



**BUTTERFLY
VALVES**



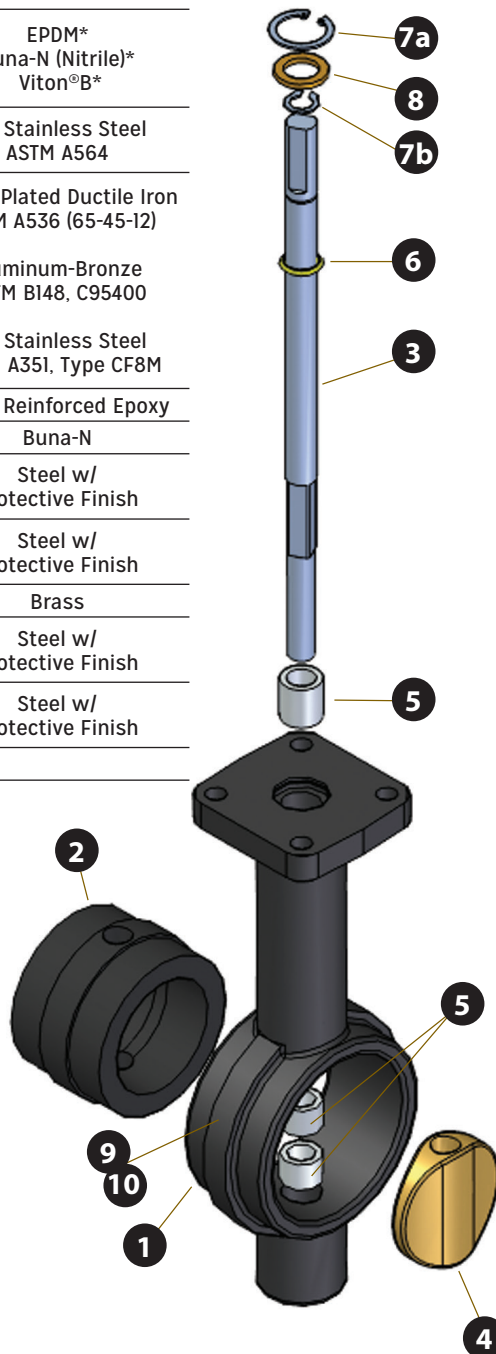


LD/WD 141 & LD/WD 145 SERIES

STANDARD MATERIALS LIST

1	BODY	Ductile Iron ASTM A536 (65-45-12)
2	SEAT	EPDM* Buna-N (Nitrile)* Viton®B*
3	SHAFT	416 Stainless Steel ASTM A564
4	DISC	Nickel Plated Ductile Iron ASTM A536 (65-45-12) Aluminum-Bronze ASTM B148, C95400 316 Stainless Steel ASTM A351, Type CF8M
5	BUSHING	Glass Reinforced Epoxy
6	STEM SEAL	Buna-N
7a	RETAINER	Steel w/ Protective Finish
7b	RETAINER	Steel w/ Protective Finish
8	WASHER	Brass
9	SET SCREWS (FLAT POINT)	Steel w/ Protective Finish
10	SET SCREWS (CONE POINT)	Steel w/ Protective Finish
11	NAMEPLATE	

WD141 - Wafer Design Shown



PRESSURE RATING

- 2" - 12": 200 psi
- 14" - 24": 150 psi

APOLLO INTERNATIONAL™

- WD141: One-Piece Wafer-Style, Sizes 2" - 12"
- LD141: Lug Valves, Sizes 2" - 24"

APOLLO® ASSEMBLED & TESTED IN USA

- WD145: One-Piece Wafer-Style, Sizes 2" to 12"
- LD145: Lug Valves, Sizes 2" to 12"

CERTIFICATION

- Certified to NSF/ANSI 372 Lead Free and NSF/ANSI 61 Water Quality*
- Registered Under Canadian Registration Number CRN# OC12102.8CL

*NSF 61 does not apply to ductile iron disc option

BODY DESIGN

- Ductile Iron ASTM A536
- WD Model: A One-Piece Wafer Design with Flange Locating Holes in Larger Sizes (8" to 12")
- LD Model: Valves are Full Lug with Tapped Lugs, to ANSI 125/150 Drilling. Face-to-Face Dimensions Meet Universal Interchangeability Standards Outlined in MSS SP-67 and API 609
- Models Come Equipped with an Extended Neck Providing at least 2" Clearance Between the Valve Top Plate and Pipe Flange to Allow Ease of Insulation Installation

BLOWOUT-PROOF SEAT WITH MOLDED IN STIFFENER RING

- Isolates Body from Process Media
- Valves are Equipped with a Stretch-Resistant, Non-Collapsible Blowout-Proof Seat
- Phenolic Stiffener Ring (2"-12")
- Aluminum Stiffener Ring (14"-24" LD141 Only)

SEAT - NO GASKETS REQUIRED

- Seat Design Eliminates the Need for Flange Gaskets
- Installs between standard ANSI 125/150 Flanges

MOUNTING FLANGE FOR ACTUATOR

- ISO 5211 Standard Cast in Top Plate
- Designed to Dimensions for Easy Mounting of Apollo® Actuators and Manual Operators

THROUGH SHAFT

- Assures Positive Disc Positioning and Dependable Performance

STEM SEAL

- Shaft Equipped with Weather Seal to Prevent External Media from Entering the Shaft Bore

SQUARE SHAFT-TO-DISC CONNECTION

- Provides a Robust Shaft-to-Disc Connection Without Pins or Bolts
- Easy Maintenance

THREE BUSHINGS

- Supports Shaft at Three Locations to Enhance Shaft Alignment and Absorb Actuator Side Thrusts

PROFILED DISC DESIGN

- Precision Machined Disc Edge Creates Bubble Tight shutoff, Primary Seal.
- Polished Disc Edge Ensures Long Seat Life, Minimal Torque

SHAFT SEAL

- The Shaft Diameter is Greater than the Diameter of the Seat's Shaft Hole Creating a Robust Shaft Seal
- The Stiffening Ring Molded into the Seat Guards Against Distortion, a Frequent Cause of Shaft Leakage

END OF LINE SERVICE

- All LD Model Valves are Equipped with Retainer Screws for Dead End service: 2" thru 12" to 200 psig

TESTING

- All Valves are 100% Factory Tested Before Shipping



LD/WD 141 & LD/WD 145 SERIES

SPECIFICATIONS

- WD - Ductile Iron, Wafer Body Design
LD - Ductile Iron, Single Flange, Lug Body Design
- Designed to Fully Comply with **MSS SP-25**, **MSS SP-67**, and **API 609**
- Meets the Intent and Passed AWWA C-504 Section 5* Proof of Design Tests
- NSF/ANSI 372 "Lead Free" in Compliance with the U.S. Safe Drinking Water Act effective January 4, 2014
- NSF/ANSI 61 "Water Quality" (Bronze and Stainless Steel Disc and EPDM and Buna-N (Nitrile) Seats Only)
- Extended Neck to Allow up to 2" of Insulation
- Dead-End Service: Lug Style Valves are Suitable for End of Line Service to their Rated Pressure Without the Use of a Downstream Flange (2" - 12" only)
- Ideal for ON/OFF and Throttling Service
- Designed for Extended Service with Minimal Wear and Maintenance. No Regular Lubrication is Necessary
- Compatible with ASME Class 125 and Class 150 Weld Neck or Slip-On Flanges
- Larger Wafer Body Design Includes Four Alignment Holes 8" to 12" (DN200 to DN300) WD Models
- Polyester Body Coating:
 - Resistant to Ultra-Violet Radiation
 - Resists a Broad Range of Chemicals Including Dilute Acids, Alkalis, Solvents Alcohols, Greases, and Oils
 - Resists Most Impacts Without Chipping or Cracking
- Cartridge Style Seat:
 - Isolates Body and Stem from the Media Provides Mating Flange Seals Eliminating the Need for Separate Flange Gaskets Provides Positive Shut-Off of Line Media at Rated Pressures
- EPDM and Buna-N (Nitrile) Seats are Food Grade as Standard
- Profiled Disc Design Assures Bubble-Tight Shut-Off, Minimal Torque and Longer Seal Life
- Double-D shaft Drive 2" to 14" (DN50 - DN350)
Round and Keyed Shaft Drive 16" to 24" (DN400 - DN600)
- Blowout-Proof Shaft

- Upper and Lower Shaft Bearing Ensure Longer Seat Life and Lower Operating Torque
- Actuator Mounting Flange (top plate) Conforms to ISO 5211 Which Allows Choice of Lever Operators, Gears and Direct Mounting of Many Apollo[®] Pneumatic and Electric Actuators
- *Specification Applies to 3" - 24" Valves

SIZE RANGE

141 Series: Apollo International™

WD141 (Wafer Body Design): 2"-12" (DN50 - DN300)

LD141 (Single Flange Body Design): 2"-24" (DN50 - DN600)

145 Series: Assembled & Tested in USA

WD145 (Wafer Body Design): 2"-12" (DN50 - DN300)

LD145 (Single Flange Body Design): 2"-12" (DN50 - DN300)

PRESSURE-TEMPERATURE RATING AT 100°F (37.8°C)

All Body, Disc, Seat Combinations

2"-12" (DN50 - DN300) 200 psi (13.8 bar)

14"-24" (DN350 - DN600) 150 psi (10.3 bar)

All Sizes - Vacuum Rating 29 in. Hg (737 mm Hg)

TEMPERATURE RATING - SEATS

EPDM -20° F to 250° F Intermittent,
225° F Continuous (-29° C to 107° C)

Buna-N (Nitrile) 10° F to 180° F (-12° C to 82° C)

Viton[®] B -20° F to 300° F (-29° C to 149° C)

FLANGE DRILLING

ANSI 125/150 Drilling Standard

WD - Wafer Body Design: 8" to 12" (DN200 to DN300) Include Two Alignment Holes

TESTING

Every LD and WD is fully tested prior to shipment. Testing includes a body shell test, a seat test, and a cycling test to insure proper functioning of moving parts. Additional testing is also available. Please let us know your requirements.

SHUTOFF PERFORMANCE

Zero Leakage. Bi-directional, Bubble Tight. All Sizes

ANSI/FCI 70-2 establishes a series of six leakage classes for control valves and defines the test procedure. Class VI allows the least leakage. LD's and WD's are bubble tight, which exceeds Class VI requirements.



OPTIONS

The following options are available factory installed on any of the LD or WD Series Apollo® Butterfly Valves.

The LC149 series are available either with the standard 10-position handle or with the optional gear operator on sizes 8" and larger. The other options may be purchased in kit form and installed by the user or distributor.

BARE STEM (MODEL CODE SUFFIX 0)

Select this suffix to specify a butterfly valve without a handle, gear operator or actuator.

TEN (10) POSITION HANDLE (SUFFIX 1)

The 10 position handle is the most common manual operator for valves 8" and smaller. (It can be specified on valves through 12" size.) The 10 position handle allows the valve to be set in any one of ten positions between fully open and fully closed (approximately 10 degree increments).



GEAR OPERATOR (SUFFIX 2)

Although the option is available for any size of valve, it is commonly used on valves larger than 6", and is the only manual option offered for valves 14" and larger. All gear operators feature a self-locking design preventing back driving of the gear and drifting in the disc's position. All gear operators are weather resistant and permanently lubricated. They are equipped with position indicators and adjustable travel stops.

INFINITE POSITION HANDLE (SUFFIX 3)

This option allows the valve to be set at any degree of open and is available for valves 2" through 12".

LOCKING HANDLE WITH 10 POSITION PLATE (SUFFIX 4)

The option adds a locking device to "suffix 1".



GEAR OPERATOR w/ CHAINWHEEL (SUFFIX 5)

A manual gear with chainwheel allows an overhead valve to be opened or closed from a location lower than the valve.



LOCKING GEAR OPERATOR (SUFFIX 7)

A manual gear with lock-out option allows the manual gear to be locked with a padlock.

LOCKING GEAR OPERATOR w/CHAINWHEEL (SUFFIX 8)

Combination of both chainwheel operator (suffix 5) and the locking device (suffix 7) are also available to work in conjunction with the gear operators described under "suffix 2".

SELF LOCKING GEAR OPERATORS

Self locking manual gear operators are available for all Apollo® WD and LD Series butterfly valves for heavy duty ON/OFF and throttling service. Gear operators are completely weatherproof and self-lubricating; they're equipped with position indicators and adjustable travel stops. Chainwheel operators are available. **All units feature 12" handwheels with gearing for each size to keep rim pull at 50# or less.**

HANDLE AND NOTCH PLATE KITS

Handle and notch plate kits are supplied for manual operation, ON/OFF and throttling service. Kit provides positive disc position indication for 2" to 12" WD and LD Series butterfly valves. Locking handle and infinite position handle are also available.

APOLLO® ACTUATORS

Apollo® Actuators are available as double acting or as spring return and come with a wide variety of corrosion resistant coatings for use in most any application. Standard features include external travel stop adjustments, high temperature, low friction bearings and seals. Mounting kits are available for ease of installation.



Butterfly valves require pneumatic actuators with dual (open & close) limit stops.



BUTTERFLY VALVES

Apollo® butterfly valves are designed for installation between ANSI Class 125/150 lb. weld-neck or slip-on flanges. While we suggest use of weld neck flanges, Apollo® models are configured to also accept slip-on flanges that eliminate failures associated with conventional butterfly valves. Be sure to properly align flange and valve when using raised face flanges. Type C stub end flanges are not recommended.

Apollo® butterfly valves can be used with schedule 40 and schedule 80 steel pipe. When the valve is properly centered between flanges, the disc of an open butterfly valve will not contact the inside diameter of schedule 40 or schedule 80 steel pipe.

