flow Profile Designed to Minimize Head Loss
- Spring Loaded Soft Seat for Bubble Tight Shut Off
- Forged Brass Body
- Sizes 1/2" to 2"



NSF 61

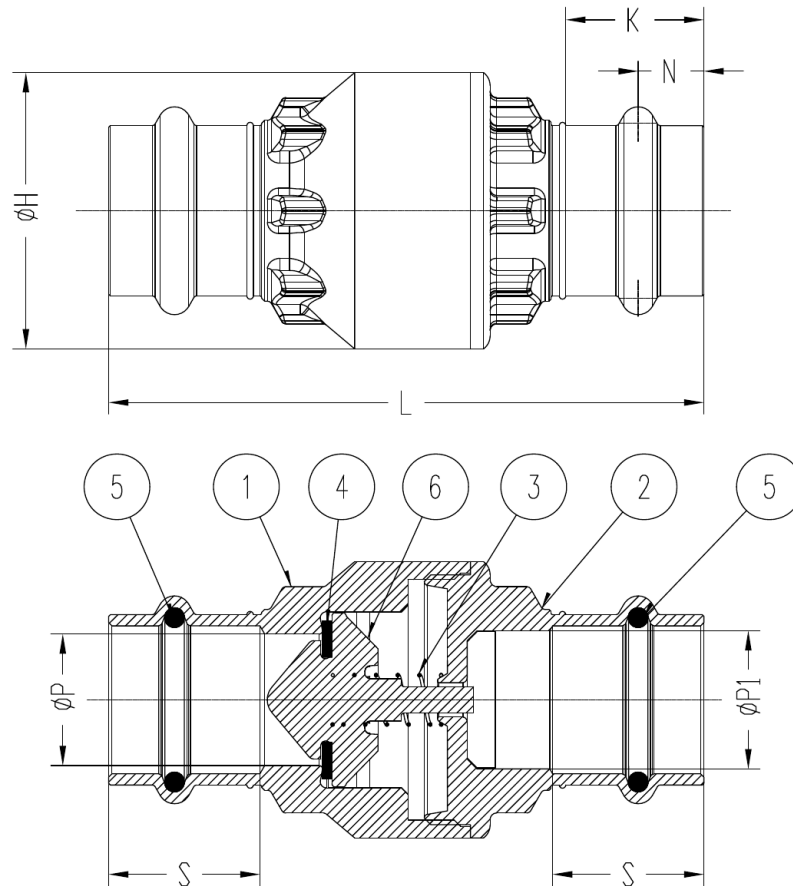
Figure Number Matrix

FNW 431 Size	
	SIZE CODE
	1/2 = D
	3/4 = F
	1 = G
	1-1/4 = H
	1-1/2 = J
	2 = K

Cv & Weights

Size	Cv	Wt. (Lbs)
1/2	6.01	0.34
3/4	10.87	0.56
1	16.76	0.85
1-1/4	27.17	1.19
1-1/2	38.73	1.92
2	60.11	2.86

HIGH CAPACITY WATER SERVICE IN-LINE CHECK VALVE w/PRESS ENDS



Dimensions (Inches)

Size	$\varnothing P$	$\varnothing P1$	S	K	N	$\varnothing H$	L
1/2	0.59	0.59	0.71	0.67	0.31	1.36	2.99
3/4	0.79	0.83	0.91	0.83	0.39	1.65	3.56
1	0.98	1.07	0.94	0.83	0.39	1.93	3.94
1-1/4	1.26	1.34	1.02	0.83	0.39	2.40	4.09
1-1/2	1.57	1.57	1.42	1.02	0.49	2.87	4.98
2	1.97	1.97	1.57	1.20	0.59	3.46	5.61

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 602N UNI EN 12165	1
2	End Connection	Brass CW 602N UNI EN 12165	1
3	Spring	Stainless Steel AISI 302	1
4	Gasket Ring	NBR	1
5	O-ring	EPDM	2
6	Obstructor	Polyetherimide	1

Figure 15B-200 STAINLESS STEEL GATE VALVES



200 WOG NON-RISING STEM GATE VALVE

Features:

- 200 WOG
- Non-Rising Stem
- Inside Screw
- Temperature: -4°F to 356°F
- Investment Cast Components
- Stainless Steel Body and Trim
- Solid Wedge Disc
- Threaded NPT Ends
- Adjustable Packing

Standards:

- Pressure Test: API 598
- Material: ASTM/ASME B16.34
- Connections: ANSI B1.20.1 (NPT)



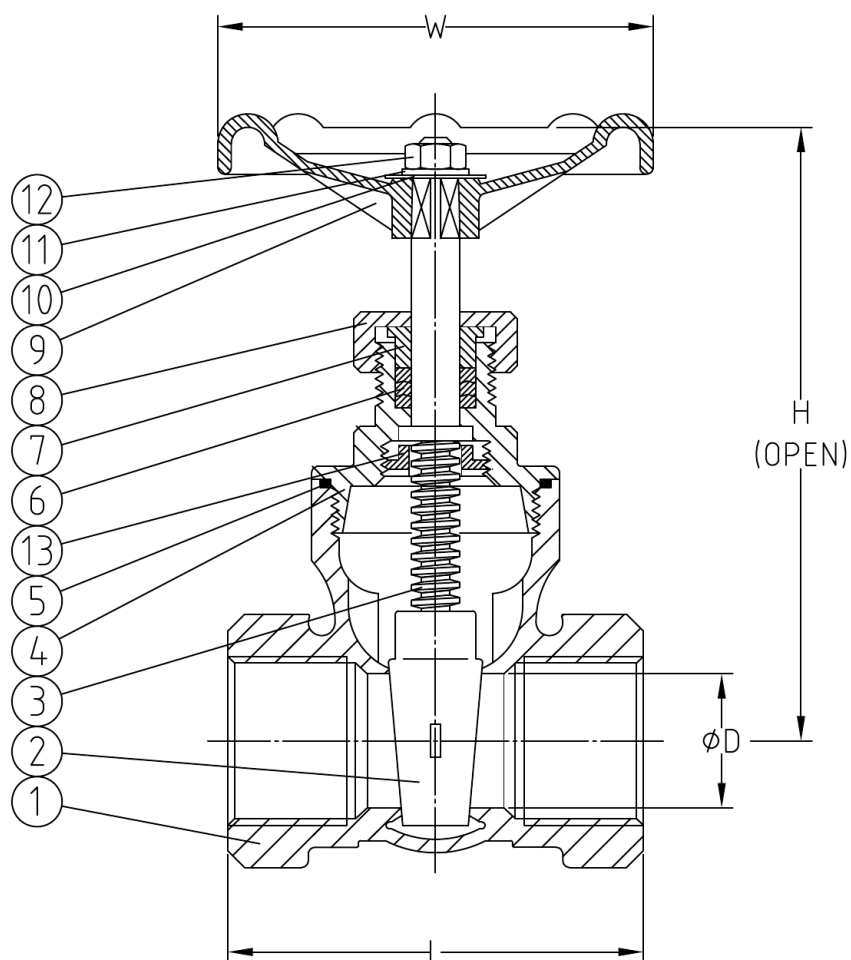
Cv & Weights

Size	Cv	Wt. (lbs.)
1/2	22.4	1.0
3/4	41.5	1.2
1	67.5	1.5
1-1/4	113.1	2.1
1-1/2	180.9	3.2
2	297.2	4.5

Figure Number Matrix

FNW 15B 200 Size	
SIZE CODE	
1/2 = D	1-1/4 = H
3/4 = F	1-1/2 = J
1 = G	2 = K

200 WOG NON-RISING STEM GATE VALVE



Dimensions (inches)

Size	ØD	L	H	W
1/2	0.59	2.17	3.62	2.76
3/4	0.79	2.38	3.82	2.76
1	0.98	2.58	4.27	3.15
1-1/4	1.26	3.01	4.86	3.15
1-1/2	1.57	3.37	5.75	3.54
2	1.98	3.76	6.38	3.94

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M	1
2	Disc	ASTM A351 Gr. CF8M	1
3	Stem	316SS	1
4	Bonnet	ASTM A351 Gr. CF8M	1
5	Body Seal	PTFE	1
6	Stem Packing	PTFE	1 Set
7	Gland	304SS	1
8	Gland Nut	ASTM A351 Gr. CF8M	1
9	Hand Wheel	MICRO STEEL	1
10	Name Plate	ALUMINUM	1
11	Hand Wheel Washer	304SS	1
12	Hand Wheel Nut	304SS	1
13	Stop Ring	304SS	1

Figure 17B-200

STAINLESS STEEL GLOBE VALVES

FNW™

200 WOG RISING STEM GLOBE VALVE

Features:

- 200 WOG
- Rising Stem
- Inside Screw
- Temperature: -4°F to 356°F
- Investment Cast Components
- Stainless Steel Body and Trim
- Conical Seat Design
- Threaded NPT Ends
- Adjustable Packing

Standards:

- Pressure Test: API 598
- Material: ASTM/ASME B16.34
- Connections: ANSI B1.20.1 (NPT)



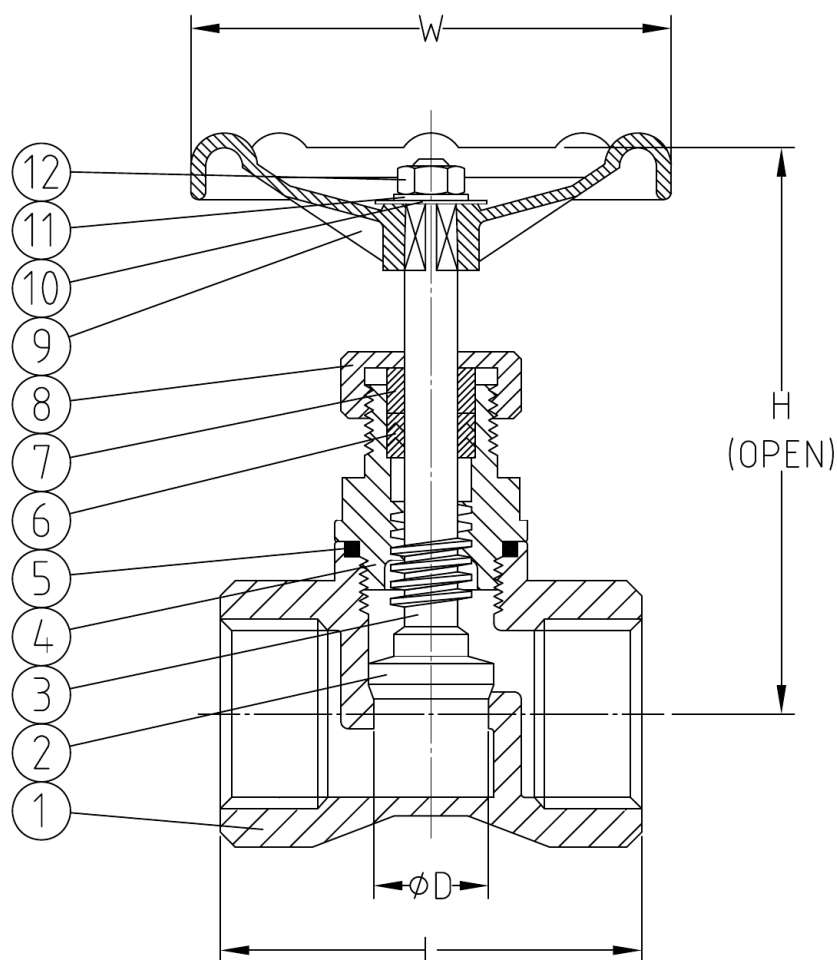
Cv & Weights

Size	Cv	Wt. (lbs.)
1/2	2.2	0.8
3/4	3.6	1.0
1	6.6	1.3
1-1/4	10.6	2.0
1-1/2	17.8	2.8
2	29.2	4.0

Figure Number Matrix

FNW 17B 200 Size	
SIZE CODE	
1/2 = D	1-1/4 = H
3/4 = F	1-1/2 = J
1 = G	2 = K

200 WOG RISING STEM GLOBE VALVE



Dimensions (inches)

Size	ØD	L	H	W
1/2	0.47	2.05	3.11	2.76
3/4	0.59	2.36	3.58	2.76
1	0.79	2.88	4.13	3.15
1-1/4	0.98	3.19	5.00	3.15
1-1/2	1.26	3.54	5.59	3.54
2	1.57	3.98	6.22	3.94

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M	1
2	Disc	316SS	1
3	Stem	316SS	1
4	Bonnet	ASTM A351 Gr. CF8M	1
5	Body Seal	PTFE	1
6	Stem Packing	PTFE	1 Set
7	Gland	304SS	1
8	Gland Nut	ASTM A351 Gr. CF8M	1
9	Hand Wheel	MICRO STEEL	1
10	Name Plate	ALUMINUM	1
11	Hand Wheel Washer	304SS	1
12	Hand Wheel Nut	304SS	1

Figure 16B-200

STAINLESS STEEL CHECK VALVES



200 WOG

SWING CHECK VALVE

Features:

- 200 WOG
- Temperature: -4°F to 356°F
- Investment Cast Components
- Stainless Steel Body and Trim
- Solid One-Piece Disc
- Threaded NPT Ends

Standards:

- Pressure Test: API 598
- Material: ASTM/ASME B16.34
- Connections: ANSI B1.20.1 (NPT)



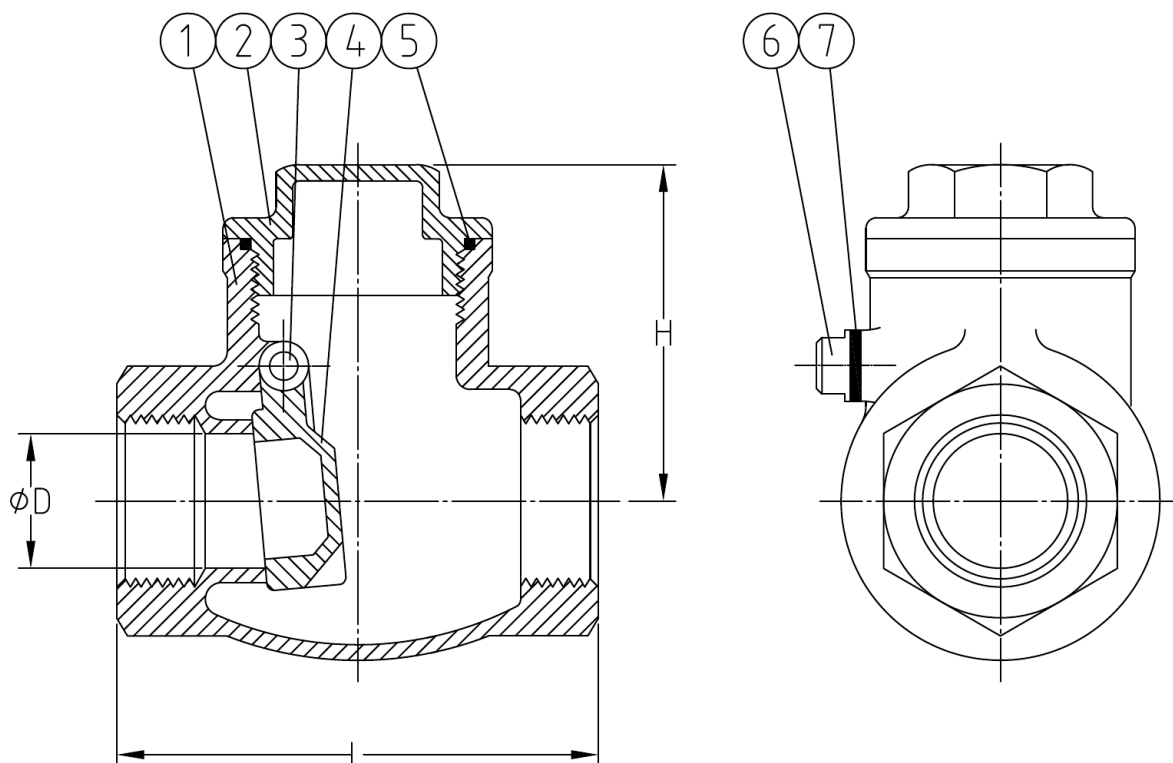
Cv & Weights

Size	Cv	Wt. (lbs.)
1/4	3.2	1.2
3/8	6.7	1.1
1/2	9.0	1.0
3/4	16.6	1.7
1	27.0	2.1
1-1/4	45.0	3.2
1-1/2	72.4	4.4
2	118.9	6.0

Figure Number Matrix

FNW 16B 200 Size	
SIZE CODE	
1/4 = B	1 = G
3/8 = C	1-1/4 = H
1/2 = D	1-1/2 = J
3/4 = F	2 = K

200 WOG SWING CHECK VALVE



Dimensions (inches)

Size	ØD	L	H
1/4	0.44	2.56	1.65
3/8	0.51	2.56	1.65
1/2	0.59	2.56	1.65
3/4	0.79	3.15	2.01
1	0.98	3.54	2.36
1-1/4	1.26	4.13	2.60
1-1/2	1.57	4.72	2.95
2	1.97	5.51	3.15

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M	1
2	Cap	ASTM A351 Gr. CF8M	1
3	Hanger Pin	316SS	1
4	Disc	ASTM A351 Gr. CF8M	1
5	Body Seal	PTFE	1
6	Plug	316SS	1
7	Plug Gasket	PTFE	1

CAST IRON WAFER STYLE SILENT CHECK

The FNW figure 681 silent check prevents flow reversal in pipelines, allowing flow in only the indicated direction. The spring backed disc closes the valve when flow ceases prior to pressure reversal, therefore reducing slam or water hammer.

Features:

- 200 PSI Non-Shock
- Temperature Range -4°F to 176°F (-20°C to 80°C)
- Wafer Style
- Non-Slam (Spring Actuated)
- Check for Water or Clean Fluids
- Cast Iron Body, Aluminum Bronze & Stainless Steel Internal Components
- Vertical or Horizontal Installation*
- Replaceable Drip Tight Resilient Seat
- Renewable Disc
- Epoxy Coated Body

* **Use Flat-Faced Metal Flanges and Full-Face gaskets only.**

Not for Steam Service

Standards:

- Face to Face: MSS SP-125
- Inspection & Test: API 598
- Flange Drilling: ANSI B16.1 Class 125
- Flange Face Finish: MSS SP-6
- Markings: MSS SP-25



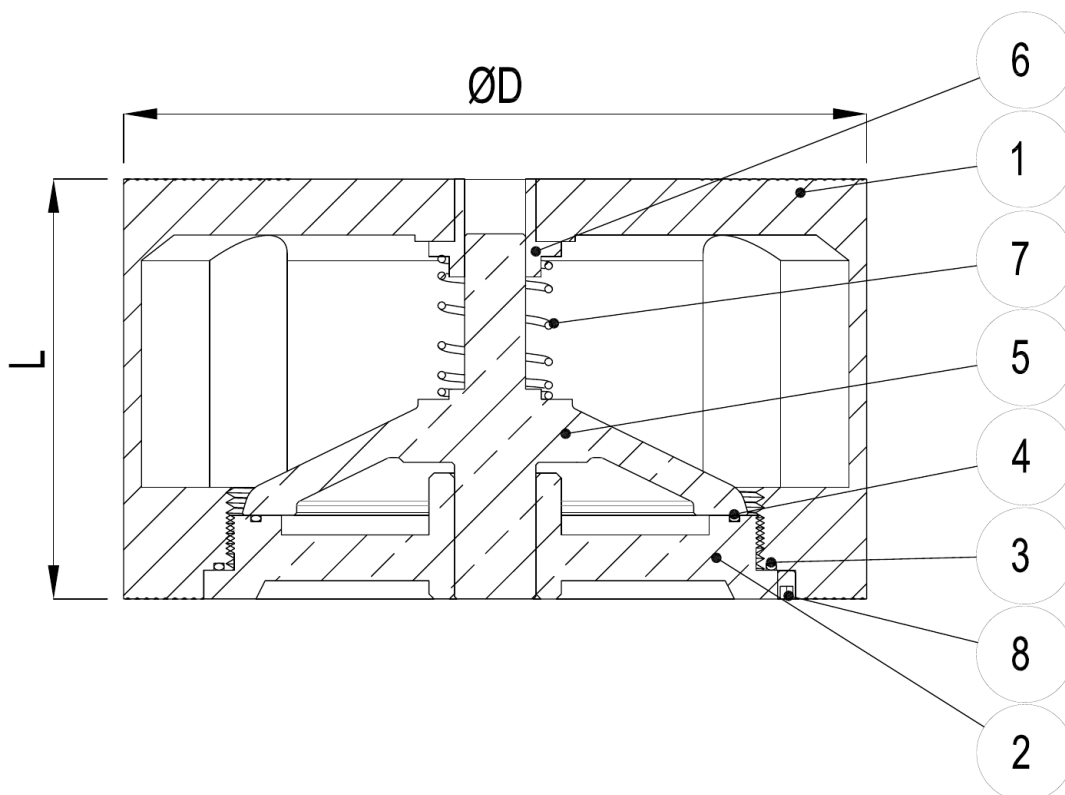
Cv & Weights

Size	Cv	Wt. (Lbs)
2	40	4.6
2-1/2	60	6.2
3	85	8.8
4	150	15.4
5	230	24.3
6	340	33.1
8	600	50.7
10	900	88.2

Figure Number Matrix

FNW 681 Size		
SIZE CODE		
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	

CAST IRON WAFER STYLE SILENT CHECK



Dimensions (Inches)

Size	ØD	L
2	4.25	2.63
2-1/2	5.00	2.87
3	5.75	3.13
4	7.00	4.02
5	8.38	4.76
6	9.75	5.51
8	11.88	6.50
10	14.06	8.27

Standard Materials

Ref. No.	Description	Material
1	Body	Cast Iron ASTM A126 Class B
2	Seat Ring	Aluminum Bronze C95500
3	Seat Ring Seal	EPDM
4	Seat	EPDM
5	Disc	Aluminum Bronze C95500
6	Bushing	Aluminum Bronze C95500
7	Spring	Stainless Steel AISI 304
8	Set Screw	Stainless Steel AISI 304

CAST IRON WAFER STYLE DOUBLE DOOR CHECK VALVE

The FNW figure 682 silent check prevents flow reversal in pipelines, allowing flow in only the indicated direction. The spring backing the discs close the valve when flow ceases prior to pressure reversal, therefore reducing slam or water hammer.

Features:

- 200 PSI Non-Shock
- Temperature Range -4°F to 176°F (-20°C to 80°C)
- Wafer Style
- Non-Slam (Spring Actuated)
Check for Water or Clean Fluids
- Cast Iron Body & Stainless Steel Internal Components
- Drip Tight Resilient Seat
- Vertical (with flow up) or Horizontal Installation*
- Epoxy Coated Body

* When installed in the horizontal position, the door hinge shaft must be in the vertical position for proper operation.

Use Flat-Faced Metal Flanges only.

Not for Steam Service



Standards:

- Face to Face: MSS SP-125
- Inspection & Test: API 598
- Flange Drilling: ANSI B16.1 Class 125
- Flange Face Finish: MSS SP-6
- Markings: MSS SP-25

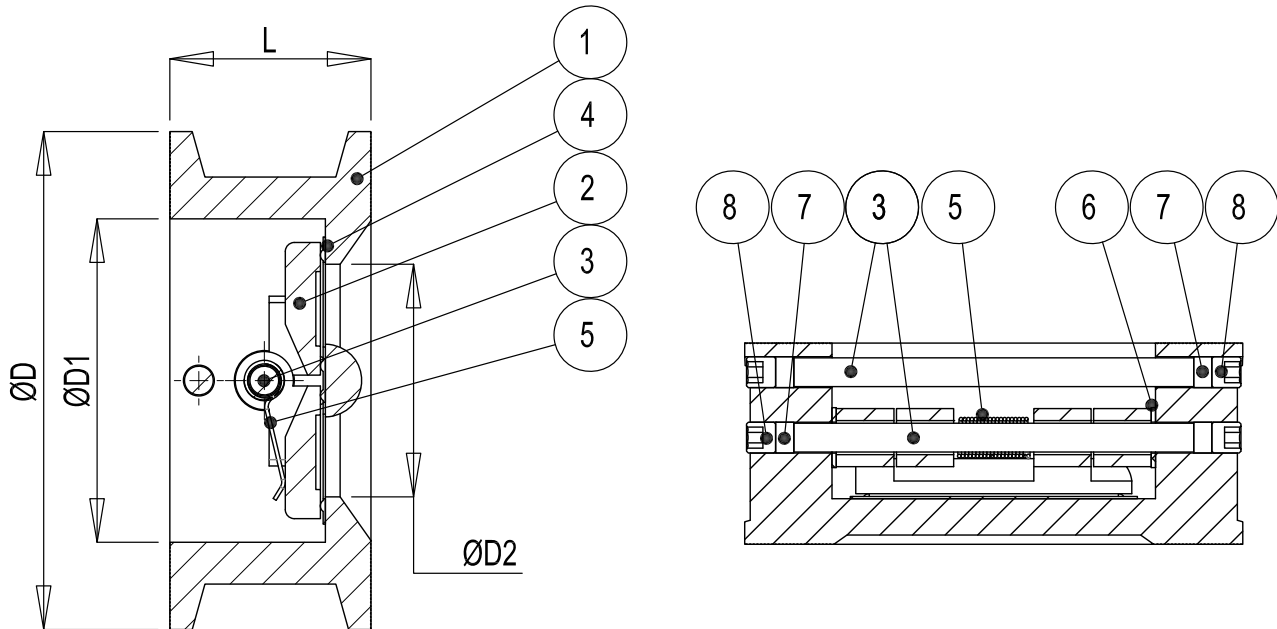
Cv & Weights

Size	Cv	Wt. (Lbs)
2	22	2.87
2-1/2	33	4.63
3	52	6.39
4	87	9.48
5	133	14.11
6	198	20.06
8	335	33.51
10	562	58.42
12	781	81.57

Figure Number Matrix

FNW 682 Size		
SIZE CODE		
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	12 = 12

CAST IRON WAFER STYLE DOUBLE DOOR CHECK VALVE



Dimensions (Inches)

Size	ØD	ØD1	ØD2	L
2	4.13	2.36	1.50	2.13
2-1/2	4.88	2.87	1.89	2.13
3	5.39	3.50	2.52	2.24
4	6.97	4.49	3.43	2.52
5	7.76	5.51	4.02	2.76
6	8.74	6.61	5.12	2.99
8	10.98	8.62	6.97	3.74
10	13.39	10.75	8.50	4.25
12	16.14	12.76	10.24	5.59

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	Cast Iron ASTM A126 Class B	1	
2	Disc (Door)	Stainless Steel ASTM A351 CF8M	2	
3	Shaft	Stainless Steel SS316	2	
4	Seat	NBR	1	Bonded to Body
5	Spring	Stainless Steel SS316	1 - 2	Qty 2 on 6 to 12 Inch Valves
6	Washer	PTFE	2 - 11	Varies According to Size
7	Shaft Seal	NBR	4	
8	Hex Nut	Stainless Steel SS304	4	
9	Eye Bolt	Steel ASTM A193 Grade B7	1	8 Inch and Larger

125# FLANGED 200 WOG IBBM GATE VALVE

Features:

- 200 PSI WOG Non-Shock (-20°F to 150°F)
- 125 PSI WSP (Saturated Steam to 353°F)
- Flat Faced Flanges
- Rising Stem OS&Y
- Tapered Solid Wedge
- Body Guide Ribs
- Back Seat Stop

Standards:

- Class 125 Flanges: ANSI B16.1
- Pressure/Temperature Rating: ANSI B16.1
- Face to Face Dimensions: ANSI B16.10
- Design & Testing: MSS SP-70

Options & Accessories:

FNW offers many options, accessories and modifications for their iron body valves which include, but are not limited to: By-Passes, Packing Options, Stem Extensions, Floor Stands, Switches, and Actuation such as Pneumatic Cylinders or Electric Operators, Gear Operators, and Chain wheels.

Pressure/Temperature*

Temp (°F)	Pressure (PSI)
-20 to 150	200
200	190
225	180
250	175
275	170
300	165
325	155
350	150
375	145
400	140
425	130
**450	125

* P/T listed is for 2 to 12 inch, 200 WOG ASTM A126 Class B gray iron valves. Temperatures shown are that of the pressure containing parts of the valve and are assumed to be equal to the contained fluid's temperature. Use of a pressure rating at a pressure containing temperature other than the contained fluid's is at the responsibility of the end-user.

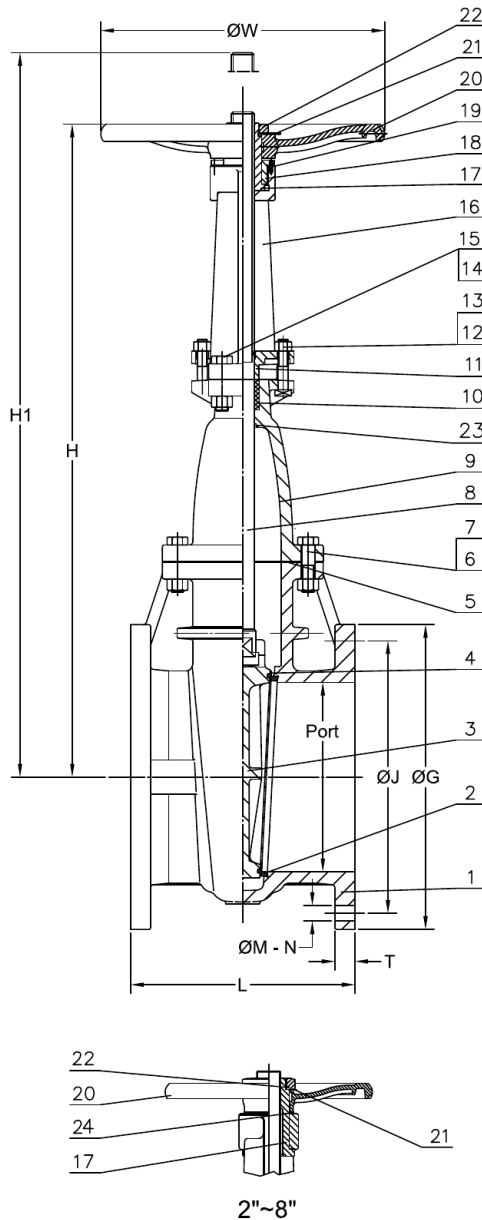
** Maximum temperature for bronze trim.



Figure Number Matrix

FNW 651A Size		
SIZE CODE		
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	12 = 12

125# FLANGED 200 WOG IBBM GATE VALVE



Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	Cast Iron, ASTM A126 B	1	
2	Seat	Bronze, ASTM B62	2	
3	Wedge	Cast Iron, ASTM A126 B	1	
4	Wedge Ring	Bronze, ASTM B62	2	
5	Body Gasket	Graphite & Steel Plate	1	
6	Bonnet Bolt	Carbon Steel, ASTM A307B	1 Set	
7	Bonnet Nut	Carbon Steel, ASTM A563	1 Set	
8	Stem	Brass, ASTM B16	1	
9	Bonnet	Cast Iron, ASTM A126 B	1	
10	Packing	Graphite	5	6 on 10" & 12"
11	Gland Flange	Ductile Iron, ASTM A536 65-45-12	1	
12	Gland Bolt	Carbon Steel, ASTM A307B	2	
13	Gland Nut	Carbon Steel, ASTM A563	2	
14	Yoke Bolt	Carbon Steel, ASTM A307B	4	10" & 12" only
15	Yoke Nut	Carbon Steel, ASTM A563	4	10" & 12" only
16	Yoke	Cast Iron, ASTM A126 B	1	10" & 12" only
17	Stem Nut	Brass	1	
18	Yoke Nut Bushing	Cast Iron, ASTM A126 B	1	10" & 12" only
19	Screw	Carbon Steel, ASTM A307B	1	10" & 12" only
20	Handwheel	Cast Iron, ASTM A126 B	1	
21	I.D. Plate	Aluminum	1	
22	Handwheel Nut	Ductile Iron, ASTM A536 65-45-12	1	
23	Backseat	Brass, ASTM B16	1	
24	Handwheel Washer	Brass	1	2" - 8" only

Dimensions (inches)

Size	Port	ØJ	ØG	T	N	ØM	L	ØW	H (closed)	H1 (open)	Wt. (Lbs)
2	1.97	4.74	5.98	0.63	4	0.75	7.00	7.09	10.94	13.46	35
2-1/2	2.50	5.50	7.01	0.69	4	0.75	7.50	7.09	12.24	15.39	44
3	2.99	6.00	7.52	0.75	4	0.75	8.00	7.09	13.39	17.01	53
4	3.94	7.50	9.02	0.94	8	0.75	9.00	7.87	15.47	20.12	84
5	4.92	8.50	10.00	0.94	8	0.87	10.00	9.84	17.87	23.62	115
6	5.91	9.50	10.98	1.00	8	0.87	10.50	11.02	19.76	26.42	150
8	7.87	11.75	13.50	1.12	8	0.87	11.50	11.81	23.31	32.01	231
10	9.84	14.25	15.98	1.19	12	0.98	13.00	14.17	35.24	46.14	386
12	11.81	17.00	19.02	1.25	12	0.98	14.00	15.75	41.54	54.49	547

125# FLANGED 200 WOG IBBM GLOBE VALVE

Features:

- 200 PSI WOG Non-Shock (-20°F to 150°F)
- 125 PSI WSP (Saturated Steam to 353°F)
- Flat Faced Flanges
- Rising Stem OS&Y
- Back Seat Stop

Standards:

- Class 125 Flanges: ANSI B16.1
- Pressure/Temperature Rating: ANSI B16.1
- Face to Face Dimensions: ANSI B16.10
- Design & Testing: MSS SP-85

Options & Accessories:

FNW offers many options, accessories and modifications for their iron body valves which include, but are not limited to: By-Passes, Packing Options, Stem Extensions, Floor Stands, Switches, and Actuation such as Pneumatic Cylinders or Electric Operators, Gear Operators, and Chain wheels.

Pressure/Temperature*

Temp (°F)	Pressure (PSI)
-20 to 150	200
200	190
225	180
250	175
275	170
300	165
325	155
350	150
375	145
400	140
425	130
**450	125

* P/T listed is for 2 to 12 inch, 200 WOG ASTM A126 Class B gray iron valves. Temperatures shown are that of the pressure containing parts of the valve and are assumed to be equal to the contained fluid's temperature. Use of a pressure rating at a pressure containing temperature other than the contained fluid's is at the responsibility of the end-user.

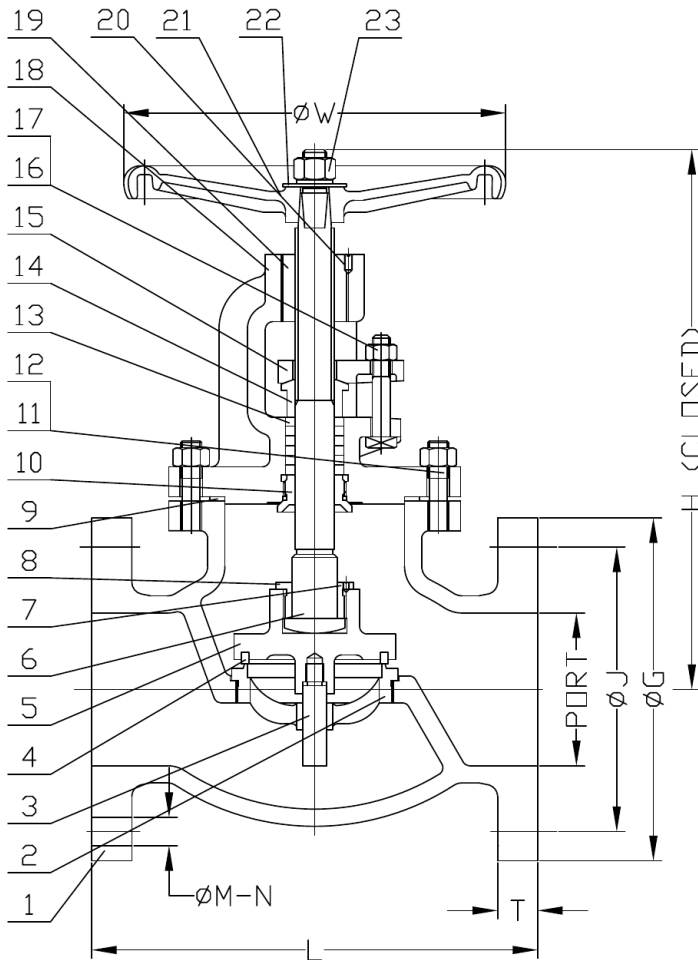
** Maximum temperature for bronze trim.



Figure Number Matrix

FNW 661 Size		
SIZE CODE		
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	12 = 12

125# FLANGED 200 WOG IBBM GLOBE VALVE



Standard Materials

Ref. No.	Description	Material
1	Body	Cast Iron, ASTM A126 B
2	Seat Ring	Bronze, ASTM B62
3	Guide Spindle	Brass, ASTM B16
4	Disc Seal Ring	Bronze, ASTM B62
5	Disc	Cast Iron, ASTM A126 B
6	Stem	Brass, ASTM B16
7	Check Screw	Carbon Steel
8	Disc Cover	Carbon Steel
9	Bonnet Gasket	Graphite & Steel Plate
10	Back Seat Bushing	Brass, ASTM B16
11	Stud	Carbon Steel, ASTM A307B
12	Nut	Carbon Steel, ASTM A563
13	Packing	Graphite
14	Packing Gland	Brass, ASTM B16
15	Gland Follower	Ductile Iron, ASTM A536 65-45-12
16	Square Head Bolt	Carbon Steel
17	Nut	Carbon Steel
18	Bonnet	Cast Iron, ASTM A126 B
19	Stem Nut	Brass, Mn
20	Screw	Carbon Steel
21	Handwheel	Cast Iron, ASTM A126 B
22	Washer	Carbon Steel
23	Nut	Carbon Steel
24	ID Plate	Aluminum

2" to 3" Valves: Do not have guide spindle

Dimensions (inches)

Size	Port	ØJ	ØG	T	N	ØM	L	ØW	H (closed)	Wt. (Lbs)
2	2.00	4.75	6.00	0.63	4	0.75	8.00	8.00	12.00	37
2-1/2	2.50	5.50	7.00	0.69	4	0.75	8.50	8.00	12.50	46
3	3.00	6.00	7.50	0.75	4	0.75	9.50	8.00	13.12	62
4	4.00	7.50	9.00	0.94	8	0.75	11.50	10.00	14.00	93
5	5.00	8.50	10.00	0.94	8	0.87	13.00	12.00	15.25	146
6	6.00	9.50	11.00	1.00	8	0.87	14.00	12.00	17.00	176
8	8.00	11.75	13.50	1.12	8	0.87	19.50	14.00	19.00	364
10	10.00	14.25	16.00	1.19	12	0.98	24.50	18.00	21.25	639
12	12.00	17.00	19.00	1.25	12	0.98	27.50	20.00	24.00	886

125# FLANGED 200 WOG IBBM SWING CHECK VALVE

Features:

- 200 PSI WOG Non-Shock (-20°F to 150°F)
- 125 PSI WSP (Saturated Steam to 353°F)
- Flat Faced Flanges
- Horizontal Swing
- Horizontal or Vertical Installation with Upward Flow

Standards:

- Class 125 Flanges: ANSI B16.1
- Pressure/Temperature Rating: ANSI B16.1
- Face to Face Dimensions: ANSI B16.10
- Design & Testing: MSS SP-71

Pressure/Temperature*

Temp (°F)	Pressure (PSI)
-20 to 150	200
200	190
225	180
250	175
275	170
300	165
325	155
350	150
375	145
400	140
425	130
**450	125

* P/T listed is for 2 to 12 inch, 200 WOG ASTM A126 Class B gray iron valves. Temperatures shown are that of the pressure containing parts of the valve and are assumed to be equal to the contained fluid's temperature. Use of a pressure rating at a pressure containing temperature other than the contained fluid's is at the responsibility of the end-user.

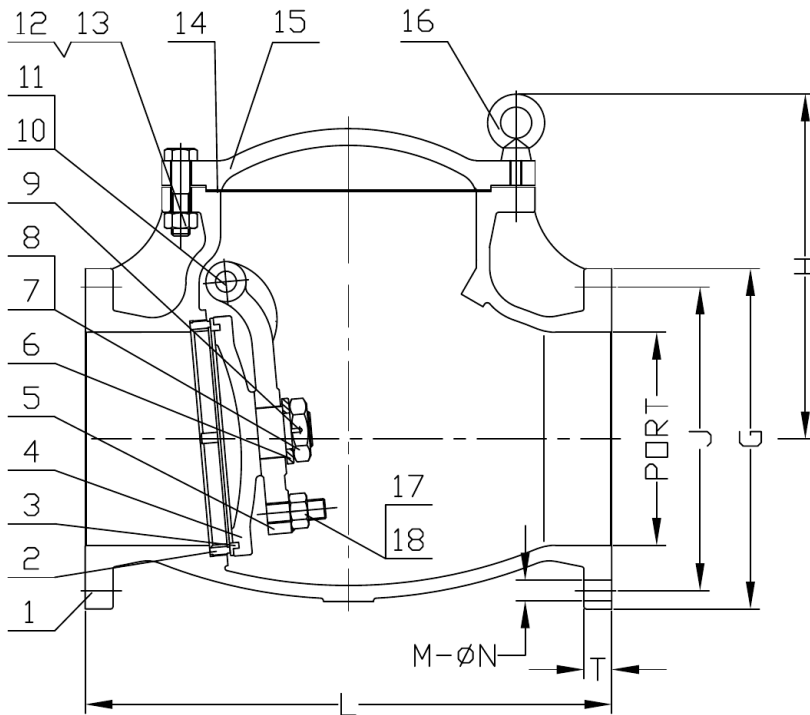
** Maximum temperature for bronze trim.



Figure Number Matrix

FNW 671 Size		
SIZE CODE		
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	12 = 12

125# FLANGED 200 WOG IBBM SWING CHECK VALVE



Standard Materials

Ref. No.	Description	Material
1	Body	ASTM A126B
2	Seat Ring	ASTM B62
3	Disc Seal Ring	ASTM B62
4	Disc	ASTM A126B
5	Hinge	ASTM A216 WCB
6	Washer	Carbon Steel
7	Nut	Carbon Steel
8	Stud	Carbon Steel
9	Split Pin	304
10	Hinge Pin	13Cr
11	Plug	ASTM A536
12	Bolt	ASTM A307
13	Nut	Carbon Steel
14	Bonnet Gasket	Graphite + Steel
15	Bonnet	ASTM A126B
16	Eye Screw	Carbon Steel
17	Adjusting Screw	Carbon Steel
18	Nut	Carbon Steel
19	ID Plate	Aluminum

Dimensions (inches)

Size	Port	J	H	T	M	N	L	G	Wt. (Lbs)
2	2.00	4.75	6.00	0.63	4	0.750	8.00	6.0	39
2-1/2	2.50	5.50	6.5	0.69	4	0.750	8.50	7.0	45
3	3.00	6.00	7.00	0.75	4	0.750	9.50	7.5	62
4	4.00	7.50	8.75	0.94	8	0.750	11.50	9.0	99
5	5.00	8.50	9.00	0.94	8	0.875	13.00	10.0	32
6	6.00	9.50	10.00	1.00	8	0.875	14.00	11.0	170
8	8.00	11.75	12.00	1.12	8	0.875	19.50	13.5	282
10	10.00	14.25	14.75	1.19	12	1.000	24.50	16.0	439
12	12.00	17.00	16.25	1.25	12	1.000	27.50	19.0	676

CAST STEEL FLANGED GATE, GLOBE, & CHECK VALVES

FNWTM



Index

Options & Accessories	180
Standards.....	180
Figure Number Matrix	181
Pressure/Temperature Ratings	181
Hydrostatic Test Pressures	181

Carbon Steel Valves

Fig No	Type	
551	150# Gate Valve	182
552	300# Gate Valve	183
561	150# Globe Valve	184
562	300# Globe Valve	185
571	150# Swing Check Valve	186
572	300# Swing Check Valve	187

Stainless Steel Valves

Fig No	Type	
451	150# Gate Valve	188
452	300# Gate Valve	189
461	150# Globe Valve	190
462	300# Globe Valve	191
471	150# Swing Check Valve	192
472	300# Swing Check Valve	193

Options & Accessories

FNW Valve Company offers many options and modifications for their cast steel valves. These include, but are not limited to:

- By-Passes - A By-Pass is primarily used to equalize pressure between the valve inlet and outlet before opening the main valve. Equalizing pressure makes opening the main valve easier, especially on valves with a high differential pressure. In high temperature applications, a by-pass allows preheating of the downstream line to lessen the shock of thermal expansion.
- Actuation & Accessories - FNW Valve can supply an assortment of actuation types and accessories including ratchets, chain wheels, square drive nuts, gear-operators, pneumatic and hydraulic cylinders, and motor operators. We can also supply accessories ranging from solenoids, position switches, and positioners, to network controls and valve monitors.
- Packing Options - Different applications can have different needs. FNW Valve offers packing materials for various pH and temperature requirements.
- Stem Extensions & Floor Stands - For remote applications, custom stem extensions and non-rising stem (NRS) adapters are available in carbon and stainless steel. Also available are floor stands made to order to your specifications.

Standards

FNW cast steel gate, globe, and check valves are manufactured according to the following standards:

- Pressure/Temperature Rating per ANSI B16.34
- Flange Dimensions per ANSI B16.5
- Face to Face Dimensions per ANSI B16.10
- Carbon Steel Valves Designed to API 600
- Stainless Steel Valves Designed to API 603
- Pressure Tested to API 598

Figure Number Matrix

FNW 5 5 1 X			
BODY/BONNET MATERIAL	VALVE TYPE	PRESSURE CLASS	SIZE
ASTM A216 Gr. WCB = 5	OS&Y GATE = 5	150# = 1	1-1/2 = J 10 = 10
ASTM A351 Gr. CF8M = 4	GLOBE = 6	300# = 2	2 = K 12 = 12
	SWING CHECK = 7		2-1/2 = L 14 = 14
			3 = M 16 = 16
			4 = P 18 = 18
			6 = U 20 = 20
			8 = X 24 = 24

Note: All figure number combinations may not be available or are Price On Availability (POA) only. Other sizes, materials and trim types may also be available. Contact FNW with your specifications.

Pressure / Temperature Ratings

Carbon Steel Material A105, A216WCB

Temperature (°F)	Max. Working Pressure(PSI)	
	Class 150	Class 300
-20° to 100°	285	740
200°	260	675
300°	230	655
400°	200	635
500°	170	600
600°	140	550
650°	125	535
700°	110	535
750°	95	505
800°	80	410
850°	65	270
900°	50	170
950°	35	105
1000°	20	50

Stainless Steel Material A351-CF8M, A182-F316

Temperature (°F)	Max. Working Pressure(PSI)	
	Class 150	Class 300
-20° to 100°	275	720
200°	240	620
300°	215	560
400°	195	515
500°	170	480
600°	140	450
650°	125	445
700°	110	430
750°	95	425
800°	80	415
850°	65	405
900°	50	395
950°	30	385
1000°	20	365
1050° ⁽⁴⁾	20	360
1100° ⁽⁴⁾	20	325
1150° ⁽⁴⁾	20	275
1200° ⁽⁴⁾	20	205
1250° ⁽⁴⁾	20	180
1300° ⁽⁴⁾	20	140
1350° ⁽⁴⁾	20	105
1400° ⁽⁴⁾	20	75
1450° ⁽⁴⁾	20	60
1500° ⁽⁴⁾	10	40

1. Pressures and temperatures listed are the maximum of the contained fluid. The pressures and temperatures listed are based on shell material only. Consideration must also be given to the bolting, trim, gasket, and packing material. For the pressure and temperature ratings for materials not given in the tables above, and for ratings for special class valves (available on special order), see ANSI B16.34.
2. A valve used under the jurisdiction of the ASTM Boiler and Pressure Vessel Code, the ANSI Code for Pressure Piping, or for Government Regulations is subject to any limitation of that code or regulation.
3. Materials shall not be used beyond the maximum temperature in the rating table.
4. Applies to weld end valves only. Flanged end valve ratings terminate at 1000°F (538°C).

Hydrostatic Test Pressures

Carbon Steel Valves		
Class	150#	300#
Shell	450	1125
Seat	315	815

Stainless Steel Valves		
Class	150#	300#
Shell	425	1100
Seat	305	795

Figure 551

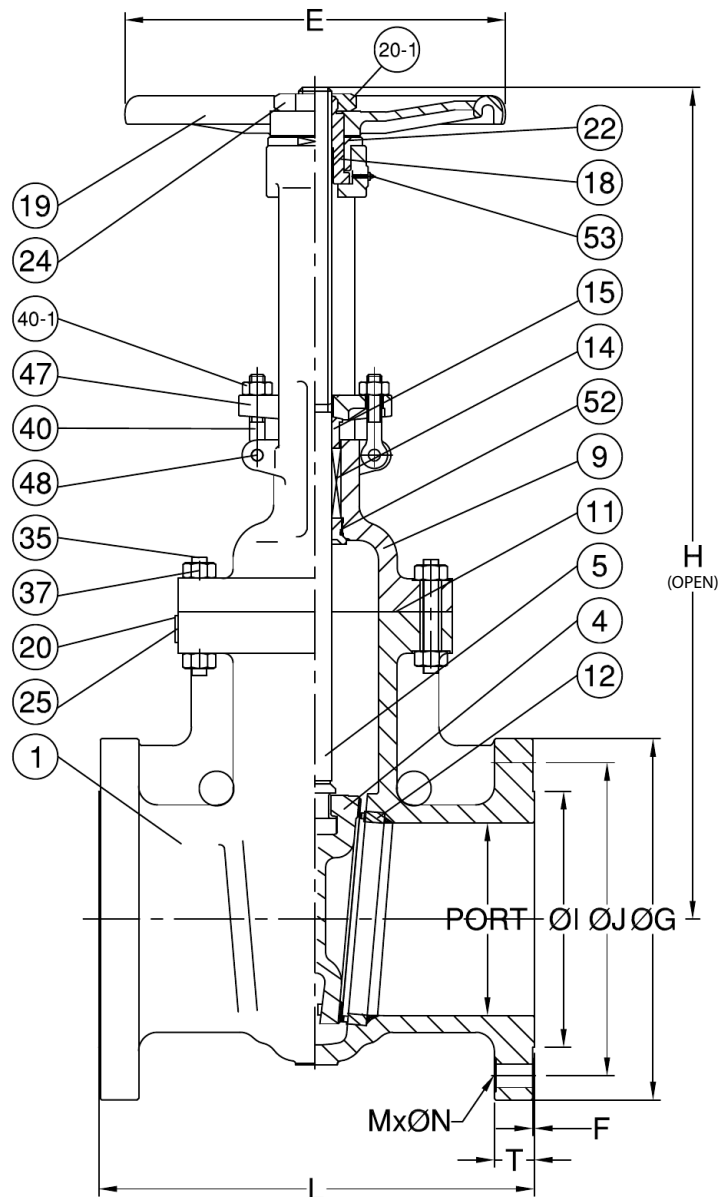
150# Carbon Steel OS&Y Gate Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A216 Gr. WCB
4	Disc	ASTM A216 WCB +13%Cr Faced
5	Stem	ASTM A182 Gr. F6
9	Bonnet	ASTM A216 Gr. WCB
11	Gasket	304+Graphite, Spiral Wound
12	Seat Ring	ASTM A105 + STL#6 Faced
14	Stem Packing	Braided Graphite +Die Formed Graphite Ring
15	Gland	ASTM A276 Type 410
18	Yoke Sleeve	ASTM A439 Gr. D2
19	Hand Wheel	Malleable Iron
20	Rivet	SS304
20-1	Screw	Carbon Steel
22	Stem Retainer Nut	Carbon Steel
24	Hand Wheel Nut	Carbon Steel
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B7
37	Bonnet Bolt Nut	ASTM A194 Gr. 2H
40	Gland Bolt	ASTM A193 Gr. B7
40-1	Gland Nut	ASTM A194 Gr. 2H
47	Gland Flange	ASTM A216 Gr. WCB
48	Gland Bolt Pin	ASTM A216 Gr. WCB
52	Back Seat	ASTM A276 Type 410
53	Grease Fitting	Carbon Steel

NOTES:

14" and larger valves have 2-piece yoke and bonnet
14" and larger valves include a gear operator
Design per API 600
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12	14	16	18	20	24
Port	2.01	2.52	2.99	4.02	5.98	7.99	10.00	12.01	13.27	15.24	17.24	19.25	23.27
L	7.01	7.48	7.99	9.02	10.51	11.50	12.99	14.02	15.00	15.98	17.01	17.99	20.00
H	15.20	17.13	19.02	23.11	30.20	37.60	45.12	52.28	59.80	67.76	74.80	83.31	97.64
ØE	7.87	7.87	9.84	9.84	11.81	13.78	15.75	17.72	19.68	22.05	25.20	25.20	28.35
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98	19.02	20.98	23.50	25.00	27.52
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76	15.00	16.26	18.50	20.98	22.99
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25	17.01	18.74	21.26	22.76	25.00
	T	0.75	0.89	0.94	0.94	1.02	1.14	1.22	1.26	1.38	1.46	1.57	1.69
	M	4	4	4	8	8	8	12	12	12	16	16	20
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98	0.98	1.14	1.14	1.26	1.26
Wt. (lbs.)	40	57	68	104	181	254	419	538	849	1,213	1,455	1,786	2,756

Figure 552

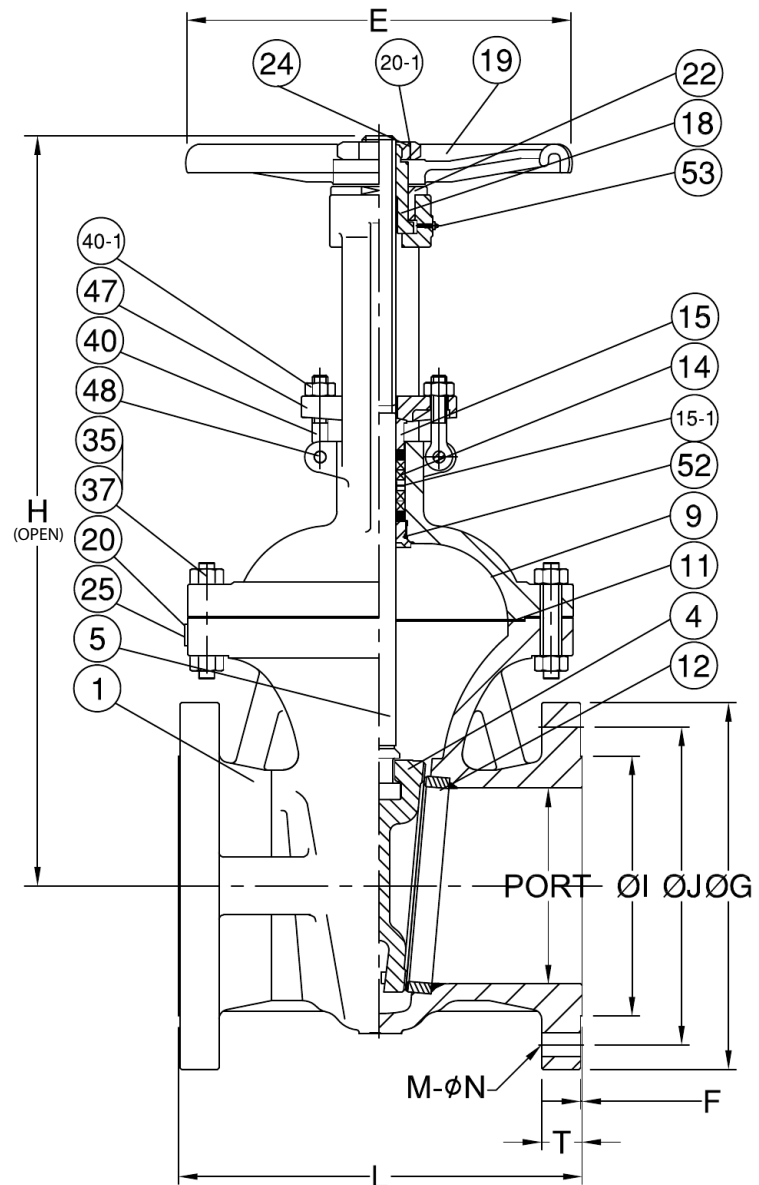
300# Carbon Steel OS&Y Gate Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A216 Gr. WCB
4	Disc	ASTM A216 WCB +13%Cr Faced
5	Stem	ASTM A182 Gr. F6
9	Bonnet	ASTM A216 Gr. WCB
11	Gasket	304+Graphite, Spiral Wound
12	Seat Ring	ASTM A105 + STL#6 Faced
14	Stem Packing	Braided Graphite +Die Formed Graphite Ring
15	Gland	ASTM A276 Type 410
15-1	Lantern Ring	ASTM A276 Type 410
18	Yoke Sleeve	ASTM A439 Gr. D2
19	Hand Wheel	Malleable Iron
20	Rivet	SS304
20-1	Screw	Carbon Steel
22	Stem Retainer Nut	Carbon Steel
24	Hand Wheel Nut	Carbon Steel
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B7
37	Bonnet Bolt Nut	ASTM A194 Gr. 2H
40	Gland Bolt	ASTM A193 Gr. B7
40-1	Gland Nut	ASTM A194 Gr. 2H
47	Gland Flange	ASTM A216 Gr. WCB
48	Gland Bolt Pin	ASTM A216 Gr. WCB
52	Back Seat	ASTM A276 Type 410
53	Grease Fitting	Carbon Steel

NOTES:

12" and larger valves have 2-piece yoke and bonnet
 14" and larger valves include a gear operator
 Design per API 600
 Pressure/Temperature Rating per ANSI B16.34
 Flange Dimensions per ANSI B16.5
 Face to Face Dimensions per ANSI B16.10
 Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12	14	16	18	20	24
Port	2.01	2.52	2.99	4.02	5.98	7.99	10.00	12.01	13.27	15.24	17.01	19.02	22.99
L	8.50	9.49	11.10	12.01	15.87	16.50	17.99	19.76	30.00	32.99	35.98	39.02	45.00
H	16.42	18.11	20.71	25.59	32.44	38.86	46.93	56.34	61.38	69.21	76.46	84.45	114.33
ØE	7.87	7.87	9.84	9.84	13.78	15.75	17.72	19.68	22.05	25.20	25.20	28.35	29.92
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	17.52	20.51	22.99	25.51	27.99	30.51
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76	15.00	16.26	18.50	20.98	22.99
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99	15.26	17.76	20.26	22.50	24.74	27.01
	T	0.91	1.02	1.14	1.26	1.46	1.65	1.89	2.01	2.13	2.28	2.40	2.52
	M	8	8	8	8	12	12	16	16	20	20	24	24
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14	1.26	1.26	1.38	1.38	1.38
Wt. (lbs.)	68	86	101	148	293	503	747	1,027	1,541	2,227	2,657	3,792	5,754

Figure 561

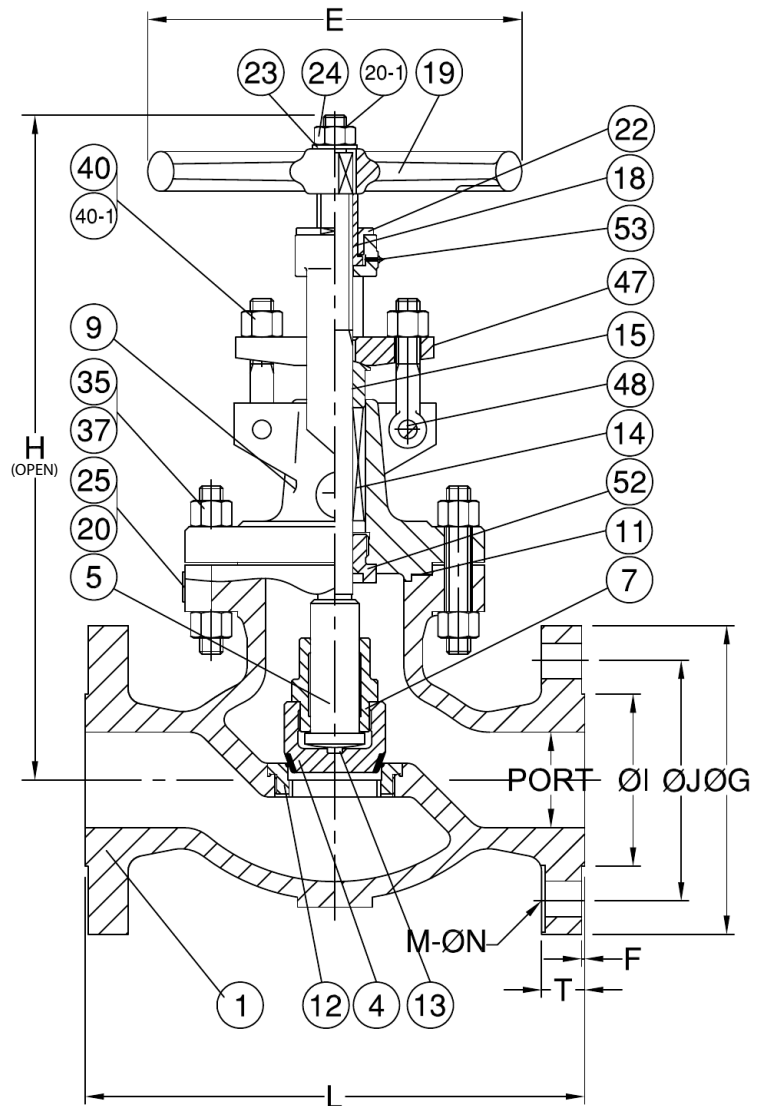
150# Carbon Steel Globe Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A216 Gr. WCB
4	Disc	ASTM A216 WCB +13%Cr Faced
5	Stem	ASTM A182 Gr. F6
7	Disc Nut	ASTM A276 Type 410
9	Bonnet	ASTM A216 Gr. WCB
11	Gasket	304+Graphite, Spiral Wound
12	Seat Ring	ASTM A105 + STL#6 Faced
13	Disc Thrust Plate	ASTM A276 Type 410
14	Stem Packing	Braided Graphite +Die Formed Graphite Ring
15	Gland	ASTM A276 Type 410
18	Yoke Sleeve	ASTM A439 Gr. D2
19	Hand Wheel	Malleable Iron
20	Rivet	SS304
20-1	Screw	Carbon Steel
22	Stem Retainer Nut	Carbon Steel
23	Hand Wheel Washer	Carbon Steel
24	Hand Wheel Nut	Carbon Steel
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B7
37	Bonnet Bolt Nut	ASTM A194 Gr. 2H
40	Gland Bolt	ASTM A193 Gr. B7
40-1	Gland Nut	ASTM A194 Gr. 2H
47	Gland Flange	ASTM A216 Gr. WCB
48	Gland Bolt Pin	ASTM A216 Gr. WCB
52	Back Seat	ASTM A276 Type 410
53	Grease Fitting	Carbon Steel

NOTES:

Design per API 600
 Pressure/Temperature Rating per ANSI B16.34
 Flange Dimensions per ANSI B16.5
 Face to Face Dimensions per ANSI B16.10
 Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12
Port	2.01	2.52	2.99	4.02	5.98	7.99	10.00	12.01
L	7.99	8.50	9.49	11.50	15.98	19.49	24.49	27.48
H	13.43	14.45	14.76	19.02	21.26	23.23	29.68	37.05
ØE	7.87	7.87	9.84	11.81	13.78	15.75	17.72	25.20
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25
	T	0.75	0.89	0.94	0.94	1.02	1.14	1.22
	M	4	4	4	8	8	8	12
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98
Wt. (lbs.)	42	62	77	130	216	351	633	972

Figure 562

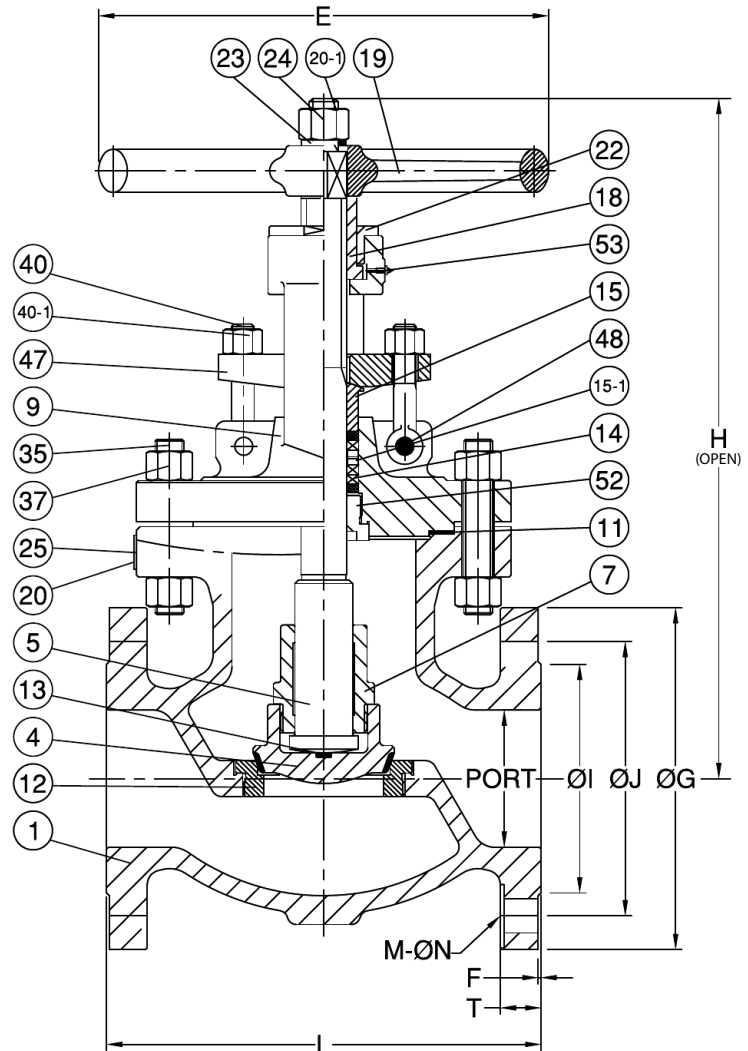
300# Carbon Steel Globe Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A216 Gr. WCB
4	Disc	ASTM A216 WCB +13%Cr Faced
5	Stem	ASTM A182 Gr. F6
7	Disc Nut	ASTM A276 Type 410
9	Bonnet	ASTM A216 Gr. WCB
11	Gasket	304+Graphite, Spiral Wound
12	Seat Ring	ASTM A105 + STL#6 Faced
13	Disc Thrust Plate	ASTM A276 Type 410
14	Stem Packing	Braided Graphite +Die Formed Graphite Ring
15	Gland	ASTM A276 Type 410
15-1	Lantern Ring	ASTM A276 Type 410
18	Yoke Sleeve	ASTM A439 Gr. D2
19	Hand Wheel	Malleable Iron
20	Rivet	SS304
20-1	Screw	Carbon Steel
22	Stem Retainer Nut	Carbon Steel
23	Hand Wheel Washer	Carbon Steel
24	Hand Wheel Nut	Carbon Steel
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B7
37	Bonnet Bolt Nut	ASTM A194 Gr. 2H
40	Gland Bolt	ASTM A193 Gr. B7
40-1	Gland Nut	ASTM A194 Gr. 2H
47	Gland Flange	ASTM A216 Gr. WCB
48	Gland Bolt Pin	ASTM A216 Gr. WCB
52	Back Seat	ASTM A276 Type 410
53	Grease Fitting	Carbon Steel

NOTES:

Design per API 600
 Pressure/Temperature Rating per ANSI B16.34
 Flange Dimensions per ANSI B16.5
 Face to Face Dimensions per ANSI B16.10
 Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12
Port	2.01	2.52	2.99	4.02	5.98	7.99	10.00	12.01
L	10.51	11.50	12.52	14.02	17.48	22.01	24.49	27.99
H	13.74	14.80	16.93	19.13	24.33	36.89	37.36	39.17
ØE	7.87	9.84	9.84	13.78	17.72	22.05	25.20	25.20
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	17.52	20.51
	ØI	3.62	4.12	5.00	6.18	8.50	10.63	12.76
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99	15.26
	T	0.91	1.02	1.14	1.26	1.46	1.89	2.01
	M	8	8	8	8	12	16	16
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14
Wt. (lbs.)	66	104	150	231	346	666	959	1,272

Figure 571

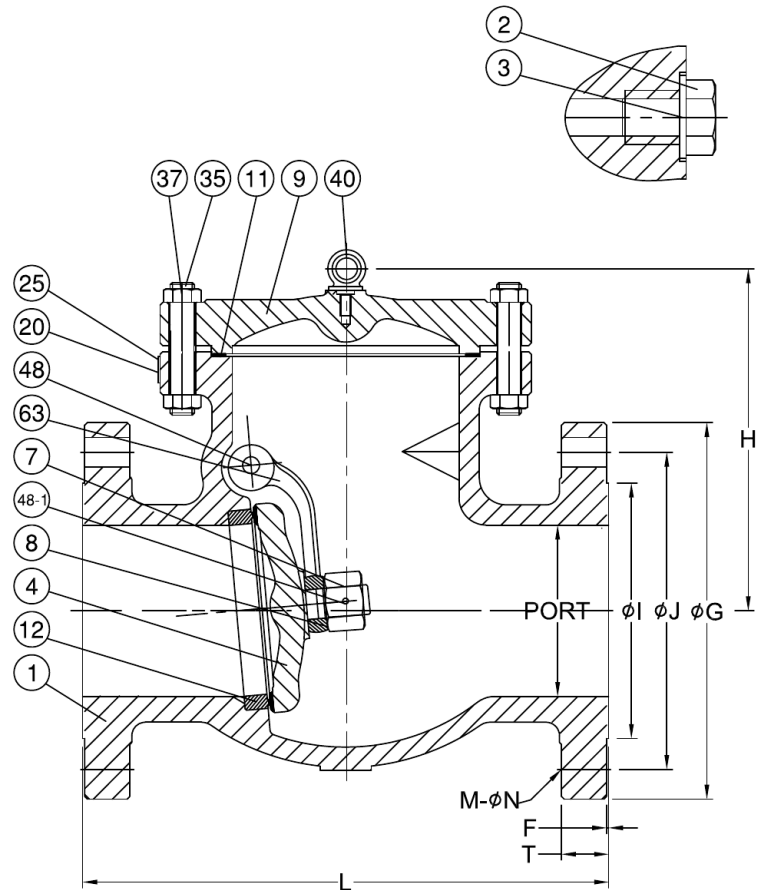
150# Carbon Steel Swing Check Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A216 Gr. WCB
2	Plug	Carbon Steel
3	Plug Seal	Carbon Steel
4	Disc	ASTM A216 WCB + 13%Cr Faced
7	Disc Nut	Stainless Steel
8	Disc Washer	Stainless Steel
9	Bonnet	ASTM A216 Gr. WCB
11	Body Seal	304+Graphite, Spiral Wound
12	Seat Ring	ASTM A105 + STL#6 Faced
20	Rivet	SS304
25	Names Plate	SS304
35	Body Bolt	ASTM A193 Gr. B7
37	Bolt Nut	ASTM A194 Gr. 2H
40	Eye Bolt	ASTM A29 1035 (4" & Larger)
48	Hinge Pin	ASTM A276 Type 410
48-1	Split Pin	ASTM A276 Type 410
63	Hinge	ASTM A216 Gr. WCB

NOTES:

Design per API 600
 Pressure/Temperature Rating per ANSI B16.34
 Flange Dimensions per ANSI B16.5
 Face to Face Dimensions per ANSI B16.10
 Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12	14	16	18	20	24
Port	2.01	2.52	2.99	4.02	5.98	7.99	10.00	12.01	13.27	15.24	17.24	19.25	23.27
L	7.99	8.50	9.49	11.50	14.02	19.49	24.49	27.48	30.98	34.02	38.50	38.50	50.98
H	5.31	5.83	6.61	9.25	10.91	13.35	15.67	20.67	23.03	22.99	26.30	28.03	29.13
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98	19.02	20.98	23.50	25.00	27.52
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76	15.00	16.26	18.50	20.98	22.99
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25	17.01	18.74	21.26	22.76	25.00
	T	0.75	0.89	0.94	0.94	1.02	1.14	1.22	1.26	1.38	1.46	1.57	1.69
	M	4	4	4	8	8	8	12	12	12	16	16	20
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98	0.98	1.14	1.14	1.26	1.26
Wt. (lbs.)	256	42	62	88	148	258	439	659	816	1,257	1,466	1,984	2,996

Figure 572

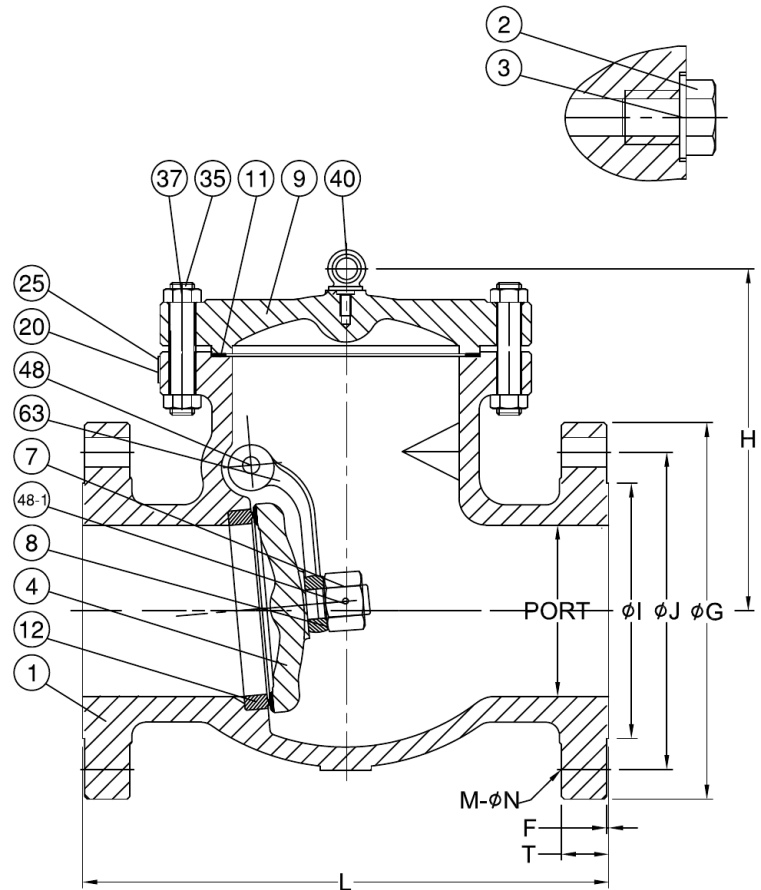
300# Carbon Steel Swing Check Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A216 Gr. WCB
2	Plug	Carbon Steel
3	Plug Seal	Carbon Steel
4	Disc	ASTM A216 WCB + 13%Cr Faced
7	Disc Nut	Stainless Steel
8	Disc Washer	Stainless Steel
9	Bonnet	ASTM A216 Gr. WCB
11	Body Seal	304+Graphite, Spiral Wound
12	Seat Ring	ASTM A105 + STL#6 Faced
20	Rivet	SS304
25	Names Plate	SS304
35	Body Bolt	ASTM A193 Gr. B7
37	Bolt Nut	ASTM A194 Gr. 2H
40	Eye Bolt	ASTM A29 1035 (4" & Larger)
48	Hinge Pin	ASTM A276 Type 410
48-1	Split Pin	ASTM A276 Type 410
63	Hinge	ASTM A216 Gr. WCB

NOTES:

Design per API 600
 Pressure/Temperature Rating per ANSI B16.34
 Flange Dimensions per ANSI B16.5
 Face to Face Dimensions per ANSI B16.10
 Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12	14	16	18	20	24
Port	2.01	2.52	2.99	4.02	5.98	7.99	10.00	12.01	13.27	15.24	17.01	19.02	22.99
L	10.51	11.50	12.52	14.02	17.48	20.98	24.49	27.99	32.99	34.02	38.50	40.00	52.99
H	5.91	6.57	7.09	9.92	11.85	14.17	16.85	19.33	23.03	24.21	25.31	26.81	27.95
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	17.52	20.51	22.99	25.51	27.99	30.51
	ØI	3.62	4.12	5.00	6.19	8.50	10.62	12.75	15.00	16.26	18.50	21.00	23.00
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99	15.26	17.76	20.26	22.50	24.74	27.01
	T	0.91	1.00	1.14	1.26	1.46	1.65	1.89	2.01	2.13	2.28	2.40	2.52
	M	8	8	8	8	12	12	16	16	20	20	24	24
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14	1.26	1.26	1.38	1.38	1.38
Wt. (lbs.)	46	60	64	93	163	238	657	928	1,499	1,852	1,797	2,207	3,417

Figure 451

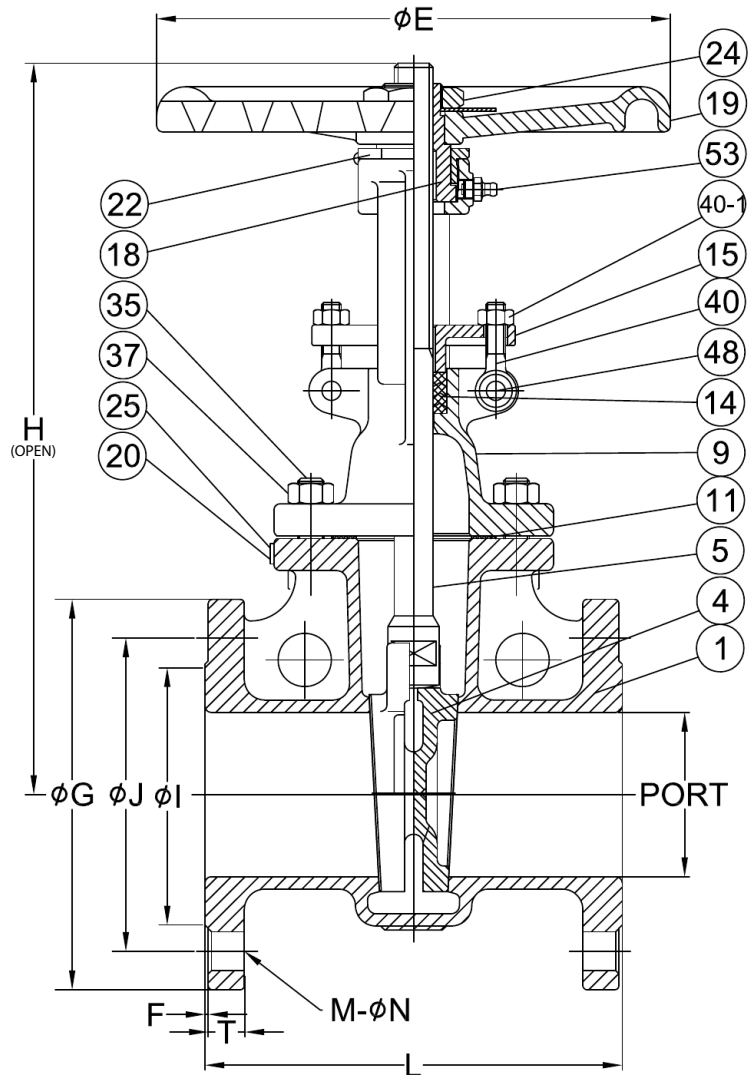
150# Stainless Steel OS&Y Gate Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A351 Gr. CF8M
4	Disc	ASTM A351 Gr. CF8M
5	Stem	SS304
9	Bonnet	ASTM A351 Gr. CF8M
11	Gasket	PTFE
14	Stem Packing	PTFE
15	Gland	ASTM A351 Gr. CF8M
18	Yoke Sleeve	Bronze
19	Hand Wheel	ASTM A536 Gr. 65-45-15
20	Rivet	SS304
22	Stem Retaining Nut	ASTM A351 Gr. CF8
24	Hand Wheel Nut	ASTM A351 Gr. CF8
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B8
37	Bonnet Nut	ASTM A194 Gr. 8
40	Gland Bolt	ASTM A193 Gr. B8
40-1	Gland Nut	ASTM A194 Gr. 8
48	Gland Bolt Pin	SS304
53	Grease Fitting	ASTM A570 Gr. A + Cr Plated

NOTES:

CF8M Seat is Integral to Body
Investment Cast Body up to 8"
Design per API 603
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12
Port	1.97	2.56	3.15	3.94	5.91	7.87	9.84	11.81
L	7.01	7.48	7.99	9.02	10.51	11.50	12.99	14.02
H	11.22	12.60	14.17	17.13	22.83	29.13	43.90	54.33
ØE	6.30	6.30	7.87	9.84	12.60	14.96	17.72	17.72
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.36
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25
	T	0.62	0.69	0.75	0.94	1.00	1.12	1.19
	M	4	4	4	8	8	12	12
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98
Wt. (lbs.)	31	37	45	81	143	194	320	430

