

"Apollo"® Valves

butterfly valves

VALVE ACTUATION OPTIONS

C-5

RESILIENT SEATED BUTTERFLY VALVES

DUCTILE IRON

C-3 - C-15

CAST IRON

C-3 - C-15

HIGH PERFORMANCE BUTTERFLY VALVES

CARBON STEEL

C-16 - C-22

STAINLESS STEEL

C-16 - C-22



section C



LC149 SERIES

2" - 12"

APOLLO INTERNATIONAL™ - CONTRACTOR GRADE

- Cast Iron Body
- Lug Style
- Aluminum Bronze Disc
- EPDM Seat
- 200psi
- NSF/ANSI/CAN 372 - Lead Free
- NSF/ANSI/CAN 61 - Water Quality

SEE PAGE C-12 FOR DETAILED INFORMATION



LD/WD 141

2" - 24"

APOLLO INTERNATIONAL™

- Ductile Iron Body
- Lug Style (2" - 24"), Wafer Style (2" - 12")
- Aluminum Bronze, Stainless Steel or Ductile Iron Disc
- EPDM or Buna-N Seat
- 200psi
- NSF/ANSI/CAN 372 - Lead Free
- NSF/ANSI/CAN 61 - Water Quality (Except w/ Ductile Iron Disc)

SEE PAGE C-13 FOR DETAILED INFORMATION



LD141 SERIES - LARGE DIAMETER

30" - 48"

APOLLO INTERNATIONAL™

- Ductile Iron Body
- Lug Style
- Stainless Steel or Ductile Iron Disc
- EPDM or Buna-N Seat
- 150psi

SEE PAGE C-14 FOR DETAILED INFORMATION



215 / 230 SERIES

2" - 36"

DOUBLE OFFSET HIGH PERFORMANCE

APOLLO INTERNATIONAL™

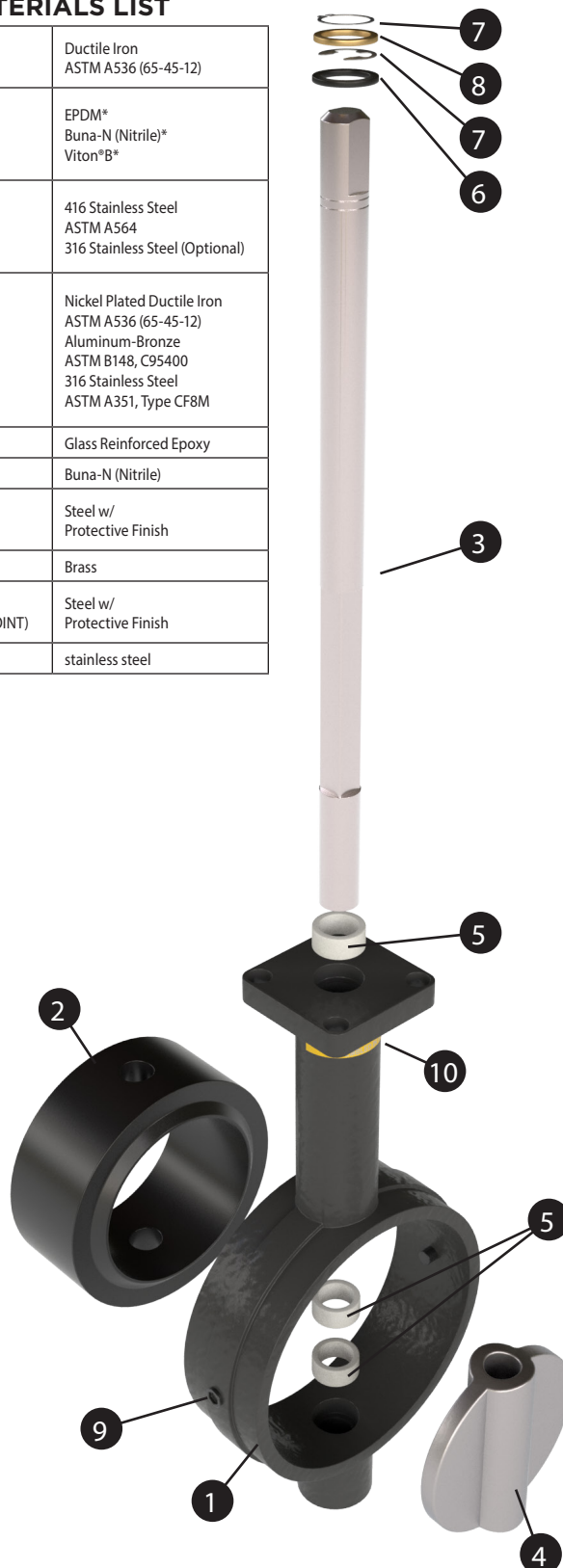
- Carbon Steel or Stainless Steel Body
- Lug or Wafer Style
- Class 150 or 300
- 316 Stainless Steel
- 17-4 PH Stainless Steel Shaft/Pin
- RTFM (TFM 1700 w/ Glass) Seat
- NSF/ANSI/CAN 61 - Water Quality
- NSF/ANSI/CAN 372 Lead Free (2" - 24", 215 & 230 Series with 316/CF8M Stainless Steel Body and Trim)

SEE PAGE C-16 FOR DETAILED INFORMATION

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 316 Stainless Steel (Optional)
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 (Nitrile)
7	RETAINER	Steel w/ Protective Finish
8	WASHER	Brass
9	SET SCREWS (FLAT POINT or CONE POINT)	Steel w/ Protective Finish
10	NAMEPLATE	stainless steel

WD141 – Wafer Design Shown



PRESSURE RATING

- 2" - 12": 200 psi
- 14" - 48": 150 psi

APOLLO INTERNATIONAL™

- WD141: One-Piece Wafer-Style, Sizes 2" - 12"
- LD141: Lug Valves, Sizes 2" - 48"

CERTIFICATION

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

*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)

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

PROFIED 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"-12" to 200 psig | 14"-24" to 150 psig with -A

TESTING

- All Valves are 100% Factory Tested Before Shipping

LD/WD 141

SPECIFICATIONS

WD - DUCTILE IRON, WAFER BODY

LD - DUCTILE IRON, SINGLE FLANGE, LUG BODY

- 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/CAN 372 "Lead Free"
- NSF/ANSI/CAN 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" - 48" only with -A)
- 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
- Epoxy Powder 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
- 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)
- LD141 (Single Flange Body Design): 30"-48" (DN750 - DN1200)

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)
30"-48"	(DN750 - DN1200)	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

- LD-lug body design: 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 (Lug Only w/ -A (2" - 48")), 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 141 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 this 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 W/ MEMORY STOPS (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. 2"-24" valves are equipped with 12" handwheels with 28" and larger valves having 15.7" handwheels. All have gearing 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 or electric actuators with dual (open & close) limit stops.