Caution: Adjacent piping and components with reduced inside diameters (Lined pipe, Schedule 80 plastic pipe, As-cast rough fittings, etc) could cause disc-pipe contact which could damage the valve's disc and shaft.

INSTALLING WD/LD SERIES VALVES

Begin by positioning the disc at partially open; maintain the disc within the body face-to-face. After positioning the valve body between flanges, install flange bolts.

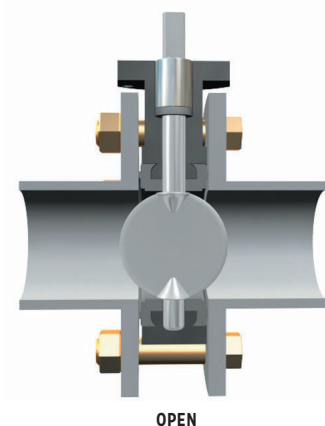
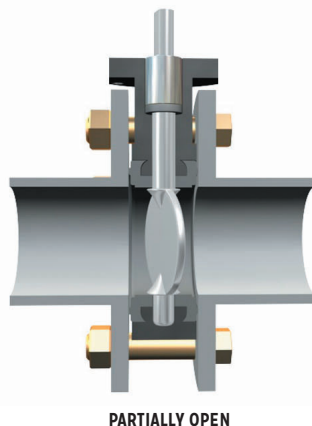
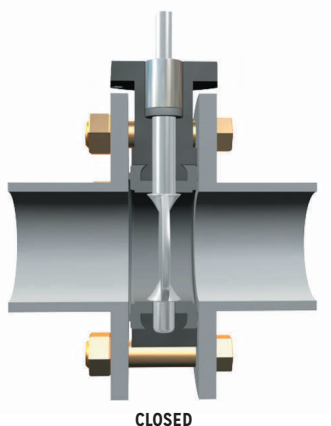
DO NOT USE FLANGE GASKETS. Before tightening flange bolts, adjust disc to the full open position. This helps assure proper alignment and clearance between the outside diameter of the disc and the inside diameter of the pipe. Hand tighten the bolts and then wrench tighten in stages following the proper sequential bolt order for the flange. After tightening, rotate disc carefully to closed position to assure proper outside diameter clearance.

MAINTENANCE

Apollo® butterfly valves are designed for extended service with minimal wear and servicing. No regular lubrication is needed. In case of replacement, put disc in a near closed position and remove from line, spread flanges and support the valve while removing flange bolts.

Always depressurize a piping system when removing a manual or power actuator or performing valve maintenance.

For additional details see appropriate Installation Operation & Maintenance Manual.
(LD141 - I979900, LD145 - I981800, LC149 - I980700)

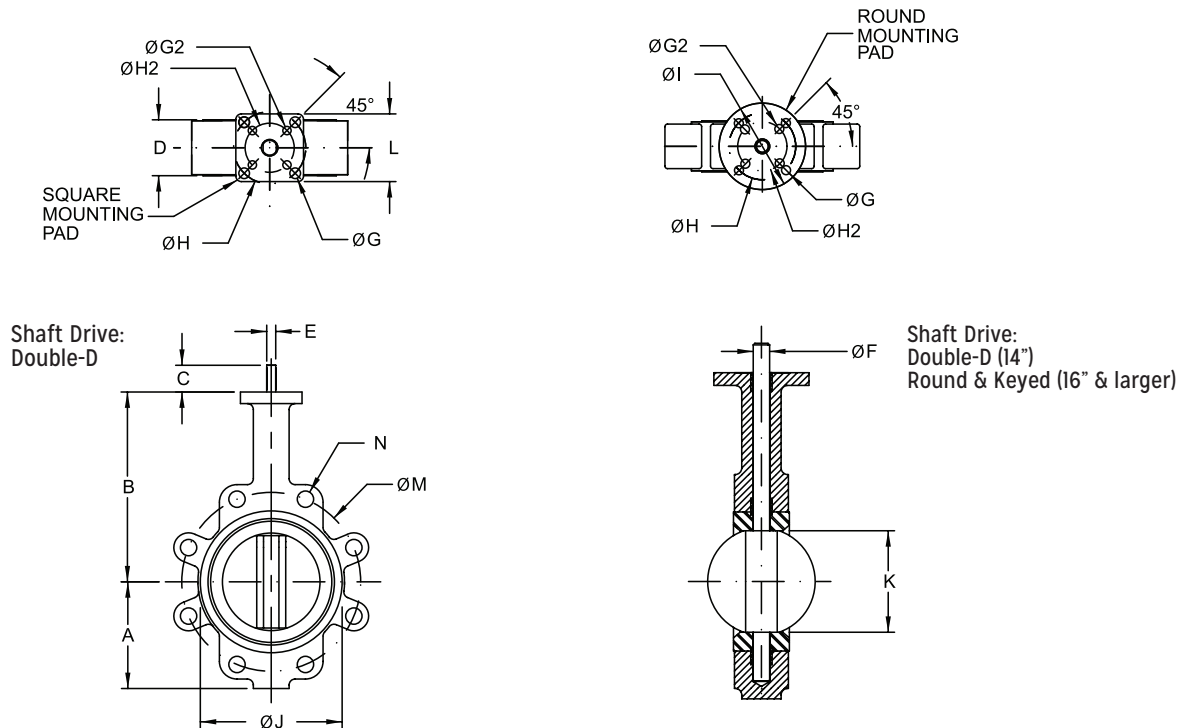




LD MODEL

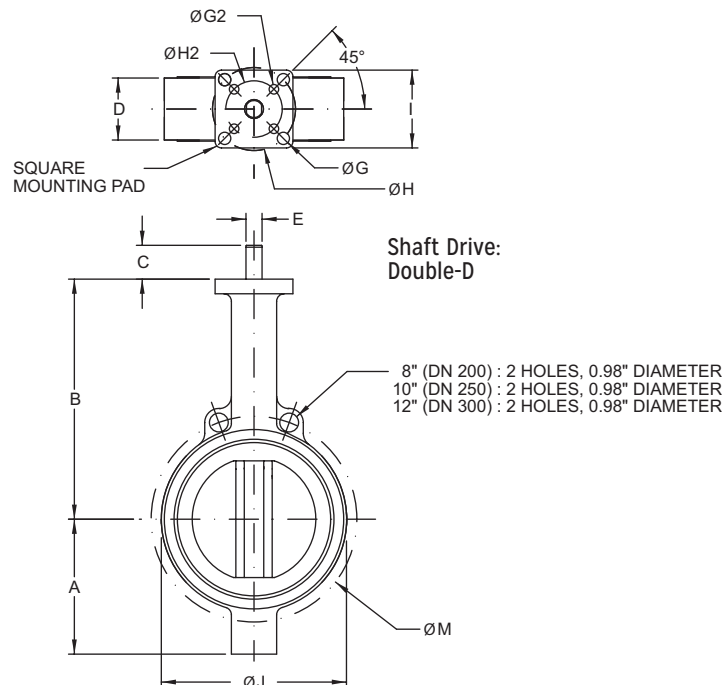
2" - 12"

14" - 24"



WD MODEL

2" - 12"





LD/WD 141 & LD/WD 145 SERIES

DIMENSIONS

DIMENSIONS

Size Inches	Size DN	Dimensions in Inches – 141 & 145 Series								
		A	B	C	D	E	ØF	ØG	ØG2	Key
2	50	3.25	6.38	1.25	1.75	0.394	0.496	0.375	--	--
2-1/2	65	3.75	6.88	1.25	1.88	0.394	0.496	0.375	--	--
3	80	4.00	7.13	1.25	1.88	0.394	0.496	0.375	--	--
4	100	4.88	7.88	1.25	2.13	0.472	0.621	0.375	--	--
5	125	5.38	8.38	1.25	2.25	0.551	0.745	0.375	--	--
6	150	5.88	8.88	1.25	2.25	0.551	0.745	0.375	--	--
8	200	7.13	10.25	1.75	2.50	0.669	0.870	0.563	0.438	--
10	250	8.25	11.50	1.88	2.75	0.866	1.120	0.563	0.438	--
12	300	9.75	13.25	1.88	3.13	0.945	1.244	0.563	--	--
14	350	11.00	14.50	1.88	3.13	0.945	1.244	0.563	--	--
16	400	12.00	15.75	2.00	3.50		1.313	0.563	--	.313 sq
18	450	14.38	16.63	2.00	4.25		1.500	0.813	--	.375 sq
20	500	14.63	18.88	2.50	5.25		1.625	0.813	--	.375 sq
24	600	18.00	22.13	2.75	6.13		2.000	0.813	--	.500 sq

DIMENSIONS

Size Inches	Dimensions in Inches – 141 & 145 Series								
	ØH	ØH2	ØI	ØJ	K	L	M	N (# Holes)	N (Tap UNC)
2	2.756	--	2.70	4.00	2.09	1.113	4.75	4	.625-11
2-1/2	2.756	--	2.70	4.75	2.54	1.706	5.50	4	.625-11
3	2.756	--	2.70	5.13	3.09	2.450	6.00	4	.625-11
4	2.756	--	2.70	6.75	4.09	3.488	7.50	8	.625-11
5	2.756	--	2.70	7.75	4.85	4.296	8.50	8	.750-10
6	2.756	--	2.70	8.63	6.13	5.697	9.50	8	.750-10
8	4.921	4.015	4.61	10.56	7.89	7.468	11.75	8	.750-10
10	4.921	4.015	4.61	13.06	9.89	9.484	14.25	12	.875-9
12	4.921	--	4.61	16.00	11.89	11.456	17.00	12	.875-9
14	4.921	--	Ø5.91	17.13	13.38	13.000	18.75	12	1.00-8
16	4.921	--	Ø5.91	20.00	15.38	14.970	21.25	16	1.00-8
18	6.496	--	Ø8.27	21.38	17.38	16.847	22.75	16	1.125-7
20	6.496	--	Ø8.27	23.31	19.38	18.650	25.00	20	1.125-7
24	6.496	--	Ø8.27	27.88	23.38	22.558	29.50	20	1.125-7

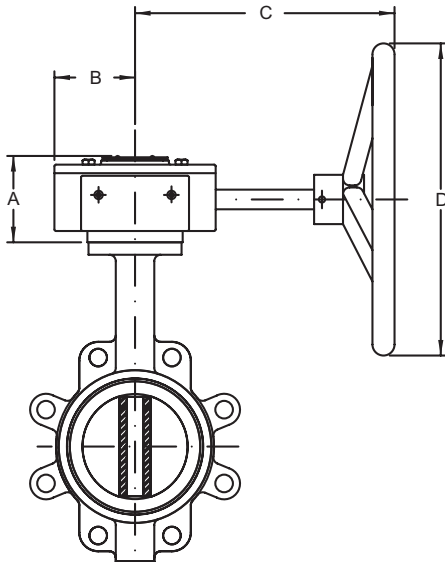
APPROXIMATE WEIGHT FOR BARE SHAFT VALVE

Valve Size		WD Model Lbs (kg)	LD Model Lbs (kg)	Valve Size		WD Model Lbs (kg)	LD Model Lbs (kg)
Inches	DN			Inches	DN		
2	50	6 (2.7)	8 (3.6)	10	250	44 (20.0)	62 (28.1)
2.5	65	6 (2.7)	10 (4.5)	12	300	70 (31.8)	97 (44.0)
3	80	7(3.2)	11 (5.0)	14	350		148 (67.1)
4	100	11 (5.0)	17 (7.7)	16	400		206 (93.4)
5	125	13 (5.9)	20 (9.1)	18	450		277 (125.6)
6	150	16 (7.3)	23 (10.4)	20	500		410 (186.0)
8	200	29 (13.2)	39 (17.7)	24	600		592 (268.5)

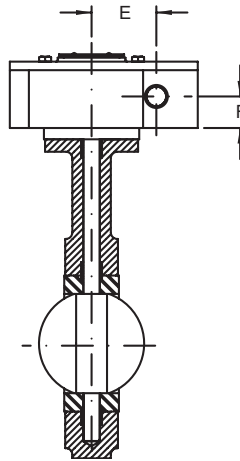


141 & 145 SERIES

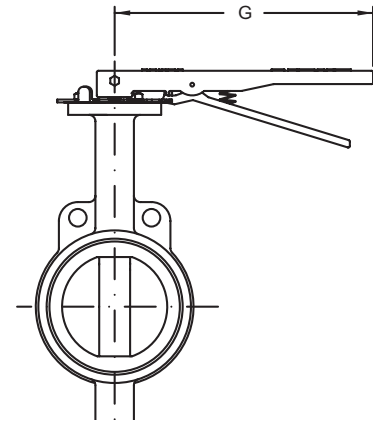
HANDLE & GEAR DIMENSIONS



with Manual Gear



with Manual Gear



with Handle

All Gear Operators supplied with 12" Handwheels with gearing to provide RIM pull at 50# or less

DIMENSIONS

Valve Size		Gear Ratio	Dimensions (.in)						
Inches	DN		A	B	C	D	E	F	G
2"	50	30:1	3.4	3.0	9.2	11.9	2.5	1.5	10.5
2.5"	65	30:1	3.4	3.0	9.2	11.9	2.5	1.5	10.5
3"	80	30:1	3.4	3.0	9.2	11.9	2.5	1.5	10.5
4"	100	30:1	3.4	3.0	9.2	11.9	2.5	1.5	10.5
5"	125	30:1	3.4	3.0	9.2	11.9	2.5	1.5	10.5
6"	150	30:1	3.4	3.1	8.9	11.9	2.5	1.5	10.5
8"	200	50:1	3.4	3.3	8.9	11.9	3.0	1.6	14.0
10"	250	50:1	3.4	3.3	8.9	11.9	3.0	1.6	14.3
12"	300	50:1	3.4	3.3	8.9	11.9	3.0	1.6	14.3
14"*	350*	50:1	3.4	3.3	8.9	11.9	3.0	1.6	--
16"*	400*	80:1	4.8	5.1	11.8	11.9	4.7	2.3	--
18"*	450*	80:1	4.8	5.1	11.8	11.9	4.7	2.3	--
20"*	500*	300:1	5.9	5.1	13.8	11.9	4.7	2.8	--
24"*	600*	300:1	5.9	5.1	13.8	11.9	4.7	2.8	--
30"*	750*	640:1	4.9	5.1	11.9	15.7	7.8	5.0	--
36"*	900*	640:1	4.9	5.1	11.9	15.7	9.0	5.0	--

* LD141 Series only



141 / 145 & 149 SERIES

OPERATING TORQUE

All torque valves shown in the chart are for wet (water and other non-lubricating media) on-off service. For dry services (non-lubricating, dry gas media) multiply the values by 1.15. For lubricous services (clean, non-abrasive lubricating media) multiply values by 0.85.