Figure 452

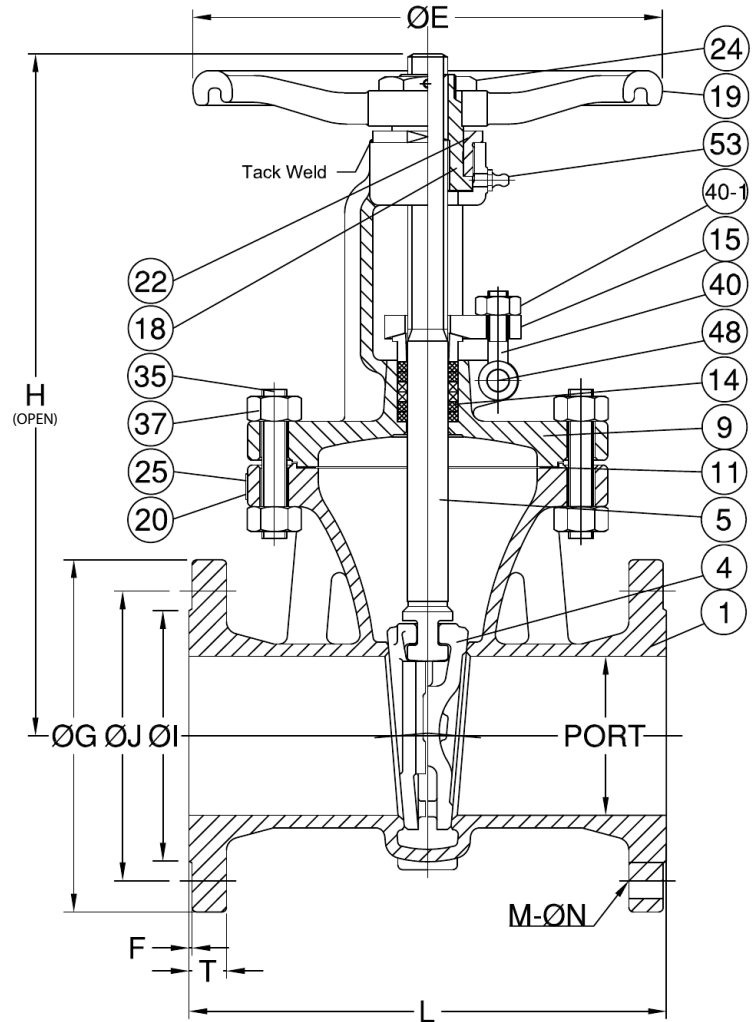
300# Stainless Steel OS&Y Gate Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A351 Gr. CF8M
4	Disc	ASTM A351 Gr. CF8M
5	Stem	SS304
9	Bonnet	ASTM A351 Gr. CF8M
11	Gasket	PTFE
14	Stem Packing	PTFE
15	Gland	ASTM A351 Gr. CF8M
18	Yoke Sleeve	Bronze
19	Hand Wheel	ASTM A536 Gr. 65-45-15
20	Rivet	SS304
22	Stem Retaining Nut	ASTM A351 Gr. CF8
24	Hand Wheel Nut	ASTM A351 Gr. CF8
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B8
37	Bonnet Nut	ASTM A194 Gr. 8
40	Gland Bolt	ASTM A193 Gr. B8
40-1	Gland Nut	ASTM A194 Gr. 8
48	Gland Bolt Pin	SS304
53	Grease Fitting	ASTM A570 Gr. A + Cr Plated

NOTES:

CF8M Seat is Integral to Body
Investment Cast Body up to 8"
Design per API 603
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12
Port	1.97	2.56	3.15	3.94	5.91	7.87	9.84	11.81
L	8.50	9.49	11.10	12.01	15.87	16.50	17.99	19.76
H	12.20	13.58	15.16	18.11	25.20	31.89	41.93	42.72
ØE	7.87	7.87	9.84	12.60	14.96	17.72	17.72	19.68
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	20.51
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99	15.26
	T	0.88	1.00	1.12	1.25	1.44	1.62	2.00
	M	8	8	8	8	12	12	16
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14
Wt. (lbs.)	55	71	103	137	265	370	772	1,036

Figure 461

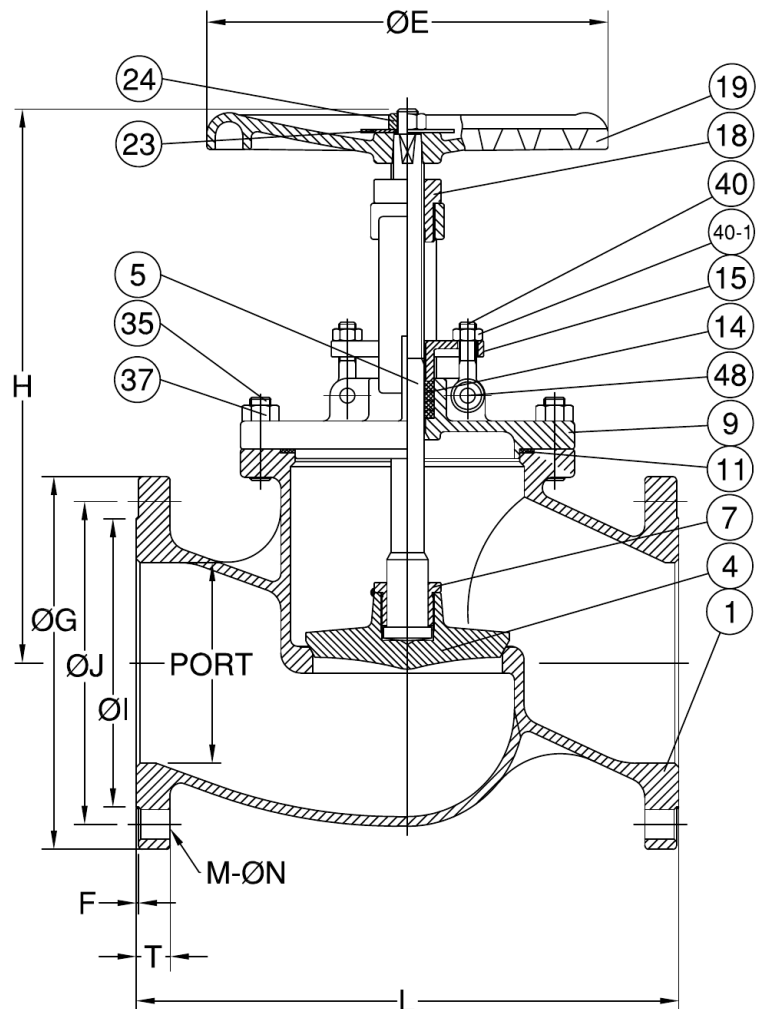
150# Stainless Steel Globe Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A351 Gr. CF8M
4	Disc	ASTM A351 Gr. CF8M
5	Stem	SS316
7	Disc Nut	ASTM A351 Gr. CF8M
9	Bonnet	ASTM A351 Gr. CF8M
11	Gasket	PTFE
14	Stem Packing	PTFE
15	Gland	ASTM A351 Gr. CF8M
18	Yoke Sleeve	Bronze
19	Hand Wheel	ASTM A536 Gr. 65-45-15
20	Rivet	SS304
23	Hand Wheel Washer	Carbon Steel
24	Hand Wheel Nut	ASTM A351 Gr. CF8
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B8
37	Bonnet Bolt Nut	ASTM A194 Gr. 8
40	Gland Bolt	ASTM A193 Gr. B8
40-1	Gland Nut	ASTM A194 Gr. 8
48	Gland Bolt Pin	SS304

NOTES:

CF8M Seat is Integral to Body
Investment Cast Body up to 8"
Design per API 603
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10	12
Port	1.97	2.56	3.15	3.94	5.91	7.87	9.84	11.81
L	7.99	8.50	9.49	11.50	15.98	19.49	24.49	27.48
H	10.83	12.60	14.17	16.14	20.87	23.62	28.15	29.92
ØE	6.30	6.30	7.87	9.84	12.60	14.96	17.72	17.72
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98
	ØI	3.62	4.13	5.00	6.26	8.50	10.63	12.76
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25
	T	0.65	0.69	0.82	0.94	0.98	1.12	1.19
	M	4	4	4	8	8	12	12
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98
Wt. (lbs.)	28	44	42	72	123	265	474	551

Figure 462

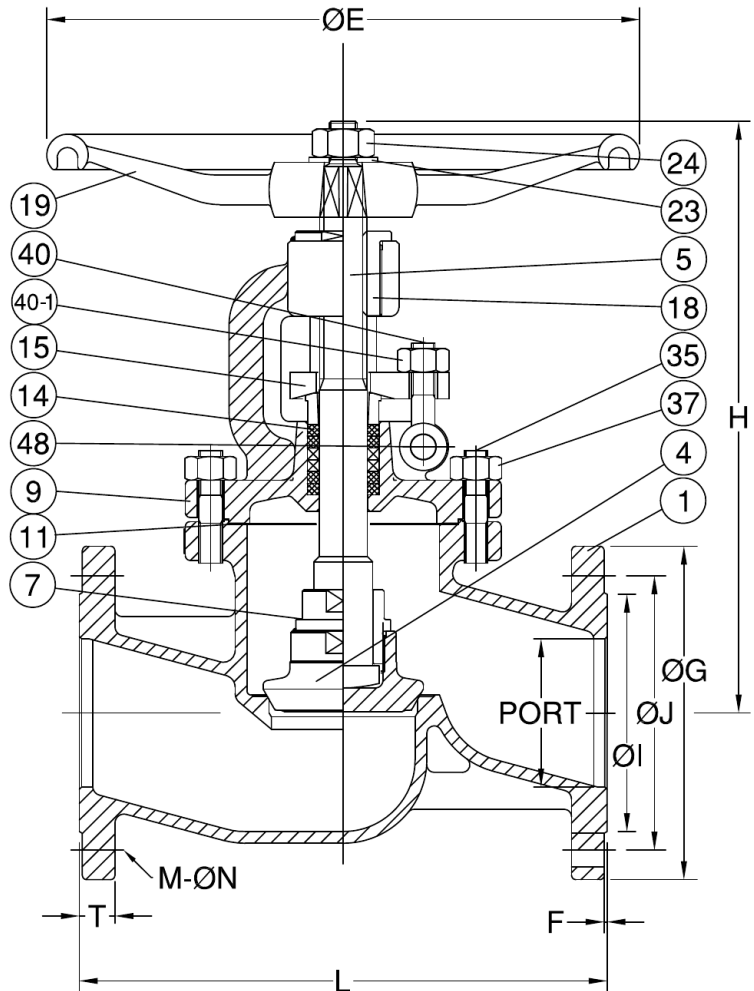
300# Stainless Steel Globe Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A351 Gr. CF8M
4	Disc	ASTM A351 Gr. CF8M
5	Stem	SS316
7	Disc Nut	ASTM A351 Gr. CF8M
9	Bonnet	ASTM A351 Gr. CF8M
11	Gasket	PTFE
14	Stem Packing	PTFE
15	Gland	ASTM A351 Gr. CF8M
18	Yoke Sleeve	Bronze
19	Hand Wheel	ASTM A536 Gr. 65-45-15
20	Rivet	SS304
23	Hand Wheel Washer	Carbon Steel
24	Hand Wheel Nut	ASTM A351 Gr. CF8
25	Name Plate	SS304
35	Bonnet Bolt	ASTM A193 Gr. B8
37	Bonnet Bolt Nut	ASTM A194 Gr. 8
40	Gland Bolt	ASTM A193 Gr. B8
40-1	Gland Nut	ASTM A194 Gr. 8
48	Gland Bolt Pin	SS304

NOTES:

CF8M Seat is Integral to Body
Investment Cast Body up to 8"
Design per API 603
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10
Port	1.97	2.56	3.15	3.94	5.91	7.87	9.84
L	10.51	11.50	12.52	14.02	17.48	22.01	24.49
H	11.22	13.19	14.96	16.93	22.05	24.80	29.53
ØE	7.87	7.87	9.84	12.60	14.96	17.72	19.68
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	17.52
	ØI	3.62	4.13	5.00	6.18	8.50	10.63
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99
	T	0.88	1.00	1.12	1.25	1.44	1.88
	M	8	8	8	8	12	12
	ØN	0.75	0.87	0.87	0.87	0.87	0.98
Wt. (lbs.)	66	88	133	188	331	882	1,169

Figure 471

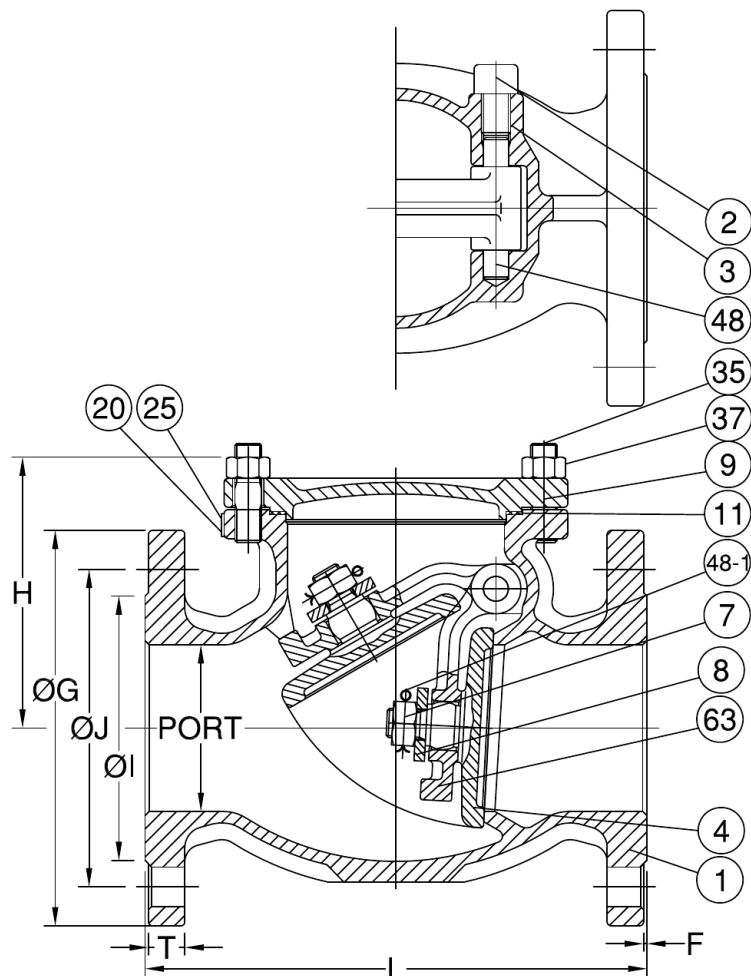
150# Stainless Steel Swing Check Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A351 Gr. CF8M
2	Plug	SS316
3	Sealing Cap	Plastic
4	Disc	ASTM A351 Gr. CF8M
7	Disc Nut	SS316
8	Disc Washer	SS316
9	Bonnet	ASTM A351 Gr. CF8M
11	Body Seal	PTFE
20	Rivet	SS304
25	Name Plate	SS304
35	Body Bolt	ASTM A193 Gr. B8
37	Bonnet Bolt Nut	ASTM A194 Gr. 8
48	Hinge Pin	SS316
48-1	Splint Pin	SS316
63	Hinge	ASTM A351 Gr. CF8M

NOTES:

CF8M Seat is Integral to Body
Investment Cast Body up to 8"
Design per API 603
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	1-1/2	2	2-1/2	3	4	6	8	10	12
Port	1.57	1.97	2.56	3.15	3.94	5.91	7.87	9.84	11.81
L	6.50	7.99	8.50	9.49	11.50	14.02	19.49	24.49	27.48
H	3.35	4.13	4.88	5.24	6.10	8.07	9.25	13.78	14.96
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	5.00	5.98	7.01	7.48	9.02	10.98	13.50	15.98
	ØI	2.87	3.70	4.25	5.06	6.27	8.61	10.63	12.76
	ØJ	3.88	4.74	5.49	6.00	7.50	9.51	11.75	14.25
	T	0.64	0.64	0.69	0.73	0.97	1.01	1.12	1.19
	M	4	4	4	4	8	8	12	12
	ØN	0.63	0.75	0.75	0.75	0.75	0.87	0.87	0.98
Wt. (lbs.)	18	25	33	39	71	106	181	331	478

Figure 472

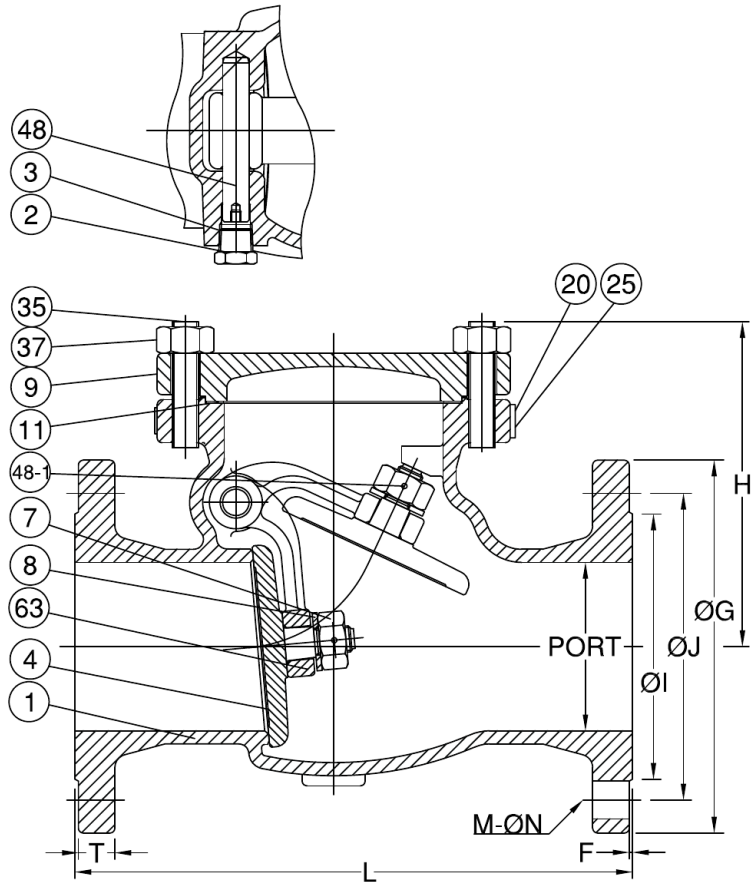
300# Stainless Steel Swing Check Valve

Standard Materials

No.	Part Name	Material
1	Body	ASTM A351 Gr. CF8M
2	Plug	SS316
3	Sealing Cap	Plastic
4	Disc	ASTM A351 Gr. CF8M
7	Disc Nut	SS316
8	Disc Washer	SS316
9	Bonnet	ASTM A351 Gr. CF8M
11	Body Seal	PTFE
20	Rivet	SS304
25	Name Plate	SS304
35	Body Bolt	ASTM A193 Gr. B8
37	Bonnet Bolt Nut	ASTM A194 Gr. 8
48	Hinge Pin	SS316
48-1	Splint Pin	SS316
63	Hinge	ASTM A351 Gr. CF8M

NOTES:

CF8M Seat is Integral to Body
Investment Cast Body up to 8"
Design per API 603
Pressure/Temperature Rating per ANSI B16.34
Flange Dimensions per ANSI B16.5
Face to Face Dimensions per ANSI B16.10
Pressure Tested per API 598



Dimensions (inches) & Weights (lbs)

Size	2	2-1/2	3	4	6	8	10
Port	1.97	2.56	3.15	3.94	5.91	7.87	9.84
L	10.51	11.50	12.52	14.02	17.48	20.98	24.49
H	5.00	5.51	6.30	6.89	9.06	11.42	12.60
Flange Dimensions	F	0.06	0.06	0.06	0.06	0.06	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	17.52
	ØI	3.62	4.13	5.00	6.18	8.50	10.63
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99
	T	0.88	1.00	1.12	1.25	1.44	1.62
	M	8	8	8	8	12	12
	ØN	0.75	0.87	0.87	0.87	0.87	0.98
Wt. (lbs.)	49	55	67	99	172	276	375

STRAINERS

BRONZE

Bronze

Figure	Description	Page
509	Y-strainer, 250 wog, 125 swp, threaded ends	195
510	Y-strainer, 400 wog, 250 swp, sweat ends	197
X509/X510	Y-strainer, 400 wog, 150 swp, lead free certified, threaded and sweat ends	199

CAST IRON

Cast Iron

Figure	Description	Page
558A	Y-strainer, 200 wog, 125 wsp, 125# flanged	201
559	Y-strainer, 400 wog, 250 wsp, threaded ends	203

STAINLESS STEEL

Cast Iron (IBBM)

Figure	Description	Page
14B	Y-strainer, 800 cwp, threaded ends	205

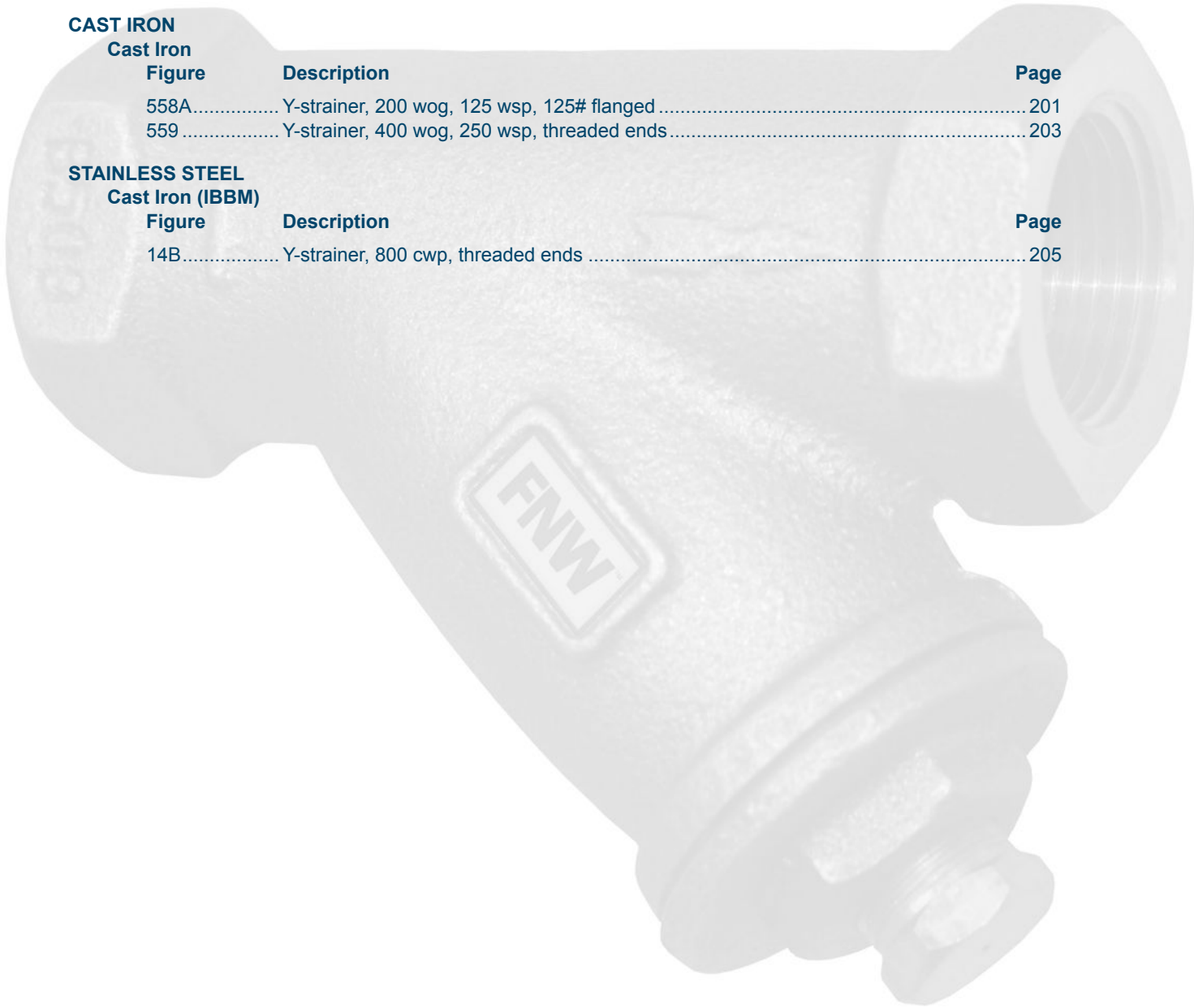


Figure 509 Y-STRAINER

FNW™

BRONZE 250 WOG Y-STRAINER

Features:

- 250 WOG
- 150 SWP
- Threaded NPT Ends
- Cast Bronze Body
- 20 Mesh Stainless Steel Screen
- Blow-off Plug Included

Standards:

- NPT Ends: ANSI/ASME B1.20.1
- Shell (Hydro) Test Pressure: 375 PSI



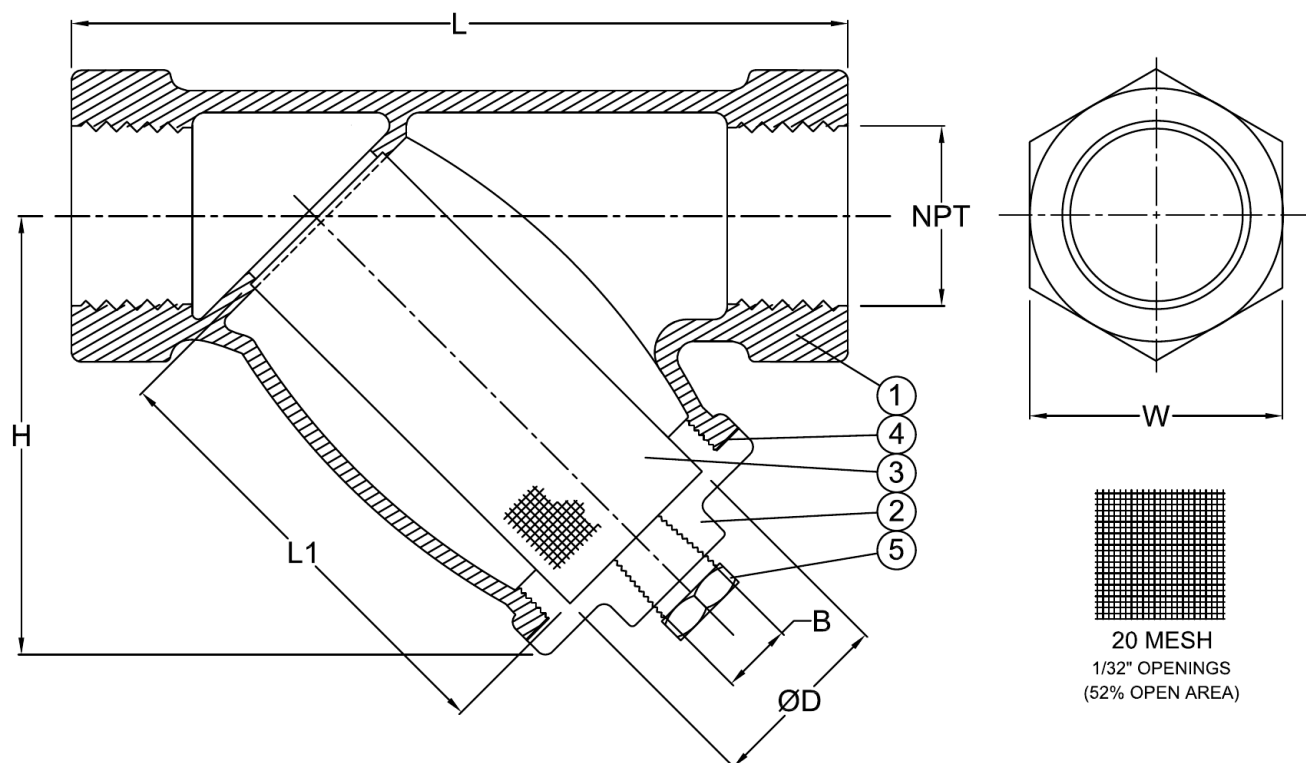
Cv & Weights

Size	Cv	Wt (Lbs)
3/8	3.2	0.82
1/2	9.2	0.82
3/4	17.5	1.23
1	28	2.12
1-1/4	45	2.82
1-1/2	62	4.37
2	96	7.72

Figure Number Matrix

FNW 509 Size	
SIZE CODE	
3/8 = C	1-1/4 = H
1/2 = D	1-1/2 = J
3/4 = F	2 = K
1 = G	
REPLACEMENT SCREENS	
3/8 & 1/2 = FNW509SCD	
3/4 = FNW509SF	
1 = FNW509SG	
1-1/4 = FNW509SH	
1-1/2 = FNW509SJ	
2 = FNW509SK	

BRONZE 250 WOG Y-STRAINER



Dimensions

Size	L	H	W	B (NPT)	L1	ØD
3/8	3.08	1.93	1.14	1/4"	1.56	0.62
1/2	3.08	1.93	1.14	1/4"	1.56	0.62
3/4	3.86	2.44	1.38	1/4"	2.19	0.87
1	4.45	2.76	1.73	3/8"	2.62	1.12
1-1/4	5.26	3.19	2.05	3/8"	3.07	1.38
1-1/2	6.26	3.82	2.36	1/2"	3.46	1.69
2	7.64	4.72	2.83	1/2"	4.65	2.17

Standard Materials

Ref. No.	Description	Material
1	Body	Bronze ASTM B584-C84400
2	Cover	Bronze ASTM B584-C84400
3	Screen	Stainless Steel ASTM A167-304
4	Gasket	Non-Asbestos
5	Plug	Brass C36000

Figure 510 Y-STRAINER



BRONZE 400 WOG Y-STRAINER

Features:

- 400 WOG
- 250 SWP
- Solder Ends
- Cast Bronze Body
- 20 Mesh Stainless Steel Screen
- Blow-off Plug Included

Standards:

- Solder Ends: ANSI/ASME B16.18
- Shell (Hydro) Test Pressure: 600 PSI



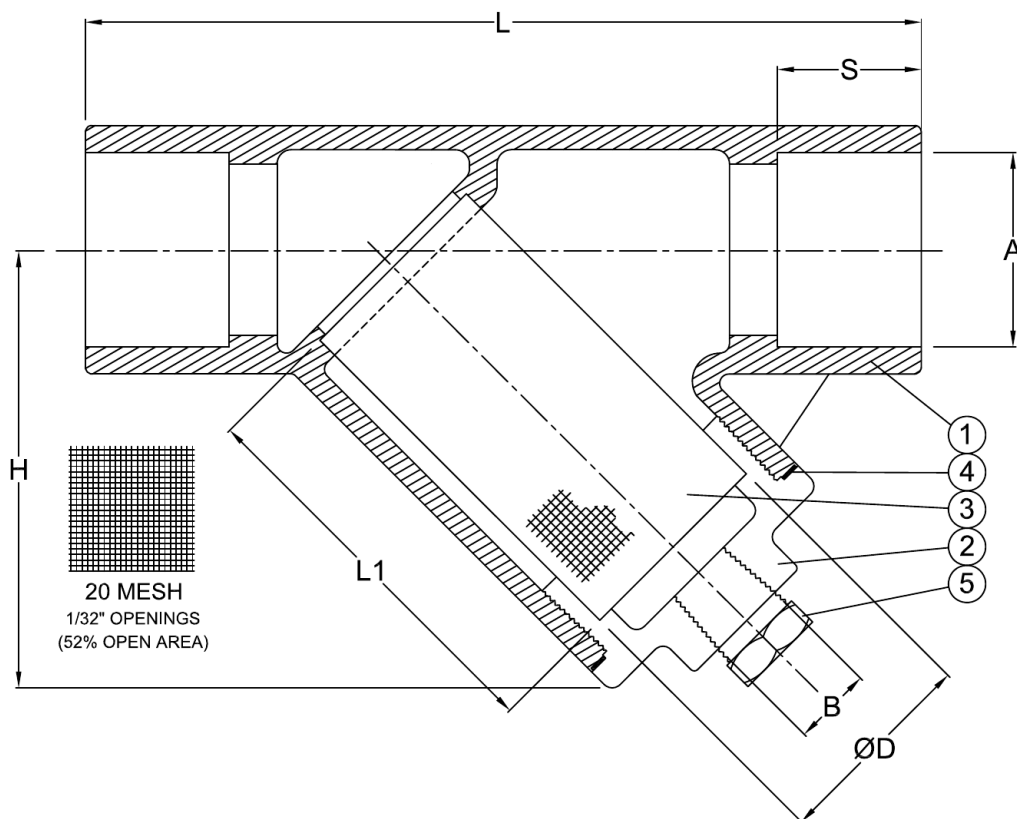
Cv & Weights

Size	Cv	Wt (Lbs)
1/2	9.2	0.73
3/4	17.5	1.28
1	28	1.89
1-1/4	45	2.98
1-1/2	62	4.32
2	96	6.83

Figure Number Matrix

FNW 510 Size	
SIZE CODE	
1/2 = D	1-1/4 = H
3/4 = F	1-1/2 = J
1 = G	2 = K
REPLACEMENT SCREENS	
1/2 = FNW510SD	
3/4 = FNW510SF	
1 = FNW510SG	
1-1/4 = FNW510SH	
1-1/2 = FNW510SJ	
2 = FNW510SK	

BRONZE 400 WOG Y-STRAINER



Dimensions

Size	L	H	B (NPT)	L1	ØD	A		S
						Min	Max	
1/2	2.94	1.56	1/4"	1.14	0.62	0.6275	0.6310	0.50
3/4	3.63	1.89	1/4"	1.49	0.88	0.8775	0.8810	0.75
1	4.48	2.61	3/8"	2.08	1.12	1.1280	1.1315	0.91
1-1/4	5.13	3.25	3/8"	2.63	1.38	1.3780	1.3815	0.97
1-1/2	5.81	3.59	1/2"	2.95	1.69	1.6285	1.6325	1.09
2	7.32	4.45	1/2"	4.01	2.16	2.1285	2.1325	1.34

Standard Materials

Ref. No.	Description	Material
1	Body	Bronze ASTM B584-C84400
2	Cover	Bronze ASTM B584-C84400
3	Screen	Stainless Steel ASTM A167-304
4	Gasket	Non-Asbestos
5	Plug	Brass C36000

LOW LEAD COMPLIANT BRONZE 400 WOG Y-STRAINER

Features:

- 400 WOG
- 150 SWP
- End Connections:
NPT Ends (X509)
Sweat Ends (X510)
- NSF 61 Annex G Approved
- 20 Mesh Stainless Steel Screen
- Blow-off Plug Included

Standards:

- NPT Ends: ANSI/ASME B1.20.1
- Solder Ends: ANSI/ASME B16.18



Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content $\leq 0.25\%$.
Source: California Health and Safety Code (116875).



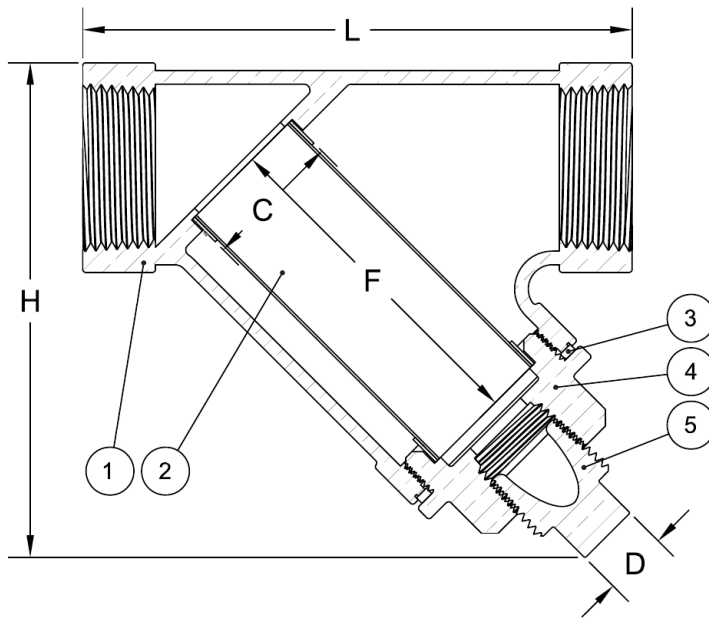
Cv & Weights

Size	Cv	Wt (Lbs)	
		X509	X510
1/2	8.3	0.70	0.68
3/4	11.4	1.19	1.07
1	28.3	1.79	1.62
1-1/4	37.7	2.54	2.42
1-1/2	48	3.50	3.30
2	63.2	5.58	5.13

Figure Number Matrix

FNW X509 Size	
END CONNECTIONS	SIZE CODE
X509 = FNPT ENDS	1/2 = D
X510 = SWEAT ENDS	3/4 = F
	1 = G
	1-1/4 = H
	1-1/2 = J
	2 = K

LOW LEAD COMPLIANT BRONZE 400 WOG Y-STRAINER

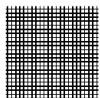
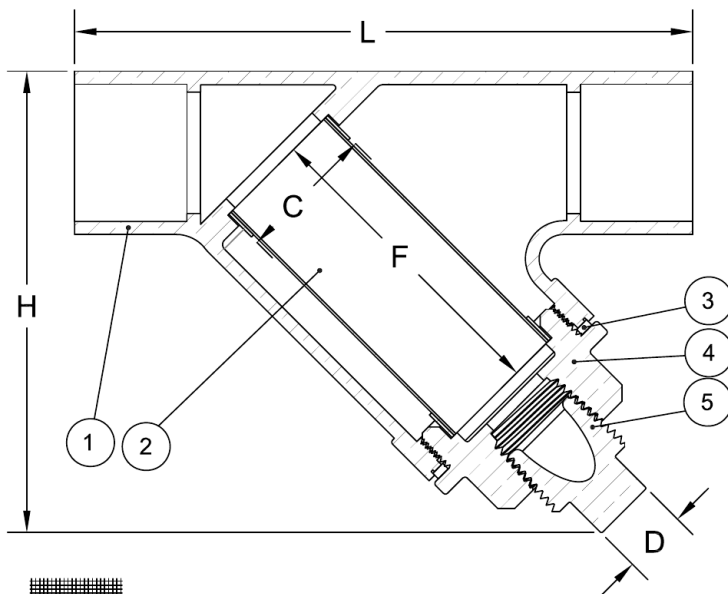


Dimensions

Size	D	H		L		C	F
		X509	X510	X509	X510		
1/2	0.45	3.01	2.83	3.23	3.43	0.77	1.95
3/4	0.45	3.49	3.27	3.94	4.31	0.98	2.34
1	0.52	4.04	3.78	4.53	5.10	1.15	2.66
1-1/4	0.52	4.70	4.37	5.33	5.91	1.43	3.16
1-1/2	0.52	5.02	4.82	6.20	6.89	1.78	3.58
2	0.52	6.14	5.91	7.44	8.62	2.20	4.80

Standard Materials

Ref. No.	Description	Material
1	Body	C89844 Bronze
2	Screen	304SS Stainless Steel
3	Gasket	Non-Asbestos (Synthetic Fibers & NBR Binder)
4	Cap	C89844 Bronze
5	Plug	C89844 Bronze



20 MESH
1/32" OPENINGS
(52% OPEN AREA)

125# FLANGED 200 WOG CAST IRON Y-STRAINER

Features:

- 200 WOG Non-Shock
(-20°F to 150°F)
- 125 PSI WSP
(125 PSI at 450°F)
- Flat Faced Flanges
- Flanged Ends Comply to
ANSI B16.1
- Perforated Stainless Steel
Screen:
 - 2" to 4" - 1/16" Holes
 - 5" to 12" - 1/8" Holes
- Blow-off Plug Included
- Test Pressure:
 - Shell (Hydro) 300 PSI
 - Per API 598
- Markings Per MSS SP-25



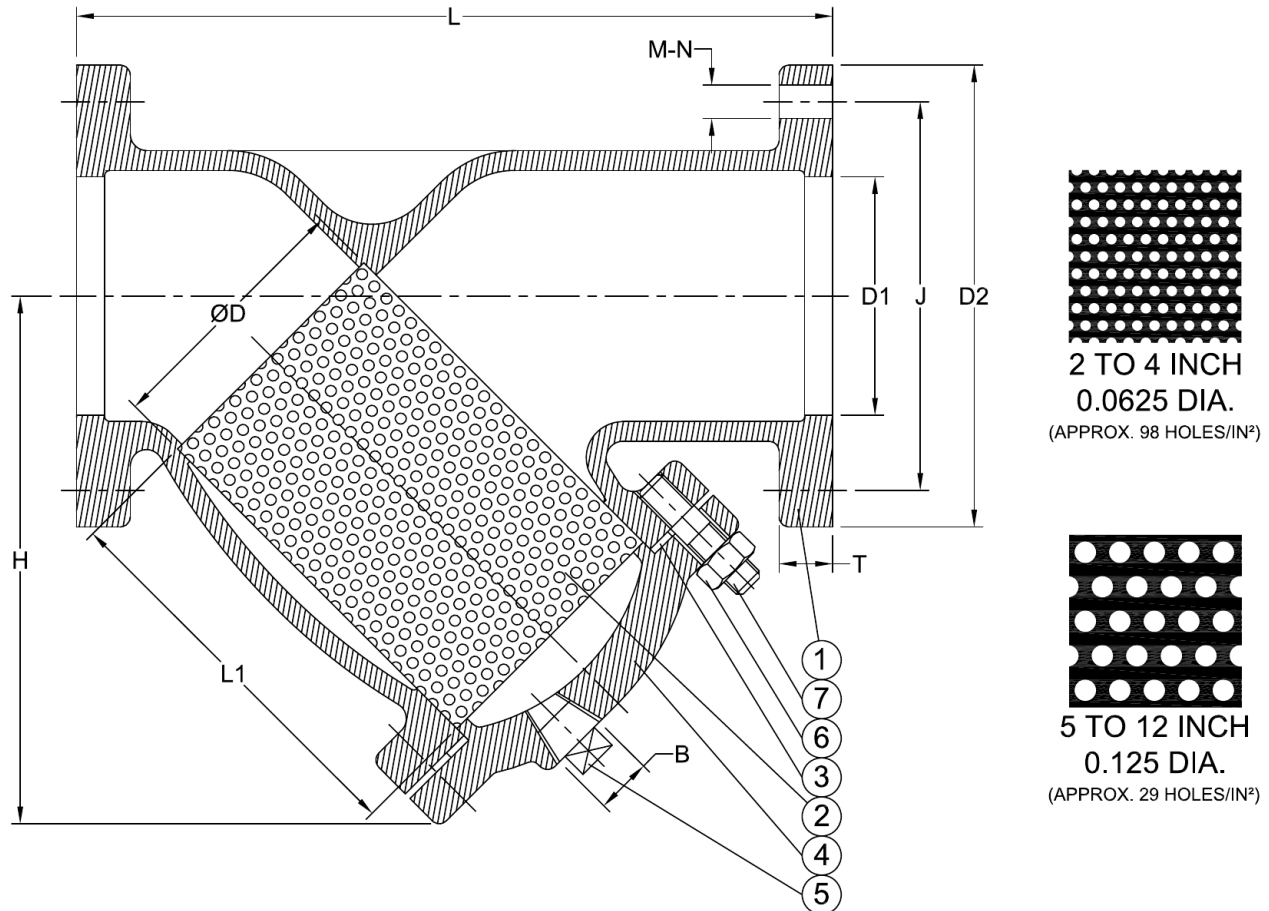
Cv & Weight

SIZE	Cv	Wt (Lbs)
2	51	29
2-1/2	80	37
3	116	44
4	205	73
5	325	112
6	465	148
8	845	227
10	1350	406
12	2080	617

Figure Number Matrix

FNW 558A Size		
SIZE CODE		
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	12 = 12
REPLACEMENT SCREENS		
2 = FNW558ASK		
2-1/2 = FNW558ASL		
3 = FNW558ASM		
4 = FNW558ASP		
5 = FNW558ASS		
6 = FNW558ASU		
8 = FNW558ASX		
10 = FNW558AS10		
12 = FNW558AS12		

125# FLANGED 200 WOG CAST IRON Y-STRAINER



Dimensions (inches)

SIZE	L	H	D1	D2	T	B (NPT)	L1	ØD	J	M	N
2	8.87	6.85	2.01	5.98	0.62	1/2"	5.51	2.24	4.75	4	0.75
2-1/2	10.75	6.93	2.50	7.01	0.69	1"	5.24	2.76	5.50	4	0.75
3	11.50	7.68	2.99	7.52	0.75	1"	5.75	3.23	6.00	4	0.75
4	13.87	9.69	4.02	9.02	0.94	1-1/4"	7.32	4.25	7.50	8	0.75
5	15.37	11.81	5.00	10.00	0.94	1-1/4"	9.45	5.28	8.50	8	0.70
6	18.50	12.01	5.98	10.98	1.00	1-1/2"	9.37	6.22	9.50	8	0.87
8	21.37	15.63	7.99	13.50	1.12	1-1/2"	12.05	8.27	11.75	8	0.87
10	26.00	19.49	10.00	15.98	1.19	2"	14.53	10.24	14.25	12	0.98
12	30.00	22.52	12.01	19.02	1.25	2"	17.40	12.28	17.00	12	0.98

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Cast Iron, ASTM A126 Class B	1
2	Screen	Stainless Steel, AISI 304	1
3	Gasket	Graphite & Steel	1
4	Cover	Cast Iron, ASTM A126 Class B	1
5	Plug	Malleable Iron	1
6	Nut	Carbon Steel, ASTM A307	4 to 12
7	Stud	Carbon Steel, ASTM A307	4 to 12

Figure 559
Y-STRAINER

400 WOG CAST IRON Y-STRAINER

Features:

- 400 WOG Non-Shock (@ 100°F)
- 250 PSI WSP
- Threaded NPT Ends
- 20 Mesh Stainless Steel Screen
- Blow-off Plug Included

Standards:

- NPT Ends:
ANSI/ASME B1.20.1
- Shell (Hydro) Test Pressure:
300 PSI Per API 598
- Markings Per MSS SP-25



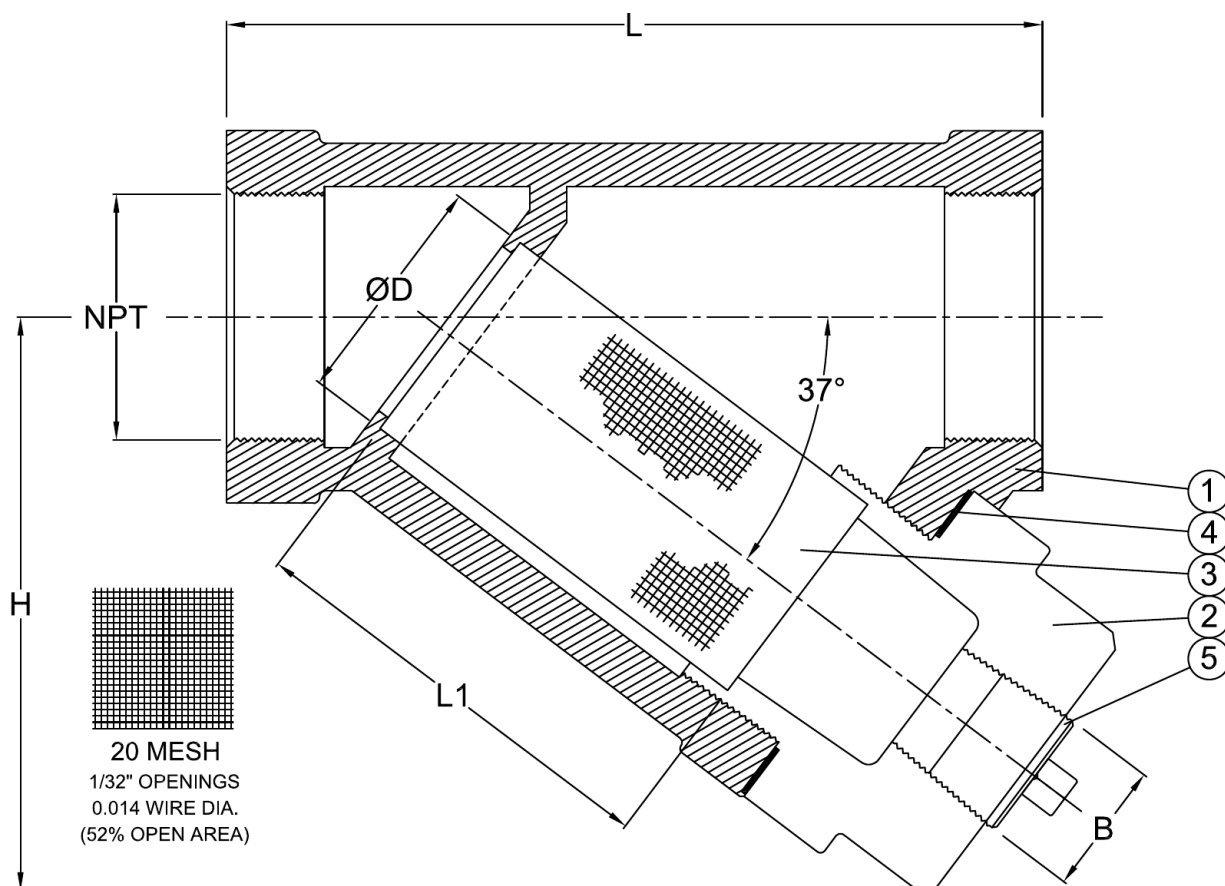
Cv & Weight

SIZE	Cv	Wt. (lbs.)
1/2	9.2	1.39
3/4	17.5	2.03
1	28	2.99
1-1/4	45	5.00
1-1/2	62	7.03
2	96	10.64
2-1/2	127	26.22

Figure Number Matrix

FNW 559 Size	
SIZE CODE	
1/2 = D	1-1/2 = J
3/4 = F	2 = K
1 = G	2-1/2 = L
1-1/4 = H	
REPLACEMENT SCREENS	
1/2 = FNW559D	
3/4 = FNW559F	
1 = FNW559G	
1-1/4 = FNW559H	
1-1/2 = FNW559J	
2 = FNW559K	
2-1/2 = FNW559L	

400 WOG CAST IRON Y-STRAINER



Dimensions (inches)

Size	L	H	B (NPT)	L1	ØD
1/2	3.19	1.97	1/4"	1.39	0.59
3/4	3.75	2.68	3/8"	1.78	0.86
1	4.00	2.95	3/8"	2.09	1.02
1-1/4	5.00	3.43	3/4"	2.76	1.33
1-1/2	5.75	3.78	3/4"	3.16	1.57
2	7.00	4.33	1"	3.69	1.96
2-1/2	9.25	6.10	1-1/2"	6.43	2.71

Standard Materials

Ref. No.	Description	Material
1	Body	Cast Iron, ASTM A126 Class B
2	Cover	Cast Iron, ASTM A126 Class B
3	Screen	Stainless Steel ASTM A167-304
4	Gasket	Non-Asbestos
5	Plug	Malleable Iron ASTM A47

Figure 14B-YSS

STAINLESS STEEL STRAINERS



800 PSI

Y-STRAINER

Features:

- 800 PSI CWP
- Temperature: -4°F to 356°F
- Investment Cast Components
- Stainless Steel Body and Screen
- Viton® O-ring Seal
- Threaded NPT Ends
- 20 Mesh Screen

Standards:

- Pressure Test: API 598
- Material: ASTM/ASME B16.34
- Connections: ANSI B1.20.1 (NPT)



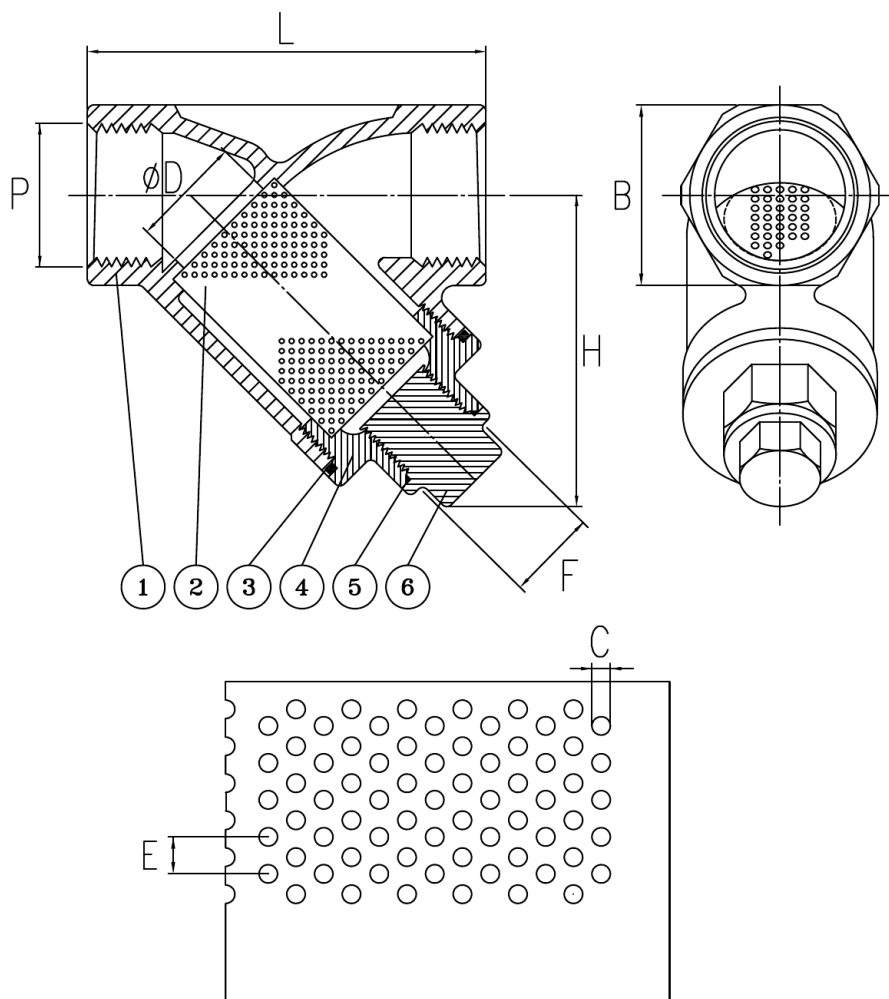
Weights

Size	Wt. (lbs.)
1/2	0.5
3/4	0.8
1	1.6
1-1/4	1.9
1-1/2	2.7
2	4.3

Figure Number Matrix

FNW YSS Size	
SIZE CODE	
1/2 = D	1-1/4 = H
3/4 = F	1-1/2 = J
1 = G	2 = K

800 PSI Y-STRAINER



Dimensions (inches)

Size	ØD	L	H	B	C	E	F (NPT)	P (NPT)
1/2	0.59	2.56	1.89	1.02	0.039	0.079	1/4"	1/2"
3/4	0.79	3.15	2.17	1.30	0.039	0.079	1/4"	3/4"
1	0.98	3.54	2.76	1.61	0.039	0.079	1/2"	1"
1-1/4	1.26	4.13	2.91	1.93	0.039	0.079	1/2"	1-1/4"
1-1/2	1.58	4.75	3.23	2.21	0.039	0.079	1/2"	1-1/2"
2	1.97	5.51	3.74	2.72	0.039	0.079	1/2"	2"

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M	1
2	Screen	316SS	1
3	Gasket	PTFE	1
4	Bonnet	ASTM A351 Gr. CF8M	1
5	O-ring	Viton®	1
6	Plug	ASTM A351 Gr. CF8M	1

[illegible]

ACTUATION & ACCESSORIES

ACTUATORS

Gear Operators

Figure	Description	Page
G731	Cast iron, quarter-turn	209
BGTM	Ductile iron, multi-turn	211

Pneumatic

Figure	Description	Page
.....	Pneumatic, linear	213
RP	Pneumatic, quarter-turn	219

Hydraulic

Figure	Description	Page
.....	Hydraulic, linear	216

Electric

Figure	Description	Page
.....	Quarter-turn	226

ACCESSORIES

Positioners

Figure	Description	Page
P5/EP5	PMV pneumatic and electro-pneumatic quarter-turn	230
V100P/V100E ..	VAC pneumatic and electro-pneumatic quarter-turn	232

Position & Limit Switches

Figure	Description	Page
QV	Position indicator, quarter turn, weather-proof	234
M4	Position indicator, quarter turn, explosion-proof	236
PLS4	Limit, proximity switch	238
MLS4	Limit, mechanical switch	239

Solenoids

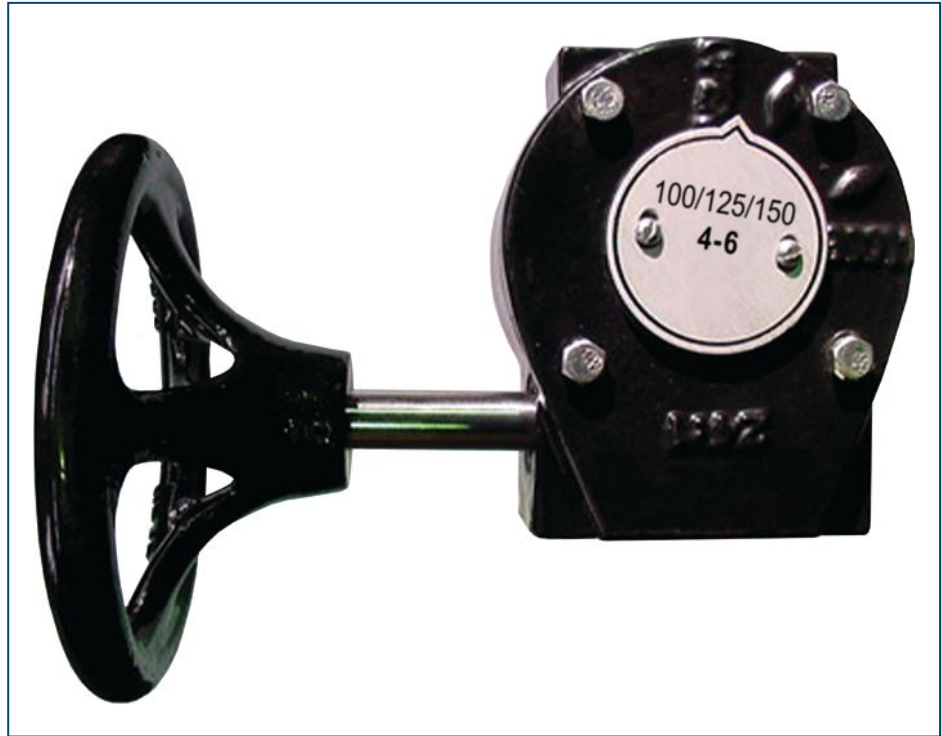
Figure	Description	Page
.....	ASCO, 3 and 4-way	240

QUARTER-TURN WORM GEAR OPERATOR

The G731 worm gear operator is designed for use on FNW series 71X and 73X butterfly valves. The ISO pads match the FNW valves per size for direct mounting. The ISO standard configuration also allows mounting the G731 to valves of other manufacturers.

Features:

- ISO 5211 Mounting Pad Configuration
- Adjustable Open & Close Stops
- Ductile Iron Gear
- Cast Iron Case
- Nickel Plated Shaft



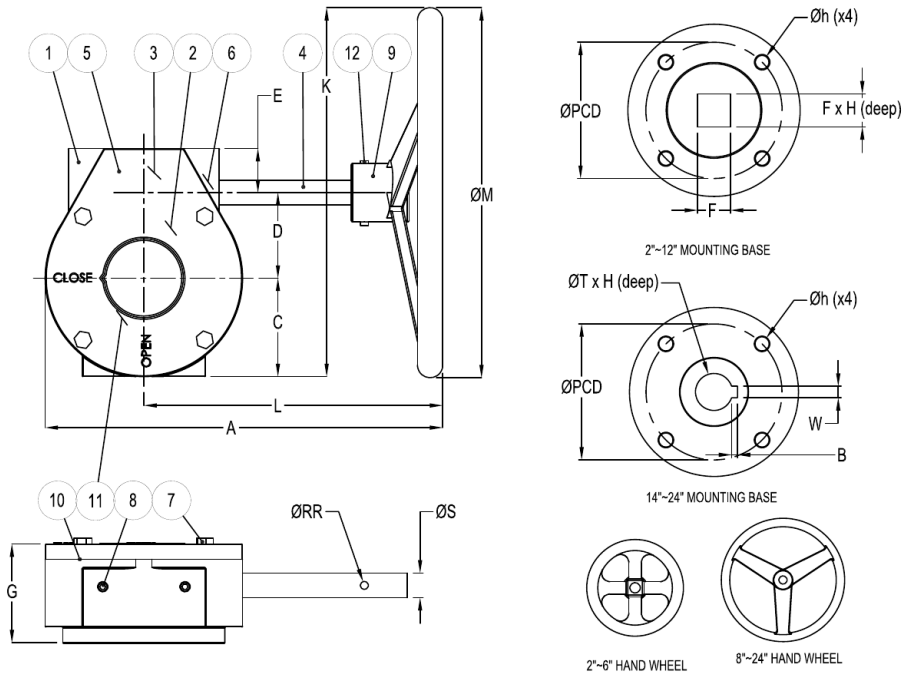
Gear Data

Size	ISO Mount	Gear Ratio	Torque (in-lbs) (Maximum Output)	Wt (lbs)
2	F07	24:1	1,327	9.9
2-1/2	F07	24:1	1,327	9.9
3	F07	24:1	1,327	9.9
4	F07	24:1	1,327	9.5
5	F07	24:1	1,327	9.5
6	F07	24:1	1,327	9.5
8	F07	30:1	4,425	18.4
10	F10	30:1	4,425	18.2
12	F10	50:1	10,620	27
14	F10	50:1	10,620	24
16	F14	50:1	22,126	23
18	F14	50:1	22,126	30
20	F16	50:1	70,806	101
24	F16	50:1	70,806	101

Figure Number Matrix

FNW G731 Size	
SIZE CODE	
2 ~ 3 = KLM	14 = 14
4 ~ 6 = PU	16 = 16
8 = X	18 = 18
10 = 10	20 = 20
12 = 12	24 = 24

QUARTER-TURN WORM GEAR OPERATOR



Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Case	ASTM A126 Cl. B	1	
2	Gear	ASTM A536 65-45-12	1	Not Shown
3	Worm	Steel	1	Not Shown
4	Shaft	Steel	1	Nickel Plated
5	Cover	ASTM A126 Cl. B	1	
6	Shaft Pin	Steel	1	Not Shown
7	Cover Screw	Steel	4	
8	Stop Screw	Steel	4	2 Per Stop
9	Hand Wheel	ASTM A126 Cl. B	1	
10	Cover Gasket	Fiber Paper	1	
11	Gear Top O-ring	Rubber	1	Not Shown
12	Hand Wheel Pin	Steel	1	

Dimensions (inches)

Valve Size	Ratio	A	L	G	C	D	E	K	ØM	Øh	ØPCD	H (max)	ØR	ØS	F	ØT	B	W
2	24:1	8.35	6.22	2.83	2.13	1.77	1.10	6.85	5.79	M8	2.76	2.17	0.20	0.63	0.43			
2-1/2	24:1	8.35	6.22	2.83	2.13	1.77	1.10	6.85	5.79	M8	2.76	2.20	0.20	0.63	0.43			
3	24:1	8.35	6.22	2.83	2.13	1.77	1.10	6.85	5.79	M8	2.76	2.24	0.20	0.63	0.43			
4	24:1	8.35	6.22	2.83	2.13	1.77	1.10	6.85	5.79	M8	2.76	2.28	0.20	0.63	0.55			
5	24:1	8.35	6.22	2.83	2.13	1.77	1.10	6.85	5.79	M8	2.76	2.32	0.20	0.63	0.55			
6	24:1	8.35	6.22	2.83	2.13	1.77	1.10	6.85	5.79	M8	2.76	2.36	0.25	0.63	0.55			
8	30:1	11.00	8.07	3.31	2.99	2.60	1.34	11.50	11.81	M8	2.76	2.91	0.25	0.75	0.67			
10	30:1	11.00	8.07	3.31	2.99	2.60	1.34	11.50	11.81	M10	4.02	2.91	0.25	0.75	0.87			
12	50:1	11.59	8.46	3.31	2.99	2.60	1.34	11.50	11.81	M10	4.02	3.07	0.25	0.75	0.87			
14	50:1	11.59	8.46	3.49	3.09	3.05	1.54	12.15	11.81	M10	4.02	3.07	0.25	0.75		1.10	0.20	0.39
16	50:1	12.30	8.86	3.49	3.09	3.05	1.54	12.15	11.81	M16	5.51	3.15	0.25	0.75		1.26	0.20	0.39
18	50:1	12.30	8.86	3.49	3.09	3.05	1.54	12.15	15.55	M16	5.51	3.15	0.25	0.75		1.50	0.20	0.47
20	80:1	15.14	10.12	4.33	5.12	5.31	1.57	18.31	15.55	M20	6.50	3.54	0.33	0.98		1.77	0.20	0.47
24	80:1	15.14	10.12	4.33	5.12	5.31	1.57	18.31	15.55	M20	6.50	3.74	0.33	0.98		2.17	0.20	0.55

MULTI-TURN BEVEL GEAR OPERATOR

FNW can supply any multi-turn valves, such as gate and knife gate valves, with bevel gear operators. For the stock operators below, FNW can supply various accessories such as square drive nuts, hand wheel extensions, spur gear reduction, hand wheel locking devices, chain wheels, and stem covers. Call FNW for your specific gear operator requirements.

Features

- Rugged Ductile Iron Housing & Base
- Durable Carbon Steel Bevel Gear & Pinion
- Welded Steel Tube Hand Wheel
- Hand Wheel Speed Handle
- Keyed Hand Wheel Connection
- Threaded & Set Screwed Top Facilitates Stem Covers
- Grease Fitting

Standards

- Mounting Flange: ISO 5210



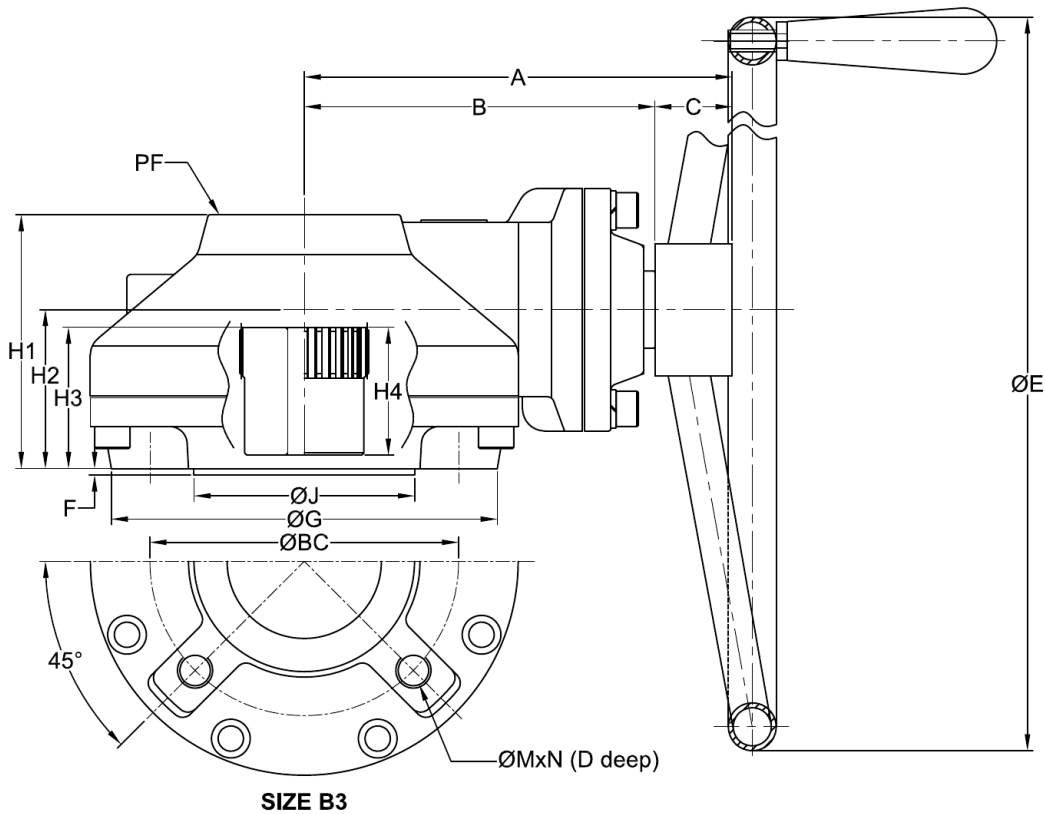
Mechanical Specifications

Model	Gear Ratio	Max. Thrust (lbs)	Maximum Torque (ft-lbs)		Mechanical Advantage	Maximum Stem Diameter (in)		ISO Mounting Flange	Weight (lbs)
			In	Out		Threaded	Keyed		
B3	3.5 : 1	28,420	158	507	3.2	1.81	1.50	F14	45.5
B5	4.0 : 1	42,741	320	1151	3.6	2.44	2.16	F20	91

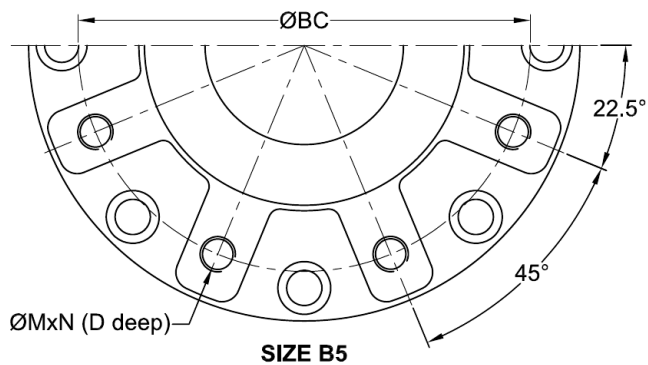
Part Number

Model	Part Number
B3	FNWBGTM B3
B5	FNWBGTM B5

MULTI-TURN BEVEL GEAR OPERATOR



SIZE B3



SIZE B5

Standard Materials

Part No.	Description	Material
1	Housing	Ductile Iron ASTM A536 Gr. 65-45-12
2	Base	Ductile Iron ASTM A536 Gr. 65-45-12
3	Bevel Gear	Carbon Steel ASTM A576-1045
4	Bevel Pinion	Carbon Steel ASTM A576-1045
5	Drive Sleeve	Ductile Iron ASTM A536 Gr. 65-45-12
6	Drive Bushing	Bronze ASTM B584-C86200

Dimensions (inches)

Model	A	B	ØC	ØE	F	ØG	ØJ	H1	H2	H3	H4	BC	ØM	D	N	PF (Straight)
B3	7.64	6.26	1.38	15.75	0.12	6.89	3.94	4.53	2.83	2.52	2.28	5.51	5/8-11	0.79	4	2-1/2" - 11
B5	9.17	7.80	1.38	24.80	0.12	9.65	5.51	6.02	4.09	3.58	3.15	8.07	5/8-11	1.18	8	3" - 11

LINEAR VALVE ACTUATORS

FNW offers pneumatic valve actuators for linear valves such as knife gates, slide gates, and wedge gate valves. Actuators can be supplied with double-acting (air-to-open, air-to-close) and spring-return (air energized, spring to fail position closed or open) configurations depending on your control needs. Coupled with actuation accessories such as solenoids, position switches, and positioners, FNW can supply a valve with a complete control package. FNW can also supply hydraulic linear actuators. Whatever your linear actuator and control needs are, contact FNW with your specific application requirements.

Features:

- Double Acting
- Bore Sizes 3-1/4" through 24"
- Pressure Rated to 150 PSI Air
- Chrome Plated Cylinder Interior
- Externally Removable Piston Rod Gland
- Dual Piston Rod Seal for Integrity and Rod Wiper
- Grooved Alignment Between Body and Caps
- Factory Tested
- -10°F to 165°F Temperature Range (Standard Seals)

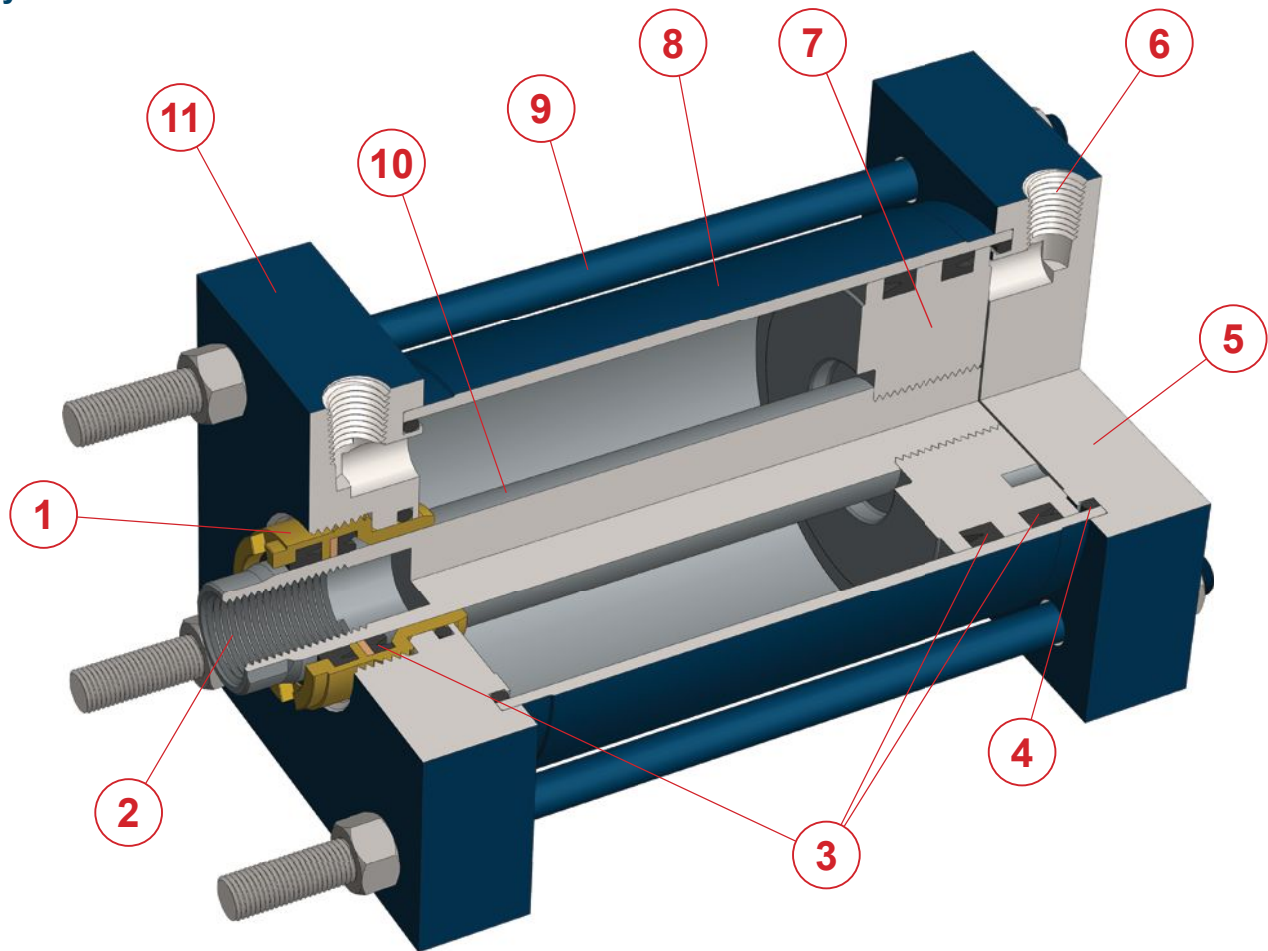
Available Options:

- Stainless Steel Piston Rods
- Spring Return (Spring Extended or Retracted)
- Double Rod End Style
- Hi-Temp Seals (-10°F to 250°F)
- Low-Temp Seals (-50°F to 150°F, limited to bores sizes 14" and smaller)
- Configured for Water Service
- Lifting Eyes
 - Tie Rod Mounted (Ordered as an accessory)
 - Welded to cap face
- Epoxy Coated Exterior
- Stroke Adjuster
- Composite Cylinder Body

Additional options are available. Contact FNW sales for your specific application needs.

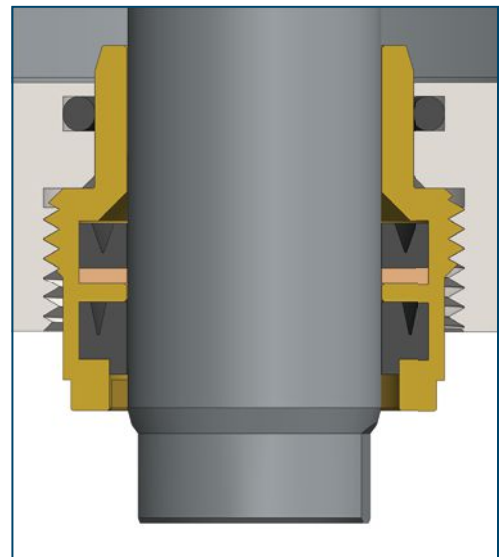


Cylinder Construction

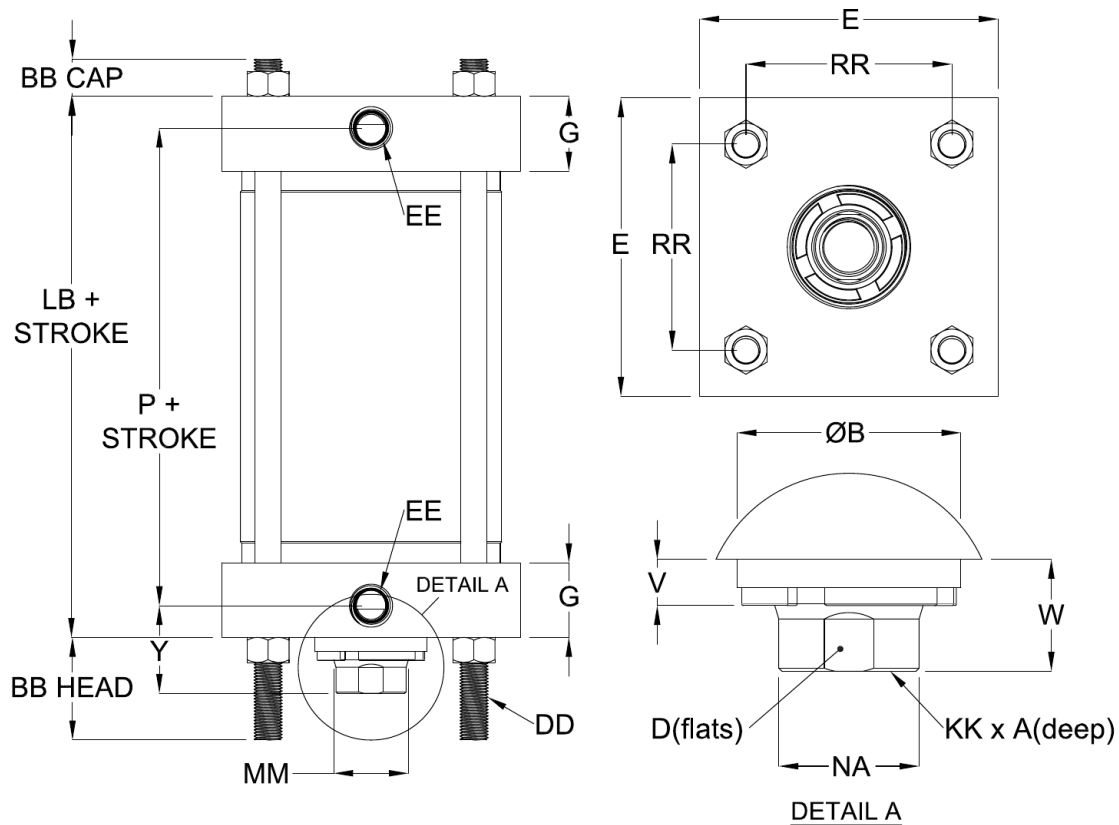


Features Description

1. The Rod Gland Assembly is externally removable without disassembling the cylinder. The rod gland incorporates a primary and secondary seal to assure leak-free service and longevity. The secondary seal acts as a rod wiper to prevent contamination from entering the cylinder. In addition, the secondary seal acts as a back up in the event of primary seal failure.
2. Standard cylinders include a female threaded piston rod connection and come standard with two wrench flats to facilitate rod end attachment.
3. Wear compensating lip seals are used throughout the rod gland and piston assembly to assure leak free operation and optimal performance over the life of the cylinder.
4. O-ring sealed alignment grooves are located at each end of the body to assure tube to head alignment and leak free operation.
5. Heads and caps are made from heavy duty steel and are machined to provide concentricity.
6. NPT air supply ports are standard throughout the entire bore range and side ported to facilitate accessory mounting.
7. Pistons are constructed from a single piece, nodular iron
8. Cylinder bodies are steel with chrome plated inner diameters for smooth operation.
9. All tie rods are made from high strength material rated to a minimum yield of 100,000 PSI.
10. All piston rod assemblies utilize induction case hardened, medium carbon steel and are hard chrome plated and polished to a 10 RMS surface finish.
11. Cylinder exterior is enamel coated for added corrosion resistance.



Externally Removable/Replaceable Rod Gland Assembly with Dual Piston Rod Seals/Wiper



Dimensions (inches)

Bore	MM	KK	A	øB	D	NA	V	W	Y	BB		DD	E	EE (NPTF)	G	NA	R	Add Stroke (Inches)	
										Head	Cap							LB	P
3-1/4	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.31	0.75	1.19	1.38	0.50	3/8 - 24	4.00	1/4"	1.00	0.94	2.76	3.25	2.38
4	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.31	0.75	1.19	1.38	0.50	3/8 - 24	4.50	3/8"	1.00	0.94	3.32	3.25	2.38
5	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.31	0.75	1.19	1.81	0.63	1/2 - 20	5.50	3/8"	1.00	0.94	4.10	3.50	2.63
6	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.38	0.88	1.31	1.81	0.63	1/2 - 20	6.50	3/8"	1.00	0.94	4.88	3.38	2.50
7	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.38	0.88	1.31	2.00	0.75	5/8 - 18	7.50	3/8"	1.00	0.94	5.73	3.50	2.63
8	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.38	0.88	1.31	2.00	0.75	5/8 - 18	8.50	3/8"	1.00	0.94	6.44	3.50	2.63
10	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.38	1.00	1.56	2.25	0.88	3/4 - 16	10.63	1/2"	1.31	0.94	7.92	4.25	3.13
12	1.375	1 - 14	1.63	1.999	1.13	1.31	0.38	1.00	1.56	2.25	0.88	3/4 - 16	12.75	1/2"	1.31	1.31	9.40	4.31	3.19
14	1.375	1 - 14	1.63	1.999	1.13	1.31	0.38	1.00	1.69	2.50	1.00	7/8 - 14	14.75	3/4"	1.56	1.31	10.90	4.88	3.50
16	1.750	1-1/4 - 12	1.63	2.374	1.50	1.69	0.50	1.25	1.94	2.75	1.13	1 - 14	17.00	3/4"	1.56	1.69	12.59	5.13	3.75
18	2.000	1-1/2 - 12	2.25	2.624	1.69	1.94	0.56	1.50	2.19	3.25	1.25	1-1/8 - 12	19.00	3/4"	1.69	1.94	14.14	5.63	4.25
20	2.000	1-1/2 - 12	2.25	2.624	1.69	1.94	0.56	1.50	2.19	3.25	1.38	1-1/4 - 12	21.00	3/4"	1.69	1.94	15.77	5.88	4.50
22	3.000	2-1/4 - 12	3.50	3.749	2.63	2.88	0.63	2.25	3.06	3.50	1.38	1-1/4 - 12	23.00	3/4"	1.94	2.88	17.18	6.50	4.88
24	3.500	2-1/2 - 12	3.50	4.249	3.00	3.38	0.63	2.25	3.56	3.50	1.38	1-1/4 - 12	25.25	3/4"	2.44	3.38	18.74	7.75	5.13

Weight (pounds)

Bore	Add Values for Total Weight		Bore	Add Values for Total Weight	
	Base Weight (lbs.)	Weight per inch of stroke (lbs.)		Base Weight (lbs.)	Weight per inch of stroke (lbs.)
3-1/4	12.97	0.70	12	181.23	3.16
4	17.10	0.87	14	277.02	3.70
5	27.45	1.09	16	384.26	6.09
6	37.24	1.40	18	526.85	7.09
7	51.50	1.71	20	668.35	7.91
8	66.17	2.13	22	899.78	12.10
10	125.56	2.63	24	1295.20	14.99

LINEAR VALVE ACTUATORS

FNW offers hydraulic valve actuators for linear valves such as knife gates, slide gates, and wedge gate valves. Actuators are supplied with double-acting (pressure-to-open, pressure-to-close) action. Coupled with actuation accessories such as solenoids, position switches, and positioners, FNW can supply a valve with a complete control package. FNW can also supply pneumatic linear actuators. Whatever your linear actuator and control needs are, contact FNW with your specific application requirements.

