FNW™

QUICK REFERENCE

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, Wafer, Flanged

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

Actuation & Accessories
Actuators, Solenoids, Switches, Positioners

Piping Products
Gaskets, Bolt Packs, Bolt Insulators, Water Hammer Arrestors, Flexible Connectors

Hangers, Clamps and Strut Accessories
Pipe Hangers, Clamps, Pipe Support Systems, Attachments, Shields, 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, Lead Free Act

Warranty and Terms & Conditions of Sale

FNW™

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: (757) 969-4974
E-mail: fnwsupport@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

© 2014 - 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.

FNW™

TABLE OF CONTENTS

KNIFE GATE VALVES 1-35
- Metal Seated 1
- Resilient Seated 12
- Special Service 23
- Options & Accessories 33

BALL VALVES 36-121
- Small Body
  - Brass 37
  - Carbon Steel 83
  - Stainless Steel 95
- Flanged
  - Carbon Steel 91
  - Stainless Steel 113

BUTTERFLY VALVES 122-141
- Resilient Seated 123
- PTFE Seated 134
- High Performance 138

THERMOPLASTIC VALVES 142-153
- Ball 143
- Butterfly 149
- Check 151

GATE, GLOBE & CHECK VALVES 154-195
- Small Body
  - Bronze 155
  - Brass 163
  - Stainless Steel 165
- Wafer
  - Cast Iron 171
- Flanged
  - IBBM (Iron Body Bronze Mounted) 175
  - Carbon Steel 184
  - Stainless Steel 190

STRAINERS 196-209
- Bronze 197
- Cast Iron 203
- Stainless Steel 207

ACTUATION & ACCESSORIES 210-245
- Gear Operators 211
- Cylinders 215
- Rack & Pinion 221
- Electric Actuators 229
- Accessories 233

PIPING PRODUCTS 246-283
- Stud Bolt Sets 247
- Bolt Packs 251
- Back-Up Flanges 256
- Bolt Insulators 258
- Nut, Bolt, Gasket Kits 259
- Flanged Gaskets 265
- Water Hammer Arrestors 270
- Flexible Connectors 274
- Riser Gauge Kits 282

HANGERS, CLAMPS & STRUT ACCESSORIES 284-317
- Hangers and Clamps 288
- Strut Accessories 301
- Pipe Supports 303
- Insulation Protection Shields 316

THERMOMETERS, GAUGES & ACCESSORIES 318-337
- Pressure Gauges 319
- Thermometers 323
- Thermowells 326
- Syphons (Pigtail) 329
- Brass Needle Valves 330
- Pressure Snubbers 333
- Pressure/Temperature Test Plugs 335

ENGINEERING DATA 338-363
- Knife Gate Bolt Recommendations 339
- Butterfly Bolt Recommendations 340
- High Performance Butterfly Bolt Recommendations 341
- About Cv (Flow Coefficients) 342
- Cast Steel Gate, Globe, & Check Cv 343
- Flanged Cast Steel Stem Data 344
- Resilient Seat/Seal Materials 346
- Thermoplastic Materials 347
- Flange Dimensions 348
- Metric Equivalents 349
- Material Codes 350
- Material Markings 351
- Chemical Compatibility Chart 352
- Lead Free Act 360

WARRANTY, TERMS & CONDITIONS of SALE 364-368
- Warranty Statement 365
- Terms & Conditions of Sale 366

FNW™

TABLE OF CONTENTS BY FIGURE NUMBER

Figure	Description	Page
10P	Water hammer arrestor, non-potable MNPT	270
11P	Water hammer arrestor, non-potable copper sweat	270
14B	Y-strainer, threaded stainless	207
15B	Gate, threaded stainless	165
16B	Swing check, threaded stainless	169
17B	Globe, threaded stainless	167
100A	1-pc 1000 cwp ball, threaded stainless	95
1211	NRS gate, threaded bronze	155
1212	NRS gate, sweat bronze	155
1221	RS gate, threaded bronze	157
1222	RS gate, sweat bronze	157
1231	Globe, threaded bronze	159
1232	Globe, sweat bronze	159
1241	Swing check, threaded bronze	161
1242	Swing check, sweat bronze	161
200A	2-pc ball, 1000 cwp threaded stainless	97
220A	2-pc ball, 2000 cwp threaded stainless	99
220AM	2-pc ball, 2000 cwp ISO mount stainless	101
221A	2-pc ball, 2000 cwp threaded carbon	83
233A	3-way ball, 1000 cwp thrd ISO mnt stainless	103
2000BTIV	Knife gate, transmitter isolation, 150 psi stainless	30
2020	Knife gate, 150 psi stainless	19
30F	Flex connector, stainless braid flanged	274
30T	Flex connector, stainless braid MNPT	276
35S	Flex connector, braided copper swt	278
310A	3-pc ball, 1000 cwp thrd/sw stainless	105
310AM	3-pc ball, 1000 cwp thrd/sw ISO mnt	107
311A	3-pc ball, 1000 cwp thrd/sw carbon	85
311AM	3-pc ball, 1000 cwp threaded ISO mnt	87
320A	3-pc ball, 2000 cwp thrd/sw stainless	109
321A	3-pc ball, 2000 cwp thrd/sw carbon	89
330A	3-pc ball, 400 cwp clamp end ISO mnt	111
340N	PVC true-union ball, thrd/sw	143
340NF	PVC true-union ball, 150# flanged	143
340NSE	PVC stem extension kit	147
345	PVC true-union check, thrd/sw	151
350N	CPVC true-union ball, thrd/sw	143
355	CPVC true-union check, thrd/sw	151
40	Flex connector, single sphere EPDM	280
410A	2-pc ball, 600 wog threaded brass	37
411A	2-pc ball, 600 wog sweat brass	39
415	2-pc ball, 600 wog threaded brass, non-adj packing	41
420	2-pc ball, 600 wog threaded brass, adj packing	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	163
435	2-pc gas ball, 125 psi press end brass	51
451	OS&Y Gate, 150# flanged stainless	190
452	OS&Y Gate, 300# flanged stainless	191
455	3-way ball, 400 wog thrd ISO T-port brass	53
461	Globe, 150# flanged stainless	192
462	Globe, 300# flanged stainless	193
465	3-way ball, 400 wog thrd ISO L-port brass	53
470	Pump isolation ball, 400 wog thrd brass	55
471	Swing check, 150# flanged stainless	194
472	Swing check, 300# flanged stainless	195
475	Pump isolation ball, 400 wog swt brass	55
480A	Compression end ball, 400 wog brass	57

FNW™

TABLE OF CONTENTS BY FIGURE NUMBER

Figure	Description	Page
485	Push fit ball, 200 psi brass	59
490	Pump isolation ball, 600 wog thrd brass	61
495	Pump isolation ball, 600 wog swt brass	61
500	1-pc ball, 150# flanged stainless	113
501	1-pc ball, 150# flanged carbon	91
509	Y-strainer, 250 wog threaded bronze	197
510	Y-strainer, 400 wog sweat bronze	199
551	OS&Y Gate, 150# flanged carbon	184
552	OS&Y Gate, 300# flanged carbon	185
558A	Y-strainer, 125# flanged cast iron	203
559	Y-strainer, 400 wog threaded cast iron	205
561	Globe, 150# flanged carbon	186
562	Globe, 300# flanged carbon	187
571	Swing check, 150# flanged carbon	188
572	Swing check, 300# flanged carbon	189
60R	Knife gate, 100 psi resilient seated	23
61B	Knife gate, 150 psi stainless lined	1
62B	Knife gate, 150 psi resilient seated stainless lined	12
600	2-pc ball, 150# flanged stainless	115
601	2-pc ball, 150# flanged carbon	93
633	3-way ball, 150# flanged L-port stainless	117
634	3-way ball, 150# flanged T-port stainless	117
651A	IBBM OS&Y gate, 125# flanged	175
660	2-pc ball, 150# flanged stainless	119
661	IBBM globe, 125# flanged	177
671A	IBBM swing check, 125# flanged	179
681	Wafer silent check, 200 psi cast iron	171
682	Wafer double-door check, 200 psi cast iron	173
6500	Knife gate, 150 psi metal seated stainless	4
6701	Knife gate, 150 psi stainless wetted	8
6800	Knife gate, 150 psi resilient seated stainless	15
72	Ductile iron back-up flanges, stub end ring	256
73	Ductile iron back-up flanges, angle face ring	256
711	Butterfly, resilient seat wafer CI/DI x AB	123
712	Butterfly, resilient seat lug DI x AB	123
721	Butterfly, EDPM/FPM seat wafer	149
731	Butterfly, resilient seat wafer CI/DI x SS	127
732	Butterfly, resilient seat lug DI x SS	127
752	Butterfly, resilient seat large OD U-body	131
761	Butterfly, PTFE seat wafer CI x SS	134
762	Butterfly, PTFE seat lug CI x SS	134
7001	Hanger, split ring malleable iron	288
7005	Hanger, standard duty adjustable clevis	289
7006	Hanger, light duty adjustable clevis	291
7008	Hanger, adjustable clevis for copper tube	292
7010	Hanger, adjustable swivel ring	293
7012	Hanger, adjustable swivel ring felt lined	293
7015	Hanger, adjustable swivel ring for copper	294
7020	Clamp, medium split horizontal	297
7022	Clamp, riser	298
7023	Clamp, riser for copper tube	298
7025	Hanger, adjustable “J”	295
7201	C-clamp, steel beam steel	300
7202	C-clamp, beam malleable iron	300
7203	Clamp, jr beam malleable iron	300
7204	Clamp, wide mouth beam malleable iron	301
7250	Retaining strap for beam clamp	302
7310	Clamp, conduit pipe for Rigid/EMT	315
7311	Clamp, conduit pipe for copper tube	315
7501	Beam connector, malleable iron	315
7502	Beam ceiling flange, malleable iron	315

FNW™

TABLE OF CONTENTS BY FIGURE NUMBER

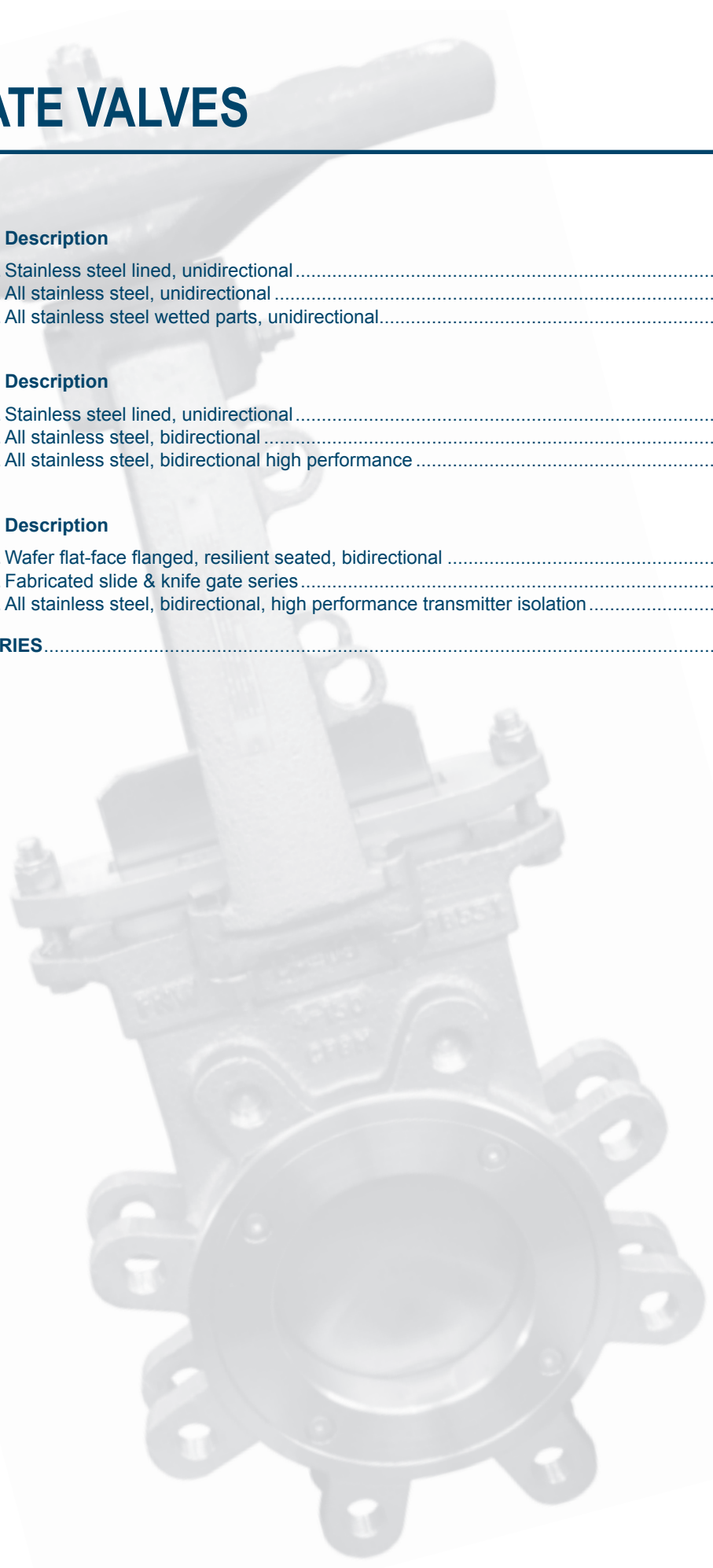
Figure	Description	Page
7610	U-bolt, w/4 hex nuts	299
7701	Pipe support, 50# with strut	303
7715	Pipe support, 150# with strut	303
7730	Pipe support, 300# with strut	303
7750	Shields, insulation protection, MSS	316
7751	Shields (dom), insulation protection, MSS	316
7753	Shields, insulation protection light duty	316
7801	Clamp, window strut to beam	301
7802	Spreader caps, strut to beam	301
7803	Clamp, square u-bolt to beam, short	302
7804	Clamp, square u-bolt to beam, long	302
7805	Clamp, notched type strut to beam	302
7806	Clamp, universal beam malleable iron	301
7811	Bracket, 2-hole 1-5/8 channel	303
7815	Strut clamp, pipe to strut cushioned	310
7816	Strut clamp, tube to strut cushioned	310
7818	Channel Nut, long spring	304
7819	Channel Nut, no spring, all channels	304
7820	Channel Nut, no spring	304
7821	Channel Nut, regular spring	304
7822	Channel Nut, short spring	304
7824	Channel Nut, top spring	304
7830	End cap, channel PVC	305
7831	End cap, channel	305
7835	Strut fitting, 1-hole square washer	307
7836	Strut fitting, 1-hole notched square washer	307
7837	Strut fitting, 2, 3, or 4-hole flat splice plate	308
7838	Strut fitting, 3-hole flat corner plate	308
7839	Strut fitting, 4-hole flat tee plate	308
7840	Strut fitting, 2-hole no-twist corner angle	305
7841	Strut fitting, 2, 3, or 4-hole corner angle	305
7842	Strut fitting, 2 or 3-hole cross corner angle	306
7843	Strut fitting, 3 or 4-hole cross corner 3-way	306
7844	Strut fitting, 7-hole gusset angle	306
7845	Strut fitting, 2-hole open 45° angle	306
7846	Strut fitting, 2-hole closed 45° angle	306
7847	Strut fitting, 4-hole open 45° angle	307
7848	Strut fitting, 2-hole angle brace	307
7850	Strut base, 2-hole single channel	309
7851	Strut base, 2-hole single channel flush	309
7852	Strut base, 4-hole single channel standard	309
7853	Strut base, 4-hole single channel tall	309
7855	Strut base, 4-hole single channel short	309
7862	Pipe wrap, EPDM	314
7865	Roller trolley 4-bearing assembly	302
7868	Clamp, right angle pipe to beam	301
7870	Strut clamp, copper tube to strut	311
7871	Strut clamp, EMT to strut	311
7872	Strut clamp, OD pipe to strut	312
7873	Strut clamp, rigid to strut	313
7874	Strut clamp, universal	313
7891	Strut fitting, 5-hole cross u-fitting	308
7895	Strut fitting, 4-hole splice u-fitting	308
7901	Roller hanger, steel yoke	296
9S	Thermometer, adjustable angle	323
9101	Riser gauge kit, fire protection	282
B7	B7 stud bolt and 2H hex nut set	247
B7K	B7 stud bolt flange kit	249
BGTM	Gear operator, multi-turn bevel	213
BNV	Needle, 600 psi brass	332
BTW	Thermowell, MNPT brass	326

FNW™

TABLE OF CONTENTS BY FIGURE NUMBER

Figure	Description	Page
BTWELL	Thermowell, NPT brass	328
CBI	Bolt insulators	258
ELKITC	Elevation kit for pipe support systems	303
EP5	4-20 mA electro-pneumatic positioner	233
F-Series	Knife gate, fabricated series	26
G	4-1/2" mechanical contractor's gauge	319
G731	Gear operator, quarter-turn worm	211
HP	Butterfly, 150# high performance	138
KGV	Knife gate, options and accessories	33
LBB	Lugged butterfly valve bolt pack	251
LFG	2-1/2" liquid-filled gauge	321
M4	Position switch, quarter-turn explosion-proof	239
MLS4	Limit switch, mechanical	242
NA	Gasket, non-asbestos	265
NBG (NA & Z)	Nut, bolt, gasket kit, non-asbestos & zinc plated carbon	259
NBG (NE & SS)	Nut, bolt, gasket kit, neoprene & stainless	261
NBG (R & SS)	Nut, bolt, gasket kit, red rubber & stainless	262
NBG (R & Z)	Nut, bolt, gasket kit, red rubber & zinc plated carbon	263
NBSG5	Flange nut & bolt set, carbon steel grade 5	252
NBSS	Flange nut & bolt set, stainless steel	253
NBSZ	Flange nut & bolt set, carbon steel grade 2	254
NE	Gasket, 150# neoprene	266
NV	Needle, 400 psi brass	330
P5	3-15 psi pneumatic positioner	233
PLS4	Limit switch, proximity	241
PS	Pressure snubber, brass	333
PTS	Pig tail syphon, brass and steel	329
PTT	Pressure/temperature test plug	335
QV	Position switch, quarter-turn weather-proof	237
R	Gasket, red rubber	267
RP	Actuator, pneumatic rack & pinion	221
SDTH	Thermometer, adjustable angle digital	324
SWG	Gasket, spiral wound	268
V100E	4-20 mA electro-pneumatic positioner	235
V100P	3-15 psi pneumatic positioner	235
WBB	Nut and bolt pack, wafer butterfly valve	255
X10P	Water hammer arrestor, low lead MNPT	272
X11P	Water hammer arrestor, low lead copper sweat	272
X410C	2-pc ball, low lead 600 wog threaded brass	63
X411C	2-pc ball, low lead 600 wog sweat brass	65
X415	2-pc ball, low lead 600 wog full port threaded brass	67
X416	2-pc ball, low lead 600 wog full port sweat brass	69
X420A	2-pc ball, low lead 600 wog threaded brass	71
X421	2-pc ball, low lead 600 wog sweat brass	73
X430	2-pc ball, low lead 200 psi press end brass, adj packing	75
X432	2-pc ball, low lead 200 psi press end brass, non-adj packing	77
X480A	2-pc ball, low lead 400 wog compression end brass	79
X485	Push fit ball, 200 psi lead free brass	81
X509	Y-strainer, low lead 400 wog bronze, threaded	201
X510	Y-strainer, low lead 400 wog bronze, sweat	201
XBTW	Thermowell, low lead brass	327
XG	4-1/2" contractor's gauge, low lead	320
XLFG	2-1/2" liquid-filled gauge, low lead	322
XNV	Needle valve, low lead brass	331
XPS	Pressure snubber, low lead brass	334
XPTT	Pressure/temperature test plug, low lead	336
	Actuator, electric quarter-turn	229
	Actuator, linear pneumatic cylinder	215
	Actuator, linear hydraulic cylinder	218
	Solenoid valves	243

KNIFE GATE VALVES



METAL SEATED

Figure	Description	Page
61B	Stainless steel lined, unidirectional	1
6500	All stainless steel, unidirectional	4
6701	All stainless steel wetted parts, unidirectional	8

RESILIENT SEATED

Figure	Description	Page
62B	Stainless steel lined, unidirectional	12
6800	All stainless steel, bidirectional	15
2020	All stainless steel, bidirectional high performance	19

SPECIAL SERVICE

Figure	Description	Page
60R	Wafer flat-face flanged, resilient seated, bidirectional	23
F-Series	Fabricated slide & knife gate series	26
2000BTIV	All stainless steel, bidirectional, high performance transmitter isolation	30

OPTIONS & ACCESSORIES 33

FNW™

A

STAINLESS STEEL LINED METAL SEATED KNIFE GATE VALVE

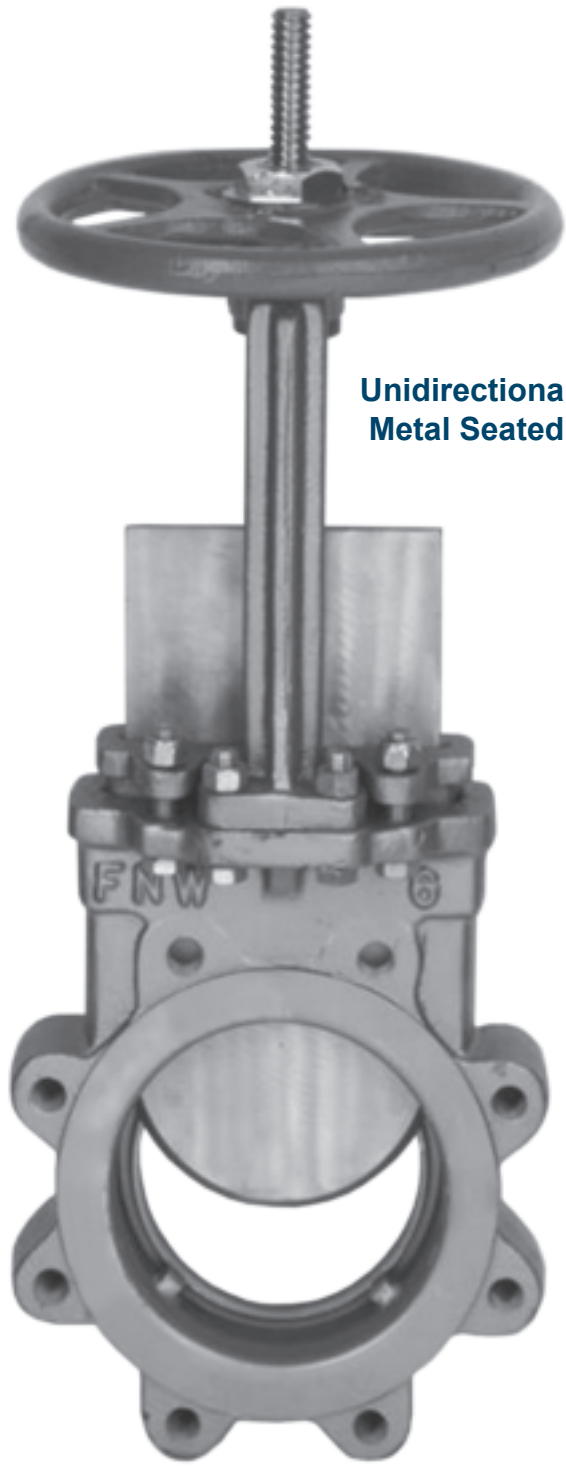
The figure 61B is a lined valve with the economy of a ductile iron body and the corrosion resistance of all stainless steel wetted parts. The 61B is designed for pulp and paper, chemicals and mining and petroleum industries to handle dense mixtures of stock and slurries. The shearing action of the knife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

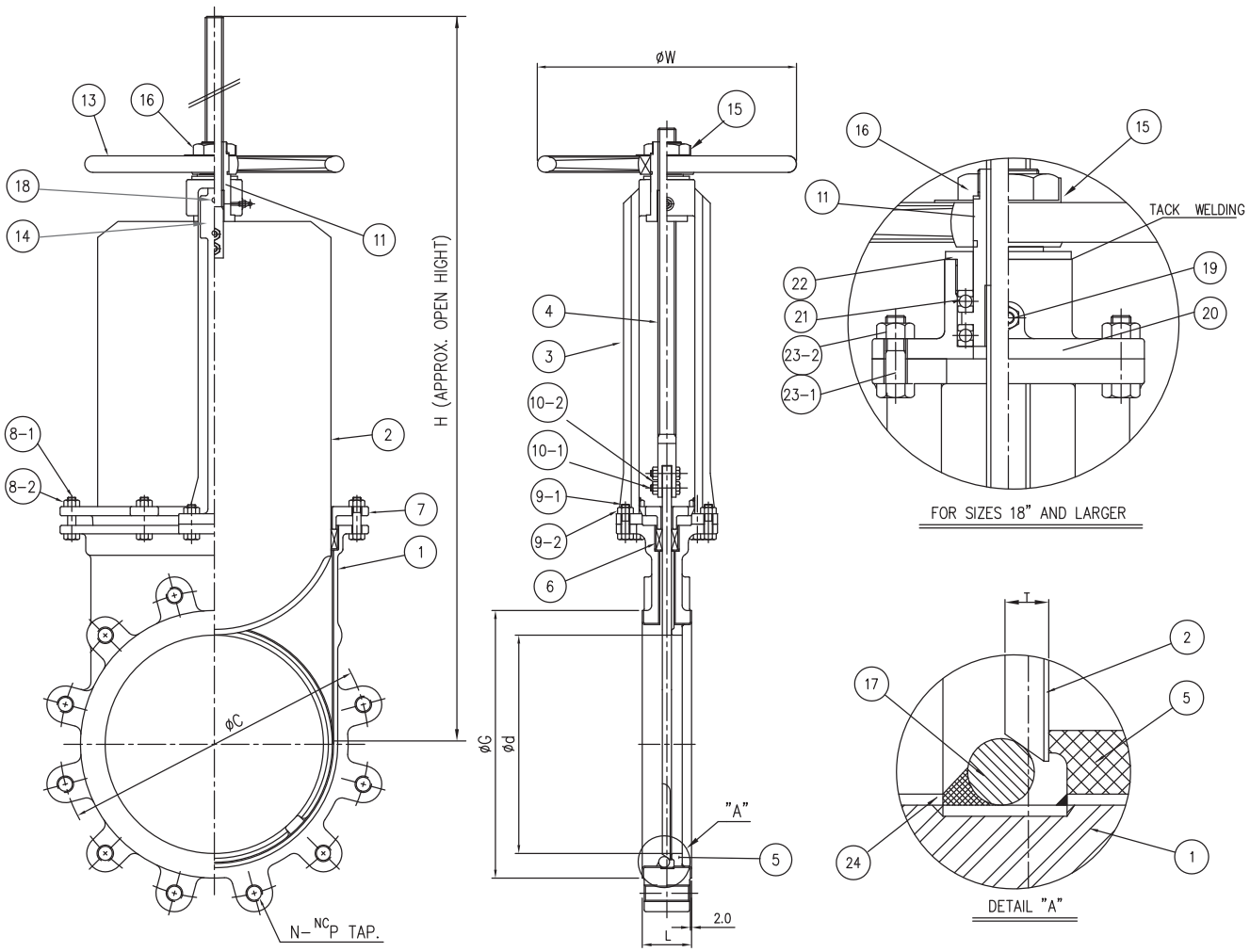
Ref. No.	Description	Material	Qty	Remarks
1	Body	Ductile Iron	1	
2	Knife	A240 316	1	
3	Yoke	A216 WCB	1	
4	Stem	A276 410	1	
5	Body Seat Ring	A240 316	1	Welding
6	Packing	PTFE Impregnated Fiber	1 Set	Non-Asbestos
7	Packing Gland	A216 WCB	1	
8-1	Gland Bolt	STEEL	1 Set	
8-2	Gland Nut	STEEL	1 Set	Nylon Lock 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)	425ºF
Pure TFE	425ºF
TFE Fiber (Ultra)	500ºF
Graphite Filament Yarn	1000ºF

Flow Coefficients, Port Areas & Weights

Size	Cv	Port Area (in²)	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

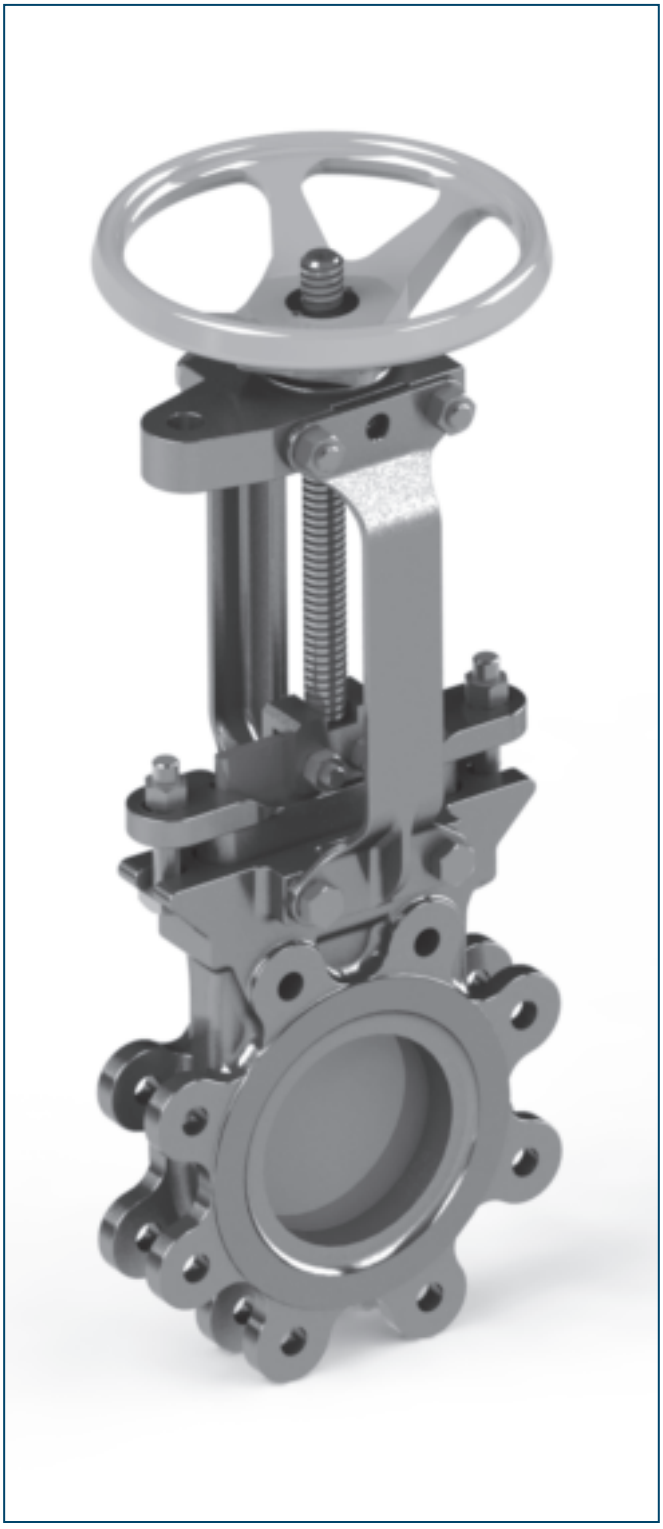
SIZE CODE

3 = M	10 = 10	18 = 18
4 = P	12 = 12	20 = 20
6 = U	14 = 14	24 = 24
8 = X	16 = 16	

A

STAINLESS STEEL UNIDIRECTIONAL METAL SEATED KNIFE GATE VALVE

The figure 6500 is an all cast stainless steel body and yoke with investment cast packing follower. It is designed 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
- Maximum Pressure: 150 PSI CWP
- Maximum Temperature: 248°F (120°C)
- Cast Stainless Steel Body, Yoke and Packing Gland
- Stainless Steel Hardware
- Gate Edge Radius (Improves Packing Seal)
- Elastomer Quad Seal is Standard in Packing Arrangement
- Resilient Anti-Extrusion Ring (Supports Packing & Acts as Gate Wiper)
- Machined Gland Pocket Area
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Smooth Flow, Non-Clogging Step Seat Design
- Cast Iron Hand Wheel
- Available in sizes 2" to 24"
- Standard design accommodates locking device

Standards:

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

Figure Number Matrix

FNW 6500 Seat Size

SEAT CODE	SIZE CODE		
Stainless Steel = S (Integral)	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	

Cv & Weight

Size	Cv	Wt. (lbs)
2	240	20
2-1/2	565	24
3	565	29
4	1,040	31
6	2,440	51
8	4,460	75
10	6,250	128

Size	Cv	Wt. (lbs)
12	9,400	163
14	12,500	243
16	16,500	309
18	21,400	386
20	27,000	463
24	39,700	540

Weights are for general reference only.

FEATURES

Hand wheel is heavy cast iron, with a rounded grip and epoxy coated hand wheel.

Double set screws prevent threaded-on hand wheel from backing off or coming loose.

Aluminum-Bronze thrust components for anti-galling operation.

Grease fitting for maintaining smooth drive sleeve operation.

Cast stainless steel yoke arms provide optimum flexural rigidity.

Stainless steel hardware is standard.

Radius gate edge improves packing seal and life. Along with the rounded packing chamber, the system reduces the amount of force needed to arrest packing leaks.

Stem-to-gate clevis is deliberately loose to allow play in gate to minimize binding.

Horizontal clevis bolts (except 2") provide flexibility of the gate during travel.

Multiple layers of PTFE impregnated square braid packing provides excellent gland sealing at full valve pressure differential.

Elastomer quad seal improves packing performance by promoting live loading of the packing.

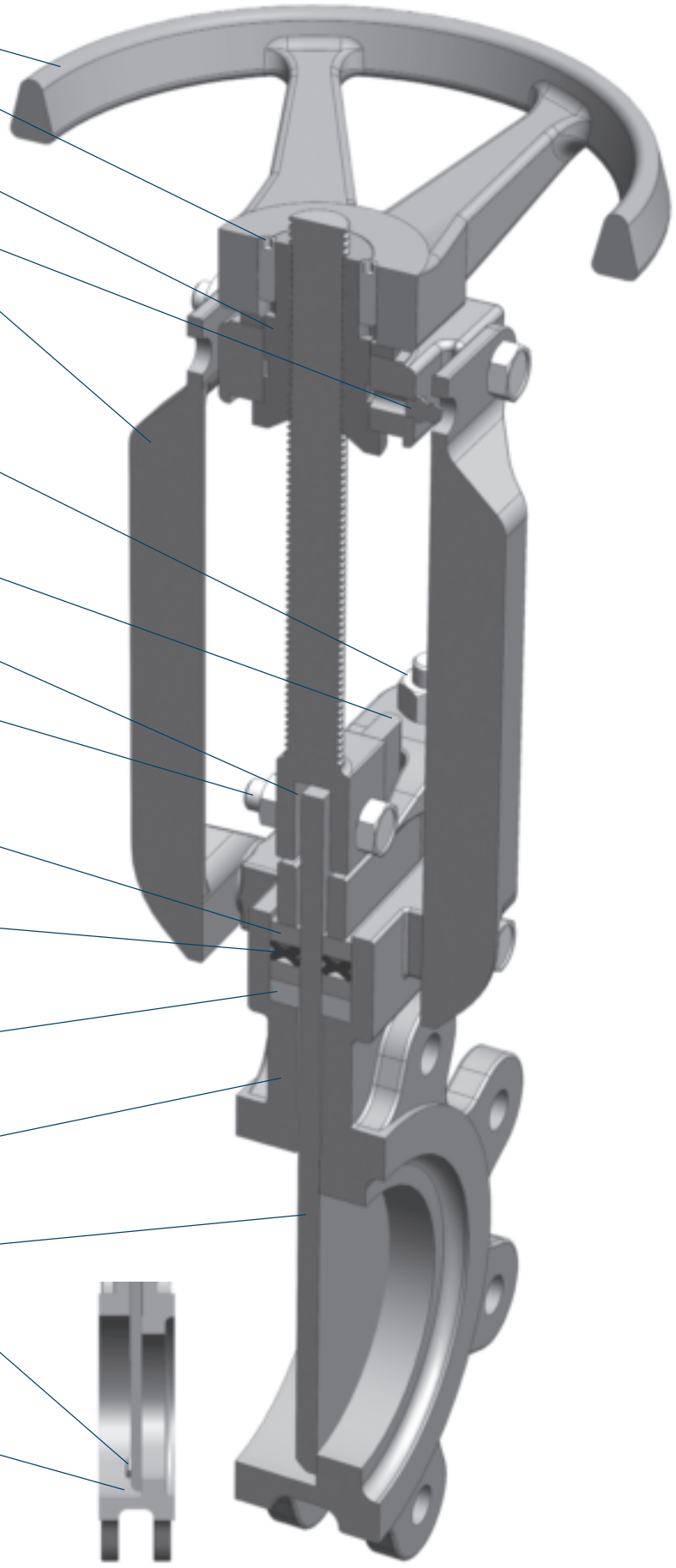
Reinforced anti-extrusion ring enhances packing functionality, reduces friction, acts as a gate wiper, and supports the gate in horizontally mounted valves.

The single piece cast all stainless steel body is rugged and compact. It offers better leak tightness than fabricated or two-piece designs.

The gate is high-quality, ground-finished stainless steel. A generous gate thickness, well supported by the packing, resists distortion or deflection and is less likely to bend in severe conditions.

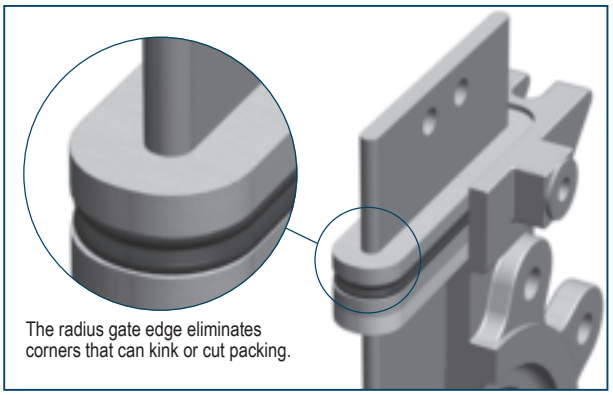
Gate wedges located in the body aid the final gate/seat sealing with a non-sliding motion.

A stepped seating design keeps the upstream area clear. There is no dead pocket space in the bottom of the body where suspended solids/media can collect.



A

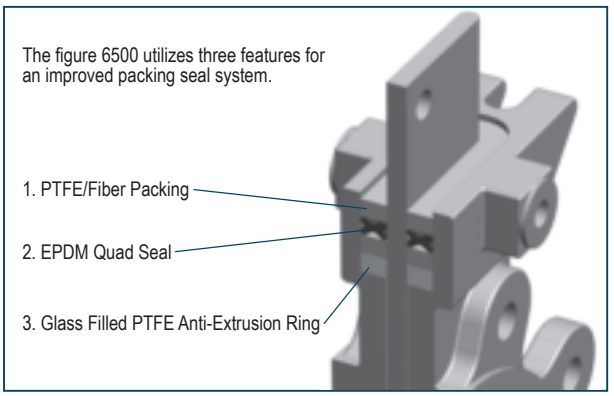
Radius Gate Edge



A radius gate edge and curved packing chamber are standard on the figure 6500 knife gate valve. The curved configuration:

- Improves sealing by eliminating sharp corners
- Improves packing life
- Eliminates sharp corners where corrosion and/or erosion can occur
- Requires less compression, thus reducing gate friction
- Reduced gate friction means less thrust and torque needed for operation

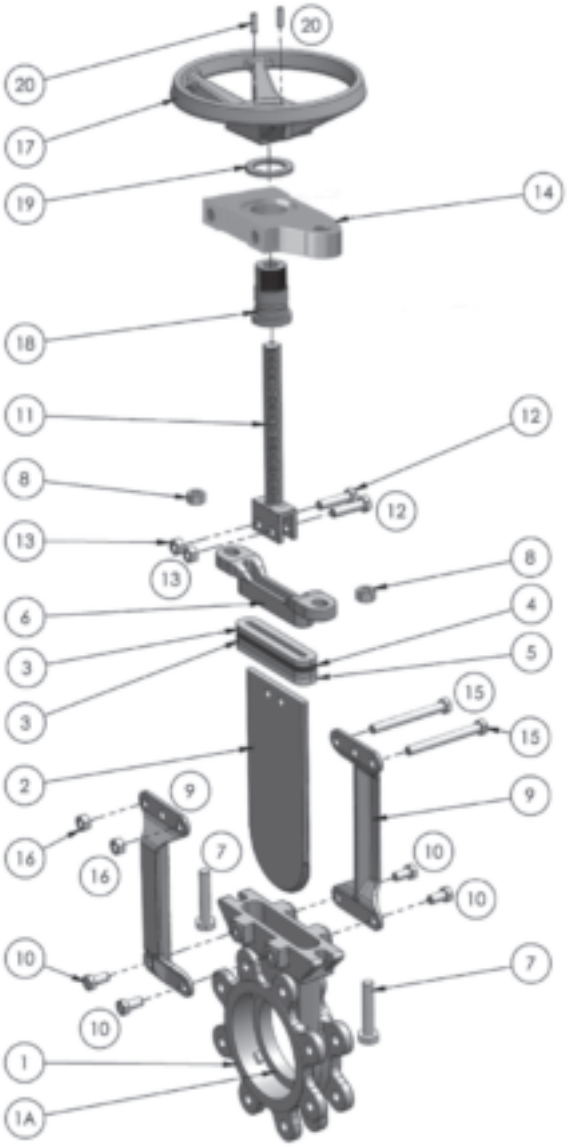
Packing Configuration



In addition to the curved packing chamber, the figure 6500 knife gate valve standard packing configuration includes:

- Multi-layered square braid PTFE impregnated fiber which provides excellent gland sealing at full valve pressure
- A center located EPDM “quad” seal which provides multiple sealing contact points and semi-energized live loading of the packing
- An anti-extrusion ring enhances packing support, acts as a gate wiper and helps center the gate

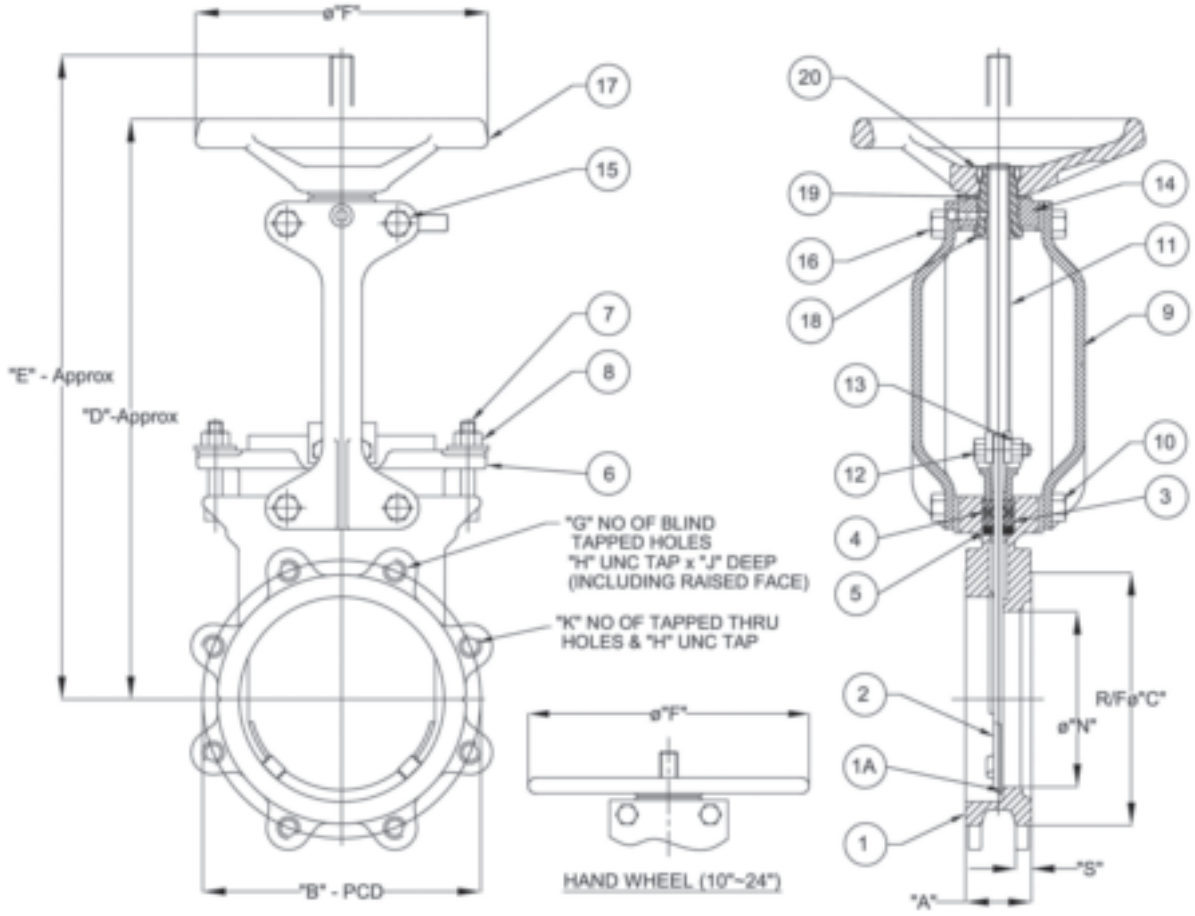
Standard Materials



Ref. No.	Description	Material	Qty
1	Body	Stainless Steel, ASTM A351 Gr. CF8M	1
1A	Seat (Integral)	Stainless Steel, ASTM A351 Gr. CF8M	1
2	Gate	Stainless Steel, ASTM A240 Type 316	1
3	Packing	PTFE Impregnated Fiber	2 (2"~18")
			3 (20" & 24")
4	Quad Seal	EPDM	1
5	Anti-Extrusion Ring	Glass Filled PTFE	1
6	Gland	Stainless Steel, ASTM A351 Gr.CF8	1
7	Gland Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2~10
8	Gland Nut	Stainless Steel 304, ASTM A194 Gr. 8	2~10
9	Yoke Arm	Stainless Steel, ASTM A351 Gr.CF8	2
10	Yoke Bolt	Stainless Steel 304, ASTM A193 Gr. B8	4
11	Stem	Stainless Steel, ASTM A276 Type 304	1
12	Clevis Bolt	Stainless Steel 304, ASTM A193 Gr. B8	1 (2")
			2 (2-1/2"~24")
13	Clevis Nut	Stainless Steel 304, ASTM A194 Gr. 8	1 (2")
			2 (2-1/2"~24")
14	Collar	Stainless Steel, ASTM A351 Gr.CF8	1
15	Collar Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2 (2"~8")
			4 (10"~24")
16	Collar Nut	Stainless Steel 304, ASTM A194 Gr. 8	2 (2"~8" only)
17	Hand Wheel	Cast Iron, ASTM A126 Gr. B	1
18	Yoke Sleeve	Aluminum Bronze, ASTM B148, UNS C95200	1
19	Thrust Washer	Aluminum Bronze, ASTM B150, UNS C62300	1
20	Set Screws	Stainless Steel, 304SS	2

A

STAINLESS STEEL UNIDIRECTIONAL METAL SEATED KNIFE GATE VALVE



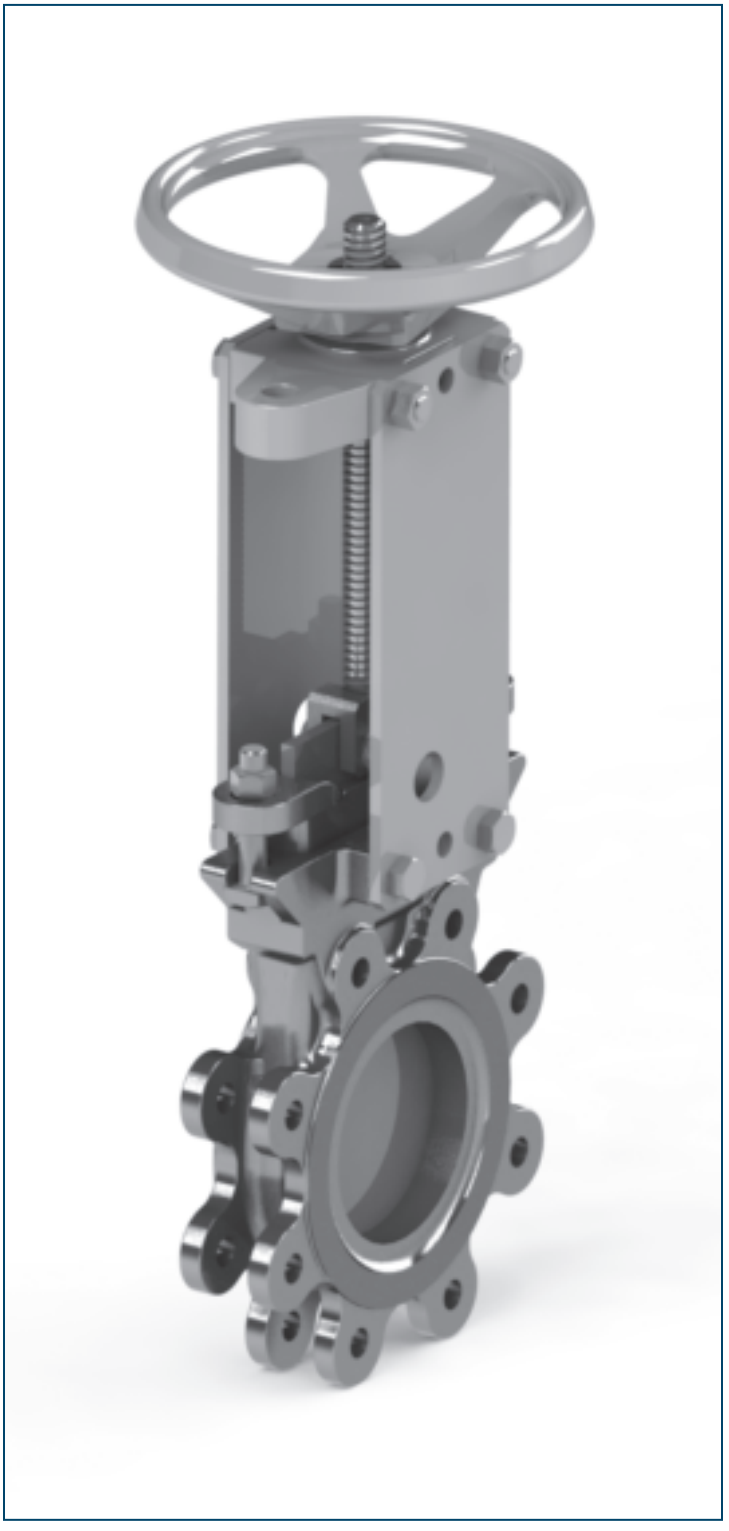
Dimensions (inches)

Size	A	B	C	D	E	F	G	H	J	K	N	S
2	1.88	4.75	3.62	12.99	14.17	7.99	2	5/8"	0.31	2	2.00	0.47
2-1/2	2.00	5.50	4.65	15.55	17.72	7.99	2	5/8"	0.37	2	2.95	0.47
3	2.00	6.00	5.00	15.55	17.72	7.99	2	5/8"	0.37	2	2.95	0.47
4	2.00	7.50	6.18	17.52	20.67	7.99	2	5/8"	0.37	6	4.00	0.47
6	2.25	9.50	8.50	20.87	25.98	10.00	2	3/4"	0.43	6	6.00	0.57
8	2.75	11.75	10.63	25.00	31.89	12.01	2	3/4"	0.43	6	8.00	0.57
10	2.75	14.25	12.76	27.56	37.40	15.98	4	7/8"	0.43	8	9.37	0.69
12	3.00	17.00	14.76	30.51	42.72	15.98	4	7/8"	0.43	8	11.42	0.69
14	3.00	18.75	16.26	32.68	47.05	20.00	4	1"	0.51	8	12.76	0.75
16	3.50	21.25	18.50	36.81	52.17	20.00	6	1"	0.67	10	14.57	0.87
18	3.50	22.75	21.00	41.34	59.25	20.00	6	1-1/8"	0.67	10	16.93	0.94
20	4.50	25.00	22.99	46.06	65.35	20.00	8	1-1/8"	0.91	12	18.50	0.98
24	4.50	29.50	27.24	53.54	77.17	20.00	8	1-1/4"	0.91	12	22.64	0.98

A

STAINLESS WETTED PARTS UNIDIRECTIONAL METAL SEATED KNIFE GATE VALVE

The figure 6701 is a stainless steel wetted parts by carbon steel and iron topworks. This configuration provides a more economical knife gate solution without sacrificing the ruggedness and corrosion resistance needed for harsh applications. It is designed 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
- Maximum Pressure: 150 PSI CWP (30" to 100 PSI CWP)
- Maximum Temperature: 446°F (230°C)
- Cast Stainless Steel Body and Packing Gland
- Zinc Plated Carbon Steel Hardware
- Machined Gland Pocket Area
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Smooth Flow, Non-Clogging Step Seat Design
- Cast Iron Hand Wheel
- Gear-Operator Standard on 30" Valve
- Available in sizes 3" to 30"
- Standard design accommodates locking device

Standards:

- Design: MSS SP-81
- Flange Drilling: ANSI B16.5 (30" to MSS SP-44 Flanges)
- Seat/Shell Test: MSS SP-81
- Material: ASME B16.34

Figure Number Matrix

FNW 6701 Seat Size

SEAT CODE	SIZE CODE		
Stainless Steel = S (Integral)	3 = M	10 = 10	18 = 18
	4 = P	12 = 12	20 = 20
	6 = U	14 = 14	24 = 24
	8 = X	16 = 16	30 = 30

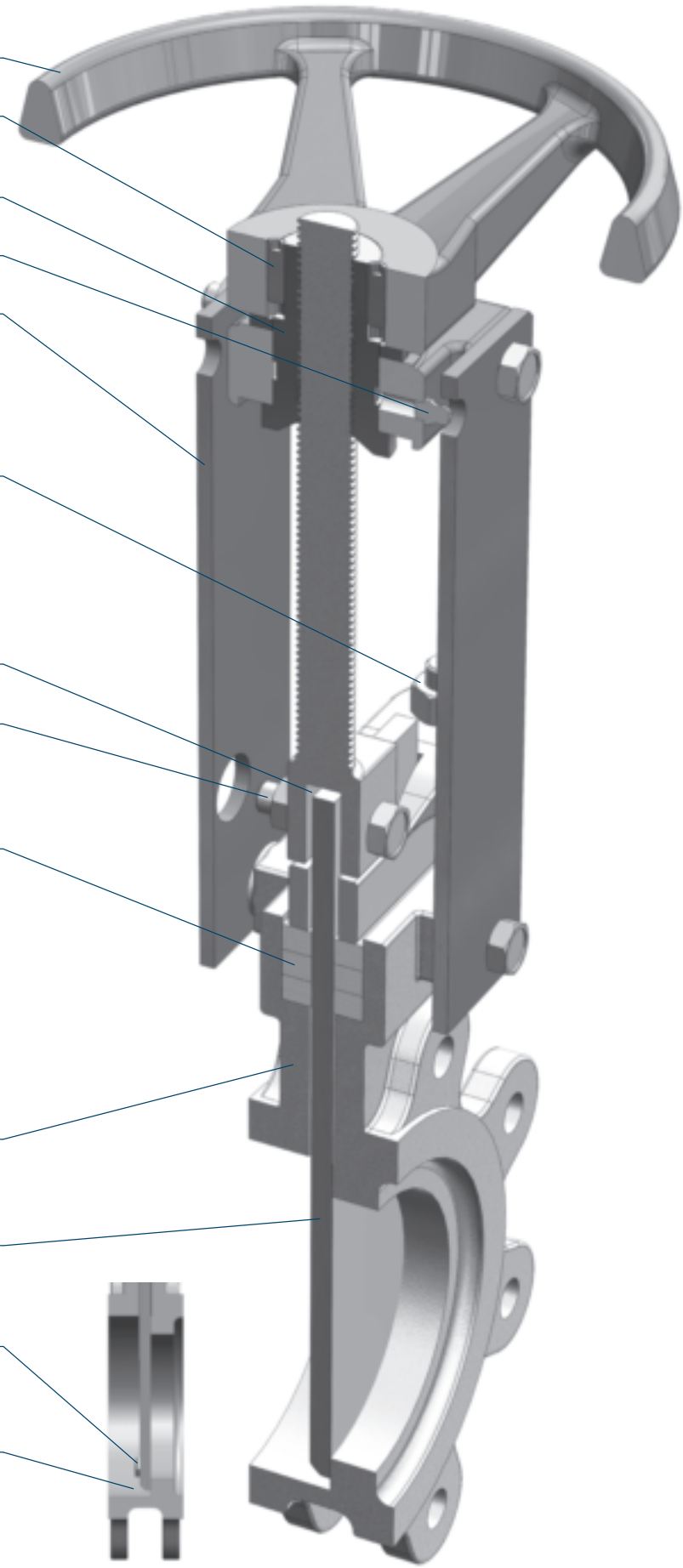
Cv & Weight

Size	Cv	Wt. (lbs)
3	565	20
4	1,040	31
6	2,440	51
8	4,460	75
10	6,250	128
12	9,400	163

Size	Cv	Wt. (lbs)
14	12,500	243
16	16,500	309
18	21,400	386
20	27,000	463
24	39,700	540
30	60,000	992

Weights are for general reference only.

FEATURES



Hand wheel is heavy cast iron, with a rounded grip and epoxy coated hand wheel.

Double set screws prevent threaded-on hand wheel from backing off or coming loose.

Aluminum-Bronze thrust components for anti-galling operation.

Grease fitting for maintaining smooth drive sleeve operation.

Carbon steel plate yoke arms provide economy without sacrificing strength and are epoxy coated.

All nuts and bolts are carbon steel grade B7 or 2H.

Stem-to-gate clevis is deliberately loose to allow play in gate to minimize binding.

Horizontal clevis bolts provide flexibility of the gate during travel.

Multiple layers of PTFE impregnated square braid packing provides excellent gland sealing at full valve pressure differential.

The single piece cast all stainless steel body is rugged and compact. It offers better leak tightness than fabricated or two-piece designs.

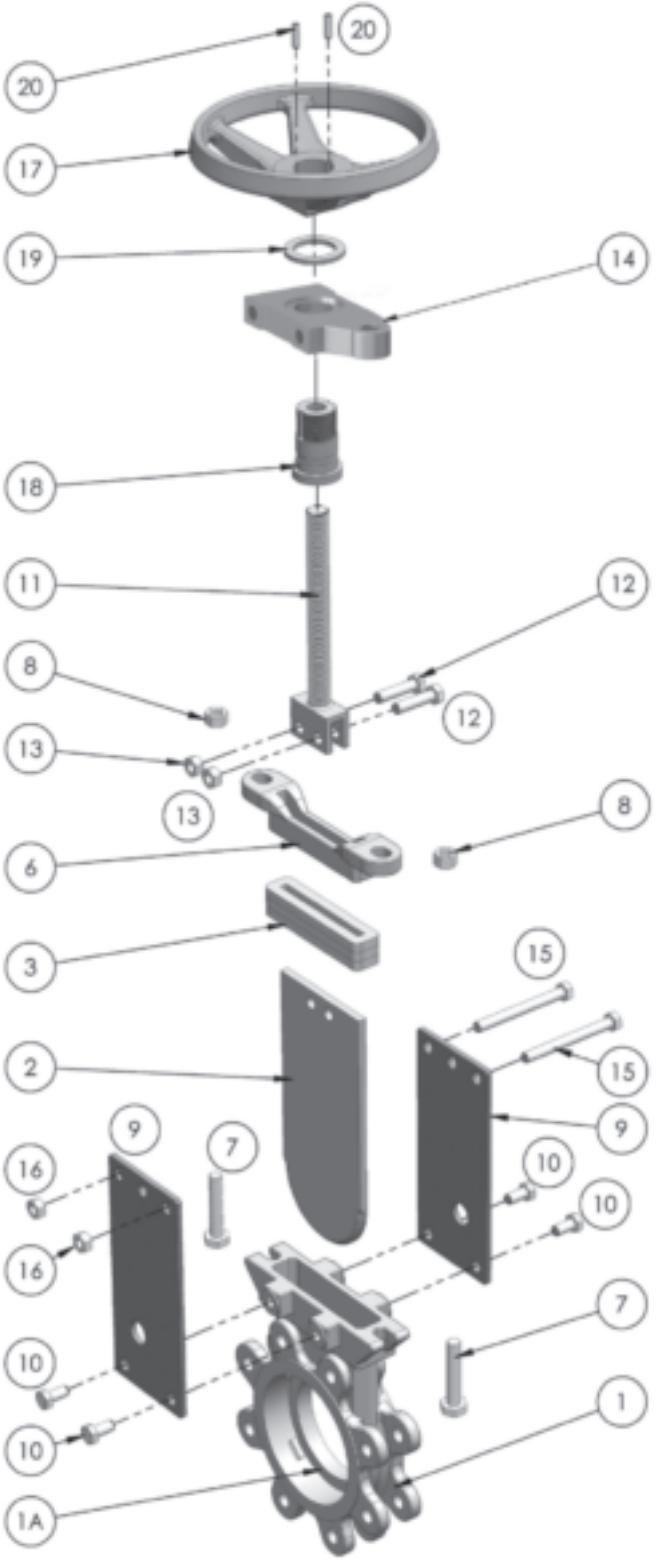
The gate is high-quality, ground-finished stainless steel. A generous gate thickness, well supported by the packing, resists distortion or deflection and is less likely to bend in severe conditions.

Gate wedges located in the body aid the final gate/seat sealing with a non-sliding motion.

A stepped seating design keeps the upstream area clear. There is no dead pocket space in the bottom of the body where suspended solids/media can collect.

Standard Materials

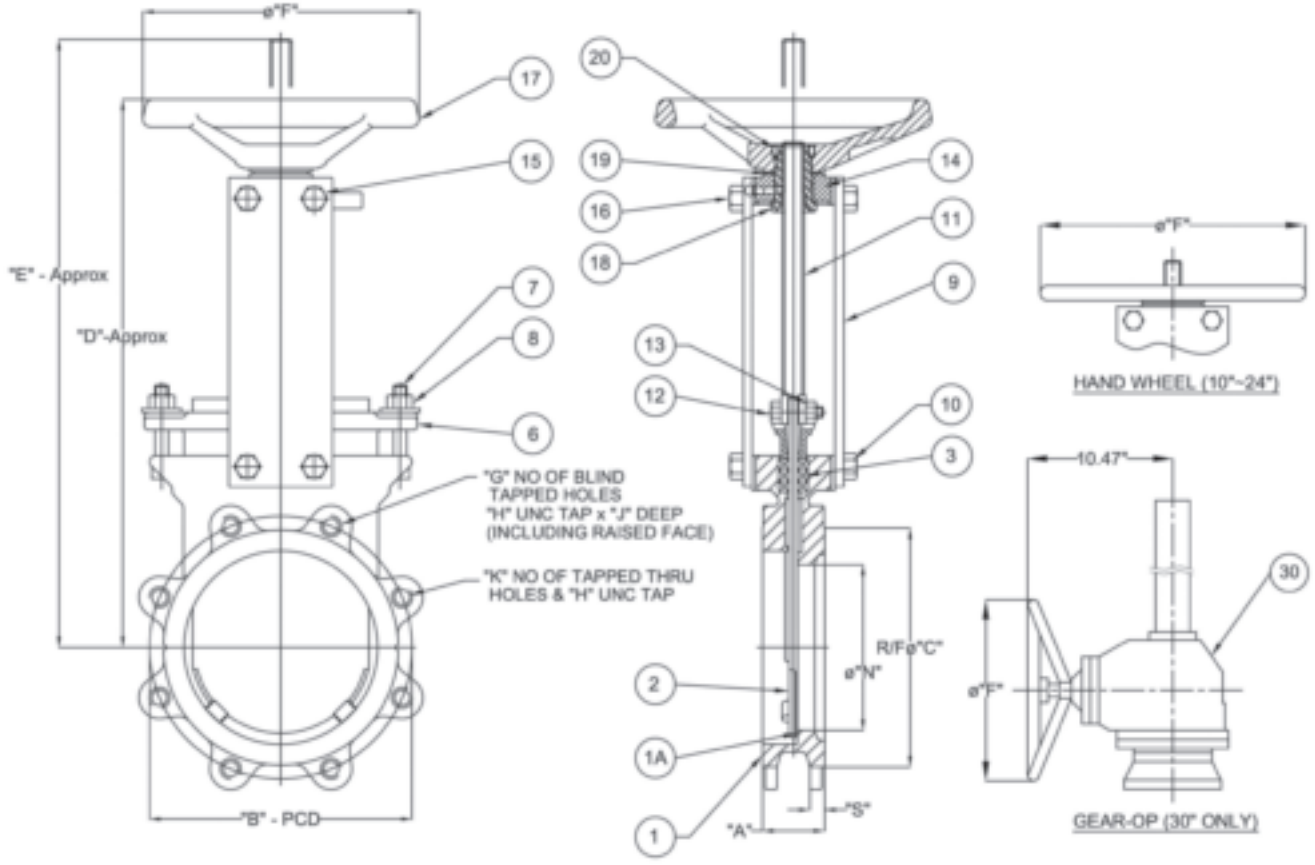
A



Ref. No.	Description	Material	Qty
1	Body	Stainless Steel, ASTM A351 Gr. CF8M	1
1A	Seat (Integral)	Stainless Steel, ASTM A351 Gr. CF8M	1
2	Gate	Stainless Steel, ASTM A240 Type 316	1
3	Packing	PTFE Impregnated Syntex Fiber	3 (3"~18")
			3 (20" & 30")
6	Gland	Stainless Steel, ASTM A351 Gr.CF8	1
7	Gland Bolt	Zinc Plated Carbon Steel, ASTM A193 Gr. B7	2~10
8	Gland Nut	Zinc Plated Carbon Steel, ASTM A194 Gr. 2H	2~10
9	Yoke Arm	Carbon Steel, ASTM A36	2
10	Yoke Bolt	Zinc Plated Carbon Steel, ASTM A193 Gr. B7	4
11	Stem	Stainless Steel, ASTM A276 Type 304	1
12	Clevis Bolt	Zinc Plated Carbon Steel, ASTM A193 Gr. B7	2
13	Clevis Nut	Zinc Plated Carbon Steel, ASTM A194 Gr. 2H	2
14	Collar	Ductile Iron, ASTM A536 Gr. 65-45-12	1
15	Collar Bolt	Zinc Plated Carbon Steel, ASTM A193 Gr. B7	2 (2"~8")
			4 (10"~24")
16	Collar Nut	Zinc Plated Carbon Steel, ASTM A194 Gr. 2H	2 (2"~8" only)
17	Hand Wheel	Cast Iron, ASTM A126 Gr. B	1
18	Yoke Sleeve	Aluminum Bronze, ASTM B148, UNS C95200	1
19	Thrust Washer	Aluminum Bronze, ASTM B150, UNS C62300	1
20	Set Screws	Stainless Steel, 304SS	2
30	Gear Operator	Enclosed Type, Model BG02 (Not shown)	1 (30" only)

STAINLESS WETTED PARTS UNIDIRECTIONAL METAL SEATED KNIFE GATE VALVE

A



Dimensions (inches)

Size	A	B	C	D	E	F	G	H	J	K	N	S
3	2.00	6.00	5.00	15.55	17.72	7.99	2	5/8"	0.37	2	2.95	0.47
4	2.00	7.50	6.18	17.52	20.67	7.99	2	5/8"	0.37	6	4.00	0.47
6	2.25	9.50	8.50	20.87	25.98	10.00	2	3/4"	0.43	6	6.00	0.57
8	2.75	11.75	10.63	25.00	31.89	12.01	2	3/4"	0.43	6	8.00	0.57
10	2.75	14.25	12.76	27.56	37.40	15.98	4	7/8"	0.43	8	9.37	0.69
12	3.00	17.00	14.76	30.51	42.72	15.98	4	7/8"	0.43	8	11.42	0.69
14	3.00	18.75	16.26	32.68	47.05	20.00	4	1"	0.51	8	12.76	0.75
16	3.50	21.25	18.50	36.81	52.17	20.00	6	1"	0.67	10	14.57	0.87
18	3.50	22.75	21.00	41.34	59.25	20.00	6	1-1/8"	0.67	10	16.93	0.94
20	4.50	25.00	22.99	46.06	65.35	20.00	8	1-1/8"	0.91	12	18.50	0.98
24	4.50	29.50	27.24	53.54	77.17	20.00	8	1-1/4"	0.91	12	22.64	0.98
30	4.62	36.00	33.75	73.20*	100.40	19.68	10	1-1/4"	0.82	18	26.69	1.12

* Dimension “D” for 30" valve is centerline of valve to centerline of gear-operator hand wheel shaft.

A

STAINLESS STEEL LINED RESILIENT SEATED KNIFE GATE VALVE

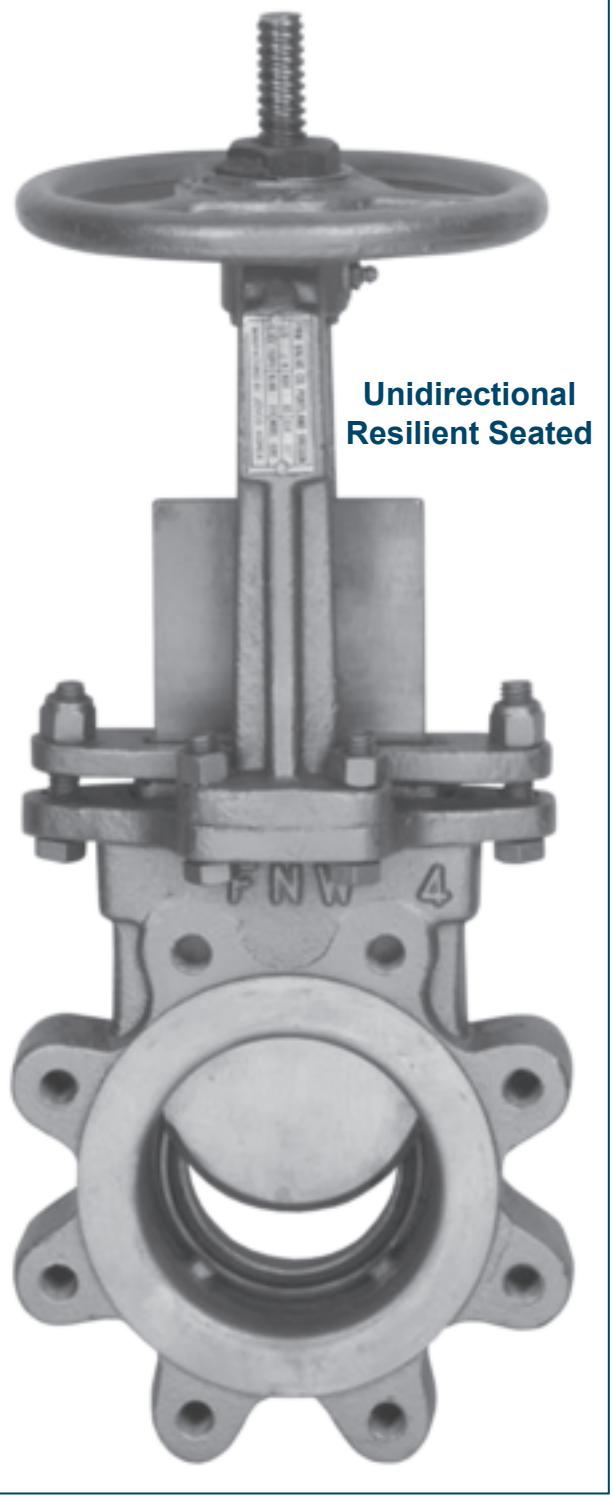
The figure 62B is a lined valve with the economy of a ductile iron body and the corrosion resistance of all stainless steel wetted parts. The 62B is designed for pulp and paper, chemicals and mining and petroleum industries to handle dense mixtures of stock and slurries where positive shut-off is required. 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 Hand Wheel
- 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	

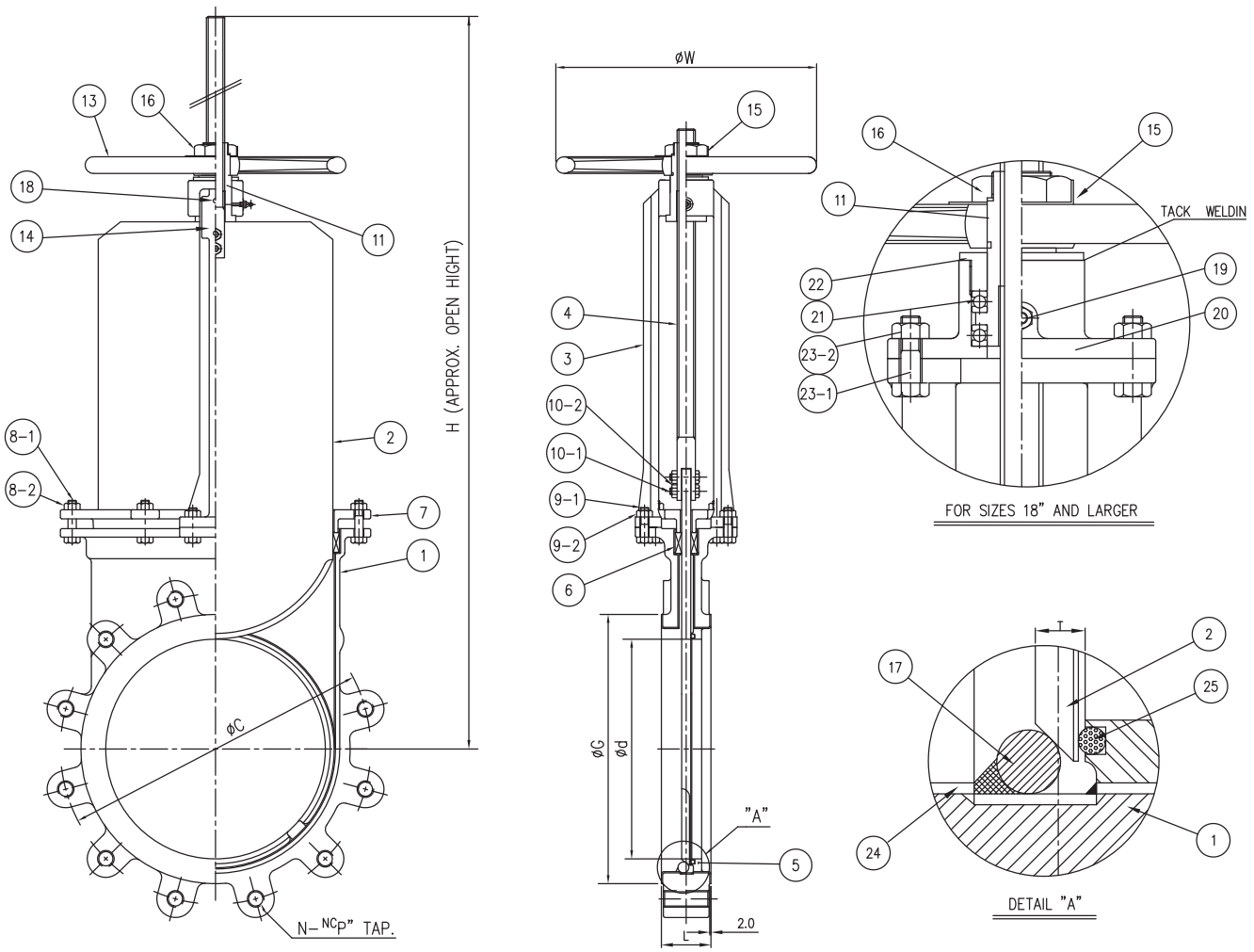
Packing Options

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

Flow Coefficients, Port Areas & Weights

Size	Cv	Port Area (in²)	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

A



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	

FNW™

A

STAINLESS STEEL BIDIRECTIONAL RESILIENT SEATED KNIFE GATE VALVE

The figure 6800 knife gate valve has an all cast stainless steel body and yoke with investment cast packing follower. It is a general purpose zero-leak bidirectional shut-off valve. Perimeter gate sealing is not pressure dependent, so there is no minimum differential needed for shut-off. Port sizing is similar to schedule 40 pipe, so the valve offers unrestricted flow and minimal pressure drop.

Features:

- Bidirectional Bubble-Tight Shut-off
- Maximum Pressure: 150 PSI CWP (30" is 50 PSI CWP)
- Maximum Temperature: 176°F (80°C)
- Non-Differential Pressure Dependent Shut-off
- Cast Stainless Steel Body, Yoke & Packing Gland
- Thrust Needle Bearing
- Combination Chest Liner & Anti-Extrusion Strip (Anti-Extrusion Strip Only on 14" and Larger Valves)
- Wire Reinforced & Retained Resilient Seat
- Stainless Steel Position Indication Arrow
- Stainless Steel Hardware
- Machined Gland Pocket Area
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Cast Iron Hand Wheel
- Gear-Operator Standard on 30" Valve
- Available in sizes 3" to 30"
- Standard design accommodates locking device

Standards:

- Face-to-Face: MSS SP-81
- Flange Drilling: ANSI B16.5 (30" to MSS SP-44 Flanges)
- Testing:
  - Shell (Before Assembly): 1.5 Times Max. CWP (No Leak)
  - Seat: 1.1 Times Max. CWP (No Leak)
- Material: ASME B16.34

Figure Number Matrix

FNW 6800 Seat Size

SEAT CODE	SIZE CODE		
Buna (Nitrile) = B (SS Wire Reinforced)	3 = M	10 = 10	18 = 18
	4 = P	12 = 12	20 = 20
	6 = U	14 = 14	24 = 24
	8 = X	16 = 16	30 = 30

Cv & Weight

Size	Cv	Wt. (lbs)
3	565	44
4	1,040	53
6	2,440	88
8	4,460	139
10	6,250	181
12	9,400	229

Size	Cv	Wt. (lbs)
14	12,500	364
16	16,500	397
18	21,400	463
20	27,000	573
24	39,700	617
30	60,000	882

Weights are for general reference only.

FEATURES

Hand wheel is heavy cast iron, with a rounded grip and epoxy coated hand wheel.

Double set screws prevent threaded-on hand wheel from backing off or coming loose.

Stainless steel needle bearings reduce hand wheel rim pull force.

Aluminum-Bronze thrust components for anti-galling operation.

Grease fitting for maintaining smooth drive sleeve operation.

Cast stainless steel yoke arms provide optimum flexural rigidity.

Stainless steel position indication arrow is standard.

Stem-to-gate clevis is deliberately loose to allow play in gate to minimize binding.

Stainless steel hardware is standard.

Horizontal clevis bolts provide flexibility of the gate during travel.

Multiple layers of PTFE impregnated square braid packing provides excellent gland sealing at full valve pressure differential.

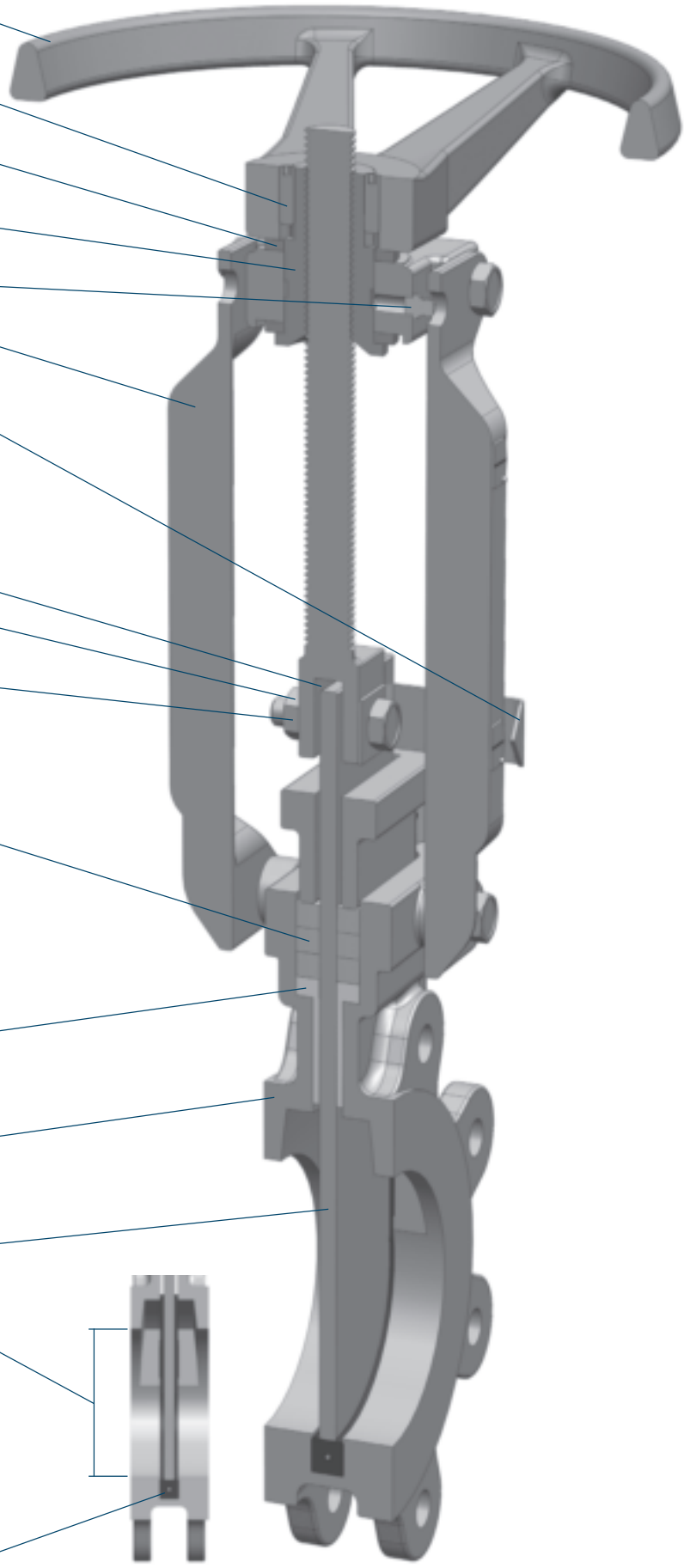
Combination PTFE chest liner & anti-extrusion strips (anti-extrusion strips only on 14" and larger valves) enhance packing functionality while centering the gate. They also act as a gate wiper and support the gate in horizontally mounted valves.

The single piece cast all stainless steel body is rugged and compact. It offers better leak tightness than fabricated or two-piece designs.

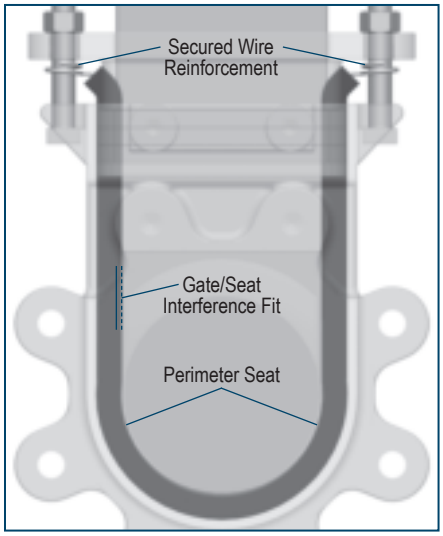
The gate is high-quality, ground-finished stainless steel. A generous gate thickness is well supported by the packing.

Port sizing is similar to schedule 40 pipe, so the valve offers unrestricted flow and minimal pressure drop.

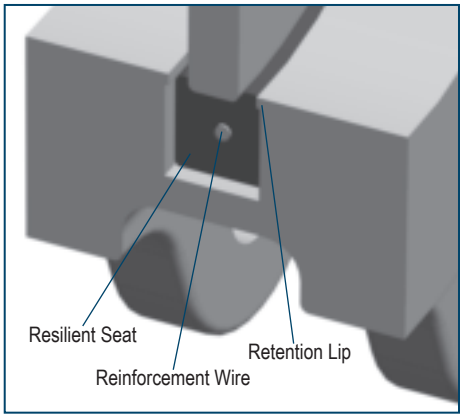
Perimeter gate sealing is not pressure dependent, so there is no minimum differential needed for shut-off.



Seat Seal Configuration



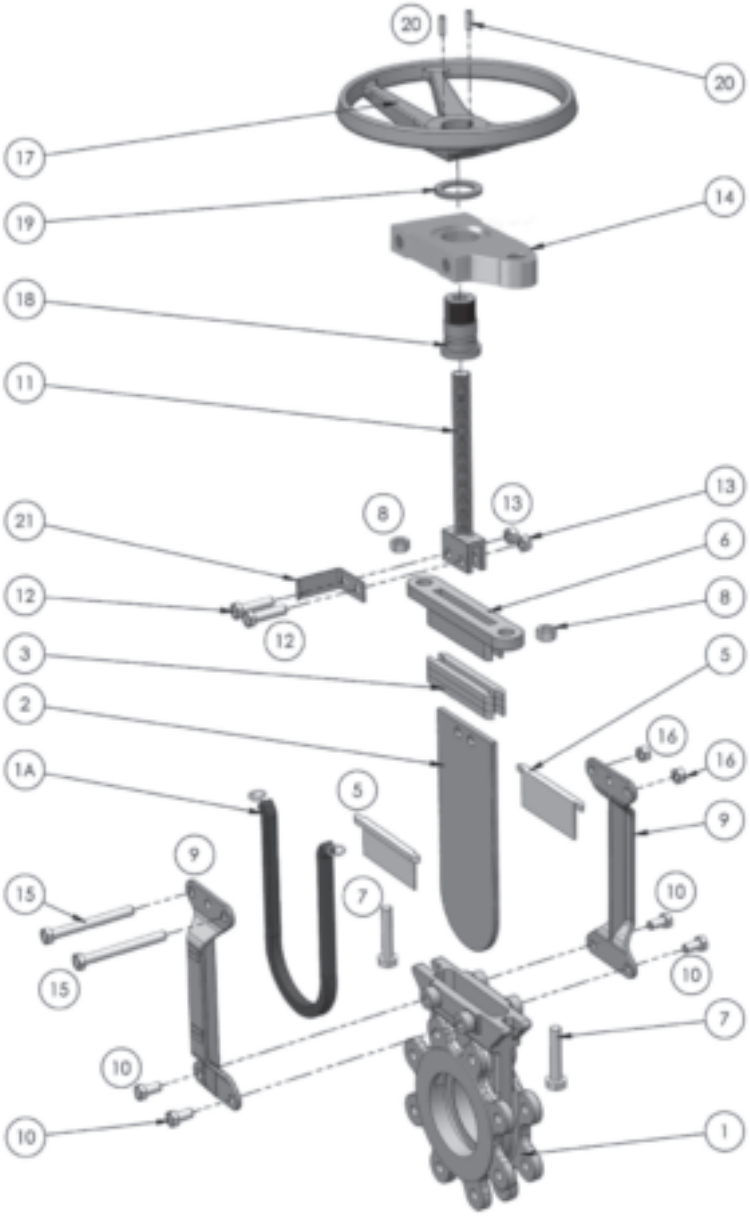
The figure 6800 knife gate valve provides bubble-tight shut-off. When the valve is closed, there is a friction fit along the entire perimeter between the flat edge of the gate and the elastomer seat. This friction fit ensures tight shut-off without the requirement of a minimum line pressure, but is tight enough to maintain shut-off at maximum rated pressures as well. There is no recommended flow direction because the seal is made at the gate's edge, hence bidirectional flow capability.



Seat seal retention is twofold. First, the seat is retained in a channel with a machined retention lip. This lip overhangs both sides of the seat, preventing seat removal from high velocity flows. Second, the seat is reinforced with a heavy stainless steel wire. The ends of the wire are wrapped around gland bolts. The wire adds rigidity to the seat form which also prevents seat movement during high flow or valve opening/closing operation.

A

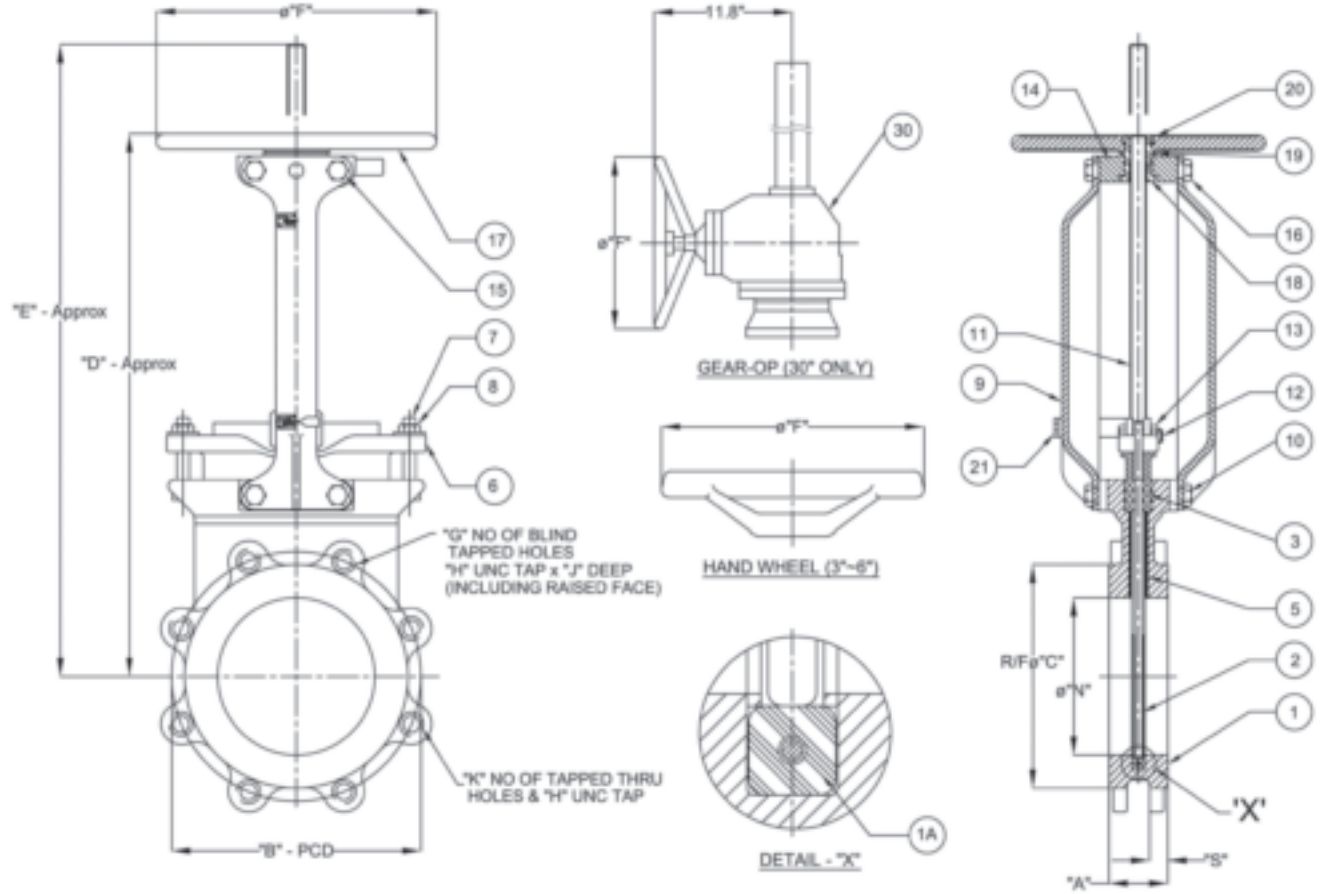
Standard Materials



Ref. No.	Description	Material	Qty
1	Body	Stainless Steel, ASTM A351 Gr. CF8M	1
1A	Seat	Buna (Nitrile) with ASTM A276 Type 304 Wire	1
2	Gate	Stainless Steel, ASTM A240 Type 316	1
3	Packing	PTFE Impregnated Syntex Fiber	3 (3"~24") 4 (30")
5	Chest Liner	PTFE	2 (3"~12")
	Anti-Extrusion Strip		2 (14"~30")
6	Gland	Stainless Steel, ASTM A351 Gr.CF8	1
7	Gland Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2~10
8	Gland Nut	Stainless Steel 304, ASTM A194 Gr. 8	2~10
9	Yoke Arm	Stainless Steel, ASTM A351 Gr.CF8	2
10	Yoke Bolt	Stainless Steel 304, ASTM A193 Gr. B8	4
11	Stem	Stainless Steel, ASTM A276 Type 304	1
12	Clevis Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2
13	Clevis Nut	Stainless Steel 304, ASTM A194 Gr. 8	2
14	Collar	Stainless Steel, ASTM A351 Gr.CF8	1 (3"~24")
15	Collar Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2 (3"~8") 4 (10"~24")
16	Collar Nut	Stainless Steel 304, ASTM A194 Gr. 8	2 (3"~8")
17	Hand Wheel	Cast Iron, ASTM A126 Gr. B	1
18	Yoke Sleeve	Aluminum Bronze, ASTM B148, UNS C95200	1 (3"~24")
19	Thrust Needle Bearing	Stainless Steel	2 (3"~24")
20	Set Screws	Stainless Steel, 304SS	2 (3"~24")
21	Position Indicator	Stainless Steel, 304SS	1
30	Gear-Op	Enclosed Type Model BG03 (not shown)	1 (30" only)

A

STAINLESS STEEL BIDIRECTIONAL RESILIENT SEATED KNIFE GATE VALVE



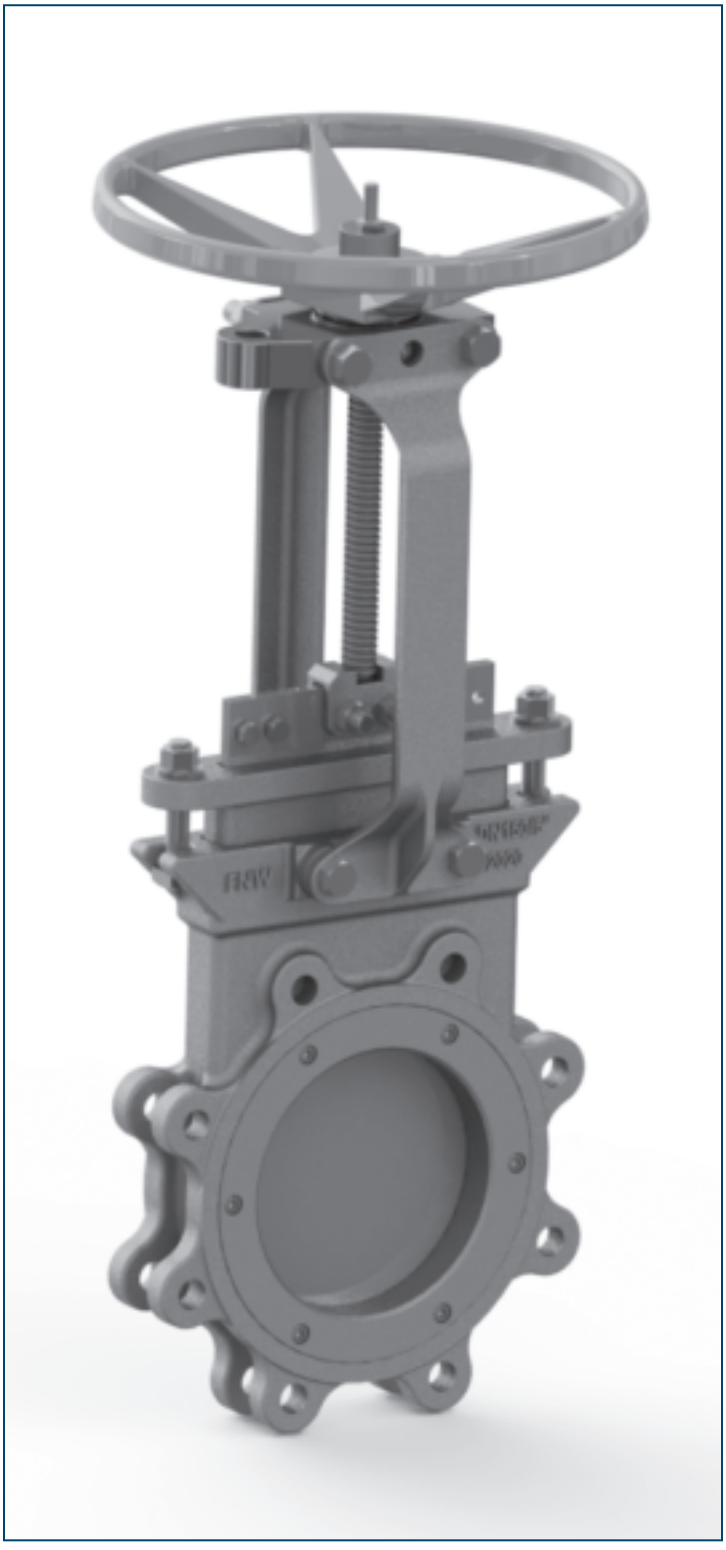
Dimensions (inches)

Size	A	B	C	D	E	F	G	H	J	K	N	S
3	2.00	6.00	5.00	16.34	19.49	9.84	2	5/8"-11	0.39	2	2.95	0.47
4	2.00	7.50	6.22	18.31	21.26	9.84	2	5/8"-11	0.39	6	4.00	0.47
6	2.25	9.50	8.50	22.05	27.36	11.75	2	3/4"-10	0.43	6	6.00	0.57
8	2.75	11.75	10.63	25.59	33.27	15.98	2	3/4"-10	0.43	6	8.00	0.57
10	2.75	14.25	12.76	28.66	39.37	15.98	4	7/8"-9	0.49	8	10.04	0.69
12	3.00	17.00	14.76	33.46	46.46	20.00	4	7/8"-9	0.43	8	11.97	0.69
14	3.00	18.75	16.26	37.60	53.15	20.00	4	1"-8	0.51	8	13.11	0.75
16	3.50	21.25	18.50	41.34	58.27	20.00	6	1"-8	0.63	10	15.00	0.87
18	3.50	22.75	20.98	45.67	63.78	20.00	6	1-1/8"-7	0.59	10	16.93	0.94
20	4.50	25.00	23.03	50.39	70.47	20.00	8	1-1/8"-7	0.75	12	18.82	0.98
24	4.50	29.50	27.24	58.46	83.66	20.00	8	1-1/4"-7	0.91	12	22.64	0.98
30	4.62	36.00	33.75	81.00*	110.00	19.68	10	1-1/4"-7	0.94	18	28.74	1.12

* Dimension "D" for 30" valve is centerline of valve to centerline of gear-operator hand wheel shaft.

STAINLESS STEEL BIDIRECTIONAL RESILIENT SEATED KNIFE GATE VALVE

The figure 2020 knife gate valve has an all cast stainless steel body and yoke with investment cast packing follower. Reminiscent of high performance butterfly valve designs that utilize a retaining ring to secure the seat, the dual seat bidirectional shut-off of the figure 2020, is a unique design that performs in many applications not typical of knife gate valves.



Features:

- Bidirectional Shut-off
- Maximum Pressure: 150 PSI CWP
- Maximum Temperature: 248°F (120°C)
- Cast Stainless Steel Body, Yoke & Packing Gland
- Thrust Needle Bearings
- Energized Reinforced Teflon Seats for Positive Shut-off at Minimum Line Pressure
- Elastomer Quad Seal is Standard in Packing Arrangement
- Stainless Steel Position Indication Arrow
- Adjustable Close Stop
- Stainless Steel Hardware
- Machined Gland Pocket Area
- Bonnetless, Outside Screw & Yoke
- Rising Stem
- Cast Iron Hand Wheel
- Available in sizes 2" to 24"
- Standard design accommodates locking device

Standards:

- Face-to-Face: MSS SP-81
- Flange Drilling: ANSI B16.5
- Testing:
  - Shell (Before Assembly): 1.5 Times Max. CWP (No Leak)
  - Seat: 1.1 Times Max. CWP (No Leak)
- Material: ASME B16.34

Figure Number Matrix

FNW 2020 Seat Size

SEAT CODE	SIZE CODE		
RTFE = T	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	

Cv & Weight

Size	Cv	Wt. (lbs)
2	240	37
2-1/2	565	40
3	565	44
4	1,040	53
6	2,440	88
8	4,460	139
10	6,250	181

Size	Cv	Wt. (lbs)
12	9,400	229
14	12,500	364
16	16,500	397
18	21,400	463
20	27,000	573
24	39,700	617

Weights are for general reference only.

FEATURES

An adjustable stopper at the top of the stem sets the close position of the gate.

Hand wheel is heavy cast iron, with a rounded grip and epoxy coated hand wheel.

Double set screws prevent threaded-on hand wheel from backing off or coming loose.

Stainless steel needle bearings reduce hand wheel rim pull force.

Aluminum-Bronze thrust components for anti-galling operation.

Grease fitting for maintaining smooth drive sleeve operation.

Cast stainless steel yoke arms provide optimum flexural rigidity.

Stainless steel position indication arrow is standard.

Stem-to-gate clevis is deliberately loose to allow play in gate to minimize binding.

Stainless steel hardware is standard.

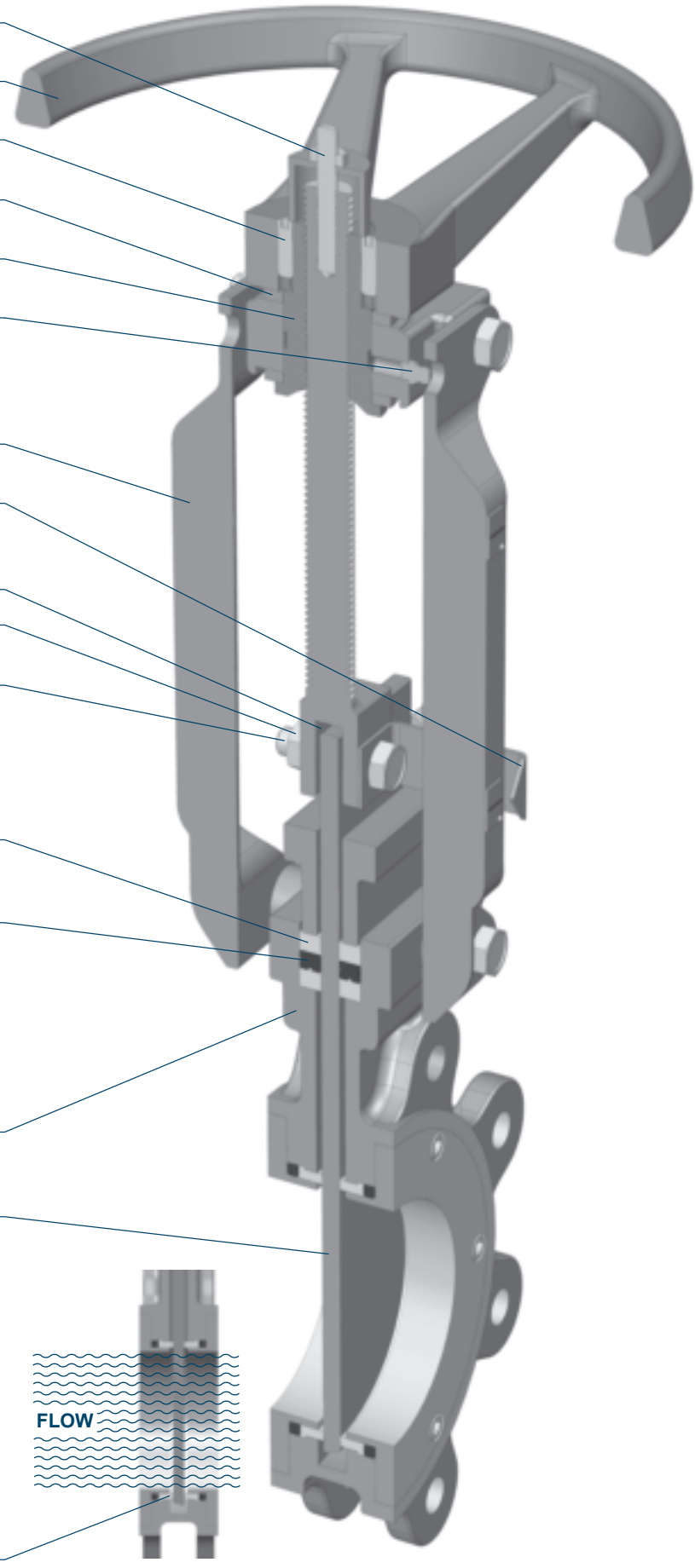
Horizontal clevis bolts provide flexibility of the gate during travel.

Multiple layers of PTFE impregnated square braid packing provides excellent gland sealing at full valve pressure differential.

Elastomer quad seal improves packing performance by promoting live loading of the packing.

The single piece cast all stainless steel body is rugged and compact. It offers better leak tightness than fabricated or two-piece designs.

The gate is high-quality, ground-finished stainless steel. A generous gate thickness is well supported by the packing.



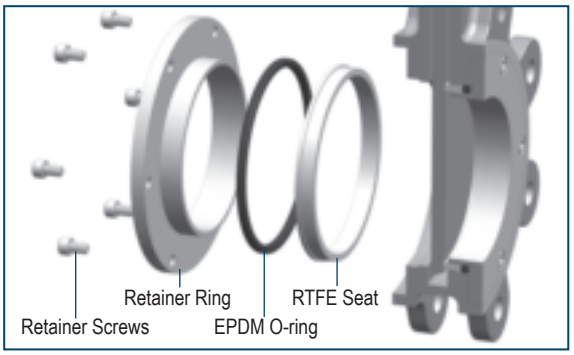
The unique retainer, O-ring, seat assembly provides positive shut-off at minimum pressure differential. Securing the seats out of the flow path improves the longevity of the resilient material, however, this configuration also allows easy replacement of the seat and O-ring.

Seat Seal Configuration

The figure 2020 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 2020 uses mechanically held retainer rings to hold the seat in place.

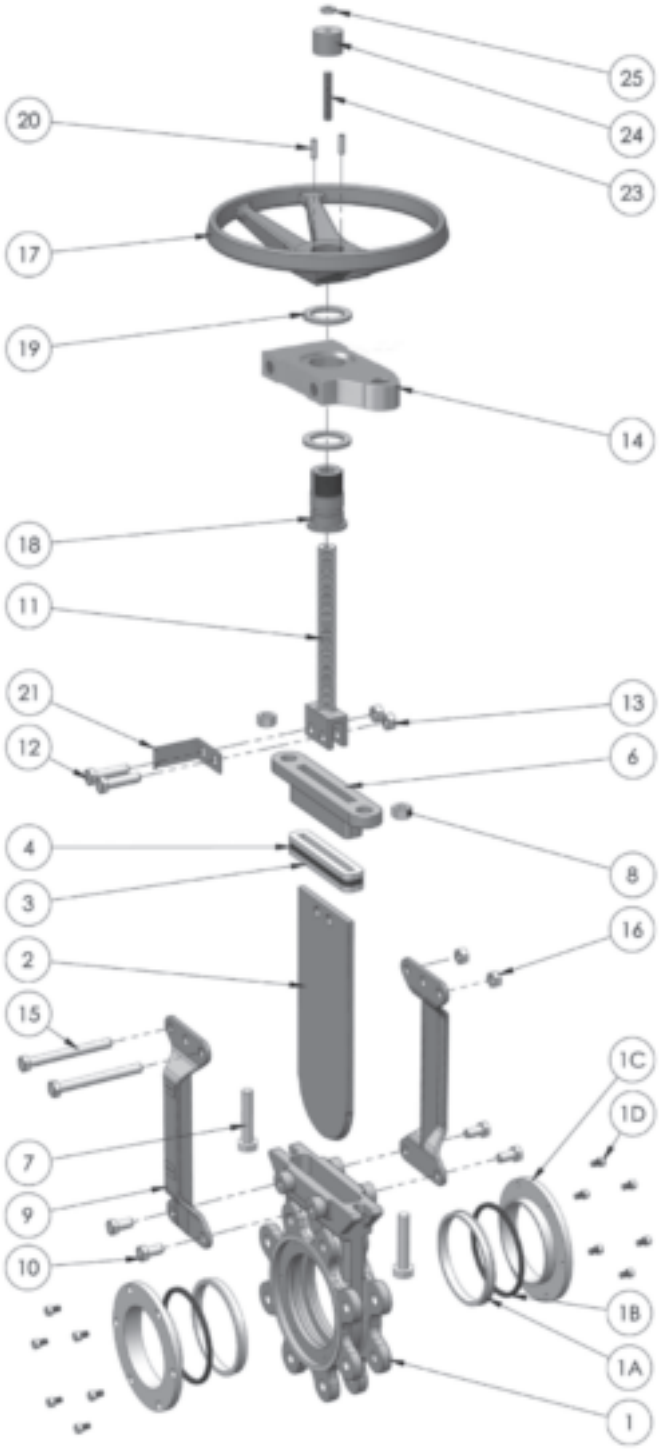
The RTFE seats are secured with an integral locator lip. Seats are energized with hefty EPDM O-rings to provide sealing pressure against the gate. The O-rings also act as the seal between the body and seat. Both are secured with stainless steel retainer rings and screws.

Seats and O-rings can easily be replaced without disturbing the valve packing. This configuration also impoves the longevity of the seats because they are not directly in the flow path.