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.

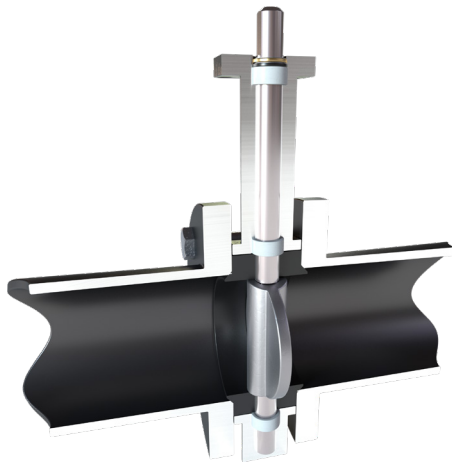
DO NOT USE FLANGE GASKETS. Before tightening flange bolts, adjust disc to the full open position. This helps assure proper alignment and clearance between the outside diameter of the disc and the inside diameter of the pipe. Hand tighten the bolts and then wrench tighten in stages following the proper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

MAINTENANCE

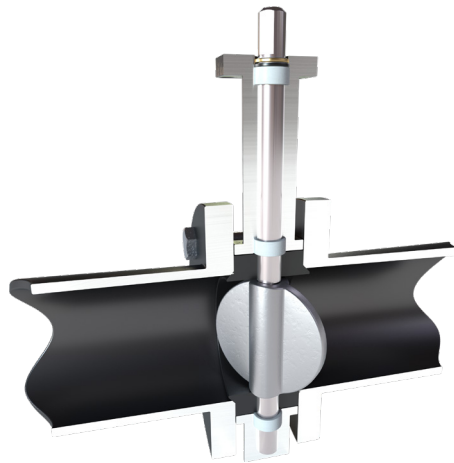
Apollo butterfly valves are designed for extended service with minimal wear and servicing. No regular lubrication is needed. In case of replacement, put disc in a near closed position and remove from line, spread flanges and support the valve while removing flange bolts.

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

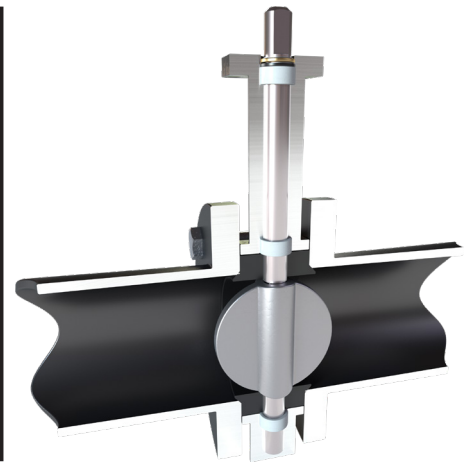
For additional details see appropriate Installation Operation & Maintenance Manual. (LD141 - I979900, LC149 - I980700)



CLOSED



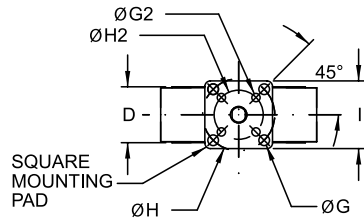
PARTIALLY OPEN



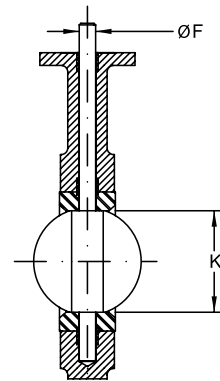
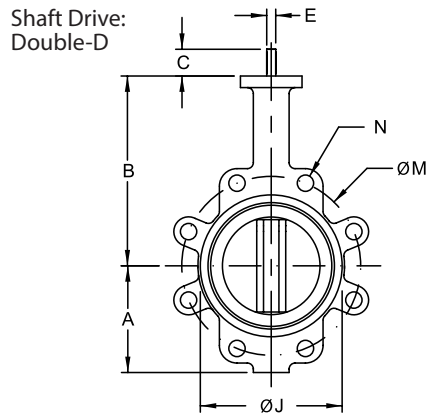
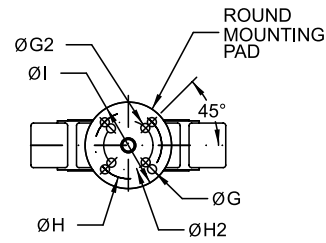
OPEN

LD MODEL LUG

2" - 12"



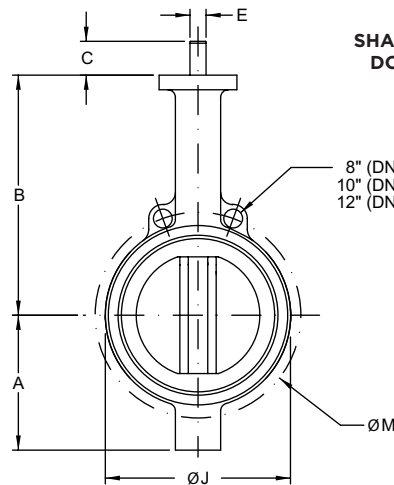
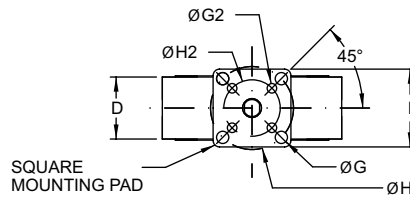
14" - 24"



**SHAFT DRIVE:
DOUBLE-D (14")
ROUND & KEYED (16" &
LARGER)**

WD MODEL WAFER

2" - 12"



**SHAFT DRIVE:
DOUBLE-D**

8" (DN 200) : 2 HOLES, 0.98" DIAMETER
10" (DN 250) : 2 HOLES, 0.98" DIAMETER
12" (DN 300) : 2 HOLES, 0.98" DIAMETER

LD/WD 141 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

*"D" dimension includes both body and seat values.