Features:

- Double Acting
- Bore Sizes 1-1/2" through 6"
- Heavy Walled Cylinder with Honed to Micro Finish Bore
- Externally Removable Piston Rod Gland
- Dual Piston Rod Seal for Integrity and Rod Wiper
- Grooved Alignment Between Body and Caps
- Head Plate Adapter for Easy Mounting
- Factory Tested
- -10°F to 165°F Temperature Range (Standard Seals)

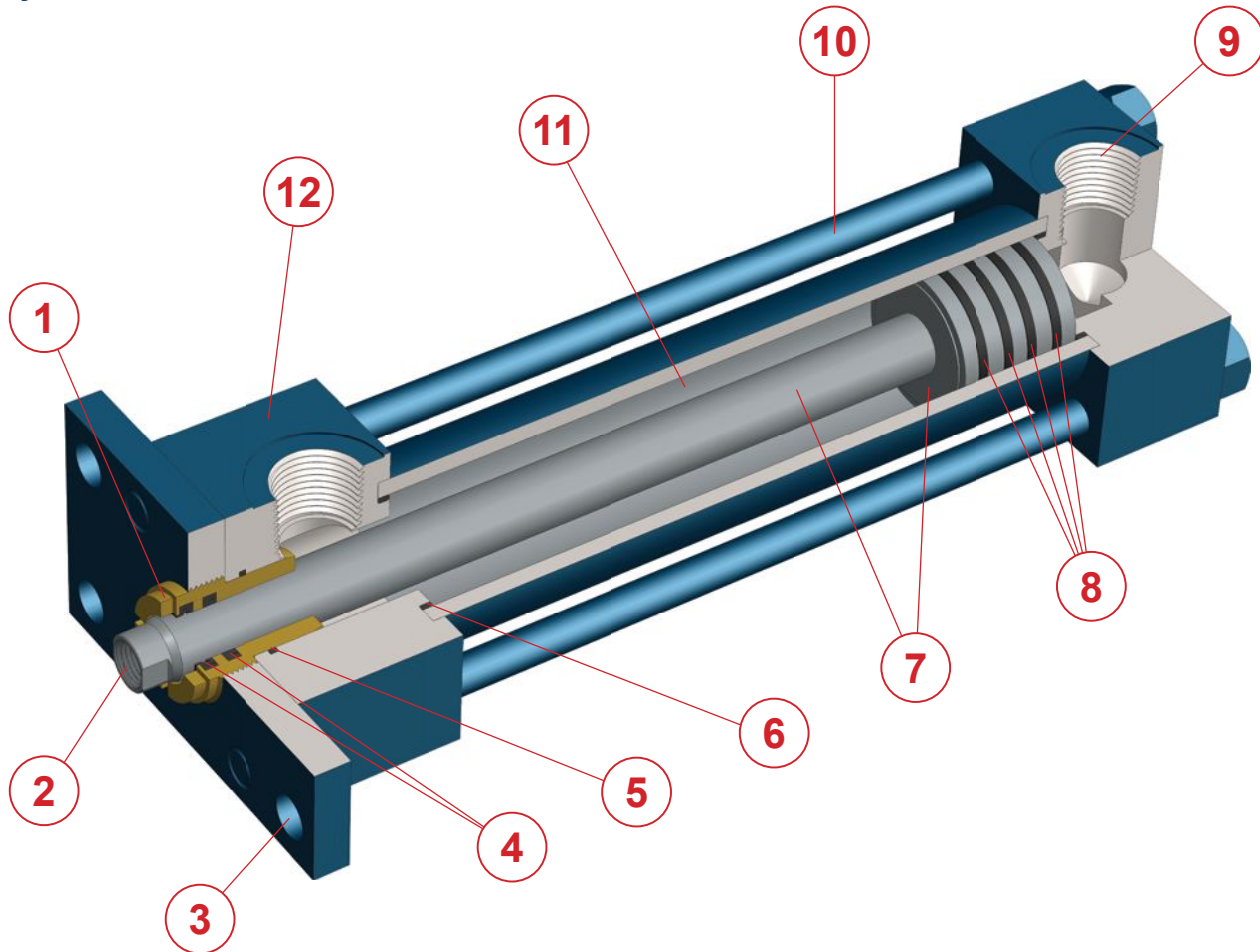
Available Options:

- Cushions at either end or both ends of stroke.
- Hi-Temp Seals (-10°F to 250°F)
- Low-Temp Seals (-50°F to 150°F)
- Spring Loaded Filled PTFE Piston Seals to Optimize Piston Seal Performance
- High Load Piston Design, Adds Wear Rings and Bronze Filled PTFE Seals to Compensate for Side Loading

Additional options are available. Contact FNW sales for your specific application needs.

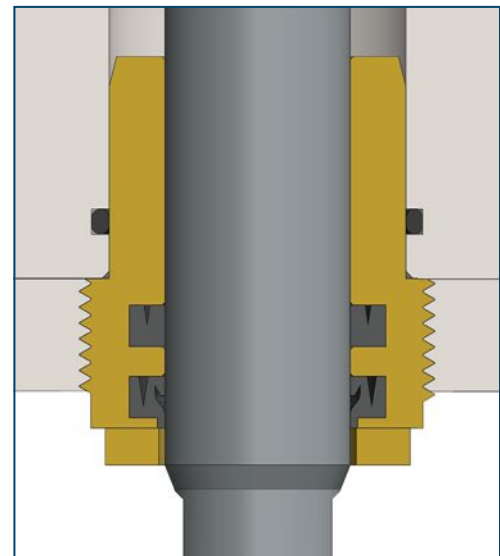


Cylinder Construction

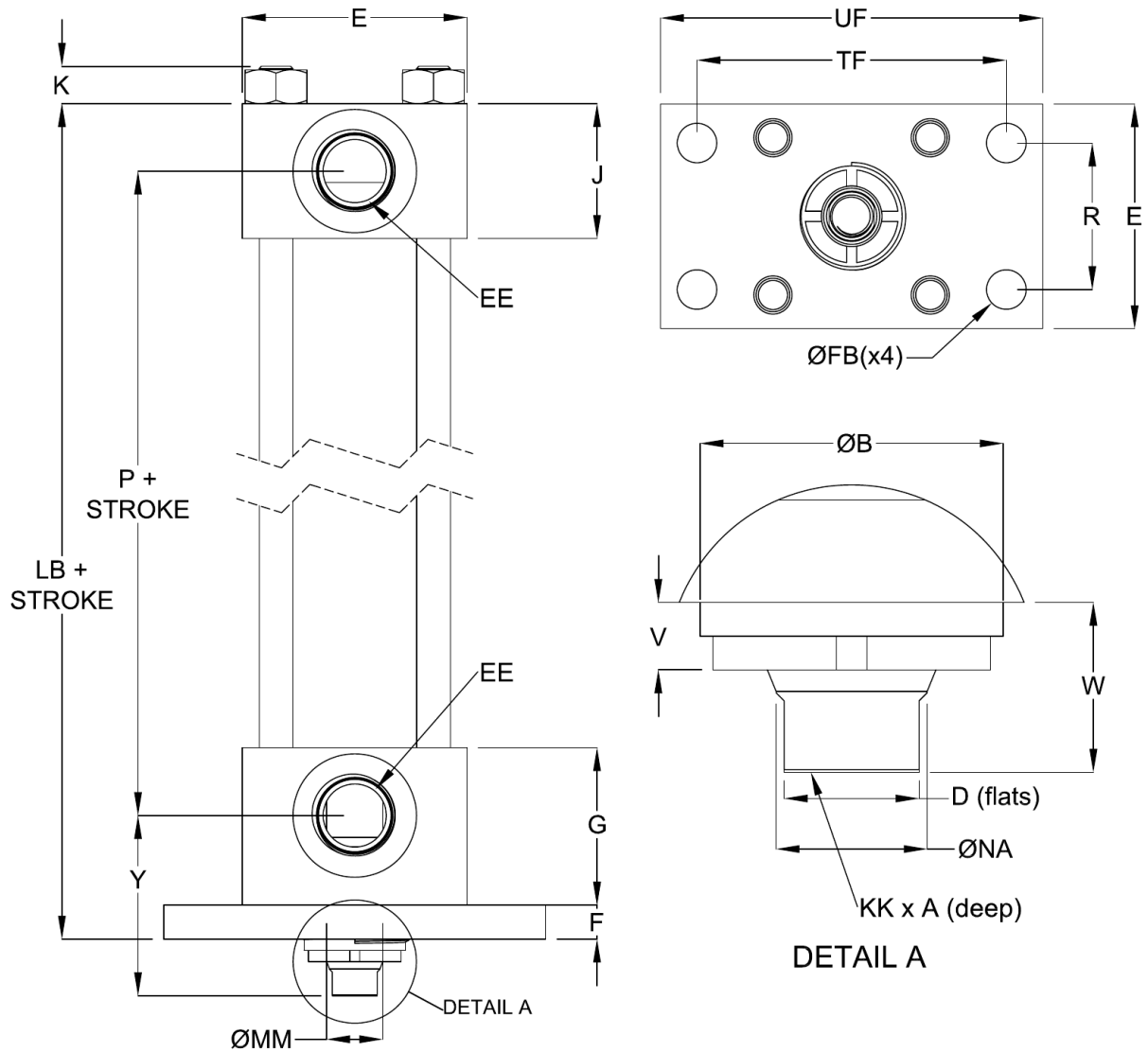


Features Description

1. The Rod Gland Assembly is externally removable without disassembling the cylinder.
2. Standard cylinders include a female threaded piston rod connection and come standard with two wrench flats to facilitate rod end attachment. Piston rods made from case hardened medium carbon steel, are hard chrome plated and polished to a 10 RMS surface finish.
3. The gland plate at the head of the cylinder is extended for easy attachment to valve mounting plates.
4. Self-compensating and self-relieving primary seal ensures positive seal and the secondary seal wiper seal keeps the rod clean during extend and return strokes.
5. The gland o-ring seals between cylinder head and gland and serves as a prevailing torque-type lock.
6. Pressure actuated o-ring seals and alignment grooves are located at each end of the body to assure tube to head alignment and leak free operation.
7. Chrome plated medium carbon steel piston rod and one-piece nodular iron piston are permanently locked together using anaerobic adhesive.
8. Standard piston seals are cast iron rings. Other piston seals available on request.
9. SAE o-ring ports for hydraulic supply are standard throughout the entire bore range and side ported to facilitate accessory mounting.
10. All tie rods are made from high strength material rated to a minimum yield of 100,000 PSI with rolled threads for added strength.
11. Cylinder bodies are heavy walled steel tubing, honed to a micro finish bore.
12. Cylinder exterior is enamel coated for added corrosion resistance.



Externally Removable/Replaceable Rod Gland Assembly with Dual Piston Rod Seals/Wiper



Dimensions (inches)

Bore	ØMM	KK	A	øB	D	NA	V	W	Y	F	G	J	K	UF	E	TF	R	ØFB	EE (SAE)	Add Stroke (Inches)	
																				LB	P
1-1/2	0.625	7/16 - 20	0.75	1.124	0.50	0.56	0.25	0.63	2.00	0.38	1.75	1.50	0.62	4.25	2.50	3.44	1.63	0.44	1/2"	5.00	2.88
2	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.25	0.75	2.38	0.63	1.75	1.50	0.69	5.13	3.00	4.13	2.05	0.56	1/2"	5.25	2.88
2-1/2	1.000	3/4 - 16	1.13	1.499	0.88	0.94	0.25	0.75	2.38	0.63	1.75	1.50	0.68	5.63	3.50	4.63	2.55	0.56	1/2"	5.38	3.00
3-1/4	1.375	1 - 14	1.63	1.999	1.13	1.31	0.25	0.88	2.75	0.75	2.00	1.75	0.81	7.13	4.50	5.88	3.25	0.69	3/4"	6.25	3.50
4	1.750	1-1/4 - 12	2.00	2.374	1.50	1.69	0.25	1.00	3.00	0.88	2.00	1.75	0.87	7.63	5.00	6.38	3.82	0.69	3/4"	6.63	3.75
5	2.000	1-1/2 - 12	2.25	2.624	1.69	1.94	0.25	1.13	3.13	0.88	2.00	1.75	1.12	9.75	6.50	8.19	4.95	0.94	3/4"	7.13	4.25
6	2.500	1-7/8 - 12	3.00	3.124	2.06	2.38	0.25	1.25	3.50	1.00	2.25	2.25	1.18	11.25	7.50	9.44	5.73	1.03	1"	8.38	4.88

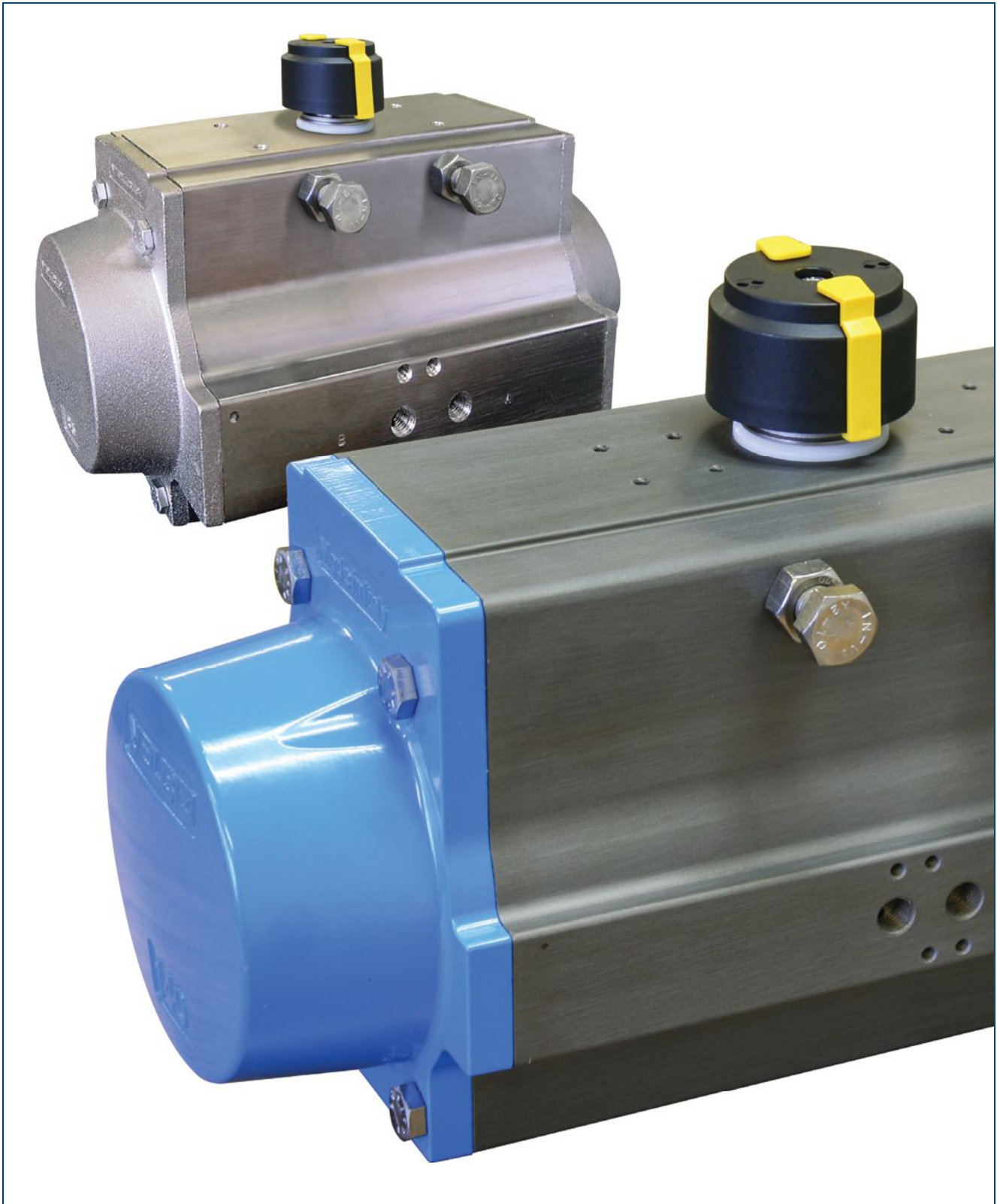
Weight (pounds)

Bore	Add Values for Total Weight	
	Base Weight (lbs.)	Weight per inch of stroke (lbs.)
1-1/2	7.8	0.5
2	11.6	0.8
2-1/2	17.0	1.1
3-1/4	32.0	1.8
4	48.0	2.5
5	76.0	3.4
6	125.0	5.2

Pressure (PSI)

Bore	Max. PSI Pushing
1-1/2	1,500
2	2,000
2-1/2	2,000
3-1/4	1,800
4	1,800
5	1,300
6	1,200

PNEUMATIC RACK & PINION



Standard Features

TORQUE RANGES

The RP rack and pinion actuators are available with output torques ranging from 44 to 36,269 in-lbs depending on air supply pressure and/or spring sets.

ACCESSORY MOUNTING

The accessory mounting pad meets international NAMUR standards for ease of directly attaching accessories following the same standard.

ANTI BLOW-OUT PINION

The design of the pinion prevents blow out by securing it with the piston racks. The pinion is ground from hardened steel and then nickel plated for maximum corrosion and wear resistance.

SPRINGS

For fail safe requirements, reliable and high resistant steel springs are included. Springs are zinc phosphate coated for corrosion resistance.

POSITION INDICATOR

High visibility position indicator with snap on marks is easily converted to indicate 3-way positions or can be removed for other accessories.

ACTUATOR BODY

The body is a single piece extruded aluminum housing with anodized hard coat exterior finished to 45-50 microns. An optional nickel plated exterior is available for added corrosion resistance.

END CAPS

Ends caps are die cast aluminum with polyester powder coating. Nickel plated bodies also come with nickel plated end cap. Double-acting and spring-return actuators utilize the same end caps, allowing quick conversion by adding or removing springs as needed.

TRAVEL STOPS

Each size actuator comes standard with two travel stops for $\pm 5^\circ$ of open and close travel adjustment at nominal positions of 0° and 90° . The stainless steel adjustment screws and cam are not located in the main pressure containing area of the body, reducing the number of possible leak paths and necessary seals.

PISTONS

Pistons are constructed of die cast aluminum and designed for strength and generous rack engagement.

PISTON GUIDES

Piston guides, constructed from POM materials, are designed with a large contact area and long life. The material offers low friction for self lubrication.

VALVE MOUNTING

The valve mounting follows ISO 5211 for direct mounting to valves with the same pattern. All output drive include an 8-point female drive (except the model 270 which has a single square 4-point female drive).

SEALS

The standard actuator is supplied with NBR seals at piston, pinion, and end caps. Viton® is available for high temperature applications, and Silicon for low temperature applications.

END CAP SCREWS

End caps are secured with extra length stainless steel screws for safe disassembly.

SOLENOID MOUNTING

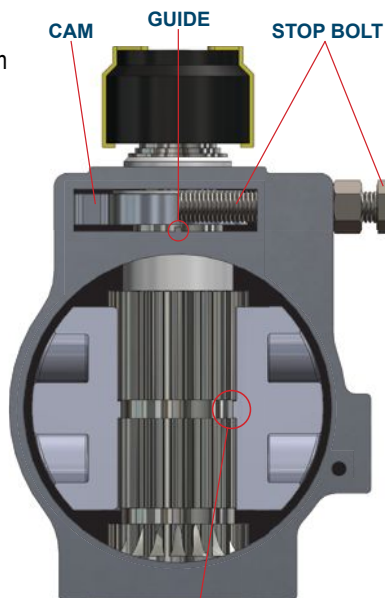
Supply air connections follow the international NAMUR standard for direct mounting of like style solenoids and is included on all sizes.

Travel Stops

The travel stop cam is located separate from the pressure chamber of the actuator. This design eliminates two potential leak paths as well as the associated seal components. The cam is positively locked to the pinion and easily installed during maintenance via a guide in the cam chamber. The cam chamber is a sealed compartment that is protected from water and dirt ingress, ensuring trouble free operation.

Anti-Blowout Pinion

The RP actuators is designed with a grooved pinion and a corresponding flat key cast in the piston rack. This system creates an added mechanical lock that prevents the pinion from blowing out of the bottom of the housing. In this design, lower pinion clips and retainers that can wear out are eliminated.

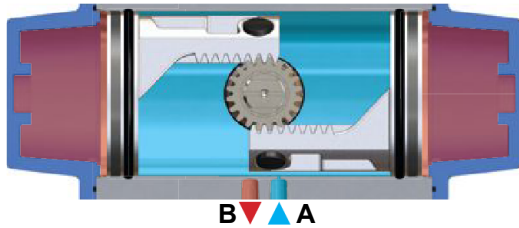


PINION / PISTON GROOVE

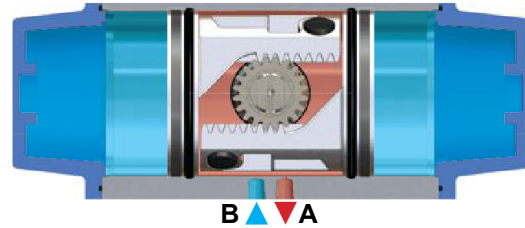
Standard Materials

- Body - UNI 6060 Aluminum, Hard Anodized (Optional Nickel Plating)
- End Caps - Die Cast Aluminum, Polyester Powder Coated (Nickel plated with nickel plated body)
- Pinion - Hardened Steel, Nickel Plated
- Pistons - Die Cast Aluminum
- Seals - NBR (Optional High Temperature Viton® or Low Temperature Silicon)
- Guides/Spacers/Anti-Friction Rings - POM (Acetal) (Model 270 uses PTFE and Graphite Filled PTFE anti-friction rings)
- Travel Stops/Cam/End Cap Screws - Stainless Steel
- Springs - Steel, Zinc Phosphate Coated (Spring return models only)
- Position Indicator - Nylon
- Travel Stop Housing - GGG40 Ductile Iron (Model 270 only)
- Upper Pinion Snap Ring - Steel, Nickel Plated

Standard Operation - Double Acting

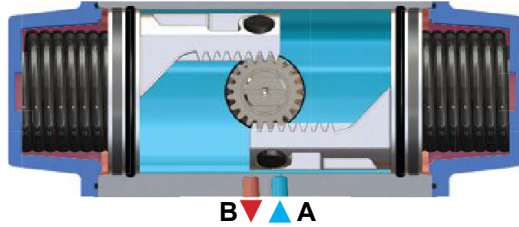


The RP rack and pinion actuator operates (turns) CCW by supplying compressed air to port A. The pressure drives the pistons outward, turning the drive pinion CCW. Air on the outside of the pistons is exhausted out of port B.

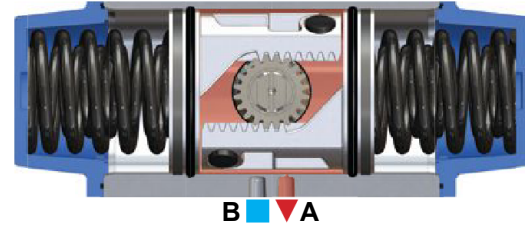


The RP rack and pinion actuator operates (turns) CW by supplying compressed air to port B. The pressure drives the pistons inward, turning the drive pinion CW. Air on the inside of the pistons is exhausted out of port A.

Standard Operation - Spring Return

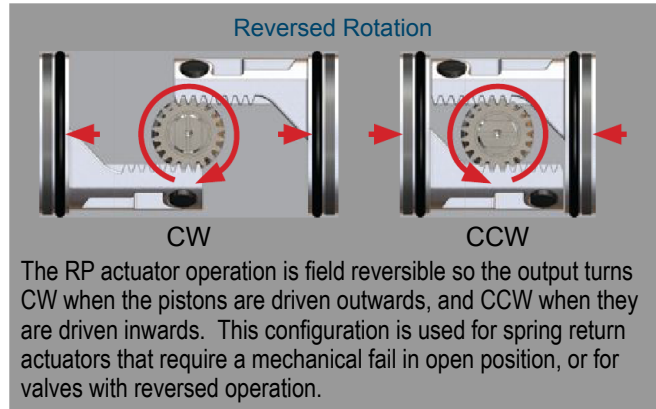
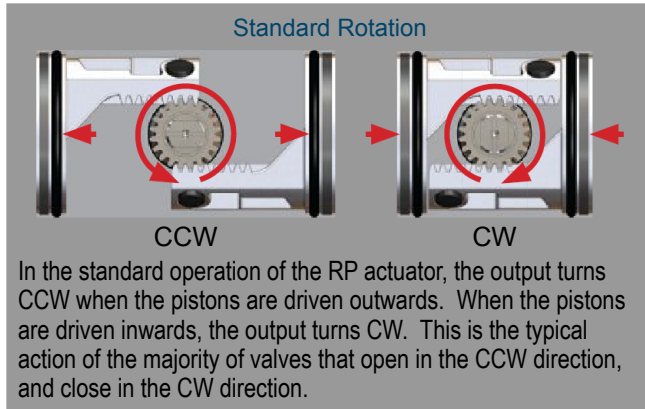


The RP rack and pinion actuator operates (turns) CCW by supplying and holding compressed air at port A. The pressure drives the pistons outward, turning the drive pinion CCW and compressing the spring sets. Air on the outside of the pistons is exhausted out of port B.



The RP rack and pinion actuator operates (turns) CW by releasing the compressed air at port A. This allows the spring sets to decompress as they drive the pistons inward and the pinion turns CW. Make-up air is drawn in through port B from the atmosphere.

Reversible Operation



Spring Return Spring Set Configurations

The RP rack and pinion actuators are stocked with full spring sets (spring set 05 for models 52 to 140, spring set 06 for models 160 to 230, and spring set 08 for the model 270). Spring sets can be modified by removal of springs, as indicated in the spring set charts, to alter the actuator's torque curve as shown on the torque charts. Full spring sets provides the maximum spring return torque for a given size actuator, but can be reduced for situations where increased torque in the air stroke is desired.



Spring Set	Spring Quantity	
	Outer	Inner
01	1	1
02	2	1
03	1	2
04	2	1
05	2	2



Spring Set	Spring Quantity		
	Outer	Middle	Inner
01		2	
02	2		
03	1	2	
04	2		2
05	2	2	
06	2	2	2



Spring Set	Springs/Side	
	Side A	Side B
01	2	3
02	3	3
03	3	4
04	4	4
05	4	5
06	5	5
07	5	6
08	6	6

* Model 230 has maximum spring set of 06.

Visit us at www.fnw.com

Weight (Pounds)

Model	52	63	75	85	100	115	125	140	160	180	200	230	270
Double Acting	2.47	3.66	6.13	8.60	12.13	19.51	23.81	35.94	47.95	63.93	81.57	128.97	182.26
Spring Return	2.87	4.34	7.47	10.58	15.43	25.24	31.04	47.40	65.04	87.96	121.25	156.53	221.06

Air Consumption Per Stroke (Cubic Inches)

Model	52	63	75	85	100	115	125	140	160	180	200	230	270
CCW (DA & SR)	6.10	11.59	21.97	31.12	48.21	78.72	99.47	137.91	220.30	282.54	347.84	651.73	915.36
CW (DA)	7.93	14.04	26.85	39.06	61.02	104.35	134.86	192.84	306.34	402.76	643.80	918.41	1,086.22

Stroke Speed (Seconds)*

Model		52	63	75	85	100	115	125	140	160	180	200	230	270
Double Acting	CCW	0.07	0.11	0.18	0.36	0.38	0.60	0.80	1.13	1.43	1.99	3.08	4.15	6.16
	CW	0.05	0.10	0.15	0.25	0.34	0.54	0.70	0.94	1.25	1.80	2.41	3.80	5.47
Spring Return	CCW	0.07	0.13	0.32	0.32	0.54	0.92	1.20	1.64	2.27	3.08	3.58	6.20	8.97
	CW	0.07	0.13	0.22	0.30	0.48	0.75	0.94	1.25	1.60	2.38	2.80	5.40	6.62

* Note: Stroke speeds listed are based on actuator alone (no valve) with 6 Bar (87 PSI) supply air pressure. Valve torques and flow characteristics of control accessories will have an effect on overall stroke speed.

Temperature Ranges

Configuration	Working Temperature
Standard	-22° to 185°F (-20°C to 85°C)
High Temp.	-4° to 302°F (-20°C to 150°C)
Low Temp.	-40° to 185°F (-40°C to 85°C)

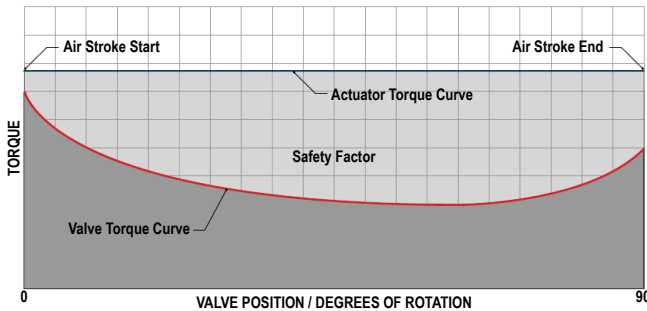
High and low temperature configurations must be specified separately.

Model Number Matrix

FNW RP 52 A DA		
SIZES	FINISH	ACTION
52 140	A = Anodized Aluminum (with polyester powder coated end caps)	DA = Double Acting
63 160	N = Nickel Plated (with nickel plated end caps)	SR = Spring Return
75 180		
85 200		
100 230		
115 270		
125		

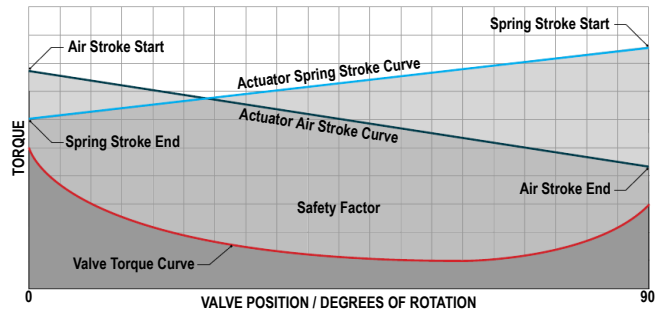
Actuators stocked standard for CCW rotation at supply port A, CW rotation at supply port B. Standard spring return configuration is fail CW on loss of supply air. Spring return actuators stocked with full (maximum) spring sets. When applications require it, rotation, fail position, and spring sets can be modified, but must be specified separately.

Double Acting Actuator Sizing



The figure RP double acting rack and pinion actuator has a constant torque output. This is represented by the horizontal line in the diagram. Sizing is simply a matter of selecting the column for the amount of supply air pressure available for the actuator, then choosing the actuator that has more torque than the highest torque requirement of the valve plus a safety factor. Any amount of torque between the valve and actuator's torque curve is the safety factor and that percentage should be chosen based on the type of valve and working conditions.

Spring Return Actuator Sizing



The torque output of the figure RP spring return actuators is not constant, but decreases during both the air stroke and spring stroke due to losses from compression and decompression of springs. When sizing, care must be taken to select an actuator whose end-of-air and end-of-spring stroke torque is greater than the valve's torque plus a safety factor. The RP has maximum spring strength as standard, but lower spring sets can be obtained by removing the appropriate springs.

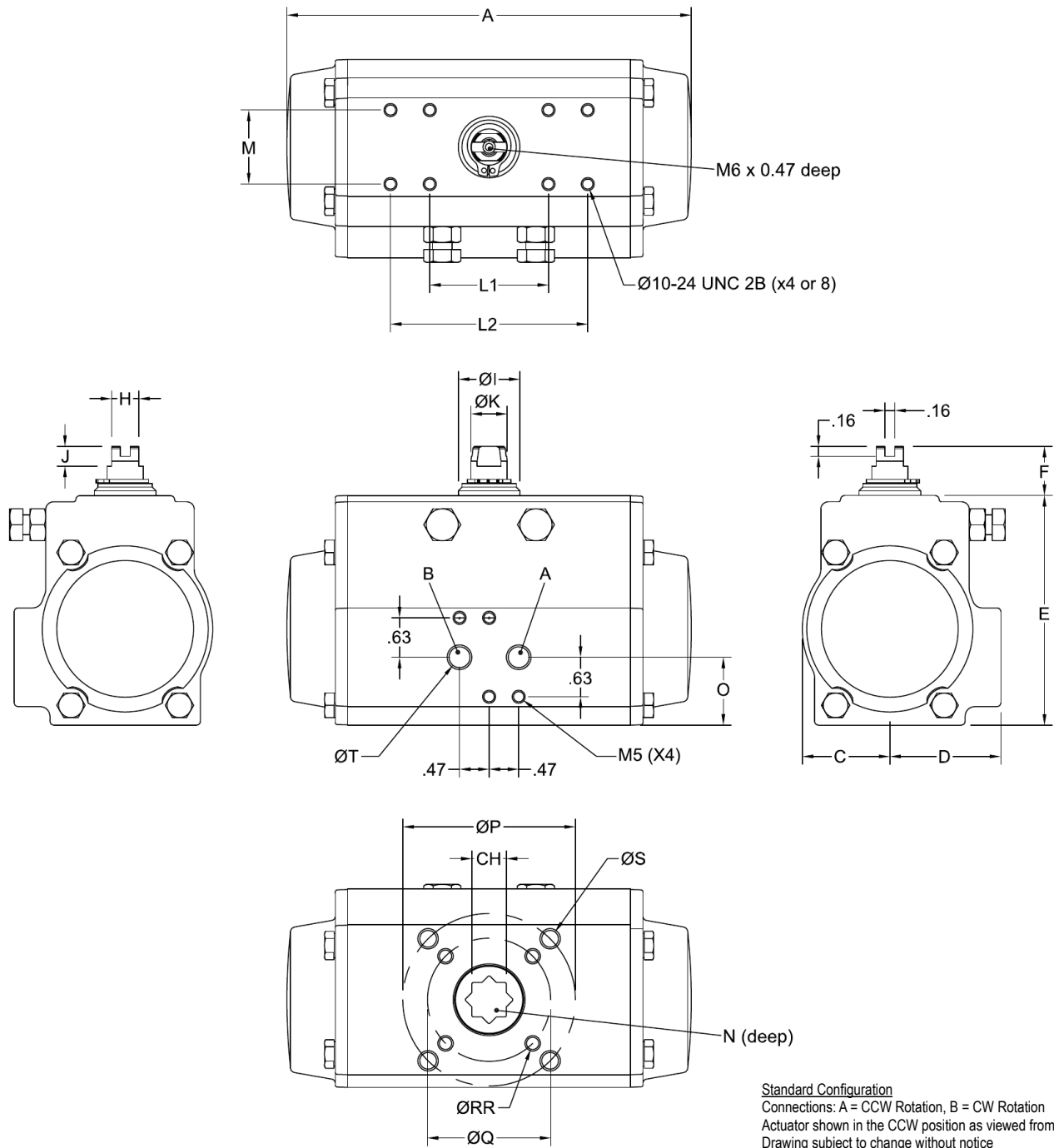
Double Acting (Air-Air) Torque Chart

Model	Air Supply Pressure (PSI)							
	40	50	60	70	80	90	100	115
Air Stroke Torque Output (in-lbs)								
52	88	112	133	158	178	201	227	263
63	152	193	238	282	320	361	405	469
75	283	356	435	513	586	659	736	851
85	406	514	628	744	853	960	1,072	1,237
100	645	814	989	1,163	1,333	1,505	1,681	1,939
115	1,065	1,344	1,640	1,932	2,212	2,488	2,779	3,211
125	1,402	1,771	2,153	2,539	2,905	3,274	3,650	4,220
140	2,003	2,504	3,005	3,506	4,006	4,509	5,009	5,764
160	2,804	3,501	4,196	4,899	5,596	6,292	6,987	8,045
180	3,860	4,825	5,790	6,746	7,711	8,661	9,627	11,081
200	5,198	6,494	7,796	9,089	10,393	11,670	12,972	14,924
230	8,589	10,738	12,880	15,031	17,180	19,289	21,440	24,671
270	12,625	15,777	18,935	22,093	25,246	28,361	31,511	36,269

Spring Return (Air-Spring) Torque Chart

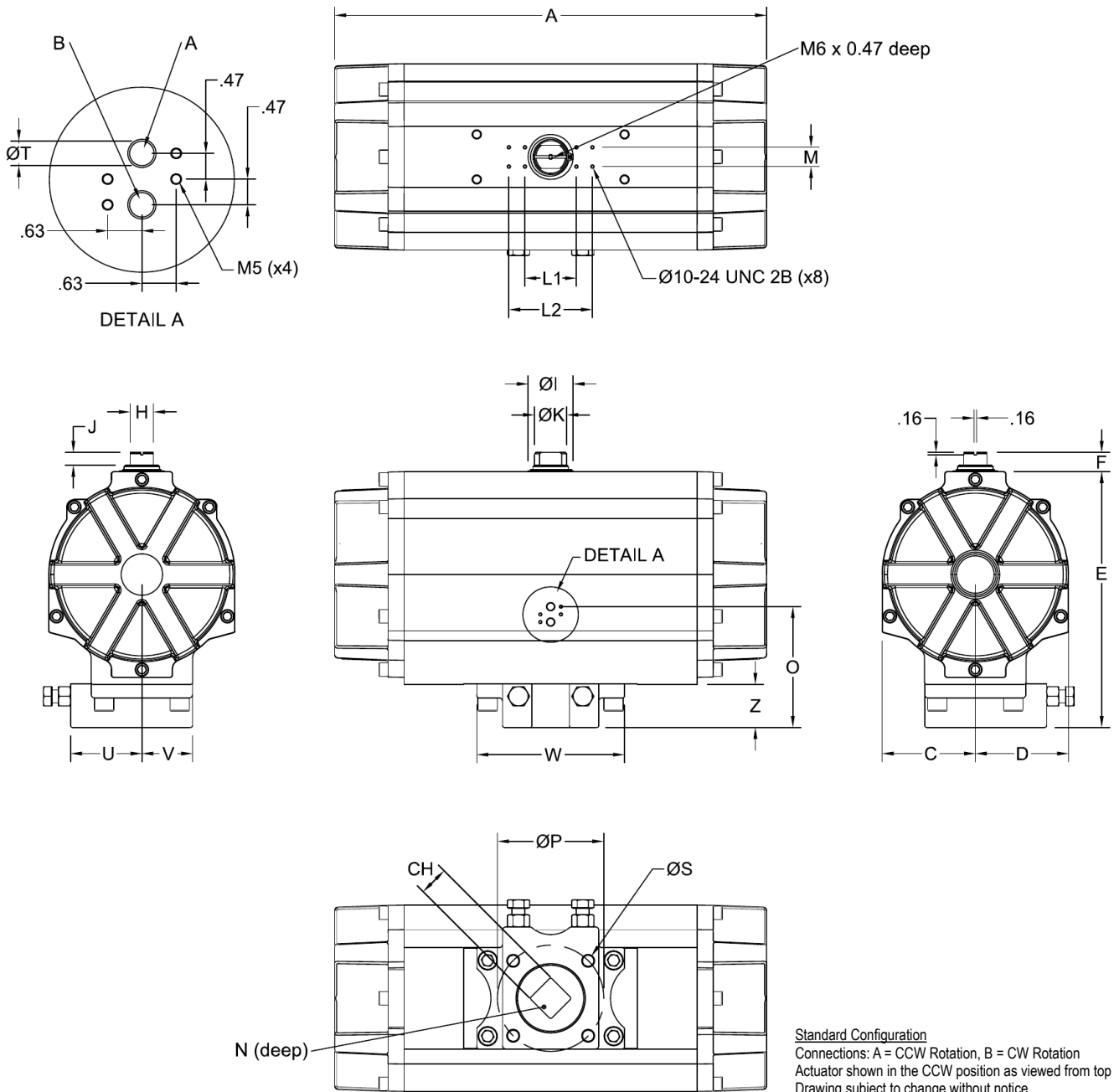
Model	Spring Set	Spring Stroke (in-lbs)		Air Supply Pressure (PSI)															
				40		50		60		70		80		90		100		115	
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
52	01	44	32	48	23	72	47	95	70										
	02	59	42			61	31	84	54	108	77								
	03	66	46					80	47	104	70	127	94	150	117				
	04	82	57					70	31	93	55	116	78	140	101	163	125		
	05	105	72							78	32	101	55	125	78	148	102	183	137
63	01	85	44	92	38	134	80	176	122										
	02	109	58			120	56	162	98	204	140								
	03	128	71					149	79	191	121	233	162	275	204				
	04	152	85					136	54	177	96	219	138	261	180	303	222		
	05	196	111							151	53	193	95	235	136	276	178	339	241
75	01	172	89	168	63	244	138	319	214										
	02	226	118			215	85	291	160	366	235								
	03	249	133					275	137	351	212	426	288	502	363				
	04	303	162					247	83	322	158	398	234	473	309	549	385		
	05	380	205							279	81	354	157	430	232	505	308	618	421
85	01	242	143	238	109	349	219	460	330										
	02	298	176			316	163	427	274	537	384								
	03	361	215					387	211	498	322	609	432	720	543				
	04	417	248					354	155	465	265	576	376	687	487	797	633		
	05	536	321							392	146	503	257	614	368	725	478	891	645
100	01	395	218	384	154	556	326	728	499										
	02	521	288			485	199	658	372	830	544								
	03	564	318					628	329	801	502	973	674	1,146	847				
	04	691	389					558	203	730	375	903	548	1,075	720	1,248	893		
	05	860	489							630	206	802	378	975	551	1,147	723	1,406	982
115	01	658	363	650	270	935	555	1,220	840										
	02	835	449			848	378	1,133	663	1,419	949								
	03	957	538					1,044	541	1,329	827	1,615	1,112	1,900	1,397				
	04	1,133	625					958	365	1,243	650	1,528	935	1,813	1,220	2,098	1,505		
	05	1,432	800							1,067	352	1,352	637	1,638	922	1,923	1,207	2,350	1,635
125	01	877	470	850	328	1,224	703	1,599	1,077										
	02	1,040	560			1,135	400	1,400	840	2,000	1,883								
	03	1,313	718					1,351	640	1,725	1,015	2,099	1,389	2,474	1,763				
	04	1,477	808					1,261	477	1,636	851	2,010	1,226	2,384	1,600	2,758	1,974		
	05	1,913	1,055							1,388	415	1,762	789	2,136	1,164	2,511	1,538	3,072	2,099
140	01	1,346	726	1,240	508	1,742	1,010	2,244	1,512										
	02	1,523	815			1,642	821	2,144	1,323	2,646	1,825								
	03	1,958	1,036					1,910	856	2,412	1,358	2,914	1,861	3,408	2,355				
	04	2,126	1,134					1,810	668	2,312	1,170	2,814	1,672	3,308	2,166	3,810	2,668		
	05	2,728	1,453							1,979	515	2,481	1,017	2,975	1,511	3,477	2,013	4,233	2,769
160	01	1,159	735	2,036	1,585	2,741	2,290												
	02	1,664	1,053			2,405	1,532	3,085	2,438										
	03	1,991	1,266			2,184	1,405	2,863	2,084	3,552	2,773								
	04	2,584	1,637					2,465	1,456	3,153	2,463	3,859	2,850						
	05	2,823	1,788							2,985	1,896	3,691	2,603	4,405	3,317				
	06	3,744	2,372									3,080	1,620	3,795	2,335	4,474	3,014	5,528	4,069
180	01	1,487	903	2,540	1,921	3,239	2,620												
	02	2,230	1,416			2,691	1,823	4,089	3,222										
	03	2,602	1,611			2,487	1,434	3,885	2,832	5,275	4,222								
	04	3,664	2,319					3,133	1,735	4,523	3,124	5,222	3,824						
	05	3,717	2,319							4,523	3,036	5,222	3,735	5,921	4,434				
	06	5,151	3,222									4,266	2,248	4,965	2,947	6,364	4,346	7,762	5,744
200	01	2,222	1,496	3,638	2,895	4,954	4,211												
	02	3,124	2,098			4,264	3,211	5,531	4,477										
	03	3,788	2,549			3,812	2,556	5,080	3,823	6,338	5,081								
	04	4,620	2,992					4,549	2,885	5,807	4,144	7,132	5,468						
	05	5,346	3,593							5,196	3,418	6,521	4,742	7,837	6,058				
	06	6,842	4,487									5,539	3,150	6,854	4,465	8,122	5,732	10,066	7,677
230	01	5,895	3,443	4,124	1,522	5,682	3,080	8,789	6,187										
	02	7,072	4,124			4,956	1,823	8,063	4,930										
	03	8,258	4,815					7,328	3,682	10,444	6,797								
	04	9,435	5,505					6,603	2,425	9,718	5,541	11,276	7,098						
	05	10,612	6,196					5,868	1,177	8,984	4,293	10,541	5,850	12,090	7,399				
	06	11,789	6,877							8,258	3,036	9,815	4,594	11,364	6,142	14,480	9,258	17,586	12,364
270	01	7,001	4,478	8,096	5,530	11,308	8,742	14,548	11,982										
	02	8,399	5,372	7,141	4,061	10,353	7,273	13,627	10,513										
	03	9,798	6,266	5,229	2,592			9,397	5,804	12,637	9,044	15,877	12,284						
	04	11,196	7,169			8,450	4,344	11,690	7,583	14,930	10,823	18,141	14,036						
	05	12,595	8,063					10,734	6,114	13,974	9,354	17,185	12,566	20,397	18,478				
	06	13,993	8,957					9,778	4,645	13,018	7,885	16,230	11,097	19,441	14,308				
	07	15,400	9,851					8,823	3,216	12,062	6,416	15,275	9,628	18,486	12,839	21,717	16,071		
	08	16,799	10,745					7,867	1,707	11,107	4,947	14,319	8,159	17,530	11,370	20,762	14,602	25,593	19,434

Dimensional Drawing - Models 52 to 230



Model	Mtg (ISO 5211)	CH	A	C	D	E	F	H	ØI	J	ØK	L1	L2	M	N	O	P	Q	R (UNC 2B)	S (UNC 2B)	T (NPT)
52	F03/F05	0.43	5.55	1.18	1.61	3.21	0.79	0.35	0.83	0.31	0.47	3.15		1.18	0.47	1.04	1.97	1.42	10-24	1/4"-20	1/8"
63	F05/F07	0.55	6.46	1.40	1.77	3.66	0.79	0.43	0.98	0.31	0.59	3.15		1.18	0.63	1.08	2.76	1.97	1/4"-20	5/16"-18	1/8"
75	F05/F07	0.67	8.27	1.65	2.07	4.37	0.79	0.51	1.14	0.31	0.75	3.15		1.18	0.75	1.38	2.76	1.97	1/4"-20	5/16"-18	1/8"
85	F05/F07	0.67	9.47	1.87	2.30	4.92	0.79	0.59	1.38	0.31	0.87	3.15		1.18	0.75	1.65	2.76	1.97	1/4"-20	5/16"-18	1/8"
100	F07/F10	0.67	10.83	2.17	2.68	5.43	0.79	0.59	1.38	0.31	0.87	3.15		1.18	0.81	1.97	4.02	2.76	5/16"-18	3/8"-16	1/4"
115	F07/F10	0.87	13.11	2.52	2.87	6.39	1.18	0.87	1.93	0.55	1.26	5.12		1.18	0.95	1.97	4.02	2.76	5/16"-18	3/8"-16	1/4"
125	F07/F10	0.87	14.65	2.68	3.15	6.87	1.18	0.87	1.93	0.55	1.26	5.12		1.18	0.95	2.40	4.02	2.76	5/16"-18	3/8"-16	1/4"
140	F10/F12	1.06	17.13	3.01	3.44	7.76	1.18	0.94	1.93	0.63	1.38	5.12		1.18	1.14	2.80	4.92	4.02	3/8"-16	1/2"-13	1/4"
160	F10/F12	1.06	19.69	3.43	3.90	8.70	1.18	1.18	2.24	0.63	1.57	3.15	5.12	1.18	1.26	3.15	4.92	4.02	3/8"-16	1/2"-13	1/4"
180	F14	1.42	19.41	3.86	4.53	9.96	1.18	1.42	2.44	0.63	1.77	3.15	5.12	1.18	1.69	3.90	5.51			5/8"-11	1/4"
200	F14	1.42	22.78	4.25	4.29	10.94	1.18	1.42	2.64	0.63	1.97	3.15	5.12	1.18	1.46	3.07	5.51			5/8"-11	1/4"
230	F16	1.81	27.17	4.88	4.90	12.80	1.18	1.42	2.64	0.63	1.97	3.15	5.12	1.18	1.97	3.62	6.50			3/4"-10	1/4"

Dimensional Drawing - Model 270



Model	Mtg (ISO 5211)	CH	A	C	D	E	F	H	$\varnothing I$	J	$\varnothing K$
270	F16	1.81	26.46	5.71	5.71	15.71	1.18	1.42	2.76	0.79	1.97

Model	L1	L2	M	N	O	P	S (UNC 2B)	T (NPT)	U	V	W	Z
270	3.15	5.12	1.18	1.97	7.40	6.50	3/4"-10	1/4"	4.37	3.11	9.06	2.68

ELECTRIC QUARTER-TURN ACTUATORS

FNW offers electric actuators for quarter-turn valves such as ball, plug, and butterfly valves. Actuators can be supplied with numerous options including, but not limited to, electro-mechanical brakes (200E and larger), auxiliary position switches, feedback potentiometers, 4-20mA and 0-10Vdc positioners, alternate motor voltages, spring return action, and explosion proof housings. Contact FNW with your specific application needs.

Standard Features

FNW 100E, 200E, 300E, & 400E

- -40°F to 150° Temperature Range (Optional heater required below 0°F)
- CSA Certified Nema 4 Enclosure
- Single 1/2" NPT Conduit Entry
- 300 Series Stainless Steel Output Drive
- 300 Series Stainless Steel Captive Enclosure Fasteners
- ISO Standard Bolting and Drive Dimensions
- Friction Brake Standard
- Non-Declutching Manual Override (400E has Declutching Manual Override Hand Wheel)
- Dome Position Indicator
- Permanently Lubricated
- Mountable in Any Position
- Thermally Bonded Polyester Powder Coated

FNW 600E, 1000E, & 1600E

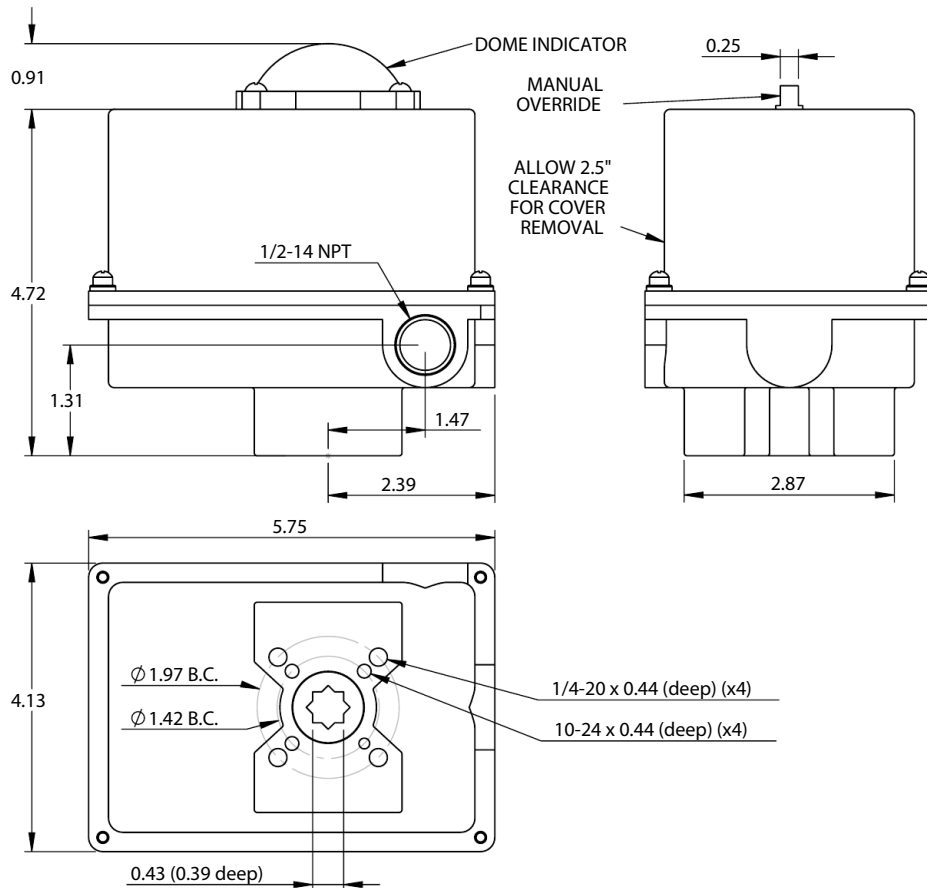
- -40°F (with Standard Heater Activated) to 140° Temperature Range
- CSA Certified Enclosure Conforms to Nema 1, 2, 3, 3R, 4, 4X, and 12
- Motor Thermal Overload Protection
- Dual 1/2" NPT Conduit Entries
- Heater & Thermostat
- Hardened Steel Spur Gear and Output Drive
- Captive Hex Head Enclosure Fasteners
- ISO Standard Bolting and Drive Dimensions
- Declutching Manual Override with Indicator
- Permanently Lubricated
- Mountable in Any Position
- Polyester Coated



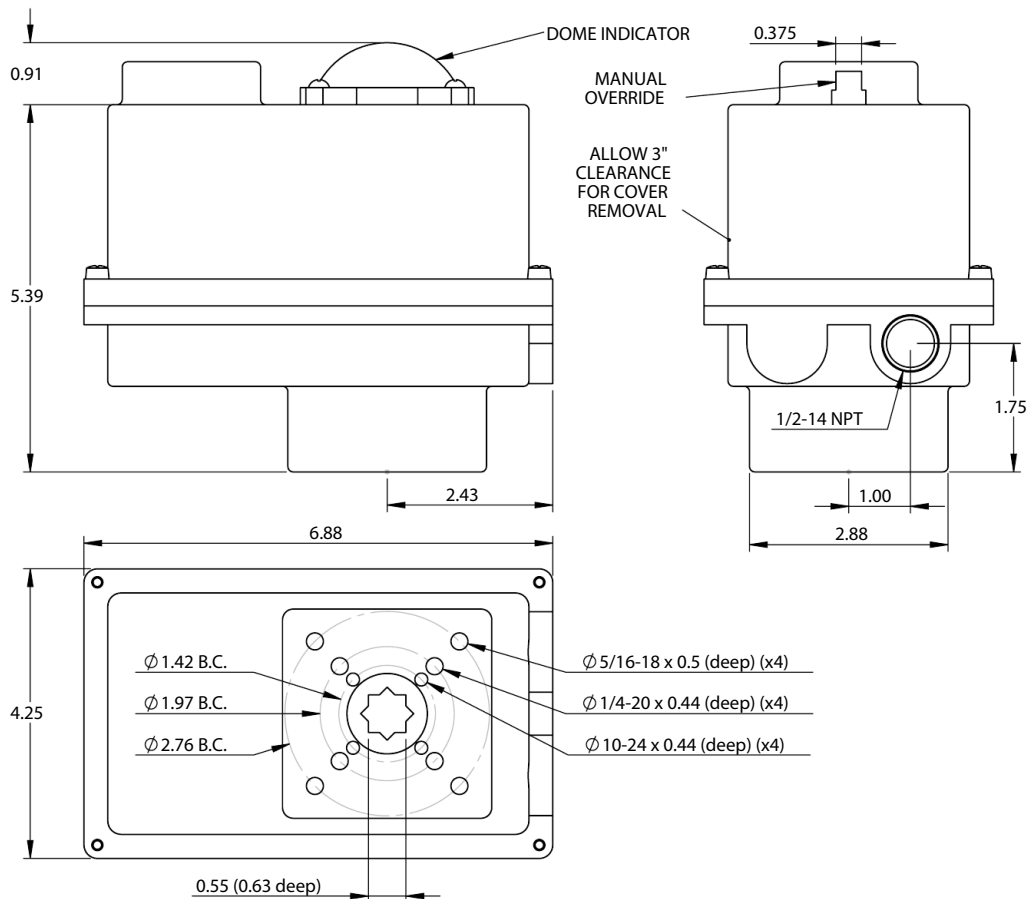
Standard Specifications

Standard Specifications	Model Number						
	100E	200E	300E	400E	600E	1000E	1600E
Output Torque (In-Lbs)	100	200	300	400	600	1000	1600
Cycle Time (Seconds)	2.5	5	5	10	15	15	30
Duty Cycle (120VAC)	25%	25%	25%	25%	30%	100%	100%
Lock Rotor Current (Amps)	0.55A	0.75A	0.99A	0.75A	0.57A	0.69A	0.35A
Weight (Lbs)	6	10	10	18	18	18	18

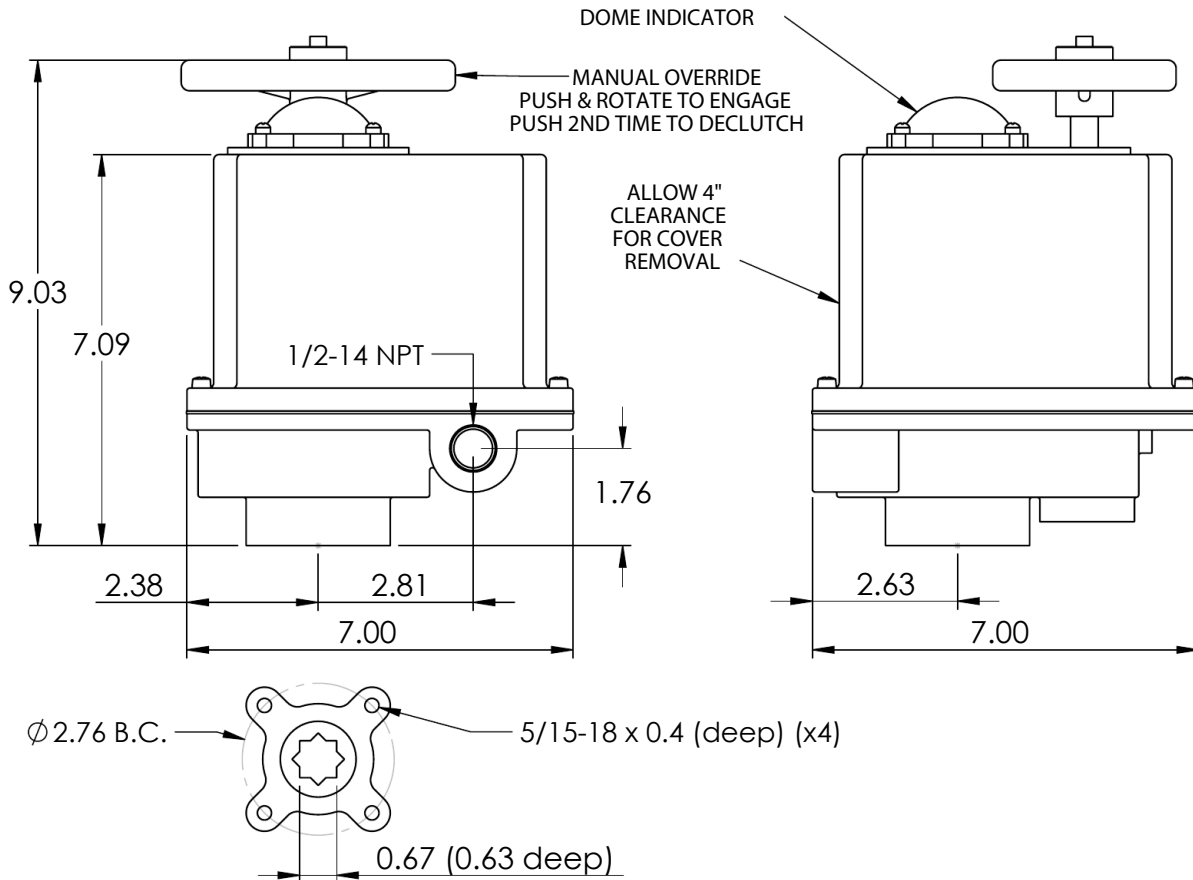
Model 100E Dimensions



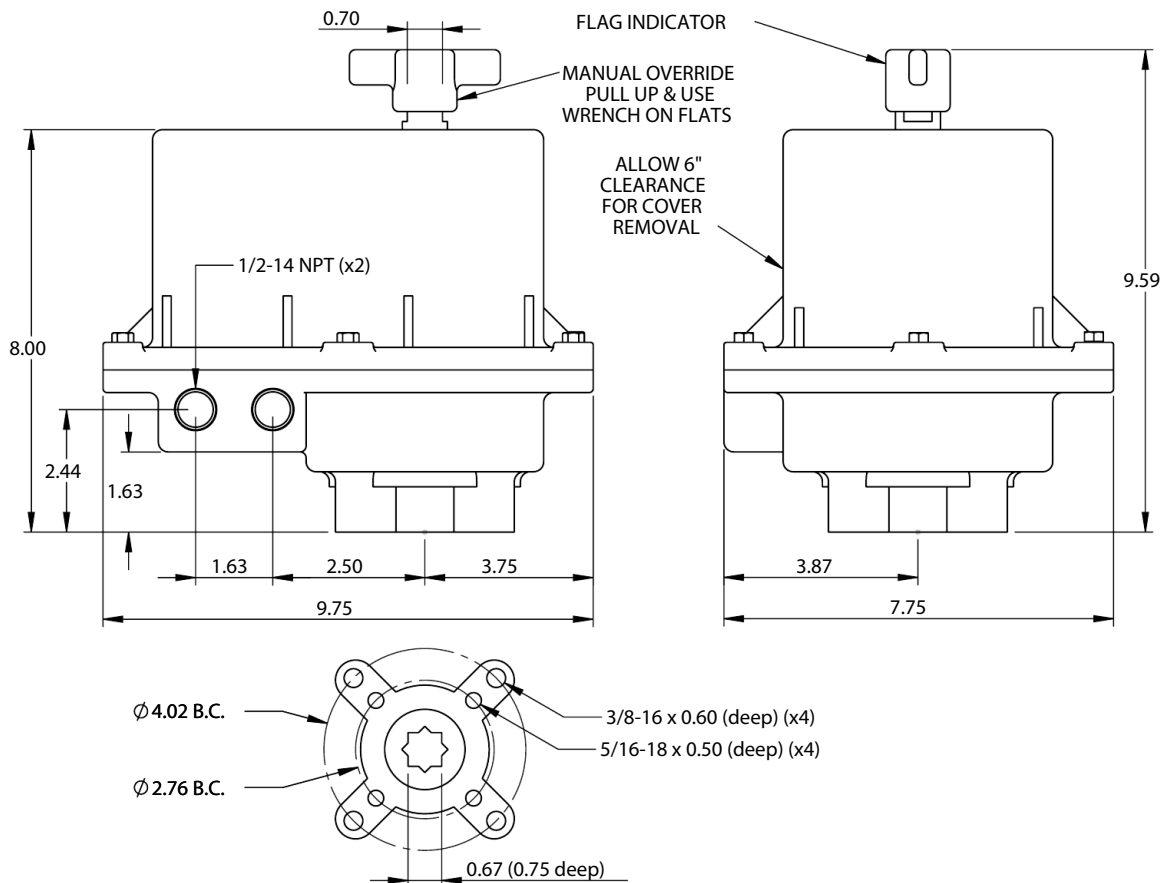
Model 200E & 300E Dimensions



Model 400E Dimensions



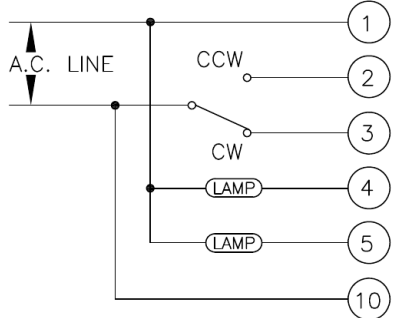
Model 600E to 1600E Dimensions



Model 100E to 400E Standard Wiring Diagram

OPTIONAL FIELD WIRING

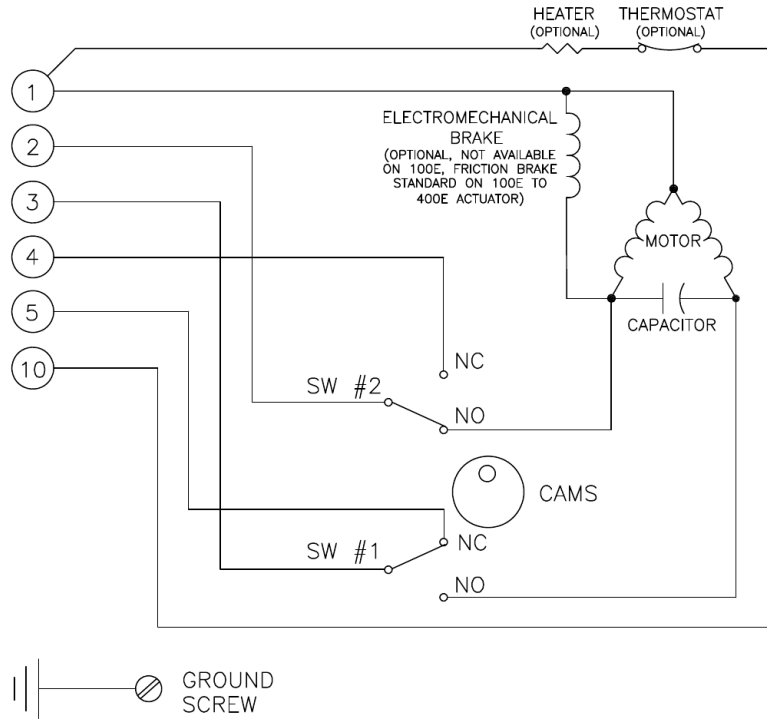
REFERENCE ONLY – NOT SUPPLIED



NOTES:

1. OPTIONAL FIELD WIRING IS SHOWN FOR REFERENCE ONLY AND IS NOT SUPPLIED WITH THE ACTUATOR.
2. ALWAYS VERIFY SPECIFIC ACTUATOR WIRING TO SPECIFICATIONS BEFORE INSTALLING.
3. ROTATION IS VIEWED FROM ABOVE THE ACTUATOR.
4. SWITCHES CONFIGURED FROM BOTTOM TO TOP (i.e. - SW#1, BOTTOM, SW#2 NEXT, ETC.
5. CAUTION: ELECTRICAL OPERATION OF THE ACTUATOR MUST BE MADE THROUGH AN INDIVIDUAL SINGLE POLE CONTROL SWITCH IN ORDER TO ISOLATE THE UNUSED MOTOR WINDINGS.
6. CAUTION: WIRING DIAGRAMS CAN VARY. CONSULT DOCUMENTATION PACKED WITH ACTUATOR.
7. WIRING DIAGRAM ILLUSTRATES ACTUATOR IN THE FULL CW POSITION.
8. THIS WIRING DIAGRAM IS FOR STANDARD 120VAC ACTUATORS, FNW MODELS 100E TO 400E.

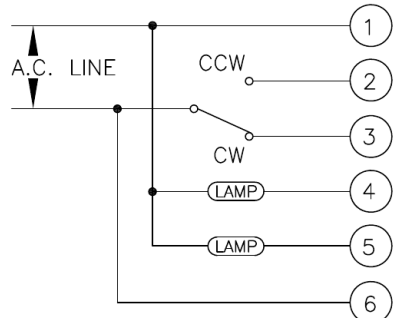
ACTUATOR WIRING



Model 600E to 1600E Standard Wiring Diagram

OPTIONAL FIELD WIRING

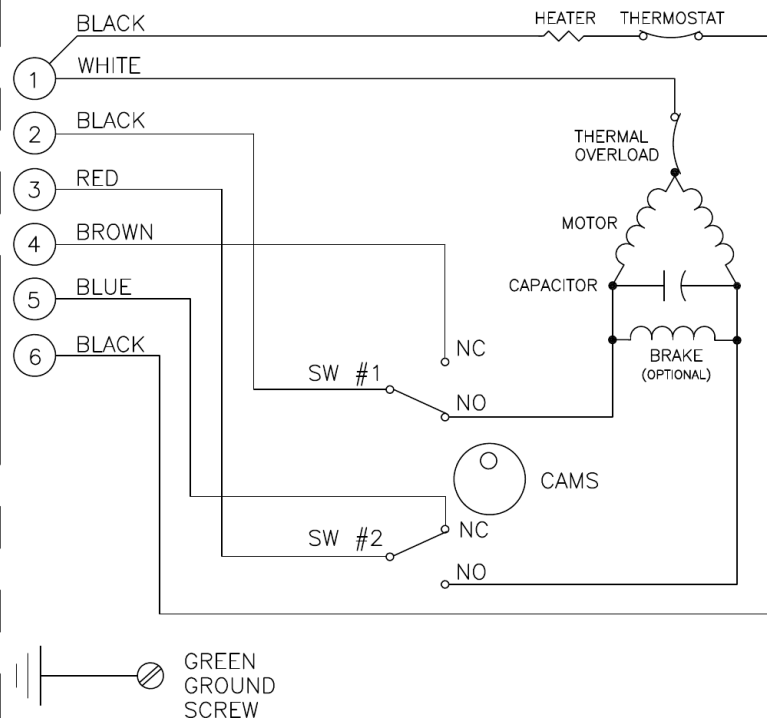
REFERENCE ONLY – NOT SUPPLIED



NOTES:

1. OPTIONAL FIELD WIRING IS SHOWN FOR REFERENCE ONLY AND IS NOT SUPPLIED WITH THE ACTUATOR.
2. ALWAYS VERIFY SPECIFIC ACTUATOR WIRING TO SPECIFICATIONS BEFORE INSTALLING.
3. ROTATION IS VIEWED FROM ABOVE THE ACTUATOR.
4. THERMAL OVERLOAD SHOWN, RESETS AUTOMATICALLY.
5. SWITCHES CONFIGURED FROM BOTTOM TO TOP (i.e. - SW#1, BOTTOM, SW#2 NEXT, ETC.
6. CAUTION: ELECTRICAL OPERATION OF THE ACTUATOR MUST BE MADE THROUGH AN INDIVIDUAL SINGLE POLE CONTROL SWITCH IN ORDER TO ISOLATE THE UNUSED MOTOR WINDINGS.
7. CAUTION: WIRING DIAGRAMS CAN VARY. CONSULT DOCUMENTATION PACKED WITH ACTUATOR.
8. WIRING DIAGRAM ILLUSTRATES ACTUATOR IN THE FULL CW POSITION.
9. THIS WIRING DIAGRAM IS FOR STANDARD 120VAC ACTUATORS, FNW MODELS 600E TO 1600E.

ACTUATOR WIRING



PMV P5 & EP5 POSITIONERS

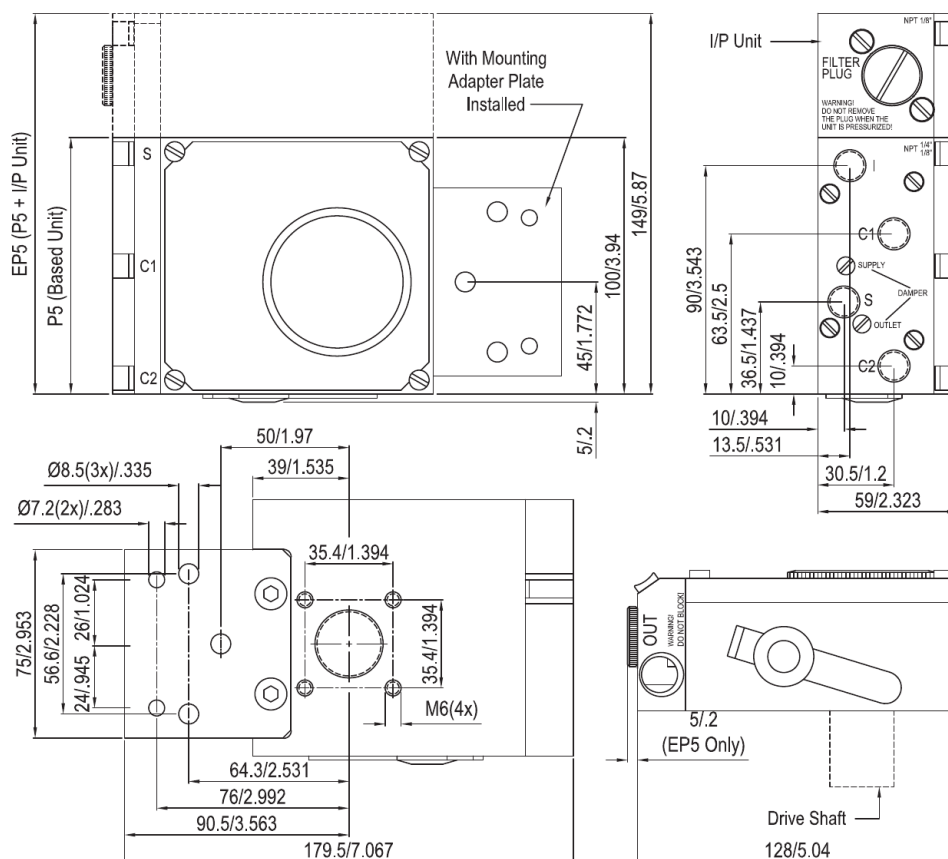
The foundation of the PMV positioner system is the P5 pneumatic positioner. Performance of this unit is enhanced with a special high gain, high capacity spool valve assembly providing quick and accurate actuator and valve response. For single and double-acting applications, the modular design allows for the simple addition of an I/P (4-20mA input) converter (such as the EP5) and/or a feedback unit with a variety of feedback options.

FNW supplies pneumatic and electro-pneumatic positioners for both quarter-turn and linear actuators. Contact FNW for optional positioner configurations such as low temp (-40°F/-40°C), reverse acting, feedback units, and characterized cams including split range, equal percent, and square root degree combinations.



Features:

- Sturdy Construction
- Force Balance Design
- High Gain Pilot Valve
- Bright Position Indicator
- Stainless Steel Cam
- Tapped Exhaust Port
- Modular Design
- Simple Calibration
- External Zero Adjustment
- Built-in Gauge Ports
- Sealed Cover
- Replaceable Drive Spindles



PMV P5 & EP5 POSITIONERS

Technical Specifications

SPECIFICATION	P5	EP5
Input Signal	3-15 PSI (20-1000 kPa)	4-20mA
Linearity	≤ 0.5%*	≤ 1.0%*
Hysteresis	≤ 0.5%*	≤ 0.75%*
Repeatability	≤ 0.5%*	
Gain Factor at 87 PSI (600 kPa)	Min. 1000 kPa/kPa	
	Max. 66%/° ISA S75.13-1989	
Max. Air Consumption		
@ 29 PSI (0.2 MPa)	0.19 SCFM (5.4 nl/min)	0.22 SCFM (6.1 nl/min)
@ 58 PSI (0.4 MPa)	0.43 SCFM (12.3 nl/min)	0.48 SCFM (13.6 nl/min)
@ 87 PSI (0.6 MPa)	0.71 SCFM (20 nl/min)	0.78 SCFM (22.0 nl/min)
@ 116 PSI (0.8 MPa)	0.98 SCFM (27.8 nl/min)	1.08 SCFM (30.5 nl/min)
@ 145 PSI (1.0 MPa)	1.26 SCFM (35.7 nl/min)	1.38 SCFM (39.0 nl/min)
Min. Air Consumption		
@ 29 PSI (0.2 MPa)	6.9 SCFM (200 nl/min)	
@ 58 PSI (0.4 MPa)	12.8 SCFM (370 nl/min)	
@ 87 PSI (0.6 MPa)	18.8 SCFM (540 nl/min)	
@ 116 PSI (0.8 MPa)	24.7 SCFM (710 nl/min)	
@ 145 PSI (1.0 MPa)	30.6 SCFM (880 nl/min)	
Max. Supply Pressure	150 PSI (1.0 MPa)	
Temperature Range	-4°F to +185°F (-20°C to +85°C)	
Connector Threads	1/4" NPT	
Gauge Threads	1/8" NPT	
Weight	2.4 Lbs. (1.1 kg)	3.4 Lbs. (1.5 kg)
Housing	Die Cast Aluminum	
Surface Treatment	ED Epoxy Paint (Black)	
Fasteners	A2/A4 Stainless	
Ingress Protection	IP66 / NEMA4	
Deadband	-	≤ 0.15%
Min. Supply Pressure	-	21 PSI (0.14 MPa)
Conduit Entry	-	1/2" NPT pr PG 13.5 (M20)
Terminals	-	2.5mm (AVG 14) Screw Terminals
Input Impedance	-	170-260 Ohms at 71°F (20°C)
RFI Influence	-	Not Measurable
Capacitance	-	Negligible
Supply Pressure Effect	-	0.5%/15 PSI (0.1 MPa)
Cenelec Intrinsically Safe	-	Eex ia IIC T4-T6
FM Intrinsically Safe	-	Div 1, Class 1, Group ABCD
CSA Intrinsically Safe	-	Div 1, Class 1, Group ABCD

* Percent of full scale

VAC V100P & V100E POSITIONERS

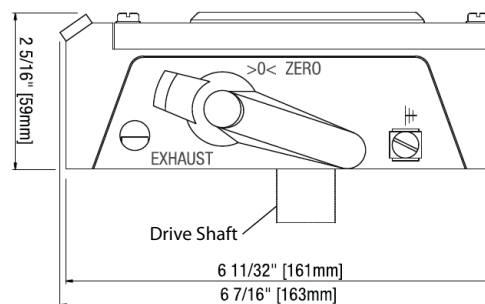
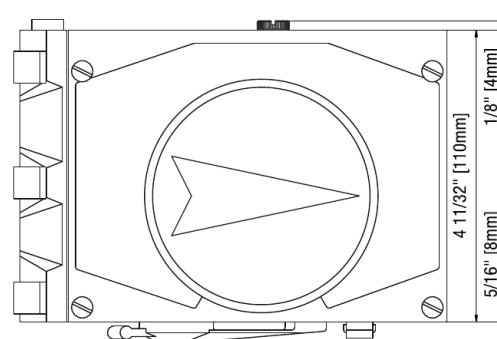
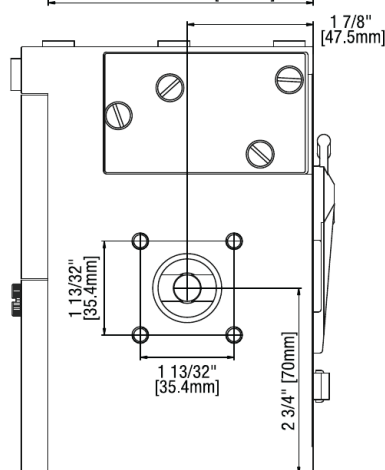
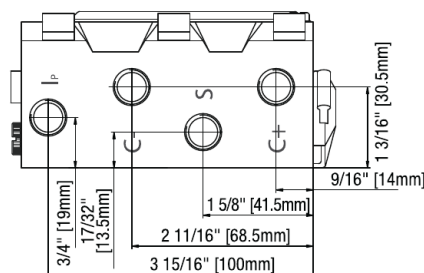
The V100 series positioner is available in pneumatic or electro-pneumatic configurations. The durable, modular design and wide assortment of options for the V100 makes the positioner easy to field convert in a matter of minutes.

FNW supplies pneumatic and electro-pneumatic positioners for both quarter-turn and linear actuators. Contact FNW for optional positioner configurations such as explosion-proof, intrinsically safe, reverse acting, feedback units, gauge kits, and characterized cams including split range, equal percent, and square root degree combinations.