Under certain conditions, hydrodynamic torque can meet or exceed seating and unseating torques. When designing valve systems, hydrodynamic torque must be considered to help ensure correct selection of actuation.

TORQUE RATING (ft./lbs.)

Valve Size		Full Rated Pressures (psig)			
Inches	DN	ΔP 50	ΔP 100	ΔP 150	ΔP 200
2	50	100	106	111	117
2.5	65	150	163	176	189
3	80	207	220	232	244
4	100	290	323	357	390
5	125	423	481	540	598
6	150	599	691	783	875
8	200	1060	1183	1307	1430
10	250	1671	1872	2074	2275
12	300	2568	2795	3023	3250
14*	350*	2640	3070	3500	N/A
16*	400*	4260	4880	5500	N/A
18*	450*	6287	7243	8200	N/A
20*	500*	8360	9180	10000	N/A
24*	600*	15427	16813	18200	N/A

*LD141 only

141 / 145 & 149 SERIES

VELOCITY LIMITS

- For ON/OFF Services
- Non-Abrasive Liquids - 30 feet/sec (9m/sec)
- Gases - 175 feet/sec (54m/sec)

141 / 145 & 149 SERIES

C_v Data

Cv values (US gallons per minute) represent the flow of 60°F water through a 100% open valve at a pressure drop of 1 psi. The metric equivalent, Kv, is the flow of water at 16°C through the valve in cubic meters per hour at a pressure drop of 1 kg/cm². To convert Cv to Kv, multiply the Cv by 0.8569.

RATED FLOW COEFFICIENT (CV)

Valve Size		Angle of Disc Opening (degrees)								
Inches	DN	10°	20°	30°	40°	50°	60°	70°	80°	90°
2	50	0.06	3	7	15	27	44	70	105	115
2.5	65	0.10	6	12	25	45	75	119	178	196
3	80	0.20	9	18	39	70	116	183	275	302
4	100	0.30	17	36	78	139	230	364	546	600
5	125	0.50	29	61	133	237	392	620	930	1022
6	150	0.80	45	95	205	366	605	958	1437	1579
8	200	2	89	188	408	727	1202	1903	2854	3136
10	250	3	151	320	694	1237	2047	3240	4859	5340
12	300	4	234	495	1072	1911	3162	5005	7507	8250
14*	350*	6	338	715	1549	2761	4568	7230	10844	11917
16*	400*	8	464	983	2130	3797	6282	9942	14913	16388
18*	450*	11	615	1302	2822	5028	8320	13168	19752	21705
20*	500*	14	791	1674	3628	6465	10698	16931	25396	27908
24*	600*	22	1222	2587	5605	9989	16528	26157	39236	43116

*LD141 only

This chart should be used as a general guide. For additional Cv information, consult the **Engineering and Application Data Section**. Cv = the volume of water in U.S. gallons per minute that will pass through a given valve opening with a pressure drop of 1 psig at room temperature.



LD/WD 141 & LD/WD 145 SERIES

LD/WD 141

APOLLO INTERNATIONAL™



WD 141
Wafer
2" - 12"



LD 141
Lug
2" - 24"

The Apollo® LD/WD Series ductile iron butterfly valves are ideal for use in industrial and HVAC/mechanical applications. The WD Series is a wafer style valve and the LD Series is a lug style.

FEATURES

- Compatible with ANSI 125# & 150# Flanges
- ISO 5211 Top Plate Allows Choice of Apollo® Actuators and Manual Operators
- Conforms to MSS SP-67 & API 609
- LD141 and LD145 Series Suitable for End of Line Service to Rated Pressure (2" - 12") (Consult Factory for Larger Sizes)
- 3"-24" Meet Performance Requirements of AWWA C-504
- Certified NSF/ANSI 372 Lead Free
- Certified NSF/ANSI 61 Water Quality*
- Registered Under Canadian Registration Number CRN# OC12102.8CL

*Applies to Bronze and Stainless Steel Disc Models

OPTIONS

- 10 Position Handle
- Gear Operator
- Infinite Position Handle
- Locking Handle
- Gear Operator with Chain Wheel
- Locking Gear Operator
- Locking Gear Operator with Chain Wheel
- Pneumatic Actuation
- Electric Actuation
- (-SF) Silicone Free Assembly Option (145 Series)

PRESSURE-TEMPERATURE RATING @ 100° F (37.8° C)

- All Body, Disc, Seat Combinations:
- 2"-12" (DN50 - DN300) 200 psi (13.8 bar)
- 14"-24" (DN350 - DN600) 150 psi (10.3 bar)
- All Sizes - Vacuum Rating: 29 in. Hg

LD/WD 145

MADE IN USA



WD 145
Wafer
2" - 12"



LD 145
Lug
2" - 12"

TORQUE RATING (in./lbs.)

Valve Size ¹		Full Rated Pressures (psig)			
Inches	DN	ΔP50	ΔP100	ΔP150	ΔP200
2	50	100	106	111	117
2.5	65	150	163	176	189
3	80	207	220	232	244
4	100	290	323	357	390
5	125	423	481	540	598
6	150	599	691	783	875
8	200	1060	1183	1307	1430
10	250	1671	1872	2074	2275
12	300	2568	2795	3023	3250
14	350	2640	3070	3500	N/A
16	400	4260	4880	5500	N/A
18	450	6287	7243	8200	N/A
20	500	8360	9180	10000	N/A
24	600	15427	16813	18200	N/A

¹ LD (2"-24"); WD (2"-12"); LC (2"-12")

Sizes 28"-48": Contact factory for availability.

Actuation assistance available on page 62, with the Apollo® Actuator Wizard located at actuatorwizard.conbraco.com or by calling customer support at (704)841-6000.



BUTTERFLY VALVES

LD141 SERIES

APOLLO INTERNATIONAL™

New!



The large diameter Apollo International™ LD141 Series Ductile Iron Butterfly Valves are ideal for use in Industrial and Commercial/HVAC/Mechanical applications. The LD141 Series is lug style butterfly valve. Available in sizes 28" - 48".

FEATURES

- Compatible with ANSI 125# & 150# Flanges
- ISO 5211 Top Plate Allows Choice of Apollo® Pneumatic Actuators and Gear Operators
- Conforms to MSS SP-67 & API 609

PERFORMANCE RATING

- Pressure Rating: 28" to 48": 150 psi

MATERIAL OPTIONS

Body

- Ductile Iron ASTM A536, (65-45-12)

Seat Material

- EPDM: -4°F to 248°F Intermittent
- BUNA-N: 14°F to 212°F

Disc Material

- Aluminum Bronze
- Ductile Iron A536 Nickel Plated
- 316 Stainless Steel, CF8M

OPERATOR

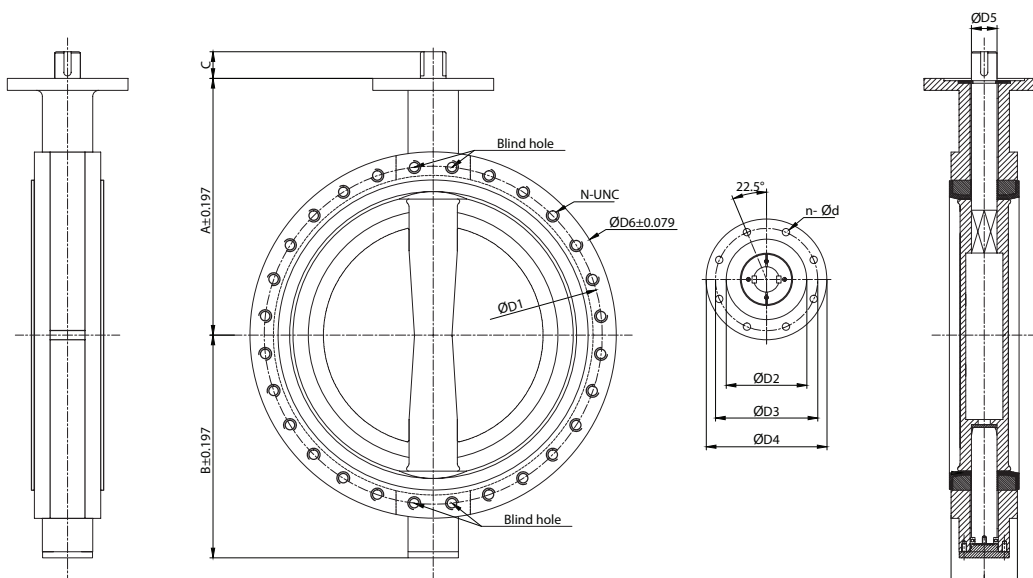
- (-0) - None
- (-2) - Gear Operator (12" Handwheels)
- (-5) - Gear Operator w/ Chain Wheel
- (-7) - Locking Gear Operator
- (-8) - Locking Gear Operator w/ Chain Wheel

STANDARD MATERIAL LIST

BODY	Ductile Iron ASTM A536
BUSHINGS	Bronze
STEM SEAL	Buna-N
SHAFT	416 SS
SEAT	EPDM
	Buna-N (Nitrile)
DISC	Aluminum Bronze
	Ductile Iron / A536 Nickel Plated
	316 Stainless Steel / CF8M

DIMENSIONS

Size (.in)	Dimensions (.in)												Weight (.lbs)
	A	B	C	D	ØD1	ØD2	ØD3	ØD4	ØD5	ØD6	n-unc	n-Ød	
28	25.00	21.18	2.598	6.496	33.99	7.87	10.00	11.81	2.494	36.42	28 - 1-1/4	8-0.709	648
30	26.57	22.05	2.598	6.496	36.00	7.87	10.00	11.81	2.494	38.78	28 - 1-1/4	8-0.709	728
32	26.61	23.66	2.598	7.480	38.50	7.87	10.00	11.81	2.494	41.73	28 - 1-1/2	8-0.709	772
36	30.39	25.79	4.65	7.874	42.75	7.87	10.00	11.81	2.95	46.06	32 - 1-1/2	8-0.709	1162
40	31.30	28.50	5.59	8.50	47.24	7.87	10.00	11.81	3.35	50.79	36 - 1-1/2	8-0.709	1526
42	33.78	30.59	5.91	9.88	49.50	7.87	10.00	11.81	3.74	52.95	36 - 1-1/2	8-0.709	2138
48	37.13	32.48	5.91	10.87	56.00	9.06	11.73	13.78	4.13	59.45	44 - 1-1/2	8-0.866	2686





LCI49 SERIES

APOLLO INTERNATIONAL™ - CONTRACTOR GRADE



The LCI49 Series Cast Iron Butterfly Valves are ideal for use in Industrial and HVAC/Mechanical applications. The LCI49 Series is a lug style valve designed to be economical yet full featured.