A

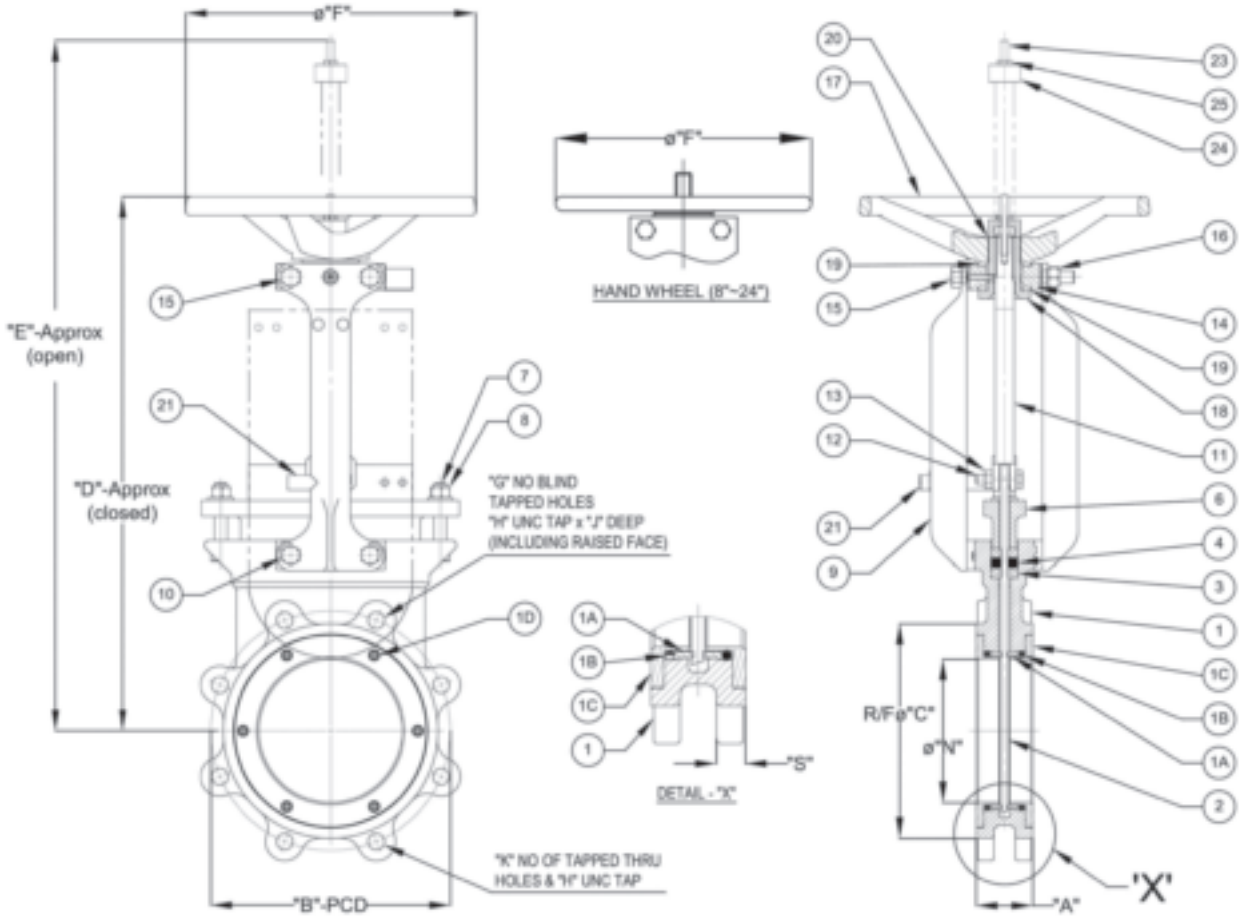
Standard Materials



Ref. No.	Description	Material	Qty
1	Body	Stainless Steel, ASTM A351 Gr. CF8M	1
1A	Seat	RTFE	2
1B	Seat O-ring	EPDM	2
1C	Seat Retainer Ring	Stainless Steel, ASTM A351 Gr. CF8M	2
1D	Retainer Screws	Stainless Steel 316, ASTM A193 Gr. B8M	2 Sets
2	Gate	Stainless Steel, ASTM A240 Type 316	1
3	Packing	PTFE Impregnated Syntex Fiber	2 (2"~18")
			3 (20"~24")
4	Quad Seal	EPDM	1
6	Gland	Stainless Steel, ASTM A351 Gr.CF8M	1
7	Gland Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2~10
8	Gland Nut	Stainless Steel 304, ASTM A194 Gr. 8	2~10
9	Yoke Arm	Stainless Steel, ASTM A351 Gr.CF8	2
10	Yoke Bolt	Stainless Steel 304, ASTM A193 Gr. B8	4
11	Stem	Stainless Steel, ASTM A276 Type 304	1
12	Clevis Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2
13	Clevis Nut	Stainless Steel 304, ASTM A194 Gr. 8	2
14	Collar	Stainless Steel, ASTM A351 Gr.CF8	1
15	Collar Bolt	Stainless Steel 304, ASTM A193 Gr. B8	2 (2"~8")
			4 (10"~24")
16	Collar Nut	Stainless Steel 304, ASTM A194 Gr. 8	2 (2"~8")
17	Hand Wheel	Cast Iron, ASTM A126 Gr. B	1
18	Yoke Sleeve	Aluminum Bronze, ASTM B148, UNS C95200	1
19	Thrust Needle Bearing	Stainless Steel	2
20	Set Screws	Stainless Steel, 304SS	2
21	Position Indicator	Stainless Steel, 304SS	1
23	Stopper Stud	Stainless Steel 304, ASTM A193 Gr. B8	1
24	Stopper	Stainless Steel, ASTM A276 Type 304	1
25	Stopper Nut	Stainless Steel 304, ASTM A194 Gr. 8	1

A

STAINLESS STEEL BIDIRECTIONAL RESILIENT SEATED KNIFE GATE VALVE



Dimensions (inches)

Size	A	B	C	D	E	F	G	H	J	K	N	S
2	1.88	4.75	3.62	13.98	16.26	10.00	2	5/8"-11	0.35	2	1.83	0.50
2-1/2	2.00	5.50	5.00	15.83	19.53	10.00	2	5/8"-11	0.39	2	2.74	0.50
3	2.00	6.00	5.00	15.83	19.53	10.00	2	5/8"-11	0.39	2	2.74	0.50
4	2.00	7.50	6.19	17.95	22.36	10.00	2	5/8"-11	0.39	6	3.72	0.50
6	2.25	9.50	8.50	21.81	28.19	11.75	2	3/4"-10	0.43	6	5.69	0.63
8	2.75	11.75	10.62	26.38	34.57	16.00	2	3/4"-10	0.43	6	7.46	0.63
10	2.75	14.25	12.75	30.91	41.14	16.00	4	7/8"-9	0.49	8	9.43	0.75
12	3.00	17.00	15.00	35.12	47.17	20.00	4	7/8"-9	0.43	8	11.40	0.75
14	3.00	18.75	16.25	39.17	52.95	20.00	4	1"-8	0.51	8	12.97	0.81
16	3.50	21.25	18.50	41.73	58.27	20.00	6	1"-8	0.55	10	14.55	0.88
18	3.50	22.75	21.00	47.24	64.57	20.00	6	1-1/8"-7	0.59	10	16.52	0.94
20	4.50	25.00	23.00	52.44	71.65	20.00	8	1-1/8"-7	0.75	12	18.48	1.00
24	4.50	29.50	27.25	61.18	84.25	20.00	8	1-1/4"-7	0.91	12	22.42	1.00

FNW™

A

RESILIENT SEATED KNIFE GATE VALVE

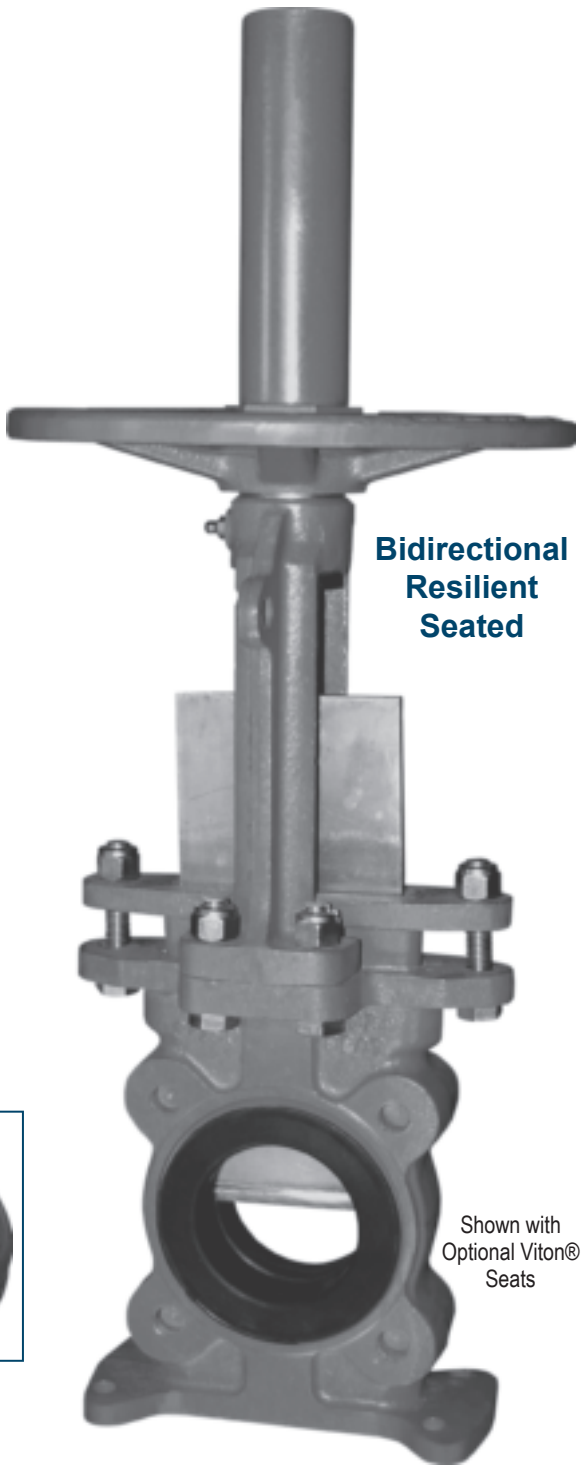
The figure 60R is a wafer flat-face flanged, bidirectional knife gate valve. It is suitable for a wide range of industrial applications, including abrasive slurry services. The full port design has no internal obstructions and provides a "blind flange" shut-off when closed. The basic simplicity and open 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

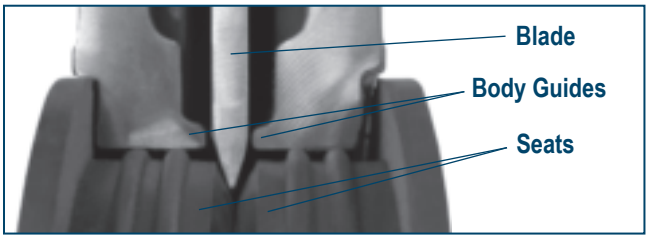


"Pop-In" Resilient Seats

A

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)	-22ºF to 230ºF
Viton® (Black)	14ºF to 482ºF

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

Packing Options

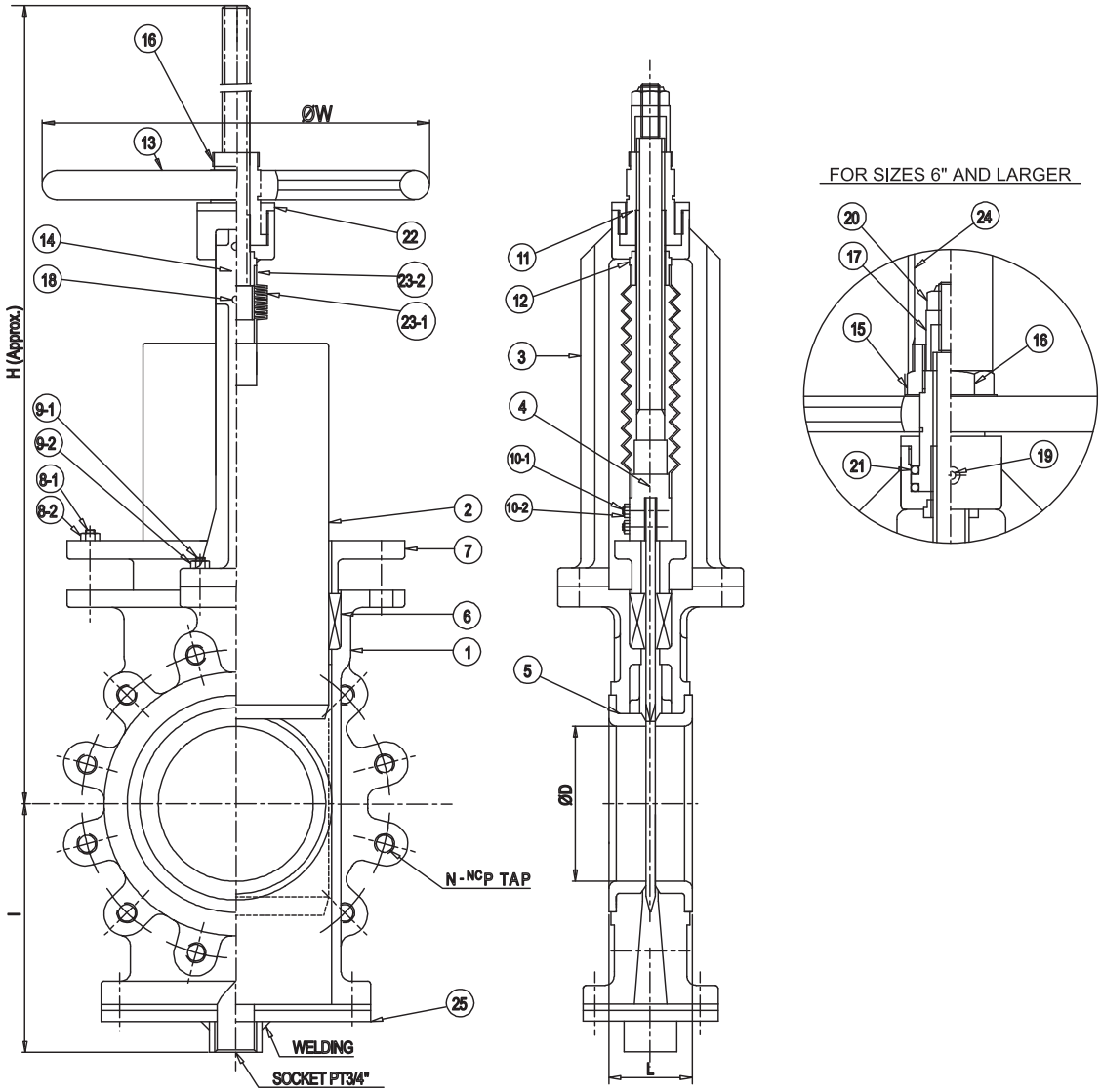
Type	Temperature Limit
PTFE Impregnated Fiber (Standard)	425ºF
Pure TFE	425ºF
TFE Fiber (Ultra)	500ºF
Graphite Filament Yarn	1000ºF

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	NC_P
				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 Material Size

MATERIAL	SIZE CODE		
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

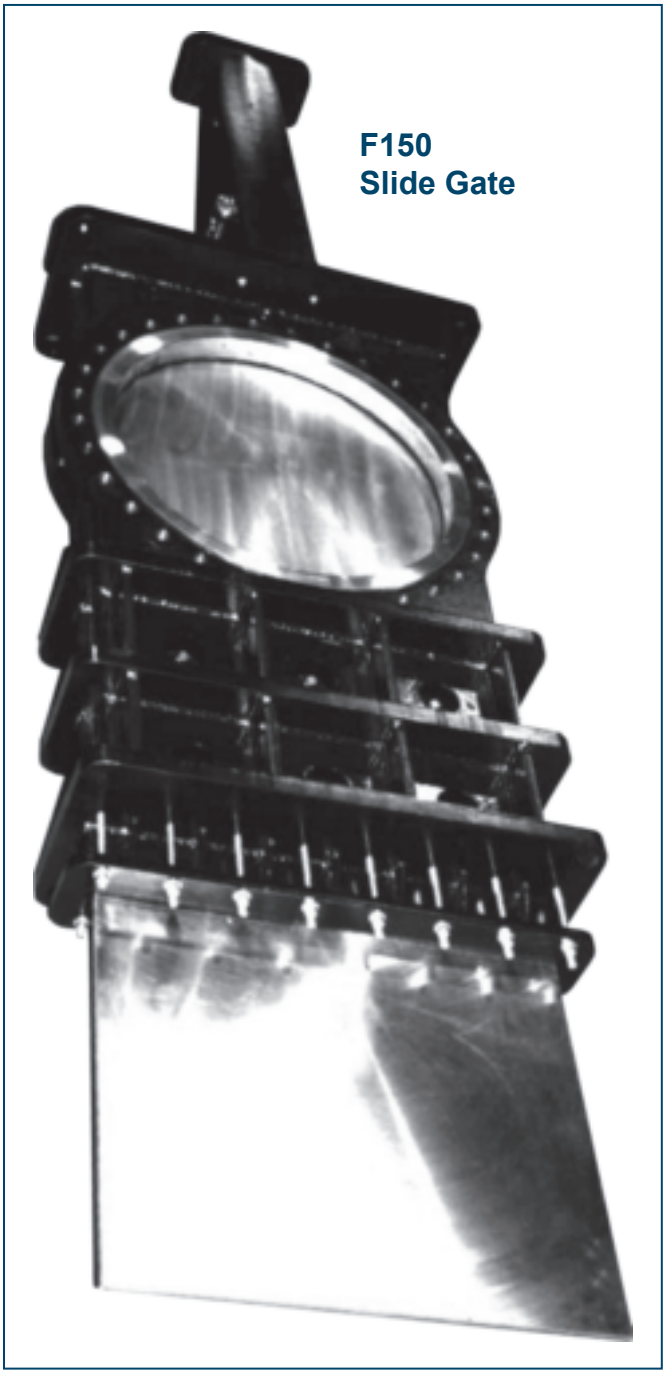
The figure F150 features a heavy-duty fully fabricated construction with heavy-gauge body walls and steel-plate body flanges. With a high shearing capability, the F150 slide gate is ideally suited for services such as cyclone and trash applications. It is also ideal for dense solutions and wet or dry 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.



F150
Slide Gate

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:

- 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

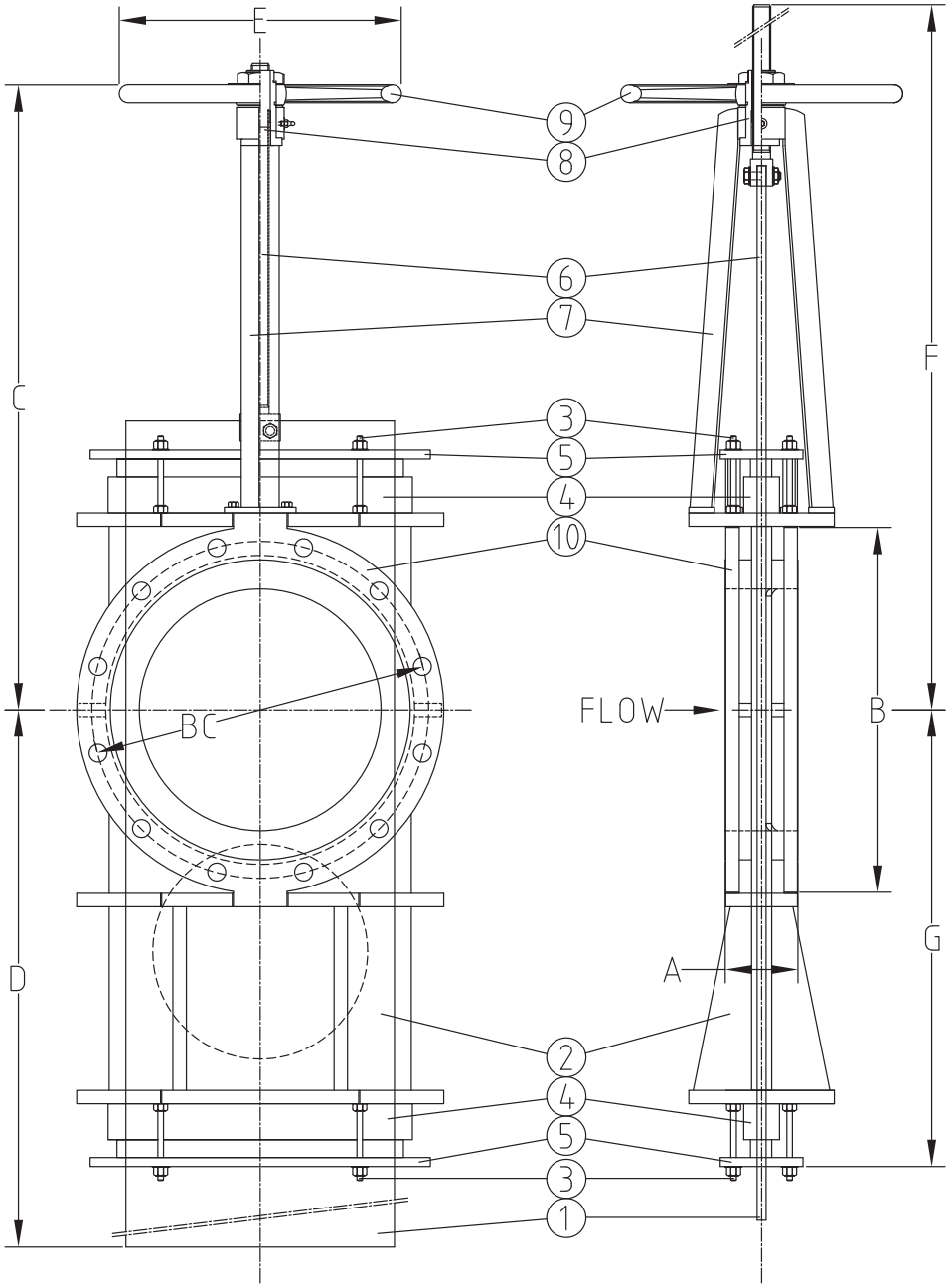
MODEL CODES	MATERIALS	SIZE CODE	
F65 = METAL SEAT	A = CARBON STEEL	3 = M	12 = 12
F67 = METAL SEAT	B = 316SS	4 = P	14 = 14
F68 = RESILIENT SEAT	L = 316L	5 = S	16 = 16
F150 = 150# O-PORT/ SLIDE		6 = U	18 = 18
		8 = X	20 = 20
		10 = 10	24 = 24

Packing Options*

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

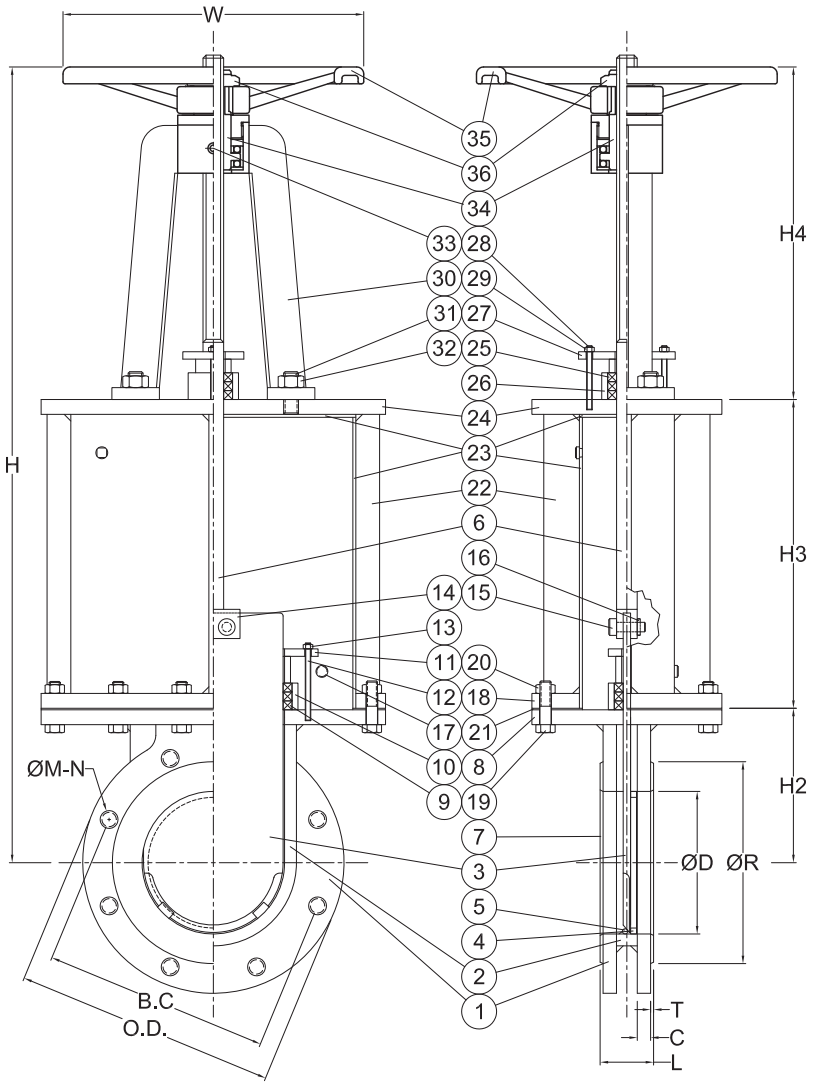
Ref.	Ref. Type	Size										
		3	4	6	8	10	12	14	16	18	20	24
A	Face to Face	2.00	2.00	2.25	2.75	2.75	3.00	3.00	3.50	3.50	4.50	4.50
B	Flange Diameter	7.50	9.00	11.00	13.50	16.00	19.00	21.00	23.50	25.00	27.50	32.00
C	Center to Top (closed)	18	19	22	26	31	33	36	40	44	47	54
D	Center to Bottom (closed)	12	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. No.	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	Hand Wheel	Ductile Iron		
10	Flanges	WCB	316SS	317L

A

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

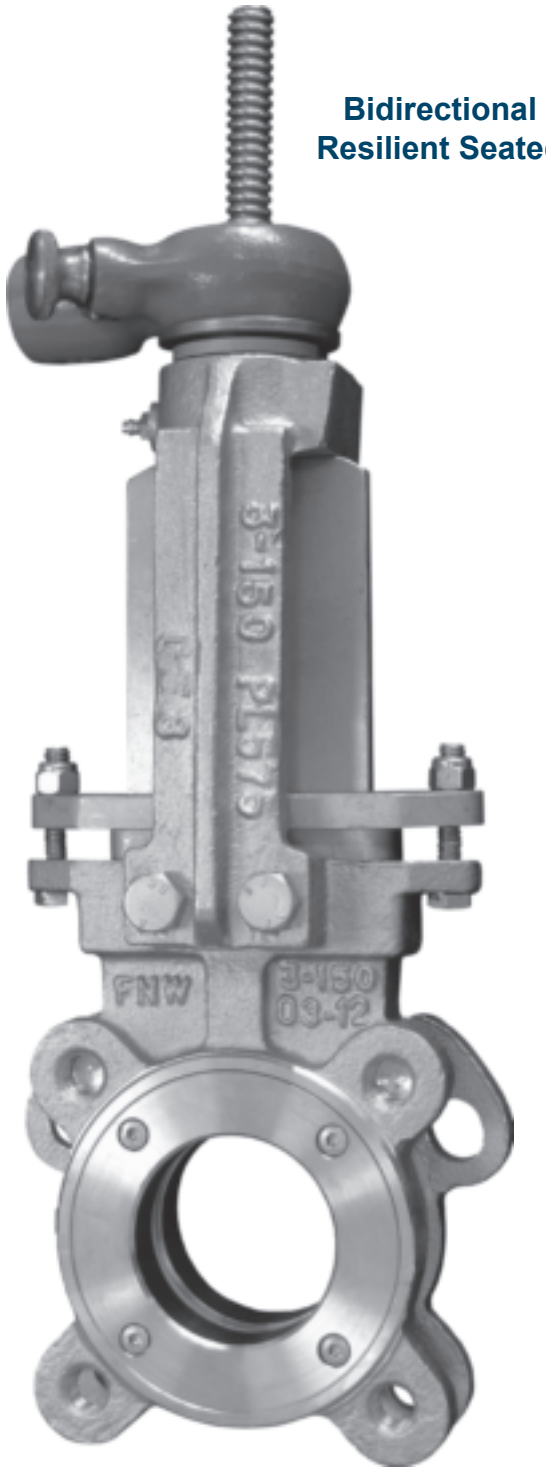
F67 Materials

Ref. No.	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 Arm	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	Hand Wheel	Ductile Iron	1
36	Hand Wheel Nut	Carbon Steel	1
37	Paint	Black Enamel	Lot

A

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 Hand Wheel 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
- Size 3"

Standards:

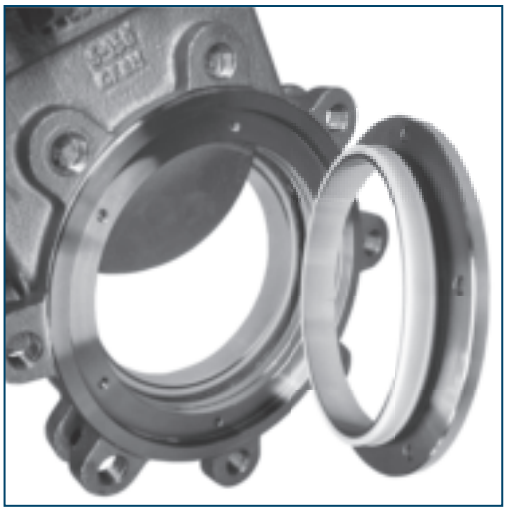
- Design: MSS SP-81
- Flange Drilling: ANSI B16.5
- Shell Test: MSS SP-81
- Seat Test: Exceeds MSS SP-81
- Material: ASME B16.34

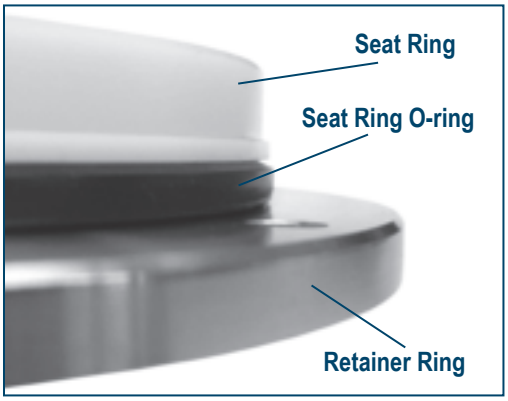
Part Number

Size	Part Number
3"	FNW2000BTIVM

Flow Coefficient, Port Area & Weight

Size	Cv	Port Area (in²)	Wt. (lbs)
3	500	5.98	25.5





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.

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

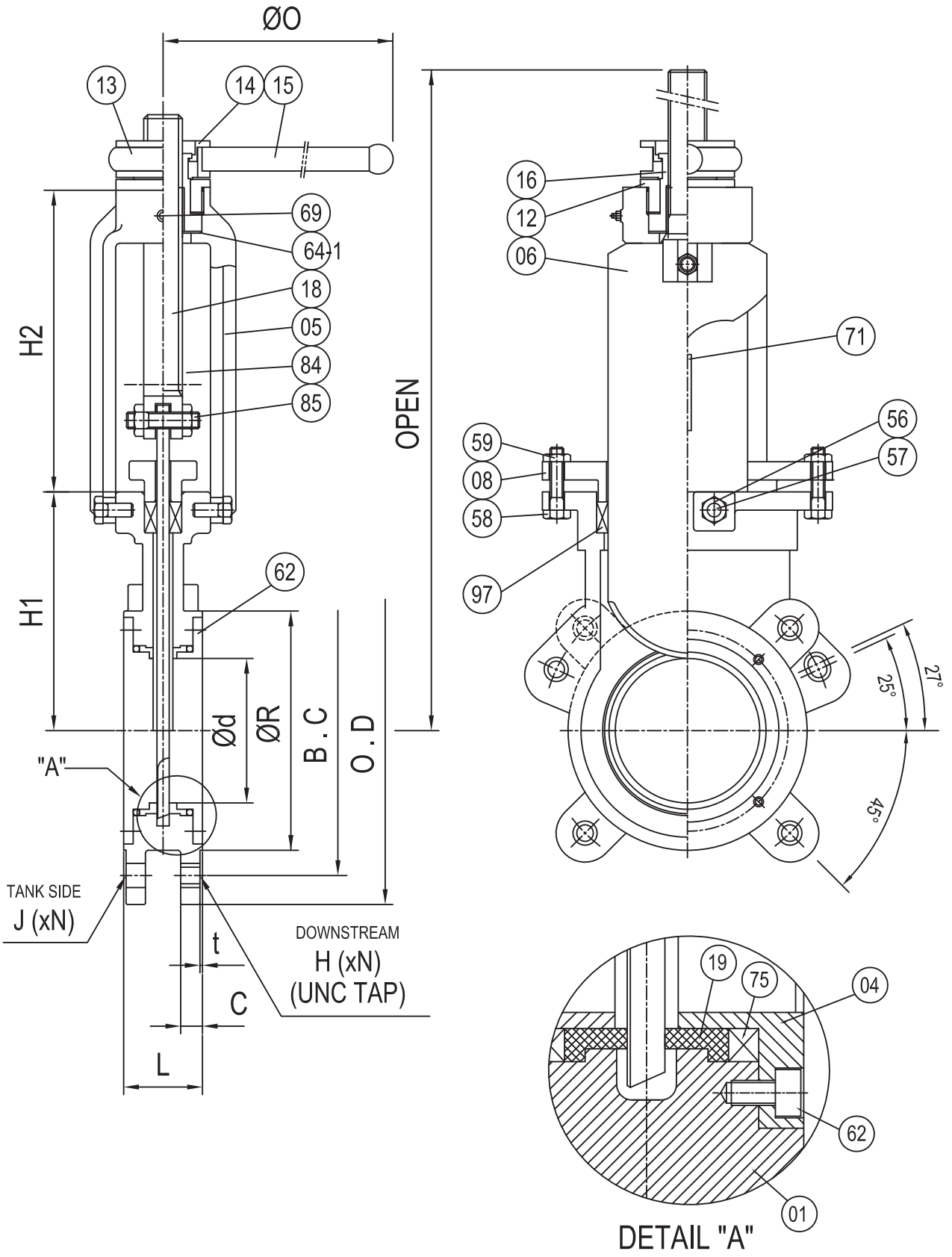
Behind each seat ring is a hefty EPDM O-ring. This O-ring not only provides sealing, but also maintains pressure behind the seat ring, ensuring a tight shut-off.

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.

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	Ød	Open	H1	H2	O	Flange							
							O.D.	B.C.	ØR	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

FNW™

A

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.

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.

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 degrees typically).

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.

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.

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.

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.

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.

KNIFE GATE VALVE OPTIONS AND ACCESSORIES

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 BLADES

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.

NOTES

BALL VALVES

SMALL BODY

Brass

Figure	Description	Page
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
415	2-pc, full port, 600 wog, 150 wsp, gas rated, non-adjustable packing, threaded ends	41
420	2-pc, full port, 600 wog, 150 wsp, gas rated, adjustable packing, 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
455/465	3-way, 400 wog, 100 wsp, ISO 5211 mount, L & T-port, threaded ends	53
470/475	2-pc, full port, 400 wog, pump isolation, flanged pump connection by threaded or sweat ends	55
480A	2-pc, standard port, 400 wog, 150 wsp, compression ends	57
485	2-pc, full port, 200 psi, water or air service, push-fit ends	59
490/495	2-pc, full port, 600 wog, pump isolation, rotating flange by threaded or sweat ends	61
X410C	2-pc, full port, 600 wog, certified lead free, gas rated, threaded ends	63
X411C	2-pc, full port, 600 wog, certified lead free, sweat ends	65
X415	2-pc, full port, 600 wog, 150 wsp, certified lead free, gas rated, threaded ends	67
X416	2-pc, full port, 600 wog, 150 wsp, certified lead free, sweat ends	69
X420A	2-pc, full port, 600 wog, 150 wsp, certified lead free, gas rated, threaded ends	71
X421	2-pc, full port, 600 wog, 150 wsp, certified lead free, sweat ends	73
X430	2-pc, full port, 200 psi, water service, certified lead free, adjustable packing, press ends	75
X432	2-pc, full port, 200 psi, water service, certified lead free, non-adjustable packing, press ends	77
X480A	2-pc, standard port, 400 wog, 150 wsp, certified lead free, compression ends	79
X485	2-pc, full port, 200 psi, water or air service, certified lead free, push-fit ends	81

Carbon Steel

Figure	Description	Page
221A	2-pc, full port, 2000 cwp, 150 or 250 wsp, threaded ends	83
311A	3-pc, full port, 1000 cwp, 150 wsp, threaded or socket weld ends	85
311AM	3-pc, full port, 1000 cwp, 150 wsp, ISO 5211 mount, threaded ends	87
321A	3-pc, full port, 2000 cwp, 150 or 250 wsp, threaded or socket weld ends	89

Stainless Steel

Figure	Description	Page
100A	1-pc, standard port, 1000 cwp, 150 wsp, threaded ends	95
200A	2-pc, full port, 1000 cwp, 150 wsp, threaded ends	97
220A	2-pc, full port, 2000 cwp, 150 or 250 wsp, threaded ends	99
220AM	2-pc, full port, 2000 cwp, 150 wsp, ISO 5211 mount, threaded ends	101
233A	3-way diverter, standard port, 1000 cwp, 150 wsp, ISO 5211 mount, threaded ends	103
310A	3-pc, full port, 1000 cwp, 150 wsp, threaded or socket weld ends	105
310AM	3-pc, full port, 1000 cwp, 150 wsp, ISO 5211 mount, threaded or sw ends	107
320A	3-pc, full port, 2000 cwp, 150 or 250 wsp, ISO 5211 mount, threaded or sw ends	109
330A	3-pc, 400 cwp, 150 wsp, ISO 5211 mount, sanitary clamp ends	111

FLANGED

Carbon Steel

Figure	Description	Page
501	1-pc (uni-body), standard port, 150 wsp, 150# flanged	91
601	2-pc (split-body), full port, 150 wsp, 150# flanged	93

Stainless Steel

Figure	Description	Page
500	1-pc (uni-body), standard port, 150 wsp, 150# flanged	113
600	2-pc (split-body), full port, 150 wsp, 150# flanged	115
633/634	3-way, full port, L & T-port, 150# flanged	117
660	2-pc (split-body), full port, ISO 5211 mount, 150# flanged	119

2 PC FULL PORT* 600 WOG

Features:

- Threaded Connection
- 600 WOG
- 150 WSP
- Full Port *
- PTFE Seats
- Meets MSS SP-110 Standards
- 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

NOT FOR USE AT OR BELOW GROUND LEVEL

Standard Lever (1/4"~ 4")

Accessories

Replacement Handles

Tee Handle Kits

Locking Handle Kits

Stem Extension Kits

Oval Handle Kits

Memory Stops

Additional Stocked Configurations

Tee Handle (1/2"~1")

Oval Handle (1/4"~1")

Figure Number Matrix

FNW 410A Handle Size

HANDLE CODE	SIZE CODE	
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

KIT TYPE	SIZE CODE
Replacement Handle = BRYLWH	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.**

FM APPROVED 1/2" ~ 2"

C SA US 1/2" ~ 2"

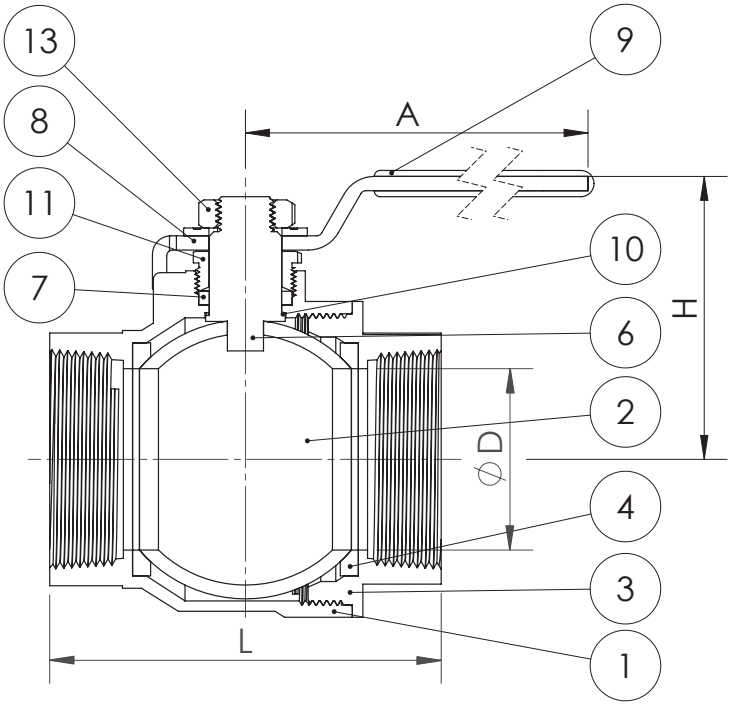
UL 1/4" ~ 2"

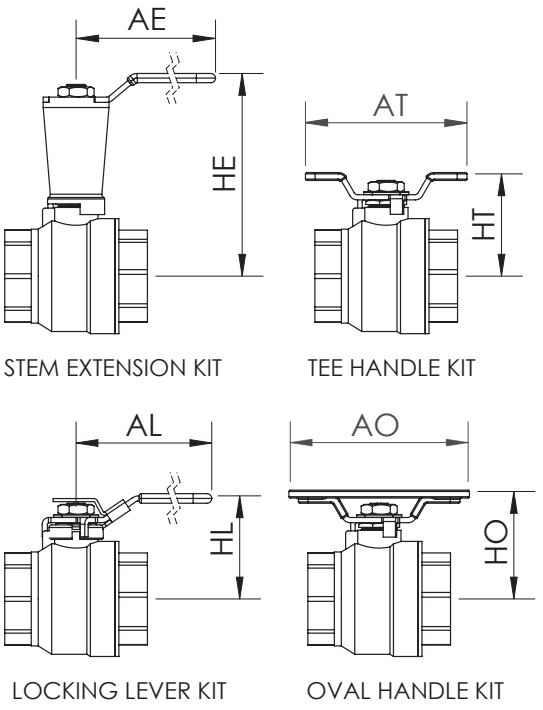
Gas Approvals

- 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

B

2 PC FULL PORT* 600 WOG





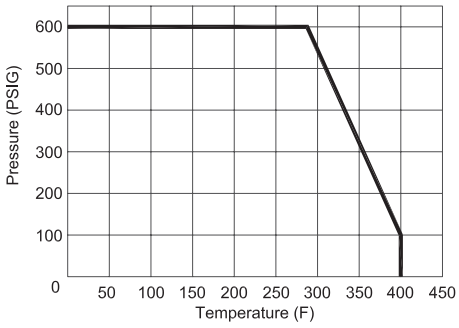
Dimensions (inches) & Weights

SIZE	ØD	A	L	H	Wt. (lbs)
1/4	0.35	3.10	1.69	1.35	0.28
3/8	0.39	3.10	1.80	1.40	0.30
1/2	0.50	3.10	2.12	1.50	0.40
3/4	0.75	4.32	2.45	1.85	0.74
1	0.98	4.32	2.98	2.01	1.03
1-1/4	1.26	5.11	3.35	2.32	1.61
1-1/2	1.50	5.11	3.60	2.55	2.11
2	1.97	7.80	4.23	3.07	3.83
2-1/2	2.48	7.80	5.15	3.48	6.48
3	2.95	7.80	5.91	3.89	9.18
4	2.95	7.80	6.26	3.92	11.65

SIZE	AL	HL	AO	HO	AT	HT	AE	HE
1/4	3.06	1.65	2.80	1.44	2.70	1.34	2.95	4.27
3/8	3.06	1.72	2.80	1.46	2.70	1.36	2.95	4.30
1/2	3.06	1.72	2.80	1.52	2.70	1.43	2.95	4.35
3/4	4.32	2.17	3.60	1.91	3.40	1.78	3.95	4.80
1	4.32	2.37	3.60	2.06	3.40	1.93	3.95	4.93
1-1/4	5.09	2.81	4.39	2.32	4.03	2.18	4.92	5.28
1-1/2	5.09	2.98	4.39	2.54	4.03	2.40	4.92	5.45
2	7.75	3.67	5.38	3.14	4.85	3.08	8.00	6.02
2-1/2	7.75	4.13	5.38	3.55	4.85	3.46	8.00	6.41
3	7.75	4.58	5.38	3.91	4.85	3.82	8.00	6.81
4	7.75	4.62	5.38	3.91	4.85	3.90	8.00	6.97

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	ASTM B124-C37700 Brass	1	1/4" to 1-1/2"
		ASTM B584-C85700 Brass		2" to 4"
2	Ball	ASTM B16-C36000 Brass (Chrome Plated)	1	1/4" to 3/4" (Solid)
		ASTM B124-C37700 Brass (Chrome Plated)		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

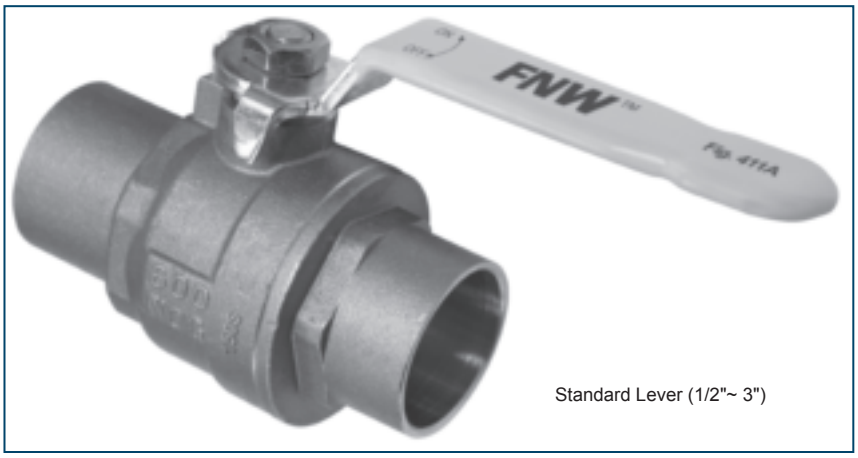


2 PC FULL PORT 600 WOG

Features:

- Sweat Connection
- 600 WOG
- 150 WSP
- Full Port
- PTFE Seats
- Meets MSS SP-110 Standards
- 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

NOT FOR USE AT OR BELOW GROUND LEVEL



Standard Lever (1/2"~ 3")

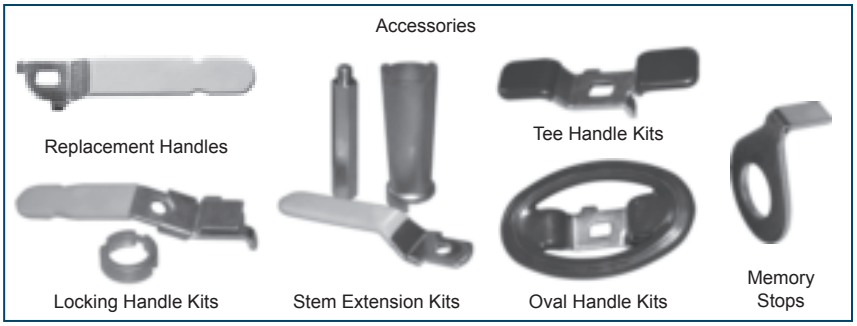


Figure Number Matrix

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

Additional Stocked Configuration

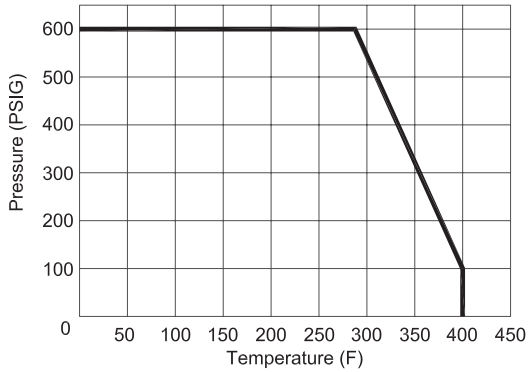
Tee Handle (1/2"~1")

Kit Codes (Order Separately)

FNW 410A Kit Size

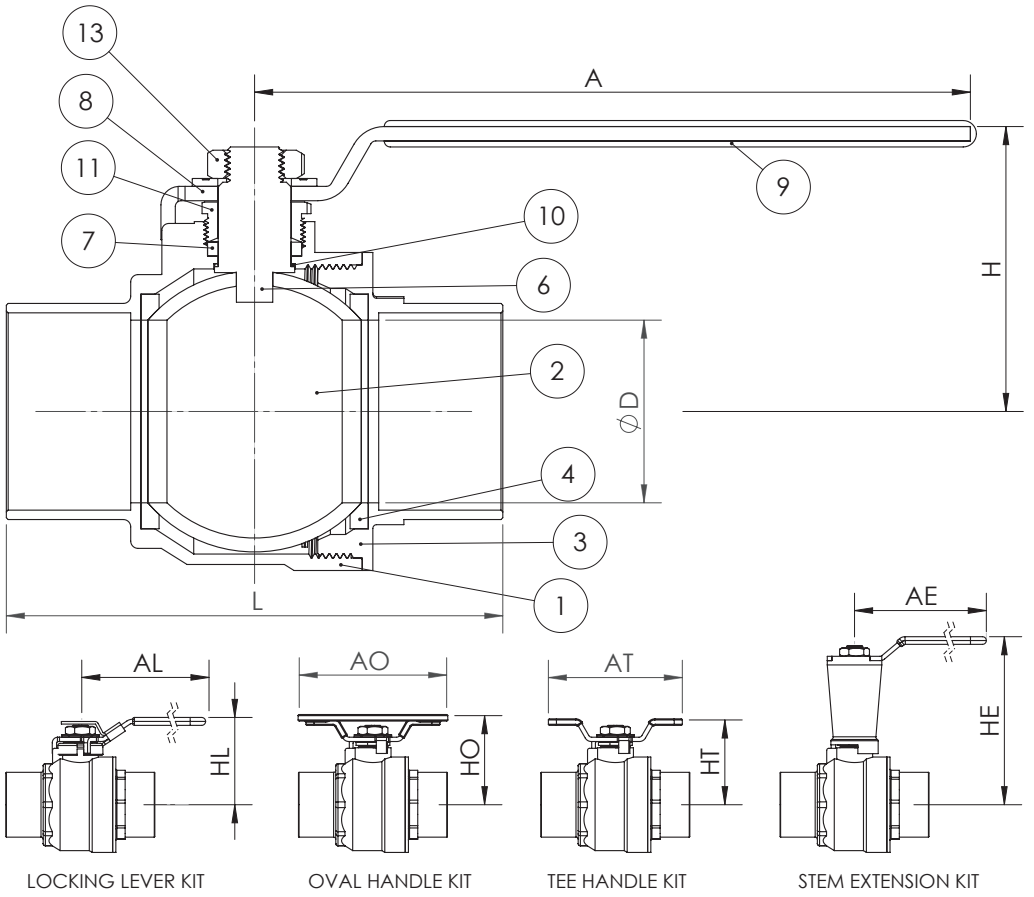
KIT TYPE	SIZE CODE
Replacement Handle = BRYLWH	1/2" = BD
Locking Lever = LHK	3/4" ~ 1" = FG
Stem Extension = SE	1-1/4" ~ 1-1/2" = HJ
Tee Handle* = THK	* 2" ~ 3" = KP
Oval Handle* = OHK	
Memory Stop = MSK	

*** 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.**



B

2 PC FULL PORT 600 WOG



Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	ASTM B124-C37700 Brass	1	1/2" to 1-1/2"
		ASTM B584-C85700 Brass		2" to 3"
2	Ball	ASTM B16-C36000 Brass (Chrome Plated)	1	1/2" & 3/4" (Solid)
		ASTM B124-C37700 Brass (Chrome Plated)		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	3.10	1.91	1.43	0.31
3/4	0.75	4.32	2.69	1.79	0.64
1	0.98	4.32	3.30	2.00	0.90
1-1/4	1.26	5.11	3.77	2.35	1.40
1-1/2	1.50	5.11	4.30	2.48	1.92
2	1.97	7.80	5.39	3.16	3.74
2-1/2	2.48	7.80	6.18	3.57	8.03
3	2.95	7.80	7.14	3.88	8.60

SIZE	AL	HL	AO	HO	AT	HT	AE	HE	Wt. (lbs)
1/2	3.06	1.64	2.80	1.44	2.70	1.30	2.95	4.28	0.31
3/4	4.32	2.17	3.60	1.71	3.40	1.82	3.95	4.75	0.64
1	4.32	2.35	3.60	2.05	3.40	1.94	3.95	4.90	0.90
1-1/4	5.09	2.78	4.39	2.34	4.03	2.24	4.92	5.24	1.40
1-1/2	5.09	2.96	4.39	2.44	4.03	2.34	4.92	5.40	1.92
2	7.75	3.70	5.38	3.17	4.85	3.03	8.00	6.03	3.74
2-1/2	7.75	4.13	5.38	3.62	4.85	3.50	8.00	6.44	8.03
3	7.75	4.46	5.38	3.95	4.85	3.76	8.00	6.79	8.60

2 PC FULL PORT* 600 WOG

Features:

- 600 WOG Non-Shock
- 400 PSI Maximum for FM Approved Applications
- 150 WSP
- Full Port*
- Threaded NPT Ends (ANSI B1.20.1)
- Forged Brass Body & End Cap
- Meets MSS SP-110 Standards
- FM & CSA Approved (1/2"~2")
- Blow-out Proof Stem
- Dual O-ring Non-adjustable Packing**
- Accessories (Sold Separately)
  - ○ Lock Lever Kit (1/4"~4")
  - ○ Stem Extension Kit (1/4"~4")
  - ○ Tee Handle Kit (1/4"~1")
  - ○ Oval Handle Kit (1/4"~2")
  - ○ Memory Stop Kit (1/4"~2")
  - ○ Stainless Handle (1/4"~2")

*** 4" Valve is Standard Port**

**** 1/4" & 3/8" Utilize one O-ring, one packing ring and adjustable packing nut**

NOT FOR USE AT OR BELOW GROUND LEVEL

Accessories

Locking Handle Kits

Stem Extension Kits

Tee Handle Kits

Oval Handle Kits

Memory Stops

Stainless Steel Handle

FM APPROVED
1/2" ~ 2"

C SP US
1/2" ~ 2"

Gas Approvals

- CSA Class 3371-08, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F~149°F
- CSA Class 3371-10, CGA 3.16, 125 PSIG, -40°F~149°F
- CSA Class 3371-12, CR91-002, 2 & 5 PSIG, -40°F~149°F
- CSA Class 3371-88, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F~149°F
- CSA Class 3371-90, ASME B16.33/B16.38, 125 PSIG, -40°F~149°F
- CSA Class 3371-92, ASME B16.44, 5 PSIG, -40°F~149°F

Figure Number Matrix

FNW 415 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	

Kit Codes (Order Separately)

FNW 420 Kit Size

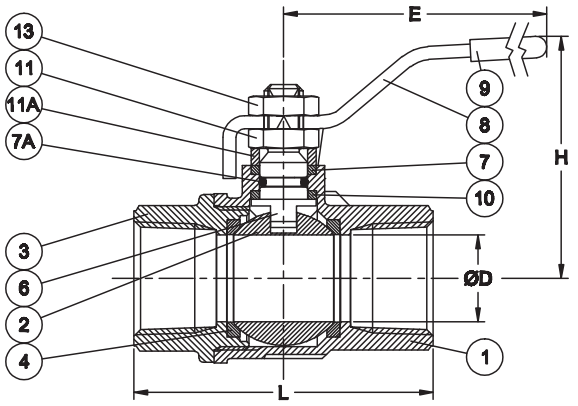
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~1/2" = BD
Stem Extension = SE	3/4"~1" = FG
Tee Handle = THK	1-1/4"~1-1/2" = HJ
Oval Handle = OHK	2" = K
Memory Stop = MSK	2-1/2"~4" = LM
Stainless Handle = SSHK	

Note: The figure 415 uses the same accessories as the 420. Since the 4" valve is standard port, the accessories for the 2-1/2" and 3" valves also fit the 4" size.

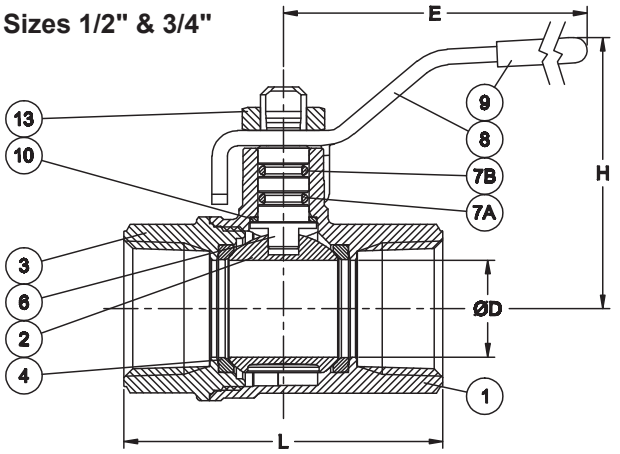
B

2 PC FULL PORT* 600 WOG

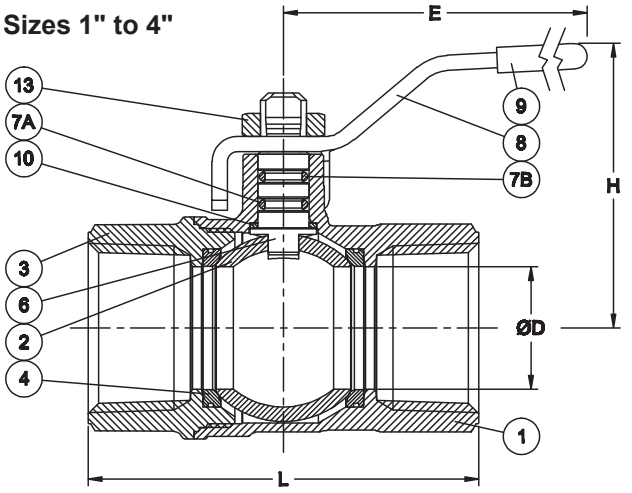
Sizes 1/4" & 3/8"



Sizes 1/2" & 3/4"



Sizes 1" to 4"



Standard Materials

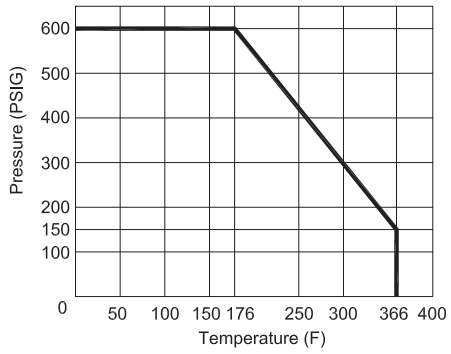
Ref. No.	Description	Material	Qty	Remarks
1	Body	Brass CW 617N	1	
2	Ball	Brass CW 617N (Nickel-Chrome Plated)	1	Solid ball 1/4" to 3/4" Hollow ball 1" & larger
3	End Cap	Brass CW 617N	1	
4	Seat	PTFE	2	
6	Stem	Brass CW 614N (Nickel Plated)	1	
7	Stem Packing	PTFE	1	1/4" & 3/8" only
7A	Stem O-ring	NBR	1	
7B	Stem O-ring	FKM	1	1/2" & larger only
8	Handle	Steel DD11	1	
9	Handle Sleeve	Vinyl	1	
10	Thrust Washer	PTFE	1	
11	Gland Nut	Steel CL 04	1	1/4" & 3/8" only
11A	Packing Gland	Brass CW 614N (Nickel Plated)	1	1/4" & 3/8" only
13	Handle Nut	Steel CL 04	1	

Dimensions (inches)

Size	ØD	E	L	H
1/4	0.39	3.78	2.03	1.67
3/8	0.39	3.78	2.03	1.67
1/2	0.55	3.78	2.22	1.77
3/4	0.75	4.76	2.46	2.22
1	0.94	4.76	3.01	2.32
1-1/4	1.19	5.94	3.37	2.85
1-1/2	1.50	5.94	3.70	3.09
2	1.95	6.30	4.33	3.70
2-1/2	2.44	8.07	5.16	4.59
3	2.99	8.07	5.94	4.98
4	2.99	8.07	6.50	4.98

Cv & Weights

Size	Cv	Wt. (lbs)
1/4	6	0.34
3/8	7	0.30
1/2	19	0.40
3/4	34	0.70
1	45	0.97
1-1/4	75	1.63
1-1/2	180	2.17
2	210	3.83
2-1/2	400	6.69
3	650	9.88
4	650	12.51



FNW™

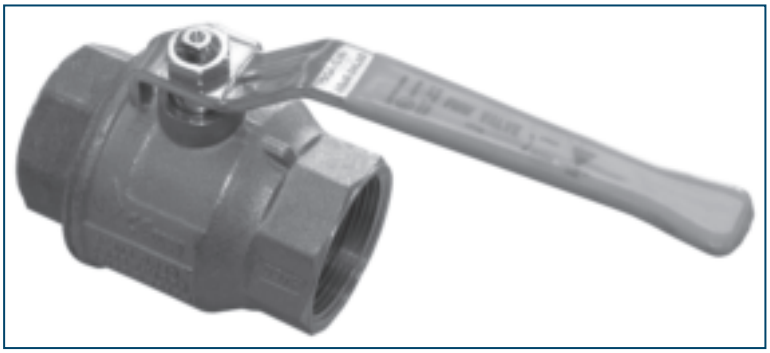
2 PC FULL PORT 600 WOG

B

Features:

- Threaded Connection
- 600 WOG
- 150 WSP
- Full Port
- Threaded NPT Ends (ANSI B1.20.1)
- Forged Brass Body & End Cap
- Meets MSS SP-110 Standards
- 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")

NOT FOR USE AT OR BELOW GROUND LEVEL



Accessories

Locking Handle Kits

Stem Extension Kits

Tee Handle Kits

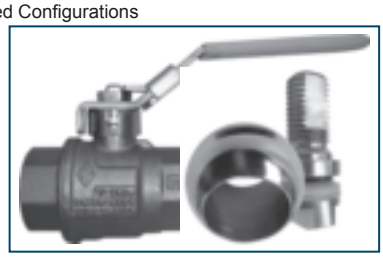
Oval Handle Kits

Memory Stops

Stainless Steel Handle

Additional Stocked Configurations

With Locking Handle (1/4"~2")



With Stainless Steel Ball & Stem (1/4"~2")
(Includes Locking Lever)

FM APPROVED
Up to 2"

C SA US
See Below

UL
1/4" ~ 4"

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
	1/2 = D	2-1/2 = L
SS Ball & Stem = SSLL w/Locking Handle (1/4"~2")	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

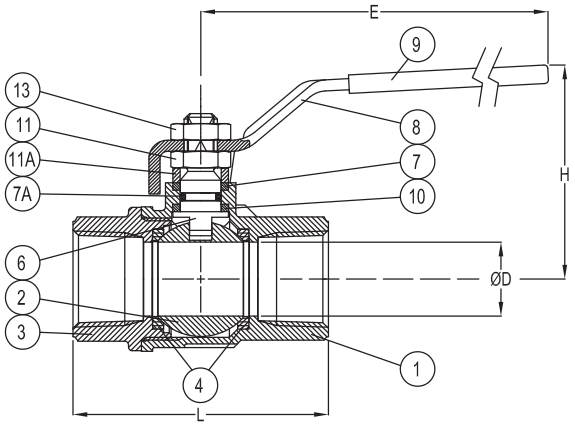
Gas Approvals

- 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")

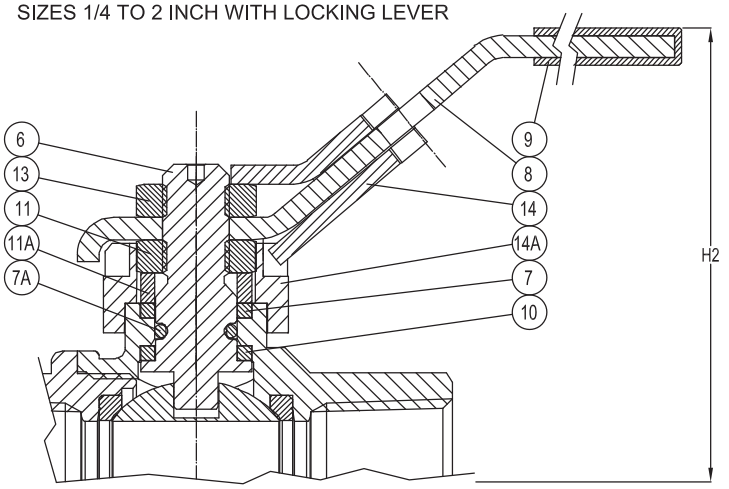
B

2 PC FULL PORT 600 WOG

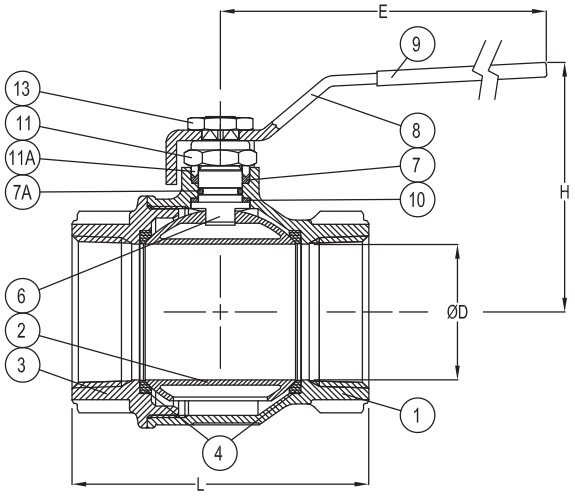
SIZES 1/4 TO 2 INCH



SIZES 1/4 TO 2 INCH WITH LOCKING LEVER



SIZES 2-1/2 TO 4 INCH



Standard Materials

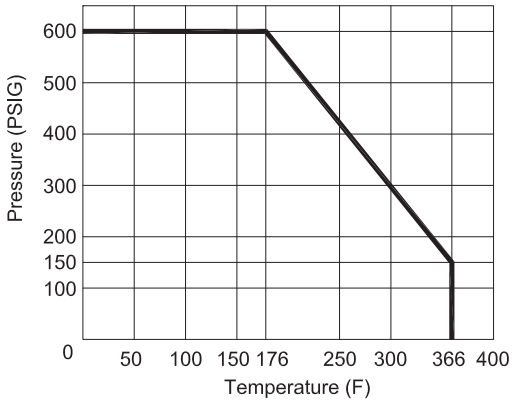
Ref. No.	Description	Material	Qty
1	Body	Brass CW 617N UNI EN 12165	1
2	Ball	Brass CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass CW 617N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass CW 614N UNI EN 12164	1
7	Stem Packing	PTFE	1
7A	Stem O-ring	NBR 75 Shore A	1
8	Handle	Fe P 11 UNI 5867	1
9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



FNW™

2 PC FULL PORT 600 WOG w/SWEAT ENDS

B

Features:

- Sweat End Connections
- 600 WOG
- 150 WSP
- Full Port
- Sweat Ends (ANSI B16.18)
- Forged Brass Body & End Cap
- Meets MSS SP-110 Standards
- 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")

NOT FOR USE AT OR BELOW GROUND LEVEL

Accessories

Locking Handle Kits

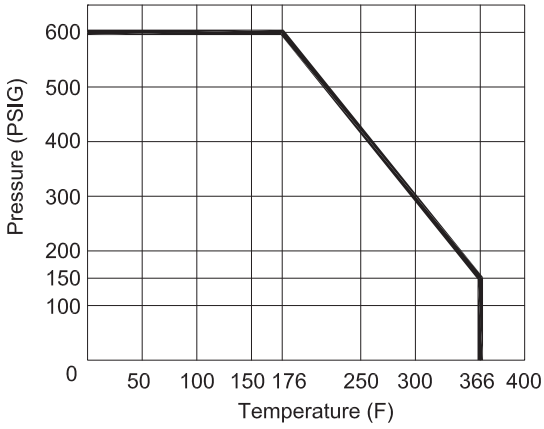
Stem Extension Kits

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)

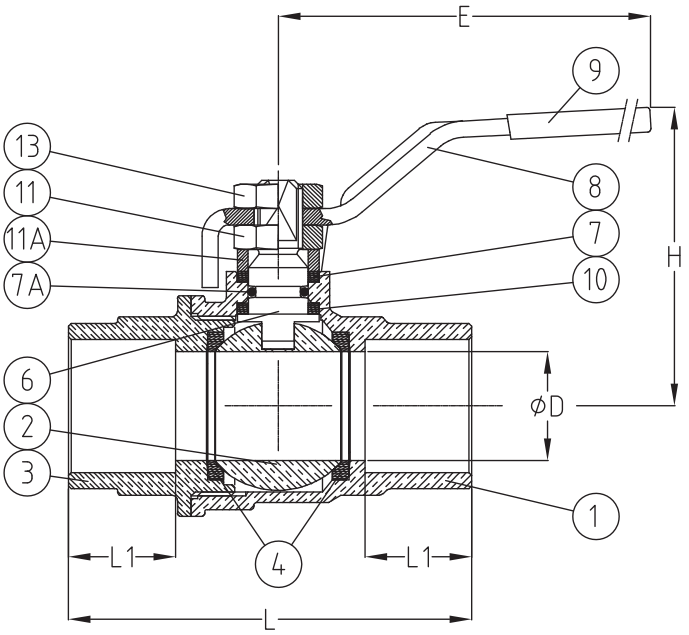
FNW 420 Kit Size

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

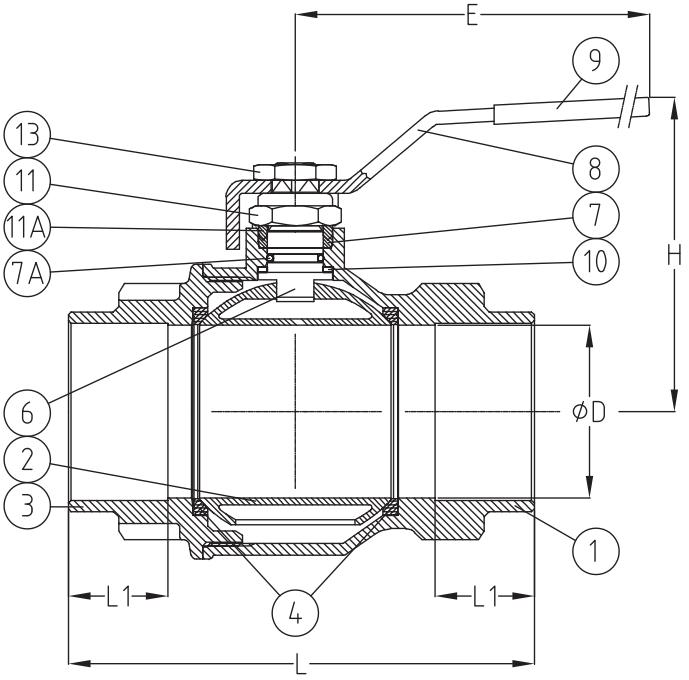
2 PC FULL PORT 600 WOG w/SWEAT ENDS

B

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

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
- Maximum Cap Pressure is 50 PSI**
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit

* The pressure/temperature ratings indicated are for the valve body only. Hose side ratings are dependent on the type of hose connected by others.

** The included cap is rated to 50 PSI maximum. The primary purpose of the cap is for protection of the hose connection threads. For safety concerns, removal under pressure is not recommended.

NOT FOR USE AT OR BELOW GROUND LEVEL

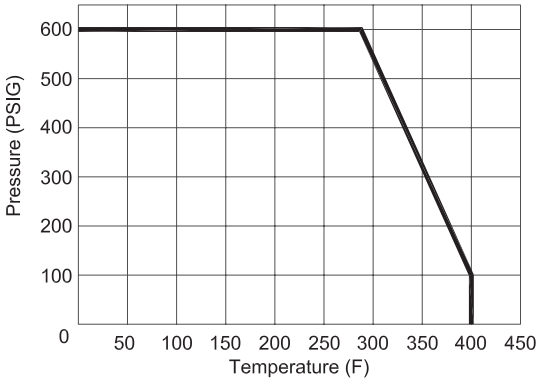


Figure 426A - FNPT

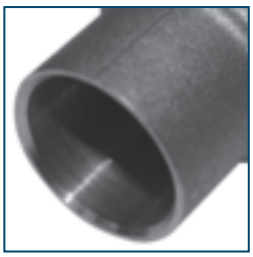


Figure 427A - SWEAT

Figure 428A - MNPT

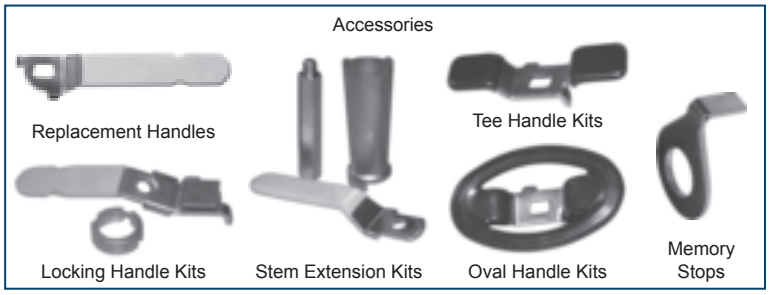


Figure Number Matrix

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 = BRYLWH	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

B

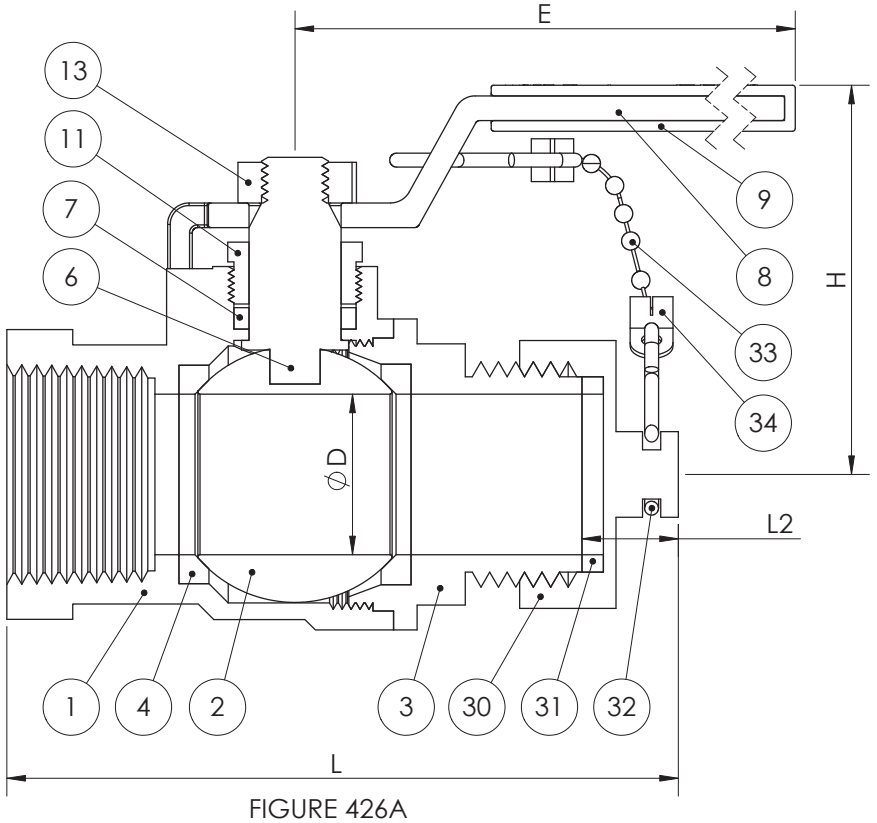


FIGURE 426A

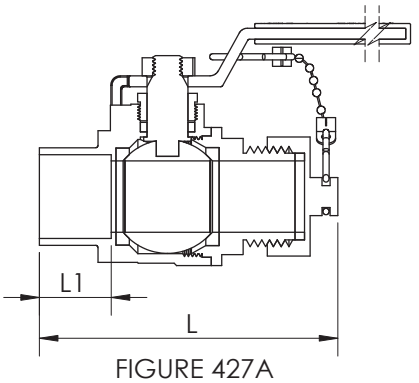


FIGURE 427A

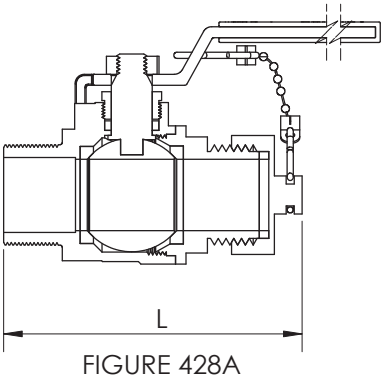


FIGURE 428A

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

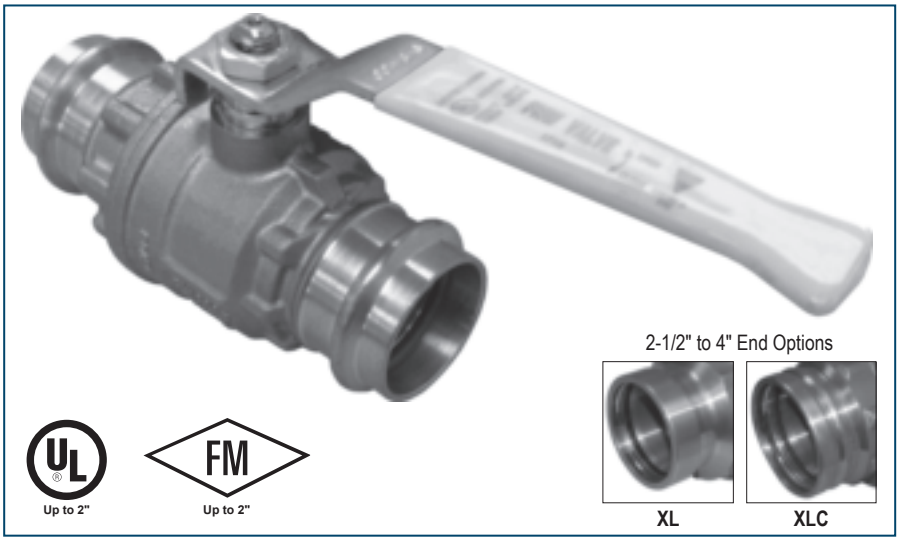
Standard Materials

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

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. Drip Fit O-rings ensure that an end connection will drip, indicating an end was not pressed.



Features:

- 200 PSI Max. Working Pressure
- 250°F Max. Temperature at Max. Pressure
- Full Port
- Press Ends
- Conforms to MSS SP-110 [1]
- FM and UL Certified (up to 2")
- True 2-Piece Design
- Drip Fit O-rings (up to 2")
- No Soldered-In End Pieces
- Blow-out Proof Stem
- Adjustable Packing
- Secondary O-ring Stem Seal
- Forged Brass Body & End Cap
- 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.

NOT FOR USE AT OR BELOW GROUND LEVEL

Accessories

Drip Fit O-rings

The Drip Fit O-rings (up to 2") ensure that an unpressed end will drip. This is an added safety feature to ensure unpressed ends are discovered and corrected.

Figure Number Matrix

FNW 430 End Size

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

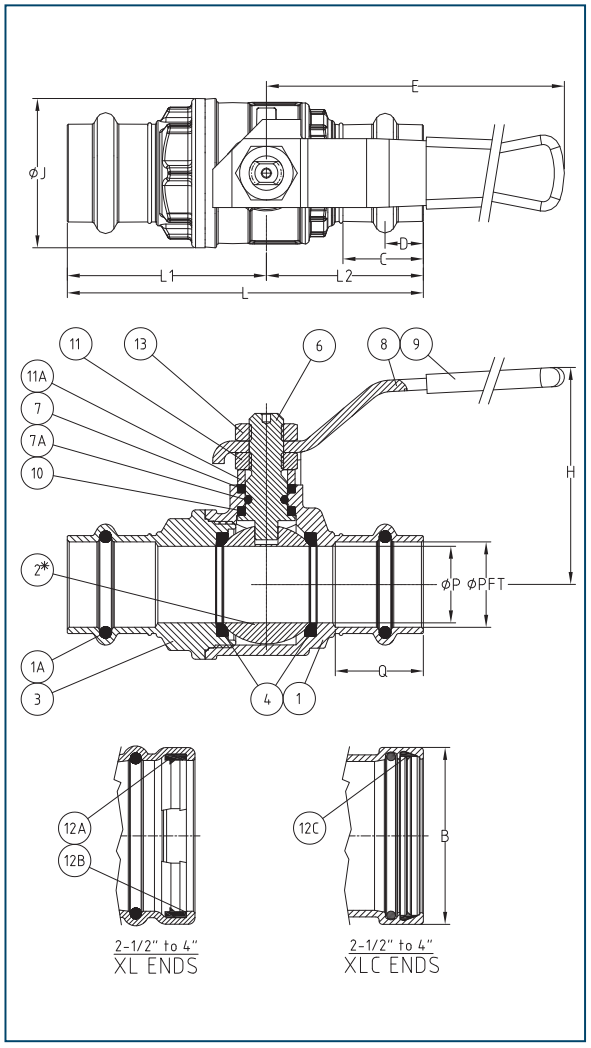
Kit Codes (Order Separately)

FNW 420 Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/2" = BD
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 WATER SERVICE VALVE w/PRESS ENDS

B



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

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 Minnimum 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
- 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.

NOT FOR USE AT OR BELOW GROUND LEVEL

Accessories

Locking Handle Kits

Stem Extension Kits

Tee Handle Kits

Oval Handle Kits

Memory Stops

Stainless Steel Handle

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

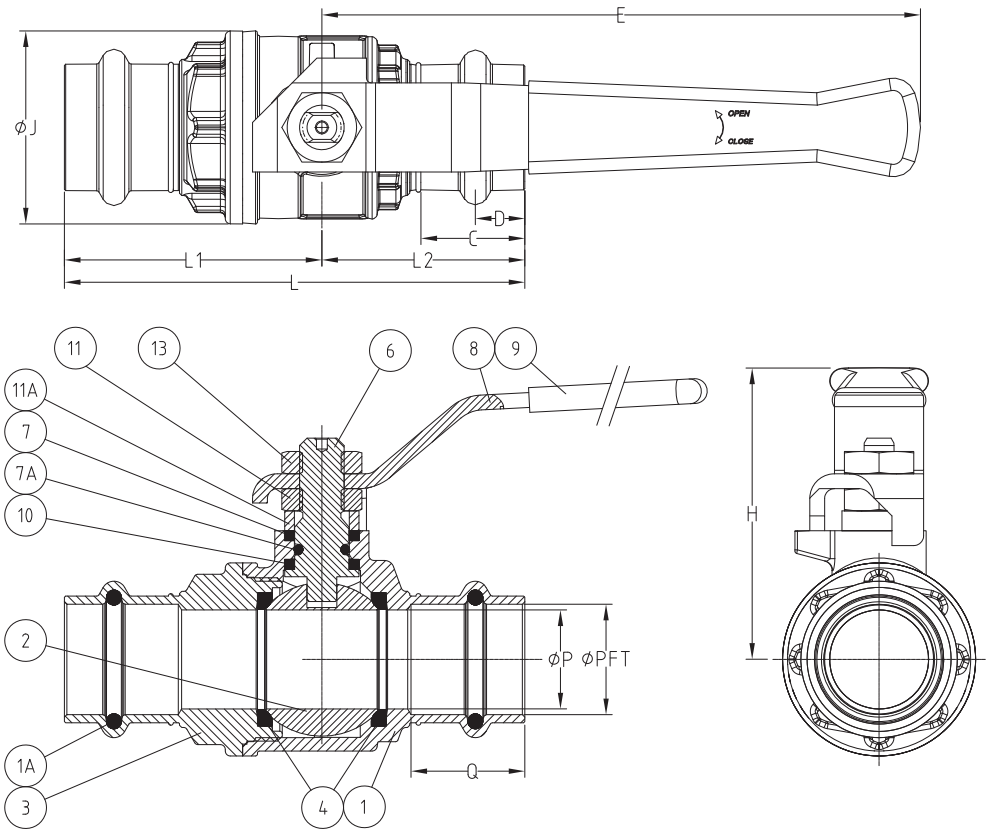
Kit Codes (Order Separately)

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

B



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

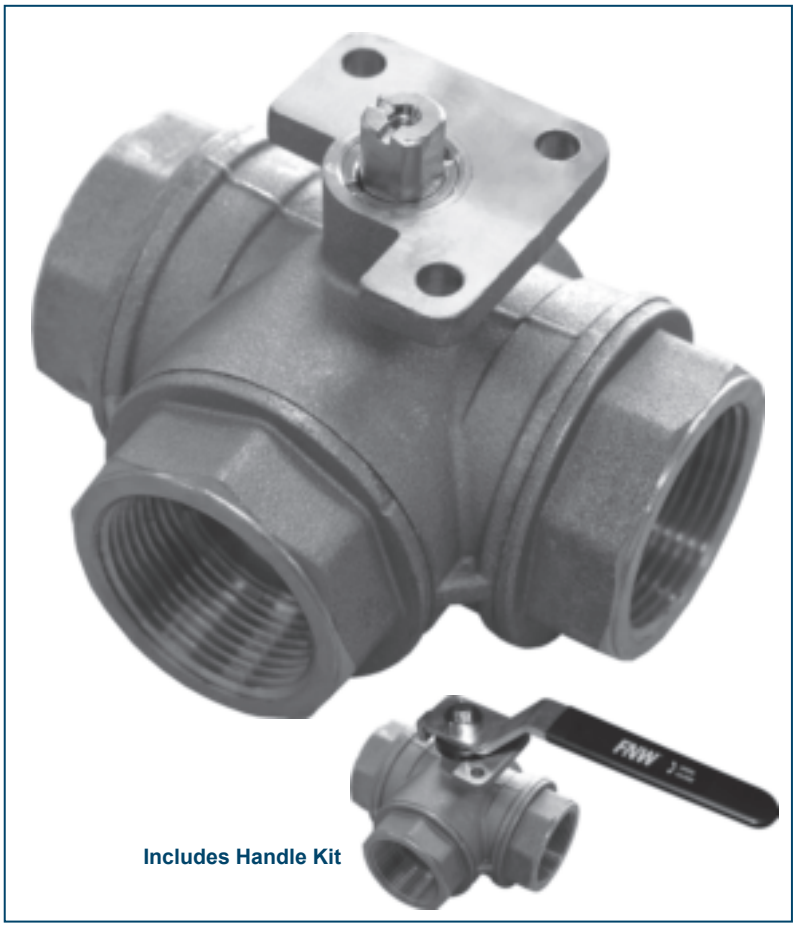
Ref. No.	Description	Material	Qty
1	Body	Brass, CW 602N UNI EN 12165	1
1A	O-ring	Rubber NBR	2
2	Ball	Brass, CW 617N UNI EN 12165 (Nickel-Chrome Plated)	1
3	End Cap	Brass, CW 602N UNI EN 12165	1
4	Seat	PTFE	2
6	Stem	Brass, CW 614N UNI EN 12164 NP	1
7	Stem Packing	PTFE	1
7A	Stem O-ring	NBR	1
8	Handle	Steel 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

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)
- Handle Kit Included
- Sizes 1/4" to 2"

NOT FOR USE AT OR BELOW GROUND LEVEL



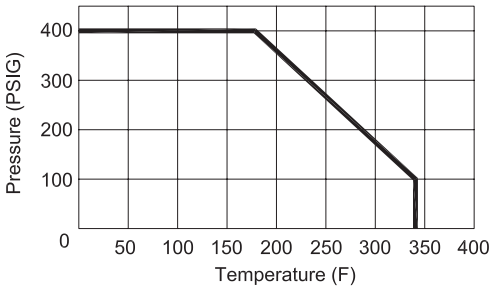
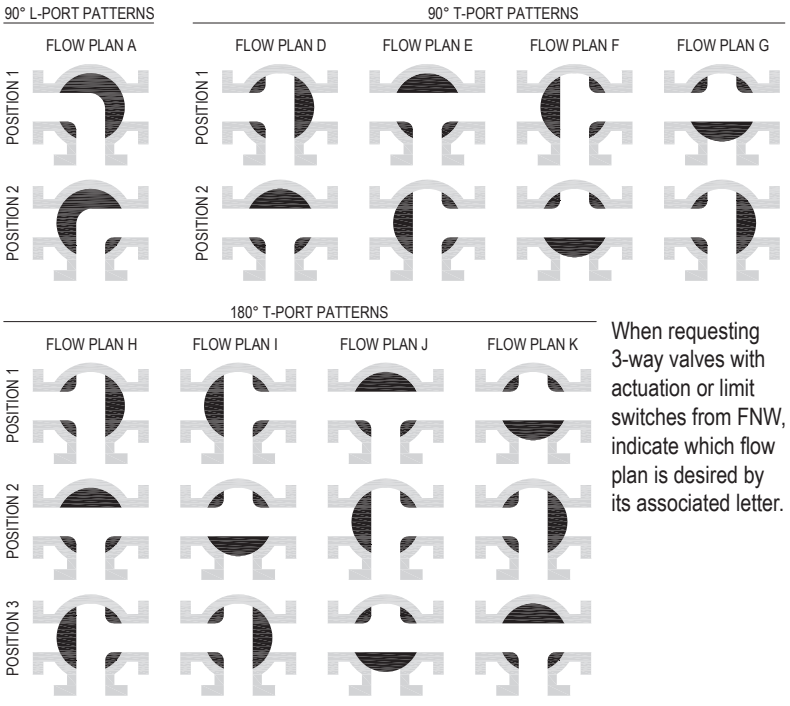


Figure Number Matrix

FNW 4 5 5 Size

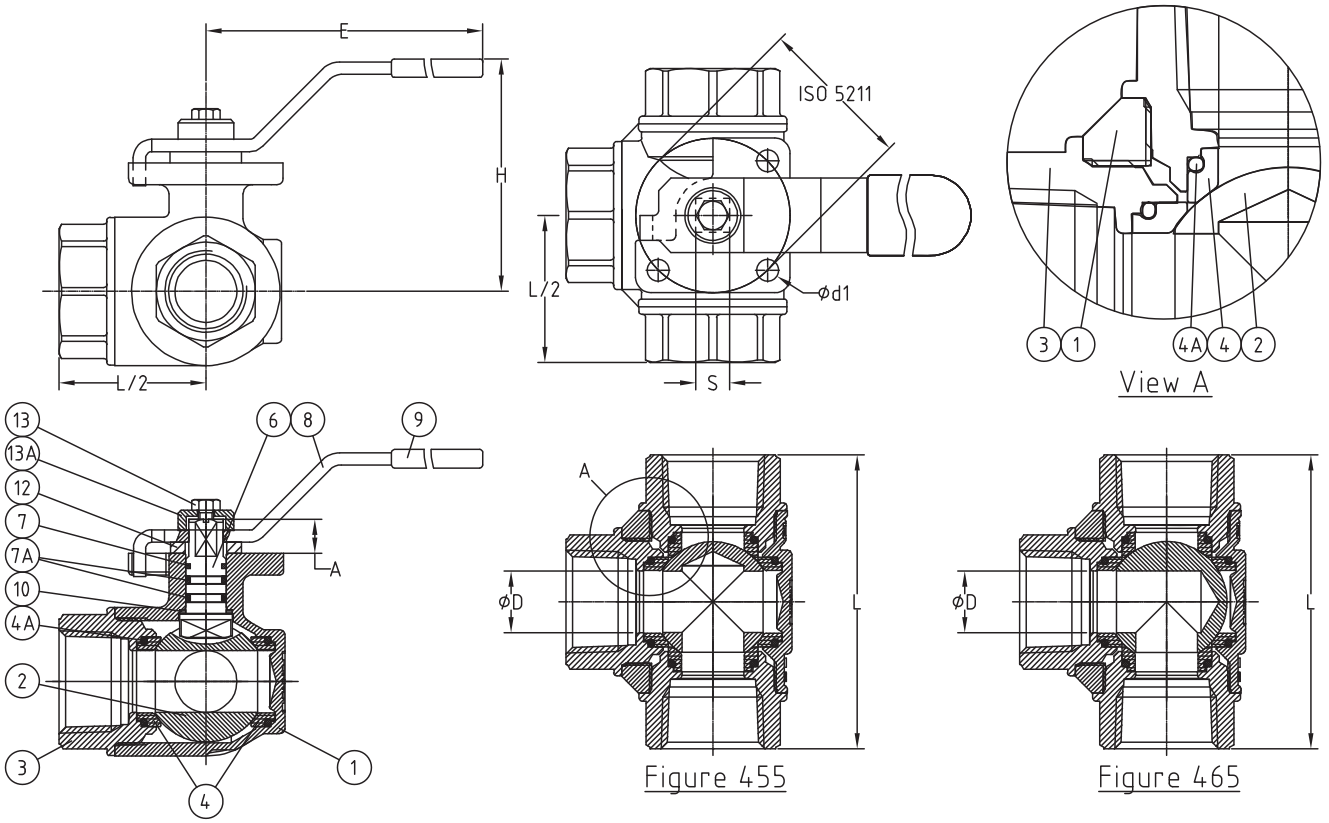
PORT TYPE	SIZE CODE	
T-PORT = 5	1/4 = B	1 = G
L-PORT = 6	3/8 = C	1-1/4 = H
	1/2 = D	1-1/2 = J
	3/4 = F	2 = K



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

B

3-WAY DIVERTING 400 WOG w/ ISO PAD



Dimensions, Cv, Torque & Weight

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

FNW™

B

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:

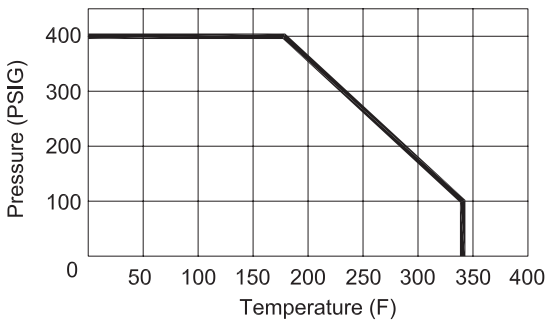
- 400 WOG
- Full Port
- Flanged Pump Connection by:
  - ○ Threaded End (Fig.470)
  - ○ Sweat End (Fig. 475)
- Solid Integral Pump-Side Flange
- Blow-out Proof Stem
- Adjustable Packing
- Forged Brass Body & End Cap
- Includes T-handle, Gasket and Hardware

NOT FOR USE AT OR BELOW GROUND LEVEL

Figure 470 - Threaded End

Figure 475 - Sweat End

T-Handle, Gasket & Hardware Included



Weight (lbs)

Size	470	475
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

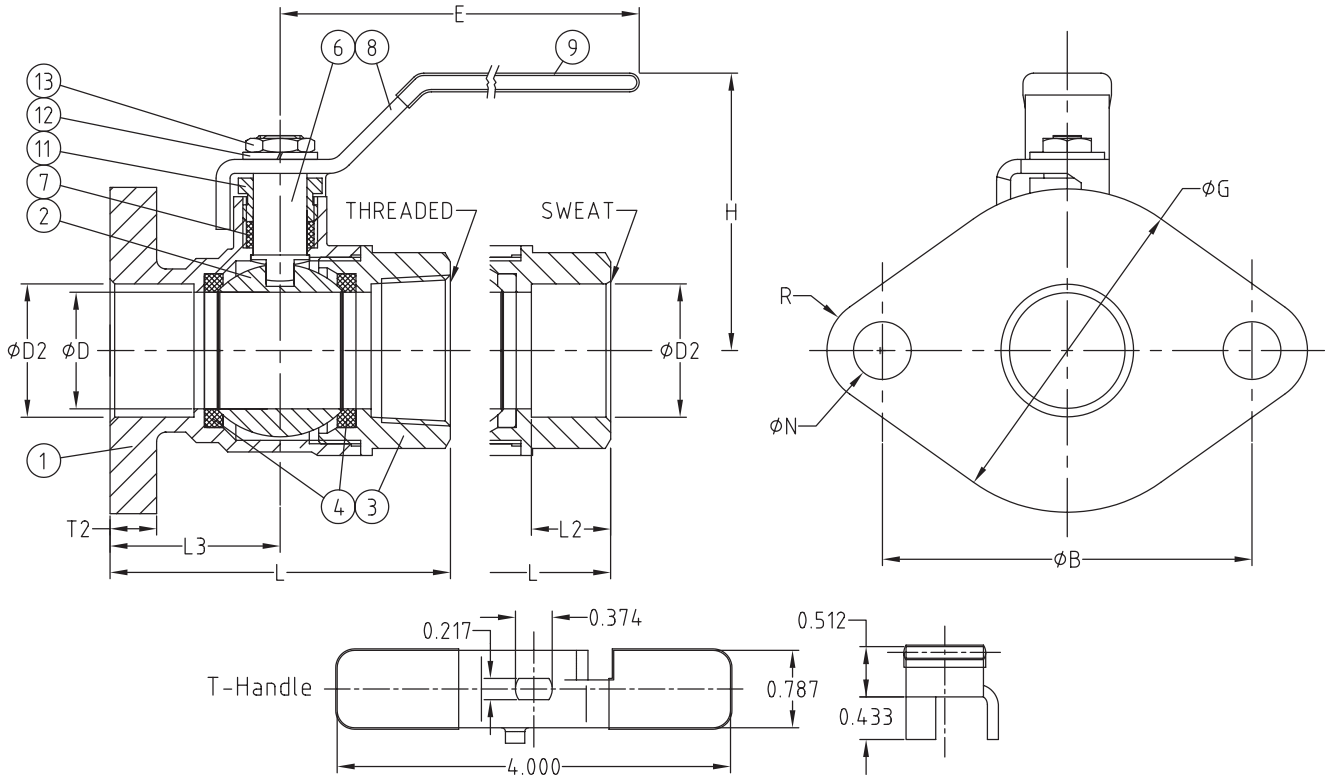
FNW 4 7 0 Size

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

Replacement Gasket P/N = FNWPIVFGFJ

B

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

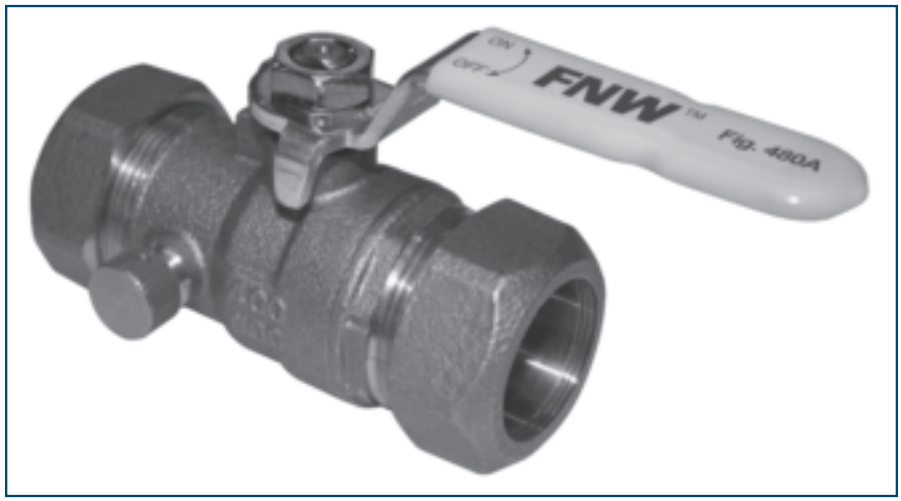
Ref. No.	Description	Material	Qty	Remarks
11	Gland Nut	Brass - C36000	1	
12	Handle Washer	ASTM G1566	1	
13	Handle Nut	Steel - AISI-1010	1	
14	Flange Bolt	Steel - AISI-1010	2	Not shown
15	Flange Nut	Steel - AISI-1010	2	Not shown
16	Flange Gasket	Rubber - NBR	1	Not shown
17	T-Handle	Steel - AISI-1010	1	

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

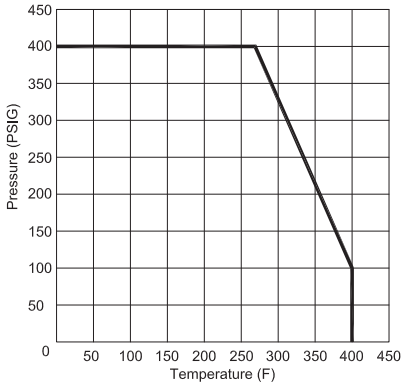
Features:

- 400 WOG
- 150 WSP (to 366ºF)
- Compression Ends
- Standard Port
- PTFE Seats
- 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

NOT FOR USE AT OR BELOW GROUND LEVEL



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 applications and includes saturated steam service to 150 PSI (366ºF). 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.



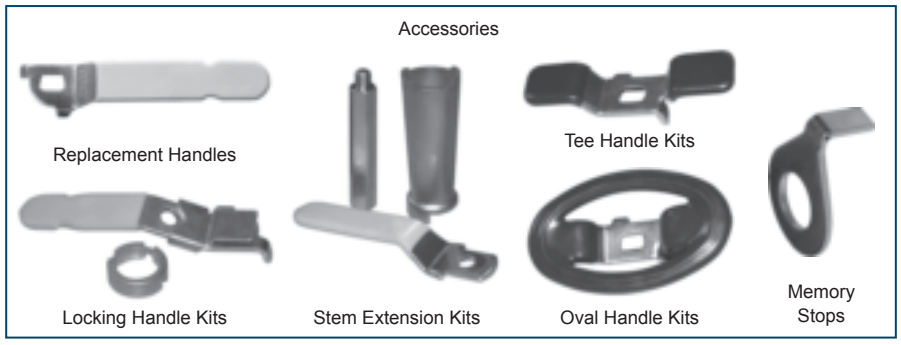


Figure Number Matrix

FNW 480A Size

SIZE CODE
1/2 = D
3/4 = F
1 = G

Kit Codes (Order Separately)

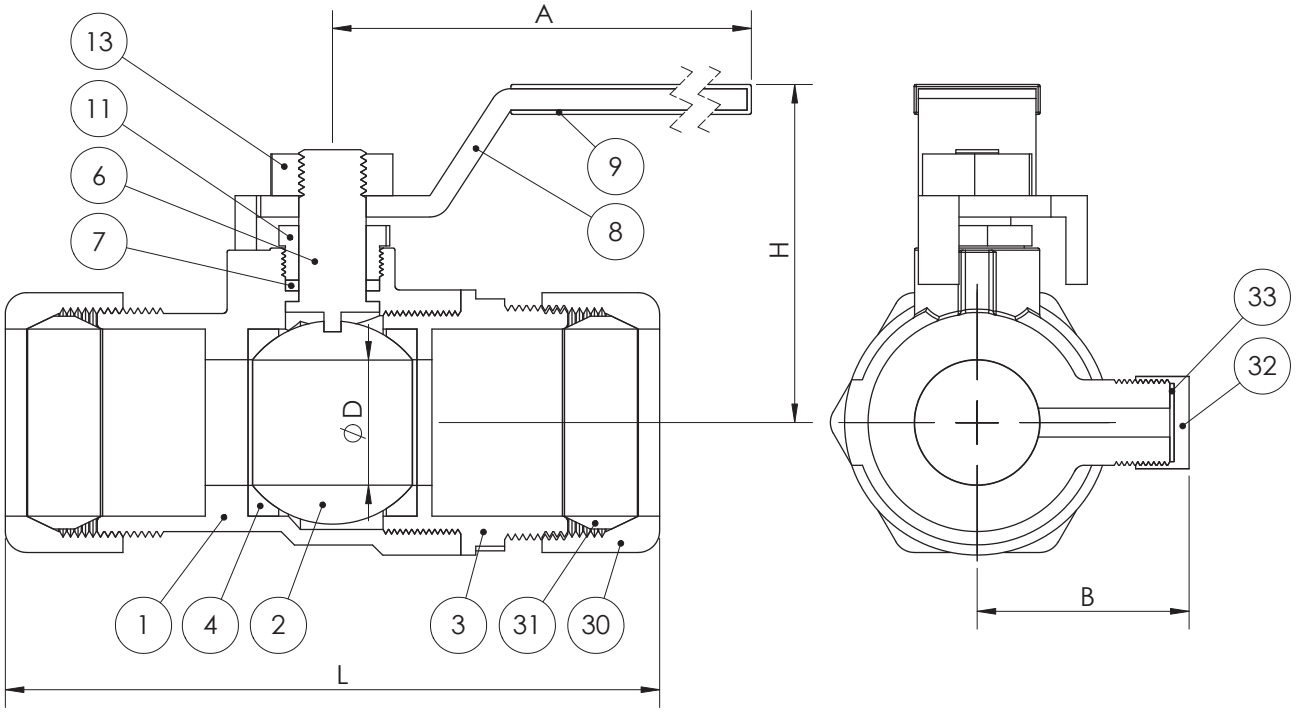
FNW 410A Kit Size

KIT TYPE	SIZE CODE
Replacement Handle = BRYLWH	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

B



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

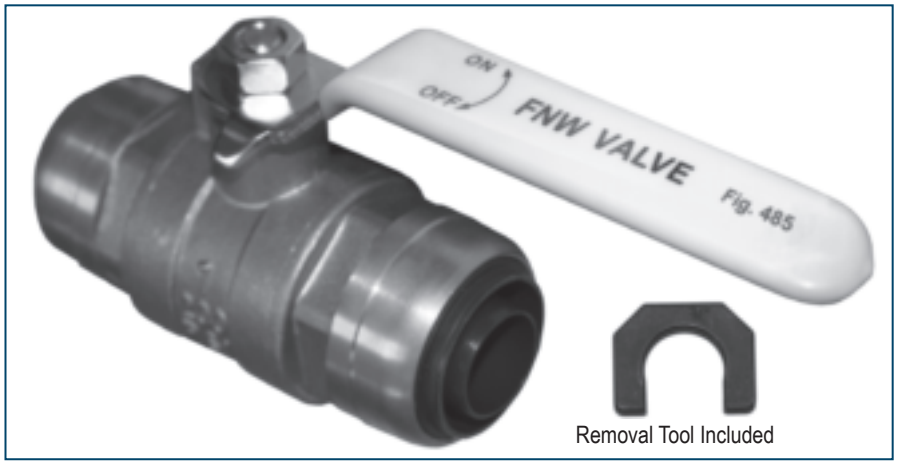
Standard Materials

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

FNW™

FULL PORT PUSH-FIT VALVE FOR WATER OR AIR

The FNW figure 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.



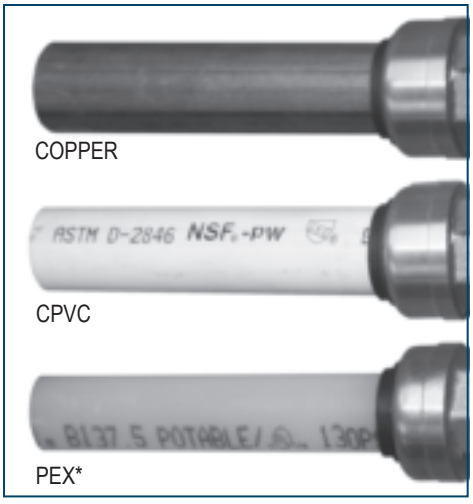
Removal Tool Included

Features:

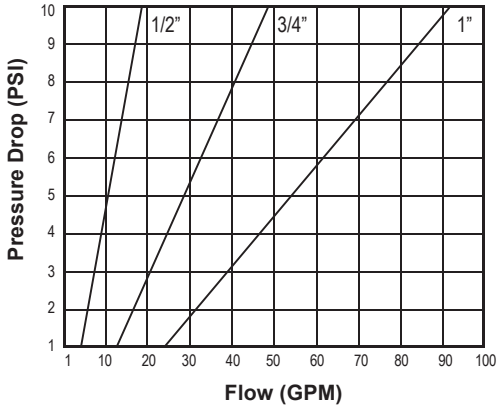
- 200 PSI Max. Working Pressure (non-shock Water or Air)
- Push-Fit Ends
- For Copper, CPVC, and PEX* Pipe
- Full Port
- Solid Ball
- Temperature Range: 33°F to 180°F (0.6°C to 82.2°C)
- Blow-out Proof Stem
- Adjustable Packing
- Includes Removal Tool

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

NOT FOR USE AT OR BELOW GROUND LEVEL



Flow Capacity



Weights

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

Figure Number Matrix

FNW 485 Size

SIZE CODES

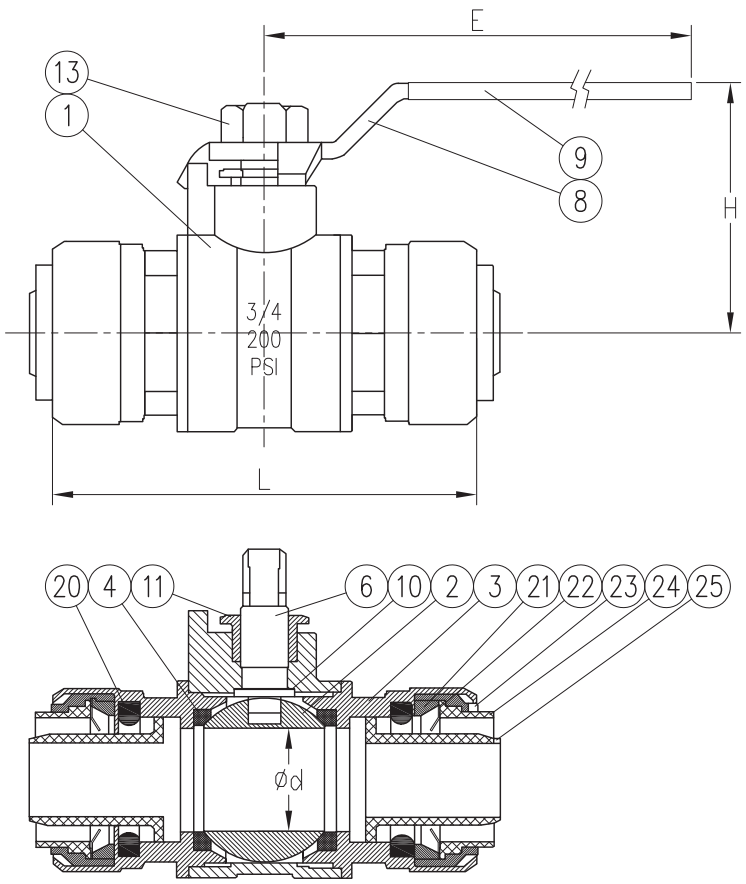
1/2 = D

3/4 = F

1 = G

FULL PORT PUSH-FIT VALVE FOR WATER OR AIR

B



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

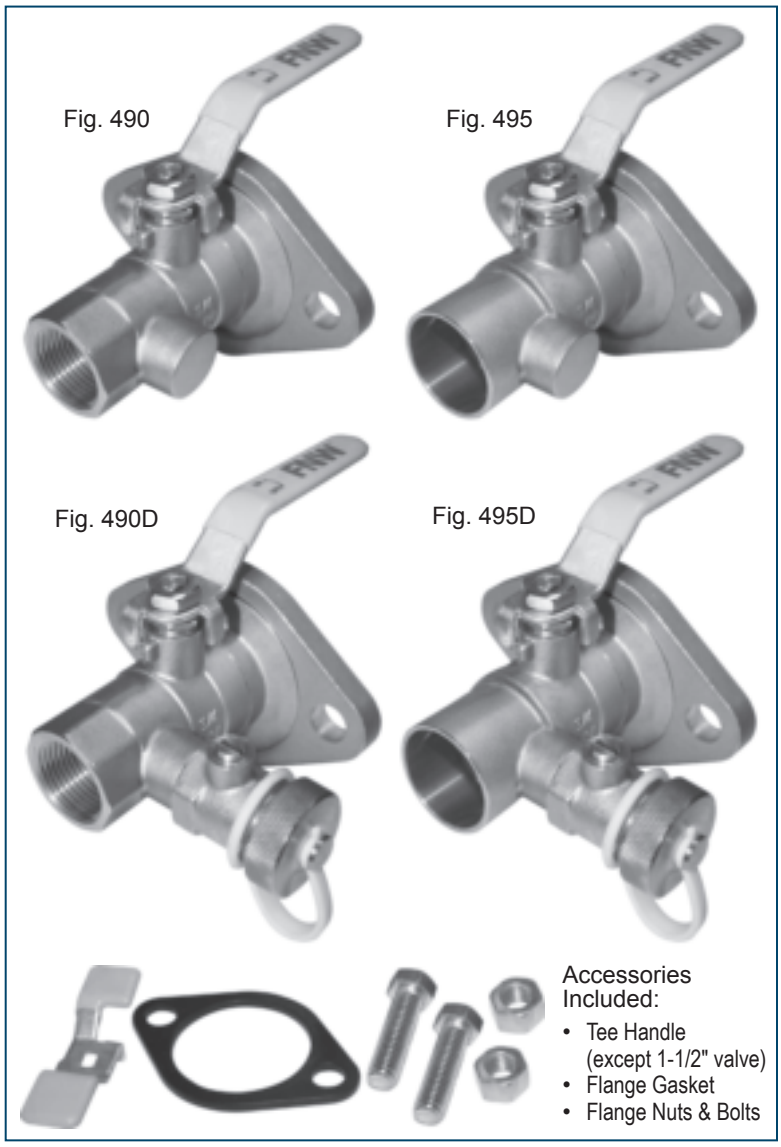
FNW™

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

NOT FOR USE AT OR BELOW GROUND LEVEL



Accessories Included:

- Tee Handle (except 1-1/2" valve)
- Flange Gasket
- Flange Nuts & Bolts

Figure Number Matrix

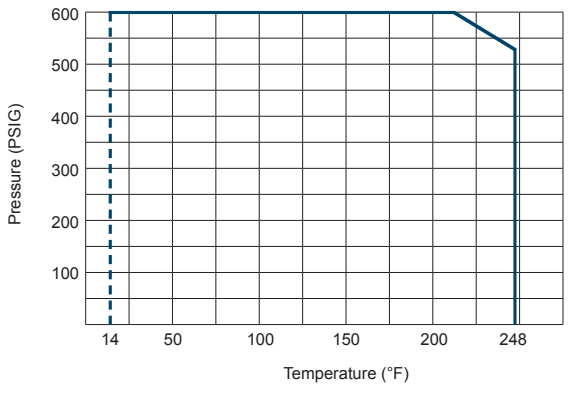
FNW 490 D Size

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

Replacement Gasket P/N = FNWPIV490FGFJ

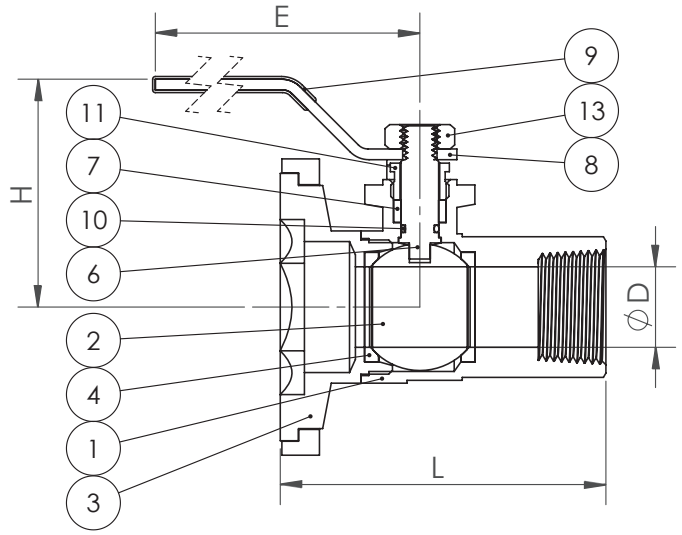
Weight (lbs)

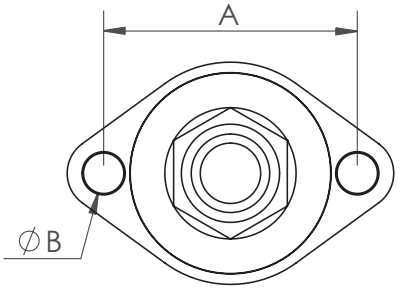
Size	490	490D	495	495D
3/4	1.47	1.66	1.40	1.57
1	1.89	2.06	1.73	1.92
1-1/4	2.41	2.59	2.17	2.37
1-1/2	3.00		2.82	



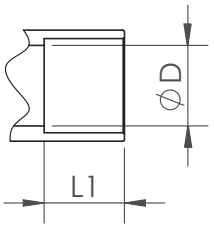
2 PC FULL PORT 600 WOG BALL VALVE PUMP ISOLATION w/ROTATING FLANGE

B

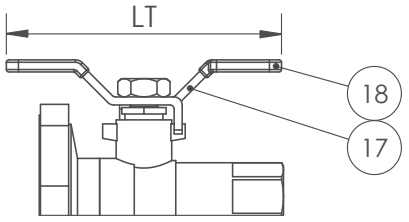




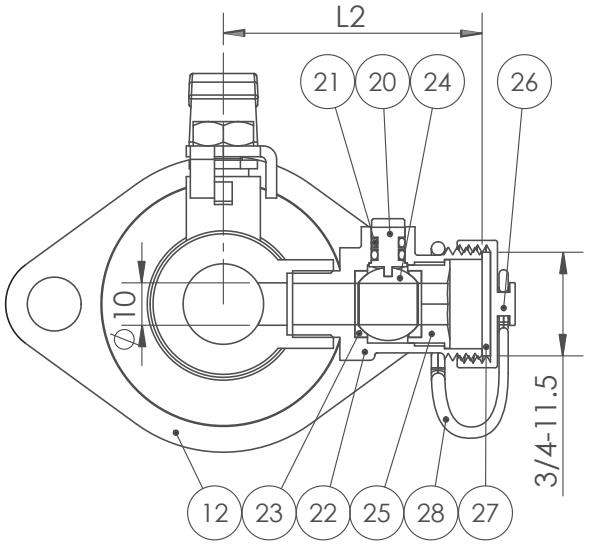
FLANGE VIEW



495-495D
SWEAT END
CONNECTION



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



490D-495D (WITH DRAIN)

Dimensions (inches)

SIZE	ØD	L		E	LT	L1	L2	H	A	ØB
		NPT	Sweat			Sweat	Drain			
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

Standard Materials

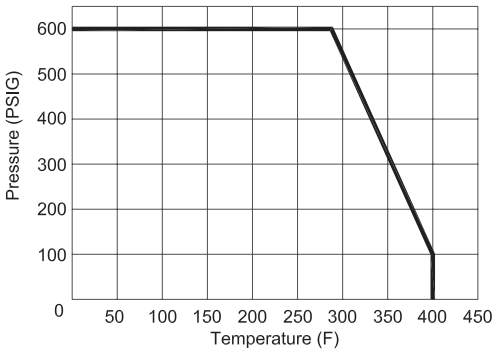
Ref. No.	Description	Material	Qty	Remarks
1	Body	HPb59-3 Brass	1	
2	Ball	HPb58-3 Brass	1	Chrome Pltd
3	End Cap	HPb59-3 Brass	1	
4	Seat	PTFE	2	
6	Stem	HPb58-3 Brass	1	
7	Packing	PTFE	1	
8	Handle	Steel	1	Zinc Plated
9	Handle Sleeve	Vinyl	1	
10	Stem O-ring	EPDM	1	
11	Packing Gland Nut	HPb58-3 Brass	1	
12	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

LOW LEAD COMPLIANT 2 PC 600 WOG GAS APPROVED BALL VALVE

Features:

- 600 WOG
- Full Port
- NSF 61 Annex G Certified (Truesdail) (Annex G references NSF 372)
- CSA Approved
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Threaded NPT Ends Per ANSI B 1.20.1
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit

NOT FOR USE AT OR BELOW GROUND LEVEL



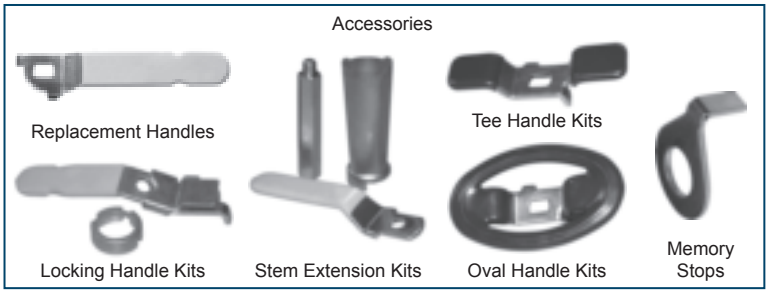


Figure Number Matrix

FNW X410C Size

SIZE CODE

1/4 = B	3/4 = F	1-1/2 = J	3 = M
3/8 = C	1 = G	2 = K	4 = P
1/2 = D	1-1/4 = H	2-1/2 = L	

Kit Codes (Order Separately)

FNW 410A Kit Size

KIT TYPE	SIZE CODE
Replacement Handle = BRYLWH	1/2" = BD
Locking Lever = LHK	3/4" ~ 1" = FG
Stem Extension = SE	1-1/4" ~ 1-1/2" = HJ
Tee Handle* = THK	* 2" = 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.**

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

NSF 61 ANNEX G

C SP US
1/2"-2"

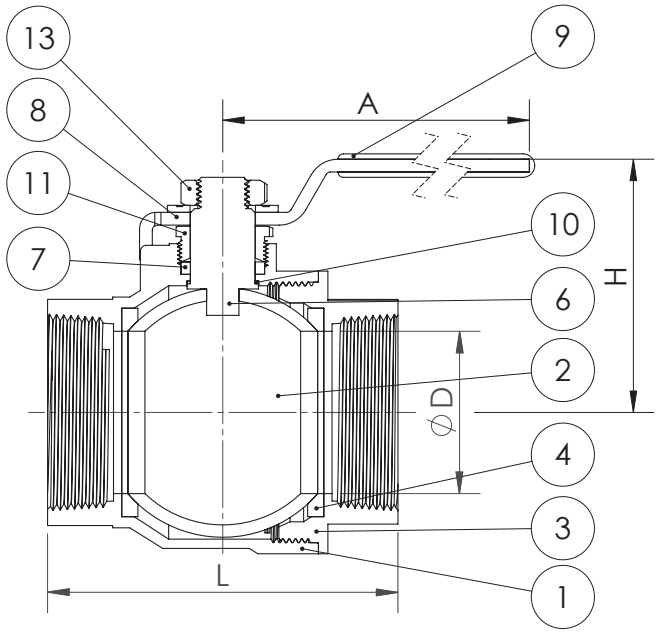
UL
1/4" ~ 2"

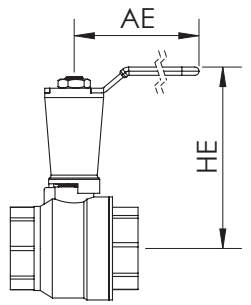
Gas Approvals

- 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, 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

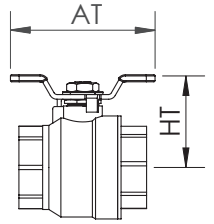
LOW LEAD COMPLIANT 2 PC 600 WOG GAS APPROVED BALL VALVE

B

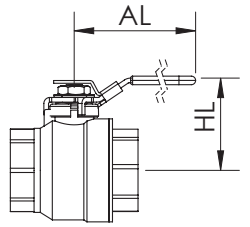




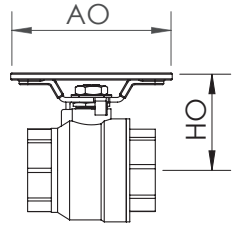
STEM EXTENSION KIT



TEE HANDLE KIT



LOCKING LEVER KIT



OVAL HANDLE KIT

Dimensions (inches) & Weights

SIZE	ØD	A	L	H	Wt. (lbs)
1/4	0.35	3.10	1.69	1.35	0.28
3/8	0.39	3.10	1.80	1.40	0.30
1/2	0.50	3.10	2.12	1.50	0.40
3/4	0.75	4.32	2.45	1.85	0.74
1	0.98	4.32	2.98	2.01	1.03
1-1/4	1.26	5.11	3.35	2.32	1.61
1-1/2	1.50	5.11	3.60	2.55	2.11
2	1.97	7.80	4.23	3.07	3.83
2-1/2	2.48	7.80	5.15	3.48	6.48
3	2.95	7.80	5.91	3.89	9.18
4	2.95	7.80	6.26	3.92	11.65

SIZE	AL	HL	AO	HO	AT	HT	AE	HE
1/4	3.06	1.65	2.80	1.44	2.70	1.34	2.95	4.27
3/8	3.06	1.72	2.80	1.46	2.70	1.36	2.95	4.30
1/2	3.06	1.72	2.80	1.52	2.70	1.43	2.95	4.35
3/4	4.32	2.17	3.60	1.91	3.40	1.78	3.95	4.80
1	4.32	2.37	3.60	2.06	3.40	1.93	3.95	4.93
1-1/4	5.09	2.81	4.39	2.32	4.03	2.18	4.92	5.28
1-1/2	5.09	2.98	4.39	2.54	4.03	2.40	4.92	5.45
2	7.75	3.67	5.38	3.14	4.85	3.08	8.00	6.02
2-1/2	7.75	4.13	5.38	3.55	4.85	3.46	8.00	6.41
3	7.75	4.58	5.38	3.91	4.85	3.82	8.00	6.81
4	7.75	4.62	5.38	3.91	4.85	3.90	8.00	6.97

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	C46400 Lead Free Brass	1	1/2"~1-1/2"
		Modified C46400 LF Brass		2"
2	Ball	C46400 Lead Free Brass (Chrome Plated)	1	1/2"~3/4" Solid
				1"~ 2" Shell
3	End Cap	C46400 Lead Free 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" Only
11	Packing Gland	ASTM B16-C36000	1	
13	Handle Nut	AISI-1010 Steel	1	Zinc Plated

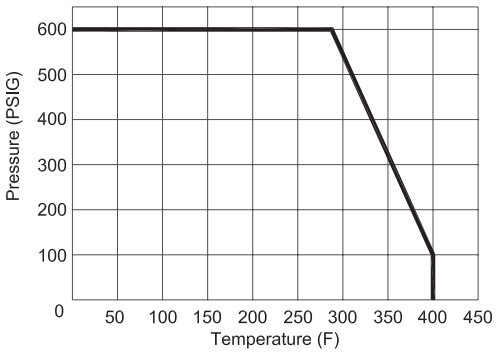
LOW LEAD COMPLIANT
2 PC 600 WOG BALL VALVE

B

Features:

- 600 WOG
- Full Port
- NSF 61 Annex G Certified (Truesdail) (Annex G references NSF 372)
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Sweat Ends Per ANSI B16.18
- Optional Lock Lever Kit
- Optional Stem Extension Kit
- Optional Tee Handle Kit
- Optional Oval Handle Kit
- Optional Memory Stop Kit

NOT FOR USE AT OR BELOW GROUND LEVEL



Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

NSF 61 ANNEX G

Figure Number Matrix

FNW X411C Size

SIZE CODE
3/8 = C
1/2 = D
3/4 = F
1 = G
1-1/4 = H
1-1/2 = J
2 = K
2-1/2 = L
3 = M

Kit Codes (Order Separately)

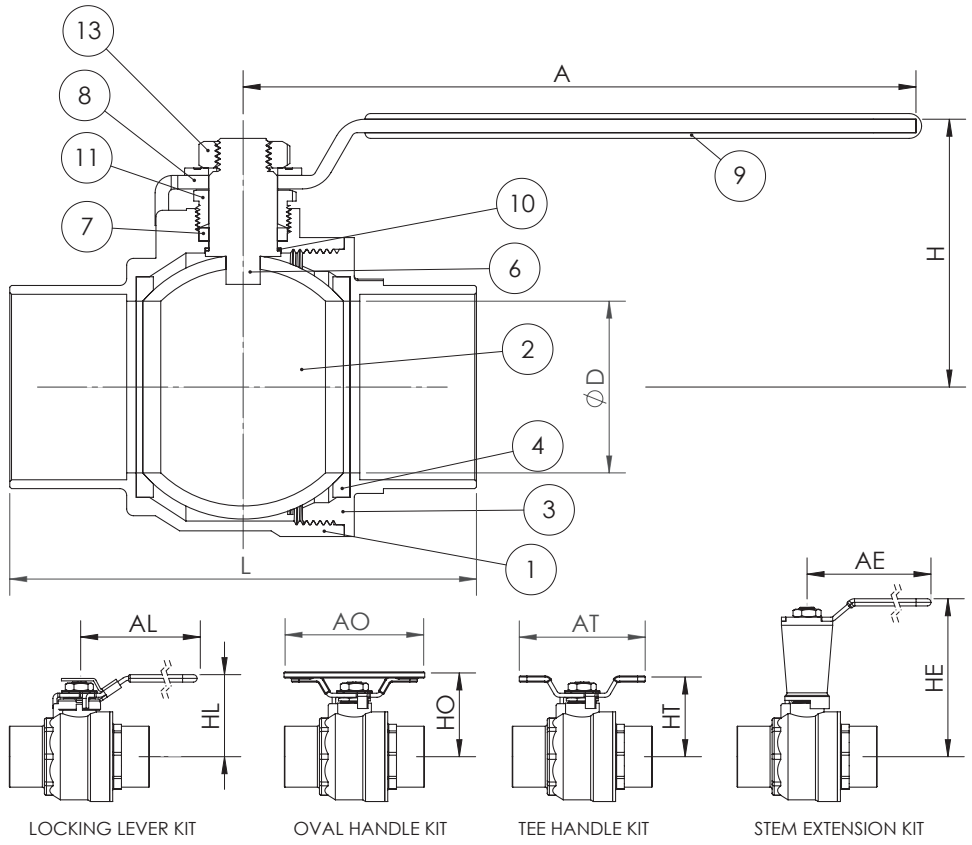
FNW 410A Kit Size

KIT TYPE	SIZE CODE
Replacement Handle = BRYLWH	1/2" = BD
Locking Lever = LHK	3/4" ~ 1" = FG
Stem Extension = SE	1-1/4" ~ 1-1/2" = HJ
Tee Handle* = THK	* 2" = 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.**

B

LOW LEAD COMPLIANT
2 PC 600 WOG BALL VALVE



LOCKING LEVER KIT | OVAL HANDLE KIT | TEE HANDLE KIT | STEM EXTENSION KIT

Dimensions (inches) & Weights

SIZE	ØD	A	L	H	Wt. (lbs)
1/2	0.50	3.10	1.91	1.43	0.31
3/4	0.75	4.32	2.69	1.79	0.64
1	0.98	4.32	3.30	2.00	0.90
1-1/4	1.26	5.11	3.77	2.35	1.40
1-1/2	1.50	5.11	4.30	2.48	1.92
2	1.97	7.80	5.39	3.16	3.74
2-1/2	2.48	7.80	6.18	3.57	8.03
3	2.95	7.80	7.14	3.88	8.60

SIZE	AL	HL	AO	HO	AT	HT	AE	HE
1/2	3.06	1.64	2.80	1.44	2.70	1.30	2.95	4.28
3/4	4.32	2.17	3.60	1.71	3.40	1.82	3.95	4.75
1	4.32	2.35	3.60	2.05	3.40	1.94	3.95	4.90
1-1/4	5.09	2.78	4.39	2.34	4.03	2.24	4.92	5.24
1-1/2	5.09	2.96	4.39	2.44	4.03	2.34	4.92	5.40
2	7.75	3.70	5.38	3.17	4.85	3.03	8.00	6.03
2-1/2	7.75	4.13	5.38	3.62	4.85	3.50	8.00	6.44
3	7.75	4.46	5.38	3.95	4.85	3.76	8.00	6.79

Standard Materials

Ref. No.	Description	Material	Qty	Remarks
1	Body	C46400 Lead Free Brass	1	1/2"~1-1/2"
		Modified C46400 LF Brass		2"
2	Ball	C46400 Lead Free Brass (Chrome Plated)	1	1/2"~3/4" Solid
				1"~ 2" Shell
3	End Cap	C46400 Lead Free 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" Only
11	Packing Gland	ASTM B16-C36000	1	
13	Handle Nut	AISI-1010 Steel	1	Zinc Plated

LOW LEAD COMPLIANT
2 PC FULL PORT* 600 WOG

Features:

- 600 WOG Non-Shock
- 400 PSI Maximum for FM Approved Applications
- 150 WSP
- Full Port*
- NSF 61 Annex G Certified (UL) (Annex G references NSF 372)
- Threaded NPT Ends (ANSI B1.20.1)
- Forged Brass Body & End Cap
- Meets MSS SP-110 Standards
- FM & CSA Approved (1/2"~2")
- Blow-out Proof Stem
- Dual O-ring Non-adjustable Packing**
- Accessories (Sold Separately)
  - Lock Lever Kit (1/4"~4")
  - Stem Extension Kit (1/4"~4")
  - Tee Handle Kit (1/4"~1")
  - Oval Handle Kit (1/4"~2")
  - Memory Stop Kit (1/4"~2")
  - Stainless Handle (1/4"~2")

*** 4" Valve is Standard Port**

**** 1/4" & 3/8" Utilize one O-ring, one packing ring and adjustable packing nut**

NOT FOR USE AT OR BELOW GROUND LEVEL

Accessories

Locking Handle Kits

Stem Extension Kits

Tee Handle Kits

Oval Handle Kits

Memory Stops

Stainless Steel Handle

LOW LEAD

CLASSIFIED UL WATER QUALITY ANSI/NSF 61 ANNEX G

FM APPROVED 1/2" ~ 2"

CSA C US 1/2" ~ 2"

Gas Approvals

- CSA Class 3371-08, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F~149°F
- CSA Class 3371-10, CGA 3.16, 125 PSIG, -40°F~149°F
- CSA Class 3371-12, CR91-002, 2 & 5 PSIG, -40°F~149°F
- CSA Class 3371-88, ANSI Z21.15/CSA9.1, 1/2 PSIG, -40°F~149°F
- CSA Class 3371-90, ASME B16.33/B16.38, 125 PSIG, -40°F~149°F
- CSA Class 3371-92, ASME B16.44, 5 PSIG, -40°F~149°F

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

Figure Number Matrix

FNW X415 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	

Kit Codes (Order Separately)

FNW 420 Kit Size

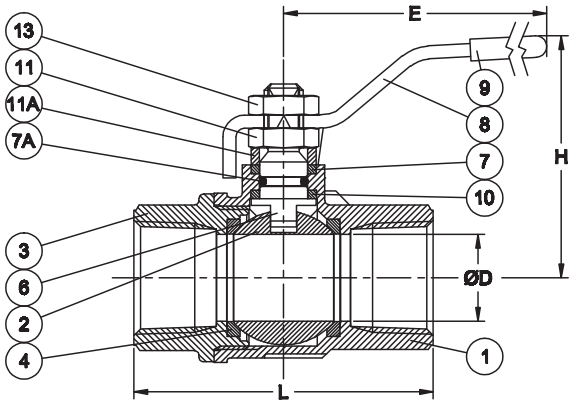
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~1/2" = BD
Stem Extension = SE	3/4"~1" = FG
Tee Handle = THK	1-1/4"~1-1/2" = HJ
Oval Handle = OHK	2" = K
Memory Stop = MSK	2-1/2"~4" = LM
Stainless Handle = SSHK	

Note: The figure X415 uses the same accessories as the 420. Since the 4" valve is standard port, the accessories for the 2-1/2" and 3" valves also fit the 4" size.