Features:

- Sturdy Construction
- Force Balance Design
- Easy Maintenance Pilot Valve
- Large Arrow Position Indicator
- Stainless Steel Cam
- I/P Test Point Facilitates Positioner Loop Testing
- Modular Design
- Simple Calibration
- External Zero Adjustment
- Built-in Gauge Ports
- Captured Stainless Steel Cover Screws
- Sealed Cover
- Replaceable Drive Spindles



VAC V100P & V100E POSITIONERS

Technical Specifications

SPECIFICATION	V100P	V100E
Input Signal	3-15 PSI (20-1000 kPa)	4-20mA
Linearity	< 0.7%*	< 1.0%*
Hysteresis	< 0.4%*	< 0.6%*
Repeatability	< 0.3%*	< 0.5%*
Pressure Gain	750 P _{OUT} / P _{IN}	
Air Delivery		
@ 29 PSI (0.2 MPa)	9.5 SCFM (269 SLPM)	
@ 87 PSI (0.6 MPa)	28.3 SCFM (801 SLPM)	
@ 145 PSI (1.0 MPa)	47.1 SCFM (1,334 SLPM)	
Bleed Rate		
@ 29 PSI (0.2 MPa)	0.18 SCFM (5 SLPM)	0.2 SCFM (5.7 SLPM)
@ 87 PSI (0.6 MPa)	0.53 SCFM (15 SLPM)	0.6 SCFM (17.0 SLPM)
@ 145 PSI (1.0 MPa)	0.88 SCFM (25 SLPM)	1.0 SCFM (28.3 SLPM)
Max. Supply Pressure	145 PSI (1.0 MPa)	
Temperature Range	-40°F to +185°F (-40°C to +85°C)	
Air Connections	1/4" NPT	
Gauge Connections	1/8" NPT	
Cable Entry	1/2" NPT	
Weight	3.5 Lbs. (1.59 kg)	3.8 Lbs. (1.72 kg)
Housing	Die Cast Aluminum	
Surface Treatment	Electrostatically Applied Polyester	
Fasteners	Stainless Steel	
Ingress Protection	IP66 / NEMA4X	
Mounting Pad	F05	
Drive Spindle	NAMUR	

* Percent of full scale

QUICK-VIEW® QUARTER-TURN POSITION INDICATION SWITCH

Features:

The QUICK-VIEW® (QV Series) Rotary Valve Position Indicators are produced by Proximity with up to four individual mechanical or proximity switches. The QUICK-VIEW® is also available with several switch and enclosure ratings as well as optional backlighting.

- UL and CSA rated
- Low cost position indication
- Extremely compact design
- Easily interchangeable with key competition
- Integral flame retardant and corrosion protection
- Optional backlighting available for maximum visibility
- Optional hazardous location rating

Applications:

The QV Series position indicators are designed for maximum reliability in general purpose and corrosive environments. Applications include:

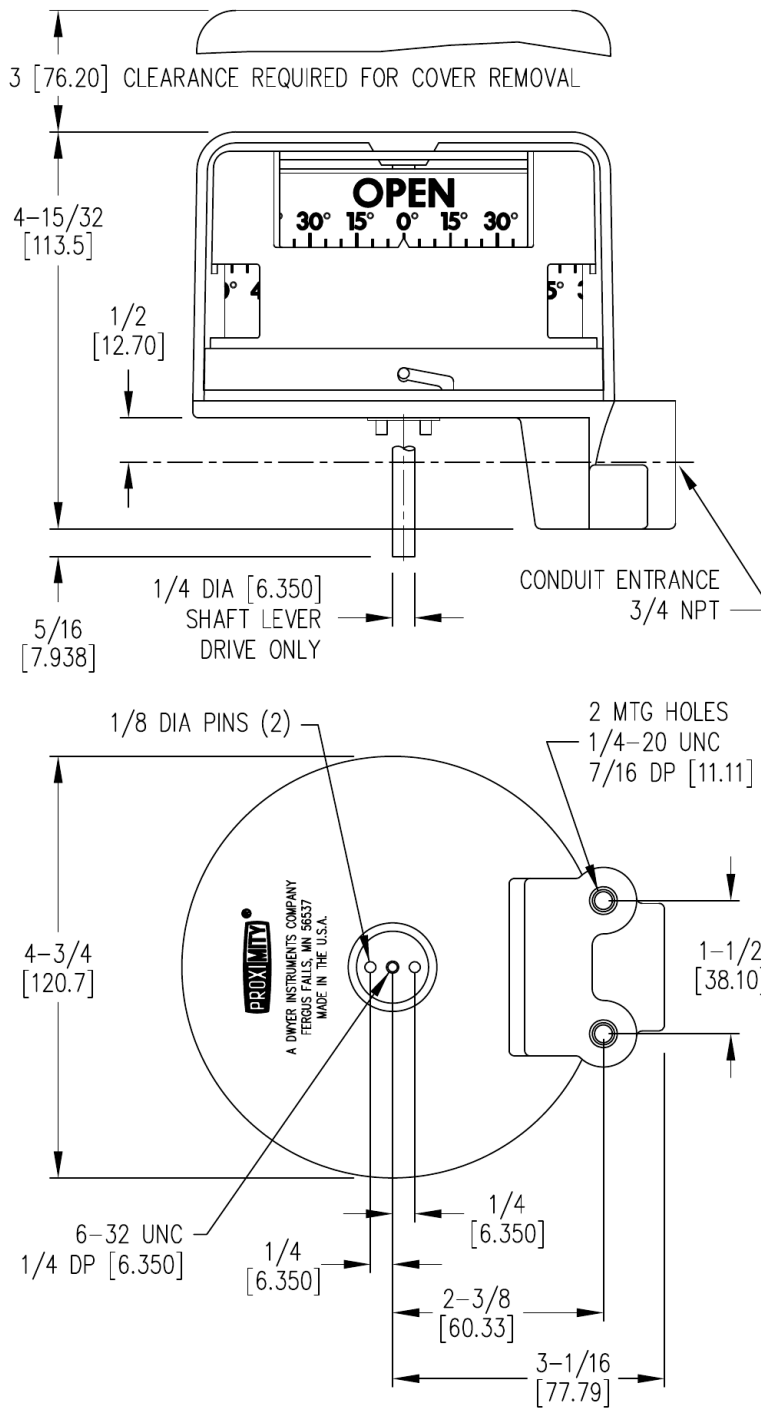
- Rotary and Linear Valves and Actuators
- Manual Valves
- Gear Operators
- Positioners



Technical Specifications

Min. Rotation Travel – Switches Only	5°
Max. Rotation Travel – Switches Only	360°
Operational Life	10,000,000 Cycles Minimum
Temperature Limits	-40°F to 180°F (-40°C to 82°C)
Switch Type	SPDT
Mounting Orientation	Not Position Sensitive
Electrical SPDT Switch Ratings	
Mech. Snap Action (Standard)	10A @ 125/250 VAC; 0.5A 125 VDC; 10A @ 24 VDC
Mech. Gold Contact (Optional)	1A @ 125 VAC; 1A @ 24 VDC
Prox. Reed Switch (Optional)	2A @ 125 VAC; 2A @ 30 VDC
NAMUR Sensor (Optional)	5-25 VDC
Inductive Sensor (Optional)	10-30 VDC
Mech. Snap Action (Optional)	10A @ 125/250 VAC
Lighting Supply Voltage (Optional)	24-28 VDC
Lighting Life (Optional)	16,000 Hours
Enclosure Material	Polycarbonate Housing and Conduit
Conduit Entrance	One 3/4"-14 NPT
Enclosure Rating (Standard)	NEMA 4, 4X
Explosion-proof (Optional)	Class I Grp A, B, C, D; Class II, Groups F&G; Div 2
Maximum Altitude	6560 Ft. (2000m)
Agency Approvals	CSA, UL, cUL
Weight	1.0 lb

QUICK-VIEW® QUARTER-TURN POSITION INDICATION SWITCH



MARK 4 QUARTER-TURN POSITION INDICATION SWITCH

Features:

The Mark 4 Rotary Valve Position Indicators are produced by Proximity with up to six individual mechanical or proximity switches (standard with 2 mechanical switches). The Mark 4 is also available with potentiometer or transmitter feedback, or AS-interface (AS-i).

- UL and CSA rated
- Bushing & o-ring sealed switch compartment
- Set screw cams for infinite adjustment
- Flexible design allows multiple mechanical or proximity switch and transmitter option(s)
- Adjustable stainless steel visual indicator with scale is standard for quarter turn direct drive applications
- Housing options include 1(standard), 2 or 3 conduit entrances, junction package, terminal strip and solenoid valve(s)
- High temperature to 600°F for limited duration consult factory for available options

Applications:

The Mark 4 position indicators are designed for maximum reliability in explosion-proof environments. Applications include:

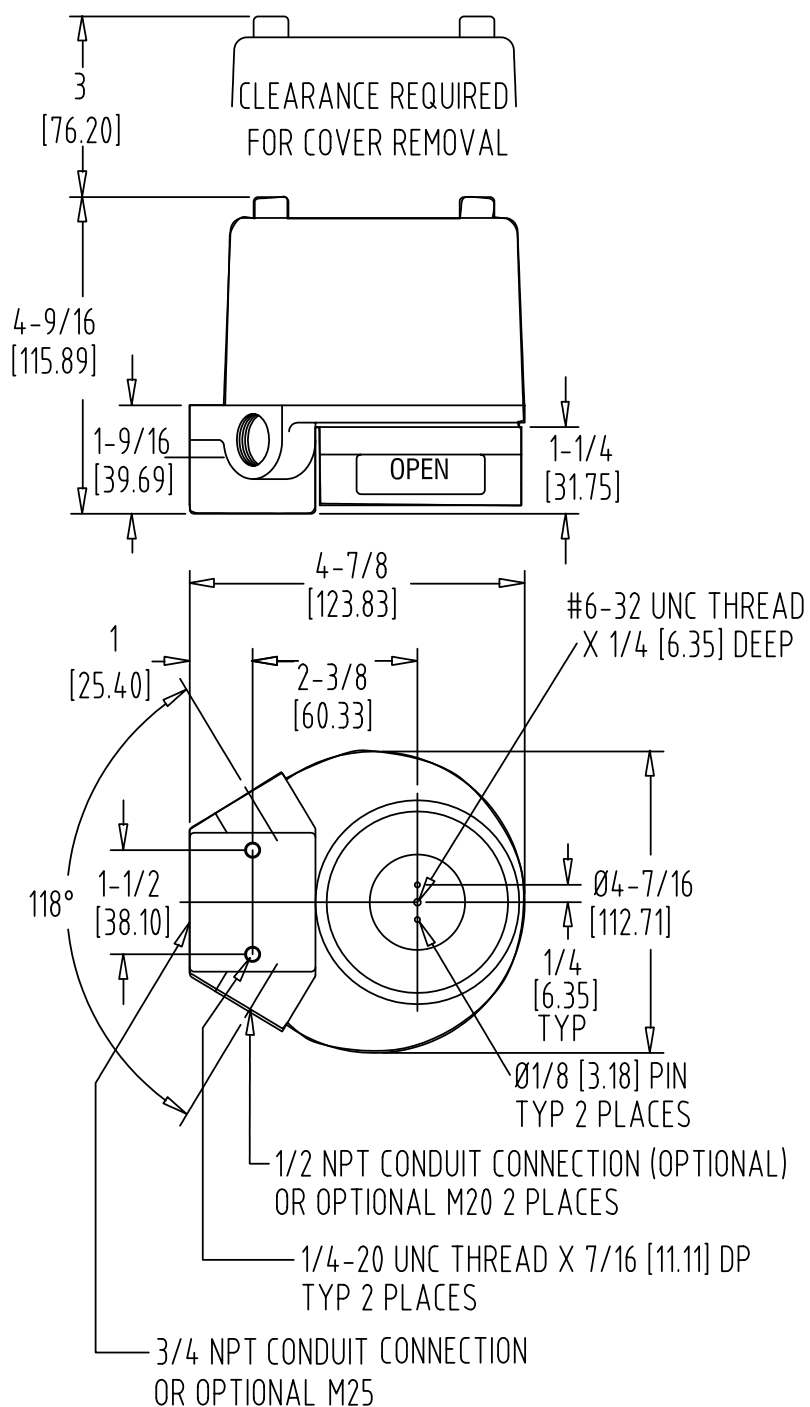
- Rotary and Linear Valves and Actuators
- Manual Valves
- Gear Operators
- Positioners



Technical Specifications

Min. Rotation Travel – Switches Only	5°
Max. Rotation Travel – Switches Only	360°
Operational Life	10,000,000 Cycles Minimum
Temperature Limits (Standard)	-58°F to 176°F (-50°C to 80°C)
Mounting Orientation	Not Position Sensitive
Electrical Switch Ratings	
SPDT Mech. Snap Action (Standard)	15A @ 125/250/480 VAC, 1/8 hp @ 125 VAC, 1/4 hp @ 250 VAC, 1/2A @ 125 VDC, 1/4A @ 250 VDC
DPDT Snap (Optional)	10A @ 125/250 VAC, 0.3A @ 125 VDC, 0.15A @ 250 VDC
SPDT Mech. Gold Contact (Optional)	1A @ 125 VAC
SPDT Hermetically Sealed Snap (Optional)	1A @ 125 VAC
SPDT Hermetically Sealed Reed Switch (Optional)	2A @ 125 VAC, 2A @ 30 VDC
NAMUR Inductive Sensor (Optional)	15mA @ 5-25 VDC
Inductive Sensor (Optional)	10-30 VDC, Load: 0.1A
SPDT High Temp Snap (Optional)	350°F (176°C) for 600 hours, 15.1A @ 125/250/277 VAC
SPDT Mech. Snap Action (Optional)	10A @ 125/250 VAC, 1/3 hp @ 125/250 VAC
Enclosure Material	Aluminum (Epoxy Coated)
Conduit Entrance	One 3/4"-14 NPT (Options Available)
Enclosure Rating (Standard)	NEMA 1, 2, 3, 3R, 4, 4X, 6, 7, 9, 12, 13
Explosion-proof (Standard)	Class I Grp C, D; Class II, Groups E, F&G
Maximum Altitude	6560 Ft. (2000m)
Agency Approvals	CSA, UL
Weight	4 to 6 lb

MARK 4 QUARTER-TURN POSITION INDICATION SWITCH



PLS4 (EFECTOR IG0330) INDUCTIVE PROXIMITY SWITCH

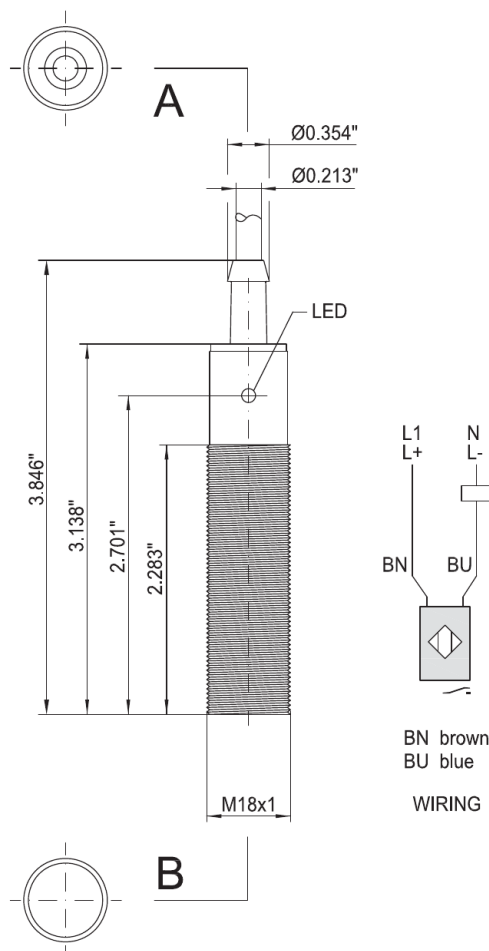
Features

Produced by Efector, the FNW PLS4 inductive proximity limit switch is ideally suited for industrial applications where corrosion resistance is needed or where mechanical connections are not desired. Primarily used for position indication on knife gate and wedge gate valves, FNW can custom mount one or more PLS4's for your control needs. Additional configurations are available. Contact FNW with your application requirements.



Specifications

Connection Type	Plastic thread M18 x 1 Cable (non-flush mount)
Sensing Range	8mm (nf) non-flush mountable
Electrical Design	AC / DC
Output	normally open
Operating Voltage	20-250 VAC/VDC
Current Rating (continuous)	350mA AC @ 122°F, 250mA AC @ 176°F, 100mA DC
Current Rating (peak)	Inrush: 2.2 A (20 ms / 0.5 Hz)
Minimum Load Current	5mA
Voltage Drop	< 6.5 VAC / < 6 VDC
Leakage Current	< 2.5mA @ 250 VAC, < 1.3mA @ 110 V AC, < 0.8mA @ 24 V DC
Real Sensing Range	8mm ± 10 %
Operating Distance	0 - 6.5mm
Switch-Point Drift	-10 - 10% / Sr
Hysteresis	1 - 15% / Sr
Switching Frequency	25Hz AC / 50Hz DC
Correction Factors	mild steel = 1 stainless steel approx. 0.7 / brass approx. 0.4 / Al approx. 0.3 / Cu approx. 0.2
Operating Temperature	-13°F - 176°F
Protection	IP 67
EMC	EN 60947-5-2; EN 55011 class B
Housing Material	Polybutyleneterephthalate (PBT)
Function Display Switching Status	Red LED
Connection	PVC cable / 2 m; 2 x 0.5 mm²
Wiring Core Colors	Brown (BN), Blue (BU)
Accessories (included)	2 lock nuts
Enclosure Rating	NEMA 3, 4, 6, 12, 13



MLS4 (ALLEN-BRADLEY 802T-AP) MECHANICAL SWITCH

Features

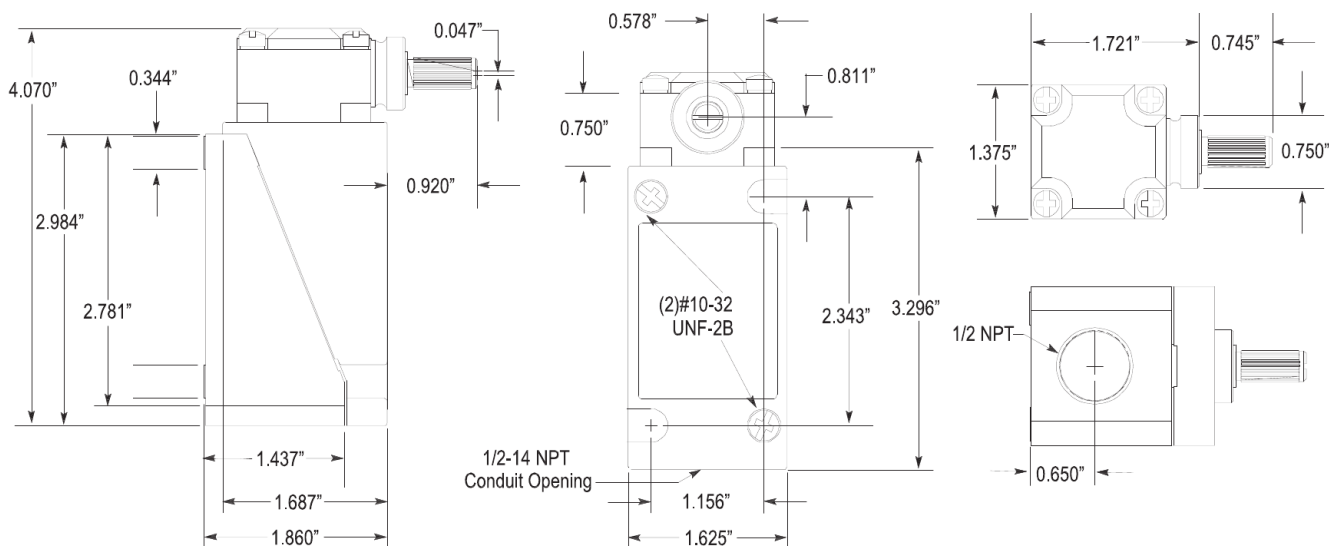
Produced by Allen-Bradley, the FNW MLS4 mechanical limit switch is a heavy duty, ruggedly designed switch for industrial applications. Primarily used for position indication on knife gate and wedge gate valves, FNW can custom mount one or more MLS4's for your control needs. Additional configurations are available. Contact FNW with your application requirements.



Specifications

Connection Type	Front mount, plug-in style with 1/2"-14 NPT conduit entry
Electrical Design	AC / DC
Output	2 circuit SPST
Travel to Operate Contacts	13°
Travel to Reset Contacts	7°
Maximum Travel	90°
Torque to Operate	2.6 in-lb max
Protection	IP 65 (IEC 529)
Wiring Terminals	Screw Clamp
Enclosure Rating	NEMA 4 and 13

Current Rating (continuous)	10A
Make/Break Current Rating	
@ 120VAC	60A make, 6A break
@ 240VAC	30A make, 3A break
@ 480VAC	15A make, 1.5A break @ 480VAC
@ 600VAC	12A make, 1.2A break @ 600VAC
@ 115-125VDC	0.4A max. current
@ 230-250VDC	0.2A max. current
@ 550-600VDC	0.1A max. current
Operating Temperature	0°F (non-moisture environments below +32°F) - 230°F



ASCO 8551

Features

- 3/2 or 5/2 Convertible Configuration
- NAMUR Mounting
- Compact Spool Valve
- Internal Pilot Design
- Stocked in Standard, Watertight, & Explosion-Proof 120 VAC Coils
- Standard Manual Operator
- Mountable in Any Position
- Optional Features/Voltages Available Upon Request

Valve Parts in Contact with Fluid

Description	Material
Body	Black Anodized Aluminum
Spring	Phosphate Treated Black Steel
Shading Coil	Copper
Seals	NBR and PUR
Core and Core Tube	Stainless Steel / Brass
End Covers and Plate	6/6 Glass Filled PA/FV
Spool	Aluminum
Internal Parts	Zamak, Steel, CA



Specifications

Catalog Number	Pipe Size (ins.)*	Orifice Size (ins.)*	Cv Flow Factor	Pilot Pressure (PSI)		Fluid & Ambient Temperature (°F)**		Standard Coil and Class of Insulation	Watt Rating and Power Consumption			Enclosures
				Min	Max	Min	Max AC		AC Watts	VA Holding	VA Inrush	
SC8551A001MS	1/4	1/4	0.86	30	150	5	140	F	2.5	3.5	6	IP65 type DIN (open frame) per 46244
WT8551A001MS	1/4	1/4	0.86	30	150	5	140	F	6.3	7	10.1	Types 1, 2, 3, 3S, 4, and 4X
EF8551A001MS	1/4	1/4	0.86	30	150	5	104	F	6.3	7	10.1	Types 3, 3S, 4, 4X, 6, 5P, 7, 9 Class I, Div. 1 (Groups A-D) and Class II, Div. 1 Type 9 (Groups E-G)

* 1/8 inch NPT exhaust ports (x2)

** For temperatures below 32°F, moisture-free air must be used

ASCO 8342

Features

- 4/2 Configuration
- Direct Acting Design (No Minimum Pressure Differential to Shift Valve)
- High Flow Construction
- Slide Style Valve
- Stocked in Watertight 120 VAC Coils
- Mountable in Any Position
- Optional Features/Voltages Available Upon Request

Valve Parts in Contact with Fluid

Description	Material
Body	Brass
Seals and Discs	NBR and FKM
Core Tube	305 Stainless Steel
Core and Plugnut	430F Stainless Steel
Springs	302 Stainless Steel / 17-7 PH Stainless Steel
Shading Coil	Copper
Sleeve	PA
Seats	Graphite-filled PTFE



Specifications

Catalog Number	Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor	Pilot Pressure (PSI)			Max Fluid Temp. (°F)	Ambient Temp. Range (°F)		Standard Coil and Class of Insulation	Watt Rating and Power Consumption (AC)			Enclosure
				Maximum AC				Min	Max		AC Watts	VA Holding	VA Inrush	
				Air-Inert Gas	Water	Lt. Oil @ 300 SSU								
8342G01	1/4	3/16	0.7	125	100	100	160	32	125	F	16.1	35	115	Types 1, 2, 3, 3S, 4, and 4X

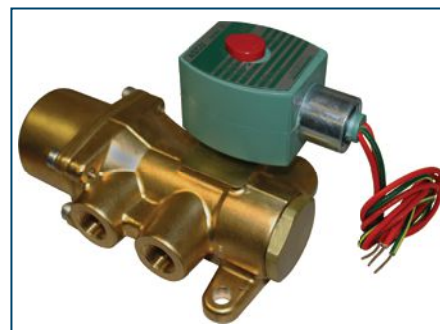
ASCO 8344

Features

- 4/2 Configuration
- Internal Pilot Design
- Piston-Operated Poppet Design Provides High Flow
- For Use with Air or Water
- Stocked in Watertight 120 VAC Coils
- Mountable in Any Position
- Optional Features/Voltages Available Upon Request

Valve Parts in Contact with Fluid

Description	Material
Body	Brass
Seals and Discs	NBR
Core Tube	305 Stainless Steel
Core and Plugnut	430F Stainless Steel
Springs	302 Stainless Steel / 17-7 PH Stainless Steel
Shading Coil	Copper
Pilot Seat Cartridge & Disc-Holder	CA
Shaft Gasket	PA



Specifications

Catalog Number	Pipe Size (ins.)	Orifice Size (ins.)	Cv Flow Factor		Pilot Pressure (PSI)				Max Fluid Temp. (°F)	Ambient Temp. Range (°F)		Standard Coil and Class of Insulation	Watt Rating and Power Consumption (AC)			Enclosure
					Min.*	Maximum AC				Min	Max		Watts	VA Holding	VA Inrush	
			Press.	Exh.		Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC							
8344G072	3/8	3/8	1.4	2.2	10	150	125	125	180	32	125	F	6.1	16	30	Types 1, 2, 3, 3S, 4 and 4X

* 25 PSI minimum on light oil service. A minimum operating pressure differential must be maintained between the pressure and exhaust ports. Supply and exhaust piping must be full area, unrestricted. Flow controls and other similar components must be installed in the cylinder lines only.

ASCO 8345

Features

- 4/2 Configuration
- Internal Pilot Design
- Compact Design for General & Low Flow Service
- Stocked in Watertight 120 VAC Coils
- Mountable in Any Position
- Optional Features/Voltages Available Upon Request

Valve Parts in Contact with Fluid

Description	Material
Body	Brass
Seals and Discs	NBR and PA
Core Tube	305 Stainless Steel
Core and Plugnut	430F Stainless Steel
Springs	302 Stainless Steel
Shading Coil	Copper
Piston	PA



Specifications

Catalog Number	Pipe Size (ins.)	Orifice Size (ins.)		Cv Flow Factor		Pilot Pressure (PSI)				Max Fluid Temp. (°F)	Ambient Temp. Range (°F)		Standard Coil and Class of Insulation	Watt Rating and Power Consumption (AC)			Enclosure
		Press.	Exh.	Press.	Exh.	Min.*	Maximum AC				Min	Max		Watts	VA Holding	VA Inrush	
							Air-Inert Gas	Water	Lt. Oil @ 300 SSU								
8345G001	1/4	1/16	3/32	0.09	0.09	10	150	150	150	180	32	125	F	10.1	25	50	Types 1, 2, 3, 3S, 4, and 4X

* A minimum operating pressure differential must be maintained between the pressure and exhaust ports. Supply and exhaust piping must be full area, unrestricted. Flow controls and other similar components must be installed in the cylinder lines only.

PIPING PRODUCTS

FLANGE ACCESSORIES

Figure	Description	Page
B7.....	B7 stud bolt set with double 2H heavy hex nuts.....	243
LBB.....	Bolt pack, for lugged butterfly valves.....	245
CBI.....	Bolt insulator.....	245
NBG.....	Nut/bolt/gasket kit, non-asbestos and red rubber.....	246
NA.....	Non-asbestos gasket, full face or ring, for 150# flanges.....	247
R.....	Red rubber gasket, full face or ring, for 150# flanges.....	248
SWG.....	Spiral wound gasket, for 150# and 300# flanges.....	249
DIBUF.....	Ductile iron back-up flange, stub end and angle face ring, primer or zinc, 150# IPS.....	251

WATER CONTROL

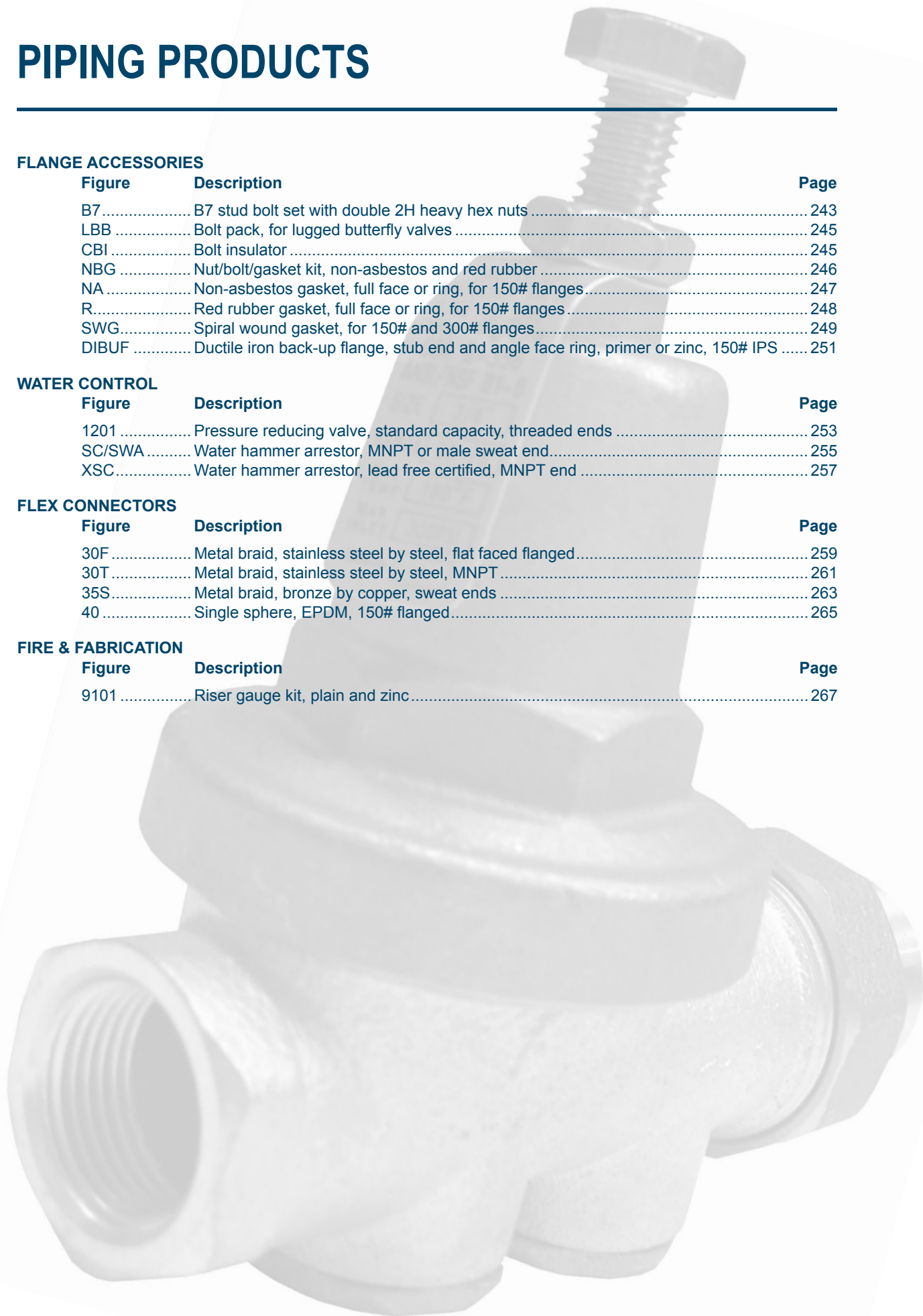
Figure	Description	Page
1201.....	Pressure reducing valve, standard capacity, threaded ends.....	253
SC/SWA.....	Water hammer arrestor, MNPT or male sweat end.....	255
XSC.....	Water hammer arrestor, lead free certified, MNPT end.....	257

FLEX CONNECTORS

Figure	Description	Page
30F.....	Metal braid, stainless steel by steel, flat faced flanged.....	259
30T.....	Metal braid, stainless steel by steel, MNPT.....	261
35S.....	Metal braid, bronze by copper, sweat ends.....	263
40.....	Single sphere, EPDM, 150# flanged.....	265

FIRE & FABRICATION

Figure	Description	Page
9101.....	Riser gauge kit, plain and zinc.....	267



B7 STUD BOLT WITH GRADE 2H HEAVY HEX NUTS ASSEMBLED

Features

- Sold in Individual Sets or Box Quantities
- Studs:
 - Grade B7
 - Full Threaded Rod Stud Bolts
 - Chamfered Flat Faced Ends
 - Manufactured from Chromium-Molybdenum Ferritic Alloy Steel
 - Tensile Strength: 125 KSI Min.
 - Hardness 35 HRC Max.
- Nuts:
 - Grade 2H
 - Heavy Hex
 - Single-Chamfered with Bottom Washer Face
 - Manufactured from Carbon Steel
 - Rockwell Hardness: C24 to C38
- Threads:
 - 1" Diameter & Smaller - Unified Inch Coarse Series (UNC), Class 2A
 - 1-1/8" Diameter & Larger - Unified Inch 8 Thread Series (UN8), Class 2A
- Plain Finish Coated with Light Protective Oil
- Right Hand Threads
- Heat Treated
- Manufacturer Identification and Grade Marks on All Stocked Studs and Nuts
- Studs and Nuts are Heat Code Traceable
- Material Test Reports (MTRs) Available on Demand (for box quantities only)*
- Stud and Nut Sets are Lot Number Traceable (for box quantities only)*



Markings

Studs and nuts are marked per ASTM requirements

- Manufacturer Mark: HY (hex nut marks can vary)
- Stud Grade Mark: B7
- Hex Nut Grade Mark: 2H



Standards

- Studs:
 - Material & Mechanical Properties: ASTM A193 Grade B7
 - Threads: ASME B1.1, UNC or UN8, Class 2A
- Nuts:
 - Material & Mechanical Properties: ASTM A194 Grade 2H
 - Dimensions: ASME B18.2.2

* Heat codes and lot numbers are listed on box labels. Open box contents throughout the distribution system can not be guaranteed, therefore MTRs are only available on full box quantities and must be requested at time of order.

Figure Number Matrix

FNW B7 D075 L0550		
DIAMETER	LENGTH	
1/2" = D050	2-1/2" = L0250	5" = L0500
5/8" = D062	2-3/4" = L0275	5-1/4" = L0525
3/4" = D075	3" = L0300	5-1/2" = L0550
7/8" = D087	3-1/4" = L0325	6" = L0600
1" = D100	3-1/2" = L0350	6-1/2" = L0650
1-1/8" = D112	3-3/4" = L0375	6-3/4" = L0675
1-1/4" = D125	4" = L0400	7" = L0700
1-1/2" = D150	4-1/4" = L0425	7-1/2" = L0750
	4-1/2" = L0450	8" = L0800
	4-3/4" = L0475	9" = L0900

Note: Not all combinations of diameter by length are stocked. See back page for a list of stocked model numbers. 1-1/8" & larger stud sets are UN8 threads.

B7 STUD BOLT WITH GRADE 2H HEAVY HEX NUTS ASSEMBLED

Part Numbers & Dimensions

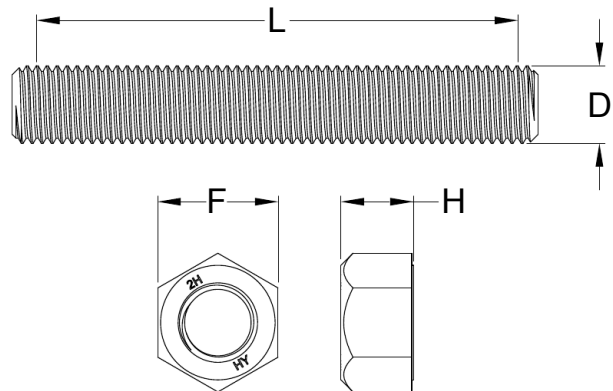
Part Numbers	D (inch) (UNC)*	L (inch)	F (inch)	H (inch)	Weight Per Set (lbs.)	Box Qty
FNWB7D050L0250	1/2 - 13	2-1/2	7/8	31/64	0.25	100
FNWB7D050L0275		2-3/4			0.27	100
FNWB7D050L0300		3			0.28	96
FNWB7D062L0300	5/8 - 11	3	1-1/16	39/64	0.47	54
FNWB7D062L0325		3-1/4			0.49	54
FNWB7D062L0350		3-1/2			0.50	50
FNWB7D062L0375		3-3/4			0.52	50
FNWB7D062L0400		4			0.54	50
FNWB7D062L0450		4-1/2			0.57	46
FNWB7D075L0350	3/4 - 10	3-1/2	1-1/4	47/64	0.78	32
FNWB7D075L0375		3-3/4			0.80	32
FNWB7D075L0400		4			0.83	30
FNWB7D075L0425		4-1/4			0.85	30
FNWB7D075L0450		4-1/2			0.88	30
FNWB7D075L0475		4-3/4			0.90	30
FNWB7D075L0550		5-1/2			0.98	24
FNWB7D075L0600		6			1.03	24
FNWB7D087L0450	7/8 - 9	4-1/2	1-7/16	55/64	1.27	20
FNWB7D087L0475		4-3/4			1.31	20
FNWB7D087L0550		5-1/2			1.41	18
FNWB7D087L0600		6			1.48	18
FNWB7D087L0800		8			1.77	14
FNWB7D087L0850		8-1/2			1.84	14
FNWB7D100L0525	1 - 8	5-1/4	1-5/8	63/64	1.87	14
FNWB7D100L0650		6-1/2			2.11	12
FNWB7D112L0600	1-1/8 - 8	6	1-13/16	1-7/64	2.69	10
FNWB7D112L0650		6-1/2			2.81	8
FNWB7D112L0675		6-3/4			2.87	8
FNWB7D112L0700		7			2.93	8
FNWB7D125L0700	1-1/4 - 8	7	2	1-7/32	3.76	6
FNWB7D125L0750		7-1/2			3.91	6
FNWB7D125L0800		8			4.06	6
FNWB7D150L0900	1-1/2 - 8	9	2-3/8	1-15/32	6.74	4

* Diameters 1-1/8" and larger are UN8

Recommended Lengths for Flanges

Flange Size	Stud Size Per Flange Rating*					
	150#			300#		
	Diameter (in-TPI)	Length (inch)	Qty/ Sets	Diameter (in-TPI)	Length (inch)	Qty/ Sets
1/2	1/2 - 13	2 1/2	4	1/2 - 13	2 1/2	4
3/4	1/2 - 13	2 1/2	4	5/8 - 11	3	4
1	1/2 - 13	2 1/2	4	5/8 - 11	3	4
1-1/4	1/2 - 13	2 3/4	4	5/8 - 11	3 1/4	4
1-1/2	1/2 - 13	3	4	3/4 - 10	3 1/2	4
2	5/8 - 11	3 1/4	4	5/8 - 11	3 1/2	8
2-1/2	5/8 - 11	3 1/2	4	3/4 - 10	4	8
3	5/8 - 11	3 1/2	4	3/4 - 10	4 1/4	8
4	5/8 - 11	3 3/4	8	3/4 - 10	4 1/2	8
5	3/4 - 10	3 3/4	8	3/4 - 10	4 3/4	8
6	3/4 - 10	4	8	3/4 - 10	4 3/4	12
8	3/4 - 10	4 1/4	8	7/8 - 9	5 1/2	12
10	7/8 - 9	4 1/2	12	1 - 8	6 1/2	16
12	7/8 - 9	4 3/4	12	1-1/8 - 8	6 3/4	16
14	1 - 8	5 1/4	12	1-1/8 - 8	7	20
16	1 - 8	5 1/4	16	1-1/4 - 8	7 1/2	20
18	1-1/8 - 8	6	16	1-1/4 - 8	8	24
20	1-1/8 - 8	6 1/2	20	1-1/4 - 8	8	24
24	1-1/4 - 8	7	20	1-1/2 - 8	9	24

* Per ASME B16.5, assumes 0.625" raised face and 0.12" gasket



Notes:

1. Diameters (D) up to and including 1" are UNC, Class 2A, per ASME B1.1.
2. Diameters (D) 1-1/8" and larger are UN8, Class 2A, per ASME B1.1.
3. Lengths (L) are effective thread lengths, excluding end points. Overall stud bolt length will be longer.
4. Heavy hex nut dimensions are nominal per ASME B18.2.2.

FIGURE LBB LUGGED BUTTERFLY VALVE BOLT PACKS

Features

- 150# Flanges Only
- Bolt Quantities for Two Flanges
- Carbon Steel Material
- Zinc Plated
- Sizes 2" to 12"

Standards

- Material: ASTM A307 Grade A
- Dimensions: ASME B18.2.1

Specifications

- Tensile: 60 KSI Minimum
- Elongation: 18% Minimum
- Rockwell Hardness: 69-100Rb



Figure Number Matrix

FNW LBB Z 1 Size					
FINISH	PRESSURE	SIZE CODE			
Zinc = Z	150# = 1	2 = K	4 = P	8 = X	
		2-1/2 = L	5 = S	10 = 10	
		3 = M	6 = U	12 = 12	

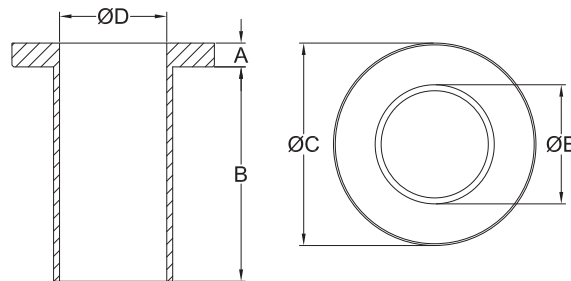
FIGURE CBI BOLT INSULATORS

Features

- Sold Individually
- Manufactured in Nylon Material
- White in Color
- For Electrical Isolation Between Flanges and Flange Bolts
- Sizes 1/2", 5/8" and 3/4"

Specifications

- Material: Mineral Reinforced Nylon 66 Resin, Minlon® 10B40 NC010
- Tensile: 13,053 PSI (ASTM D638)
- Elongation: 2.5% (ASTM D638)
- Heat Deflection Temperature:
 - 66 PSI - 482°F (ASTM D648)
 - 264 PSI - 428°F (ASTM D648)
- Melting Point: 504°F (ASTM D3418)
- Specific Gravity: 1.51 (ASTM D792)



Dimensions (inches)

Size	A	B	ØC	ØD	ØE
1/2	0.16	1.03	1.14	0.53	0.59
5/8	0.17	1.13	1.32	0.66	0.72
3/4	0.16	1.59	1.57	0.78	0.84



Figure Number Matrix

FNW CBI Size	
SIZE CODE	
1/2 = D	
5/8 = E	
3/4 = F	

NUT, BOLT, GASKET KIT

Specifications

Non-Asbestos Gaskets

- Manufactured From Aramid and Other Synthetic Fibers Bonded with Nitrile Rubber (NBR)
- Color: Green
- Meets ASME B16.21 for 150# & 300# gaskets
- Dimensions: ASME B16.5
- Max. Temperature: 750°F (400°C)
- Max. Continuous Temperature: 460°F (240°C)
- Max. Pressure: 1595 PSI (110 Bar)
- Max. Continuous Pressure: 725 (50 Bar)
- ASTM F104 Line Call Out: F712120E22M5
- Density: 109 lb/ft³ (1.75 gm/cc)
- Compressibility: 7-17%
- Recovery: min 45%
- Tensile Strength Across Grain: 1670 psi (11.5 N/mm²)
- Ignition Loss: max 34%
- Thickness Increase After 5 Hour Immersion
 - ASTM IRM 903 @ 300°F (150°C): max 12%
 - ASTM Fuel B @ 77°F (25°C): max 10%
- Weight Increase After 5 Hour Immersion
 - ASTM IRM 903 @ 300°F (150°C): max 15%
 - ASTM Fuel B @ 77°F (25°C): max 15%
- Creep Relaxation: 25%
- Sealability at 1000 PSI: 0.25 ml/h

Red Rubber Gaskets

- Manufactured From Styrene-Butadiene (SBR)
- Color/Finish: Red to Reddish Orange/Smooth
- Meets ASME B16.21 for 150# gaskets
- Dimensions: ASME B16.5
- Durometer Hardness: Shore A ±5: 75
- Tensile Strength: 400 PSI
- Elongation: 150%
- Temperature Range: -20°F to 170°F (-29°C to 77°C)
- Max. Pressure: 200 PSI (13.8 Bar)
- Max. Pressure x Temperature (°F x PSI): 20,000
- Compression Set for 22 Hrs @ 158°F (70°C) (ASTM D395B): 35%
- Heat Aging for 94 Hrs @ 158°F (70°C) (ASTM D573)
 - Change in Hardness: +5 Shore A
 - Change in Tensile: -15%
 - Change in Elongation: -35%

Bolts

- Material: Carbon Steel ASTM A307 Grade A
- Coating: Zinc Plated
- Dimensions: ASME B18.2.1
- Tensile: 60 KSI Minimum
- Elongation: 18% Minimum
- Rockwell Hardness: 69-100Rb



Nuts

- Material: Carbon Steel ASTM A563 Grade A
- Coating: Zinc Plated
- Dimensions: ASME B18.2.2

Kit Types / Size Ranges*

Non-Asbestos Kits		Red Rubber Kits	
150# 1/16" Ring Gaskets	1/2" to 20"	150# 1/16" Ring Gaskets	2" to 12"
300# 1/16" Ring Gaskets	1/2" to 20"	150# 1/16" Full Face Gaskets	2" to 16"

Figure Number Matrix**

FNW NBG Z 1 NA F 6 Size					
PRESSURE	MATERIAL	TYPE	SIZE CODE		
150# = 1	Non-Asbestos = NA	Ring = R	1/2 = D	2-1/2 = L	10 = 10
300# = 3	Red Rubber = R	Full Face = F	3/4 = F	3 = M	12 = 12
			1 = G	4 = P	14 = 14
			1-1/4 = H	5 = S	16 = 16
			1-1/2 = J	6 = U	18 = 18
			2 = K	8 = X	20 = 20

NOTE: Physical properties are nominal values obtained from laboratory test samples. Actual production values may vary. Please ensure the product meets your application specifications prior to placing an order.

* NOTE: Each kit contains components for one flange.

** NOTE: Not all configurations of model numbers may be available. Contact your supplier for specific material, rating and size combinations.

150# & 300# NON-ASBESTOS FULL FACE & RING GASKETS

Features

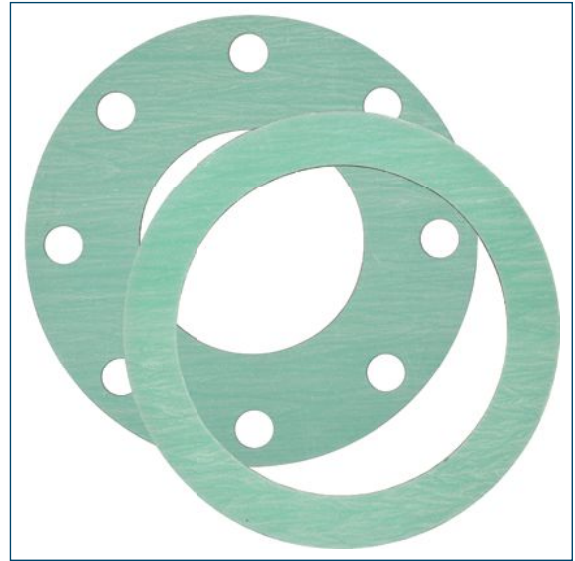
- Manufactured from compressed non-asbestos sheet gasket material
- Material is aramid and other synthetic fibers bonded with nitrile rubber (NBR)
- Manufactured through the hot calendar process under rigorous quality control standards that are registered under ISO-9001 certification

Standards

- Meets ASME B16.21 for 150# & 300# gaskets
- Dimensions: ASME B16.5

Service Limits

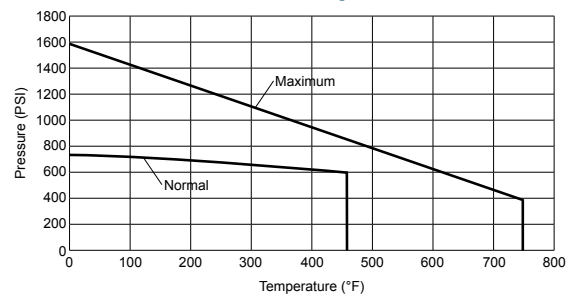
- Max. Temperature: 750°F (400°C)
- Max. Continuous Temperature: 460°F (240°C)
- Max. Pressure: 1595 PSI (110 Bar)
- Max. Continuous Pressure: 725 (50 Bar)
- ASTM F104 Line Call Out: F712120E22M5



Typical Physical Properties

ASTM Test Method	Property	Value
-	Density	109 lb/ft³ (1.75 gm/cc)
F36	Compressibility	7-17%
F36	Recovery	min 45%
F38	Tensile Strength Across Grain	1670 psi (11.5 N/mm²)
F495	Ignition Loss	max 34%
F146	Thickness Increase After 5 Hour Immersion ASTM IRM 903 @ 300°F (150°C) ASTM Fuel B @ 77°F (25°C)	max 12% max 10%
F146	Weight Increase After 5 Hour Immersion ASTM IRM 903 @ 300°F (150°C) ASTM Fuel B @ 77°F (25°C)	max 15% max 15%
F38	Creep Relaxation	25%
F37	Sealability at 1000 PSI	0.25 ml/h

Pressure / Temperature



The pressure/temperature chart shown indicates the service limits for the gaskets considering pressure and temperature simultaneously (Tests were performed with nitrogen on 1.6mm [1/16"] thick sheet). The normal curve represents the common usage area for the gaskets while the maximum curve indicates the maximum limits. For applications near or above the maximum curve, contact FNW.

Figure Number Matrix

FNW NA 1 FFG A Size							
PRESSURE	TYPE	THICKNESS	SIZE CODE				
150# = 1	Ring Gasket = RG	1/16" = 116	1/2 = D	2 = K	6 = U	16 = 16	
300# = 3	Full Face Gasket = FFG	1/8" = A	3/4 = F	2-1/2 = L	8 = X	18 = 18	
			1 = G	3 = M	10 = 10	20 = 20	
			1-1/4 = H	4 = P	12 = 12	24 = 24	
			1-1/2 = J	5 = S	14 = 14	30 = 30	

* NOTE: Not all configurations of model numbers may be available. Contact your supplier for specific rating and size combinations.

150# RED RUBBER FULL FACE & RING GASKETS

Features

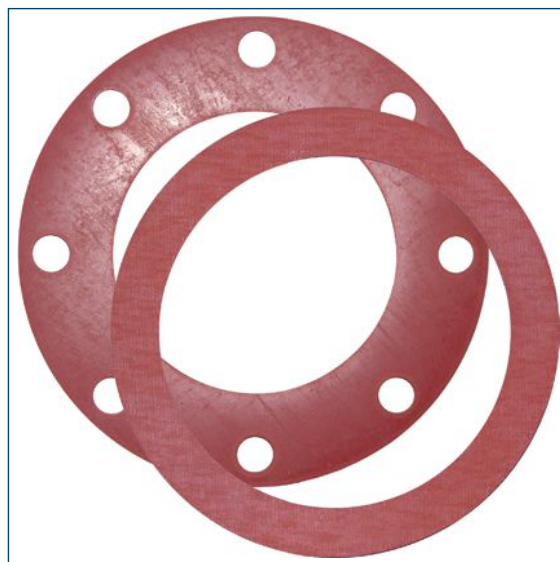
Red rubber gaskets are manufactured from Styrene-Butadiene or SBR for short. This synthetic material was developed as an alternative to natural rubbers. The red rubber gaskets are recommended for service in cold and hot water, air, steam, and some weak acids. It should not be used with strong acids, oils, grease, and chlorates. It offers little resistance to ozone and to the majority of hydrocarbons.

Standards

- Meets ASME B16.21 for 150# gaskets
- Dimensions: ASME B16.5

Service Limits

- Max. Temperature: 170°F (77°C)
- Min. Temperature: -20°F (-29°C)
- Max. Pressure: 200 PSIG (13.8 Bar)
- Max Pressure x Temperature (PxT) - 20,000 (°F x PSIG)



Typical Physical Properties

Property	Value
Durometer Hardness	75 Shore A ± 5
Tensile	400 PSI
Elongation	150%
Finish	Smooth
Compression Set for 22 Hrs @ 158°F (70°C) (ASTM D395B)	35%
Heat Aging for 94 Hrs @ 158°F (70°C) (ASTM D573)	
Change in Hardness	+5 Shore A
Change in Tensile	-15%
Change in Elongation	-35%

Properties and application parameters shown on this data sheet are typical. Failure to select proper sealing products could result in property damage and/or serious personal injury.

Figure Number Matrix

FNW R 150 FFG A Size					
TYPE	THICKNESS		SIZE CODE		
Ring Gasket = RG	1/16" = 116	1/2 = D	2 = K	6 = U	16 = 16
Full Face Gasket = FFG	1/8" = A	3/4 = F	2-1/2 = L	8 = X	18 = 18
		1 = G	3 = M	10 = 10	20 = 20
		1-1/4 = H	4 = P	12 = 12	24 = 24
		1-1/2 = J	5 = S	14 = 14	30 = 30

* NOTE: Not all configurations of model numbers may be available. Contact your supplier for specific rating and size combinations.

SPIRAL-WOUND GASKETS

DESCRIPTION

The FNW figure SWG spiral-wound gaskets are made of a preformed metallic v-shaped strip and a soft filler material wound together under pressure, with an outer guide ring.

CONSTRUCTION

The winding is manufactured in the form of a spiral with filler material between the windings. The filler materials fill the irregularities of the flanges. The external guide ring has the function of centering the gasket in the flanges and gives the sealing elements additional resistance against line pressure and excessive bolt torque.

APPLICATION / SERVICE

FNW spiral-wound gaskets are made for applications with high temperature variations (thermal cycling), and/or pressure variations, and/or flange rotation problems etc., and where gaskets with adequate residual stress (stress retention) and flexibility are needed.

Features

- Manufactured According To ASME B16.20
- Designed For Use In ASME B16.5 Flanges
- Fire Resistant
- Stainless Steel Windings
(AISI 304 or AISI 316)
- Flexible Graphite Filler - GRAFLEX®
- Carbon Steel Outer Guide Ring
(with Zinc Dichromate Coating)
- Maximum Temperature: 842°F
- Maximum Pressure: Per ASME B16.5
- 1/2" To 3" 300# Gaskets Are Multirated & Stamped "3/600#"

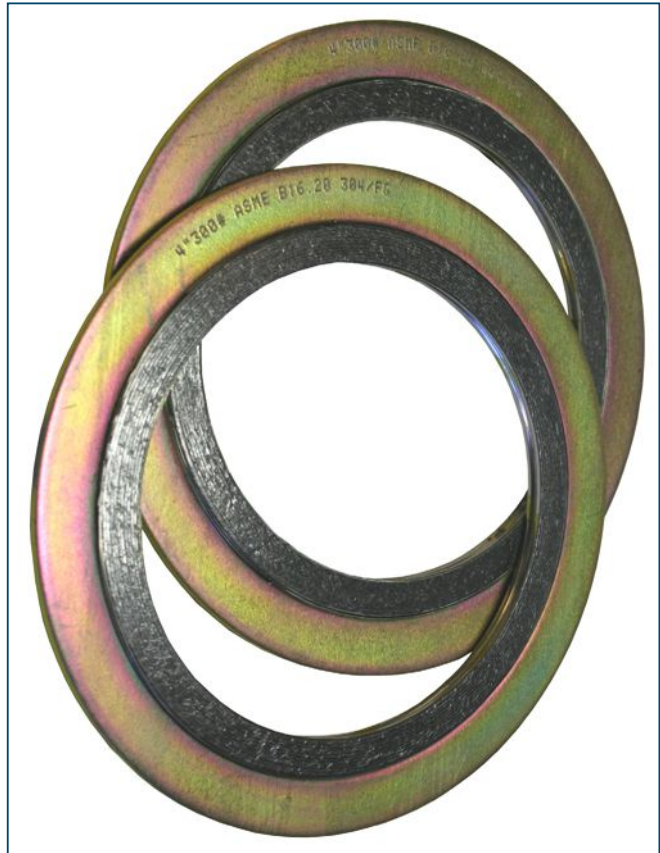


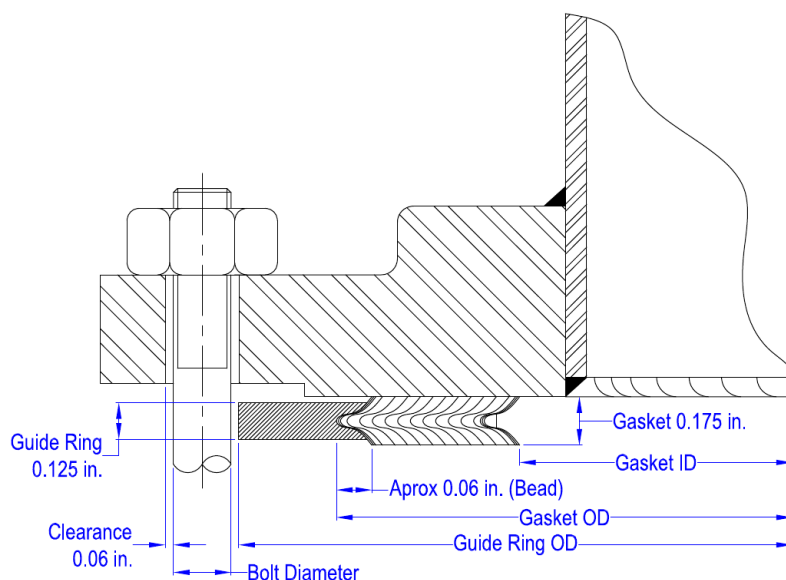
Figure Number Matrix

FNW SWG CLASS WINDING FILLER SIZE						COLOR CODES		
CLASS	WINDING	FILLER		SIZE		Continuous color on guide ring edge denotes winding material.		
1 = 150#	4 = 304SS	F = FLEXIBLE GRAPHITE	D = 1/2	M = 3	14 = 14	YELLOW = 304SS		
3 = 300# *	6 = 316SS		F = 3/4	P = 4	16 = 16	GREEN = 316SS		
* 1/2" To 3" 300# Gaskets Are Multirated & Stamped "3/600#"			G = 1	S = 5	18 = 18	Intermittent stripe on guide ring edge denotes filler material.		
			H = 1-1/4	U = 6	20 = 20			
			J = 1-1/2	X = 8	24 = 24	GRAY = FLEXIBLE GRAPHITE		
			K = 2	10 = 10				
			L = 2-1/2	12 = 12				
Other configurations are available POA. For spiral-wound gaskets with inner guide rings, alternate materials, or non-standard dimensions, contact an FNW sales associate at (503) 287-8383.								

SPIRAL-WOUND GASKETS

Dimensions (inches)

Size	Gasket			Guide Ring	
	OD	ID		OD	
	Cls 150 & 300	Cls 150	Cls 300	Cls 150	Cls 300
1/2	1.25	0.75	0.75	1.88	2.13
3/4	1.56	1.00	1.00	2.25	2.63
1	1.88	1.25	1.25	2.63	2.88
1-1/4	2.38	1.88	1.88	3.00	3.25
1-1/2	2.75	2.13	2.13	3.38	3.75
2	3.38	2.75	2.75	4.13	4.38
2-1/2	3.88	3.25	3.25	4.88	5.13
3	4.75	4.00	4.00	5.38	5.88
4	5.88	5.00	5.00	6.88	7.13
5	7.00	6.13	6.13	7.75	8.50
6	8.25	7.19	7.19	8.75	9.88
8	10.38	9.19	9.19	11.00	12.13
10	12.50	11.31	11.31	13.38	14.25
12	14.75	13.38	13.38	16.13	16.63
14	16.00	14.63	14.63	17.75	19.13
16	18.25	16.63	16.63	20.25	21.25
18	20.75	18.69	18.69	21.63	23.50
20	22.75	20.69	20.69	23.88	25.75
24	27.00	24.75	24.75	28.25	30.50



Flange Sealing Surface

Although most commercial flange finishes can be used, the following are considered most appropriate for FNW spiral-wound gaskets.

Media	Flange Sealing Surface Finish (Ra)	
	μ m	μ in
General Use	6.3	250
Dangerous Service & Gases	3.2	125

Note: The sealing surface of flanges cannot have scratches or radial tool marks going from the inside to the outside diameter. These irregularities make the sealing very difficult for any style of gasket and especially for spiral-wound gaskets. **A smooth and polished surface can permit the gasket to inward buckle and should be avoided.**

Bolting Calculation

For ASME Code Calculations

Gasket Factor (m value)	3.00
Minimum Design Seating Stress (y value)	10,000 PSI
Maximum Seating Stress*	30,000 PSI

* Note: Per Division 2 Section VIII of the ASME Pressure Vessel and Boiler Code, the Maximum Gasket Stress or $S_{g(max)}$ value should not exceed the Maximum Seating Stress.

150# IPS DUCTILE IRON BACK-UP FLANGES

Features

- 150# Drilling
- IPS Sizes
- Types:
 - Stub End (SE) - 1/2" to 36"
 - Angle Face Ring (AFR) - 1" to 36"
- Finishes:
 - Red Primer Painted
 - Hot Dipped Galvanized
- Light Weight Pattern

Materials

- ASTM A536 grade 65-45-12

Physical Properties

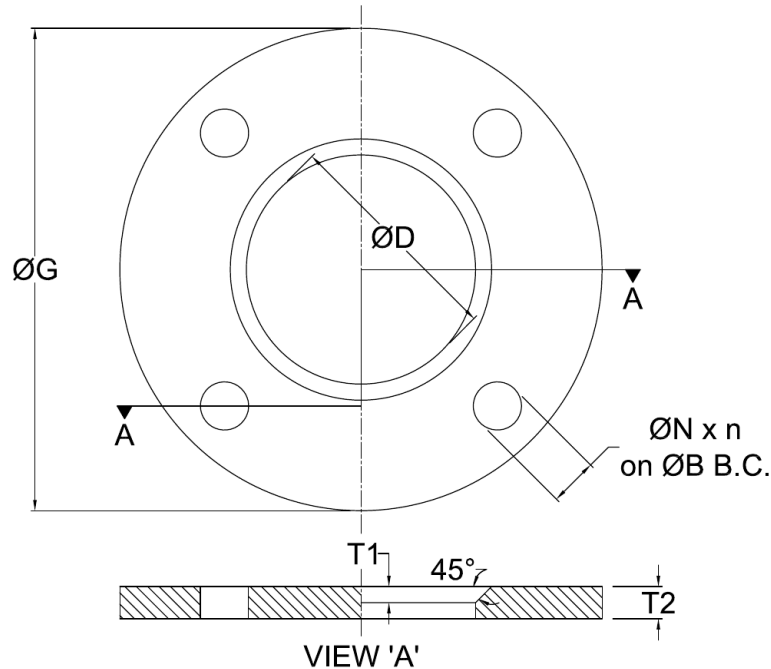
- Tensile Strength: 65 KSI min.
- Yield Strength: 45 KSI min.
- Elongation: 12% min.



Figure Number Matrix

FNW G DI TYPE BUF IPS SIZE					
FINISH	TYPE	SIZE CODE			
RED PRIMER = P	STUB END = BLANK	1/2 = D	2-1/2 = L	8 = X	18 = 18
GALVANIZED = G	ANGLE FACE RING = AFR	3/4 = F	3 = M	10 = 10	20 = 20
		1 = G	4 = P	12 = 12	24 = 24
		1-1/2 = J	5 = S	14 = 14	30 = 30
		2 = K	6 = U	16 = 16	36 = 36

150# IPS DUCTILE IRON BACK-UP FLANGES



Dimensions (inches)

Size	ØD		ØG ± 0.118	$T1$	$T2$	$T2$ Tolerance	ØB ± 0.059	ØN $+ 0.079$	n	Wt. (Lbs.)
	SE (IPS) $+0.079$	AFR $+ 0.079$								
1/2	0.90		3.50	0.25	0.500	± 0.079	2.375	0.625	4	
3/4	1.11		3.88	0.25	0.500	± 0.079	2.750	0.625	4	
1	1.375	1.750	4.25	0.25	0.500	± 0.079	3.125	0.625	4	1.1
1-1/2	1.969	2.375	5.00	0.25	0.500	± 0.079	3.875	0.625	4	1.7
2	2.437	2.750	6.00	0.25	0.500	± 0.079	4.750	0.750	4	2.9
2-1/2	2.937	3.250	7.00	0.25	0.500	± 0.079	5.500	0.750	4	3.8
3	3.563	4.000	7.50	0.25	0.500	± 0.079	6.000	0.750	4	4
4	4.563	5.125	9.00	0.25	0.500	± 0.079	7.500	0.750	8	5.3
5	5.625	6.063	10.00	0.25	0.500	± 0.079	8.500	0.875	8	7
6	6.750	7.250	11.00	0.25	0.625	± 0.079	9.500	0.875	8	8
8	8.750	9.375	13.50	0.25	0.625	± 0.079	11.750	0.875	8	11.4
10	10.875	11.375	16.00	0.25	0.625	± 0.079	14.250	1.000	12	14.1
12	12.875	13.625	19.00	0.25	0.750	± 0.079	17.000	1.000	12	23.8
14	14.187	14.750	21.00	0.25	0.750	± 0.118	18.750	1.125	12	30.9
16	16.187	16.880	23.50	0.25	0.750	± 0.118	21.250	1.125	16	40
18	18.187	18.750	25.00	0.25	0.750	± 0.118	22.750	1.250	16	43.5
20	20.250	20.750	27.50	0.25	0.875	± 0.118	25.000	1.250	20	53
24	24.250	24.750	32.00	0.25	1.000	± 0.157	29.500	1.375	20	80
30	30.375	30.875	38.75	0.25	1.000	± 0.157	36.000	1.375	28	104
36	36.500	36.875	45.50	0.25	1.125	± 0.157	42.750	1.625	32	150

Figure 1201 PRESSURE REDUCING VALVES

FNW™

STANDARD CAPACITY WATER PRV BRASS w/FEMALE UNION INLET

The FNW figure 1201 water pressure reducing valves are designed to reduce incoming water pressure to an appropriate, safe level. Reduced water pressure decreases water consumption and protects plumbing system components. The 1201 is suitable for water supply pressures up to 300 PSI (2,068 kPa) with an adjustable output of 25 to 75 PSI (172 to 517 kPa). The setting from the factory is 50 PSI (345 kPa). Components are serviceable while the valve is in-line, including the integral stainless steel strainer. When downstream pressure exceeds inlet pressure due to thermal expansion, the built-in by-pass permits water flow back through the valve to the main.

Features:

- Max. Working Pressure: 300 PSI
- Max. Working Water Temperature: 160°F
- Adjustable Reduced Pressure Range: 25 - 75 PSI
- Factory Preset: 50 PSI
- Built-in By-pass for Thermal Expansion Control
- Internal High-capacity Stainless Steel Strainer
- Replaceable Stainless Steel Seat
- High-temperature Resistant Diaphragm
- In-line Serviceable
- Threaded Female Union Inlet with Gasket
- Concealed Diaphragm
- Corrosion Resistant Adjustment Hardware

Standards:

- ASSE Standard 1003 (ANSI A112.26.2)
- CSA Standard B356
- IAPMO Listed (UPC)
- ANSI/NSF61-8



Figure Number Matrix

FNW 1201 Size

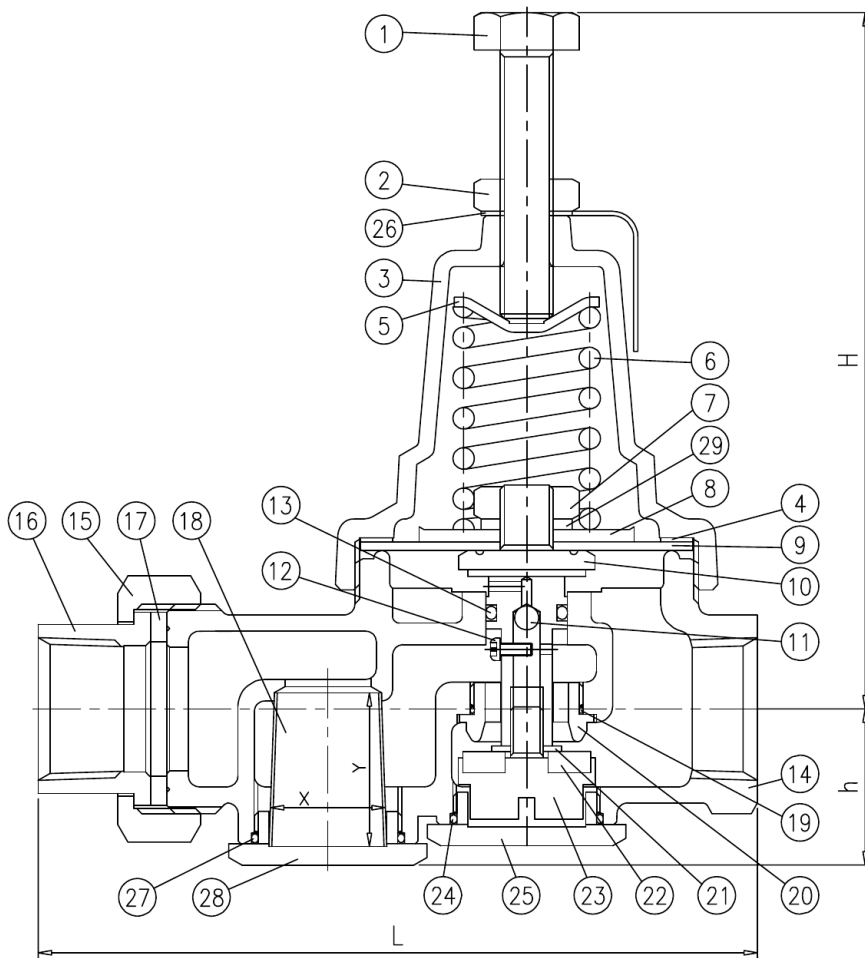
SIZE CODE

1/2 = D

3/4 = F

1 = G

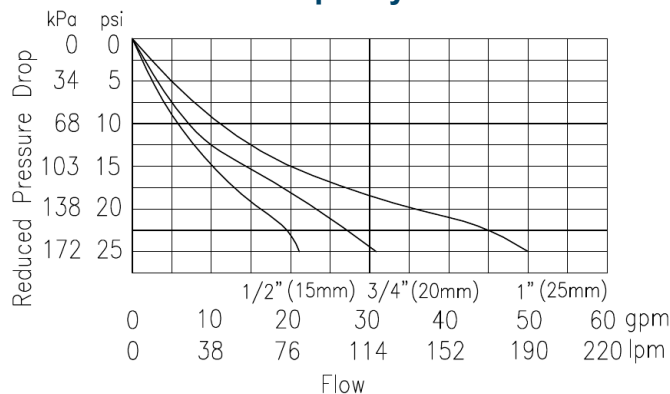
STANDARD CAPACITY WATER PRV BRASS w/FEMALE UNION INLET



Standard Materials

No.	Description	Material
1	Adjustment Bolt	Steel A283-D
2	Lock Nut	Steel AISI-1010
3	Bonnet	Brass B584-C85700
4	Friction Ring	Steel A283-D
5	Spring Disc	Steel A283-D
6	Spring	ASTM A227/A227M-91
7	Diaphragm Nut	Steel AISI-1010
8	Diaphragm Disc	Steel A283-D
9	Diaphragm	BUNA-N+NYLON
10	Stem	Brass B16-C36000
11	Rubber Ball	BUNA-N
12	Ball Screw	Stainless SUS304
13	Stem O-ring	BUNA-N
14	Body	Brass B584-C83600
15	Union Nut	Brass B584-C85700
16	Union	Brass B124-C37700
17	Union Gasket	NBR
18	Strainer	Stainless SUS304
19	Seat O-ring	BUNA-N
20	Seat	Stainless SUS304
21	Plunger Washer	Stainless SUS304
22	Plunger Seal	BUNA-N
23	Plunger	Brass B16-C36000
24	Cap O-ring	BUNA-N
25	Cap	Brass B124-C37700
26	Name Plate	Aluminum B209-1100
27	Strainer Cap O-ring	BUNA-N
28	Strainer Cap	Brass B124-C37700
29	Spring Washer	ASTM A227/A227M-91

Capacity



Dimensions (inches)

Size	L	H	h	Strainer Info.			Wt. (lbs.)
				X	Y	Mesh	
1/2	5.28	5.12	1.14	1.18	0.87	24	3.03
3/4	5.28	5.12	1.14	1.18	0.87	24	2.99
1	6.26	5.71	1.54	1.50	1.02	20	4.72

WATER HAMMER ARRESTORS

Applications:

The FNW water hammer arrestors are engineered devices that provide maintenance-free continuous protection systems against water hammer. Water hammer is a hydraulic shock wave generated within a water distribution system due to a sudden stop in water flow. If allowed to exist for any length of time, water hammer can cause pipes to rattle, is capable of bursting pipe, and damaging other components within the system. When installed properly, there is an unobstructed shock path to the arrestor that is absorbed by a piston driven and isolated cushion of air.

Features:

- Max. Pressure: 600 PSI
- Working Pressure: 60 to 400 PSI
- Temperature: 33°F to 188°F (0.5°C to 87°C)
- For Commercial and Residential Systems
- Low Lead Brass
- Suitable for Potable Water Applications
- Designed for Vertical or Horizontal Installation (not to be installed in the inverted position)
- Can be installed in systems without need for access panels*
- ASSE 1010 Listed
- IAPMO Listed (UPC)

* Always check local plumbing codes to determine if access panels are required

Standards:

- ASSE Standard 1010
- IAPMO Listed (cUPC)

Warranty:

- Guaranteed for the life of the system they are installed in.



Sizing / PDI Fixture Units*

FNW Size	PDI Size Code		PDI Fixture Units
	SC	SWA	
1/2"	A	A	1 - 11
3/4"	B	B	12 - 32
1"	C	C	33 - 60
1-1/4"	D	D	61 - 113
1-1/2"	E		114 - 154
2"	F		155 - 330

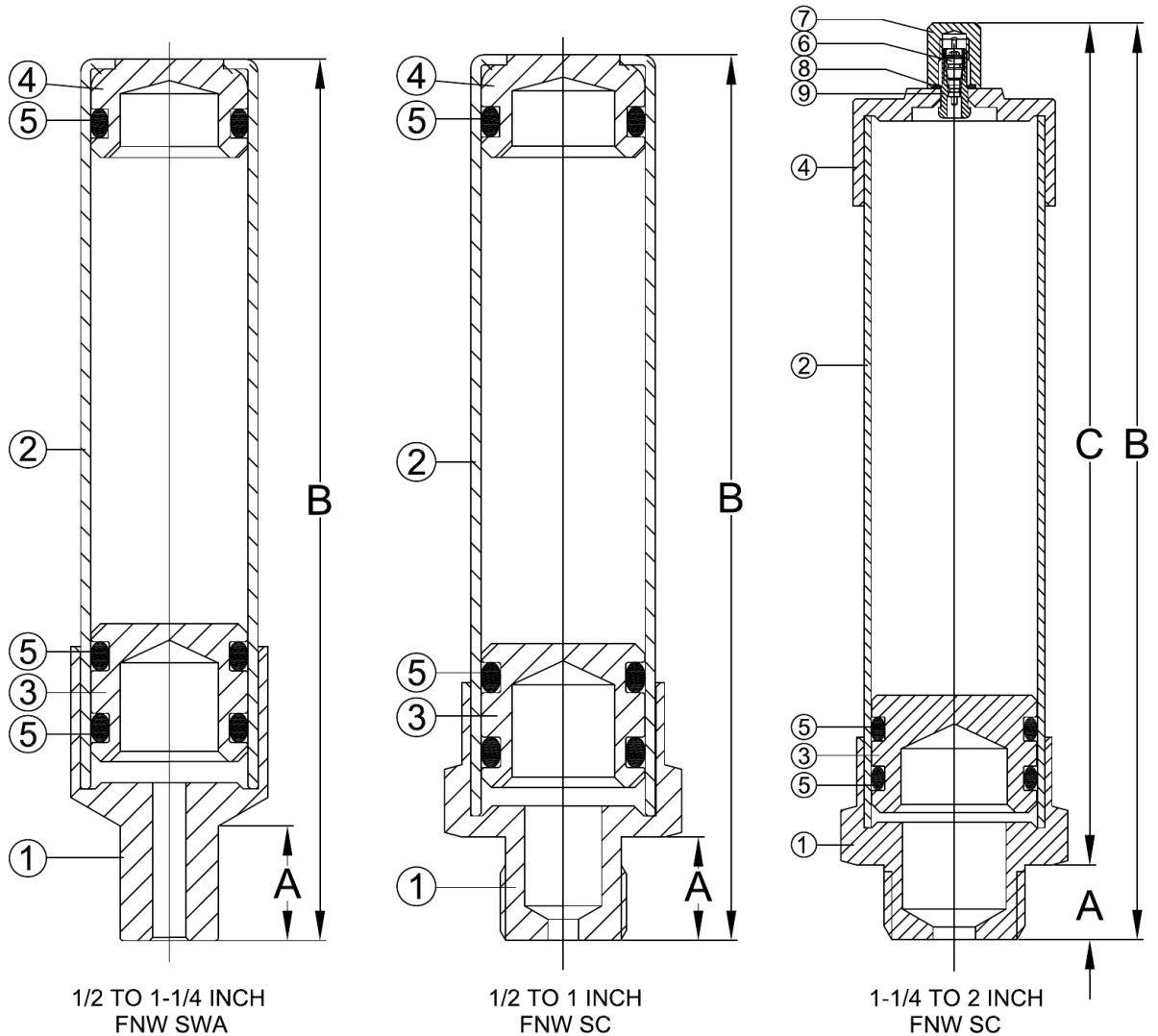
* As outlined in The Plumbing and Drainage Institute standard PDI-WH 201 revision 1992. See the FNW water hammer arrestor IOM for more details.

Figure Number Matrix

FNW End Size			
END TYPE		SIZE CODE	
SC = MALE NPT (1/2" to 2")	SWA = COPPER SWEAT (1/2" to 1-1/4")	1/2 = 500	1-1/4 = 1250
		3/4 = 750	1-1/2 = 1500
		1 = 1000	2 = 2000



WATER HAMMER ARRESTORS



Dimensions (inches)

Size	SWA (Sweat)		SC (MNPT)			
	A	B	A	B	C	TPI
1/2	0.73	5.60	0.63	5.39		14
3/4	0.81	5.60	0.65	7.54		14
1	0.98	7.78	0.81	8.15		11.5
1-1/4	1.10	8.32	0.88	10.79	9.91	11.5
1-1/2			0.94	11.47	10.53	11.5
2			0.89	14.84	13.95	11.5

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass JIS3602	1
2	Cylinder	Copper C12200	1
3	Piston	Brass JIS3602	1
4	Cylinder Cap	Brass JIS3602	1
5	O-ring	EPDM	2 to 3
6	Valve	Stainless Steel	1 (SC Only)
7	Valve Cap	Brass JIS3602	1 (SC Only)
8	Cap O-ring	EPDM	1 (SC Only)
9	Retainer	Brass JIS3602	1 (SC Only)

LOW LEAD COMPLIANT WATER HAMMER ARRESTORS

Applications:

The FNW water hammer arrestors are engineered devices that provide maintenance-free continuous protection systems against water hammer. Water hammer is a hydraulic shock wave generated within a water distribution system due to a sudden stop in water flow. If allowed to exist for any length of time, water hammer can cause pipes to rattle, is capable of bursting pipe, and damaging other components within the system. When installed properly, there is an unobstructed shock path to the arrestor that is absorbed by a piston driven and isolated cushion of air.

Features:

- AB 1953 Certified (IAPMO)
- Max. Pressure: 600 PSI
- Working Pressure: 60 to 400 PSI
- Temperature: 33°F to 188°F (0.5°C to 87°C)
- For Commercial and Residential Systems
- Low Lead Brass
- Suitable for Potable Water Applications
- Designed for Vertical or Horizontal Installation (not to be installed in the inverted position)
- Can be installed in systems without need for access panels*
- ASSE 1010 Listed
- IAPMO Listed (UPC)

* Always check local plumbing codes to determine if access panels are required

Standards:

- ASSE Standard 1010
- IAPMO Listed (cUPC)

Warranty:

- Guaranteed for the life of the system they are installed in.



Conforms to California law AB 1953 requirements for lead free content.

Note: Lead free refers to the wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25%. Source: California Health and Safety Code (116875).

Sizing / PDI Fixture Units*

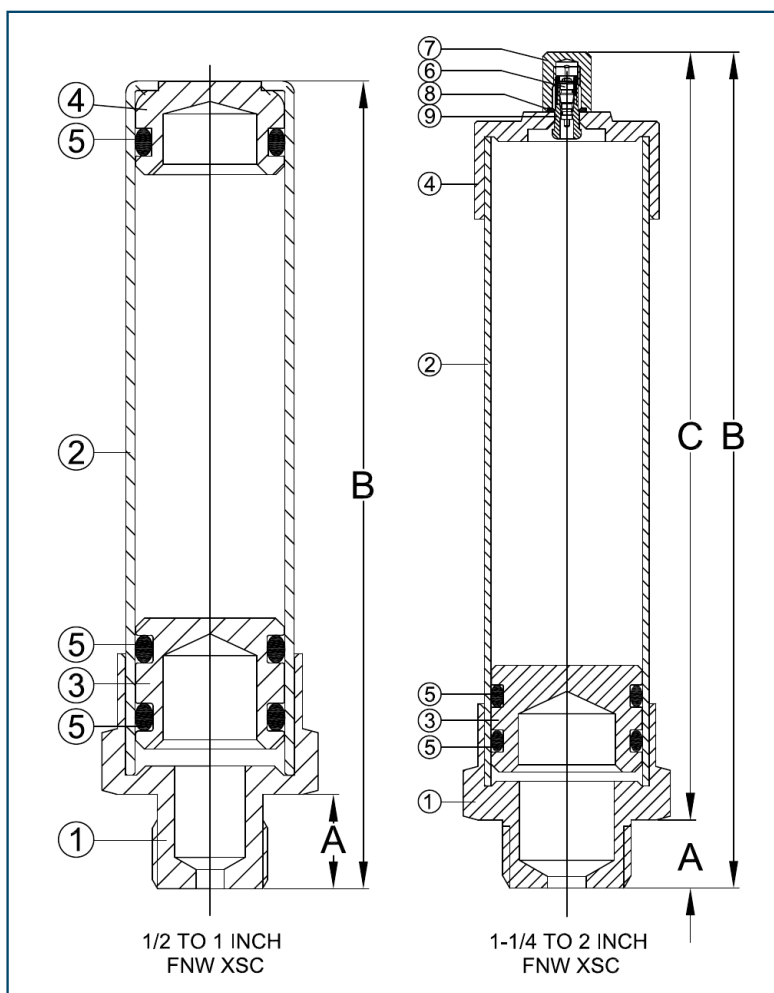
FNW Size	PDI Size Code	PDI Fixture Units
1/2"	A	1 - 11
3/4"	B	12 - 32
1"	C	33 - 60
1-1/4"	D	61 - 113
1-1/2"	E	114 - 154
2"	F	155 - 330

* As outlined in The Plumbing and Drainage Institute standard PDI-WH 201 revision 1992. See the FNW water hammer arrestor IOM for more details.