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

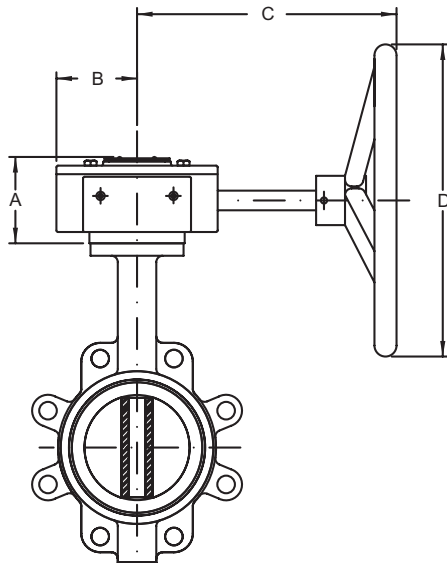
APPROXIMATE WEIGHT FOR BARE SHAFT VALVE

VALVE SIZE		WD MODEL LB (KG)	LD MODEL LB (KG)
INCHES	DN		
2	50	6 (2.7)	8 (3.6)
2.5	65	6 (2.7)	10 (4.5)
3	80	7 (3.2)	11 (5.0)
4	100	11 (5.0)	17 (7.7)
5	125	13 (5.9)	20 (9.1)
6	150	16 (7.3)	23 (10.4)
8	200	29 (13.2)	39 (17.7)

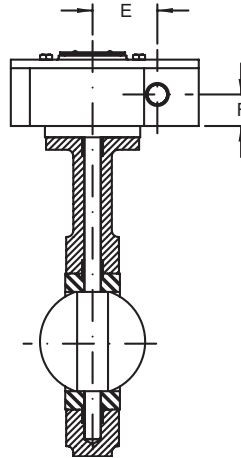
VALVE SIZE		WD MODEL LB (KG)	LD MODEL LB (KG)
INCHES	DN		
10	250	44 (20.0)	62 (28.1)
12	300	70 (31.8)	97 (44.0)
14	350		148 (67.1)
16	400		206 (93.4)
18	450		277 (125.6)
20	500		410 (186.0)
24	600		592 (268.5)

141 SERIES

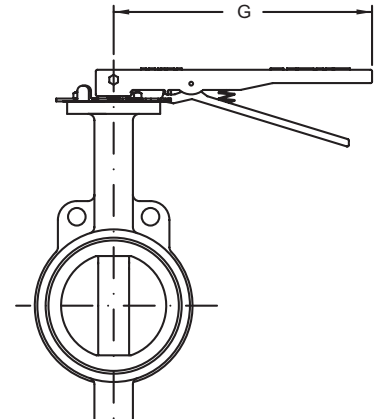
HANDLE & GEAR DIMENSIONS



WITH MANUAL GEAR



WITH MANUAL GEAR



WITH HANDLE

Most gear operators supplied with 12" diameter 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	11.5	2.5	1.5	10.5
2.5"	65	30:1	3.4	3.0	9.2	11.5	2.5	1.5	10.5
3"	80	30:1	3.4	3.0	9.2	11.5	2.5	1.5	10.5
4"	100	30:1	3.4	3.0	9.2	11.5	2.5	1.5	10.5
5"	125	30:1	3.4	3.0	9.2	11.5	2.5	1.5	10.5
6"	150	30:1	3.4	3.1	9.2	11.5	2.5	1.5	10.5
8"	200	50:1	3.4	3.3	8.9	11.5	3.0	1.6	14.0
10"	250	50:1	3.4	3.3	8.9	11.5	3.0	1.6	14.3
12"	300	50:1	3.4	3.3	8.9	11.5	3.0	1.6	14.3
14" *	350*	50:1	3.4	3.3	8.9	11.5	3.0	1.6	--
16" *	400*	80:1	4.8	5.1	15.0	12.0	4.7	2.3	--
18" *	450*	80:1	4.8	5.1	15.0	12.0	4.7	2.3	--
20" *	500*	300:1	5.9	5.1	17.9	12.0	4.7	2.8	--
24" *	600*	300:1	5.9	5.1	17.9	12.0	4.7	2.8	--
30" *	750*	640:1	5.9	6.3	15.0	14.2	8.6	5.5	--
36" *	900*	640:1	5.9	6.7	13.8	15.2	9.4	6.3	--
42" *	1050*	832:1	5.9	6.7	13.8	15.2	9.4	6.3	--
48" *	1200*	800:1	7.2	7.0	18.3	19.7	12.2	8.2	--

* LD141 Series only

141 & 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 lubricious 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./LB.)

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 & 149 SERIES VELOCITY LIMITS

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

141 & 149 SERIES CV 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.

PART NUMBER MATRIX (2" - 24")

LD	141	06	B	E	1	1 -A (LD141 ONLY)
MODEL	SERIES	SIZE (IN.)	DISC MATERIAL	SEAT MATERIAL	SHAFT	OPERATOR
LD - LUG BODY	141 - APOLLO INTERNATIONAL™ (DUCTILE IRON)	02 - 2"	B - ALUMINUM BRONZE (2"-20")	E - BLACK EPDM -20° F TO 250° F -29° C TO 121° C	1 - 416 SS (STANDARD)	0 - BARE SHAFT (≥10") **
WD - WAFER BODY		25 - 2.5"	D - DUCTILE IRON A536 NICKEL PLATED			1 - 10 POSITION HANDLE
		03 - 3"			2 - 316 SS	2 - GEAR OPERATOR - DIRECT MOUNT
		04 - 4"	S - STAINLESS STEEL, CF8M	N - BLACK BUNA-N 10° F TO 180° F -12° C TO 82° C		3 - INFINITE POSITION HANDLE
		05 - 5"				4 - LOCKING HANDLE
		06 - 6"				5 - GEAR OPERATOR W/ CHAINWHEEL
		08 - 8"		V - BLACK VITON® B† -20° F TO 300° F -29° C TO 149° C (SPECIAL ORDER ONLY)		7 - LOCKING GEAR OPERATOR
		10 - 10"				8 - LOCKING GEAR OPERATOR W/ CHAINWHEEL
		12 - 12"				-SF - SILICONE FREE ASSEMBLY
		14 - 14"				
		16 - 16"				
		18 - 18"				
	141 - SIZES 14"-24"	20 - 20"				
	LD141 LUG STYLE ONLY	24 - 24"				