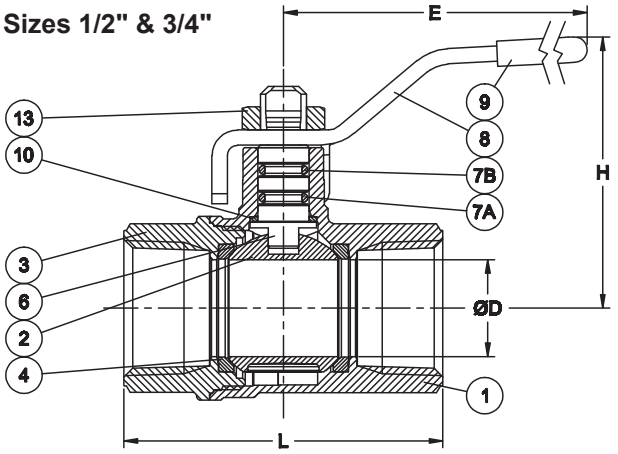
LOW LEAD COMPLIANT
2 PC FULL PORT* 600 WOG

B

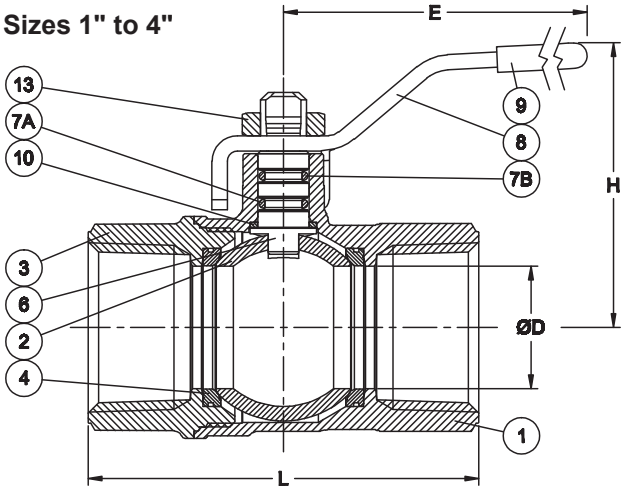
Sizes 1/4" & 3/8"



Sizes 1/2" & 3/4"



Sizes 1" to 4"



Standard Materials

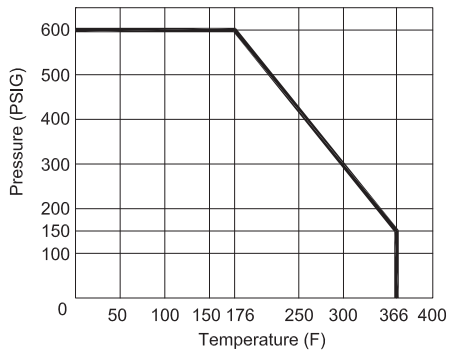
Ref. No.	Description	Material	Qty	Remarks
1	Body	Brass CW 510L	1	
2	Ball	Brass CW 510L (TEA Plated)	1	Solid ball 1/4" to 3/4" Hollow ball 1" & larger
3	End Cap	Brass CW 510L	1	
4	Seat	PTFE	2	
6	Stem	Brass CW 510L (TEA Plated)	1	
7	Stem Packing	PTFE	1	1/4" & 3/8" only
7A	Stem O-ring	NBR	1	
7B	Stem O-ring	FKM	1	1/2" & larger only
8	Handle	Steel DD11	1	
9	Handle Sleeve	Vinyl	1	
10	Thrust Washer	PTFE	1	
11	Gland Nut	Steel CL 04	1	1/4" & 3/8" only
11A	Packing Gland	Brass CW 614N (Nickel Plated)	1	1/4" & 3/8" only
13	Handle Nut	Steel CL 04	1	

Dimensions (inches)

Size	ØD	E	L	H
1/4	0.39	3.78	2.03	1.67
3/8	0.39	3.78	2.03	1.67
1/2	0.55	3.78	2.22	1.77
3/4	0.75	4.76	2.46	2.22
1	0.94	4.76	3.01	2.32
1-1/4	1.19	5.94	3.37	2.85
1-1/2	1.50	5.94	3.70	3.09
2	1.95	6.30	4.33	3.70
2-1/2	2.44	8.07	5.16	4.59
3	2.99	8.07	5.94	4.98
4	2.99	8.07	6.50	4.98

Cv & Weights

Size	Cv	Wt. (lbs)
1/4	6	0.34
3/8	7	0.30
1/2	19	0.40
3/4	34	0.70
1	45	0.97
1-1/4	75	1.63
1-1/2	180	2.17
2	210	3.83
2-1/2	400	6.69
3	650	9.88
4	650	12.51



FNW™

LOW LEAD COMPLIANT
2 PC FULL PORT 600 WOG

B

Features:

- 600 WOG Non-Shock
- 150 WSP
- Full Port
- NSF 61 Annex G Certified (UL)
  (Annex G references NSF 372)
- Sweat Ends (ANSI B16.18)
- Forged Brass Body & End Cap
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Dual O-ring Non-adjustable Packing
- Accessories (Sold Separately)
  - Lock Lever Kit (1/2"~3")
  - Stem Extension Kit (1/2"~3")
  - Tee Handle Kit (1/2"~1")
  - Oval Handle Kit (1/2"~2")
  - Memory Stop Kit (1/2"~2")
  - Stainless Handle (1/2"~2")

NOT FOR USE AT OR BELOW GROUND LEVEL

Accessories

Locking Handle Kits

Stem Extension Kits

Tee Handle Kits

Oval Handle Kits

Memory Stops

Stainless Steel Handle

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

CLASSIFIED UL
WATER QUALITY
ANSI/NSF 61
ANNEX G

Figure Number Matrix

FNW X416 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	3 = M

Kit Codes (Order Separately)

FNW 420 Kit Size

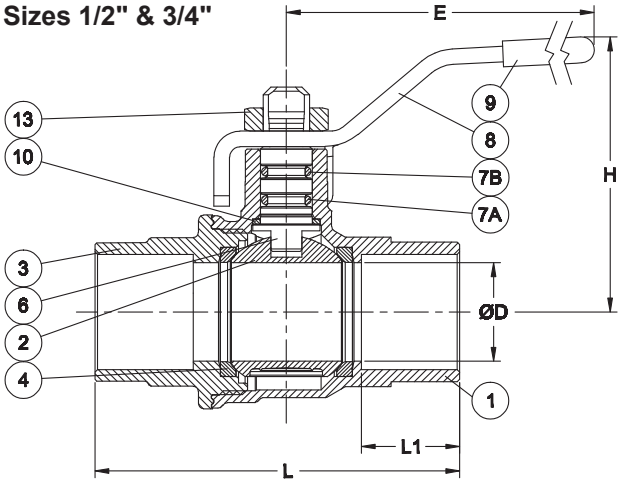
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/2" = BD
Stem Extension = SE	3/4"~1" = FG
Tee Handle = THK	1-1/4"~1-1/2" = HJ
Oval Handle = OHK	2" = K
Memory Stop = MSK	2-1/2"~3" = LM
Stainless Handle = SSHK	

Note: The figure X416 uses the same accessories as the 420.

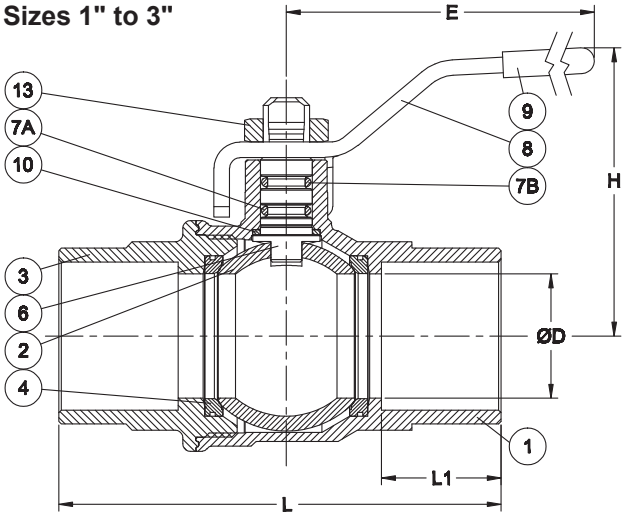
LOW LEAD COMPLIANT
2 PC FULL PORT 600 WOG

B

Sizes 1/2" & 3/4"



Sizes 1" to 3"



Standard Materials

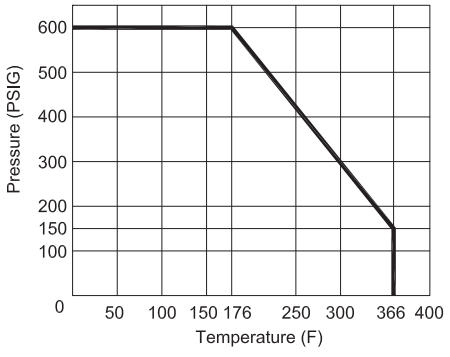
Ref. No.	Description	Material	Qty	Remarks
1	Body	Brass CW 510L	1	
2	Ball	Brass CW 510L (TEA Plated)	1	Solid ball 1/2" & 3/4" Hollow ball 1" & larger
3	End Cap	Brass CW 510L	1	
4	Seat	PTFE	2	
6	Stem	Brass CW 510L (TEA Plated)	1	
7A	Stem O-ring	NBR	1	
7B	Stem O-ring	FKM	1	
8	Handle	Steel DD11	1	
9	Handle Sleeve	Vinyl	1	
10	Thrust Washer	PTFE	1	
13	Handle Nut	Steel CL 04	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	2.78	0.75	2.22
1	0.94	4.76	3.37	0.91	2.32
1-1/4	1.19	5.94	3.86	0.97	2.85
1-1/2	1.50	5.94	4.48	1.10	3.09
2	1.95	6.30	5.33	1.34	3.70
2-1/2	2.44	8.07	6.14	1.48	4.59
3	2.99	8.07	7.17	1.67	4.98

Cv & Weights

Size	Cv	Wt. (lbs)
1/2	19	0.39
3/4	34	0.63
1	45	0.88
1-1/4	75	1.63
1-1/2	180	2.28
2	210	4.09
2-1/2	400	6.89
3	650	9.76



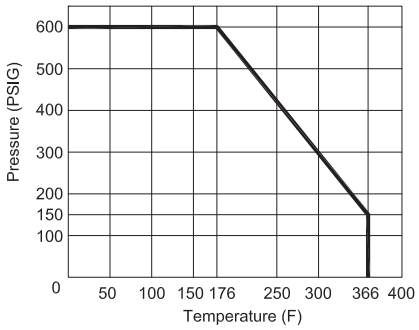
FNW™

LOW LEAD COMPLIANT
2 PC 600 WOG BALL VALVE

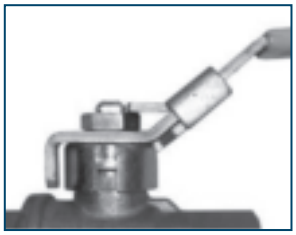
Features:

- 600 WOG
- 150 WSP
- Full Port
- NSF 61 Annex G Certified (UL) (Annex G references NSF 372)
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Threaded NPT Ends Per ANSI B 1.20.1
- Optional Lock Lever
- Optional Stem Extension
- Optional Tee Handle (to 1")
- Optional Oval Handle
- Optional Memory Stop

NOT FOR USE AT OR BELOW GROUND LEVEL



OPTIONS


Lock Lever

Stem Extension

Tee or Oval Handle

Memory Stop

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

CLASSIFIED UL WATER QUALITY ANSI/NSF 61 ANNEX G

Figure Number Matrix

FNW X420A Size

SIZE CODE

1/4 = B	3/4 = F	1-1/2 = J	3 = M
3/8 = C	1 = G	2 = K	4 = P
1/2 = D	1-1/4 = H	2-1/2 = L	

Kit Codes (Order Separately)

FNW X420A 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	
Stainless Handle = SSHK	

FM APPROVED Up to 2"

C SP US See Below

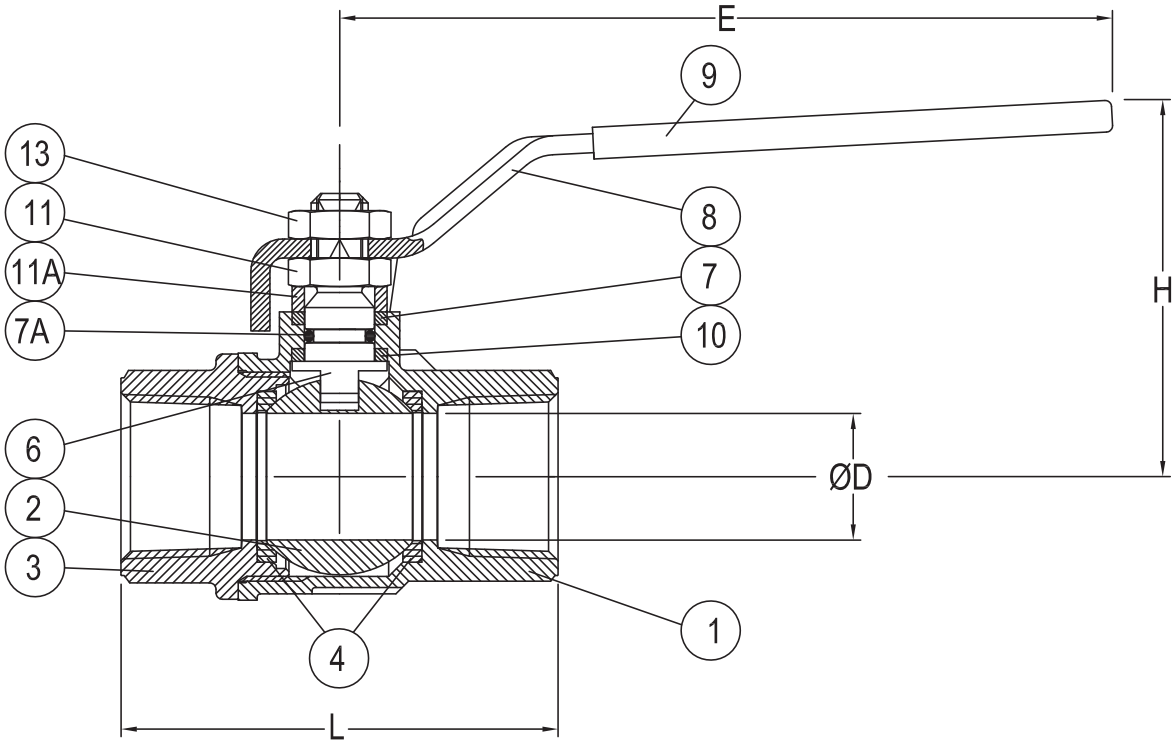
UL 1/4" ~ 2"

Gas Approvals

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

B

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

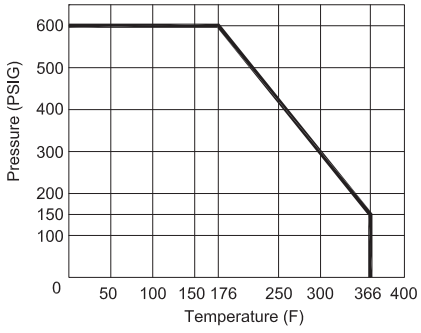
LOW LEAD COMPLIANT
2 PC 600 WOG BALL VALVE

B

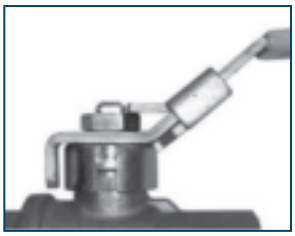
Features:

- 600 WOG
- 150 WSP
- Full Port
- NSF 61 Annex G Certified (UL) (Annex G references NSF 372)
- Meets MSS SP-110 Standards
- Blow-out Proof Stem
- Adjustable Packing
- Sweat Ends Per ANSI B 16.18
- Optional Lock Lever *
- Optional Stem Extension
- Optional Tee Handle (to 1")
- Optional Oval Handle
- Optional Memory Stop

NOT FOR USE AT OR BELOW GROUND LEVEL



OPTIONS



Lock Lever

Stem Extension

Tee or Oval Handle

Memory Stop

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

CLASSIFIED UL
WATER QUALITY
ANSI/NSF 61
ANNEX G

Figure Number Matrix

FNW X421 Size

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

* Note: Locking lever kits are of the standard figure 420 yellow sleeve type.

EXTENSIONS
1/2 = FNW420SEBD
3/4 - 1 = FNW420SEFG
1-1/4 - 1-1/2 = FNW420SEHJ
2 = FNW420SEK

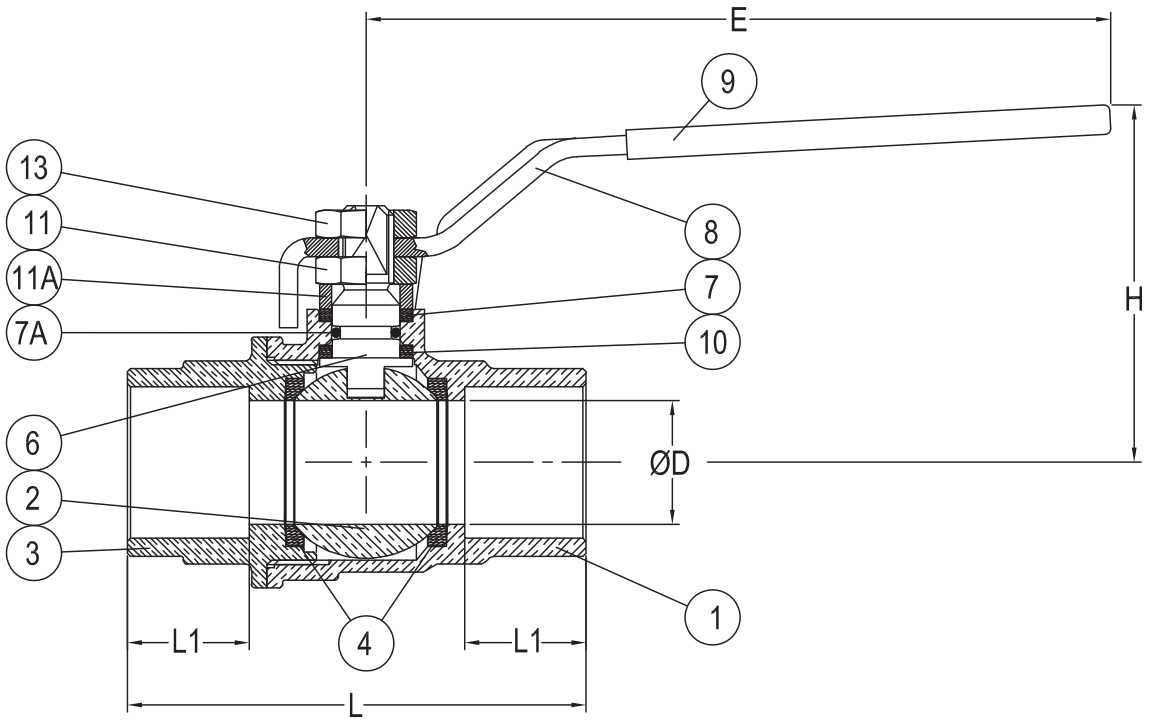
OVAL HANDLES
1/2 = FNW420OHKBCD
3/4 - 1 = FNW420OHKFG
1-1/4 - 1-1/2 = FNW420OHKHJ
2 = FNW420OHKK

MEMORY STOPS
1/2 = FNW420MSKBD
3/4 - 1 = FNW420MSKFG
1-1/4 - 1-1/2 = FNW420MSKHJ
2 = FNW420MSKK

TEE HANDLES
1/2 = FNW420THKBD
3/4 - 1 = FNW420THKFG

B

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

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. Drip Fit O-rings ensure that an end connection will drip, indicating an end was not pressed.

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 Certified (UL) (Annex G references NSF 372)
- True 2-Piece Design
- Drip Fit O-rings
- No Soldered-In End Pieces
- Blow-out Proof Stem
- Adjustable Packing
- Secondary O-ring Stem Seal
- Forged Brass Body & End Cap
- 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.

NOT FOR USE AT OR BELOW GROUND LEVEL

LOW LEAD

ANSI/NSF61 Annex G CLASSIFIED UL WATER QUALITY

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

OPTIONS

Lock Lever | Stem Extension | Tee or Oval Handle | Memory Stop

Figure Number Matrix

FNW X430 Size

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

* Note: Locking lever kits are of the standard figure 420 yellow sleeve type.

EXTENSIONS
1/2 = FNW420SEBD
3/4 - 1 = FNW420SEFG
1-1/4 - 1-1/2 = FNW420SEHJ
2 = FNW420SEK

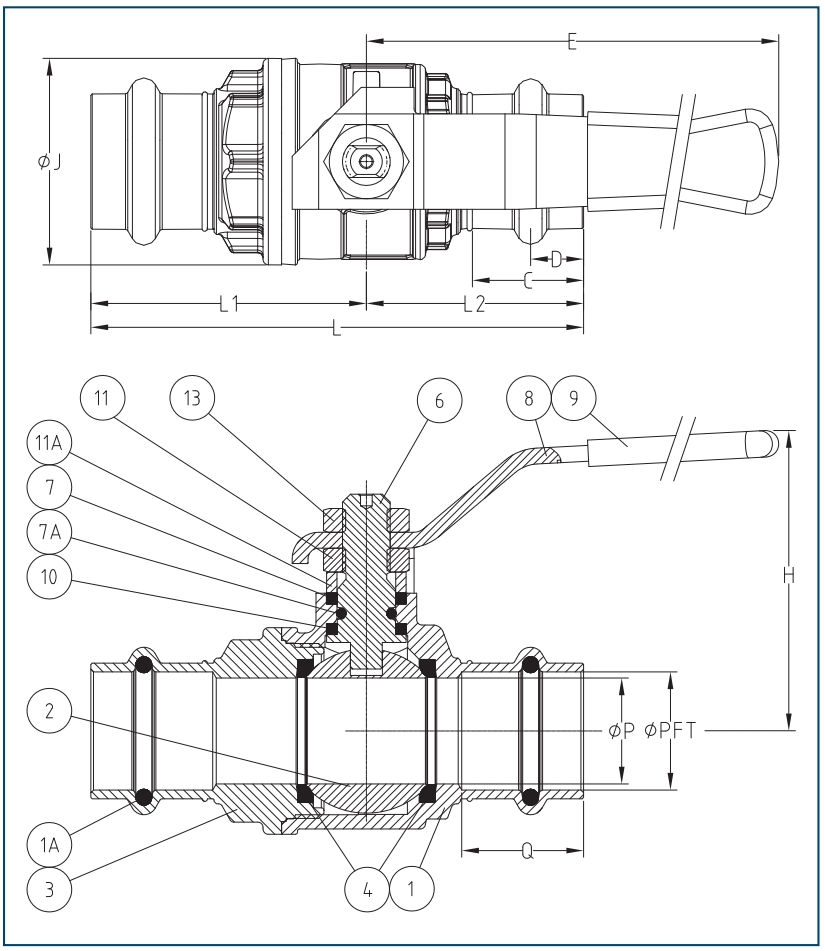
OVAL HANDLES
1/2 = FNW420OHKBCD
3/4 - 1 = FNW420OHKFG
1-1/4 - 1-1/2 = FNW420OHKHJ
2 = FNW420OHKK

MEMORY STOPS
1/2 = FNW420MSKBD
3/4 - 1 = FNW420MSKFG
1-1/4 - 1-1/2 = FNW420MSKHJ
2 = FNW420MSKK

TEE HANDLES
1/2 = FNW420THKBD
3/4 - 1 = FNW420THKFG

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

B



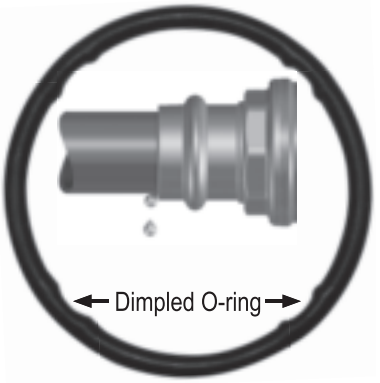
Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 511L	1
1A	O-ring	EPDM (EP851)	2
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), Cv & Weights

Size	E	H	ØJ	ØP	ØPFT	C	D	Q	L	L1	L2	Cv	Wt. (lbs)
1/2	3.86	1.89	1.30	0.59	0.63	0.67	0.31	0.71	3.13	1.71	1.42	18	0.49
3/4	4.80	2.28	1.54	0.79	0.88	0.83	0.39	0.91	3.66	2.05	1.61	34	0.86
1	4.80	2.44	1.93	0.98	1.13	0.83	0.39	0.94	4.13	2.32	1.81	49	1.23
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	102	2.34
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	265	3.48
2	6.38	3.80	3.39	1.95	2.13	1.18	0.57	1.57	6.48	3.39	3.09	306	4.61

Drip Fit O-rings



The Drip Fit O-rings ensure that an unpressed end will drip. This is an added safety feature to ensure unpressed ends are discovered and corrected.

FNW™

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

B

The FNW figure X432 press valve for water service is an economical alternative to the more robust figure X430. 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. Drip Fit O-rings ensure that an end connection will drip, indicating an end was not pressed.

Features:

- 200 PSI Max. Working Pressure (Non-Shock)
- 250°F Max. Temperature at Max. Pressure
- Full Port**
- Press Ends
- Conforms to MSS SP-110 †
- ANSI/NSF 61 Annex G Certified (UL) (Annex G references NSF 372)
- Drip Fit O-rings (1/2" to 2")
- No Soldered-In End Pieces
- Blow-out Proof Stem
- Dual O-ring Non-adjustable Packing
- Forged Brass Body & End Cap
- Accessories (Sold Separately)
  - Lock Lever Kit (1/2"~4")
  - Stem Extension Kit (1/2"~4")
  - Tee Handle Kit (1/2"~1")
  - Oval Handle Kit (1/2"~2")
  - Memory Stop Kit (1/2"~2")
  - Stainless Handle (1/2"~2")
- Sizes 1/2" to 4" (2-1/2" to 4" are XLC end connections‡)

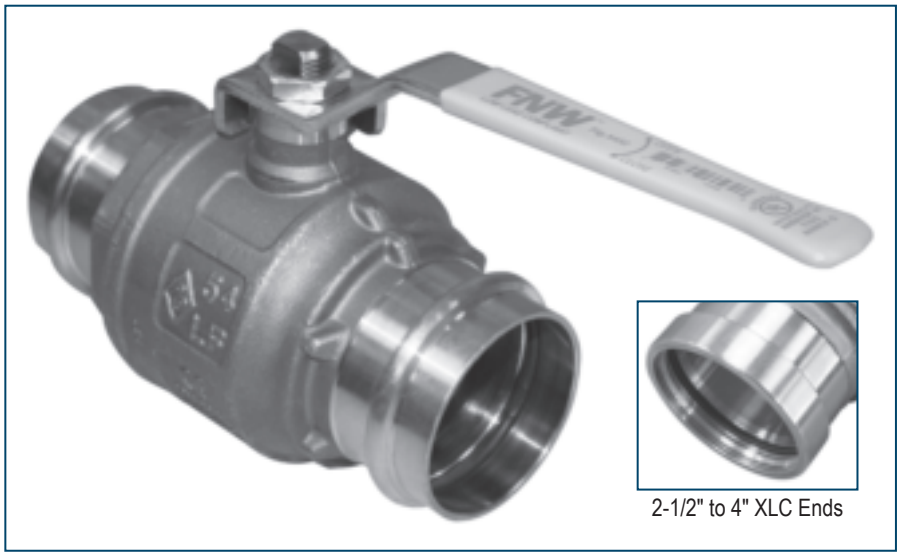
* **2-1/2" to 4" sizes use threaded in, O-ring sealed XLC press end adapters.**

** **4" Valve is Standard Port.**

† **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.**

‡ **XLC valves are for copper pipe or copper XLC fittings only and should not be used on brass fittings or adapters.**

NOT FOR USE AT OR BELOW GROUND LEVEL



Accessories

Locking Handle Kits

Stem Extension Kits

Tee Handle Kits

Oval Handle Kits

Memory Stops

Stainless Steel Handle

Figure Number Matrix

FNW X432 End Size

CONFIGURATION	SIZE CODE
1/2" to 2" = Blank	1/2 = D
2-1/2" to 4" = XLC	3/4 = F
	1 = G
	1-1/4 = H
	1-1/2 = J
	2 = K
	2-1/2 = L
	3 = M
	4 = P

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"~4" = LM
Stainless Handle = SSHK	

Note: The figure X432 uses the same accessories as the 420. Since the 4" valve is standard port, the accessories for the 2-1/2" and 3" valves also fit the 4" size.

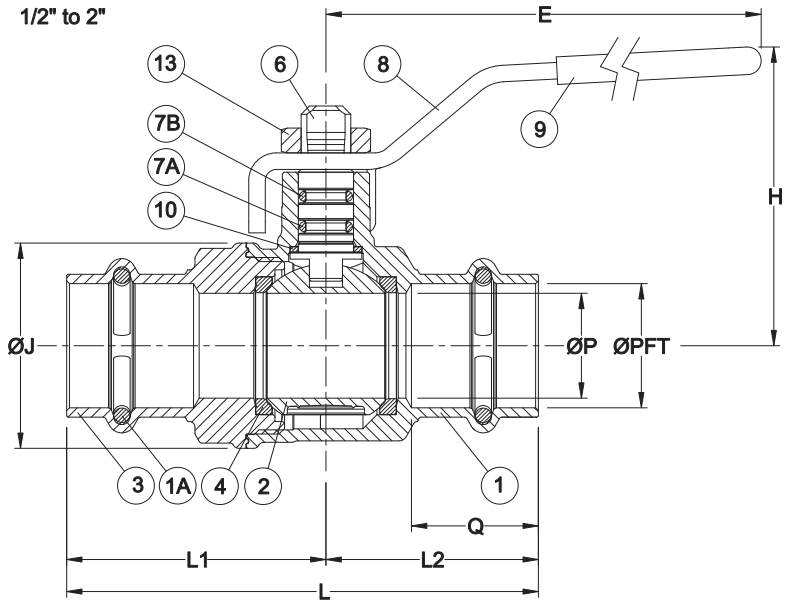
Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

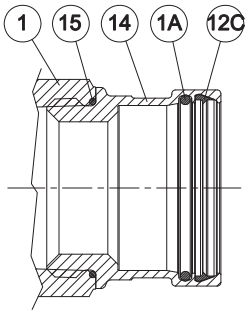
LOW LEAD

ANSI/NSF61 Annex G
CLASSIFIED UL WATER QUALITY

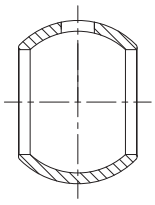
LOW LEAD COMPLIANT 2 PC* FULL PORT** WATER SERVICE VALVE w/PRESS ENDS

B





2-1/2" to 4" (XLC Ends)



1" to 4" Shell Ball

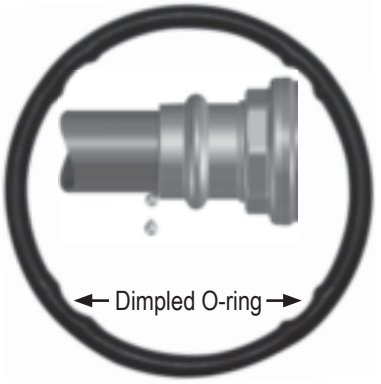
Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass CW 511L	1
1A	O-ring	EPDM	2
2	Ball	Brass CW 510L (TEA Plated)	1
3	End Cap	Brass CW 511L	1
4	Seat	PTFE	2
6	Stem	Brass CW 510L	1
7A	Stem O-ring	NBR	1
7B	Stem O-ring	FKM (Viton®)	1
8	Handle	Steel DD11	1
9	Sleeve	Vinyl	1
10	Thrust Washer	PTFE	1
12C	Comp. Ring	Steel 38NiCrMo4 (Zinc Plated)	2
13	Handle Nut	Steel CL 04 (Zinc Plated)	1
14	XLC End Adapter	Brass CW 511L	2
15	O-ring	NBR	2

Dimensions (Inches), Cv & Weights

Size	E	H	ØJ	ØP	ØPFT	Q	L	L1	L2	Cv	Wt. (lbs)
1/2	3.78	1.77	1.22	0.55	0.63	0.71	2.93	1.62	1.31	19	0.44
3/4	4.76	2.22	1.46	0.75	0.88	0.91	3.37	1.85	1.52	34	0.72
1	4.76	2.32	1.76	0.94	1.13	0.94	3.81	2.11	1.70	45	1.01
1-1/4	5.94	2.85	2.11	1.19	1.38	1.02	4.17	2.24	1.93	75	1.57
1-1/2	5.94	3.09	2.64	1.50	1.63	1.42	5.23	2.78	2.45	180	2.51
2	6.30	3.70	3.39	1.95	2.13	1.57	6.27	3.29	2.98	210	4.33
2-1/2	8.07	4.57	4.09	2.44	2.50	1.65	9.17	4.59	4.59	400	9.35
3	8.07	4.98	4.96	2.99	3.00	1.91	10.55	5.28	5.28	650	13.62
4	8.07	4.96	5.28	2.99	4.00	2.42	11.85	5.93	5.93	650	18.58

Drip Fit O-rings



The Drip Fit O-rings ensure that an unpressed end will drip. This is an added safety feature to ensure unpressed ends are discovered and corrected.

LOW LEAD COMPLIANT
2 PC 400 WOG w/COMPRESSION ENDS

Features:

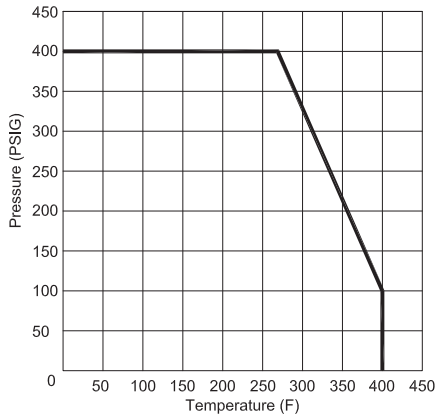
- 400 WOG
- 150 PSI WSP (366°F)
- Standard Port
- NSF 61 Annex G Certified (Annex G references NSF 372)
- Forged Brass Body & End Cap
- Blow-out Proof Stem
- Adjustable Packing
- Compression Ends
- Drain with Cap

NOT FOR USE AT OR BELOW GROUND LEVEL

NSF 61 ANNEX G

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

Constructed with a low lead forged brass body and end cap and with brass compression nuts, the FNW figure X480A 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

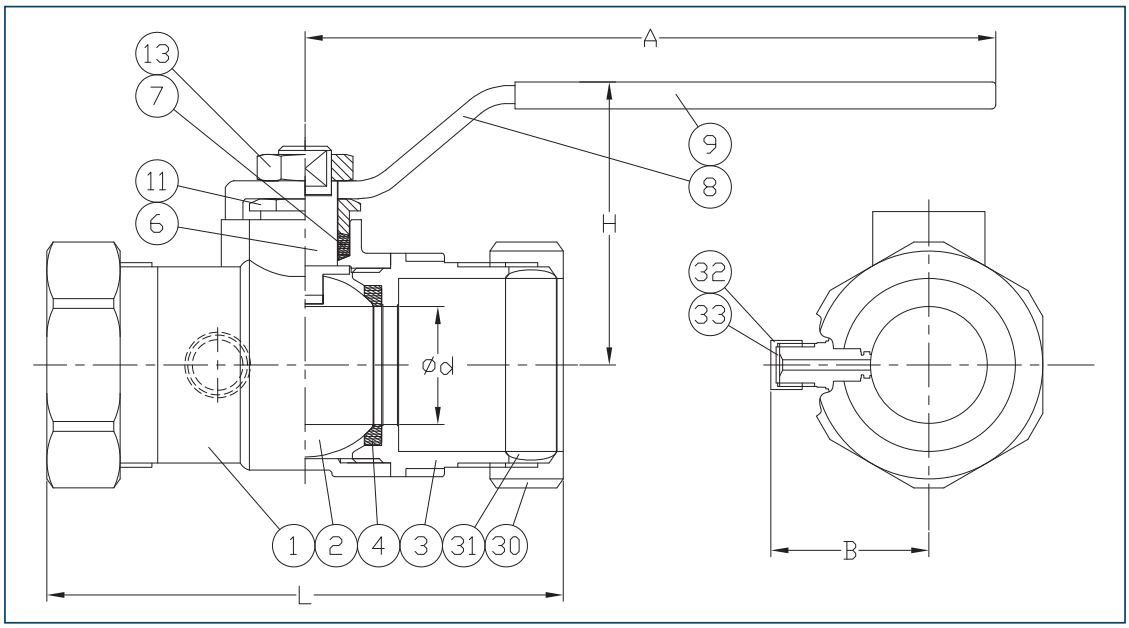
Figure Number Matrix

FNW X480A Size

SIZE CODE
1/2 = D
3/4 = F
1 = G

B

LOW LEAD COMPLIANT
2 PC 400 WOG w/COMPRESSION ENDS



Dimensions (inches)

Size	Ød	B	A	L	H
1/2	0.39	0.83	3.15	2.76	1.46
3/4	0.59	0.98	3.15	2.99	1.57
1	.75	1.10	4.33	3.62	1.85

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Lead Free Brass, C46400	1
2	Ball	Lead Free Brass, C46400 (Chrome Plated)	1
3	End Cap	Lead Free Brass, C46400	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, Vinyl	1
11	Packing Gland	Brass, ASTM B16 C36000	1
13	Handle Nut	Steel, AISI 1010	1
30	Compression Nut	Brass, ASTM B124 C37700	2
31	Compression Ring	Brass, ASTM B135 C26000	2
32	Drain Cap	Brass, ASTM B16 C36000	1
33	Drain Cap Seal	Rubber, NBR	1

FNW™

LOW LEAD COMPLIANT
PUSH-FIT VALVE FOR WATER OR AIR

B

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 Certified (IAPMO) (Annex G references NSF 372)
- 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.

NOT FOR USE AT OR BELOW GROUND LEVEL

LOW LEAD

NSF 61 ANNEX G

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

The FNW figure 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

COPPER

CPVC

PEX*

Weights

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

Figure Number Matrix

FNW X485 Size

SIZE CODES

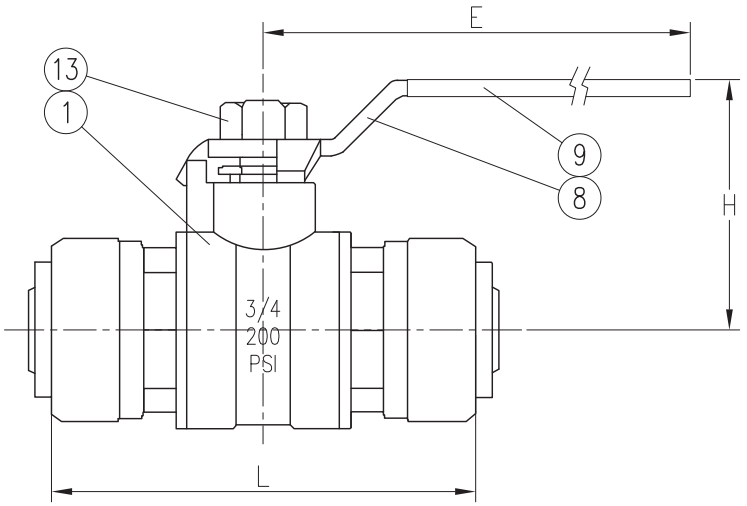
1/2 = D

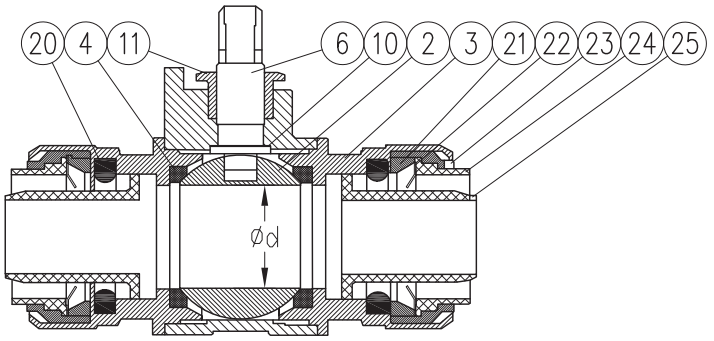
3/4 = F

1 = G

LOW LEAD COMPLIANT PUSH-FIT VALVE FOR WATER OR AIR

B





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

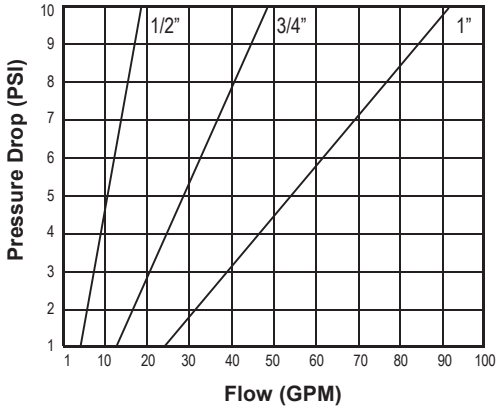
* Chemical Content by Percentage is:

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



2 PC FULL PORT 2000 CWP

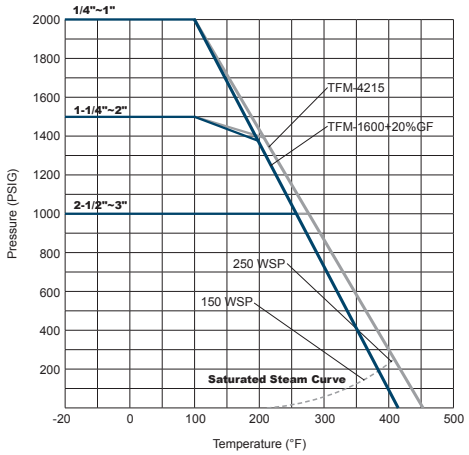
Features:

- 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
- Replacement Locking Handle Kits Available (1/4"~3")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~1-1/4")

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



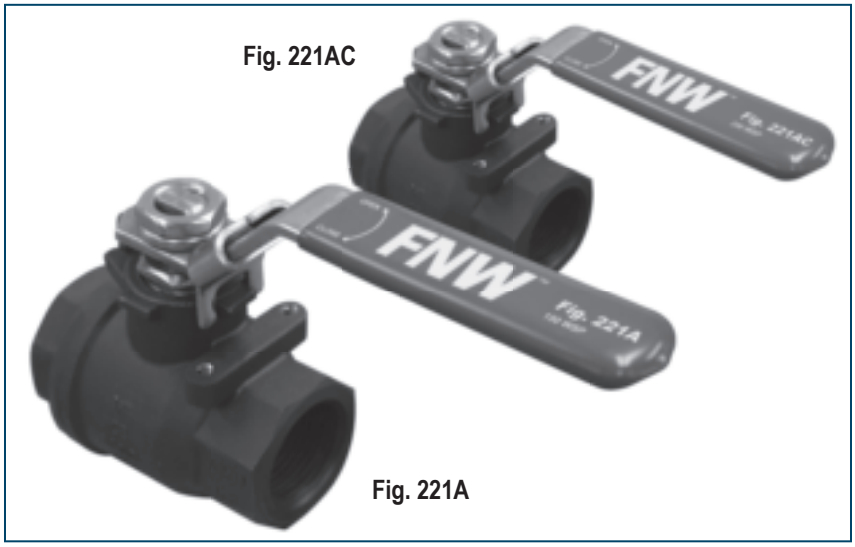


Fig. 221A

Accessories

Replacement Handles (1/4"~3")

Stem Extensions (1/4"~2")

Oval Handles (1/4"~1-1/4")

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

Kit Codes (Order Separately)

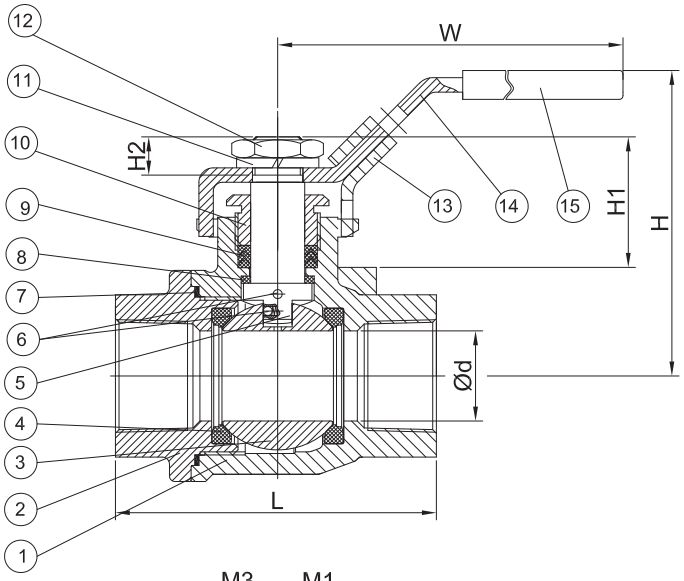
FNW 220A Kit Size

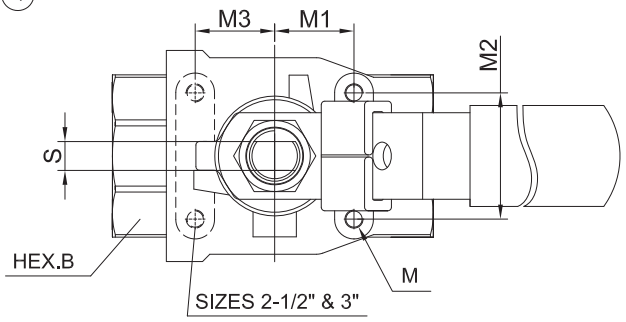
KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
Stem Extension = SEK	1"~1-1/4" = GH
Oval Handle = OH	1-1/2"~2" = JK
	2-1/2"~3" = LM

Note: The figure 221A uses the same accessories as the 220A.

B

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

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

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

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
- Replacement Locking Handle Kits Available (1/4"~3")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~2")

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

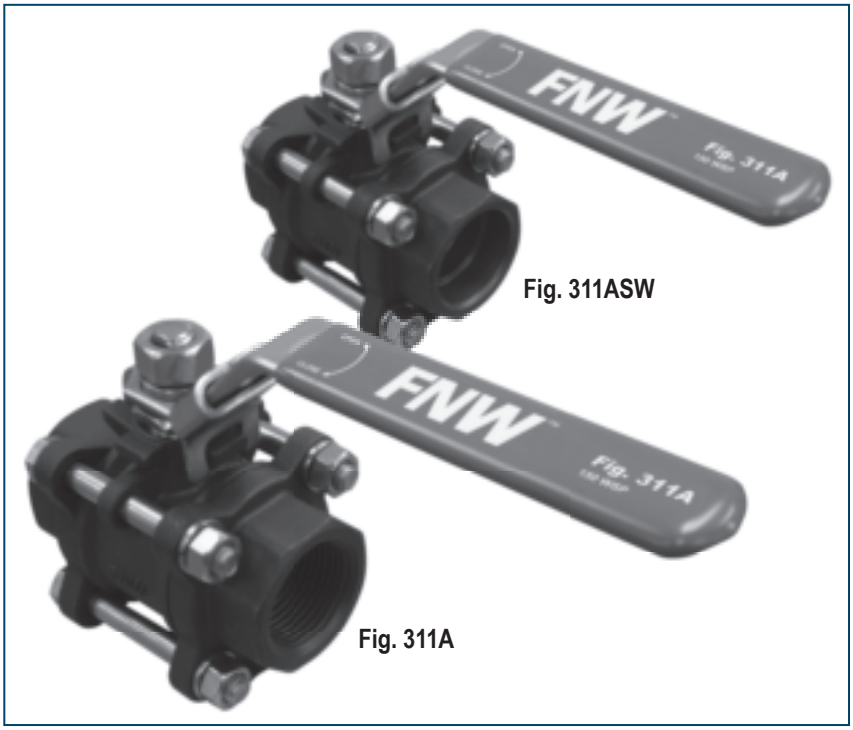


Fig. 311ASW

Fig. 311A

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

Note: For 4" valves, use FNW Figure number 311AM

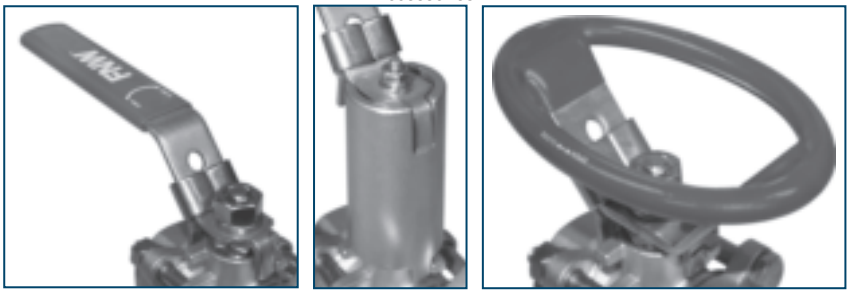
Kit Codes (Order Separately)

FNW 310A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~1/2" = BD
Stem Extension = SEK	3/4" = F
Oval Handle = OH	1"~1-1/4" = GH
	1-1/2"~2" = JK
	2-1/2"~3" = LM

Note: The figure 311A uses the same accessories as the 310A.

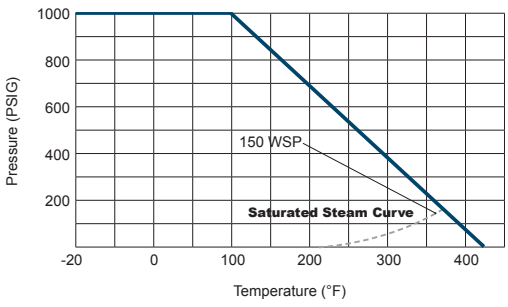
Accessories



Replacement Locking Handle Kits (1/4"~3")

Stem Extension Kits (1/4"~2")

Oval Handle Kits (1/4"~2")

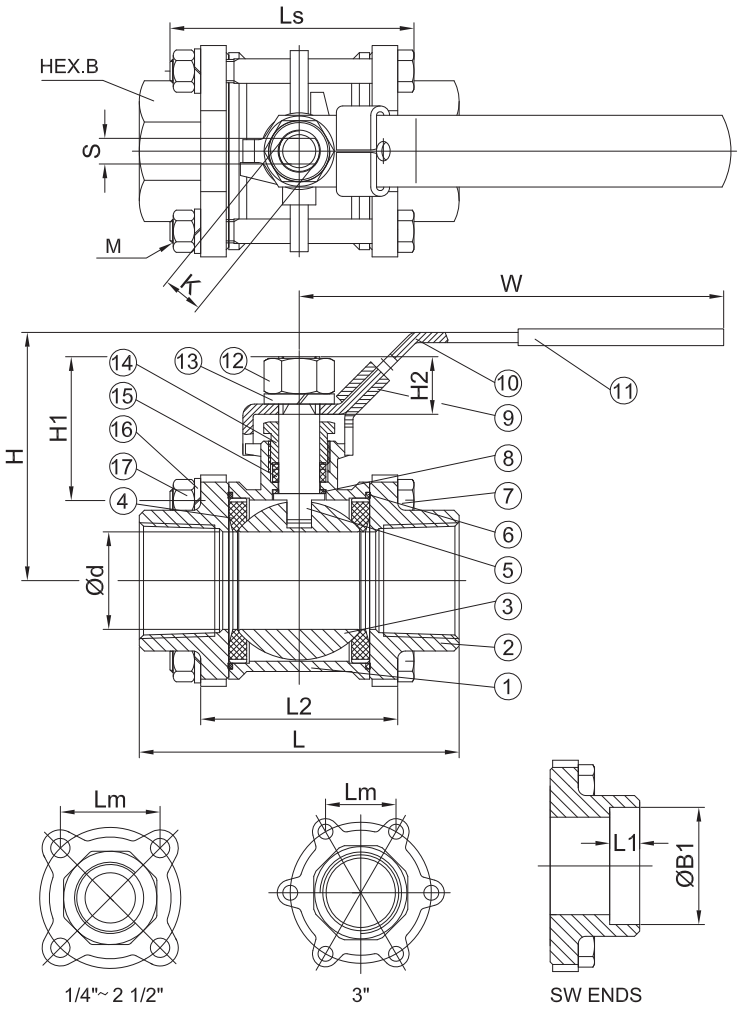


Cv, Torque & Weight

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

B

3 PC FULL PORT 1000 CWP



1/4"~ 2 1/2"

3"

SW ENDS

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	Stem		316SS Stainless	1
6	Body Gasket		PTFE	2
7	Body Bolt	1/4"~2-1/2"	ASTM A193-B8 Stainless	4
		3"		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"	SUS304 Stainless	4
		2-1/2"		8
		3"		12
17	Bolt Nut	1/4"~2"	ASTM A194-8 Stainless	4
		2-1/2"		8
		3"		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	0.47	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

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, Contact FNW for Price & Availability)
- 4" With Handle Standard (Lock-out Style)
- Direct Mounting Pad
- Vacuum rated to 26.967"Hg (75 Torr)*
- Vented Ball
- Manufactured Silicone Free
- Optional Locking Handle Kits (1/4"~4")

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.

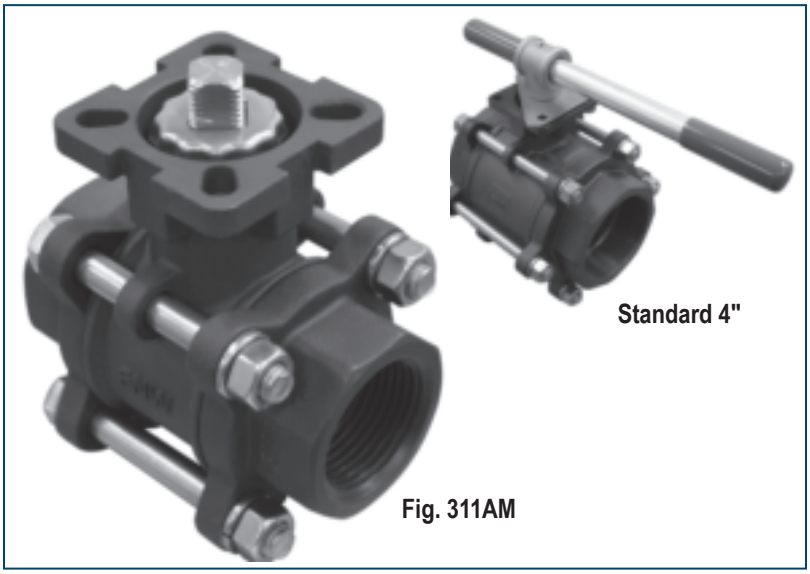


Fig. 311AM

Accessories

Locking Handle Kits (1/4"~4")

4" Includes Locking Handle

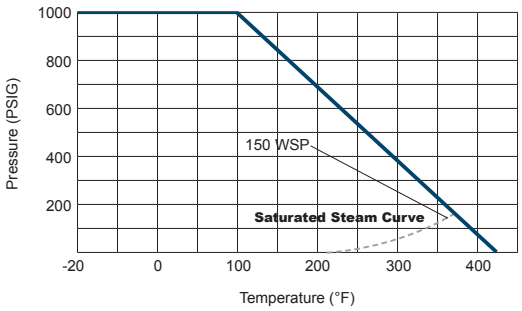


Figure Number Matrix

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	

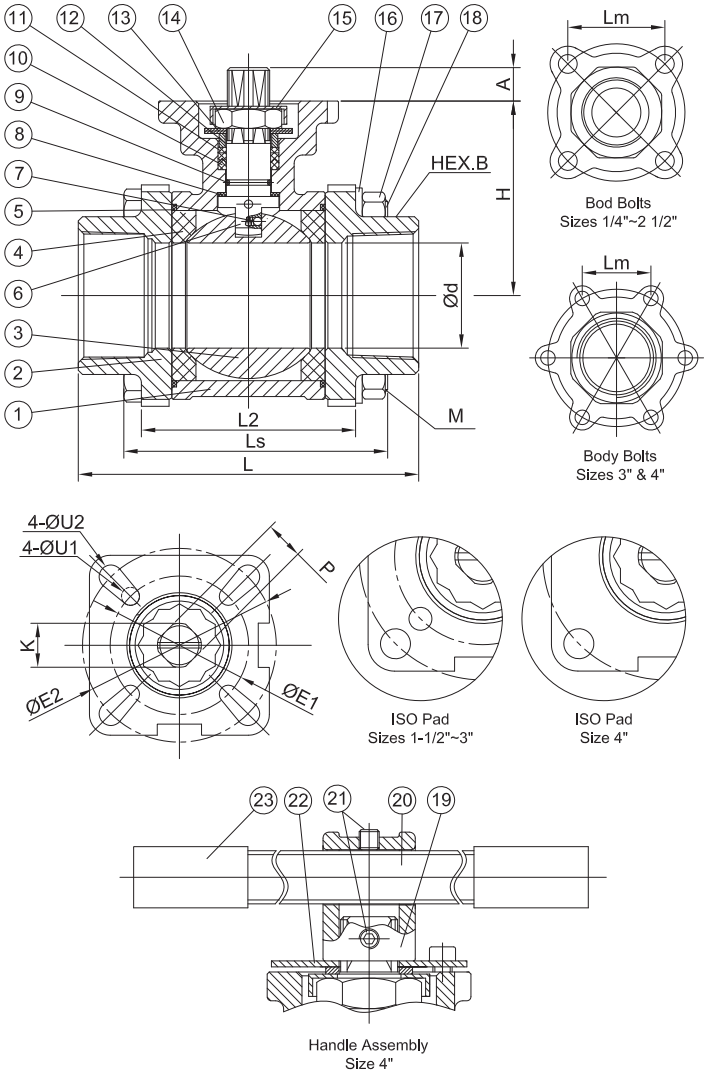
Kit Codes (Order Separately)

FNW 310AM Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
	1"~1-1/4" = GH
Note: The figure 311AM uses the same handle kit as the 310AM.	1-1/2"~2" = JK
	2-1/2"~3" = LM
	4" = P

B

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"	304SS Stainless	4
		2-1/2"		8
		3"~4"		12
17	Bolt Nut	1/4"~2"	ASTM A194-8 Stainless	4
		2-1/2"		8
		3"~4"		12
18	Body Bolt	1/4"~3"	ASTM A193-B8 Stainless	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

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

FNW™

3 PC FULL PORT 2000 CWP

Features:

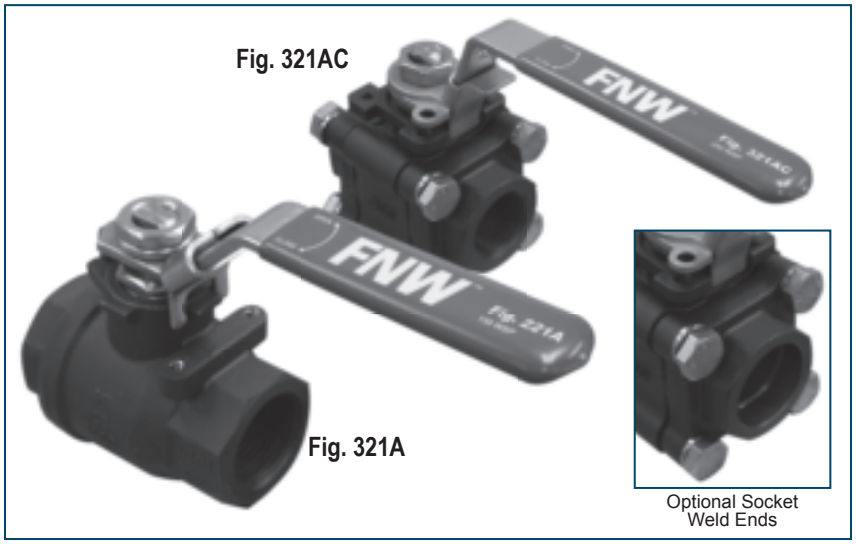
- 2000 PSI CWP* Non-Shock
- Working Steam Pressure (WSP)
  - 150 PSI - Fig. 321A
  - 250 PSI - Fig. 321AC
- Full Port
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- End Connections
  - Threaded
  - Socket Weld
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad
- Vacuum rated to 26.967"Hg (75 Torr)**
- Vented Ball
- Manufactured Silicone Free
- Replacement Locking Handle Kits Available (1/4"~2")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~1-1/4")

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.



Accessories

Stem Extensions (1/4"~2")

Replacement Locking Handles Kits (1/4"~2")

Oval Handle Kits (1/4"~1-1/4")

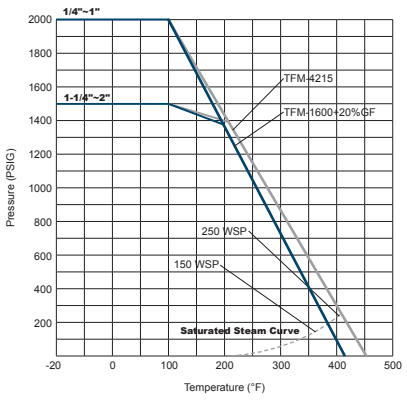


Figure Number Matrix

FNW 321A Seat/Seals Ends Size

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

Kit Codes (Order Separately)

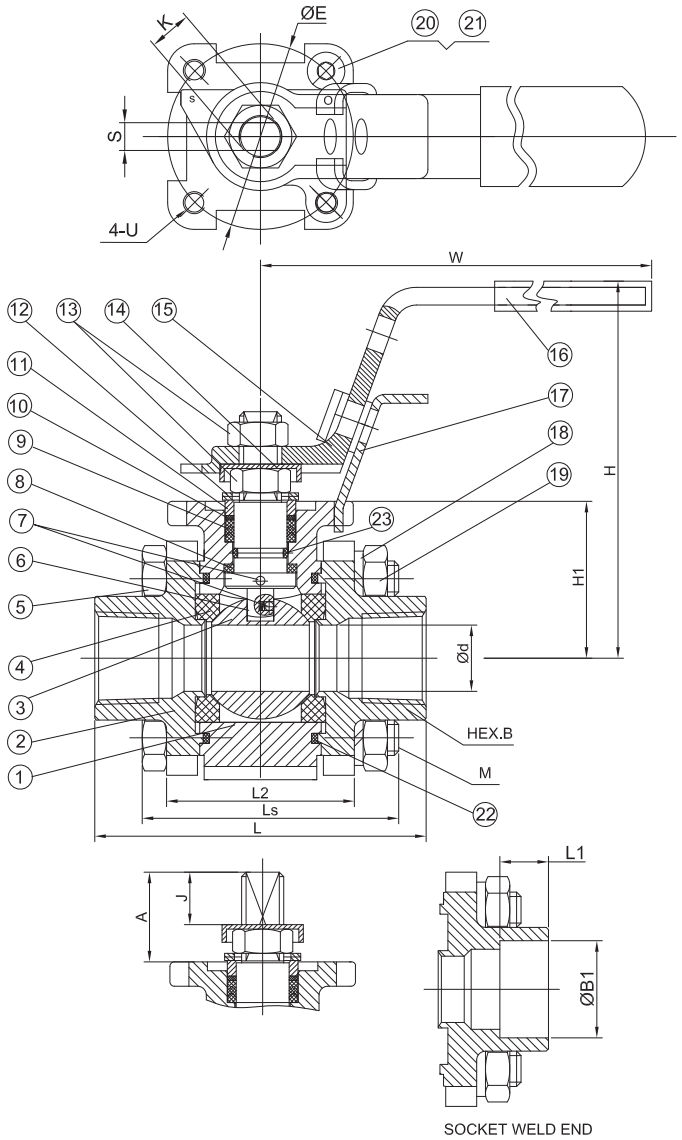
FNW 320A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
Stem Extension = SEK	1"~1-1/4" = GH
Oval Handle = OH	1-1/2"~2" = JK

Note: The Figure 321A uses the same accessories as the 320A.

B

3 PC FULL PORT 2000 CWP



SOCKET WELD END

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

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

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

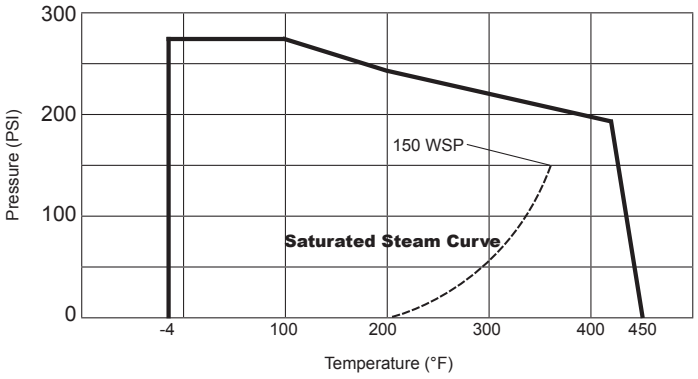


Figure Number Matrix

FNW 501 Size

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

Cv & Weight

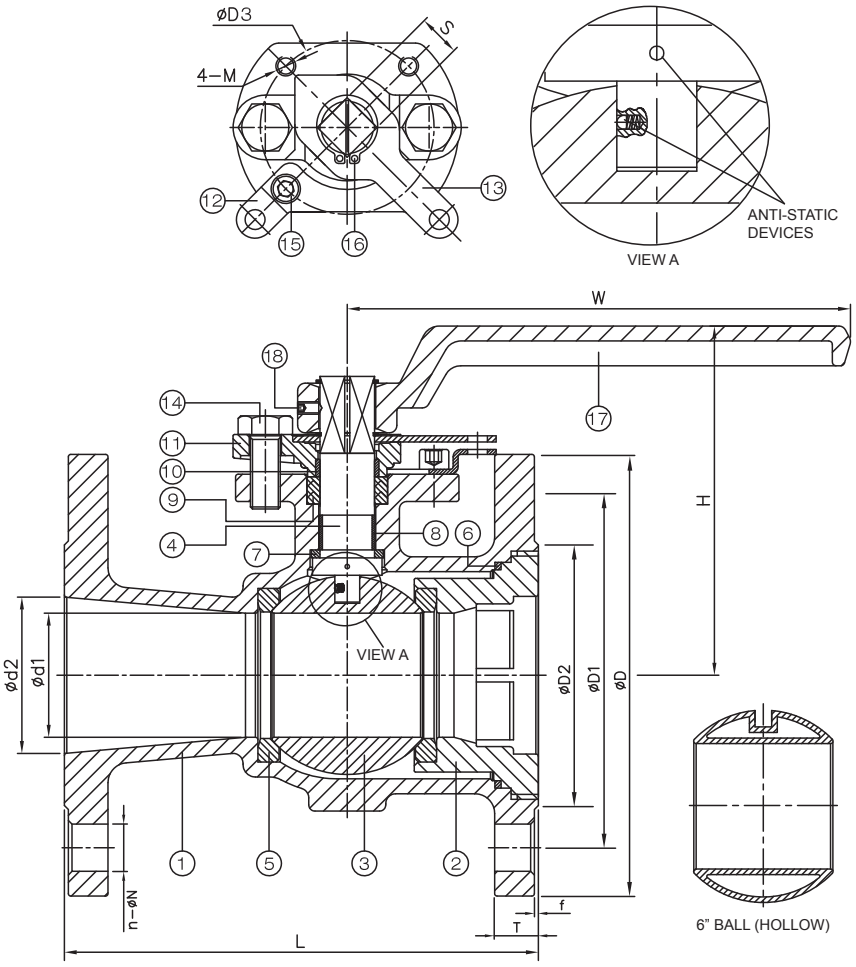
Size	Cv	Wt. (lbs)
2	165	16.3
2-1/2	240	23.1
3	290	32.6
4	690	51.1
6	900	90.4

Torque

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

B

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

FNW™

2 PC FULL PORT 150# FLANGED

B

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

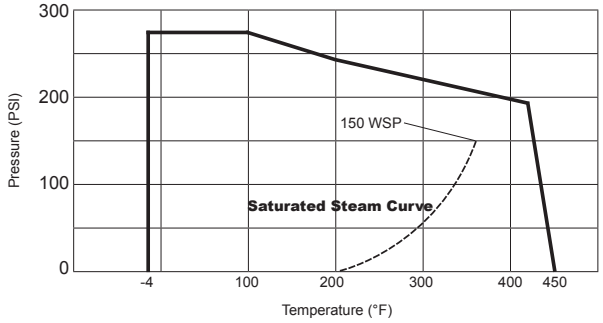


Figure Number Matrix

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

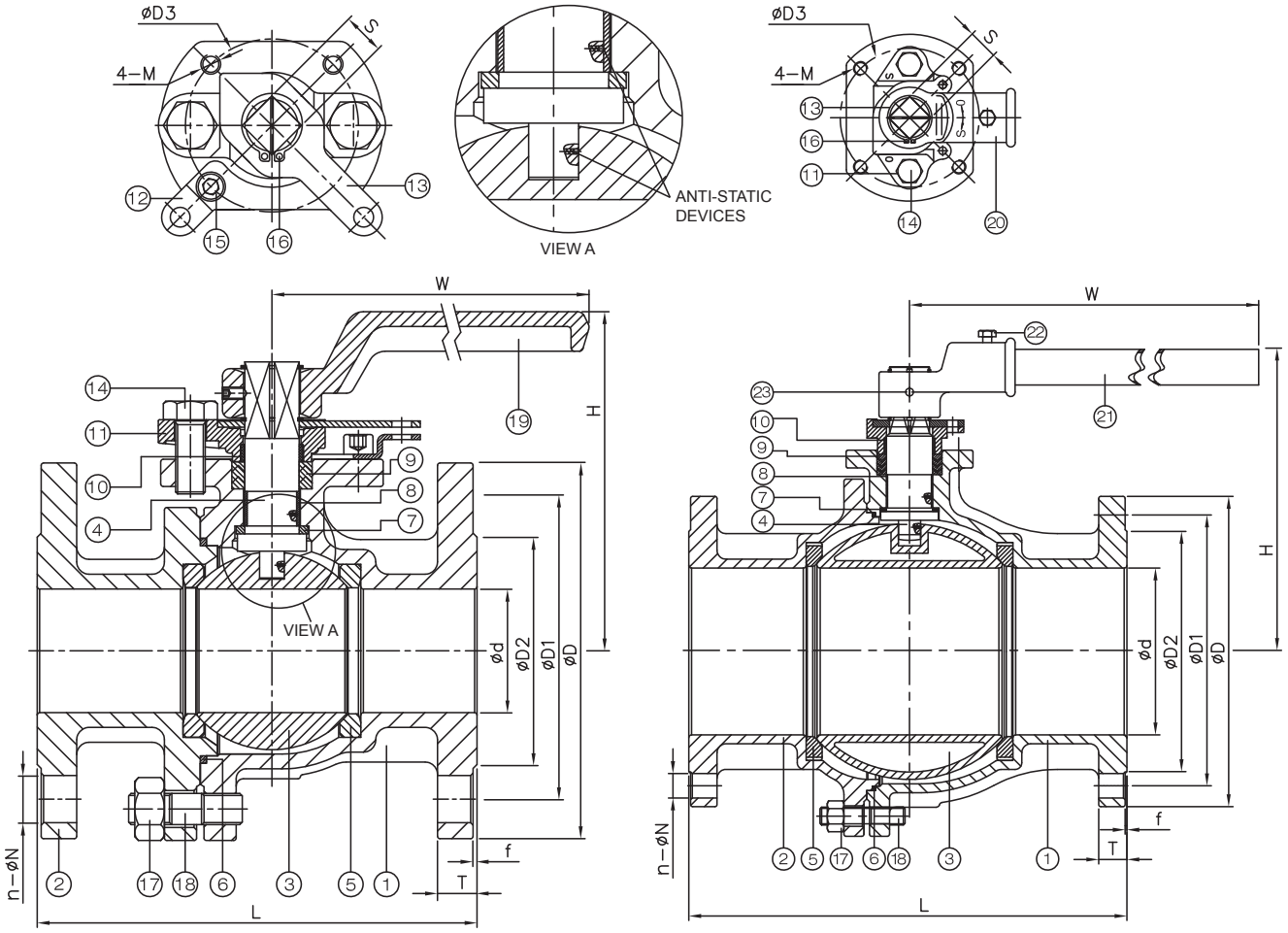
Torque

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

FNW™

Figure 601
CARBON STEEL BALL VALVES

B



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

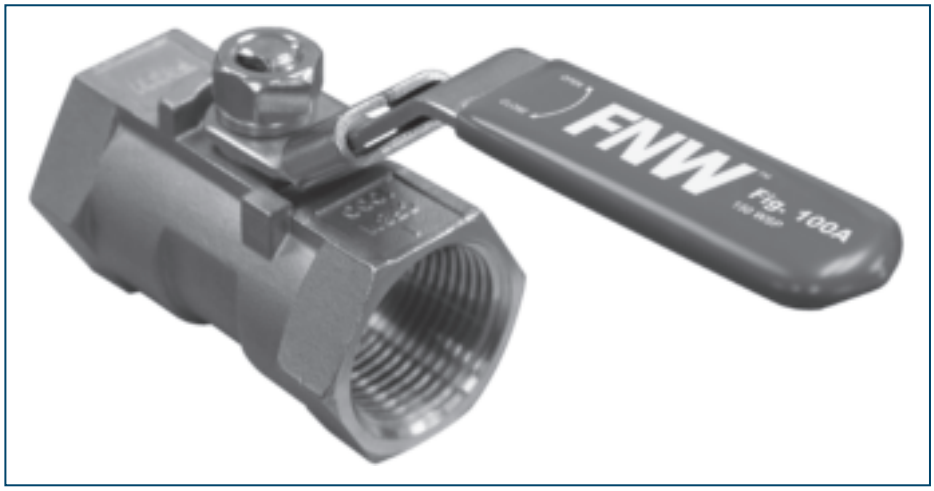
FNW™

B

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
- Replacement Locking Handle Kits Available (1/4"~2")

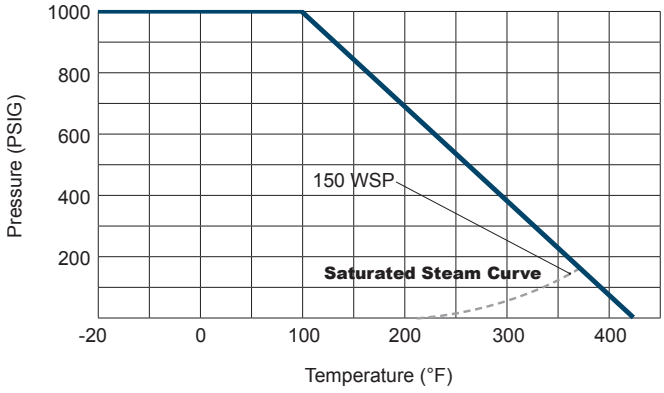


Standards:

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

Accessories

Replacement Locking Handle Kits (1/4"~2")



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

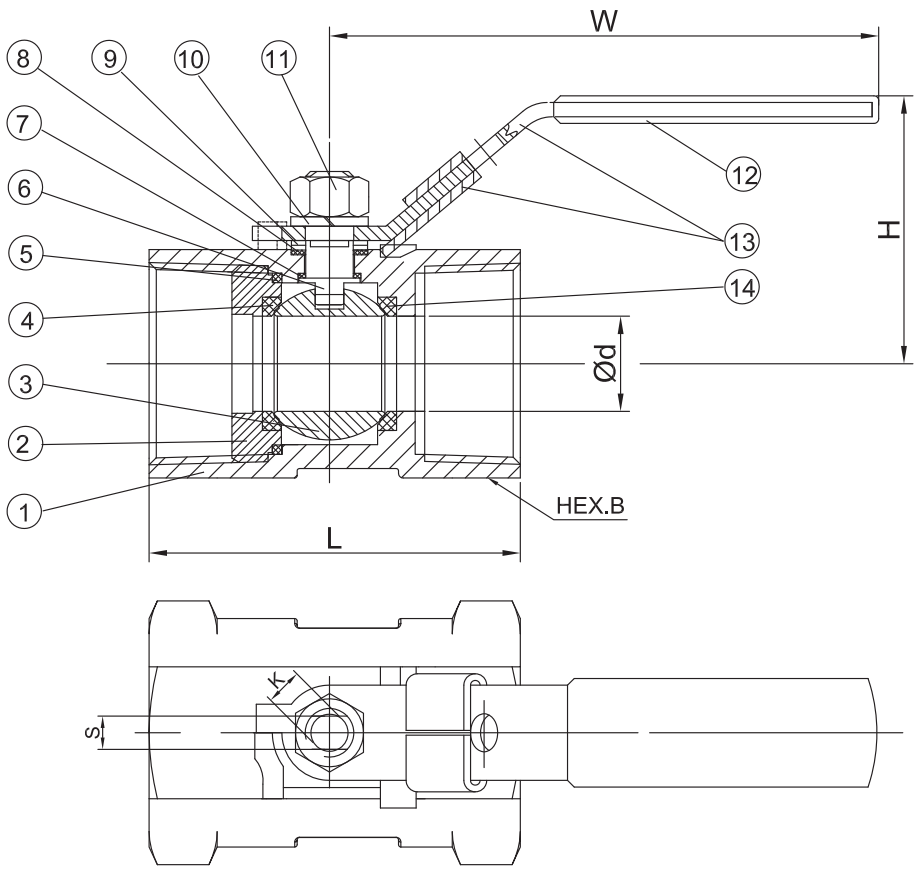
Kit Codes (Order Separately)

FNW 100A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4" = B
	3/8" = C
	1/2" = D
	3/4" = F
	1"~1-1/4" = GH
	1-1/2"~2" = JK

B

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-1 on smaller sizes.

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
- Stocked Configurations:
  - Standard Locking Lever (1/4"~2")
  - Oval Handle (1/4"~2")
- Manufactured Silicone Free
- Replacement Locking Handle Kits Available (1/4"~2")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~2")

Standards:

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

Accessories

Stem Extension Kits (1/4"~2")

Replacement Locking Handle Kits (1/4"~2")

Oval Handle Kits (1/4"~2")

Additional Stocked Configurations

Oval Handle (1/4"~2")

Figure Number Matrix

FNW 200A Handle Size

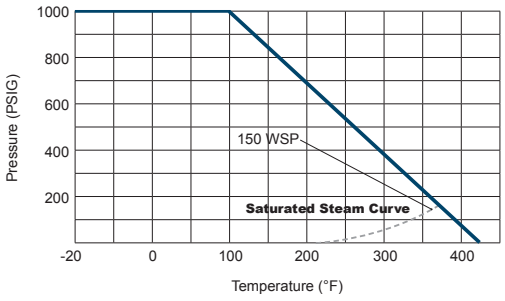
HANDLE CODE	SIZE CODE
Standard Handle = Blank	1/4 = B
Oval Handle = OL	3/8 = C
	1/2 = D
	3/4 = F
	1 = G
	1-1/4 = H
	1-1/2 = J
	2 = K

Kit Codes (Order Separately)

FNW 310A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~1/2" = BD
Stem Extension = SEK	3/4" = F
Oval Handle = OH	1"~1-1/4" = GH
	1-1/2"~2" = JK

Note: The figure 200A uses the same accessories as the 310A.

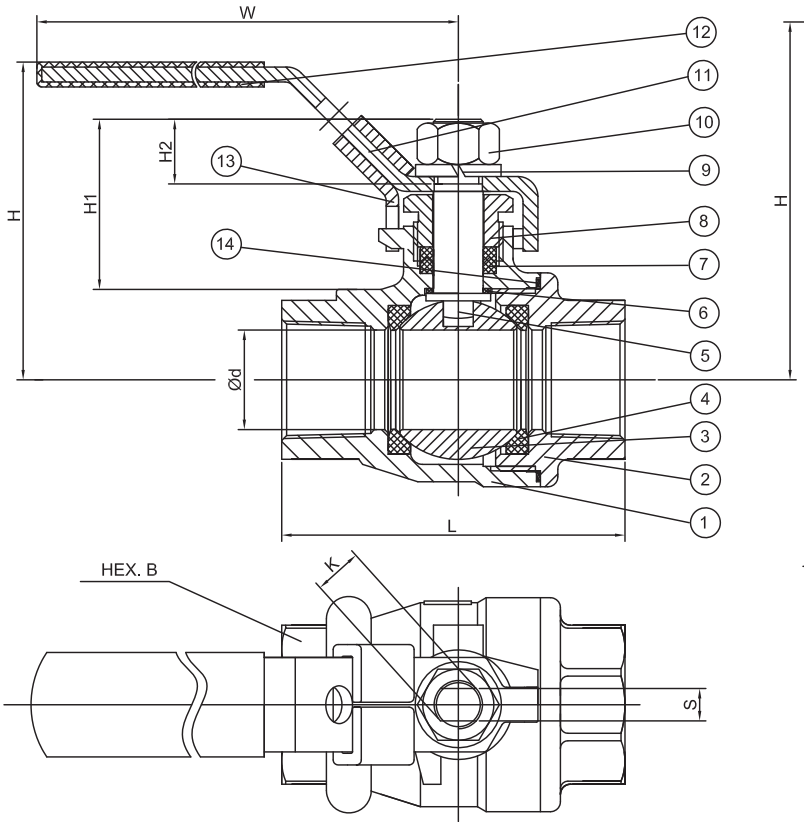


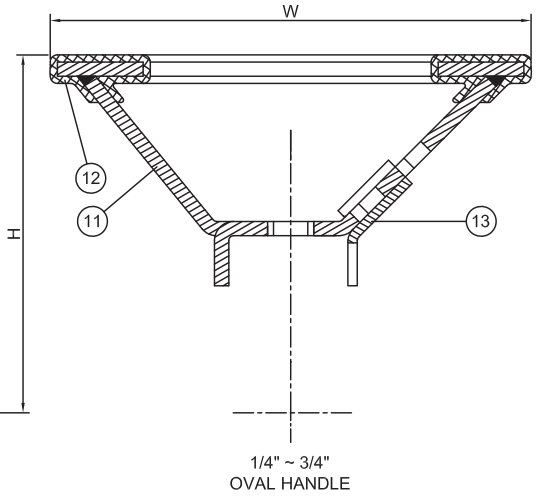
Cv, Torque & Weight

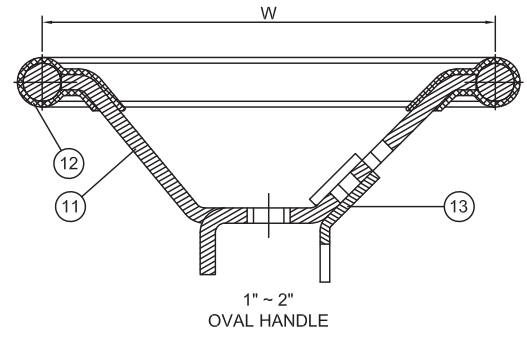
Size	Cv	Torque (in-lbs)	Wt. (lbs)
1/4	15	60	0.73
3/8	15	60	0.68
1/2	18	66	0.75
3/4	36	80	1.14
1	48	146	1.94
1-1/4	58	252	2.82
1-1/2	120	344	4.12
2	190	503	6.48

B

2 PC FULL PORT 1000 CWP







Dimensions (inches)

Size	Ød	L	H1	H2	Straight Lever		Oval Handle		K (UNC)	S	B
					H	W	H	W			
1/4	0.42	2.28	1.13	0.43	2.28	3.94	2.50	3.97	5/16-18	0.197	0.93
3/8	0.47	2.28	1.13	0.43	2.28	3.94	2.50	3.97	5/16-18	0.197	0.93
1/2	0.59	2.44	1.05	0.38	2.28	3.94	2.50	3.97	5/16-18	0.197	0.98
3/4	0.79	2.85	1.35	0.49	2.52	5.08	2.96	5.20	3/8-16	0.256	1.26
1	0.98	3.35	1.51	0.62	3.03	6.14	3.03	5.20	7/16-14	0.314	1.61
1-1/4	1.26	3.70	1.46	0.55	3.27	6.14	3.22	5.20	7/16-14	0.314	1.97
1-1/2	1.50	4.13	1.96	0.89	3.78	7.19	3.80	5.63	5/8-11	0.394	2.20
2	1.97	4.92	1.91	0.89	4.02	7.19	4.02	5.63	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
	1"~2" Oval Handle	304SS+CF8	1
12	Handle Sleeve	Vinyl Plastic	1
13	Locking Device	304SS Stainless	1
14	Body Gasket	PTFE	1

2 PC FULL PORT 2000 CWP

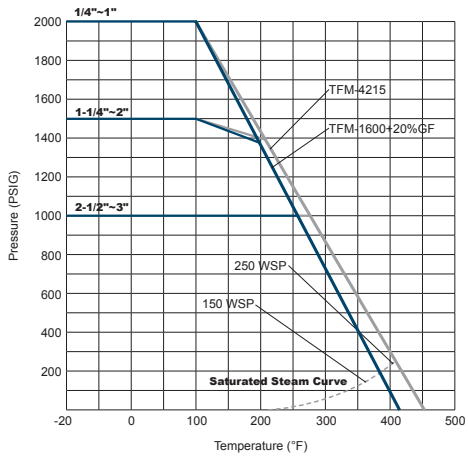
Features:

- 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
- Replacement Locking Handle Kits Available (1/4"~3")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~1-1/4")

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



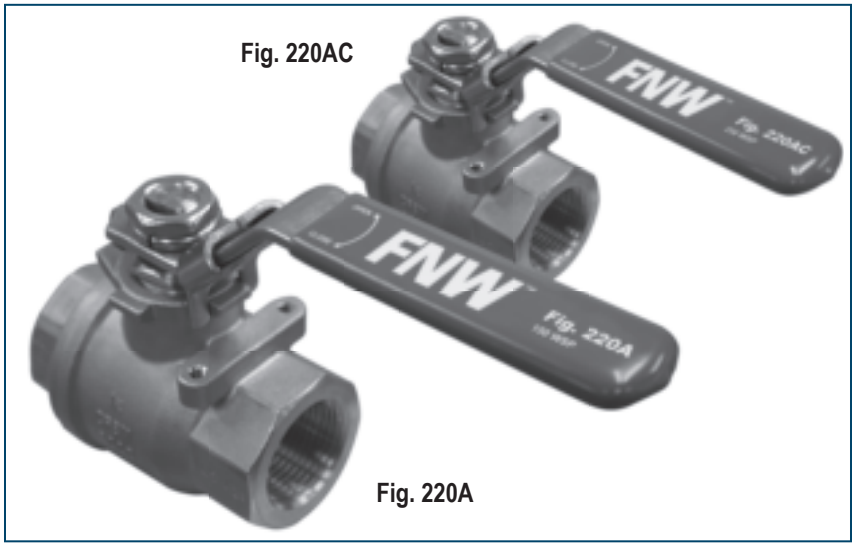


Fig. 220A

Accessories

Replacement Handles (1/4"~3")

Stem Extensions (1/4"~2")

Oval Handles (1/4"~1-1/4")

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

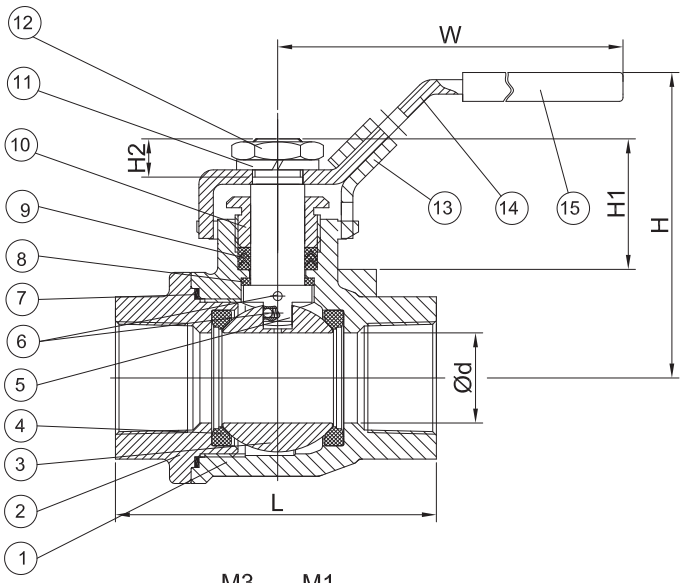
Kit Codes (Order Separately)

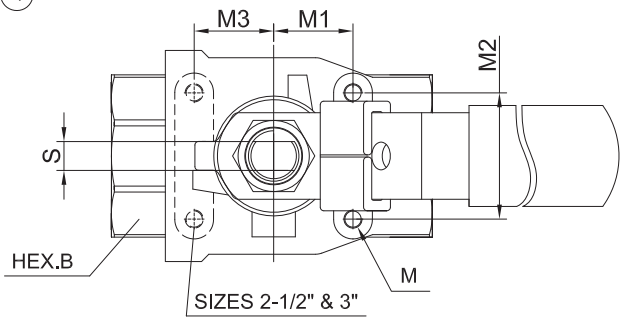
FNW 220A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
Stem Extension = SEK	1"~1-1/4" = GH
Oval Handle = OH	1-1/2"~2" = JK
	2-1/2"~3" = LM

B

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

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

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

2 PC FULL PORT 2000 CWP w/ ISO MOUNTING PAD

Features:

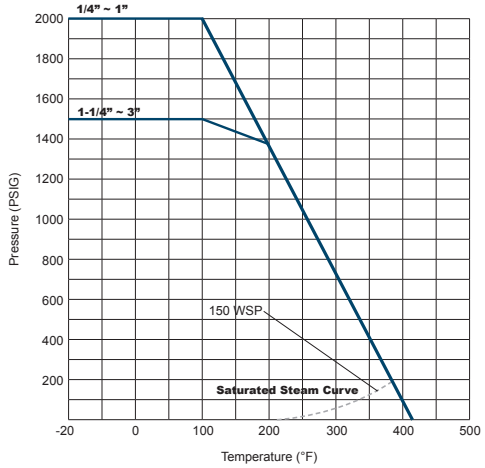
- 2000 PSI CWP* Non-Shock
- 150 PSI WSP
- Full Port
- Blow-out Proof Stem
- Live Loaded Packing
- Anti-static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- Threaded NPT Ends
- Direct Mounting Pad
- Vacuum rated to 26.967"Hg (75 Torr)**
- Vented Ball
- Manufactured Silicone Free
- Optional Locking Handle Kits (1/4"~3")

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.



Accessories

Locking Handle Kits (1/4"~3")

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

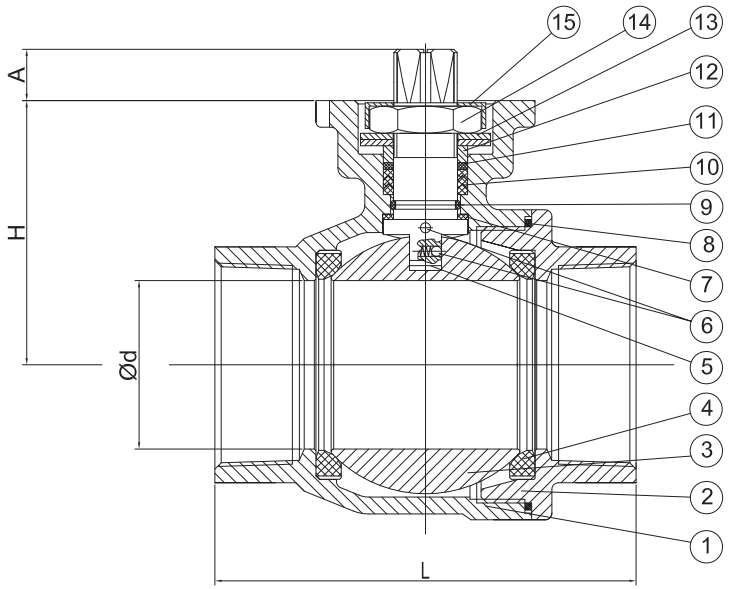
Kit Codes (Order Separately)

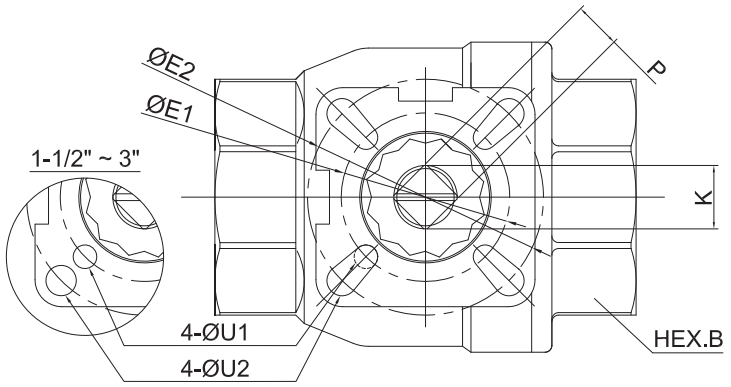
FNW 220AM Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
	1"~1-1/4" = GH
	1-1/2"~2" = JK
	2-1/2" = L
	3" = M

2 PC FULL PORT 2000 CWP w/ ISO MOUNTING PAD

B





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

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

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
- Replacement Locking Handle Kits Available (1/2"~2")

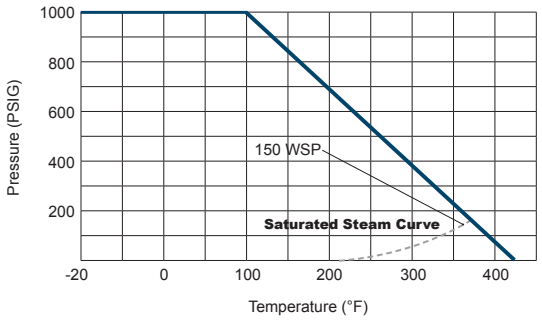
Standards:

- 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.

Accessories

Replacement Locking Handle Kits (1/2"~2")



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

Kit Codes (Order Separately)

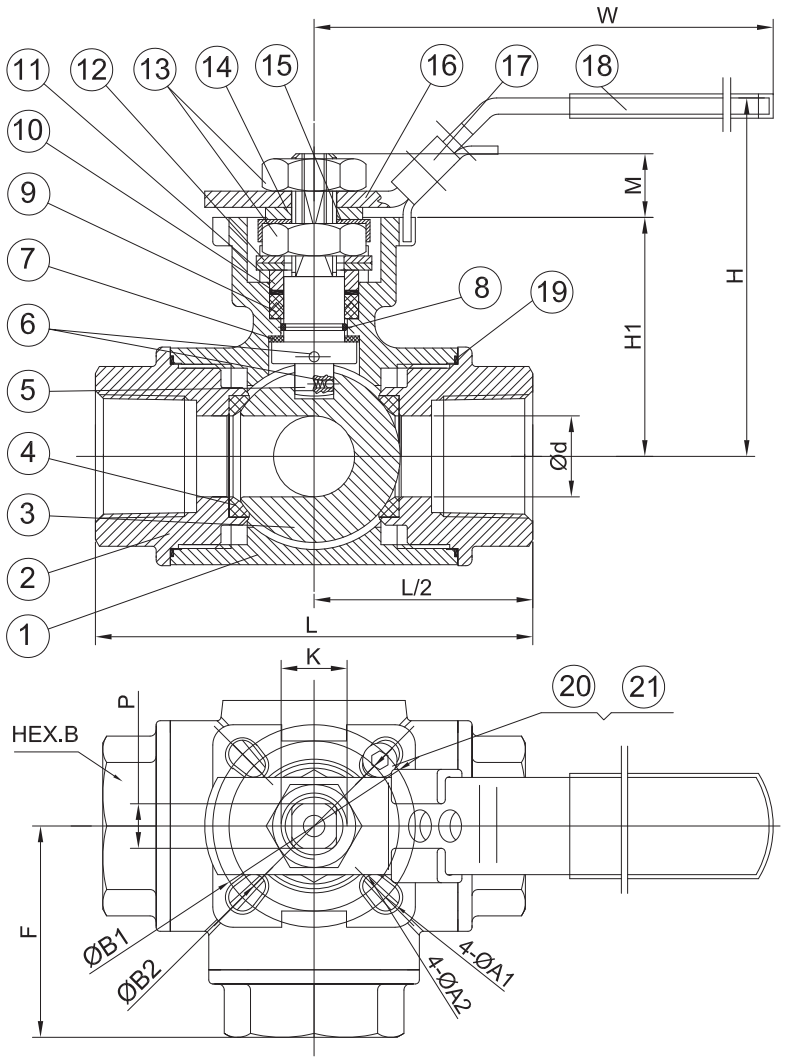
FNW 233A Kit Size

KIT TYPE
Locking Handle = LHK

SIZE CODE
1/2" = D
3/4" = F
1"~1-1/4" = GH
1-1/2"~2" = JK

B

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

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
- Replacement Locking Handle Kits Available (1/4"~3")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~2")

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

Figure Number Matrix

FNW 310A Ends Size

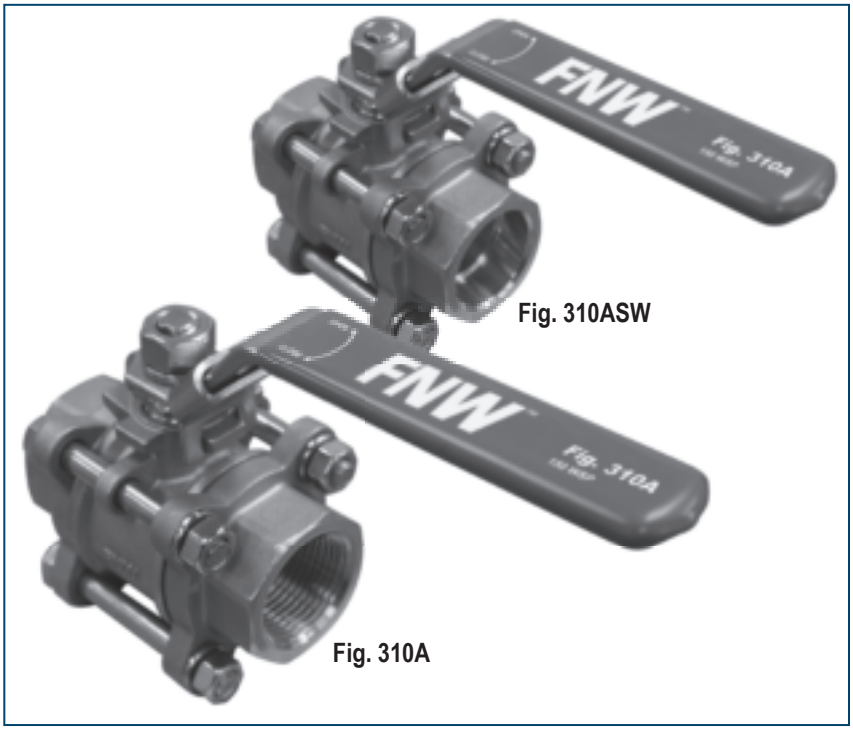
END CODE	SIZE CODE	
Blank = Threaded NPT	1/4 = B	1-1/4 = H
SW = Socket Weld	3/8 = C	1-1/2 = J
	1/2 = D	2 = K
	3/4 = F	2-1/2 = L
	1 = G	3 = M

Note: For 4" valves, use FNW Figure number 310AM

Kit Codes (Order Separately)

FNW 310A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~1/2" = BD
Stem Extension = SEK	3/4" = F
Oval Handle = OH	1"~1-1/4" = GH
	1-1/2"~2" = JK
	2-1/2"~3" = LM

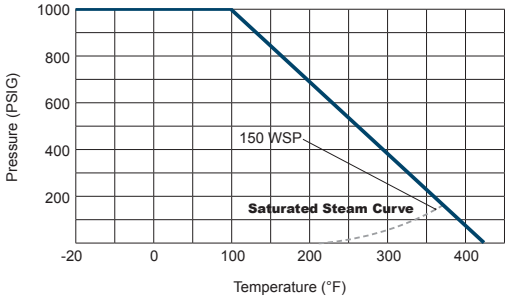


Accessories

Replacement Locking Handle Kits (1/4"~3")

Stem Extension Kits (1/4"~2")

Oval Handle Kits (1/4"~2")

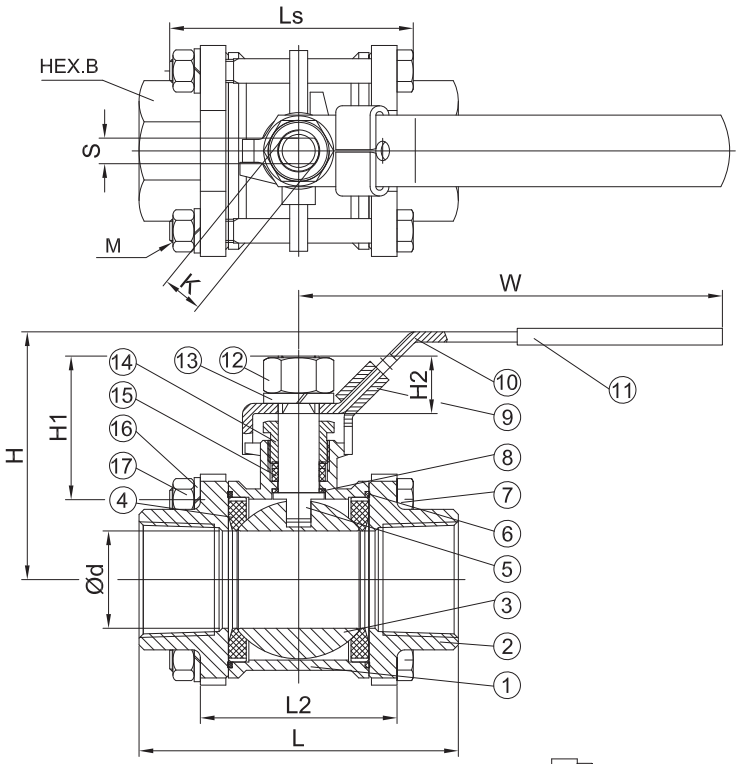


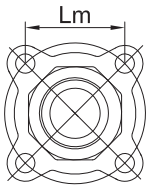
Cv, Torque & Weight

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

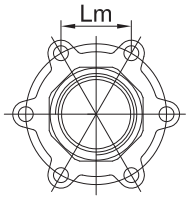
B

3 PC FULL PORT 1000 CWP

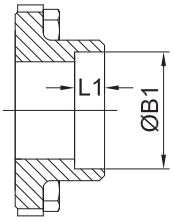




1/4"~ 2 1/2"



3"



SW ENDS

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	Stem		316SS Stainless	1
6	Body Gasket		PTFE	2
7	Body Bolt	1/4"~2-1/2"	ASTM A193-B8 Stainless	4
		3"		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"	SUS304 Stainless	4
		2-1/2"		8
		3"		12
17	Bolt Nut	1/4"~2"	ASTM A194-8 Stainless	4
		2-1/2"		8
		3"		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	0.47	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

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
- Optional Locking Handle Kits (1/4"~4")

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.