Figure Number Matrix

FNW XSC Size	
SIZE CODE	
1/2 = 500	1-1/4 = 1250
3/4 = 750	1-1/2 = 1500
1 = 1000	2 = 2000

LOW LEAD COMPLIANT WATER HAMMER ARRESTORS



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass, Modified JIS C6802 *	1
2	Cylinder	Copper C12200	1
3	Piston	Brass, Modified JIS C6802 *	1
4	Cylinder Cap	Brass, Modified JIS C6802 *	1
5	O-ring	EPDM	2 - 3
6	Valve	Stainless Steel	1
7	Valve Cap	Brass, Modified JIS C6802 *	1
8	Cap O-ring	EPDM	1
9	Retainer	Brass, Modified JIS C6802 *	1

Dimensions (inches)

Size	A	B	TPI (MNPT)
1/2	0.63	5.39	14
3/4	0.65	7.54	14
1	0.81	8.15	11.5
1-1/4	0.88	10.79	11.5
1-1/2	0.94	11.47	11.5
2	0.89	14.84	11.5

* Chemical Content by Percentage is:

Cu	Bi	Pb	Sn	P	Fe	Cd	Hg	Zn
59 - 62	< 1.5	< 0.08	0.2-2.5	< 0.2	< 0.7	< 0.008	< 0.003	Rem.

FLANGED END METAL BRAIDED FLEXIBLE CONNECTOR

Flexible connectors are used to absorb thermal and seismic movement, absorb hydraulic shock, provide vibration and noise dampening, ease installation and correct minor misalignment of piping and components. They come in a variety of sizes, materials, and connection ends for numerous applications.

The inner hose is an annular (bellows) design. An annular hose is better suited for pump connections because it can better sustain torsion stress due to longitudinal expansion from rises in pressure. Metal wire braid on a hose assembly restrains against hose elongation under higher pressures and acts to dampen vibration. A heavy braid also increases abrasion resistance. Optimal braid coverage will contain the core under pressure and reduce the possibility of twisting and squirming.

The use of braided metal connectors for applications such as pumps, compressors and other mechanical equipment can enhance the overall operation of a system.

Braided connectors have the advantages of:

- Longer service life
- Increased pressure capacity
- Greater fatigue resistance due to flex
- Increased temperature capacity of media
- Greater protection of annular hose
- Acceptance of thermal expansion



Pressure / Temperature

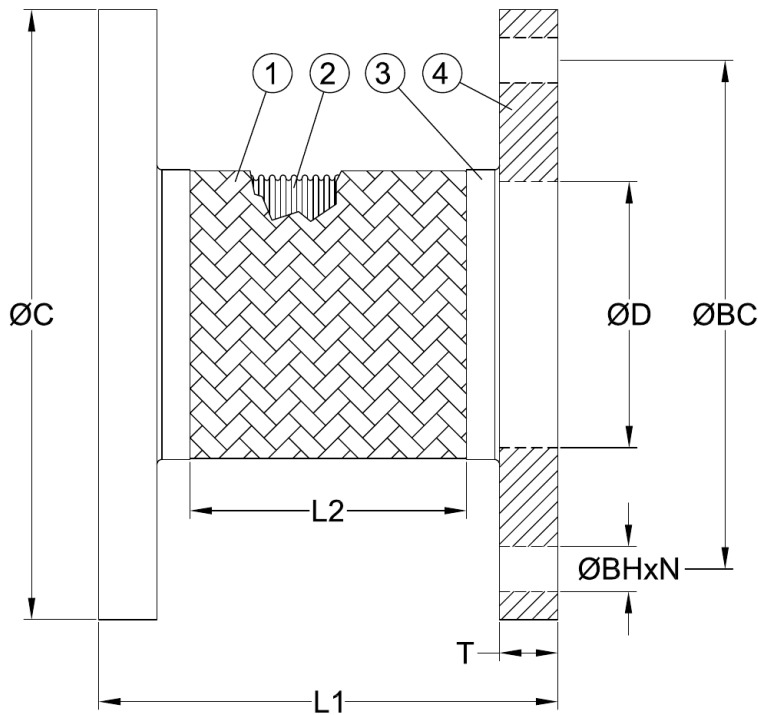
Size	Pressure @ 70°F		Pressure Factors for Above 70°F*			
	Working PSI	Test PSI	°F	Factor	°F	Factor
2	455	683	100	0.99	450	0.81
2-1/2	345	518	150	0.96	500	0.79
3	290	435	200	0.94	550	0.76
4	250	375	250	0.92	600	0.74
5	200	300	300	0.89	650	0.72
6	210	315	350	0.86	800	0.66
8	190	285	400	0.84	1000	0.60
10	150	225				

* Multiply working pressure by pressure factor for temperature adjusted pressure rating.

Part Numbers & Weight

Size	Part Number	Approx. Wt (Lbs)
2	FNW30FK	12
2-1/2	FNW30FL	13
3	FNW30FM	14
4	FNW30FP	19
5	FNW30FS	27
6	FNW30FU	32
8	FNW30FX	50
10	FNW30F10	76

FLANGED END METAL BRAIDED FLEXIBLE CONNECTOR



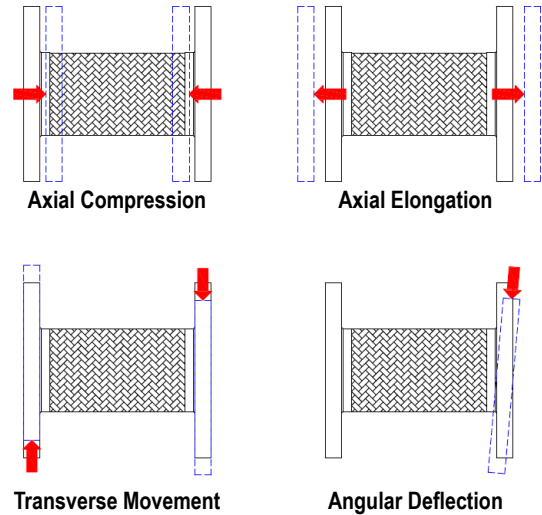
Dimensions (inches)

Size	ØC	ØD	L1	L2	ØBC	ØBH	N	T
2	6.0	2.44	9	5.78	4.75	0.75	4	0.62
2-1/2	7.0	2.94	9	5.78	5.50	0.75	4	0.62
3	7.5	3.57	9	5.78	6.00	0.75	4	0.62
4	9.0	4.57	9	5.39	7.50	0.75	8	0.62
5	10.0	5.66	11	7.14	8.50	0.87	8	0.75
6	11.0	6.72	11	6.74	9.50	0.87	8	0.75
8	13.5	8.72	12	7.24	11.75	0.87	8	1.00
10	16.0	10.88	13	7.85	14.25	1.00	12	1.00

Standard Materials

Ref. No.	Description	Material
1	Hose Braid	304 Stainless Steel
2	Corrugated Hose	321 Stainless Steel
3	Braid Band	304 Stainless Steel
4	Flange	Carbon Steel
5	Welding	Grade er308 Stainless

Braid Limits



Size	Maximum Axial Compression	Maximum Axial Elongation	Maximum Transverse Movement	Maximum Angular Deflection
2	0.16"	0.16"	±0.12"	1.5°
2-1/2	0.16"	0.16"	±0.12"	1.5°
3	0.16"	0.16"	±0.12"	1.5°
4	0.16"	0.16"	±0.12"	1.5°
5	0.20"	0.20"	±0.16"	1°
6	0.20"	0.20"	±0.16"	1°
8	0.20"	0.20"	±0.16"	1°
10	0.20"	0.20"	±0.16"	1°

Figure 30T

FLEXIBLE CONNECTORS



THREADED END METAL BRAIDED FLEXIBLE CONNECTOR

Flexible connectors are used to absorb thermal and seismic movement, absorb hydraulic shock, provide vibration and noise dampening, ease installation and correct minor misalignment of piping and components. They come in a variety of sizes, materials, and connection ends for numerous applications.

The inner hose is an annular (bellows) design. An annular hose is better suited for pump connections because it can better sustain torsion stress due to longitudinal expansion from rises in pressure. Metal wire braid on a hose assembly restrains against hose elongation under higher pressures and acts to dampen vibration. A heavy braid also increases abrasion resistance. Optimal braid coverage will contain the core under pressure and reduce the possibility of twisting and squirming.

The use of braided metal connectors for applications such as pumps, compressors and other mechanical equipment can enhance the overall operation of a system.

Braided connectors have the advantages of:

- Longer service life
- Increased pressure capacity
- Greater fatigue resistance due to flex
- Increased temperature capacity of media
- Greater protection of annular hose
- Acceptance of thermal expansion



Pressure / Temperature

Size	Pressure @ 70°F	
	Working PSI	Test PSI
1/2	1040	1560
3/4	600	900
1	580	870
1-1/4	450	675
1-1/2	410	615
2	450	675

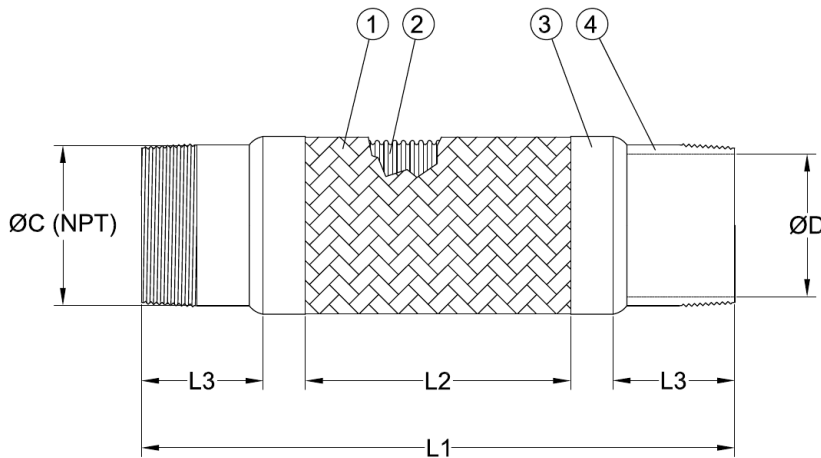
Pressure Factors for Above 70°F*			
°F	Factor	°F	Factor
100	0.99	450	0.81
150	0.96	500	0.77
200	0.94	550	0.75
250	0.92	600	0.73
300	0.89	650	0.69
350	0.86	800	0.64
400	0.84	1000	0.60

* Multiply working pressure by pressure factor for temperature adjusted pressure rating.

Part Numbers & Weight

Size	Part Number	Approx. Wt (Lbs)
1/2	FNW30TD	0.38
3/4	FNW30TF	0.50
1	FNW30TG	0.75
1-1/4	FNW30TH	1.00
1-1/2	FNW30TJ	1.25
2	FNW30TK	2.13

THREADED END METAL BRAIDED FLEXIBLE CONNECTOR

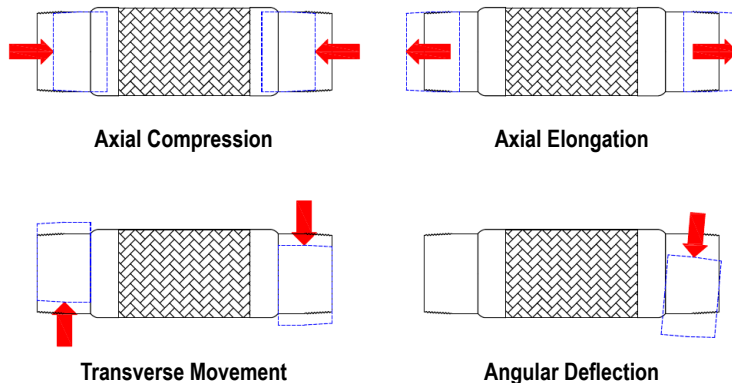


Dimensions (inches)

Size	ØC (NPT)	ØD	L1	L2	L3
1/2	1/2-14	0.55	6.5	2.56	1.18
3/4	3/4-14	0.75	7.0	2.67	1.38
1	1-11.5	0.95	8.0	3.28	1.58
1-1/4	1-1/4-11.5	1.26	8.5	3.38	1.77
1-1/2	1-1/2-11.5	1.50	9.0	3.49	1.97
2	2-11.5	1.97	10.5	4.99	1.97

Standard Materials

Ref. No.	Description	Material
1	Hose Braid	304 Stainless Steel
2	Corrugated Hose	321 Stainless Steel
3	Braid Band	304 Stainless Steel
4	Male Pipe Thread	ASTM A53 Carbon Steel
5	Welding	Grade er308 Stainless



Braid Limits

Size	Maximum Axial Compression	Maximum Axial Elongation	Maximum Transverse Movement	Maximum Angular Deflection
1/2	0.12"	0.12"	±0.08"	2°
3/4	0.12"	0.12"	±0.08"	2°
1	0.12"	0.12"	±0.08"	2°
1-1/4	0.12"	0.12"	±0.08"	1.5°
1-1/2	0.12"	0.12"	±0.08"	1.5°
2	0.16"	0.16"	±0.12"	1.5°

Figure 35S FLEXIBLE CONNECTORS

FNW™

SWEAT END METAL BRAIDED FLEXIBLE CONNECTOR

Flexible connectors are used to absorb thermal and seismic movement, absorb hydraulic shock, provide vibration and noise dampening, ease installation and correct minor misalignment of piping and components. They come in a variety of sizes, materials, and connection ends for numerous applications.

The inner hose is an annular (bellows) design. An annular hose is better suited for pump connections because it can better sustain torsion stress due to longitudinal expansion from rises in pressure. Metal wire braid on a hose assembly restrains against hose elongation under higher pressures and acts to dampen vibration. A heavy braid also increases abrasion resistance. Optimal braid coverage will contain the core under pressure and reduce the possibility of twisting and squirming.

The use of braided metal connectors for applications such as pumps, compressors and other mechanical equipment can enhance the overall operation of a system.

Braided connectors have the advantages of:

- Longer service life
- Increased pressure capacity
- Greater fatigue resistance due to flex
- Increased temperature capacity of media
- Greater protection of annular hose
- Acceptance of thermal expansion



Pressure / Temperature

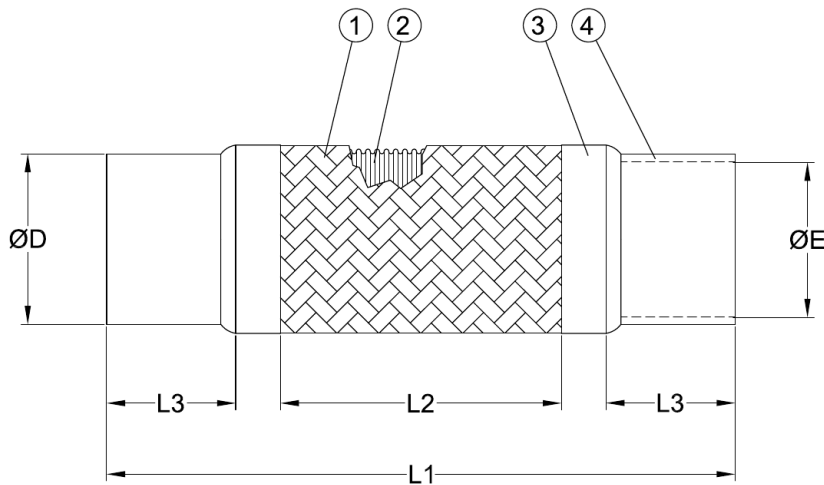
Size	Pressure @ 70°F		Pressure Factors for Above 70°F*	
	Working PSI	Test PSI	°F	Factor
3/4	375	562	100	0.95
1	390	585	150	0.92
1-1/4	340	510	200	0.89
1-1/2	320	480	250	0.86
2	320	480	300	0.83
			350	0.81
			400	0.78
			450	0.75

* Multiply working pressure by pressure factor for temperature adjusted pressure rating.

Part Numbers & Weight

Size	Part Number	Approx. Wt (Lbs)
3/4	FNW35SF	0.50
1	FNW35SG	0.75
1-1/4	FNW35SH	1.00
1-1/2	FNW35SJ	1.25
2	FNW35SK	2.13

SWEAT END METAL BRAIDED FLEXIBLE CONNECTOR

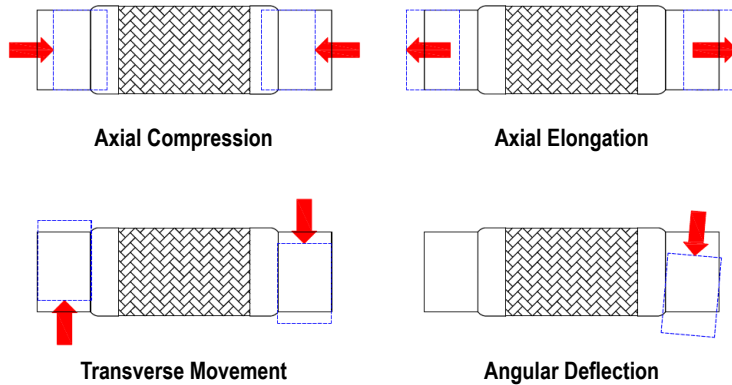


Dimensions (inches)

Size	ØD	ØE	L1	L2	L3
3/4	0.88	0.868	7.0	2.93	1.250
1	1.13	1.288	8.0	3.68	1.375
1-1/4	1.38	1.368	8.5	4.18	1.375
1-1/2	1.63	1.618	9.0	4.23	1.500
2	2.13	2.116	10.5	5.43	1.750

Standard Materials

Ref. No.	Description	Material
1	Hose Braid	Bronze
2	Corrugated Hose	Bronze
3	Braid Band	ASTM B88 Copper
4	Female Sweat Ends	ASTM B88 Copper



Braid Limits

Size	Maximum Axial Compression	Maximum Axial Elongation	Maximum Transverse Movement	Maximum Angular Deflection
3/4	0.12"	0.12"	±0.08"	2°
1	0.12"	0.12"	±0.08"	2°
1-1/4	0.12"	0.12"	±0.08"	1.5°
1-1/2	0.12"	0.12"	±0.08"	1.5°
2	0.16"	0.16"	±0.12"	1.5°

Figure 40 FLEXIBLE CONNECTORS

FNW™

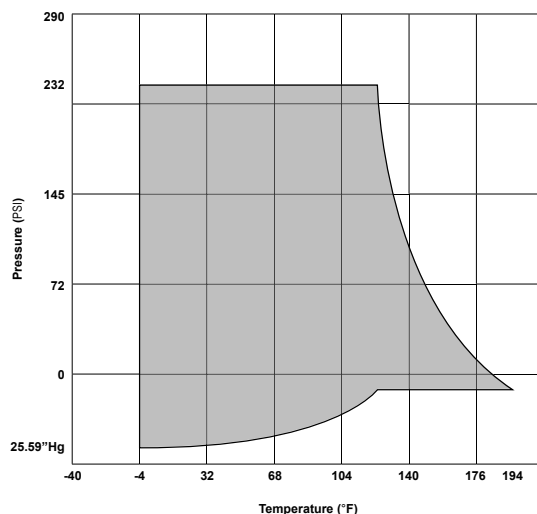
SINGLE SPHERE FLEXIBLE CONNECTOR

Flexible connectors are used to absorb thermal and seismic movement, absorb hydraulic shock, provide vibration and noise dampening, ease installation and correct minor misalignment of piping and components. They come in a variety of sizes, materials, and connection ends for numerous applications.

Similar to the metal flexible connectors in application advantages, single sphere flexible connectors are suitable for pressure and vacuum services. The spherical shape is stronger than cylindrical elastomer connectors and disperses pressure evenly over a larger surface area. The streamline shape also reduces turbulence and sediment build-up and lessens deformation while under pressure. The elastomer allows greater movements in the axial, elongation, lateral, and angular directions and provides a wide service range due to its chemical resistance characteristics.



Pressure / Temperature*



* Figure 40 should not be used at the maximum working pressure and working temperature at the same time.

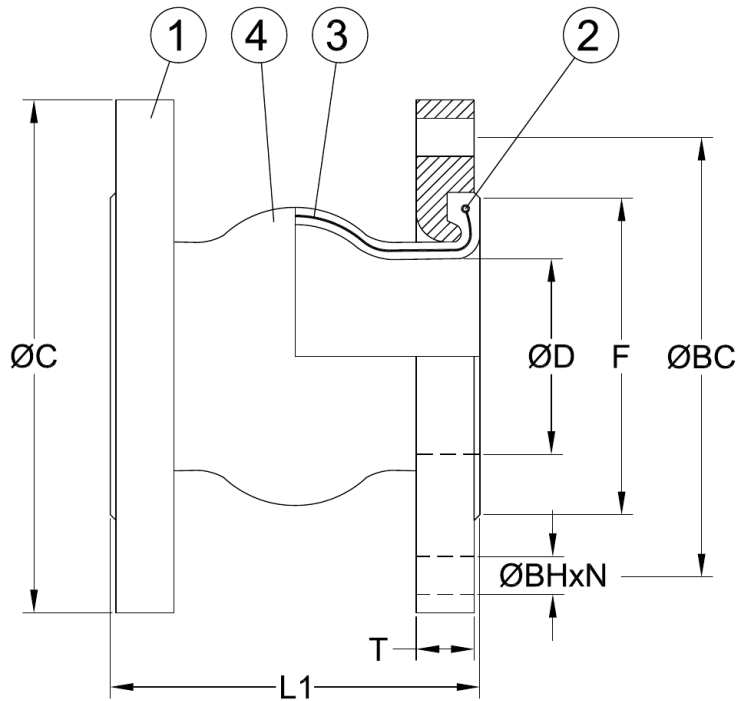
Ratings

Max. Working Pressure	232 PSI
Test Pressure	348 PSI
Burst Pressure @ 80°F	850 PSI
Vacuum Rating	25.59\"Hg (650 Torr)
Operating Temperature	-4°F to 194°F

Part Numbers & Weight

Size	Part Number	Approx. Wt (Lbs)
2-1/2	FNW40L	14.74
3	FNW40M	16.50
4	FNW40P	18.26
5	FNW40S	23.98
6	FNW40U	31.68
8	FNW40X	42.24
10	FNW4010	55.00

SINGLE SPHERE FLEXIBLE CONNECTOR



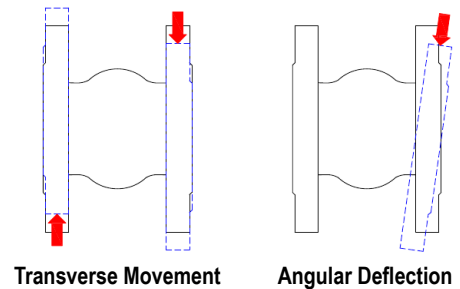
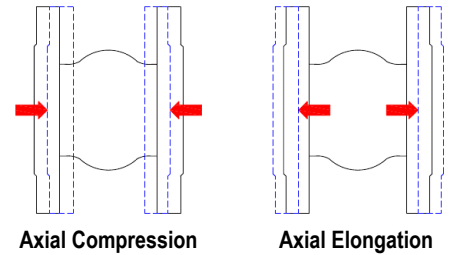
Dimensions (inches)

Size	ØC	ØD	F	L1	ØBC	ØBH	N	T
2-1/2	7.0	2.68	4.17	6.0	5.50	0.75	4	0.71
3	7.5	2.99	4.57	6.0	6.00	0.75	4	0.71
4	9.0	4.06	5.91	6.0	7.50	0.75	8	0.71
5	10.0	5.04	7.09	6.0	8.50	0.87	8	0.79
6	11.0	5.98	8.23	6.0	9.50	0.87	8	0.87
8	13.5	7.64	10.24	6.0	11.75	0.87	8	0.87
10	16.0	9.84	12.60	8.0	14.25	1.00	12	0.94

Standard Materials

Ref. No.	Description	Material
1	Flange	Carbon Steel
2	Reinforcement Wire	Carbon Steel
3	Reinforcement Fabric	Synthetic Fiber
4	Elastomer Sleeve	EPDM

Braid Limits



Size	Maximum Axial Compression	Maximum Axial Elongation	Maximum Transverse Movement	Maximum Angular Deflection
2-1/2	0.500"	0.375"	0.50"	15°
3	0.500"	0.375"	0.50"	15°
4	0.625"	0.375"	0.50"	15°
5	0.625"	0.375"	0.50"	15°
6	0.625"	0.375"	0.50"	15°
8	0.625"	0.375"	0.50"	15°
10	0.625"	0.500"	0.75"	15°

RISER GAUGE KITS

Application:

The FNW riser gauge kit comes complete with everything needed to install a sprinkler system gauge. The kit includes a 4" UL listed and FM approved gauge for fire sprinkler service, 1/4" UL listed brass 3-way valve, 1/4" x 4" pipe nipple in black or galvanized finish, 1/4" x 1/2" galvanized reducer, and 1/4" pipe plug. When installed, the kit allows replacement of the gauge without having to shut off the system water supply. It also allows the AHJ to test the system pressure through the second valve outlet, which is normally plugged, using an additional gauge.

Features:

- 4" Dual Scale 300 PSI Air/Water Gauge (PSI & kPa)
- 400 WOG 3-Way 1/4" Brass Valve with 1 Inlet and 2 Outlets
- Second Valve Outlet for Testing
- 1/4" x 4" NPT Pipe Nipple (Black or Galvanized)
- 1/4" x 1/2" NPT Galvanized Reducer
- 1/4" NPT Pipe Plug
- Blister Packing Secures Components Until Needed

Standards:

- Gauge:
 - cULus Listed
 - FM Approved
- 3-Way Valve:
 - cULus Listed



9101Z



9101P

Figure Number Matrix

FNW 9101 Finish

FINISH

P = PLAIN BLACK PIPE NIPPLE

Z = ZINC GALVANIZED PIPE NIPPLE

HANGERS, CLAMPS & STRUT ACCESSORIES

HANGER

Figure	Description	Page
7001	Split ring malleable iron.....	272
7005	Standard duty adjustable clevis	273
7006	Light duty adjustable clevis	274
7008	Adjustable clevis for copper tube	275
7010	Adjustable swivel ring	276
7012	Adjustable swivel ring felt lined	276
7015	Adjustable swivel ring for copper	277
7025	Adjustable "J"	278

CLAMPS

Figure	Description	Page
7020	Medium split horizontal	279
7022	Riser for pipe.....	280
7023	Riser for copper tube	280
7201	C-clamp, steel beam steel	281
7202	C-clamp, beam malleable iron	281
7203	Jr. beam malleable iron.....	281
7204	Wide mouth beam malleable iron	282
7806	Universal beam malleable iron.....	282
7868	Right angle pipe to beam.....	282
7250	Retaining strap for beam clamp	283
7310	Conduit pipe for Rigid/EMT.....	296
7311	Conduit pipe for copper tube.....	296

STRUT ACCESSORIES

Figure	Description	Page
7801	Clamp, window strut to beam.....	282
7802	Spreader caps, strut to beam.....	282
7803	Clamp, square u-bolt to beam.....	283
7804	Clamp, square u-bolt to beam.....	283
7805	Clamp, notched type strut to beam	283
7865	Roller trolley 4-bearing assembly.....	283
7811	Bracket, 2-hole 1-5/8" channel.....	284
7818	Channel Nut, long spring	285
7819	Channel Nut, no spring	285
7820	Channel Nut, no spring	285
7821	Channel Nut, regular spring	285
7822	Channel Nut, short spring	285
7824	Channel Nut, top spring	285
7830	End cap, channel PVC.....	286
7831	End cap, channel	286
7840	Fitting, 2-hole no-twist corner angle.....	286
7841	Fitting, 2, 3, or 4-hole corner angle.....	286
7842	Fitting, 2 or 3-hole cross corner angle	287
7843	Fitting, 3 or 4-hole cross corner 3-way.....	287
7844	Fitting, 7-hole gusset angle.....	287
7845	Fitting, 2-hole open 45deg angle	287
7846	Fitting, 2-hole closed 45deg angle.....	287
7847	Fitting, 4-hole open 45deg angle	288
7848	Fitting, 2-hole angle brace	288
7835	Fitting, 1-hole square washer.....	288
7836	Fitting, 1-hole notched square washer.....	288
7837	Fitting, 2, 3, or 4-hole flat splice plate	289
7838	Fitting, 3-hole flat corner plate	289
7839	Fitting, 4-hole flat tee plate.....	289

STRUT ACCESSORIES (cont.)

Figure	Description	Page
7850	Base, 2-hole single channel.....	290
7851	Base, 2-hole single channel flush	290
7852	Base, 4-hole single channel standard.....	290
7853	Base, 4-hole single channel tall	290
7855	Base, 4-hole single channel short.....	290
7815	Clamp, pipe to strut cushioned	291
7816	Clamp, tube to strut cushioned	291
7870	Clamp, copper tube to strut.....	292
7871	Clamp, EMT to strut.....	292
7872	Clamp, O.D. pipe to strut	293
7873	Clamp, rigid to strut.....	294
7874	Clamp, universal	294
7862	Pipe wrap, EPDM.....	295

PIPE SUPPORT SYSTEMS

Figure	Description	Page
7701	Pipe support, 50# with strut	284
7715	Pipe support, 150# with strut	284
7730	Pipe support, 300# with strut	284
ELKITC	Elevation kit.....	284

ATTACHMENTS

Figure	Description	Page
7501	Beam connector, malleable iron.....	296
7502	Beam ceiling flange, malleable iron	296

SHIELDS

Figure	Description	Page
7750	Insulation protection, MSS	297
7751	Insulation protection, MSS (domestic)	297
7753	Insulation protection light duty	297

FNW™

Material Specifications

Malleable Iron	ASTM A47 Grade 32510
Carbon Steel.....	ASTM A283 Gr. C
Carbon Steel.....	ASTM A1011-00 SS GR 33
Carbon Steel.....	ASTM A1011-00CS Type B
304 Stainless Steel.....	ASTM A240 (Type 304)

Approvals & Standards

Where indicated, FNW hanger products have the following approvals or are made to the following standards:

MSS SP-58
MSS SP-69
WW-H-171
NFPA 13
UL Category VXFT/VXFT7 (UL 203 / ULC/ORD-C203)
FM Class 1951

Epoxy plating is tested according to:

ASTM B117-03 (Epoxy Plating Test)
ASTM D 3359-08 (Epoxy Plating Test)
ASTM D 3363-05 (Epoxy Plating Test)

Bolt and nut hardware dimensions for epoxy plated products per:

ASME B.18.2.1 (Bolt)
ASME B.18.2.2 (Nut)

Finishes

P Plain

No finish applied

Z Electroplated Zinc (Electro-Galvanized)

Electroplating deposits zinc on the surface of the steel by electrolysis from a bath of zinc salts. This coating is recommended for relatively dry indoor use. This is the standard coating for most FNW strut accessory products. The thickness of zinc applied in this method is between 0.2 mils to 0.5 mils [5.1 µm to 12.7 µm] and meet ASTM B633 SC3 Type I.

or

Hot Dip Galvanized After Fabrication

The steel is zinc coated by hot dipping the fabricated product. The product is dipped in molten zinc and is completely covered on all surfaces. This coating is generally recommended for outdoor use. The zinc coating thickness is typically 2.6 mils [66.0 µm] or 1.5 oz. per square foot [0.46 kg per square meter] per side.

Y Yellow Zinc Dichromate

A 0.5 mil [12.7 µm] electro-galvanized zinc plating meeting ASTM B633 SC3 Type I is applied to the surface of the metal. Yellow Dichromate is applied over the zinc. This results in a yellowish-gold appearance and acts as a nonporous barrier sealant that is corrosion resistant and can be painted.

C Copper Zinc Dichromate

A 0.5 mil [12.7 µm] electro-galvanized zinc plating meeting ASTM B633 SC3 Type I is applied to the surface of the metal. Copper Zinc Dichromate is applied over the zinc. This results in a copper colored appearance and acts as a nonporous barrier sealant that does not react adversely with copper pipe or tubing.

or

Copper (Electrolytic)

Electro-copper plated

G Green E-Coat

An 8-step electro-deposition epoxy coating. Following a thorough cleaning and phosphate rinse the epoxy is applied by immersing the part in liquid epoxy to ensure coverage in crevices and difficult areas. It is then baked on creating a 0.7 to 0.9 mil [18 – 23 µm] thick coating. This process negates drips and sags and produces a coating that withstands 1000 hours or more in a salt spray test. This coating is also an excellent base should the part need to be painted or powder coated before or after installation.

S Stainless Steel

Product made in 304 Stainless Steel - ASTM A240 (Type 304)

EP Epoxy Plated (Zinc Colored)

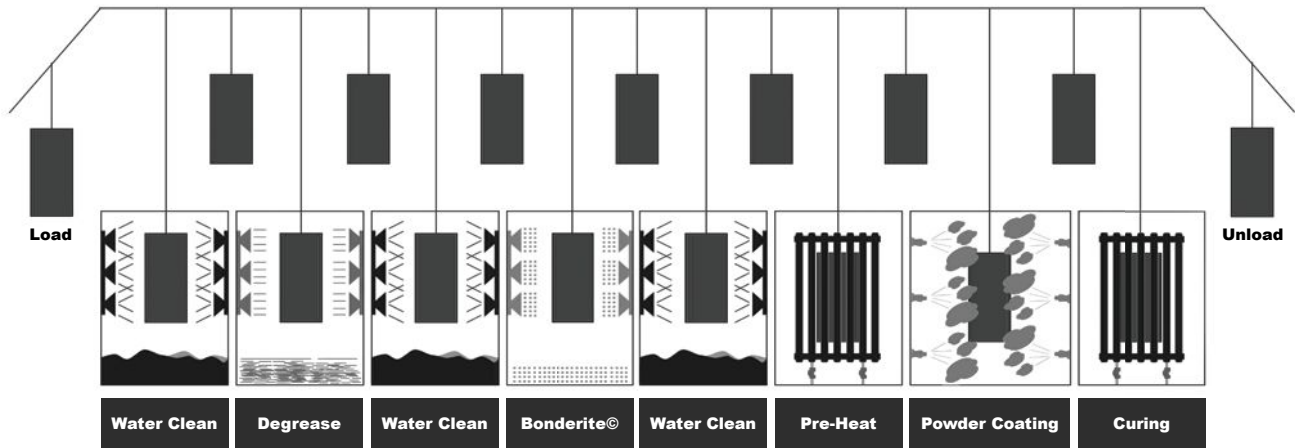
A highly durable and corrosion resistant coating system. See page 271 for details.

EC Epoxy Plated (Copper Colored)

A highly durable and corrosion resistant coating system. See page 271 for details.

Epoxy Plated Finish

FNW EP and EC designated hangers and clamps come standard with epoxy plating that uses a more environmentally friendly method than epoxy coatings that use phosphates and heavy metals. The eight step process results in a superior coating that both enhances corrosion resistance and appearance.

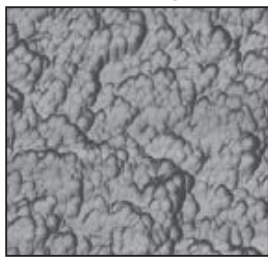


Eight Step Epoxy Plating Process

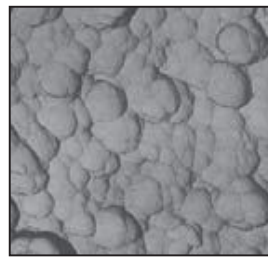
1. Water Clean - Initial cleaning after forming.
2. Degrease - An alkaline solution to removes oils, lubrication grease, soil, and metal oxides.
3. Water Clean - Removes alkaline solution.
4. Bonderite® - Surface pretreatment using Bonderite® NT-1™ (see below).
5. Water Clean - Post-vitrification cleaning.
6. Pre-Heat - Preheating prior to powder coating.
7. Powder Coating - Epoxy is applied to minimum thickness of 0.05mm.
8. Curing - Heated to a temperature of 392°F (200°C).

About Bonderite® NT-1™

Bonderite® Nanoparticles



Iron Phosphate



Bonderite® NT-1™ is a nano-ceramic vitrification surface pretreatment that creates a cohesive, inorganic, very dense layer for outstanding corrosion protection that is superior to iron phosphating. Specifically formulated for use on metal surfaces like steel, it is absolutely uniform and is free of any phosphates or toxic heavy metals and does not require passivation. The nanotechnology also produces a smooth finish.

Bonderite® and NT-1™ are trademarks and/or registered trademarks of Henkel and its affiliates'.

Superior Corrosion Resistance

FNW hangers and clamps with epoxy plating are tested in a 20% salt spray solution that exceeds ASTM B 117-03 salt solution requirements by a factor of 4.

After 240 hours in a salt spray (fog) apparatus, the FNW hanger with epoxy plating showed little to no signs of corrosion or pitting and the finish was still smooth. Compare FNW's to a typical electro-zinc plated hanger that shows significant corrosion and pitting after the same test. It is easy to see that FNW's epoxy plating, offered as standard, is the superior finish.

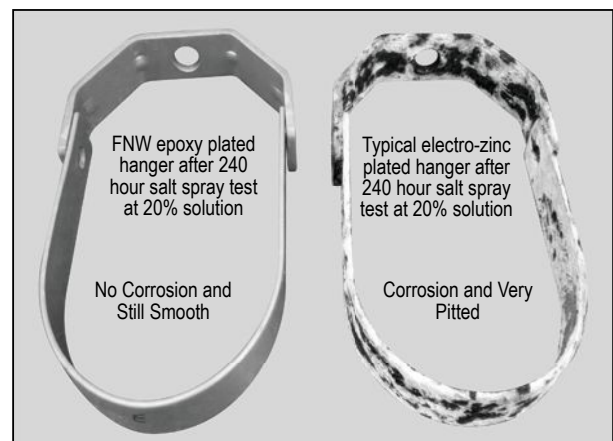
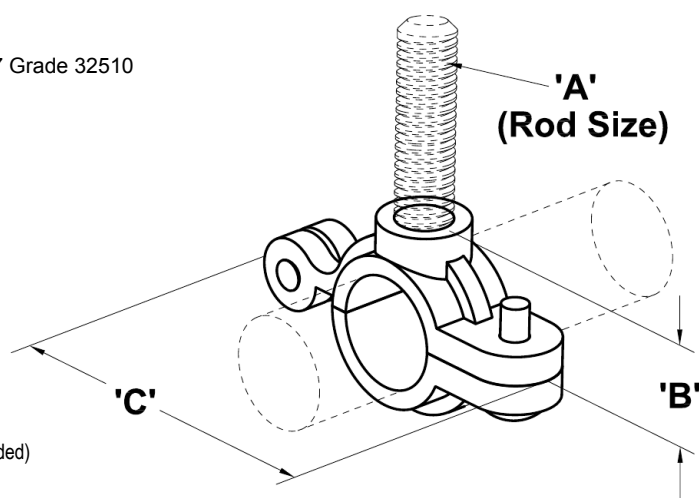


FIGURE 7001 - Hinged Split Ring

Finish: Plain, Zinc, or Copper

MSS SP-58, type 12

Material: Malleable Iron, ASTM A47 Grade 32510



A - Rod size (hanger rod and nuts not included)

B - Center of pipe to top of hanger

C - Width of hanger

Pipe Size		A (Rod Size)	B (in.)		Pipe Size		C (in.)		Max. Load Lbs.	Weights (oz.)	
in.	mm		Plain & Zinc	Copper	in.	mm	Plain & Zinc	Copper		Plain & Zinc	Copper
3/8	17.2	3/8"-16	0.66	0.66	3/8	17.2	2.06	1.78	180	1.66	1.34
1/2	21.3	3/8"-16	0.75	0.75	1/2	21.3	2.22	1.97	180	1.76	1.62
3/4	26.6	3/8"-16	0.84	0.84	3/4	26.6	2.50	2.25	180	2.08	1.80
1	33.4	3/8"-16	0.97	0.97	1	33.4	2.75	2.44	180	2.36	2.08
1-1/4	42.1	3/8"-16	1.16	1.13	1-1/4	42.1	3.22	2.78	180	3.10	2.40
1-1/2	48.2	3/8"-16	1.28	1.25	1-1/2	48.2	3.44	3.06	180	3.46	2.82
2	60.3	3/8"-16	1.53	1.47	2	60.3	3.94	3.53	180	4.41	3.77
2-1/2	73.0	1/2"-13	1.94	1.88	2-1/2	73.0	4.75	4.44	300	7.65	6.81
3	88.9	1/2"-13	2.56	2.16	3	88.9	5.38	4.94	300	9.17	7.51
4	114.3	1/2"-13	2.75	2.63	4	114.3	6.41	5.94	300	10.58	9.28

Pipe Size		Catalog Number		
in.	mm	Plain	Zinc	Copper
3/8	17.2	FNW7001PC	FNW7001ZC	FNW7001CC
1/2	21.3	FNW7001PD	FNW7001ZD	FNW7001CD
3/4	26.6	FNW7001PF	FNW7001ZF	FNW7001CF
1	33.4	FNW7001PG	FNW7001ZG	FNW7001CG
1-1/4	42.1	FNW7001PH	FNW7001ZH	FNW7001CH
1-1/2	48.2	FNW7001PJ	FNW7001ZJ	FNW7001CJ
2	60.3	FNW7001PK	FNW7001ZK	FNW7001CK
2-1/2	73.0	FNW7001PL	FNW7001ZL	FNW7001CL
3	88.9	FNW7001PM	FNW7001ZM	FNW7001CM
4	114.3	FNW7001PP	FNW7001ZP	FNW7001CP

FIGURE 7005 - Standard Duty Adjustable Clevis Hangers


UL/FM Approved - Sizes 2-1/2" to 8"

Finish: Epoxy Plated

Color: Zinc

MSS SP-58, Type 1

Federal Specification WW-H-171, Type 1

A - Rod size (hanger rod and nuts not included)

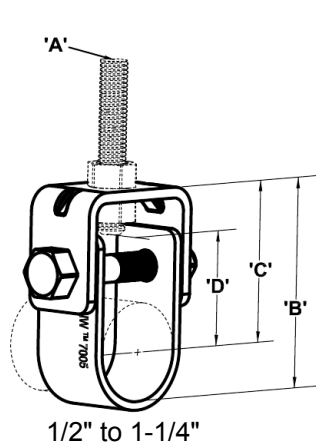
B - Bottom of pipe to top of hanger

C - Center of pipe to top of hanger

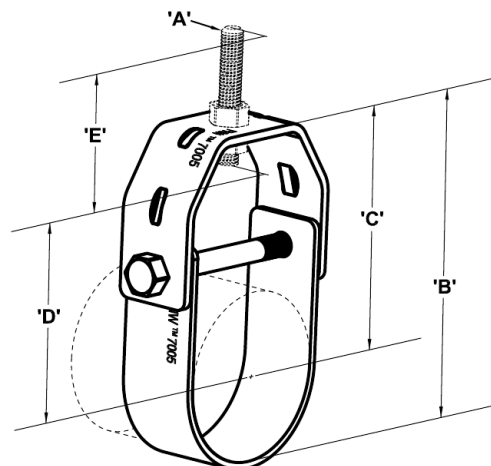
D - Rod take out (center of pipe to bottom of hanger rod)

E - Minimum thread length of hanger rod

F - Adjustment, top of cross bolt to bottom of hanger rod nut inside hanger



1/2" to 1-1/4"



1-1/2" to 12"

Catalog Number	Pipe Size		A (Rod Size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7005EP0050	1/2	21.3	3/8"-16	1-15/16	49.00	1-7/16	37.55	3/8	9.5
FNW7005EP0075	3/4	26.6	3/8"-16	2-1/4	57.40	1-3/4	43.25	5/8	15.3
FNW7005EP0100	1	33.4	3/8"-16	2-11/16	68.00	2	50.50	7/8	22.5
FNW7005EP0125	1-1/4	42.1	3/8"-16	3-1/4	82.00	2-3/8	59.90	1-1/4	31.9
FNW7005EP0150	1-1/2	48.2	3/8"-16	3-7/8	98.00	2-7/8	72.85	1-3/4	44.9
FNW7005EP0200	2	60.3	3/8"-16	4-5/16	109.00	3-1/16	77.85	1-15/16	49.4
FNW7005EP0250	2-1/2	73.0	1/2"-13	5-1/8	130.20	3-5/8	92.65	2-5/16	57.9
FNW7005EP0300	3	88.9	1/2"-13	5-15/16	150.10	4-1/8	104.40	2-3/4	69.2
FNW7005EP0350	3-1/2	101.6	1/2"-13	6-1/2	165.50	4-7/16	113.45	3-1/16	78.2
FNW7005EP0400	4	114.3	5/8"-11	7-7/16	189.00	5-1/8	130.35	3-11/16	93.6
FNW7005EP0500	5	141.3	5/8"-11	9-1/4	233.80	6-3/8	161.40	4-5/8	117.0
FNW7005EP0600	6	168.2	3/4"-10	10-1/2	267.30	7-1/8	181.15	5-5/16	134.8
FNW7005EP0800	8	219.1	3/4"-10	12-15/16	328.40	8-1/2	216.35	6-1/2	164.7
FNW7005EP1000	10	273.1	7/8"-9	15-1/2	394.00	10	254.45	7-5/8	194.2
FNW7005EP1200	12	323.9	7/8"-9	18-5/8	473.10	12-1/8	307.90	9-3/4	247.6

Catalog Number	Pipe Size		E		F		Bolt Size	Design Load		Weight
	in.	mm	in.	mm	in.	mm		Lbs.	kN	Lbs.
FNW7005EP0050	1/2	21.3	2-1/2	63.5	7/16	11.1	1/4-20UNC	610	2.71	0.15
FNW7005EP0075	3/4	26.6	2-1/2	63.5	1/2	12.7	1/4-20UNC	610	2.71	0.17
FNW7005EP0100	1	33.4	2-1/2	63.5	5/8	15.9	1/4-20UNC	610	2.71	0.20
FNW7005EP0125	1-1/4	42.1	2-1/2	63.5	7/8	22.2	1/4-20UNC	610	2.71	0.29
FNW7005EP0150	1-1/2	48.2	2-1/2	63.5	1-3/16	30.2	1/4-20UNC	610	2.71	0.32
FNW7005EP0200	2	60.3	2-1/2	63.5	1-5/8	41.3	1/4-20UNC	610	2.71	0.39
FNW7005EP0250	2-1/2	73.0	2-1/2	63.5	2	50.8	5/16-18UNC	1130	5.02	0.67
FNW7005EP0300	3	88.9	2-1/2	63.5	2	50.8	5/16-18UNC	1130	5.02	0.83
FNW7005EP0350	3-1/2	101.6	2-1/2	63.5	2	50.8	5/16-18UNC	1130	5.02	0.91
FNW7005EP0400	4	114.3	2-1/2	63.5	2	50.8	5/16-18UNC	1430	6.36	1.25
FNW7005EP0500	5	141.3	2-1/2	63.5	2	50.8	3/8-16UNC	1430	6.36	2.03
FNW7005EP0600	6	168.2	3	76.2	2	50.8	3/8-16UNC	1940	8.62	3.56
FNW7005EP0800	8	219.1	3-1/2	88.9	2-5/16	58.7	5/8-11UNC	2000	8.89	4.89
FNW7005EP1000	10	273.1	3-1/2	88.9	2-5/16	58.7	3/4-10UNC	3600	16.00	8.64
FNW7005EP1200	12	323.9	3-1/2	88.9	2-5/16	66.7	3/4-10UNC	3800	16.89	10.18

FIGURE 7006 - Light Duty Adjustable Clevis Hangers

UL Approved - Sizes 3/4" to 4"

Finish: Epoxy Plated

Color: Zinc

MSS SP-58, Type 1

Federal Specification WW-H-171, Type 1

A - Rod size (hanger rod and nuts not included)

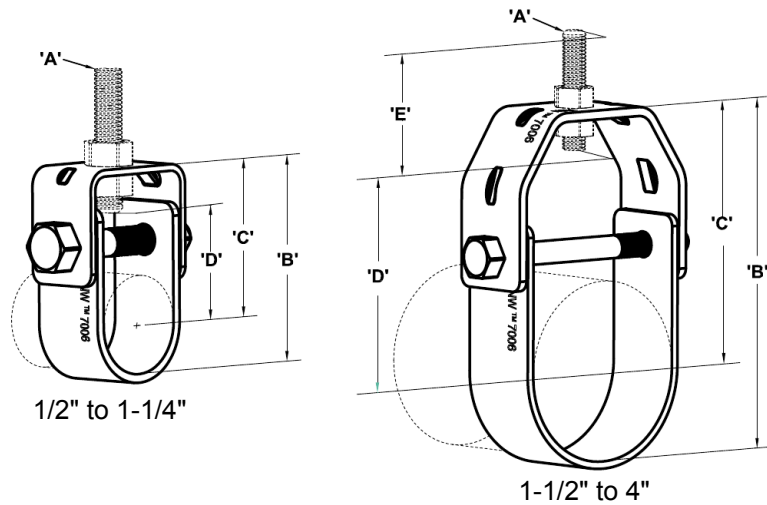
B - Bottom of pipe to top of hanger

C - Center of pipe to top of hanger

D - Rod take out (center of pipe to bottom of hanger rod)

E - Minimum thread length of hanger rod

F - Adjustment, top of cross bolt to bottom of hanger rod nut inside hanger

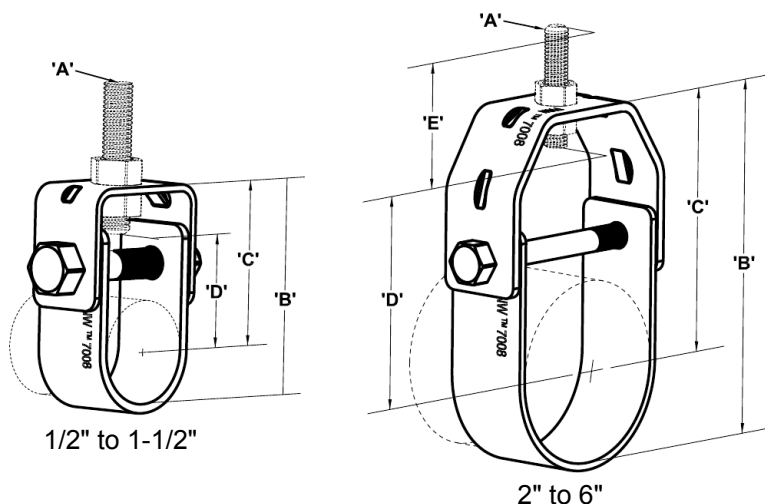


Catalog Number	Pipe Size		A (Rod Size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7006EP0050	1/2	21.3	3/8"-16	2	51.20	1-1/2	39.75	1/2	13.05
FNW7006EP0075	3/4	26.6	3/8"-16	2-7/16	61.60	1-7/8	47.45	3/4	20.75
FNW7006EP0100	1	33.4	3/8"-16	2-11/16	68.52	2	51.02	15/16	24.32
FNW7006EP0125	1-1/4	42.1	3/8"-16	3-3/16	83.20	2-3/8	61.10	1-5/16	34.10
FNW7006EP0150	1-1/2	48.2	3/8"-16	3-7/8	98.90	2-7/8	73.75	1-7/8	46.75
FNW7006EP0200	2	60.3	3/8"-16	4-3/8	111.90	3-3/16	80.75	1-15/16	48.75
FNW7006EP0250	2-1/2	73.0	1/2"-13	5-3/16	131.20	3-11/16	93.70	2-5/16	58.80
FNW7006EP0300	3	88.9	1/2"-13	5-7/8	149.40	4-1/16	103.70	2-3/4	68.80
FNW7006EP0400	4	114.3	5/8"-11	7-5/8	194.00	5-5/16	135.35	3-15/16	99.45

Catalog Number	Pipe Size		E		F		Bolt Size	Design Load		Weight
	in.	mm	in.	mm	in.	mm		Lbs.	kN	Lbs.
FNW7006EP0050	1/2	21.3	2-1/2	63.5	7/16	11.1	1/4-20UNC	150	0.67	0.10
FNW7006EP0075	3/4	26.6	2-1/2	63.5	1/2	12.7	1/4-20UNC	150	0.67	0.12
FNW7006EP0100	1	33.4	2-1/2	63.5	5/8	15.9	1/4-20UNC	250	1.11	0.13
FNW7006EP0125	1-1/4	42.1	2-1/2	63.5	7/8	22.2	1/4-20UNC	250	1.11	0.21
FNW7006EP0150	1-1/2	48.2	2-1/2	63.5	1-3/16	30.2	1/4-20UNC	250	1.11	0.23
FNW7006EP0200	2	60.3	2-1/2	63.5	1-5/8	41.3	1/4-20UNC	250	1.11	0.33
FNW7006EP0250	2-1/2	73.0	2-1/2	63.5	2	50.8	3/8-16UNC	350	1.56	0.45
FNW7006EP0300	3	88.9	2-1/2	63.5	2	50.8	3/8-16UNC	350	1.56	0.51
FNW7006EP0400	4	114.3	2-1/2	63.5	2	50.8	3/8-16UNC	400	1.78	0.84

FIGURE 7008 - Adjustable Clevis Hangers for Copper Tube

Finish: Epoxy Plated
 Color: Copper
 MSS SP-58, Type 1
 Federal Specification WW-H-171, Type 1



- A - Rod size (hanger rod and nuts not included)
 B - Bottom of pipe to top of hanger
 C - Center of pipe to top of hanger
 D - Rod take out (center of pipe to bottom of hanger rod)
 E - Minimum thread length of hanger rod
 F - Adjustment, top of cross bolt to bottom of hanger rod nut inside hanger

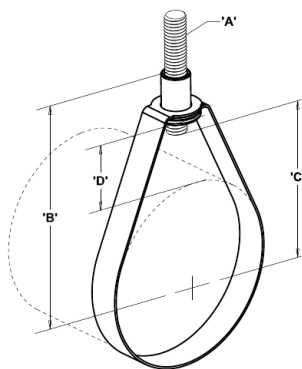
Catalog Number	Pipe Size		A (Rod size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7008EC0050	1/2	15.9	3/8"-16	1-3/4	45.00	1-7/16	36.20	3/8	9.20
FNW7008EC0075	3/4	22.2	3/8"-16	2	51.40	1-1/2	39.40	1/2	12.40
FNW7008EC0100	1	28.6	3/8"-16	2-7/16	61.70	1-7/8	46.55	3/4	19.55
FNW7008EC0125	1-1/4	34.9	3/8"-16	2-3/4	71.10	2-1/16	52.55	1	25.55
FNW7008EC0150	1-1/2	41.3	3/8"-16	3-3/16	82.00	2-3/8	60.30	1-1/8	27.80
FNW7008EC0200	2	54.1	3/8"-16	4-1/16	102.70	2-15/16	74.65	1-5/8	42.15
FNW7008EC0250	2-1/2	66.7	1/2"-13	5-3/16	131.37	3-7/8	96.77	2-5/16	57.52
FNW7008EC0300	3	79.4	1/2"-13	5-5/8	142.47	4	101.52	2-7/16	62.27
FNW7008EC0400	4	104.8	1/2"-13	6-1/2	166.27	4-7/16	112.37	2-7/8	72.62
FNW7008EC0500	5	130.2	1/2"-13	9-1/8	231.17	6-1/2	164.42	4-1/2	116.02
FNW7008EC0600	6	155.6	5/8"-11	11-1/16	281.07	7-15/16	201.32	6	152.92

Catalog Number	Pipe Size		E		F		Bolt Size	Design Load		Weight
	in.	mm	in.	mm	in.	mm		Lbs.	kN	
FNW7008EC0050	1/2	15.9	2-1/2	63.5	7/16	11.1	1/4-20UNC	150	0.67	0.09
FNW7008EC0075	3/4	22.2	2-1/2	63.5	1/2	12.7	1/4-20UNC	250	1.11	0.10
FNW7008EC0100	1	28.6	2-1/2	63.5	5/8	15.9	1/4-20UNC	250	1.11	0.13
FNW7008EC0125	1-1/4	34.9	2-1/2	63.5	7/8	22.2	1/4-20UNC	250	1.11	0.15
FNW7008EC0150	1-1/2	41.3	2-1/2	63.5	1-3/16	30.2	1/4-20UNC	250	1.11	0.18
FNW7008EC0200	2	54.1	2-1/2	63.5	1-5/8	41.3	1/4-20UNC	250	1.11	0.21
FNW7008EC0250	2-1/2	66.7	2-1/2	63.5	2	50.8	5/16-18UNC	350	1.56	0.51
FNW7008EC0300	3	79.4	2-1/2	63.5	2	50.8	5/16-18UNC	350	1.56	0.57
FNW7008EC0400	4	104.8	2-1/2	63.5	2	50.8	5/16-18UNC	400	1.78	0.70
FNW7008EC0500	5	130.2	2-1/2	63.5	2	50.8	3/8-16UNC	550	2.45	1.50
FNW7008EC0600	6	155.6	3	76.2	2	50.8	3/8-16UNC	500	2.23	1.80

FIGURE 7010 - Adjustable Swivel Ring Hangers

UL Approved - Sizes 1/2" to 8"
FM Approved - Sizes 3/4" to 8"

Finish: Epoxy Plated
Color: Zinc
MSS SP-58, Type 10
Federal Specification WW-H-171, Type 10
NFPA 13



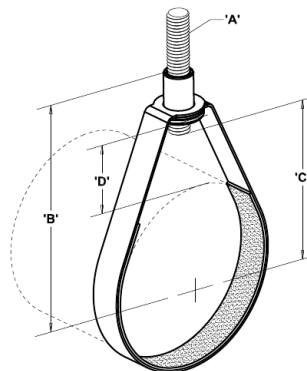
A - Rod size (hanger rod not included)
B - Center of pipe to top of knured hanger rod nut
C - Rod take out (center of pipe to bottom of hanger rod)
D - Top of pipe to bottom of hanger rod nut

Catalog Number	Pipe Size		A (Rod size)	B		C		D		Design Load		Weight
	in.	mm		in.	mm	in.	mm	in.	mm	Lbs.	kN	
FNW7010EP0050	1/2	21.3	3/8-16UNC	2-7/32	56.36	25/32	19.8	7/8	22.2	300	1.33	0.09
FNW7010EP0075	3/4	26.6	3/8-16UNC	2-7/16	61.91	1-1/32	26.2	1-3/32	27.8	300	1.33	0.09
FNW7010EP0100	1	33.4	3/8-16UNC	2-5/8	66.68	1-7/32	31.0	1-3/16	30.2	300	1.33	0.10
FNW7010EP0125	1-1/4	42.1	3/8-16UNC	2-25/32	70.64	1-3/8	34.9	1-5/32	29.4	300	1.33	0.11
FNW7010EP0150	1-1/2	48.2	3/8-16UNC	2-7/8	73.03	1-7/16	36.5	1-3/32	27.8	300	1.33	0.12
FNW7010EP0200	2	60.3	3/8-16UNC	3-1/32	76.99	1-19/32	40.5	1-1/32	26.2	300	1.33	0.13
FNW7010EP0250	2-1/2	73	3/8-16UNC	3-31/32	100.81	2-9/16	65.1	1-23/32	43.7	525	4.45	0.29
FNW7010EP0300	3	88.9	3/8-16UNC	4-15/32	113.51	3-1/16	77.8	1-15/16	49.2	525	4.45	0.33
FNW7010EP0350	3-1/2	101.6	3/8-16UNC	4-15/16	125.41	3-17/32	89.7	2-1/8	54.0	585	4.45	0.37
FNW7010EP0400	4	114.3	3/8-16UNC	5-9/32	134.14	3-27/32	97.6	2-3/16	55.6	650	4.89	0.39
FNW7010EP0500	5	141.3	1/2-13UNC	5-31/32	151.61	4-7/16	112.7	2-1/4	57.2	1000	4.89	0.53
FNW7010EP0600	6	168.2	1/2-13UNC	7	177.80	5-1/2	139.7	2-3/4	69.9	1000	5.56	0.72
FNW7010EP0800	8	219	1/2-13UNC	7-31/32	202.41	6-7/16	163.5	2-23/32	69.1	1000	5.56	1.04

FIGURE 7012 - Felt Lined Adjustable Swivel Ring Hangers

UL Approved - Sizes 1/2" to 4"
FM Approved - Sizes 3/4" to 4"
NFPA Rod - Sizes 1/2" to 4" *

Finish: Epoxy Plated
Color: Zinc
MSS SP-58, Type 10
Federal Specification WW-H-171, Type 10
NFPA 13



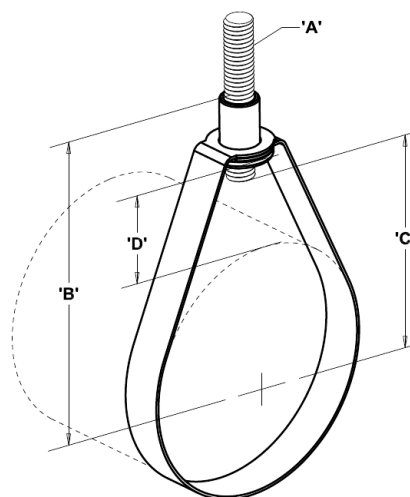
A - Rod size (hanger rod not included)
B - Center of pipe to top of knured hanger rod nut
C - Rod take out (center of pipe to bottom of hanger rod)
D - Top of pipe to bottom of hanger rod nut

*** Note: For 2-1/2" to 4" hangers with NFPA rod sizes, use figure number 7012N**

Catalog Number	Pipe Size		A (Rod size)	B		C		D		Design Load		Weight
	in.	mm		in.	mm	in.	mm	in.	mm	Lbs.	kN	
FNW7012EP0050	1/2	21.3	3/8-16UNC	2-7/32	56.36	25/32	19.8	7/8	22.2	300	1.33	0.089
FNW7012EP0075	3/4	26.6	3/8-16UNC	2-7/16	61.91	1-1/32	26.2	1-3/32	27.8	300	1.33	0.095
FNW7012EP0100	1	33.4	3/8-16UNC	2-5/8	66.68	1-7/32	31.0	1-3/16	30.2	300	1.33	0.100
FNW7012EP0125	1-1/4	42.1	3/8-16UNC	2-25/32	70.64	1-3/8	34.9	1-5/32	29.4	300	1.33	0.112
FNW7012EP0150	1-1/2	48.2	3/8-16UNC	2-7/8	73.03	1-7/16	36.5	1-3/32	27.8	300	1.33	0.121
FNW7012EP0200	2	60.3	3/8-16UNC	3-1/32	76.99	1-19/32	40.5	1-1/32	26.2	300	1.33	0.130
FNW7012EP0250	2-1/2	73	1/2-13UNC	3-31/32	100.81	2-9/16	65.1	1-23/32	43.7	1000	2.34	0.323
FNW7012EP0300	3	88.9	1/2-13UNC	4-15/32	113.51	3-1/16	77.8	1-15/16	49.2	1000	2.34	0.359
FNW7012EP0400	4	114.3	5/8-11UNC	5-9/32	134.14	3-27/32	97.6	2-3/16	55.6	1100	2.89	0.474
FNW7012NEP0250*	2-1/2	73	3/8-16UNC	3-31/32	100.81	2-9/16	65.1	1-23/32	43.7	525	2.34	0.323
FNW7012NEP0300*	3	88.9	3/8-16UNC	4-15/32	113.51	3-1/16	77.8	1-15/16	49.2	525	2.34	0.359
FNW7012NEP0400*	4	114.3	3/8-16UNC	5-9/32	134.14	3-27/32	97.6	2-3/16	55.6	650	2.89	0.474

FIGURE 7015 - Adjustable Swivel Ring Hangers for Copper Tube

Finish: Epoxy Plated
 Color: Copper
 MSS SP-58, Type 10
 Federal Specification WW-H-171, Type 10



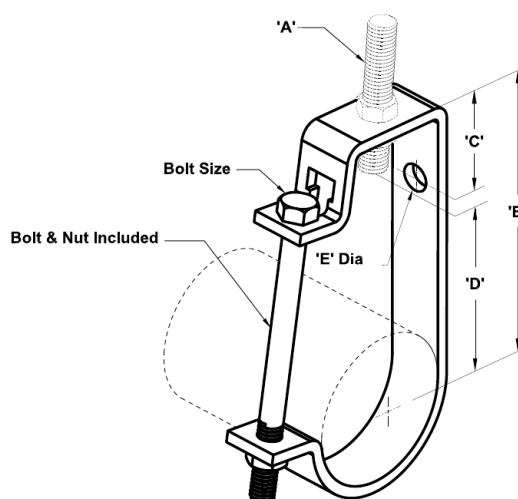
A - Rod size (hanger rod not included)
 B - Center of pipe to top of knurled hanger rod nut
 C - Rod take out (center of pipe to bottom of hanger rod)
 D - Top of pipe to bottom of hanger rod nut

Catalog Number	Pipe Size		A (Rod Size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7015EC0050	1/2	16.00	3/8-16UNC	2-1/4	57.2	13/16	20.6	15/16	23.8
FNW7015EC0075	3/4	22.35	3/8-16UNC	2-1/2	63.5	1-3/32	27.8	1 3/16	30.2
FNW7015EC0100	1	28.70	3/8-16UNC	2-17/32	64.3	1-1/8	28.6	1 5/32	29.4
FNW7015EC0125	1-1/4	35.05	3/8-16UNC	2-1/2	63.5	1-3/32	27.8	31/32	24.6
FNW7015EC0150	1-1/2	41.40	3/8-16UNC	2-27/32	72.2	1-7/16	36.5	1 3/16	30.2
FNW7015EC0200	2	54.10	3/8-16UNC	2-27/32	72.2	1-13/32	35.7	29/32	23.0
FNW7015EC0250	2-1/2	66.68	3/8-16UNC	3	76.2	1-19/32	40.5	27/32	21.4
FNW7015EC0300	3	79.38	1/2-13UNC	3-15/16	100.0	2-13/32	61.1	1-13/32	35.7
FNW7015EC0400	4	104.78	1/2-13UNC	4-3/4	120.7	3-7/32	81.8	1-3/4	44.5
FNW7015EC0500	5	130.18	5/8-11UNC	5-25/32	146.8	4-3/16	106.4	2-1/4	57.2
FNW7015EC0600	6	155.58	5/8-11UNC	6-3/16	157.2	4-5/8	117.5	2-5/32	54.8

Catalog Number	Pipe Size		Design Load		Weight
	in.	mm	Lbs.	kN	Lbs.
FNW7015EC0050	1/2	16.00	300	1.33	0.09
FNW7015EC0075	3/4	22.35	300	1.33	0.10
FNW7015EC0100	1	28.70	300	1.33	0.10
FNW7015EC0125	1-1/4	35.05	300	1.33	0.10
FNW7015EC0150	1-1/2	41.40	300	1.33	0.11
FNW7015EC0200	2	54.10	300	1.33	0.11
FNW7015EC0250	2-1/2	66.68	525	2.34	0.13
FNW7015EC0300	3	79.38	525	2.34	0.31
FNW7015EC0400	4	104.78	650	2.89	0.38
FNW7015EC0500	5	130.18	1000	4.45	0.53
FNW7015EC0600	6	155.58	1000	4.45	0.78

FIGURE 7025 - Adjustable “J” Hangers

Finish: Epoxy Plated
 Color: Zinc
 MSS SP-58, Type 5



A - Rod size (hanger rod and nuts not included)
 B - Center of pipe to top of hanger
 C - Rod take out (center of pipe to bottom of hanger rod)

Catalog Number	Pipe Size		Bolt Size	A (Rod Size)	B		C	
	in.	mm			in.	mm	in.	mm
FNW7025EP0050	1/2	21.3	1/4-20UNC x 2-1/4	3/8-16UNC	1-27/32	46.8	7/8	22.2
FNW7025EP0075	3/4	26.7	1/4-20UNC x 2-1/4	3/8-16UNC	2-1/4	57.2	7/8	22.2
FNW7025EP0100	1	33.4	1/4-20UNC x 2-1/2	3/8-16UNC	2-7/32	56.4	31/32	24.6
FNW7025EP0125	1-1/4	42.2	1/4-20UNC x 2-3/4	3/8-16UNC	2-19/32	65.9	31/32	24.6
FNW7025EP0150	1-1/2	48.3	1/4-20UNC x 3	3/8-16UNC	2-7/16	61.9	1-7/32	31.0
FNW7025EP0200	2	60.3	1/4-20UNC x 3-1/2	3/8-16UNC	2-21/32	67.5	1-7/32	31.0
FNW7025EP0250	2-1/2	73.0	3/8-16UNC x 4-1/2	1/2-13UNC	3-1/16	77.8	1-31/32	50.0
FNW7025EP0300	3	88.9	3/8-16UNC x 5	1/2-13UNC	3-9/32	83.3	1-31/32	50.0
FNW7025EP0400	4	114.3	3/8-16UNC x 6-1/4	5/8-11UNC	3-25/32	96.0	1-31/32	50.0
FNW7025EP0500	5	141.3	3/8-16UNC x 8-1/4	5/8-11UNC	3-1/2	88.9	1-3/16	30.2
FNW7025EP0600	6	168.3	3/8-16UNC x 9-3/4	3/4-10UNC	4-5/16	109.5	1-9/16	39.7
FNW7025EP0800	8	219.1	3/8-16UNC x 11	3/4-10UNC	4-31/32	126.2	1-31/32	50.0

Catalog Number	Pipe Size		D		E		Design Load		Weight
	in.	mm	in.	mm	in.	mm	Lbs.	kN	Lbs.
FNW7025EP0050	1/2	21.3	1-1/16	27.0	13/32	10.3	400	1.78	0.14
FNW7025EP0075	3/4	26.7	1-15/32	37.3	13/32	10.3	400	1.78	0.16
FNW7025EP0100	1	33.4	1-7/16	36.5	13/32	10.3	400	1.78	0.18
FNW7025EP0125	1-1/4	42.2	1-13/16	46.0	13/32	10.3	400	1.78	0.21
FNW7025EP0150	1-1/2	48.3	1-21/32	42.1	13/32	10.3	400	1.78	0.21
FNW7025EP0200	2	60.3	1-7/8	47.6	13/32	10.3	400	1.78	0.23
FNW7025EP0250	2-1/2	73.0	2-9/32	57.9	9/16	14.3	800	3.56	0.40
FNW7025EP0300	3	88.9	2-1/2	63.5	9/16	14.3	800	3.56	0.47
FNW7025EP0400	4	114.3	3	76.2	9/16	14.3	800	3.56	0.73
FNW7025EP0500	5	141.3	2-17/32	63.9	9/16	14.3	800	3.56	1.15
FNW7025EP0600	6	168.3	3-11/32	84.5	9/16	14.3	1000	4.45	2.14
FNW7025EP0800	8	219.1	4	101.2	9/16	14.3	1200	5.34	2.71

FIGURE 7020 - Medium Split Horizontal Pipe Clamps

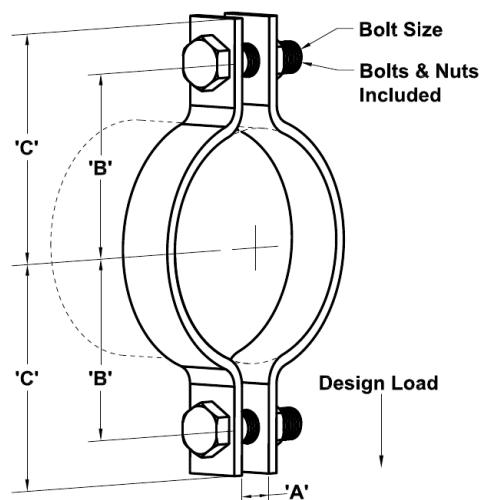

UL Approved - Sizes 3/4" to 8"

Finish: Epoxy Plated

Color: Zinc

MSS SP-58, Type 4

Federal Specification WW-H-171, Type 4



A - Center of pipe to center of bolt

B - Center of pipe to end of clamp

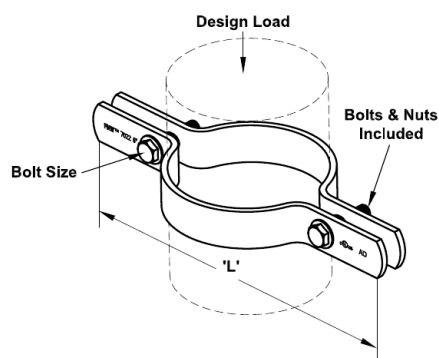
Catalog Number	Pipe Size		Bolt Size	A		B	
	in.	mm		in.	mm	in.	mm
FNW7020EP0050	1/2	21.3	5/16-18UNC	13/32	10.6	1-1/32	26.2
FNW7020EP0075	3/4	26.7	5/16-18UNC	15/32	12.0	1-3/32	27.8
FNW7020EP0100	1	33.4	5/16-18UNC	15/32	12.2	1-11/32	34.1
FNW7020EP0125	1-1/4	42.2	5/16-18UNC	15/32	12.2	1-7/16	36.5
FNW7020EP0150	1-1/2	48.3	5/16-18UNC	15/32	12.2	1-5/8	41.3
FNW7020EP0200	2	60.3	1/2-13UNC	21/32	16.4	2-1/8	54.0
FNW7020EP0250	2-1/2	73.0	1/2-13UNC	5/8	16.0	2-5/8	66.7
FNW7020EP0300	3	88.9	1/2-13UNC	23/32	18.0	3-1/32	77.0
FNW7020EP0350	3-1/2	101.6	1/2-13UNC	23/32	18.6	3-1/4	82.6
FNW7020EP0400	4	114.3	5/8-11UNC	3/4	19.4	3-9/16	90.5
FNW7020EP0500	5	141.3	5/8-11UNC	3/4	19.4	4-19/32	116.7
FNW7020EP0600	6	168.3	3/4-10UNC	23/32	18.2	4-15/16	125.4
FNW7020EP0800	8	219.1	3/4-10UNC	15/16	24.0	6-3/16	157.2
FNW7020EP1000	10	273.1	7/8-9UNC	1-1/4	32.0	7-19/32	192.9
FNW7020EP1200	12	323.9	7/8-9UNC	1-7/16	36.8	8-9/16	217.5

Catalog Number	Pipe Size		C		Design Load		Weight
	in.	mm	in.	mm	Lbs.	kN	Lbs.
FNW7020EP0050	1/2	21.3	1-17/32	38.9	500	2.2	0.33
FNW7020EP0075	3/4	26.7	1-19/32	40.5	500	2.2	0.34
FNW7020EP0100	1	33.4	1-7/8	47.6	500	2.2	0.40
FNW7020EP0125	1-1/4	42.2	1-15/16	49.2	500	2.2	0.42
FNW7020EP0150	1-1/2	48.3	2-1/8	54.0	800	3.6	0.46
FNW7020EP0200	2	60.3	2-23/32	69.1	1040	4.6	0.90
FNW7020EP0250	2-1/2	73.0	3-1/4	82.6	1040	4.6	1.05
FNW7020EP0300	3	88.9	3-21/32	92.9	1040	4.6	1.18
FNW7020EP0350	3-1/2	101.6	3-27/32	97.6	1040	4.6	1.25
FNW7020EP0400	4	114.3	4-15/32	113.5	1040	4.6	1.91
FNW7020EP0500	5	141.3	5-15/32	138.9	1040	4.6	2.29
FNW7020EP0600	6	168.3	5-13/16	147.6	1615	7.2	5.30
FNW7020EP0800	8	219.1	7-1/16	179.4	1615	7.2	6.36
FNW7020EP1000	10	273.1	8-23/32	221.5	2400	10.7	13.53
FNW7020EP1200	12	323.9	9-23/32	246.9	2400	10.7	14.93

FIGURE 7022 - Riser Clamps

UL Approved - Sizes 1/2" to 8"

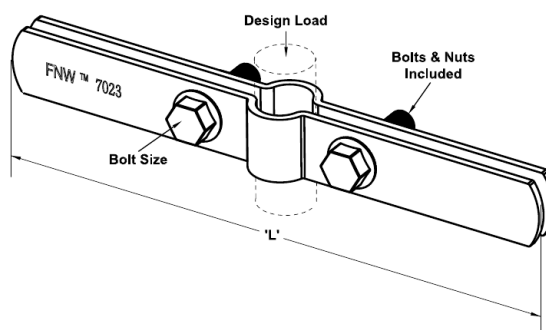
Finish: Epoxy Plated
Color: Zinc
MSS SP-58, Type 8
Federal Specification WW-H-171, Type 8



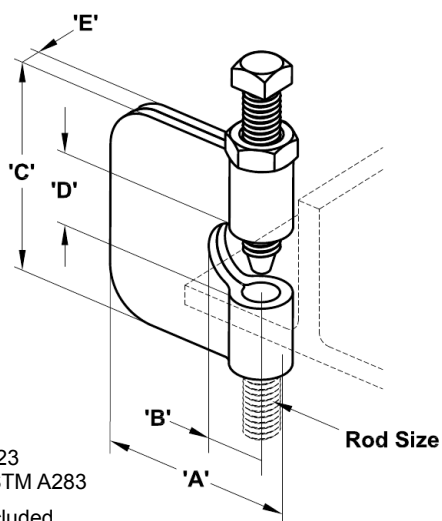
Catalog Number	Pipe Size		L		Bolt Size	Design Load		Torque Value	Weight
	in.	mm	in.	mm		Lbs.	kN		
FNW7022EP0050	1/2	21.3	8-1/2	215.9	3/8-16UNC	220	0.98	25 ft.lbs	0.65
FNW7022EP0075	3/4	26.6	9	228.5	3/8-16UNC	220	0.98	25 ft.lbs	0.71
FNW7022EP0100	1	33.4	9-1/16	230	3/8-16UNC	220	0.98	25 ft.lbs	0.73
FNW7022EP0125	1-1/4	42.1	9-1/2	241.3	3/8-16UNC	250	1.11	25 ft.lbs	0.77
FNW7022EP0150	1-1/2	48.2	9-9/10	251.5	3/8-16UNC	250	1.11	25 ft.lbs	0.81
FNW7022EP0200	2	60.3	10-3/10	261.6	3/8-16UNC	300	1.33	25 ft.lbs	1.44
FNW7022EP0250	2-1/2	73	11-1/16	281	3/8-16UNC	400	1.78	25 ft.lbs	1.56
FNW7022EP0300	3	88.9	11-3/4	298.5	3/8-16UNC	500	2.22	25 ft.lbs	1.79
FNW7022EP0400	4	114.3	12-15/16	328.6	1/2-13UNC	750	3.33	55 ft.lbs	3.05
FNW7022EP0500	5	141.3	14-1/4	362	1/2-13UNC	1500	6.67	55 ft.lbs	3.41
FNW7022EP0600	6	168.2	15-1/2	393.7	1/2-13UNC	1600	7.11	55 ft.lbs	4.78
FNW7022EP0800	8	219	18-1/4	463.5	5/8-11UNC	2500	11.12	80 ft.lbs	9.23
FNW7022EP1000	10	273	20-1/10	510.5	5/8-11UNC	2500	11.12	80 ft.lbs	10.39
FNW7022EP1200	12	323.8	22-3/8	568.3	5/8-11UNC	2700	12.01	80 ft.lbs	16.09

FIGURE 7023 - Riser Clamps for Copper Tube

Finish: Epoxy Plated
Color: Copper
MSS SP-58, Type 8
Federal Specification WW-H-171, Type 8



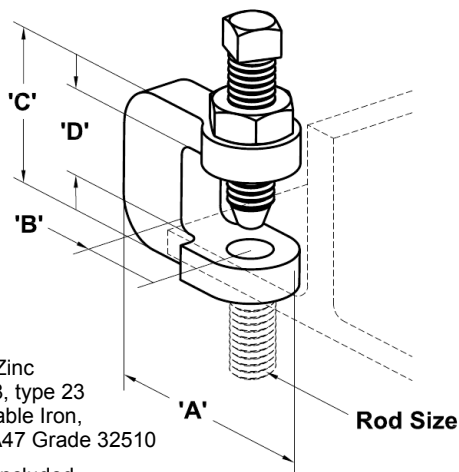
Catalog Number	Pipe Size		L		Bolt Size	Design Load		Torque Value	Weight
	in.	mm	in.	mm		Lbs.	kN		
FNW7023EC0050	1/2	15.9	8-1/2	216.5	3/8-16UNC	75	0.33	25 ft.lbs	0.68
FNW7023EC0075	3/4	22.2	9-1/4	235.5	3/8-16UNC	75	0.33	25 ft.lbs	0.75
FNW7023EC0100	1	28.6	9-5/16	237.0	3/8-16UNC	120	0.53	25 ft.lbs	0.86
FNW7023EC0125	1-1/4	34.9	9-1/2	241.0	3/8-16UNC	150	0.67	25 ft.lbs	1.16
FNW7023EC0150	1-1/2	41.3	9-5/8	245.0	3/8-16UNC	150	0.67	25 ft.lbs	1.18
FNW7023EC0200	2	54.1	10-7/16	265.0	3/8-16UNC	150	0.67	25 ft.lbs	1.30
FNW7023EC0250	2-1/2	66.7	11-3/16	284.5	3/8-16UNC	300	1.34	25 ft.lbs	1.38
FNW7023EC0300	3	79.4	12	304.0	3/8-16UNC	300	1.34	25 ft.lbs	1.49
FNW7023EC0400	4	104.8	12-1/2	318.0	3/8-16UNC	300	1.34	25 ft.lbs	1.61
FNW7023EC0600	6	155.6	15-1/8	385.0	1/2-13UNC	600	2.67	55 ft.lbs	5.27

FIGURE 7201 - Steel Beam C-Clamp


Finish: Plain
MSS SP-58, type 23
Material: Steel, ASTM A283
Hanger rod not included

Catalog Number	A	B	C	D	E
FNW7201PC	2.13"	0.88"	2.38"	0.75"	0.25"

Rod Size	Finish	Max. Load	Wt. (Oz.)
3/8"-16	Plain	400 Lbs.	5.75

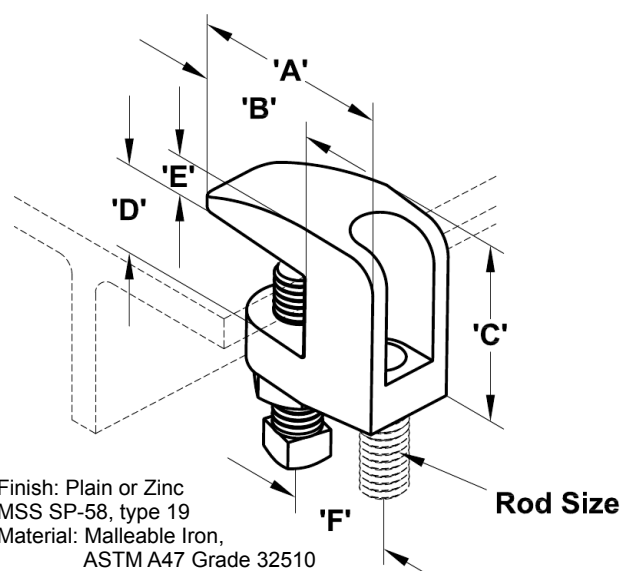
FIGURE 7202 - MI Beam C-Clamp


Finish: Plain or Zinc
Per: MSS SP-58, type 23
Material: Malleable Iron,
ASTM A47 Grade 32510
Hanger rod not included

Rod Size	A	B	C	D	Wt. (Oz.)
3/8"-16	1.75"	0.63"	1.75"	0.75"	3.60
1/2"-13	1.75"	0.63"	1.75"	0.75"	4.09
5/8"-11	2.00"	0.75"	2.00"	0.75"	8.54

Catalog Number	Finish	Rod Size	Max. Load (Lbs.)
FNW7202PC	Plain	3/8"-16	400
FNW7202ZC	Zinc	3/8"-16	400
FNW7202PD	Plain	1/2"-13	400
FNW7202ZD	Zinc	1/2"-13	400
FNW7202PE	Plain	5/8"-11	440

Note: Do not overtighten the set screw or the clamp can be damaged. The set screw should be finger tight, then given approximately an additional 1/4 to 1/3 turn. The recommended set screw torque is 5 ft-lbs (60 in-lbs).