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

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

*NSF 61 does not apply to ductile iron disc

**Sizes 2" - 8" order -11 option

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

PART NUMBER MATRIX (30" - 48")

LD	141	28	D	E	1	2
MODEL	SERIES	SIZE (IN.)	DISC MATERIAL	SEAT MATERIAL	SHAFT	OPERATOR
LD - LUG BODY	141 - APOLLO INTERNATIONAL™ (DUCTILE IRON)	30 - 30"	D - DUCTILE IRON A536 NICKEL PLATED	E - BLACK EPDM -20° F TO 250° F -29° C TO 121° C	1 - 416 SS (STANDARD)	0 - BARE SHAFT
		36 - 36"	S - STAINLESS STEEL, CF8M (STANDARD)		2 - 316 SS	2 - GEAR OPERATOR - DIRECT MOUNT
		42 - 42"		N - BLACK BUNA-N 10° F TO 180° F -12° C TO 82° C		5 - GEAR OPERATOR W/ CHAINWHEEL
		48 - 48"				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	02 - 2"	1 - 10 POSITION HANDLE (2"-12")
ALUMINUM BRONZE DISC	25 - 2.5"	2 - GEAR OPERATOR (8"-12" ONLY)
416 SS SHAFT	03 - 3"	
BLACK EPDM SEAT	04 - 4"	
	05 - 5"	
	06 - 6"	
	08 - 8"	
	10 - 10"	
	12 - 12"	

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

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

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

PRICING

Pricing of valves and options may be accessed through published price list CPPL9000 or by authorized Apollo Online users.

LC149 SERIES

APOLLO INTERNATIONAL™ - CONTRACTOR GRADE



The LC149 Series Cast Iron Butterfly Valves are ideal for use in Industrial and HVAC/Plumbing/Mechanical applications. The LC149 Series is a lug style valve designed to be economical yet full featured.

PERFORMANCE RATING

- Max Operating Pressure: 200 psi (13.8 bar)
- Temperature Range: -20°F to 250°F Intermittent, 225°F Continuous

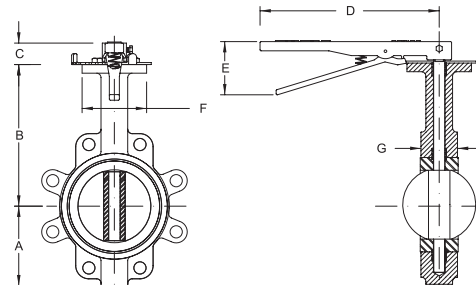
APPROVALS

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

DIMENSIONS - 149 SERIES WITH HANDLE

SIZE (IN.)	DIMENSIONS (IN.)							WEIGHT (LB.)
	A	B	C	D	E	F	G*	
2	3.25	6.38	1.25	10.5	3.1	2.70	1.75	8
2-1/2	3.75	6.88	1.25	10.5	3.1	2.70	1.88	10
3	4.00	7.13	1.25	10.5	3.1	2.70	1.88	11
4	4.88	7.88	1.25	10.5	3.1	2.70	2.13	17
5	5.38	8.38	1.25	10.5	3.1	2.70	2.25	20
6	5.88	8.88	1.25	10.5	3.1	2.70	2.25	23
8	7.13	10.25	1.75	14.3	3.5	4.61	2.50	44
10	8.25	11.50	1.88	14.3	3.5	4.61	2.75	67
12	9.75	13.25	1.88	14.3	3.5	4.61	3.13	102

*"G" dimension includes both body and seat values.

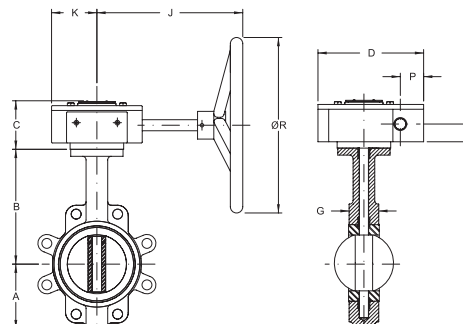


STANDARD MATERIAL LIST

BODY	Cast Iron, ASTM A126 Class B
BUSHINGS	PTFE
STEM SEAL	EPDM
SHAFT	Stainless Steel, ASTM A276, Type 416
SEAT	Black EPDM with Phenolic Backing
DISC	Aluminum Bronze, ASTM B148-C95400

DIMENSIONS - 149 SERIES WITH OPTIONAL GEAR OPERATOR

SIZE (IN.)	DIMENSIONS (IN.)										WEIGHT (LB.)
	A	B	C	D	G	H	J	K	P	ØR	
8	7.13	10.25	3.38	8.00	2.50	1.62	8.75	3.25	1.50	11.5	71
10	8.25	11.50	3.38	8.00	2.75	1.62	8.75	3.25	1.50	11.5	94
12	9.75	13.25	3.38	8.00	3.13	1.62	8.75	3.25	1.50	11.5	129



LD/WD 141 SERIES

LD/WD 141 APOLLO INTERNATIONAL™



**WD 141
WAFER
2" - 12"**



**LD 141
LUG
2" - 24"**

The Apollo LD and WD 141 Series ductile iron butterfly valves are ideal for use in industrial and HVAC/Plumbing/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 Series Suitable for End of Line Service to Rated Pressure (2" - 24")
- 3"-24" Meet Performance Requirements of AWWA C-504
- Certified NSF/ANSI/CAN 61 - Water Quality*
- Certified NSF/ANSI/CAN 372 - Lead Free
- Registered Under Canadian Registration Number CRN# 0C12102.8CL

*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

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

TORQUE RATING (IN./LB.)