STANDARD MATERIALS

- Body Cast Iron, ASTM A126 Class B
- Disc Aluminum Bronze, ASTM B148-C95400
- Shaft Stainless Steel, ASTM A276, Type 416
- Seat Black EPDM (FDA Food Grade) with Phenolic Backing
- Bushings PTFE
- Stem Seal EPDM

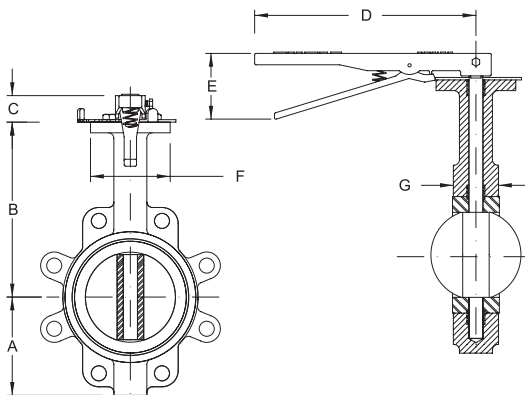
PERFORMANCE RATING

- Max Operating Pressure: 200 psi (13.8 bar)
- Temperature Range: -30°F @ 225°F

APPROVALS

- NSF/ANSI 372 Lead Free
- NSF/ANSI 61 Water Quality
- Registered Under Canadian Registration Number CRN# 0C12102.8CL

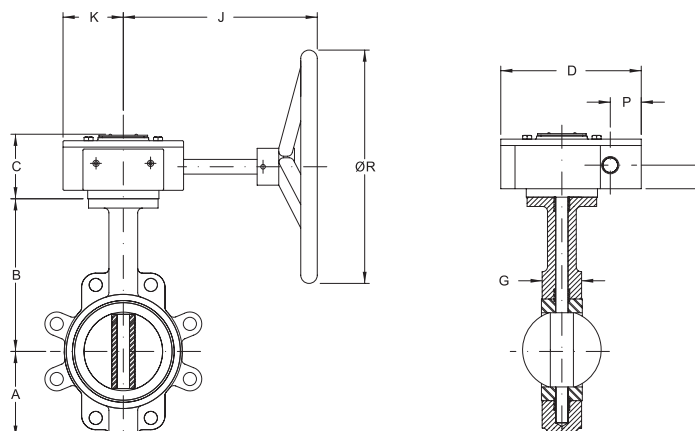
DIMENSIONS - 149 Series with Handle



Size (in)	Dimensions (.in)						
	A	B	C	D	E	F	G
2	3.25	6.38	1.25	10.5	3.1	2.70	1.75
2-1/2	3.75	6.88	1.25	10.5	3.1	2.70	1.88
3	4.00	7.13	1.25	10.5	3.1	2.70	1.88
4	4.88	7.88	1.25	10.5	3.1	2.70	2.13
5	5.38	8.38	1.25	10.5	3.1	2.70	2.25
6	5.88	8.88	1.25	10.5	3.1	2.70	2.25
8	7.13	10.25	1.75	14.3	3.5	4.61	2.50
10	8.25	11.50	1.88	14.3	3.5	4.61	2.75
12	9.75	13.25	1.88	14.3	3.5	4.61	3.13

DIMENSIONS - 149 Series with Optional Gear Operator

Size (in)	Dimensions (.in)									
	A	B	C	D	G	H	J	K	P	ØR
8	7.13	10.25	3.38	8.00	2.50	1.62	9.48	3.25	1.50	11.88
10	8.25	11.50	3.38	8.00	2.75	1.62	9.48	3.25	1.50	11.88
12	9.75	13.25	3.38	8.00	3.13	1.62	9.48	3.25	1.50	11.88





BUTTERFLY VALVES

PART NUMBER MATRIX (2" - 24")

LD	141	06	B	E	1	1	-S
MODEL	SERIES	SIZE (IN.)	DISC MATERIAL	SEAT MATERIAL	SHAFT	OPERATOR	
LD = Lug Body WD = Wafer Body	141 = Apollo International™ (Ductile Iron) 145 = Assembled & Tested in USA (Ductile Iron)	02 = 2" 25 = 2.5" 03 = 3" 04 = 4" 05 = 5" 06 = 6" 08 = 8" 10 = 10" 12 = 12" 14 = 14" 16 = 16" 18 = 18" 20 = 20" 24 = 24"	B = Aluminum Bronze D = Ductile Iron A536 Nickel Plated S = Stainless Steel, CF8M	E = Black EPDM** -30° F to 275° F -34° C to 135° C N = Black BUNA-N** 10° F to 180° F -12° C to 82° C V = Black Viton® B † -20° F to 300° F -29° C to 149° C (145 Series Only) ** FDA Food Grade	1 = Std. 416 SS	0 = Bare Shaft 1 = 10 Position Handle 2 = Gear Operator - Direct Mount 3 = Infinite Position Handle 4 = Locking Handle 5 = Gear Operator w/ Chainwheel 7 = Locking Gear Operator 8 = Locking Gear Operator w/Chainwheel -SF= Silicone Free Assembly (145 Series Only)	
	141 = Sizes 14" - 24" NOTE: LD-141 lug style only						



Certification - Product complies with NSF/ANSI 372 and NSF/ANSI 61 lead content requirements.

*NSF 61 does not apply to ductile iron disc

†Viton is primarily used for process applications, and has not been included in the scope of our Lead Free approvals

EXAMPLE:

WD141-06-BE-11 = 6" WD141 Series, Ductile Iron Wafer Body, Aluminum Bronze Disc, Black EPDM Seat, 416 SS Shaft with 10 Position Handle

PART NUMBER MATRIX (28" - 48")

WD	141	06	B	E	1	1	-S
MODEL	SERIES	SIZE (IN.)	DISC MATERIAL	SEAT MATERIAL	SHAFT	OPERATOR	
LD = Lug Body	141 = Apollo International™ (Ductile Iron)	28 = 28" 30 = 30" 32 = 32" 36 = 36" 40 = 40" 42 = 42" 48 = 48"	B = Aluminum Bronze D = Ductile Iron A536 Nickel Plated S = Stainless Steel, CF8M	E = Black EPDM** -30° F to 275° F -34° C to 135° C N = Black BUNA-N** 10° F to 180° F -12° C to 82° C ** FDA Food Grade	1 = Std. 416 SS	0 = Bare Shaft 2 = Gear Operator - Direct Mount 5 = Gear Operator w/ Chainwheel 7 = Locking Gear Operator 8 = Locking Gear Operator w/Chainwheel	

PART NUMBER MATRIX

LC149	06	1
SERIES	SIZE (IN.)	OPERATOR
LC149 = Cast Iron Lug Body Aluminum Bronze Disc 416 SS Shaft Black EPDM Seat	02 = 2" 25 = 2.5" 03 = 3" 04 = 4" 05 = 5" 06 = 6" 08 = 8" 10 = 10" 12 = 12"	1 = 10 Position Handle (2" - 12") 2 = Gear Operator (8" - 12" only)



Certification - Product complies with NSF/ANSI 372 and NSF/ANSI 61 lead content requirements.

†Viton is primarily used for process applications, and has not been included in the scope of our Lead Free approvals

EXAMPLE:

LC149-06-1: 6" LC149 Series, Cast Iron Body, Aluminum Bronze Disc, Black EPDM Seat, 416 SS Shaft with 10 Position Handle

PRICING

Pricing of valves and options may be accessed through published price list BFPL9000 or by authorized Apollo® Online users.



The Apollo® LD/WD Series Ductile Iron Butterfly Valves offer reliable performance in a wide range of applications; on/off, throttling, control isolation, flow balancing and diversion. Ideal for use in Industrial and HVAC/Mechanical applications.

Service compatibility is dependant on several factors; the corrosion resistance of the disc and shaft and the chemical resistance of the seat (liner) and required temperature range. Erosion resistance also affects material selection when dealing with abrasive slurries.

EPDM Cartridge Style Seat Ethylene propylene rubber	Buna-N Cartridge Style Seat Nitrile rubber Also known as NBR	Viton® B Cartridge Style Seat Fluorocarbon rubber
Temperature rated from -20°F to 250°F Intermittent, 225°F Continuous	Temperature rated from 10°F to 180°F	Temperature rated from -20°F to 300°F
Typical applications: • Food Grade EPDM is Standard • Typically offered for general service and elevated temperatures • Hot water • Chilled water • Glycols • Detergents • Phosphate esters • Ketones • Alcohols • Low Pressure Steam • Dilute acids • Phosphate based hydraulic oils and fluids • Silicone greases and oils • Alkalies	Typical applications: • Food Grade Buna-N is Standard • Good for most general services • Water – ambient temperature • Vacuum • Compressed air • Salt solutions • Alkaline solutions • Dilute acids • Petroleum oils & fluids • Silicone oils & greases • Ethylene glycol	Typical applications: • A fluorocarbon rubber with a wide spectrum of chemical resistance (exceptional resistance to oils and chemicals at higher temperatures). • A fluorocarbon rubber that typically has better chemical resistance than Buna-N. • Hydrocarbons • Mineral acids • Alcohols
 ⊗ EPDM is not recommended for any hydrocarbon-based oils, petroleum oils, hydrocarbon-based lubricants, or di-ester based lubricants, or air systems with hydrocarbons.	 ⊗ Buna-N can swell in hot water applications, and increase operating torque. ⊗ Buna-N is NOT recommended for strong oxidizing agents, nitrated hydrocarbons, Aromatic hydrocarbons (benzene, toluene, xylene), acetates, phenols, aldehydes, gasolines with additives, Automotive brake fluid, Halogen derivatives (carbon tetrachloride, trichloroethylene), Ketones (MEK, acetone), Phosphate ester hydraulic fluids (Skydrol®, Pydraul®), Strong acids, ozone	 ⊗ Viton® can swell in higher temperature water applications. ⊗ At low temperatures, Viton®'s flexibility decreases (hardens), which often increases operating torque. ⊗ Viton® is not recommended for ketones, Skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric chlorosulfonic acids.



215 / 230 & 260 SERIES

DOUBLE OFFSET HIGH PERFORMANCE

SIZE RANGE

Class 150: 2" - 36" (including 2.5" & 5")

Class 300: 2" - 24" (including 2.5" & 5")

Class 600: 3" - 12"

SEATS

Resilient, Fire Safe and Metal Seat Configurations Available.

STANDARD COMPLIANCE

ASME B16.34 - Valves - Flanged, Threaded, and Welding End

ASME B16.5 - Pipe Flanges and Flanged Fittings

ASME B16.10 - Face-to-Face and End-to-End Dimensions of Valves

ANSI/FCI 70-2 - Control Valve Seat Leakage

MSS SP-25 - Standard Marking System for Valves

MSS SP-44 - Steel Pipe Line Flanges

MSS SP-55 - Quality Standards for Steel Castings

MSS SP-61 - Pressure Testing of Steel Valves

MSS SP-68 - High Pressure Butterfly Valves with Offset Design

MSS SP-96 - Terminology for Valves and Fittings

API 598 - Valve Inspection and Testing

API 607 - Fire Test for Soft Seated Valves

API 609 - Butterfly Valves: Double Flanged, Lug and Wafer Type

NSF/ANSI 61 - Drinking Water System Components - Health Effects

2" - 36", 215 & 230 Series

316/CF8M Stainless Steel | 317 Stainless Steel

Duplex Stainless Steel | Super Duplex Stainless Steel

NSF/ANSI 372 - Drinking Water System Components - Lead Content

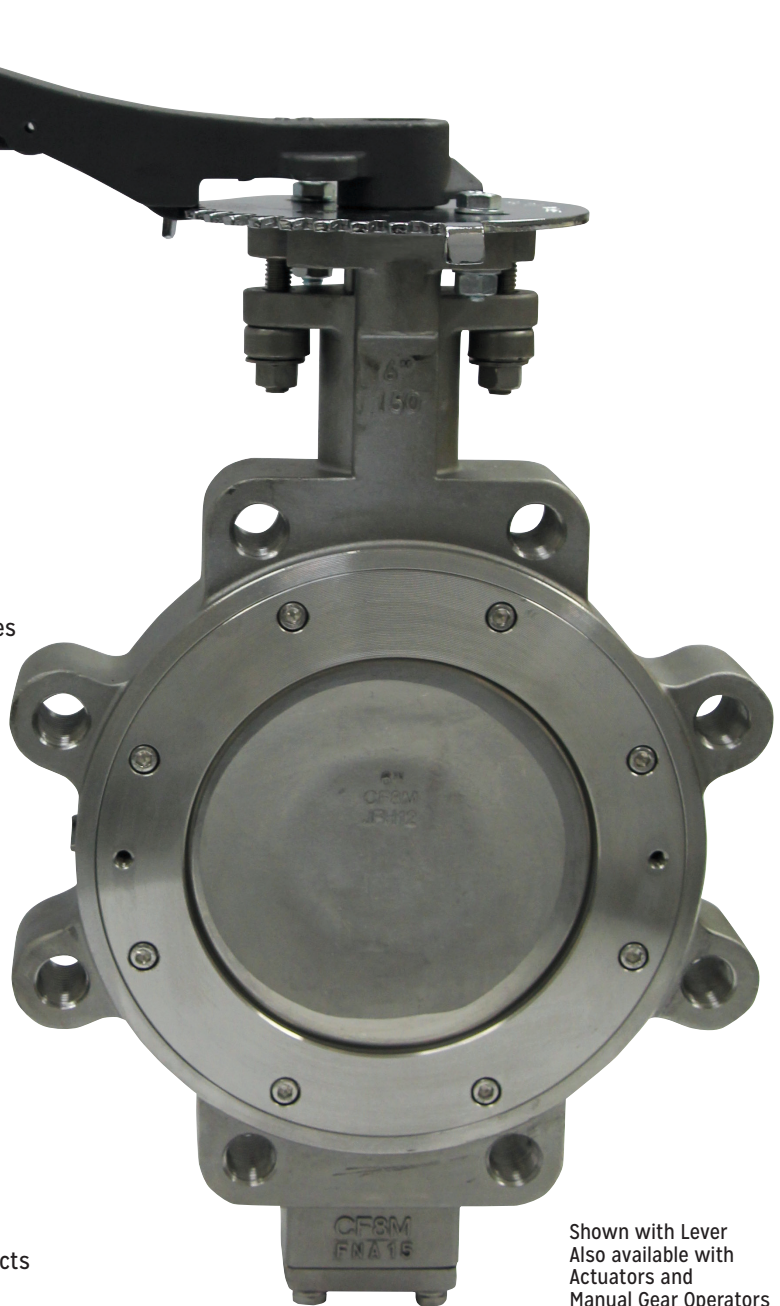
2" - 36", 215 & 230 Series

316/CF8M Stainless Steel | 317 Stainless Steel

Duplex Stainless Steel | Super Duplex Stainless Steel

CE Marked and Documented Valves that Conform to the European Pressure Equipment Directive (PED) 97/23/EC are Available in ANSI Class 150/300/600 Including Resilient, Fire Safe and Metal Seat Configurations (sizes 2"-24" only)

CRN No. OC17459.5CL



Shown with Lever
Also available with
Actuators and
Manual Gear Operators



215 / 230 & 260 SERIES

ADVANTAGES

ISO 5211 MOUNTING FLANGE

Universal mounting dimensions simplify valve actuation. Allows for direct mounting of several actuators.