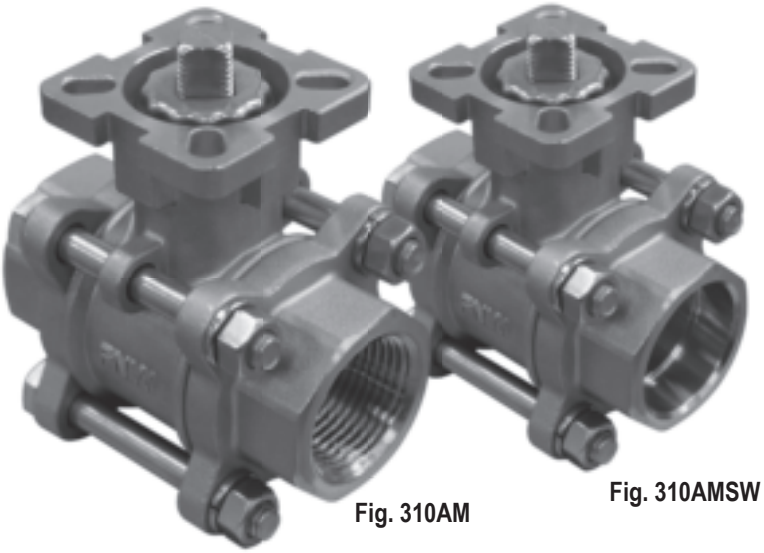


Fig. 310AM

Fig. 310AMSW

Accessories

Locking Handle Kits (1/4"~4")

4" Includes Locking Handle

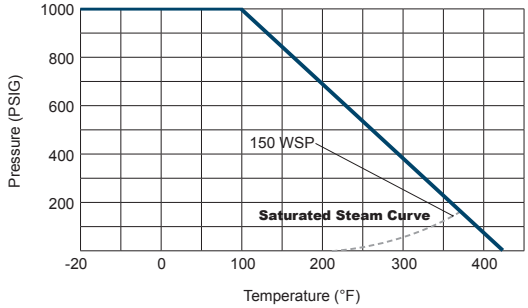


Figure Number Matrix

FNW 310AM Ends Size

END CODE	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	

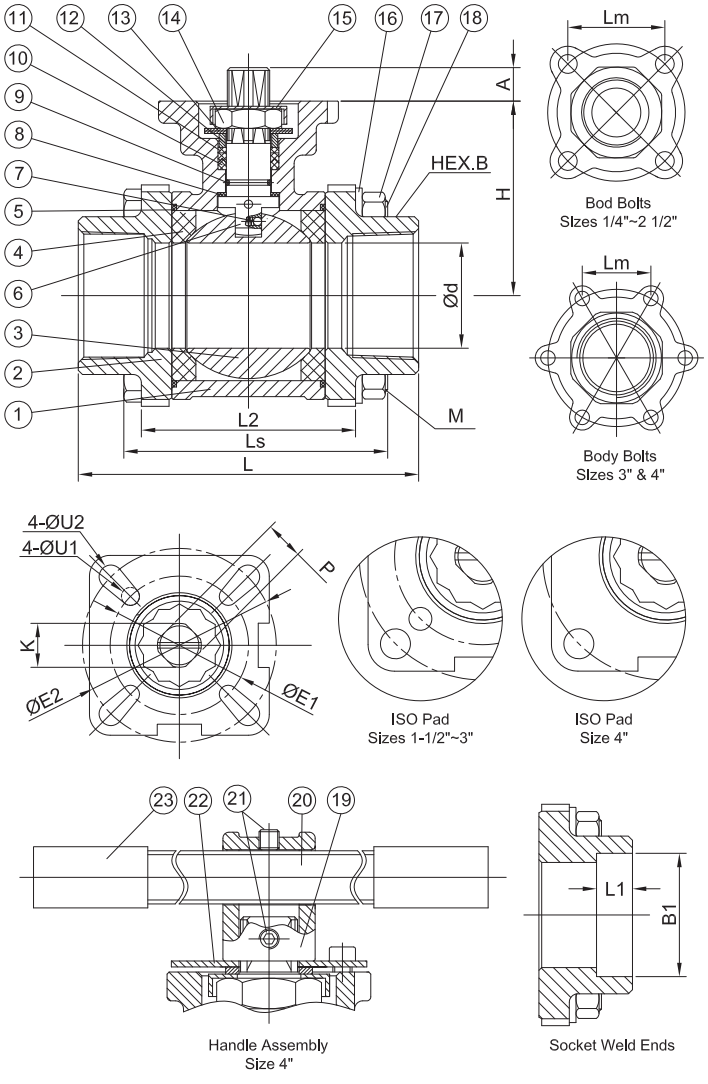
Kit Codes (Order Separately)

FNW 310AM Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
	1"~1-1/4" = GH
	1-1/2"~2" = JK
	2-1/2"~3" = LM
	4" = P

B

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"	304SS Stainless	4
		2-1/2"		8
		3"~4"		12
17	Bolt Nut	1/4"~2"	ASTM A194-8 Stainless	4
		2-1/2"		8
		3"~4"		12
18	Body Bolt	1/4"~3"	ASTM A193-B8 Stainless	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

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

3 PC FULL PORT 2000 CWP

Features:

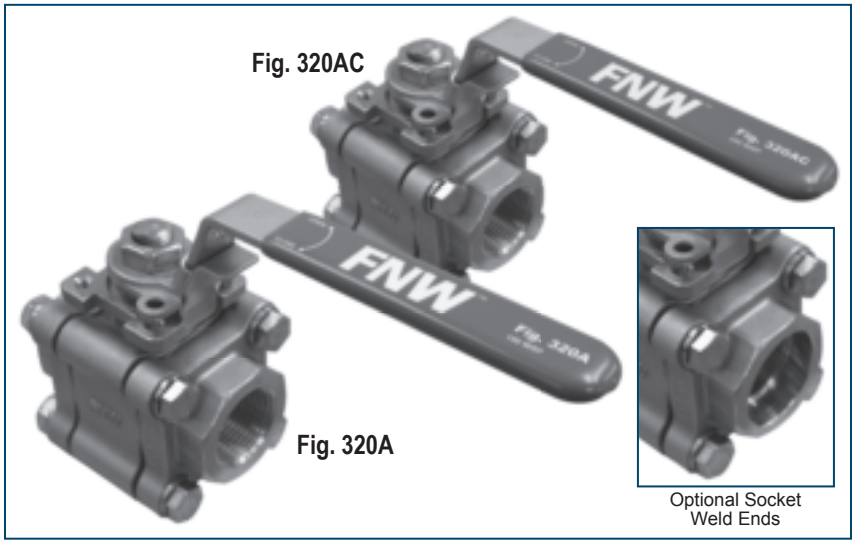
- 2000 PSI CWP* Non-Shock
- Working Steam Pressure (WSP)
  - 150 PSI - Fig. 320A
  - 250 PSI - Fig. 320AC
- Full Port
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-static Design
- Investment Cast Body
- TFM (Super TFE) Seats
- End Connections
  - Threaded
  - Socket Weld
- Stainless Steel Handle
- Locking Lever
- Tapped Hole Mounting Pad
- Vacuum rated to 26.967"Hg (75 Torr)**
- Vented Ball
- Manufactured Silicone Free
- Replacement Locking Handle Kits Available (1/4"~2")
- Optional Stem Extension Kit (Uses Existing Valve Handle)(1/4"~2")
- Optional Oval Handle Kit (1/4"~1-1/4")

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.



Accessories

Stem Extensions (1/4"~2")

Replacement Locking Handles Kits (1/4"~2")

Oval Handle Kits (1/4"~1-1/4")

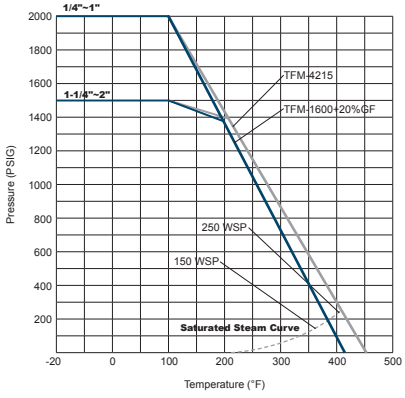


Figure Number Matrix

FNW 320A Seat/Seals Ends Size

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

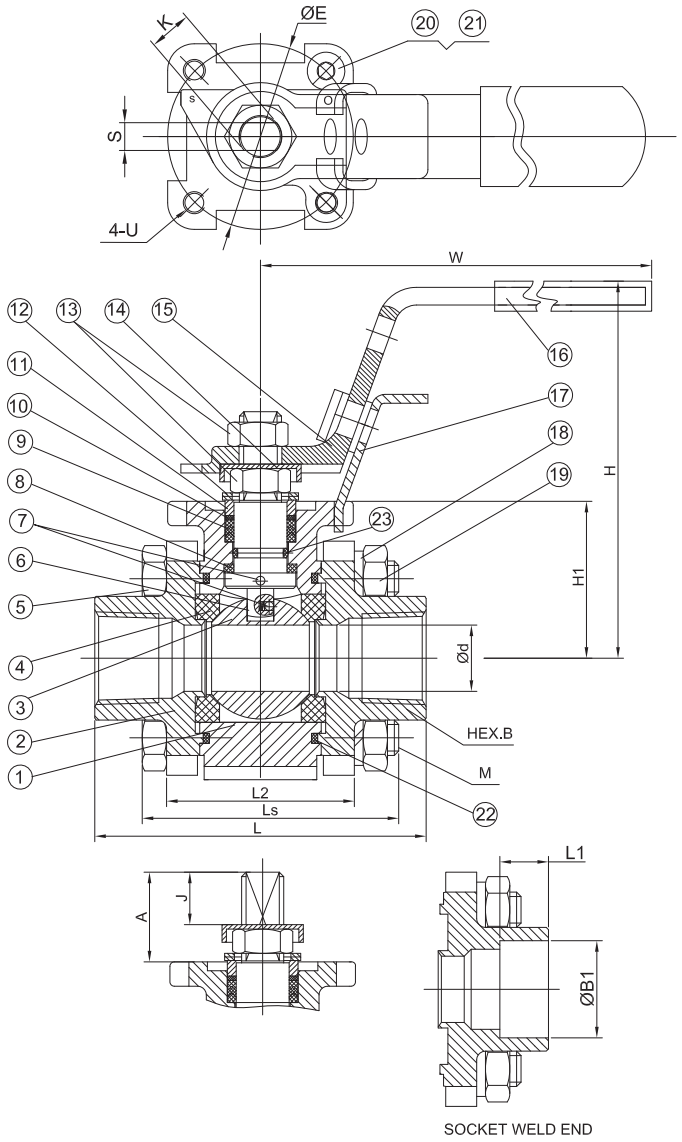
Kit Codes (Order Separately)

FNW 320A Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/4"~3/4" = BF
Stem Extension = SEK	1"~1-1/4" = GH
Oval Handle = OH	1-1/2"~2" = JK

B

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

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

3 PC SANITARY 400 CWP w/CLAMP ENDS

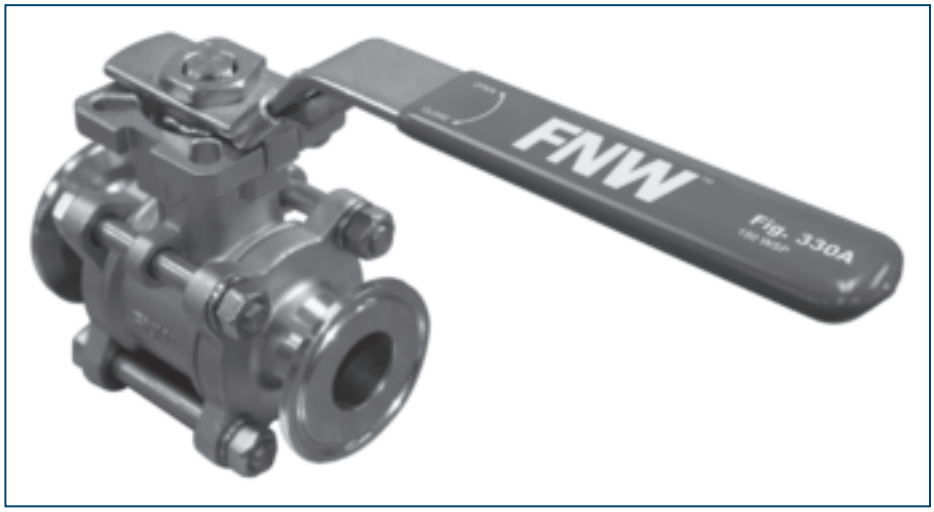
Features:

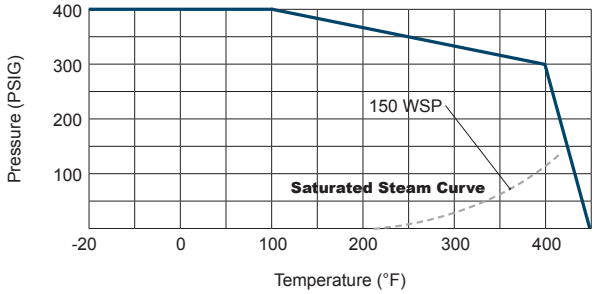
- 400 PSI CWP Non-Shock
- 150 PSI WSP
- Blow-out Proof Stem
- Live-Loaded Packing
- Anti-static Design
- Investment Cast Body
- Internal Polished Body & Ball Surface (Ra 32µin / 0.8µm)
- Double Stem Seal
- Cavity Filled TFM (Super TFE) Seat Design
- Clamp Ends
- Stainless Steel Handle
- Locking Lever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

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.





Accessories

Replacement Locking Handle Kits

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	

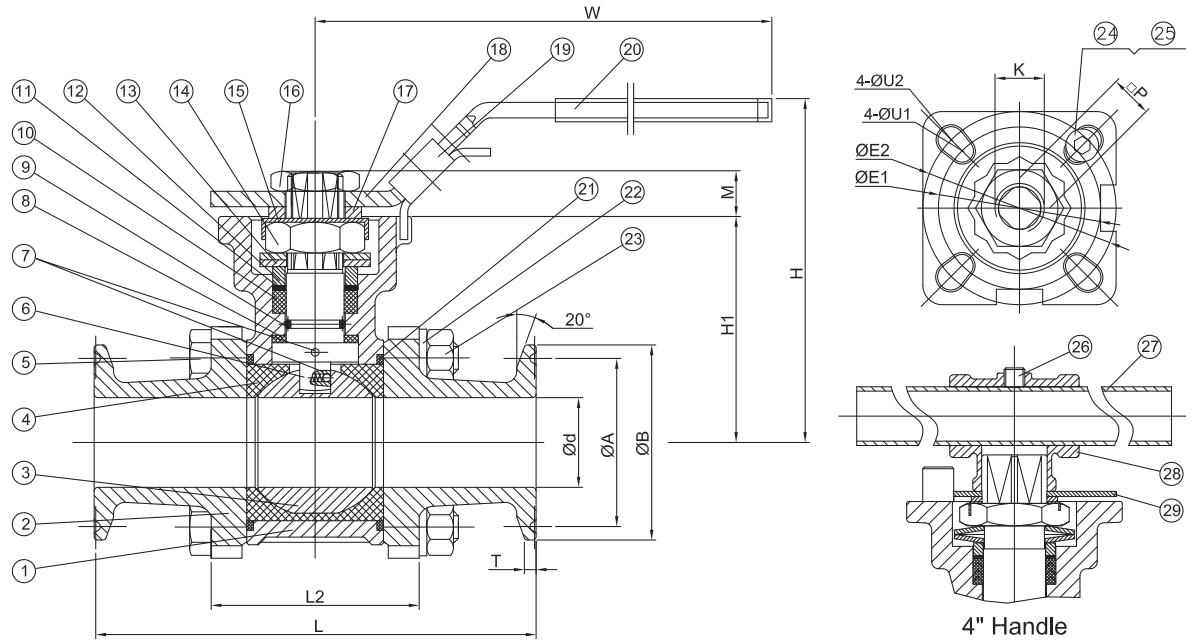
Kit Codes (Order Separately)

FNW 310AM Kit Size

KIT TYPE	SIZE CODE
Locking Handle = LHK	1/2"~3/4" = BF
	1"~1-1/4" = GH
	1-1/2"~2" = JK
	2-1/2"~3" = LM
	4" = P

Note: The figure 330A uses the same handle kit as the 310AM.

Figure 330A
STAINLESS STEEL BALL VALVES



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

Ref. No.	Description	Material	Qty
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

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

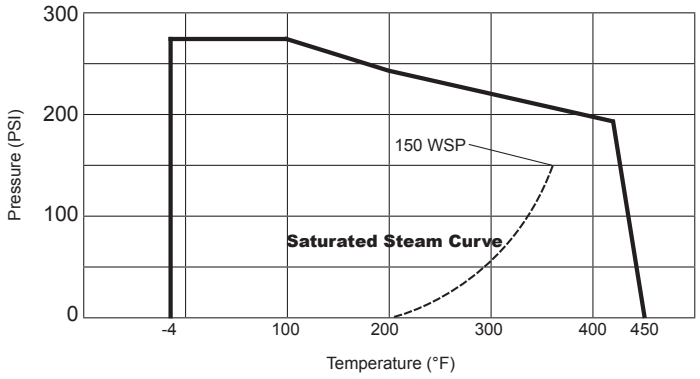


Figure Number Matrix

FNW 500 Size

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

Cv & Weight

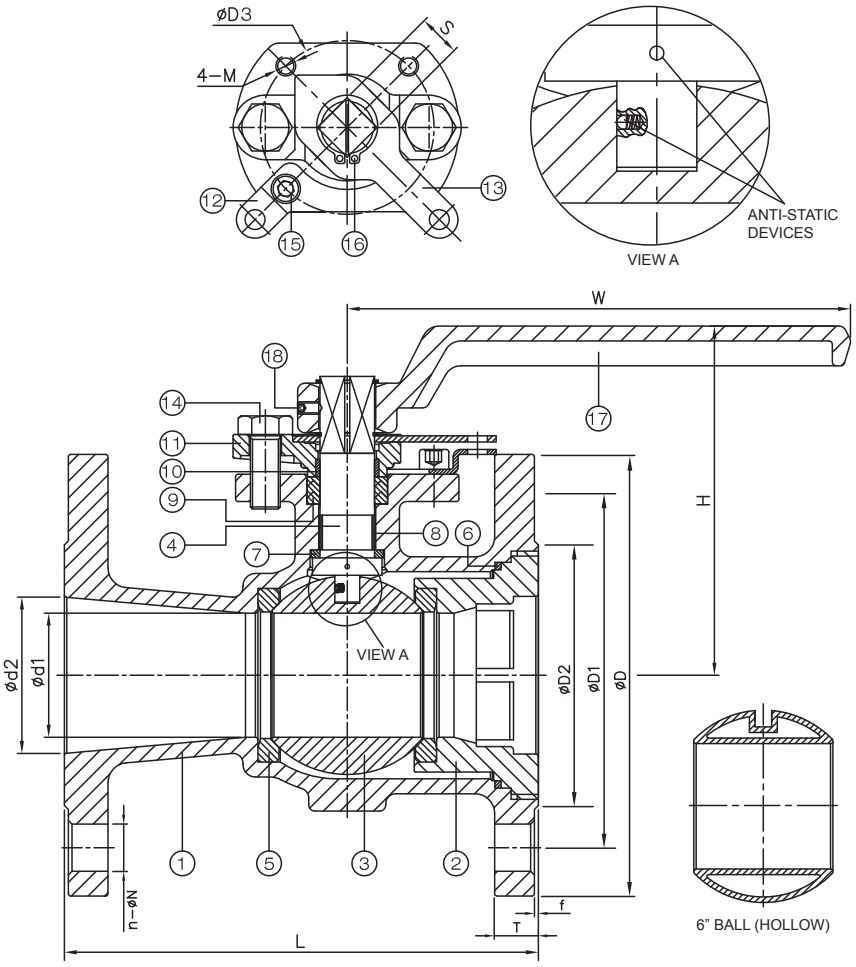
Size	Cv	Wt. (lbs)
2	165	16.3
2-1/2	240	23.1
3	290	32.6
4	690	51.1
6	900	90.4

Torque

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

B

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

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

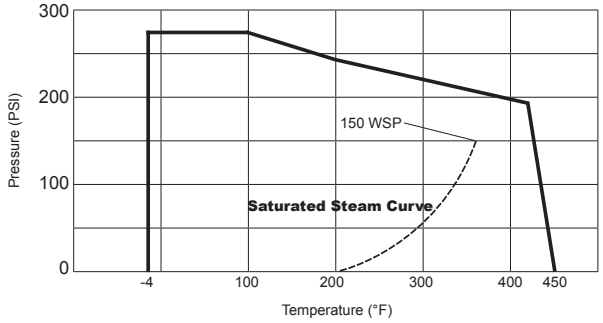


Figure Number Matrix

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

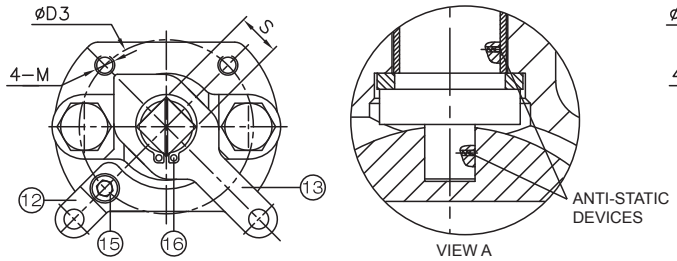
Torque

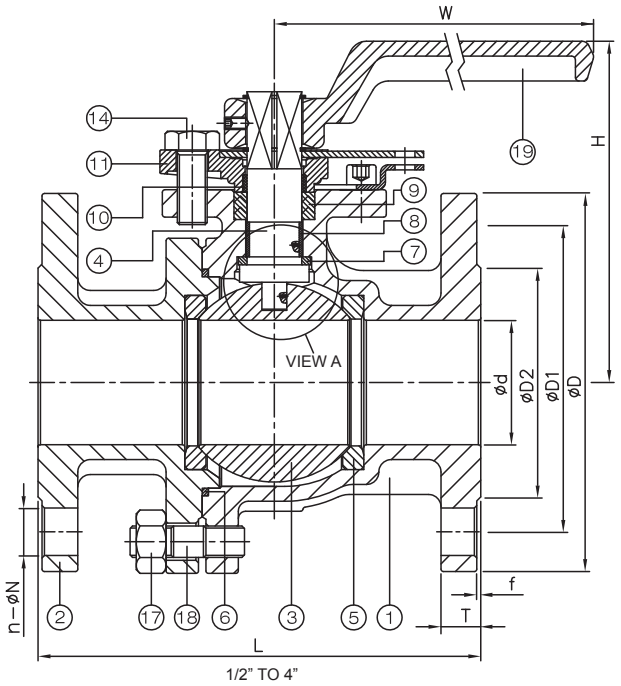
Size	Torque (in-lbs)
1/2	68
3/4	96
1	186
1-1/2	226
2	485
2-1/2	598
3	664
4	1,394
6	3,280
8	6,240
10	9,957

FNW™

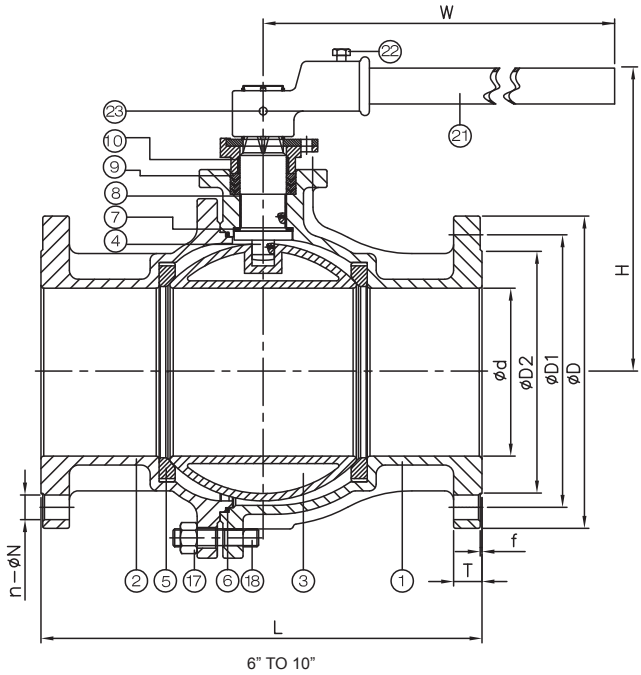
Figure 600
STAINLESS STEEL BALL VALVES

B





1/2" TO 4"



6" TO 10"

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

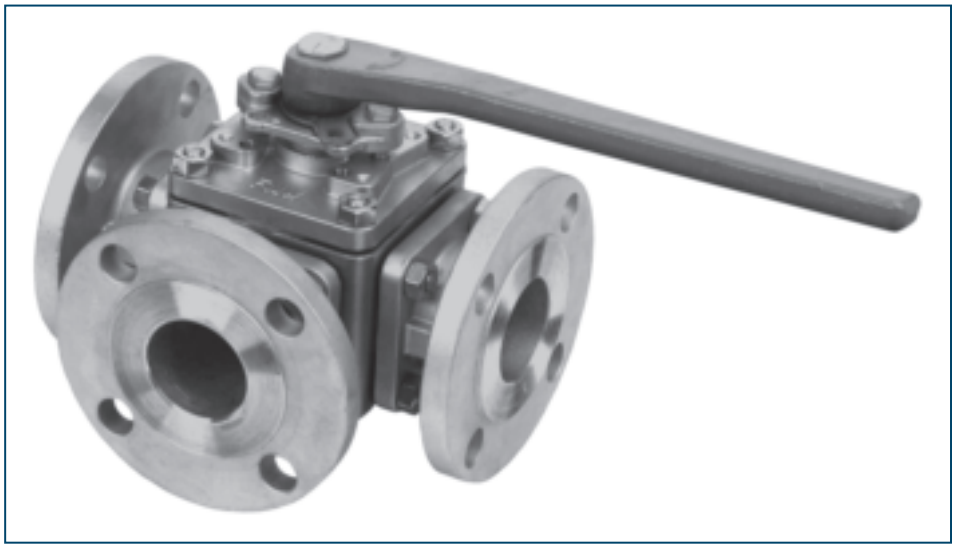
Ref. No.	Description	Material	Qty
1	Body	ASTM A351 Gr. CF8M Stainless	1
2	End Cap	ASTM A351 Gr. CF8M Stainless	1
3	Ball	ASTM A351 Gr. CF8M Stainless	1
4	Stem	ASTM A276-316 Stainless	1
5	Seat	RTFE	2
6	Body Seal	PTFE	1
7	Thrust Washer	PTFE	1
8	Stem Bushing	PTFE	1
9	Packing	PTFE	1
10	Bearing	PTFE	1
11	Gland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

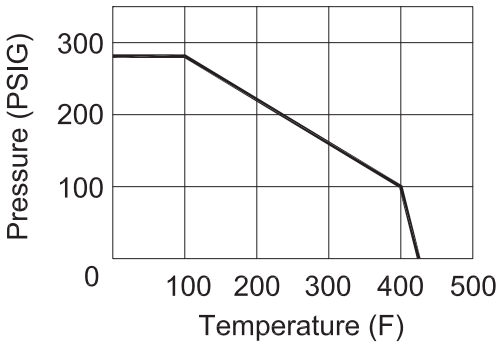
Ref. No.	Description	Material	Qty
13	Stop Plate	AISI304 Stainless	1
14	Packing Bolt	AISI304 Stainless	2
15	Lock Plate Bolt	AISI304 Stainless	2
16	Snap Ring	AISI304 Stainless	2
17	Body Nut	AISI304 Stainless	4-12
18	Body Stud	AISI304 Stainless	4-12
19	Handle	ASTM A216-WCB Carbon Steel	1
20	Handle Head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

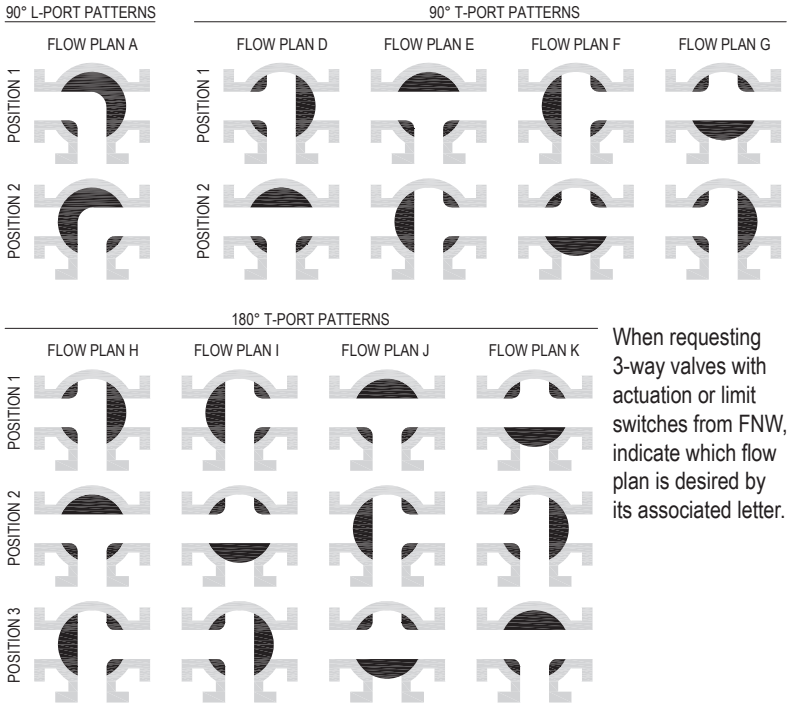
3-WAY FULL PORT 150# FLANGED

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"







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

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

Cv & Weight

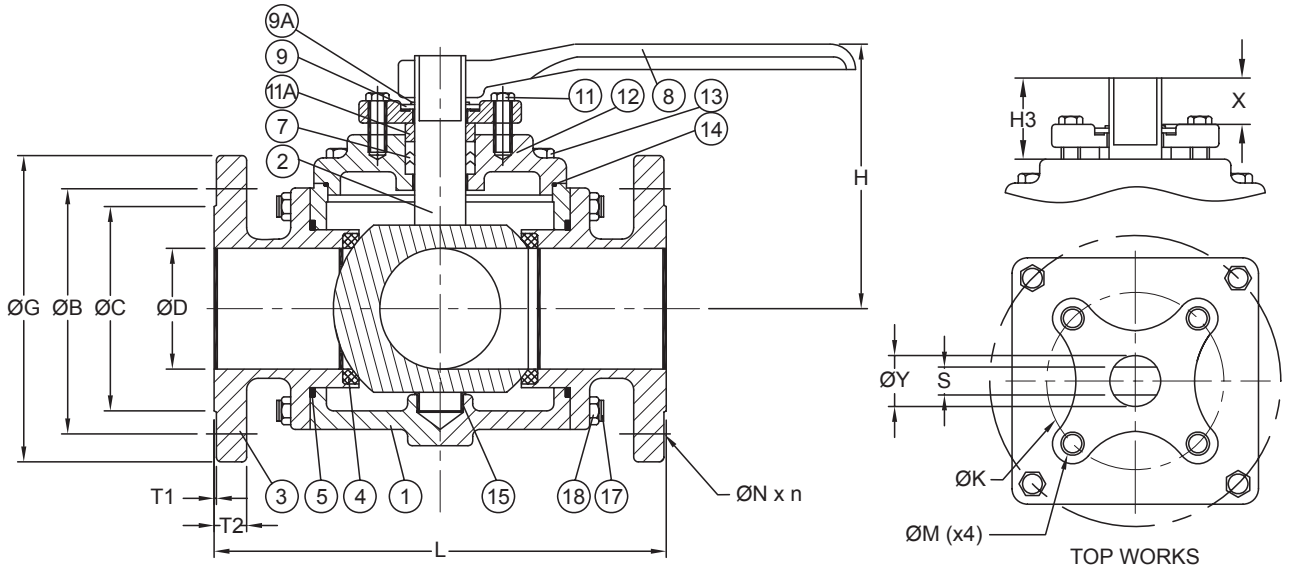
SIZE	Cv	Wt. (lbs)
2	153	36
2-1/2	275	56
3	364	75
4	662	122
6	1,575	300
8	2,889	530

Torque

SIZE	Torque (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

B



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	4.02	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

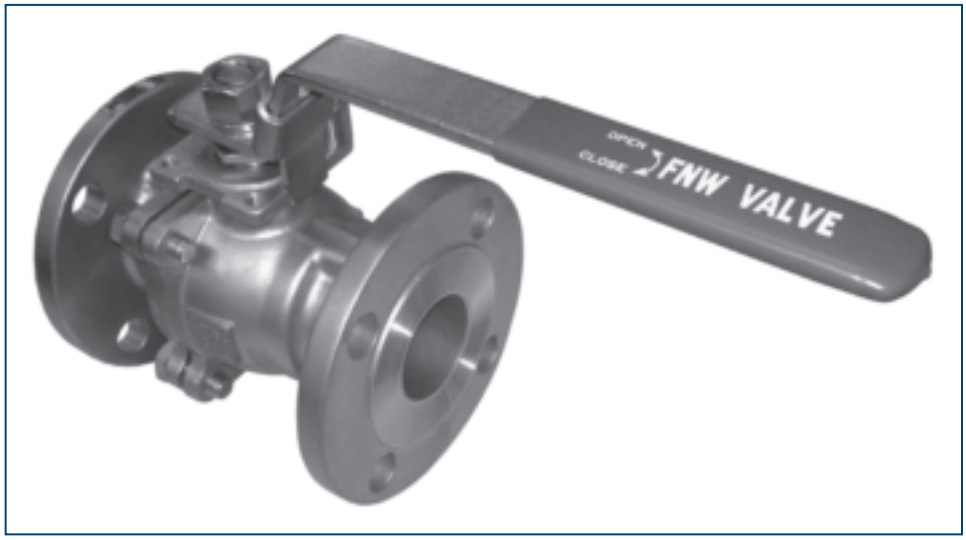
2 PC ECONOMY
FULL PORT 150# FLANGED

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



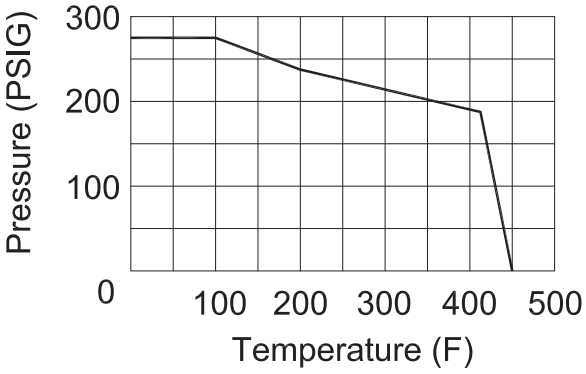


Figure Number Matrix

FNW 660 Size

SIZE CODE

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

Cv & Weight

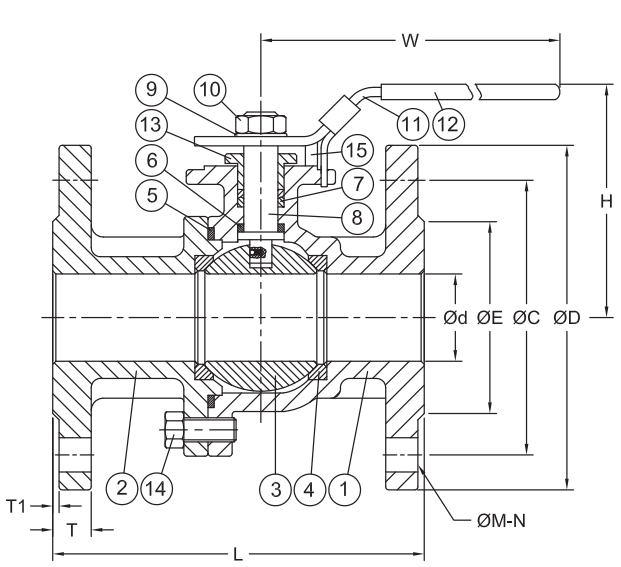
SIZE	Cv	Wt. (lbs)
2	386	19
2-1/2	497	28
3	702	40
4	1,402	62
6	4,600	149

Torque

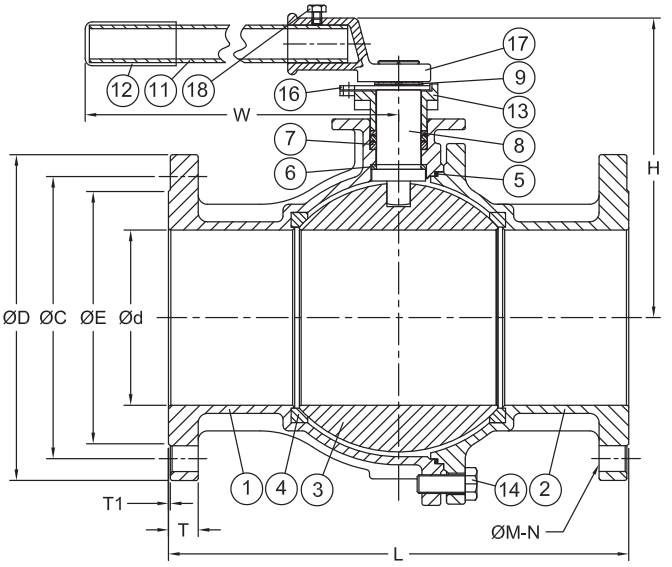
SIZE	Torque (in-lbs)
2	337
2-1/2	448
3	519
4	576
6	2,129

B

2 PC ECONOMY
FULL PORT 150# FLANGED



2" TO 4"



6"

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

NOTES

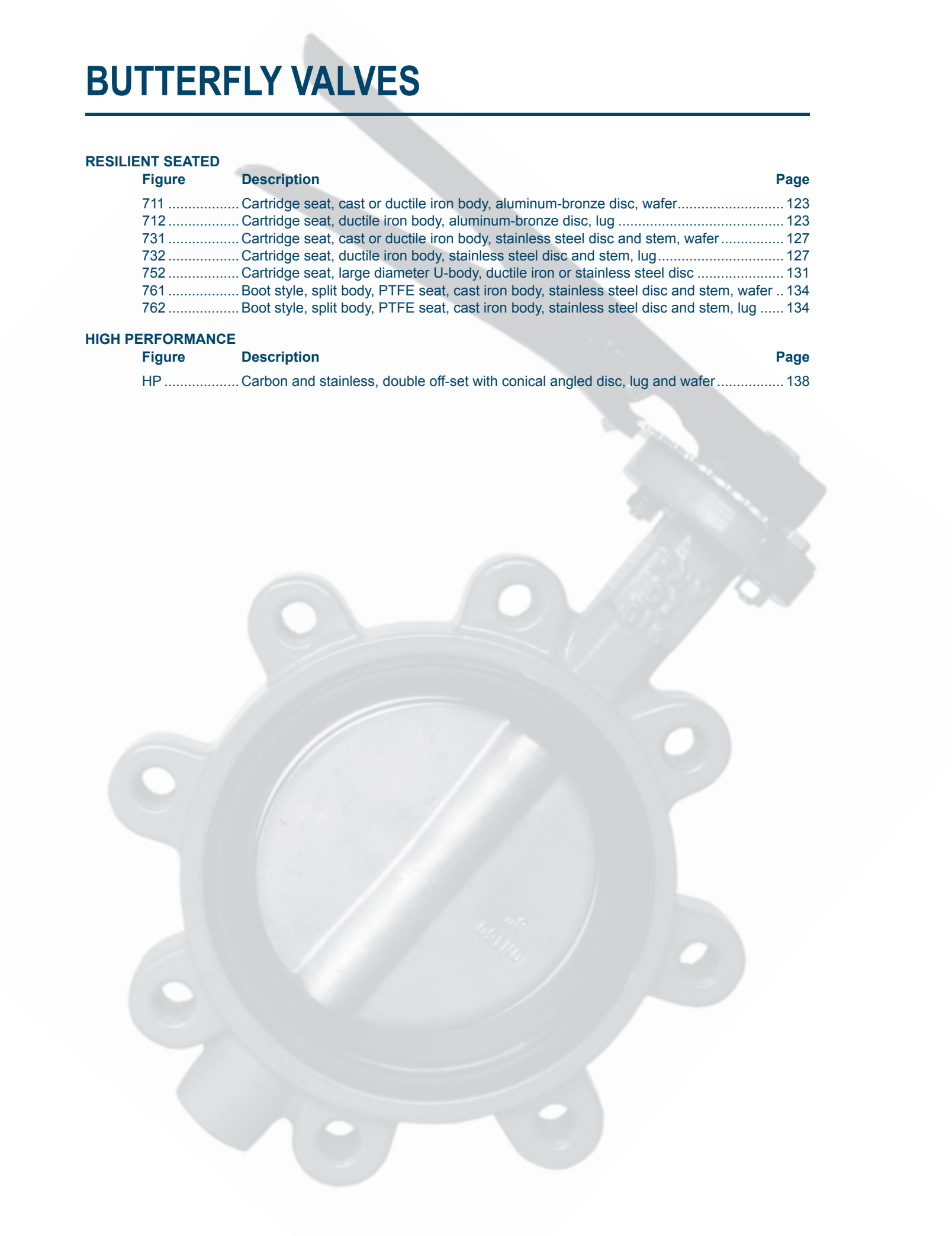
BUTTERFLY VALVES

RESILIENT SEATED

Figure	Description	Page
711	Cartridge seat, cast or ductile iron body, aluminum-bronze disc, wafer	123
712	Cartridge seat, ductile iron body, aluminum-bronze disc, lug	123
731	Cartridge seat, cast or ductile iron body, stainless steel disc and stem, wafer	127
732	Cartridge seat, ductile iron body, stainless steel disc and stem, lug	127
752	Cartridge seat, large diameter U-body, ductile iron or stainless steel disc	131
761	Boot style, split body, PTFE seat, cast iron body, stainless steel disc and stem, wafer	134
762	Boot style, split body, PTFE seat, cast iron body, stainless steel disc and stem, lug	134

HIGH PERFORMANCE

Figure	Description	Page
HP	Carbon and stainless, double off-set with conical angled disc, lug and wafer	138



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 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*
- Lockable Handles (up to 8")
- 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

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.

Fig. 712

Fig. 711

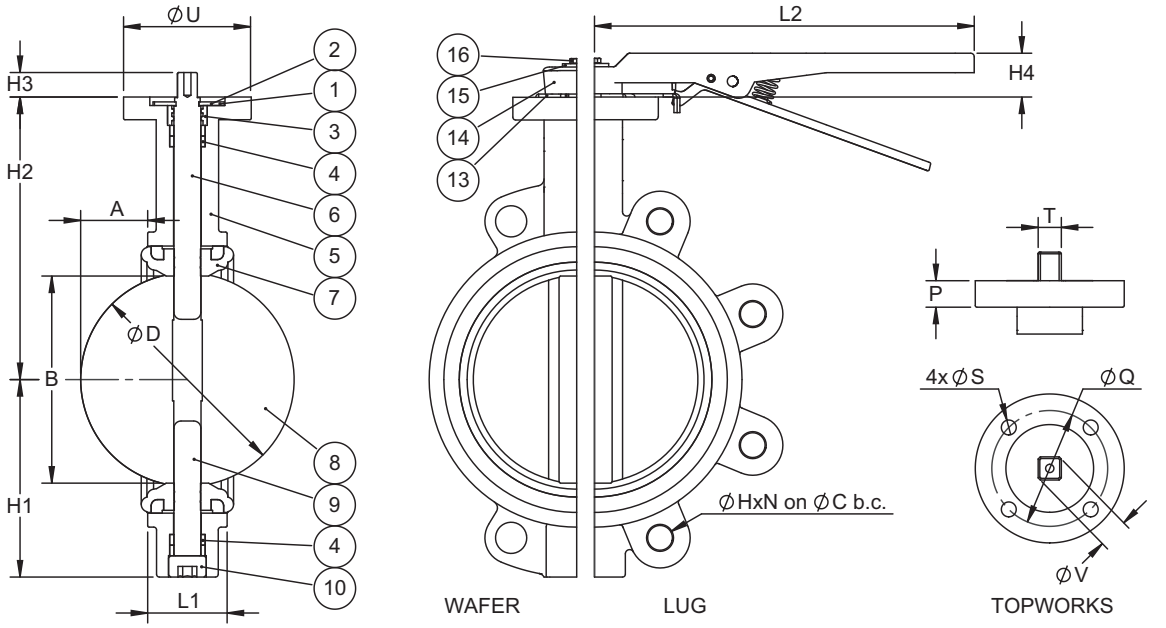
* Pressed collar style angle face rings (typically sizes 2" to 6") are not recommended due to the large radius of the inner diameter. Cast type angle face rings or stub ends should be used with light wall stainless steel piping. Prior to installation, always verify that the connecting piping flange face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

** Lugged valve for dead-end service and no downstream flange, 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.

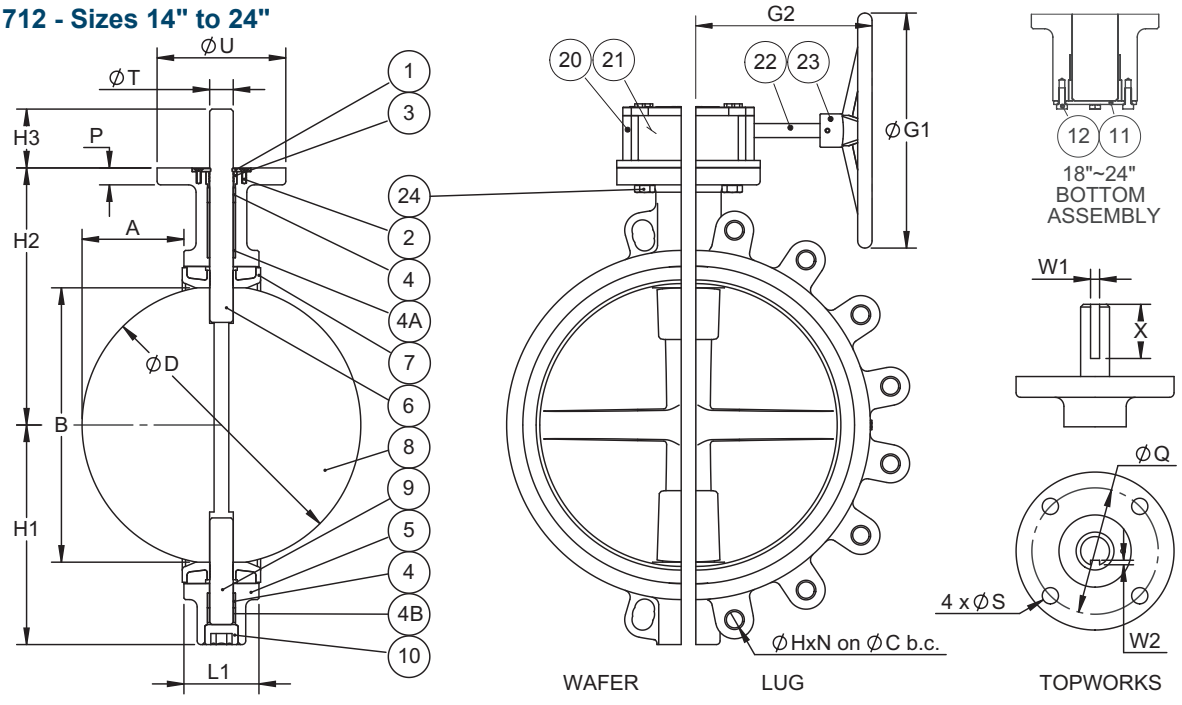
† Vacuum measurements are often made in inches of mercury below atmospheric pressure. The values calculated here assume standard atmospheric pressure of 29.92 inches of mercury.

C

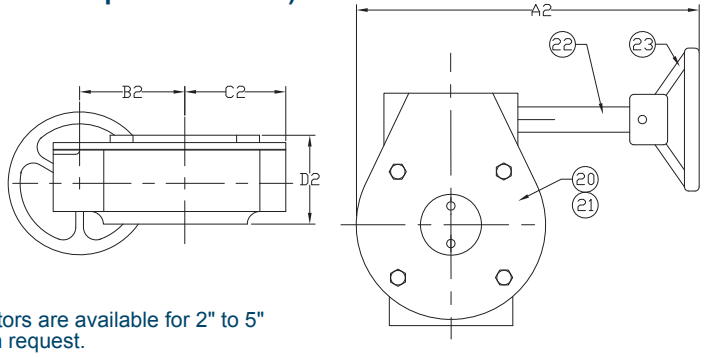
711 / 712 - Sizes 2" to 12" (10" & 12" standard with gears)



711 / 712 - Sizes 14" to 24"



Additional Gear Operator Dimensions for 6" to 24" Valves*
(Gears for 10" & up are standard)



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

Dimensions (inches)

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

Figure 711 & 712
BUTTERFLY VALVES

FNW™

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			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			5.49	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			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			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			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		2.68		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		3.07		11.81	8.46	17.00	7/8"-9	12	0.95	4.92	0.79	4.02	0.43	0.87	1.10

C

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 711, Sizes 2"~10"
		ASTM A536 65-45-12 DUCTILE IRON		Fig 711, Sizes 12" & Up, Fig 712 All
6	Upper Stem	416SS STAINLESS STEEL	1	
7	Seat	EPDM or BUNA	1	
8	Disc	JIS H 5114 ALUMINUM BRONZE	1	
9	Lower Stem	416SS STAINLESS STEEL	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"~8"
14	Lever	ASTM A47 Gr 32510 MALLEABLE IRON	1	Sizes 2"~8"
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 10"~24" Standard
21	Gear Drive	ASTM A536 65-45-12 DUCTILE IRON	1	Sizes 10"~24" Standard, Not Shown
22	Gear Input Shaft	STEEL	1	Nickel Plated, Sizes 10"~24"
23	Hand Wheel	ASTM A126 CAST IRON	1	Sizes 10"~24"
24	Gear Mounting Bolt	ASTM A283D-A36 STEEL	4	Zinc Plated, Sizes 10"~24"

Standard configurations are with levers up to 8" and gear operators 6" to 24". Gear operators for valves 5" and smaller are available upon request.

FNW™

Figure 711 & 712
BUTTERFLY VALVES

C

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"	367
2-1/2"	367
3"	480
4"	593
5"	649
6"	971
8"	1,896
10"	4,006
12"	4,627
14"	13,385
16"	17,506
18"	23,542
20"	29,076
24"	46,847

1. Torque for each valve size includes 30% safety factor.
2. Max Working Pressure: Sizes 2"-12": 255 PSI, Sizes 14"-24": 188 PSI.
3. All unseating torques based on non-corrosive clean, wet or lubricating service at ambient temperatures.
4. For line velocities greater than 15 FPS, dynamic torque must be taken into consideration.

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

BODY TYPE	SEAT	OPERATOR	SIZE CODES	
1 = Wafer	E = EPDM	Blank = 10 Position Lever (2"-8")	2 = K	10 = 10
2 = Lug	B = BUNA-N	G = Gear Operator (6"-24")	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

Seat Temperatures

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

Figure 731 & 732
BUTTERFLY VALVES

FNW™

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*
- Lockable Handles
- 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, pneumatic and electric operators, control accessories, stem extensions and custom mounting hardware. Contact FNW with your specific application needs.

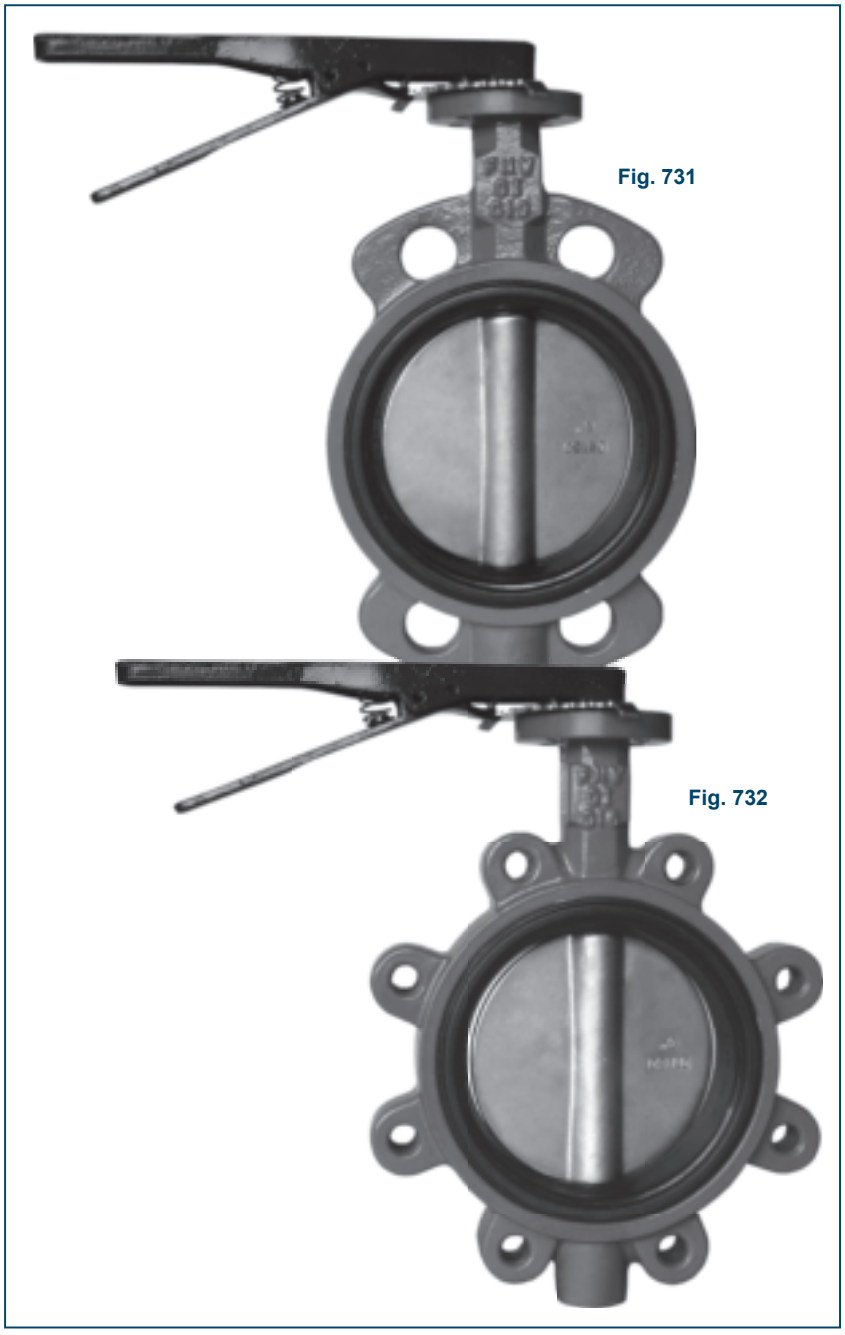


Fig. 731

Fig. 732

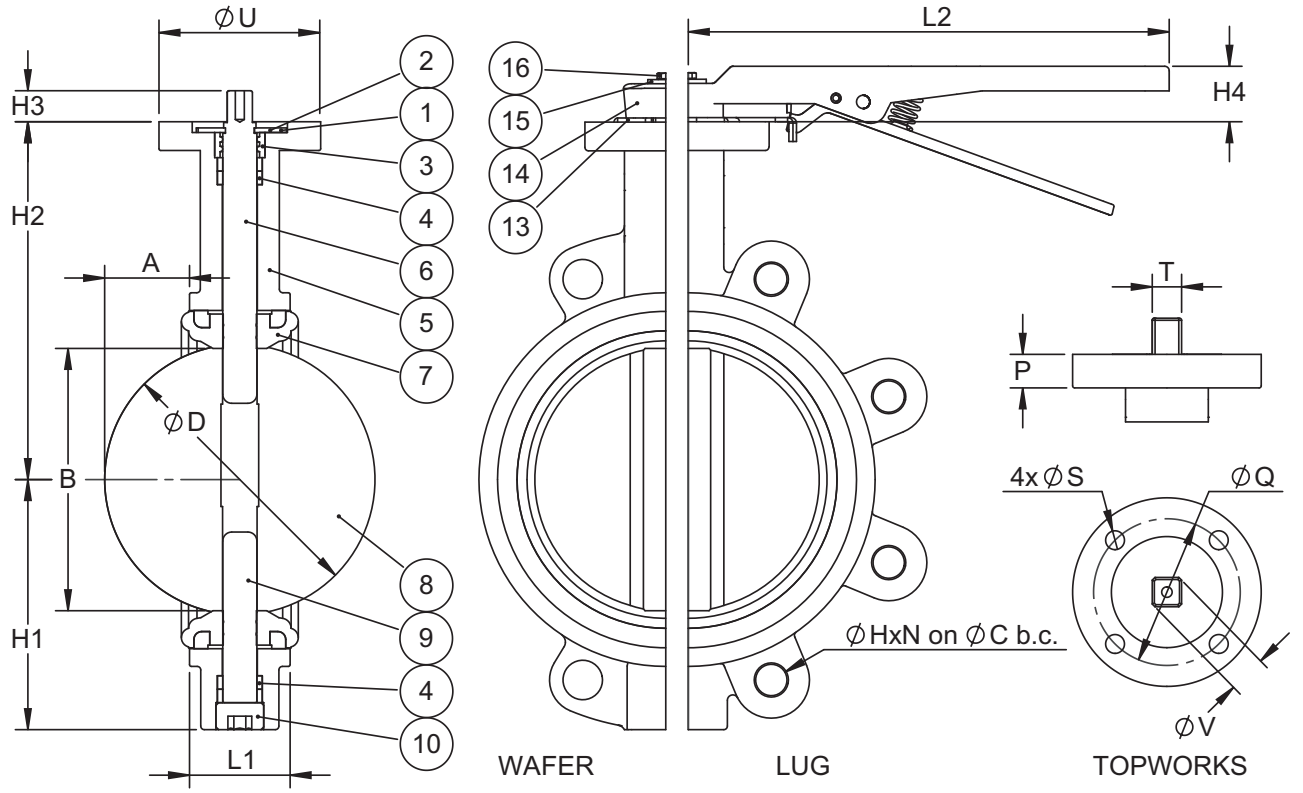
* Pressed collar style angle face rings (typically sizes 2" to 6") are not recommended due to the large radius of the inner diameter. Cast type angle face rings or stub ends should be used with light wall stainless steel piping. Prior to installation, always verify that the connecting piping flange face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

** Lugged valve for dead-end service and no downstream flange, 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.

C

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



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

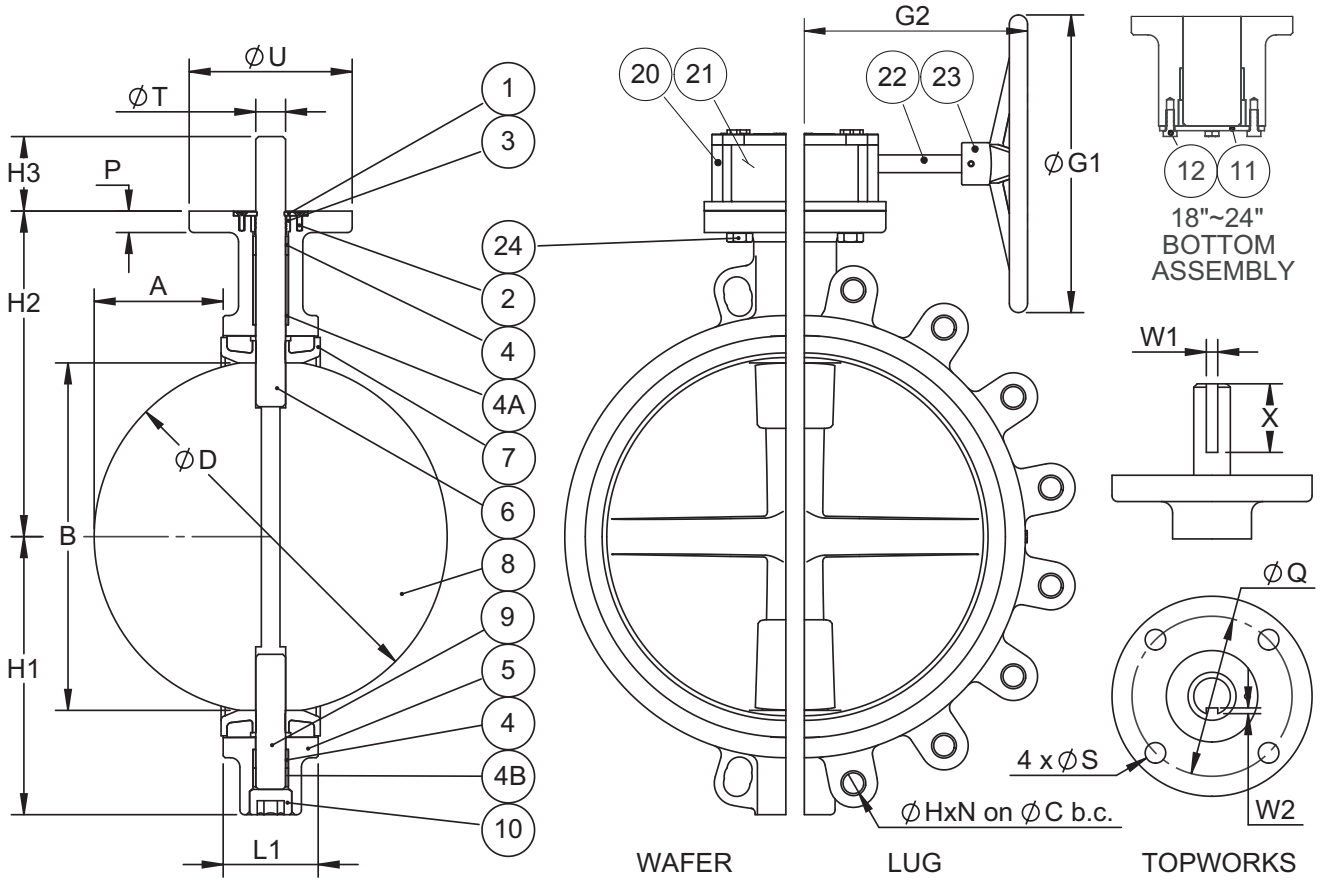


Figure 731 & 732
BUTTERFLY VALVES

FNW™

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	0.43	0.87	1.10

C

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	
		VITON®		Sizes 2"~12" Only
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.

FNW™

Figure 731 & 732
BUTTERFLY VALVES

C

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"	367
2-1/2"	367
3"	480
4"	593
5"	649
6"	971
8"	1,896
10"	4,006
12"	4,627
14"	13,385
16"	17,506
18"	23,542
20"	29,076
24"	46,847

1. Torque for each valve size includes 30% safety factor.
2. Max Working Pressure: Sizes 2"-12": 255 PSI, Sizes 14"-24": 188 PSI.
3. All unseating torques based on non-corrosive clean, wet or lubricating service at ambient temperatures.
4. For line velocities greater than 15 FPS, dynamic torque must be taken into consideration.

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"-12")	2 = K	10 = 10
2 = Lug	B = BUNA-N	G = Gear Operator (2"-24")	2-1/2 = L	12 = 12
	V = Viton®		3 = M	14 = 14
			4 = P	16 = 16
			5 = S	18 = 18
			6 = U	20 = 20
			8 = X	24 = 24

Seat Temperatures

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

C

Seat Temperatures

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

Figure Number Matrix

FNW 752 E D S G 30

SEAT	DISC MATERIAL	STEM MATERIAL	OPERATOR	SIZE CODE
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

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

Cv (Flow Coefficients)

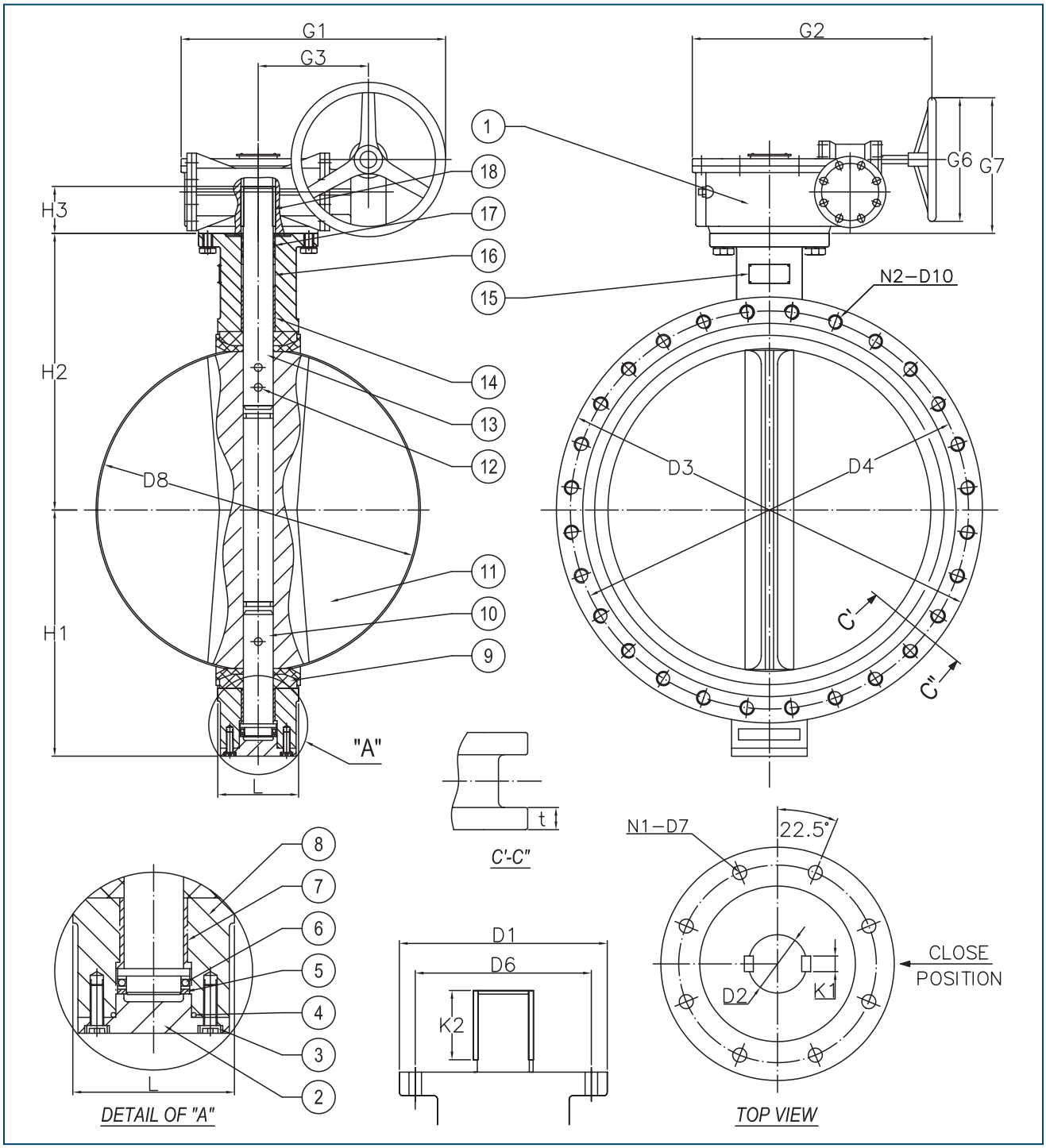
The size of butterfly valves used for control purposes should be calculated on the basis of the operating characteristics. In order to achieve optimum control, the flow coefficient (Cv) of a valve needs to be considered. Cv is the volume of water in U.S. gallons per minute that passes through the valve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

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

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

FNW™

SPLIT BODY PTFE SEATED BUTTERFLY VALVE

C

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
- Lockable Lever Handle
- 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 598
- Mounting Pad: ISO 5211

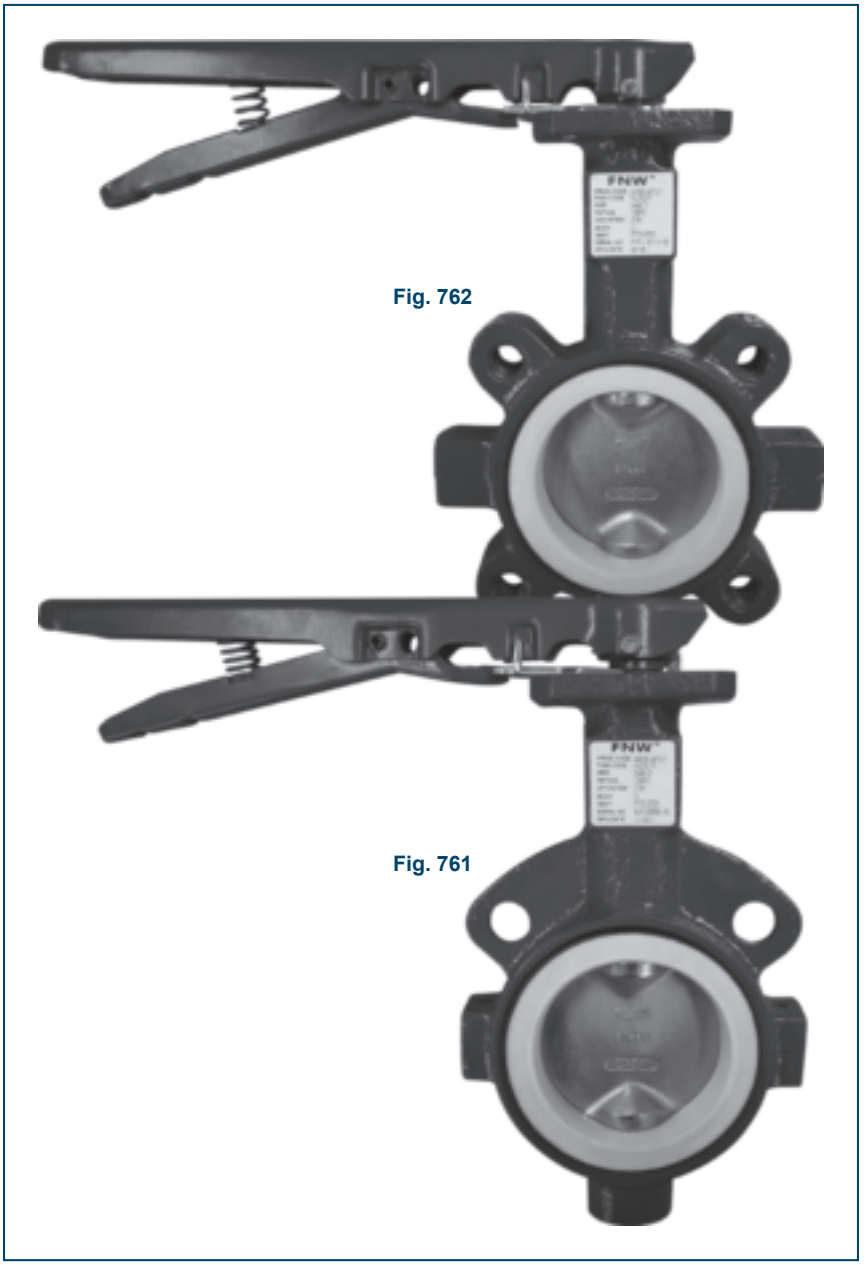


Fig. 762

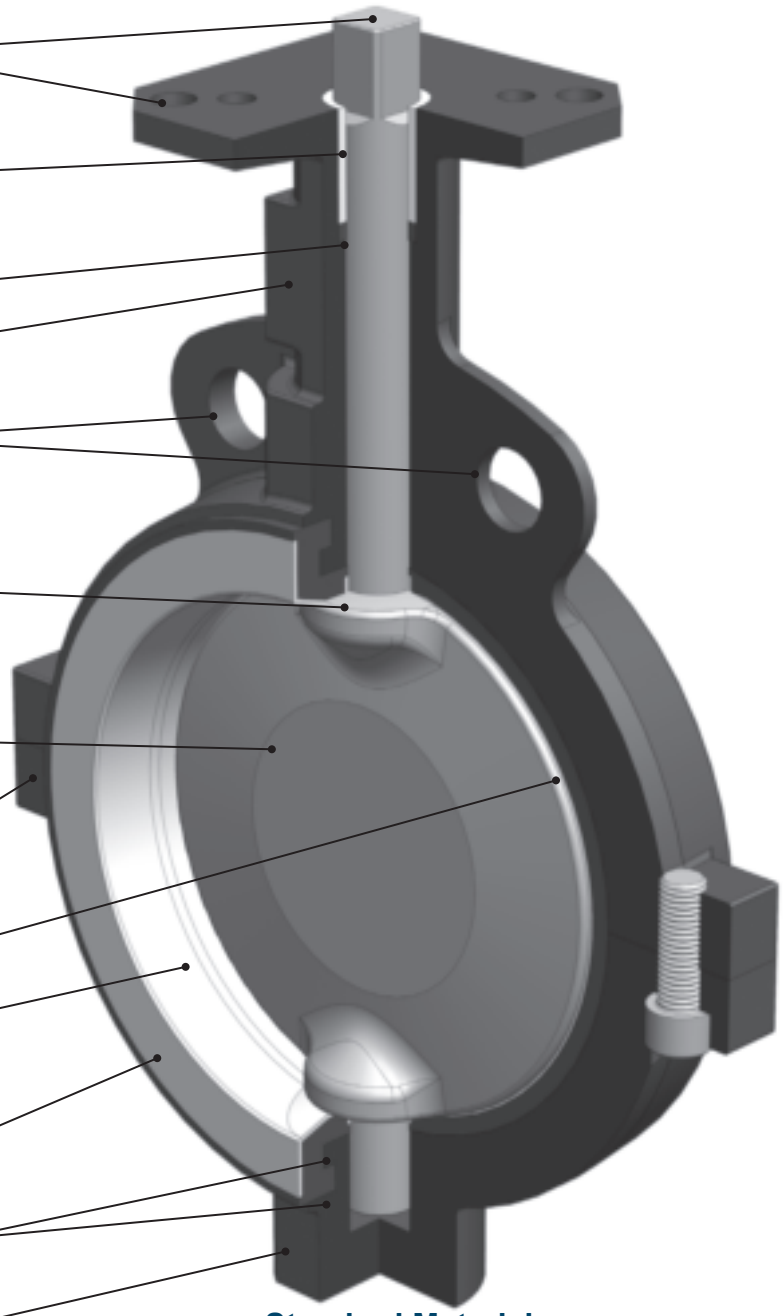
Fig. 761

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

** Leakage rate not exceeding $1x10^{-6}$ 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
- Heady-duty square groove locks boot seat in place
- Two layer coating starting with Epoxy Zinc Phosphate Primer followed by a Polyurethane top coat

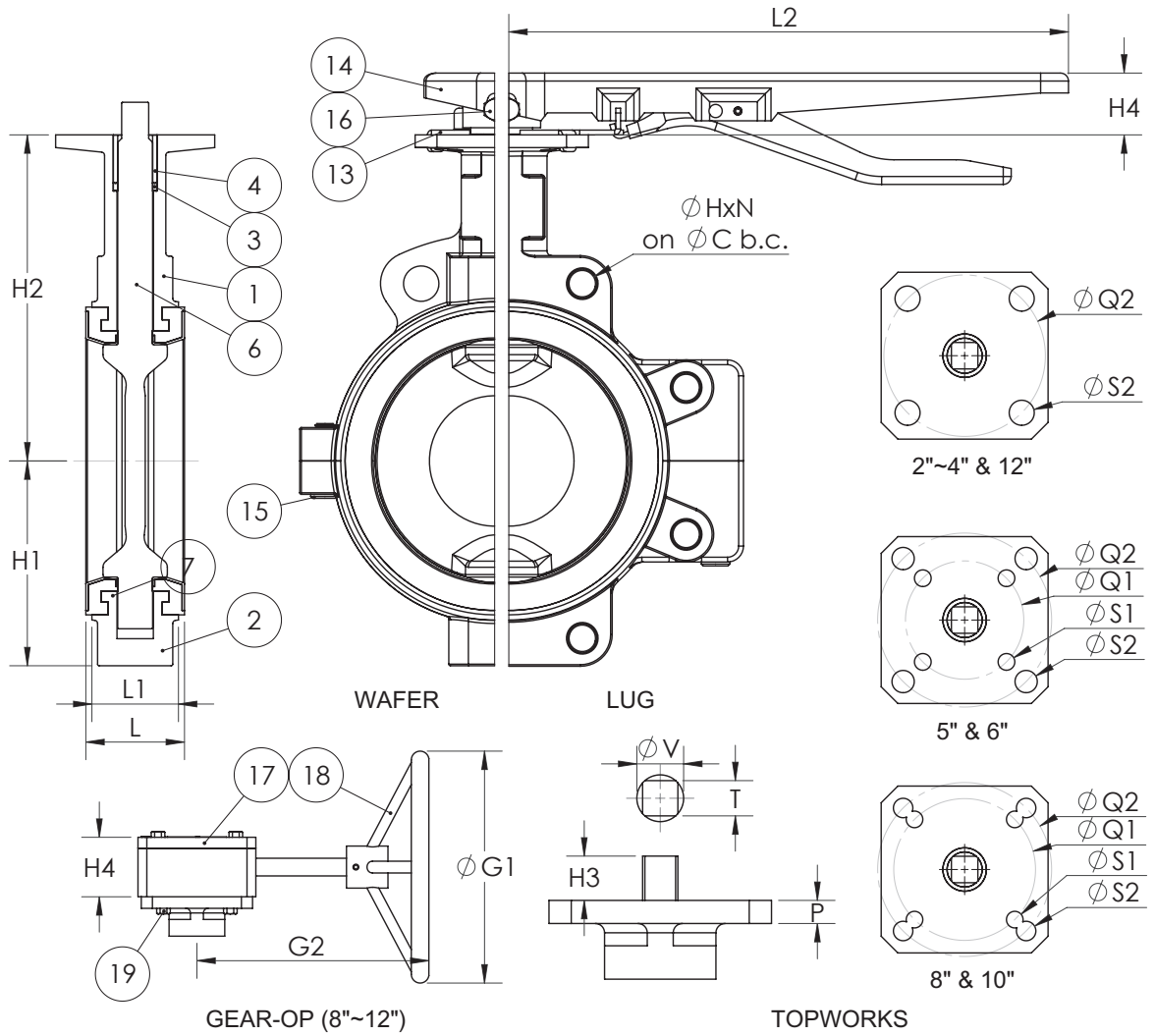


Options:

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.

Standard Materials

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	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	Hand Wheel	CARBON STEEL	1	8"~12", Fabricated
19	Gear Mtg Bolt	CARBON STEEL	4	8"~12", Zinc Plated



Dimensions (inches)

Size	H1		H2	H3	H4	L*	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	1.81	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	1.93	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	1.93	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	2.24	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	2.36	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	2.36	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	2.78	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	2.78	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	3.25	2.99		17.71	13.19	0.49	4.72		4.92		0.55	1.43	1.06	7/8"-9	12	17.00

*** Dimension "L" represents the approximate uncompressed, pre-installation seat width. Actual dimension can vary.**

Figure Number Matrix

FNW 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	243	6.2	7.9
2-1/2	288	6.9	9.0
3	487	7.9	10.0
4	608	12.0	17.5
5	797	16.1	23.8
6	1,084	18.5	27.6
8	2,113	52.2	62.8
10	3,385	68.3	86.0
12	5,100	85.1	116.5

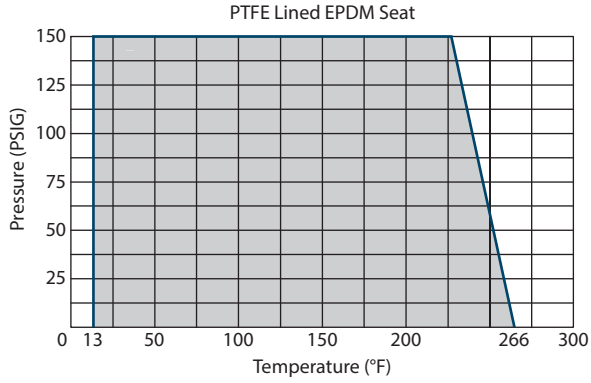
* Note: Torques listed are for maximum pressure differential on wet, lubricating services. An application specific safety factor adder is recommended for actuation.

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.



FNW™

HIGH PERFORMANCE BUTTERFLY VALVE

C

Features:

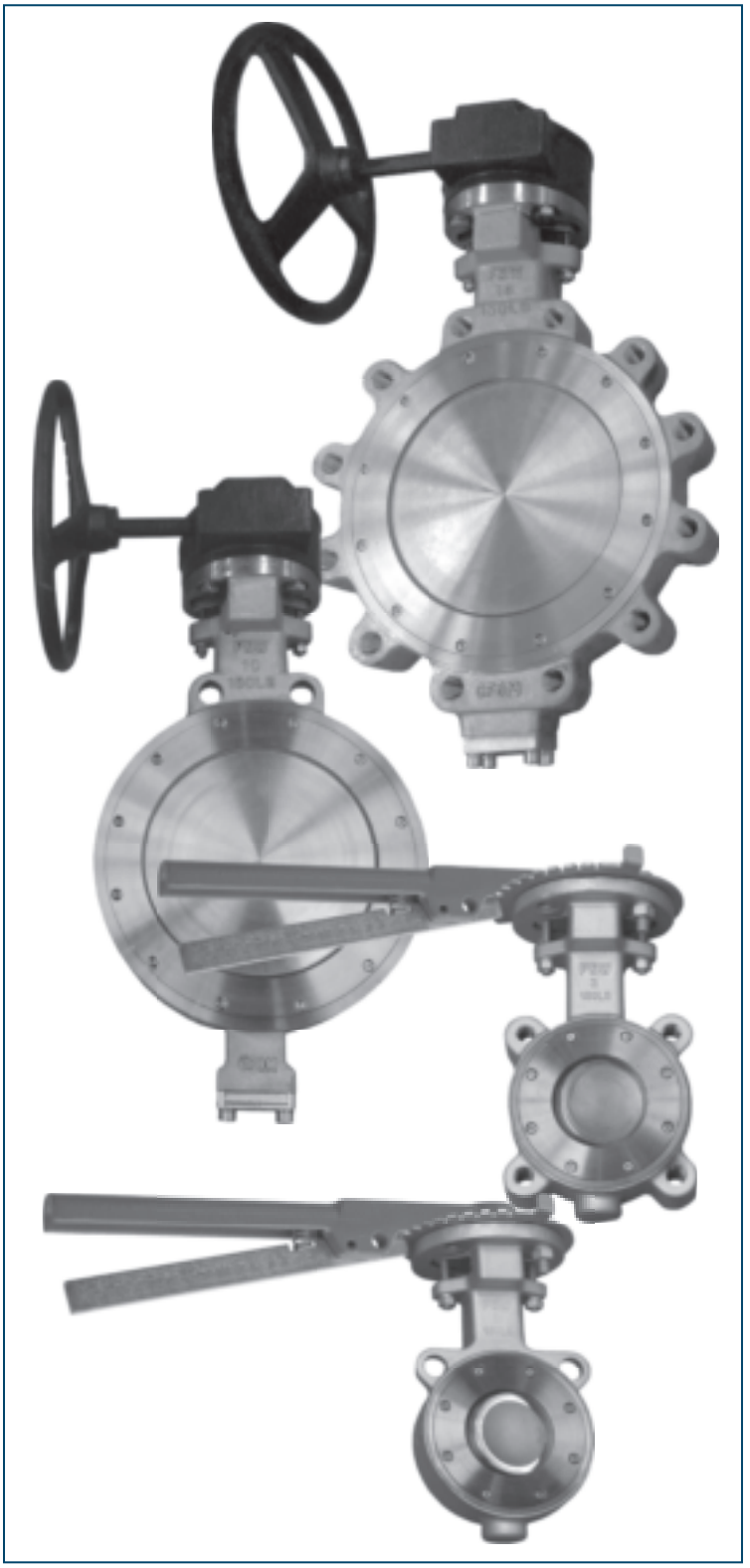
- Bidirectional Bubble-tight Shut-off
- Suitable for Saturated Steam Service to 150 PSI
- Double Off-Set Configuration with Conical Angled Disc
- Available in Wafer (3" to 12") or Lug (3" to 24")
- Stocked in Carbon by Stainless and All Stainless Steel Configurations
- Dead-end Service Rated to Full 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 and 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	Name Plate	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

C

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-Ø11	0.51	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-Ø11	0·63	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-Ø11	0.71	0.94	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-Ø11	0.71	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	0.91	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	1.10	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	1.10	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	3.46	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	3.46	1.57	1.69	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	3.86	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	3.86	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	3.86	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.

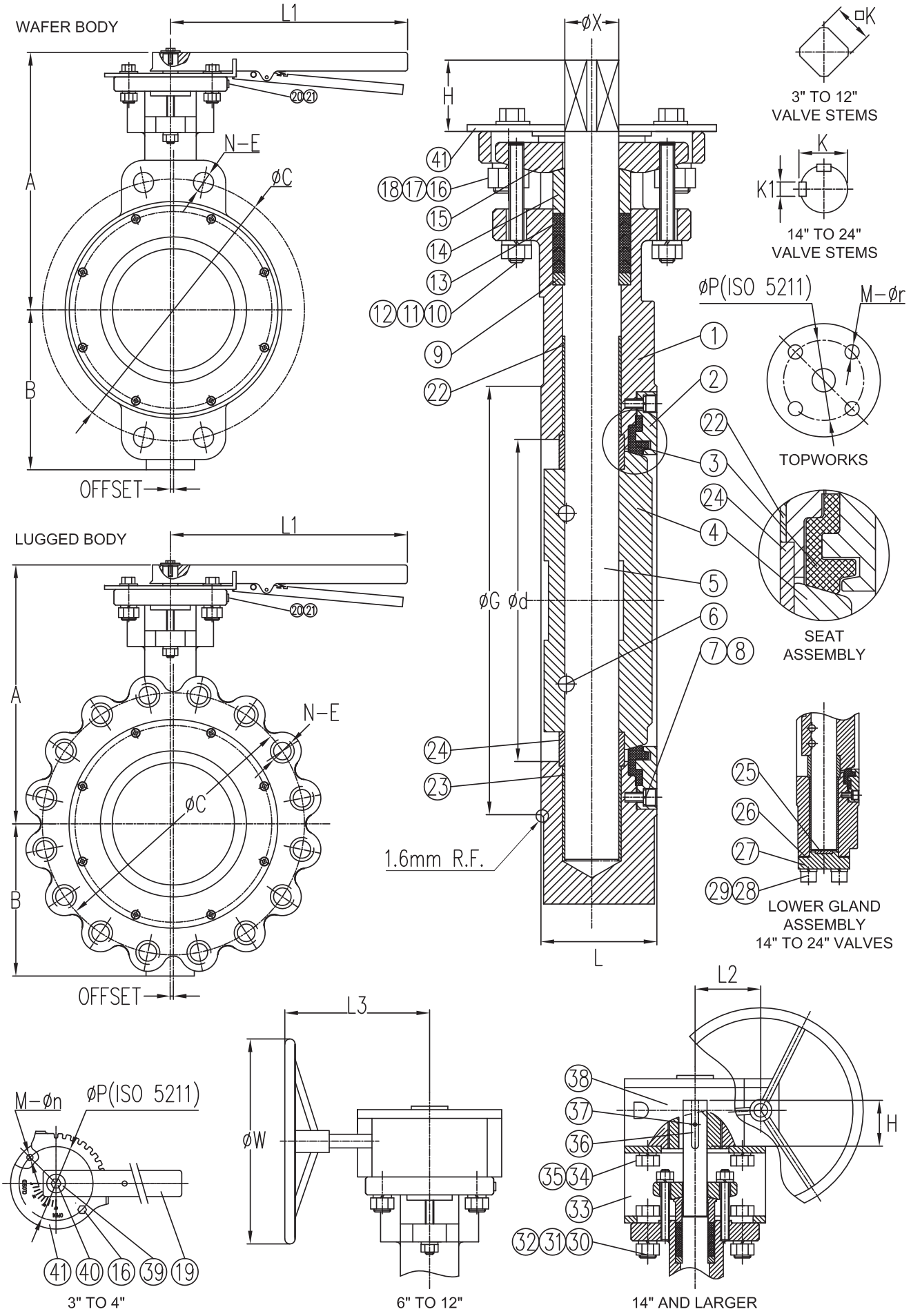
Cv (Flow Coefficients)

Size	Degrees of 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 valves 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.

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

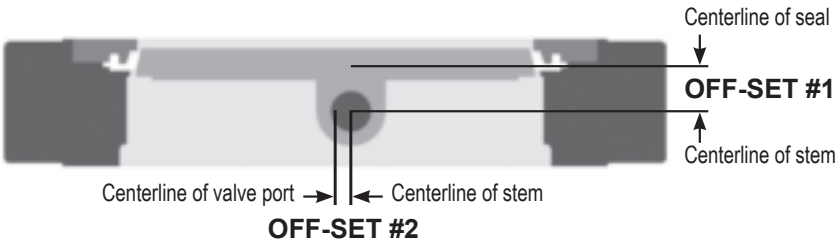
Where:
Q = Valve flow rate in gallons per minute (US GPM)
ΔP = Pounds per square inch (PSI) pressure drop across valve
62.4 = Conversion factor for fluids computed in relation to water
D = Density of fluids in pounds per cubic foot


WAFER BODY
L1
A
B
N–E
øC
OFFSET
LUGGED BODY
øX
H
øG ød
1.6mm R.F.
L
□K
3" TO 12"
VALVE STEMS
K
K1
14" TO 24"
VALVE STEMS
øP(ISO 5211)
M–ør
TOPWORKS
SEAT
ASSEMBLY
LOWER GLAND
ASSEMBLY
14" TO 24" VALVES
M–øn
øP(ISO 5211)
3" TO 4"
L3
øW
6" TO 12"
L2
H
14" AND LARGER

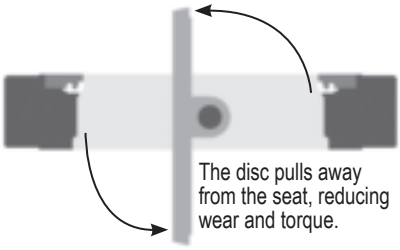
Double Off-Set Design

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.

DOUBLE OFF-SET



CAM ACTION

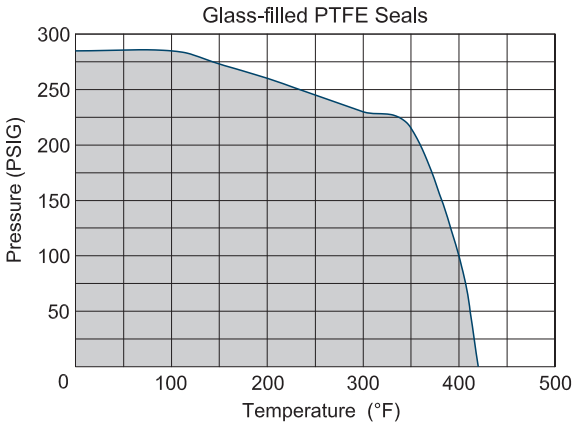


CONICAL ANGLED DISC

The disc edges are angled as if cut from a cone. This angle improves the cam action of the valve.

C

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

FNW HP 1 L S T G X

CLASS	CONNECTION	BODY MATERIAL	SEAT	OPERATOR	SIZE CODES
1 = 150#	W = WAFER 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, 4 = P, 5 = S, 6 = U, 8 = X, 10 = 10, 12 = 12, 14 = 14, 16 = 16, 18 = 18, 20 = 20, 24 = 24

THERMOPLASTIC VALVES

BALL VALVES

Figure	Description	Page
340N	PVC, true-union, full port, 150 psi, threaded or socket weld ends	143
340NF	PVC, true-union, full port, 150 psi, 150# flanged	143
350N	CPVC, true-union, full port, 150 psi, threaded or socket weld ends	143

BALL VALVE ACCESSORIES

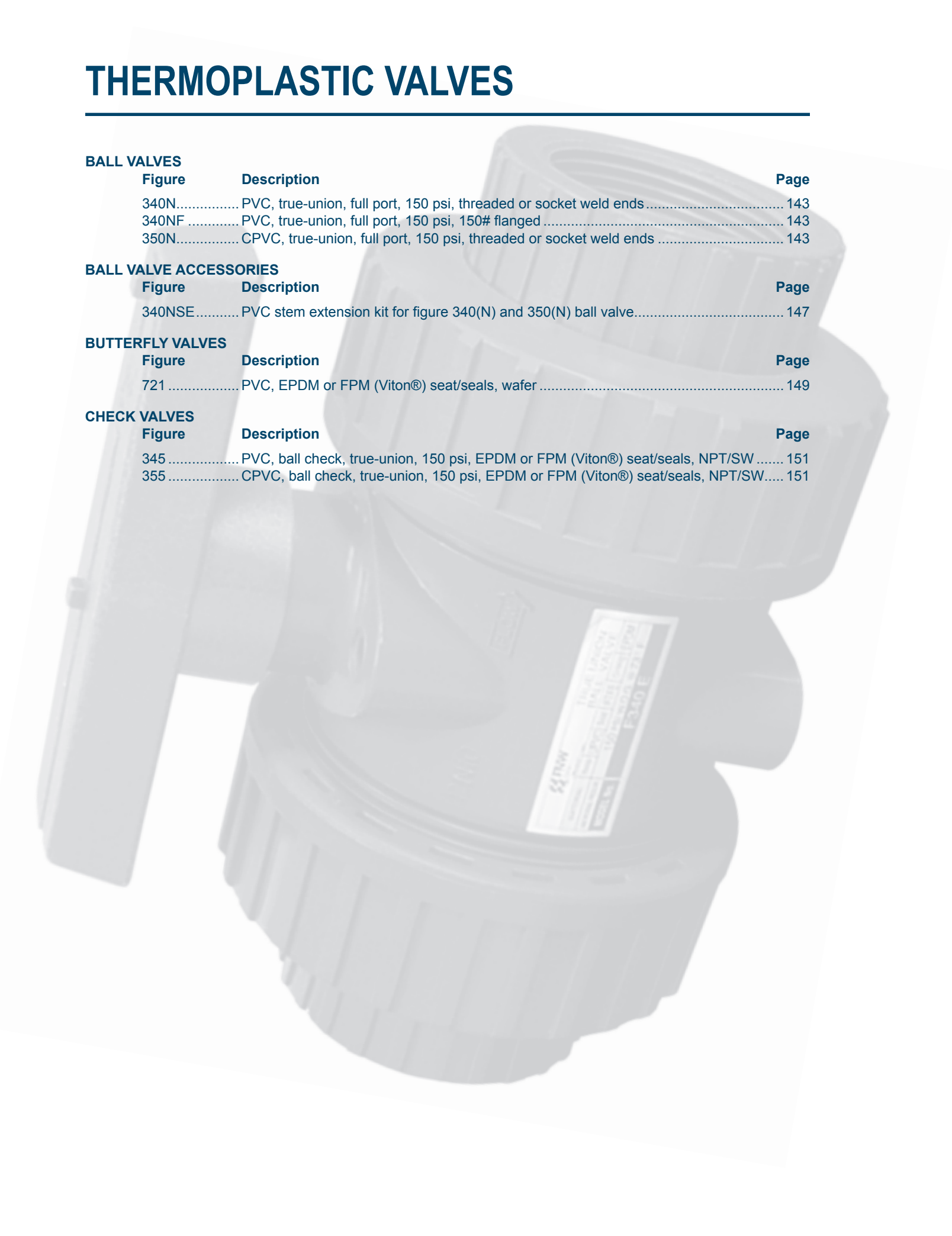
Figure	Description	Page
340NSE	PVC stem extension kit for figure 340(N) and 350(N) ball valve	147

BUTTERFLY VALVES

Figure	Description	Page
721	PVC, EPDM or FPM (Viton®) seat/seals, wafer	149

CHECK VALVES

Figure	Description	Page
345	PVC, ball check, true-union, 150 psi, EPDM or FPM (Viton®) seat/seals, NPT/SW	151
355	CPVC, ball check, true-union, 150 psi, EPDM or FPM (Viton®) seat/seals, NPT/SW	151



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.

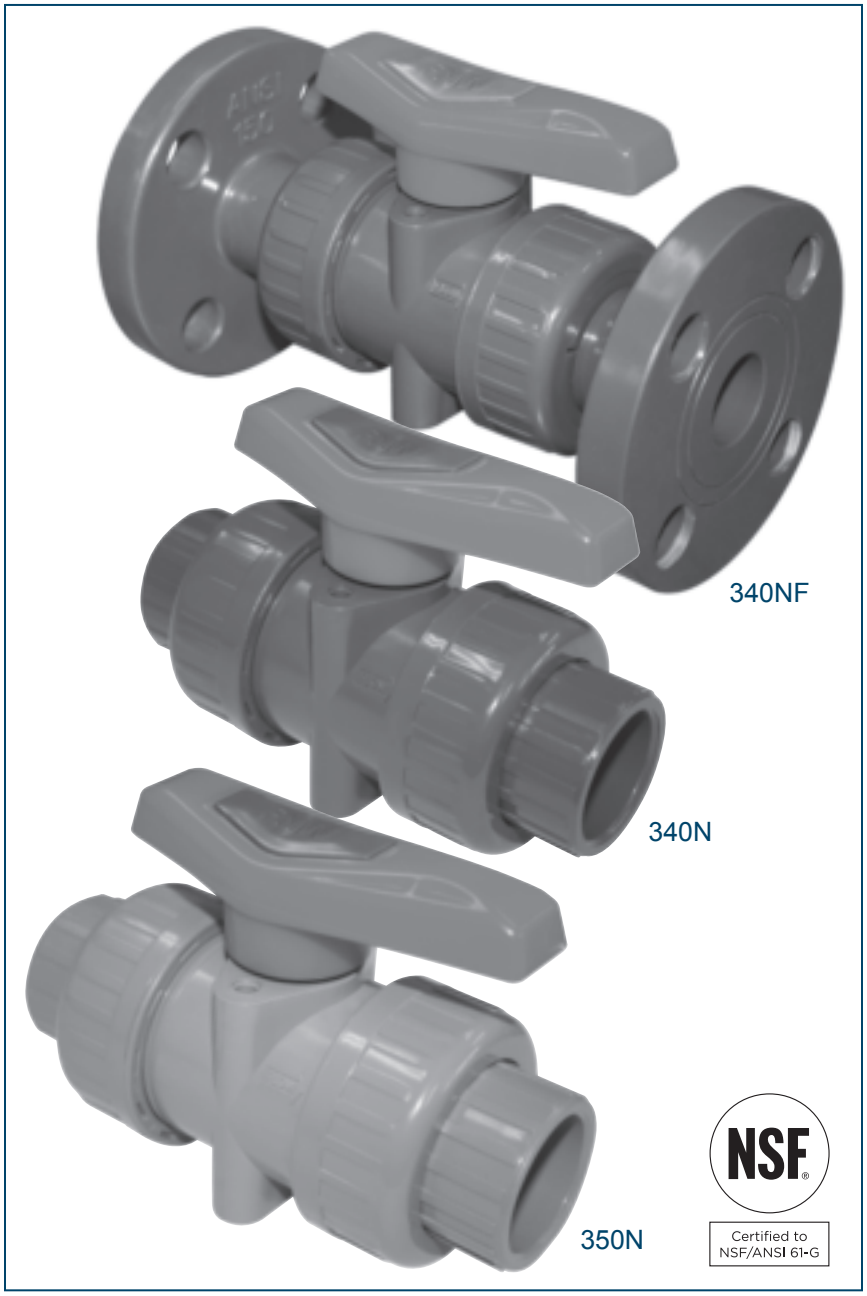
Standards:

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

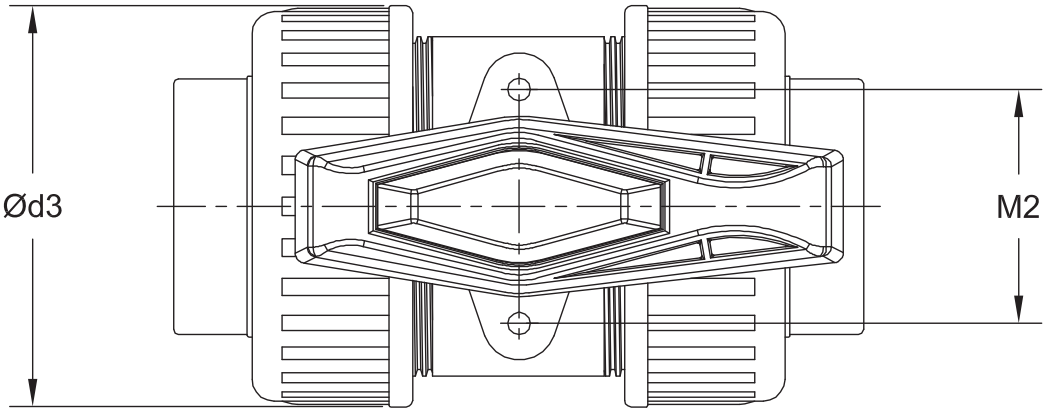
Materials:
- PVC: Cell Classification 12454 per ASTM D1784 (Formerly Type I, Grade 1)
- CPVC: Cell Classification 23447 per ASTM D1784 (Formerly Type IV, Grade 1)

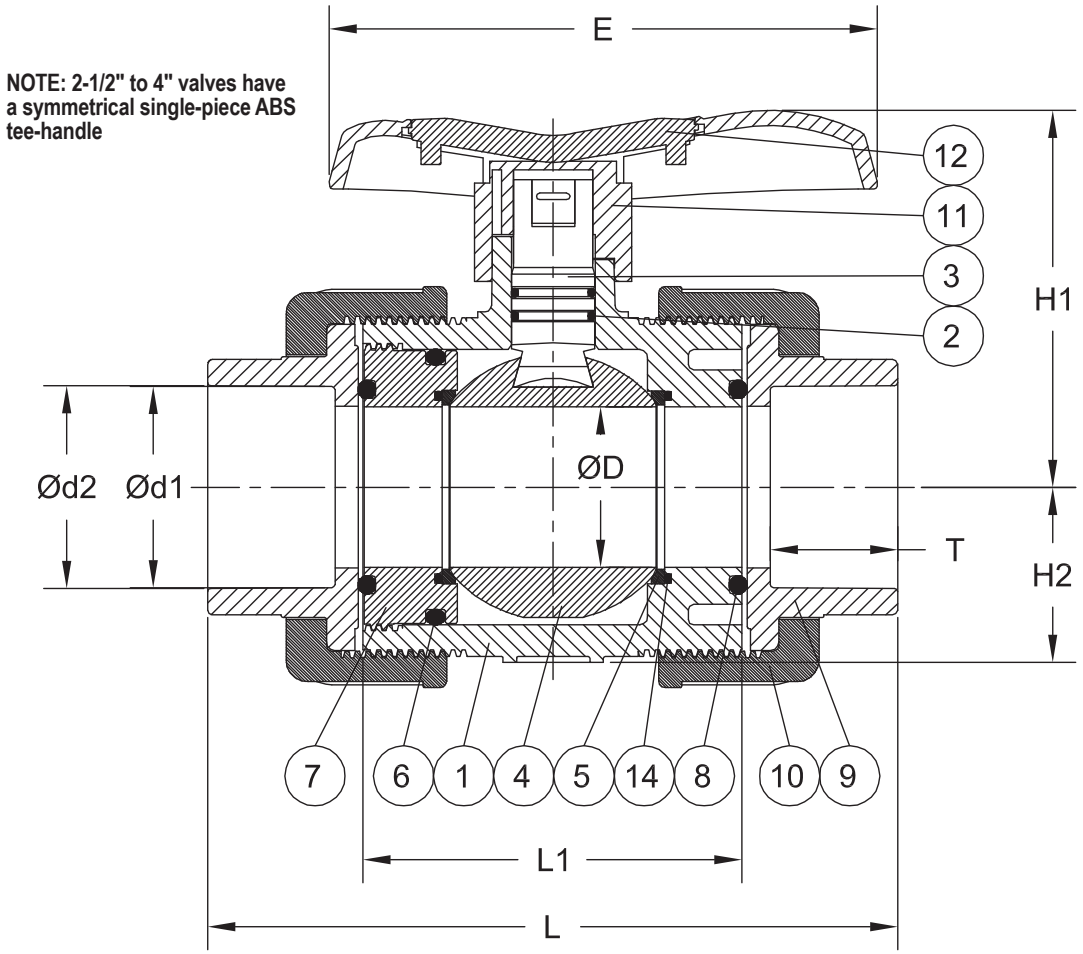


Options

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.

D



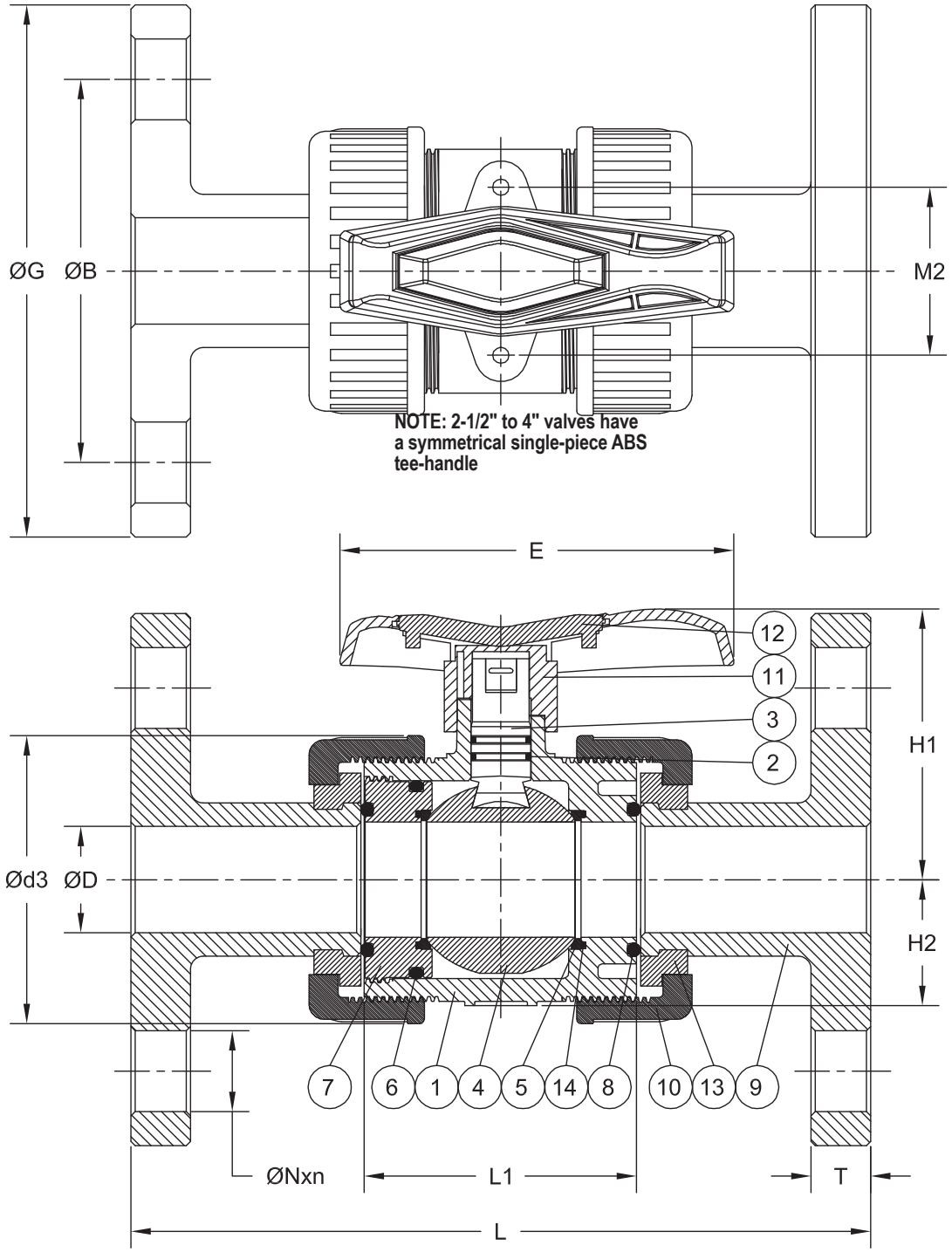


D

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.



D

Dimensions (inches) Figure 340NF

Size	ØD	E	L	L1	ØB	ØG	Ød3	T	H1	H2	M2	ØN	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 and 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 32ºF to 140ºF* (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.