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 30"-48": Contact factory for availability.

Actuation assistance available in Section D, with the Apollo Actuator Wizard located at actuatorwizard.apollovalves.com or by calling customer support at (704)841-6000.

LD141 SERIES LARGE DIAMETER 30" - 48"

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 30" - 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
- Suitable for End of Line Service to Rated Pressure

PERFORMANCE RATING

- Pressure Rating: 30" to 48": 150 psi

MATERIAL OPTIONS

Body

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

Seat Material

- EPDM: -20°F to 250°F Intermittent
225°F Continuous
- BUNA-N: 10°F to 180°F

Disc Material

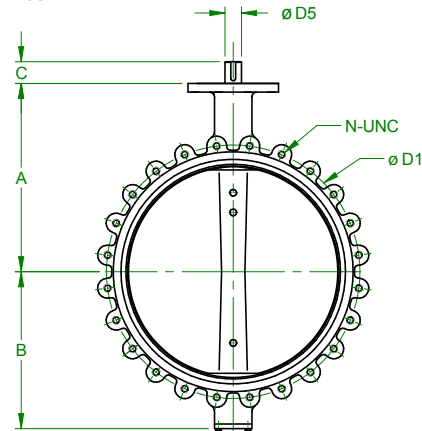
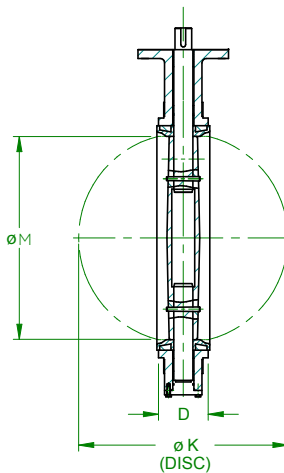
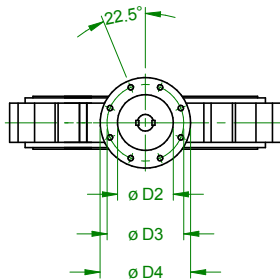
- Ductile Iron A536 Nickel Plated
- 316 Stainless Steel, CF8M (Standard)

STANDARD MATERIAL LIST

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

OPERATOR

- (-0) None (bare stem)
- (-2) Gear Operator (15.7" Handwheels)
- (-5) Gear Operator w/ Chain Wheel
- (-7) Locking Gear Operator
- (-8) Locking Gear Operator w/ Chain Wheel



DIMENSIONS

SIZE (IN.)	DIN	DIMENSIONS (IN.)												WEIGHT (LB.)	
		A	B	C	D	ØD1	ØD2	ØD3	ØD4	ØD5	K (DISC DIA.)	ØM (DISC CHORD)	N-UNC		N-ØD
30	750	26.57	22.05	2.60	6.61	36.00	7.87	10.00	11.81	2.49	29.29	28.53	24 - 1-1/4" -7	8 - 0.709	728
36	900	30.39	25.79	4.65	7.99	42.75	7.87	10.00	11.81	2.95	34.03	33.08	28 - 1-1/2" -6	8 - 0.709	1162
42	1050	33.78	30.59	5.91	9.88	49.50	7.87	10.00	11.81	3.74	40.53	39.30	32 - 1-1/2" -6	8 - 0.709	2138
48	1200	37.13	32.48	5.91	10.87	56.00	9.06	11.73	13.78	4.13	45.67	44.35	40 - 1-1/2"-6	8 - 0.866	2686

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: - 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: - 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.

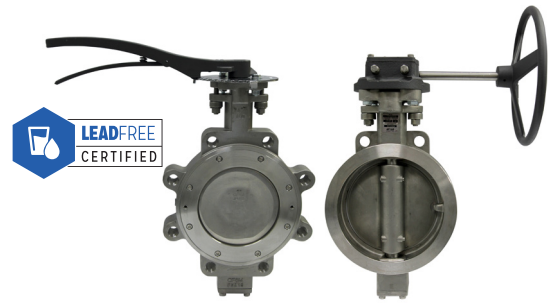
215 / 230 SERIES

DOUBLE OFFSET HIGH PERFORMANCE

Apollo International™ 215 and 230 Series double offset high performance butterfly valves are available in wafer or lug body design. Stainless steel models 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"
- 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



APPROVALS AND CERTIFICATIONS

- NSF/ANSI/CAN 61 - Water Quality and NSF/ANSI/CAN 372 - Lead Free 2" - 24", 215 & 230 Series with 316/CF8M Stainless Steel Body and Trim
- Registered under Canadian Registration Number CRN# 0C17459.CL
- CE marking and documented valves that conform to the European Pressure Equipment Directive (PED) 2014/68/EU are available in ANSI Class 150/300 including soft seat configurations (sizes 2"-24" only)

STANDARDS COMPLIANCE

- | | |
|--------------------|---|
| • ASME B16.10 | "Face to Face and End to End Dimensions of Valves" |
| • ASME B16.34 | "Valves - Flanged, Threaded, and Welding End" |
| • ASME B16.5 | "Pipe Flanges and Flanged Fittings" |
| • ANSI/FCI 70-2 | "For 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" |
| • API 598 | American Petroleum Institute - "Valve Inspection and Testing" |
| • API 609 | American Petroleum Institute - "Butterfly Valves: Double Flanged, Lug and Wafer Type" |
| • NSF/ANSI/CAN 61 | "Drinking Water System Components - Health Effects" (2" - 24", Stainless 215 & 230) |
| • NSF/ANSI/CAN 372 | "Drinking Water System Components - Lead Content" (2" - 24", Stainless 215 & 230) |

SERVICES

BIDIRECTIONAL

- Valves are suitable for flow in either direction.

DEAD-END/END-OF-PIPE

- Valves are suitable for service at the end of a pipe, also known as "dead-end" service. Valve can be oriented in either direction.

VACUUM

- Standard valves are rated for 29" Hg vacuum.