ROCKER PACKING GLAND

Shaped packing gland compensates for uneven adjustment of gland nuts.

STEM PACKING

V-ring PTFE, UHMWPE or flat graphite provides positive sealing.

EXTENDED NECK

Allows for 2" of pipe insulation.

BODY

Robust one-piece casting in WCB carbon steel or CF8M stainless steel. Available in wafer & lug style.

POSITIVE CAST DISC STOP

Prevents seat damage from over-travel of the disc beyond the closed position. (not visible)

JACKING TAPS

Allows the use of seat retainer bolts to aid in retainer removal.

SEAT RETAINER

Reliable multi-bolt retainer holds and supports the seat. Standard valves are suitable for bi-directional dead-end service at the full pressure-temperature rating of the valve. Same material as body material.

CORROSION PROTECTION

Polyamide epoxy primer with high performance polyurethane topcoat is the standard finish for carbon steel valve bodies.

STEM (BLOWOUT-PROOF)

17-4 PH stainless steel stem with high strength, and good corrosion resistance. Designed per API 609 standard.

ANTI-EXTRUSION RING (UNDER STEM SEALS)

Prevents the extrusion of stem seals, maintaining optimum seal.

BEARING (UPPER)

Full length provides maximum stem support. Made of 316 SS/PTFE.

SEAT

An advanced free floating, pressure assisted, solid seat design provides an interference and pressure assisted seal. This creates a positive seal under both low and high pressure requirements. The seat does not rely on any secondary components to hold it in place, assuring longer service life with less maintenance.

TANGENTIAL DISC PINS

17-4 PH stainless steel disc pins are tangentially positioned, placing them in compression rather than shear. This robust joint design eliminates potential failure of the disc-stem connection.

DISC

Standard material is 316 stainless steel.

BEARING (LOWER)

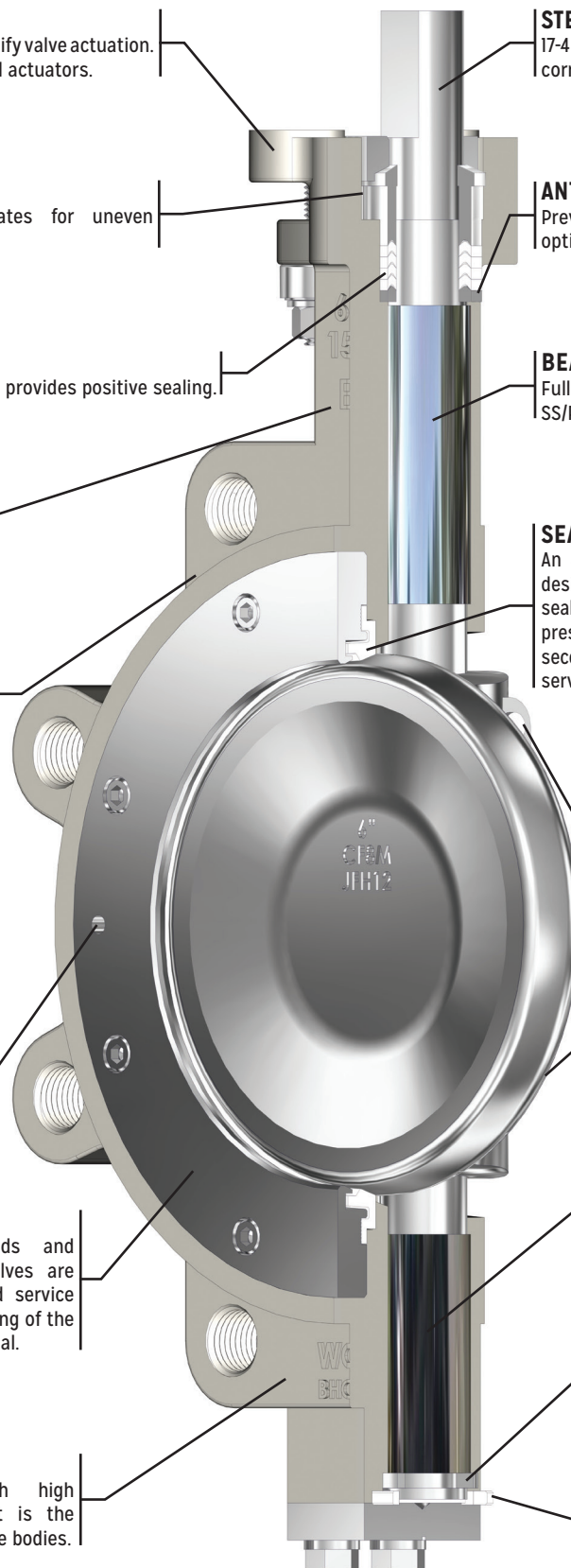
Full length provides maximum stem support. Made of 316 SS/PTFE.

THRUST RING

Centers the disc. Ensures tight shutoff and long service life. Made of 316 stainless steel.

END CAP SEAL

Made of PTFE, UHMWPE or graphite.





BUTTERFLY VALVES

215 / 230 & 260 SERIES

DOUBLE OFFSET HIGH PERFORMANCE



Apollo International™ 215, 230, 260 Series double offset high performance butterfly valves are available in wafer or lug body design. Stainless steel valves are certified lead-free with stainless steel disc and 17-4PH stainless steel stem.

FEATURES

- 215 Series Class 150# Carbon Steel (CWP 285) and 316 SS (CWP 275) 2" to 36"
- 230 Series Class 300# Carbon Steel (CWP 740) and 316 SS (CWP 720) 2" - 24"
- 260 Series Class 600# Carbon Steel (CWP 1480) and 316 SS (CWP 1440) 3" - 12"
- ISO 5211 Mounting Flange Allows Choice of Apollo[®] Actuators and Manual Operators
- Multi-Bolt Retainer Holds and Supports the Seat. Standard Valves are Suitable for Bi-Directional Dead-End Service at the Full Pressure-Temperature Rating of the Valve. Same Material as the Body
- Well-suited for a wide range of liquid and Steam Applications, Defined in the High Performance Butterfly Valve Pressure-Temperature Charts
- Vacuum Service to 29" Hg
- Soft Seats Made from TFM 1700
- UHMWPE Available on Request

APPROVALS

- NSF/ANSI 61 Water Quality
 - 2" - 36", 215 & 230 Series
 - 316/CF8M Stainless Steel | 317 Stainless Steel
 - Duplex Stainless Steel | Super Duplex Stainless Steel
- NSF/ANSI 372 Lead Free
 - 2" - 36", 215 & 230 Series
 - 316/CF8M Stainless Steel | 317 Stainless Steel
 - Duplex Stainless Steel | Super Duplex Stainless Steel
- CE/(PED) 97/23/EC Models are Available
- CRN No. OC17459.5CL
- Registered under Canadian Registration Number CRN# OC12102.8CL

PART NUMBER MATRIX

2	15	L	06	C	S	P	8T	A	O	
VALVE TYPE	CLASS	VALVE STYLE	SIZE	BODY MATERIAL	DISC MATERIAL	STEM MATERIAL	SEAT MATERIAL	SPECIAL SERVICE	OPERATOR	
2 - Double Offset	15 (150)	L - Lug	02 (2")	C - Carbon Steel	S - 316 SS	P - 17-4 PH SS	8T - RTFM	A - Standard Apollo	0 - Bare Stem	
	30 (300)	W - Wafer	25 (2.5")	S - 316 SS	A - Alloy 20	A - Alloy 20	(TFM 1700 w/Glass)		1 - Lever Operator ⁴	
	60 (600) ¹		03 (3")	A - Alloy 20	B - 317 SS	B - 317 SS	2F - TFM/Inconel, Graphite Seals (Fire Safe)		2 - Worm Gear Operator	
			04 (4")	B - 317 SS	H - Hastelloy C	H - Hastelloy C			5 - Worm Gear Operator w/ Chain Wheel	
			05 (5")	H - Hastelloy C	J - Duplex	J - Duplex			2M - 316SS (Metal Seated)	7 - Locking Worm Gear Operator
			06 (6")	J - Duplex	K - Super Duplex	K - Super Duplex				21 - UHMWPE ³
			08 (8")	K - Super Duplex	M - Monel	M - Monel				
			10 (10")			S - 316 SS				
			12 (12")							
			14 (14")							
			16 (16")							
			18 (18")							
			20 (20")							
			24 (24")							
			30 (30") ²							
			36 (36") ²							

¹ Class 600 valves available in sizes 3" through 12" (excluding 5" size)

² 215L Only

³ UHMWPE not available in Class 600

⁴ Standard handle can be locked in the full open or fully closed position.

Lever operators are available with 2"-12" class 150 valves (215), and 2"-10" class 300 valves (230)

See table for Lever Handle Availability & Maximum Differential Pressure

Safety Warning:

Gear operators are normally specified for larger high performance butterfly valves because the force of the pipeline flow on the disc can be too great to safely use a handle.

EXAMPLE:

215L06CSP8TA0 = 6" Class 150 Lug, Carbon Steel Body, SS Disc, 17-4 PH Stem, TFM 1700 Seats, Standard Service, Bare Stem

LEVER HANDLE AVAILABILITY & MAXIMUM DIFFERENTIAL PRESSURE

		SOFT SEAT (CODES: 8T & 21)		FIRE-SAFE SEAT (CODE: 2F)		METAL SEAT (CODE: 2M)	
		PSI	bar	PSI	bar	PSI	bar
Class 150	215	2"-6"	Full Rating	Full Rating	Full Rating	Full Rating	Full Rating
		8"	150	10.3	Not Available	Not Available	Not Available
		10"-12"	50	3.4	Not Available	Not Available	Not Available
Class 300	230	2"-4"	Full Rating	Full Rating	Full Rating	Full Rating	Full Rating
		6"-8"	150	10.3	Not Available	Not Available	Not Available
		10"	50	3.4	Not Available	Not Available	Not Available



215 / 230 & 260 SERIES

RESILIENT SEAT

CLASS 150 - 2" THRU 24", 30", 36" | CLASS 300 - 2" THRU 24" | CLASS 600 - 3" THRU 12"

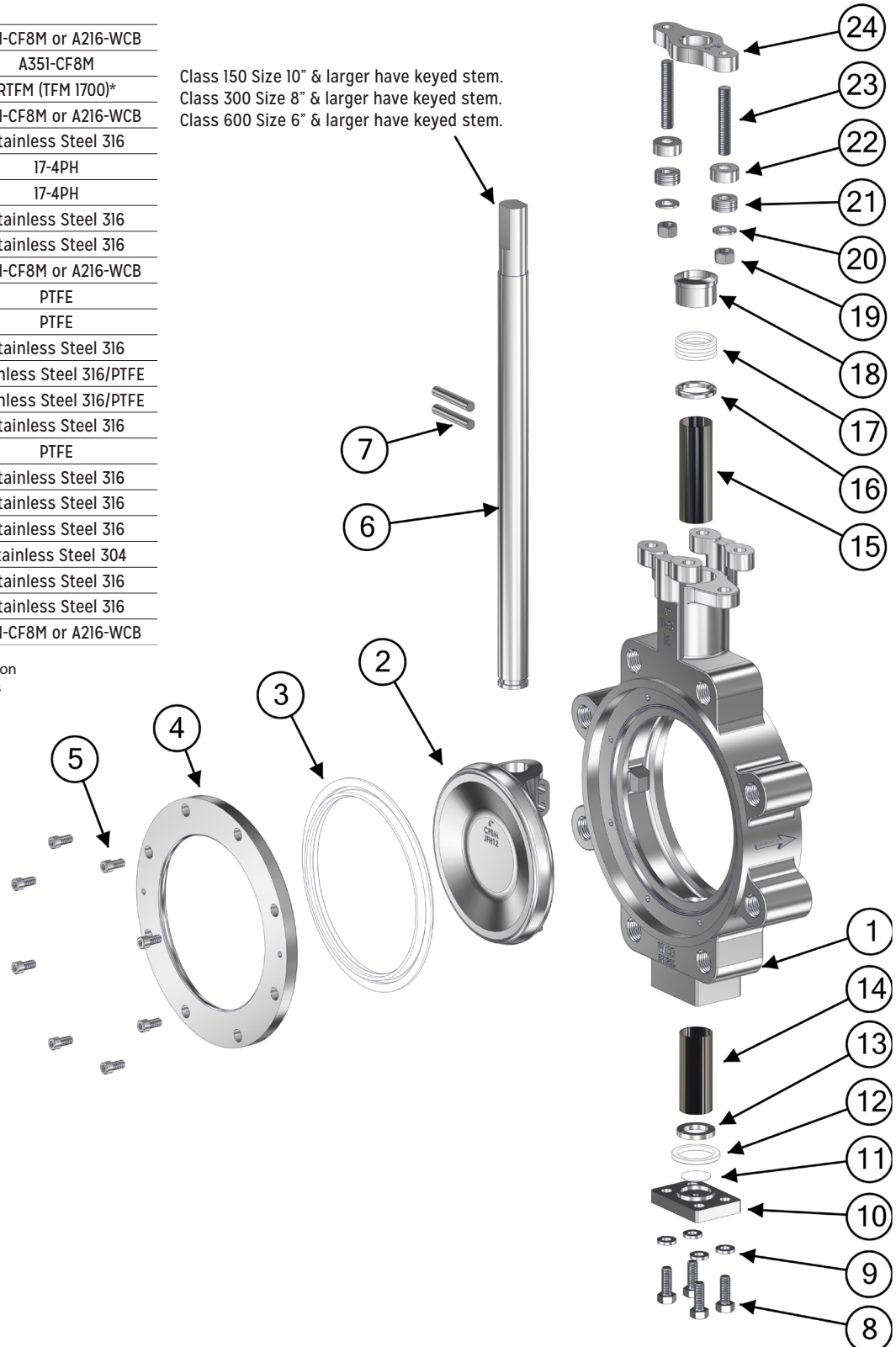
STANDARD MATERIAL LIST

1	BODY	A351-CF8M or A216-WCB
2	DISC	A351-CF8M
3	SEAT	RTFM (TFM 1700)*
4	SEAT RETAINER	A351-CF8M or A216-WCB
5	SEAT RETAINER BOLT	Stainless Steel 316
6	STEM	17-4PH
7	DISC PIN	17-4PH
8	END CAP BOLT	Stainless Steel 316
9	WASHER	Stainless Steel 316
10	END CAP	A351-CF8M or A216-WCB
11	SPACER	PTFE
12	END CAP SEAL	PTFE
13	THRUST RING	Stainless Steel 316
14	LOWER BEARING	Stainless Steel 316/PTFE
15	UPPER BEARING	Stainless Steel 316/PTFE
16	ANTI-EXTRUSION RING	Stainless Steel 316
17	STEM PACKING	PTFE
18	PACKING GLAND	Stainless Steel 316
19	GLAND NUT	Stainless Steel 316
20	WASHER	Stainless Steel 316
21	DISC SPRING	Stainless Steel 304
22	DISC SPRING RETAINER	Stainless Steel 316
23	GLAND STUDS	Stainless Steel 316
24	GLAND PLATE	A351-CF8M or A216-WCB

Class 150 Size 10" & larger have keyed stem.
Class 300 Size 8" & larger have keyed stem.
Class 600 Size 6" & larger have keyed stem.