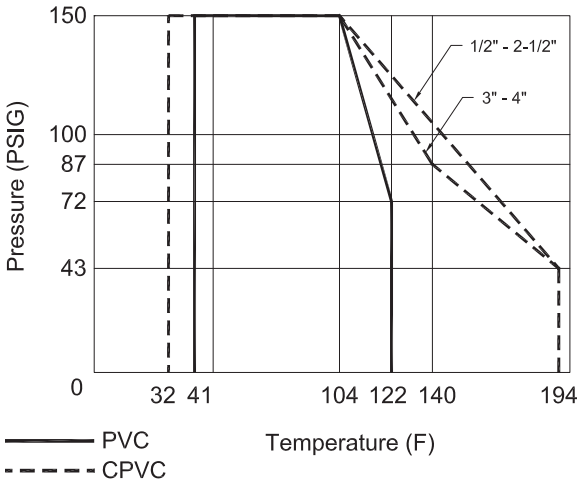
* **Note: Other materials within valves besides PVC and CPVC can have an affect on the temperature limits of the valve. Temperatures noted above are for the thermoplastic material alone.**

D

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 (340NF 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

FNW 340N E G

BODY TYPE

340N = PVC w/ NPT & SW ends to 2" (SW only over 2", NPT upon request)
340NF = PVC w/ FLANGED ends
350N = CPVC w/ NPT & SW ends to 2" (SW only over 2", NPT upon request)

SEALS

E = EPDM
V = FPM (VITON®)

SIZE CODES

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

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

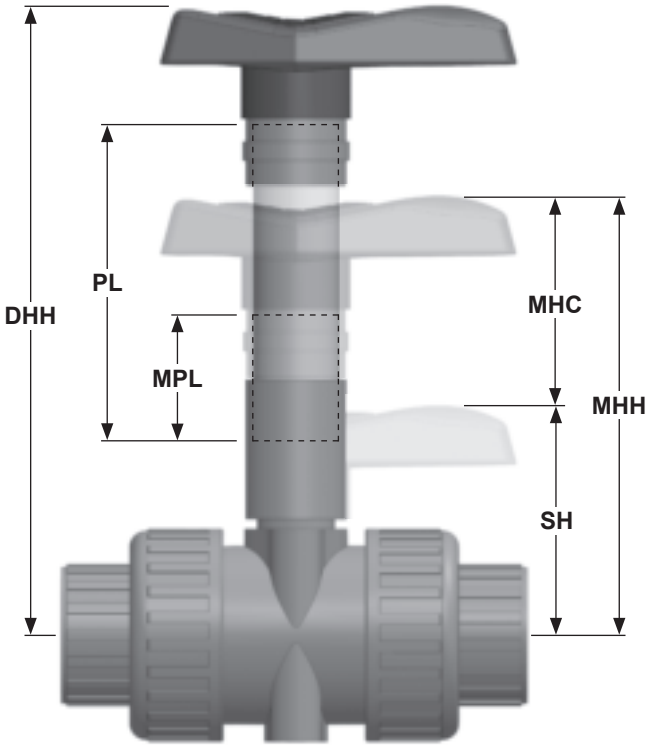
Features:

- 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, 340NF, 350, & 350N)
- Corrosion Resistant PVC Material
- Kit Contains 1 Handle Adapter & 1 Stem Adapter

Extension Length Table:

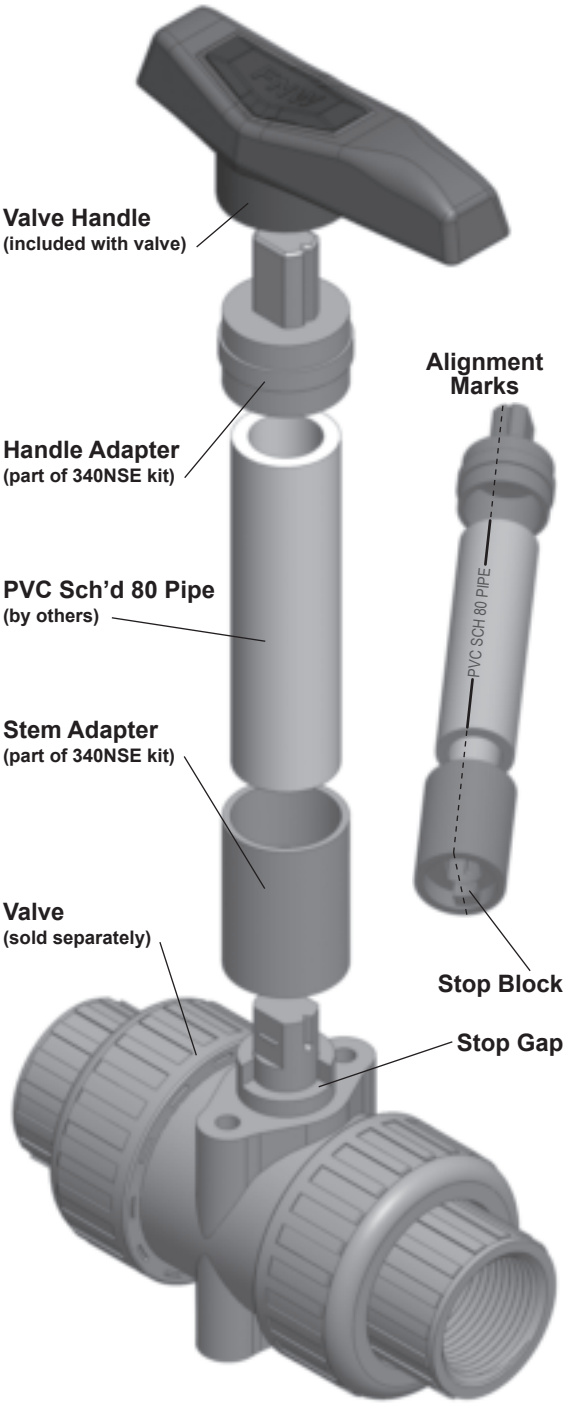
Since the figure 340NSE uses PVC Schedule 80 pipe between the kit's two adapter pieces, any Desired Handle Height (DHH) between minimum and maximum can be achieved. Minimum heights are indicated in the table. Maximum recommended handle height is 48 inches. To determine the Pipe Length (PL) needed to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

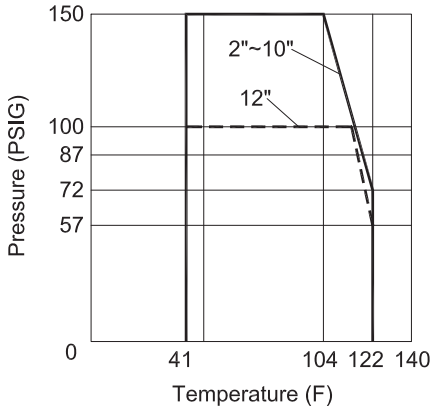
Features:

- 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

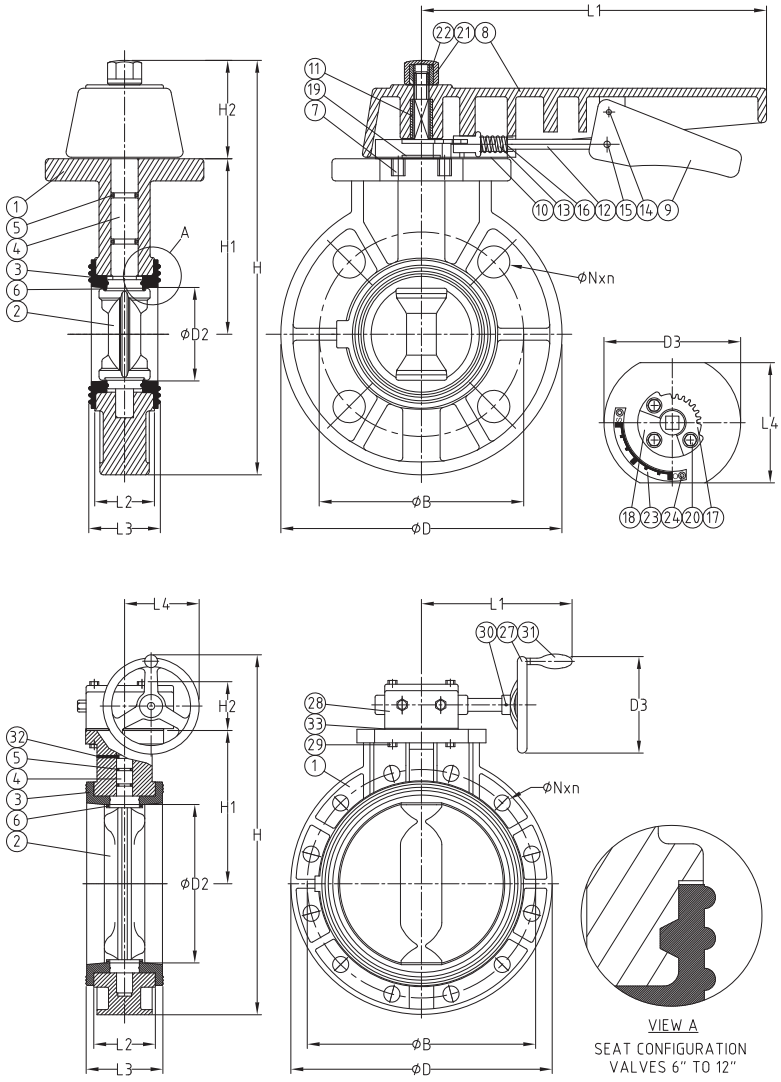
Size	Wt. (lbs)
2	2.75
2-1/2	3
3	4
4	5
5	8
6	12
8	14
Gear Operated	
8	34.5
10	46
12	70

Figure Number Matrix

FNW 721 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	Hand Wheel 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

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

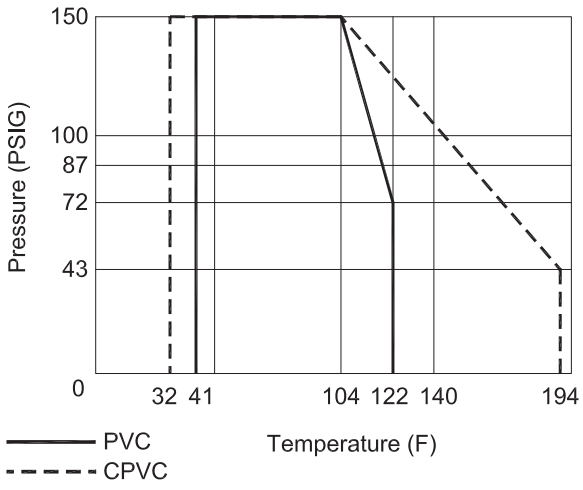


Figure Number Matrix

FNW 3 4 5 E G

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

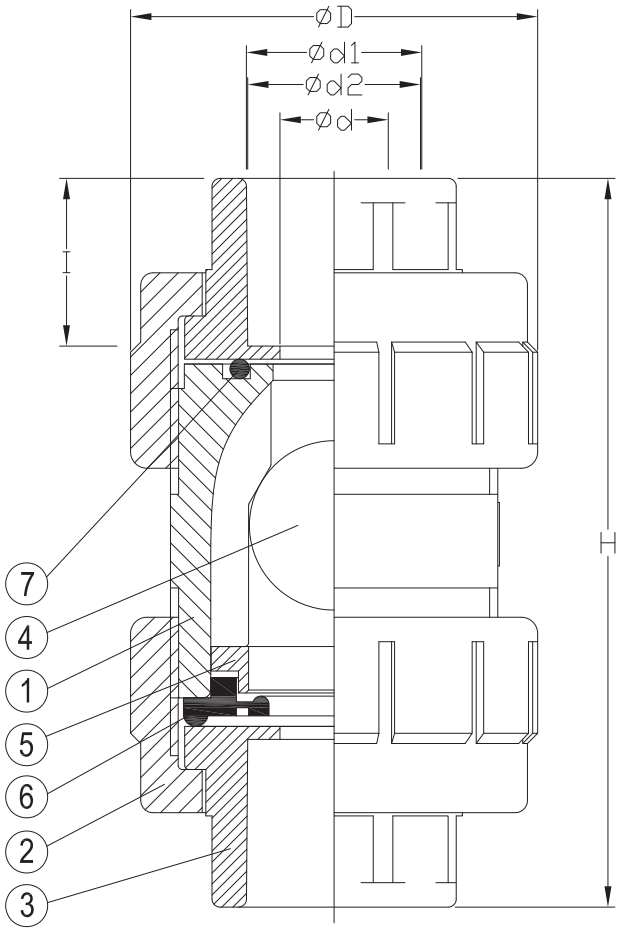
About PVC

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 and 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 32ºF to 140ºF* (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

NOTES

GATE, GLOBE & CHECK VALVES

SMALL BODY

Bronze

Figure	Description	Page
1211/1212	Gate, non-rising stem, 125#, threaded or sweat ends	155
1221/1222	Gate, rising stem, 125#, threaded or sweat ends	157
1231/1232	Globe, rising stem, 125#, threaded or sweat ends	159
1241/1242	Check, Y-pattern swing, 150#, threaded or sweat ends	161

Brass

Figure	Description	Page
431	Check, in-line, 2-pc, 200 psi, high capacity water service, press ends	163

Stainless Steel

Figure	Description	Page
15B	Gate, non-rising stem, 200 wog, threaded ends	165
17B	Globe, rising stem, 200 wog, threaded ends	167
16B	Check, swing, 200 wog, threaded ends	169

WAFER

Cast Iron

Figure	Description	Page
681	Check, silent, 200 psi, resilient seat, aluminum bronze & stainless steel internals	171
682	Check, double-door, 200 psi, resilient seat, stainless steel internals	173

FLANGED

Cast Iron (IBBM)

Figure	Description	Page
651A	Gate, OS&Y, 200 wog, 125 wsp, bronze trim, 125# flanged	175
661	Globe, OS&Y, 200 wog, 125 wsp, bronze trim, 125# flanged	177
671A	Check, swing, 200 wog, 125 wsp, bronze trim, 125# flanged	179

Carbon Steel

Figure	Description	Page
551	Gate, OS&Y, 150# flanged	184
552	Gate, OS&Y, 300# flanged	185
561	Globe, 150# flanged	186
562	Globe, 300# flanged	187
571	Check, swing, 150# flanged	188
572	Check, swing, 300# flanged	189

Stainless Steel

Figure	Description	Page
451	Gate, OS&Y, 150# flanged	190
452	Gate, OS&Y, 300# flanged	191
461	Globe, 150# flanged	192
462	Globe, 300# flanged	193
471	Check, swing, 150# flanged	194
472	Check, swing, 300# flanged	195

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

E

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

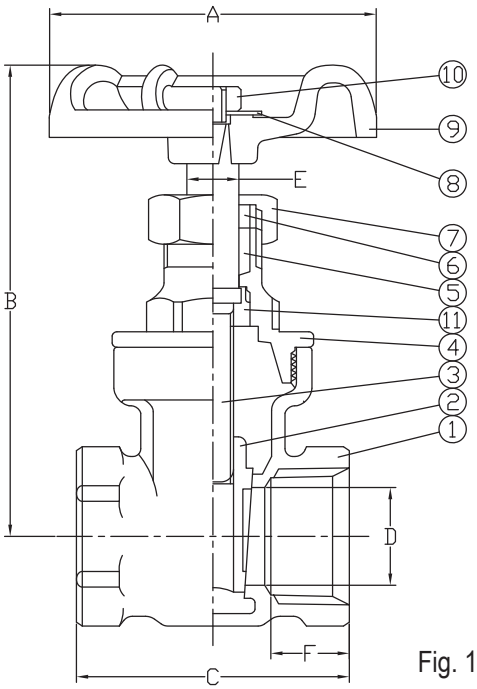


Fig. 1211

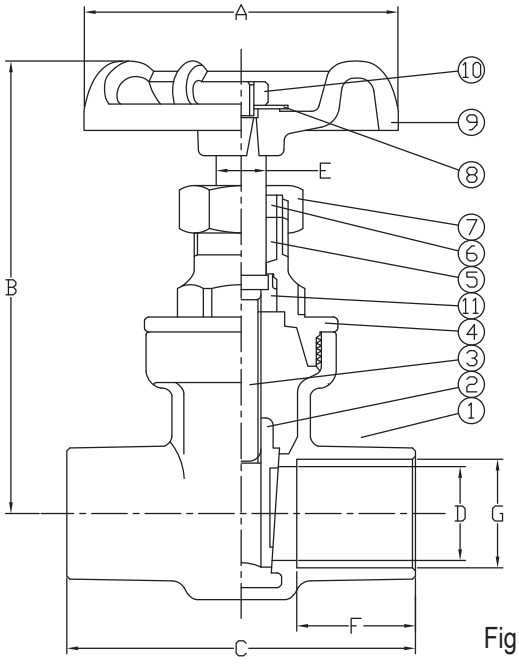


Fig. 1212

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	Hand Wheel	POWDER COATED ALUMINUM ASTM B85
10	Hand Wheel Nut	STEEL
11	Lock Nut	BRASS ASTM B16-C36000

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

E

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

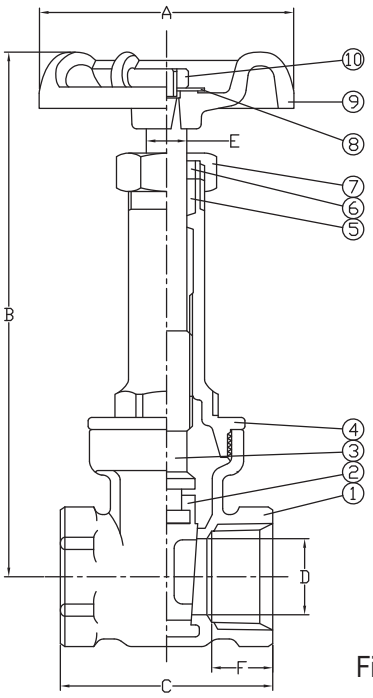


Fig. 1221

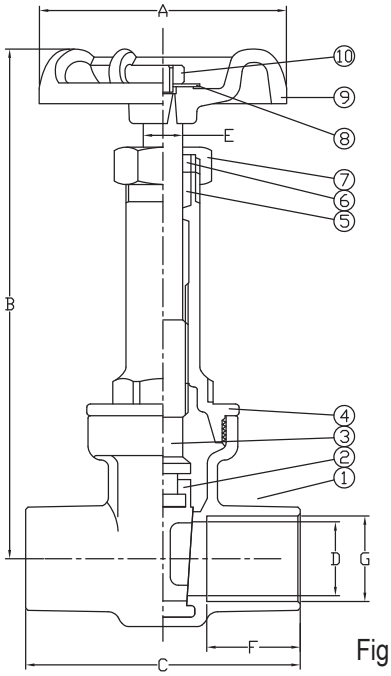


Fig. 1222

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	Hand Wheel	POWDER COATED ALUMINUM ASTM B85
10	Hand Wheel Nut	STEEL
11	Lock Nut	BRASS ASTM B16-C36000

RISING 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.

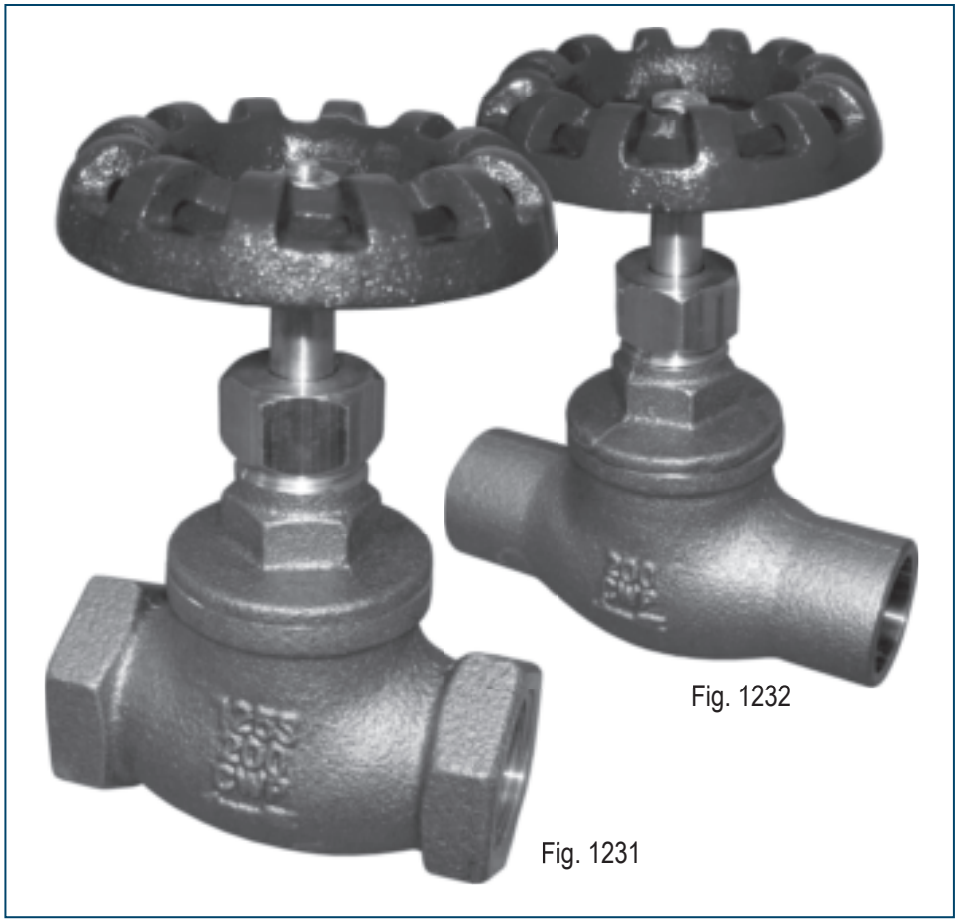


Fig. 1232

Fig. 1231

E

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

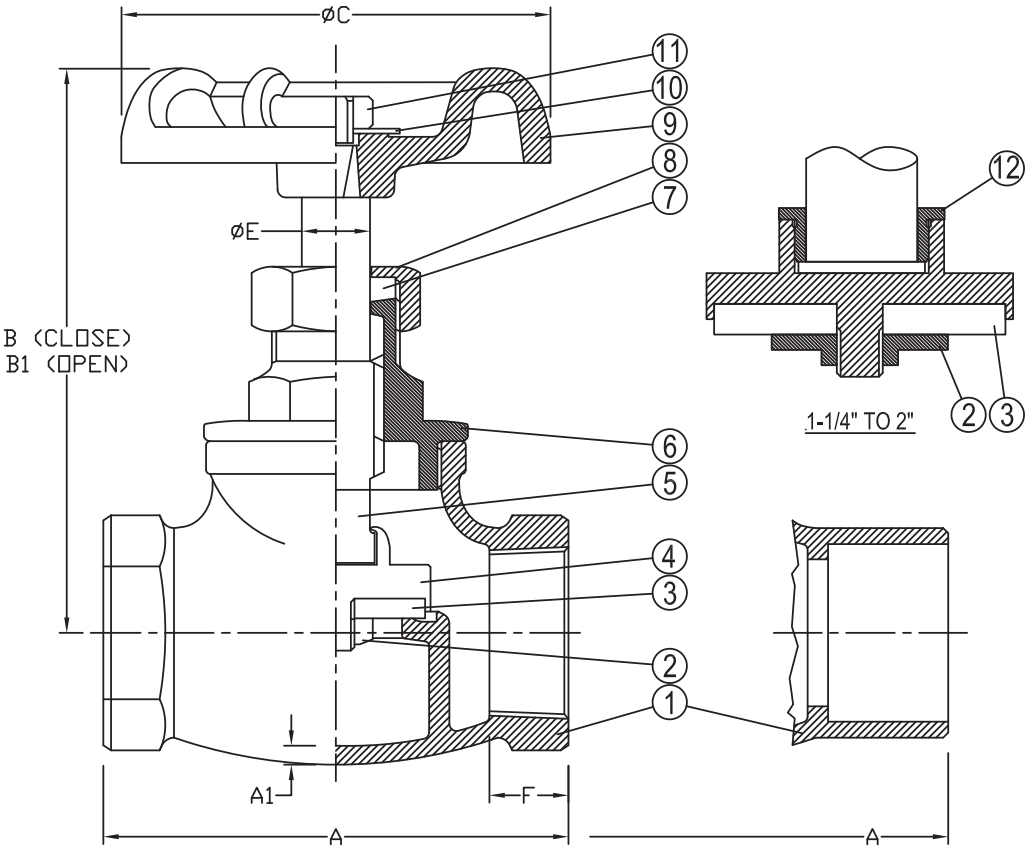


FIG. 1231 - NPT

FIG. 1232 - SWEAT

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 1-1/4" 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	Hand Wheel	CAST IRON A48 CLASS #35	
10	Name Plate	COMMERCIAL ALUMINUM	
11	Hand Wheel Nut	STEEL AISI-1010	
12	Disc Lock Nut	BRASS ASTM B16 C36000	Sizes 1-1/4" to 2"

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.

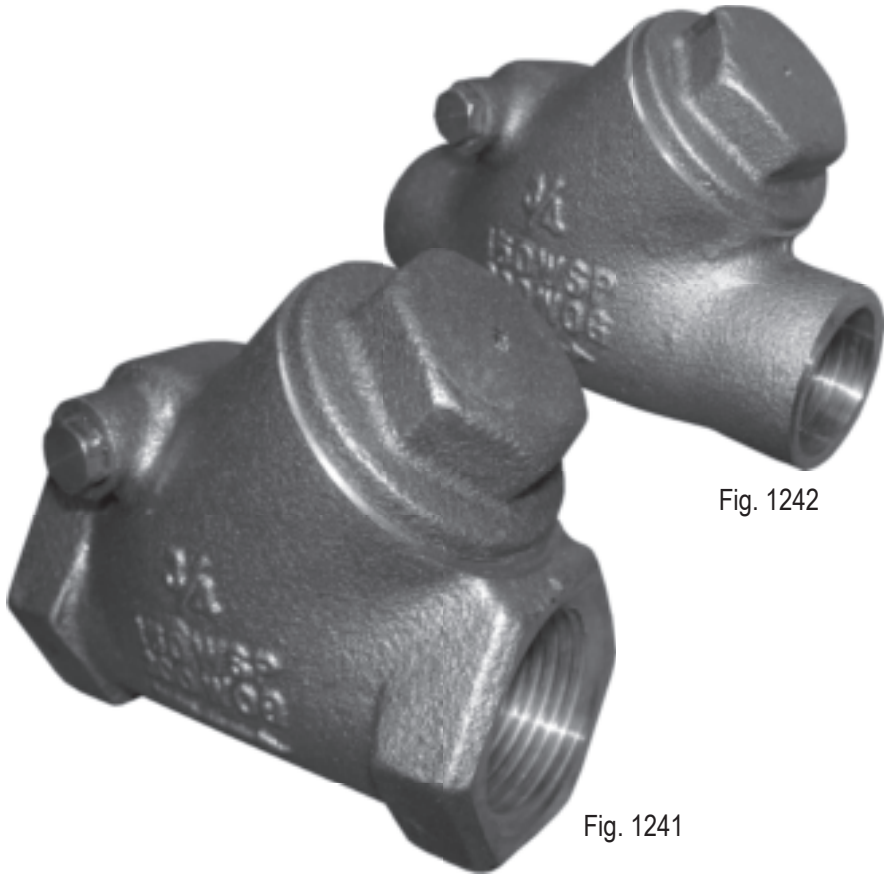


Fig. 1242

Fig. 1241

E

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

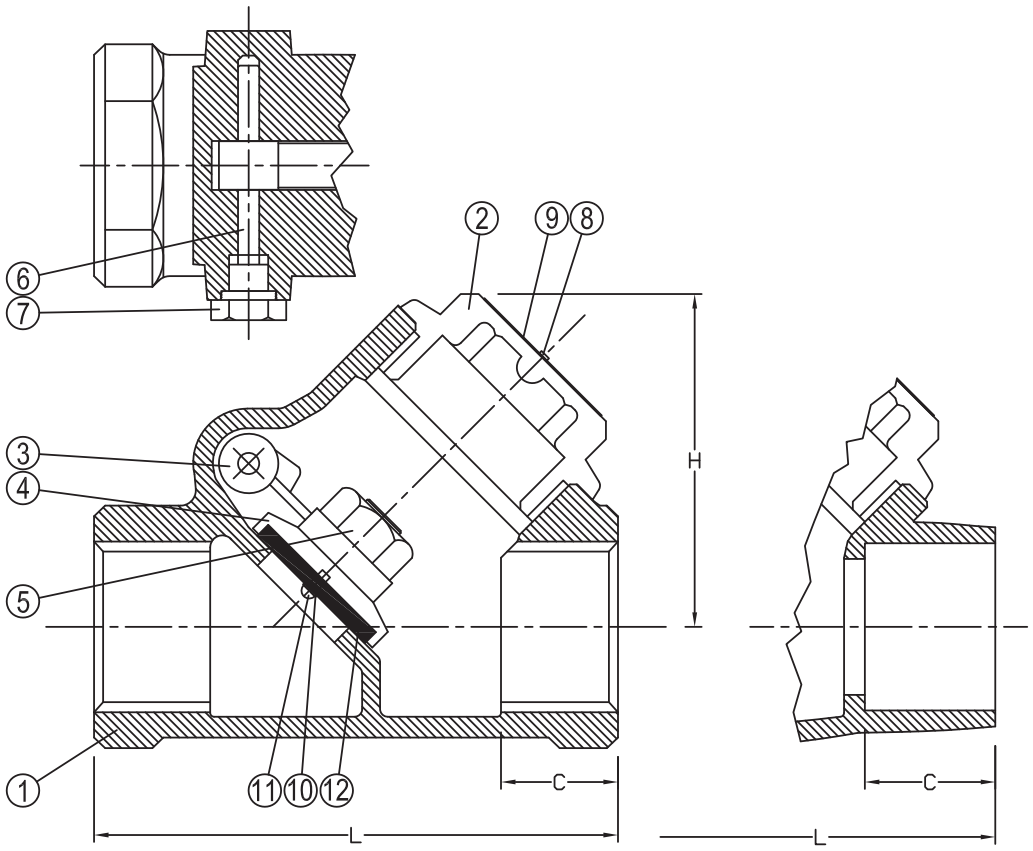


FIG. 1241 - NPT

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)

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

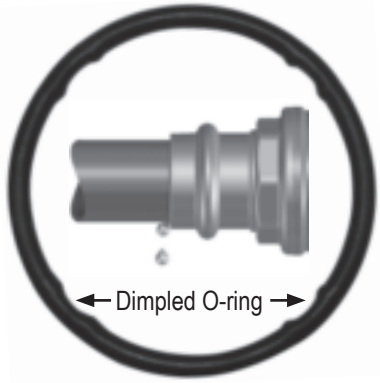
The FNW figure 431 press check valve for water service is suggested for all applications where labor and time savings is a must. The figure 431 allows quick installation on copper pipelines meeting ASTM B88 standards. The structure of the valve, made in dezincification resistant brass, guarantees excellent corrosion resistance particularly in the connection areas of the pipeline. Drip Fit O-rings ensure that an end connection will drip, indicating an end was not pressed.

Features:

- 200 PSI Max. Working Pressure
- Temperature Range from 10°F to 250°F
- Press Ends
- High Capacity
- True 2-Piece Design
- Drip Fit O-rings
- 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"

E

Drip Fit O-rings



The Drip Fit O-rings ensure that an unpressed end will drip. This is an added safety feature to ensure unpressed ends are discovered and corrected.

Figure Number Matrix

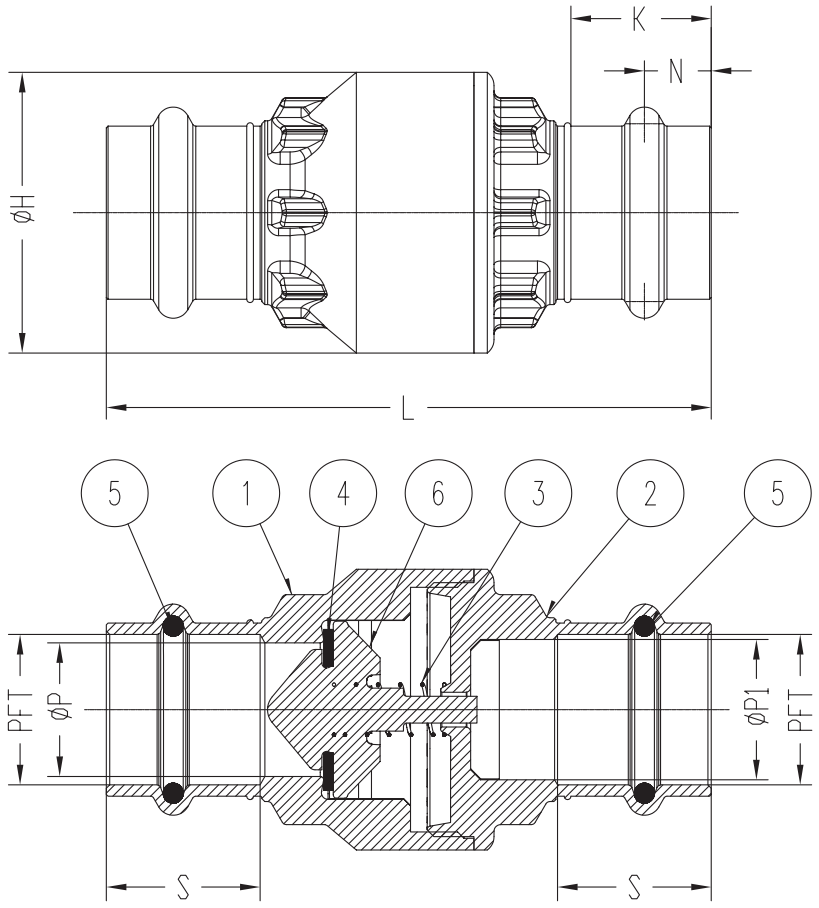
FNW 431 Size

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



E

Dimensions (Inches)

Size	ØP	ØP1	S	K	N	ØH	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

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:

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

E

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

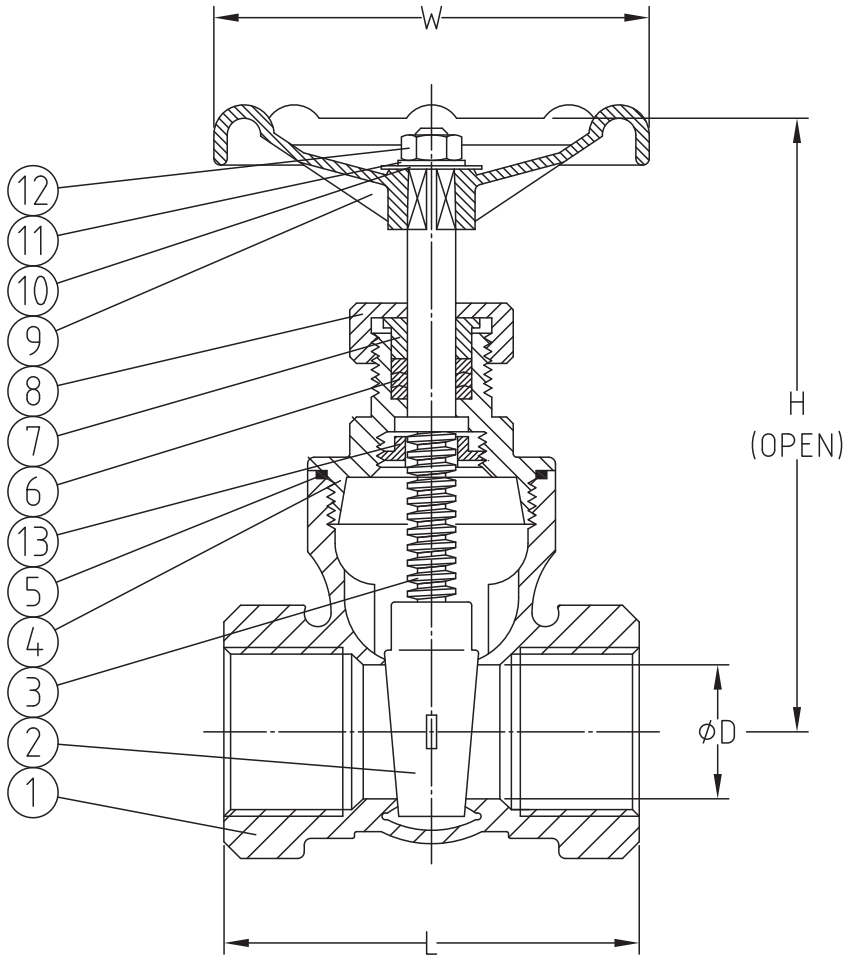
Figure Number Matrix

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	DIE CAST ZINC ALLOY	1
10	Name Plate	ALUMINUM	1
11	Hand Wheel Washer	304SS	1
12	Hand Wheel Nut	304SS	1
13	Stop Ring	304SS	1

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:

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

E

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

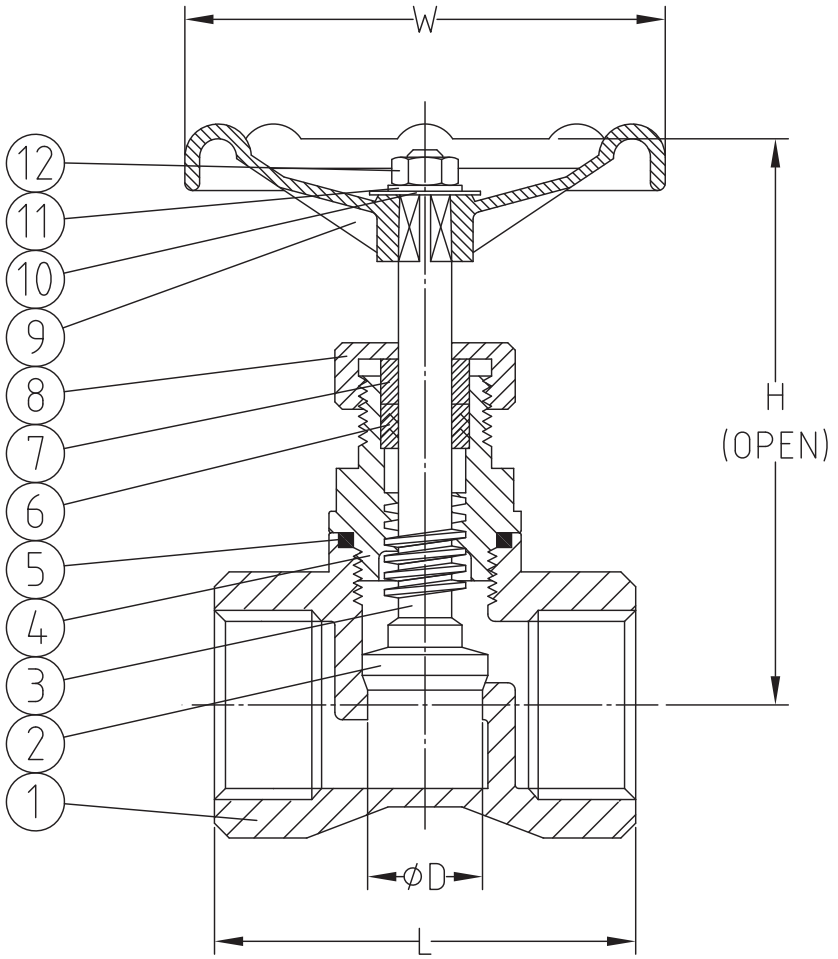
Figure Number Matrix

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	DIE CAST ALUMINUM	1
10	Name Plate	ALUMINUM	1
11	Hand Wheel Washer	304SS	1
12	Hand Wheel Nut	304SS	1

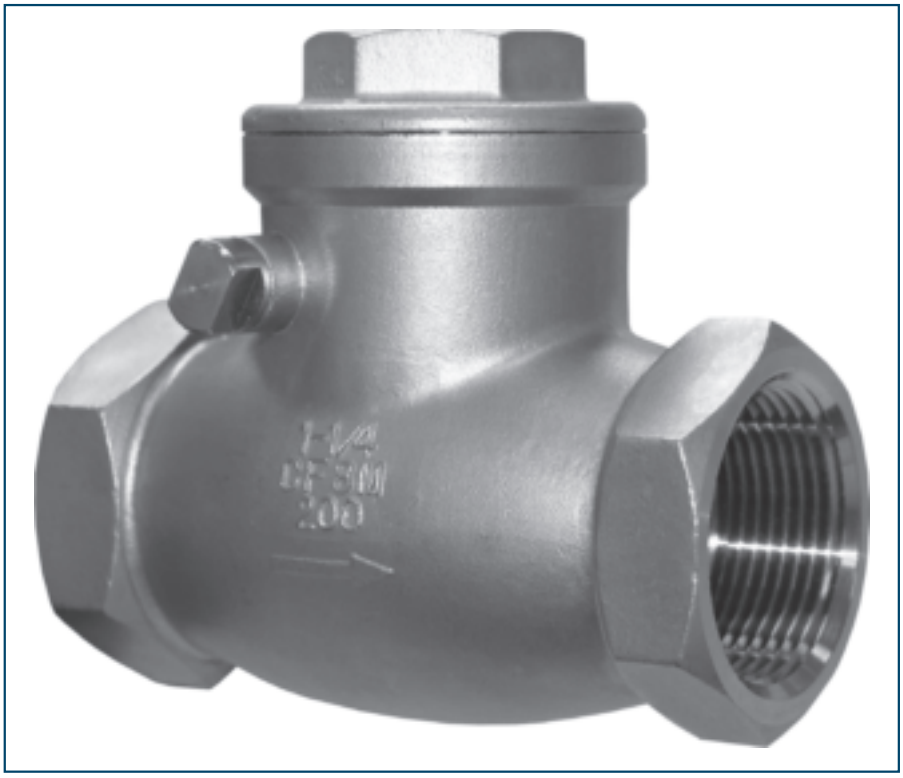
200 WOG
SWING CHECK VALVE

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:

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



E

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

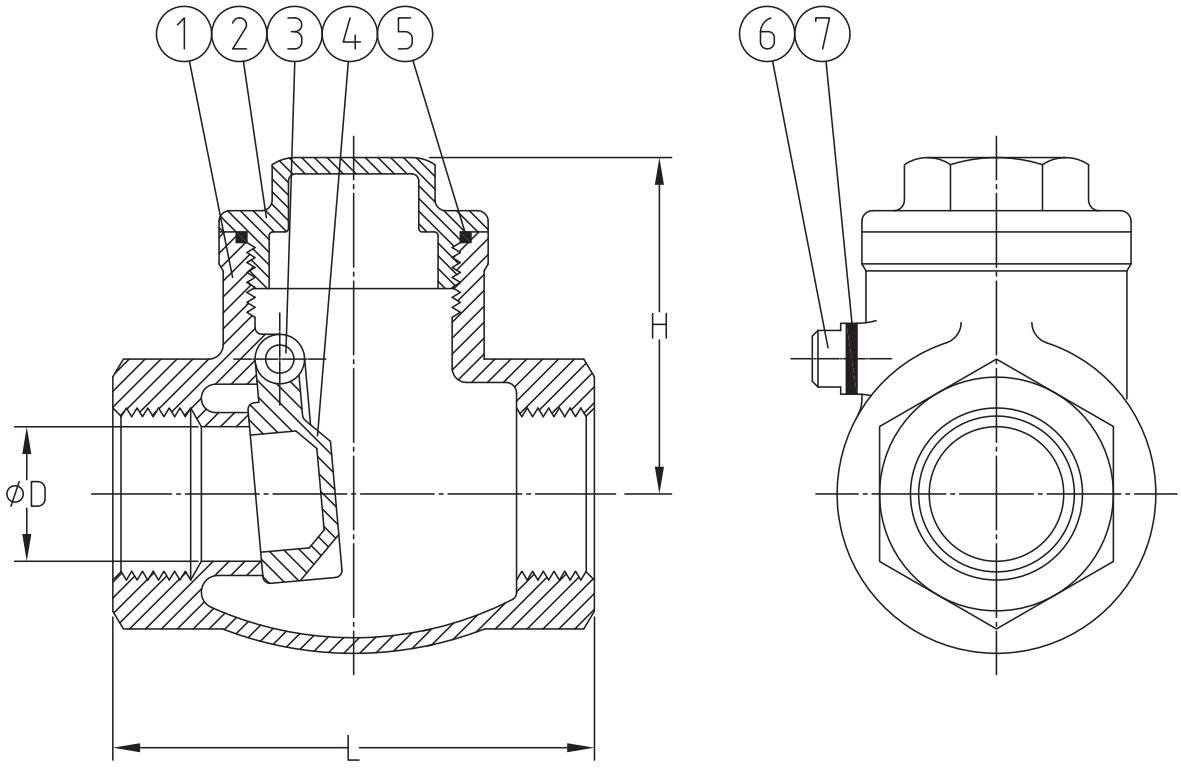
Figure Number Matrix

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

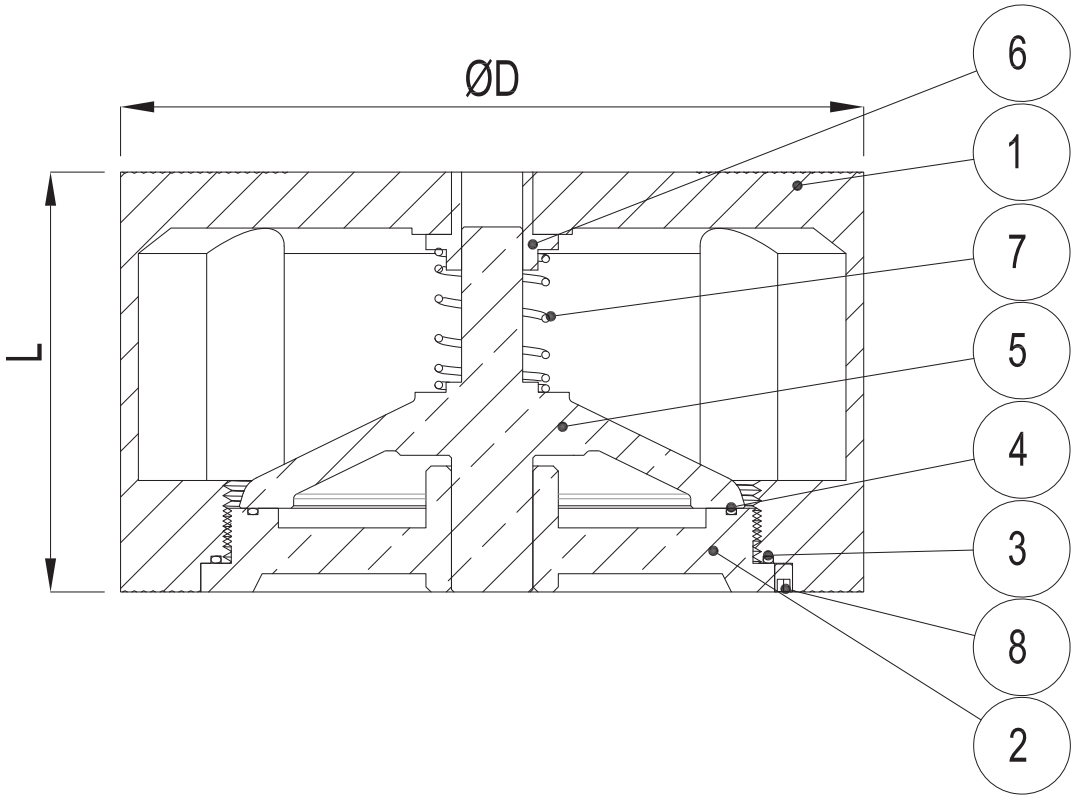
Figure Number Matrix

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)

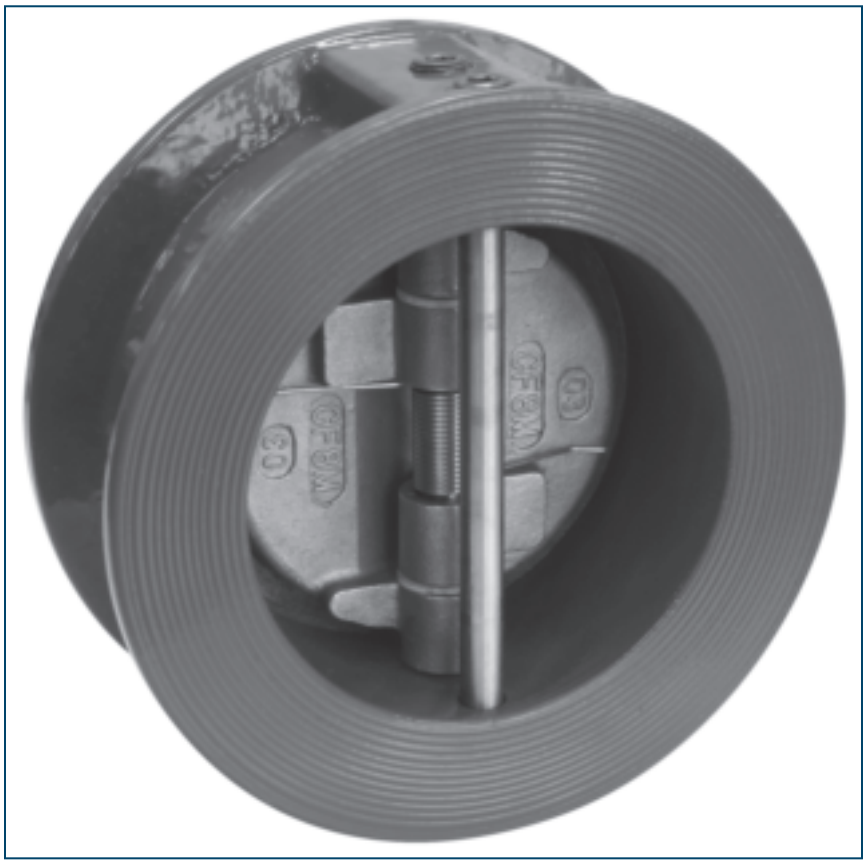
Size	ØD	L
2	4.25	2.63
2-1/2	5.00	2.87
3	5.75	3.13
4	7.00	4.02
5	8.38	4.76
6	9.75	5.51
8	11.88	6.50
10	14.06	8.27

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

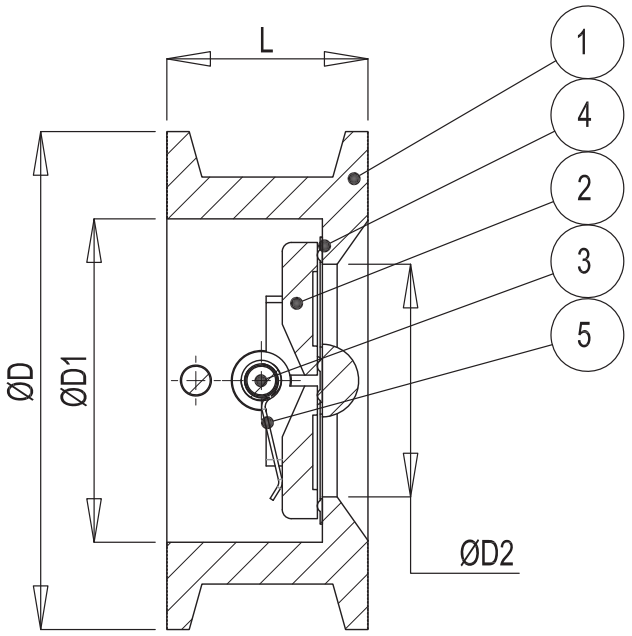
Figure Number Matrix

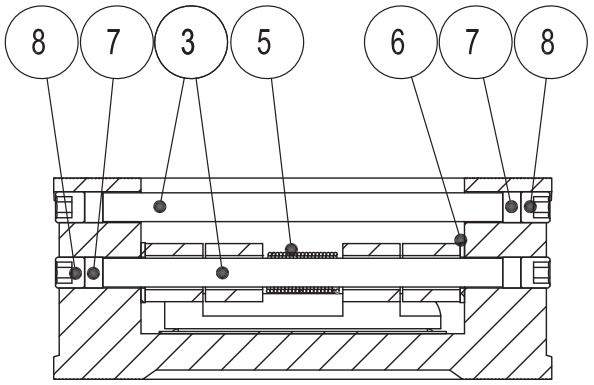
FNW 682 Size

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





E

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, Actuations 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.

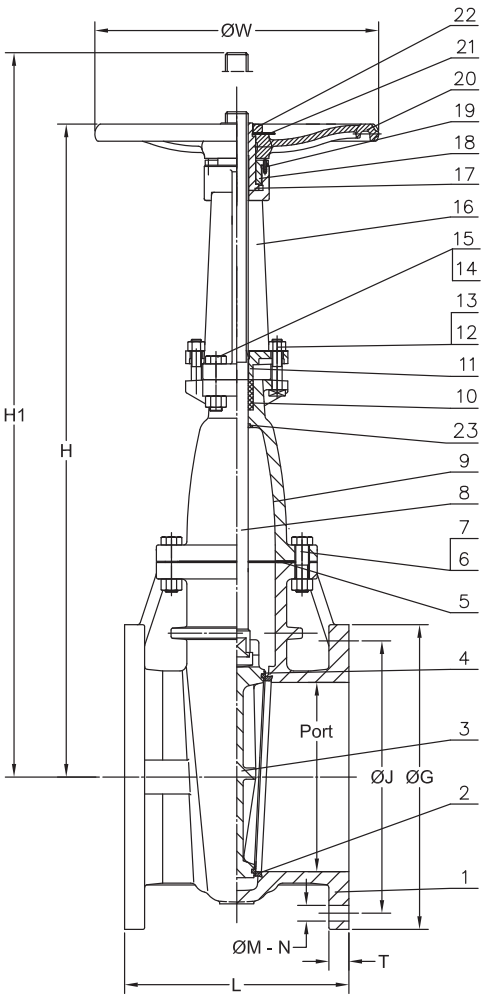
Figure Number Matrix

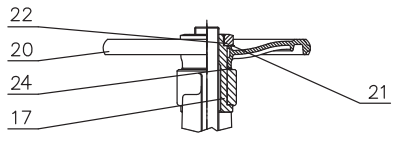
FNW 651A Size

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





2" ~ 8"

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	Hand Wheel	Cast Iron, ASTM A126 B	1	
21	I.D. Plate	Aluminum	1	
22	Hand Wheel Nut	Ductile Iron, ASTM A536 65-45-12	1	
23	Backseat	Brass, ASTM B16	1	
24	Hand Wheel Washer	Brass	1	2" - 8" only

Dimensions (inches)

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

Cv & Weight

Size	2	2-1/2	3	4	5	6	8	10	12
Cv	215	335	510	945	1525	2250	4150	6700	9925
Wt. (lbs)	35	44	53	84	115	150	231	386	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, Actuations 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.

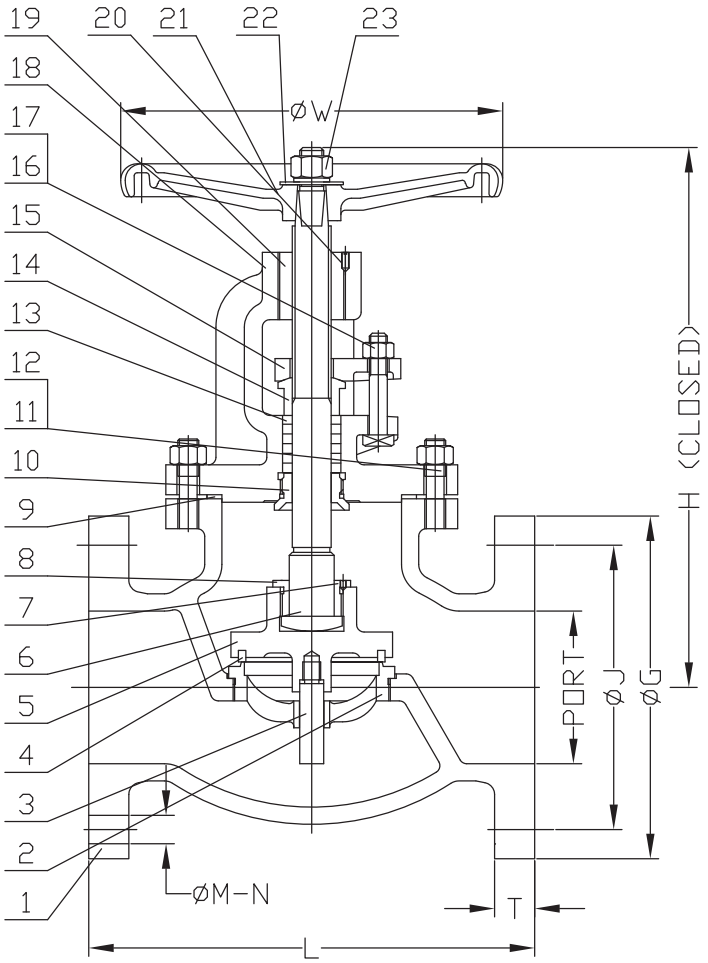
Figure Number Matrix

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	Hand Wheel	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)
2	2.00	4.75	6.00	0.63	4	0.75	8.00	8.00	12.00
2-1/2	2.50	5.50	7.00	0.69	4	0.75	8.50	8.00	12.50
3	3.00	6.00	7.50	0.75	4	0.75	9.50	8.00	13.12
4	4.00	7.50	9.00	0.94	8	0.75	11.50	10.00	14.00
5	5.00	8.50	10.00	0.94	8	0.87	13.00	12.00	15.25
6	6.00	9.50	11.00	1.00	8	0.87	14.00	12.00	17.00
8	8.00	11.75	13.50	1.12	8	0.87	19.50	14.00	19.00
10	10.00	14.25	16.00	1.19	12	0.98	24.50	18.00	21.25
12	12.00	17.00	19.00	1.25	12	0.98	27.50	20.00	24.00

Cv & Weight

Size	Cv	Wt. (lbs)
2	45	37
2-1/2	70	46
3	105	62
4	195	93
5	315	146
6	465	176
8	860	364
10	1390	639
12	n/a	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 Installation or Vertical 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.

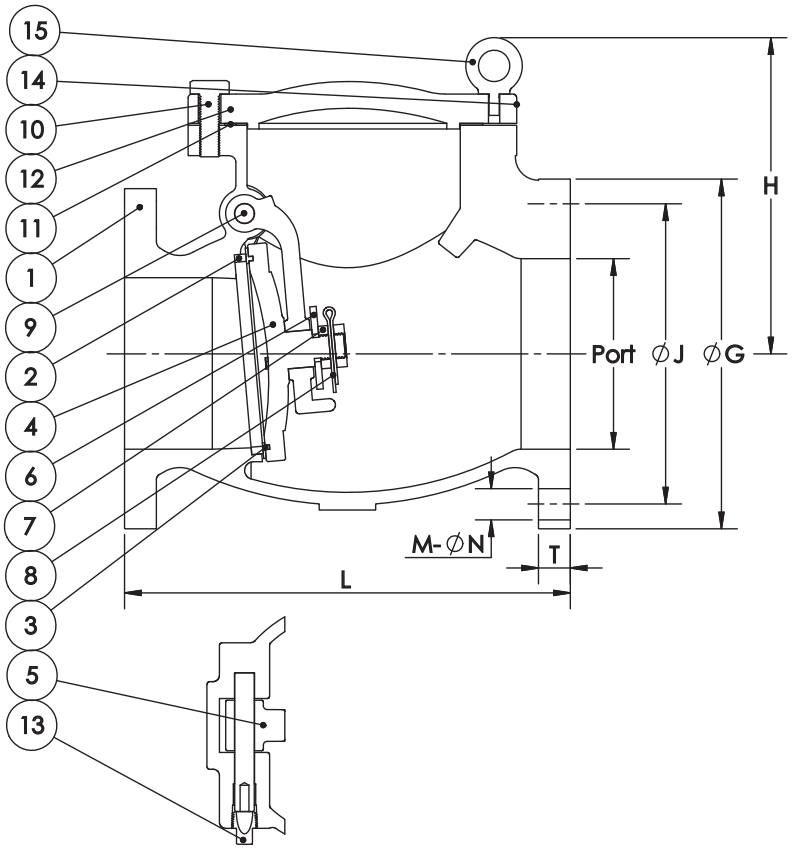
Figure Number Matrix

FNW 671A 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 A126 B, Cast Iron
2	Seat Ring	ASTM B62, Bronze
3	Disc Ring	ASTM B62, Bronze
4	Disc	ASTM A126 B, Cast Iron
5	Hinge	ASTM A216 WCB, Carbon Steel
6	Washer	ASTM A307 B, Carbon Steel
7	Nut	ASTM A563, Carbon Steel
8	Pin	304SS, Stainless Steel
9	Hinge Pin	13Cr, Stainless Steel
10	Bolt	ASTM A307 B, Carbon Steel
11	Bonnet Gasket	Graphite + Steel
12	Bonnet	ASTM A126 B, Cast Iron
13	Plug	ASTM A47, Malleable Iron
14	ID Plate	Aluminum
15	Lifting Eye Bolt (6" and Larger)	ASTM A307 B, Carbon Steel

Dimensions (inches)

Size	Port	ØJ	H	T	M	ØN	L	ØG
2	2.01	4.75	6.02	0.62	4	0.75	8.00	5.98
2-1/2	2.50	5.50	6.38	0.69	4	0.75	8.50	7.01
3	2.99	6.00	6.93	0.75	4	0.75	9.50	7.48
4	4.02	7.50	8.66	0.94	8	0.75	11.50	9.02
5	5.00	8.50	8.90	0.94	8	0.87	13.00	10.00
6	5.98	9.50	12.64	1.00	8	0.87	14.00	10.98
8	7.99	11.75	13.86	1.12	8	0.87	19.50	13.50
10	10.00	14.25	15.12	1.19	12	0.98	24.50	15.98
12	12.01	17.00	16.77	1.25	12	0.98	27.50	19.02

Cv & Weight

Size	Cv	Wt. (lbs)
2	137	22
2-1/2	221	31
3	327	42
4	605	71
5	975	110
6	1440	130
8	2670	236
10	4300	377
12	6350	564

CAST STEEL FLANGED
GATE, GLOBE & CHECK VALVES

FNW™

E

Index

Options & Accessories 182
Standards 182
Figure Number Matrix 183
Pressure/Temperature Ratings 183
Hydrostatic Test Pressures 183

Carbon Steel Valves

Figure	Type	
551	150# Gate Valve	184
552	300# Gate Valve	185
561	150# Globe Valve	186
562	300# Globe Valve	187
571	150# Swing Check Valve	188
572	300# Swing Check Valve	189

Stainless Steel Valves

Figure	Type	
451	150# Gate Valve	190
452	300# Gate Valve	191
461	150# Globe Valve	192
462	300# Globe Valve	193
471	150# Swing Check Valve	194
472	300# Swing Check Valve	195

E

Options & Accessories

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

- By-Passes - 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

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.

* Applies to weld end valves only. Flanged end valve ratings terminate at 1000°F (538°C).

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°*	20	360
1100°*	20	325
1150°*	20	275
1200°*	20	205
1250°*	20	180
1300°*	20	140
1350°*	20	105
1400°*	20	75
1450°*	20	60
1500°*	10	40

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

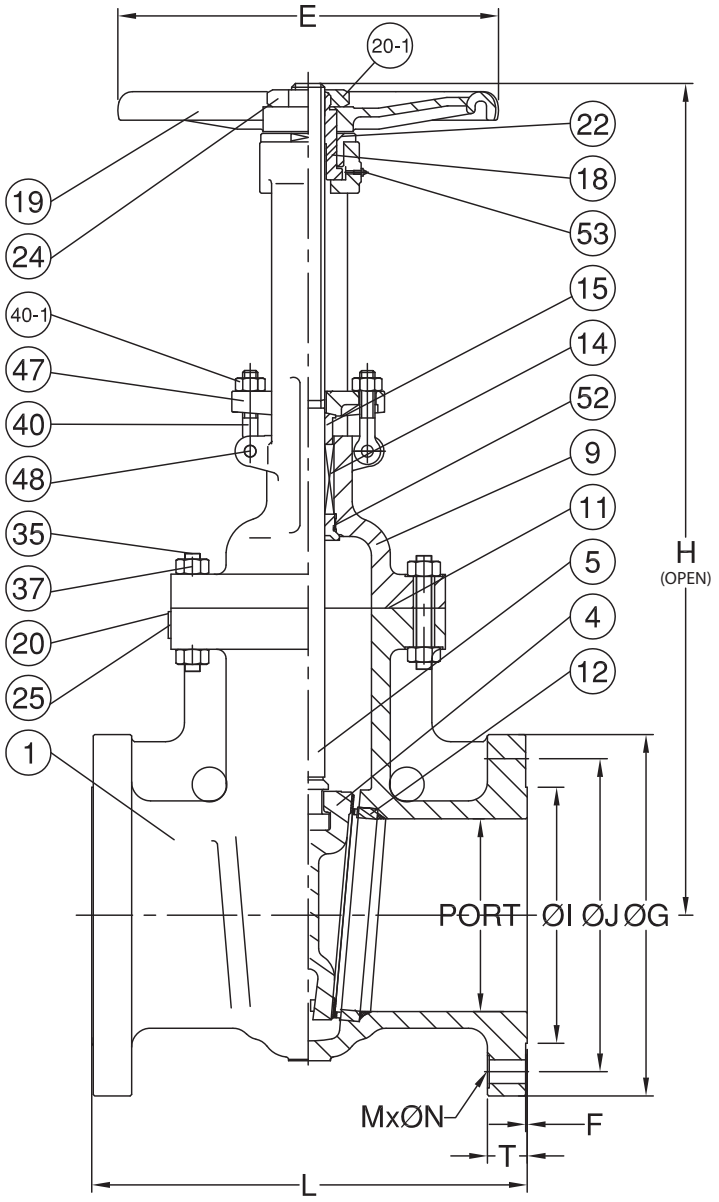
150# Carbon Steel OS&Y Gate Valve

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	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	32.01
	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	27.24
	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	29.51
	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	1.89
	M	4	4	4	8	8	8	12	12	12	16	16	20	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	1.38
Wt. (lbs)		40	57	68	104	181	254	419	538	849	1,213	1,455	1,786	2,756

Figure 552

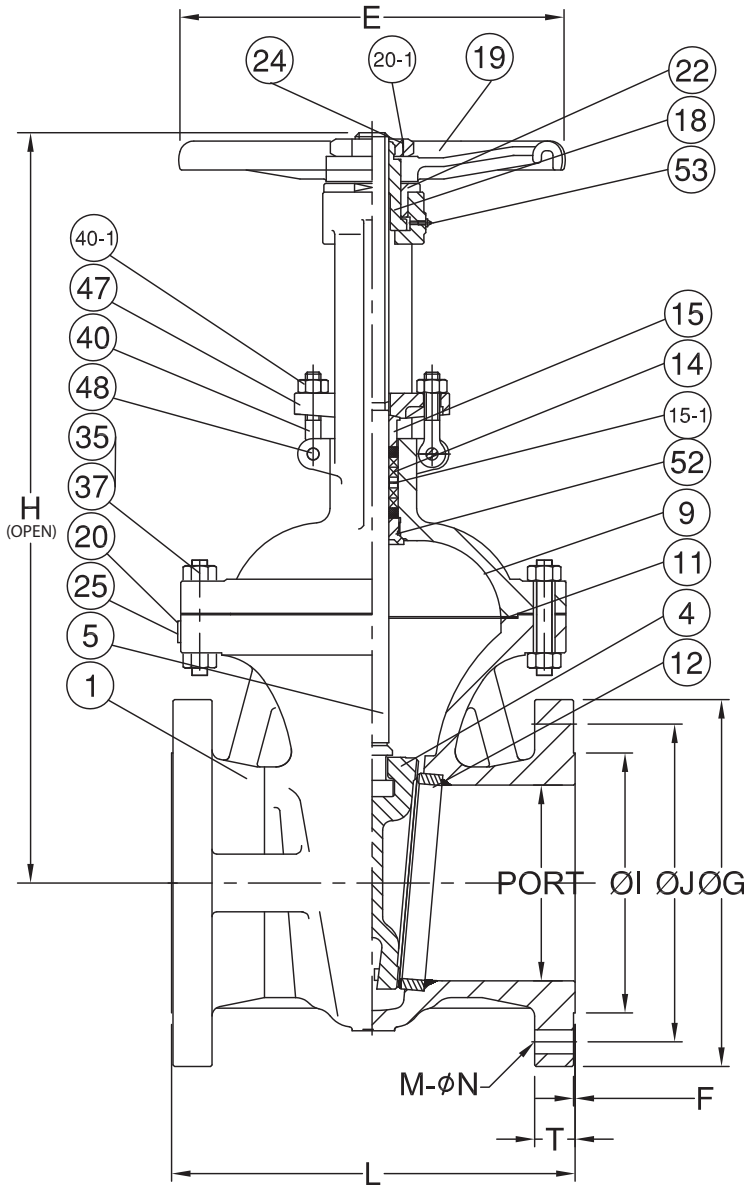
300# Carbon Steel OS&Y Gate Valve

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	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	35.98
	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	27.24
	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	32.01
	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	2.76
	M	8	8	8	8	12	12	16	16	20	20	24	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	1.61
Wt. (lbs)		68	86	101	148	293	503	747	1,027	1,541	2,227	2,657	3,792	5,754

Figure 561

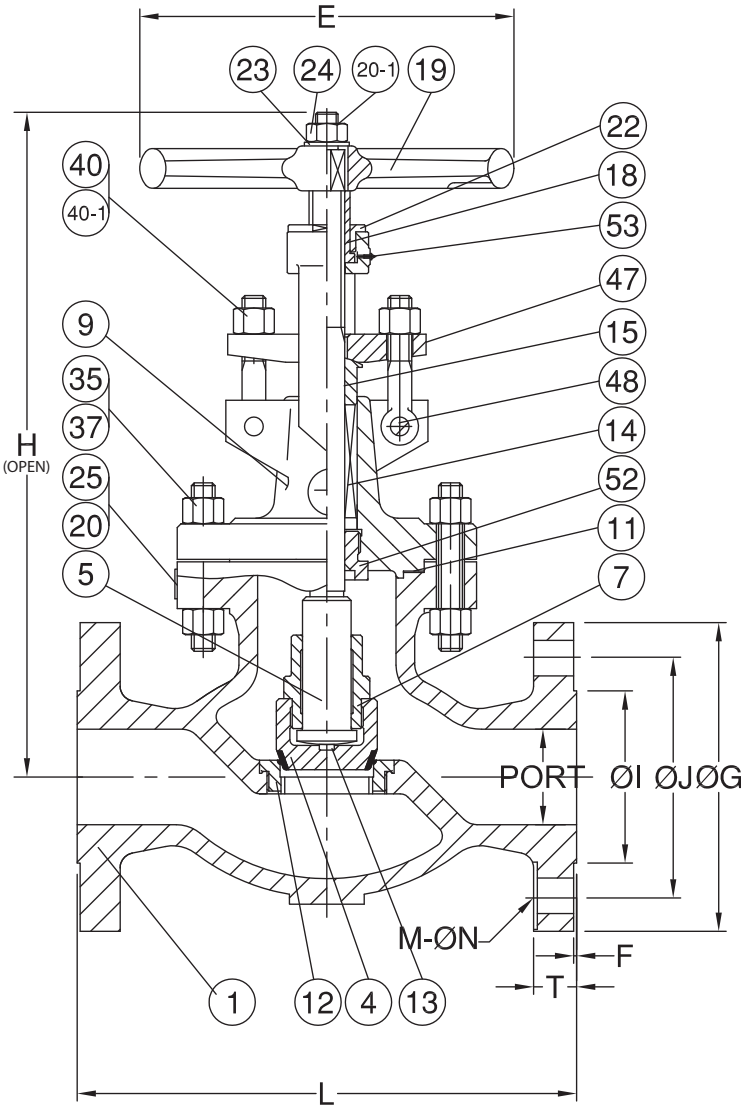
150# Carbon Steel Globe Valve

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	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98	19.02
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76	15.00
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25	17.01
	T	0.75	0.89	0.94	0.94	1.02	1.14	1.22	1.26
	M	4	4	4	8	8	8	12	12
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98	0.98
Wt. (lbs)		42	62	77	130	216	351	633	972

Figure 562

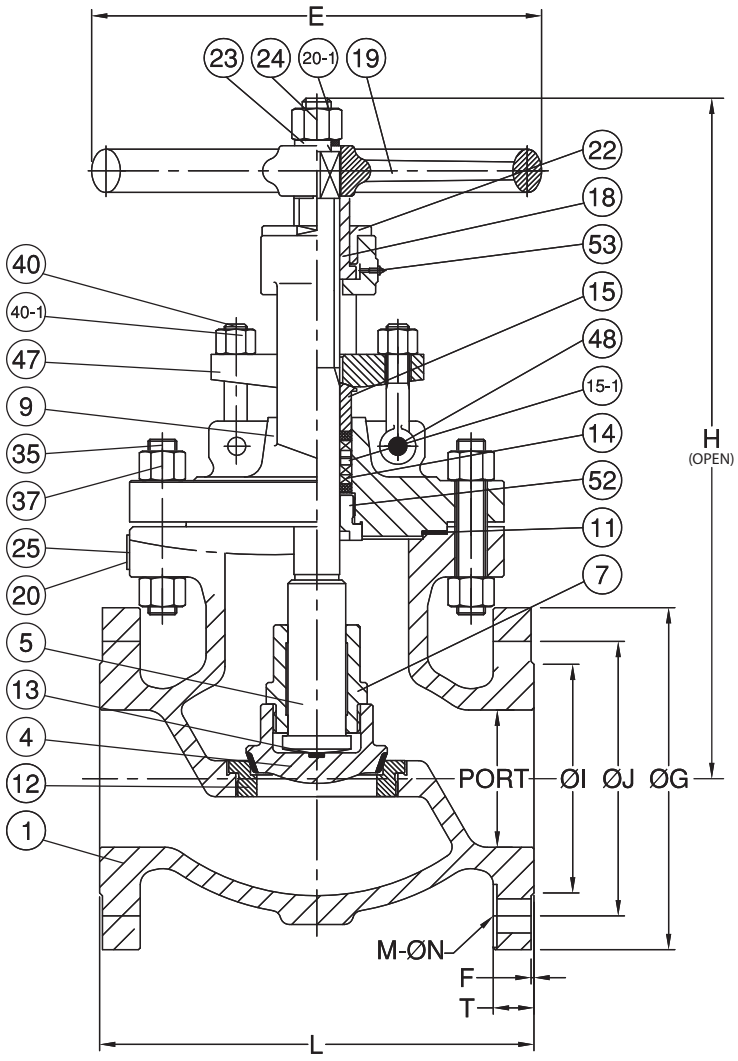
300# Carbon Steel Globe Valve

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	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	17.52	20.51
	ØI	3.62	4.12	5.00	6.18	8.50	10.63	12.76	15.00
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99	15.26	17.76
	T	0.91	1.02	1.14	1.26	1.46	1.65	1.89	2.01
	M	8	8	8	8	12	12	16	16
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14	1.26
Wt. (lbs)		66	104	150	231	346	666	959	1,272

Figure 571

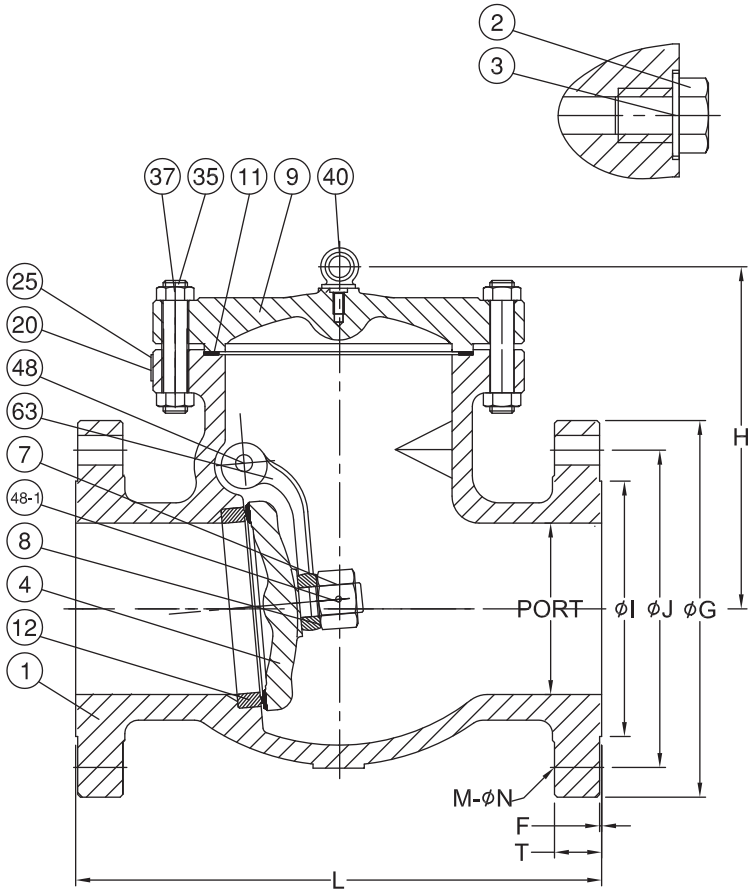
150# Carbon Steel Swing Check Valve

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	Name 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	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	32.01
	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	27.24
	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	29.51
	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	1.89
	M	4	4	4	8	8	8	12	12	12	16	16	20	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	1.38
Wt. (lbs)		256	42	62	88	148	258	439	659	816	1,257	1,466	1,984	2,996

Figure 572

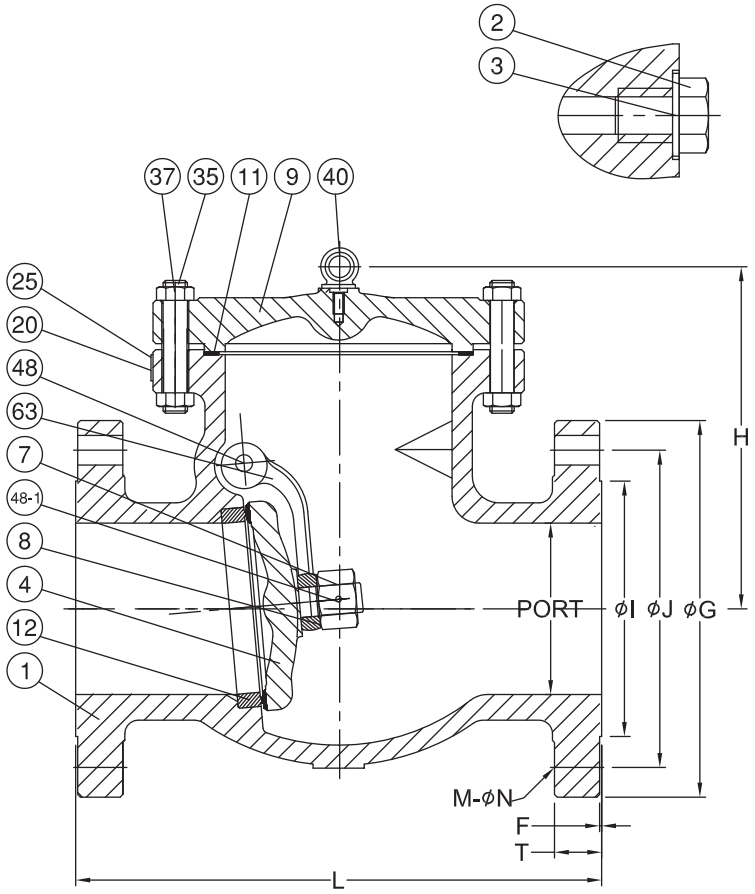
300# Carbon Steel Swing Check Valve

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	Name 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	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	35.98
	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	27.25
	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	32.01
	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	2.76
	M	8	8	8	8	12	12	16	16	20	20	24	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	1.61
Wt. (lbs)		46	60	64	93	163	238	657	928	1,499	1,852	1,797	2,207	3,417

Figure 451

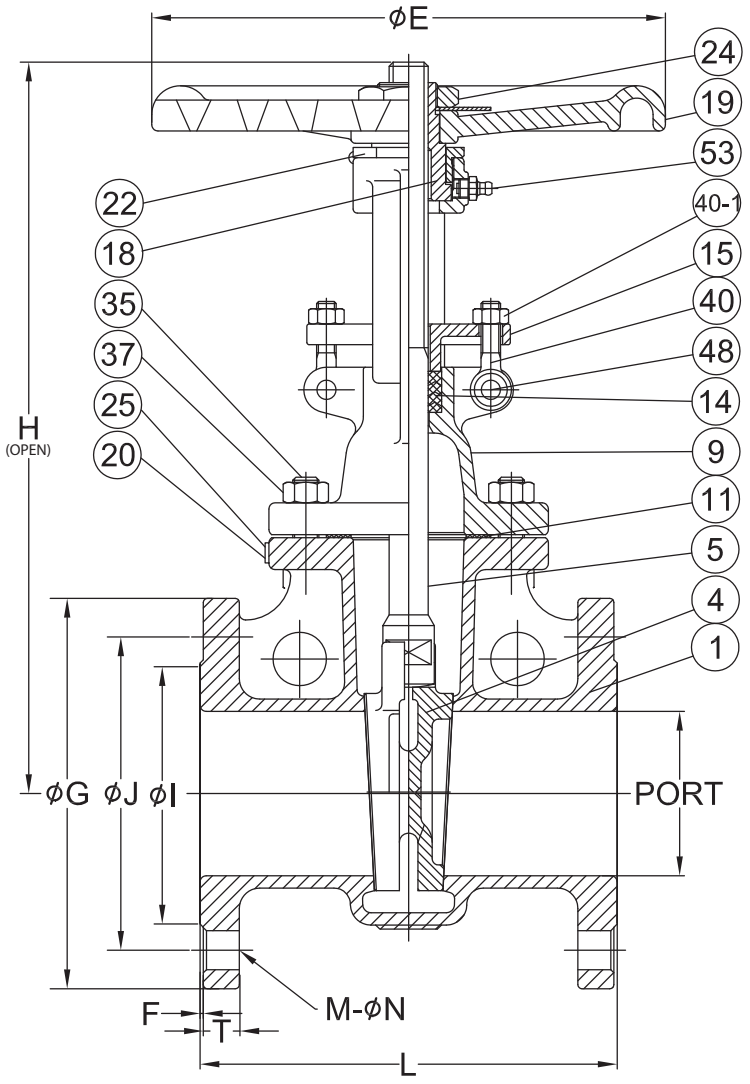
150# Stainless Steel OS&Y Gate Valve

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	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98	19.02
	Øl	3.62	4.13	5.00	6.18	8.50	10.63	12.36	15.00
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25	17.01
	T	0.62	0.69	0.75	0.94	1.00	1.12	1.19	1.25
	M	4	4	4	8	8	8	12	12
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98	0.98
Wt. (lbs)		31	37	45	81	143	194	320	430

Figure 452

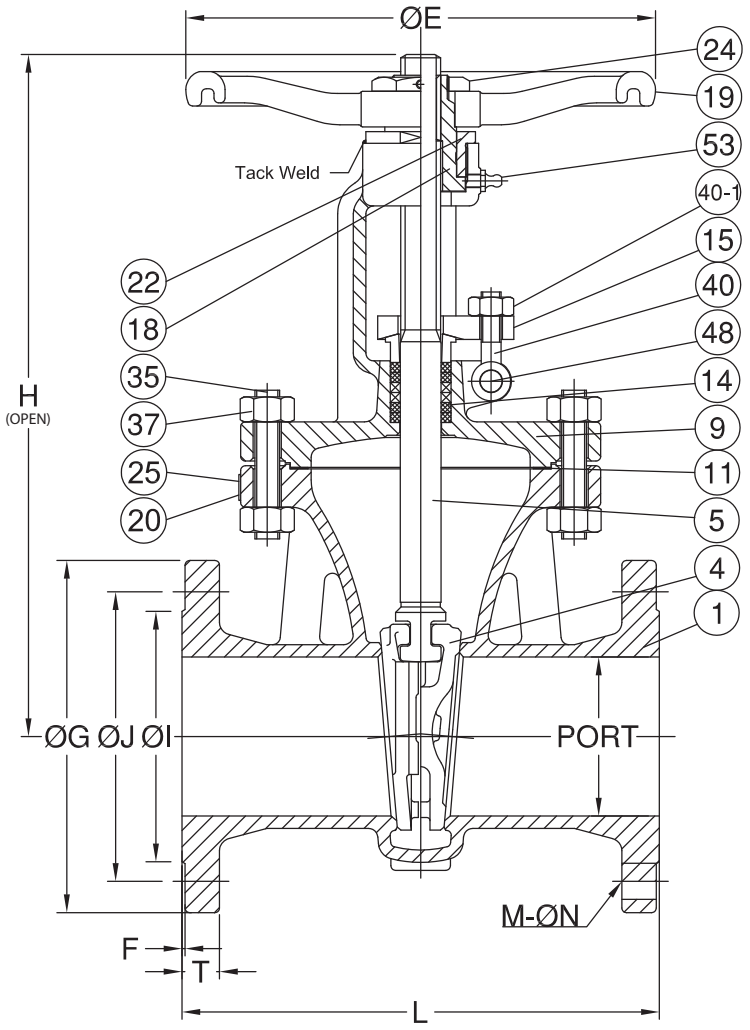
300# Stainless Steel OS&Y Gate Valve

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	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	17.52	20.51
	ØI	3.62	4.13	5.00	6.18	8.50	10.63	12.76	15.00
	ØJ	5.00	5.87	6.63	7.87	10.63	12.99	15.26	17.76
	T	0.88	1.00	1.12	1.25	1.44	1.62	1.88	2.00
	M	8	8	8	8	12	12	16	16
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14	1.26
Wt. (lbs)		55	71	103	137	265	370	772	1,036

Figure 461

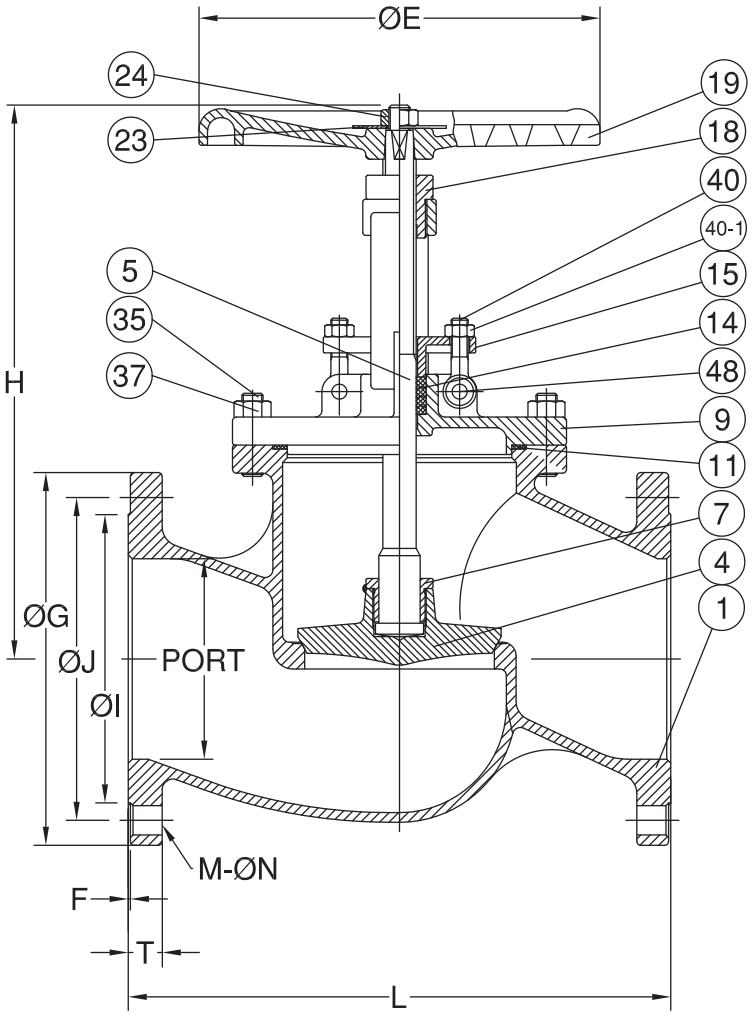
150# Stainless Steel Globe Valve

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	0.06
	ØG	5.98	7.01	7.48	9.02	10.98	13.50	15.98	19.02
	ØI	3.62	4.13	5.00	6.26	8.50	10.63	12.76	15.00
	ØJ	4.74	5.49	6.00	7.50	9.51	11.75	14.25	17.01
	T	0.65	0.69	0.82	0.94	0.98	1.12	1.19	1.25
	M	4	4	4	8	8	8	12	12
	ØN	0.75	0.75	0.75	0.75	0.87	0.87	0.98	0.98
Wt. (lbs)		28	44	42	72	123	265	474	551

Figure 462

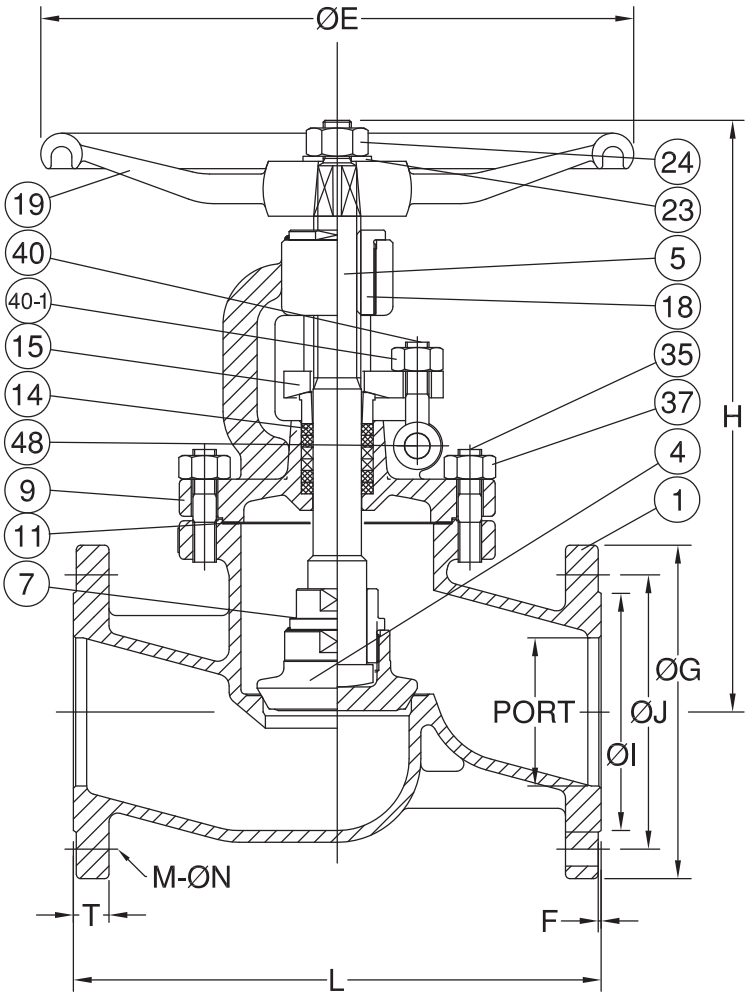
300# Stainless Steel Globe Valve

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



E

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	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	17.52
	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	1.88
	M	8	8	8	8	12	12	16
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14
Wt. (lbs)		66	88	133	188	331	882	1,169

Figure 471

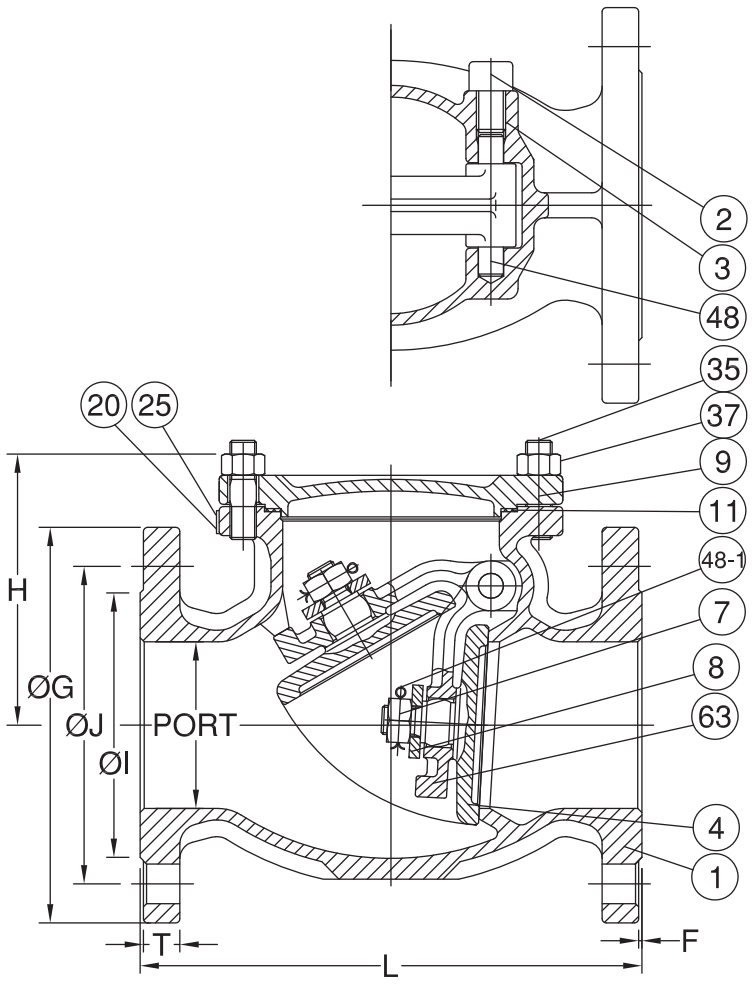
150# Stainless Steel Swing Check Valve

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	0.06
	ØG	5.00	5.98	7.01	7.48	9.02	10.98	13.50	15.98	19.02
	ØI	2.87	3.70	4.25	5.06	6.27	8.61	10.63	12.76	15.00
	ØJ	3.88	4.74	5.49	6.00	7.50	9.51	11.75	14.25	17.01
	T	0.64	0.64	0.69	0.73	0.97	1.01	1.12	1.19	1.25
	M	4	4	4	4	8	8	8	12	12
	ØN	0.63	0.75	0.75	0.75	0.75	0.87	0.87	0.98	0.98
Wt. (lbs)		18	25	33	39	71	106	181	331	478

Figure 472

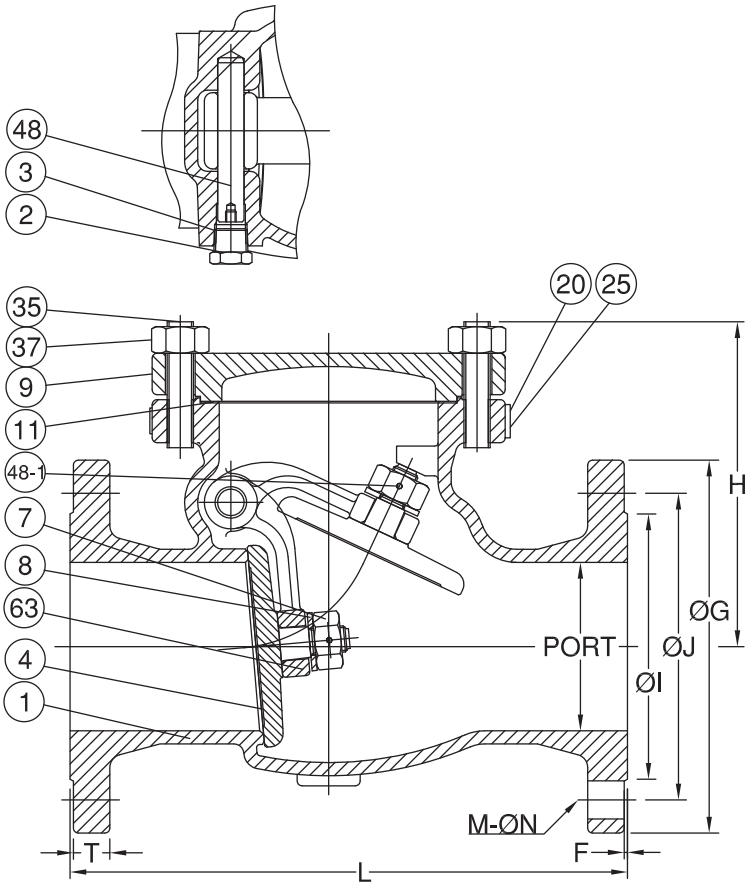
300# Stainless Steel Swing Check Valve

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



E

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	0.06
	ØG	6.50	7.48	8.27	10.00	12.52	15.00	17.52
	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	1.88
	M	8	8	8	8	12	12	16
	ØN	0.75	0.87	0.87	0.87	0.87	0.98	1.14
Wt. (lbs)		49	55	67	99	172	276	375

STRAINERS

BRONZE

Bronze

Figure	Description	Page
509	Y-strainer, 250 wog, 150 swp, threaded ends	197
510	Y-strainer, 400 wog, 250 swp, sweat ends	199
X509/X510	Y-strainer, 400 wog, 150 swp, lead free certified, threaded and sweat ends	201

CAST IRON

Cast Iron

Figure	Description	Page
558A	Y-strainer, 200 wog, 125 wsp, 125# flanged	203
559	Y-strainer, 400 wog, 250 wsp, threaded ends	205

STAINLESS STEEL

Cast Iron (IBBM)

Figure	Description	Page
14B	Y-strainer, 800 cwp, threaded ends	207

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

F

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

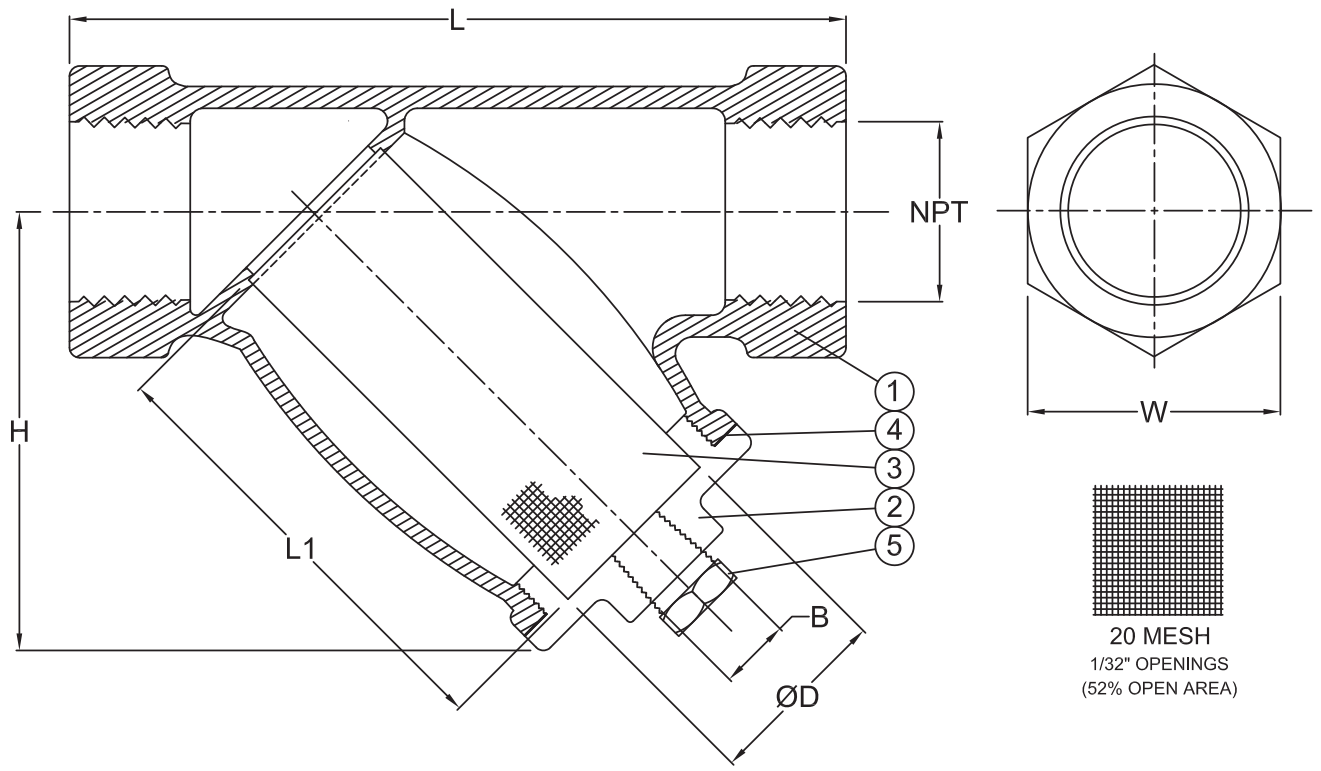
SIZE CODE

3/8 = C
1/2 = D
3/4 = F
1 = G
1-1/4 = H
1-1/2 = J
2 = K

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



F

Dimensions (inches)

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

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

F

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

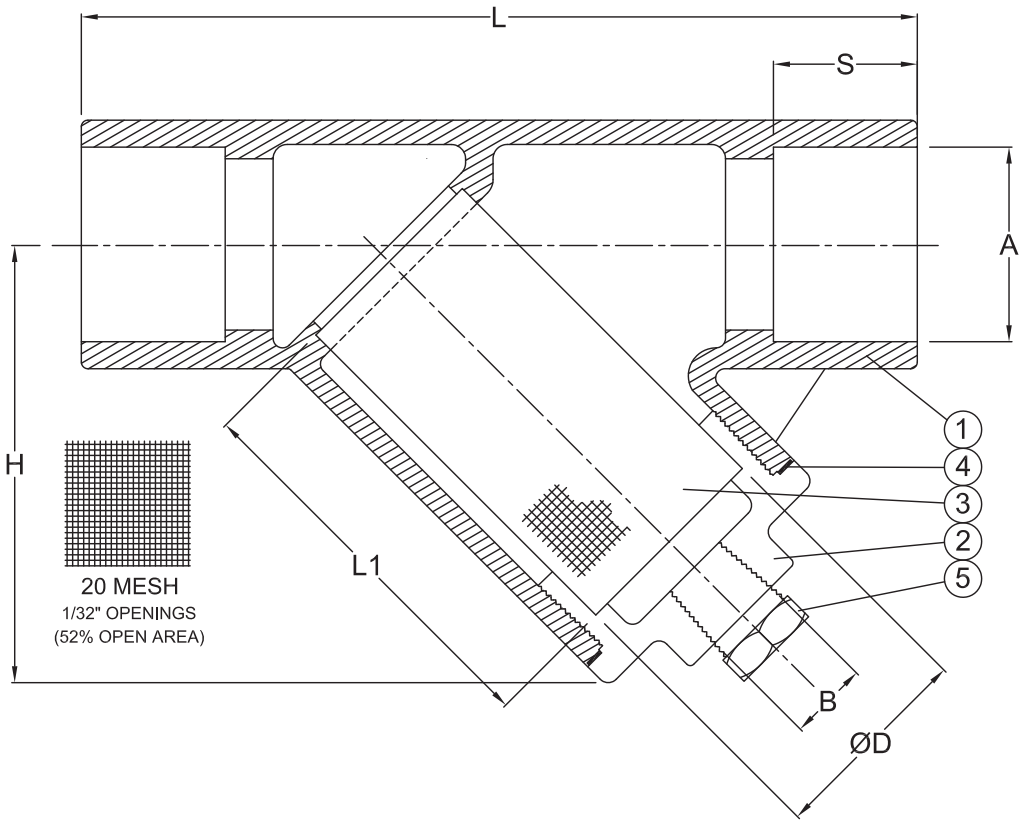
SIZE CODE

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



F

Dimensions (inches)

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 Certified (IAPMO)
  (Annex G references NSF 372)
- 20 Mesh Stainless Steel Screen
- Blow-off Plug Included

Standards:

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

LOW LEAD

NSF 61 ANNEX G
UPC ®

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

F

Cv & Weights

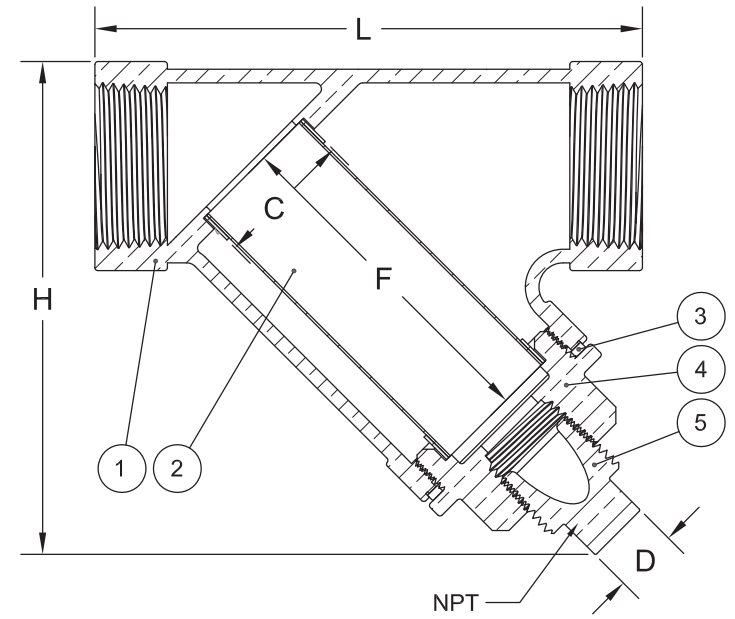
Size	Cv	Wt. (lbs)	
		X509	X510
1/2	8.3	0.70	0.68
3/4	11.4	1.19	1.07
1	28.3	1.79	1.62
1-1/4	37.7	2.54	2.42
1-1/2	48	3.50	3.30
2	63.2	5.58	5.13

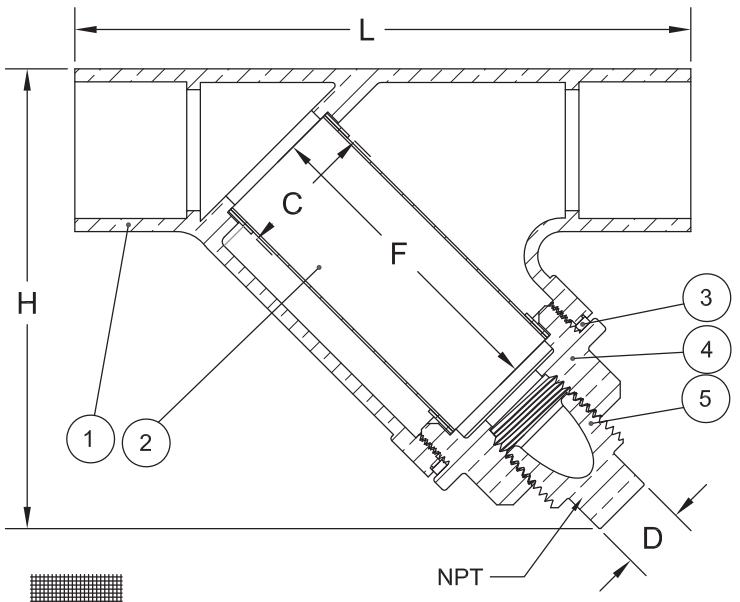
Figure Number Matrix

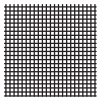
FNW X509 Size

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







20 MESH
1/32" OPENINGS
(52% OPEN AREA)

Dimensions (inches)

Size	D	H		L		C	F	NPT
		X509	X510	X509	X510			
1/2	0.45	3.01	2.83	3.23	3.43	0.77	1.95	3/8"-18
3/4	0.45	3.49	3.27	3.94	4.31	0.98	2.34	3/8"-18
1	0.52	4.04	3.78	4.53	5.10	1.15	2.66	1/2"-14
1-1/4	0.52	4.70	4.37	5.33	5.91	1.43	3.16	1/2"-14
1-1/2	0.52	5.02	4.82	6.20	6.89	1.78	3.58	1/2"-14
2	0.52	6.14	5.91	7.44	8.62	2.20	4.80	1/2"-14

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

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
- Perforated Stainless Steel Screen:
  - 2" to 4" - 1/16" Holes
  - 5" to 12" - 1/8" Holes
- Blow-off Plug Included

Standards:

- Flanged Ends: ANSI B16.1
- Shell (Hydro) Test Pressure: 300 PSI Per API 598
- Markings: MSS SP-25

F

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

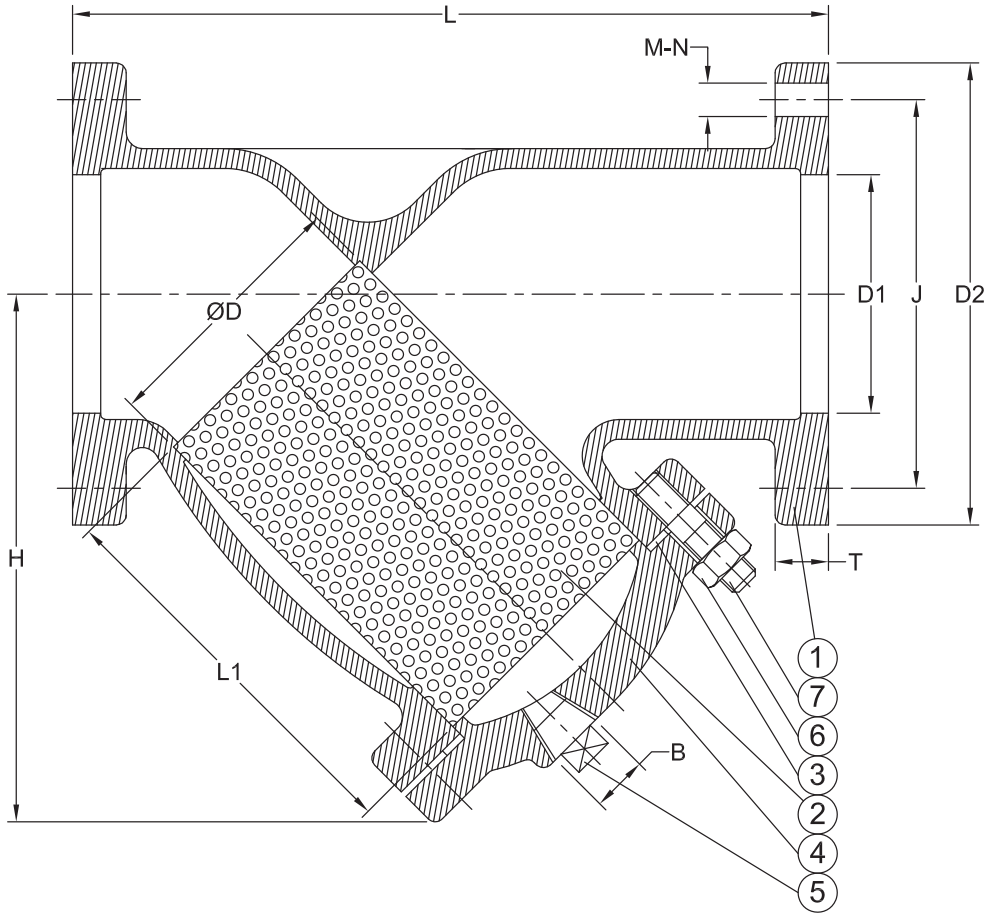
SIZE CODE

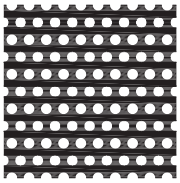
2 = K	4 = P	8 = X
2-1/2 = L	5 = S	10 = 10
3 = M	6 = U	12 = 12

REPLACEMENT SCREENS

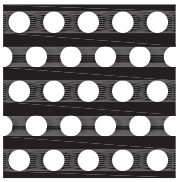
2 = FNW558ASK
2-1/2 = FNW558ASL
3 = FNW558ASM
4 = FNW558ASP
5 = FNW558ASS
6 = FNW558ASU
8 = FNW558ASX
10 = FNW558AS10
12 = FNW558AS12

125# FLANGED 200 WOG
CAST IRON Y-STRAINER





2 TO 4 INCH
0.0625 DIA.
(APPROX. 98 HOLES/IN²)



5 TO 12 INCH
0.125 DIA.
(APPROX. 29 HOLES/IN²)

F

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

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: MSS SP-25

F

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

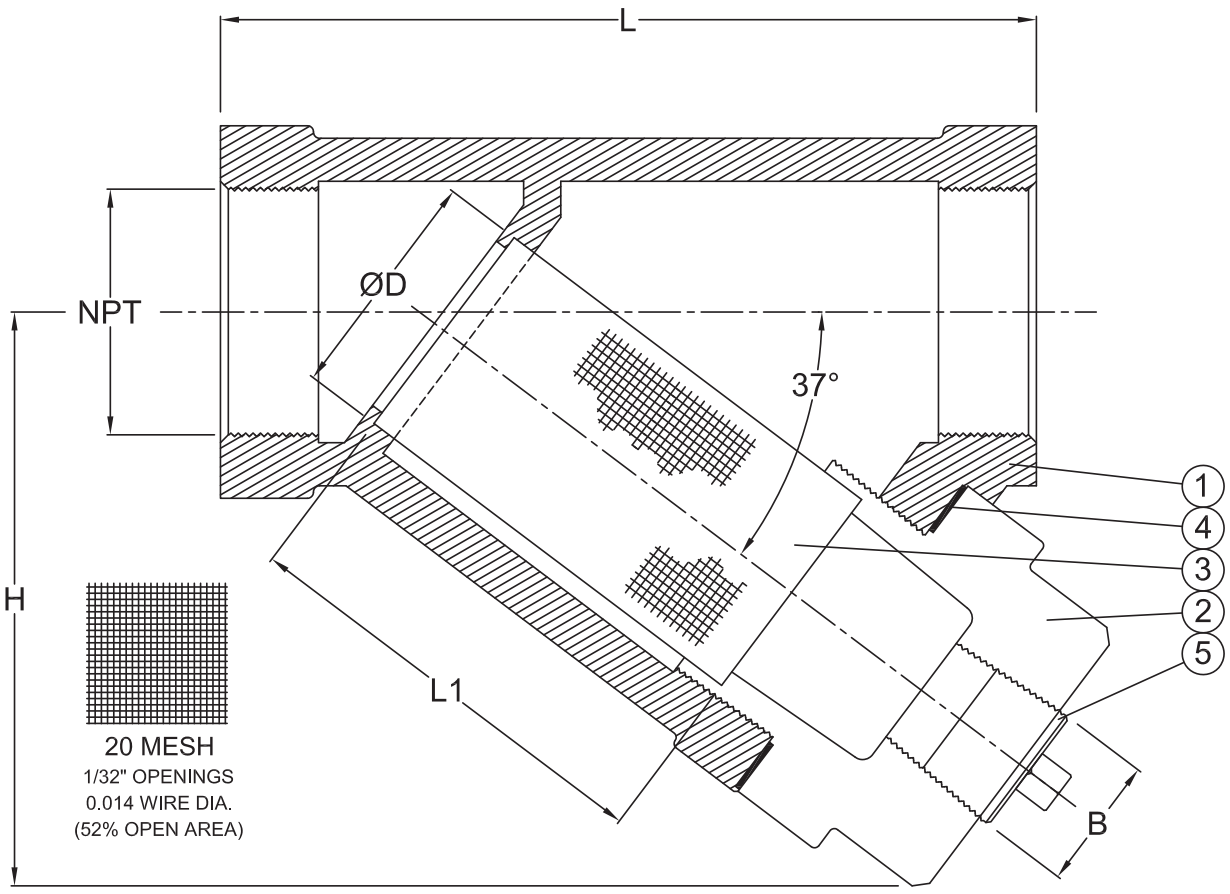
SIZE CODE

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

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



F

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

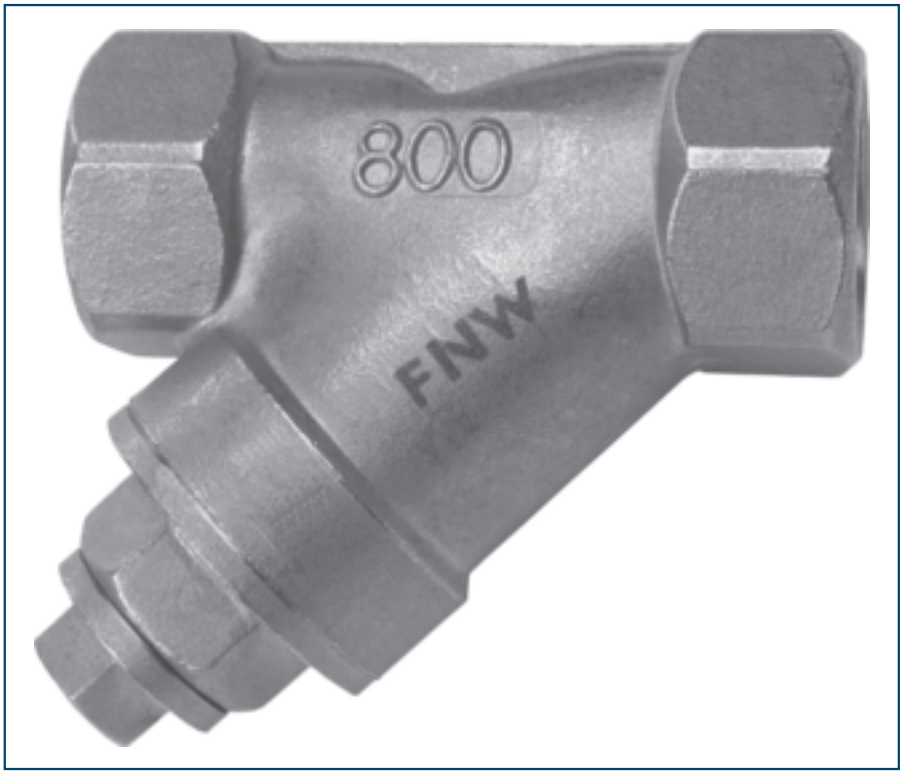
800 PSI STAINLESS STEEL Y-STRAINER

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
- NPT Ends: ANSI B1.20.1



F

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

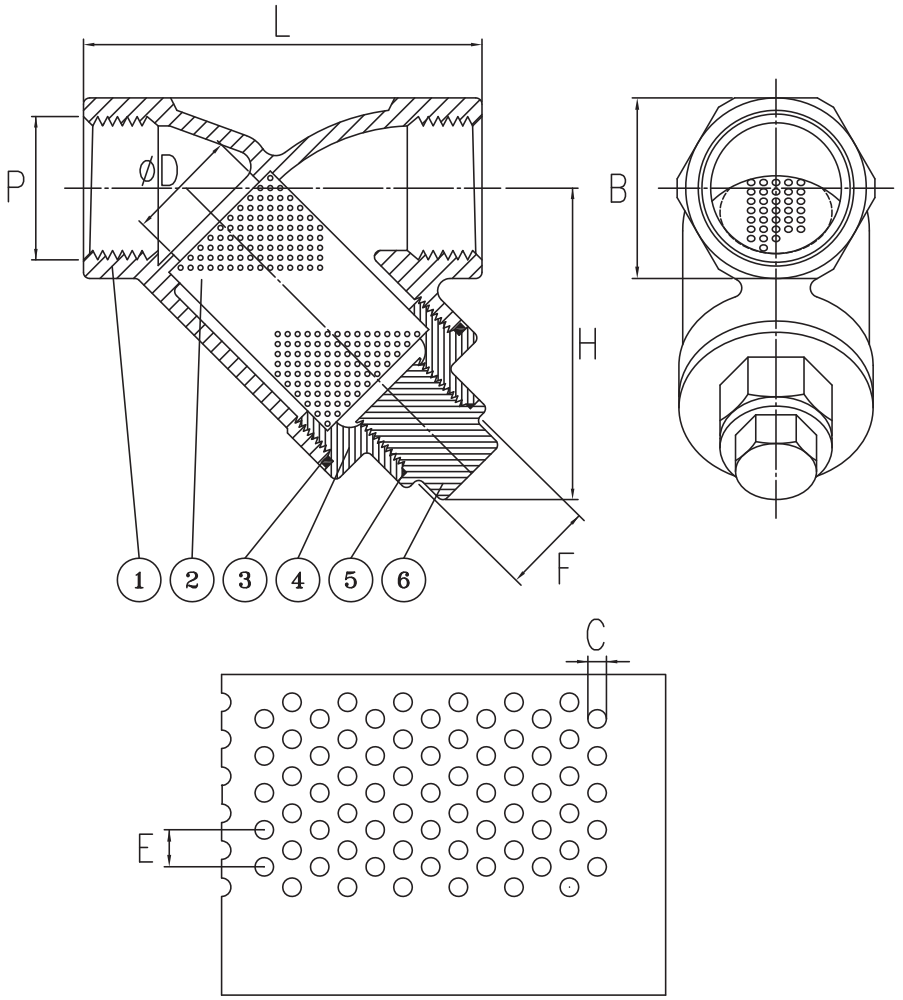
Figure Number Matrix

FNW 14B YSS Size

SIZE CODE

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

800 PSI STAINLESS STEEL 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

NOTES

ACTUATION & ACCESSORIES

ACTUATORS

Gear Operators

Figure	Description	Page
G731	Cast iron, quarter-turn worm	211
BGTM	Ductile iron, multi-turn bevel	213

Pneumatic Cylinders

Figure	Description	Page
	Pneumatic, linear	215
RP	Pneumatic, rack & pinion	221

Hydraulic Cylinders

Figure	Description	Page
	Hydraulic, linear	218

Electric

Figure	Description	Page
	Electric, quarter-turn	229

ACCESSORIES

Positioners

Figure	Description	Page
P5/EP5	PMV pneumatic and electro-pneumatic, quarter-turn	233
V100P/V100E	VAC pneumatic and electro-pneumatic, quarter-turn	235

Position & Limit Switches

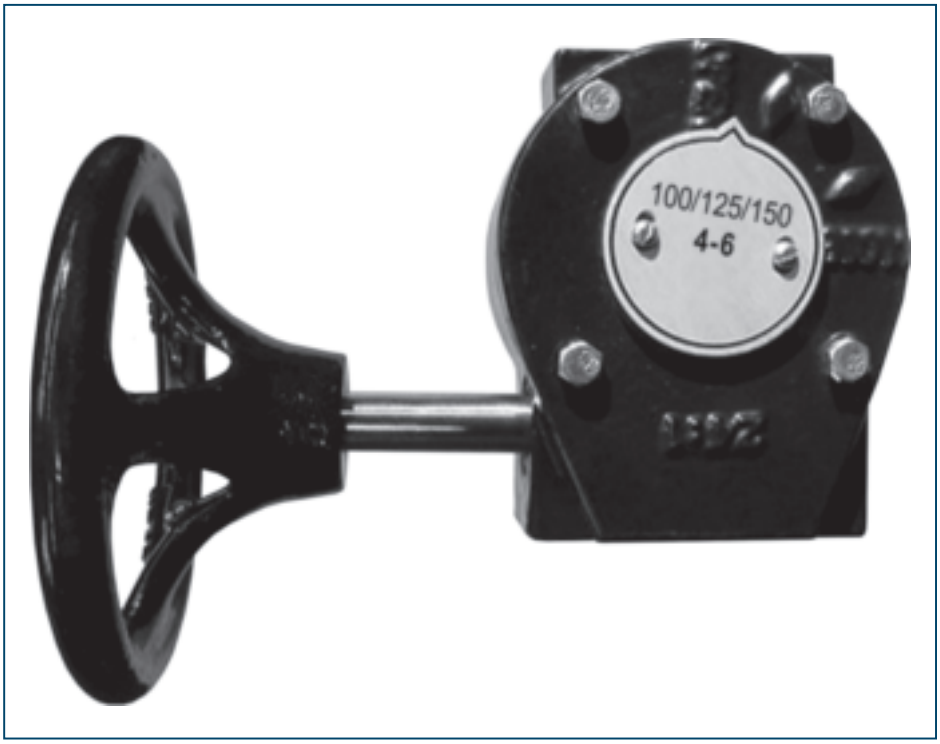
Figure	Description	Page
QV	Position indicator, quarter-turn, weather-proof	237
M4	Position indicator, quarter-turn, explosion-proof	239
PLS4	Limit, proximity switch	241
MLS4	Limit, mechanical switch	242

Solenoids

Figure	Description	Page
	ASCO, 3, 4 and 5-way configuration	243

QUARTER-TURN WORM GEAR OPERATOR

The FNW figure 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

G

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

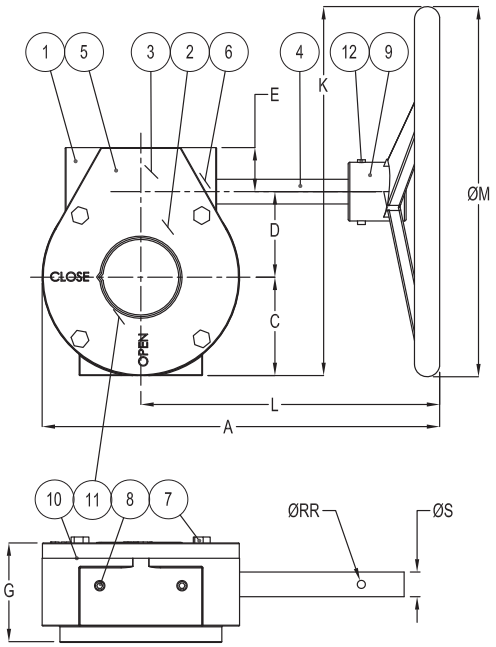
Figure Number Matrix

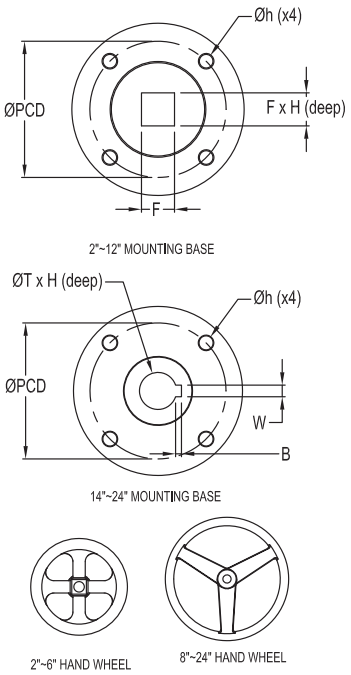
FNW G731 Size

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	

G

Dimensions (inches)

Valve Size	Ratio	A	L	G	C	D	E	K	ØM	Øh	Ø PCD	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

G

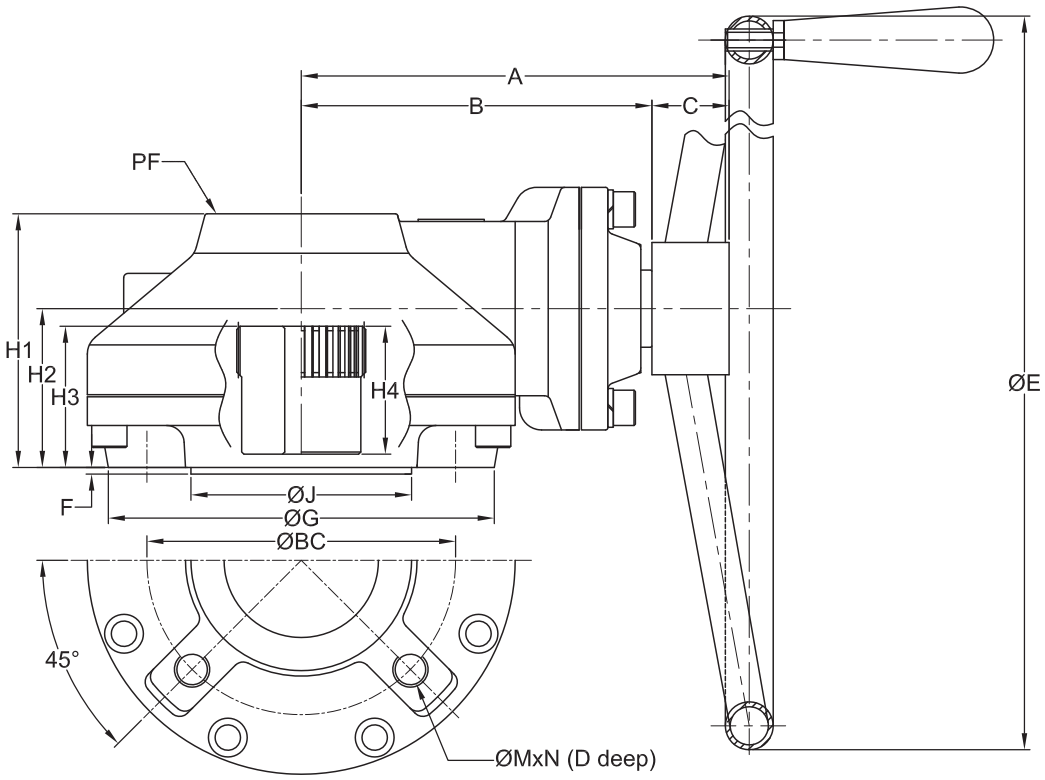
Mechanical Specifications

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

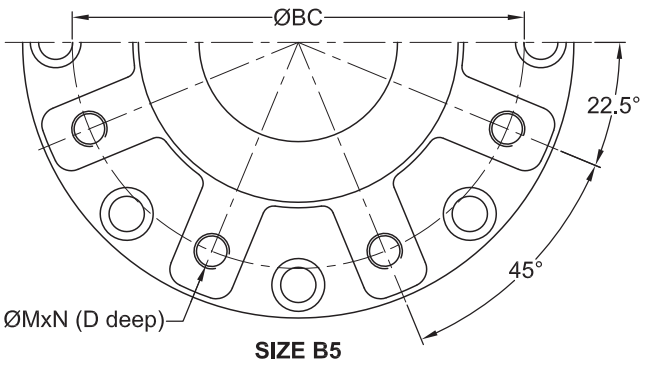
Part Number

Model	Part Number
B3	FNWBGTMB3
B5	FNWBGTMB5

MULTI-TURN BEVEL GEAR OPERATOR



SIZE B3



SIZE B5

Standard Materials

Ref. 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	7.625	1/2-13	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:

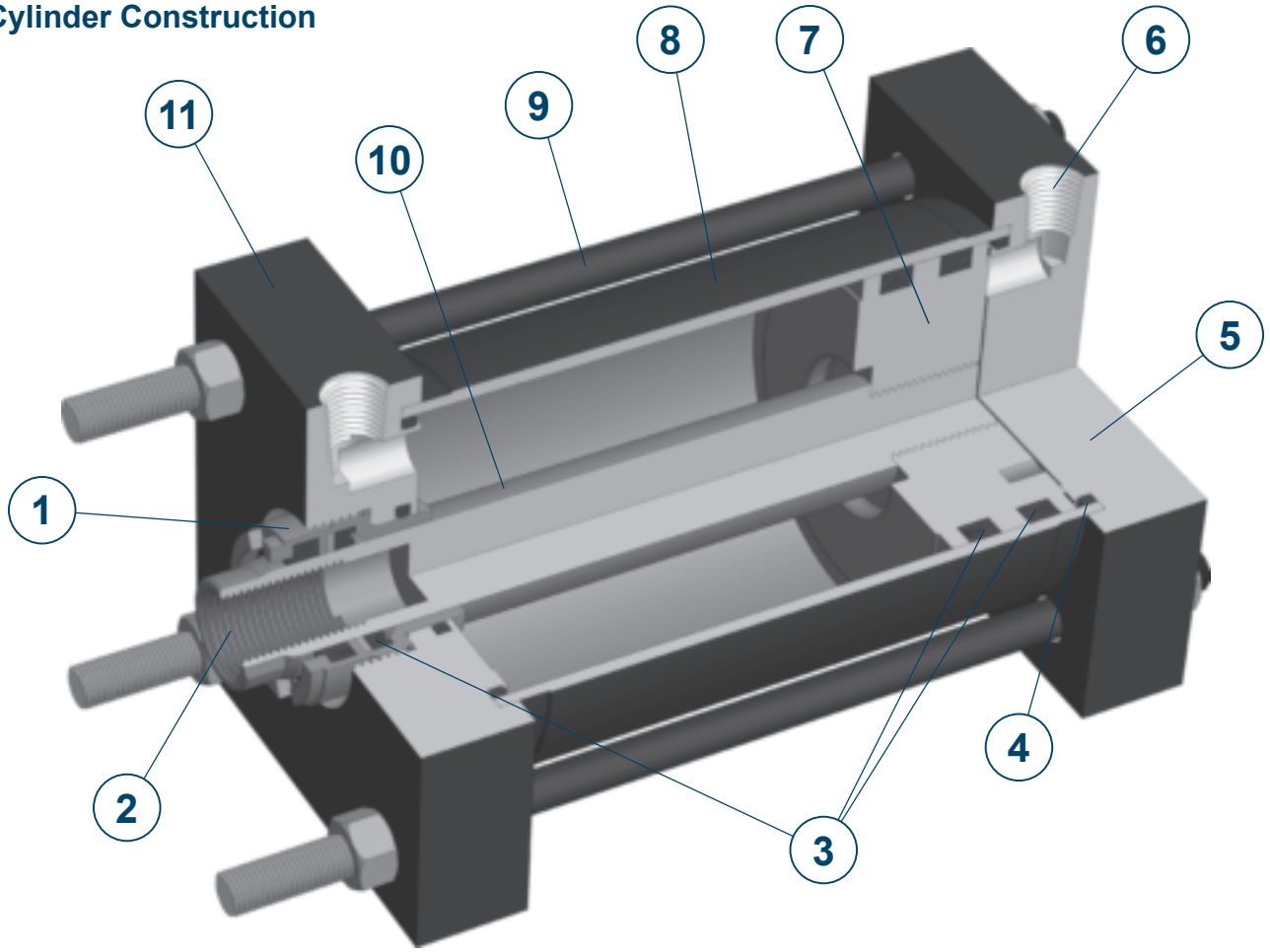
- Double-Acting
- Bore Sizes 3-1/4" through 24"
- Pressure Rated to 150 PSI Air
- Chrome Plated Cylinder Interior
- Externally Removable Piston Rod Gland
- Dual Piston Rod Seal for Integrity and Rod Wiper
- Grooved Alignment Between Body and Caps
- Factory Tested
- -10°F to 165°F Temperature Range (Standard 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

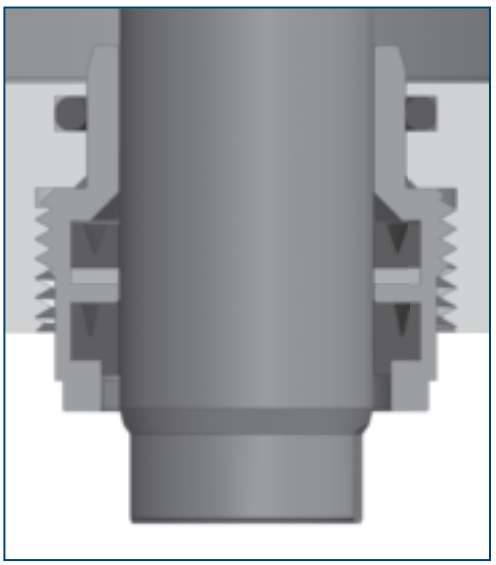
Additional options are available. Contact FNW sales for your specific application needs.