STEAM

- Valves are well-suited for a wide range of steam applications. The following steam working pressure (SWP) ratings apply to 215/230 models with standard TFM 1700 soft seats.
 - 215 Series class 150# rated at 200 SWP
 - 230 Series class 300# rated at 250 SWP

SHAFT (BLOWOUT PROOF)

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

ISO 5211 MOUNTING FLANGE

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

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.

JACKING TAPS

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

DISC

Standard material is 316 SS.

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.

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.

SHAFT PACKING

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

ROCKER PACKING GLAND

Shaped packing gland compensates for uneven adjustment of gland nuts.

ANTI-EXTRUSION RING

Prevents the extrusion of shaft seals, maintaining optimum seal.

WASHERS

Belleville washers with live loading technology featured on valves with graphite packing.

BEARING (UPPER)

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

CORROSION PROTECTION

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

POSITIVE CAST DISC STOP

Prevents seat damage from over-travel of the disc beyond the closed position.

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.

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 SS.

END CAP SEAL

Made of PTFE, UHMWPE or graphite.

215 / 230 SERIES HOW TO SPECIFY

2	15	L	06	C	S	P	8T	A	0
VALVE TYPE	CLASS	VALVE STYLE	SIZE	BODY MATERIAL	DISC MATERIAL	STEM & PIN MATERIAL	SEAT MATERIAL	SPECIAL SERVICE	OPERATOR
2 - DOUBLE OFFSET	15 (150) 30 (300)	L - LUG W - WAFER	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") 30 (30") ¹ 36 (36") ¹	CARBON STEEL C - A216 WCB STAINLESS STEEL S - 316 SS	STAINLESS STEEL S - A351 CF8M (316 SS)	P - 17-4 PH SS	8T - RTFM (TFM 1700 W/GLASS)	A - STANDARD APOLLO	0 - BARE STEM 1 - LEVER OPERATOR ² 2 - WORM GEAR OPERATOR 5 - WORM GEAR OPERATOR W/ CHAIN WHEEL 7 - LOCKING WORM GEAR OPERATOR 8 - LOCKING WORM GEAR OPERATOR W/ CHAIN WHEEL
EXAMPLE: 215L06CSP8TA0 = 6" Class 150 Lug, Carbon Steel Body, SS Disc, 17-4 PH Stem, TFM 1700 Seats, Standard Service, Bare Stem									

() Represents close wrought equivalent

¹ 215L Only

² 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.

LEVER HANDLE AVAILABILITY & MAXIMUM DIFFERENTIAL PRESSURE

		SOFT SEAT (CODES: 8T & 21)	
		PSI	BAR
Class 150 215	2"-6"	Full Rating	
	8"	150	10.3
	10"-12"	50	3.4
Class 300 230	2"-4"	Full Rating	
	6"-8"	150	10.3
	10"	50	3.4

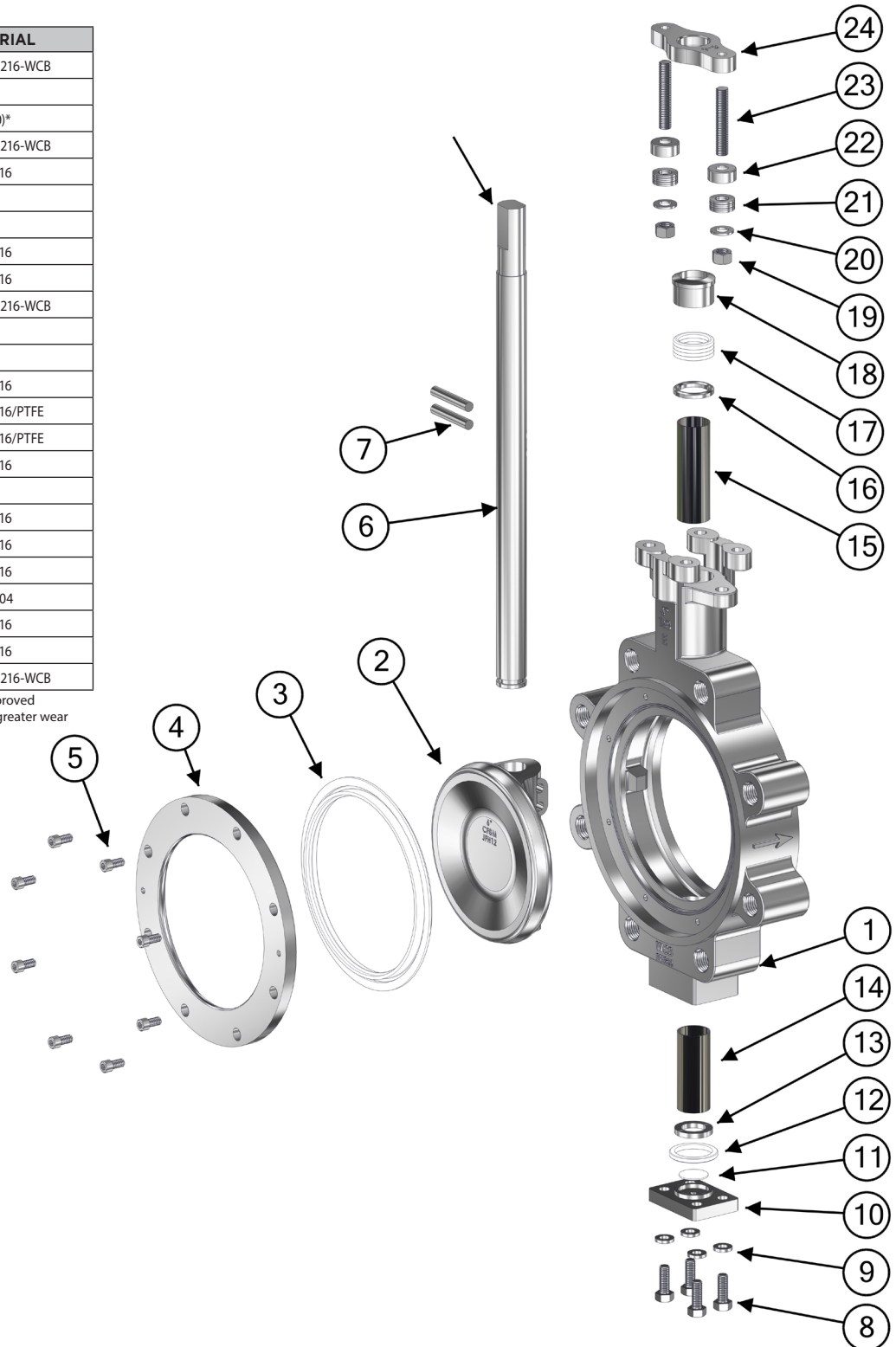
215 / 230 SERIES RESILIENT SEAT

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

STANDARD MATERIAL LIST

	PART	MATERIAL
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

* 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.