* TFM 1700 modified PTFE is a next-generation PTFE with improved properties. Added glass further improves the seat providing greater wear resistance and a higher modulus.

Lug Design Shown





215 / 230 & 260 SERIES

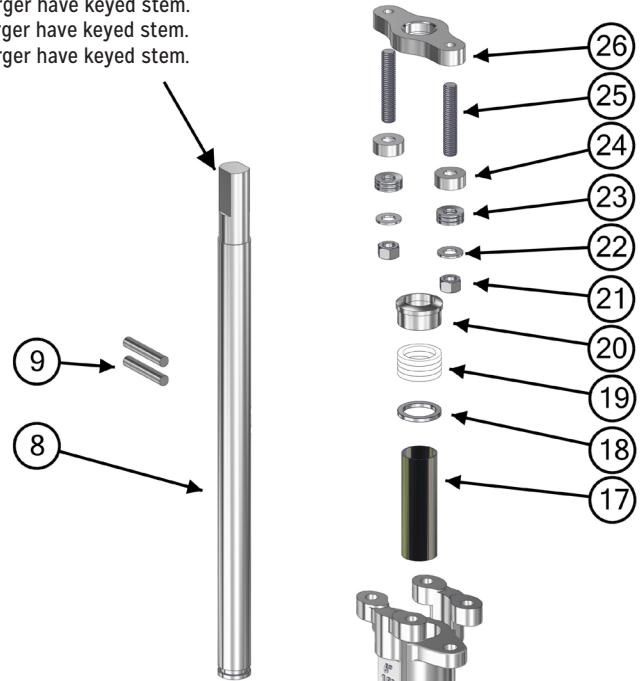
FIRE SAFE SEAT

CLASS 150 - 2" THRU 24" | CLASS 300 - 2" THRU 24" | CLASS 600 - 3" THRU 12"

STANDARD MATERIAL LIST

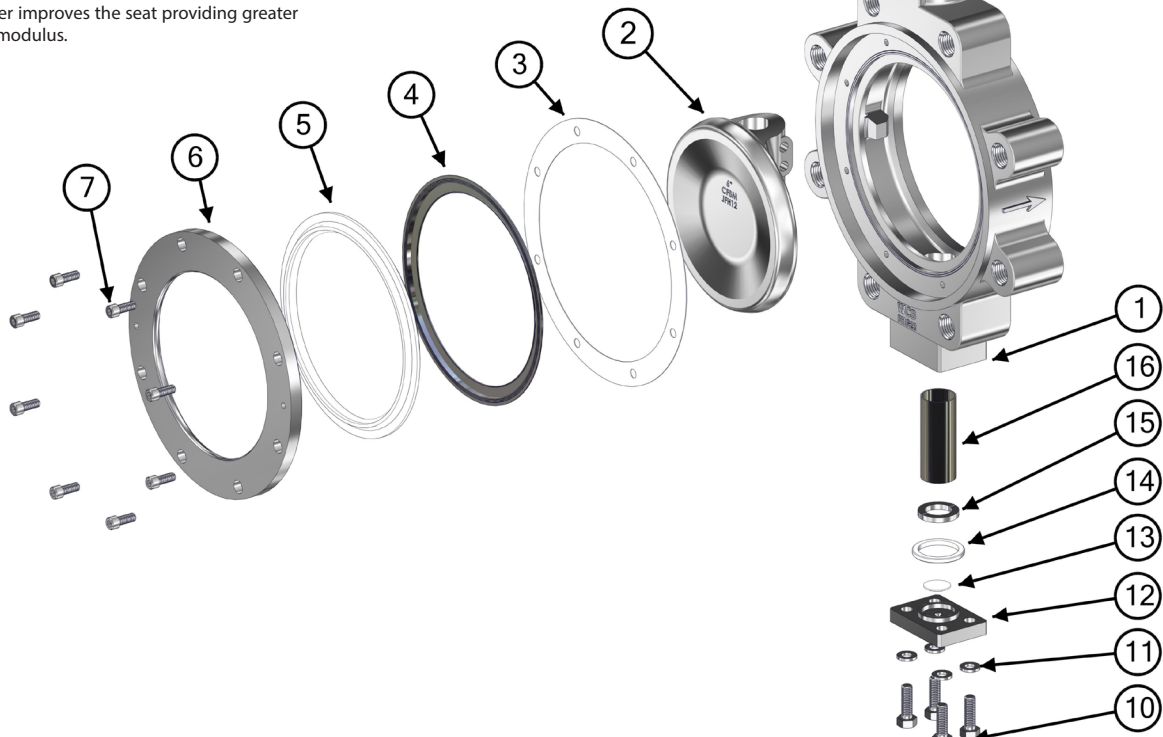
1	BODY	A351-CF8M or A216-WCB
2	DISC	A351-CF8M
3	BODY SEAL	Graphite
4	METAL SEAT	Inconel 718
5	SEAT	RTFM (TFM 1700)*
6	SEAT RETAINER	A351-CF8M or A216-WCB
7	SEAT RETAINER BOLT	Stainless Steel 316
8	STEM	17-4PH
9	DISC PIN	17-4PH
10	END CAP BOLT	Stainless Steel 316
11	WASHER	Stainless Steel 316
12	END CAP	A351-CF8M or A216-WCB
13	SPACER	PTFE
14	END CAP SEAL	Graphite
15	THRUST RING	Stainless Steel 316
16	LOWER BEARING	Stainless Steel 316/PTFE
17	UPPER BEARING	Stainless Steel 316/PTFE
18	ANTI-EXTRUSION RING	Stainless Steel 316
19	STEM PACKING	Graphite
20	PACKING GLAND	Stainless Steel 316
21	GLAND NUT	Stainless Steel 316
22	WASHER	Stainless Steel 316
23	DISC SPRING	Stainless Steel 304
24	DISC SPRING RETAINER	Stainless Steel 316
25	GLAND STUDS	Stainless Steel 316
26	GLAND PLATE	A351-CF8M or A216-WCB

Class 150 Size 10" & larger have keyed stem.
Class 300 Size 8" & larger have keyed stem.
Class 600 Size 6" & larger have keyed stem.



* TFM 1700 modified PTFE is a next-generation PTFE with improved properties. Added glass further improves the seat providing greater wear resistance and a higher modulus.

Lug Design Shown





215 / 230 & 260 SERIES

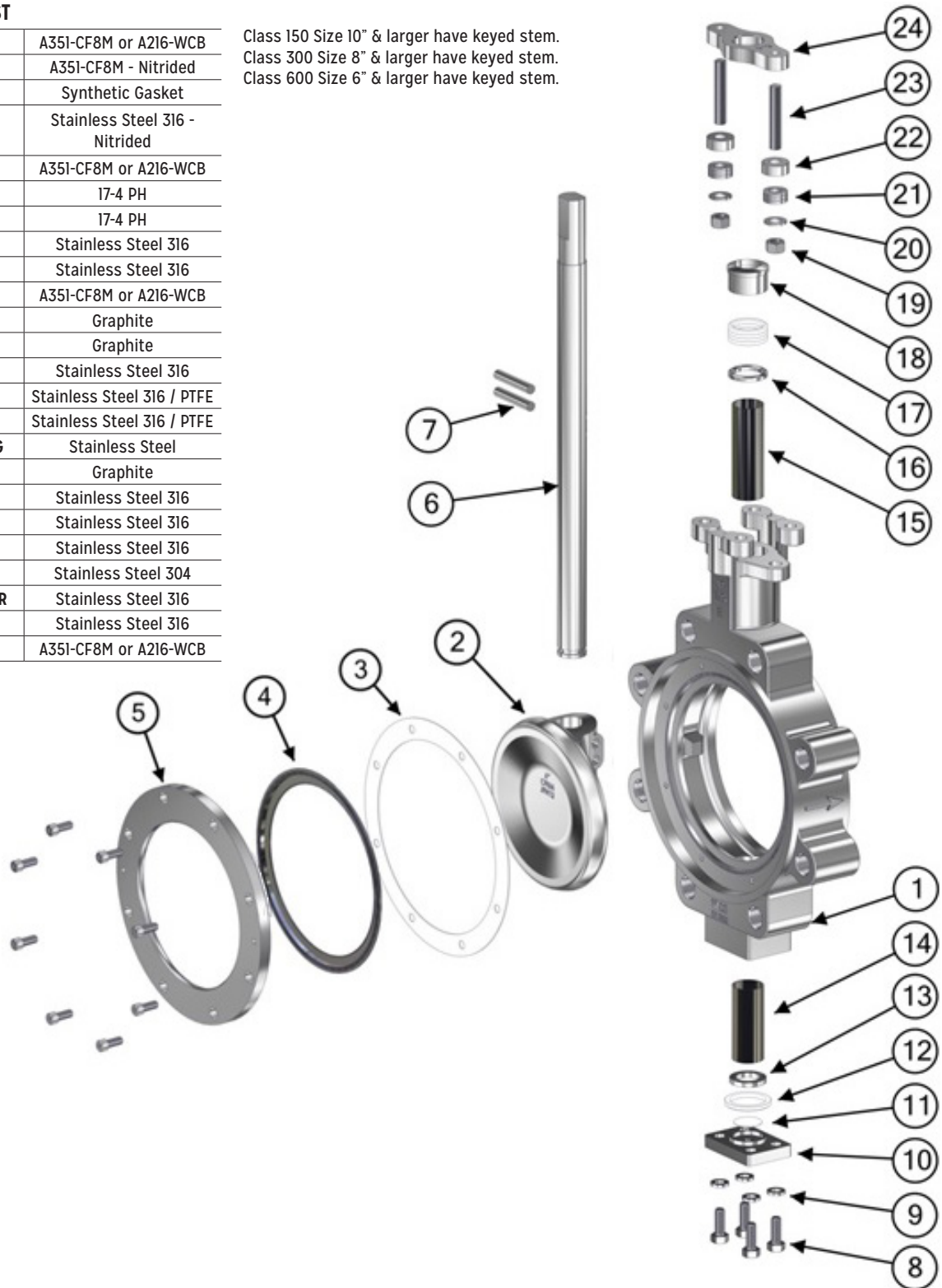
METAL SEAT

STANDARD MATERIAL LIST

1	BODY	A351-CF8M or A216-WCB
2	DISC	A351-CF8M - Nitrided
3	BODY SEAL	Synthetic Gasket
4	SEAT	Stainless Steel 316 - Nitrided
5	SEAT RETAINER	A351-CF8M or A216-WCB
6	STEM	17-4 PH
7	DISC PIN	17-4 PH
8	END CAP BOLT	Stainless Steel 316
9	WASHER	Stainless Steel 316
10	END CAP	A351-CF8M or A216-WCB
11	SPACER	Graphite
12	END CAP SEAL	Graphite
13	THRUST RING	Stainless Steel 316
14	LOWER BEARING	Stainless Steel 316 / PTFE
15	UPPER BEARING	Stainless Steel 316 / PTFE
16	ANTI-EXTRUSION RING	Stainless Steel
17	STEM PACKING	Graphite
18	PACKING GLAND	Stainless Steel 316
19	GLAND NUT	Stainless Steel 316
20	WASHER	Stainless Steel 316
21	DISC SPRING	Stainless Steel 304
22	DISC SPRING RETAINER	Stainless Steel 316
23	GLAND STUDS	Stainless Steel 316
24	GLAND PLATE	A351-CF8M or A216-WCB

Class 150 Size 10" & larger have keyed stem.
Class 300 Size 8" & larger have keyed stem.
Class 600 Size 6" & larger have keyed stem.