Cylinder Construction

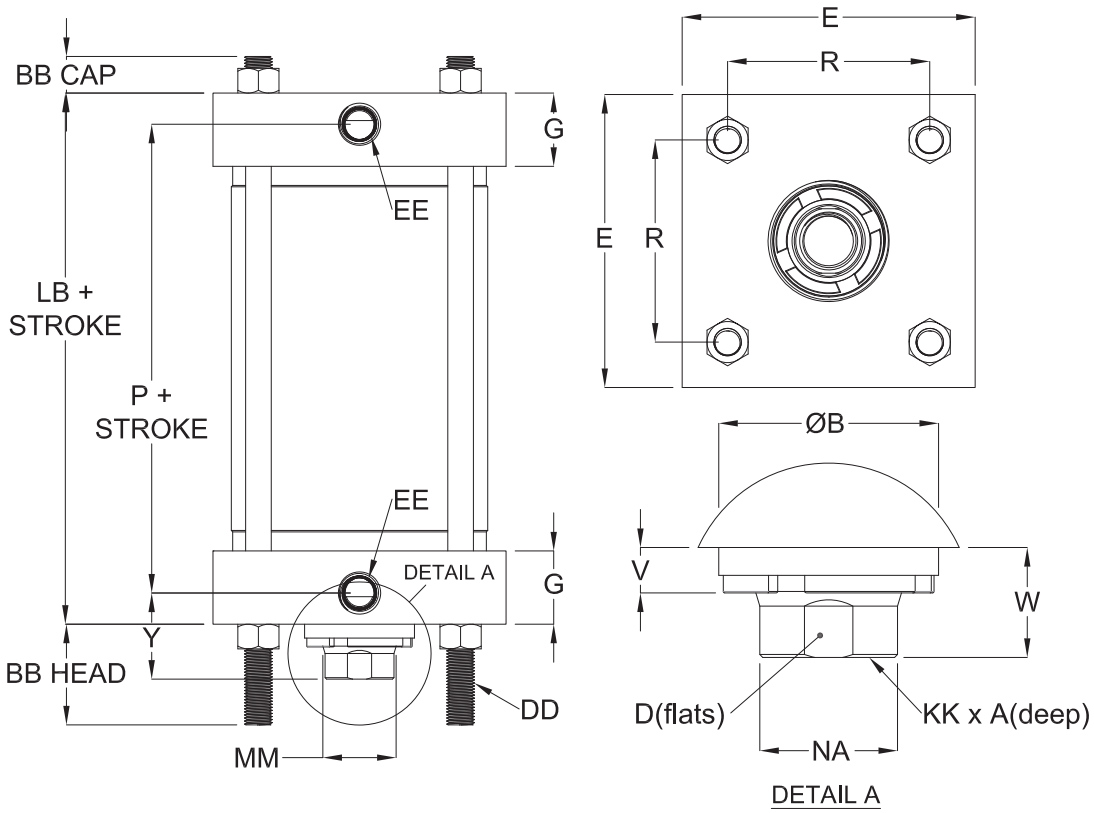


Features Description

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 - 14	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	
	Base Weight (lbs)	Weight per inch of stroke (lbs)
3-1/4	12.97	0.70
4	17.10	0.87
5	27.45	1.09
6	37.24	1.40
7	51.50	1.71
8	66.17	2.13
10	125.56	2.63

Bore	Add Values for Total Weight	
	Base Weight (lbs)	Weight per inch of stroke (lbs)
12	181.23	3.16
14	277.02	3.70
16	384.26	6.09
18	526.85	7.09
20	668.35	7.91
22	899.78	12.10
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:

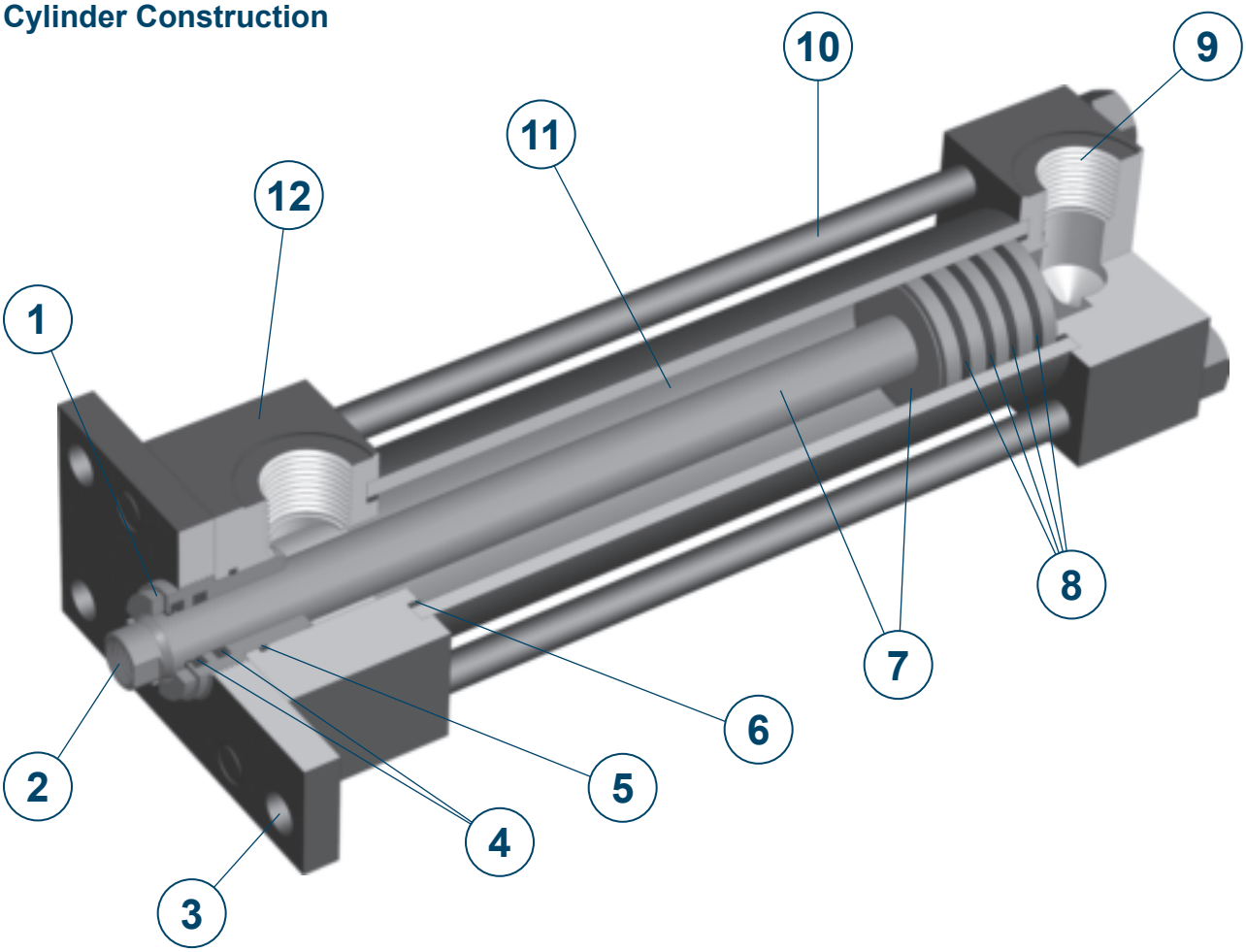
- Double-Acting
- Bore Sizes 1-1/2" through 6"
- Heavy Walled Cylinder with Honed to Micro Finish Bore
- Externally Removable Piston Rod Gland
- Dual Piston Rod Seal for Integrity and Rod Wiper
- Grooved Alignment Between Body and Caps
- Head Plate Adapter for Easy Mounting
- Factory Tested
- -10°F to 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

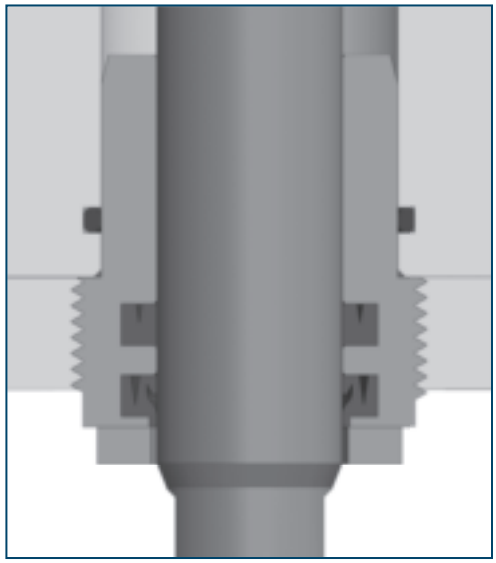
Additional options are available. Contact FNW sales for your specific application needs.

Cylinder Construction

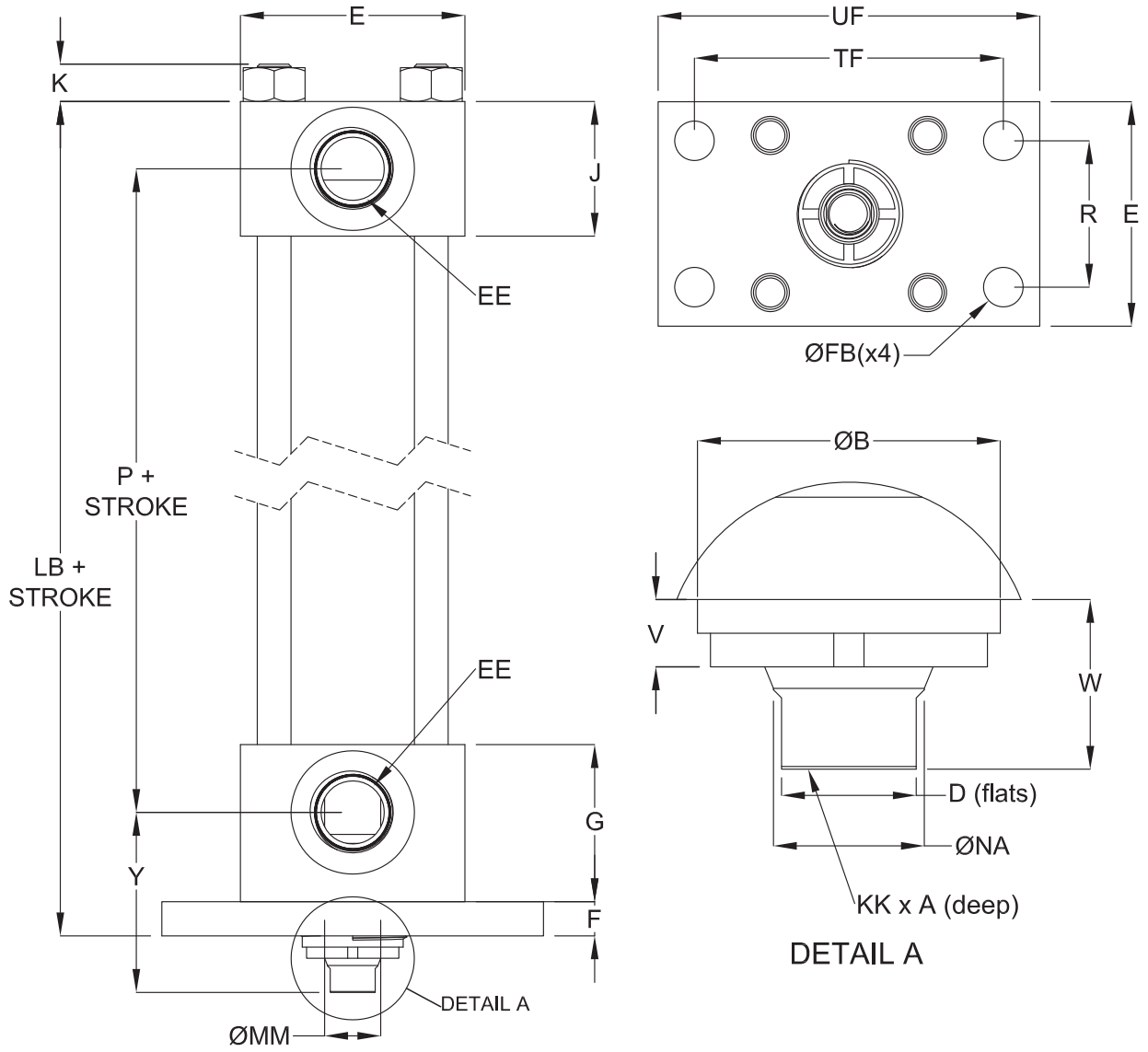


Features Description

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



G

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 64,555 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-BLOWOUT PINION
The design of the pinion prevents blowout 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.

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.

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.

END CAP SCREWS
End caps are secured with extra length stainless steel screws for safe disassembly.

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.

SOLENOID MOUNTING
Supply air connections follow the international NAMUR standard for direct mounting of like style solenoids and is included on all sizes.

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 +/-5° 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 and 330 which have a single square 4-point female drive).

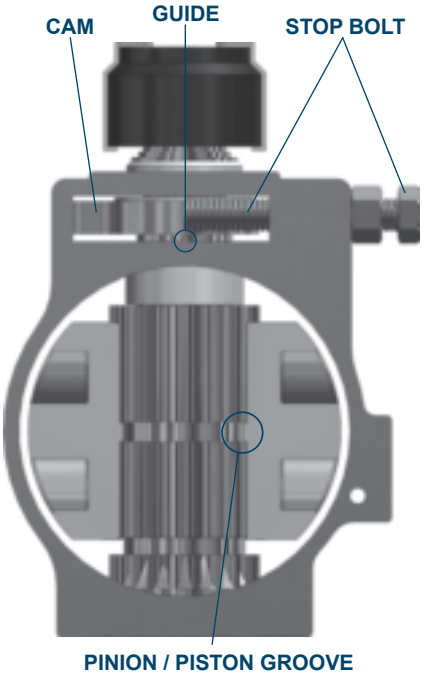
G

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

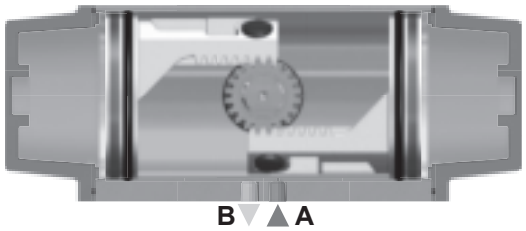
The RP actuators are designed with a grooved pinion and a corresponding flat key cast in the piston rack. This system creates an added mechanical lock that prevents the pinion from blowing out of the bottom of the housing. In this design, lower pinion clips and retainers that can wear out are eliminated.



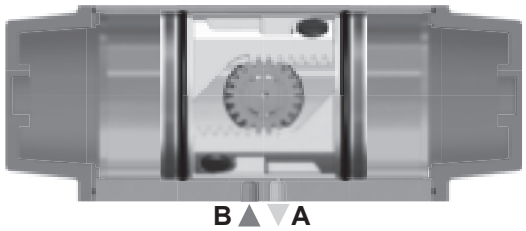
Standard Materials

- 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) (Models 270 and 330 use 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 (Models 270 and 330 only)
- Upper Pinion Snap Ring - Steel, Nickel Plated

Standard Operation - Double Acting

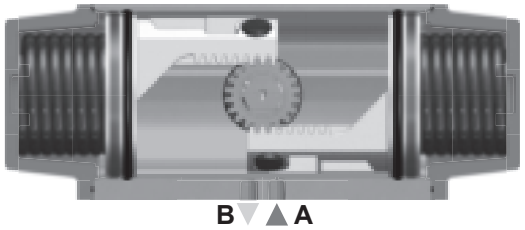


The RP rack and pinion actuator operates (turns) CCW by supplying compressed air to port A. The pressure drives the pistons outward, turning the drive pinion CCW. Air on the outside of the pistons is exhausted out of port B.

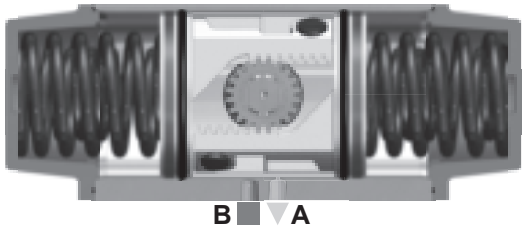


The RP rack and pinion actuator operates (turns) CW by supplying compressed air to port B. The pressure drives the pistons inward, turning the drive pinion CW. Air on the inside of the pistons is exhausted out of port A.

Standard Operation - Spring Return



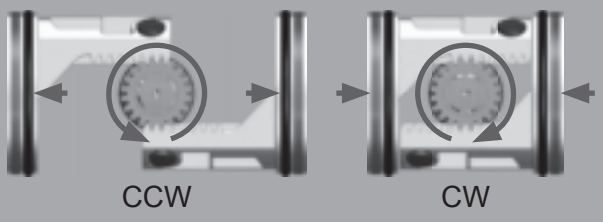
The RP rack and pinion actuator operates (turns) CCW by supplying and holding compressed air at port A. The pressure drives the pistons outward, turning the drive pinion CCW and compressing the spring sets. Air on the outside of the pistons is exhausted out of port B.



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.

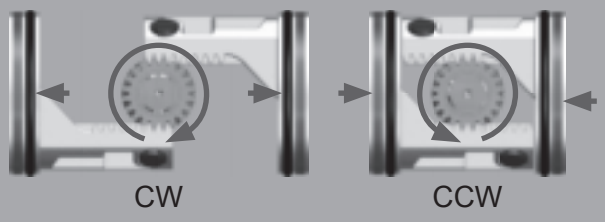
Reversible Operation

Standard Rotation



In the standard operation of the RP actuator, the output turns CCW when the pistons are driven outwards. When the pistons are driven inwards, the output turns CW. This is the typical action of the majority of valves that open in the CCW direction, and close in the CW direction.

Reversed Rotation



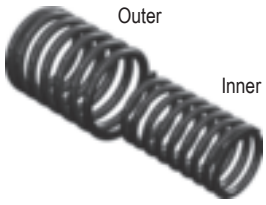
The RP actuator operation is field reversible so the output turns CW when the pistons are driven outwards, and CCW when they are driven inwards. This configuration is used for spring return actuators that require a mechanical fail in open position, or for valves with reversed operation.

G

Spring Return Spring Set Configurations

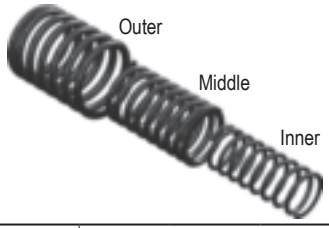
The RP rack and pinion actuators are stocked with full spring sets (spring set 05 for models 52 to 140, spring set 06 for models 160 to 230, and spring set 08 for the model 270 and 330).
Spring sets can be modified by removal of springs, as indicated in the spring set charts, and to alter the actuator's torque curve as shown on the torque charts. Full spring sets provide 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.

Models 52 to 140



Spring Set	Spring Quantity	
	Outer	Inner
01	1	1
02	2	
03	1	2
04	2	1
05	2	2

Models 160 to 200



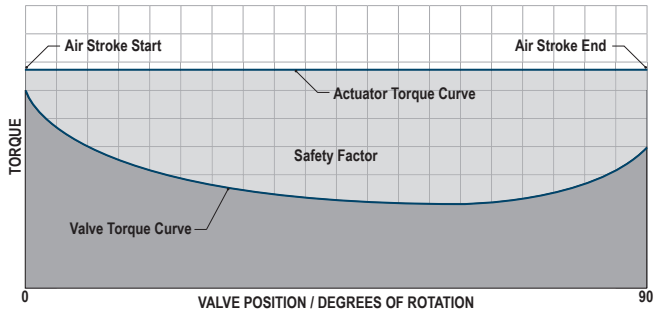
Spring Set	Spring Quantity		
	Outer	Middle	Inner
01		2	
02	2		
03	1	2	
04	2		2
05	2	2	
06	2	2	2

*** Model 230 has maximum spring set of 06.**

Models 230* to 330

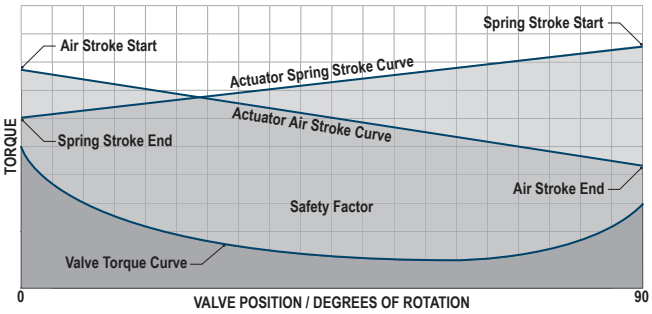
Spring Set	Springs/Side	
	Side A	Side B
01	2	3
02	3	3
03	3	4
04	4	4
05	4	5
06	5	5
07	5	6
08	6	6

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
330	22,464	28,083	33,702	39,321	44,939	50,476	56,086	64,555

Spring Return (Air-Spring) Torque Chart

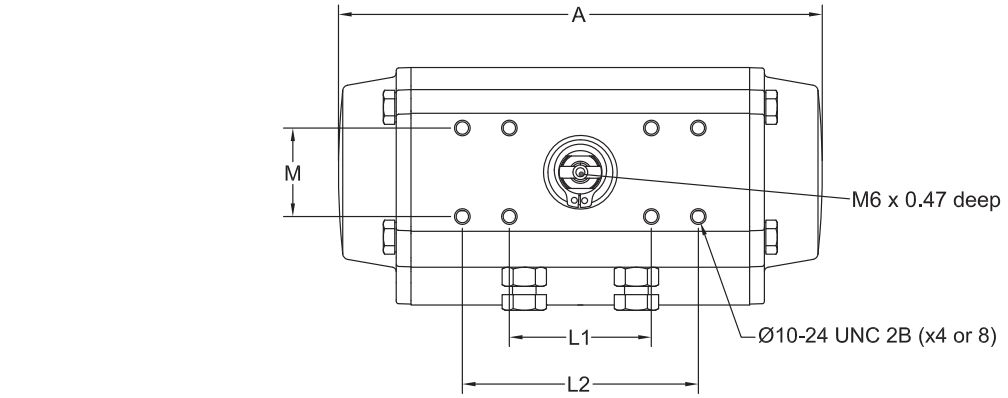
Model	Spring Set	Spring Stroke (in-lbs)		Air Supply Pressure (PSI)															
				40		50		60		70		80		90		100		115	
				Air Stroke Torque Output (in-lbs)															
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
52	01	44	32	48	23	72	47	95	70										
	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

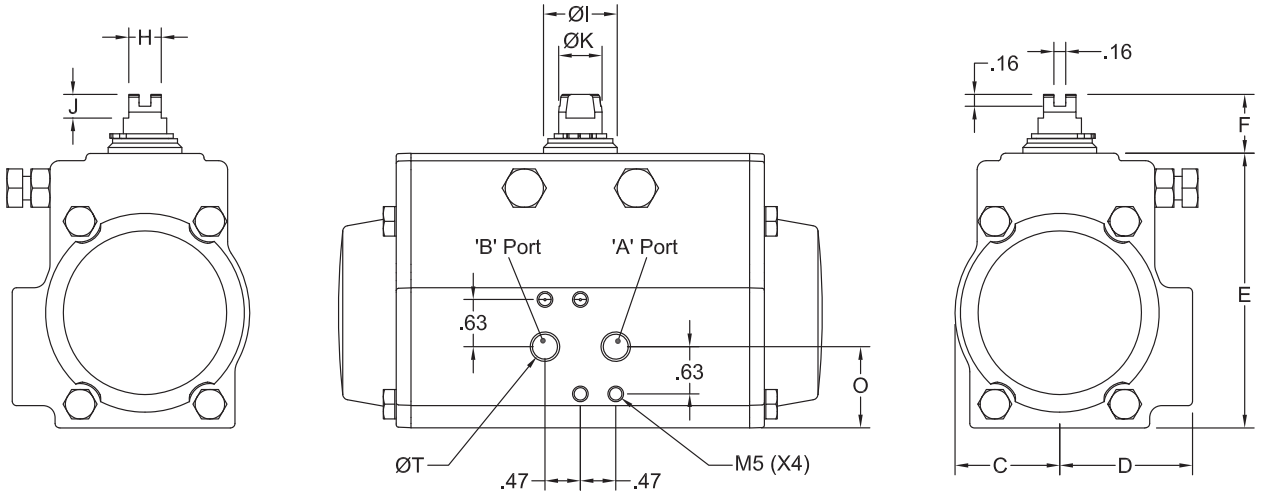
Spring Return (Air-Spring) Torque Chart (continued)

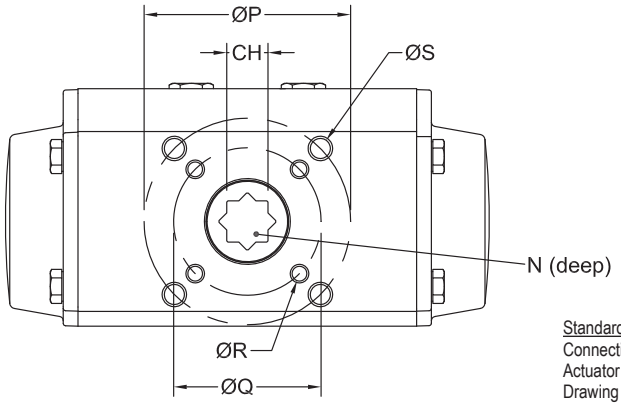
Model	Spring Set	Spring Stroke (in-lbs)		Air Supply Pressure (PSI)															
				40		50		60		70		80		90		100		115	
				Air Stroke Torque Output (in-lbs)															
		Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End	Start	End
100	01	395	218	384	154	556	326	728	499										
	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
330	01	12,143	7,824	12,046	7,452	16,117	11,524	24,260	19,666										
	02	14,577	9,382	10,382	4,868	14,453	8,939	22,596	17,082										
	03	17,002	10,948	8,718	2,292	12,789	6,364	20,932	14,506	29,075	22,649								
	04	19,436	12,515			11,134	3,779	19,277	11,922	27,420	20,065	31,491	24,136						
	05	21,861	14,082					17,613	9,346	25,756	17,489	29,827	21,560	33,898	25,632				
	06	24,295	15,639					15,949	6,762	24,092	14,905	28,163	18,976	32,234	23,047				
	07	26,720	17,206					14,294	4,186	22,437	12,329	26,508	16,400	30,579	20,472	38,713	28,606		
	08	29,154	18,772							20,773	9,745	24,844	13,816	28,915	17,887	37,049	26,021	45,192	34,164

G

Dimensional Drawing - Models 52 to 230



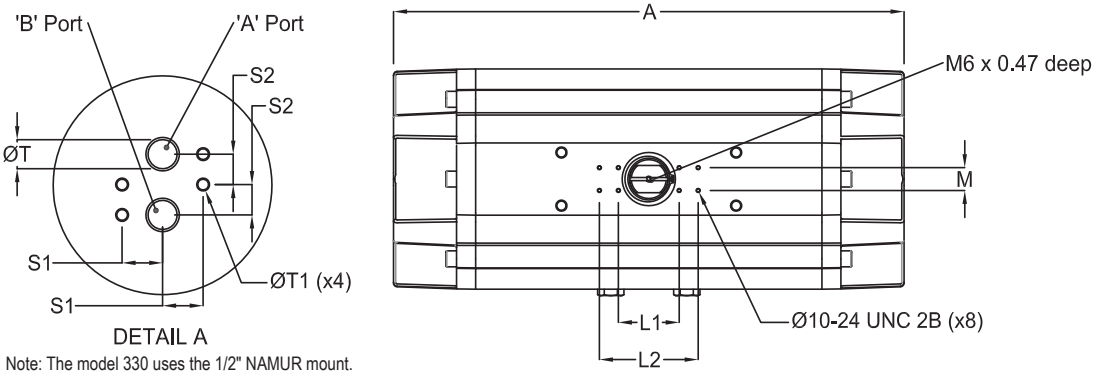




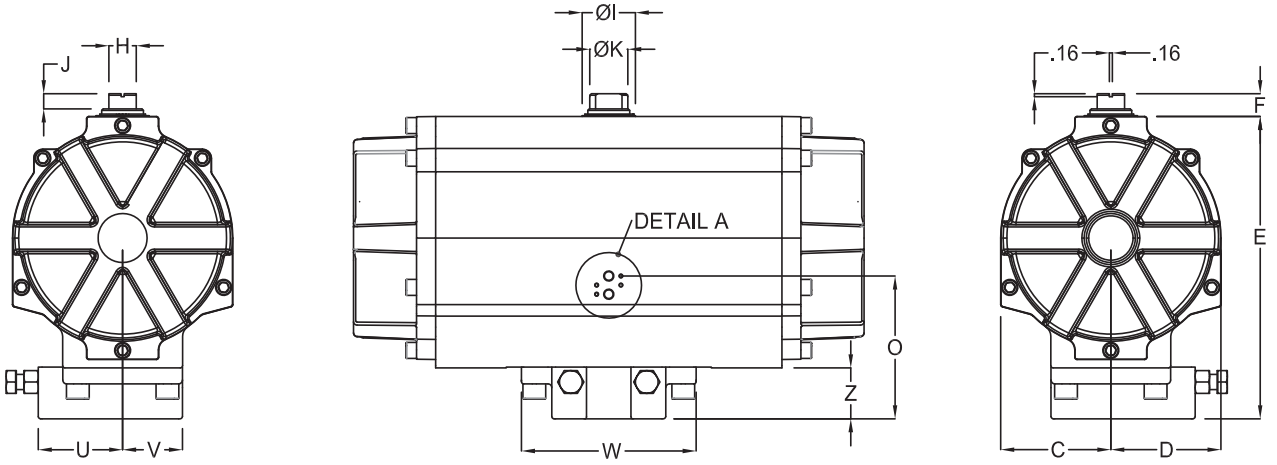
Standard Configuration
Connections: A = CCW Rotation, B = CW Rotation
Actuator shown in the CCW position as viewed from top
Drawing subject to change without notice

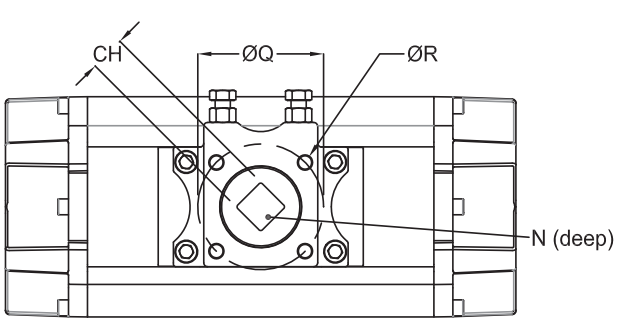
Model	Mtg (ISO 5211)	CH	A	C	D	E	F	H	øI	J	øK	L1	L2	M	N	O	P	Q	R (UNC 2B)	S (UNC 2B)	T (NPT)
52	F03/F05	0.43	5.55	1.18	1.61	3.21	0.79	0.35	0.83	0.31	0.47	3.15		1.18	0.47	1.04	1.97	1.42	10-24	1/4"-20	1/8"
63	F05/F07	0.55	6.46	1.40	1.77	3.66	0.79	0.43	0.98	0.31	0.59	3.15		1.18	0.63	1.08	2.76	1.97	1/4"-20	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 & 330

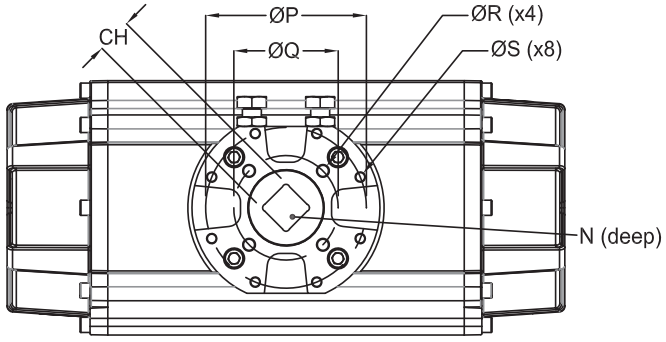


Note: The model 330 uses the 1/2" NAMUR mount.





Model 270



Model 330

Standard Configuration
Connections: A = CCW Rotation, B = CW Rotation
Actuator shown in the CCW position as viewed from top
Drawing subject to change without notice

Model	MTG (ISO 5211)	CH	A	C	D	E	F	H	øI	J	øK	L1	L2	M
270	F16	1.81	26.46	5.71	5.71	15.71	1.18	1.42	2.76	0.79	1.97	3.15	5.12	1.18
330	F16/F25	2.17	34.69	7.90	7.90	19.90	1.97	1.42	4.33	0.79	1.97		5.12	1.18

Model	N	O	P	Q	R (UNC 2B)	S (UNC 2B)	S1	S2	T (NPT)	øT1	U	V	W	Z
270	1.97	7.40		6.50	3/4"-10		0.63	0.47	1/4"	M5	4.37	3.11	9.06	2.68
330	2.44	11.14	10.00	6.50	3/4"-10	5/8"-11	0.89	0.79	1/2"	M6	5.06	5.31	11.69	3.74

G

Weight (Pounds)

Model	52	63	75	85	100	115	125	140	160	180	200	230	270	330
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	381.40
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	443.13

Air Consumption Per Stroke (Cubic Inches)

Model	52	63	75	85	100	115	125	140	160	180	200	230	270	330
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	1556.11
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	2697.25

Stroke Speed (Seconds)*

Model		52	63	75	85	100	115	125	140	160	180	200	230	270	330
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	7.30
	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	8.20
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	8.70
	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	9.65

* 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 affect on overall stroke speed.

Temperature Ranges

Configuration	Working Temperature
Standard	-4°F to 185°F (-20°C to 85°C)
High Temp.	-4°F to 302°F (-20°C to 150°C)
Low Temp.	-40°F 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

MODEL

52 63 75 85 100 115 125 140 160 180 200 230 270 330

FINISH

A = Anodized Aluminum (with polyester powder coated end caps)
N = Nickel Plated (with nickel plated end caps)

ACTION

DA = Double Acting
SR = Spring Return

Note: 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.

G

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

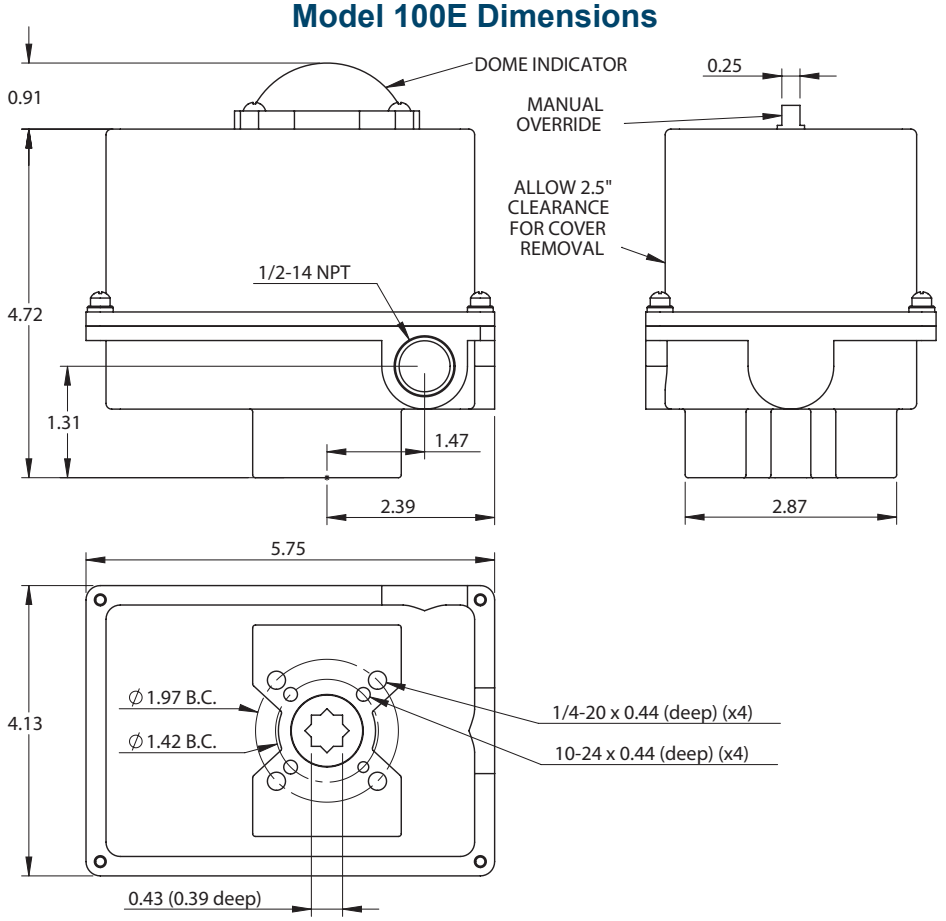
- -40°F (with Standard Heater Activated) to 140° Temperature Range
- CSA Certified Enclosure Conforms to Nema 1, 2, 3, 3R, 4, 4X and 12
- Motor Thermal Overload Protection
- Dual 1/2" NPT Conduit Entries
- Heater & Thermostat
- Hardened Steel Spur Gear and Output Drive
- Captive Hex Head Enclosure Fasteners
- ISO Standard Bolting and Drive Dimensions
- Declutching Manual Override with Indicator
- Permanently Lubricated
- Mountable in Any Position
- Polyester Coated

G

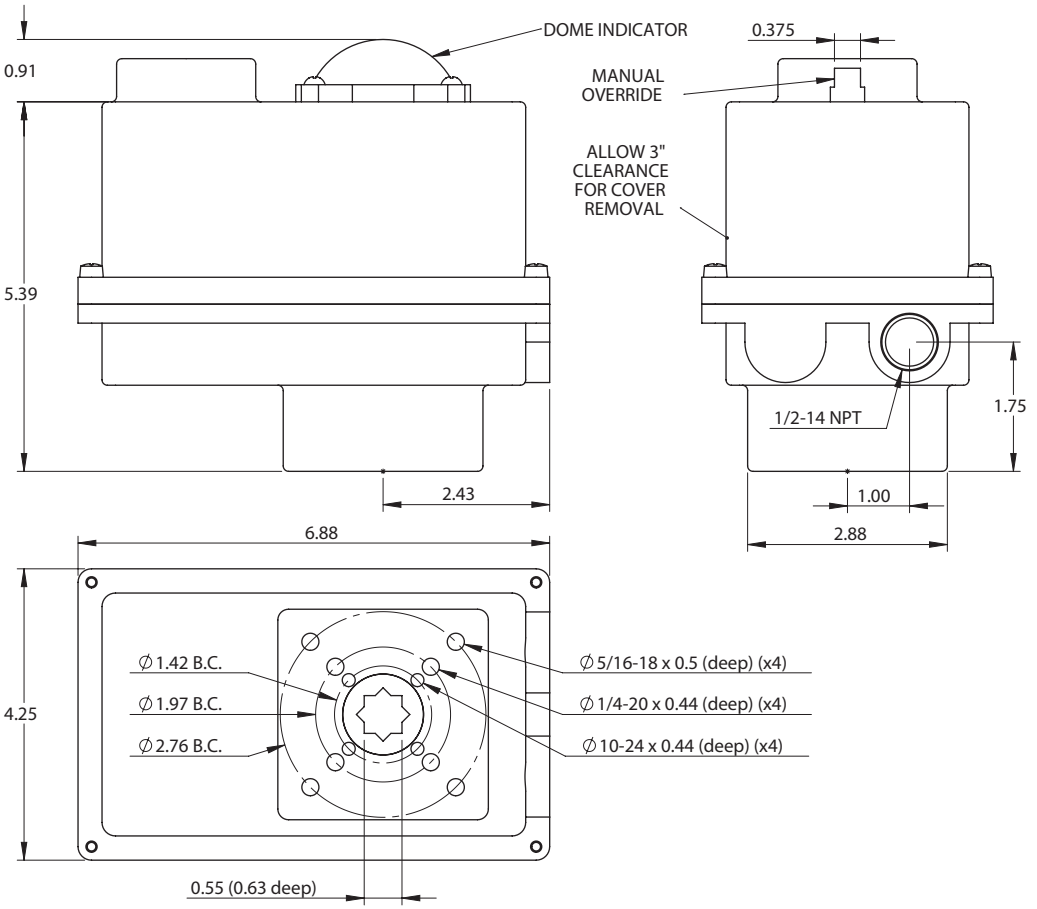
Standard Specifications

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

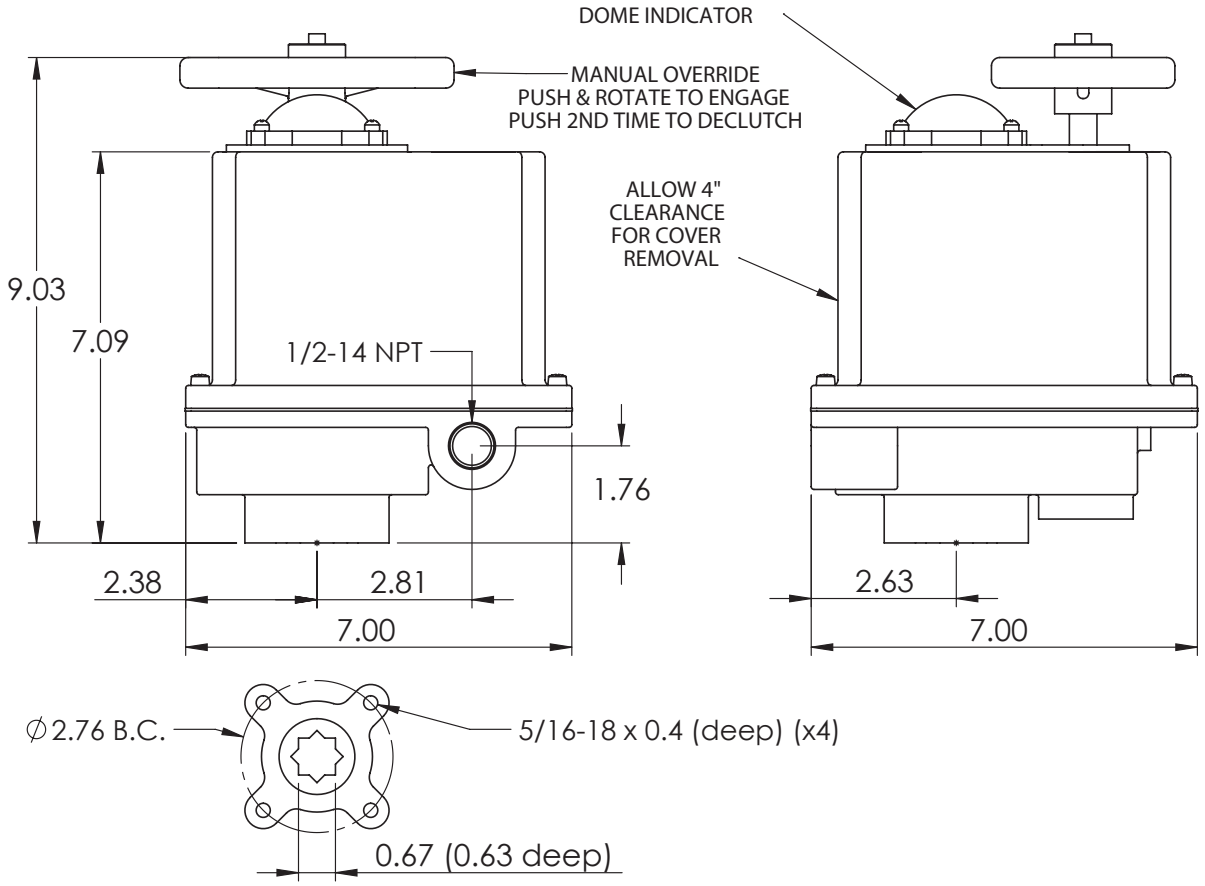


Model 200E & 300E Dimensions

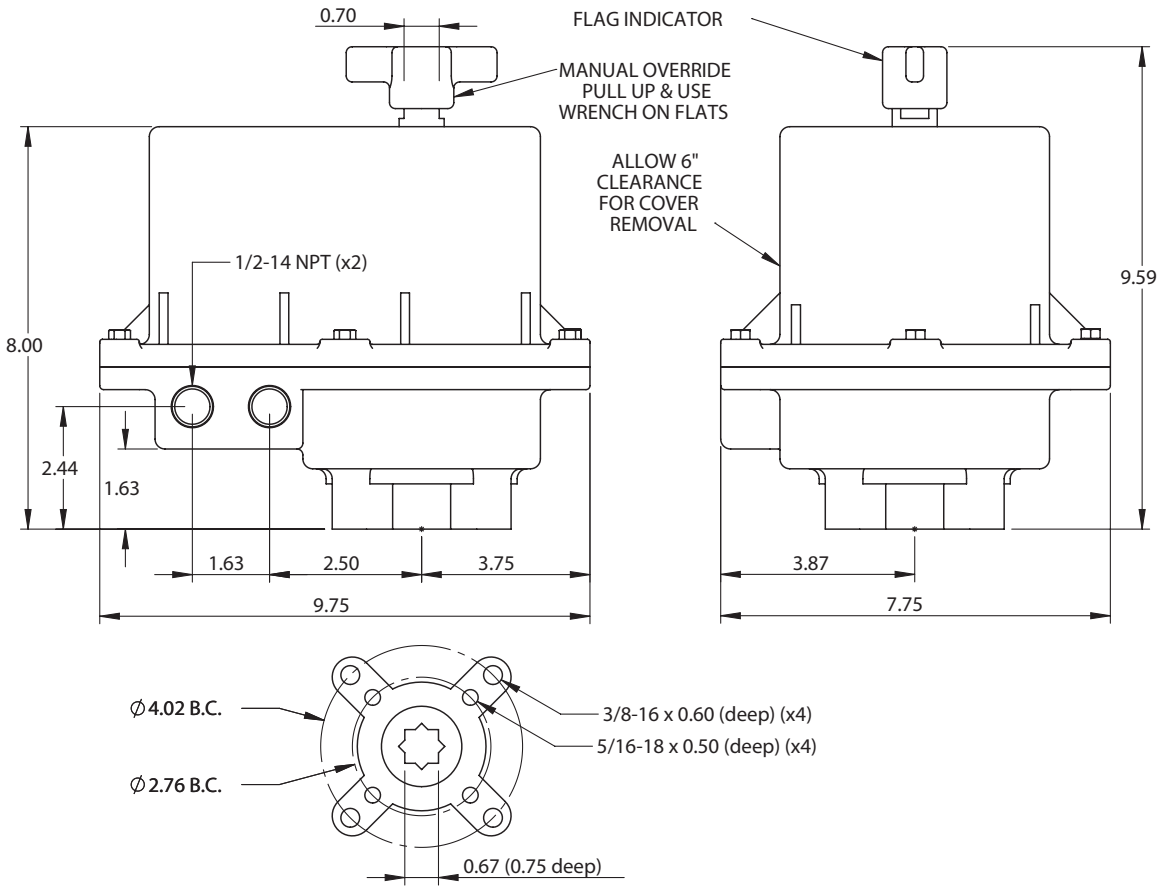


G

Model 400E Dimensions

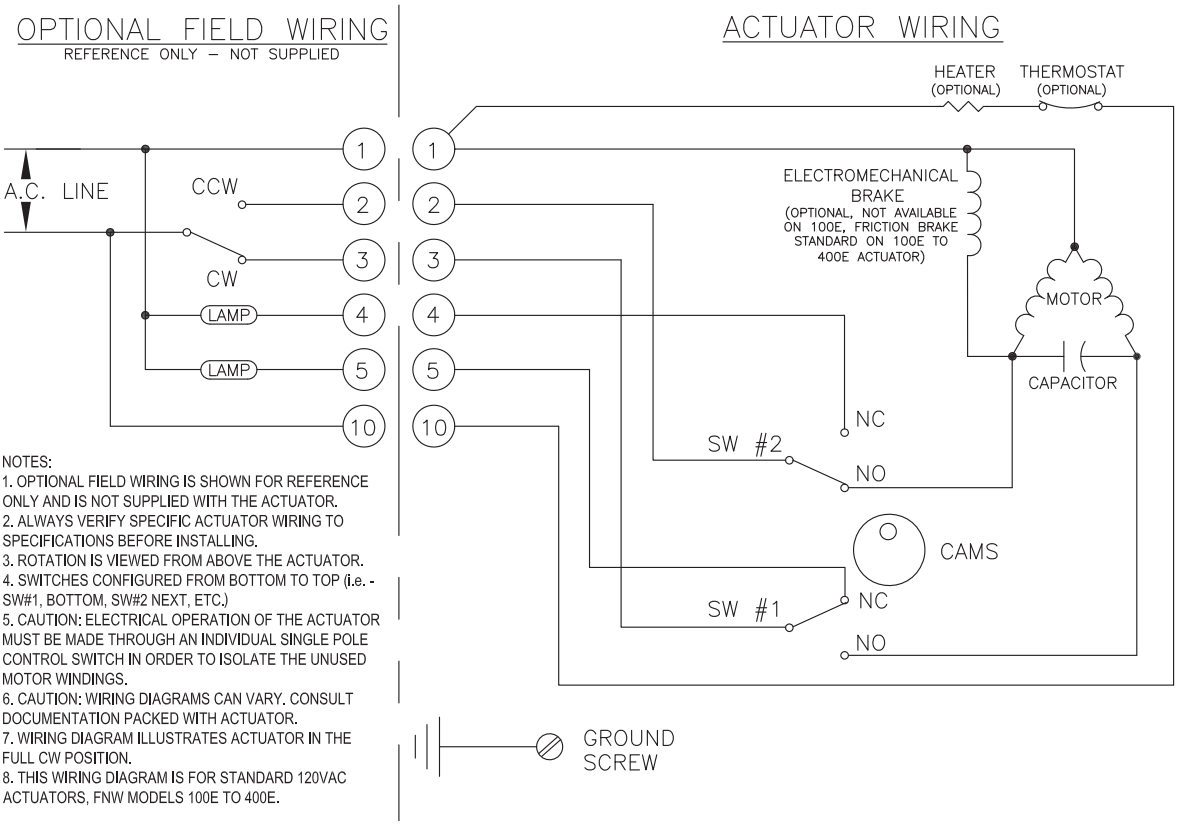


Model 600E to 1600E Dimensions



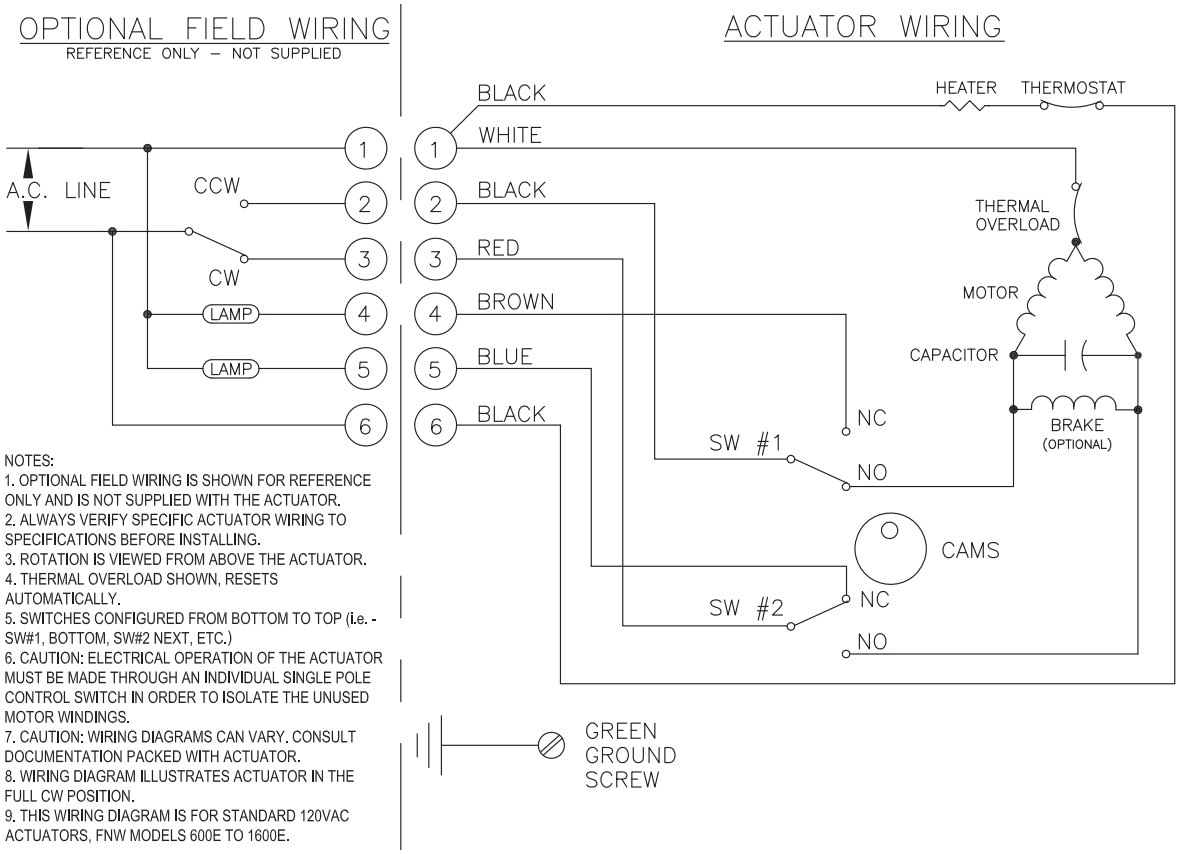
G

Model 100E to 400E Standard Wiring Diagram



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.

Model 600E to 1600E Standard Wiring Diagram



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.

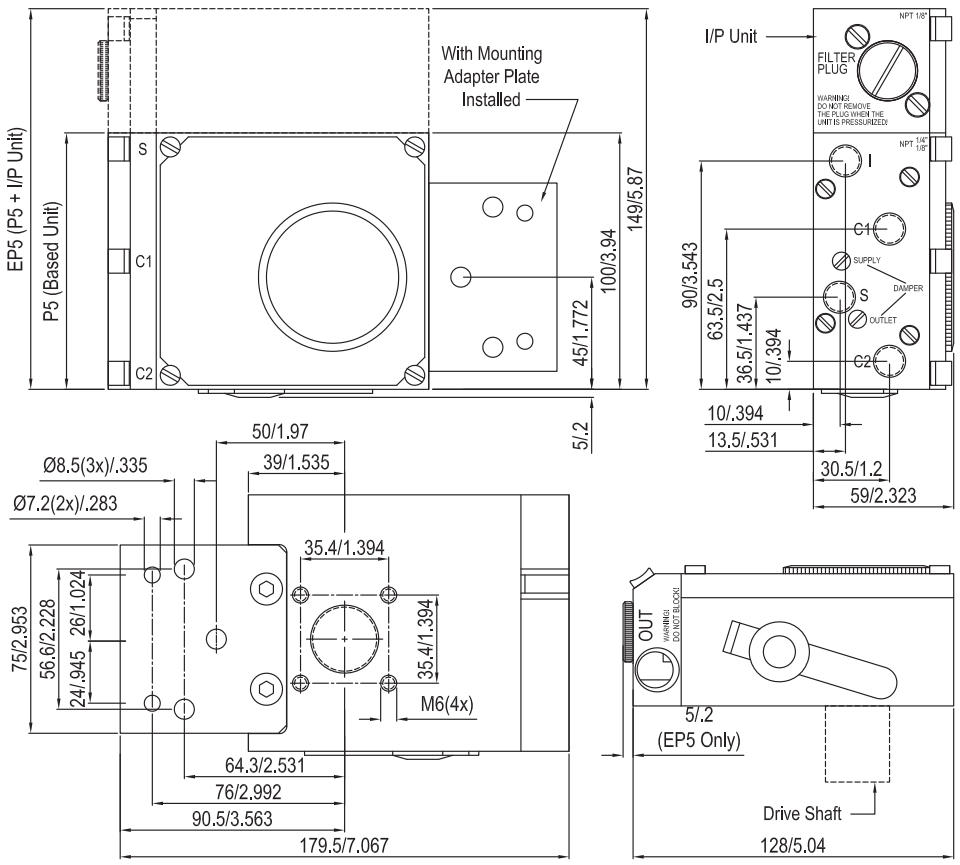
PMV P5 & EP5 POSITIONERS

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 postioner configurations such as low temp (-40ºF/-40ºC), 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



G

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	-4ºF to 185ºF (-20ºC to 85ºC)	
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 71ºF (20ºC)
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

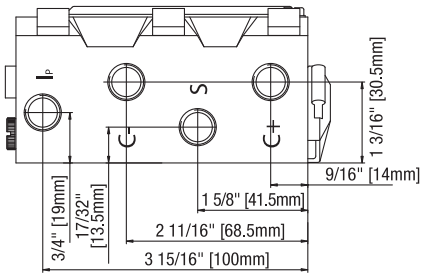
VAC V100P & V100E POSITIONERS

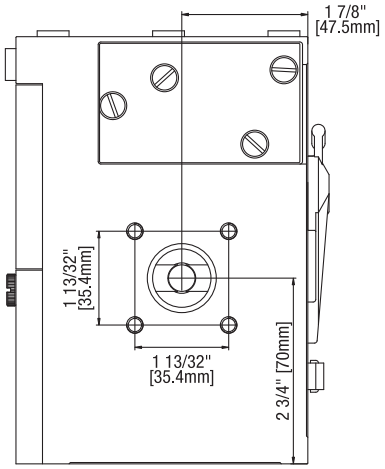
The V100 series positioner is available in pneumatic or electro-pneumatic configurations. The durable, modular design and wide assortment of options for the V100 makes the positioner easy to field convert in a matter of minutes.

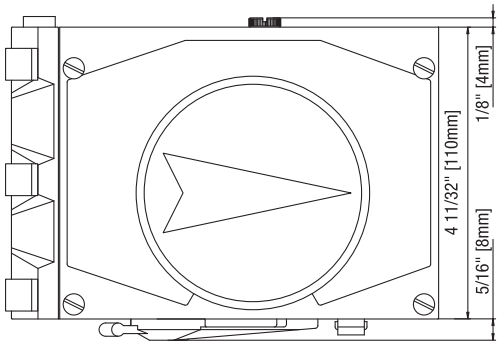
FNW supplies pneumatic and electro-pneumatic positioners for both quarter-turn and linear actuators. Contact FNW for optional postioner configurations such as explosion-proof, intrinsically safe, reverse acting, feedback units, gauge kits and characterized cams including split range, equal percent, and square root degree combinations.

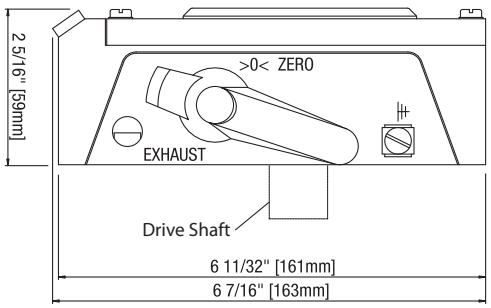
Features:

- 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









G

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)	
Blead 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	-40ºF to 185ºF (-40ºC to 85ºC)	
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 / NEMA 4X	
Mounting Pad	F05	
Drive Spindle	NAMUR	

* Percent of full scale

G

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

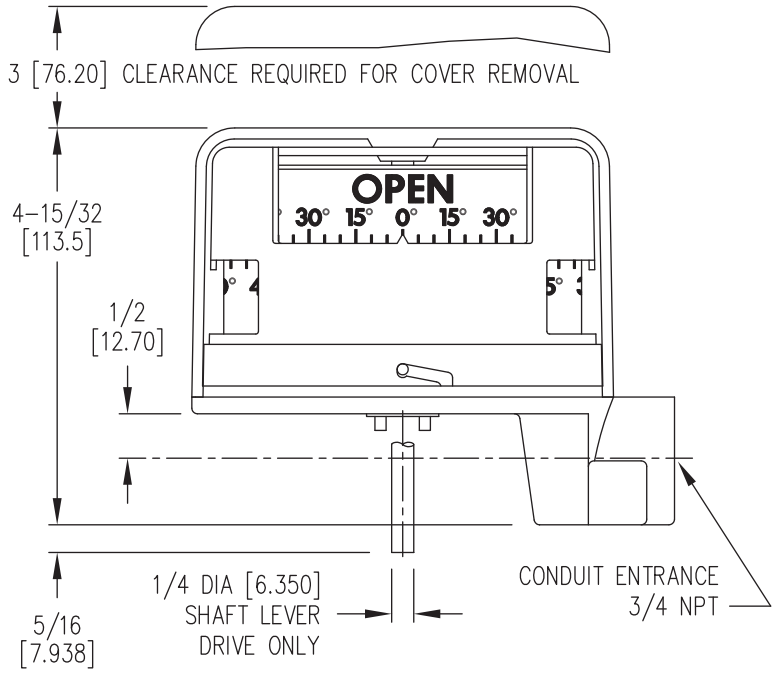
c UL us LISTED

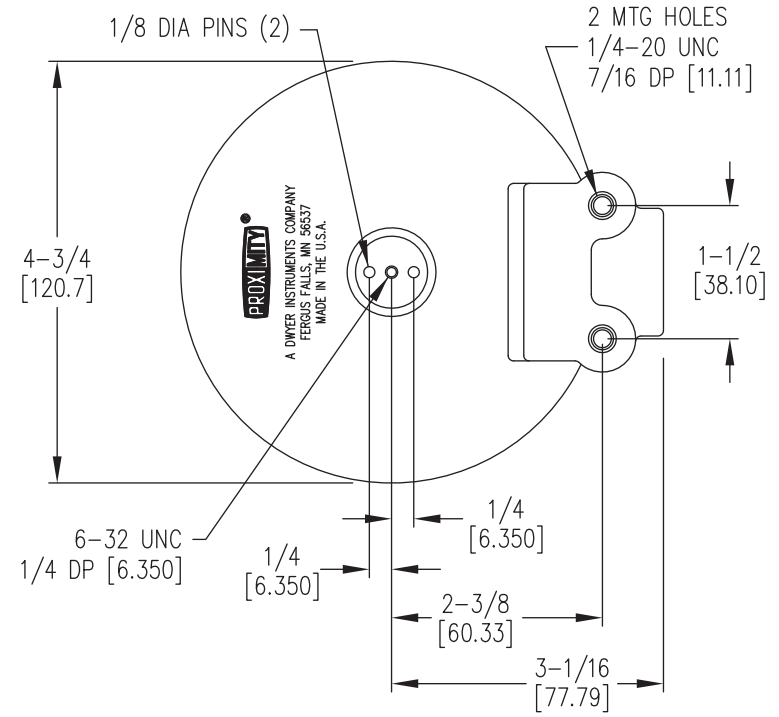
G

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, Groups 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





G

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, 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:

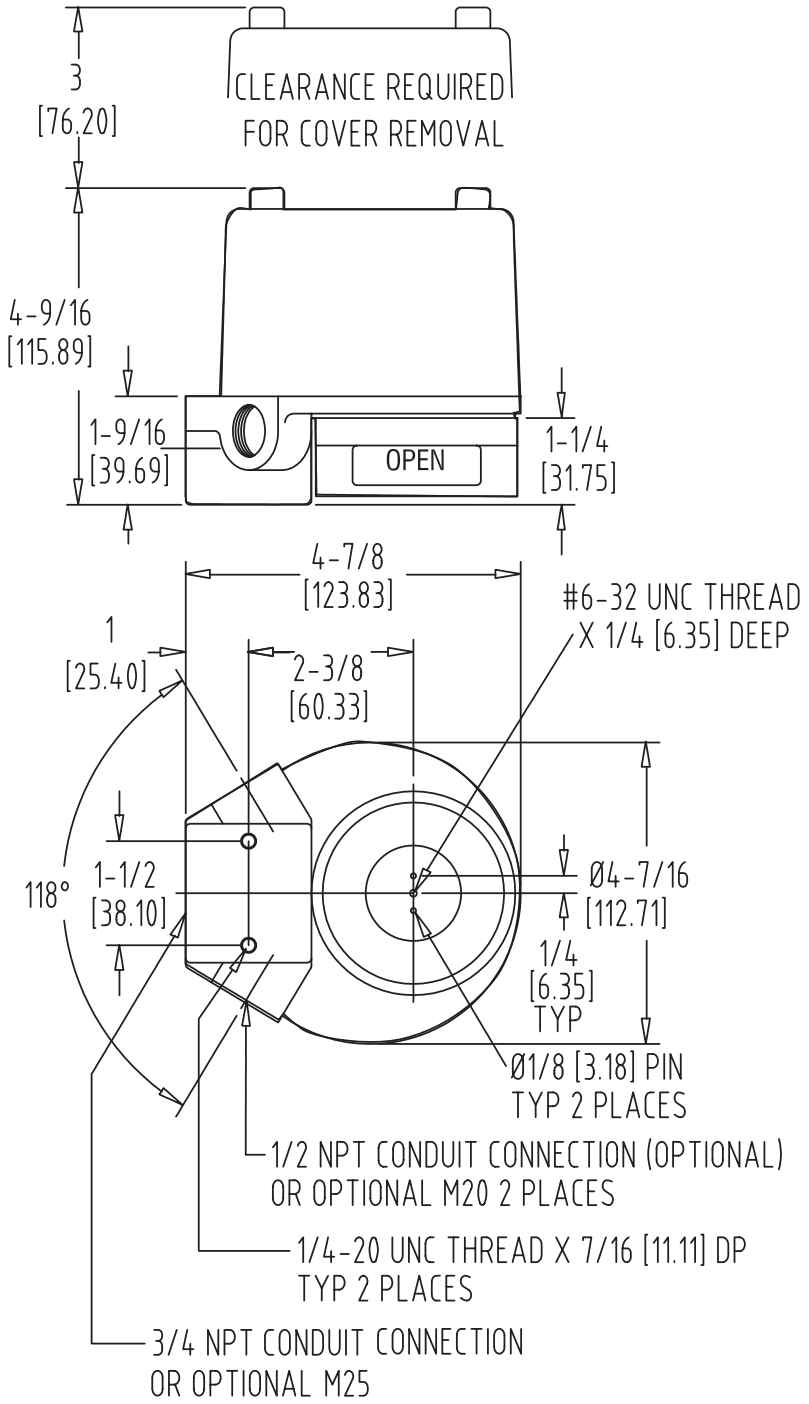
- Rotary and Linear Valves and Actuators
- Manual Valves
- Gear Operators
- Positioners

G

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, Groups C&D; Class II, Groups E, F&G
Maximum Altitude	6560 Ft. (2000m)
Agency Approvals	CSA, UL
Weight	4 to 6 lbs

MARK 4 QUARTER-TURN POSITION INDICATION SWITCH



G

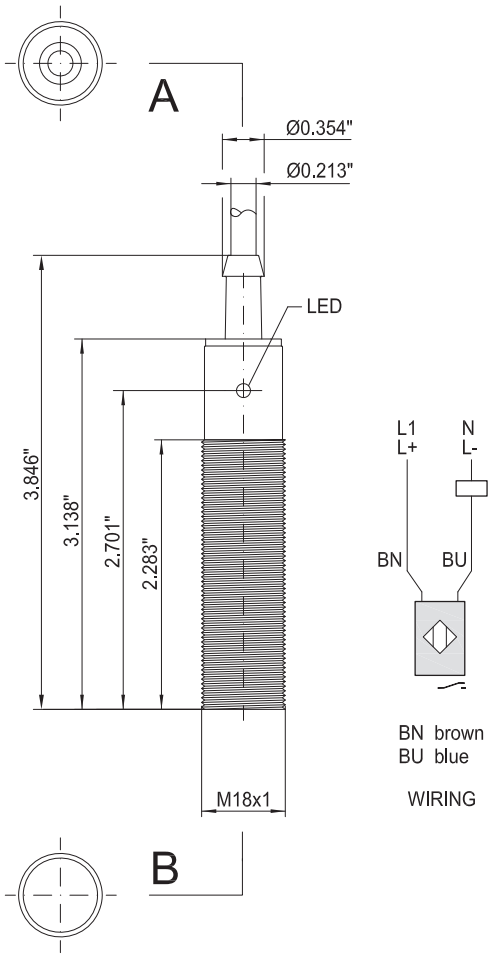
PLS4 (EFECTOR IG0330)
INDUCTIVE PROXIMITY SWITCH

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

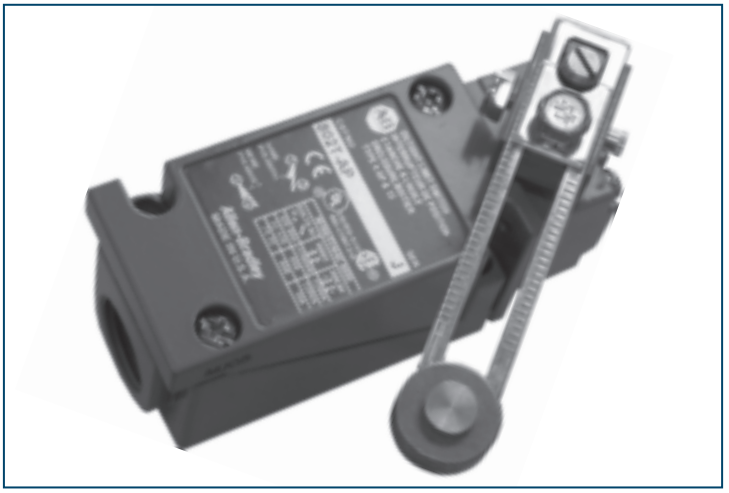


G

MLS4 (ALLEN-BRADLEY 802T-AP) MECHANICAL SWITCH

Features:

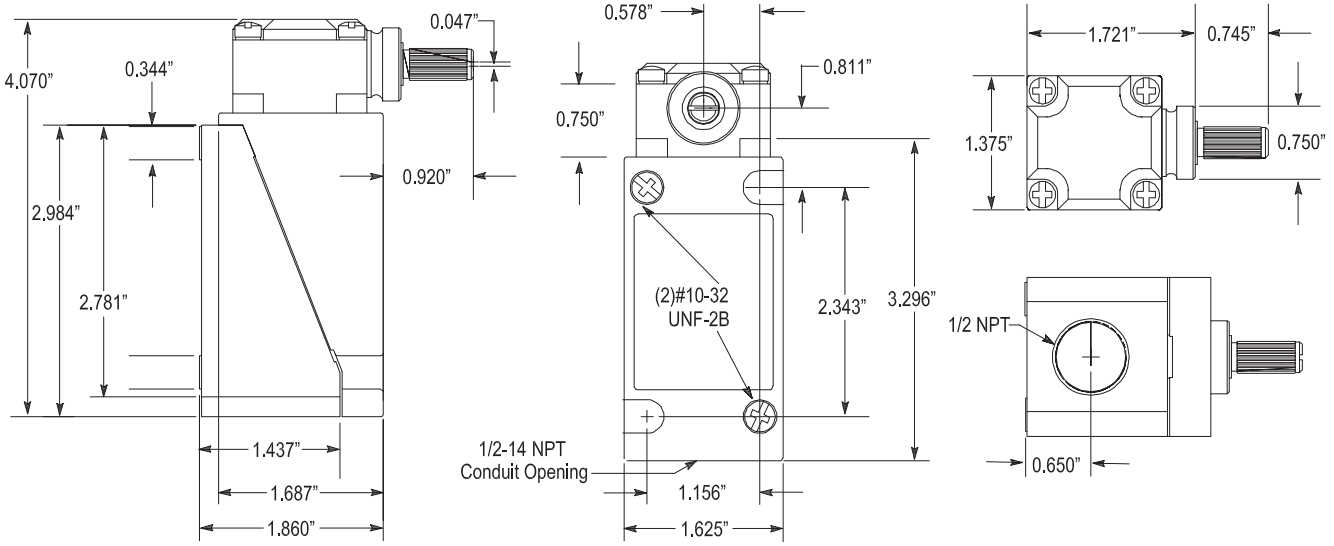
Produced by Allen-Bradley, the FNW MLS4 mechanical limit switch is a heavy duty, ruggedly designed switch for industrial applications. Primarily used for position indication on knife gate and wedge gate valves, FNW can custom mount one or more MLS4's for your control needs. Additional configurations 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-lbs 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 (in.)*	Orifice Size (in.)*	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

G

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 (in.)	Orifice Size (in.)	Cv Flow Factor	Pilot Pressure (PSI) Maximum AC			Max Fluid Temp. (°F)	Ambient Temp. Range (°F)		Standard Coil and Class of Insulation	Watt Rating and Power Consumption (AC)			Enclosure
				Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	Min	Max		AC Watts	VA Holding	VA Inrush	
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 (in.)	Orifice Size (in.)	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										
			Press.	Exh.		Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	Min	Max		Watts	VA Holding	VA Inrush	
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 and unrestricted. Flow controls and other similar components must be installed in the cylinder lines only.

ASCO 8345

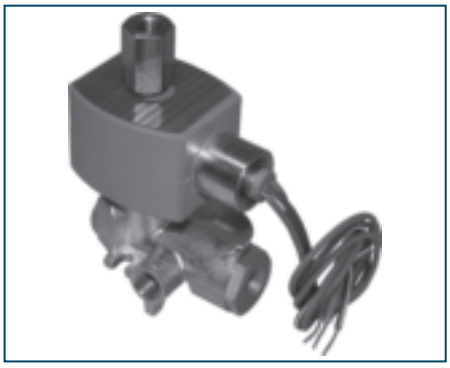
G

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 (in.)	Orifice Size (in.)		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										
		Press.	Exh.	Press.	Exh.		Air-Inert Gas	Water	Lt. Oil @ 300 SSU	AC	Min	Max		Watts	VA Holding	VA Inrush	
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 and unrestricted. Flow controls and other similar components must be installed in the cylinder lines only.

NOTES

PIPING PRODUCTS

FLANGE ACCESSORIES

Figure	Description	Page
B7	B7 stud bolt set with grade 2H heavy hex nuts	247
B7K	B7 stud bolt pre-packaged flange kit	249
LBB	Bolt pack for lugged butterfly valves carbon steel	251
NBSG5	Flange nut & bolt set, carbon steel, grade 5	252
NBSS	Flange nut & bolt set, stainless steel	253
NBSZ	Flange nut & bolt set, carbon steel, grade 2	254
WBB	Nut & bolt pack for wafer butterfly valves, carbon steel	255
72/73	Back-up flange, ductile iron, stub end & angle face ring	256
CBI	Bolt insulator	258
NBG (NA & Z)	Nut/bolt/gasket kit, non-asbestos & zinc plated carbon steel for 150# & 300# flanges	259
NBG (NE & SS)	Nut/bolt/gasket kit, neoprene & stainless steel for 150# flanges	261
NBG (R & SS)	Nut/bolt/gasket kit, red rubber & stainless steel for 150# flanges	262
NBG (R & Z)	Nut/bolt/gasket kit, red rubber & zinc plated carbon steel for 150# flanges	263
NA	Non-asbestos gasket, full face or ring for 150# & 300# flanges	265
NE	Neoprene gasket, full face for 150# flanges	266
R	Red rubber gasket, full face or ring for 150# flanges	267
SWG	Spiral-wound gasket for 150# and 300# flanges	268

WATER CONTROL

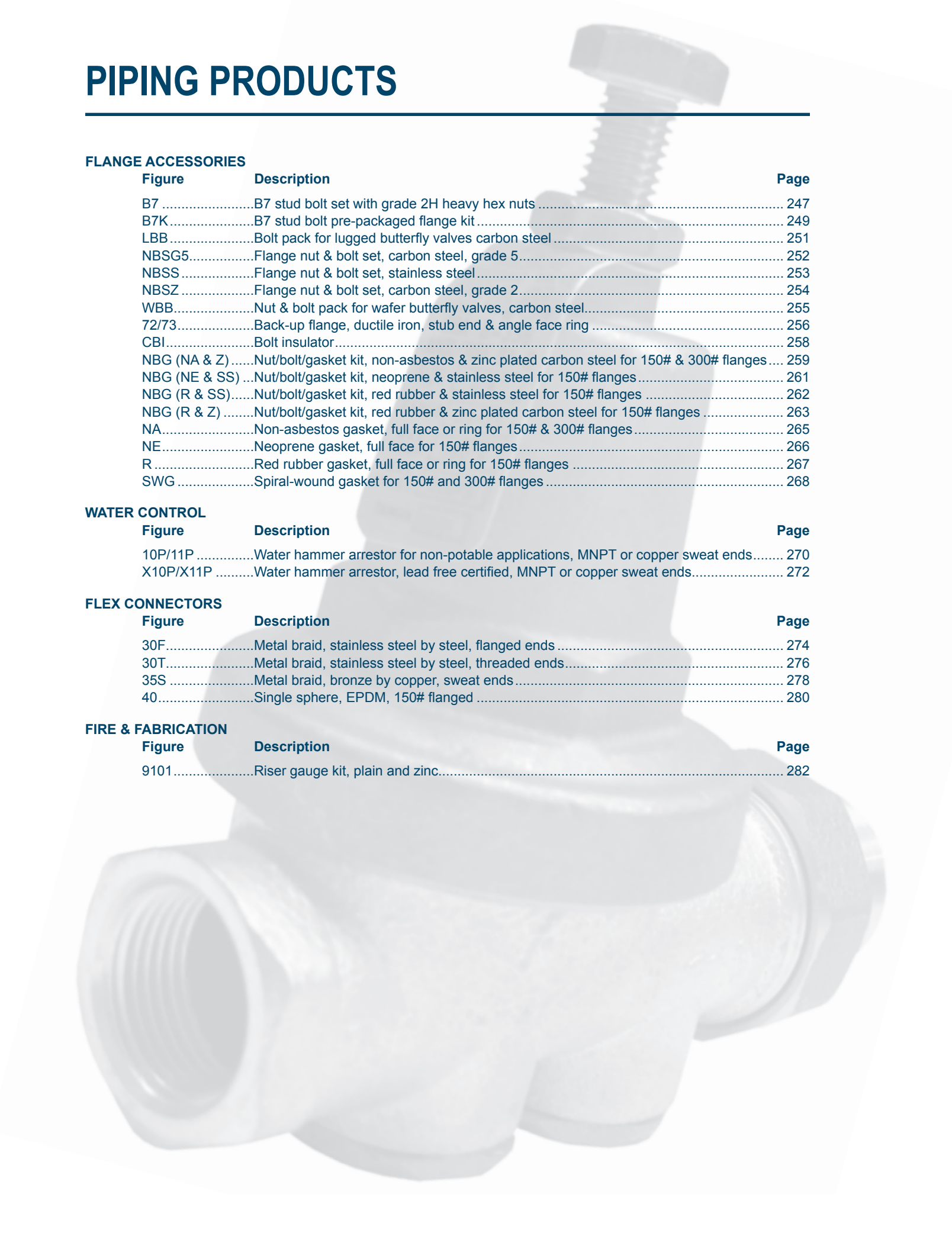
Figure	Description	Page
10P/11P	Water hammer arrestor for non-potable applications, MNPT or copper sweat ends	270
X10P/X11P	Water hammer arrestor, lead free certified, MNPT or copper sweat ends	272

FLEX CONNECTORS

Figure	Description	Page
30F	Metal braid, stainless steel by steel, flanged ends	274
30T	Metal braid, stainless steel by steel, threaded ends	276
35S	Metal braid, bronze by copper, sweat ends	278
40	Single sphere, EPDM, 150# flanged	280

FIRE & FABRICATION

Figure	Description	Page
9101	Riser gauge kit, plain and zinc	282



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)*

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.

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

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.

H

B7 STUD BOLT WITH GRADE 2H HEAVY HEX NUTS ASSEMBLED

Part Numbers & Dimensions

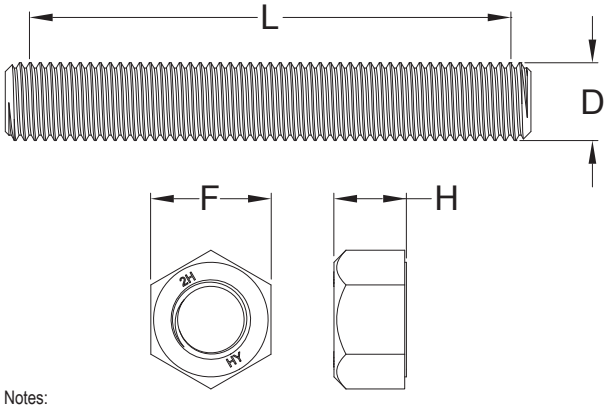
Part Numbers	D (inch) (UNC)*	L (inch)	F (inch)	H (inch)	Weight Per Set (lbs)	Box Qty
FNWB7D050L0250	1/2 - 13	2-1/2	7/8	31/64	0.25	100
FNWB7D050L0275		2-3/4			0.27	100
FNWB7D050L0300		3			0.28	96
FNWB7D062L0300	5/8 - 11	3	1-1/16	39/64	0.47	54
FNWB7D062L0325		3-1/4			0.49	54
FNWB7D062L0350		3-1/2			0.50	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.

H

B7 STUD BOLT
PRE-PACKAGED FLANGE KITS

Features

- Material Test Reports (MTRs) in the Box
- Pre-package kits for ANSI class 150# and 300# Flanges
- Bagged & Packed in Double-Walled Strapped Cartons
- 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 - 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 Studs and Nuts
- Studs and Nuts are Heat Code Traceable*
- Stud and Nut Sets are Lot Number Traceable*

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

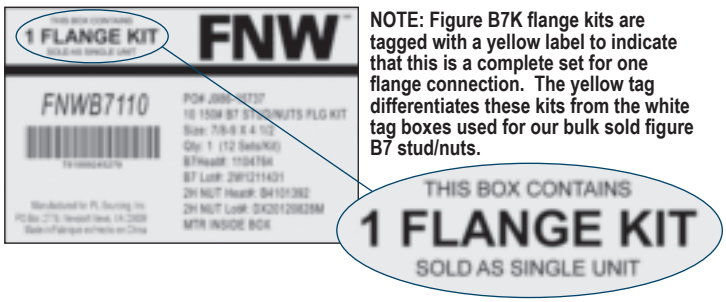
- Studs:
  - Material & Mechanical Properties: ASTM A193 Grade B7
  - Threads: ASME B1.1, UNC or UN8, Class 2A
- Nuts:
  - Material & Mechanical Properties: ASTM A194 Grade 2H
  - Dimensions: ASME B18.2.2

* Heat codes and lot numbers are listed on box labels. MTRs are included in each kit.

Figure Number Matrix

FNW B7K 1 X

FLANGE CLASS	FLANGE SIZE	
1 = 150#	1/2" = D	3" = M
3 = 300#	3/4" = F	4" = P
	1" = G	5" = S
	1-1/4" = H	6" = U
	1-1/2" = J	8" = X
	2" = K	10" = 10
	2-1/2" = L	12" = 12

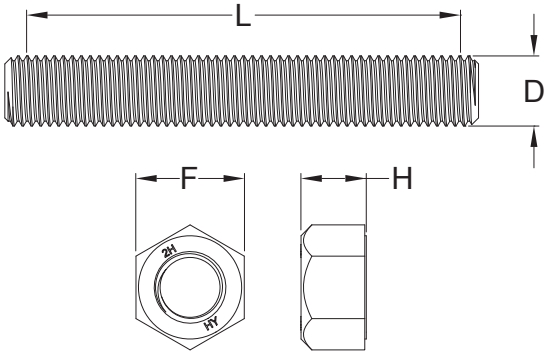


NOTE: Figure B7K flange kits are tagged with a yellow label to indicate that this is a complete set for one flange connection. The yellow tag differentiates these kits from the white tag boxes used for our bulk sold figure B7 stud/nuts.

B7 STUD BOLT
PRE-PACKAGED FLANGE KITS

Part Numbers & Dimensions

Flange Size	150#						
	Part Number	D (inch) (UNC)	L (inch)	F (inch)	H (inch)	Qty/ Kit	Wt. (lbs)
1/2	FNWB7K1D	1/2 - 13	2-1/2	7/8	31/64	4	1.07
3/4	FNWB7K1F	1/2 - 13	2-1/2	7/8	31/64	4	1.07
1	FNWB7K1G	1/2 - 13	2-1/2	7/8	31/64	4	1.07
1-1/4	FNWB7K1H	1/2 - 13	2-3/4	7/8	31/64	4	1.12
1-1/2	FNWB7K1J	1/2 - 13	3	7/8	31/64	4	1.16
2	FNWB7K1K	5/8 - 11	3-1/4	1-1/16	39/64	4	2.04
2-1/2	FNWB7K1L	5/8 - 11	3-1/2	1-1/16	39/64	4	2.11
3	FNWB7K1M	5/8 - 11	3-1/2	1-1/16	39/64	4	2.11
4	FNWB7K1P	5/8 - 11	3-3/4	1-1/16	39/64	8	4.37
5	FNWB7K1S	3/4 - 10	3-3/4	1-1/4	47/64	8	6.72
6	FNWB7K1U	3/4 - 10	4	1-1/4	47/64	8	6.93
8	FNWB7K1X	3/4 - 10	4-1/4	1-1/4	47/64	8	7.15
10	FNWB7K110	7/8 - 9	4-1/2	1-7/16	55/64	12	15.98
12	FNWB7K112	7/8 - 9	4-3/4	1-7/16	55/64	12	16.43



Notes:

1. Diameters (D) up to and including 1" are UNC, Class 2A, per ASME B1.1.
2. Diameters (D) 1-1/8" 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.

Flange Size	300#						
	Part Number	D (inch) (UNC)*	L (inch)	F (inch)	H (inch)	Qty/ Kit	Wt. (lbs)
1/2	FNWB7K3D	1/2 - 13	2-1/2	7/8	31/64	4	1.07
3/4	FNWB7K3F	5/8 - 11	3	1-1/16	39/64	4	1.96
1	FNWB7K3G	5/8 - 11	3	1-1/16	39/64	4	1.96
1-1/4	FNWB7K3H	5/8 - 11	3-1/4	1-1/16	39/64	4	2.04
1-1/2	FNWB7K3J	3/4 - 10	3-1/2	1-1/4	47/64	4	3.25
2	FNWB7K3K	5/8 - 11	3-1/2	1-1/16	39/64	8	4.22
2-1/2	FNWB7K3L	3/4 - 10	4	1-1/4	47/64	8	6.93
3	FNWB7K3M	3/4 - 10	4-1/4	1-1/4	47/64	8	7.15
4	FNWB7K3P	3/4 - 10	4-1/2	1-1/4	47/64	8	7.37
5	FNWB7K3S	3/4 - 10	4-3/4	1-1/4	47/64	8	7.52
6	FNWB7K3U	3/4 - 10	4-3/4	1-1/4	47/64	12	11.28
8	FNWB7K3X	7/8 - 9	5-1/2	1-7/16	55/64	12	17.77
10	FNWB7K310	1 - 8	6-1/2	1-5/8	63/64	16	35.33
12	FNWB7K312	1-1/8 - 8	6-3/4	1-13/16	1-7/64	16	48.12

*** Diameters 1-1/8" and larger are UN8**

FNW™

LUGGED BUTTERFLY VALVE BOLT PACKS

Features

- For 150# Flanges
- Pack Quantity for Two Flanges (One Butterfly Valve)
- Material: Carbon Steel
- Finish: Zinc Plated
- Sizes: 2" to 24"

Standards

- Material: ASTM A307A Grade A
- Dimensions: ASME B18.2.1
- Thread: Class 2A

Specifications

- Tensile: 60 KSI Minimum
- Elongation: 18% Minimum
- Hardness: 69 - 100 Rb

Figure Number Matrix

FNW LBB Z 1 Size

FINISH	FLANGE	SIZE CODE	
Zinc = Z	150# = 1	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

Pack Quantities & Bolt Sizes (inches)

Size	Bolt Qty	Diameter	Bolt Length
2	8	5/8-11	1-1/2
2-1/2	8	5/8-11	1-3/4
3	8	5/8-11	1-3/4
4	16	5/8-11	1-3/4
5	16	3/4-10	2
6	16	3/4-10	2
8	16	3/4-10	2-1/4
10	24	7/8-9	2-1/2
12	24	7/8-9	2-3/4
14	24	1-8	2-3/4
16	32	1-8	3-1/4
18	32	1-1/8-7	3-1/2
20	40	1-1/8-7	4
24	40	1-1/4-7	4-3/4

CARBON STEEL FLANGE NUT & BOLT SET SAE J429 GRADE 5 / SAE J995 GRADE 5

Features

- For ANSI 150# Flanges
- Lengths for Joining Two Flanges*
- Material: Carbon Steel
- Finish: Zinc Plated
- Sizes: 1/2" to 12"

Standards

- Cap Screws:
  - Material - SAE J429 Grade 5
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts:
  - Material - SAE J995 Grade 5
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Cap Screw Properties

- Minimum Proof Strength: 85 KSI
- Minimum Yield Strength: 92 KSI
- Tensile: 120 KSI Minimum
- Hardness: C25 - C34

*** Based on 1/16" raised face and 1/8" gasket**

H

Figure Number Matrix

FNW NBSG5 Z 1 Size

FINISH	FLANGE	SIZE CODE	
Zinc = Z	150# = 1	1/2 = D	3 = M
		3/4 = F	4 = P
		1 = G	5 = S
		1-1/4 = H	6 = U
		1-1/2 = J	8 = X
		2 = K	10 = 10
		2-1/2 = L	12 = 12

Pack Quantities & Screw Sizes (inches)

Size	Bolt Qty	Nut Qty	Diameter	Bolt Length
1/2	4	4	1/2-13	2
3/4	4	4	1/2-13	2
1	4	4	1/2-13	2-1/4
1-1/4	4	4	1/2-13	2-1/4
1-1/2	4	4	1/2-13	2-1/2
2	4	4	5/8-11	2-3/4
2-1/2	4	4	5/8-11	3
3	4	4	5/8-11	3
4	8	8	5/8-11	3
5	8	8	3/4-10	3-1/4
6	8	8	3/4-10	3-1/4
8	8	8	3/4-10	3-1/2
10	12	12	7/8-9	4
12	12	12	7/8-9	4

STAINLESS STEEL FLANGE NUT & BOLT SET
ASTM F593 / ASTM F594

Features

- For ANSI 150# Flanges
- Lengths for Joining Two Flanges*
- Material: 304 & 316 Stainless Steel
- Finish: Material Finish
- Sizes: 1/2" to 12"

Standards

- Cap Screws:
  - Material - ASTM F593 Grp 1 (304) or 2 (316)
  - Heat Treatment: Condition CW
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts:
  - Material - ASTM F594 Grp 1 (304) or 2 (316)
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Cap Screw Properties

- 1/4" to 5/8":
  - Tensile - 100 to 150 KSI
  - Hardness - B95 to C32
  - Yield - 65 KSI
- 3/4" to 7/8":
  - Tensile - 85 to 140 KSI
  - Hardness - B80 to C32
  - Yield - 45 KSI

*** Based on 1/16" raised face and 1/8" gasket**

H

Figure Number Matrix

FNW NBSS 4 1 Size

MATERIAL	FLANGE	SIZE CODE	
304SS = 4	150# = 1	1/2 = D	3 = M
316SS = 6		3/4 = F	4 = P
		1 = G	5 = S
		1-1/4 = H	6 = U
		1-1/2 = J	8 = X
		2 = K	10 = 10
		2-1/2 = L	12 = 12

Pack Quantities & Screw Sizes (inches)

Size	Bolt Qty	Nut Qty	Diameter	Bolt Length
1/2	4	4	1/2-13	2
3/4	4	4	1/2-13	2
1	4	4	1/2-13	2-1/4
1-1/4	4	4	1/2-13	2-1/4
1-1/2	4	4	1/2-13	2-1/2
2	4	4	5/8-11	2-3/4
2-1/2	4	4	5/8-11	3
3	4	4	5/8-11	3
4	8	8	5/8-11	3
5	8	8	3/4-10	3-1/4
6	8	8	3/4-10	3-1/4
8	8	8	3/4-10	3-1/2
10	12	12	7/8-9	4
12	12	12	7/8-9	4

CARBON STEEL FLANGE NUT & BOLT SET ASTM A307 GRADE A / SAE J995 GRADE 2

Features

- For 150# & 300# ANSI Flanges
- Lengths for Joining Two Flanges*
- Material: Carbon Steel
- Finish: Zinc Plated
- Sizes: 1/2" to 24" (150#), 1/2" to 12" (300#)

Standards

- Bolts:
  - Material - ASTM A307A Grade A
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts:
  - Material - SAE J995 Grade 2
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Bolt Properties

- Tensile: 60 KSI Minimum
- Elongation: 18% Minimum
- Hardness: 69 - 100 Rb

*** Based on 1/16" raised face and 1/8" gasket**

H

Figure Number Matrix

FNW NBS Z 1 Size

FINISH	FLANGE	SIZE CODE	
Zinc = Z	150# = 1	1/2 = D	6 = U
	300# = 3	3/4 = F	8 = X
		1 = G	10 = 10
		1-1/4 = H	12 = 12
		1-1/2 = J	14 = 14
		2 = K	16 = 16
		2-1/2 = L	18 = 18
		3 = M	20 = 20
		4 = P	24 = 24
		5 = S	

Note: 300# sizes are up to 12" only.