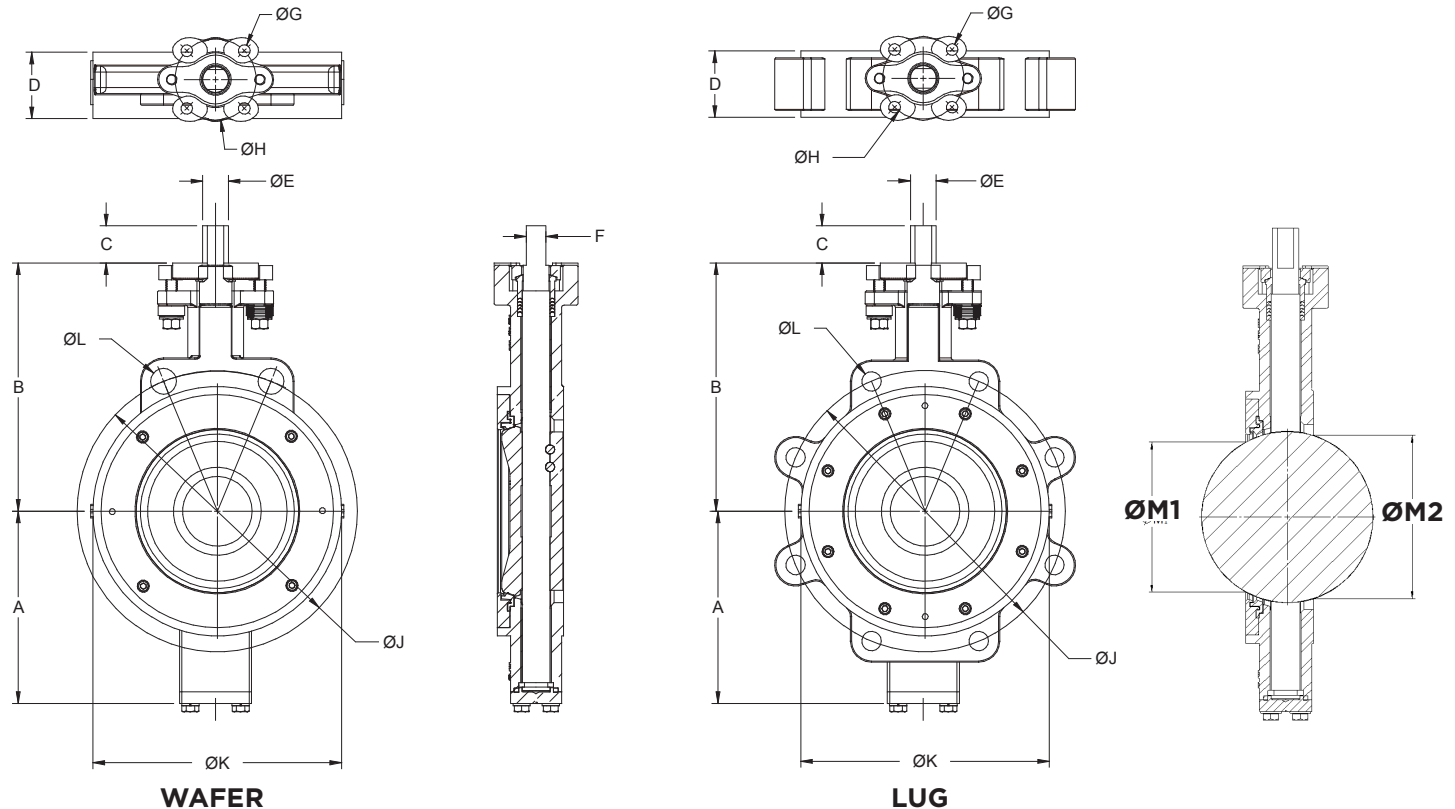


EXPLODED VIEW LUG DESIGN SHOWN NOTE

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

215L/215W SERIES CLASS 150 - 2" THRU 36"

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



150 CLASS DOUBLE-D AND KEYED STEM

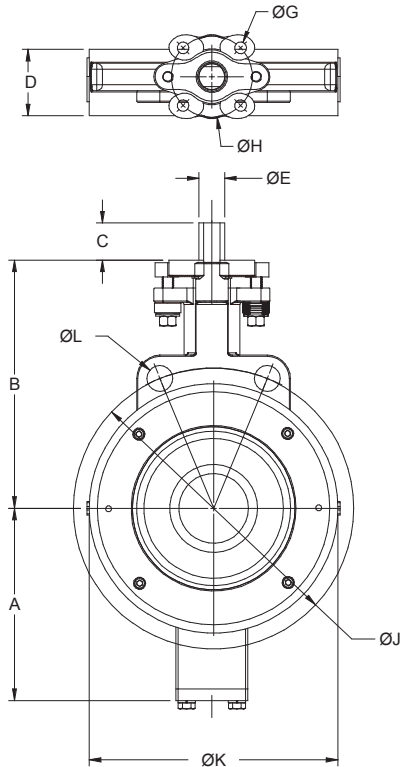
SIZE (IN.)	SIZE DN	DIMENSIONS (IN.)														
		A	B	C	D	ØE	F	KEY	ØG	ØH**	ØJ	ØK	ØL WAFER	ØL LUG	ØM1	ØM2
2	50	3.622	5.276	1.102	1.693	0.476	0.354	--	4 x 0.394	2.756 (F07)	4.75	4.09	2 x 0.669	4 x 5/8"-11UNC-2B	0.50	1.64
2.5	65	4.016	5.787	1.102	1.850	0.555	0.433	--	4 x 0.394	2.756 (F07)	5.50	4.72	2 x 0.748	4 x 5/8"-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	4 x 5/8"-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	8 x 5/8"-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	8 x 3/4"-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	8 x 3/4"-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	8 x 3/4"-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	12 x 7/8"-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	12 x 7/8"-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	12 x 1"-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	16 x 1"-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	16 x1-1/8"-8UN-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	20 x 1-1/8"-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	20 x 1-1/4"-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	--	28 x 1-1/4"-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	--	32 x 1-1/2"-8UN-2B	32.29	32.35