Lug Design Shown

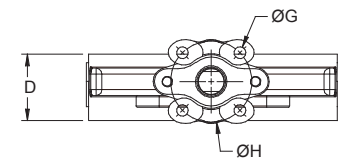




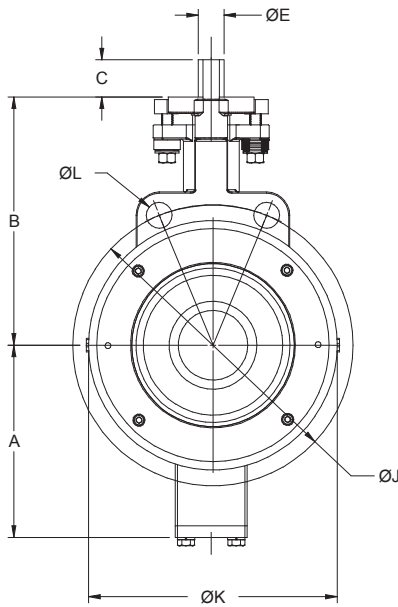
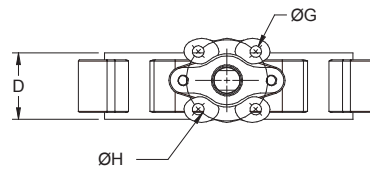
BUTTERFLY VALVES

215L/215W SERIES

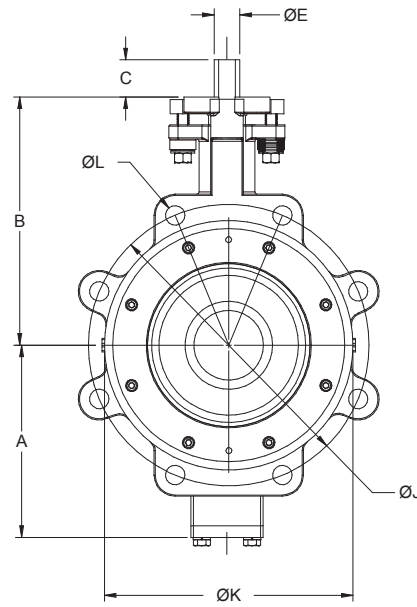
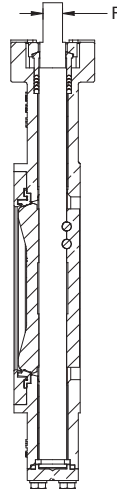
CLASS 150 - 2" THRU 36"



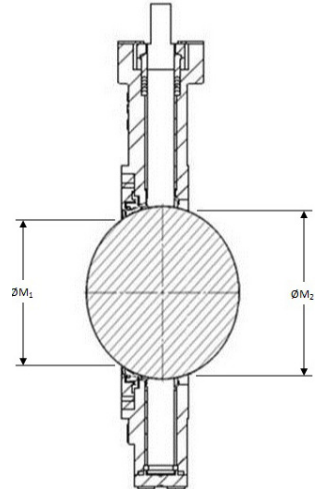
Four hole bolt pattern shown.
See table column "G" for
number of mounting holes.



WAFER



LUG



150 CLASS DOUBLE-D AND KEYED STEM

SIZE INCHES	SIZE DN	DIMENSIONS IN INCHES														
		A	B	C	D	ØE	F	KEY	ØG	ØH**	ØJ	ØK	ØL Wafer	ØL Lug	ØM1	ØM2
2	50	3.622	5.276	1.102	1.693	0.476	0.354	--	4 x 0.394	2.756 (F07)	4.75	4.09	2 x 0.669	4x5/8"-11UNC-2B	0.50	1.64
2.5	65	4.016	5.787	1.102	1.850	0.555	0.433	--	4 x 0.394	2.756 (F07)	5.50	4.72	2 x 0.748	4x5/8"-11UNC-2B	1.48	2.06
3	80	4.331	6.142	1.102	1.890	0.555	0.433	--	4 x 0.394	2.756 (F07)	6.00	4.92	2 x 0.748	4x5/8"-11UNC-2B	1.67	2.58
4	100	4.764	7.008	1.260	2.126	0.713	0.551	--	4 x 0.394	2.756 (F07)	7.50	6.10	2 x 0.748	8x5/8"-11UNC-2B	2.76	3.46
5	125	5.591	7.598	1.260	2.244	0.874	0.669	--	4 x 0.394	2.756 (F07)	8.50	7.24	2 x 0.874	8x3/4"-10UNC-2B	3.94	4.49
6	150	6.496	8.386	1.259	2.244	0.874	0.669	--	4 x 0.394	2.756 (F07)	9.50	8.43	2 x 0.874	8x3/4"-10UNC-2B	5.02	5.46
8	200	7.165	9.449	1.260	2.520	0.992	0.748	--	4 x 0.551	4.921 (F12)	11.75	10.55	2 x 0.874	8x3/4"-10UNC-2B	6.95	7.26
10	250	8.386	10.827	2.165	2.795	1.102	--	0.313	4 x 0.551	4.921 (F12)	14.25	12.68	2 x 0.984	12x7/8"-9UNC-2B	8.85	9.15
12	300	10.236	12.283	2.165	3.189	1.417	--	0.375	4 x 0.551	4.921 (F12)	17.00	14.92	2 x 0.984	12x7/8"-9UNC-2B	10.37	10.70
14	350	11.811	13.307	2.559	3.622	1.654	--	0.437	4 x 0.709	5.512 (F14)	18.75	16.14	2 x 1.118	12x1"-8UNC-2B	11.89	12.25
16	400	13.307	15.354	3.150	4.016	1.969	--	0.500	4 x 0.866	6.496 (F16)	21.25	18.43	2 x 1.118	16x1"-8UNC-2B	13.59	13.94
18	450	14.803	16.732	3.149	4.488	1.969	--	0.500	4 x 0.866	6.496 (F16)	22.75	20.94	4 x 1.240	16x1-1/8"-8UNC-2B	15.65	15.91
20	500	15.748	17.717	4.331	5.000	2.362	--	0.625	4 x 0.866	6.496 (F16)	25.00	22.99	4 x 1-1/8"-8UN-2B	20x1-1/8"-8UN-2B	17.50	17.72
24	600	18.622	20.787	4.331	6.063	2.559	--	0.750	8 x 0.748	10.000 (F25)	29.50	27.24	4 x 1-1/4"-8UN-2B	20x1-1/4"-8UN-2B	20.94	21.01
*30	750	23.228	25.315	4.331	7.480	3.150	--	0.875	8 x 0.748	10.000 (F25)	36.00	36.42	--	28X1-1/4"-8UN-2B	26.22	26.28
*36	850	26.575	28.740	4.331	7.992	3.150	--	0.875	8 x 0.906	11.732 (F30)	42.75	45.28	--	32X1-1/2"-8UN-2B	32.29	32.35

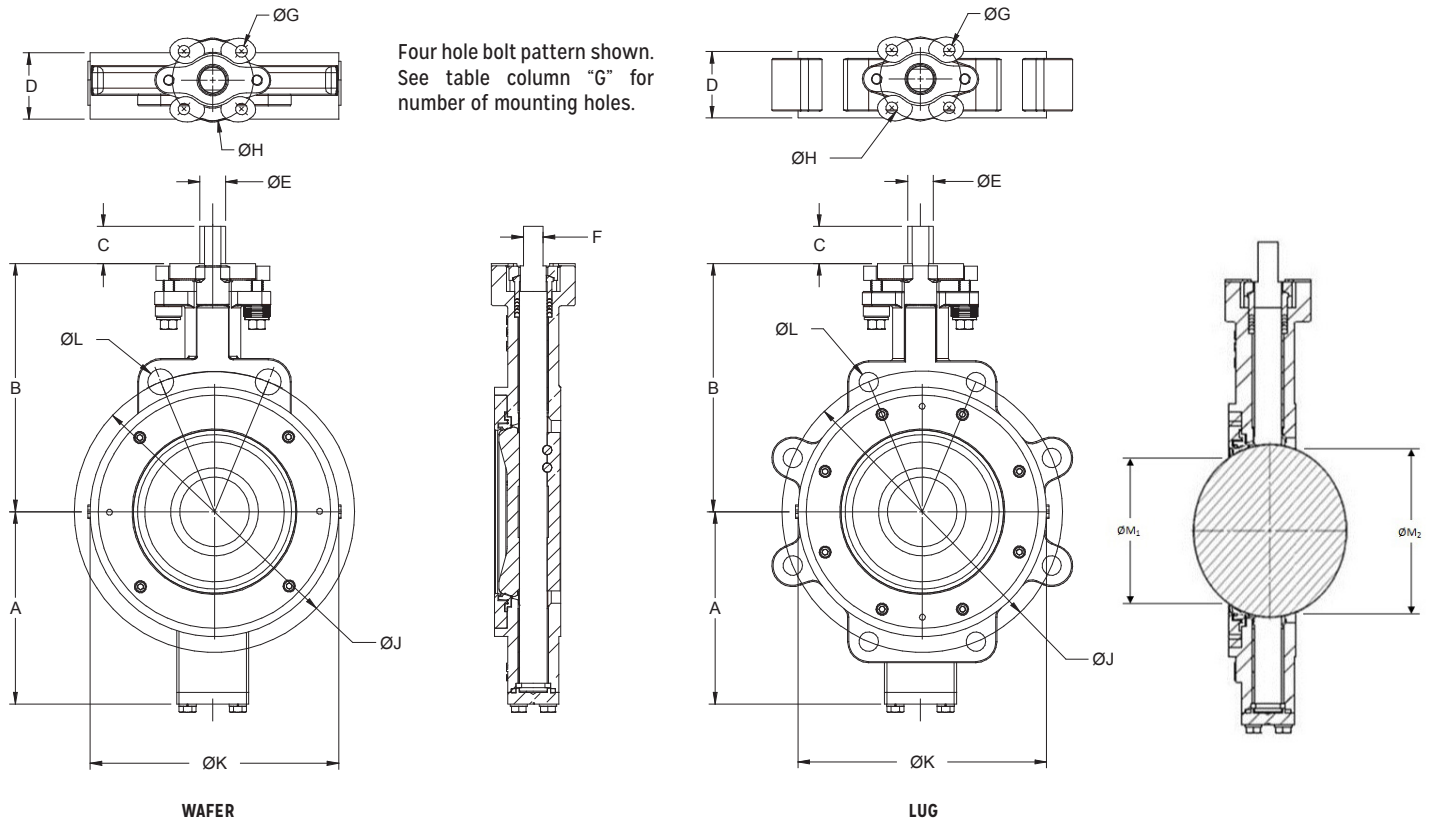
*30" & 36" are Class 150 Lug Style only.

** ISO 5211 mounting/drilling pattern (F size) shown in parentheses.



230L/230W SERIES

CLASS 300 - 2" THRU 24"



300 CLASS DOUBLE-D AND KEYED STEM

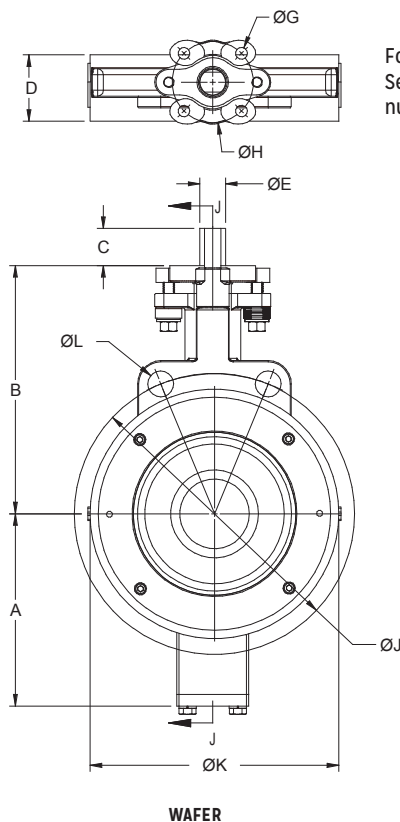
SIZE INCHES	SIZE DN	DIMENSIONS IN INCHES														
		A	B	C	D	ØE	F	KEY	ØG	ØH**	ØJ	ØK	ØL Wafer	ØL Lug	ØM1	ØM2
2	50	3.622	5.276	1.102	1.693	0.476	0.354	--	4 x 0.394	2.756 (F07)	5.00	4.17	2 x 0.709	8x5/8"-11UNC-2B	0.50	1.64
2.5	65	4.016	5.787	1.102	1.850	0.555	0.433	--	4 x 0.394	2.756 (F07)	5.88	4.72	2 x 0.874	8x3/4"-10UNC-2B	1.48	2.06
3	80	4.331	6.142	1.102	1.890	0.555	0.433	--	4 x 0.394	2.756 (F07)	6.62	4.92	2 x 0.874	8x3/4"-10UNC-2B	1.67	2.58
4	100	4.764	7.008	1.260	2.126	0.713	0.551	--	4 x 0.394	2.756 (F07)	7.88	6.10	2 x 0.874	8x3/4"-10UNC-2B	2.76	3.46
5	125	5.591	7.598	1.260	2.244	0.874	0.669	--	4 x 0.472	4.016 (F10)	9.25	7.24	2 x 0.874	8x3/4"-10UNC-2B	3.94	4.49
6	150	6.496	8.386	1.259	2.323	0.874	0.669	--	4 x 0.472	4.016 (F10)	10.62	8.43	2 x 0.874	12x3/4"-10UNC-2B	4.93	5.46
8	200	8.268	10.157	2.165	2.874	1.102	--	0.313	4 x 0.551	4.921 (F12)	13.00	10.55	2 x 0.984	12x7/8"-9UNC-2B	6.73	7.19
10	250	9.449	11.417	2.165	3.268	1.417	--	0.375	4 x 0.551	4.921 (F12)	15.25	12.72	4 x 1"-8UNC-2B	16x1"-8UNC-2B	8.44	8.85
12	300	10.63	12.795	2.559	3.662	1.654	--	0.437	4 x 0.709	5.512 (F14)	17.75	15.04	4 x 1-1/8"-8UNC-2B	16x1-1/8"-8UNC-2B	10.17	10.62
14	350	12.756	14.764	3.150	4.606	1.969	--	0.500	4 x 0.866	6.496 (F16)	20.25	16.14	4 x 1-1/8"-8UNC-2B	20x1-1/8"-8UNC-2B	11.55	11.89
16	400	14.37	16.732	3.149	5.236	1.969	--	0.500	4 x 0.866	6.496 (F16)	22.50	18.43	4 x 1-1/4"-8UNC-2B	20x1-1/4"-8UNC-2B	13.21	13.55
18	450	16.043	18.209	4.331	5.866	2.362	--	0.625	8 x 0.748	10.000 (F25)	24.75	20.94	4 x 1-1/4"-8UNC-2B	24x1-1/4"-8UNC-2B	15.36	15.54
20	500	17.795	19.882	4.331	6.260	2.835	--	0.750	8 x 0.748	10.000 (F25)	27.00	22.99	4 x 1-1/4"-8UNC-2B	24x1-1/4"-8UNC-2B	16.93	17.27
24	600	20.315	22.835	4.331	7.126	3.150	--	0.875	8 x 0.748	10.000 (F25)	32.00	27.24	4 x 1-1/2"-8UNC-2B	24x1-1/2"-8UNC-2B	20.57	20.57