Pack Quantities & Bolt Sizes (inches)

Size	Bolt Qty	Nut Qty	Diameter	Bolt Length
1/2	4	4	1/2-13	2
3/4	4	4	1/2-13	2
1	4	4	1/2-13	2-1/4
1-1/4	4	4	1/2-13	2-1/4
1-1/2	4	4	1/2-13	2-1/2
2	4	4	5/8-11	2-3/4
2-1/2	4	4	5/8-11	3
3	4	4	5/8-11	3
4	8	8	5/8-11	3
5	8	8	3/4-10	3-1/4
6	8	8	3/4-10	3-1/4
8	8	8	3/4-10	3-1/2
10	12	12	7/8-9	4
12	12	12	7/8-9	4
14	12	12	1-8	4-1/2
16	16	16	1-8	4-1/2
18	16	16	1-1/8-7	5
20	20	20	1-1/8-7	5-1/2
24	20	20	1-1/4-7	6

FNW™

WAFER BUTTERFLY VALVE NUT & BOLT PACKS

Features

- For 150# Flanges
- Lengths for Two Flanges & One Wafer Butterfly Valve (per API 609 dimensions)
- Material: Carbon Steel
- Finish: Zinc Plated
- Sizes: 2" to 12"

Standards

- Bolts:
  - Material - ASTM A307A Grade A
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts:
  - Material - SAE J995 Grade 2
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Bolt Properties

- Tensile: 60 KSI Minimum
- Elongation: 18% Minimum
- Hardness: 69 - 100 Rb

H

Figure Number Matrix

FNW WBB Z 1 Size

FINISH	FLANGE	SIZE CODE	
Zinc = Z	150# = 1	2 = K	6 = U
		2-1/2 = L	8 = X
		3 = M	10 = 10
		4 = P	12 = 12
		5 = S	

Pack Quantities & Bolt Sizes (inches)

Size	Bolt Qty	Nut Qty	Diameter	Bolt Length
2	4	4	5/8-11	4-1/4
2-1/2	4	4	5/8-11	4-3/4
3	4	4	5/8-11	5
4	8	8	5/8-11	5
5	8	8	3/4-10	5-1/4
6	8	8	3/4-10	5-1/2
8	8	8	3/4-10	6
10	12	12	7/8-9	6-1/2
12	12	12	7/8-9	7

150# IPS DUCTILE IRON BACK-UP FLANGES

Features

- 150# Flange Drilling
- Cast Ductile Iron
- IPS Sizes
- For Ring Types:
  - Stub End SE Type C
  - Angle Face Ring (AFR)
- Finishes:
  - Red Primer Paint
  - Hot Dipped Galvanized
- Ring-side Beveled Inner Diameter
- Back-side Markings Visible When Installed
- Sizes 1 to 24 Inch

Standards

- Material: ASTM A536 grade 65-45-12
- Hardness: ISO 1083
- Finish:
  - 1 mil Minimum (Red Primer)
  - ASTM A123 (Galvanized)

Physical Properties

- Tensile Strength: 65 KSI Minimum
- Yield Strength: 45 KSI Minimum
- Elongation: 12% Minimum
- Hardness: HBW 160-210 (Brinell)

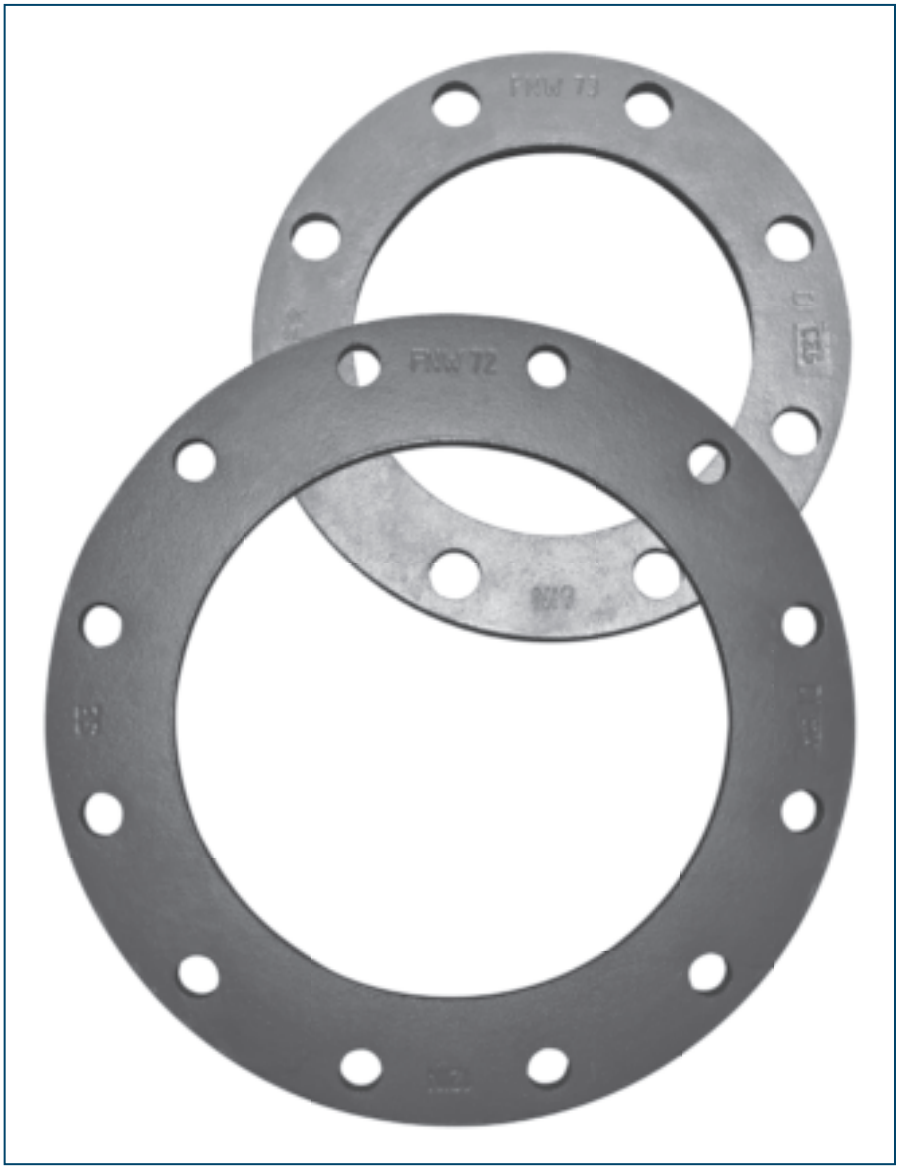
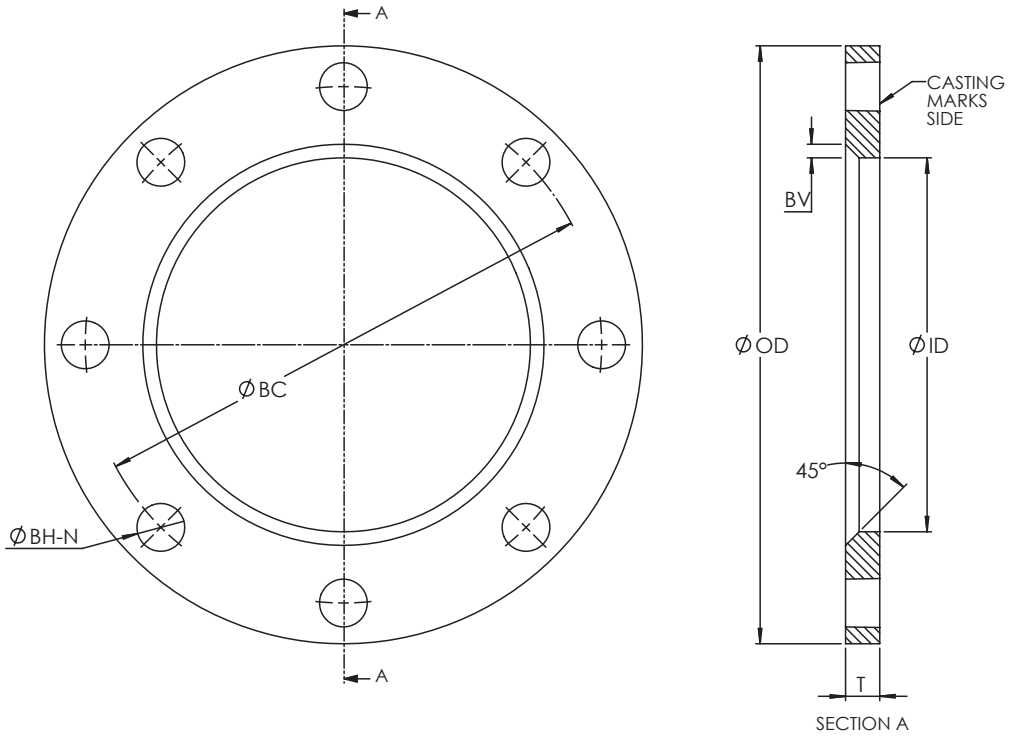


Figure Number Matrix

FNW Figure Finish Size

FIGURE	FINISH CODE	SIZE CODE		
STUB END = 72	RED PRIMER = P	1 = G	5 = S	16 = 16
ANGLE FACE RING = 73	GALVANIZED = G	1-1/2 = J	6 = U	18 = 18
		2 = K	8 = X	20 = 20
		2-1/2 = L	10 = 10	24 = 24
		3 = M	12 = 12	
		4 = P	14 = 14	

150# IPS DUCTILE IRON BACK-UP FLANGES



Dimensions (inches)

Size	ØOD	ØID		T	BV	BC	BH	N	Wt. (lbs)	
		SE	AFR						SE	AFR
1	4.25	1.44	1.75	0.50	0.25	3.13	0.63	4	1.43	1.32
1-1/2	5.00	2.06	2.38	0.50	0.25	3.88	0.63	4	1.76	1.76
2	6.00	2.63	2.88	0.50	0.25	4.75	0.75	4	2.91	2.91
2-1/2	7.00	3.13	3.38	0.50	0.25	5.50	0.75	4	3.81	3.81
3	7.50	3.75	4.00	0.50	0.25	6.00	0.75	4	4.01	4.01
4	9.00	4.75	5.00	0.56	0.25	7.50	0.75	8	6.61	5.95
5	10.00	5.75	6.06	0.63	0.25	8.50	0.88	8	7.61	7.05
6	11.00	6.88	7.25	0.63	0.25	9.50	0.88	8	8.82	8.00
8	13.50	8.88	9.25	0.63	0.31	11.75	0.88	8	13.45	11.90
10	16.00	11.00	11.44	0.63	0.31	14.25	1.00	12	15.10	14.11
12	19.00	13.00	13.63	0.75	0.31	17.00	1.00	12	27.23	24.47
14	21.00	14.25	14.88	0.75	0.31	18.75	1.13	12	35.94	32.19
16	23.50	16.25	16.88	0.75	0.38	21.25	1.13	16	42.33	40.04
18	25.00	18.25	18.88	0.88	0.38	22.75	1.25	16	46.96	43.87
20	27.50	20.25	20.88	0.88	0.38	25.00	1.25	20	55.12	53.04
24	32.00	24.25	24.88	1.00	0.38	29.50	1.38	20	82.01	80.03

Tolerances

Dimension	ID	T	BV	BC 10"-12": ± .079 BC 14"-24": ± .098	OD 12"-24": ± .120	BH
				BC	OD	
Tolerances	+0.079	+0.12	+0.039	+0.059	+0.079	+0.079
	-0	-0	-0	-0.059	-0.059	-0

H

BOLT INSULATORS

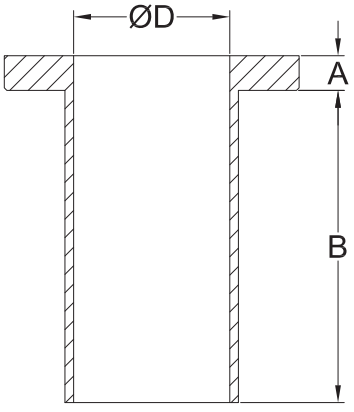
Features

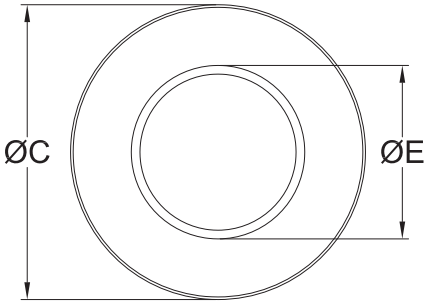
- Sold Individually
- Manufactured in Nylon Material
- White in Color
- For Electrical Isolation Between Flanges and Flange Bolts
- Sizes 1/2", 5/8" and 3/4"

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)

H





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

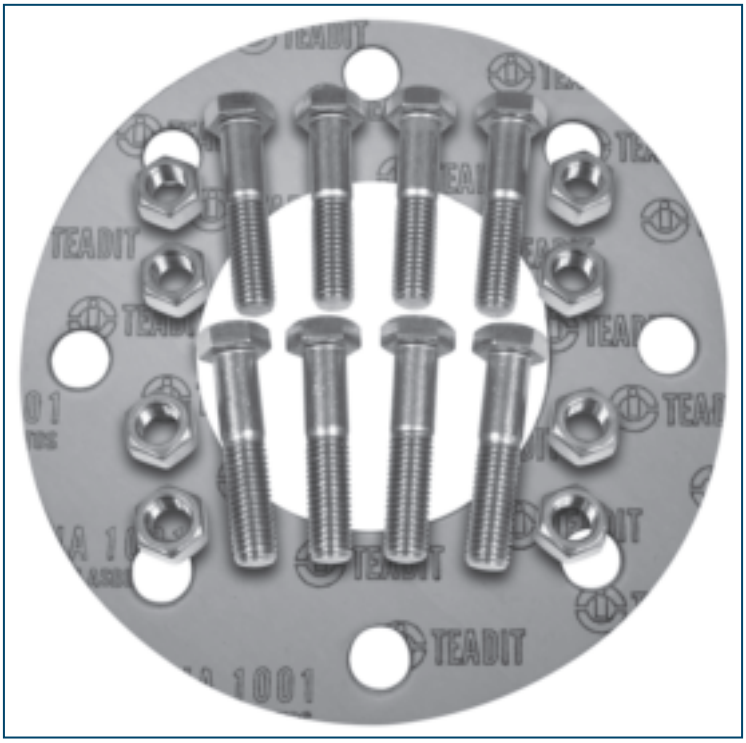
FNW CBI Size

SIZE CODE
1/2 = D
5/8 = E
3/4 = F

NUT, BOLT, GASKET KIT, NON-ASBESTOS & ZINC PLATED CARBON STEEL

Features

- For ANSI 150# & 300# Flanges
- Full Face & Ring Style
- 1/16" & 1/8" Thickness
- Lengths for Joining Two Flanges*
- Non-Asbestos Gasket (Aramid & Other Synthetic Fibers Bonded with Nitrile Rubber)
- Carbon Steel Steel Hardware
- Hardware Finish: Zinc Plated
- Sizes: 1/2" to 14" **

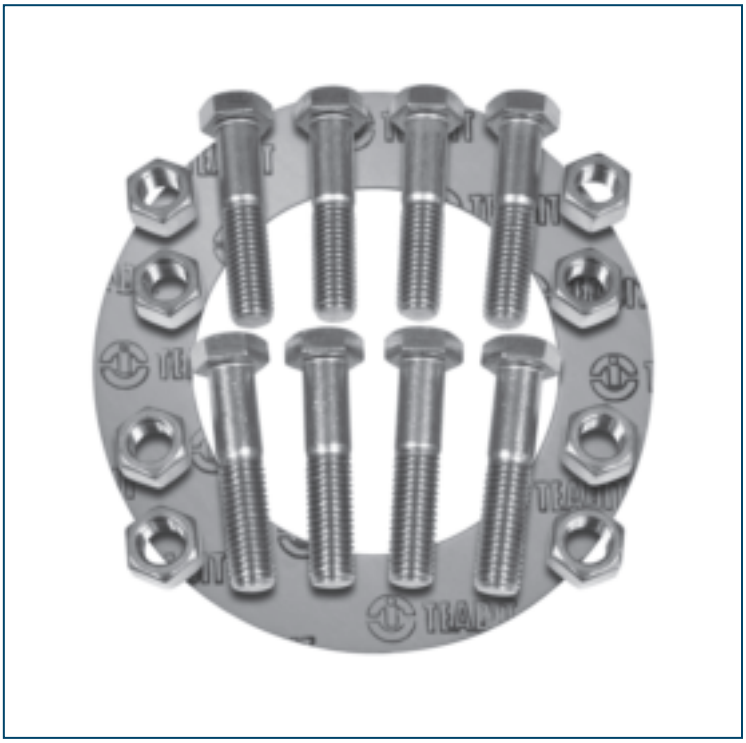


Standards

- Gaskets
  - Meets ASME B16.21 for 150# & 300# Gaskets
  - Dimensions: ASME B16.5
- Bolts
  - Material - ASTM A307A Grade A
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts
  - Material - SAE J995 Grade 2
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Properties***

- Gaskets
  - 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)
  - Max. Pressure for Saturated Steam: 75 PSI
  - ASTM 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%
  - Creep Relaxation: 25%
  - Sealability at 1000 PSI: 0.25 ml/h
  - Finish: Smooth
- Bolts
  - Tensile - 60 KSI Minimum
  - Elongation: 18% Minimum
  - Hardness: 69 - 100 Rb



*** Based on 1/16" raised face and 1/8" gasket.**

**** Not all configurations are available in all sizes. Please see the part number list on the back page.**

***** Gasket 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.**

NUT, BOLT, GASKET KIT, NON-ASBESTOS & ZINC PLATED CARBON STEEL

Part Numbers, Quantities & Bolt Sizes (inches)

Size	150# Flanges				Nut/Bolt Qty	Bolt Diameter	Bolt Length
	Full Face		Ring				
	1/16" Thick	1/8" Thick	1/16" Thick	1/8" Thick			
1/2	FNWNBGZ1NAF6D	FNWNBGZ1NAF8D	FNWNBGZ1NAR6D	FNWNBGZ1NAR8D	4	1/2-13	2
3/4	FNWNBGZ1NAF6F	FNWNBGZ1NAF8F	FNWNBGZ1NAR6F	FNWNBGZ1NAR8F	4	1/2-13	2
1	FNWNBGZ1NAF6G	FNWNBGZ1NAF8G	FNWNBGZ1NAR6G	FNWNBGZ1NAR8G	4	1/2-13	2-1/4
1-1/4	FNWNBGZ1NAF6H	FNWNBGZ1NAF8H	FNWNBGZ1NAR6H	FNWNBGZ1NAR8H	4	1/2-13	2-1/4
1-1/2	FNWNBGZ1NAF6J	FNWNBGZ1NAF8J	FNWNBGZ1NAR6J	FNWNBGZ1NAR8J	4	1/2-13	2-1/2
2	FNWNBGZ1NAF6K	FNWNBGZ1NAF8K	FNWNBGZ1NAR6K	FNWNBGZ1NAR8K	4	5/8-11	2-3/4
2-1/2	FNWNBGZ1NAF6L	FNWNBGZ1NAF8L	FNWNBGZ1NAR6L	FNWNBGZ1NAR8L	4	5/8-11	3
3	FNWNBGZ1NAF6M	FNWNBGZ1NAF8M	FNWNBGZ1NAR6M	FNWNBGZ1NAR8M	4	5/8-11	3
4	FNWNBGZ1NAF6P	FNWNBGZ1NAF8P	FNWNBGZ1NAR6P	FNWNBGZ1NAR8P	8	5/8-11	3
5	FNWNBGZ1NAF6S	FNWNBGZ1NAF8S	FNWNBGZ1NAR6S	FNWNBGZ1NAR8S	8	3/4-10	3-1/4
6	FNWNBGZ1NAF6U	FNWNBGZ1NAF8U	FNWNBGZ1NAR6U	FNWNBGZ1NAR8U	8	3/4-10	3-1/4
8	FNWNBGZ1NAF6X	FNWNBGZ1NAF8X	FNWNBGZ1NAR6X	FNWNBGZ1NAR8X	8	3/4-10	3-1/2
10	FNWNBGZ1NAF610	FNWNBGZ1NAF810	FNWNBGZ1NAR610	FNWNBGZ1NAR810	12	7/8-9	4
12	FNWNBGZ1NAF612	FNWNBGZ1NAF812	FNWNBGZ1NAR612	FNWNBGZ1NAR812	12	7/8-9	4
14			FNWNBGZ1NAR614		12	1-8	4-1/2

Size	300# Flanges				Nut/Bolt Qty	Bolt Diameter	Bolt Length
	Full Face		Ring				
	1/16" Thick	1/8" Thick	1/16" Thick	1/8" Thick			
1/2	FNWNBGZ3NAF6D	FNWNBGZ3NAF8D	FNWNBGZ3NAR6D	FNWNBGZ3NAR8D	4	1/2-13	2-1/4
3/4	FNWNBGZ3NAF6F	FNWNBGZ3NAF8F	FNWNBGZ3NAR6F	FNWNBGZ3NAR8F	4	5/8-11	2-1/2
1	FNWNBGZ3NAF6G	FNWNBGZ3NAF8G	FNWNBGZ3NAR6G	FNWNBGZ3NAR8G	4	5/8-11	2-1/2
1-1/4	FNWNBGZ3NAF6H	FNWNBGZ3NAF8H	FNWNBGZ3NAR6H	FNWNBGZ3NAR8H	4	5/8-11	2-3/4
1-1/2	FNWNBGZ3NAF6J	FNWNBGZ3NAF8J	FNWNBGZ3NAR6J	FNWNBGZ3NAR8J	4	3/4-10	3
2	FNWNBGZ3NAF6K	FNWNBGZ3NAF8K	FNWNBGZ3NAR6K	FNWNBGZ3NAR8K	8	5/8-11	3
2-1/2	FNWNBGZ3NAF6L	FNWNBGZ3NAF8L	FNWNBGZ3NAR6L	FNWNBGZ3NAR8L	8	3/4-10	3-1/4
3	FNWNBGZ3NAF6M	FNWNBGZ3NAF8M	FNWNBGZ3NAR6M	FNWNBGZ3NAR8M	8	3/4-10	3-1/2
4	FNWNBGZ3NAF6P	FNWNBGZ3NAF8P	FNWNBGZ3NAR6P	FNWNBGZ3NAR8P	8	3/4-10	3-3/4
5	FNWNBGZ3NAF6S	FNWNBGZ3NAF8S	FNWNBGZ3NAR6S	FNWNBGZ3NAR8S	8	3/4-10	4-1/4
6	FNWNBGZ3NAF6U	FNWNBGZ3NAF8U	FNWNBGZ3NAR6U	FNWNBGZ3NAR8U	12	3/4-10	4-1/4
8	FNWNBGZ3NAF6X	FNWNBGZ3NAF8X	FNWNBGZ3NAR6X	FNWNBGZ3NAR8X	12	7/8-9	4-3/4
10	FNWNBGZ3NAF610	FNWNBGZ3NAF810	FNWNBGZ3NAR610	FNWNBGZ3NAR810	16	1-8	5-1/2
12	FNWNBGZ3NAF612	FNWNBGZ3NAF812	FNWNBGZ3NAR612	FNWNBGZ3NAR812	16	1-1/8-7	5-3/4

NUT, BOLT, GASKET KIT
NEOPRENE & STAINLESS STEEL

Features

- For ANSI 150# Flanges
- Lengths for Joining Two Flanges*
- Neoprene Gasket
- 304 & 316 Stainless Steel Hardware
- Hardware Finish: Material Finish
- Sizes: 3" to 16"

Standards

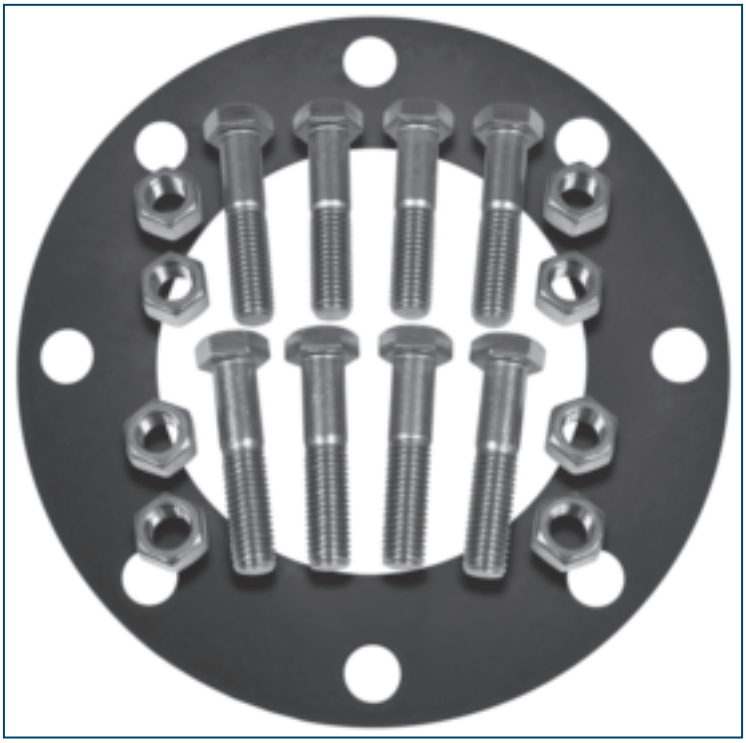
- Gaskets
  - Meets ASME B16.21 for 150# Gaskets
  - Dimensions: ASME B16.5
- Cap Screws
  - Material - ASTM F593 Grp 1 (304) or 2 (316)
  - Heat Treatment: Condition CW
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts
  - Material - ASTM F594 Grp 1 (304) or 2 (316)
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Properties**

- Gaskets
  - Max. Temperature: 170°F (77°C)
  - Min. Temperature: -20°F (-29°C)
  - Durometer Hardness: 65 Shore A±5
  - Tensile: 500 PSI
  - Elongation: 300%
  - Density: 93 to 100 lbs/ft³
  - Compressibility: 20 to 30%
  - Finish: Smooth
  - Color: Black
- Cap Screws
  - Tensile - 100 to 150 KSI (5/8"), 85 to 140 KSI (3/4" to 1")
  - Hardness - B95 to C32 (5/8"), B80 to C32 (3/4" to 1")
  - Yield - 65 KSI (5/8"), 45 KSI (3/4" to 1")

* **Based on 1/16" raised face and 1/8" gasket.**

** **Gasket 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.**



Part Numbers, Quantities & Screw Sizes (inches)

Size	Part Number		Nut/ Screw Qty	Diameter	Bolt Length
	304 Stainless	316 Stainless			
3	FNWNBGS41NEF8M	FNWNBGS61NEF8M	4	5/8-11	3
4	FNWNBGS41NEF8P	FNWNBGS61NEF8P	8	5/8-11	3
6	FNWNBGS41NEF8U	FNWNBGS61NEF8U	8	3/4-10	3-1/4
8	FNWNBGS41NEF8X	FNWNBGS61NEF8X	8	3/4-10	3-1/2
10	FNWNBGS41NEF810	FNWNBGS61NEF810	12	7/8-9	4
12	FNWNBGS41NEF812	FNWNBGS61NEF812	12	7/8-9	4
14	FNWNBGS41NEF814	FNWNBGS61NEF814	12	1-8	4-1/2
16	FNWNBGS41NEF816	FNWNBGS61NEF816	16	1-8	4-1/2

NUT, BOLT, GASKET KIT
RED RUBBER & STAINLESS STEEL

Features

- For ANSI 150# Flanges
- Lengths for Joining Two Flanges*
- Red Rubber (Styrene-Butadiene or SBR) Gasket
- 304 & 316 Stainless Steel Hardware
- Hardware Finish: Material Finish
- Sizes: 3" to 16"

Standards

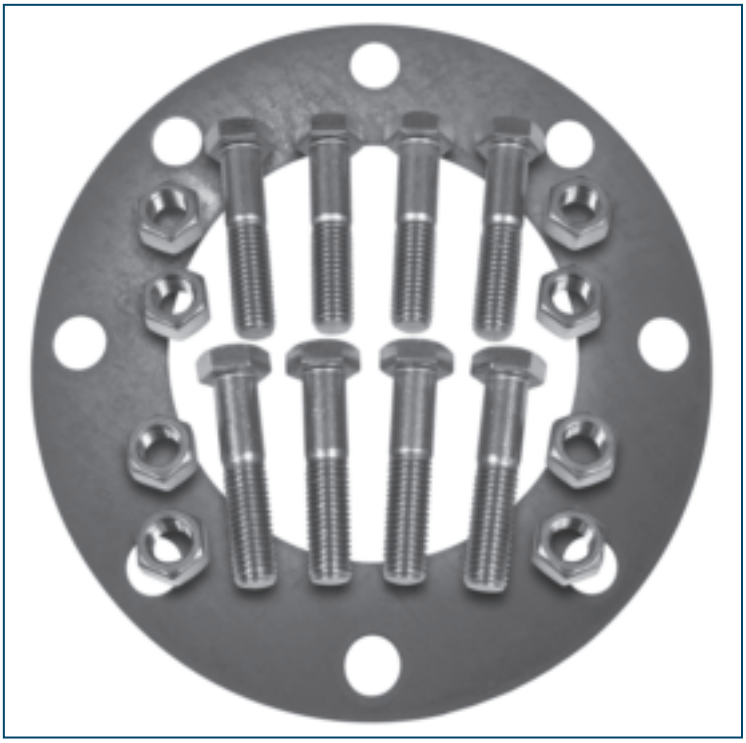
- Gaskets
  - Meets ASME B16.21 for 150# Gaskets
  - Dimensions: ASME B16.5
- Cap Screws
  - Material - ASTM F593 Grp 1 (304) or 2 (316)
  - Heat Treatment: Condition CW
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts
  - Material - ASTM F594 Grp 1 (304) or 2 (316)
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Properties**

- Gaskets
  - 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)
  - Durometer Hardness: 75 Shore A±5
  - Tensile: 400 PSI
  - Elongation: 150%
  - Compression Set (22 Hrs @ 158°F): 35%
  - Heat Aging (94 Hrs @ 158°F):
  - Change in Hardness: +5 Shore A
  - Change in Tensile: -15%
  - Change in Elongation: -35%
  - Finish: Smooth
- Cap Screws
  - Tensile - 100 to 150 KSI (5/8"), 85 to 140 KSI (3/4" to 1")
  - Hardness - B95 to C32 (5/8"), B80 to C32 (3/4" to 1")
  - Yield - 65 KSI (5/8"), 45 KSI (3/4" to 1")

* **Based on 1/16" raised face and 1/8" gasket.**

** **Gasket 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.**



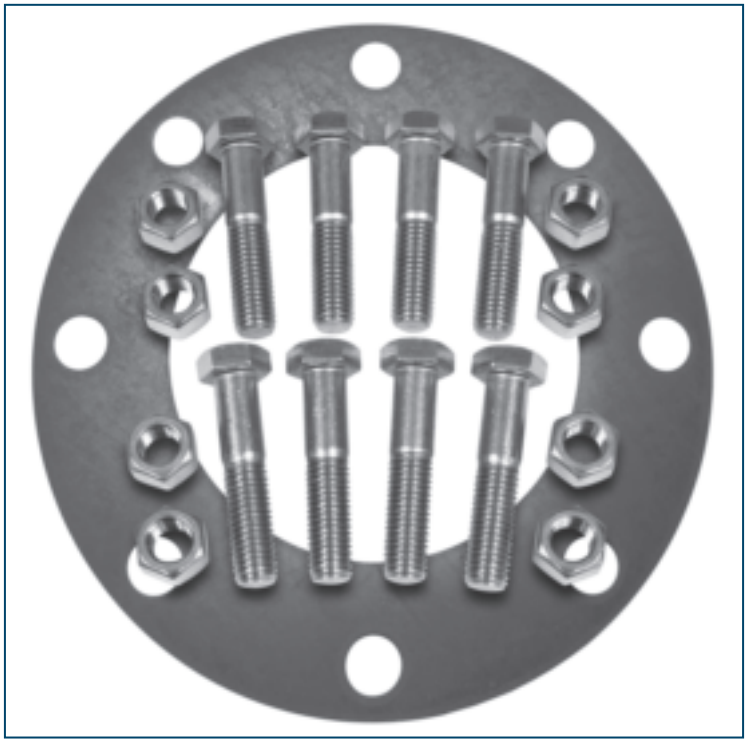
Part Numbers, Quantities & Screw Sizes (inches)

Size	Part Number		Nut/ Screw Qty	Diameter	Bolt Length
	304 Stainless	316 Stainless			
3	FNWNBGS41RF8M	FNWNBGS61RF8M	4	5/8-11	3
4	FNWNBGS41RF8P	FNWNBGS61RF8P	8	5/8-11	3
6	FNWNBGS41RF8U	FNWNBGS61RF8U	8	3/4-10	3-1/4
8	FNWNBGS41RF8X	FNWNBGS61RF8X	8	3/4-10	3-1/2
10	FNWNBGS41RF810	FNWNBGS61RF810	12	7/8-9	4
12	FNWNBGS41RF812	FNWNBGS61RF812	12	7/8-9	4
14	FNWNBGS41RF814	FNWNBGS61RF814	12	1-8	4-1/2
16	FNWNBGS41RF816	FNWNBGS61RF816	16	1-8	4-1/2

NUT, BOLT, GASKET KIT
RED RUBBER & ZINC PLATED CARBON STEEL

Features

- For ANSI 150# Flanges
- Full Face & Ring Style
- 1/16" & 1/8" Thickness
- Lengths for Joining Two Flanges*
- Red Rubber (Styrene-Butadiene or SBR) Gasket
- Carbon Steel Hardware
- Hardware Finish: Zinc Plated
- Sizes: 1/2" to 18" **

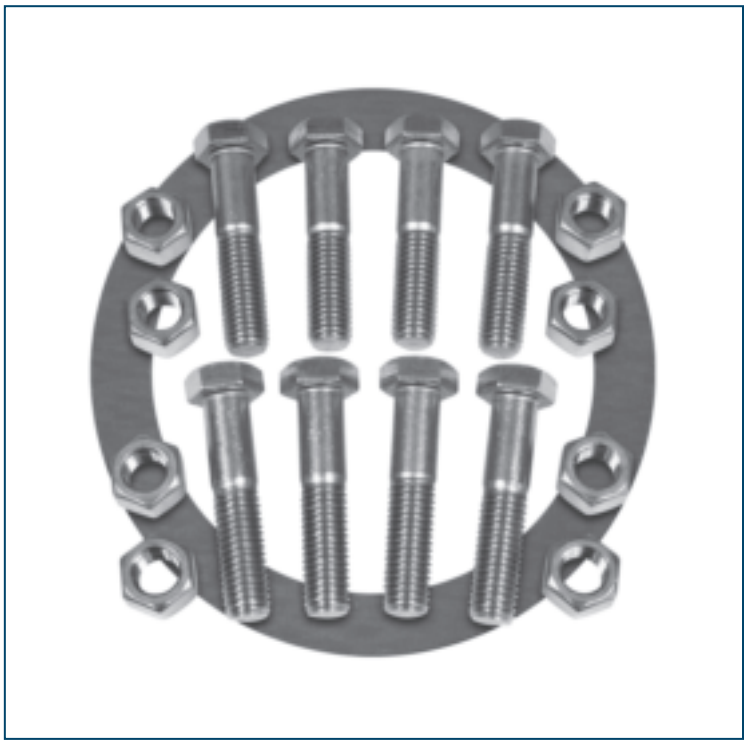


Standards

- Gaskets
  - Meets ASME B16.21 for 150# Gaskets
  - Dimensions: ASME B16.5
- Bolts
  - Material - ASTM A307A Grade A
  - Dimensions - ASME B18.2.1
  - Thread - Class 2A
- Nuts
  - Material - SAE J995 Grade 2
  - Dimensions - ASME B18.2.2
  - Thread - Class 2B

Properties***

- Gaskets
  - 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)
  - Durometer Hardness: 75 Shore A±5
  - Tensile: 400 PSI
  - Elongation: 150%
  - Compression Set (22 Hrs @ 158°F): 35%
  - Heat Aging (94 Hrs @ 158°F):
  - Change in Hardness: +5 Shore A
  - Change in Tensile: -15%
  - Change in Elongation: -35%
  - Finish: Smooth
- Bolts
  - Tensile - 60 KSI Minimum
  - Elongation: 18% Minimum
  - Hardness: 69 - 100 Rb



*** Based on 1/16" raised face and 1/8" gasket.**

**** Not all configurations are available in all sizes. Please see the part number list on the back page.**

***** Gasket 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.**

H

NUT, BOLT, GASKET KIT
RED RUBBER & ZINC PLATED CARBON STEEL

Part Numbers, Quantities & Bolt Sizes (inches)

Size	150# Flanges				Nut/Bolt Qty	Bolt Diameter	Bolt Length
	Full Face		Ring				
	1/16" Thick	1/8" Thick	1/16" Thick	1/8" Thick			
1/2	FNWNBGZ1RF6D	FNWNBGZ1RF8D	FNWNBGZ1RR6D	FNWNBGZ1RR8D	4	1/2-13	2
3/4	FNWNBGZ1RF6F	FNWNBGZ1RF8F	FNWNBGZ1RR6F	FNWNBGZ1RR8F	4	1/2-13	2
1	FNWNBGZ1RF6G	FNWNBGZ1RF8G	FNWNBGZ1RR6G	FNWNBGZ1RR8G	4	1/2-13	2-1/4
1-1/4	FNWNBGZ1RF6H	FNWNBGZ1RF8H	FNWNBGZ1RR6H	FNWNBGZ1RR8H	4	1/2-13	2-1/4
1-1/2	FNWNBGZ1RF6J	FNWNBGZ1RF8J	FNWNBGZ1RR6J	FNWNBGZ1RR8J	4	1/2-13	2-1/2
2	FNWNBGZ1RF6K	FNWNBGZ1RF8K	FNWNBGZ1RR6K	FNWNBGZ1RR8K	4	5/8-11	2-3/4
2-1/2	FNWNBGZ1RF6L	FNWNBGZ1RF8L	FNWNBGZ1RR6L	FNWNBGZ1RR8L	4	5/8-11	3
3	FNWNBGZ1RF6M	FNWNBGZ1RF8M	FNWNBGZ1RR6M	FNWNBGZ1RR8M	4	5/8-11	3
4	FNWNBGZ1RF6P	FNWNBGZ1RF8P	FNWNBGZ1RR6P	FNWNBGZ1RR8P	8	5/8-11	3
5	FNWNBGZ1RF6S	FNWNBGZ1RF8S	FNWNBGZ1RR6S	FNWNBGZ1RR8S	8	3/4-10	3-1/4
6	FNWNBGZ1RF6U	FNWNBGZ1RF8U	FNWNBGZ1RR6U	FNWNBGZ1RR8U	8	3/4-10	3-1/4
8	FNWNBGZ1RF6X	FNWNBGZ1RF8X	FNWNBGZ1RR6X	FNWNBGZ1RR8X	8	3/4-10	3-1/2
10	FNWNBGZ1RF610	FNWNBGZ1RF810	FNWNBGZ1RR610	FNWNBGZ1RR810	12	7/8-9	4
12	FNWNBGZ1RF612	FNWNBGZ1RF812	FNWNBGZ1RR612	FNWNBGZ1RR812	12	7/8-9	4
14		FNWNBGZ1RF814		FNWNBGZ1RR814	12	1-8	4-1/2
16	FNWNBGZ1RF616	FNWNBGZ1RF816		FNWNBGZ1RR816	16	1-8	4-1/2
18				FNWNBGZ1RR818	16	1-1/8-7	5

FNW™

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

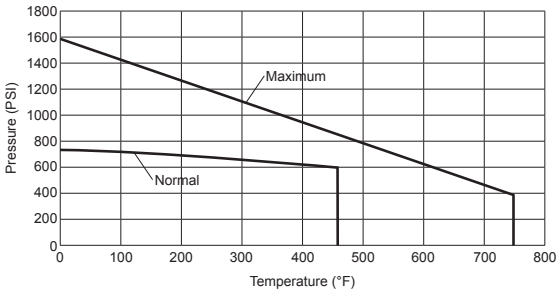
Service Limits

- Max. Temperature: 750°F (400°C)
- Max. Continuous Temperature: 460°F (240°C)
- Max. Pressure: 1595 PSI (110 Bar)
- Max. Continuos Pressure: 725 (50 Bar)
- Max. Pressure for Saturated Steam: 75 PSI
- ASTM F104 Line Call Out: F712120E22M5

Typical Physical Properties

ASTM Test Method	Property	Value
-	Density	109 lbs/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.

H

Figure Number Matrix

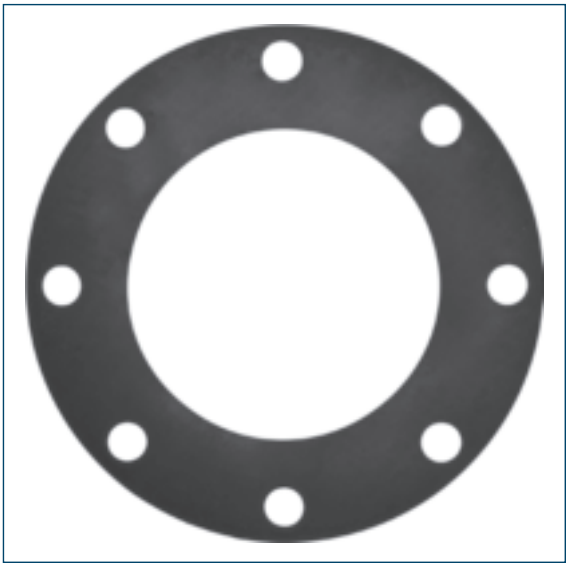
FNW NA 1 FFG A Size

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	

150# NEOPRENE FULL FACE GASKETS

Features

Neoprene (Chloroprene Rubber) has excellent resistance to oils, ozone, sunlight and aging with low permeability to gases. It is recommended for use with gasoline and non-aromatic solvents. Neoprene gaskets offer little resistance to and should not be used in strong oxidants, and aromatic and chlorate 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)

Typical Physical Properties

Property	Value
Durometer Hardness	65 Shore A ±5
Tensile	500 PSI
Elongation	300%
Density	93~100 lbs/ft³
Compressibility	20~30%
Finish	Smooth
Color	Black

Note: 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 NE 1 FFG A Size

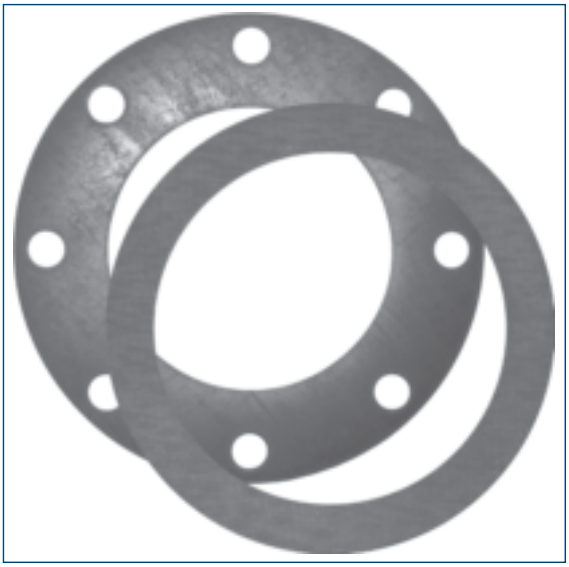
PRESSURE	TYPE	THICKNESS	SIZE CODE			
150# = 1	Full Face Gasket = FFG	1/8" = A	1/2 = D	2 = K	6 = U	16 = 16
			3/4 = F	2-1/2 = L	8 = X	18 = 18
			1 = G	3 = M	10 = 10	20 = 20
			1-1/4 = H	4 = P	12 = 12	24 = 24
			1-1/2 = J	5 = S	14 = 14	

FNW™

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
  (Except 30" which is ASME B16.47 Series A)

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 Change in Tensile Change in Elongation	 +5 Shore A -15% -35%

Note: 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 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: The 30" red rubber gaskets are available in 150#, 1/8", full face only (FNWR1FFGA30).

H

SPIRAL-WOUND GASKETS

DESCRIPTION

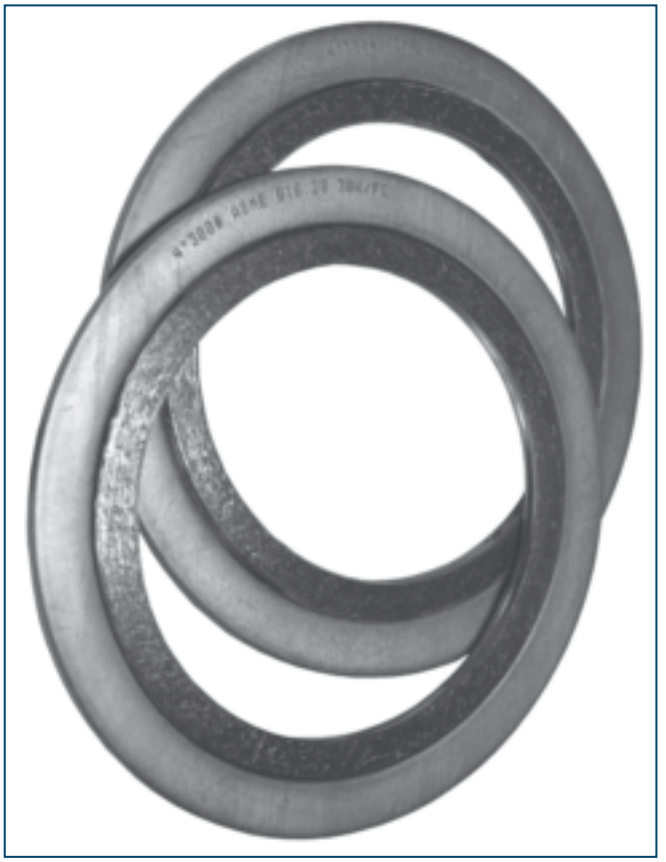
The FNW figure SWG spiral-wound gaskets are made of a preformed metallic v-shaped strip and a soft filler material wound together under pressure, with an outer guide ring.

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 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#"

H

Figure Number Matrix

FNW SWG CLASS WINDING FILLER SIZE

CLASS	WINDING	FILLER	SIZE		
1 = 150#	4 = 304SS	F = FLEXIBLE GRAPHITE	D = 1/2	M = 3	14 = 14
3 = 300# *	6 = 316SS		F = 3/4	P = 4	16 = 16
			G = 1	S = 5	18 = 18
			H = 1-1/4	U = 6	20 = 20
			J = 1-1/2	X = 8	24 = 24
			K = 2	10 = 10	
			L = 2-1/2	12 = 12	

*** 1/2" to 3" 300# Gaskets Are Multirated & Stamped "3/600#"**

COLOR CODES

Continuous color on guide ring edge denotes winding material.

YELLOW = 304SS
GREEN = 316SS

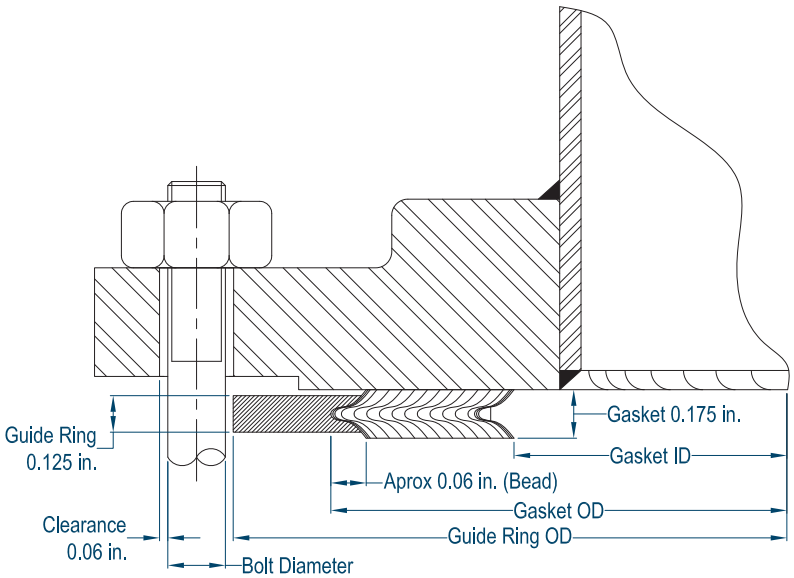
Intermittent stripe on guide ring edge denotes filler material.

GRAY = FLEXIBLE GRAPHITE

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 $Sg_{(max)}$ value should not exceed the Maximum Seating Stress.

WATER HAMMER ARRESTORS FOR NON-POTABLE APPLICATIONS

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. Static (Working) Pressure: 150 PSI
- Max. Spike Pressure: 350 PSI
- Temperature: 33°F to 180°F (0.6°C to 82°C)
- End Connection: NPT (10P), CxC (11P)
- For Commercial and Residential Systems (non-potable)
- Designed for Vertical or Horizontal Installation (not to be installed in the inverted position)
- Can be installed in systems without need for access panels (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.

H

ASSE 1010 · cUPC IAPMO

Sizing / PDI Fixture Units*

FNW Size	PDI Size Code		PDI Fixture Units
	10P	11P	
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. See the FNW water hammer arrestor IOM for more details.

Figure Number Matrix

FNW End Size

END TYPE	SIZE CODE	
10P = MALE NPT (1/2" to 2")	1/2 = 500	1-1/4 = 1250
11P = COPPER SWEAT (1/2" to 1-1/4")	3/4 = 750	1-1/2 = 1500
	1 = 1000	2 = 2000

WATER HAMMER ARRESTORS FOR NON-POTABLE APPLICATIONS

Fig. 10P

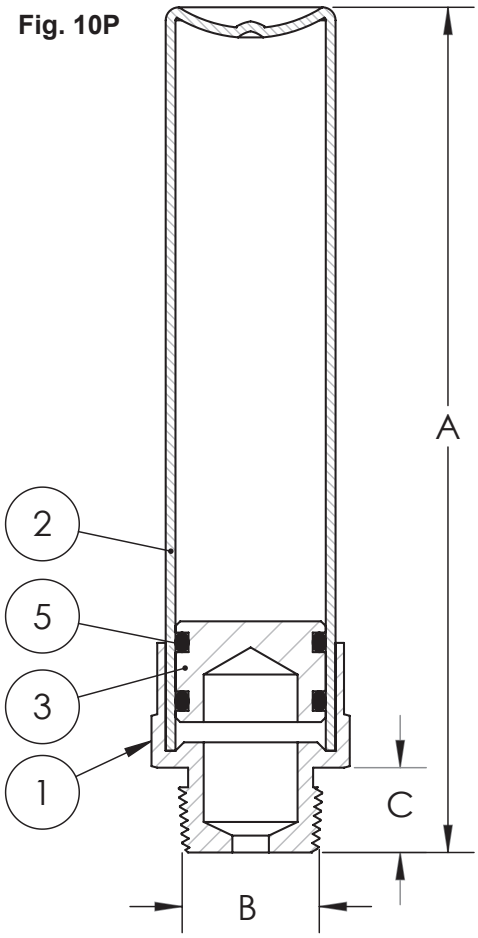
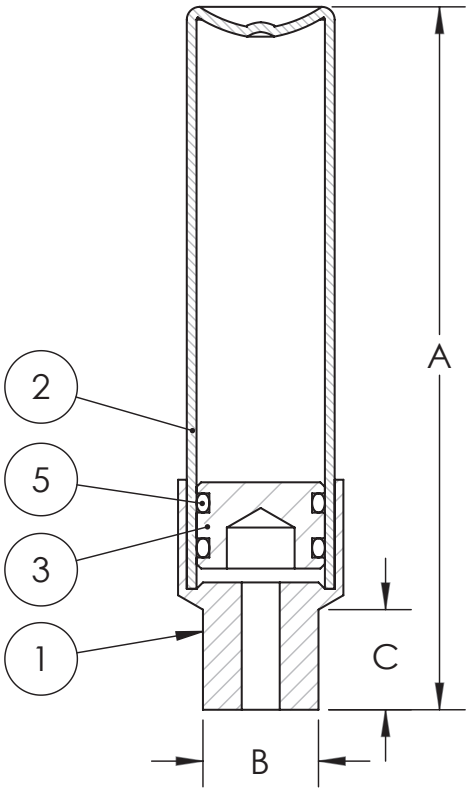


Fig. 11P



Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Brass, JIS 3604	1
2	Cylinder	Copper, C12200	1
3	Piston	PP+30% Fiber	1
5	O-ring	EPDM	2

Dimensions (inches)

Size	Fig. 10P			Fig. 11P		
	A	B (NPT)	C	A	B	C
1/2	4.75	1/2 - 14	0.63	4.96	0.625	0.72
3/4	5.37	3/4 - 14	0.65	5.57	0.875	0.80
1	6.70	1 - 11-1/2	0.74	6.85	1.125	0.98
1-1/4	8.20	1-1/4 - 11-1/2	0.88	8.30	1.375	1.10
1-1/2	9.40	1-1/2 - 11-1/2	0.94			
2	9.40	2 - 11-1/2	0.94			

H

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:

- Lead Free Certified
- Max. Static (Working) Pressure: 150 PSI
- Max. Spike Pressure: 350 PSI
- Temperature: 33°F to 180°F (0.6°C to 82°C)
- End Connection: MNPT (X10P), CxC (X11P)
- For Commercial and Residential Systems
- 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 (always check local plumbing codes to determine if access panels are required)

Standards:

- Federal Safe Drinking Water Act, Sec. 1417 (Lead Free)
- ASSE Standard 1010
- IAPMO Listed (cUPC)

Warranty:

- Guaranteed for the life of the system they are installed in.

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

ASSE 1010

UPC C IAPMO ®

Sizing / PDI Fixture Units*

FNW Size	PDI Size Code		PDI Fixture Units
	X10P	X11P	
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. See the FNW water hammer arrestor IOM for more details.

Figure Number Matrix

FNW End Size

END TYPE	SIZE CODE	
X10P = MALE NPT (1/2" to 2")	1/2 = 500	1-1/4 = 1250
X11P = COPPER SWEAT	3/4 = 750	1-1/2 = 1500
(1/2" to 1-1/4")	1 = 1000	2 = 2000

LOW LEAD COMPLIANT WATER HAMMER ARRESTORS

Fig. X10P

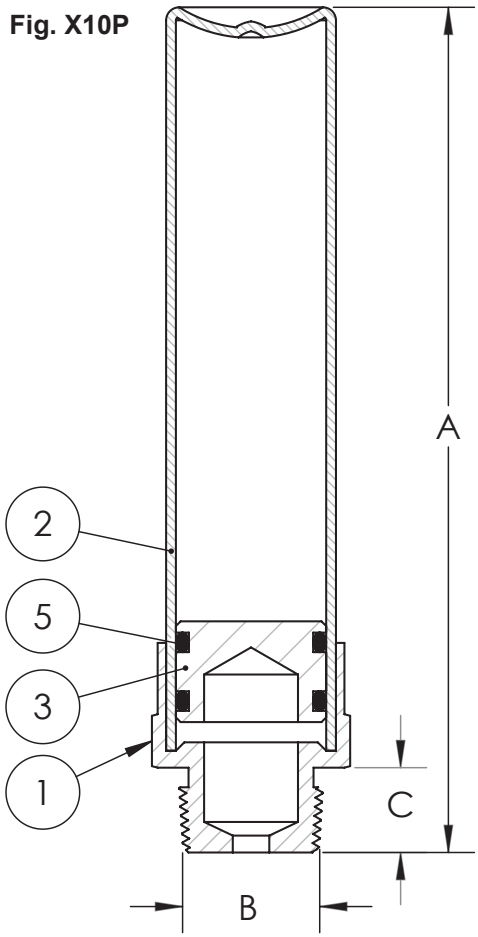
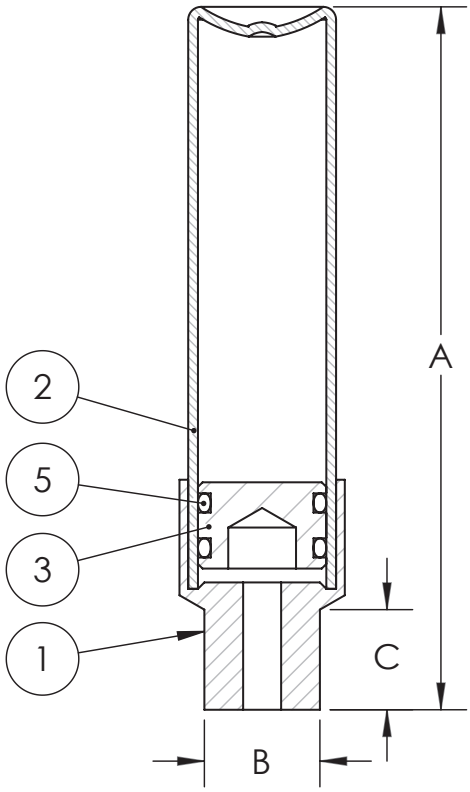


Fig. X11P



H

Standard Materials

Ref. No.	Description	Material	Qty
1	Body	Lead Free Brass, C46400	1
2	Cylinder	Copper, C12200	1
3	Piston	PP+30% Fiber	1
5	O-ring	EPDM	2

Dimensions (inches)

Size	Fig. 10P			Fig. 11P		
	A	B (NPT)	C	A	B	C
1/2	4.75	1/2 - 14	0.63	4.96	0.625	0.72
3/4	5.37	3/4 - 14	0.65	5.57	0.875	0.80
1	6.70	1 - 11 1/2	0.74	6.85	1.125	0.98
1-1/4	8.20	1-1/4 - 11 1/2	0.88	8.30	1.375	1.10
1-1/2	9.40	1-1/2 - 11 1/2	0.94			
2	9.40	2 - 11 1/2	0.94			

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	
	Working PSI	Test PSI
2	455	683
2-1/2	345	518
3	290	435
4	250	375
5	200	300
6	210	315
8	190	285
10	150	225

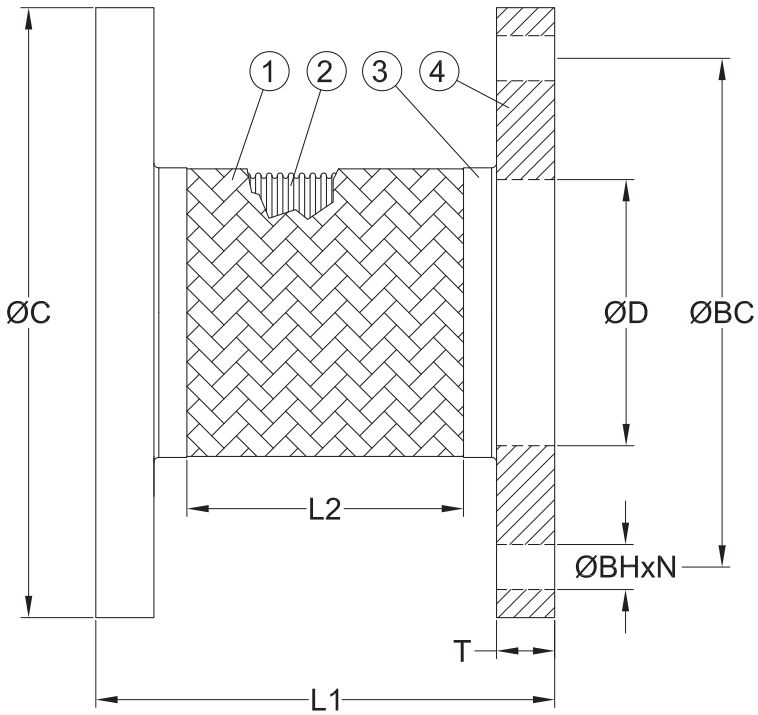
Pressure Factors for Above 70°F*			
°F	Factor	°F	Factor
100	0.99	450	0.81
150	0.96	500	0.79
200	0.94	550	0.76
250	0.92	600	0.74
300	0.89	650	0.72
350	0.86	800	0.66
400	0.84	1000	0.60

* Multiply working pressure by pressure factor for temperature adjusted pressure rating.

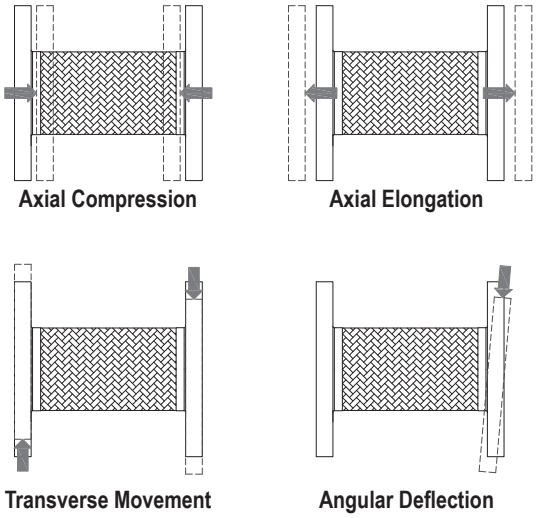
Part Numbers & Weight

Size	Part Number	Approx. Wt. (lbs)
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



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°

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

H

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

H

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

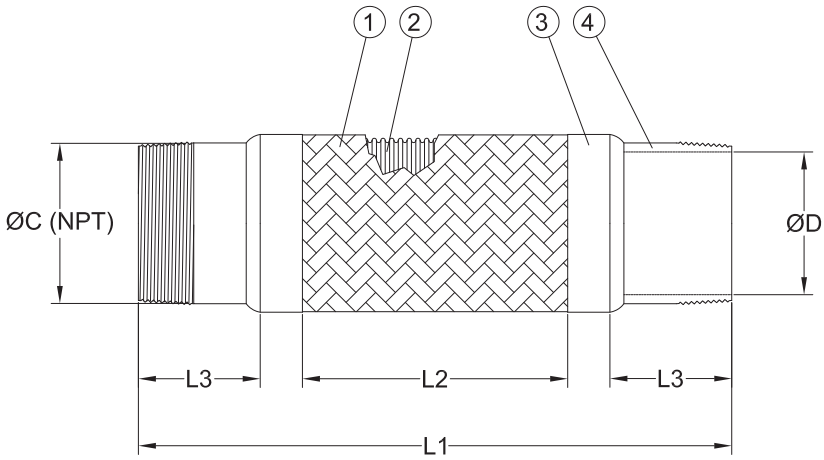
Pressure Factors for Above 70°F*			
°F	Factor	°F	Factor
100	0.99	450	0.81
150	0.96	500	0.77
200	0.94	550	0.75
250	0.92	600	0.73
300	0.89	650	0.69
350	0.86	800	0.64
400	0.84	1000	0.60

* 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

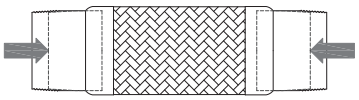


Dimensions (inches)

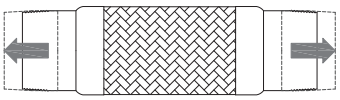
Size	ØC (NPT)	ØD	L1	L2	L3
1/2	1/2-14	0.55	6.5	2.56	1.18
3/4	3/4-14	0.75	7.0	2.67	1.38
1	1-11.5	0.95	8.0	3.28	1.58
1-1/4	1-1/4-11.5	1.26	8.5	3.38	1.77
1-1/2	1-1/2-11.5	1.50	9.0	3.49	1.97
2	2-11.5	1.97	10.5	4.99	1.97

Standard Materials

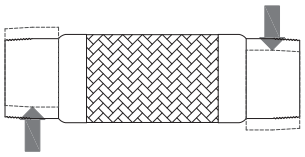
Ref. No.	Description	Material
1	Hose Braid	304 Stainless Steel
2	Corrugated Hose	321 Stainless Steel
3	Braid Band	304 Stainless Steel
4	Male Pipe Thread	ASTM A53 Carbon Steel
5	Welding	Grade er308 Stainless



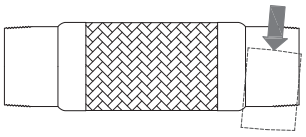
Axial Compression



Axial Elongation



Transverse Movement



Angular Deflection

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°

H

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	
	Working PSI	Test PSI
3/4	375	562
1	390	585
1-1/4	340	510
1-1/2	320	480
2	320	480

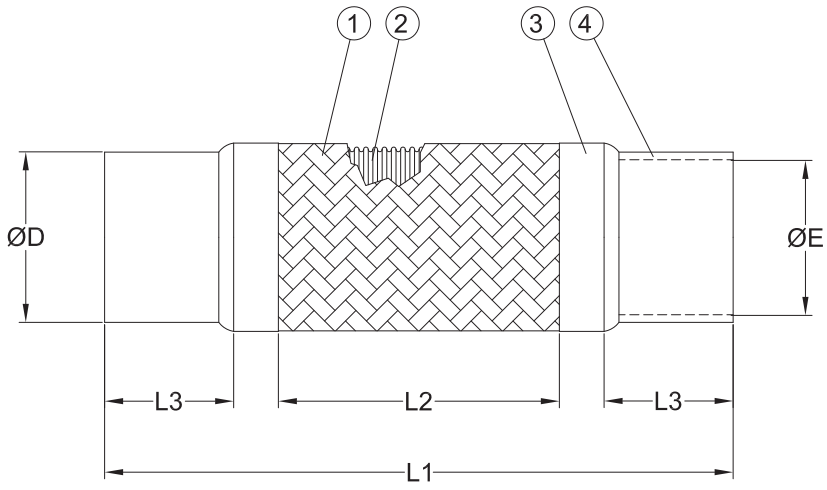
* Multiply working pressure by pressure factor for temperature adjusted pressure rating.

Pressure Factors for Above 70°F*	
°F	Factor
100	0.95
150	0.92
200	0.89
250	0.86
300	0.83
350	0.81
400	0.78
450	0.75

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

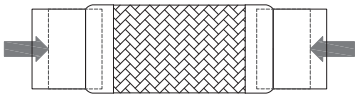


Dimensions (inches)

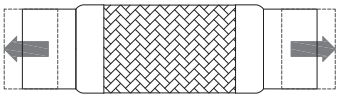
Size	ØD	ØE	L1	L2	L3
3/4	0.88	0.868	7.0	2.93	1.250
1	1.13	1.288	8.0	3.68	1.375
1-1/4	1.38	1.368	8.5	4.18	1.375
1-1/2	1.63	1.618	9.0	4.23	1.500
2	2.13	2.116	10.5	5.43	1.750

Standard Materials

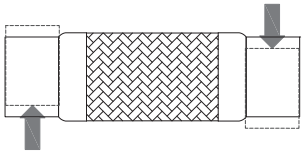
Ref. No.	Description	Material
1	Hose Braid	Bronze
2	Corrugated Hose	Bronze
3	Braid Band	ASTM B88 Copper
4	Female Sweat End	ASTM B88 Copper



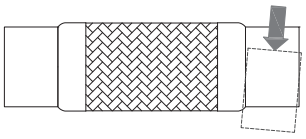
Axial Compression



Axial Elongation



Transverse Movement



Angular Deflection

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°

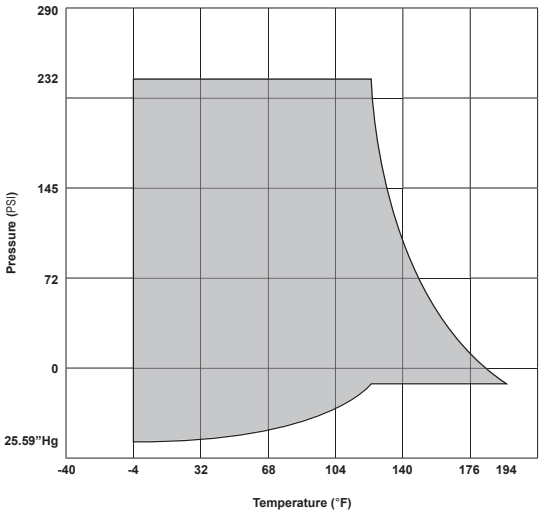
H

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.

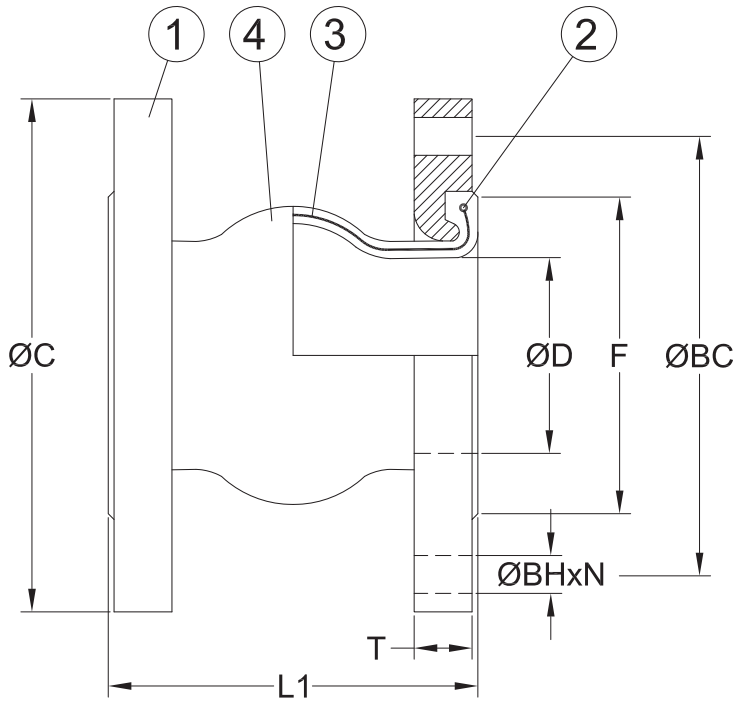
Ratings

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

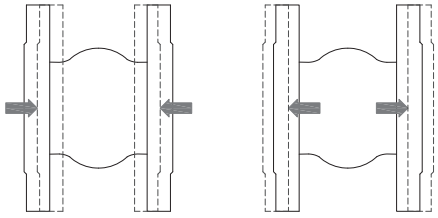
Part Numbers & Weight

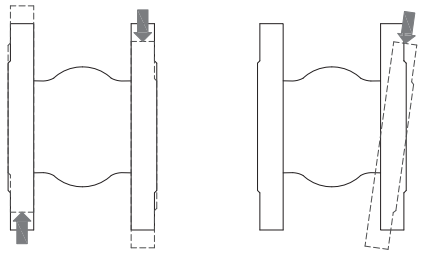
Size	Part Number	Approx. Wt. (lbs)
2-1/2	FNW40L	14.74
3	FNW40M	16.50
4	FNW40P	18.26
5	FNW40S	23.98
6	FNW40U	31.68
8	FNW40X	42.24
10	FNW4010	55.00

SINGLE SPHERE FLEXIBLE CONNECTOR



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°

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	.87
8	13.5	7.64	10.24	6.0	11.75	0.87	8	.87
10	16.0	9.84	12.60	8.0	14.25	1.00	12	.94

Standard Materials

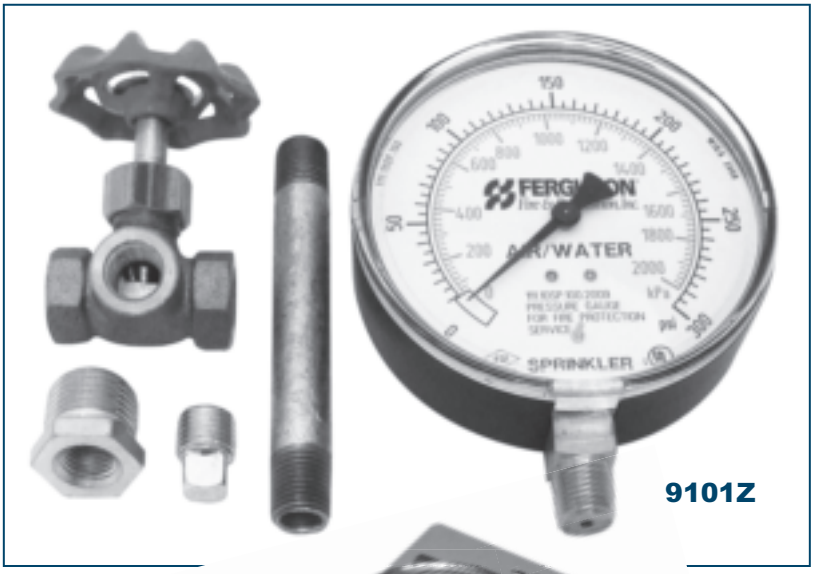
Ref. No.	Description	Material
1	Flange	Carbon Steel
2	Reinforcement Wire	Carbon Steel
3	Reinforcement Fabric	Synthetic Fiber
4	Elastomer Sleeve	EPDM

H

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.



9101Z

9101P

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

FM APPROVED

c UL us

Figure Number Matrix

FNW 9101 Finish

FINISH
P = PLAIN BLACK PIPE NIPPLE
Z = ZINC GALVANIZED PIPE NIPPLE

H

NOTES

HANGERS, CLAMPS & STRUT ACCESSORIES

HANGERS

Figure	Description	Page
7001	Split ring, malleable iron	288
7005	Standard duty adjustable clevis	289
7006	Light duty adjustable clevis	291
7008	Adjustable clevis for copper tube	292
7010	Adjustable swivel ring	293
7012	Adjustable swivel ring, felt lined	293
7015	Adjustable swivel ring for copper	294
7025	Adjustable “J”	295
7901	Roller, steel yoke	296

CLAMPS

Figure	Description	Page
7020	Medium split horizontal	297
7022	Riser for pipe	298
7023	Riser for copper tube	298
7201	C-clamp, steel beam	300
7202	C-clamp, beam malleable iron	300
7203	Jr. beam, malleable iron	300
7204	Wide mouth beam, malleable iron	301
7806	Universal beam, malleable iron	301
7868	Right angle pipe to beam	301
7250	Retaining strap for beam clamp	302
7310	Conduit pipe for Rigid/EMT	315
7311	Conduit pipe for copper tube	315

STRUT ACCESSORIES

Figure	Description	Page
7801	Clamp, window strut to beam	301
7802	Spreader caps, strut to beam	301
7803	Clamp, square u-bolt to beam, short	302
7804	Clamp, square u-bolt to beam, long	302
7805	Clamp, notched type strut to beam	302
7865	Roller trolley 4-bearing assembly	302
7811	Bracket, 2-hole 1-5/8” channel	303
7818	Channel Nut, long spring	304
7819	Channel Nut, no spring, all channel sizes	304
7820	Channel Nut, no spring	304
7821	Channel Nut, regular spring	304
7822	Channel Nut, short spring	304
7824	Channel Nut, top spring	304
7830	End cap, channel PVC	305
7831	End cap, channel	305
7840	Fitting, 2-hole no-twist corner angle	305
7841	Fitting, 2, 3, or 4-hole corner angle	305
7842	Fitting, 2 or 3-hole cross corner angle	306
7843	Fitting, 3 or 4-hole cross corner 3-way	306
7844	Fitting, 7-hole gusset angle	306
7845	Fitting, 2-hole open 45° angle	306
7846	Fitting, 2-hole closed 45° angle	306
7847	Fitting, 4-hole open 45° angle	307
7848	Fitting, 2-hole angle brace	307
7835	Fitting, 1-hole square washer	307
7836	Fitting, 1-hole notched square washer	307
7837	Fitting, 2, 3, or 4-hole flat splice plate	308
7838	Fitting, 3-hole flat corner plate	308

STRUT ACCESSORIES (cont.)

Figure	Description	Page
7839	Fitting, 4-hole flat tee plate	308
7891	Fitting, 5-hole cross U-fitting	308
7895	Fitting, 4-hole splice U-fitting	308
7850	Base, 2-hole single channel	309
7851	Base, 2-hole single channel flush	309
7852	Base, 4-hole single channel standard	309
7853	Base, 4-hole single channel tall	309
7855	Base, 4-hole single channel short	309
7815	Clamp, pipe to strut cushioned	310
7816	Clamp, tube to strut cushioned	310
7870	Clamp, copper tube to strut	311
7871	Clamp, EMT to strut	311
7872	Clamp, O.D. pipe to strut	312
7873	Clamp, rigid to strut	313
7874	Clamp, universal	313
7862	Pipe wrap, EPDM	314

PIPE SUPPORT SYSTEMS

Figure	Description	Page
7701	Pipe support, 50# with strut	303
7715	Pipe support, 150# with strut	303
7730	Pipe support, 300# with strut	303
ELKITC	Elevation kit	303

ATTACHMENTS

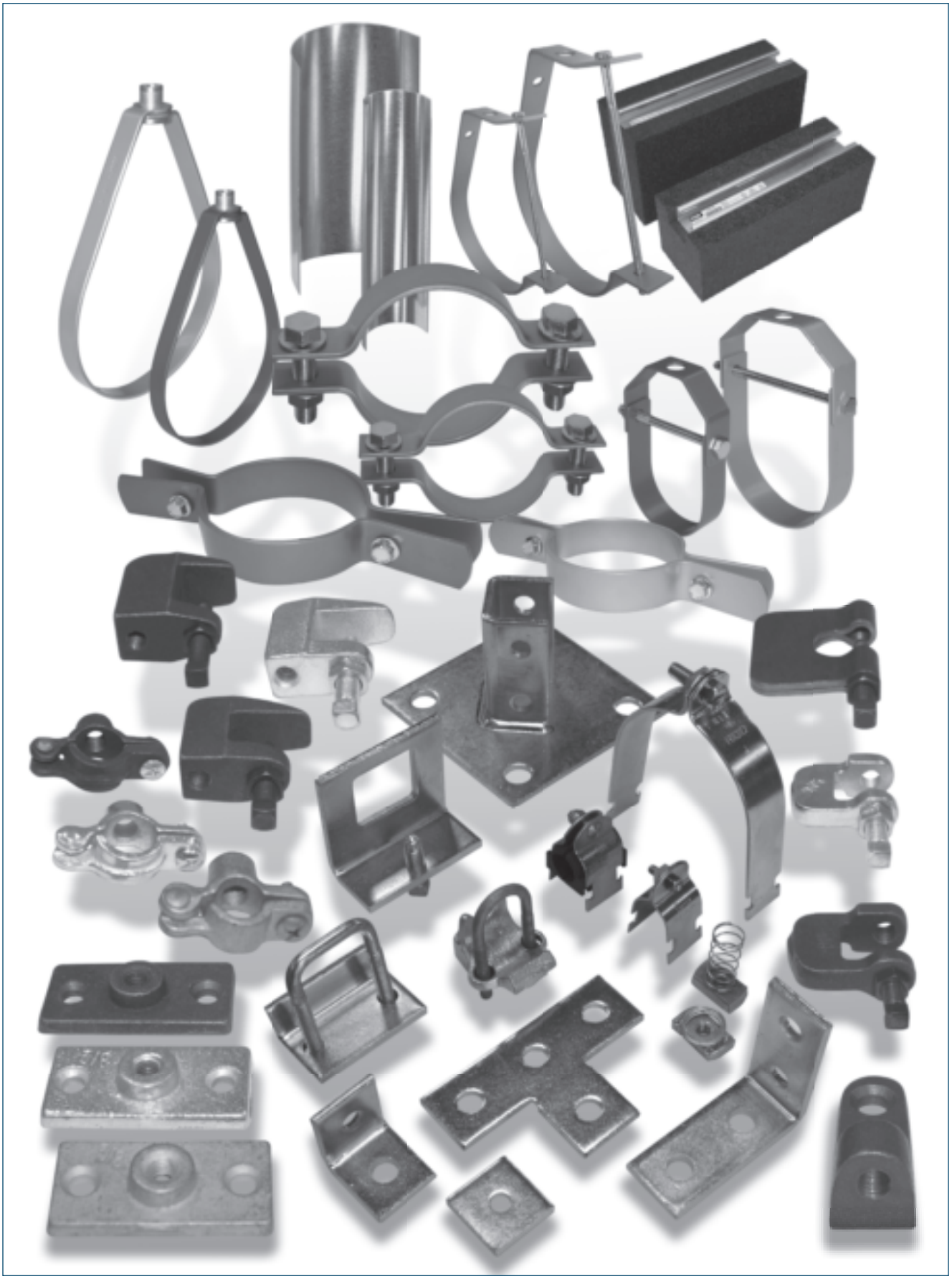
Figure	Description	Page
7501	Beam connector, malleable iron	315
7502	Beam ceiling flange, malleable iron	315

SHIELDS

Figure	Description	Page
7750	Insulation protection, MSS	316
7751	Insulation protection, MSS (domestic)	316
7753	Insulation protection, light duty	316

U-Bolts

Figure	Description	Page
7610	Standard U-bolt with 4 hex nuts	299



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)
316 Stainless Steel ..... ASTM A240 (Type 316)

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)

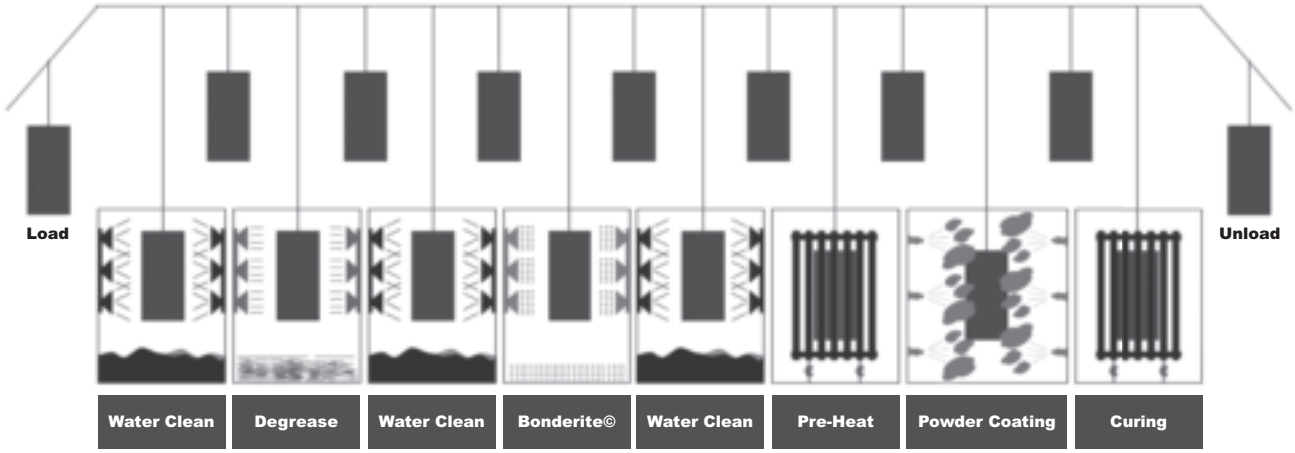
S6 .....Stainless Steel
Product made in 316 Stainless Steel - ASTM A240 (Type 316)

EP.....Epoxy Plated (Zinc Colored)
A highly durable and corrosion resistant coating system. See page 4 for details.

EC.....Epoxy Plated (Copper Colored)
A highly durable and corrosion resistant coating system. See page 4 for details.

Epoxy Plated Finish

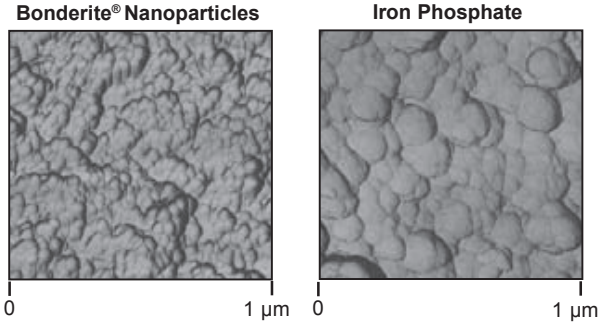
FNW's EP and EC designated hangers and clamps come standard with epoxy plating that use a more environmentally friendly method than epoxy coatings that use phosphates and heavy metals. The eight step process results in a superior coating that both enhances corrosion resistance and appearance.



Eight Step Epoxy Plating Process

1. Water Clean - Initial cleaning after forming.
2. Degrease - An alkaline solution 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® 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.

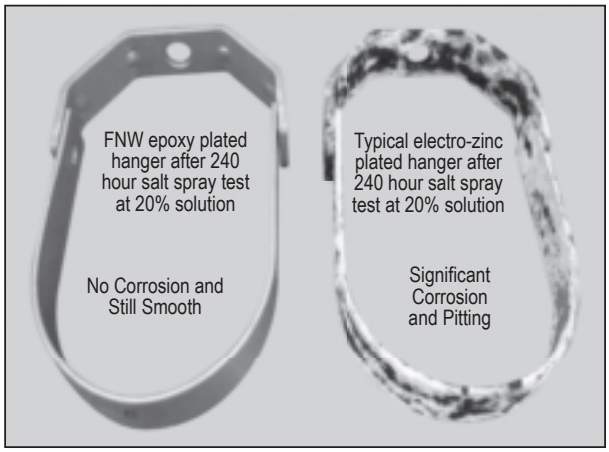
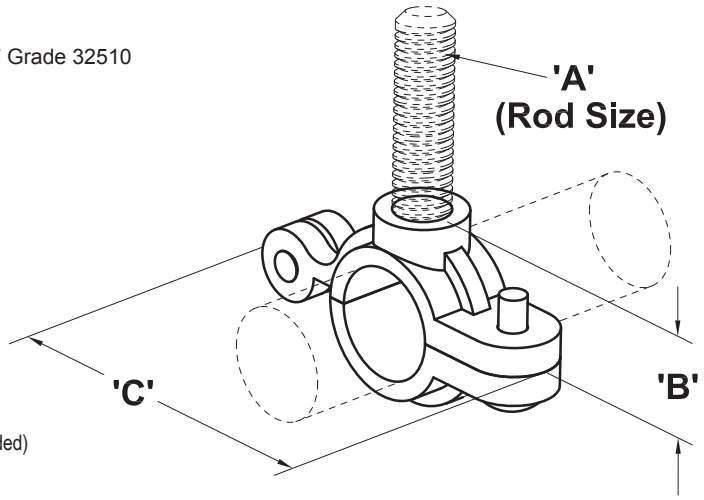


FIGURE 7001 - Hinged Split Ring

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	Weight (oz.)	
in.	mm		Plain & Zinc	Copper	in.	mm	Plain & Zinc	Copper	lbs	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

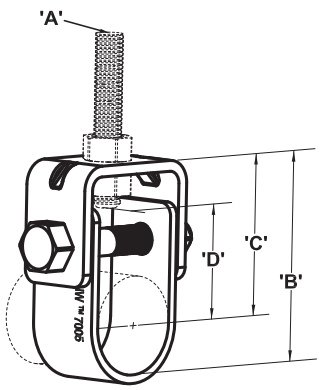
Pipe Size		Catalog Number		
in.	mm	Plain	Zinc	Copper
3/8	17.2	FNW7001PC	FNW7001ZC	FNW7001CC
1/2	21.3	FNW7001PD	FNW7001ZD	FNW7001CD
3/4	26.6	FNW7001PF	FNW7001ZF	FNW7001CF
1	33.4	FNW7001PG	FNW7001ZG	FNW7001CG
1-1/4	42.1	FNW7001PH	FNW7001ZH	FNW7001CH
1-1/2	48.2	FNW7001PJ	FNW7001ZJ	FNW7001CJ
2	60.3	FNW7001PK	FNW7001ZK	FNW7001CK
2-1/2	73.0	FNW7001PL	FNW7001ZL	FNW7001CL
3	88.9	FNW7001PM	FNW7001ZM	FNW7001CM
4	114.3	FNW7001PP	FNW7001ZP	FNW7001CP

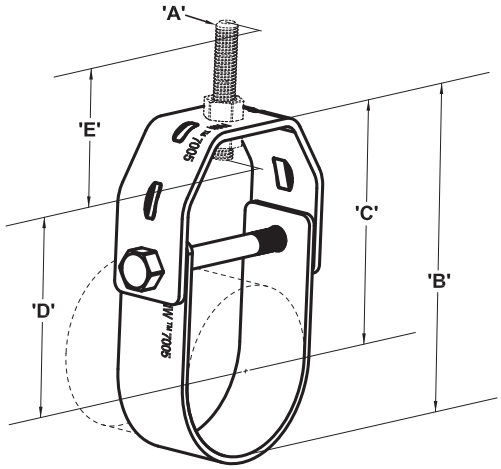
FIGURE 7005 - Standard Duty Adjustable Clevis Hangers

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



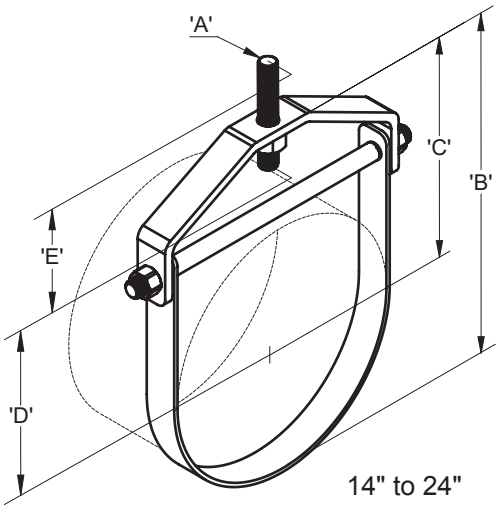


Catalog Number	Pipe Size		A (Rod Size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7005EP0050	1/2	21.3	3/8"-16	1-15/16	49.00	1-7/16	37.55	3/8	9.5
FNW7005EP0075	3/4	26.6	3/8"-16	2-1/4	57.40	1-3/4	43.25	5/8	15.3
FNW7005EP0100	1	33.4	3/8"-16	2-11/16	68.00	2	50.50	7/8	22.5
FNW7005EP0125	1-1/4	42.1	3/8"-16	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 7005 - Standard Duty Large Diameter Adjustable Clevis Hangers

Finish: Epoxy Plated
Color: Zinc
MSS SP-58, Type 1
Federal Specification: WW-H-171, Type 1



A - Rod size (hanger rod and nut 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
FNW7005EP1400	14	355.6	1"-8	21-1/6	537.5	13-5/8	347.2	11-3/16	281.6
FNW7005EP1600	16	406.4	1"-8	23-1/2	596.5	14-3/4	380.8	12-7/8	327.0
FNW7005EP1800	18	457.2	1"-8	27	683.5	17-3/8	442.4	13-15/16	354.0
FNW7005EP2000	20	508.0	1-1/4"-7	29-2/3	754.0	19	486.0	17-7/16	442.9
FNW7005EP2400	24	609.6	1-1/4"-7	33-7/9	858.0	21-1/8	539.2	20	485.5

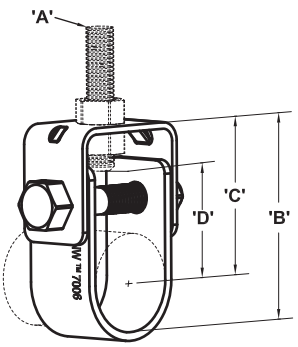
Catalog Number	Pipe Size		E		F		Bolt Size	Design Load		Weight
	in.	mm	in.	mm	in.	mm		lbs	kN	lbs
FNW7005EP1400	14	355.6	4	101.6	2-7/8	73.0	1-8UNC	4200	18.67	18.15
FNW7005EP1600	16	406.4	4	101.6	3-3/8	85.7	1-8UNC	4600	20.44	23.84
FNW7005EP1800	18	457.2	4-1/2	114.3	3-3/8	85.7	1-8UNC	4800	21.33	26.79
FNW7005EP2000	20	508.0	5	127.0	4-13/16	122.2	1-1/4-7UNC	4800	21.33	43.53
FNW7005EP2400	24	609.6	5	127.0	5-1/4	133.3	1-1/4-7UNC	4800	21.33	50.39

FIGURE 7006 - Light Duty Adjustable Clevis Hangers

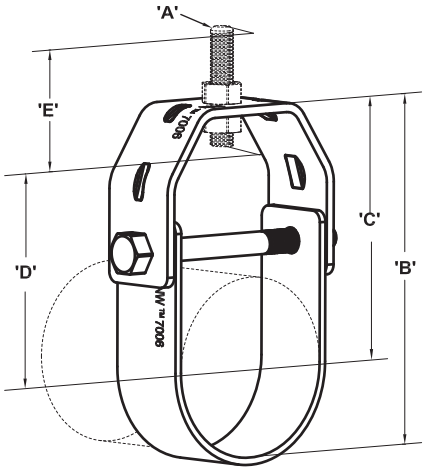
UL Approved - Sizes 3/4" to 4"

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



1/2" to 1-1/4"



1-1/2" to 4"

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

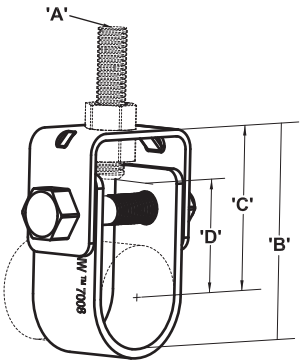
Catalog Number	Pipe Size		E		F		Bolt Size	Design Load		Weight
	in.	mm	in.	mm	in.	mm		lbs	kN	lbs
FNW7006EP0050	1/2	21.3	2-1/2	63.5	7/16	11.1	1/4-20UNC	150	0.67	0.10
FNW7006EP0075	3/4	26.6	2-1/2	63.5	1/2	12.7	1/4-20UNC	150	0.67	0.12
FNW7006EP0100	1	33.4	2-1/2	63.5	5/8	15.9	1/4-20UNC	250	1.11	0.13
FNW7006EP0125	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

I

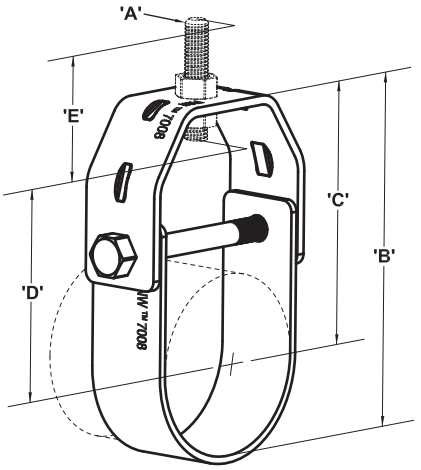
FIGURE 7008 - Adjustable Clevis Hangers for Copper Tube

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



1/2" to 1-1/2"



2" to 6"

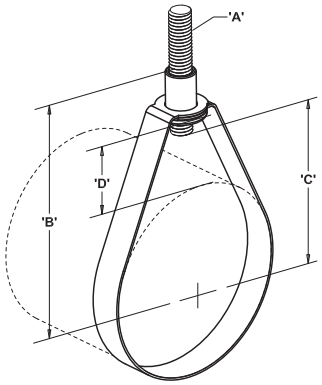
Catalog Number	Pipe Size		A (Rod Size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7008EC0050	1/2	15.9	3/8"-16	1-3/4	45.00	1-7/16	36.20	3/8	9.20
FNW7008EC0075	3/4	22.2	3/8"-16	2	51.40	1-1/2	39.40	1/2	12.40
FNW7008EC0100	1	28.6	3/8"-16	2-7/16	61.70	1-7/8	46.55	3/4	19.55
FNW7008EC0125	1-1/4	34.9	3/8"-16	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	lbs
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

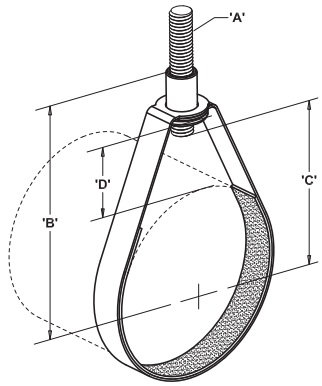
Catalog Number	Pipe Size		A (Rod Size)	B		C		D		Design Load		Weight
	in.	mm		in.	mm	in.	mm	in.	mm	lbs	kN	lbs
FNW7010EP0050	1/2	21.3	3/8-16UNC	2-7/32	56.36	25/32	19.8	7/8	22.2	300	1.33	0.09
FNW7010EP0075	3/4	26.6	3/8-16UNC	2-7/16	61.91	1-1/32	26.2	1-3/32	27.8	300	1.33	0.09
FNW7010EP0100	1	33.4	3/8-16UNC	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

*** Note: For 2-1/2" to 4" hangers with NFPA rod sizes, use figure number 7012N**

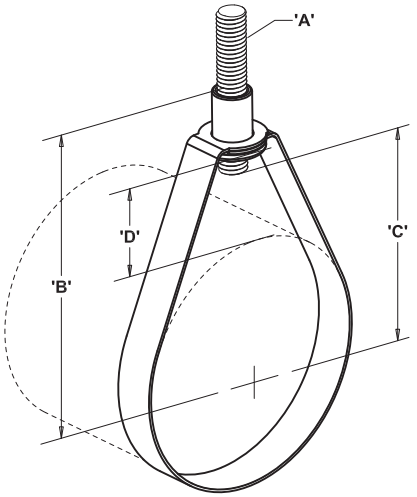


A - Rod size (hanger rod not included)
B - Center of pipe to top of knured hanger rod nut
C - Rod take out (center of pipe to bottom of hanger rod)
D - Top of pipe to bottom of hanger rod nut

Catalog Number	Pipe Size		A (Rod Size)	B		C		D		Design Load		Weight
	in.	mm		in.	mm	in.	mm	in.	mm	lbs	kN	lbs
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 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

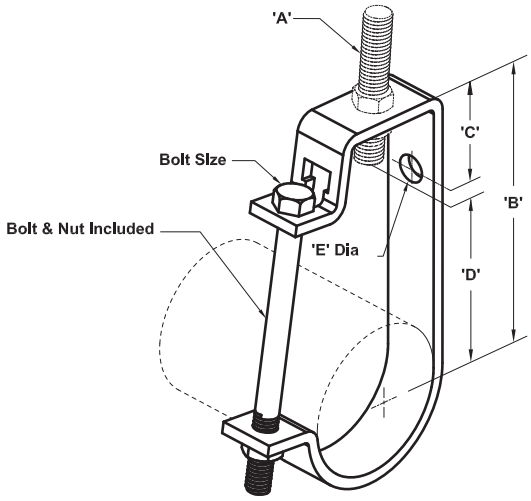
Catalog Number	Pipe Size		A (Rod Size)	B		C		D	
	in.	mm		in.	mm	in.	mm	in.	mm
FNW7015EC0050	1/2	16.00	3/8-16UNC	2-1/4	57.2	13/16	20.6	15/16	23.8
FNW7015EC0075	3/4	22.35	3/8-16UNC	2-1/2	63.5	1-3/32	27.8	1-3/16	30.2
FNW7015EC0100	1	28.70	3/8-16UNC	2-17/32	64.3	1-1/8	28.6	1-5/32	29.4
FNW7015EC0125	1-1/4	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

FNW701XRNC	3/8 RIVET NUT F/ LOOP HGR
FNW701XRND	1/2 RIVET NUT F/ LOOP HGR
FNW701XRNE	5/8 RIVET NUT F/ LOOP HGR

FIGURE 7025 - Adjustable "J" Hangers

Finish: Epoxy Plated
Color: Zinc
MSS SP-58, Type 5



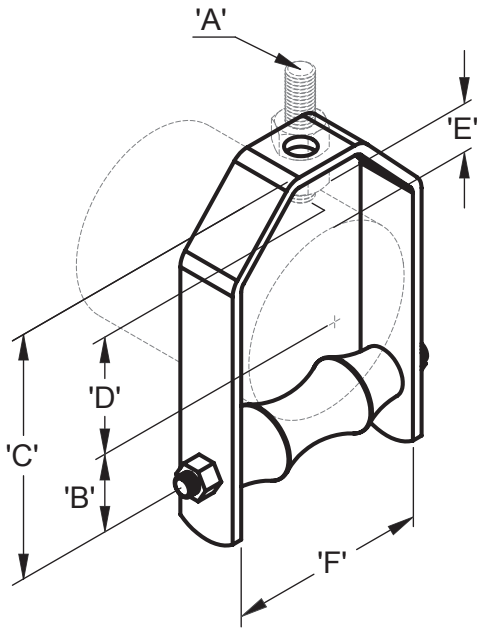
A - Rod size (hanger rod and nuts not included)
B - Center of pipe to top of hanger
C - Rod take out (center of pipe to bottom of hanger rod)

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 7901 - Steel Yoke Roller Hanger

Epoxy Plated Yoke
Carbon Steel Yoke, Axle and Nuts
Cast Iron Roller
MSS SP-58, Type 43
Federal Specification: WW-H-17E, Type 44
Selection & Application: MSS SP-69, Type 43



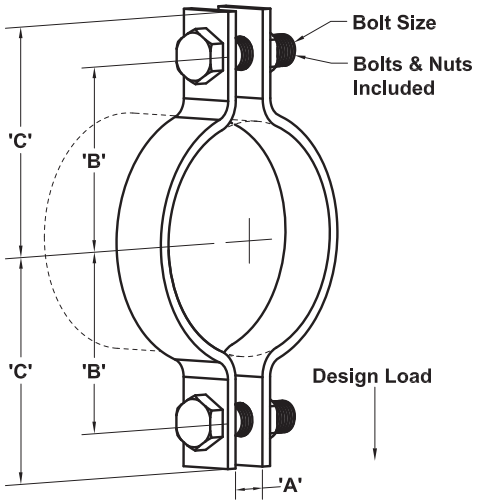
Catalog Number	Pipe Size		A (Rod Size)	B		C		D		E		F	
	in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
FNW7901EP0300	3	88.9	1/2-13	2-3/16	55.56	6-7/8	174.63	3-1/2	88.90	2-1/16	52.39	3-7/8	98.43
FNW7901EP0400	4	114.3	5/8-11	2-13/16	71.44	7-5/8	193.68	3-5/8	92.08	1-5/8	41.28	4-7/8	123.83
FNW7901EP0500	5	141.3	5/8-11	3-3/8	85.73	9-1/8	231.78	4-9/16	115.89	2	50.80	5-7/8	149.23
FNW7901EP0600	6	168.2	3/4-10	4	101.60	10-5/16	261.94	4-15/16	125.41	2	50.80	7	177.80
FNW7901EP0800	8	219.1	7/8-9	5-1/16	128.59	12-11/16	322.26	5-15/16	150.81	2	50.80	9	228.60
FNW7901EP1000	10	273.1	7/8-9	6-1/4	158.75	15	381.00	7-1/16	179.39	2-1/16	52.39	11-1/8	282.58
FNW7901EP1200	12	323.9	7/8-9	7-3/8	187.33	17	431.80	8-3/8	212.73	1-7/8	47.63	13-3/8	339.73

FIGURE 7020 - Medium Split Horizontal Pipe Clamps

c UL us

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

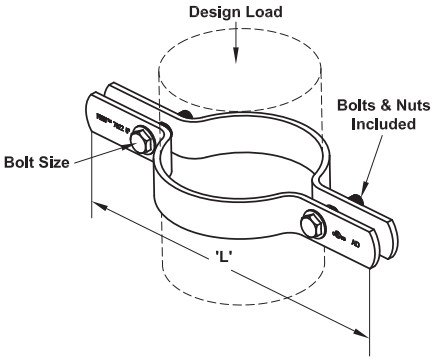
Catalog Number	Pipe Size		C		Design Load		Weight
	in.	mm	in.	mm	lbs	kN	lbs
FNW7020EP0050	1/2	21.3	1-17/32	38.9	500	2.2	0.33
FNW7020EP0075	3/4	26.7	1-19/32	40.5	500	2.2	0.34
FNW7020EP0100	1	33.4	1-7/8	47.6	500	2.2	0.40
FNW7020EP0125	1-1/4	42.2	1-15/16	49.2	500	2.2	0.42
FNW7020EP0150	1-1/2	48.3	2-1/8	54.0	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

c UL us

UL Approved - Sizes 1/2" to 8"

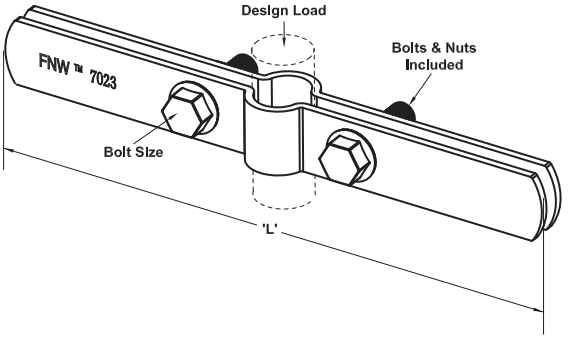
Finish: Epoxy Plated
Color: Zinc
MSS SP-58, Type 8
Federal Specification: WW-H-171, Type 8



Catalog Number	Pipe Size		L		Bolt Size	Design Load		Torque Value	Weight
	in.	mm	in.	mm		lbs	kN		lbs
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

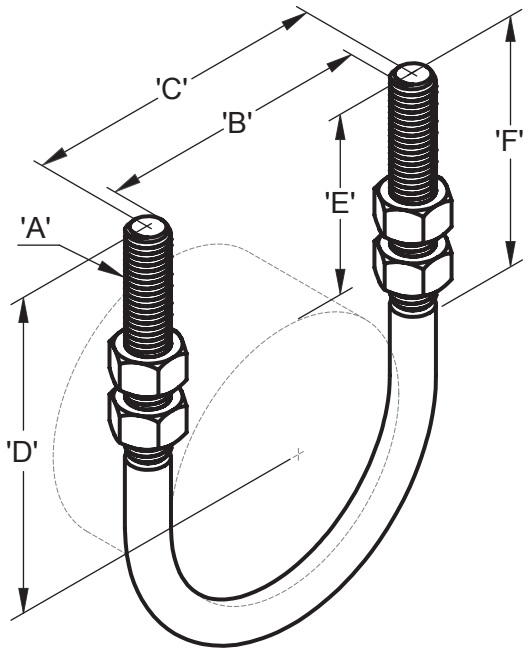


Catalog Number	Pipe Size		L		Bolt Size	Design Load		Torque Value	Weight
	in.	mm	in.	mm		lbs	kN		lbs
FNW7023EC0050	1/2	15.9	8-1/2	216.5	3/8-16UNC	75	0.33	25 ft.lbs	0.68
FNW7023EC0075	3/4	22.2	9-1/4	235.5	3/8-16UNC	75	0.33	25 ft.lbs	0.75
FNW7023EC0100	1	28.6	9-5/16	237.0	3/8-16UNC	120	0.53	25 ft.lbs	0.86
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 7610 - Standard U-Bolt w/4 Hex Nuts

Includes 4 Finished Hex Nuts
Available In:
- ○ Plain Carbon Steel
- ○ Zinc Coated Carbon Steel
- ○ 304 Stainless Steel

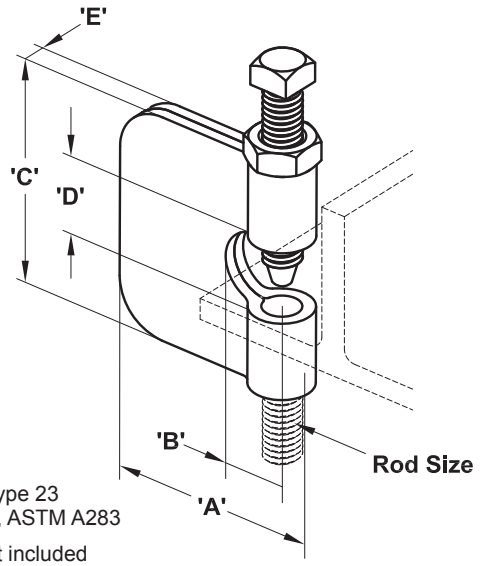
MSS SP-58, Type 24
Federal Specification: WW-H-17E, Type 24
Selection & Application: MSS SP-69, Type 24



Pipe Size		A (Thread Size)	B		C		D		E		F		Weight
in.	mm		in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	lbs
1/2	21.3	1/4"-20	15/16	23.8	1-3/16	30.2	2-3/4	69.8	2-5/16	58.7	2-1/8	54.0	0.86
3/4	26.6	1/4"-20	1-1/8	28.6	1-3/8	34.9	2-3/4	69.8	2-7/32	56.3	2-1/8	54.0	0.95
1	33.4	1/4"-20	1-3/8	34.9	1-5/8	41.3	2-3/4	69.8	2-3/32	53.2	2-1/8	54.0	1.01
1-1/4	42.1	3/8"-16	1-11/16	42.9	2-3/32	53.2	2-7/8	73.0	2-1/32	51.6	2-1/8	54.0	2.66
1-1/2	48.2	3/8"-16	2	50.8	2-3/8	60.3	3	76.2	2-1/16	52.4	2-1/2	63.5	2.75
2	60.3	3/8"-16	2-7/16	61.9	2-13.16	71.4	3-1/4	82.5	2-1/16	52.4	2-1/2	63.5	3.10
2-1/2	73.0	1/2"-13	2-15/16	74.6	3-7/16	87.3	3-3/4	95.2	2-5/16	58.7	3	76.2	7.04
3	88.9	1/2"-13	3-9/16	90.5	4-1/16	103.2	4	101.6	2-1/4	57.1	3	76.2	7.59
4	114.3	1/2"-13	4-9/16	115.9	5-1/16	128.6	4-1/2	114.3	2-1/4	57.1	3	76.2	8.78
5	141.3	1/2"-13	5-21/32	143.6	6-5/32	156.3	5	127.0	2-7/32	56.3	3	76.2	9.83
6	168.2	5/8"-11	6-3/4	171.4	7-3/8	187.3	6-1/8	155.6	2-13/16	71.4	3-3/4	95.2	19.14
8	219.1	5/8"-11	8-3/4	222.2	9-3/8	238.1	7-1/8	181.0	2-13/16	71.4	3-3/4	95.2	22.68
10	273.1	3/4"-10	10-7/8	276.2	11-5/8	295.3	8-3/8	212.7	3	76.2	4	101.6	39.75
12	323.9	7/8"-9	12-7/8	327.0	13-3/4	349.2	9-5/8	244.5	3-1/4	82.5	4-1/4	107.9	66.10
14	355.6	7/8"-9	14-1/8	358.8	15	381.0	10-1/4	260.3	3-1/4	82.5	4-1/4	107.9	70.18
16	406.4	7/8"-9	16-1/8	409.6	17	431.8	11-1/4	285.7	3-1/4	82.5	4-1/4	107.9	75.35
18	457.2	1"-8	18-1/8	460.4	19-1/8	485.8	12-5/8	320.7	3-5/8	92.1	4-3/4	120.6	134.4
20	508.0	1"-8	20-1/8	511.2	21-1/8	536.6	13-5/8	346.1	3-5/8	92.1	4-3/4	120.6	121.8
24	609.6	1"-8	24-1/8	612.8	25-1/8	638.2	15-5/8	396.9	3-5/8	92.1	4-3/4	120.6	168.7

Beam Clamps

FIGURE 7201 - Steel Beam C-Clamp



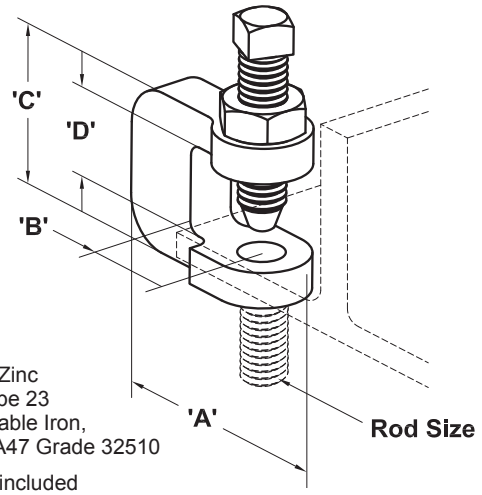
Finish: Plain
MSS SP-58, Type 23
Material: Steel, ASTM A283

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
MSS SP-58, Type 23
Material: Malleable Iron,
ASTM A47 Grade 32510

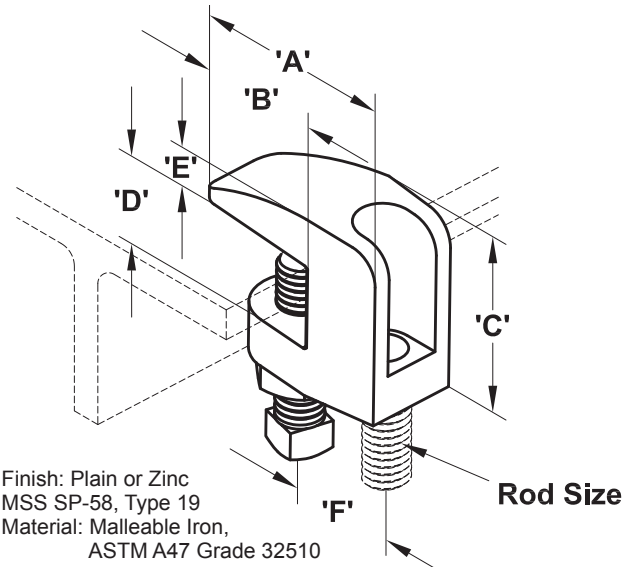
Hanger rod not included

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"

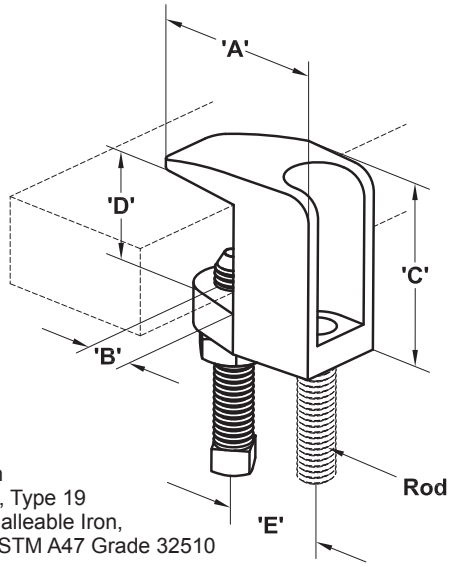
Rod Size	E	F	Wt. (oz.)
3/8"-16	0.41"	0.88"	4.94
1/2"-13	0.44"	0.97"	6.81
5/8"-11	0.50"	1.06"	9.17
3/4"-10	0.50"	1.06"	10.93

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).

Beam Clamps

FIGURE 7204 - Wide Mouth Beam Clamp



Finish: Plain
MSS SP-58, Type 19
Material: Malleable Iron,
ASTM A47 Grade 32510

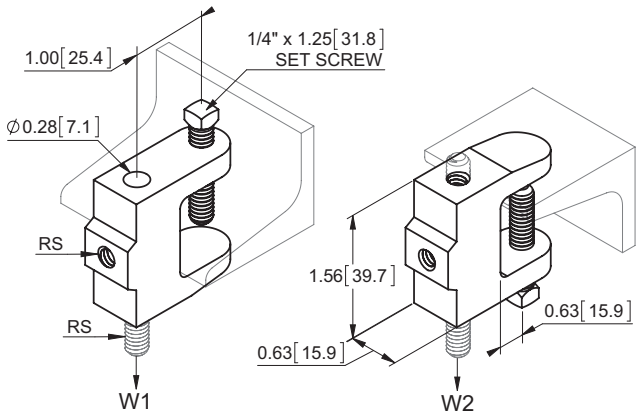
Hanger rod not included

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



Maximum flange thickness of 5/8"

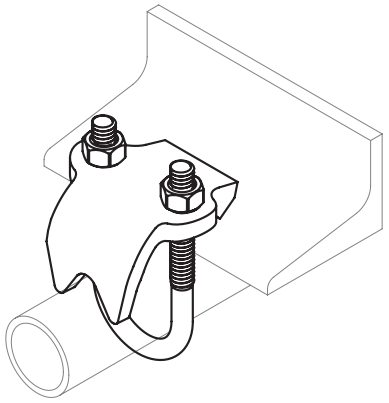
Finish: Zinc
Material: Malleable Iron

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.

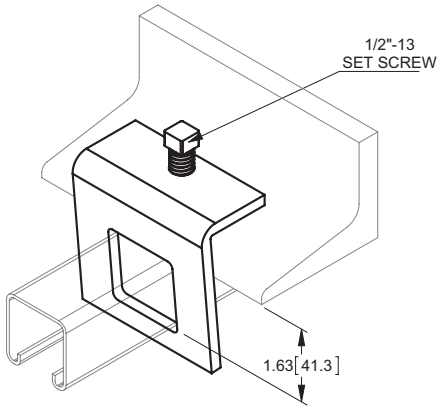
FIGURE 7868 - Right Angle Clamp



Standard finish is hot dip galvanized

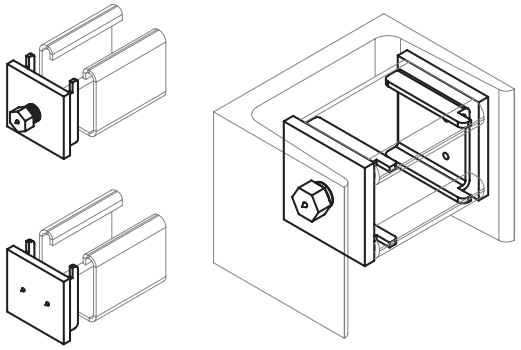
Catalog Number	Pipe Size	
	Inch	Metric
FNW7868Z0050	1/2	15
FNW7868Z0075	3/4	20
FNW7868Z0100	1	25
FNW7868Z0150	1-1/2	40
FNW7868Z0200	2	50

FIGURE 7801 - Window Strut to Beam Clamp



Design load 950 lbs [4.23 kN] when used in pairs
Catalog Number: FNW7801Z

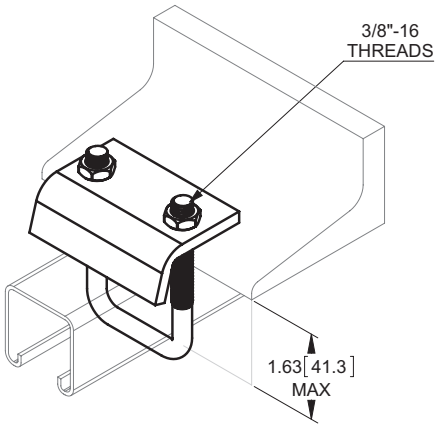
FIGURE 7802 - Strut to Beam Spreader Caps



Includes 1 adjustable cap and 1 non-adjustable cap
Cut strut length to opening minus 1" [25mm]
Design load 500 lbs [2.22 kN] when used as a set
Catalog Number: FNW7802Z

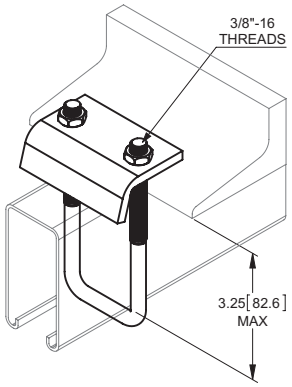
I

FIGURE 7803 - Square U-Bolt to Beam Clamp



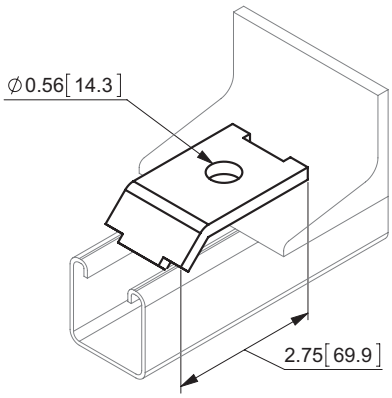
For 13/16" & 1-5/8" Channel
Design load 1200 lbs [5.34 kN] when used in pairs
Catalog Number: FNW7803Z

FIGURE 7804 - Square U-Bolt Strut to Beam Clamp



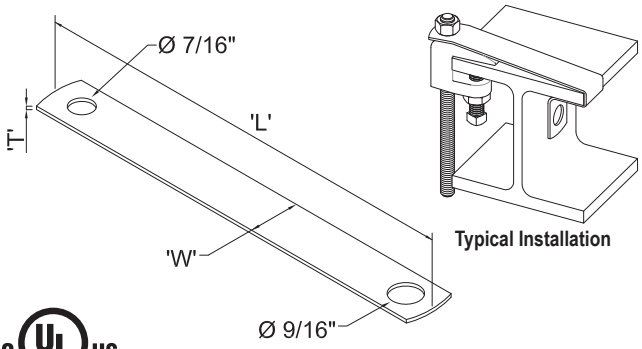
For 2-7/16" & 3-1/4" Channel
Design load 1200 lbs [5.34 kN] when used in pairs
Catalog Number: FNW7804Z

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

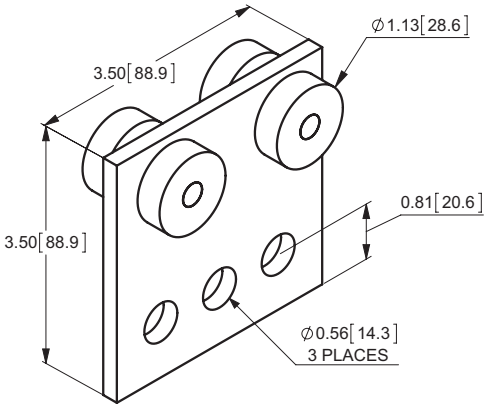


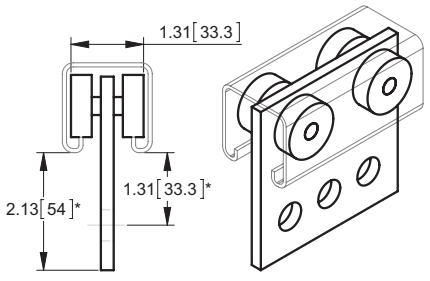
c UL us
UL Approved

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"

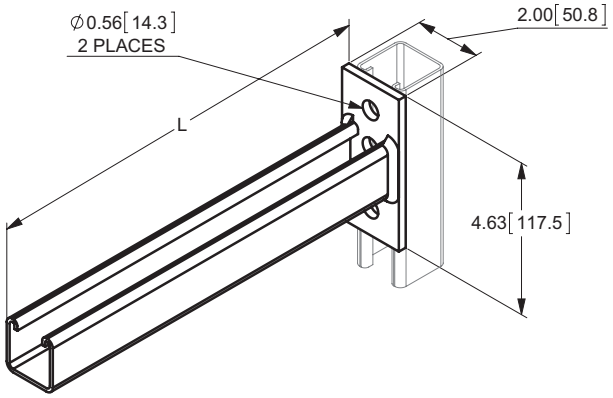
FIGURE 7865 - Roller Trolley 4-Bearing Assembly





Stainless steel ball bearings
Max load rating of 600 lbs [2.67 kN] with 12 ga. channel
* Based on standard dimensions for channel
Catalog Number: FNW7865Z4

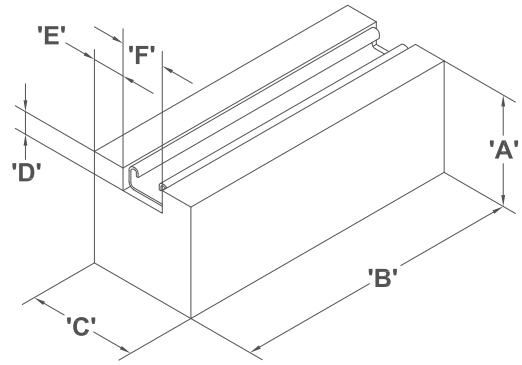
FIGURE 7811 - Bracket Channel 1-5/8" Channel 2-HL



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

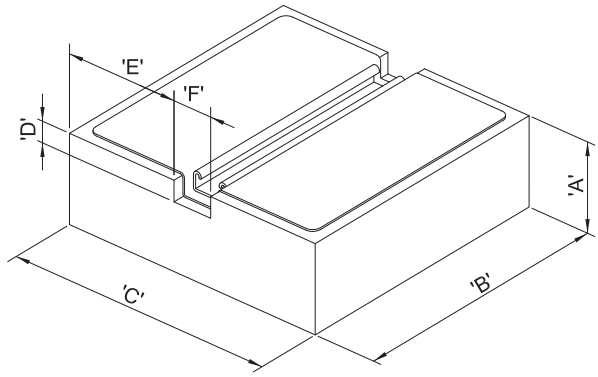
Ethafoam® 400 plank - The closed-cell medium density black polyethylene foam. Ethafoam HS 45 has successfully passed MVSS 302 flammability testing and meets or exceeds the requirements for U.S. Federal Standard PPP-C-1752C, Type III.
Ethafoam® is a registered trademark of Sealed Air Corporation (US).

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 (Fig. 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).

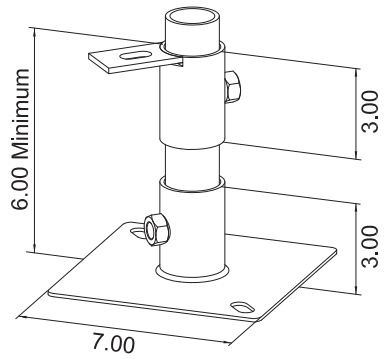
14 Gauge Strut Channel - Cold roll-formed carbon steel conforms to ASTM 570 GR 33 and ASTM A653.