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

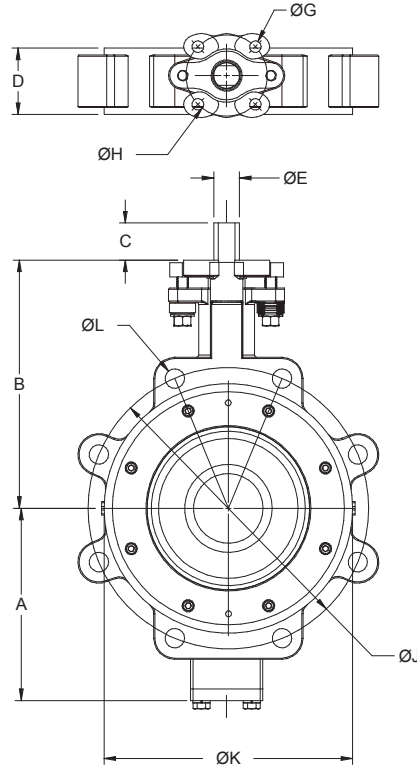
** ISO 5211 mounting/drilling pattern (F size) shown in parentheses.

230L/230W SERIES CLASS 300 - 2" THRU 24"

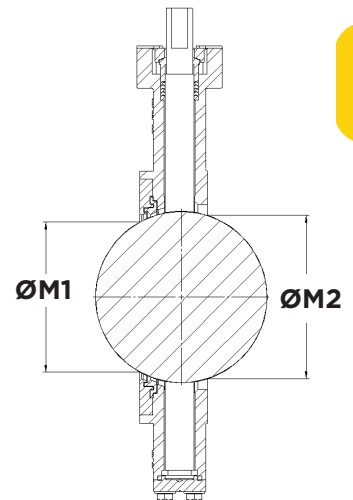
Four hole mounting pattern shown.
See table column "G" for number of mounting holes.



WAFER



LUG



300 CLASS DOUBLE-D AND KEYED STEM

SIZE (IN.)	SIZE DN	DIMENSIONS (IN.)														
		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	8 x 5/8"-11 UNC-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	8 x 3/4"-10 UNC-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	8 x 3/4"-10 UNC-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	8 x 3/4"-10 UNC-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	8 x 3/4"-10 UNC-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	12 x 3/4"-10 UNC-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	12 x 7/8"-9 UNC-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	16 x 1"-8 UNC-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"-8UN-2B	16 x 1-1/8"-8 UN-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"-8UN-2B	20 x 1-1/8"-8 UN-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"-8UN-2B	20 x 1-1/4"-8 UN-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"-8UN-2B	24 x 1-1/4"-8 UN-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"-8UN-2B	24 x 1-1/4"-8 UN-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"-8UN-2B	24 x 1-1/2"-8 UN-2B	20.57	20.57

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

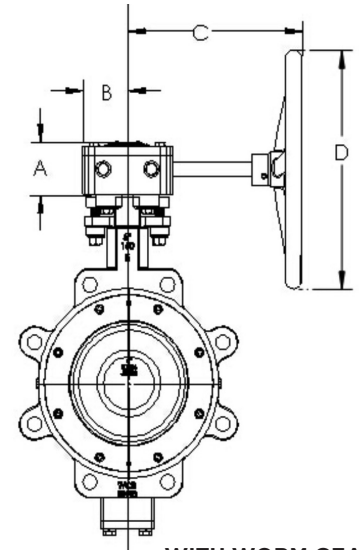
RTFM & UHMWPE SEAT

HANDLE & GEAR DIMENSIONS

CLASS 150

RTFM SEAT

VALVE SIZE		GEAR RATIO	DIMENSIONS IN INCHES						
INCHES	DN		A	B	C	D	E	F	G
2"	50	37:1	2.24	2.11	7.87	5.9	2.09	1.14	8.82
2.5"	65	37:1	2.24	2.11	7.87	5.9	2.09	1.14	8.82
3"	80	37:1	2.24	2.11	7.87	5.9	2.09	1.14	8.82
4"	100	37:1	2.24	2.11	7.87	5.9	2.09	1.14	12.82
5"	125	37:1	2.24	2.11	7.87	5.9	2.09	1.14	12.82
6"	150	37:1	2.24	2.11	7.87	5.9	2.09	1.14	12.82
8"	200	37:1	2.76	2.11	10.94	11.81	2.09	1.50	22.00
10"	250	37:1	2.76	2.11	10.94	11.81	2.09	1.50	22.00
12"	300	34:1	3.43	2.50	12.87	11.81	2.80	1.59	22.00
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	280:1	6.65	7.48	18.90	24.00	7.00	3.54	—
36"	850	360:1	8.15	9.06	20.90	24.00	8.26	4.29	—

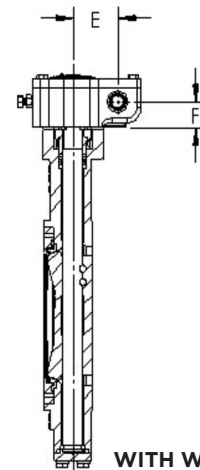


WITH WORM GEAR

CLASS 300

RTFM 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	22.00
10"	250	34:1	3.43	2.50	12.87	11.81	2.80	1.59	22.00
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	280:1	6.65	7.48	18.90	24.00	7.00	3.54	—
24"	600	280:1	6.65	7.48	18.90	24.00	7.00	3.54	—



WITH WORM GEAR