FIGURE 7203 - Jr. Beam Clamp


Finish: Plain or Zinc
MSS SP-58, type 19
Material: Malleable Iron,
ASTM A47 Grade 32510
Hanger rod not included

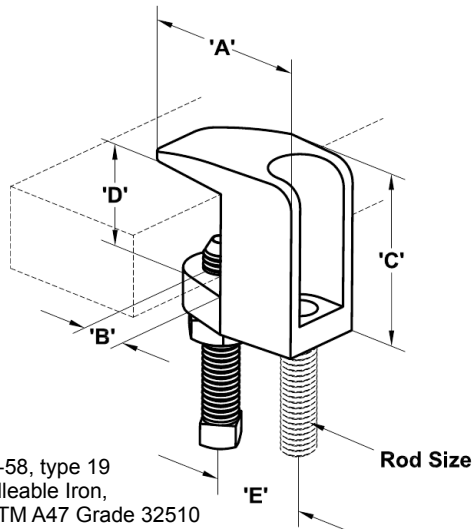
Rod Size	A	B	C	D
3/8"-16	1.88"	1.22"	1.56"	0.75"
1/2"-13	2.06"	1.20"	1.63"	0.75"
5/8"-11	2.19"	1.20"	1.75"	0.75"
3/4"-10	2.38"	1.20"	1.75"	0.75"

Rod Size	E	F	Wt. (Oz.)
3/8"-16	0.41"	0.88"	4.94
1/2"-13	0.44"	0.97"	6.81
5/8"-11	0.50"	1.06"	9.17
3/4"-10	0.50"	1.06"	10.93

Catalog Number	Finish	Rod Size	Max. Load (Lbs.)
FNW7203PC	Plain	3/8"-16	400
FNW7203ZC	Zinc	3/8"-16	400
FNW7203PD	Plain	1/2"-13	500
FNW7203ZD	Zinc	1/2"-13	500
FNW7203PE	Plain	5/8"-11	600
FNW7203PF	Plain	3/4"-10	800

Note: Do not overtighten the set screw or the clamp can be damaged. The set screw should be finger tight, then given approximately an additional 1/4 to 1/3 turn. The recommended set screw torque is 5 ft-lbs (60 in-lbs).

FIGURE 7204 - Wide Mouth Beam Clamp



Finish: Plain
Per: MSS SP-58, type 19
Material: Malleable Iron,
ASTM A47 Grade 32510

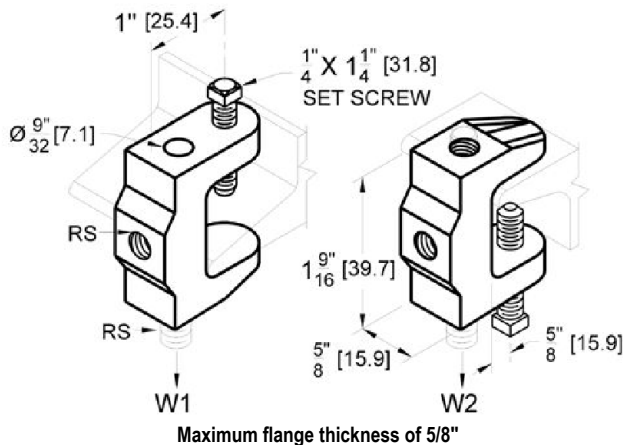
Hanger rod not included

Rod Size	A	B	C	D	E	Wt. (Oz.)
3/8"-16	1.63"	0.50"	1.88"	1.25"	1.06"	7.65
1/2"-13	1.63"	0.50"	1.88"	1.25"	1.06"	7.65
5/8"-11	2.25"	0.75"	2.31"	1.25"	1.38"	11.25
3/4"-10	2.38"	0.75"	2.38"	1.25"	1.38"	14.11

Catalog Number	Finish	Rod Size	Max. Load (Lbs.)
FNW7204PC	Plain	3/8"-16	400
FNW7204PD	Plain	1/2"-13	500
FNW7204PE	Plain	5/8"-11	850
FNW7204PF	Plain	3/4"-10	900

Note: Do not overtighten the set screw or the clamp can be damaged. The set screw should be finger tight, then given approximately an additional 1/4 to 1/3 turn. The recommended set screw torque is 5 ft-lbs (60 in-lbs).

FIGURE 7806 - Universal Beam Clamp

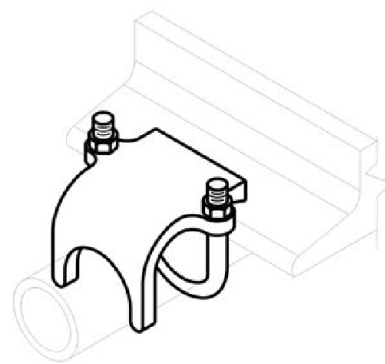


Finish: Zinc
Material: Malleable Iron
Hanger rod not included

Catalog Number	Rod Size (RS)	Max Load (W1)		Max Load (W2)	
		Lbs.	kN	Lbs.	kN
FNW7806Z	1/4"-20	100	0.44	250	1.11

Note: The threaded hole on the back side of the clamp is not load rated.

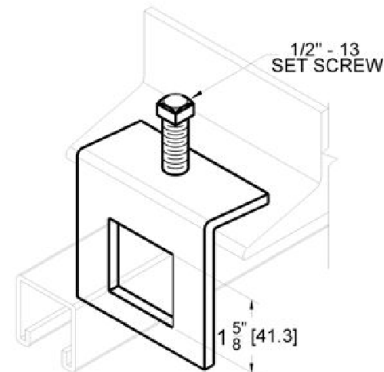
FIGURE 7868 - Right Angle Clamp



Standard finish is hot dip galvanized

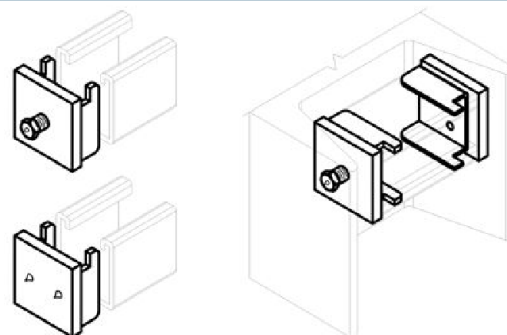
Catalog Number	Pipe Size	
	Inch	Metric
FNW7868Z0050	1/2	15
FNW7868Z0075	3/4	20
FNW7868Z0100	1	25
FNW7868Z0150	1-1/2	40
FNW7868Z0200	2	50

FIGURE 7801 - Window Strut to Beam Clamp

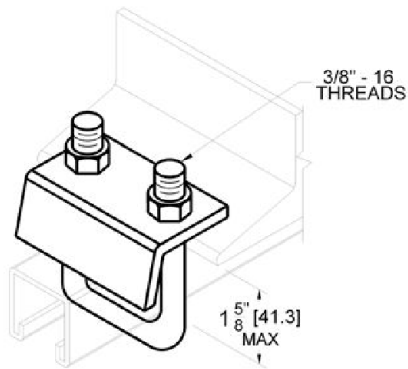


Design load 950 Lbs [4.23 kN] when used in pairs
Catalog Number: FNW7801Z

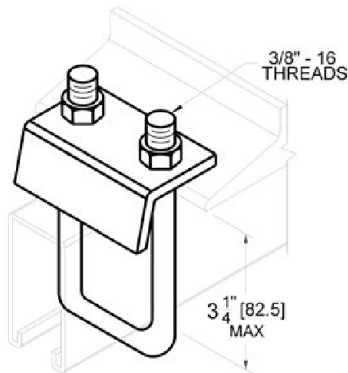
FIGURE 7802 - Strut to Beam Spreader Caps



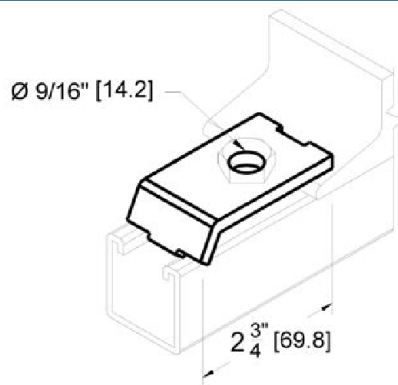
Includes 1 adjustable cap and 1 nonadjustable cap
Cut strut length to opening minus 1" [25mm]
Design load 500 Lbs [2.22 kN] when used as a set
Catalog Number: FNW7802Z

FIGURE 7803 - Square U-Bolt to Beam Clamp


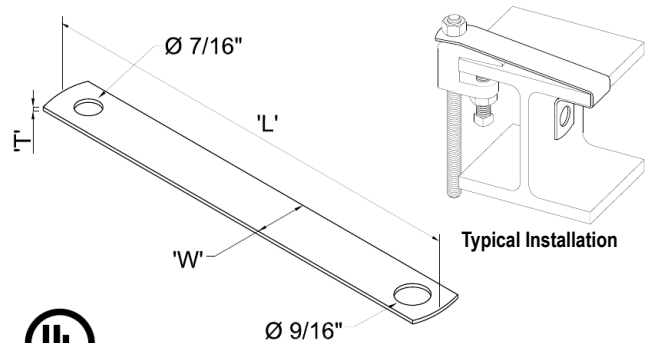
For 13/16" & 1-5/8" Channel
 Design load 1200 Lbs [5.34 kN] when used in pairs
 Catalog Number: FNW7803Z

FIGURE 7804 - Square U-Bolt Strut to Beam Clamp


For 2-7/16" & 3-1/4" Channel
 Design load 1200 Lbs [5.34 kN] when used in pairs
 Catalog Number: FNW7804Z

FIGURE 7805 - Notched Type Strut to Beam Clamp


Material is 1-5/8" [41.3] wide x 1/4" [6.3] thick
 Clamp requires 1/2"-13 HCS and 1/2" channel nut, order separately
 Design load 1100 Lbs [4.89 kN] when used in pairs
 Catalog Number: FNW7805Z

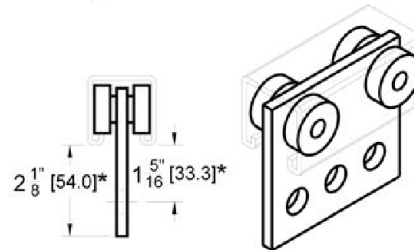
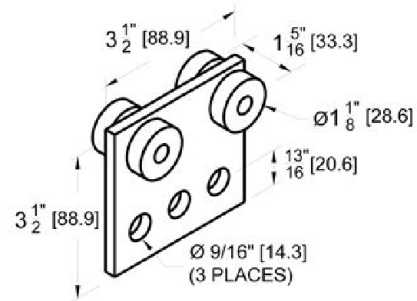
FIGURE 7250 - Beam Clamp Retaining Strap


UL Approved

Finish: G90 Galvanized Coating

Material: Carbon Steel, ASTM A653 type B

Catalog Number	W	T	L
FNW7250Z0600	0.95"	16 ga.	8.00"
FNW7250Z0800	0.95"	16 ga.	10.00"
FNW7250Z1000	0.95"	16 ga.	12.00"
FNW7250Z1200	0.95"	16 ga.	14.00"
FNW7250Z1400	0.95"	16 ga.	16.00"

FIGURE 7865 - Roller Trolley 4-Bearing Assembly


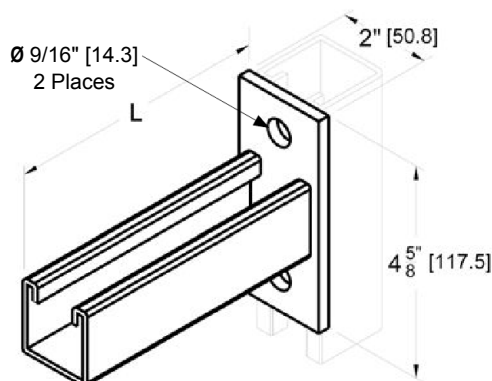
Stainless steel ball bearings

Max load rating of 600 lbs. [2.67 kN] with 12ga channel

* Based on standard dimensions for channel

Catalog Number: FNW7865Z4

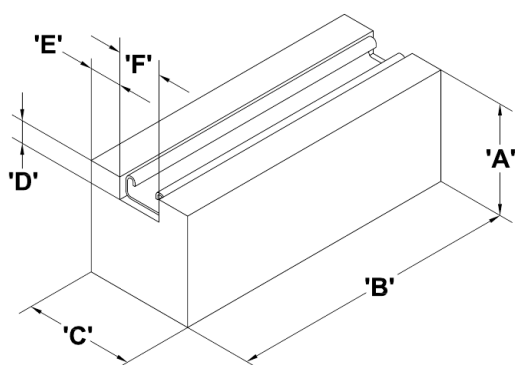
FIGURE 7811 - Bracket Channel 1-5/8" Channel 2-HL



Catalog Number	L		Uniform Load*	
	in.	mm	Lbs.	kN
FNW7811Z1200	12	304.8	570	3.34
FNW7811Z1800	18	457.2	500	2.22
FNW7811Z2400	24	609.6	350	1.56

* When mounted on 12 gauge channel

FIGURE 7701 - 50# Pipe Support



Maximum Load: 50 lbs.
Height: 4 or 6 inches

Components

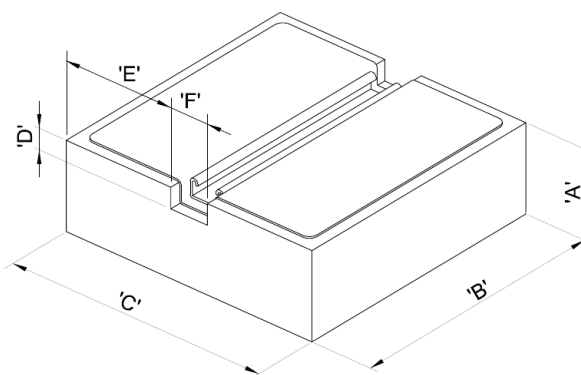
Ethafoam® 400 plank - The closed-cell medium density black polyethylene foam. Ethafoam HS 45 has successfully passed MVSS 302 flammability testing and meets or exceeds the requirements for U.S. Federal Standard PPP-C-1752C, Type III. Ethafoam® is a registered trademark of Sealed Air Corporation (US).

14 Gauge Strut Channel - Cold roll-formed carbon steel conforms to ASTM 570 GR 33 and ASTM A653.

Bondmaster Instaweld 34-3378 - Adhesive conforms to MS-CC926.

Catalog Number	A	B	C	D	E	F
FNW7701PP	4.00	10.50	4.00	0.8125	1.1875	1.625
FNW7701UP	6.00	10.50	4.00	0.8125	1.1875	1.625

FIGURE 7715 & 7730 - 150# & 300# Pipe Support



Maximum Load: 150 lbs. (Fig. 7715)
300 lbs. (Figure 7730)
Height: 4 inches

Components

Ethafoam® 400 plank - The closed-cell medium density black polyethylene foam. Ethafoam HS 45 has successfully passed MVSS 302 flammability testing and meets or exceeds the requirements for U.S. Federal Standard PPP-C-1752C, Type III. Ethafoam® is a registered trademark of Sealed Air Corporation (US).

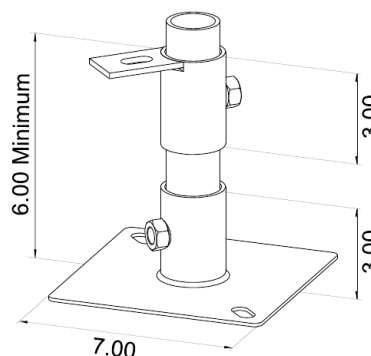
14 Gauge Strut Channel - Cold roll-formed carbon steel conforms to ASTM 570 GR 33 and ASTM A653.

14 Gauge Galva Neal Sheet Metal - Hot-dipped zinc coated treated to a harder surface than galvanizing alone.

Bondmaster Instaweld 34-3378 - Adhesive conforms to MS-CC926.

Catalog Number	A	B	C	D	E	F
FNW7715	4.00	12.00	12.00	1.01	5.16	1.63
FNW7730	4.00	21.50	12.00	1.01	5.16	1.63

FIGURE ELKITC - Elevation Kit for Pipe Supports

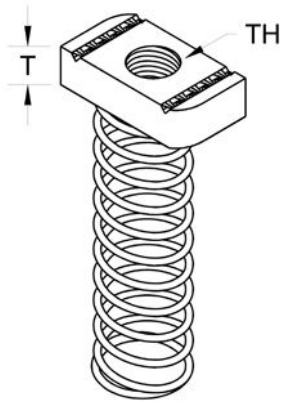


1-1/4" Schedule 40 Steel Pipe by Others

ELKIITC Provides elevation to pipe support systems. Kit contains components for two posts using 1-1/4" schedule 40 steel pipe supplied by others. Minimum elevation is 6", or 10" when mounted on figure 7715 or 7730 pipe supports (sold separately) using included channel nuts. Kit components include:

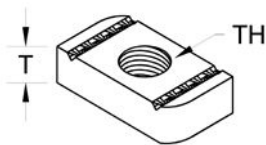
- 2 Base Units
- 2 Vertical Mounts
- 10 1/2-13 x 3/4" Hex Bolts
- 6 1/2" Washers
- 4 1/2" Strut Nuts
- 2 1/2" Hex Nuts

Catalog Number
FNWELKITC

FIGURE 7818 - Long Spring Channel Nut


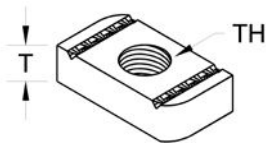
For 2-7/16" & 3-1/4" channel

Catalog Number	TH	T	
		in.	mm
FNW7818Z0037	3/8"-16	0.37	9.4
FNW7818Z0050	1/2"-13	0.50	12.7

FIGURE 7819 - No Spring Channel Nut


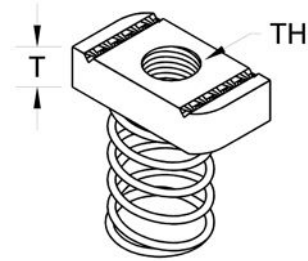
For all channel sizes

Catalog Number	TH	T	
		in.	mm
FNW7819Z0025	1/4"-20	0.25	6.3
FNW7819Z0037	3/8"-16	0.37	9.4
FNW7819Z0062	5/8"-11	0.37	9.4

FIGURE 7820 - No Spring Channel Nut


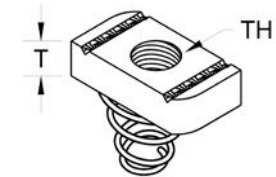
Cannot be used with 13/16" & 1" channel

Catalog Number	TH	T	
		in.	mm
FNW7820Z0050	1/2"-13	0.50	12.7
FNW7820Z0062	5/8"-11	0.50	12.7
FNW7820Z0075	3/4"-10	0.50	12.7
FNW7820Z0087	7/8"-9	0.50	12.7

FIGURE 7821 - Regular Spring Channel Nut


For 1-3/8" & 1-5/8" channel

Catalog Number	TH	T	
		in.	mm
FNW7821Z0025	1/4"-20	0.25	6.3
FNW7821Z0037	3/8"-16	0.37	9.4
FNW7821Z0050	1/2"-13	0.50	12.7
FNW7821Z0062	5/8"-11	0.50	12.7
FNW7821Z0075	3/4"-10	0.50	12.7
FNW7821Z0087	7/8"-9	0.50	12.7

FIGURE 7822 - Short Spring Channel Nut


For 13/16" & 1" channel

Catalog Number	TH	T	
		in.	mm
FNW7822Z0037	3/8"-16	0.25	6.3

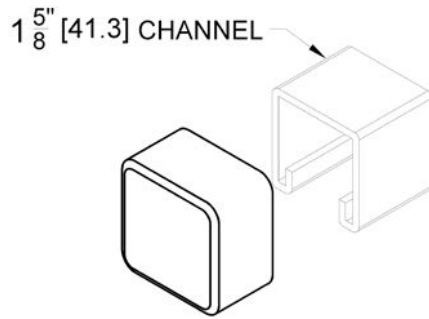
FIGURE 7824 - Top Spring Channel Nut


For all channel sizes except as noted

Catalog Number	TH	T	
		in.	mm
FNW7824Z0025	1/4"-20	0.25	6.3
FNW7824Z0037	3/8"-16	0.37	9.4
FNW7824Z0050*	1/2"-13	0.50	12.7

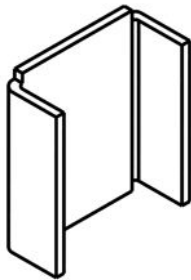
* Cannot be used with 13/16" & 1" channel

FIGURE 7830 - PVC Channel End Cap (1-5/8")



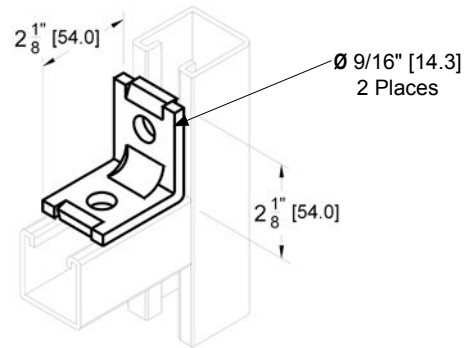
White PVC
Catalog Number: FNW7830W0162

FIGURE 7831 - Channel End Cap (1-5/8")



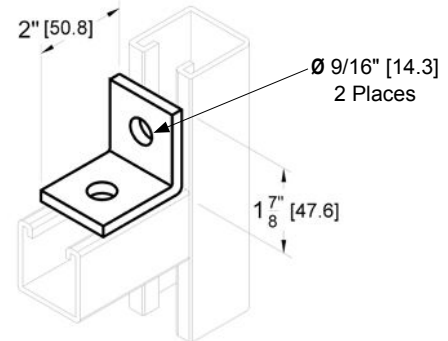
End Cap 1-5/8" 12 Ga.
Catalog Number: FNW7831Z0162

FIGURE 7840 - No Twist 2-Hole Corner Angle Fitting

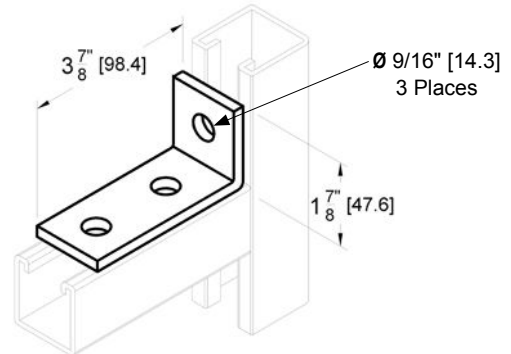


Catalog Number: FNW7840Z2

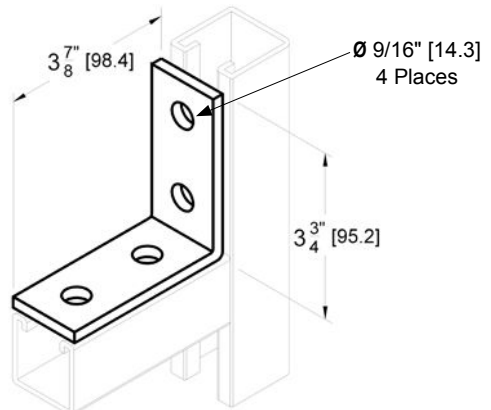
FIGURE 7841 - Corner Angle Fitting



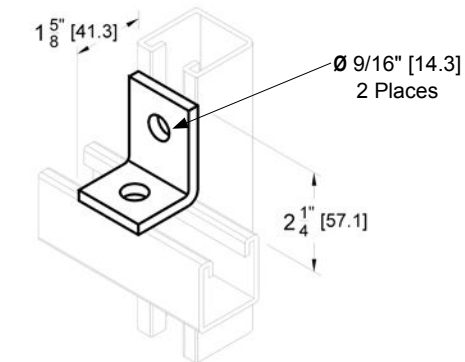
Catalog Number: FNW7841Z2



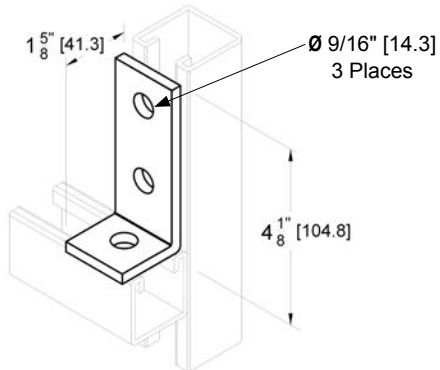
Catalog Number: FNW7841Z3



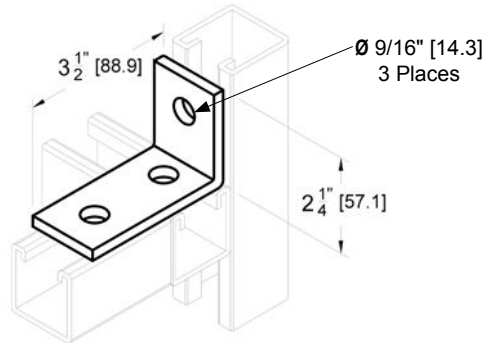
Catalog Number: FNW7841Z4

FIGURE 7842 - Cross Corner Angle Fitting


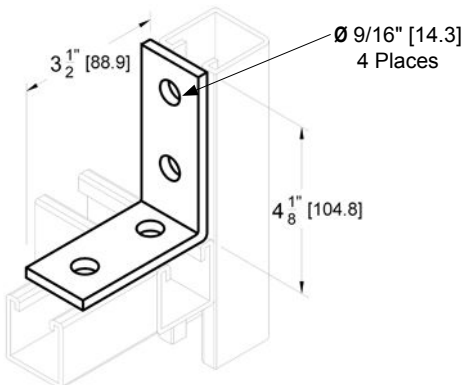
2-Hole Catalog Number: FNW7842Z2
FNW7842G2



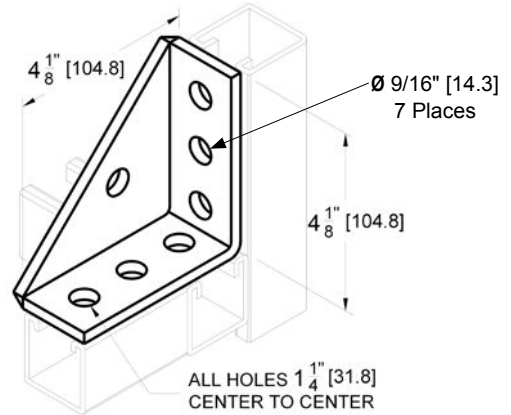
3-Hole Catalog Number: FNW7842Z3

FIGURE 7843 - 3-Way Cross Corner Angle Fitting


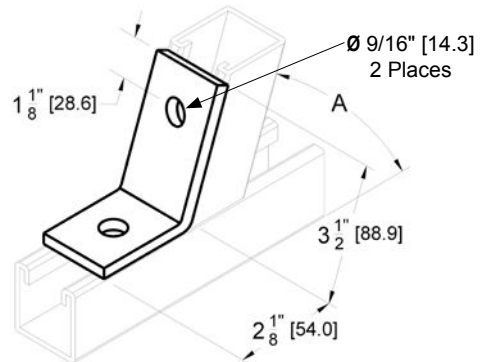
3-Hole Catalog Number: FNW7843Z3



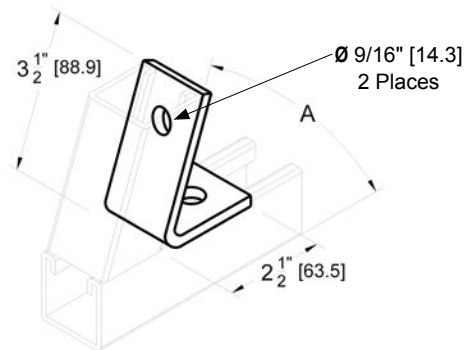
4-Hole Catalog Number: FNW7843Z4
FNW7843G4

FIGURE 7844 - 7-Hole Gusset Angle Fitting


Catalog Number: FNW7844Z7

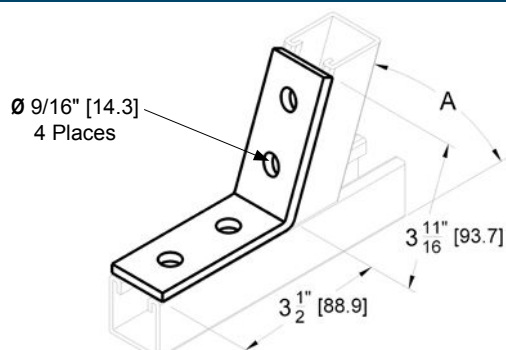
FIGURE 7845 - 2-Hole Open 45° Corner Angle Fitting


2-Hole Catalog Number: FNW7845Z2

FIGURE 7846 - 2-Hole Closed 45° Corner Angle


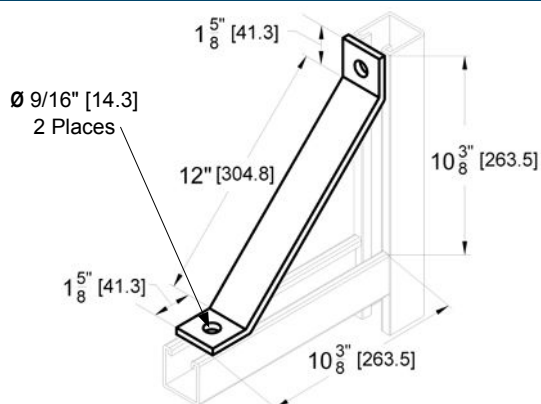
Catalog Number: FNW7846Z2

FIGURE 7847 - 4-Hole Open 45° Corner Angle Fitting

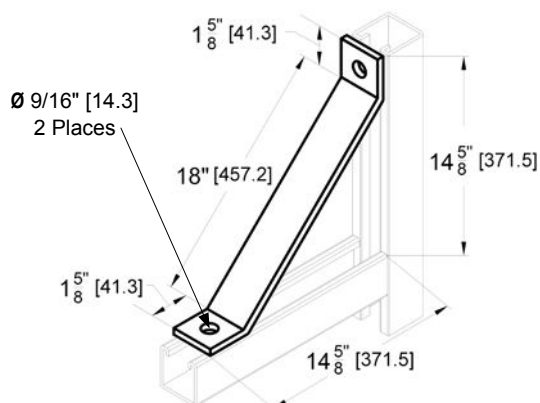


Catalog Number: FNW7847Z4

FIGURE 7848 - 2-Hole Angle Brace

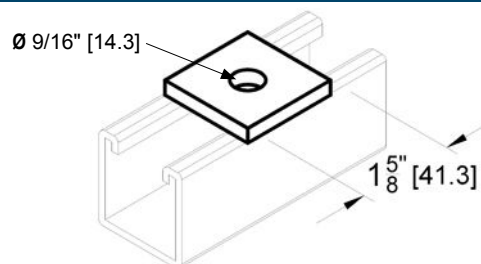


Catalog Number: FNW7848Z1200



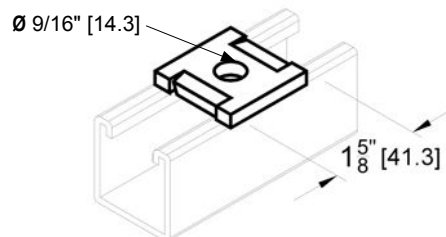
Catalog Number: FNW7848Z1800

FIGURE 7835 - Square Washer Flat Fitting



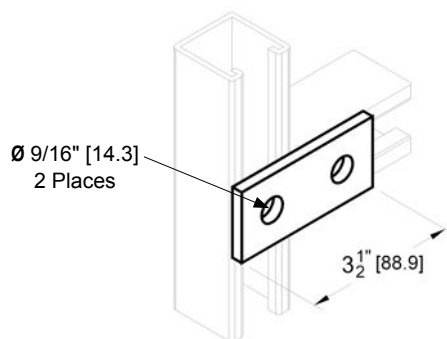
Catalog Number	Bolt Size		Hole Size	
	in.	mm	in.	mm
FNW7835Z0037 FNW7835G0037	3/8	8	7/16	11.1
FNW7835Z0050 FNW7835G0050	1/2	12	9/16	14.3
FNW7835Z0062 FNW7835G0062	5/8	16	11/16	17.5
FNW7835Z0075	3/4	20	13/16	20.6

FIGURE 7836 - Notched Square Washer Flat Fitting

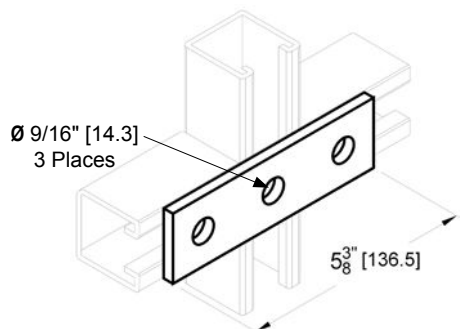


Catalog Number	Bolt Size	
	in.	mm
FNW7836Z0037 FNW7836G0037	3/8	8
FNW7836Z0050	1/2	12

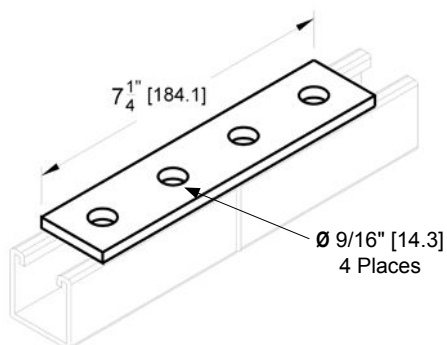
FIGURE 7837 - Splice Plate Flat Fitting



2-Hole Catalog Number: FNW7837Z2

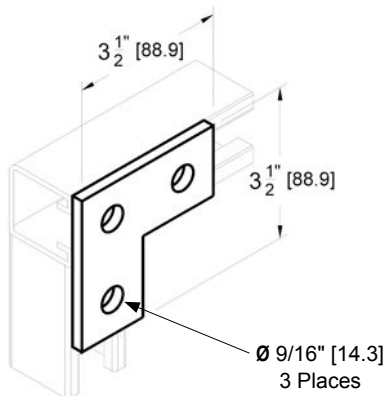


3-Hole Catalog Number: FNW7837Z3



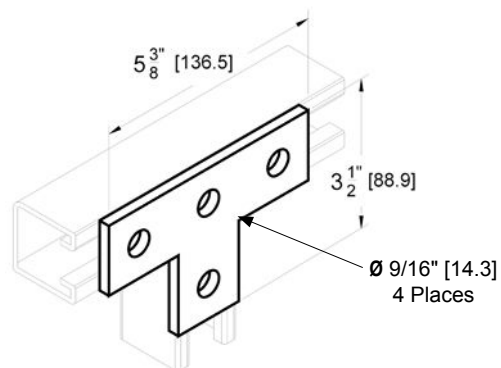
4-Hole Catalog Number: FNW7837Z4
FNW7837G4

FIGURE 7838 - 3-Hole Corner Plate Flat Fitting



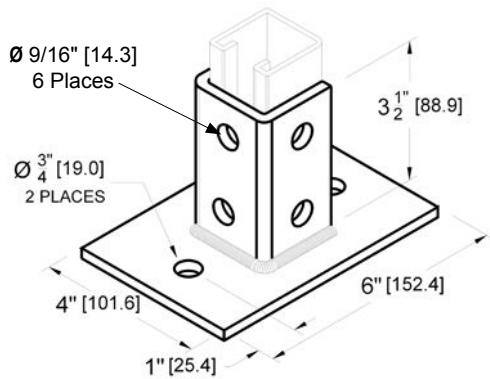
Catalog Number: FNW7838Z3
FNW7838G3

FIGURE 7839 - 4-Hole Tee Plate Flat Fitting



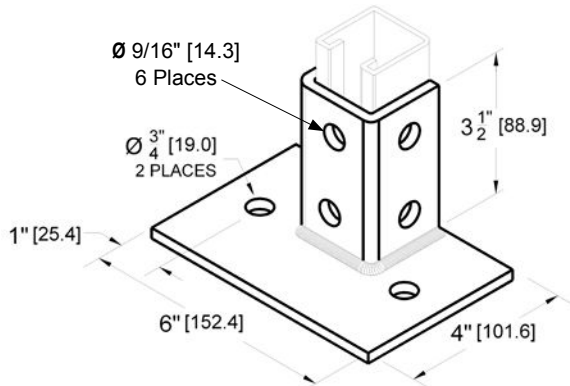
Catalog Number: FNW7839Z4
FNW7839G4

FIGURE 7850 - Single Channel 2-Hole Base



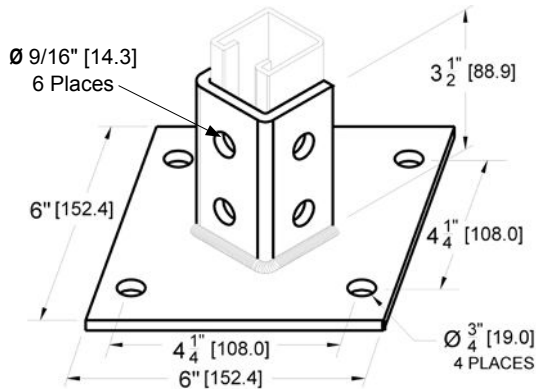
Square Mounted 3-1/2"
Catalog Number: FNW7850Z

FIGURE 7851 - Single Channel 2-Hole Flush Base



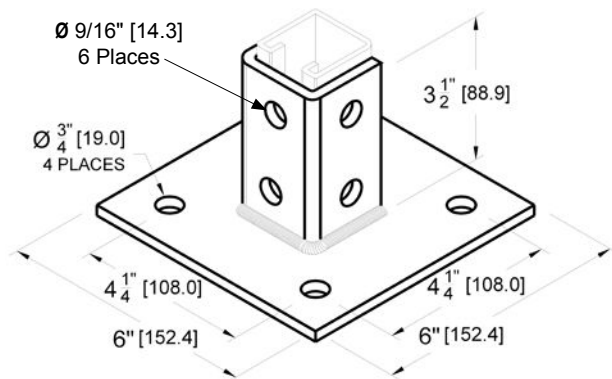
Square Mounted Flush 3-1/2"
Catalog Number: FNW7851Z

FIGURE 7852 - Single Channel 4-Hole Standard



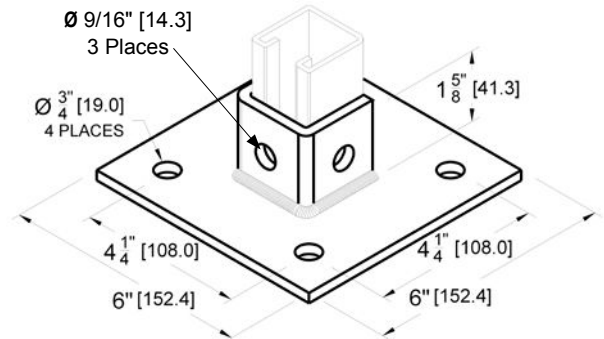
Square Mounted 3-1/2"
Catalog Number: FNW7852Z

FIGURE 7853 - Single Channel 4-Hole Base (tall)

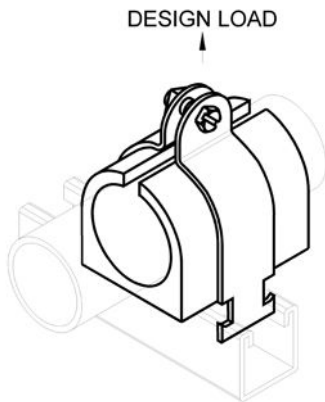


Square Mounted 3-1/2"
Catalog Number: FNW7853Z
FNW7853G

FIGURE 7855 - Single Channel 4-Hole Base (short)



Square Mounted 1-5/8"
Catalog Number: FNW7855Z

FIGURE 7815 - Cushioned Pipe Strut Clamp


Catalog Number	Pipe Size		O.D.		Design Load	
	in.	Metric	in.	mm	Lbs.	kN
FNW7815Y0050	1/2	15	0.840	21.3	330	1.48
FNW7815Y0075	3/4	20	1.050	26.7	330	1.48
FNW7815Y0100	1	25	1.315	33.4	330	1.48
FNW7815Y0125	1-1/4	32	1.660	42.2	730	3.26
FNW7815Y0150	1-1/2	40	1.900	48.3	730	3.26
FNW7815Y0200	2	50	2.375	60.3	730	3.26
FNW7815Y0250	2-1/2	65	2.875	73.0	730	3.26
FNW7815Y0300	3	80	3.500	88.9	1200	5.34
FNW7815Y0400	4	100	4.500	114.3	1200	5.34

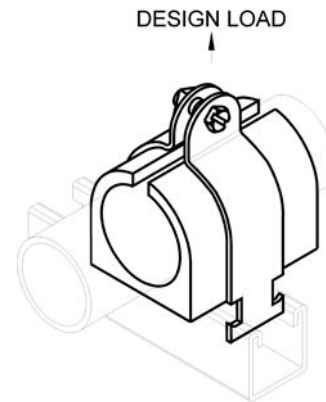
Cushion Information

Material: Thermoplastic Elastomer

Temperature Range: -50°F to 275°F

Hardness Shore "D": 46.0 avg. (per ASTM D-2240)

Dielectric Strength: 640 volts/mil.

FIGURE 7816 - Cushioned Tubing Strut Clamp


Catalog Number	Tubing O.D.			Design Load	
	in. (Fractions)	in. (Decimal)	mm	Lbs.	kN
FNW7816Y0025	1/4	0.250	6.4	330	1.48
FNW7816Y0037 FNW7816S0037	3/8	0.375	9.5	330	1.48
FNW7816Y0050 FNW7816S0050	1/2	0.500	12.7	330	1.48
FNW7816Y0062	5/8	0.625	15.9	330	1.48
FNW7816Y0075	3/4	0.750	19.0	330	1.48
FNW7816Y0087 FNW7816S0087	7/8	0.875	22.3	330	1.48
FNW7816Y0100	1	1.000	25.4	330	1.48
FNW7816Y0112	1-1/8	1.125	28.6	330	1.48
FNW7816Y0125	1-1/4	1.250	31.8	330	1.48
FNW7816Y0137	1-3/8	1.375	34.9	330	1.48
FNW7816Y0150	1-1/2	1.500	38.1	730	3.26
FNW7816Y0162	1-5/8	1.625	41.3	730	3.26
FNW7816Y0187	1-7/8	1.875	47.6	730	3.26
FNW7816Y0200	2	2.000	50.8	730	3.26
FNW7816Y0212	2-1/8	2.125	54.0	730	3.26
FNW7816Y0262	2-5/8	2.625	66.7	730	3.26
FNW7816Y0312	3-1/8	3.125	79.4	730	3.26
FNW7816Y0362	3-5/8	3.625	92.1	1200	5.34
FNW7816Y0412	4-1/8	4.125	104.8	1200	5.34

Cushion Information

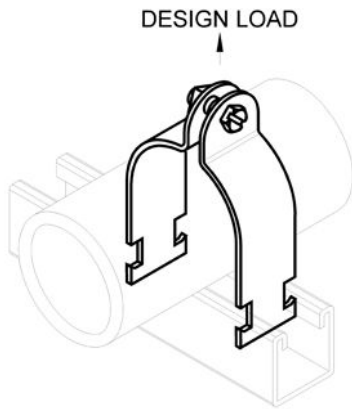
Material: Thermoplastic Elastomer

Temperature Range: -50°F to 275°F

Hardness Shore "D": 46.0 avg. (per ASTM D-2240)

Dielectric Strength: 640 volts/mil.

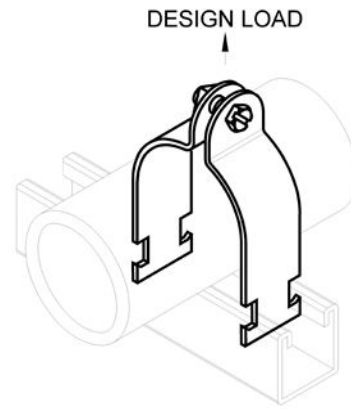
FIGURE 7870 - Copper Tubing Strut Clamp



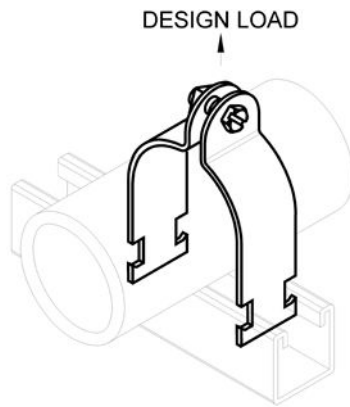
Standard finish for figure 7870 is Copper Zinc Dichromate which has a copper color to identify product for use with copper tubing.

Catalog Number	Tubing Sizes		O.D.		Design Load	
	in.	Metric	in.	mm	Lbs.	kN
FNW7870C0025	1/4	6	0.375	9.5	400	1.78
FNW7870C0037	3/8	10	0.500	12.7	400	1.78
FNW7870C0050	1/2	15	0.625	15.9	400	1.78
FNW7870C0075	3/4	20	0.875	22.2	400	1.78
FNW7870C0100	1	25	1.125	28.6	600	2.67
FNW7870C0125	1-1/4	32	1.375	34.9	600	2.67
FNW7870C0150	1-1/2	40	1.625	41.3	600	2.67
FNW7870C0200	2	50	2.125	54.0	800	3.56
FNW7870C0250	2-1/2	65	2.625	66.7	800	3.56
FNW7870C0300	3	80	3.125	79.4	800	3.56
FNW7870C0350	3-1/2	90	3.625	92.1	1000	4.45
FNW7870C0400	4	100	4.125	104.8	1000	4.45
FNW7870C0500	5	125	5.125	130.2	1000	4.45
FNW7870C0600	6	150	6.125	155.6	1000	4.45

FIGURE 7871 - EMT Strut Clamp



Catalog Number	EMT Sizes		O.D.		Design Load	
	in.	Metric	in.	mm	Lbs.	kN
FNW7871Z0050	1/2	15	0.706	17.9	400	1.78
FNW7871Z0075	3/4	20	0.922	23.4	400	1.78
FNW7871Z0125	1-1/4	32	1.510	38.4	600	2.67
FNW7871Z0150	1-1/2	40	1.740	44.2	800	3.56
FNW7871Z0200	2	50	2.197	55.8	800	3.56

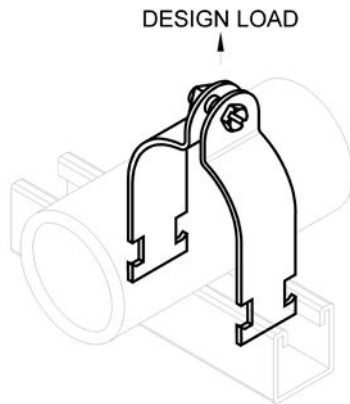
FIGURE 7872 - O.D. Strut Clamp


Catalog Number	Size (O.D.)			Design Load	
	in. (Fractions)	in. (Decimal)	mm	Lbs.	kN
FNW7872Z0025	1/4	0.250	6.4	400	1.78
FNW7872Z0037	3/8	0.375	9.5	400	1.78
FNW7872Z0050	1/2	0.500	12.7	400	1.78
FNW7872Z0062	5/8	0.625	15.9	400	1.78
FNW7872Z0075	3/4	0.750	19.0	400	1.78
FNW7872Z0087	7/8	0.875	22.3	400	1.78
FNW7872Z0100	1	1.000	25.4	600	2.67
FNW7872Z0112	1-1/8	1.125	28.6	600	2.67
FNW7872Z0125	1-1/4	1.250	31.8	600	2.67
FNW7872Z0137	1-3/8	1.375	34.9	600	2.67
FNW7872Z0150	1-1/2	1.500	38.1	600	2.67
FNW7872Z0162	1-5/8	1.625	41.3	600	2.67
FNW7872Z0175	1-3/4	1.750	44.5	800	3.56
FNW7872Z0187	1-7/8	1.875	47.6	800	3.56
FNW7872Z0200	2	2.000	50.8	800	3.56
FNW7872Z0212	2-1/8	2.125	54.0	800	3.56
FNW7872Z0225	2-1/4	2.250	57.2	800	3.56
FNW7872Z0237	2-3/8	2.375	60.3	800	3.56
FNW7872Z0250	2-1/2	2.500	63.5	800	3.56
FNW7872Z0262	2-5/8	2.625	66.7	800	3.56
FNW7872Z0275	2-3/4	2.750	69.9	800	3.56
FNW7872Z0287	2-7/8	2.875	73.0	800	3.56
FNW7872Z0300	3	3.000	76.2	800	3.56
FNW7872Z0312	3-1/8	3.125	79.4	800	3.56
FNW7872Z0325	3-1/4	3.250	82.6	800	3.56
FNW7872Z0337	3-3/8	3.375	85.7	800	3.56
FNW7872Z0350	3-1/2	3.500	88.9	800	3.56

FIGURE 7872 - O.D. Strut Clamp (continued)

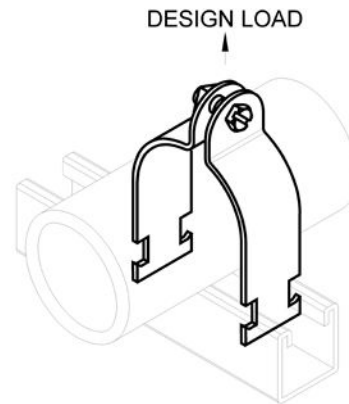
Catalog Number	Size (O.D.)			Design Load	
	in. (Fractions)	in. (Decimal)	mm	Lbs.	kN
FNW7872Z0362	3-5/8	3.625	92.1	800	3.56
FNW7872Z0375	3-3/4	3.750	95.3	1000	4.45
FNW7872Z0387	3-7/8	3.875	98.4	1000	4.45
FNW7872Z0400	4	4.000	101.6	1000	4.45
FNW7872Z0412	4-1/8	4.125	104.8	1000	4.45
FNW7872Z0425	4-1/4	4.250	108.0	1000	4.45
FNW7872Z0437	4-3/8	4.375	111.1	1000	4.45
FNW7872Z0450	4-1/2	4.500	114.3	1000	4.45
FNW7872Z0462	4-5/8	4.625	117.5	1000	4.45
FNW7872Z0475	4-3/4	4.750	120.7	1000	4.45
FNW7872Z0487	4-7/8	4.875	123.8	1000	4.45
FNW7872Z0500	5	5.000	127.0	1000	4.45
FNW7872Z0512	5-1/8	5.125	130.2	1000	4.45
FNW7872Z0525	5-1/4	5.250	133.4	1000	4.45
FNW7872Z0537	5-3/8	5.375	136.5	1000	4.45
FNW7872Z0550	5-1/2	5.500	139.7	1000	4.45
FNW7872Z0562	5-5/8	5.625	142.9	1000	4.45
FNW7872Z0587	5-7/8	5.875	149.2	1000	4.45
FNW7872Z0600	6	6.000	152.4	1000	4.45
FNW7872Z0612	6-1/8	6.125	155.6	1000	4.45
FNW7872Z0637	6-3/8	6.375	161.9	1000	4.45
FNW7872Z0650	6-1/2	6.500	165.1	1000	4.45
FNW7872Z0662	6-5/8	6.625	168.3	1000	4.45
FNW7872Z0675	6-3/4	6.750	171.5	1000	4.45
FNW7872Z0750	7-1/2	7.500	190.5	1000	4.45
FNW7872Z0762	7-5/8	7.625	193.7	1000	4.45
FNW7872Z0775	7-3/4	7.750	196.9	1000	4.45
FNW7872Z0800	8	8.000	203.2	1000	4.45
FNW7872Z0837	8-3/8	8.375	212.7	1000	4.45
FNW7872Z0850	8-1/2	8.500	215.9	1000	4.45

FIGURE 7873 - Rigid Strut Clamp



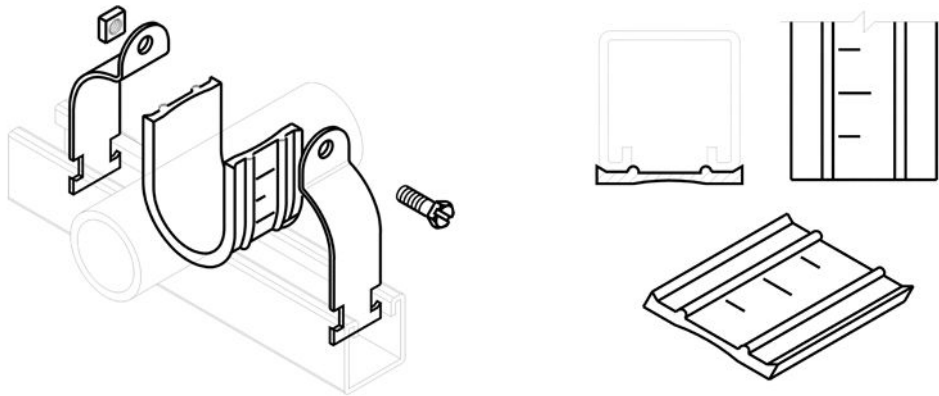
Catalog Number	Pipe Sizes		O.D.		Design Load	
	in.	Metric	in.	mm	Lbs.	kN
FNW7873Z0037	3/8	10	0.675	17.1	400	1.78
FNW7873Z0050 FNW7873S0050	1/2	15	0.840	21.3	400	1.78
FNW7873Z0075 FNW7873S0075	3/4	20	1.050	26.7	600	2.67
FNW7873Z0100 FNW7873S0100	1	25	1.315	33.4	600	2.67
FNW7873Z0125 FNW7873S0125	1-1/4	32	1.660	42.2	600	2.67
FNW7873Z0150 FNW7873S0150	1-1/2	40	1.900	48.3	800	3.56
FNW7873Z0200 FNW7873S0200	2	50	2.375	60.3	800	3.56
FNW7873Z0250 FNW7873S0250	2-1/2	65	2.875	73.0	800	3.56
FNW7873Z0300 FNW7873S0300	3	80	3.500	88.9	800	3.56
FNW7873Z0350	3-1/2	90	4.000	101.6	1000	4.45
FNW7873Z0400	4	100	4.500	114.3	1000	4.45
FNW7873Z0500	5	125	5.562	141.3	1000	4.45
FNW7873Z0600	6	150	6.625	168.3	1000	4.45
FNW7873Z0800	8	200	8.625	219.1	1000	4.45
FNW7873Z1000	10	250	10.750	273.1	1000	4.45
FNW7873Z1200	12	300	12.750	323.9	1000	4.45

FIGURE 7874 - Universal Strut Clamp



Catalog Number	Clamp Sizes*		O.D.		Design Load	
	in.	Metric	in.	mm	Lbs.	kN
FNW7874Z0050	1/2	15	0.773	19.6	400	1.78
FNW7874Z0075	3/4	20	0.986	25.0	600	2.67
FNW7874Z0100	1	25	1.239	31.5	600	2.67
FNW7874Z0125	1-1/4	32	1.585	40.3	600	2.67
FNW7874Z0150	1-1/2	40	1.820	45.7	800	3.56
FNW7874Z0200	2	50	2.286	58.1	800	3.56

* These clamps are designed to fit both pipe (rigid conduit) and thin walled tubing (EMT) in the corresponding sizes.

FIGURE 7862 - Pipe Wrap


Sold in 25 Foot Rolls

Catalog Number: FNW7862EP25

Recommended clamp size and cut length for common pipe and tubing.

Iron Pipe or Rigid Conduit

Nominal Pipe Size		PW Cut Length		Clamp Number	Qty Per Roll*
in.	Metric	in.	mm		
3/8	10	2-1/8	54.0	FNW7871Z0075	141
1/2	15	2-5/8	66.7	FNW7873Z0075	114
3/4	20	3-1/4	82.6	FNW7872Z0125	92
1	25	4-1/8	104.8	FNW7871Z0125	72
1-1/4	32	5-3/16	131.8	FNW7873Z0150	57
1-1/2	40	5-15/16	150.8	FNW7872Z0212	50
2	50	7-7/16	188.9	FNW7872Z0262	40
2-1/2	65	9	228.6	FNW7872Z0312	33
3	80	11	279.4	FNW7872Z0375	27
3-1/2	90	12-1/2	317.5	FNW7872Z0425	24
4	100	14-1/8	358.8	FNW7872Z0475	21
5	125	17-7/16	442.9	FNW7872Z0575	17
6	150	20-3/4	527.1	FNW7872Z0687	14

Thin Wall (EMT) Conduit

Nominal Pipe Size		PW Cut Length		Clamp Number	Qty Per Roll*
in.	Metric	in.	mm		
3/8	10	1-13/16	46.0	FNW7872Z0075	165
1/2	15	2-3/16	55.6	FNW7871Z0075	137
3/4	20	2-7/8	73.0	FNW7871Z0100	104
1	25	3-5/8	92.1	FNW7872Z0137	82
1-1/4	32	4-11/16	119.1	FNW7872Z0187	64
1-1/2	40	5-7/16	138.1	FNW7873Z0150	55
2	50	6-7/8	174.6	FNW7873Z0200	43

Copper Tubing

Nominal Pipe Size		PW Cut Length		Clamp Number	Qty Per Roll*
in.	Metric	in.	mm		
1/4	6	1-1/8	28.6	FNW7872Z0062	266
3/8	10	1-9/16	39.7	FNW7872Z0075	192
1/2	15	1-7/8	47.6	FNW7872Z0087	160
5/8	17	2-5/16	58.7	FNW7872Z0100	129
3/4	20	2-3/4	69.9	FNW7872Z0112	109
1	25	3-1/2	88.9	FNW7872Z0137	85
1-1/4	32	4-5/16	109.5	FNW7872Z0162	69
1-1/2	40	5-1/16	128.6	FNW7872Z0187	59
2	50	6-11/16	169.9	FNW7873Z0200	44
2-1/2	65	8-1/4	209.6	FNW7873Z0250	36
3	80	9-13/16	249.2	FNW7872Z0337	30
3-1/2	90	11-3/8	288.9	FNW7872Z0387	26
4	100	12-15/16	328.6	FNW7872Z0437	23
5	125	16-1/16	408.0	FNW7872Z0537	18
6	150	19-1/4	488.9	FNW7872Z0637	15
8	200	25-1/2	647.7	FNW7872Z0837	11

* Quantity per roll is an approximation based on the cut length specified from a 25 foot roll.

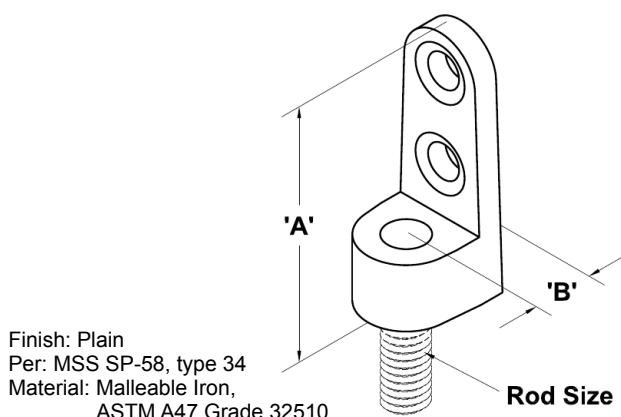
Wrap Information

Material: EPDM

Temperature Range: -50°F to 360°F

Hardness Shore "A": 70 avg. (per ASTM D-2240)

FIGURE 7501 - Beam Connector



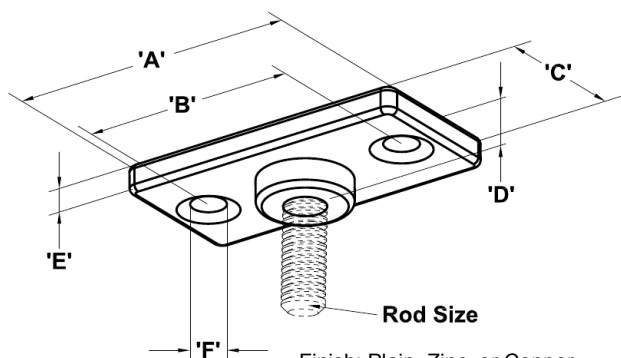
Finish: Plain
Per: MSS SP-58, type 34
Material: Malleable Iron,
ASTM A47 Grade 32510

Hanger rod not included

Catalog Number	Rod Size	A	B
FNW7501PC	3/8"-16	2.19"	0.56"

Rod Size	Finish	Max. Load	Wt. (Oz.)
3/8"-16	Plain	250 Lbs.	1.80

FIGURE 7502 - Beam Ceiling Flange



Finish: Plain, Zinc, or Copper
Material: Malleable Iron,
ASTM A47 Grade 32510

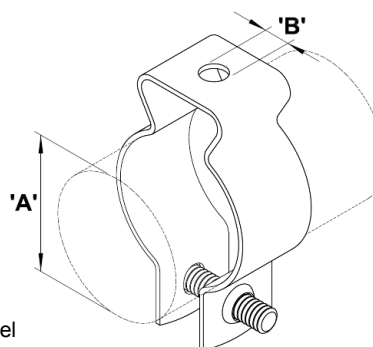
Hanger rod not included

Rod Size	A	B	C	D
3/8"-16	2.75"	2.00"	1.38"	0.50"
1/2"-13	2.75"	2.00"	1.38"	0.50"

Rod Size	E	F	Wt. (Oz.)
3/8"-16	0.25"	0.31"	2.96
1/2"-13	0.25"	0.31"	2.72

Catalog Number	Finish	Rod Size	Max. Load (Lbs.)
FNW7502PC	Plain	3/8"-16	180
FNW7502ZC	Zinc	3/8"-16	180
FNW7502CC	Copper	3/8"-16	180
FNW7502PD	Plain	1/2"-13	180
FNW7502ZD	Zinc	1/2"-13	180
FNW7502CD	Copper	1/2"-13	180

FIGURE 7310 - Rigid/EMT Clamp



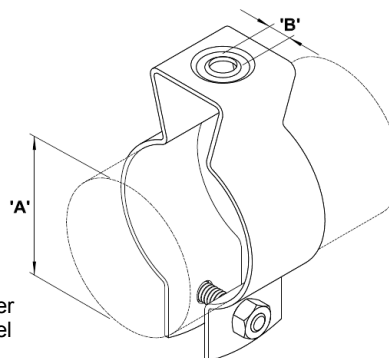
Finish: Zinc
Material: Steel

Notes:

1. Sizes 0050 to 0200 have embossed threading for clamp screw.
2. Sizes 0250 & 0300 use nut and bolt.
3. Sizes 0250 & 0300 have an embossment around hole 'B'.

Catalog Number	Sizes (in.)		A	B	Gauge	Design Load
	Rigid	EMT				
FNW7310Z0050	3/8	1/2	0.80	0.28	18	200 lbs.
FNW7310Z0075	3/4	3/4	1.00	0.28	18	200 lbs.
FNW7310Z0100	1	1	1.20	0.28	18	200 lbs.
FNW7310Z0125E		1-1/4	1.50	0.28	18	200 lbs.
FNW7310Z0125	1-1/4	1-1/2	1.70	0.28	18	200 lbs.
FNW7310Z0150	1-1/2		1.87	0.34	18	200 lbs.
FNW7310Z0200	2	2	2.25	0.34	18	350 lbs.
FNW7310Z0250	2-1/2	2-1/2	3.00	0.41	14	350 lbs.
FNW7310Z0300	3	3	3.50	0.41	14	350 lbs.

FIGURE 7311 - Copper Pipe Clamp



Finish: Copper
Material: Steel

Notes:

1. Copper plating is for identification purposes only.
2. All sizes use nut and bolt.
3. All sizes have an embossment around hole 'B'.

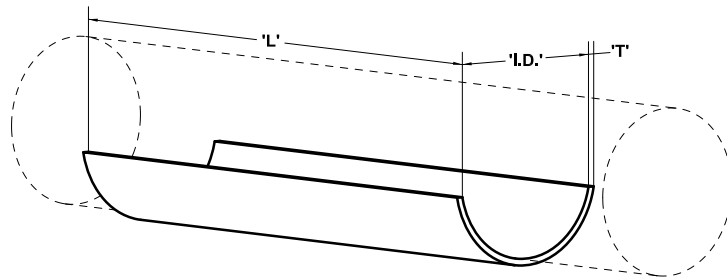
Catalog Number	Copper Sizes (in.)	A	B	Gauge	Design Load
FNW7311C0050	1/2	0.65	0.28	19	200 lbs.
FNW7311C0075	3/4	0.87	0.28	18	200 lbs.
FNW7311C0100	1	1.20	0.28	18	200 lbs.
FNW7311C0125	1-1/4	1.38	0.28	18	200 lbs.
FNW7311C0150	1-1/2	1.70	0.34	16	200 lbs.
FNW7311C0200	2	2.13	0.34	16	200 lbs.

FIGURE 7750 (Standard) & 7751 (Domestic¹) - MSS Compliant Insulation Protection Shields

Finish: G60 Galvanized Coating
 Material: Steel, ASTM 1011 type B
 MSS SP-58, Type 40*
 Federal Specification WW-H-171, Type 41*

* Complies when used within the pipe size, insulation thickness, and compressive strength of insulation as specified by MSS SP-58.

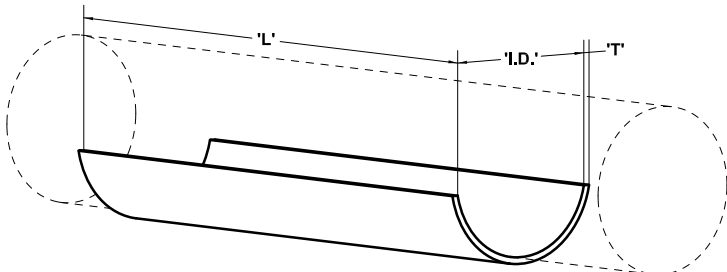
¹ Domestic shields are ordered on demand (SOD)



Catalog Number		Shield Size	L		I.D.		T			Required Hanger Size	Weight Lbs.
Standard	Domestic ¹		in.	mm	in.	mm	in.	mm	gauge		
FNW7750Z0150	FNW7751Z0150	1-1/2	12	305	1.91	48.4	0.047	1.2	18	1-1/2"	0.47
FNW7750Z0200	FNW7751Z0200	2	12	305	2.38	60.4	0.047	1.2	18	2"	0.58
FNW7750Z0250	FNW7751Z0250	2-1/2	12	305	2.88	73.2	0.047	1.2	18	2-1/2"	0.71
FNW7750Z0300	FNW7751Z0300	3	12	305	3.50	88.9	0.047	1.2	18	3"	0.86
FNW7750Z0350	FNW7751Z0350	3-1/2	12	305	4.00	101.6	0.047	1.2	18	3-1/2"	0.98
FNW7750Z0400	FNW7751Z0400	4	12	305	4.52	114.7	0.047	1.2	18	4"	1.10
FNW7750Z0450	FNW7751Z0450	4-1/2	12	305	5.00	127.0	0.047	1.2	18	5"	1.28
FNW7750Z0500	FNW7751Z0500	5	12	305	5.31	135.0	0.047	1.2	18	5"	1.38
FNW7750Z0550	FNW7751Z0550	5-1/2	12	305	5.56	141.2	0.047	1.2	18	5"	1.39
FNW7750Z0600	FNW7751Z0600	6	12	305	6.66	169.1	0.059	1.5	16	6"	2.02
FNW7750Z0700	FNW7751Z0700	7	12	305	7.65	194.3	0.059	1.5	16	8"	2.31
FNW7750Z0800	FNW7751Z0800	8	12	305	8.70	220.9	0.059	1.5	16	8"	2.79
FNW7750Z1000	FNW7751Z1000	10	18	458	10.86	275.8	0.059	1.5	16	10"	5.25
FNW7750Z1200	FNW7751Z1200	12	24	610	12.83	326.0	0.071	1.8	15	12"	9.55

FIGURE 7753 - Light Duty Insulation Protection Shields

Material: Carbon Steel, ASTM A653, type A/B
 Finish: G60 Galvanized Coating



Catalog Number	L		I.D.			T			Required Hanger Size	Weight Lbs.
	in.	mm	in.	mm	± in (mm)	in.	mm	gauge		
FNW7753Z0000	11.9	302	1.90	48.3	0.093 (2.38)	0.024	0.6	24	1-1/2"	0.25
FNW7753Z0001	11.9	302	2.38	60.5	0.093 (2.38)	0.024	0.6	24	2"	0.31
FNW7753Z0002	11.9	302	2.87	72.9	0.093 (2.38)	0.024	0.6	24	2-1/2"	0.38
FNW7753Z0003	12	305	3.50	88.9	0.093 (2.38)	0.047	1.2	18	3"	0.88
FNW7753Z0004	12	305	4.00	101.6	0.093 (2.38)	0.047	1.2	18	3-1/2"	1.01
FNW7753Z0005	12	305	4.50	114.3	0.093 (2.38)	0.047	1.2	18	4"	1.13
FNW7753Z0006	12	305	5.00	127.0	0.125 (3.18)	0.047	1.2	18	5"	1.26
FNW7753Z0007	12	305	5.63	143.0	0.125 (3.18)	0.047	1.2	18	5"	1.40
FNW7753Z0008	12	305	6.62	168.1	0.125 (3.18)	0.047	1.2	18	6"	1.66
FNW7753Z0009	12	305	7.63	193.8	0.250 (6.35)	0.047	1.2	18	8"	1.91
FNW7753Z0010	12	305	8.62	219.0	0.250 (6.35)	0.047	1.2	18	8"	2.16
FNW7753Z0013	12	305	9.63	244.6	0.250 (6.35)	0.047	1.2	18	10"	2.41
FNW7753Z0014	12	305	10.75	273.0	0.250 (6.35)	0.047	1.2	18	10"	2.69
FNW7753Z0015	12	305	11.75	298.5	0.250 (6.35)	0.047	1.2	18	12"	2.94
FNW7753Z0016	12	305	12.75	323.9	0.250 (6.35)	0.047	1.2	18	12"	3.19

GAUGES, THERMOMETERS & ACCESSORIES

THERMOMETERS & THERMOWELLS

Figure	Description	Page
9S.....	Adjustable angle thermometer, 9" display.....	299
SDTH	Adjustable angle thermometer, digital, solar powered	300
BTW	Brass thermowell	302
BTWELL.....	Brass thermowell	303

PRESSURE GAUGES

Figure	Description	Page
LFG	Liquid filled gauge, 2-1/2"	304
G	Mechanical contractor's gauge, 4-1/2"	305

GAUGE ACCESSORIES

Figure	Description	Page
PTS	Syphon, pigtail, brass or steel.....	306
NV	Needle valve, 400 psi, brass.....	307
BNV	Needle valve, 600 psi, brass.....	308
PS	Pressure snubber.....	309
PTT	Pressure/temperature test plug.....	310

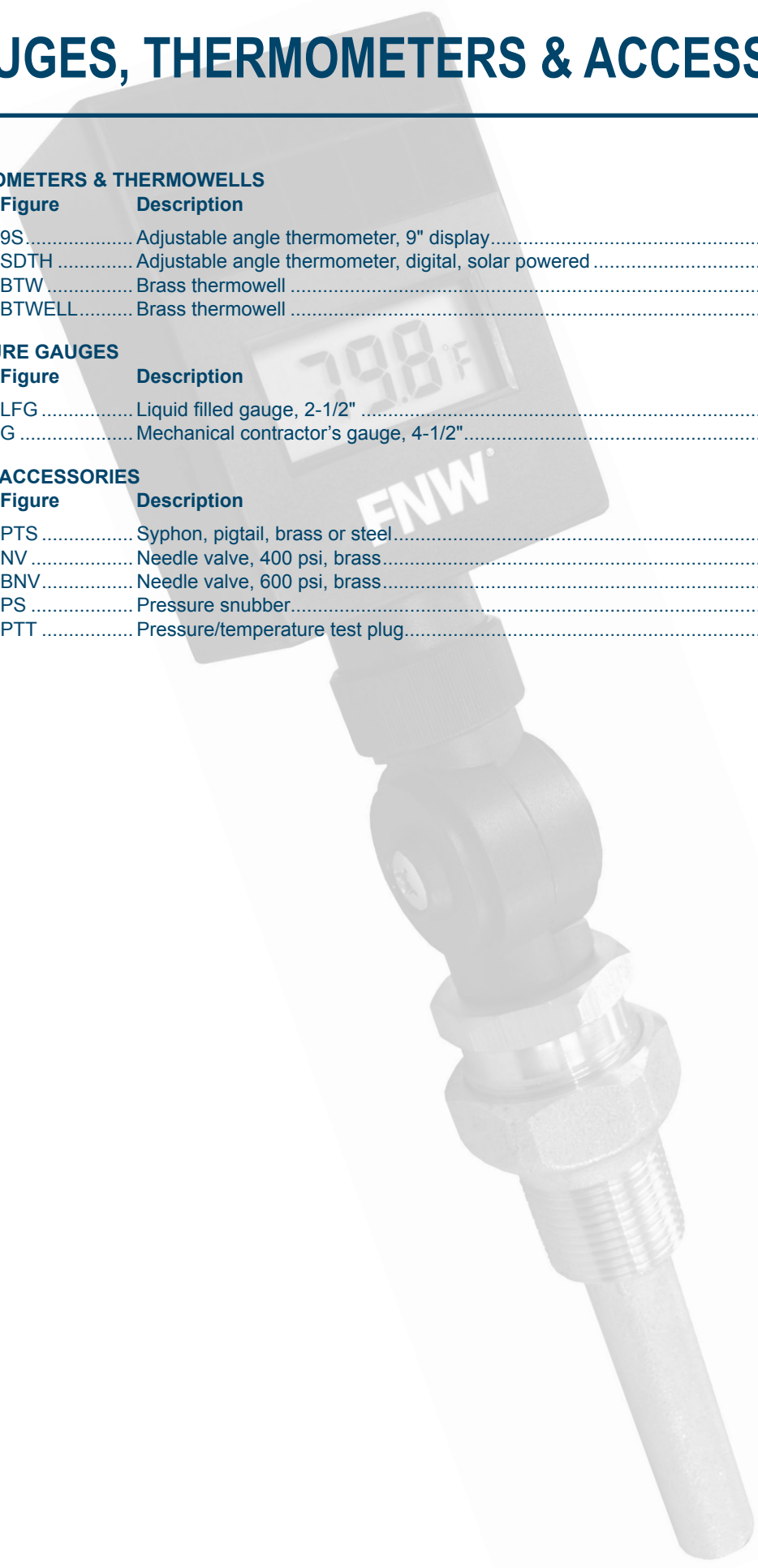


Figure 9S GAUGES & THERMOMETERS



ADJUSTABLE ANGLE THERMOMETER

The figure 9S adjustable angle thermometer is widely used in the commercial plumbing market. The thermometer is well suited for new construction, plumbing, water lines, boilers, heating, ventilation, and air conditioning applications.

Features:

- Dual Scale (°F and °C)
- +/- 1% Accuracy
- Adjustable in 20 Positions Over 180°
- 360° Case Rotation
- 3.5" (90mm) Stem
- Glass Organic Non-Mercury Filled Tube (Green Kerosene)
- Graphite Filled Bulb Chamber for Maximum Heat Conduction
- 9 Inch Valox® Case*
- Glass Lens
- 1-1/4"-18 UNEF Brass Swivel Nut Connection
- -40°F to 330°F (-40°C to 150°C) Process Temperature Limit
- IP54 Enclosure Rating
- CAN/CGSB 14.4-M88 Compliant
- ASME B40.200, ASTM E1 (E2251) Compliant

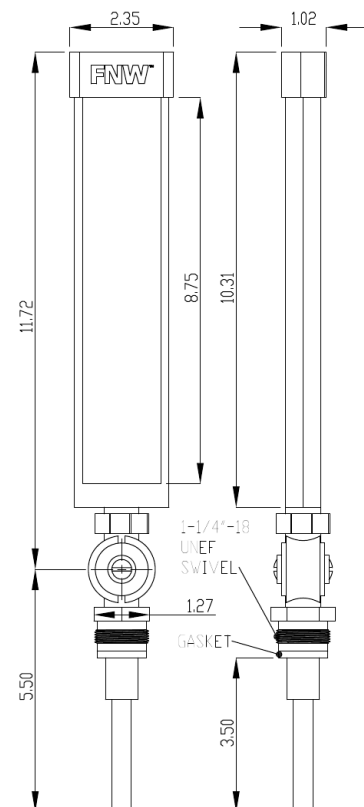
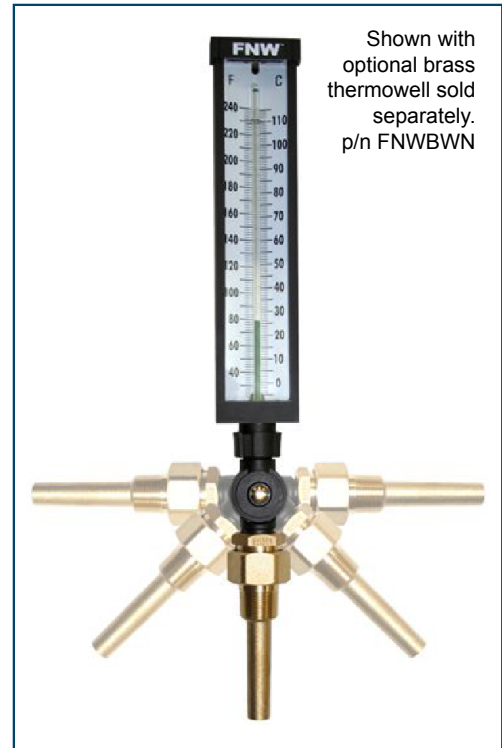
* Valox is a registered trademark of General Electric Company

Specifications

Range (°F)	Gradations	Stem Length	Scale Size
0 to 120	1°	3-1/2"	9"
0 to 160	2°	3-1/2"	9"
30 to 240	2°	3-1/2"	9"

Part Numbers

Range (°F)	Part Number
0 to 120	FNW9S0120AT
0 to 160	FNW9S0160AT
30 to 240	FNW9S30240AT



ADJUSTABLE ANGLE SOLAR THERMOMETER w/ DIGITAL LCD DISPLAY

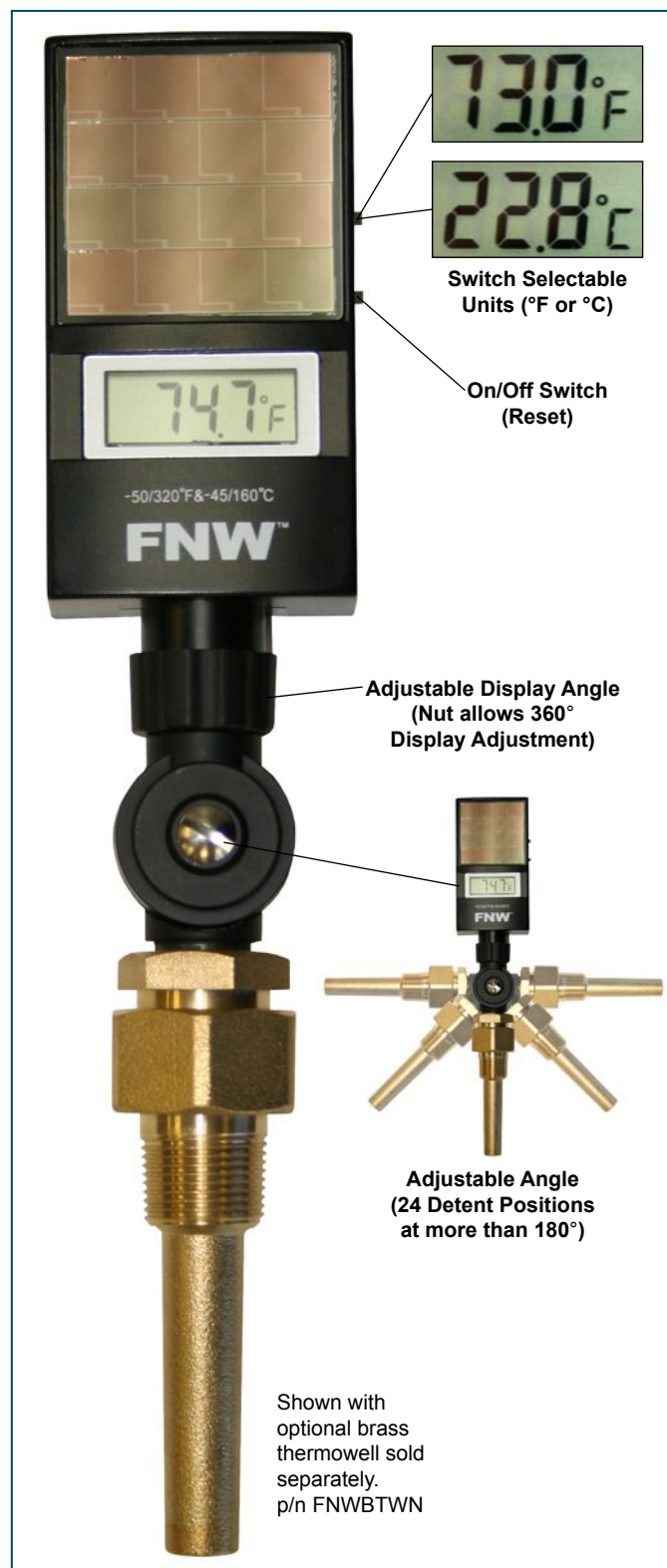
The figure SDTH solar-powered thermometer fits any standard industrial thermowell (such as FNW p/n FNWBTWN). The high contrast display is easily read from greater distances than the typical glass tube thermometer. The design of the solar panels collects light to power the unit in as little as 16 LUX.