14 Gauge Galvaneal 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

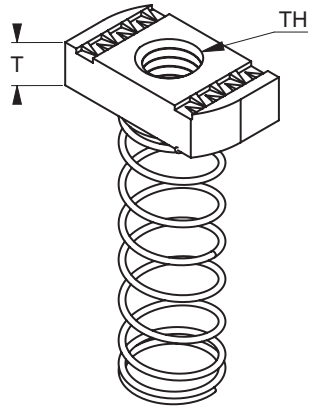
ELKITC Provides elevation to pipe support systems. Kit contains components for two posts using 1-1/4" schedule 40 steel pipe supplied by others. Minimum elevation is 6" or 10" when mounted on figure 7715 or 7730 pipe supports (sold separately) using included channel nuts. Kit components include:

- **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

Channel Nuts

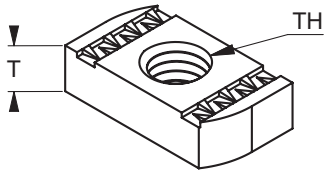
FIGURE 7818 - Long Spring Channel Nut



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

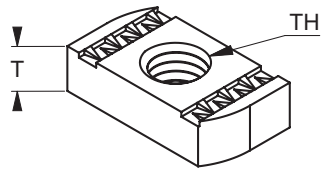
FIGURE 7819 - No Spring Channel Nut



For all channel sizes

Catalog Number	TH	T	
		in.	mm
FNW7819Z0025	1/4"-20	0.25	6.3
FNW7819Z0037 FNW7819S60037	3/8"-16	0.37	9.4
FNW7819Z0062	5/8"-11	0.37	9.4

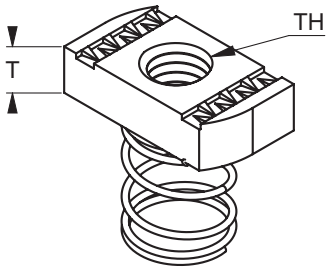
FIGURE 7820 - No Spring Channel Nut



Cannot be used with 13/16" & 1" channel

Catalog Number	TH	T	
		in.	mm
FNW7820Z0050 FNW7820S60050	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

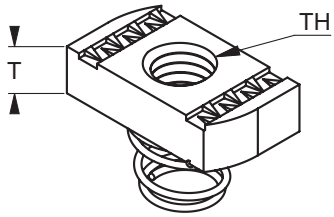
FIGURE 7821 - Regular Spring Channel Nut



For 1-3/8" & 1-5/8" channel

Catalog Number	TH	T	
		in.	mm
FNW7821Z0025 FNW7821S60025	1/4"-20	0.25	6.3
FNW7821Z0037 FNW7821S60037	3/8"-16	0.37	9.4
FNW7821Z0050 FNW7821S60050	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

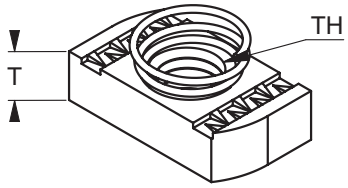
FIGURE 7822 - Short Spring Channel Nut



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

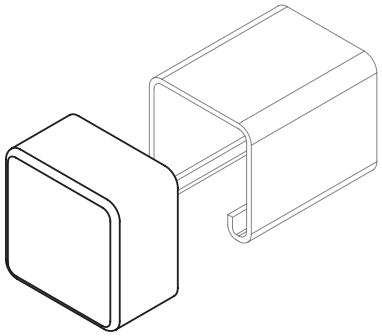


For all channel sizes except as noted

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

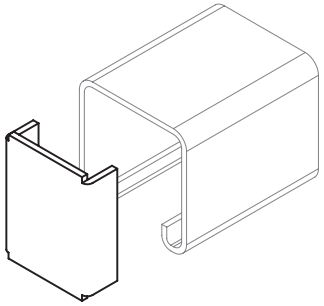
* Cannot be used with 13/16" & 1" channel

FIGURE 7830 - PVC Channel End Cap (1-5/8")



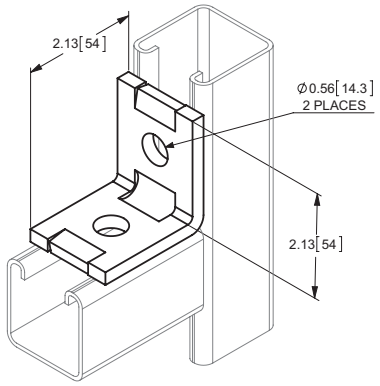
White PVC
Catalog Number: FNW7830W0162

FIGURE 7831 - Channel End Cap (1-5/8")



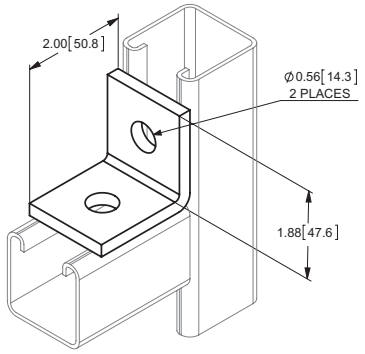
End Cap 1-5/8" 12 ga.
Catalog Number: FNW7831Z0162

FIGURE 7840 - No Twist 2-Hole Corner Angle Fitting

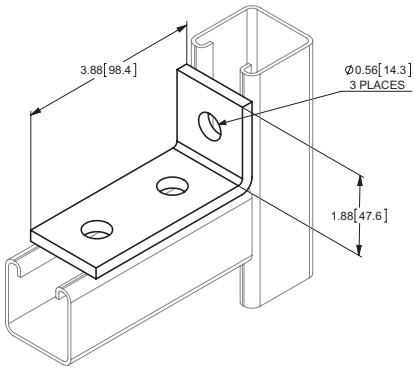


Catalog Number: FNW7840Z2

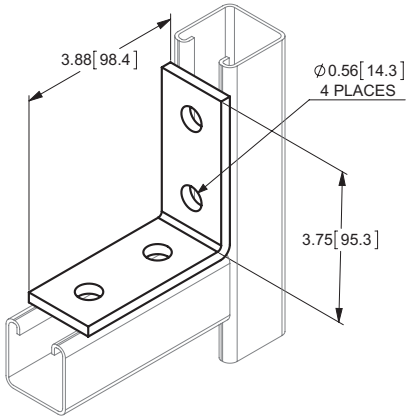
FIGURE 7841 - Corner Angle Fitting



Catalog Number: FNW7841Z2
FNW7841S2



Catalog Number: FNW7841Z3

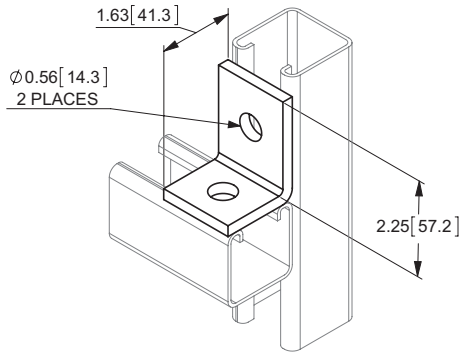


Catalog Number: FNW7841Z4
FNW7841S4

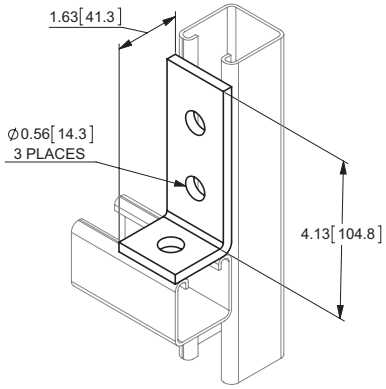
I

Angle Fittings

FIGURE 7842 - Cross Corner Angle Fitting

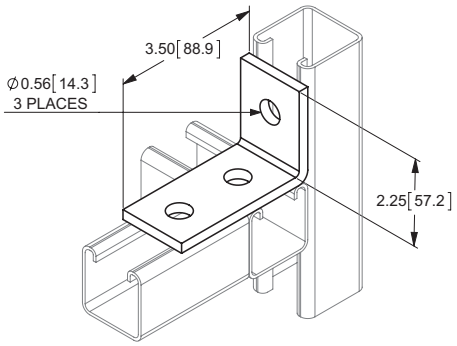


2-Hole Catalog Number: FNW7842Z2
FNW7842G2

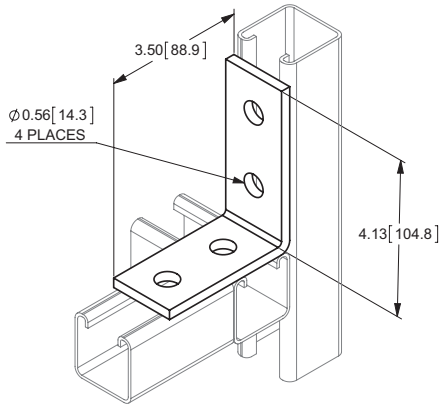


3-Hole Catalog Number: FNW7842Z3

FIGURE 7843 - 3-Way Cross Corner Angle Fitting

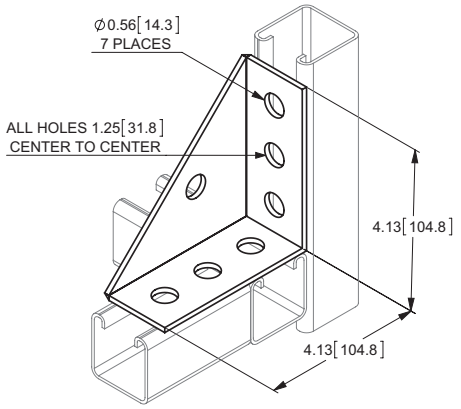


3-Hole Catalog Number: FNW7843Z3



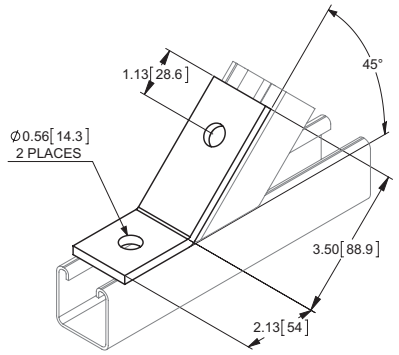
4-Hole Catalog Number: FNW7843Z4
FNW7843G4

FIGURE 7844 - 7-Hole Gusset Angle Fitting



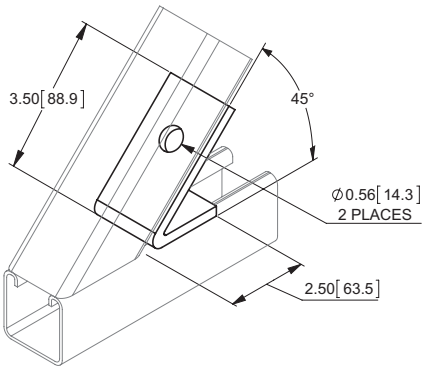
Catalog Number: FNW7844Z7

FIGURE 7845 - 2-Hole Open 45° Corner Angle Fitting



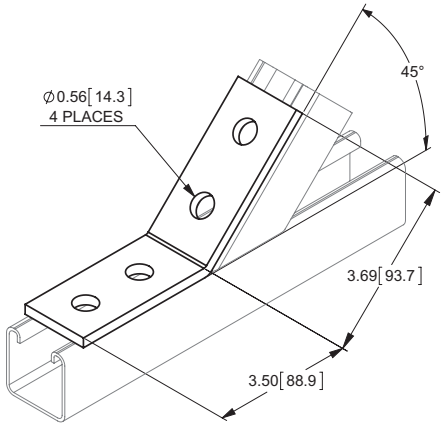
2-Hole Catalog Number: FNW7845Z2

FIGURE 7846 - 2-Hole Closed 45° Corner Angle



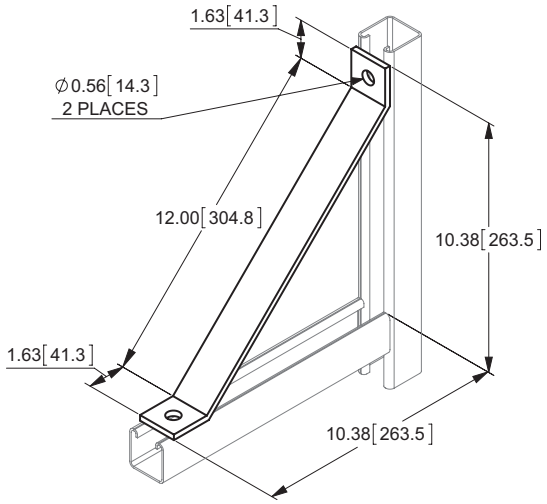
Catalog Number: FNW7846Z2

FIGURE 7847 - 4-Hole Open 45° Corner Angle Fitting

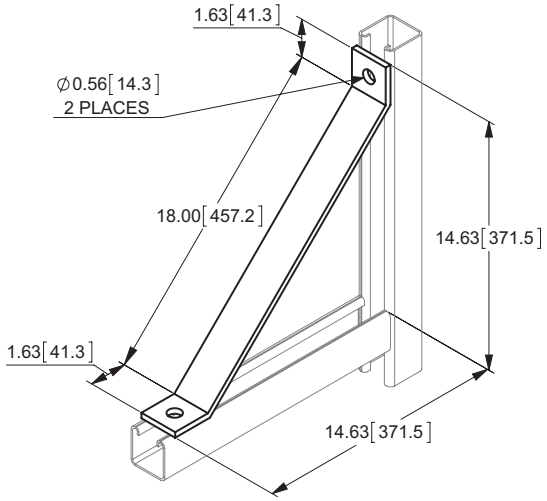


Catalog Number: FNW7847Z4

FIGURE 7848 - 2-Hole Angle Brace

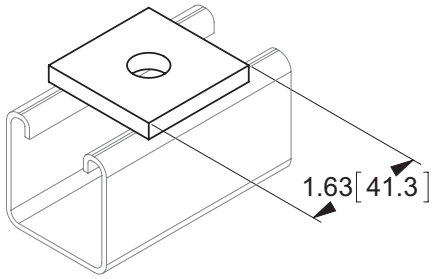


Catalog Number: FNW7848Z1200



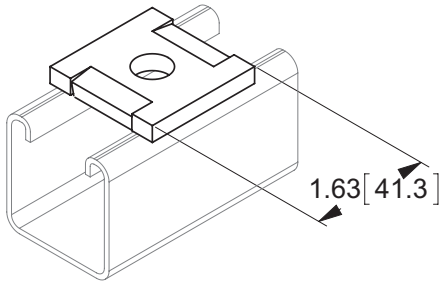
Catalog Number: FNW7848Z1800

FIGURE 7835 - Square Washer Flat Fitting



Catalog Number	Bolt Size		Hole Size	
	in.	mm	in.	mm
FNW7835Z0037 FNW7835G0037 FNW7835S0037	3/8	8	7/16	11.1
FNW7835Z0050 FNW7835G0050 FNW7835S0050	1/2	12	9/16	14.3
FNW7835Z0062 FNW7835G0062	5/8	16	11/16	17.5
FNW7835Z0075	3/4	20	13/16	20.6

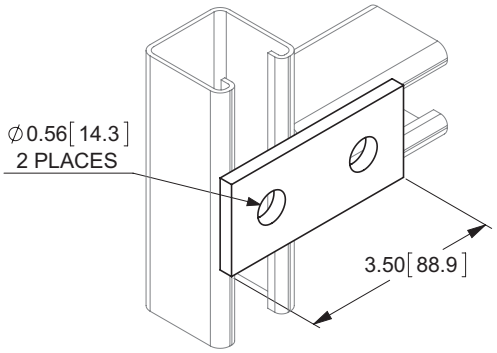
FIGURE 7836 - Notched Square Washer Flat Fitting



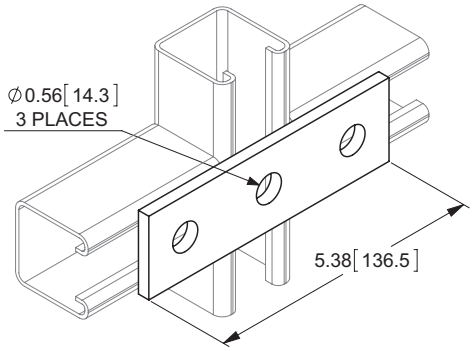
Catalog Number	Bolt Size	
	in.	mm
FNW7836Z0037 FNW7836G0037	3/8	8
FNW7836Z0050	1/2	12

I

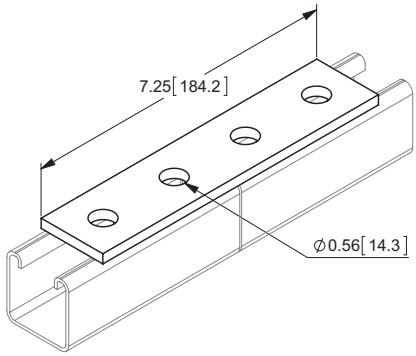
FIGURE 7837 - Splice Plate Flat Fitting



2-Hole Catalog Number: FNW7837Z2

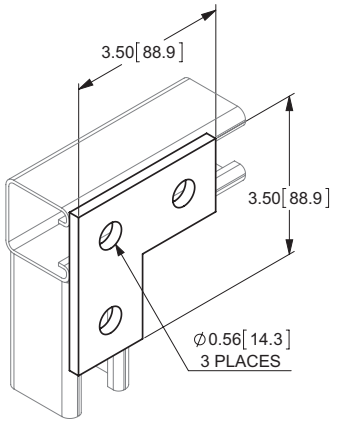


3-Hole Catalog Number: FNW7837Z3



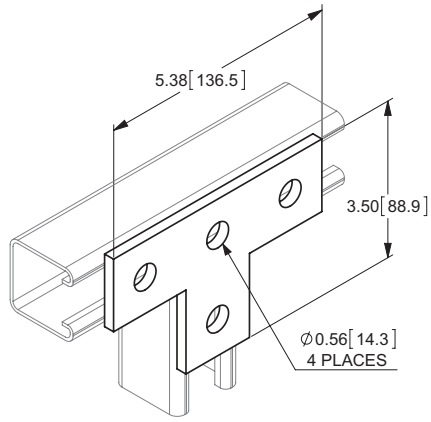
4-Hole Catalog Number: FNW7837Z4
FNW7837G4

FIGURE 7838 - 3-Hole Corner Plate Flat Fitting



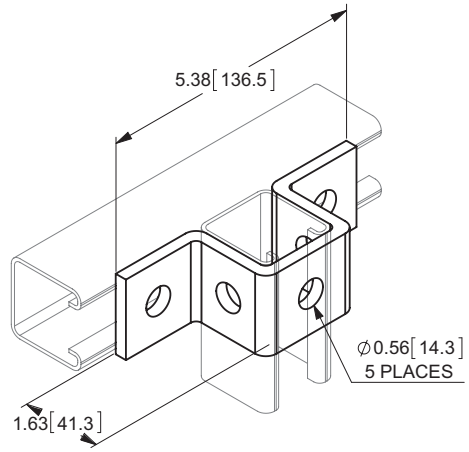
Catalog Number: FNW7838Z3
FNW7838G3

FIGURE 7839 - 4-Hole Tee Plate Flat Fitting



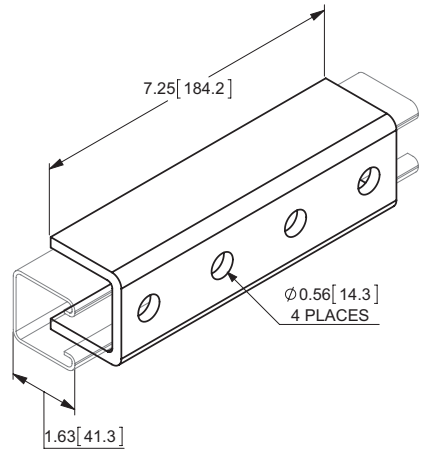
Catalog Number: FNW7839Z4
FNW7839G4

FIGURE 7891 - 5-Hole Cross U-Fitting



For 1-5/8" Channel
Catalog Number: FNW7891Z0162

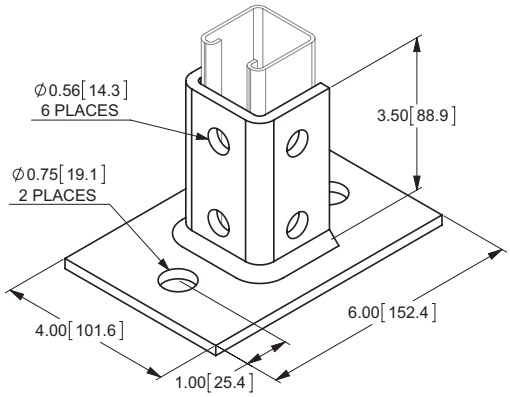
FIGURE 7895 - 4-Hole Splice U-Fitting



For 1-5/8" Channel
Catalog Number: FNW7895Z4

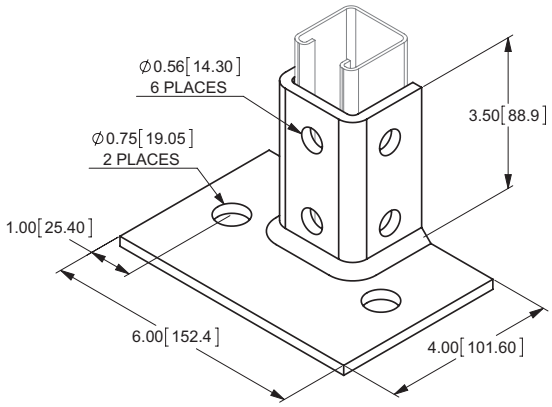
Post Base

FIGURE 7850 - Single Channel 2-Hole Base



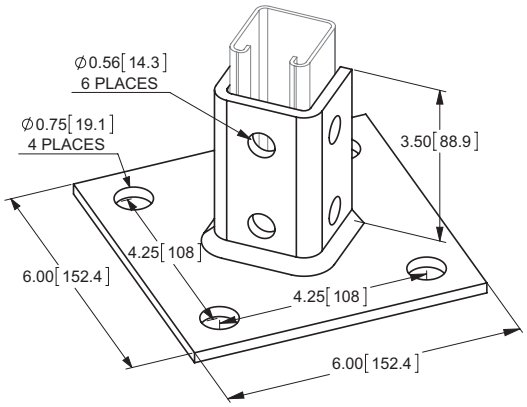
Square Mounted 3-1/2"
Catalog Number: FNW7850Z

FIGURE 7851 - Single Channel 2-Hole Flush Base



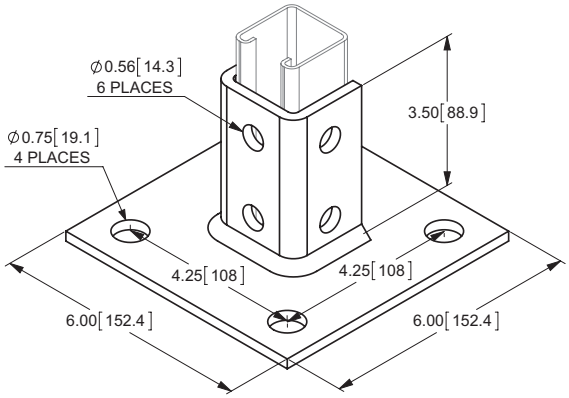
Square Mounted Flush 3-1/2"
Catalog Number: FNW7851Z

FIGURE 7852 - Single Channel 4-Hole Standard



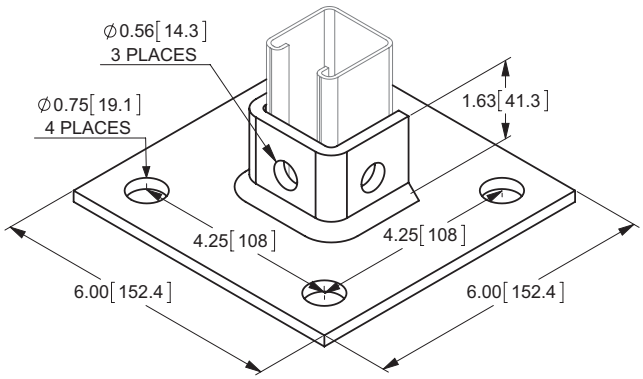
Square Mounted 3-1/2"
Catalog Number: FNW7852Z
FNW7852S

FIGURE 7853 - Single Channel 4-Hole Base (Tall)



Square Mounted 3-1/2"
Catalog Number: FNW7853Z
FNW7853G
FNW7853S

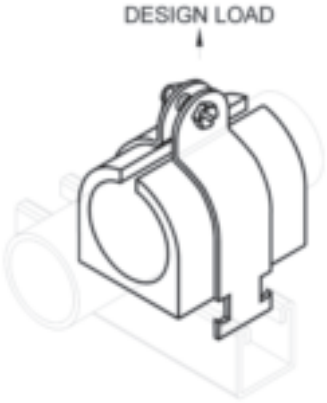
FIGURE 7855 - Single Channel 4-Hole Base (Short)



Square Mounted 1-5/8"
Catalog Number: FNW7855Z

I

FIGURE 7815 - Cushioned Pipe Strut Clamp

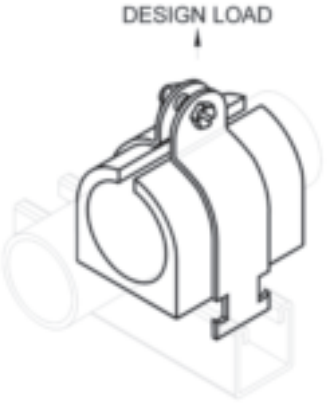


Catalog Number	Pipe Size		O.D.		Design Load	
	in.	Metric	in.	mm	lbs	kN
FNW7815Y0050	1/2	15	0.840	21.3	330	1.48
FNW7815Y0075	3/4	20	1.050	26.7	330	1.48
FNW7815Y0100	1	25	1.315	33.4	330	1.48
FNW7815Y0125	1-1/4	32	1.660	42.2	730	3.26
FNW7815Y0150	1-1/2	40	1.900	48.3	730	3.26
FNW7815Y0200	2	50	2.375	60.3	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.

Strut Clamps

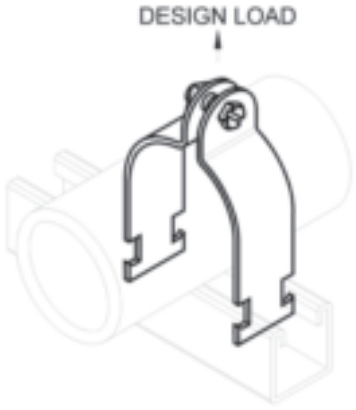
FIGURE 7816 - Cushioned Tubing Strut Clamp



Catalog Number	Tubing O.D.			Design Load	
	in. (Fraction)	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.

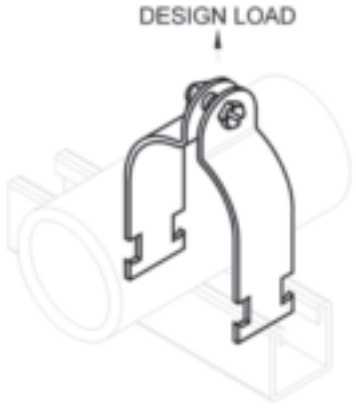
FIGURE 7870 - Copper Tubing Strut Clamp



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 Size		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

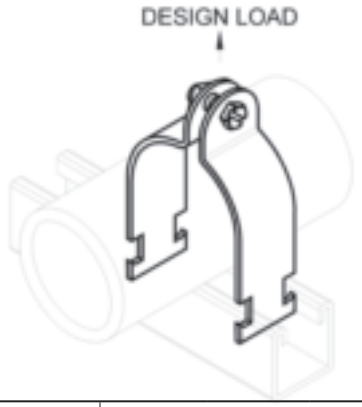
FIGURE 7871 - EMT Strut Clamp



Catalog Number	EMT Size		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

Strut Clamps

FIGURE 7872 - O.D. Strut Clamp



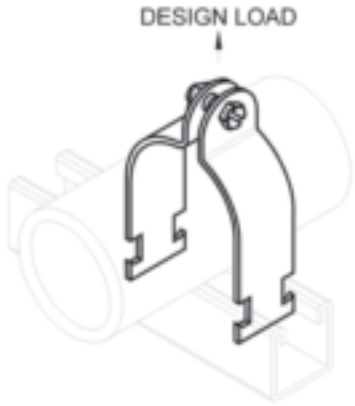
Catalog Number	Size (O.D.)			Design Load	
	in. (Fraction)	in. (Decimal)	mm	lbs	kN
FNW7872Z0025	1/4	0.250	6.4	400	1.78
FNW7872Z0037	3/8	0.375	9.5	400	1.78
FNW7872Z0050	1/2	0.500	12.7	400	1.78
FNW7872Z0062	5/8	0.625	15.9	400	1.78
FNW7872Z0075	3/4	0.750	19.0	400	1.78
FNW7872Z0087	7/8	0.875	22.3	400	1.78
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. (Fraction)	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

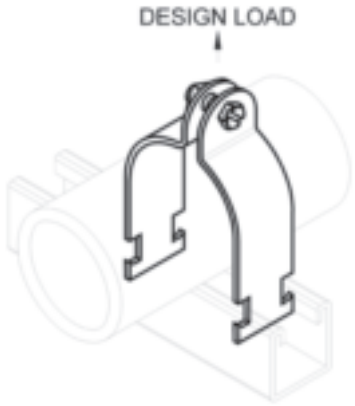
Strut Clamps

FIGURE 7873 - Rigid Strut Clamp



Catalog Number	Pipe Size		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 FNW7873S0350	3-1/2	90	4.000	101.6	1000	4.45
FNW7873Z0400 FNW7873S0400	4	100	4.500	114.3	1000	4.45
FNW7873Z0500 FNW7873S0500	5	125	5.562	141.3	1000	4.45
FNW7873Z0600 FNW7873S0600	6	150	6.625	168.3	1000	4.45
FNW7873Z0800 FNW7873S0800	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

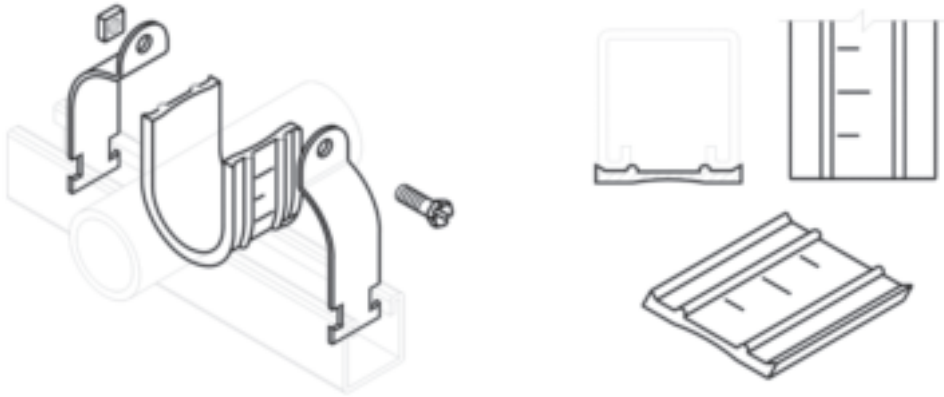


Catalog Number	Clamp Size*		O.D.		Design Load	
	in.	Metric	in.	mm	lbs	kN
FNW7874Z0050	1/2	15	0.773	19.6	400	1.78
FNW7874Z0075	3/4	20	0.986	25.0	600	2.67
FNW7874Z0100	1	25	1.239	31.5	600	2.67
FNW7874Z0125	1-1/4	32	1.585	40.3	600	2.67
FNW7874Z0150	1-1/2	40	1.820	45.7	800	3.56
FNW7874Z0200	2	50	2.286	58.1	800	3.56

*** These clamps are designed to fit both pipe (rigid conduit) and thin walled tubing (EMT) in the corresponding sizes.**

I

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		Catalog 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		Catalog 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

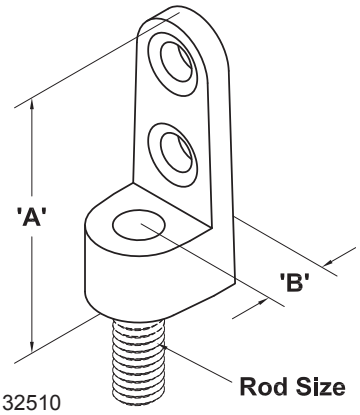
Copper Tubing

Nominal Pipe Size		PW Cut Length		Catalog 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



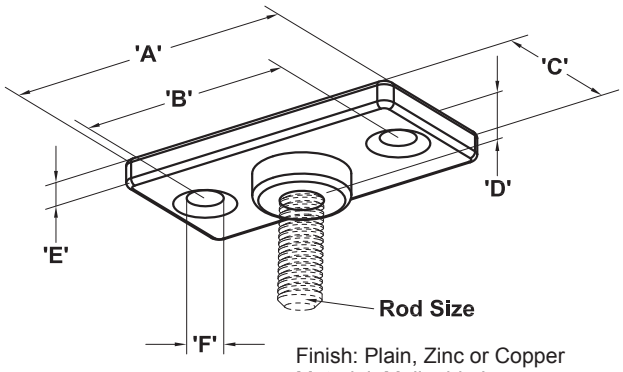
Finish: Plain
MSS SP-58, Type 34
Material: Malleable Iron,
ASTM A47 Grade 32510

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

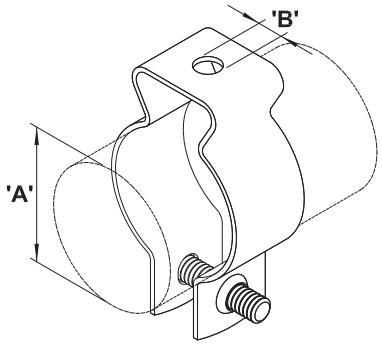
Hanger rod not included

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

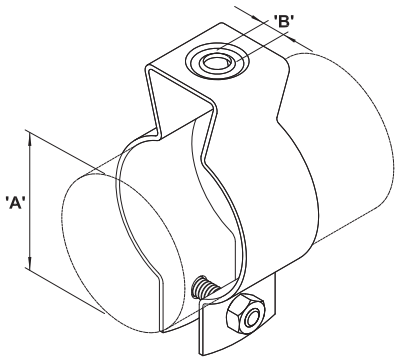


Finish: Zinc
Material: Steel

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	Size (in.)		A	B	Gauge	Design Load
	Rigid	EMT				
FNW7310Z0050	3/8 1/2	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 Size (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

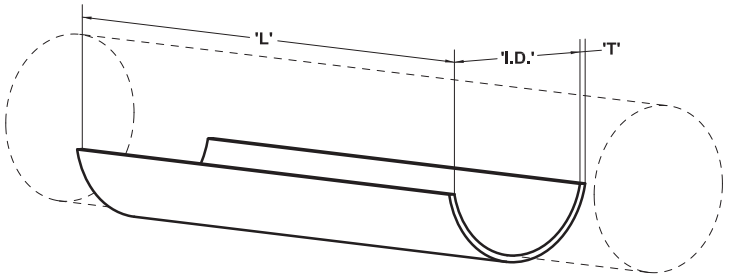
I

FIGURE 7750 (Standard) & 7751 (Domestic[1]) - 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.

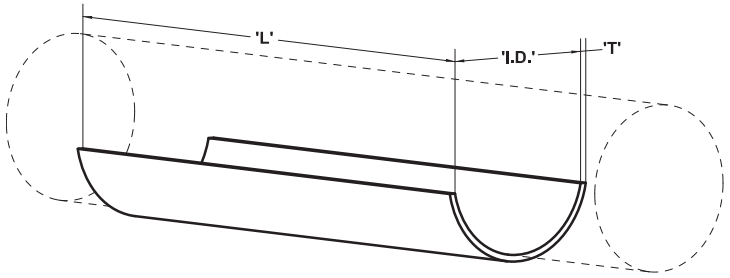
[1] Domestic shields are ordered on demand (SOD).



Catalog Number		Shield Size	L		I.D.		T			Required Hanger Size	Weight
Standard	Domestic[1]		in.	mm	in.	mm	in.	mm	ga.		lbs
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
	in.	mm	in.	mm	± in (mm)	in.	mm	ga.		lbs
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

NOTES

GAUGES, THERMOMETERS & ACCESSORIES

PRESSURE GAUGES

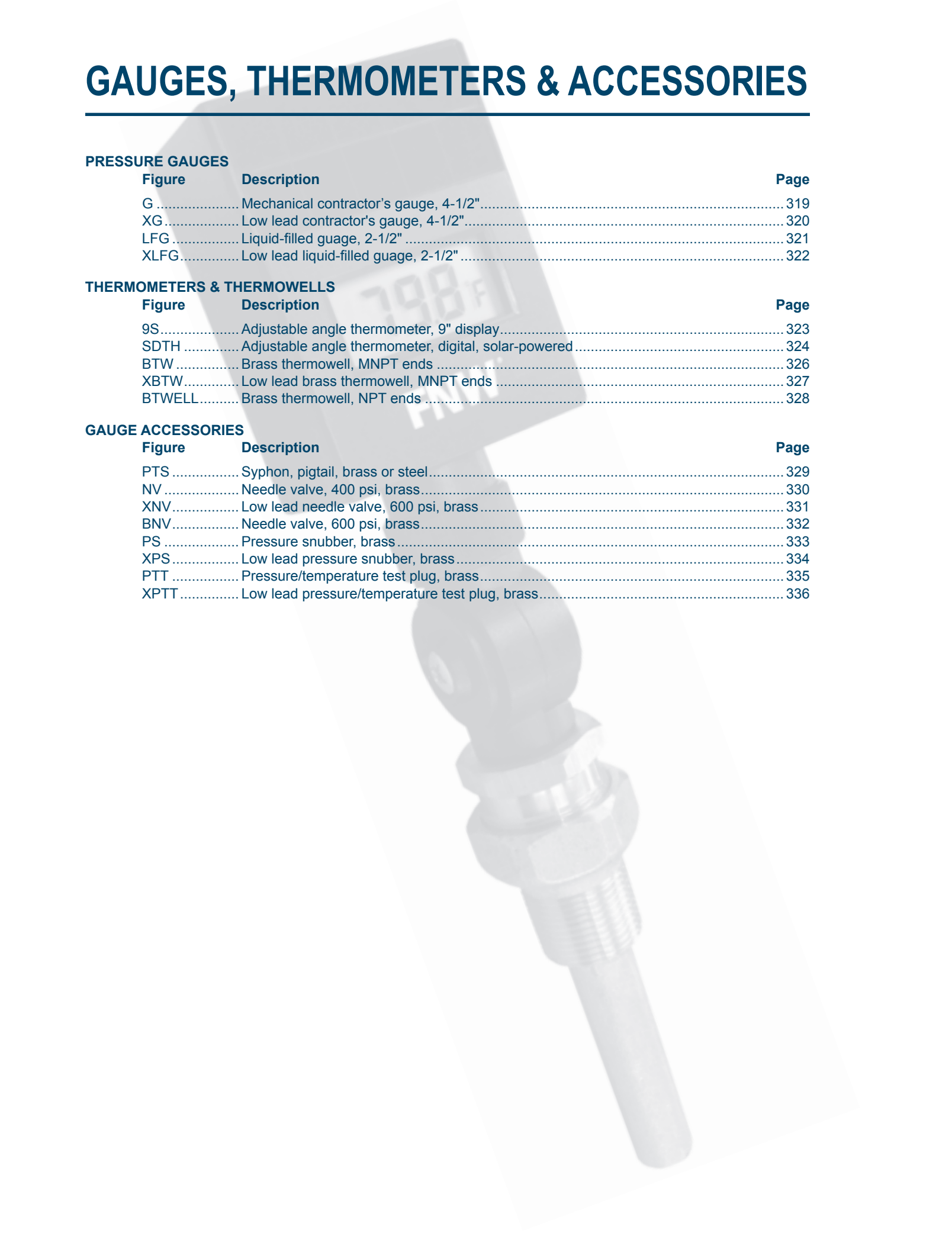
Figure	Description	Page
G	Mechanical contractor’s gauge, 4-1/2"	319
XG	Low lead contractor's gauge, 4-1/2"	320
LFG	Liquid-filled guage, 2-1/2"	321
XLFG	Low lead liquid-filled guage, 2-1/2"	322

THERMOMETERS & THERMOWELLS

Figure	Description	Page
9S	Adjustable angle thermometer, 9" display	323
SDTH	Adjustable angle thermometer, digital, solar-powered	324
BTW	Brass thermowell, MNPT ends	326
XBTW	Low lead brass thermowell, MNPT ends	327
BTWELL	Brass thermowell, NPT ends	328

GAUGE ACCESSORIES

Figure	Description	Page
PTS	Syphon, pigtail, brass or steel	329
NV	Needle valve, 400 psi, brass	330
XNV	Low lead needle valve, 600 psi, brass	331
BNV	Needle valve, 600 psi, brass	332
PS	Pressure snubber, brass	333
XPS	Low lead pressure snubber, brass	334
PTT	Pressure/temperature test plug, brass	335
XPTT	Low lead pressure/temperature test plug, brass	336



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:

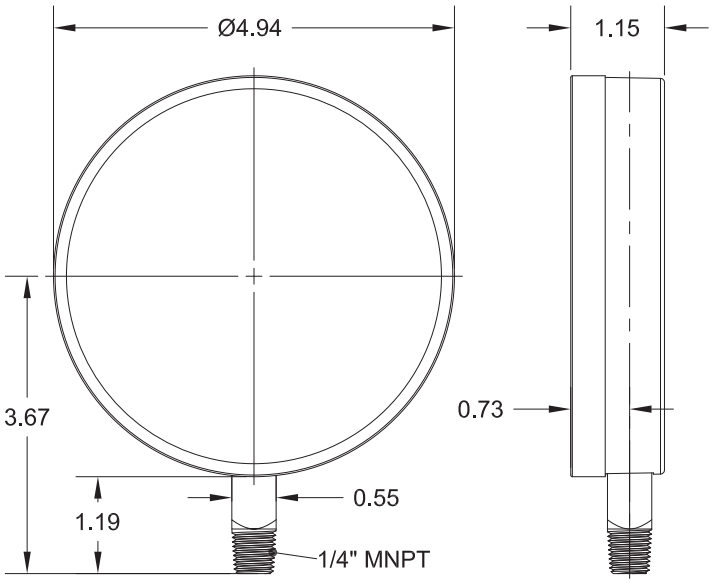
- Dual Scale (PSI and kPa)
- +/- 1% Grade 1A Per ANSI/ASME B40.100
- 304SS Case and Bezel Ring
- Zero Adjustment Screw
- Phosphor Bronze Bourdon Tube
- 1/4" Brass MNPT Connection
- Brass Movement
- Black Anodized Aluminum Pointer
- White Aluminum Dial with Black and Red Markings
- Silver Solder Welding
- 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



J

LOW LEAD COMPLIANT
4-1/2" 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. Connection and wetted internal components meet Federal lead free requirements.

Features:

- Dual Scale (PSI and kPa)
- +/- 1% Grade 1A Per ANSI/ASME B40.100
- Complies with Federal Lead-Free Law (Sec. 1417)
- 304SS Case and Bezel Ring
- Zero Adjustment Screw
- Lead Free Phosphor Bronze Bourdon Tube
- 1/4" Lead Free Brass MNPT Connection
- Brass Movement
- Black Anodized Aluminum Pointer
- White Aluminum Dial with Black and Red Markings
- Lead Free 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

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

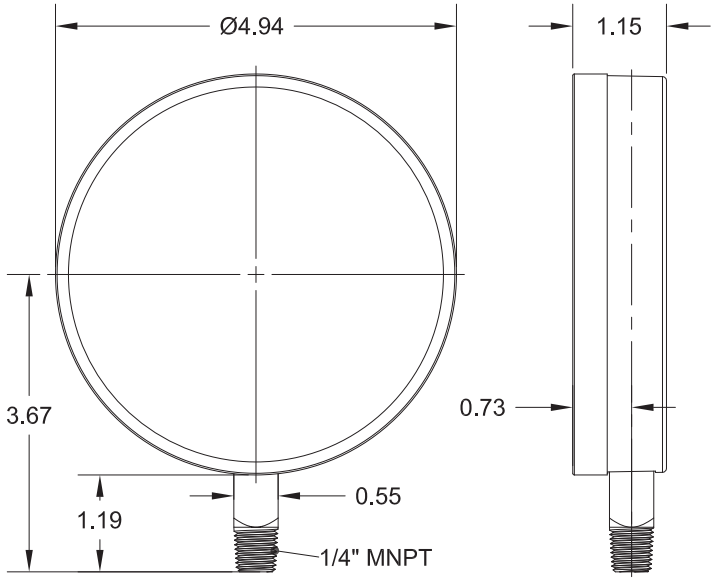
LOW LEAD

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	FNWXG030R
0 to 60	FNWXG060R
0 to 100	FNWXG0100R
0 to 160	FNWXG0160R
0 to 200	FNWXG0200R
0 to 300	FNWXG0300R



J

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:

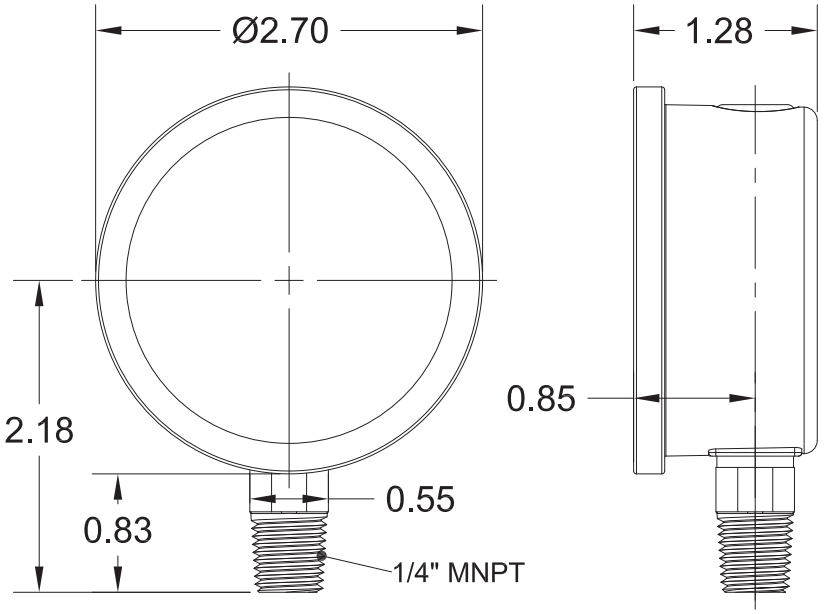
- Dual Scale (PSI and kPa)
- +/- 1.5% of Full Scale Accuracy
- 304SS Case and Crimp-On Bezel Ring
- Glycerin Filled
- Phosphor Bronze C-Shaped Bourdon Tube
- 1/4" OT 58 Brass MNPT Connection
- OT 59 Brass Movement
- Black Anodized Aluminum Pointer
- White Aluminum Dial with Black and Red Markings
- Tin/Copper Alloy Welding
- Polycarbonate Lens
- Buna-N Socket Gasket and Fill Plug
- Silicone Gasket at Lens (Non Wetted Part)
- 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



J

LOW LEAD COMPLIANT
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. Connection and wetted internal components meet Federal lead free requirements.

Features:

- Dual Scale (PSI and kPa)
- +/- 1.5% of Full Scale Accuracy
- Complies with Federal Lead-Free Law (Sec. 1417)
- 304SS Case and Crimp-On Bezel Ring
- Glycerin Filled
- Lead Free Phosphor Bronze C-Shaped Bourdon Tube
- 1/4" Lead Free Brass MNPT Connection
- OT 59 Brass Movement
- Black Anodized Aluminum Pointer
- White Aluminum Dial with Black and Red Markings
- Lead Free Tin/Copper Alloy Welding
- Polycarbonate Lens
- Buna-N Socket Gasket and Fill Plug
- Silicone Gasket at Lens (Non Wetted Part)
- 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

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

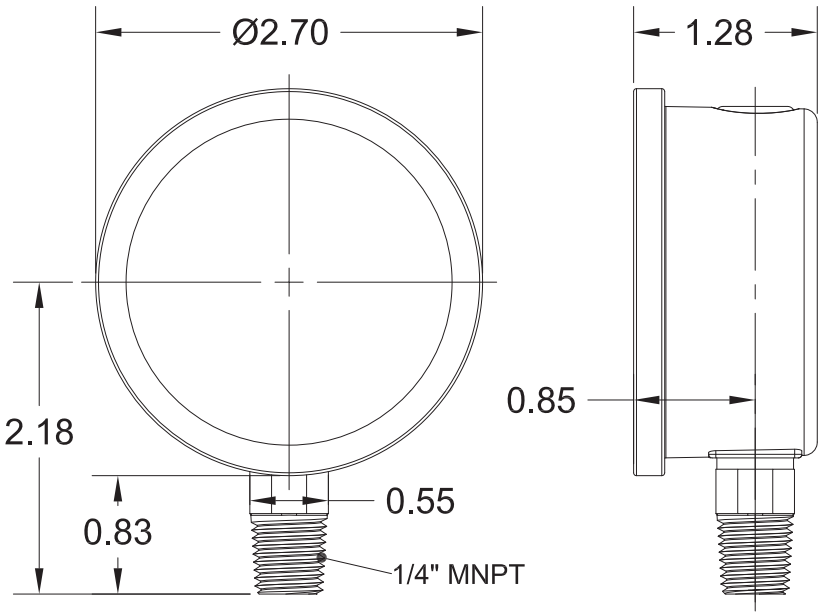
LOW LEAD

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

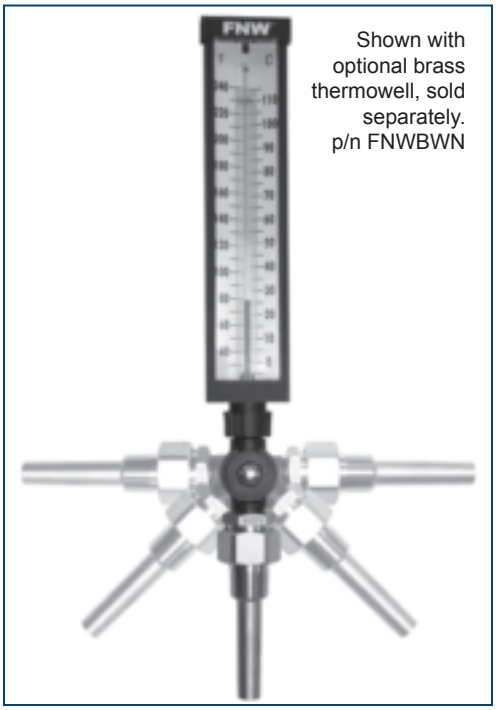
Range (PSI)	Part Number
0 to 30	FNWXLFG030L
0 to 60	FNWXLFG060L
0 to 100	FNWXLFG0100L
0 to 160	FNWXLFG0160L
0 to 200	FNWXLFG0200L
0 to 300	FNWXLFG0300L



J

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.



Shown with optional brass thermowell, sold separately. p/n FNWBWN

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" 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

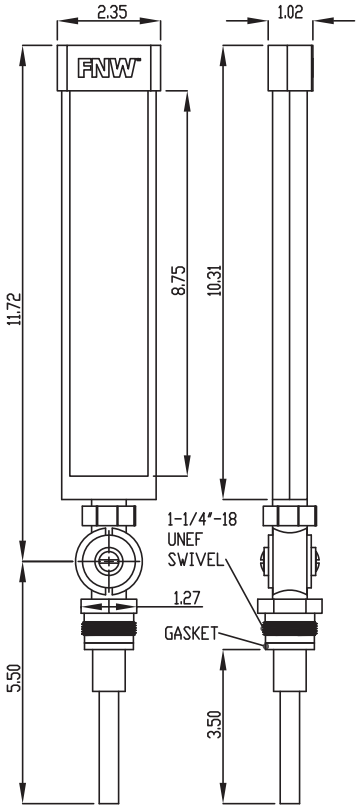
* Valox is a registered trademark of General Electric Company

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



J

ADJUSTABLE ANGLE SOLAR THERMOMETER w/ DIGITAL LCD DISPLAY

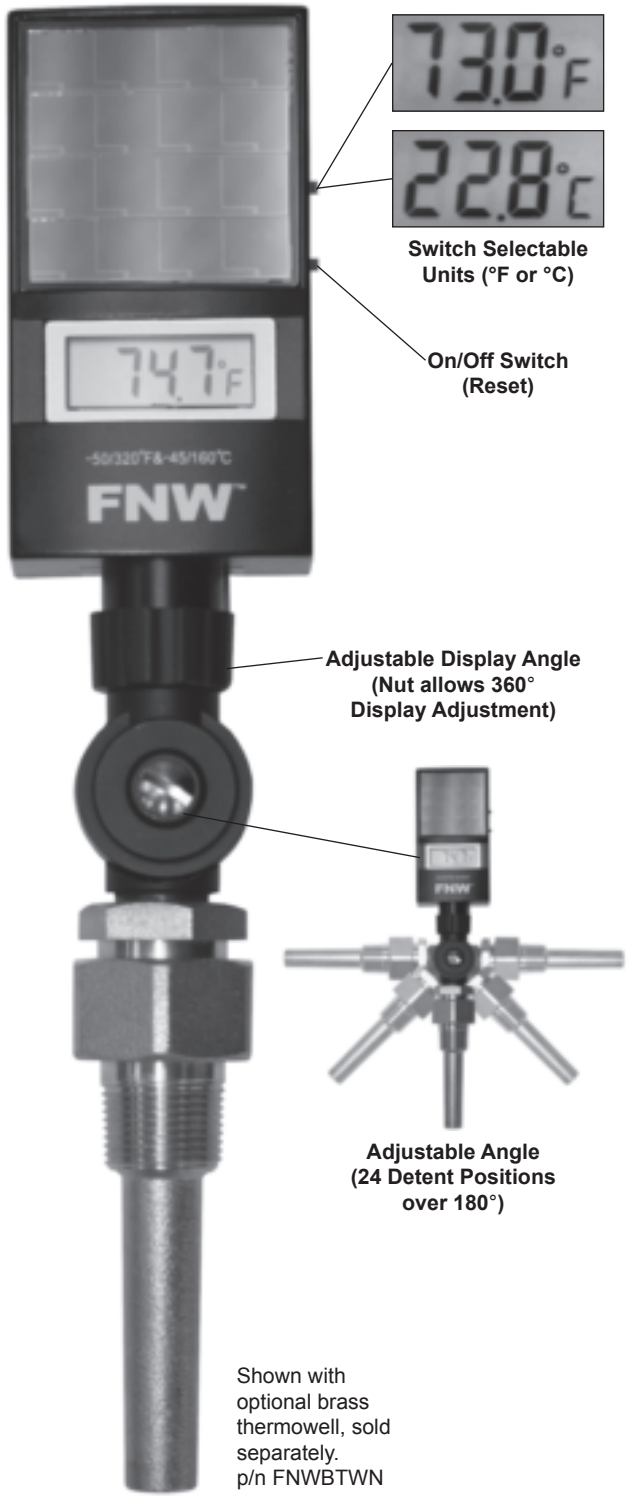
The figure SDTH solar-powered thermometer fits any standard industrial thermowell (such as FNW p/n FNWBTWN). The high contrast display is easily read from greater distances than the typical glass tube thermometer. The design of the solar panels collects light to power the unit in as little as 16 LUX.

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

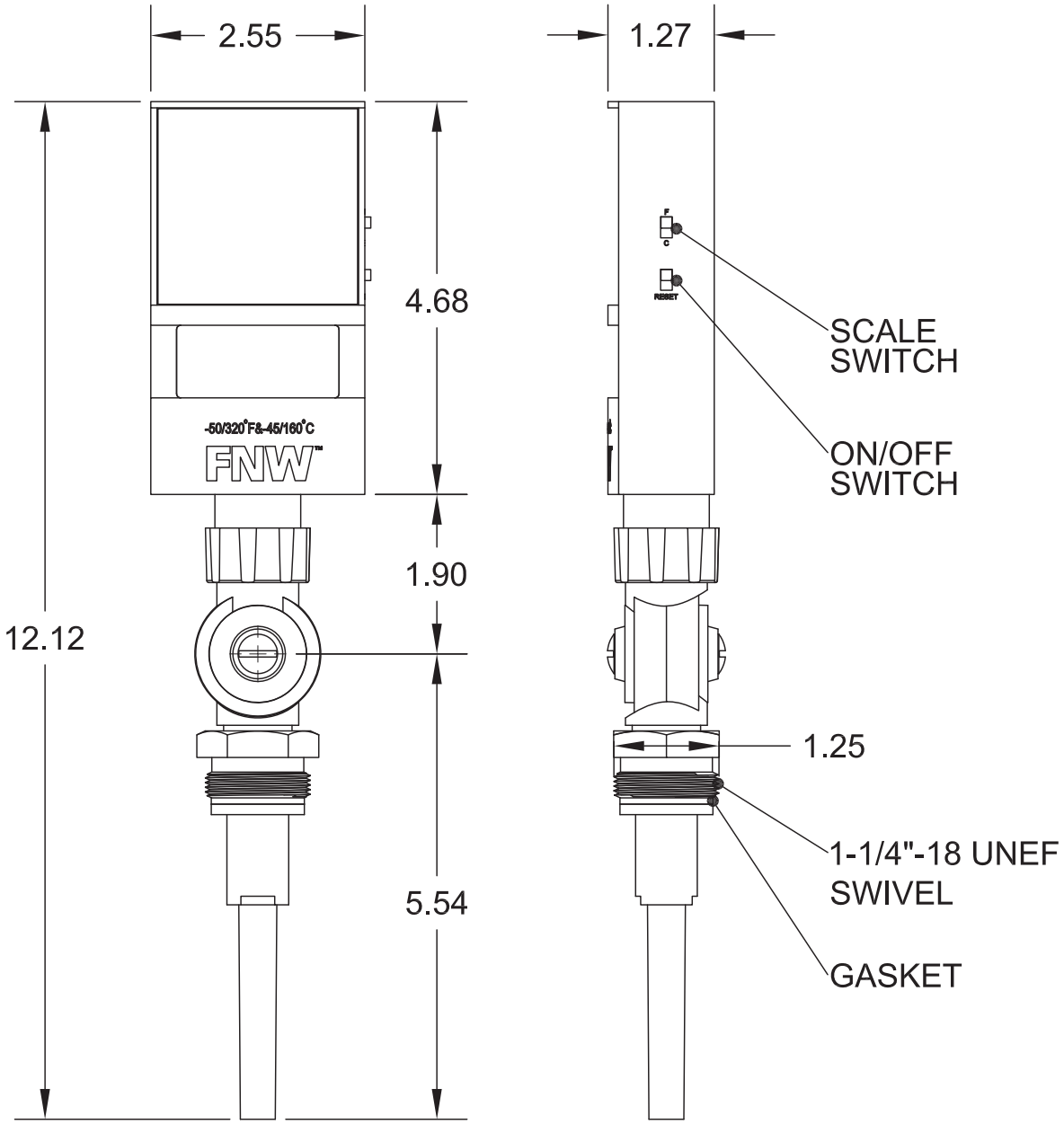
Part Number

Range (°F)	Part Number
-50 to 320	FNWSDTHN



J

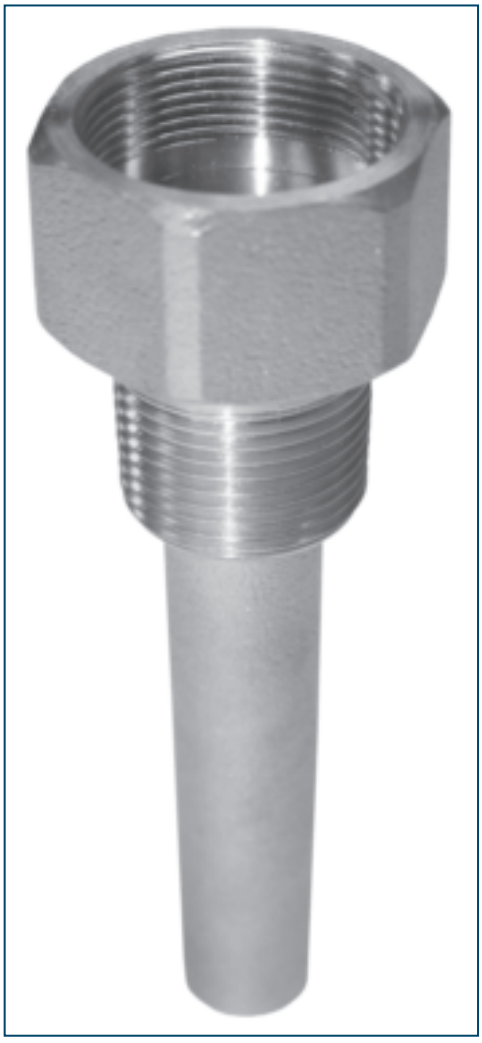
ADJUSTABLE ANGLE SOLAR THERMOMETER w/ DIGITAL LCD DISPLAY



J

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:

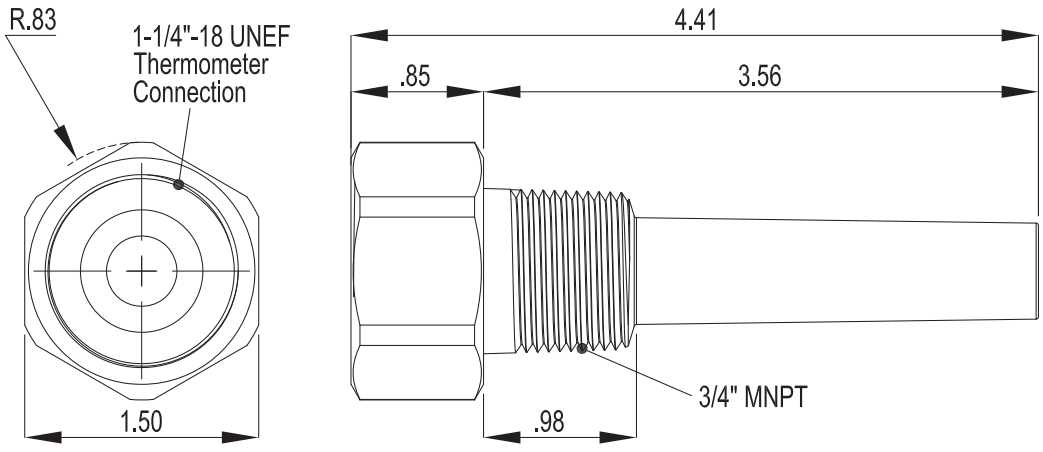
- Brass Construction
- Accepts 3.5" (90mm) Stem
- 7/16" Bore Diameter Taper
- Stepped Standard Form
- 3/4" MNPT Process Connection
- 1-1/4"-18 Instrument Connection

Standards:

- NPT Connections Per ASME B1.20.1
- Instrument Connection Per UNEF
- CAN/CGSB 14.4-M88 Compliant
- Meets ASME B40.200 for Thermowells (Includes B40.9)

Part Number

Size	Part Number
3-1/2"	FNWBTWN



J

LOW LEAD COMPLIANT 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:

- Lead Free Brass Construction
- Complies with Federal Lead-Free Law (Sec. 1417)
- Accepts 3.5" (90mm) Stem
- 7/16" Bore Diameter Taper
- Stepped Standard Form
- 3/4" MNPT Process Connection
- 1-1/4"-18 Instrument Connection

Standards:

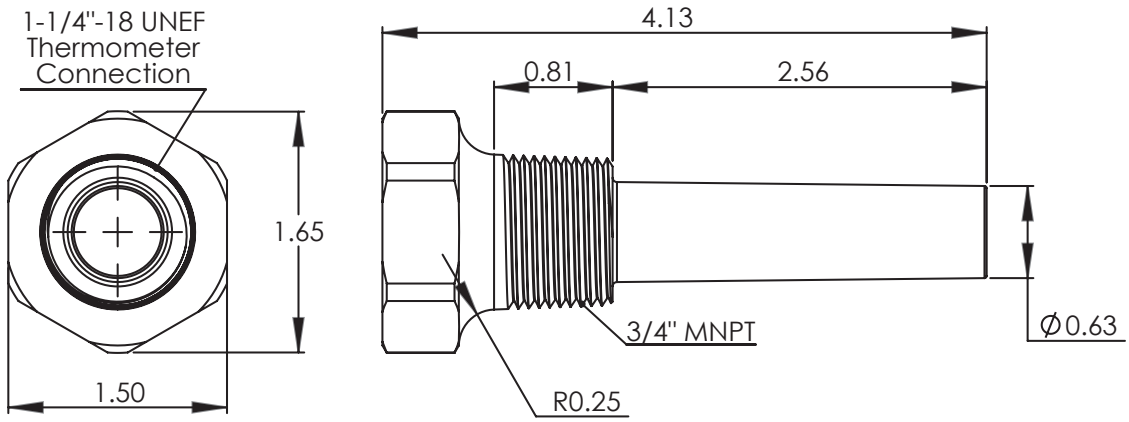
- NPT Connections Per ASME B1.20.1
- Instrument Connection Per UNEF
- CAN/CGSB 14.4-M88 Compliant
- Meets ASME B40.200 for Thermowells (Includes B40.9)

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

Part Number

Size	Part Number
3-1/2"	FNWXBTWN



J

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:

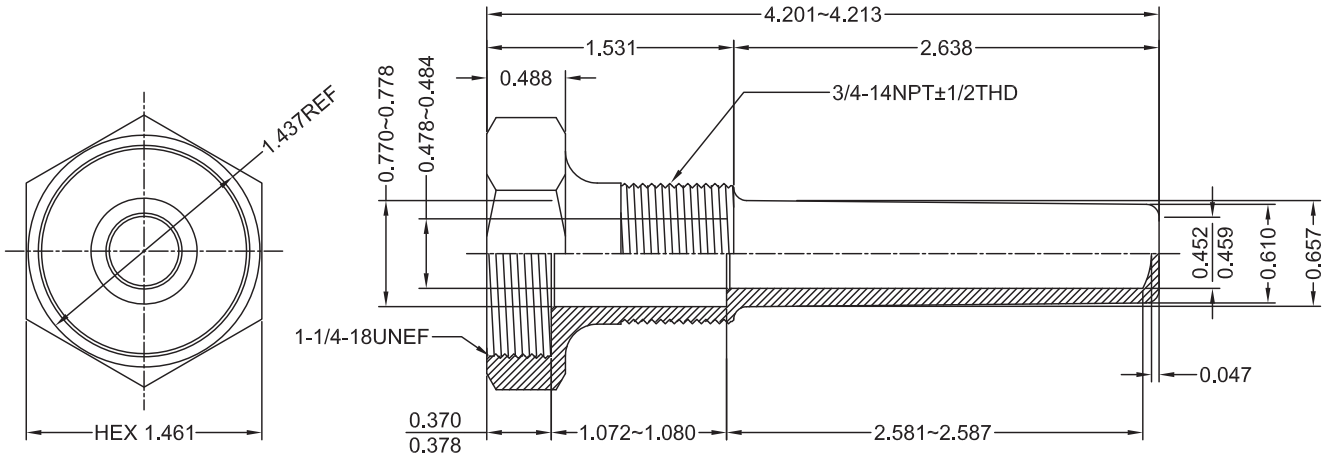
- Socket Length: 3-1/2"
- Process Connection: 3/4"-14 NPT
- Instrument Connection: 1-1/4"-18 UNEF

Material:

- JIS-3771 Brass

Part Number

Size	Part Number
3-1/2"	FNWBTWELL



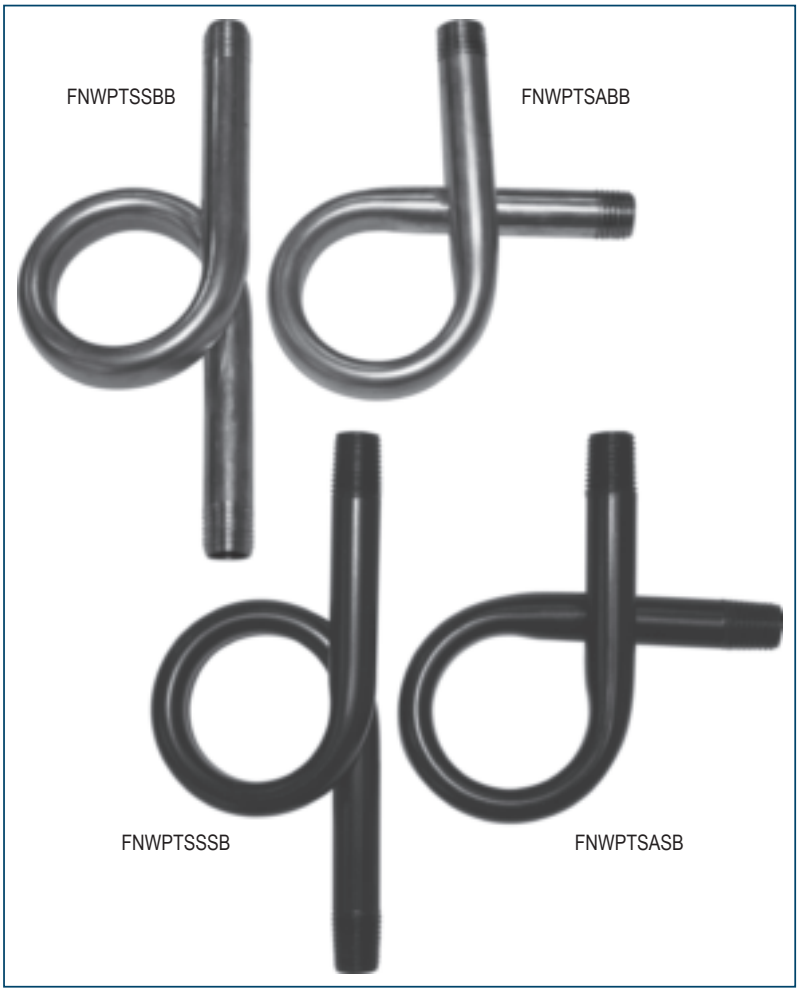
J

PIGTAIL 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.

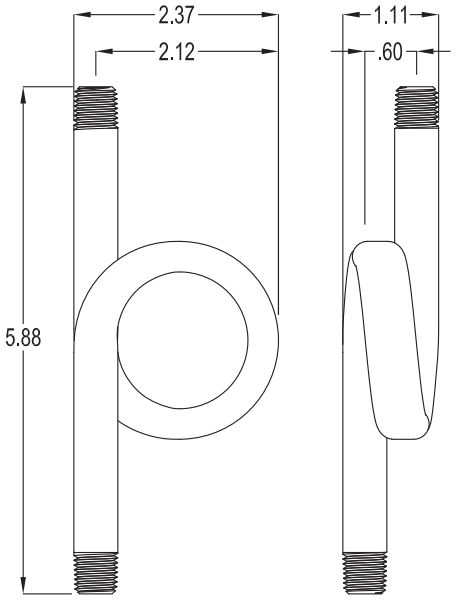
Features:

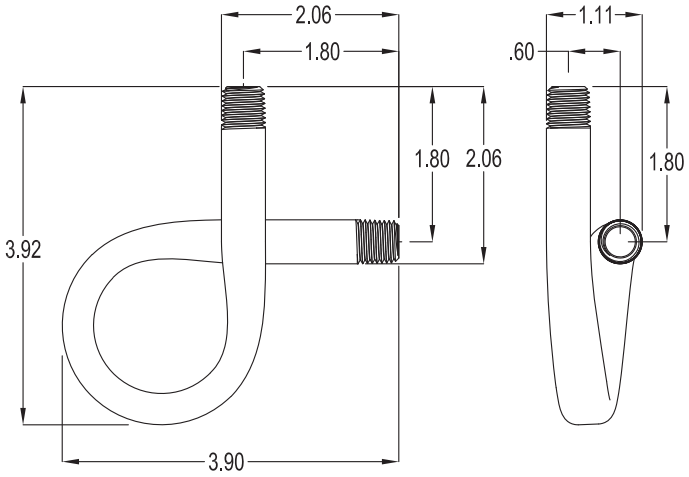
- 600 PSI Maximum
- 750°F Maximum
- Available in Straight and Angled Configurations
- Material Options:
  - C26000 Brass
  - ASTM A53 Steel
- Steel Syphons are Epoxy Coated by Electrodeposition



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.

J

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:

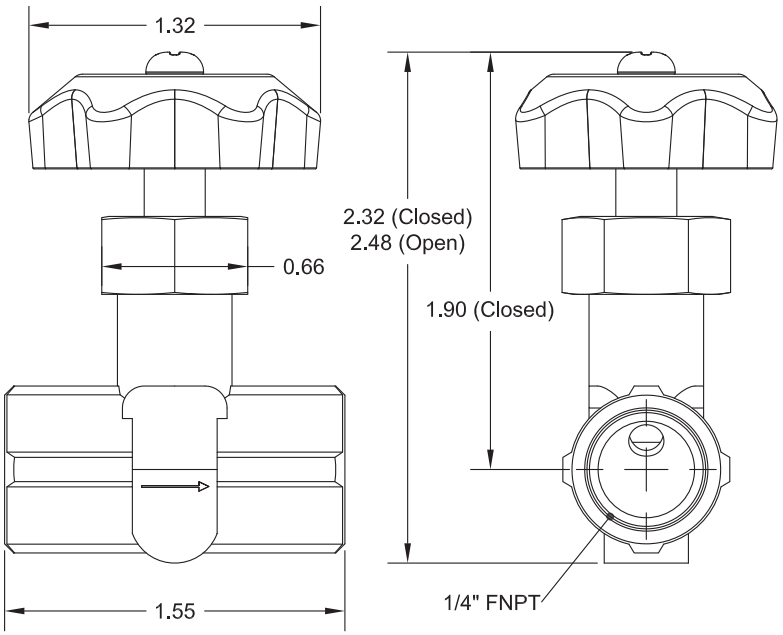
- 400 PSI Maximum Operating Pressure
- 1/4" FNPT End Connections
- #59-1 Forged Brass Body
- Red ABS Plastic Handle
- Rubber O-ring Stem Seal
- #59-1 Brass Stem
- #59-1 Brass Stem Nut
- -9°F to 212°F (-23°C to 100°C) Process Temperature Limit

Standards:

- NPT Connections Per ASME B1.20.1

Part Number

Size	Part Number
1/4"	FNWNVB



J

LOW LEAD COMPLIANT BRASS NEEDLE VALVE

The FNW figure XNV brass needle valve is utilized for fine flow control and for controlling severe line pulsations in water, oil and gas service. The XNV features a robust design with knurl knob control wheel and meets Federal lead free requirements.

Features:

- Complies with Federal Lead-Free Law (Sec. 1417)
- 600 PSI Maximum Operating Pressure
- -9°F to 212°F Temperature Range
- 1/4" FNPT End Connections
- All HBI59-1 Lead Free Brass Construction
- Buna-N Packing

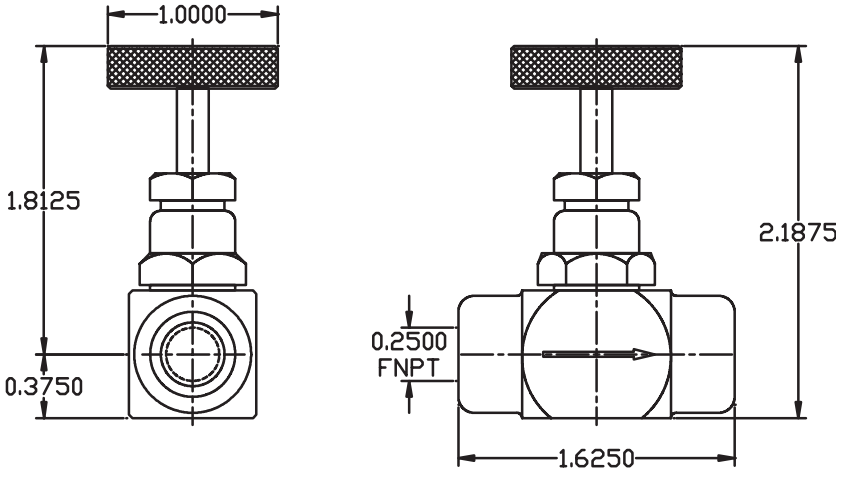
Part Number

Size	Part Number
1/4"	FNWXNVB

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

Dimensions (inches)



J

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.

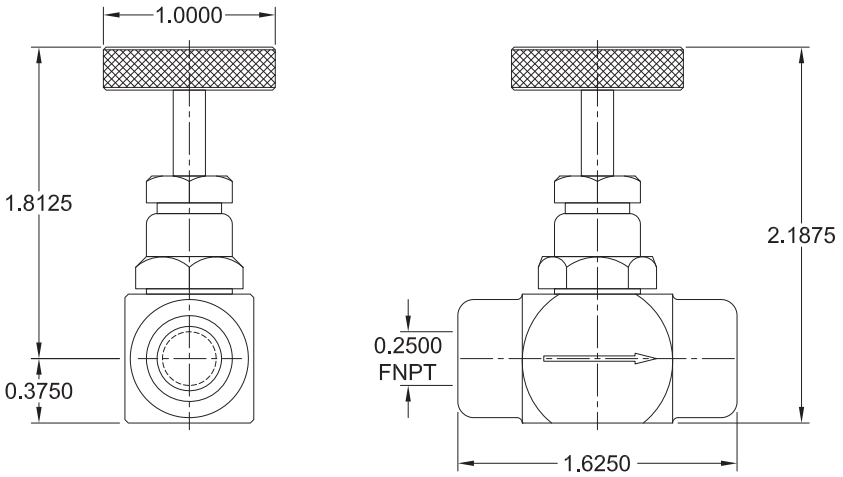
Features:

- 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)



J

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:

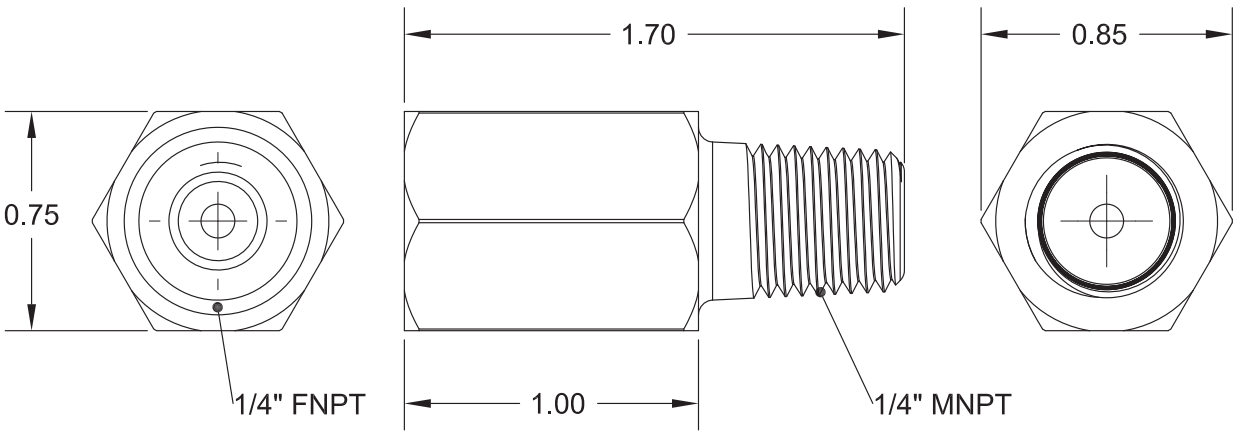
- 10,000 PSI Maximum Operating Pressure
- 30,000 PSI Burst Pressure
- 1/4" FNPT End Instrument Connection
- 1/4" MNPT End Process Connection
- Brass Body
- Sintered (Porous Type) 316SS Snubbing Element
- Stainless Steel Retainer
- -65°F to 650°F (-53°C to 343°C) Process Temperature Limit

• Standards:

- NPT Connections Per ASME B1.20.1
- Meets ASME B40.100 for Snubbers (Includes B40.5)

Part Number

Size	Part Number
1/4"	FNWPSB



J

LOW LEAD COMPLIANT PRESSURE SNUBBER

The figure XPS lead free 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
- Lead Free Brass Body
- Complies with Federal Lead-Free Law (Sec. 1417)
- Sintered (Porous Type) 316SS Snubbing Element
- Stainless Steel Retainer
- -65°F to 650°F (-53°C to 343°C) Process Temperature Limit

• Standards:

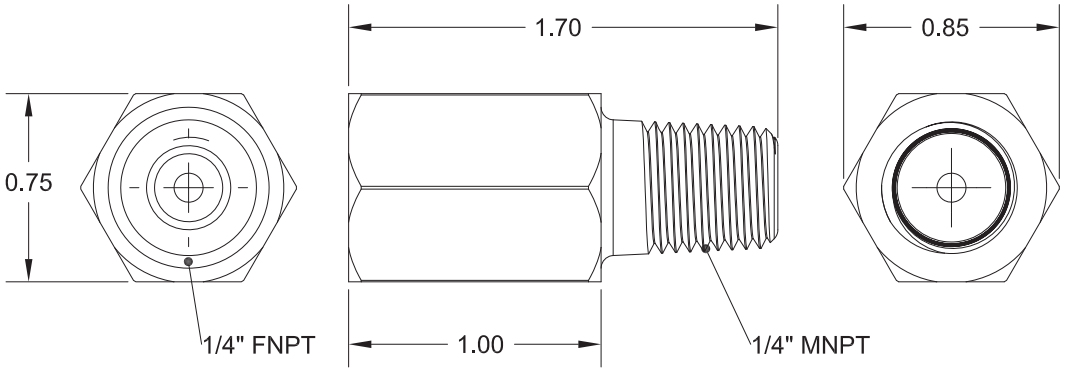
- NPT Connections Per ASME B1.20.1
- Meets ASME B40.100 for Snubbers (Includes B40.5)

Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

LOW LEAD

Part Number

Size	Part Number
1/4"	FNWXPSB



J

PRESSURE/TEMPERATURE TEST PLUG

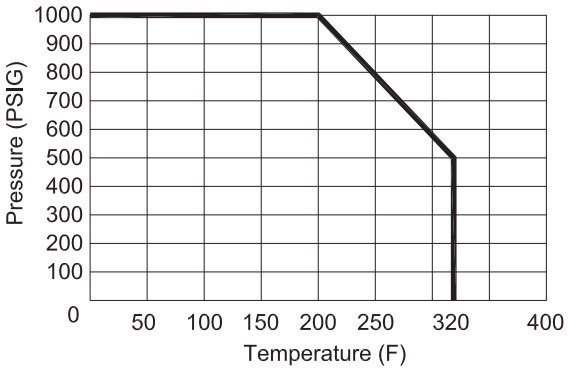
The figure PTT brass pressure/temperature test plugs facilitate quick pressure and temperature readings at recommended test points without disturbing the process. They are widely used in the HVAC industry.

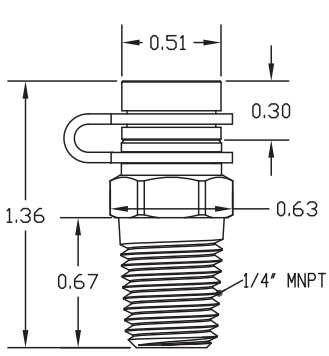
Features:

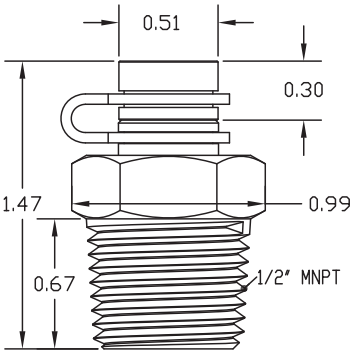
- 1,000 PSI Maximum Operating Pressure
- 1/4" or 1/2" MNPT End Process Connection
- Brass Body
- EPDM Diaphragm/Core
- Plastic Cap Retainer
- 320°F (160°C) Process Temperature Limit

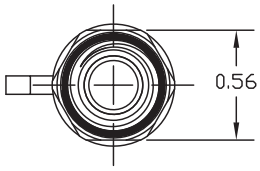
Part Numbers

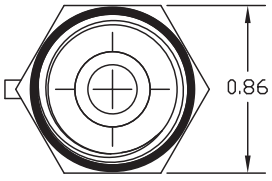
Size	Part Number
1/4"	FNWPTTB
1/2"	FNWPTTD











J

LOW LEAD COMPLIANT PRESSURE/TEMPERATURE TEST PLUG

The figure XPTT lead free 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:

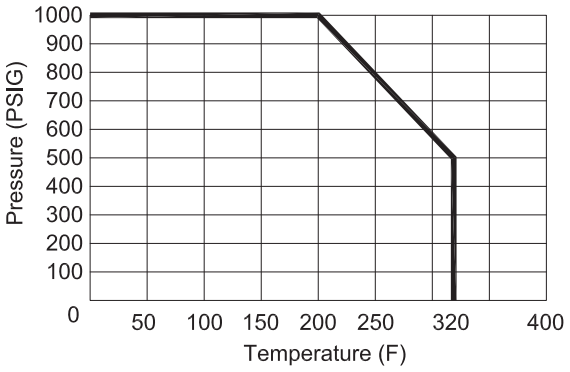
- 1,000 PSI Maximum Operating Pressure
- 1/4" or 1/2" MNPT End Process Connection
- Lead Free Brass Body
- Complies with Federal Lead-Free Law (Sec. 1417)
- EPDM Diaphragm/Core
- Plastic Cap Retainer
- 320°F (160°C) Process Temperature Limit

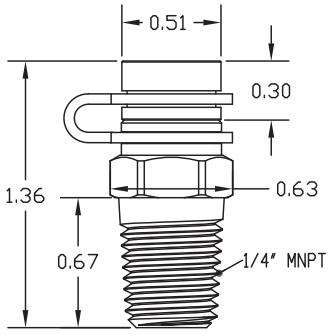
Low Lead Compliant: Referring to laws defining "Lead Free" as wetted surface of pipe, fittings and fixtures in potable water systems that have a weighted average lead content ≤ 0.25% per the Safe Drinking Water Act (Sec. 1417) amended 1-4-2011 as well as other state regulations.

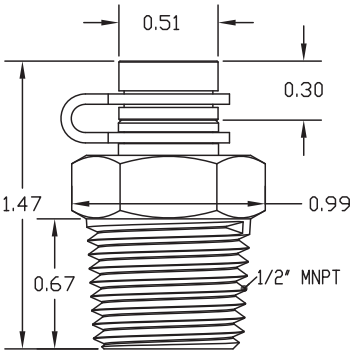
LOW LEAD

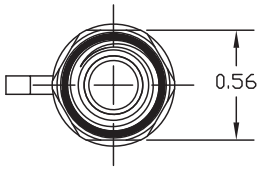
Part Numbers

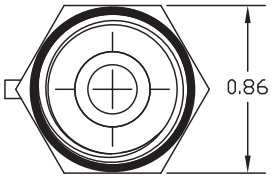
Size	Part Number
1/4"	FNWXPTTB
1/2"	FNWXPTTD











J

NOTES

ENGINEERING DATA

Description	Page
Knife gate valve flange bolting guide	339
Butterfly valve flange bolting guide	340
High performance butterfly valve flange bolting guide	341
About Cv, general information on flow coefficients with basic formulas	342
Flange cast steel gate, globe and check valve Cv	343
Flange cast steel gate and globe stem characteristics	344
About resilient seat and seal materials	346
About thermoplastic materials	347
ANSI class 150# and 300# flange dimensions	348
Metric equivalents	349
Typical material codes	350
Typical material markings	351
Chemical compatibility charts	352
Lead free act	360

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.

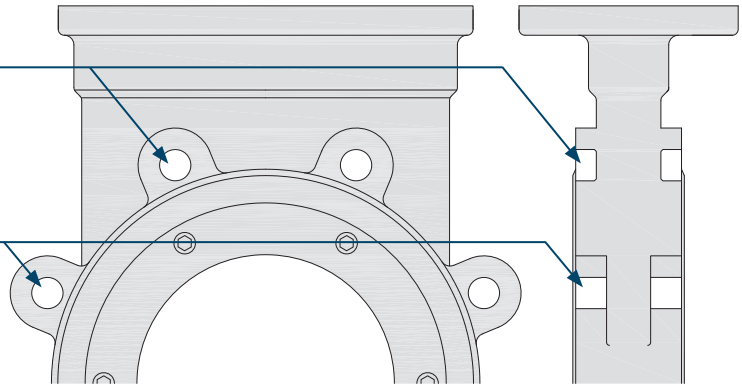
CAUTION: Dimensions provided for flange bolting are intended only as a guide. Bolt lengths may vary due to manufacturing tolerances in valves, gaskets, flange bolts and flanges.

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.

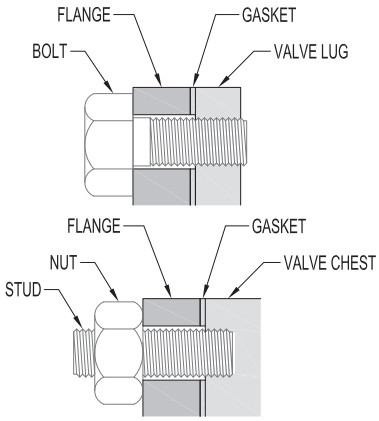
Bolt Hole Types & Locations

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.

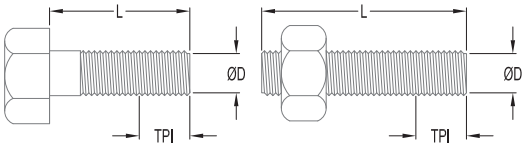
Washers
If washers are utilized, bolt or stud length should be adjusted accordingly.

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.



K

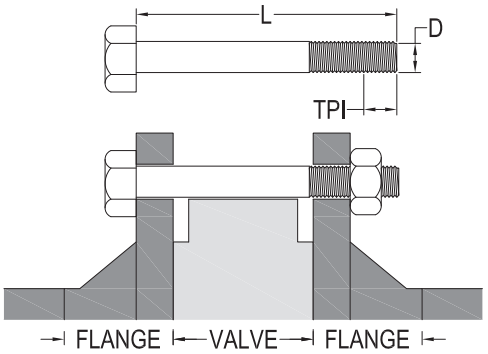
FNW™

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.

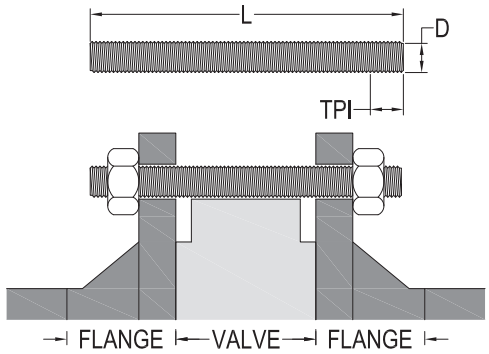
CAUTION: Dimensions provided for flange bolting are intended only as a guide. Bolt lengths may vary due to manufacturing tolerances in valves, gaskets, flange bolts and flanges. FNW figure 7xx-series resilient seated valves are designed to fit between ANSI B16.5 class 150 flanges without flange gaskets. **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



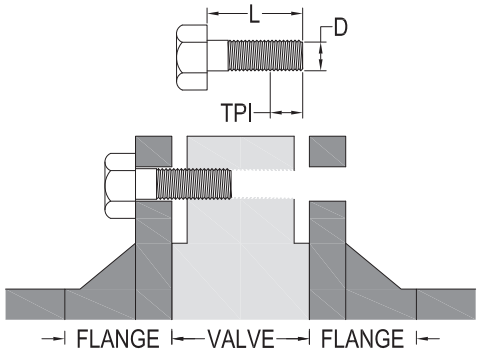
Size	D	TPI	L	Qty
2	5/8"	11	4-1/4"	4
2-1/2	5/8"	11	4-3/4"	4
3	5/8"	11	5"	4
4	5/8"	11	5"	8
5	3/4"	10	5-1/4"	8
6	3/4"	10	5-1/2"	8
8	3/4"	10	6"	8
10	7/8"	9	6-1/2"	12
12	7/8"	9	7"	12
14	1"	8	8"	12
16	1"	8	8-3/4"	16
18	1-1/8"	7	9-1/2"	16
20	1-1/8"	7	10-1/2"	20
24	1-1/4"	7	12"	20

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

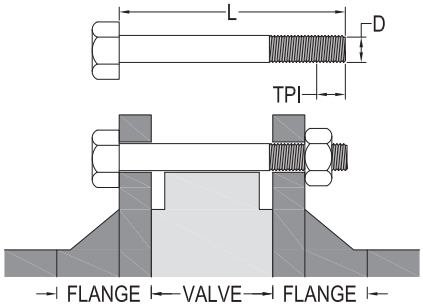


Size	D	TPI	L	Qty
2	5/8"	11	1-1/2"	8
2-1/2	5/8"	11	1-3/4"	8
3	5/8"	11	1-3/4"	8
4	5/8"	11	1-3/4"	16
5	3/4"	10	2"	16
6	3/4"	10	2"	16
8	3/4"	10	2-1/4"	16
10	7/8"	9	2-1/2"	24
12	7/8"	9	2-3/4"	24
14	1"	8	2-3/4"	24
16	1"	8	3-1/4"	32
18	1-1/8"	7	3-1/2"	32
20	1-1/8"	7	4"	40
24	1-1/4"	7	4-3/4"	40

K

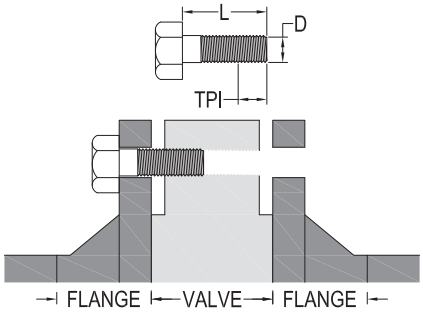
FLANGE BOLTING GUIDE FOR FIGURE HP BUTTERFLY VALVES

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

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

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.

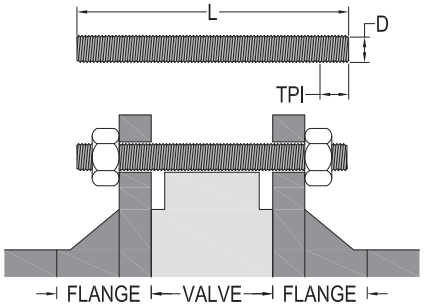
NOTE: The FNW figure HP high performance butterfly valves are designed to fit between ANSI B16.5 class 150 flanges. Lengths are based on the minimum flange thickness of weld neck flanges per ANSI B16.5 and use of standard 1/16" gaskets. Stud lengths also assume heavy hex nut heights per ANSI B18.2.2.

GASKETS: When using metallic spiral wound gaskets, add 1/8" to bolt and stud length dimension L.

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.

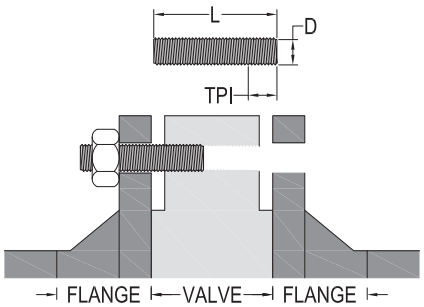
Lug Sizes 16" to 24": The lugs of the 16" to 24" lug pattern valves are not tapped through the entire body. Bolt and stud lengths are based on usable thread depth.

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 & 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

K

FNW™

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.

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

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.

$$Q = Cv \times \sqrt{\frac{\Delta P}{G}}$$

Likewise, Cv for particular flow characteristics can be determined from this formula:

$$Cv = Q \times \sqrt{\frac{G}{\Delta P}}$$

Similar formulas are available using metric units:

$$Q = Kv \times \sqrt{\frac{\Delta P \times 1000}{D}}$$

$$Kv = Q \times \sqrt{\frac{D}{1000 \times \Delta P}}$$

$$Q = Kv \times \sqrt{\frac{\Delta P}{G}}$$

$$Kv = Q \times \sqrt{\frac{G}{\Delta P}}$$

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.

$$Cv = \frac{Q_G}{962} \times \sqrt{\frac{(G \times T)}{(P1^2 - P2^2)}}$$

$$Q_G = 962 \times Cv \sqrt{\frac{(P1^2 - P2^2)}{(G \times T)}}$$

Where:
- QG = 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 ºR (ºF + 460)
- G = Specific gravity of medium where air at 70ºF 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.

$$Cv = Q_G \frac{\sqrt{(G \times T)}}{816 \times P1}$$

$$Q_G = Cv \frac{816 \times P1}{\sqrt{G \times T}}$$

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.

K

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

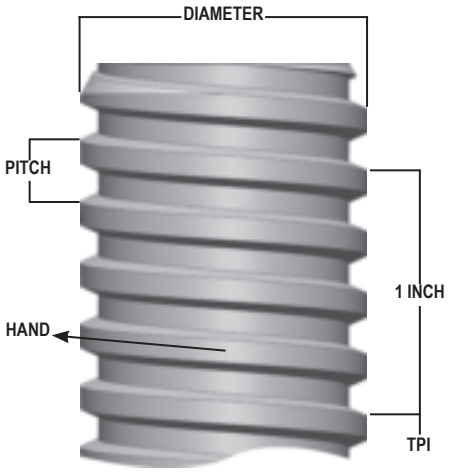


DIAGRAM A

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 travels 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 462 & 562

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

FNW™

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 a 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 and is 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, fats, 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 -20ºF to 225ºF (250ºF 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°F 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 -40ºF to 450ºF. 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 -20ºF to 500ºF. 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 torque. 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 and 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 32ºF to 140ºF (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 (polor solvents), aromatics and chlorinated hydrocarbons. Some poorer quality PVC can leach chemicals into the 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, 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.

FNW™

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	250	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

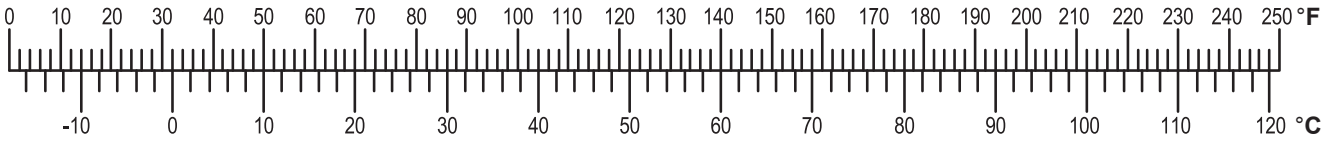
Whole Inches to Millimeters

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

°F = °C x 9/5 + 32

°C = (°F - 32) x 5/9

K

FNW™

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
MI
MALL
3% NICKEL CAST IRON
3NI
CIA
NCI*
NI RESIST CAST IRON
NR
NR2
CAUSUL*
DUCTILE IRON
DI
DCI
21 (JB)
CARBON STEEL
WCB (CAST)
A 105 (FORGED)
22 (JB)
DS
CS
LOW TEMP STEELS
LCB (CAST CARBON)
LC1 (CAST ½ % MOLY)
LC2 (CAST 2½ % NICKEL)
LC3 (CAST 3½ % NICKEL)
LF1 (FORGED CARBON)
LF2 (FORGED CARBON)
LF3 (FORGED 3½ NICKEL)
304SS
304
CF8
188S
L22
D2
33 (JB)
8 ♦ (LAD)
S (ALOYCO)
D (CONTRO)
F8
KA2S

316SS
316
CF8M
188SMO
188M
188MO
L22XM
D4
CF7M
8M♦ (LAD)
36 (JB)
6 (HMC)
0 (ALOYCO)
C (CONTRO)
KA2SMO
316LSS
316L
CF3M
188SMO ELC
D4L
6L (HMC)
L22XMELC
317SS
CG8M
347SS
347
CF8C
CF82B
188SCB
188CB
D2CB
410SS
CR13
11 13
F6
EXELLOY (CRANE)
CA 15
ALUMINUM
AL
44 (JB)
ALUM
SPECIAL
A-254-SMO

HASTELLOY A
HAST A
HA
HAA
A
HASTELLOY B
HAST B
HB
HAB
N7M
N12M
N2
DC2
B♦ (LADISH)
NiMO
CW12M
HASTELLOY C
HAST C
HC
HAC
CW7M
CW12M
N3
DC3
C♦ (LAD)
73 (JB)
NIMOCR
HASTELLOY D
HAST D
HD
HAD
INCONEL 600
INC
CY40
DIN
FERRALIUM
CD4M
CD4MCU
DURCOMET 100
38 (JB)
ZIRCONIUM
ZR

MONEL 400
M35
M35W
DM
M
MNL
MONL
MLCB
MON
ML
EM
NICU
QQN-177 (LAD)
COMPE (LAD)
K (TRIM)
71 (JB)
Mo (HMC)
1 ¼% CR ½% MOLY
WC6 (CAST)
F11 (FORGED)
2 ¼% CR ½% MOLY
WC9 (CAST)
F22 (FORGED)
5% CR ½% MOLY
C5 (CAST)
F5 (FORGED)
F5A (FORGED)
9% CR 1% MOLY
C12 (CAST)
F9 (FORGED)
NICKEL 200
NI
DNI
CZ100
78 (JB)
CZ100S
LNI
TITANIUM
TI
T♦ (LAD)
TI♦ (LAD)

* The information contained herein is general in nature. Reference should be made to the manufacturing catalog for individual manufacturer markings.

K

	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
Acrylonite	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
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.

Chemical Compatibility

FNW™

	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
Berryllium 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		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				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.

FNW™

Chemical Compatibility

	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
Coppper 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 Gycol	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 Gylcol	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	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.

Chemical Compatibility

FNW™

	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	
Gycol	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
Hydrolic 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
Hydrofluoslicic 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	
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.

FNW™

Chemical Compatibility

	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
Maganese 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
Methy Bromide, 100%	C	C		D	B		A	B		B	A	D	B	D	D			
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
Nitorbenzene	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.

Chemical Compatibility

FNW™

	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
Parldehyde					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 (Vaselien 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 Bisfite	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
Pyidine	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.

FNW™

Chemical Compatibility

	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
Sodiulm Fluoride	C	C	D	D	B	B	A	B		A	A	B	A	B	A	C		A
Sodium Hydroxied 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 Metasilcate, 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	B	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.

Chemical Compatibility

	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.

K

"REDUCTION OF LEAD IN DRINKING WATER ACT" AMENDMENT and FNW PRODUCTS

OVERVIEW

On January 4, 2014, The United States Senate Bill S. 3874, amendment to the national "Reduction of Lead in Drinking Water Act", is in effect for products sold and installed in potable water (human consumption) applications.

In summary, the law defines lead free as: (1) not containing more than 0.2% lead when used with respect to solder and flux (current law); and (2) not more than a weighted average of 0.25% lead when used with respect to the wetted surfaces of pipes, pipe fittings, plumbing fittings and fixtures. It also establishes a formula for calculating the weighted average lead content of a pipe or plumbing fitting or fixture. Further, the law amends the "Safe Drinking Water Act" to exempt from prohibitions on the use or sale of lead pipes, solder and flux: (1) pipes or plumbing fittings or fixtures, including backflow preventers, that are used exclusively for non-potable services such as manufacturing, industrial processing, irrigation, outdoor watering or any other use where the water is not anticipated to be used for human consumption; or (2) toilets, bidets, urinals, fill valves, flush-o-meter valves, tub fillers, shower valves, service saddles or water distribution main gate valves that are two inches in diameter or larger.

A full text version of the law can be found at: http://www.govtrack.us/congress/bills/111/s3874.

WHAT DOES THIS MEAN?

The purpose of the new law is to limit lead in drinking water by defining the term "Lead Free". For FNW valve products, this means any valve sold or installed for potable water service must meet this new definition of lead free.

ARE THERE EXEMPTIONS TO THE LAW?

The law specifically addresses products for potable water service. If the application is not anticipated to include human consumption, the law does not apply. In addition, the law exempts valves 2" and above for water mains. That said, previous experience with similar laws already in effect in California, Vermont, Maryland and Louisiana have shown that local authorities, and even inspectors, may enforce a more stringent interpretation of the law. The Environmental Protection Agency is expected to issue official guidelines in 2014 that hopefully will clarify these "grey" areas of the law.

IS CERTIFICATION REQUIRED?

As of this time, only the states of California and Louisiana require certification by a third party testing agency such as NSF, IAPMO, UL or others. The remaining states with current lead free laws (Vermont and Maryland) and the pending federal law do not require third party certification. However, any local authority may, through job specifications, ordinances or local laws, still require certification.

WHAT ABOUT PRODUCTS THAT MEET THE INTENT OF THE LAW?

Since the federal law currently does not require third party certification, products such as an all stainless steel ball valve may be compliant. However, suitability must be made on a job-by-job basis in case certification by a local authority is specifically called for.

WHY NOT CERTIFY ALL PRODUCTS?

The law is application specific and only applies to products sold and used in potable water. Since there is an added cost for third party certification and/or possible material changes, it only makes sense to certify those products traditionally and frequently used in potable water service.

WHAT TYPES OF STANDARDS ARE THERE FOR CERTIFICATION?

When states such as California enacted their Lead Free law, the standard ANSI/NSF 61-8, which defined certain performance criteria for valve products sold into potable water applications, was amended to include the option Annex G. Annex G specifically addressed the requirements for California's Lead Free Law (AB 1953) for which the new Federal law is modeled after. However, not all products require the performance certification of NSF 61-8, so the standard ANSI/NSF 372 was created, specifically addressing the requirements of the new law. ANSI/NSF 61-8 Annex G now references ANSI/NSF 372.

WILL LEAD FREE PRODUCTS COST MORE?

Yes, in addition to certification costs, there is a marked increase in the cost of lead free materials used to meet the law when compared to their leaded counterparts. In addition, these materials often require more stringent processing or higher cost tooling during fabrication. However, since the law will apply to all markets in the United States, all manufacturer's costs are affected, and hopefully the greater demand for Lead Free products will absorb these added costs in time.

AM I STUCK WITH ONLY HIGH COST LEAD FREE PRODUCTS WHEN NOT NEEDED?

No. FNW will continue to offer non-compliant products for applications that do not require compliance. For example, FNW will continue to sell a threaded end bronze strainer in both leaded and Lead Free compliant versions.

WHAT IF I DON'T WANT TO STOCK ALL THESE DIFFERENT VALVES?

To protect commercial/industrial users from the added costs of Lead Free products, FNW will typically offer applicable products in a leaded or separate Lead Free version only. However, dual certified Lead Free/Gas application brass balls valve (figure X415 and X420A) will be offered for those markets that want to reduce inventory.

WHAT'S THE DIFFERENCE BETWEEN LOW LEAD COMPLIANT AND LEAD FREE?

FNW uses the term and logo "Low Lead Compliant" interchangeably with Lead Free. While the law defines what Lead Free means, FNW uses the Low Lead Compliant terminology as a type of trademark for products meeting the Lead Free law.

LOW LEAD

HOW CAN I TELL WHICH FNW PRODUCTS ARE LEAD FREE?

For easy part numbering identification, all FNW Lead Free compliant products have an "X" prefix in their figure number. For example, the figure X415 ball valve is certified Lead Free through Underwriters Laboratories (UL), but the figure 415 is not.

For easy brochure identification, all FNW Lead Free compliant or certified product brochures will contain our "Low Lead Compliant" logo as shown above. In addition, certified products' brochures will list the certification type (ANSI/NSF 61-8 Annex G or ANSI/NSF 372) and certifying agency (NSF, IAPMO, UL, etc.) in the features and/or standards column.

HOW ARE THE PHYSICAL PRODUCTS IDENTIFIED AS LEAD FREE?

Since 2010, FNW ball valves standardized on a green handle sleeve for Lead Free certified product. FNW will transition to a white handle sleeve by 2014 as this appears to be emerging as an industry standard. The printing on the handles also indicate "Low Lead Compliant".

2010 to 2014 - Green Sleeve Indicating Lead Free

2014 and After - White Sleeve Indicating Lead Free

HOW ARE THE PHYSICAL PRODUCTS IDENTIFIED AS LEAD FREE? (continued)

In addition to handle colors and printing, or for products that do not have handles, additional markings are employed. FNW Lead Free products utilize marks of the following types:

Figure X415, X416, X420A, X421, X430, X431, X432 & X440

These models utilize an “LF” on the body casting to indicate that the material is Lead Free. Where space permits, the valve may also have the material code cast on it. Note, material codes are based on Italian standards.

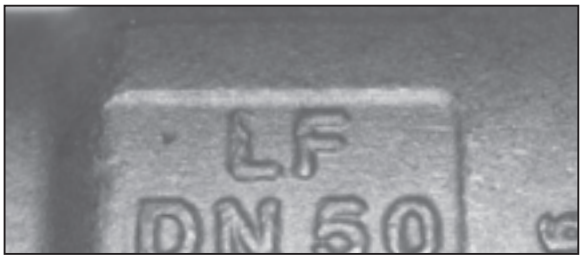


Figure X480A

Our compression end valve utilizes an “O” cast on the body of the valve. It can typically be found on the neck of the valve, just below the packing adjustment nut. This mark may transition to the “LF” mark by 2014.

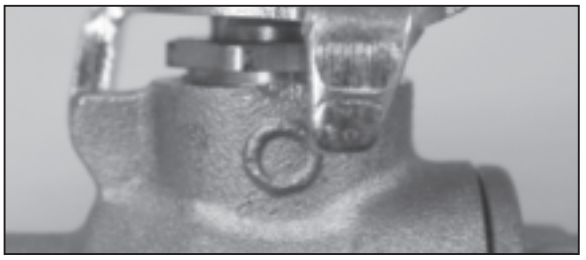


Figure X485

Up to mid-2013, the push-fit brass ball valve had the letter “L” cast on the side of the lever stop to indicate the material was Lead Free. After that time, the valve was shipped with the letters “LF” for clarification.

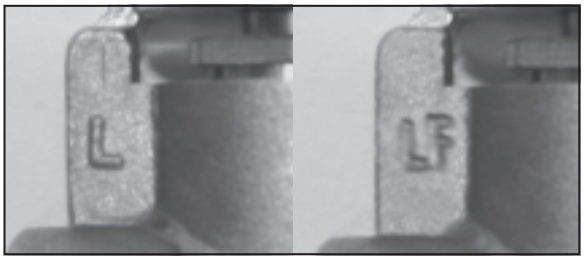
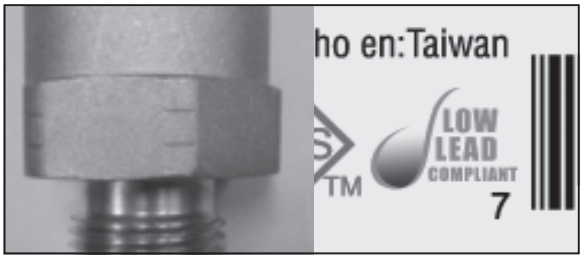


Figure X509 & X510

These bronze Y-Strainers utilize an “NL” with a circled check mark above it to indicate they are Lead Free. These marks are smaller and debossed in the side of the body.

Figure XSC & XSWA

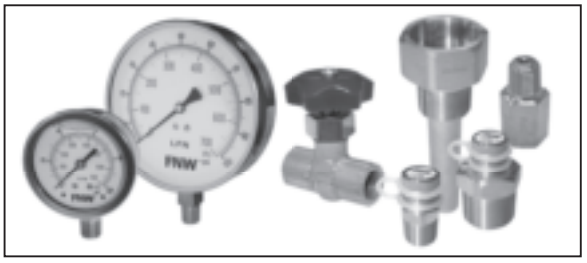
Water hammer arrestors have two markings. The connection base is scored with two short parallel lines. The metallic stick-on label also bears our “Low Lead Compliant” logo.



K

Lead Free Gauges & Accessories

Marks for identifying Lead Free gauge and accessory items will vary by product. Gauges will have “LFN” printed on the dial (LFN = Lead Free National, meaning compliant, but not certified). Accessory items will either have the part number stamped on them or include an “FNW-LFN” sticker.



WHAT LEAD FREE PRODUCTS WILL FNW HAVE BY 2014?

In order to determine which products should transition to, or be added to, our Lead Free offering, FNW has examined the breadth of their products and looked at the markets they are used. The table below is a snapshot view of what our Lead Free program is expected to look like by January 4, 2014. Additional products are always under consideration.

Figure	Description	Size Range
X415	Threaded End 2-pc Brass Ball Valve (gas rated also)	1/4" to 4"
X416	Sweat End 2-pc Brass Ball Valve	1/2" to 3"
X420A*	Threaded End 2-pc Brass Ball Valve (gas rated also)*	1/2" to 2"
X421	Sweat End 2-pc Brass Ball Valve	1/2" to 2"
X430	Press End 2-pc Brass Ball Valve	1/2" to 2"
X431	Press End In-Line Check Valve	1/2" to 2"
X432	Press End Brass Ball Valve	1/2" to 4"
X440	Threaded End ISO Mount 2-pc Brass Ball Valve	1/2" to 2"
X480A	Compression End 2-pc Brass Ball Valve	1/2" to 1"
X485	Push-Fit Brass Ball Valve	1/2" to 1"
X509	Threaded End Bronze Y-Strainer	1/2" to 2"
X510	Sweat End Bronze Y-Strainer	1/2" to 2"
XSC	MNPT Water Hammer Arrestor	1/2" to 1-1/2"
XSWA	Sweat End Water Hammer Arrestor	1/2" to 1-1/4"
XBTW**	Thermowell	3-1/2"
XG**	4-1/2" Contractor's Pressure Gauge	0-30 to 0-300 PSI
XLFG**	2-1/2" Liquid-Filled Pressure Gauge	0-30 to 0-300 PSI
XNV**	Brass Needle Valve	1/4"
XPS**	Brass Pressure Snubber	1/4"
XPTT**	Brass Pressure/Temperature Test Plug	1/4" and 1/2"

NOTE:
*** The current model X420 is NOT gas rated. FNW will transition to the gas rated figure X420A by 2014.**
**** These products comply with the Federal Lead Free law but they are not certified.**

Brochures and drawings for these products are, or will be, posted to the FNW website as they become available.

FNW will continue to monitor the market as the United States transitions to the new requirements of the Lead Free law. We will adjust our Lead Free program to meet market demands or interpretations of the law as they arise.

WARRANTY AND TERMS & CONDITIONS

Description	Page
Warranty Statement	365
Terms & Conditions of Sale	366

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, SPECIALOR 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 manufacturers 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 the Seller's Branch Manager. 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 contract 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 conviens 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 control 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.

PRODUCT SELECTION AND USE: At its own expense, Buyer shall apply for and obtain any permits and inspections required for the purchase, installation, and/or use of the products. Buyer is solely responsible for choosing the products, including decisions regarding use, style, size, and finishes. Some of the products sold to Buyer may contain materials deemed potentially harmful under federal, state or local laws ordinances, regulations, codes or standards. Seller makes no representation, warranty, or promise that the products or services will conform to any applicable laws, ordinances, regulations, codes or standards, including, but not limited to, low lead or lead free laws or regulations, except as particularly specified and agreed upon in writing by an authorized representative of Seller. Seller is not responsible if the product does not fit the particular use, style, size, or finish requirements or is misapplied or misused by Buyer or any other party in violation of law. Seller's products are not for use in or with any nuclear facility unless specifically so stated by Seller in writing.

INDEMNIFICATION: 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 and (iii) meets all applicable laws ordinances, regulations, codes or standards governing the type of product that can be sold or put into transit in the state in which the product is being returned. Buyer's surplus job returns, and those not meeting (i), (ii) and (iii), 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), (ii) and (iii), 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 the Seller's Branch Manager. All transactions shall be governed solely by the terms and conditions contained herein.

Revised 10/11/2013