** ISO 5211 mounting/drilling pattern (F size) shown in parentheses.

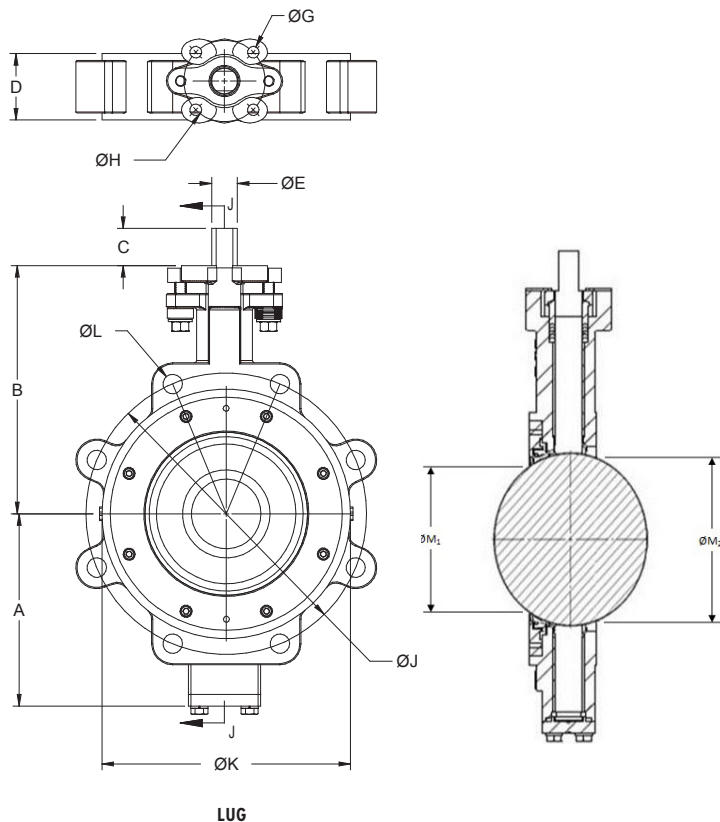


260L/260W SERIES

CLASS 600 - 3" THRU 12"



Four hole bolt pattern shown.
See table column "G" for
number of mounting holes.



600 CLASS DOUBLE-D AND KEYED STEM

SIZE INCHES	SIZE DN	DIMENSIONS IN INCHES											ØL Wafer	ØL Lug	ØM1	ØM2
		A	B	C	D	ØE	F	KEY	ØG	ØH**	ØJ	ØK				
3	80	4.705	6.496	1.260	2.126	0.713	0.551	--	4 x 0.394	2.756 (F07)	6.62	5.71	2 x 0.866	8 x 3/4"-10 UNC-2B	1.87	2.68
4	100	5.748	7.717	1.260	2.520	0.874	0.669	--	4 x 0.551	4.921 (F12)	8.50	6.85	2 x 0.984	8 x 7/8"-9 UNC-2B	2.79	3.37
6	150	7.953	9.724	2.165	3.071	1.417	--	0.375	4 x 0.551	4.921 (F12)	11.50	9.45	4 x 1"-8UNC-2B	12 x 1"-8 UNC-2B	4.52	5.26
8	200	9.528	11.614	3.150	4.016	1.890	--	0.500	4 x 0.906	6.496 (F16)	13.75	11.65	4 x 1-1/8"-8UN-2B	12 x 1-1/8"-8UN-2B	6.14	6.82
10	250	11.024	13.386	3.150	4.606	1.969	--	0.500	4 x 0.906	6.496 (F16)	17.00	13.86	4 x 1-1/4"-8UN-2B	16 x 1-1/4"-8UN-2B	7.99	8.61
12	300	12.913	15.354	4.331	5.512	2.362	--	0.625	8 x 0.709	10.000 (F25)	19.25	16.34	4 x 1-1/4"-8UN-2B	20 x 1-1/4"-8UN-2B	9.56	10.13

(5" size not available)

**ISO 5211 mounting/drilling pattern (F size) shown in parentheses.

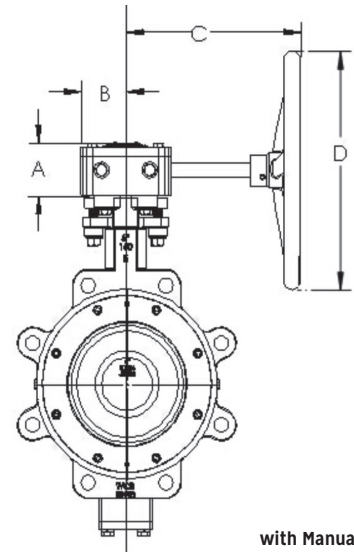


RTFM & UHMWPE SEAT

HANDLE & GEAR DIMENSIONS

CLASS 150 - RTFM & UHMWPE SEAT

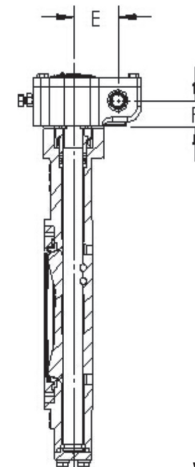
Valve Size		Gear Ratio	Dimensions (.in)						
Inches	DN		A	B	C	D	E	F	G
2"	50	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
2.5"	65	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
3"	80	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
4"	100	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
5"	125	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
6"	150	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
8"	200	37:1	2.76	2.11	10.94	11.81	2.09	1.50	—
10"	250	37:1	2.76	2.11	10.94	11.81	2.09	1.50	—
12"	300	34:1	3.43	2.50	12.87	11.81	2.80	1.59	—
14"	350	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
16"	400	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
18"	450	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
20"	500	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
24"	600	52:1	4.96	4.92	13.11	15.75	5.12	2.40	—
30"	750	70:1	6.65	7.48	18.90	24.00	7.00	3.54	—
36"	850	60:1	8.15	9.06	20.90	24.00	8.26	4.29	—



with Manual Gear

CLASS 300 - RTFM & UHMWPE SEAT

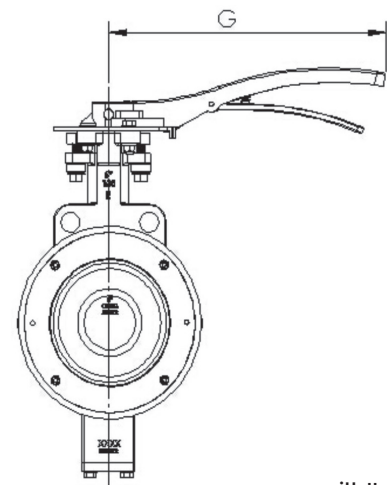
Valve Size		Gear Ratio	Dimensions (.in)						
Inches	DN		A	B	C	D	E	F	G
2"	50	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
2.5"	65	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
3"	80	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
4"	100	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
5"	125	37:1	2.76	2.11	10.94	11.81	2.09	1.50	12.82
6"	150	37:1	2.76	2.11	10.94	11.81	2.09	1.50	12.82
8"	200	34:1	3.43	2.50	12.87	11.81	2.80	1.59	—
10"	250	34:1	3.43	2.50	12.87	11.81	2.80	1.59	—
12"	300	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
14"	350	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
16"	400	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
18"	450	52:1	4.96	4.92	13.11	15.75	5.12	2.40	—
20"	500	70:1	6.65	7.48	18.90	24.00	7.00	3.54	—
24"	600	70:1	6.65	7.48	18.90	24.00	7.00	3.54	—



with Manual Gear

CLASS 600 - RTFM & UHMWPE SEAT

Valve Size		Gear Ratio	Dimensions (.in)					
Inches	DN		A	B	C	D	E	F
3"	80	37:1	2.24	2.11	7.87	11.81	2.09	1.14
4"	100	37:1	2.76	2.11	10.94	11.81	2.09	1.50
6"	150	37:1	2.76	2.11	10.94	11.81	2.09	1.50
8"	200	55:1	4.06	4.39	13.07	15.75	4.11	1.93
10"	250	55:1	4.06	4.39	13.07	15.75	4.11	1.93
12"	300	52:1	4.96	4.92	13.11	15.75	5.12	2.40



with Handle

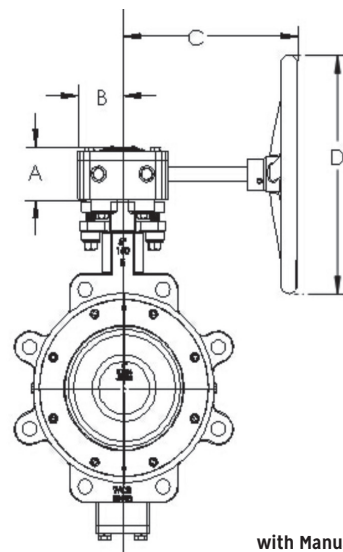


FIRE SAFE & METAL SEAT

HANDLE & GEAR DIMENSIONS

CLASS 150 - FIRE SAFE & METAL SEAT

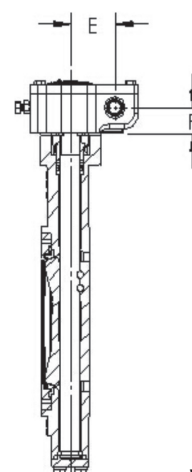
Valve Size		Gear Ratio	Dimensions (.in)						
Inches	DN		A	B	C	D	E	F	G
2"	50	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
2.5"	65	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
3"	80	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
4"	100	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
5"	125	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
6"	150	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
8"	200	37:1	2.76	2.11	10.94	11.81	2.09	1.50	—
10"	250	34:1	3.43	2.50	12.87	11.81	2.80	1.59	—
12"	300	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
14"	350	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
16"	400	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
18"	450	52:1	4.96	4.92	13.11	15.75	5.12	2.40	—
20"	500	52:1	4.96	4.92	13.11	15.75	5.12	2.40	—
24"	600	70:1	6.65	7.48	18.90	24.00	7.00	3.54	—



with Manual Gear

CLASS 300 - FIRE SAFE & METAL SEAT

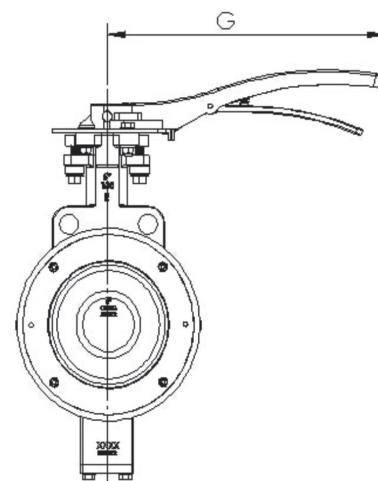
Valve Size		Gear Ratio	Dimensions (.in)						
Inches	DN		A	B	C	D	E	F	G
2"	50	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
2.5"	65	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
3"	80	37:1	2.24	2.11	7.87	11.81	2.09	1.14	8.82
4"	100	37:1	2.24	2.11	7.87	11.81	2.09	1.14	12.82
5"	125	37:1	2.76	2.11	10.94	11.81	2.09	1.50	12.82
6"	150	37:1	2.76	2.11	10.94	11.81	2.09	1.50	12.82
8"	200	34:1	3.43	2.50	12.87	11.81	2.80	1.59	—
10"	250	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
12"	300	55:1	4.06	4.39	13.07	15.75	4.11	1.93	—
14"	350	52:1	4.96	4.92	13.11	15.75	5.12	2.40	—
16"	400	52:1	4.96	4.92	13.11	15.75	5.12	2.40	—
18"	450	70:1	6.65	7.48	18.90	24.00	7.00	3.54	—
20"	500	70:1	6.65	7.48	18.90	24.00	7.00	3.54	—
24"	600	60:1	8.15	9.06	20.90	24.00	8.26	4.29	—



with Manual Gear

CLASS 600 - FIRE SAFE & METAL SEAT

Valve Size		Gear Ratio	Dimensions (.in)					
Inches	DN		A	B	C	D	E	F
3"	80	37:1	2.24	2.11	7.87	11.81	2.09	1.14
4"	100	34:1	3.43	2.50	12.87	11.81	2.80	1.59
6"	150	55:1	4.06	4.39	13.07	15.75	4.11	1.93
8"	200	55:1	4.06	4.39	13.07	15.75	4.11	1.93
10"	250	52:1	4.96	4.92	13.11	15.75	5.12	2.40
12"	300	70:1	8.86	5.91	15.04	17.72	9.02	3.23



with Handle