Features:

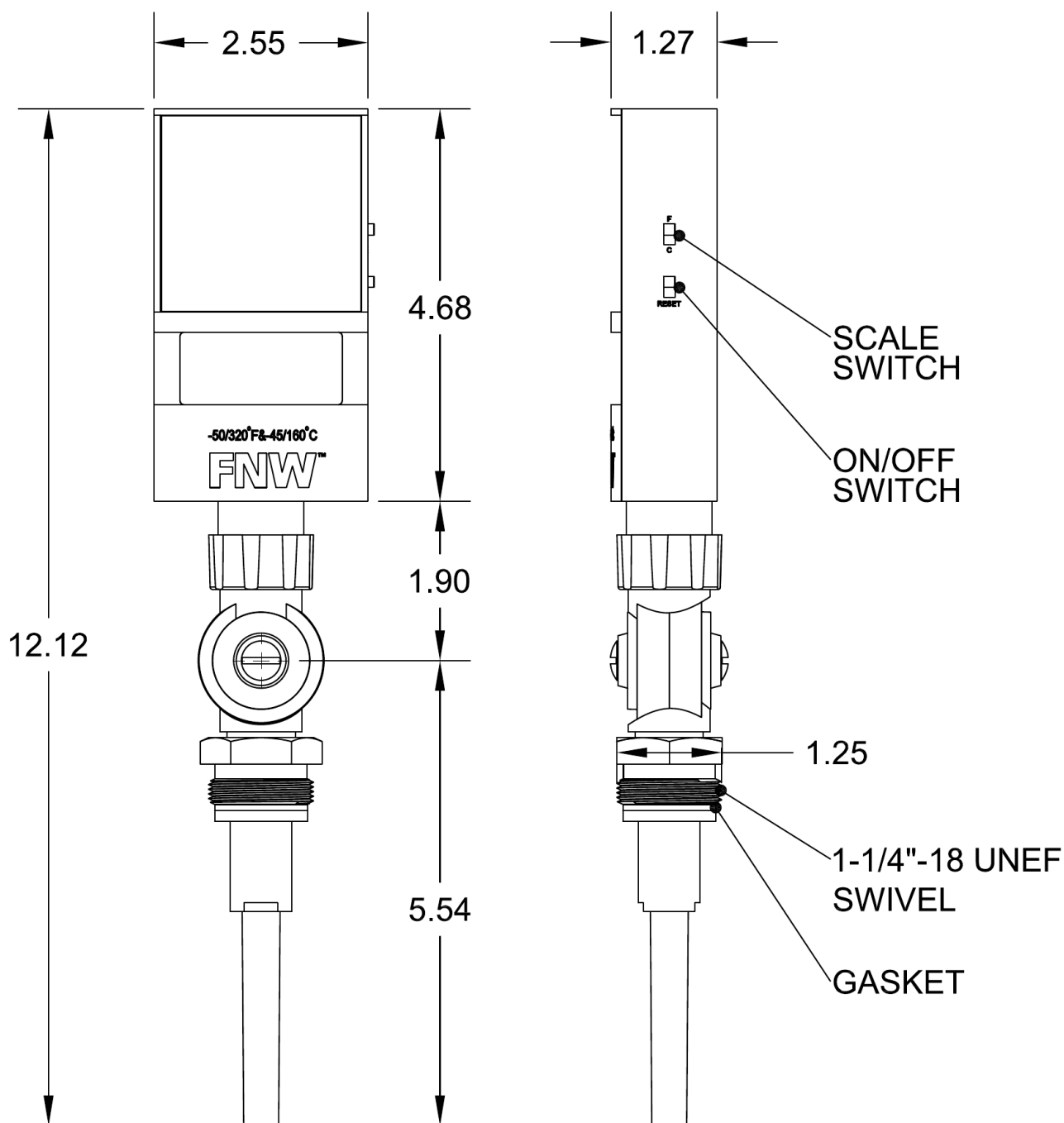
- Dual Scale (Switchable Between °F and °C)
- +/- 1% Accuracy
- Display Updates Every 6 Seconds
- 0.10° Display Resolution
- Adjustable in 24 Positions Over 180°
- 360° Case Rotation
- 3.5" (90mm) Stem
- Durable High Impact ABS Case
- Polycarbonate Lens
- Low Light Compatible 16 LUX Minimum (Approximately 1.5 Foot-Candles)
- 1-1/4"-18 UNEF Brass Swivel Nut Connection
- -50°F to 320°F (-45°C to 160°C) Process Temperature Limit
- 14°F to 150°F (-10°C to 65°C) Ambient Temperature Limit
- IP60 Enclosure Rating

Part Number

Range (°F)	Part Number
-50 to 320	FNWSDTHN



ADJUSTABLE ANGLE SOLAR THERMOMETER w/ DIGITAL LCD DISPLAY



BRASS THERMOWELL

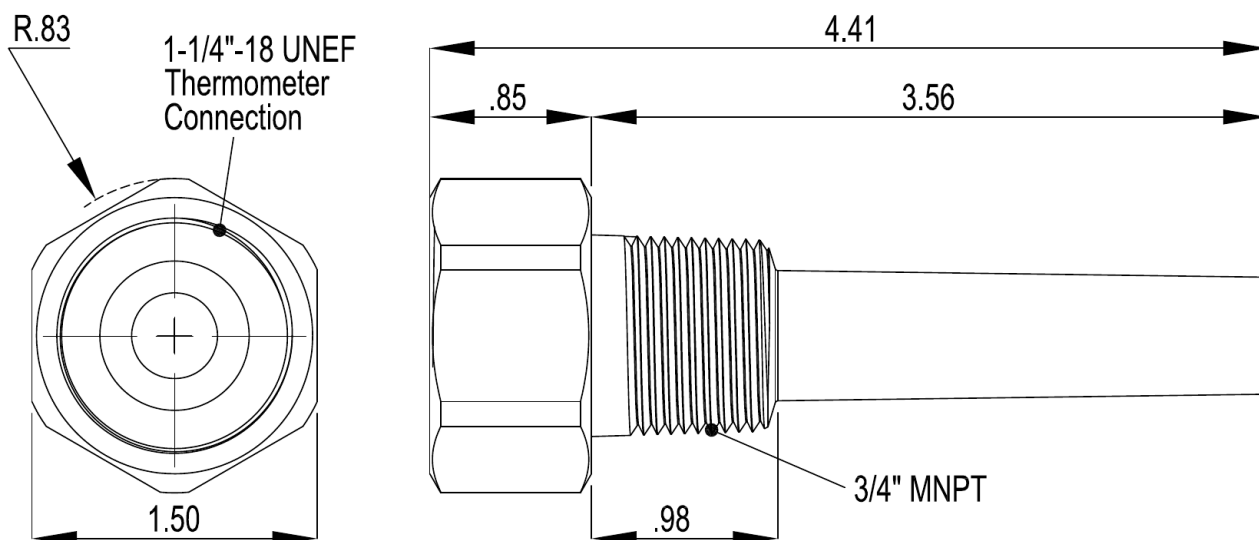
Designed for use with all 9" (228mm) industrial thermometers to create a "sealed system". Thermowells provide insertion of various temperature instruments while protecting them from damage due to process media pressure, abrasion, velocity, or corrosion. In addition, thermowells allow for removal of temperature instruments for repair, replacement, or calibration without the need to shut down or drain the process.

Features:

- Brass Construction
- Accepts 3.5" (90mm) Stem
- 7/16" Bore Diameter Taper
- Stepped Standard Form
- 3/4" MNPT Process Connection
- 1-1/4"-18 UNEF Instrument Connection
- CAN/CGSB 14.4-M88 Compliant

Part Number

Size	Part Number
3-1/2"	FNWBTWN



BRASS THERMOWELL

Application

Thermowells provide insertion of various temperature instruments while protecting them from damage due to process media pressure, abrasion, velocity, or corrosion. In addition, thermowells allow for removal of temperature instruments for repair, replacement, or calibration without the need to shut down the process.

Configuration

- Threaded Taper

Connection

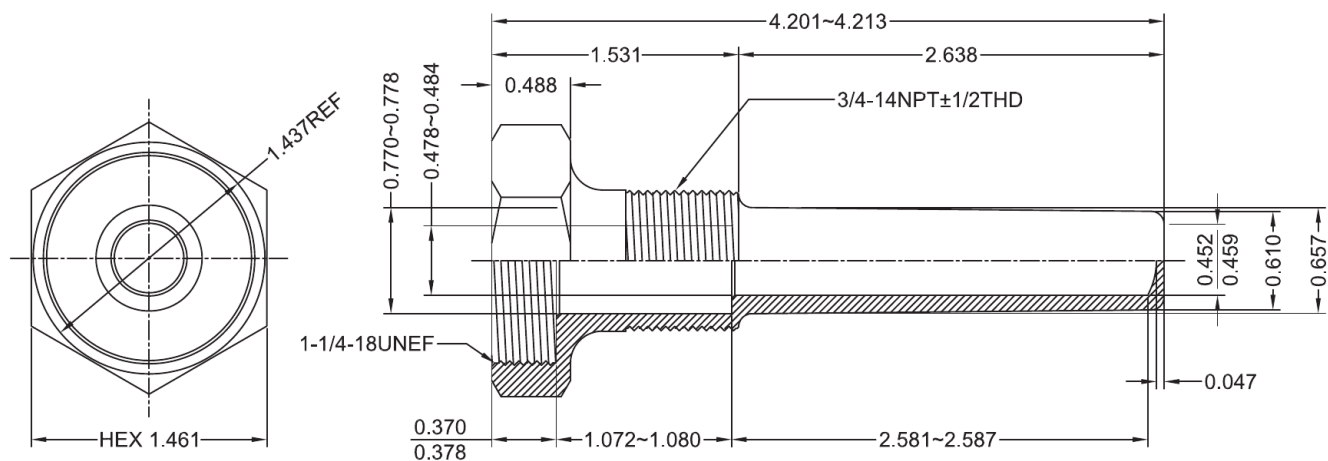
- Socket Length: 3-1/2"
- Process Connection: 3/4"-14 NPT
- Instrument Connection: 1-1/4"-18 UNEF

Material

- JIS-3771 Brass

Part Number

Size	Part Number
3-1/2"	FNWBTWELL



2-1/2" LIQUID FILLED GAUGE

Liquid-filled pressure gauges provide users with a number of advantages in certain measurement applications. They are ideally suited for uses on equipment where excessive vibration and pulsation are encountered, such as pumps, compressors, and machine tools.

Features:

- Dual Scale (PSI and kPa)
- +/- 1.5% of Full Scale Accuracy
- 304SS Case and Crimp-On Bezel Ring
- Glycerin Filled
- Phosphor Bronze C-Shaped Bourdon Tube
- 1/4" OT 58 Brass MNPT Connection
- OT 59 Brass Movement
- Black Anodized Aluminum Pointer
- White Aluminum Dial with Black and Red Markings
- Tin/Copper Alloy Welding
- Polycarbonate Lens
- Silicone Rubber Gasket at Connection
- EPDM Gasket at Lens, Fill Plug, and Blow-Out Vent
- 75% of Full Scale Working Pressure
- 25% Over-Pressure Limit
- -4°F to 150°F (-20°C to 65°C) Process and Ambient Temperature Limit
- IP65 Enclosure Rating

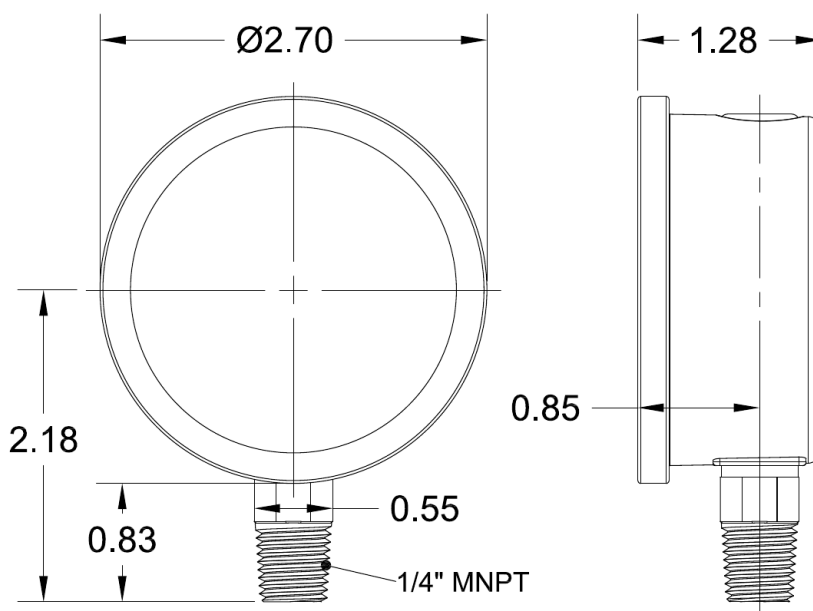


Dial Resolution

Range (PSI)	PSI Per Mark
0 to 30	0.5
0 to 60	1
0 to 100	2
0 to 160, 200, 300	5

Part Numbers

Range (PSI)	Part Number
0 to 30	FNWLFG030L
0 to 60	FNWLFG060L
0 to 100	FNWLFG0100L
0 to 160	FNWLFG0160L
0 to 200	FNWLFG0200L
0 to 300	FNWLFG0300L

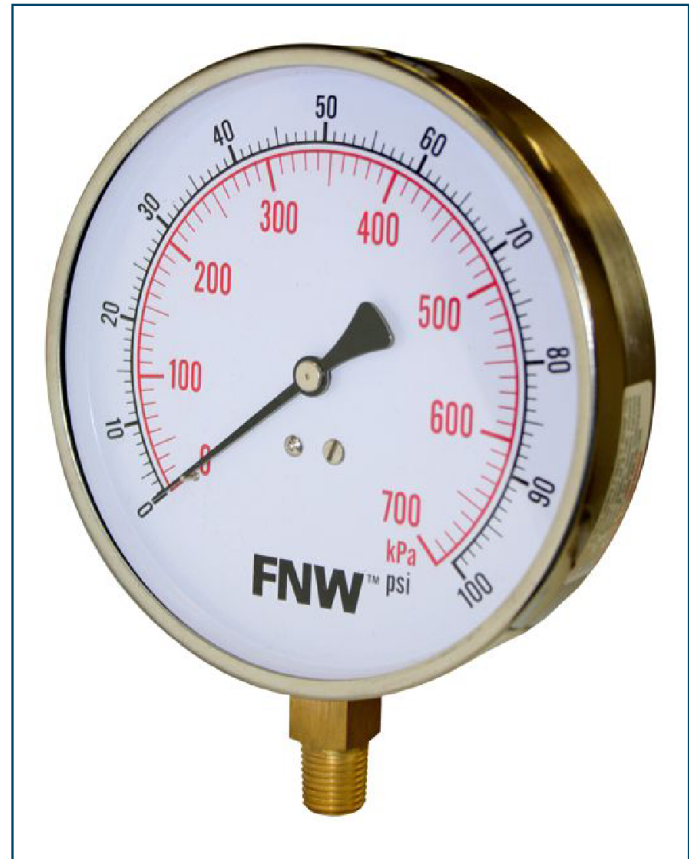


4-1/2" MECHANICAL CONTRACTOR'S GAUGE

The contractor's gauge is designed for a wide variety of industrial applications, but is especially suited for heating and air conditioning systems. The rugged gauge case is made of stainless steel to provide the protection needed in corrosive atmospheres.

Features:

- Dual Scale (PSI and kPa)
- +/- 1% Grade 1A Per ANSI/ASME B40.100
- 304SS Case and Bezel Ring
- Zero Adjustment Screw
- Phosphor Bronze Bourdon Tube
- 1/4" Brass MNPT Connection
- Brass Movement
- Black Anodized Aluminum Pointer
- White Aluminum Dial with Black and Red Markings
- Silver Solder Welding
- Acrylic Lens
- 75% of Full Scale Working Pressure
- 25% Over-Pressure Limit
- -40°F to 150°F (-40°C to 65°C) Process and Ambient Temperature Limit
- IP52 Enclosure Rating

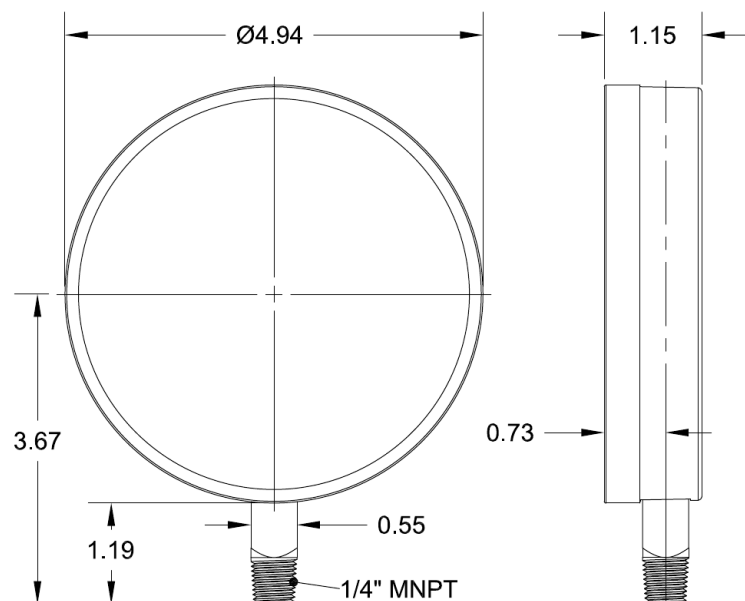


Dial Resolution

Range (PSI)	PSI Per Mark
0 to 30	0.5
0 to 60, 100	1
0 to 160, 200	2
0 to 300	5

Part Numbers

Range (PSI)	Part Number
0 to 30	FNWG030R
0 to 60	FNWG060R
0 to 100	FNWG0100R
0 to 160	FNWG0160R
0 to 200	FNWG0200R
0 to 300	FNWG0300R



PIG TAIL SYPHON

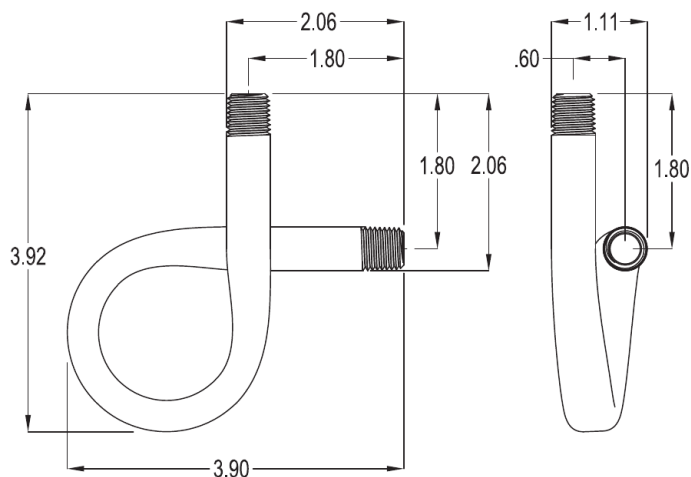
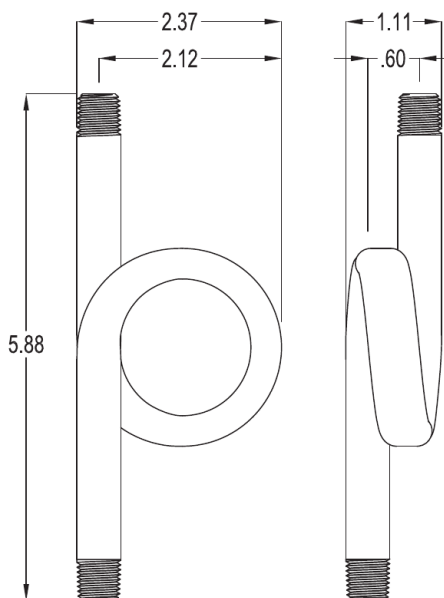
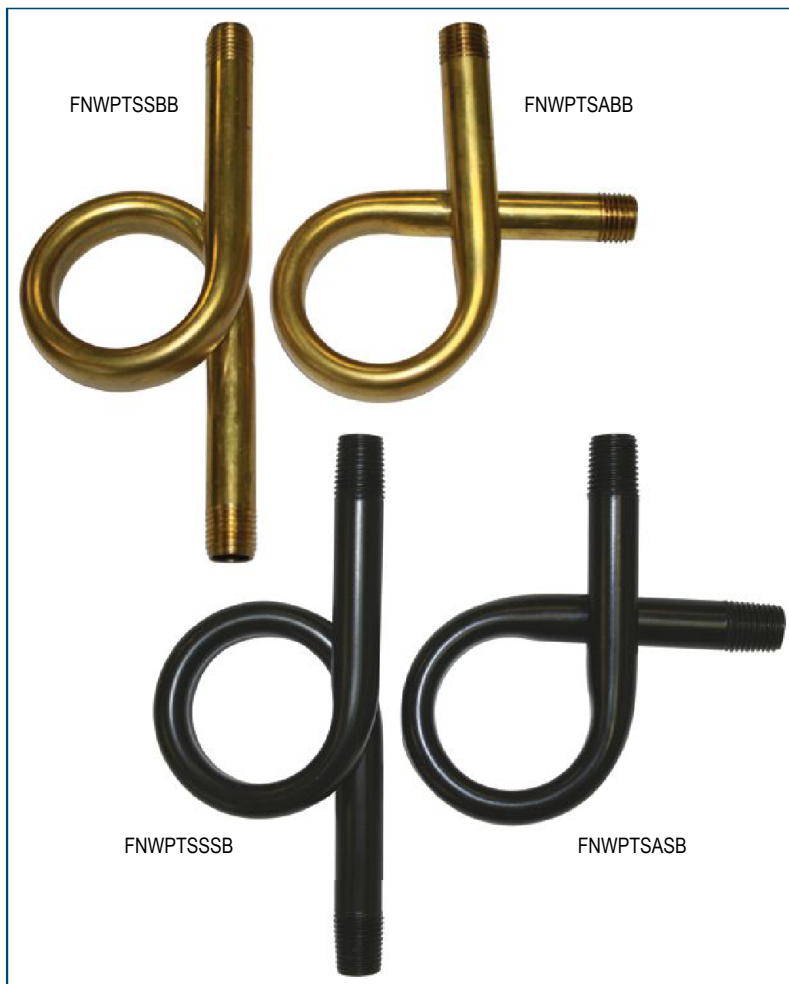
Pigtail syphons are used to protect pressure gauges from the effects of hot pressure media such as steam and also to reduce the effects of rapid pressure surges. Syphons should be filled with water or any other suitable separating liquid prior to installation.

Features:

- 600 PSI Maximum
- 750°F Maximum
- Available in Straight and Angled Configuration
- Material Options:
 - C26000 Brass
 - ASTM A53 Steel
- Steel Syphons are Epoxy Coated by Electrodeposition

Part Number

Style	Material	Size	Part Number
Straight	Brass	1/4" NPT	FNWPTSSBB
Straight	Steel	1/4" NPT	FNWPTSSSB
Angle	Brass	1/4" NPT	FNWPTSABB
Angle	Steel	1/4" NPT	FNWPTSASB



Dimensions are approximations only; some variation may occur.

BRASS NEEDLE VALVE

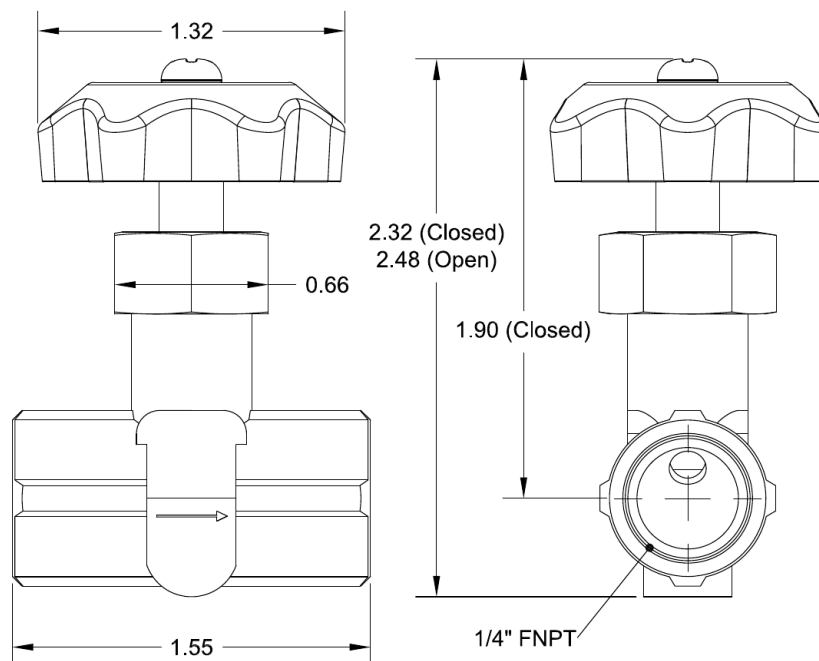
The figure NV brass needle valve is utilized for fine flow control in non-corrosive applications and controlling mild pulsations in water, oil, and gas service. It is also used as an isolation valve for pressure gauges and transmitters.

Features:

- 400 PSI Maximum Operating Pressure
- 1/4" FNPT End Connections
- #59-1 Forged Brass Body
- Red ABS Plastic Handle
- Rubber O-ring Stem Seal
- #59-1 Brass Stem
- #59-1 Brass Stem Nut
- -9°F to 212°F (-23°C to 100°C) Process Temperature Limit

Part Number

Size	Part Number
1/4"	FNWNVB



BRASS NEEDLE VALVE

The FNW figure BNV brass needle valve is utilized for fine flow control and for controlling severe line pulsations in water, oil, and gas service. The BNV features a robust design with knurl knob control wheel.

Features:

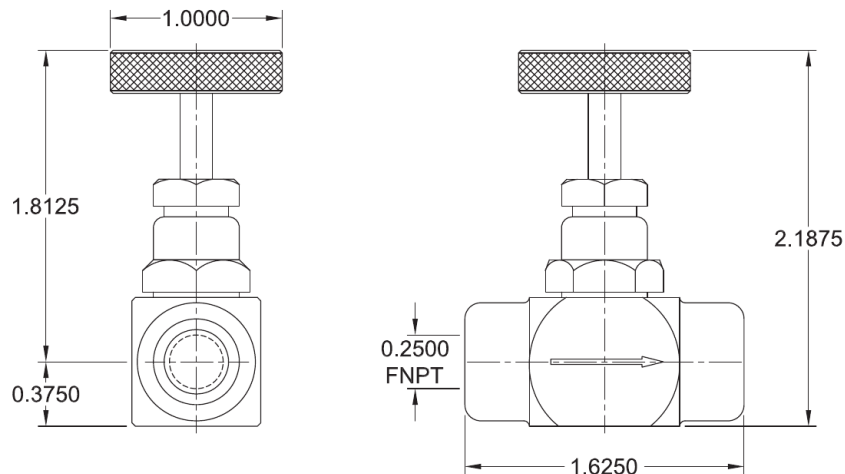
- 600 PSI Maximum Operating Pressure
- 1/4" FNPT End Connections
- Brass Bar Stock Body
- Brass Seat (Integral to body)
- PTFE Packing
- Rated to 300°F

Part Number

Size	Part Number
1/4"	FNWBNVB



Dimensions (inches)



PRESSURE SNUBBER

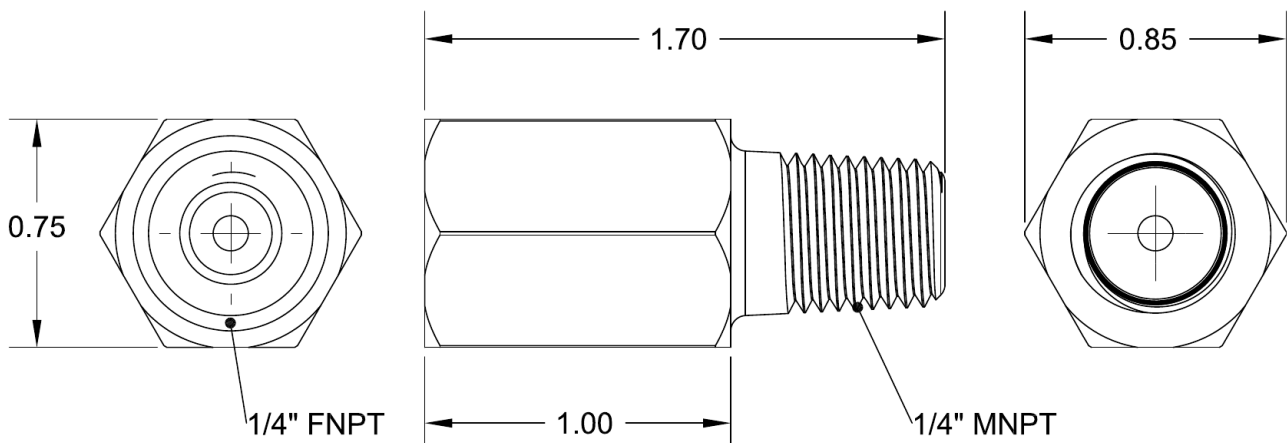
The figure PS brass snubber, when placed before a pressure gauge, significantly lessens the damaging effects of pulsation on gauges, transducers, transmitters, manometers, and pressure switches.

Features:

- 10,000 PSI Maximum Operating Pressure
- 30,000 PSI Burst Pressure
- 1/4" FNPT End Instrument Connection
- 1/4" MNPT End Process Connection
- Brass Body
- Sintered (Porous Type) 316SS Snubbing Element
- Stainless Steel Retainer
- -65°F to 650°F (-53°C to 343°C) Process Temperature Limit
- Meets ASME B40.5

Part Number

Size	Part Number
1/4"	FNWPSB



PRESSURE/TEMPERATURE TEST PLUG

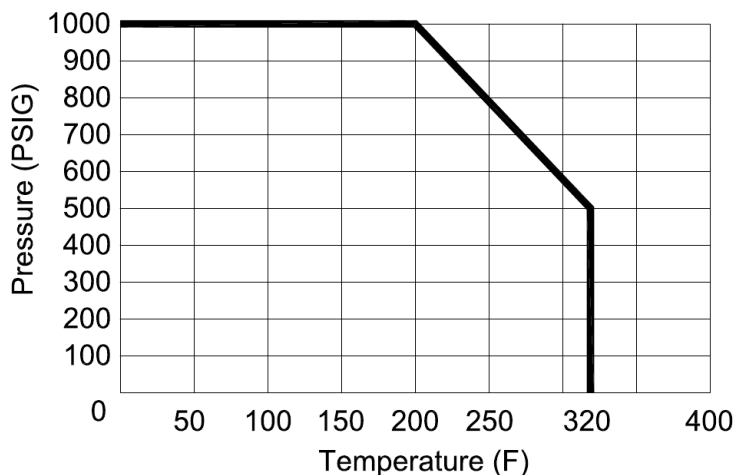
The figure PTT brass pressure/temperature test plugs facilitate quick pressure and temperature readings at recommended test points without disturbing the process. They are widely used in the HVAC industry.

Features:

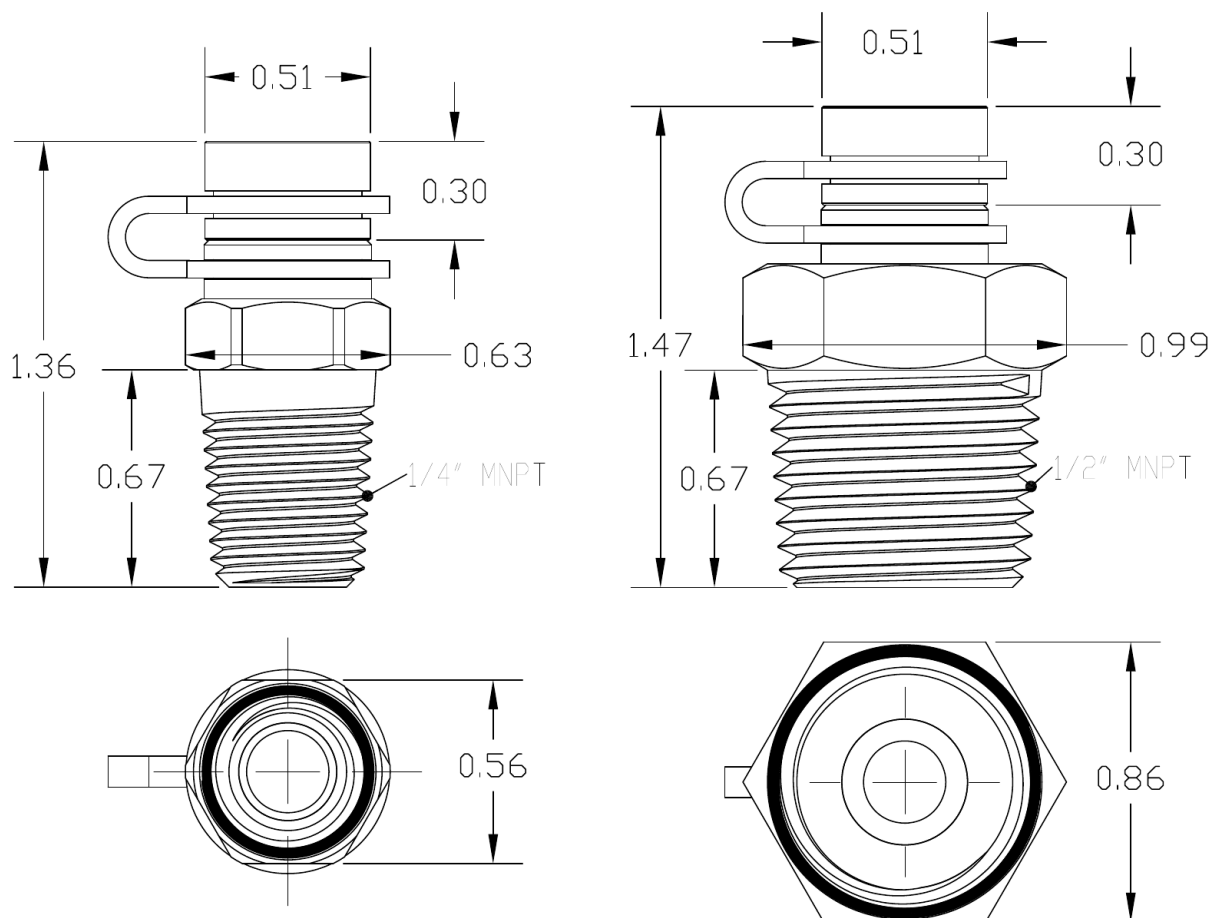
- 1,000 PSI Maximum Operating Pressure
- 1/4" or 1/2" MNPT End Process Connection
- Brass Body
- EPDM Diaphragm/Core
- Plastic Cap Retainer
- 320°F (160°C) Process Temperature Limit

Part Numbers

Size	Part Number
1/4"	FNWPTTB
1/2"	FNWPTTD



PRESSURE/TEMPERATURE TEST PLUG



ENGINEERING DATA

Description	Page
Knife gate valve vibration treatment, medium.....	313
Knife gate valve vibration treatment, heavy	314
Knife gate valve flange bolting guide	315
Butterfly valve flange bolting guide	316
High performance butterfly valve flange bolting guide	317
About Cv, general information on flow coefficients with basic formulas.....	318
Flange cast steel gate, globe and check valve Cv.....	319
Flange cast steel gate and globe valve stem characteristics	320
About resilient seat and seal materials	322
About thermoplastic materials.....	323
ANSI class 150# and 300# flange dimensions.....	324
Metric equivalents	325
Typical material codes.....	326
Typical material markings.....	327
Chemical compatibility chart	328

65B & 2000B KNIFE GATE VALVE MEDIUM VIBRATION TREATMENT

The following optional post factory treatment is available for the figure 65B and 2000B knife gate valve in medium vibration applications. Medium vibration is defined as oscillation ranging from non-visible to 1/16" transverse pipeline movement. Every effort should be made to reduce vibration in the piping system, as this treatment makes repeated valve stop adjustments (as on the figure 2000B) more difficult.

Closed Position Stopper (Figure 2000B only)

The stopper nut and cap are secured with (red) Loctite® 262 after the close position stop is set.

The stopper bolt is fully seated in the valve stem and secured with (red) Loctite® 262.

Note

No activator is used with the Loctite® thread locker. In shop cure time is 24 hours. For stainless steel hardware, an additional 72 hours should be allowed for curing prior to initial service of the valve.

Note

Stop adjustability will not be available once the thread locker cures. If adjustment is needed, the thread locker must be defeated by the application of localized heat as from a propane torch. Thread locker must be reapplied once the stop is readjusted.

Sleeve Box Assembly

Valve sizes 12" to 24" have a bearing hub. Hub nut and bolts are secured with (red) Loctite® 262.

Clevis Assembly

Valves are supplied with nylon lock nuts on clevis bolts as standard. Nylon lock nuts are checked and verified tight.

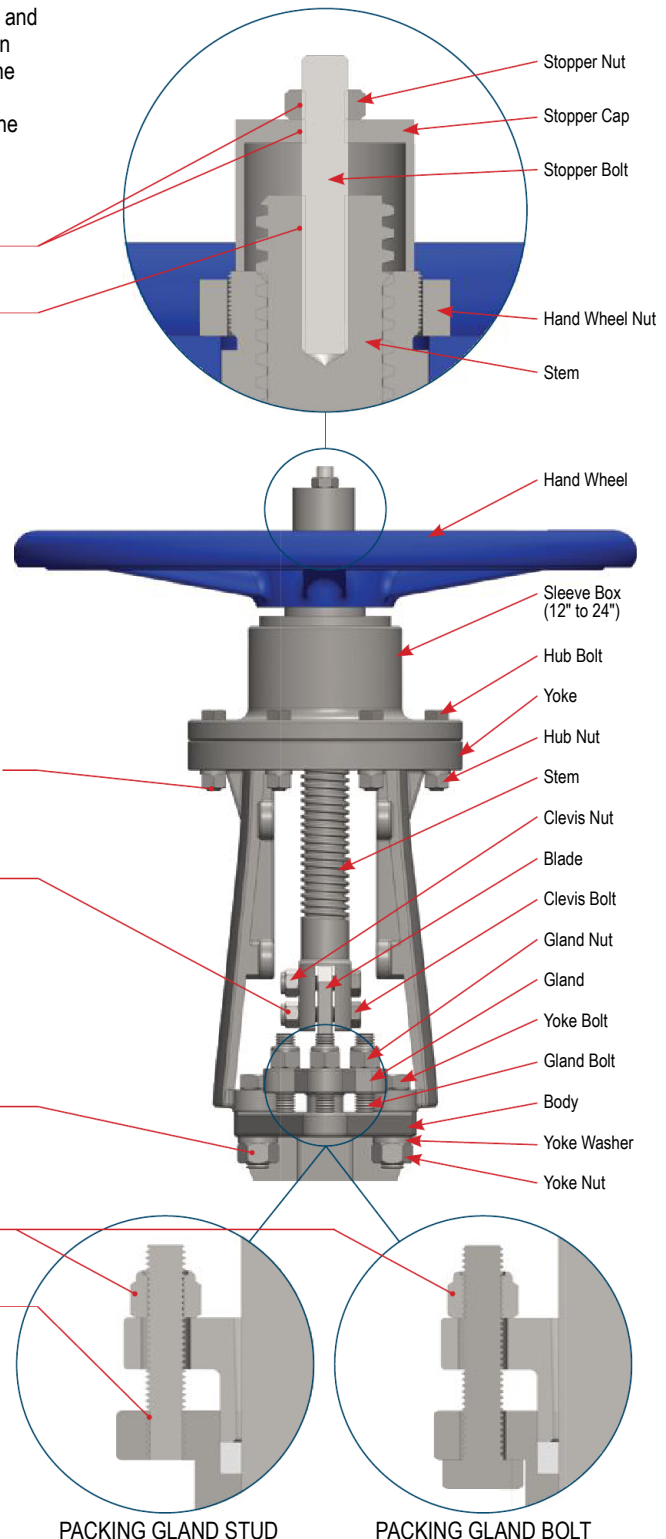
Yoke/Body Assembly

The yoke bolt and nut are secured with a split ring washer and (red) Loctite® 262.

Packing Assembly

Valves are supplied with nylon lock nuts on packing glands as standard. Nylon lock nuts are checked and verified tight*.

For valve sizes utilizing a packing gland stud, the studs are fully seated in the body flange and then secured with (red) Loctite® 262.



* Valves are shipped with the packing minimally energized.
AFTER INSTALLATION, PACKING GLAND MUST BE TIGHTENED.

65B & 2000B KNIFE GATE VALVE HIGH VIBRATION TREATMENT

The following optional post factory treatment is available for the figure 65B and 2000B knife gate valve in high vibration applications. High vibration is defined as oscillation ranging from 1/16" to 1/8" transverse pipeline movement. Every effort should be made to reduce vibration in the piping system, as this treatment makes repeated valve stop adjustments (as on the figure 2000B) more difficult.

Closed Position Stopper (Figure 2000B only)

Once the close position is determined, the stopper nut and cap are secured to the stopper bolt by tack weld.

The stopper bolt is fully seated in the valve stem and secured by tack weld.

Note

Stop adjustability will not be available as the stopper components will be tack welded. If an adjustment is needed, the tack welds must be ground off. Once the adjustment is made, the tack welds must be reapplied.

Sleeve Box Assembly

Valve sizes 12" to 24" have a bearing hub. Hub nut and bolts are secured by tack weld.

Clevis Assembly

Valves are supplied with nylon lock nuts on clevis bolts as standard. Nylon lock nuts are checked and verified tight.

Yoke/Body Assembly

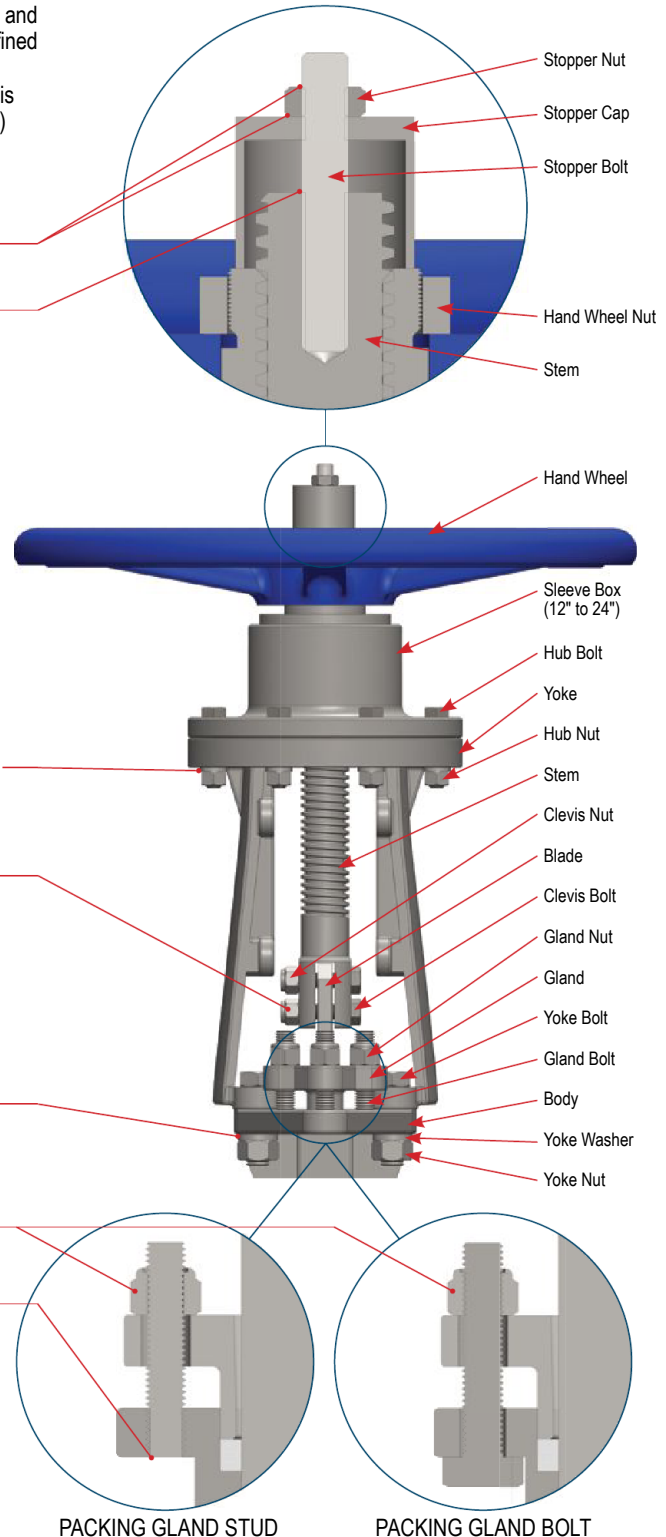
The yoke bolt and nut are secured with a split ring washer. The nut and washer assembly is secured to the body by tack weld.

Packing Assembly

Valves are supplied with nylon lock nuts on packing glands as standard. Nylon lock nuts are checked and verified tight*.

For valve sizes utilizing a packing gland stud, the studs are fully seated in the body flange and then secured by tack weld.

* Valves are shipped with the packing minimally energized.
AFTER INSTALLATION, PACKING GLAND MUST BE TIGHTENED.



PACKING GLAND STUD

PACKING GLAND BOLT

FLANGE BOLTING GUIDE FOR 150# KNIFE GATE VALVES

NOTE: While this bolting guide includes information for use of hex head bolts, FNW recommends that studs be used on all mounting holes for knife gate valves. Use of studs ensures that the valve will not be damaged during installation.

CAUTION: Dimensions provided for flange bolting are intended only as a guide. Bolt lengths may vary due to manufacturing tolerances in valves, gaskets, flange bolts and flanges.

WARNING: Damage can occur to the valve if improper bolting is used. It is always recommended that studs be used for tapped blind holes typically found in the chest area of the valve. Hex head bolts can bottom out in the tapped hole when fully tightened to the valve, causing damage to the body, liners, and/or blade. Hex head bolts in the chest area must not be used. Improper bolt and stud lengths could result in leakage at the flange resulting in death or serious injury.

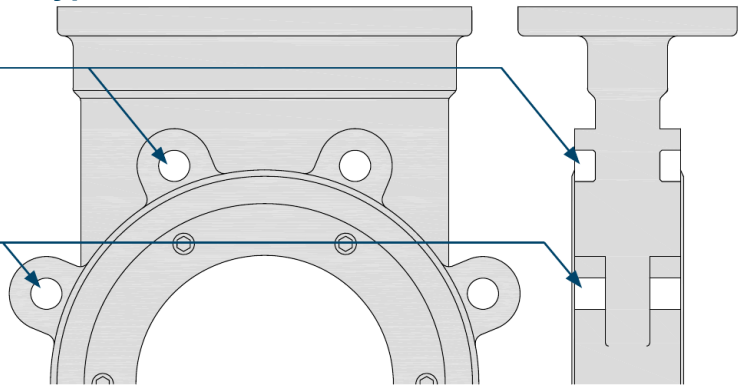
Bolt Hole Types & Locations

Tapped Blind Hole

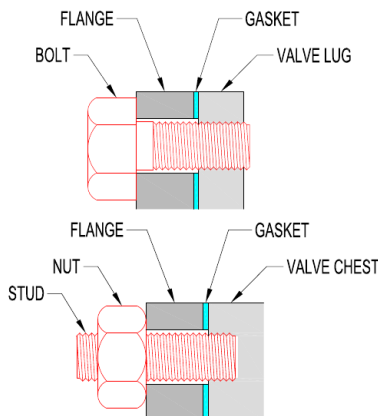
Tapped blind holes are located in the chest area of the valve. Studs must be used in this area to ensure that mechanical force is NOT imparted into the pressure containment area of the valve body, liner of lined valves, or blade.

Tapped Through Hole

Tapped through holes are located in lugs around the perimeter of the valve body. Hex head bolts can be used in this area, but studs are still recommended.



Typical Mounting Configuration



Bolts

Bolts must be threaded completely through to utilize all threads available on lugs or in blind tapped holes.

Gaskets

Use gasket material appropriate to the application.

Washers

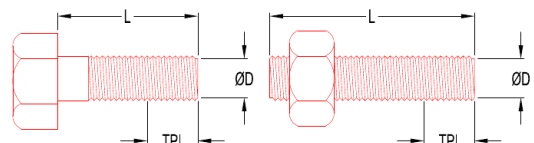
If washers are utilized, bolt or stud length should be adjusted accordingly.

NOTE: Due to castings, machining, and flange thickness tolerances, the body tapped hole depth may vary slightly from valve to valve. It is recommended that all knife gate valves be installed with stainless steel ASTM A-304-B8 studs or ASTM A-316-B-8M studs. The use of carbon steel class B-7 studs may also be considered. When using stainless steel bolting on stainless steel valve bodies, thread lubricant is recommended to prevent galling.

Recommended Bolt Lengths

Size	ØD	TPI	L		Qty
			BOLT*	STUD	
2	5/8"	11	1-3/4"	2-3/4"	4
2-1/2	5/8"	11	1-3/4"	2-3/4"	4
3	5/8"	11	1-3/4"	2-3/4"	4
4	5/8"	11	1-3/4"	2-3/4"	8
6	3/4"	10	2"	3"	8
8	3/4"	10	2"	3"	8
10	7/8"	9	2-1/4"	3-1/2"	12
12	7/8"	9	2-1/4"	3-1/2"	12
14	1"	8	2-1/2"	4"	12
16	1"	8	2-5/8"	4-1/4"	16
18	1-1/8"	7	3"	4-3/4"	16
20	1-1/8"	7	3-1/4"	5"	20
24	1-1/4"	7	3-1/2"	5-1/4"	20

* FNW recommends the use of stud bolts only.

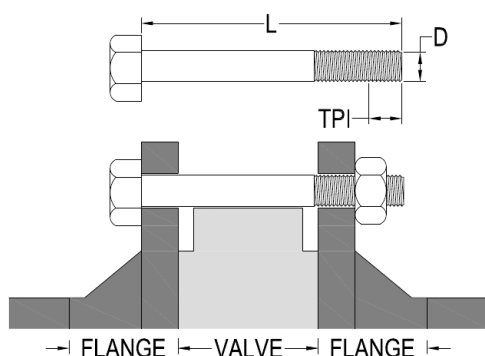


FLANGE BOLTING GUIDE FOR FIGURE 7xx-SERIES BUTTERFLY VALVES

WARNING: Improper bolt and stud lengths could result in leakage at the flange resulting in damage, serious injury, or death.

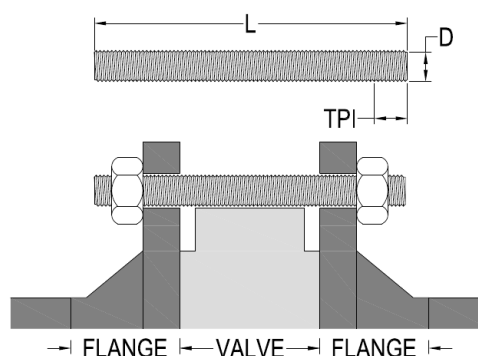
CAUTION: Dimensions provided for flange bolting are intended only as a guide. Bolt lengths may vary due to manufacturing tolerances in valves, gaskets, flange bolts and flanges. FNW figure 7xx-series resilient seated valves are designed to fit between ANSI B16.5 class 150 flanges without flange gaskets. **Some models utilize a raised resilient bead for flange sealing. Since inside flange diameters vary depending on type of flange, always verify that the connecting pipe flange face fully engages the valve seat face before installation.**

Wafer Valve & Cap Screws



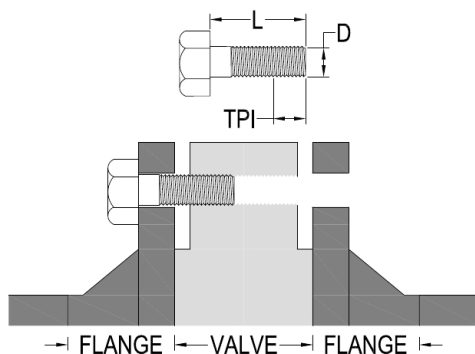
Size	D	TPI	L	Qty
2	5/8"	11	4-1/4"	4
2-1/2	5/8"	11	4-3/4"	4
3	5/8"	11	5"	4
4	5/8"	11	5-1/4"	8
5	3/4"	10	5-1/2"	8
6	3/4"	10	5-1/2"	8
8	3/4"	10	6"	8
10	7/8"	9	6-1/2"	12
12	7/8"	9	7-1/4"	12
14	1"	8	8"	12
16	1"	8	8-3/4"	16
18	1-1/8"	7	9-1/2"	16
20	1-1/8"	7	10-1/2"	20
24	1-1/4"	7	12"	20

Wafer Valve & Stud Bolts



Size	D	TPI	L	Qty
2	5/8"	11	5-1/8"	4
2-1/2	5/8"	11	5-1/8"	4
3	5/8"	11	5-1/2"	4
4	5/8"	11	5-1/2"	8
5	3/4"	10	6-3/8"	8
6	3/4"	10	6-3/8"	8
8	3/4"	10	6-1/4"	8
10	7/8"	9	7-1/2"	12
12	7/8"	9	8-3/8"	12
14	1"	8	8-3/4"	12
16	1"	8	10"	16
18	1-1/8"	7	11-1/8"	16
20	1-1/8"	7	12"	20
24	1-1/4"	7	13-13/16"	20

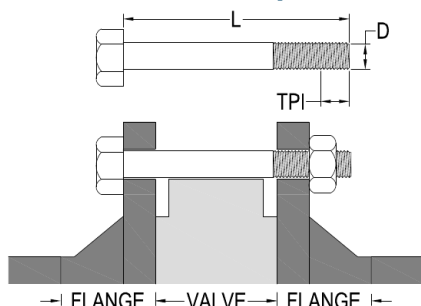
Lugged Valve & Cap Screws



Size	D	TPI	L	Qty
2	5/8"	11	1-1/2"	8
2-1/2	5/8"	11	1-3/4"	8
3	5/8"	11	1-3/4"	8
4	5/8"	11	1-3/4"	16
5	3/4"	10	2"	16
6	3/4"	10	2"	16
8	3/4"	10	2-1/4"	16
10	7/8"	9	2-1/2"	24
12	7/8"	9	2-3/4"	24
14	1"	8	2-3/4"	24
16	1"	8	3-1/4"	32
18	1-1/8"	7	3-1/4"	32
20	1-1/8"	7	3-1/4"	40
24	1-1/4"	7	3-1/2"	40

FLANGE BOLTING GUIDE FOR FIGURE HP BUTTERFLY VALVES

Wafer Valve & Cap Screws



Size	D	TPI	L	Qty
3	5/8"	11	4-3/4"	8
4	5/8"	11	5"	16
5	3/4"	10	5-1/2"	16
6	3/4"	10	5-1/2"	16
8	3/4"	10	6"	16
10	7/8"	9	6-1/2"	24
12	7/8"	9	7-1/4"	24
14	1"	8	8"	24
16	1"	8	8-1/2"	32
18	1-1/8"	8	9-1/2"	32
20	1-1/8"	8	10-1/4"	32
			2-3/4"	8
24	1-1/4"	8	12"	32
			3-1/4"	8

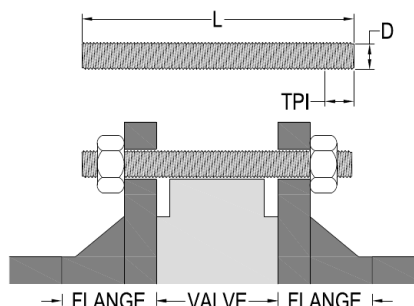
WARNING: Improper bolt and stud lengths could result in leakage at the flange resulting in damage, serious injury, or death.

CAUTION: Dimensions provided for flange bolting are intended only as a guide. Bolt lengths may vary due to manufacturing tolerances in valves, gaskets, flange bolts and flanges.

NOTE: The FNW figure HP high performance butterfly valves are designed to fit between ANSI B16.5 class 150 flanges. Lengths are based on the minimum flange thickness of weld neck flanges per ANSI B16.5 and use of standard 1/16" gaskets. Stud lengths also assume heavy hex nut heights per ANSI B18.2.2.

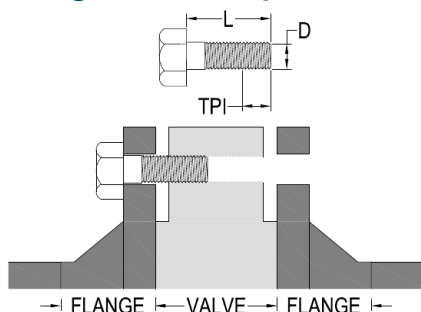
GASKETS: When using metallic spiral wound gaskets, add 1/8" to bolt and stud length dimension L.

Wafer Valve & Stud Bolts



Size	D	TPI	L	Qty
3	5/8"	11	5-3/4"	8
4	5/8"	11	6"	16
5	3/4"	10	6-1/2"	16
6	3/4"	10	6-1/2"	16
8	3/4"	10	7"	16
10	7/8"	9	7-3/4"	24
12	7/8"	9	8-1/4"	24
14	1"	8	9-1/2"	24
16	1"	8	10"	32
18	1-1/8"	8	11"	32
20	1-1/8"	8	11-3/4"	32
			4-1/2"	8
24	1-1/4"	8	13-1/2"	32
			5-1/4"	8

Lug Valve & Cap Screws

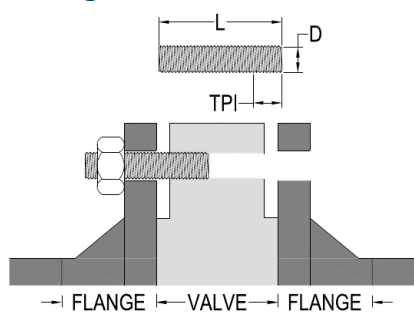


Size	D	TPI	L	Qty
3	5/8"	11	1-3/4"	8
4	5/8"	11	1-7/8"	16
5	3/4"	10	2"	16
6	3/4"	10	2"	16
8	3/4"	10	2-1/4"	16
10	7/8"	9	2-1/2"	24
12	7/8"	9	2-3/4"	24
14	1"	8	3"	24
16	1"	8	2-1/2"	32
18	1-1/8"	8	2-3/4"	32
20	1-1/8"	8	3"	32
			2-3/4"	8
24	1-1/4"	8	3-1/4"	32
			3-1/4"	8

STEM JOURNAL HOLES: The 20" and 24" Wafer and Lug pattern valves have tapped blind holes near the stem journal (upper and lower). These sizes list a second length for these holes only. Standard lengths must be used on all other flange holes.

Lug Sizes 16" to 24": The lugs of the 16" to 24" lug pattern valves are not tapped through the entire body. Bolt and stud lengths are based on usable thread depth.

Lug Valve & Stud Bolts



Size	D	TPI	L	Qty
3	5/8"	11	3"	8
4	5/8"	11	3"	16
5	3/4"	10	3-1/4"	16
6	3/4"	10	3-1/4"	16
8	3/4"	10	3-1/2"	16
10	7/8"	9	4"	24
12	7/8"	9	4-1/4"	24
14	1"	8	4-3/4"	24
16	1"	8	4-1/4"	32
18	1-1/8"	8	4-3/4"	32
20	1-1/8"	8	4-3/4"	32
			4-1/2"	8
24	1-1/4"	8	5-1/4"	32
			5-1/4"	8

ABOUT Cv (FLOW COEFFICIENTS)

Cv for FLUIDS

Cv for liquids is the volume of 68°F water in U.S. gallons per minute that passes through a valve at a pressure drop of 1 PSI. Flow for a given Cv is typically calculated from the following formula.

$$Q = C_v \times \sqrt{\frac{\Delta P \times 62.4}{D}}$$

Where:

- Q = Valve flow rate in gallons per minute (US GPM)
- ΔP = Difference between upstream and downstream pressure in pounds per square inch (PSI)
- 62.4 = Conversion factor for fluids computed in relation to water
- D = Density of fluids in pounds per cubic foot

The formula above utilizes a conversion factor of 62.4 which is the density of water in lbs/ft³. The following formula is often used using a fluid's specific gravity (G) where the relationship to water density is already considered.

$$Q = C_v \times \sqrt{\frac{\Delta P}{G}}$$

Likewise, Cv for particular flow characteristics can be determined from this formula:

$$C_v = Q \times \sqrt{\frac{G}{\Delta P}}$$

Similar formulas are available using metric units:

$$Q = K_v \times \sqrt{\frac{\Delta P \times 1000}{D}}$$

$$K_v = Q \times \sqrt{\frac{D}{1000 \times \Delta P}}$$

$$Q = K_v \times \sqrt{\frac{\Delta P}{G}}$$

$$K_v = Q \times \sqrt{\frac{G}{\Delta P}}$$

Where:

- Q = Valve flow rate in cubic meters per hour (m³/h)
- ΔP = Difference between upstream and downstream pressure in Bar
- 1000 = Conversion factor for fluids computed in relation to water
- D = Density of fluids in kilograms per cubic meter (kg/m³)
- G = Specific Gravity

Cv for GASES

The Cv formula for liquid flow can be modified for gas flow. However, since gases are compressible, they are affected by temperature. In addition, there are two flow conditions which must be considered, sub-critical flow, and critical (or choked) flow.

If the upstream pressure (P1) is less than two times the downstream pressure (P2), the formulas for sub-critical flow should be used.

$$C_v = \frac{Q_G}{962} \times \sqrt{\frac{(G \times T)}{(P_1^2 - P_2^2)}}$$

$$Q_G = 962 \times C_v \sqrt{\frac{(P_1^2 - P_2^2)}{(G \times T)}}$$

Where:

- Q_G = Gas flow rate in Standard Cubic Feet per Hour (SCFH)
- P1 = Upstream (inlet) pressure in PSIA (absolute pressure)
- P2 = Downstream (outlet) pressure in PSIA (absolute pressure)
- PSIA = Absolute pressure. This is PSIG (gauge pressure) plus 14.7 (atmospheric pressure)
- T = Absolute temperature in °R (°F + 460)
- G = Specific gravity of medium where air at 70°F and 14.7 PSIA equals 1.0

If the upstream pressure (P1) equals or exceeds two times the downstream pressure (P2), the formulas for critical (choked) flow should be used.

$$C_v = Q_G \frac{\sqrt{(G \times T)}}{816 \times P_1}$$

$$Q_G = C_v \frac{816 \times P_1}{\sqrt{G \times T}}$$

NOTE: The formulas provided here are simplified for general use. There are many factors that can be considered when sizing valves for flow control including, temperature, pipe size, viscosity, flashing and cavitation conditions, turbulent flow, two-phase flow, and expansion factors to name a few. For critical flow control, control valve software or a systems engineer should be consulted.

CAST STEEL GATE, GLOBE, & CHECK VALVE FLOW COEFFICIENTS

Flow coefficients are the same for both carbon steel and stainless steel bodies. Refer to main catalog for valve size offerings.

Gate Valve - 150# - Figure 451 & 551 Cv

Size	2"	2-1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Cv	298	466	694	1,234	2,873	5,109	8,622	12,416	17,651	23,055	30,603	37,782	57,349

Gate Valve - 300# - Figure 452 & 552 Cv

Size	2"	2-1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Cv	289	452	672	1,194	2,776	4,935	7,982	11,929	15,646	21,207	26,841	34,490	51,874

Globe Valve - 150# - Figure 461 & 561 Cv

Size	2"	2-1/2"	3"	4"	6"	8"	10"	12"
Cv	46	72	105	166	400	810	1,310	1,900

Globe Valve - 300# - Figure 462 & 562 Cv

Size	2"	2-1/2"	3"	4"	6"	8"	10"	12"
Cv	46	84	104	165	436	692	1,120	1,882

Swing Check Valve - 150# - Figure 471 & 571 Cv

Size	2"	2-1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Cv	218	332	499	903	2,032	3,679	5,857	8,435	11,708	15,293	19,754	24,912	36,680

Swing Check Valve - 300# - Figure 472 & 572 Cv

Size	2"	2-1/2"	3"	4"	6"	8"	10"	12"	14"	16"	18"	20"	24"
Cv	211	330	482	858	1,963	3,549	5,546	8,128	11,063	14,715	18,624	23,431	33,741

Cv is the volume of water in U.S. gallons per minute that passes through the valve at a pressure drop of 1 PSI at 68°F. Cv is in imperial units; in metric units, the same coefficient (often called the Flow Factor) is Kv and corresponds to the flow rate of water in cubic meters (m3) per hour at a pressure drop of 100kPa (1 bar) at 20°C.

CAST STEEL GATE & GLOBE STEM CHARACTERISTICS

Stem Data Terms

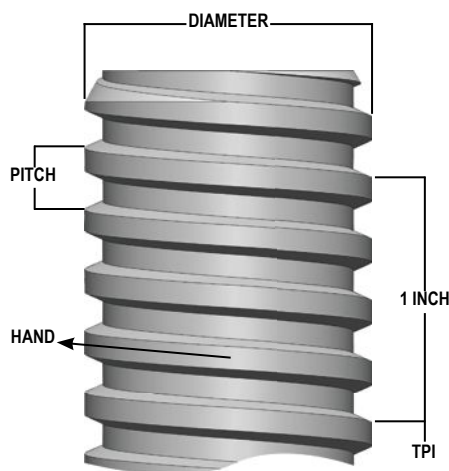
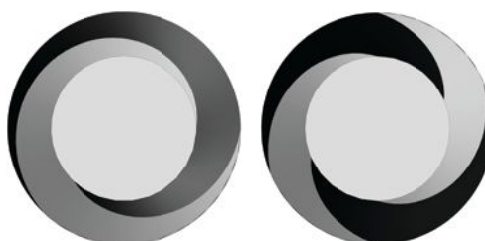


DIAGRAM A

DIAMETER: Cross section width of the stem from the outer edges of the thread

PITCH: The distance from a point on the stem thread to the corresponding point of the next thread

TPI: The number of threads crossed per inch of stem



Single Lead

Double Lead

DIAGRAM B

LEAD: Lead can be expressed in two ways:

1. The number of starts as seen from the top of the stem (indicated in black in DIAGRAM B). It is the number of independent interwoven threads running down the stem.
2. Also expressed in inches, lead is the distance the stem travel linearly with one complete turn of the stem nut (i.e. - a single lead is the same as the pitch, a 2 lead stem is twice the pitch, etc.).

HAND: Determines whether the threads are machined clockwise or counterclockwise. Left and right hand threads are determined looking at the stem profile. If the threads slant upward to the left (like DIAGRAM A), they are left hand threads. If they slant upward to the right, they are right hand threads.

THRUST: The amount of linear force needed to move the stem up or down assuming the valve stem nut is removed

TORQUE: The amount of rotary force needed at the stem to open and close the valve (rotary force is converted to linear force by the mechanics of the stem and stem nut)

LIFT: The overall travel of the stem between the valve's open and close position

TURNS: The overall number of turns needed at the hand wheel to fully open or close the valve (our values are rounded to the nearest whole number)

Note on actuation: When sizing actuators for valves, always include an engineering safety factor that is appropriate to the application. The values provided here are from factory testing in ideal situations. Contact FNW if you require assistance. **All FNW cast steel gate and globe stems are left hand threads.**

Gate Valve - 150# - Figure 451 & 551

Valve Size (inch)	Stem Diameter (inch)	Threads Per Inch (TPI)	Pitch (inch)	Lead (Starts)	Stem Thrust (lbs)	Stem Torque (lbs-ft)	Lift (inch)	Number of Turns
2	3/4	6ACME	0.167	1	877	10	2.22	13
2-1/2	3/4	6ACME	0.167	1	922	10	2.74	16
3	7/8	6ACME	0.167	1	1,102	12	3.23	19
4	1	5ACME	0.200	1	1,664	20	4.25	22
5	1-1/8	5ACME	0.200	1	2,743	24	5.31	27
6	1-1/8	5ACME	0.200	1	3,642	27	6.22	32
8	1-1/4	5ACME	0.200	1	6,587	47	8.31	42
10	1-3/8	4ACME	0.250	1	8,161	62	10.33	42
12	1-1/2	4ACME	0.250	1	12,320	97	12.36	50
14	1-5/8	4ACME	0.250	2	19,199	149	10.47	58
16	1-3/4	4ACME	0.250	2	24,842	252	16.46	33
18	1-7/8	4ACME	0.250	2	31,384	374	18.62	38
20	2	4ACME	0.250	2	39,679	414	20.39	41
24	2-1/4	3ACME	0.335	2	56,832	717	32.60	38
30	2-1/2	3ACME	0.335	2	88,440	1,256	30.75	47
36	3	3ACME	0.500	2	121,982	2,158	36.10	37

CAST STEEL GATE & GLOBE STEM CHARACTERISTICS

Gate Valve - 300# - Figure 452 & 552

Valve Size (inch)	Stem Diameter (inch)	Threads Per Inch (TPI)	Pitch (inch)	Lead (Starts)	Stem Thrust (lbs)	Stem Torque (lbs-ft)	Lift (inch)	Number of Turns
2	3/4	6ACME	0.167	1	1,012	12	2.22	13
2-1/2	3/4	6ACME	0.167	1	1,259	14	2.74	16
3	7/8	6ACME	0.167	1	1,754	16	3.23	19
4	1	5ACME	0.200	1	3,642	31	4.25	22
6	1-1/4	5ACME	0.200	1	8,903	64	6.26	32
8	1-3/8	4ACME	0.250	1	11,488	95	8.31	34
10	1-1/2	4ACME	0.250	1	18,750	159	10.31	42
12	1-5/8	4ACME	0.250	2	24,392	214	12.32	50
14	1-3/4	4ACME	0.250	2	45,727	373	14.25	29
16	1-7/8	4ACME	0.250	2	59,822	486	16.61	34
18	2	4ACME	0.250	2	75,109	653	18.39	37
20	2-1/8	3ACME	0.335	2	93,274	944	20.39	31
24	2-1/2	3ACME	0.335	2	135,268	1,475	24.33	37
30	2-7/8	3ACME	0.335	2	213,974	2,548	30.59	46

Globe Valve - 150# - Figure 461 & 561

Valve Size (inch)	Stem Diameter (inch)	Threads Per Inch (TPI)	Pitch (inch)	Lead (Starts)	Stem Thrust (lbs)	Stem Torque (lbs-ft)	Lift (inch)	Number of Turns
2	3/4	6ACME	0.167	1	3,035	15	1.02	6
2-1/2	7/8	6ACME	0.167	1	4,317	22	1.65	10
3	1	5ACME	0.200	1	6,587	34	1.30	7
4	1-1/8	5ACME	0.200	1	9,712	50	1.46	8
6	1-1/4	5ACME	0.200	1	17,108	96	2.36	12
8	1-3/8	4ACME	0.250	1	24,033	181	1.93	8
10	1-5/8	4ACME	0.250	1	27,180	347	3.39	11
12	2	4ACME	0.250	1	39,454	635	3.43	10
14	2-3/8	3ACME	0.335	1	47,638	856	3.15	9
16	2-1/2	3ACME	0.335	1	62,048	1,243	3.82	12

Globe Valve - 300# - Figure 461 & 561

Valve Size (inch)	Stem Diameter (inch)	Threads Per Inch (TPI)	Pitch (inch)	Lead (Starts)	Stem Thrust (lbs)	Stem Torque (lbs-ft)	Lift (inch)	Number of Turns
2	3/4	6ACME	0.167	1	4,339	23	0.98	6
2-1/2	7/8	6ACME	0.167	1	6,587	38	1.77	11
3	1	5ACME	0.200	1	10,589	62	1.10	6
4	1-1/8	5ACME	0.200	1	17,221	107	1.38	7
6	1-1/2	4ACME	0.250	1	38,308	236	2.60	10
8	1-7/8	4ACME	0.250	1	55,461	456	1.85	8
10	2	4ACME	0.250	1	66,634	1,070	3.39	11
12	2-3/8	3ACME	0.335	1	95,027	1,708	3.43	10

RESILIENT SEAT/SEAL MATERIALS

VITON® (Fluorocarbon, FKM, or FPM) - Fluorocarbon elastomers are inherently compatible with a broad spectrum of chemicals. Because of this extensive chemical compatibility which spans considerable concentration and temperature ranges, fluorocarbon elastomers have gained wide acceptance as a material of construction for knife gate valve seats. Fluorocarbon can be used in most applications involving mineral acids, salt solutions, chlorinated hydrocarbons and petroleum oils. It is particularly good in hydrocarbon service. Temperature rating is from -20°F to +300°F. Color is gray (black) or red and may be used on bleached paper lines. Fluorocarbon (VITON) is not suitable for steam or hot water service.

BUNA-N (HYCAR or Nitrile) - Buna-N is a general purpose polymer which has good resistance to oil, water, solvents and hydraulic fluids. It also displays good compression, abrasion resistance, and tensile strength. This material performs extremely well in process areas where paraffin base materials, fatty acids, oils, alcohols or glycerins are present, since it is totally unaffected. It should not be used around high polar solvents (acetones, ketones) chlorinated hydrocarbons, ozone, or nitro hydrocarbons. Temperature range is +225°F maximum. Hycar is black in color and should not be used where discoloration cannot be tolerated. It is regarded as a comparable replacement to neoprene. Major differences are: Buna-N has a higher temperature limit; neoprene is more resistant to oils.

HYPALON® - Hypalon has very good resistance to oxidation, ozone and good flame resistance. It is similar to neoprene except with improved acid resistance where it will resist such oxidizing acids as nitric, hydrofluoric and sulfuric acid. Abrasion resistance of Hypalon is excellent, about the equivalent of the nitriles. Oil and solvent resistance is somewhat between that of neoprene and nitriles. Salts have little if any effect on Hypalon. Hypalon is not recommended for exposure to concentrated oxidizing acids, esters, ketones, chlorinated, aromatic and nitro hydrocarbons. Not to be used in steam service. Temperature rating is from 0°F to +220°F. Seats are white food grade and may be used on food service as well as bleached paper lines.

NEOPRENE - Neoprene was one of the first synthetic rubbers developed. It is an all purpose polymer with many desirable characteristics. Neoprene features high resiliency with low compression set flame resistance and animal and vegetable oil resistance. It is principally recommended for use in pulp and paper applications. Generally, neoprene is not recommended and is attacked by strong oxidizing acids, most chlorinated solvents, esters, ketones, aromatic hydrocarbons and hydraulic fluids. Neoprene is not generally affected by moderate chemicals, fat, greases and many oils and solvents. Temperature rating is from -20°F to +180°F. Seats are black in color and should not be used on bleached paper lines.

EPDM - EPDM is a terpolymer elastomer made from ethylene-propylene diene monomer. EPDM has good abrasion and tear resistance and offers excellent chemical resistance to a variety of acids and alkalines. It is susceptible to attacks by oils and is not recommended for applications involving petroleum oils, strong acids, or strong alkalines. EPDM should not be used on compressed air lines. It has exceptionally good weather aging and ozone resistance. Temperature rating is from -20°F to +225°F (250°F intermittent service). It is fairly good in ketones and alcohols.

PTFE (TFE or Teflon®) - PTFE is the most chemically resistant of all plastics. It also has excellent thermal and electrical insulation properties. PTFE's mechanical properties are low compared to other engineering plastics, but its properties remain at useful levels over a great temperature range (-40 to 400 °F, depending on application).

RTFE (Reinforced TFE) - RTFE is compounded with a selected percentage of fiber glass filler to improve strength and resistance to abrasive wear, cold flow, and permeation in molded seats. Reinforcement permits application at higher pressure and temperature than unfilled TFE. Typical temperature range is -40°F to 450°F. RTFE should not be used in applications that attack glass, such as hydrofluoric acid and hot strong caustics.

Carbon Filled TFE - Carbon filled TFE is an excellent seat material for steam applications as well as high efficiency oil-based thermal fluids. Fillers including graphite enable this seat material to have a better cycle life than other filled or reinforced TFE seats. Temperature range is -20°F to 500°F. Chemical resistance is equal to other TFE seats.

TFM1600 - TFM1600 is a modified version of PTFE that maintains the exceptional chemical and heat resistance properties of PTFE, but has a significantly lower melt viscosity. The result is reduced cold flow, porosity, permeability and void content. Surfaces are smoother and reduce torques. The theoretical service range for TFM1600 is -328°F to 500°F.

TFM1600+20%GF - TFM1600+20%GF is a fiber glass reinforced version of TFM1600. Similar to RTFE, but with the benefits of TFM1600, the glass filled version provides greater abrasion resistance and improves stability at higher pressures.

TFM4215 - TFM4215 is an electro graphitized carbon filled TFM material. The added carbon improves stability for higher pressure and temperature combinations.

THERMOPLASTIC MATERIALS

UPVC (Unplasticised PVC) - Unplasticised Polyvinyl Chloride is the most widely used of all plastics and commonly used for pressure pipes. It is rigid, suitable for above and below ground applications. UPVC has good chemical resistance and is odorless and tasteless. It is for use with liquids and gasses with temperatures +32°F to +140°F (for higher temperatures see CPVC) at a wide range of operating pressures. PVC has strong resistance to chemical attack by alkalis, acids, oxidizers, salt solutions, and many chemicals. PVC should not be used in some vegetable oils (such as peanut oil), non-ionic surfactants, and organic chemicals such as ketones (polar solvents), aromatics, and chlorinated hydrocarbons. Some poorer quality PVC can leach chemicals into that water which can build up in recirculation systems, however most modern pipe is built to specific standards (e.g. BS3505/6, ASTM D 1785, ASTM D 2241, DIN 8061/2, KIWA 49, BS4346 PART 1, DIN 8063) and as long as the pipe is rated as such, there should be no problems. UPVC is usually joined using a push fit solvent cement joint, requiring no special tools. ASTM D1784 controls the compounds for rigid PVC and CPVC.

CPVC (Chlorinated PVC) - Chlorinated polyvinyl chloride, or CPVC, has been offering the process industry superior corrosion resistance, mechanical strength, and excellent life-cycle economics in a single package. Conceptually, CPVC is a PVC homopolymer that has been subjected to a chlorination reaction. It is generally inert to most mineral acids, bases, salts, and paraffinic hydrocarbon solutions. CPVC is not recommended for use with chlorinated or aromatic hydrocarbons, esters, or ketones. The upper temperature limit on CPVC is 200°F. There is no lower temperature limit on CPVC and the material will withstand pressure. At very cold temperatures, the material will become brittle and the impact strength will decline.

Q&A About Thermoplastic Valve Class Ratings

Q. How do the terms "Schedule 40" and "Schedule 80" relate to PVC valves?

A. Where they're installed. These terms refer to pipe wall thickness, not valve wall thickness; the higher the Schedule number, the thicker the pipe wall. Equally important, is that the inside diameter gets smaller as wall thickness increases, while the outside diameter remains the same. That's why a Schedule 80 valve can be installed onto a Schedule 40 piece of pipe, and vice-versa.

Q. Since Schedule 40 and 80 are terms that describe pipe, why use them to describe thermoplastic valves?

A. It has become standard industry practice to describe PVC valves using these pipe-descriptive terms. Remember, all valves are rated by pressure, not wall thickness. Polyvinyl Chloride (PVC) resin is typically tinted white and is used to make Schedule 40 PVC pipe, valves and fittings. Unplasticized Polyvinyl Chloride (UPVC) resin is typically tinted dark gray and is used to make Schedule 80 UPVC pipe, valves and fittings. Since in both instances, the same color resin is used to make both the pipe and valves, the terminology describing the pipe has inaccurately "carried over" to describe the valves.

Q. Since all of the PVC ball valves fit onto both Schedule 40 and Schedule 80 PVC pipe, then why have separate Schedule 40 and Schedule 80 ball valves?

A. For general piping applications, such as potable water, the Schedule 40 valves have EPDM seats and stem o-ring. For the commercial or industrial applications, such as chlorinated pool water or acids, the Schedule 80 valves have superior Teflon® seats and EPDM stem o-ring (or Viton®). In Schedule 40 valves, the use of EPDM seats with traditional PVC resin offers a reliable, competitively priced valve.

Note: Since PVC valve ratings are technically independent of PVC pipe schedule ratings, FNW does not use schedule ratings to describe valve products. Pressure and temperature limits should always be referenced prior to installing any PVC valve into an application.

CLASS 150# FLANGE DIMENSIONS

ANSI B16.5 1/16" Raised Faced - Also Mate with ANSI B16.1 125# Flat Faced Flanges

Size	Flange Diameter		Flange Thickness		Bolt Circle Diameter		Bolt Hole Diameter		Number of Bolt Holes	Diameter of Bolts		Length of Stud Bolts	
	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal		Fraction	Decimal	Fraction	Decimal
2	6	6.0	5/8	0.6250	4-3/4	4.75	3/4	0.750	4	5/8	0.625	3-1/4	3.25
2-1/2	7	7.0	11/16	0.6875	5-1/2	5.50	3/4	0.750	4	5/8	0.625	3-1/2	3.50
3	7-1/2	7.5	3/4	0.7500	6	6.00	3/4	0.750	4	5/8	0.625	3-3/4	3.75
3-1/2	8-1/2	8.5	13/16	0.8125	7	7.00	3/4	0.750	8	5/8	0.625	3-3/4	3.75
4	9	9.0	15/16	0.9375	7-1/2	7.50	3/4	0.750	8	5/8	0.625	3-3/4	3.75
5	10	10.0	15/16	0.9375	8-1/2	8.50	7/8	0.875	8	3/4	0.750	4	4.00
6	11	11.0	1	1.000	9-1/2	9.50	7/8	0.875	8	3/4	0.750	4	4.00
8	13-1/2	13.5	1-1/8	1.1250	11-3/4	11.75	7/8	0.875	8	3/4	0.750	4-1/4	4.25
10	16	16.0	1-3/16	1.1875	14-1/4	14.25	1	1.000	12	7/8	0.875	4-3/4	4.75
12	19	19.0	1-1/4	1.2500	17	17.00	1	1.000	12	7/8	0.875	4-3/4	4.75
14	21	21.0	1-3/8	1.3750	18-3/4	18.75	1-1/8	1.125	12	1	1.000	5-1/4	5.25
16	23-1/2	23.5	1-7/16	1.4375	21-1/4	21.25	1-1/8	1.125	16	1	1.000	5-1/2	5.50
18	25	25.0	1-9/16	1.5625	22-3/4	22.75	1-1/4	1.250	16	1-1/8	1.125	6	6.00
20	27-1/2	27.5	1-11/16	1.6875	25	25.00	1-1/4	1.250	20	1-1/8	1.125	6-1/4	6.25
24	32	32.0	1-7/8	1.8750	29-1/2	29.50	1-3/8	1.375	20	1-1/4	1.250	7	7.00

CLASS 300# FLANGE DIMENSIONS

ANSI B16.5 1/16" Raised Faced - Also Mate with ANSI B16.1 250# Flat Faced Flanges

Size	Flange Diameter		Flange Thickness		Bolt Circle Diameter		Bolt Hole Diameter		Number of Bolt Holes	Diameter of Bolts		Length of Stud Bolts	
	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal	Fraction	Decimal		Fraction	Decimal	Fraction	Decimal
2	6-1/2	6.50	7/8	0.8750	5	5.000	3/4	0.750	8	5/8	0.625	3-1/2	3.50
2-1/2	7-1/2	7.50	1	1.0000	5-7/8	5.875	7/8	0.875	8	3/4	0.750	4	4.00
3	8-1/4	8.25	1-1/8	1.1250	6-5/8	6.625	7/8	0.875	8	3/4	0.750	4-1/4	4.25
3-1/2	9	9.00	1-3/16	1.1875	7-1/4	7.250	7/8	0.875	8	3/4	0.750	4-1/2	4.50
4	10	10.00	1-1/4	1.2500	7-7/8	7.875	7/8	0.875	8	3/4	0.750	4-1/2	4.50
5	11	11.00	1-3/8	1.3750	9-1/4	9.250	7/8	0.875	8	3/4	0.750	4-3/4	4.75
6	12-1/2	12.50	1-7/16	1.4375	10-5/8	10.625	7/8	0.875	12	3/4	0.750	5	5.00
8	15	15.00	1-5/8	1.6250	13	13.000	1	1.000	12	7/8	0.875	5-1/2	5.50
10	17-1/2	17.50	1-7/8	1.8750	15-1/4	15.250	1-1/8	1.125	16	1	1.000	6-1/4	6.25
12	20-1/2	20.50	2	2.0000	17-3/4	17.750	1-1/4	1.250	16	1-1/8	1.125	6-3/4	6.75
14	23	23.00	2-1/8	2.1250	20-1/4	20.250	1-1/4	1.250	20	1-1/8	1.125	7	7.00
16	25-1/2	25.50	2-1/4	2.2500	22-1/2	22.500	1-3/8	1.375	20	1-1/4	1.250	7-1/2	7.50
18	28	28.00	2-3/8	2.3750	24-3/4	24.750	1-3/8	1.375	24	1-1/4	1.250	7-3/4	7.75
20	30-1/2	30.50	2-1/2	2.5000	27	27.000	1-3/8	1.375	24	1-1/4	1.250	8-1/4	8.25
24	36	36.00	2-3/4	2.7500	32	32.000	1-5/8	1.625	24	1-1/2	1.500	9-1/4	9.25

METRIC DISTANCE EQUIVALENTS

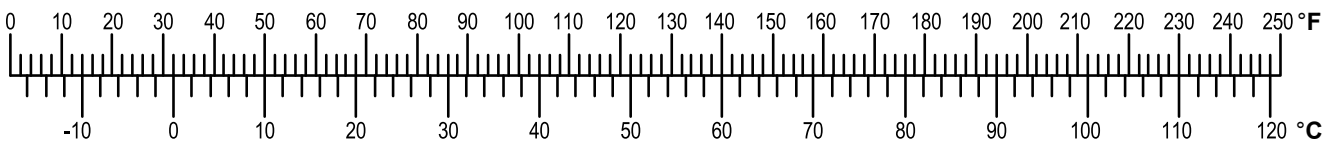
Whole Inches to Millimeters

in.	mm	in.	mm	in.	mm	in.	mm
1	25.4	26	660.4	51	1295.4	76	1930.4
2	50.8	27	685.8	52	1320.8	77	1955.8
3	76.2	28	711.2	53	1346.2	78	1981.2
4	101.6	29	736.6	54	1371.6	79	2006.6
5	127.0	30	762.0	55	1397.0	80	2032.0
6	152.4	31	787.4	56	1422.4	81	2057.4
7	177.8	32	812.8	57	1447.8	82	2082.8
8	203.2	33	838.2	58	1473.2	83	2108.2
9	228.6	34	863.6	59	1498.6	84	2133.6
10	254.0	35	889.0	60	1524.0	85	2159.0
11	279.4	36	914.4	61	1549.4	86	2184.4
12	304.8	37	939.8	62	1574.8	87	2209.8
13	330.2	38	965.2	63	1600.2	88	2235.2
14	355.6	39	990.6	64	1625.6	89	2260.6
15	381.0	40	1016.0	65	1651.0	90	2286.0
16	406.4	41	1041.4	66	1676.4	91	2311.4
17	431.8	42	1066.8	67	1701.8	92	2336.8
18	457.2	43	1092.2	68	1727.2	93	2362.2
19	482.6	44	1117.6	69	1752.6	94	2387.6
20	508.0	45	1143.0	70	1778.0	95	2413.0
21	533.4	46	1168.4	71	1803.4	96	2438.4
22	558.8	47	1193.8	72	1828.8	97	2463.8
23	584.2	48	1219.2	73	1854.2	98	2489.2
24	609.6	49	1244.6	74	1879.6	99	2514.6
25	635.0	50	1270.0	75	1905.0	100	2540.0

Fractional Inches to Millimeters

in.		mm	in.		mm
1/64	0.016	0.397	33/64	0.516	13.097
1/32	0.031	0.794	17/32	0.531	13.494
3/64	0.047	1.191	35/64	0.547	13.891
1/16	0.063	1.588	9/16	0.563	14.288
5/64	0.078	1.984	37/64	0.578	14.684
3/32	0.094	2.381	19/32	0.594	15.081
7/64	0.109	2.778	39/64	0.609	15.478
1/8	0.125	3.175	5/8	0.625	15.875
9/64	0.141	3.572	41/64	0.641	16.272
5/32	0.156	3.969	21/32	0.656	16.669
11/64	0.172	4.366	43/64	0.672	17.066
3/16	0.188	4.763	11/16	0.688	17.463
13/64	0.203	5.159	45/64	0.703	17.859
7/32	0.219	5.556	23/32	0.719	18.256
15/64	0.234	5.953	47/64	0.734	18.653
1/4	0.250	6.350	3/4	0.750	19.050
17/64	0.266	6.747	49/64	0.766	19.447
9/32	0.281	7.144	25/32	0.781	19.844
19/64	0.297	7.541	51/64	0.797	20.241
5/16	0.313	7.938	13/16	0.813	20.638
21/64	0.328	8.334	53/64	0.828	21.034
11/32	0.344	8.731	27/32	0.844	21.431
23/64	0.359	9.128	55/64	0.859	21.828
3/8	0.375	9.525	7/8	0.875	22.225
25/64	0.391	9.922	57/64	0.891	22.622
13/32	0.406	10.319	29/32	0.906	23.019
27/64	0.422	10.716	59/64	0.922	23.416
7/16	0.438	11.113	15/16	0.938	23.813
29/64	0.453	11.509	61/64	0.953	24.209
15/32	0.469	11.906	31/32	0.969	24.606
31/64	0.484	12.303	63/64	0.984	25.003
1/2	0.500	12.700	1	1.000	25.400

METRIC TEMPERATURE EQUIVALENTS



Temperature Conversion Formulas

$$^{\circ}\text{F} = ^{\circ}\text{C} \times 9/5 + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5/9$$

ASTM MATERIAL CODES

CARBON STEELS

Pipe	Valves	Flanges	Weld Fittings	Screwed & Socket Fittings
A53	A105	A105 Grade 2	A234 WPB	A105 Grade 2
	A216 WCB	A181 Grade 2		A181 Grade 2
A106B	A105	A105 Grade 2	A234 WPB	A105 Grade 2
	A216 WCB	A181 Grade 2		A181 Grade 2

STAINLESS STEELS

Pipe	Valves	Flanges	Weld Fittings	Screwed & Socket Fittings
A312 T304	A182 F-304/A351 CF8	A182 F-304	A403 WP-304	A182 F-304
A312 304L	A182 F-304L/A296 CF3	A182 F-304L	A403 WP-304L	A182 F-304L
A312 T316	A182 F-316/A351 CF8M	A182 F-316	A403 WP-316	A182 F-316
A312 316L	A182 F-316L/A296 CF3M	A182 F-316L	A403 WP-316L	A182 F-316L
A312 321	A182 F-321/A351 CF8C	A182 F-321	A403 WP-321	A182 F-321
A312 347	A182 F-347/A351 CF8CMO	A182 F-347	A403 WP-347	A182 F-347

LOW-TEMPERATURE STEELS

Pipe	Valves	Flanges	Weld Fittings	Screwed & Socket Fittings
A333 Grade 6	A350 LF-2/A352 LCB	A350 LF-2	A420 WPL-6	A350 LF-2
A333 Grade 3	A350 LF-3/A352 LCS	A350 LF-3	A420 WPL-3	A350 LF-3

CHROME-MOLY ALLOYS

Pipe	Valves	Flanges	Weld Fittings	Screwed & Socket Fittings
A335 P-1	A217 WC-6	A182 F-1	A234 WP-1	A182 F-1
A335 P-12	A217 WC-6	A182 F-12	A234 WP-12	A182 F-12
A335 P-11	A182 F-11/A217 WC-6	A182 F-11	A234 WP-11	A182 F-11
A335 P-22	A182 F-22/A217 WC-9	A182 F-22	A234 WP-22	A182 F-22
A335 P-5	A182 F-5/A217 WC-5	A182 F-5	A234 WP-5	A182 F-5
A335 P-7	A182 F-7/A217 WC-12	A182 F-7	A234 WP-7	A182 F-7
A335 P-9	A182 F-9/A217 WC-12	A182 F-9	A234 WP-9	A182 F-9
A268 T-410	A182 F-6/A351 CA15	A182 F-6	A234 WP-410	A182 F-6

MATERIAL MARKINGS

MALLEABLE IRON	316SS	HASTELLOY A	MONEL 400
MI	316	HAST A	M35
MALL	CF8M	HA	M35W
3% NICKEL CAST IRON	188SMO	HAA	DM
3NI	188M	A	M
CIA	188MO	HASTELLOY B	MNL
NCI*	L22XM	HAST B	MONL
NI RESIST CAST IRON	D4	HB	MLCB
NR	CF7M	HAB	MON
NR2	8M♦ (LAD)	N7M	ML
CAUSUL*	36 (JB)	N12M	EM
DUCTILE IRON	6 (HMC)	N2	NICU
DI	0 (ALOYCO)	DC2	QQN-177 (LAD)
DCI	C (CONTRO)	B♦ (LADISH)	COMPE (LAD)
21 (JB)	KA2SMO	NiMO	K (TRIM)
CARBON STEEL	316LSS	CW12M	71 (JB)
WCB (CAST)	316L	HASTELLOY C	Mo (HMC)
A 105 (FORGED)	CF3M	HAST C	1 ¼% CR ½% MOLY
22 (JB)	188SMO ELC	HC	WC6 (CAST)
DS	D4L	HAC	F11 (FORGED)
CS	6L (HMC)	CW7M	2 ¼% CR ½ % MOLY
LOW TEMP STEELS	L22XMELC	CW12M	WC9 (CAST)
LCB (CAST CARBON)	317SS	N3	F22 (FORGED)
LC1 (CAST ½ % MOLY)	CG8M	DC3	5% CR ½ % MOLY
LC2 (CAST 2½ % NICKEL)	347SS	C♦ (LAD)	C5 (CAST)
LC3 (CAST 3½ % NICKEL)	347	73 (JB)	F5 (FORGED)
LF1 (FORGED CARBON)	CF8C	NIMOCR	F5A (FORGED)
LF2 (FORGED CARBON)	CF82B	HASTELLOY D	9% CR 1% MOLY
LF3 (FORGED 3½ NICKEL)	188SCB	HAST D	C12 (CAST)
304SS	188CB	HAD	F9 (FORGED)
304	410SS	INCONEL 600	NICKEL 200
CF8	CR13	INC	NI
188S	11 13	CY40	DNI
L22	F6	DIN	CZ100
D2	EXELLOY (CRANE)	FERRALIUM	78 (JB)
33 (JB)	CA 15	CD4M	CZ100S
8 ♦ (LAD)	ALUMINUM	CD4MCU	LNI
S (ALOYCO)	AL	DURCOMET 100	TITANIUM
D (CONTRO)	44 (JB)	38 (JB)	TI
F8	ALUM	ZIRCONIUM	T♦ (LAD)
KA2S	SPECIAL	ZR	TI♦ (LAD)
	A-254-SMO		

* The information contained herein is general in nature. Reference should be made to the manufacturing catalog for individual manufacturer markings.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Acetaldehyde	B	C	C	C	A		A	A	A	D	A	B	C	D	D	B		A
Acetamine	B	B	B	B	B				A	A				B	B			A
Acetate Solvents	A	B	A	B	A			A	A	D	D		D	D	D			A
Acetic Acid, aerated	B	D	D	D	A			A	A	C	D		C		C	B	A	A
Acetic Acid, Air Free	B	B	D	D	A	A	A	A	A	C	D		D		C	B	A	A
Acetic Acid, crude	C	C	C	C	A	A	A	B	A	D	D		D		D	B	A	A
Acetic Acid, glacial						A			A	D		B	C	C	C	B	A	A
Acetic Acid, pure	C	C	D	D	A	A	A	D	A	D	D		D	A	D	B	A	A
Acetic Acid, 10%	C	C	C	C	A	A	A	B	A	D	B	B	D	C	C	B	A	A
Acetic Acid, 80%	C	C	C	C	A	A	A	B	A	D	D	C	D	D	D	B	A	A
Acetic Acid Vapors	B	D			D	D	B	C	A	D						B	A	A
Acetic Anhydride	B	D	D	D	B	B	B	B	A	D	C	C	D	B	C		A	A
Acetone	A	A	A	A	A	A	A	A	A	D	A	A	D	D	D	A	A	A
Other Ketones	A	A	A	A	A	A	A	A	A	D	A	D	D	D	D			A
Acetyl Chloride	D	A		D	C			B	A	D	D	D	D	D	D			A
Acetylene	A	B	A	A	A	A	A	A	A	B	A	A	A	C	C	A		A
Acid Fumes	B	D	D	D	B		B			C	D			C	B			A
Acrylonitrile	B	A	A	C	A		B	A	A	D	D	D	C	D	D	A		A
Air	A	A	A	A	A		A	A	A	A	A	A	A	A	A	A		A
Alcohol, Amyl	B	B	B	C	A		B	B	B	C	A	A	B	B	C	A	A	A
Alcohol, Butyl	B	B	B	C	A		A	A	A	B	A	C	A	B	B	A	A	A
Alcohol, Diacetone	A	A	A	A	A		A	B	A	D	A	B	D	C	C	A	A	A
Alcohol, Ethyl	B	B	B	B	B		A	B	A	A	A	A	A	B	B	A	A	A
Alcohols, Fatty	B	B	B	B	A		A		A	B	A			B	B	A	A	A
Alcohol, Isopropyl	B	B	B	B	B		A	B	B	C	A	A	A	B	B	A	A	A
Alcohol, Methyl	B	B	B	B	A		A	A	A	B	A	A	C	A	A	A	A	A
Alcohol, Propyl	A	A	B	B	A		A	A	A	B	A	A	A	B	B	A	A	A
Alumina	A	A							A	A	A	A			A	A		A
Aluminum Acetate	C	D		D	A	B	B	C	B	D	D	A	D	D	D			A
Aluminum Chloride dry	B	B	C	D	C		D	B	B	B	A	A	A	B	B	A	A	A
Aluminum Chloride solution	C				D	C	B	B	A	B	D		A	B	B	A	A	A
Aluminum Fluoride	C		D	D	C		C	B	A	A	C	A	A	B	A			A
Aluminum Hydroxide	A	A	D	D	A	B	B	B	B	A	C	A	A		A			A
Aluminum Nitrate	D	D		D	C		B	C	B	B	D	B	D	B	B			A
Aluminum Oxalate	B						A	B	A									A
Alum (Aluminum Potassium Sulfate)	D	D		D	B	C	B	C	A	B	D		B	B	B		A	A
Alum (Aluminum Sulfate)	C	C	D	D	B	A	B	C	A	A	D	A	A	B	A	A	A	A
Amines	B	B	B	C	A	A	A	B	B	D	C	C	D	D	D	B		A
Ammonia, Alum	C				A		A		A	B	C				B	D	A	A
Ammonia, Anhydrous Liquid	A	D	A	B	A	A	A	B	A	B	D	B	D	B	C	A	A	A
Ammonia, Aqueous	B	D	A	A	A		A	B	B	B	D		A	B	B	B	A	A
Ammonia, Gas, hot	A	D		B	A		A	B	B	C	D	A	D	C	A		A	A
Ammonia Liquor					A		A		B							B	A	A
Ammonia Solutions	C	D	B	B	A		A	B	B	B	D	B	D	D	B	B	A	A
Ammonium Acetate	B	D		B	B		A	B	B	B	D	A	D	D	B			A
Ammonium Bicarbonate	B	B	C	B	B		B	B		B	A	A	A	B	A	B		A
Ammonium Bromide 5%	D				B		B	B			A							A
Ammonium Carbonate	B	B	B	B	B		B	B		C	D	A	B	B	A			A
Ammonium Chloride	D	D	D	D	C	C	B	B	B	B	C	A	A	A	A	D		A
Ammonium Hydroxide 28%	C	D	C	C	B	A	A	D	B	B	D	B	A		A	B	A	A
Ammonium Hydroxide Concentrated	C	D	C	C	B	A	A	C	B	C	D	A	A	A	A		A	A
Ammonium Monosulfate	D					A		B	B	B		D						A
Ammonium Nitrate	B	D	D	D	A	A	B	D	B	A	D	A	A	A	A	C		A
Ammonium Oxiate 5%	A				A		A	B			A							A
Ammonium Persulfate	C	C			A		A	D		D	D	B	B	B	C			A
Ammonium Phosphate	C	D	D	D	B		B	C		A	C	A	A	A	A	A		A
Ammonium Phosphate Di-basic	B	C	D	D	B		B	C	B	A	A	A	A		A	A		A
Ammonium Phosphate Tri-basic	C	C	D	D	B		B	C	B	A	A		A		A	A		A
Ammonium Sulfate	C	C	C	D	B	B	B	B	B	A	B	A	B	B	A	A	A	A
Ammonium Sulfide	C	D	D	D	B		B	B		A	A	A	D	B	B			A
Ammonium Sulfite	C	C	C	C	A		B	D		B	A	B	A		A			A
Amyl Acetate	B	B	C	C	B	A	A	B	A	D	A	B	D	D	D	D		A
Amyl Chloride	D	B		B	A		A	B	B	D	A	D	D	D	C	B		A
Aniline	C	D	C	C	B		A	B	B	D	D	C	C	D	D	B	A	A
Aniline Dyes	C	C	C	C	A		A	A		C	A	C	B	C	C			A
Apple Juice	B	C	D	D	B		A	A		A	A	B	A	B	A			A
Aqua Regia (Strong Acid)	D	D	D	D	B		B			D	D	D	D	D	D		D	A
Aromatic Solvents	A	A	C	B	A		A	B		D	A	D		A	D			A
Arsenic Acid	D	D	D	D	B		B	D	B	A	D	B	A	B	A		A	A
Asphalt Emulsion	C	A	B	B	A		A	A	A	D	A	D	A	D	C	A		A
Asphalt Liquid	C	A	B	B	A		A	A	A	C	A	D	A	D	C			A
Barium Carbonate	C	B	B	B	B		B	B	A	B	A	A	A	A	A			A
Barium Chloride	D	B	C	C	B	B	C	B		A	A	A	A	B	A			A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Barium Cyanide	D	C		C	B		B	D		B	A	B	B	B	B			A
Barium Hydrate	D	D			A		A	B			A							A
Barium Hydroxide	D	C	C	B	B	A	A	B		A	A	B	A	B	A	A		A
Barium Nitrate	B				A		A				A				B			A
Barium Sulfate	D	C	C	C	A		A	B		A	A	B	A	B	A			A
Barium Sulfide	D	D	C	D	B		B	C		A	A	A	A	B	B	B		A
Beer	A	B	D	D	A	A	A	A		B	A	B	A	C	B	A		A
Beet Sugar Liquors	A	A	B	B	A		A	A		A	A	B	A	C	A	A		A
Benzaldehyde	A	A	A	C	A		A	B	B	D	A	A	D	D	D	A		A
Benzene (Benzol)	B	B	B	B	B	B	A	A	B	D	C	D	B	D	D	A	A	A
Benzoic Acid	B	B	D	D	B	A	B	B	A	C	A	D	B	D	C	D		A
Beryllium Sulfate	B	B		B	B		A	B		B	A	B	B	B	B			A
Bleaching Powder wet		B			C		B	D	A	D	D	B	B	B	A	D		A
Blood (Meat Juices)	B	B		D	A	A	A	B		B	A	B	B	B	B			A
Borax (Sodium Borate)	C	D	C	C	A			A	A	B	A	A	A	B	D			A
Bordeaux Mixture					A		A				A							A
Borax Liquors	C	A	C	C	B		A	A	B		A	A	A	D	C			A
Boric Acid	B	C	D	D	B		B	B	A	B	A	B	A	B	B	D	A	A
Brake Fluid	B	B		B	B	A		B		D	B	B	D	B	C			A
Brines, saturated	C	B	D	C	B		B	B	A	A	A	A	A	B	B	C		A
Bromine, dry	C	B	D	D	D		B	A	A	D	D	D	B	D	D	D	B	A
Bunker Oils (Fuel)	A	B	B	B	A		A	A		B	A				B			A
Butadiene	B	C	B	B	A		A	C	B	C	A	C	B	D	C			D
Butane	A	A	B	B	A		A	B	A	B	A	D	A	A	B	A		A
Butter					A		A			B	A			D	B			A
Buttermilk	A	D	D	D	A		A	D		A	A	B	A	D	A			A
Butyl Acetate	B	B		B	B		A	B	B	D	B	D	D	D	D			A
Butylene	A	A	A	A	A		A	A		D	A	D	D	D	D	A		A
Butyric Acid	B	C	D	D	B		B	B	A	C	A	C	C	C	C	D		A
Calcium Bisulfite	C	C	D	D	B		B	D	B	A	D	D	A	B	A			A
Calcium Carbonate	C	C	D	D	B		B	B	B	A	A	B	A	B	A	A		A
Calcium Chlorate	B	D		C	B		B	B		B	D	B	B	B	B		B	A
Calcium Chloride	C	B	C	C	B	B	B	B	A	A	A	B	A	B	A	D		A
Calcium Hydroxide	D	C	C	C	B		B	A	A	A	A	A	A	B	B	A		A
Calcium Nitrate	B				B		B			B	C	B		B	B			A
Calcium Phosphate	D	C		C	B		B			B	B	B	B	B	B			A
Calcium Silicate	D	C		C	B		B			B	A	B	B	B	B			A
Calcium Sulfate	B	C	C	C	B	B	B	B	B	A	A	B	A	B	A			A
Caliche Liquor			B		A		A			B	A			B	B			A
Camphor	C	C		C	B		C	C		B	A	B	B	B	B			A
Cane Sugar Liquors	A	B		B	A		A	B		B	A	B	B	C	B			A
Carbonated Beverages	B	B	D	B	B	B	B	C		B	A	B	B	D	B		A	A
Carbonated Water	A	B	B	A	A	B	A	B		A	A	A	A	D	A		A	A
Carbon Bisulfide	A	C	B	B	B		B	B		D	A	D	A	D	D			A
Carbon Dioxide, Dry	A	A	A	B	A	A	A	A		C	A	B	B	B	B		A	A
Carbonic Acid	A	D	D	D	B		B	A	B	B	A	B	A	B	B		A	A
Carbon Monoxide	A	A		B	A	A	A	A	A	B	A	B	B	C	D	A		A
Carbon Tetrachloride, dry	B	C	B	C	A	A	A	A	A	D	A	D	B	D	D	A	A	A
Carbon Tetrachloride, wet		D	D	D	B		B	B	B	D	B	D	B	D	D	A	A	A
Casein	C	C		C	B		B	C		B	A	B	B	B	B			A
Caster Oil	A	A	B	B	A		A	A	A	A	A	B	A	B	B	A		A
Caustic Potash					A		A	B		B	D			B	B			A
Caustic Soda	D		B	B	A		A	A		C	D	B	B	B				A
Cellulose Acetate	B	B		B	B			B	B	D	C	B	D	D	D			A
China Wood Oil (Tung)	A	C	C	C	A		A	A	A	A	A	D	A	B	B	A		A
Chlorinated Solvents	D	C	C	C	A		A	B		D	A	D	C	D	D			A
Chlorinated Water	C				C	D	A	D	D	B	D		A	B	A	D	B	A
Chlorine Gas, dry	B	C	B	B	B	C	A	A	A	C	D	D	B	C	D	D	A	A
Chlorobenzene, dry	B	B	B	B	A		A	B	B	D	B	D	A	D	D	A		A
Chloroform, dry	D	B	B	C	A	B	A	A	B	D	A	D	B	D	D	B		A
Chlorophyll, dry	B	B		B	B		A	B		B		B	B	B	B			A
Chlorosulfonic Acid, dry	B	C	B	B	B		B	B	A	D	D	D	D	D	D	D		A
Chrome Alum	C	C	B	C	A		A	B		B	B	B	B	B	B	D		A
Chromic Acid < 50%	C	D	D	D	C	C	B	C	B	D	D	C	C	B	D	D		A
Chromic Acid > 50%	D	D	D	C	C	D	B	D	B	D	D	C	C	B	D	D		A
Chromium Sulfate	B	C		D	B		C	B		B	C	B	B	B	B			A
Cider	B				A		B	A			A			D				A
Citric Acid	B	C	D	D	B	C	A	B	A	B	A	B	A	A	A	B	A	A
Citrus Juices	C	B	D	D	B		A	A		A	A		A	D	A			A
Coca-Cola Syrup					A		A			B	A		B	D	B			A
Coconut Oil	B	B	C	C	B		A	B		A	A				C			A
Coffee	A	A		D	A		A	B		A	A							B
Coffee Extracts, hot	A	B	C	C	A		A	A			A					D		A
Coke Oven Gas	A	C	B	B	A		A	B		C	D	D	B	C	D	C		A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Cooking Oil	B	B	B	B	A		A	A		A	A	D	A	C	B			A
Copper Acetate	D	D	D	D	A		A	C	B	C	D	B	D	D	C			A
Copper Carbonate	D				A		A				A							A
Copper Cyanide	D	D		D	A		A	C		A	A	B	B	B	A			A
Copper Nitrate	D	D	D	D	B		B	D		A	A	B	A		A			A
Copper Sulfate	D	D	D	D	B	B	B	C	A	A	A	A	A	A	A	A	A	A
Corn Oil	B	B	C	C	B		B	B		A	A	C	A	C	C			A
Cottonseed Oil	B	B	C	C	B		B	B		A	A	C	B	C	B			A
Cresol					B		B			D	D	D	D	D	D			A
Cresote Oil	B	B	B	B	B	B	A	B	B	C	D	D	A	D	D			A
Cresylic Acid	C	C	C	D	B		B	B		D	D	D	B	D	D			A
Crude Oil, sour	B	C	B	C	A		A	B		A	A	D	A	C	B			A
Crude Oil, sweet	A	B	B	B	A		A	A		A	A		A		B			A
Cupric Nitrate	D				A		A	D			D							A
Cutting Oils, Water/Emulsions	A	A	B	B	A		A			A	A		A		B			A
Cyanide Plating Solution	D	D		D	B		B	D		B	D	B	B	B	B			A
Cyclohexane	A	A	A	A	A		A	B	B	C	A	D	A	D	D	A		A
Cyclohexanone	B	B			A		A	B	B	D	A				D	A		A
Detergents, synthetic	B	B		B	B		A	B		B	A	B	A	B	B			A
Dextrin	B	B		B	B		B	B		B	A	B	B	B	B			A
Dichloroethane				C	C		B	B		D	D	D			D			A
Dichloroethyl Ether	B	B		B	B		B			D	D	D	D	D	D			A
Diesel Oil Fuels	A	A	A	A	A		A	A		A	A	D	A	D	C			A
Diethylamine	B	B	A	B	A		A	B		B	A	C	D	C	C	B		A
Diethyl Benzene					B		B			D	C	D			D			A
Diethylene Glycol	B	B		A	A		A	B		A	A	A	B	B	A			A
Diethyl Sulfate	B	B		B	B		B	B		C	A	C	B	D	C			A
Dimethyl Formamide	B	B		B	A		A	B		B	A	D	D	D	D			A
Dimethyl Phthalate										B	C		D	B	B			A
Dioxane	B	B		B	B		B	B		D	C	C	D	D	D		A	A
Dipentane (Pinene)	A	A		A	A		A			B	A	D	B	D	D			A
Disodium Phosphate	B				B		B	C		B	A		B	B	B			A
Dowtherm	A	A	B	B	A		A	A		D	A	D	A	D	D	C	A	A
Drilling Mud	B	B	B	B	A		A	B		A	A	A	A	B	C			A
Dry Cleaning Fluids	A	C	B	B	A		A	B		D	A		B		D			A
Drying Oil	C	C	C	B	B		B	B		A	A				B			A
Enamel		A								B	A	D			B			A
Epsom Salts (MgSo4)	A	B	C	C	B		B	B		A	A		A	D	A	B		A
Ethane	A	B	C	C	B		B	B		A	A	D	A		B			A
Ethers	A	B	A	B	A	B	A	B		D	C	C	C	D	D			A
Ethyl Acetate	A	C	B	C	B	A	B	B	B	D	C	C	D	D	D	A		A
Ethyl Acrylate	C	B	C	C	A		A	B	A	D	B	C	D	D	D	A		A
Ethyl Benzene							A		A	C	A	D			D	B		A
Ethyl Bromide	B	A		B	B		C	B		B	A	B	B	D	B			A
Ethyl Chloride, dry	B	B	B	B	A	A	A	B	B	C	A	C	B	D	C	A		B
Ethyl Chloride, wet	D	C	D	D	B		B	B	B	C	A	B	B	D	C	A		A
Ethylene Chloride	C				A		A	B	B	D	A		D		A			A
Ethylene Dichloride					B		A	B		D	C	D	D	D	D	A	A	A
Ethylene Glycol	A	B	B	B	B	A	A	B	A	A	A	A	A	B	B	A		A
Ethylene Oxide	C	C	B	B	B		B	B	A	D	A	D	D	D	D	D		A
Ethyl Ether	B	B		C	A		A	A	B	D	A	D	D	D	D			A
Ethyl Silicate	A	B		B	B		B	B		B	A	B	B	B	C			A
Ethyl Sulfate					B		B			B	A	C	A		B			A
Fatty Acids	B	C	D	D	A		A	B	A	B	A	D	A	D	B	A	A	A
Ferric Hydroxide					A		A	A		B	A							A
Ferric Nitrate	D	D	D	D	C	B	A	D	B	A	A	A	A	B	A			A
Ferric Sulfate	D	D	D	D	B	B	A	D		A	A	A	A	A	A	C		A
Ferrous Ammonium Citrate	B				B		B				A							A
Ferrous Chloride	D	B	D	D	D		D	D	D	A	A	A	A	B	A	C	A	A
Ferrous Sulfate	C	B	D	D	B		B	B	B	A	A	A	A	B	A		A	A
Ferrous Sulfate, Saturated	C	C	C	C	A		A	B	B	C	A	B	B	B	C			A
Fertilizer Solutions	B	C	B	B	B		B	B		B					B			A
Fish Oils	C	B	B	B	A		A	A	A	A	A	D	A	D	B			A
Flue Gases	C	B		B	A		A	B		C	C	D	C	B	C			A
Fluoboric Acid	B				B		A			A	D			B	B			A
Fluorosilicic Acid	D	B	D	D	B		B	A	B	C	C	C	C	C	C			A
Formaldehyde, cold	A	A	A	B	A	A	A	A	B	B	A	B	D	C	C	A		A
Formaldehyde, hot	B	B	D	D	C		B	B	B	B	A			B	B			A
Formic Acid, cold	D	B	D	D	B	B	A	B	A	D	D		B	C	B	A	A	A
Formic Acid, hot	D	B	D	D	B	D	B	B	B	D	D		A		A	D	A	A
Freon Gas, dry	B	B	B	B	A	A	A	A	B	C	A	C	C	B	C	A	A	A
Freon 11, MF, 112, BF	B	B		C	A		A	B	B	C	A	C	D	B	C	A	A	
Freon 12, 13, 32, 114, 115	A	A		B	A		A	B	B	B	A	A	D	B	A	A	A	
Freon 21, 31	B	B		C	A		A	B	B	D	A	D	D		D	A	A	

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Freon 22	A	A		B			A		B	D	A	D	D		B	A	A	
Freon 113, TF	B	B		C	A		A	B	B	B	A	C	C		C	A	A	
Freon, wet	D	D		D	C	B	B	B	B	B	A	B	D	B	B	D	A	A
Fruit Juices	B	B	D	D	A		A	B		A	A	A	A	C	A			A
Fuel Oil	A	B	B	B	A		A	B		A	A	D	A	C	C			A
Fumaric Acid							A			B	A				B			A
Furfural	A	A	A	B	A	B	A	B	B	D	A	C	D	D	C			A
Gallic Acid 5%	A	C	D	D	B		B	B	B	B	A	C	A	C	B	A		A
Gas, Manufactured	B	B	B	B	B		B	A		A	A		A		A	A		A
Gas, Natural	B	B	B	B	A		B	A		A	A	D	A	B	A	A		A
Gas, Odorizers	A	A	B	B	B		A	B		B	A		A		B	A		A
Gasoline, Aviation	A	A	A	B	A		A	A	A	C	A		A		D	A	A	A
Gasoline, Leaded	A	A	A	A	A		A	B	A	C	A		A	B	D	A	A	A
Gasoline, Motor	A	A	A	B		A	A	A	A	C	A	D	A	D	D	A	A	A
Gasoline, Refined	A	B	B	B	A		A	B	A	C	A	D	A	D	C	A	A	A
Gasoline, Sour	A	B	B	B	A		A	C	A	C	A	D	A	C	D	B	A	A
Gasoline, Unleaded	A	A	A	B	A		A	A	A	C	A		A	B	D	A	A	A
Gelatin	A	A	D	D	A		A	B		A	A	A	A	B	A	A		A
Glucose	A	A	B	B	A		A	A	A	A	A	A	A	B	A	A		A
Glue	A	B	A	B	B		A	B	A	A	A	B	A	B	A	A		A
Glycerine (Glycerol)	A	B	C	B	A	A	A	A	A	C	A	A	B	A	D	A	A	
Glycol Amine	C	D		B	B	A			D	A	C	D	D	C			A	
Glycol	A	B	C	B	B		A	B		B	C	A	A	B	A			A
Graphite	B	B		C	B		A	B		B	A	B	B	B	B			A
Grease	B	C	A	A	A		A	B		A	A	D	A	D	B			A
Helium Gas	B	B		B	A		A	B	A	B	A	B	B	B	B			A
Heptane	A	A	B	B	A		A	B	A	A	A	D	A	B	B			A
Hexane	A	B	B	B	A		A	B	A	A	A	D	A	B	C	A		A
Hexanol, Tertiary	A	A	A	A	A		A	A	A	A	A	D	B	C	C	A		A
Hydric Oil, Petroleum Base	A	B	A	B	A		A	A		A	A	D	A		B			A
Hydrazine	C	D		D	B		B	D		C	D	B	D	C	C			A
Hydrocyanic Acid	A	D	D	C	A		A	C	B	B	D	B	A	B	B			A
Hydrofluosilicic Acid	D	A	D	D	C		B	B		B	A	B	A	B	B		A	A
Hydrogen Gas, cold	A	B	B	B	A		A	A		B	A	B	A	B	B	A		A
Hydrogen Gas, hot	C		B		B		A		A	B	A	B			B			A
Hydrogen Peroxide, Concentrated	A	D	D	D	B		B	D	D	D	D	B	B	B	D	D		A
Hydrogen Peroxide, Dilute	A	C	D	D	B		B	D	D	A	D	B	A		B	D		A
Hydrogen Sulfide, Dry	A	C	B	B	A	B	B	B	B	C	C	A	A	B	A	D	A	A
Hydrogen Sulfide, Wet	B	D	C	D	B		B	C	D	C	C	B	A	B	B	D	A	A
Hypo (Sodium Thiosulfate)	B	C	D	C	B		B	B		A	A	A	A		A			A
Illuminating Gas	A	A	A	A	A		A	A		C	A	D	A	D	C			A
Ink-Newsprint	C	C	D	D	A		A	B		A	A	B	A	B	B	A		A
Iodoform	C	C	B	C	A		A	C			A		A					A
Iso-Butane					B		B			B	A	D			D			A
Iso-Octane	A	A	A	B	A		A	A		A	A	D	A	B	C			A
Isopropyl Acetate					B		A			D	A	D			D		A	A
Isopropyl Ether	B	A	A	B	A		A	B	A	C	A	D	D	D	C	A	A	A
J P-4 Fuel	A	A	A	B	A		A	A	A	A	A		A		C	A		A
J P-5 Fuel	A	A	A	A	A		A	A	A	B	A		A		C	A		A
J P-6 Fuel	A	A	A	A	A		A	A	A	A	A		A		C	A		A
Kerosene	A	A	B	B	A		A	A	A	A	A	D	A	D	C	A	A	A
Ketchup	D	D	D	D	A		A	B		A	A		A	B	A			A
Ketones	A	A	A	A	A		A	A		D	A	D	D	D	D			A
Laquer (and Solvent)	A	A	C	C	A		A	A		D	A	D	D	D	D			A
Lactic Acid Concentrated cold	C	D	D	D	A	D	A	D	A	B	D	B	A	B	A	A	A	A
Lactic Acid Concentrated hot	C	D	D	D	B	D	A	D	B	C	D	B	B	B	C		A	A
Lactic Acid Dilute cold	A	D	D	D	A	B	A	C	A	B	D	B	A	B	A		A	A
Lactic Acid Dilute hot	B	D	D	D	A	D	A	D	B	C	D		D		D		A	A
Lactose	B	B		C	B		B	B		B	A	B	B	B	C			A
Lard	A	B		A	A		A			B	A	C			C			A
Lard Oil	B	B	C	C	B		A	B		A	A	B	A	D	B			A
Lead Acetate	D	C	D	D	B		B	B		A	A	B	B		B			A
Lead Sulfate	D	C		D	B		B	B		B	A	B	B	B	B			A
Lecithin	D	C		C	B		B	B		D	A	D	B	D	D			A
Linoleic Acid	A	B	B	B	A		A	B		B	A	D	B	D	B			A
Linseed Oil	A	B	A	A	A		A	B		A	A	D	A	B	C			A
Lithium Chloride	D	B		B	B		A	B		B	A	B	B	B	B			A
LPG	A	A	B	B	B		B	B		A	A	D	A	D	B			A
Lubricating Oil Petroleum Base	A	B	A	A	A		A	B		A	A	D	A	C	B			A
Ludox	D	D		B	B		B	B		B	B	B	B	B	B			A
Magnesium Bisulfate	B	B	B	B	A		A	B		B	A	B	B	B	B			A
Magnesium Bisulfide	C	D		D	B		B	B		B	A	B	B	B	B			A
Magnesium Carbonate	B	B		B	A		A	B		B	A	B	B	B	B			A
Magnesium Chloride	D	B	C	D	B	C	B	B	A	A	A	A	A	A	A	C		A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Magnesium Hydroxide	D	B	B	B	A	A	A	B	B	A	A	A	A	A	A	D		A
Magnesium Hydroxide Hot	D	D	B	B	A	A	A	A	B	B	A		A	B	B	D		A
Magnesium Nitrate	B				A		A	B		B	A		B	B	A			A
Magnesium Sulfate	B	B	B	B	A	A	A	B	A	A	A	A	A	A	A	A		A
Maleic Acid	B	B	B	C	B		B	B	A	B	A	D	A	D	B			A
Maleic Anhydride	B	B		B	B		B	B	B	D	C	D	B	D	D			A
Malic Acid	B	B	D	D	B		B	B		A	A		A		A			A
Malt Beverage					A		B	A		A	A	B	A		A			A
Manganese Carbonate	B				B		A			B	A							A
Manganese Sulfate	B	B		D	A		A	B		B	A	B	B	B	B		A	A
Mayonnaise	D	D	D	D	A		A	B		A	A		A		A			A
Meat Juices	B	D			A		A			B	A			B	B			A
Melamine Resins				D	C		C			B	A			D	B			A
Methanol	B	B		B	A		A	B		B	C	D	B	D	B			A
Mercuric Chloride	D	D	D	D	B		B	D	B	A	A	A	A	B	B	C		A
Mercuric Cyanide	D	D	D	D	A		A	C	B	A	A	A	A	B	B			A
Mercurous Nitrate	D	D			A		A	D			A		B	B				A
Mercury	D	D	A	A	A		A	B	B	A	A	A	A	B	A			A
Methane	A	A	B	B	A		A	B	A	A	A		A		B			A
Methyl Acetate	A	A	B	B	A		A	B	A	D	B	B	D	D	D	A		A
Methyl Acetone	A	A	A	A	A		A	A		D	B	A	D	D	D	A		A
Methylamine	A	D	B	B	A		A	C	B	D	A	B	D	D	D	A		A
Methyl Bromide 100%	C	C		D	B		A	B		B	A	D	B	D	D			A
Methyl Cellosolve	A	A	B	B	A		A	B	B	C	A	B	D	D	D	B		A
Methyl Cellulose					A		A		B	D	A				D			A
Methyl Chloride	D	B	B	B	A		A	B		D	A	D	B	D	D	A		A
Methyl Ethyl Ketone	A	A	A	A	A		A	A	B	D	A	B	D	D	D	A	A	A
Methylene Chloride	C	A	B	B	A		A	B	B	D	A	D	C	D	D	A		A
Methyl Formate	C	A	C	C	B		A	B	B	D	A	B	D	B	B			A
Methyl Isobutyle Ketone					A		A			D	A				D		A	A
Milk & Milk Products	A	B	D	D	A		A	B		A	A	A	A	B	A	A		A
Mineral Oils	A	B	B	B	A		A	A		A	A	D	A	C	B			A
Mineral Spirits	A	B	B	B	B		B	B		A	A		A		C			A
Mixed Acids (cold)	D	D	C	C	B		B	C		D	D	D	B	D	D	C		A
Molasses, crude	B	A	A	A	A		A	A		A	A		A	B	A	A		A
Molasses, Edible	A	A	C	C	A		A	A		A	A		A		A	A		A
Molybdic Acid					A		A				A							A
Monochloro Benzene Dry					B		B	B		D	C				D		A	A
Morpholine	B	B		B	A		A	B		D	A	B	D	D	D			A
Mustard	B	A	B	B	A		A	A		A	A		A		A			A
Naptha	A	B	B	B	B		B	B	A	B	A	D	A	C	C	A		A
Napthalene	B	B	B	B	B		B	B	B	D	A	D	A	D	D	A		A
Natural Gas, Sour	B	B	B	B	A		A	D	A	A	A	D	A	D	A	A		A
Nickel Ammonium Sulfate	D	D	D	D	A		A	C		A	C	B	D	B	B	A		A
Nickel Chloride	D	D	D	D	B		A	B	A	A	D	B	A	B	A	C	A	A
Nickel Nitrate	C	D	D	D	B		A	B		A	C	A	A	B	A			A
Nickel Sulfate	D	D	D	D	B		A	B	B	A	C	B	A	B	A	A	A	A
Nicotinic Acid	A	A	B	C	A		A	A		D	C	D	B	D	D			A
Nitric Acid 10%	D	D	D	D	A	A	A	D		C	D		A		B	D	A	A
Nitric Acid 30%	D	D	D	D	A	D	A	D		C	D	B	A	D	C	D	B	A
Nitric Acid 80%	B	D	D	D	C	D	B	D		D	D	B	B	D	D	D	B	A
Nitric Acid 100%	B	D	D	D	A	D	A	D		D	D	D	B	C	D	D	B	A
Nitric Acid Anhydrous	B	D	D	C	A	D	A	D		D	D	D	A	D	D	D	B	A
Nitrobenzene	C	D	B	B	A		A	B	B	D	B	C	C	D	D	A		A
Nitrogen	A	A	A	A	A		A	A		A	A	B	A	B	A			A
Nitrous Acid 10%	D	D	D	D	B		B	D		C	B		A		A			A
Nitrous Gases	B	D	B	C	A		A	D			B							A
Nitrous Oxide	C	B	B	C	B		B	D	B	B	A		A		B	A		A
Oils & Fats	B				A		A			B	A	D				A		A
Oils, Animal	A	A	A	A	A		A	B	A	A	A	B	B	C	B	A		A
Oils, Petroleum Refined	A	B	A	A	A		A	A	A	A	A	D	A	B	B	A		A
Oils, Petroleum Sour	A	C	B	C	A		A	A	A	B	A	D	A	B	B	A		A
Oils, Water Mixture	A	A	B	B	A		A		A	A	A		A		B	A		A
Olaic Acid	B				B		B	A		D	C		C		D	A		A
Oleic Acid	B	B	C	C	B		A	B	B	B	C	D	A	D	C	A	A	A
Oleum	B	C	B	D	B		B	C	B	D	D	D	C	B	D	D		A
Oleum Spirits	D	D		D	D		B	D		C	D	D	A	D	D	D		A
Olive Oil	B	C	B	B	A		A	A		A	A	B	A	B	B	A		A
Oxalic Acid	C	B	D	D	B	D	B	B		C	C	B	A	B	B	D	A	A
Oxygen	A	A	B	B	A	A	A	A	A	B	D	A	A	A	B	D		A
Ozone, Dry	B	B	C	C	A		A	A	A	D	C	B	B	B	D	D		A
Ozone, Wet	B	B	C	C	A		A	A	A	D	C	B	B	B	D	D		A
Paints & Solvents	A	A	A	A	A		A	A		D	A	D	B	D	D			A
Palmitic Acid	B	B	C	C	B		B	B		B	A	B	A	D	B	D		A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Palm Oil	A	B	C	C	B		A	A		B	A	D	A	D	B	A		A
Paper Pulp	D	B		B	A		A	B		B	A	B	B	B	B	A		
Paraffin	A	A	B	B	A		A	A	A	A	A	D	A	B	C	A		A
Paraformaldehyde	B	B	B	B	B		B	B		B	A	D			B			A
Pardehyde					B		B			B	A	D			B		A	A
Pentane	A	A	B	B	A		A	B		A	A	D	A		B			A
Perchlorethylene, dry	B	C	B	B	A		A	B	B	D	B	D	A	D	D	A		A
Petrolatum (Vaseliene Petroleum Jelly)	B	B	C	C			A	A		A	A		A		B			A
Phenol	A	B	D	D	A	B	A	A	A	D	C	D	B	D	D	D		A
Phosphate Ester 10%	D	D	A	A	A		A	A		D	A	A				A		A
Phosphoric Acid 10%	D	D	D	D	D	B	B	D		B	D	B	A	B	A	D	A	A
Phosphoric Acid 50% Cold	D	D	D	D	B	B	B	C		B	D	B	A	B	B	D	A	A
Phosphoric Acid 50% Hot	D	D	D	D	D	D	B	C		B	D	B	A	B	B	D	A	A
Phosphoric Acid 85% Cold	D	D	B	B	A	C	B	A		C	D		B	B	C	D	A	A
Phosphoric Acid 85% Hot	D	D	C	C	B	D	B			C	D			B	C	D	A	A
Phosphoric Anhydride	A				A		A			D	B		B		D	D	A	A
Phosphorous Trichloride	D		B	C	A		A			D	D	B	B		D	D	A	A
Phthalic Acid	B	B	C	C	B		B	A	B	C	B		A		C	A		A
Phthalic Anhydride	B	B	C	C	B		B	A	A	C	A		A		C	A		A
Picric Acid	C	C	D	D	B	C	B	D	B	C	D	B	B	B	A	B		A
Pineapple Juice	A	C	C	C	A		A	A		A	A		A	D	A			A
Pine Oil	B	B	B	B	A		A	B		A	A	D	A	D	D			A
Pitch (Bitumen)					A		A			C	A	D			C			A
Polysulfide Liquor	D	D		B	B		A	B		B	D	B	B	B	B			A
Polyvinyl Acetate	B	B		B	B		B	B			A	B		B	C			A
Polyvinyl Chloride	B	B		B	B		B	B			A	B		B	C			A
Potassium Bicarbonate	A				A		A	B		B	A							A
Potassium Bichromate	A				A		A	A		B	B		B		B			A
Potassium Bisulfate	B				A		A	B		B	A		A	C	B			A
Potassium Bisulfite	C	C	D	D	B		B	D		A	A	B	A	C	A			A
Potassium Bromide	C	C	D	D	A	C	B	B		A	A	B	A	B	A			A
Potassium Carbonate	D	B	B	B	B	A	B	B		A	A	B	A	B	A			A
Potassium Chlorate	C	B	B	B	B	B	B	C		A	A	B	A		A			A
Potassium Chloride	D	C	C	B	B	B	A	B	B	A	A	A	A	B	A	A		A
Potassium Chromate	B	B		B	B		B	B		B	A	B	B	B	A			A
Potassium Cyanide	D	D	B	B	B		B	B	B	A	A	A	A	B	A			A
Potassium Dichromate	A	D	C	C	B		A	B		A	A	B	A	B	A			A
Potassium Ferricyanide	B	D	C	C	A	B	B	B		A	A	B	A		A			A
Potassium Ferrocyanide	B	B	C	C	B		B	A		A	A		A		A			A
Potassium Hydroxide Dilute Cold	D	D	A	A	B	B	B	A		A	D		D	B	B	B		A*
Potassium Hydroxide to 70%, Cold	D	D	B	B	B	C	B	A		B	D	B	D	B	B	B		A*
Potassium Hydroxide Dilute Hot	D	D	B	B	B	C	B	A		B	D				B			A*
Potassium Hydroxide to 70%, Hot	D	D	A	B	B	D	B	A		C	D	A		A	B			A*
Potassium Iodide	D	D	C	C	B	B	B	C		A	A	B	A		A			A
Potassium Nitrate	A	B	B	B	B	B	B	B	B	A	A	B	A	B	A			A
Potassium Oxalate	C				A		A				A							A
Potassium Permanganate	B	B	B	B	B	B	B	B	B	A	A	B	A	B	A			A
Potassium Phosphate	D	C		C	B		B	B	B	A	A	A	A	B	A	A		A
Potassium Phosphate Di-basic	B	B	A	A	A		A	B	B	A	A	B	A		A	A		A
Potassium Tri-basic	D		A	A	B		B	B		B		B			B	A		A
Potassium Sulfate	A	B	B	C	A	A	A	B		A	A	A	A	B	A	A		A
Potassium Sulfide	B	B	B	B	A		A	C	A	A	A	B	B	B	B	A		A
Potassium Sulfite	B	B	B	B	A		A	C	B	B	A	A	B	B	B	A		A
Producer Gas	B	B	B	B	B	A	B	A		A	A	D	A		B			A
Propane Gas	A	A	B	B	B	A	A	B	A	A	A	D	A	B	B	A		A
Propyl Bromide	B	B		B	B		A	B		B	A	B	B	D	B			A
Propylene Glycol	A	B	B	B	B		B	B		A	C	B	A	B	A			A
Pyridine	B			B	B		A			D	D		D		D			A
Pyrolgalic Acid	B	B	B	B	B	B	A	B		A	A		A		A			A
Quench Oil	A	B	B	B	A		A			A	A		A	B	B			A
Quinine, Sulfate, dry					A	B	A	B			A							A
Resins & Rosins	A	A	C	C	A	B	A	A		C	A		A		C	A		A
Resorcinol						B		B										A
Road Tar	A	A	A	A	A		A	A		B	A	D	A	D	C			A
Roof Pitch	A	A	A	A	A		A	A		B	A		A		C			A
Rosin Emulsion	A	B	C	C	A		A	A		D	A		B		C			A
R P-1 Fuel	A	A	A	A	A		A	A		B	A		A		C			A
Rubber Latex Emulsions	A	A	B	B	A		A				A		A					A
Rubber Solvents	A	A	A	A	A		A	A		D	C		D		C			A
Salad Oil	B	B	C	C	B		A	B		A	A	B	A	B	A			A
Salicylic Acid	C	C	D	D	A		B	B		A	A	B	A	B	A			A
Salt (NaCl)	B	B	C	C	B		A	A		A	A		A		A			A
Salt Brine	B	B		D	B		B	B		A	A	B	B	D	D	C		A
Sauerkraut Brine					B		B				C							A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information * Do not use reinforced or poly-fill, pure PTFE only

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Sea Water	C	C	D	D	B		B	A		A	A	A	A	C	A	C		A
Sewage	C	C	C	D	B	A	B	B		A	B	B	B	B	C			A
Shellac	A	A	A	B	A		A	A		A	A				A			A
Silicone Fluids	B	B		B	B		B			B	A		B	B	B			A
Silver Bromide	D				A	C	A	B			D							A
Silver Cyanide	D	D		D	A			A	B		B	D		B	B	B		A
Silver Nitrate	D	D	D	D	A		A	D		C	A	A	A	B	C			A
Silver Plating Sol.	B				A		A				D				B			A
Soap Solutions (Stearates)	C	A	A	B	A		A	A		A	A	A	A	B	B			A
Sodium Acetate	B	B	C	C	B		B	B	B	B	A	B	A	D	B	A		A
Sodium Aluminate	D	B	C	C	A		B	B	B	A	A	B	A	B	A	A		A
Sodium Benzoate	B				B		B	B			B							A
Sodium Bicarbonate	B	B	C	C	B		A	B		A	B	A	A	B	A			A
Sodium Bichromate	A				B		B			D	A			B				A
Sodium Bisulfate 10%	D	B	D	D	A		A	B		A	D	B	A	B	A	A		A
Sodium Bisulfite 10%	D	B	D	D	A		B	B	B	A	D	B	A	B	A	A		A
Sodium Borate	B	B	C	C	B		B	B		A	A	B	A	B	A			A
Sodium Bromide 10%	B	B	C	D	B		B	B		A	A	B	A		A			A
Sodium Cargonate (Soda Ash)	D	B	B	B	A		A	B	B	A	A	B	A	B	A	A		A
Sodium Chlorate	C	B	C	C	B		B	C	B	A	A	B	A	B	A		B	A
Sodium Chloride	B	B	C	C	B		A	A	B	A	A	B	A	B	A	A	A	A
Sodium Chromate	D	C	B	B	A		B	B		A	A	B	A		A			A
Sodium Citrate	D				B		B				A							A
Sodium Cyanide	D	D	B	B	A	B	A	B		A	A	B	A	B	A			A
Sodium Ferricyanide	A				A		A	B			A							A
Sodium Fluoride	C	C	D	D	B	B	A	B		A	A	B	A	B	A	C		A
Sodium Hydroxide 20% Cold	D	A	A	A	A	A	B	A		A	D	B	B	B	A	C	A	A*
Sodium Hydroxide 20% Hot	D	A	B	B	A	C	A	A		B	D	B	C	B	B	C	A	A*
Sodium Hydroxide 50% Cold	D	A	A	B	A	B	A	A		A	D	B	C	B	A	C	A	A*
Sodium Hydroxide 50% Hot	D	A	B	B	A	C	A	B		B	D		C	B	B	C	A	A*
Sodium Hydroxide 70% Cold	D	A	A	A	A	B	B	A		B	D	B	C	B	C	C	A	A*
Sodium Hydroxide 70% Hot	D	B	B	B	A	C	B	B		D	D	B	C	B	D	C	A	A*
Sodium Hypochlorite (Bleach)	D	D	D	D	D	D	C	D	A		D		A			B		A
Sodium Hyposulfite	B				B		B	B			A							A
Sodium Lactate	D				A		A	B			A							A
Sodium Metaphosphate	A	C	B	C	B	B	B		A	A	B	B		B	A		A	
Sodium Metasilicate Cold	B	B	C	C	A		A	A		B	A		B	B	A	A		A
Sodium Metasilicate Hot	B	B	D	D	A		A	A	A		A							A
Sodium Nitrate	A	B	B	B	A	B	A	B	B	C	A	B	A	B	B	A		A
Sodium Nitrite	A				B		B	C	B	C	B	A	B		D	A		A
Sodium Perborate	B	B	B	B	B	B	B	B	B	C	A	A	A	C	B			A
Sodium Peroxide	C	D	C	C	B	B	B	B	B	C	A	A	A	B	B			A
Sodium Phosphate	D	C	C	C	B	B	B	B	B	B	A	A	A	B	C	A		A
Sodium Phosphate Di-basic	D	C	C	C	B		B	B	B	A	A	A	A		A	A		A
Sodium Phosphate Tri-basic	D	C	C	C	B		B	B	B	B	A	A	A		B	A		A
Sodium Polyphosphate					B		B	B	B	B		A			B			A
Sodium Salicylate					A		A				A							A
Sodium Silicate	B	B	B	B	B		B	B		A	A	B	A	B	A	D		A
Sodium Silicate, hot	C	C	C	C	B		B	B		A	B					D		A
Sodium Sulfate	B	B	B	B	A	B	A	A		A	A	A	A	A	A			A
Sodium Sulfide	C	D	B	B	B	A	B	B		A	A	B	A	B	A	A		A
Sodium Sulfite	B	C		A	A	A	A	B	B	A	A	B	B	B	A	D		A
Sodium Tetraborate				A	A		A			A	A	B			A			A
Sodium Thiosulfate	B	C	B	C	B	A	B	B		A	A	A	A	B	A	A		A
Soybean Oil	B	B	C	C	A		A	A		A	B	B	A	D	B			A
Starch	B	B	C	C	B		A	A		A	A	C	A	B	A			A
Steam (212°F)	A	A	A	A	A	A	A	B		D	D	B	C	B	D		A	A
Stearic Acid	A	C	C	C	B		B	B	A	A	A	B	A	B	C	A	A	A
Styrene	A	A	A	B	A		A	B	A	D	A	D	B	D	D	A		A
Sugar Liquids	A	A	B	B	A		A	A		A	A	B	A	D	A			A
Sugar, Syrup & Jam	B	B		C		A	A				A			D	B			A
Sulfate, Black Liquor	C	C	C	C	B	A	B	B		C	C	B	C	D	B			A
Sulfate, Green Liquor	B	C	C	C	B	A	B	B		C	A		C	D	B			A
Sulfate, White Liquor	B	C	C	C	B	B	D	C		C	D		C	D	B			A
Sulfur	A	D	C	C	B		A	B		D	A	B	B	B	C	C		A
Sulfur Chlorides	D	B	D	D	D		A	B		D	A	C	A	B	D		A	A
Sulfur Dioxide, dry	A	B	B	B	A	A	B	B	A	D	A	A	A	D	D	A	A	A
Sulfur Dioxide, wet	C	D			A	C	B	A	B	D	D	B		B	D		A	A
Sulfur Hexafluoride	A	B			A		A								B			A
Sulfur, Molten	A	D	C	B	B		A	D	B	D	D	B	B	B	C			A
Sulfur Trioxide		B	B	B	B	B	B		B	D	D		B	D	D		D	A
Sulfur Trioxide, dry	A	B	B	B	B	B	B	B	B	D	A	B	A	D	D	A	D	A
Sulfuric Acid 0 to 77%	C	C	D	D	C		B	B		B	D		A	B	B	D	A	A
Sulfuric Acid 100%	D	C	C	B	A	B	A	D		D	D	C	B	B	D	D	D	A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information * Do not use reinforced or poly-fill, pure PTFE only

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

	Aluminum	Brass	Carbon Steel	Ductile Iron / Cast Iron	316 Stainless Steel	17-4PH Stainless Steel	Alloy 20	Monel	Hastelloy C	Buna N (Nitrile)	Delrin	EPDM/EPR	Viton	Hypalon	Neoprene	Nylon	Grafoil	Teflon
Sulfurous Acid	C	D	D	D	B		B	D	B	C	C	C	A	B	C	D	A	A
Tall Oil	C	B	B	B	B		B	B	A	B	A	D	A	D	B	D		A
Tannic Acid (Tannin)	C	B	C	C	B	B	B	B	B	B	A	B	A	B	B	A		A
Tanning Liquors	A				B		B			B	D				D			A
Tar & Tar Oils	A	A	A	A	A	A	A	A		C	A	D	A	D	D			A
Tartaric Acid	B	B	D	D	A	A	A	B	B	C	A	B	A	B	B			A
Tetraethyl Lead	B	B	C	C	B		B	A			A							A
Toluol (Toluene)	A	A	A	A	A		A	A	A	D	C	D	B	D	D	A		A
Tomato Juice	A	C	C	C	A		A	B		A	A		A	D	A			A
Transformer Oil	A	B	A	B	A		A	A		A	A		A		B			A
Tributyl Phosphate	A	A	A	A	A		A	A		D	A	B	D	D	D	A		A
Trichlorethylene	A	B	B	C	B	A	B	B	A	D	A	D	B	D	D	A	A	A
Trichloroacetic Acid	D	B		D	D		B	B	A	C	D		D		D			A
Triethanolamine	B				B		B	B	A	C	A	B		B	B			A
Triethylamine		B			B		B		A	B	C				B			A
Trisodium Phosphate	D				B		B		A	A	A	B	B	B	A			A
Tung Oil	B	B	B	B	A		A	C	A	A	A	D	A	D	B			A
Turpentine	B	B	B	B	B	A	B	B	A	B	A	D	A	C	D	A		A
Urea	B	B	C	C	B		B	B	A	C	A	B	D	D	B			A
Uric Acid	D				A		A		A		B							A
Varnish	A	A	C	C	A		A	A	A	C	A	D	B	D	B			A
Vegetable Oils	A	B	B	B	A		A	B	A	A	A	D	A	B	B			A
Vinegar	C	B	D	D	A		A	B	A	D	B	A	D	C	D			A
Vinyl Acetate	B	B		B	B		B	B	A		D	A		B	B	A	A	A
Water, Distilled	A	A	D	D	A	A	A	A	A	C	A	B	A	B	B			A
Water, Fresh	A	A	C	C	A	A	A	A	A	C	A	B	A	A	B	C		A
Water, Acid Mine	D	D	D	D	B	B		D	C	B	A	A	D	C	A		A	
Waxes	A	A	A	A	A		A	A	A	A	A	C	A	B	B			A
Whiskey & Wines	D	B	D	D	A		A	A	A	B	A	A	A	C	B	A		A
Xylene (Xylol), Dry	A	A	B	B	A		A	A	A	D	A	D	B	D	D	A	A	A
Zinc Bromide	D	B		D	B		B	B	A	B	A	B	B	B	B			A
Zinc Hydrosulfite	D	C	A	B	A		A	B	A	A	A	A	A		A			A
Zinc Sulfate	D	B	D	D	B		A	B	A	A	A	A	A	B	A		A	A

Ratings: A-Excellent B-Good C-Poor D-Do not use Blank-No information

FNW provides this information from numerous sources without claim or warranty expressed or implied. FNW assumes no responsibility for errors within this information regarding material compatibility. It is recommended that valve materials be tested in the service material for best consideration.

WARRANTY AND TERMS & CONDITIONS

Description	Page
Warranty Statement.....	337
Terms & Conditions of Sale	338

LIMITED WARRANTY

CONTROLLING PROVISIONS:

No terms and conditions other than the terms and conditions contained herein shall be binding upon Seller unless accepted by it in a writing signed by an officer of Seller. All terms and conditions contained in any prior oral or written communication, including, without limitation, Buyer's purchase order, which are different from or in addition to the terms and conditions herein are hereby rejected and shall not be binding on Seller, whether or not they would materially alter this document, and Seller hereby objects thereto. All prior proposals, negotiations and representations, if any, are merged herein. Buyer will be deemed to have assented to all terms and conditions contained herein if any part of the goods and/or services described herein are shipped or an invoice is presented in connection with the said goods and/or services.

1. WARRANTY:

Subject to the limitations expressed herein, Seller warrants that products manufactured by Seller shall be free from defects in design, material and workmanship under normal use for a period of one year from installation but in no case shall the warranty period extend longer than eighteen months from the date of sale. This warranty is void for any damage caused by misuse, abuse, neglect, acts of God, or improper installation. For the purpose of this section, "Normal Use" means in strict accordance with the installation, operation and maintenance manual. The warranty for all other products is provided by the original equipment manufacturer.

2. REMEDIES:

Seller shall repair or replace, at its option, any non-conforming or otherwise defective product, upon receipt of notice from Buyer during the Manufacturer's warranty period at no additional charge. SELLER HEREBY DISCLAIMS ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OR FITNESS FOR A PARTICULAR PURPOSE.

3. LIMITATION OF LIABILITY:

UNDER NO CIRCUMSTANCES SHALL EITHER PARTY BE LIABLE TO THE OTHER FOR INCIDENTAL, PUNITIVE, SPECIAL OR CONSEQUENTIAL DAMAGES OF ANY KIND. BUYER HEREBY ACKNOWLEDGES AND AGREES THAT UNDER NO CIRCUMSTANCES, AND IN NO EVENT, SHALL SELLER'S LIABILITY, IF ANY, EXCEED THE NET SALES PRICE OF THE DEFECTIVE PRODUCT(S) PURCHASED DURING THE PREVIOUS CONTRACT YEAR.

4. LABOR ALLOWANCE:

Seller makes NO ADDITIONAL ALLOWANCE FOR THE LABOR OR EXPENSE OF REPAIRING OR REPLACING DEFECTIVE PRODUCTS OR WORKMANSHIP OR DAMAGE RESULTING FROM THE SAME.

5. RECOMMENDATIONS BY SELLER:

Seller may assist Buyer in selection decisions by providing information regarding products that it manufactures and those manufactured by others. However, Buyer acknowledges that Buyer ultimately chooses the product's suitability for its particular use, as normally signified by the signature of Buyer's technical representative. Any recommendations made by Seller concerning the use, design, application or operation of the products shall not be construed as representations or warranties, expressed or implied. Failure by Seller to make recommendations or give advice to Buyer shall not impose any liability upon Seller.

6. EXCUSED PERFORMANCE:

Seller will make a good faith effort to complete delivery of the products as indicated by Seller in writing, but Seller assumes no responsibility or liability and will accept no back charge for loss or damage due to delay or inability to deliver, caused by acts of God, war, labor difficulties, accidents, inability to obtain materials, delays of carriers, contractors or suppliers or any other causes of any kind whatever beyond the control of Seller. Under no circumstances shall Seller be liable for any special, consequential, incidental, or indirect damages, losses, or expense (whether or not based on negligence) arising directly or indirectly from delays or failure to give notice of delay.



TERMS & CONDITIONS OF SALE

CONTROLLING PROVISIONS:

No terms and conditions other than the terms and conditions contained herein shall be binding upon Seller unless accepted by it in a writing signed by an officer of Seller. All terms and conditions contained in any prior oral or written communication, including, without limitation, Buyer's purchase order, which are different from or in addition to the terms and conditions herein are hereby rejected and shall not be binding on Seller, whether or not they would materially alter this document, and Seller hereby objects thereto. All prior proposals, negotiations and representations, if any, are merged herein. Buyer will be deemed to have assented to all terms and conditions contained herein if any part of the goods and/or services described herein are shipped or an invoice is presented in connection with the said goods and/or services.

TERMS:

Buyer agrees to pay for the products Net 10 unless other terms are approved by Seller in writing. In the event Buyer fails to make any payment to Seller when due, Buyer's entire account(s) with Seller shall become immediately due and payable without notice or demand. All past due amounts are subject to service charges at the rate agreed upon by the parties, otherwise at the maximum rate permitted by law. In states where a rate is required, it shall be 1.5% per month. Buyer does hereby grant Seller a purchase money security interest in the products until such time as Seller is fully paid. Buyer will assist Seller in taking the necessary action to perfect and protect Seller's security interest. No products furnished by the Seller shall become a fixture by reason of being attached to real estate.

REMEDIES OF SELLER:

Upon default by Buyer, Buyer agrees to reimburse Seller all attorney fees and court costs incurred by Seller in connection therewith. In states where a rate is required, it shall be 25%. Buyer agrees that any of the following shall constitute an event of default which shall enable Seller, at its option, to cancel any unexecuted portion of this order or to exercise any right or remedy which it may have by law: (a) the failure of Buyer to perform any term or condition contained herein; (b) any failure of Buyer to give required notice; (c) the insolvency of Buyer or its failure to pay debts as they mature, an assignment by Buyer for benefit of its creditors, the appointment of receiver for Buyer or for the materials covered by this order or the filing of any petition to adjudicate Buyer bankrupt; (d) the death, incompetence, dissolution or termination of existence of Buyer; (e) a failure by Buyer to provide adequate assurance of performance within ten (10) days after a justified demand by Seller or (f) if Seller, in good faith, believes that Buyer's prospect of performance under this Agreement is impaired. All rights and remedies of Seller herein are in addition to, and shall not exclude, any rights or remedies that Seller may have by law. In the event it becomes necessary to incur any expense for collection of any overdue account, reasonable collection charges, including reasonable attorneys' fees, will be added to the balance due and Buyer shall pay all such charges.

GOVERNING LAW:

This transaction shall be governed in all respects by the laws of the Commonwealth of Virginia (excluding choice of law provisions). All actions, regardless of form, arising out of or related to this transaction or the products sold hereunder must be brought against Seller within the applicable statutory period, but in no event more than ONE (1) YEAR after the date of invoice. Buyer waives all objections of forum non conveniens in any action brought by Seller for collection of unpaid amounts.

DELIVERY:

Seller will make a good faith effort to complete delivery of the products as indicated by Seller in writing, but Seller assumes no responsibility or liability and will accept no backcharge for loss or damage due to delay or inability to deliver, whether or not such loss or damage was made known to Seller, including, but not limited to, liability for Seller's non-performance caused by acts of God, war, labor difficulties, accidents, inability to obtain materials, delays of carriers, contractors or suppliers or any other causes of any kind whatever beyond the con-

trol of Seller. Under no circumstances shall Seller be liable for any special, consequential, incidental, indirect, or liquidated damages, losses, or expense (whether or not based on negligence) arising directly or indirectly from delays or failure to give notice of delay.

WARRANTY:

THE BUYER'S SOLE AND EXCLUSIVE WARRANTY, IF ANY, IS THAT PROVIDED BY THE PRODUCT'S MANUFACTURER. SELLER MAKES NO EXPRESSED OR IMPLIED WARRANTIES. SELLER HEREBY DISCLAIMS ALL EXPRESSED OR IMPLIED WARRANTIES, WHETHER IMPLIED BY OPERATION OF LAW OR OTHERWISE, INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS OR FITNESS FOR A PARTICULAR PURPOSE. UNDER NO CIRCUMSTANCES, AND IN NO EVENT, WILL SELLER BE LIABLE FOR PERSONAL INJURY OR PROPERTY DAMAGE OR ANY OTHER LOSS, DAMAGE, COST OF REPAIRS OR INCIDENTAL, PUNITIVE, SPECIAL, CONSEQUENTIAL, OR LIQUIDATED DAMAGES OF ANY KIND, WHETHER BASED UPON WARRANTY, CONTRACT, STRICT LIABILITY, NEGLIGENCE OR ANY OTHER CAUSE OF ACTION ARISING IN CONNECTION WITH THE DESIGN, MANUFACTURE, SALE, TRANSPORTATION, INSTALLATION, USE OR REPAIR OF THE PRODUCTS SOLD BY SELLER. BUYER HEREBY ACKNOWLEDGES AND AGREES THAT UNDER NO CIRCUMSTANCES, AND IN NO EVENT, SHALL SELLER'S LIABILITY, IF ANY, EXCEED THE NET SALES PRICE OF THE DEFECTIVE PRODUCT(S); NO ADDITIONAL ALLOWANCE SHALL BE MADE FOR THE LABOR OR EXPENSE OF REPAIRING OR REPLACING DEFECTIVE PRODUCTS OR WORKMANSHIP OR DAMAGE RESULTING FROM THE SAME. EXCEPT AS EXPRESSLY SET FORTH IN THIS PARAGRAPH, ALL PRODUCTS AND/OR SERVICES PROVIDED BY SELLER AND ITS EMPLOYEES AND AGENTS ARE PROVIDED "AS IS," "WHERE IS," AND "WITH ALL FAULTS."

RECOMMENDATIONS BY SELLER:

Buyer acknowledges that Seller does not make and specifically negates, renounces and disclaims any representations, warranties and/or guaranties of any kind or character, expressed or implied, with respect to (i) the products sold, their use, design, application or operation, their merchantability, their physical condition or their fitness for a particular purpose, (ii) the maintenance or other expenses to be incurred in connection with the products, (iii) the engineering, design, fabrication work or any other work or service (whether gratuitous or for payment) supplied by Seller and/or its agents, suppliers and employees or (iv) the accuracy or reliability of any information, designs or documents furnished to Buyer. Seller neither assumes, nor authorizes any person to assume for it, any other obligation in connection with the sale of its products and/or rendering of its services. Any recommendations made by Seller concerning the use, design, application or operation of the products shall not be construed as representations or warranties, expressed or implied. Failure by Seller to make recommendations or give advice to Buyer shall not impose any liability upon Seller.

INDEMNIFICATION:

The Buyer shall at its own expense apply for and obtain any permits and inspections required for the installation and/or use of the products. Seller makes no promise or representation that the products or services will conform to any federal, state or local laws ordinances, regulations, codes or standards, except as particularly specified and agreed upon in writing by an authorized representative of Seller. The Seller's products are not for use in or with any nuclear facility unless specifically so stated by Seller in writing.

Seller shall not be responsible for any losses or damages sustained by the Buyer or any other person as a result of improper installation or misapplication of the products. Buyer shall defend, indemnify and hold harmless Seller and its agents and employees against any loss, damage, claim, suit, liability, judgment or expense (including, without limitation, attorney's fees) arising out of or in connection with any injury, disease or death of persons (including, without limitation, Buyer's employees and agents) or damage to or loss of any property or the environment, or violation of any applicable laws or regulations resulting from or in connection with the sale, transportation, installation, use, or repair of the products by Buyer or of the information, designs, services or other work supplied to Buyer, whether caused by the concurrent and/or contributory negligence of Buyer, Seller, or any of their agents, employees or suppliers. The obligations, indemnities and covenants contained in this paragraph shall survive the consummation or termination of this transaction.

INSPECTION AND ACCEPTANCE:

Claims for damage, shortage or errors in shipping must be reported within one (1) day following delivery to Buyer. Buyer shall have seven (7) days from the date Buyer receives any products to inspect such products and services for defects and nonconformance which are not due to damage, shortage or errors in shipping and notify Seller, in writing, of any defects, nonconformance or rejection of such products. After such seven (7) day period, Buyer shall be deemed to have irrevocably accepted the products, if not previously accepted. After such acceptance, Buyer shall have no right to reject the products for any reason or to revoke acceptance. Buyer hereby agrees that such seven (7) day period is a reasonable amount of time for such inspection and revocation. Buyer shall have no right to order any change or modification to any product or service previously ordered by Buyer or its representatives or cancel any order without Seller's written consent and payment to Seller of all charges, expenses, commissions and reasonable profits owed to or incurred by Seller. Specially fabricated or ordered items may not be canceled or returned, and no refund will be made. The sole and exclusive remedy for merchandise alleged to be defective in workmanship or material will be the replacement of the merchandise subject to the manufacturer's inspection and warranty.

RETURNS:

Buyer may return any product which Seller stocks with no restocking charge if: (i) it is in new condition, suitable for resale in its undamaged original packaging and with all its original parts and (ii) it has not been used, installed, modified, rebuilt, reconditioned, repaired, altered or damaged. Buyer's surplus job returns, and those not meeting (i) and (ii), above, will be evaluated on an individual basis after Buyer has contacted Seller's authorized representative for prior written permission. Special orders or non-stock items may be returned if the manufacturer will accept the return. Except for items Seller stocks which meet (i) and (ii), above, credit memoranda issued for authorized returns shall be subject to the following deductions: (a) cost of putting items in salable condition; (b) transportation charges, if not prepaid; and (c) handling and restocking charges.

SHIPMENTS:

All products are shipped F.O.B., point of shipment. Risk of loss shall transfer to the Buyer upon tender of goods to Buyer, Buyer's representative, or common carrier. The cost of any special packing or special handling caused by Buyer's requirements or requests shall be added to the amount of the order. If Buyer causes or requests a shipment delay, or if Seller ships or delivers the products erroneously as a result of inaccurate, incomplete or misleading information supplied by Buyer or its agents or employees, storage and all other additional costs and risks shall be borne solely by Buyer. Claims for products damaged or lost in transit should be made by Buyer to the carrier, as Seller's responsibility ceases upon tender of goods to Buyer, Buyer's representative or common carrier.

TAXES:

The amount of any sales, excise or other taxes, if any, applicable to the products shall be added to the purchase price and shall be paid by Buyer unless Buyer provides Seller with an exemption certificate acceptable to the taxing authorities. Any taxes which Seller may be required to pay or collect under any existing or future law, upon or with respect to the sale, purchase, delivery, storage, processing, use or consumption of any of the products, including taxes upon or measured by the receipts from the sale thereof, shall be for the account of the Buyer, who shall promptly pay the amount thereof to Seller upon demand.

SEVERABILITY:

These terms and conditions of sale shall not be construed against the party preparing them, but shall be construed as if all parties jointly prepared these terms and conditions of sale and any uncertainty or ambiguity shall not be interpreted against any one party. If any provision hereof is held to be illegal, invalid or unenforceable under any present or future laws, such provision shall be fully severable and the terms and conditions herein shall be construed and enforced as if such illegal, invalid or unenforceable provision had never been made a part hereof. The remaining provisions herein shall remain in full force and effect and shall not be affected by such illegal, invalid or unenforceable provisions or by their severance herefrom.

SET-OFF:

Buyer shall not be entitled to set-off any amounts due Buyer against any amount due Seller in connection with this transaction.

CERTIFICATIONS:

Seller certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments and that it does not permit and will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. Seller certifies further that its services are performed in compliance with the Fair Labor Standards Act of 1938, as amended.

NON-WAIVER:

Seller's failure to insist upon the strict performance of any term or condition herein shall not be deemed a waiver of any of Seller's rights or remedies hereunder, nor of its right to insist upon the strict performance of the same or any other term herein in the future. No waiver of any term or condition hereunder shall be valid unless in writing and signed by Seller's Branch Manager.

ENTIRE AGREEMENT:

This document constitutes the entire, complete, and exclusive agreement between the parties with respect to the subject matter hereof and contains all the agreements and conditions of sale; no course of dealing or usage of the trade shall be applicable unless expressly incorporated herein. The terms and conditions contained herein may not be added to, modified, superseded or otherwise altered except by a written modification signed by an officer of Seller. All transactions shall be governed solely by the terms and conditions contained herein.

Revised 3/16/2008

Ferguson is open - even when the jobsite isn't.

For over 50 years, building professionals have learned to count on Ferguson for superior service, selection and expertise. Now, we're taking everything you've come to expect from Ferguson and making it available 24/7 at fergusononline.com.

- 24/7 access to the industry's largest online product selection
- Check your net price and actual real-time product availability
- Place and track all orders
- View your account information and product purchase history anytime
- Tools to manage and market your business

Sign up now at fergusononline.com or call 1-888-222-1785.

All the benefits of Ferguson. All the speed of the internet

FERGUSON
Nobody expects more from us than we do



© 2012 Ferguson Enterprises, Inc. All rights reserved.

Wolseley Canada Customers

Shop Online at www.wolseleyexpress.com



and get

24/7

Access to Your
Wolseley
Account

Wolseley is Canada's leading national distributor of plumbing, hydronic, HVAC/R and PVF products.

Wolseley Express is our eCommerce portal that makes it easier for you to do business by providing access to your account information when you need it.

Check out these site features

- View net pricing
- Build draft orders
- Check inventory
- Create custom lists
- Check account status
- Monitor order status
- Take **FREE** online training
- Download current vendor catalogues
- Discover new products and trends

PLUS - Now you can view and print invoices and statements online!

For more information visit
www.wolseleyexpress.com today!

WOLSELEY
express.com



FNWTM

Phone: (503) 287-8383

Fax: (503) 281-9677

www.fnw.com