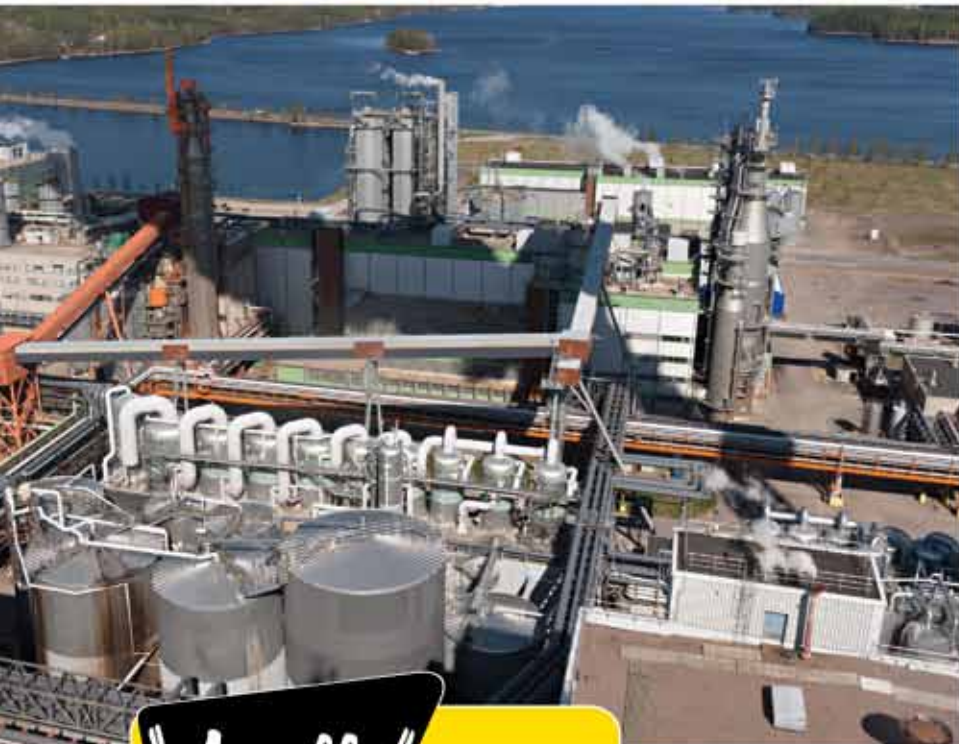


# BUTTERFLY VALVES



**"Apollo" Valves**

# "Apollo" Valves

## A history of Quality, Service and Innovation

Now in its ninth decade, Conbraco Industries, Inc. is a leading manufacturer of flow control products for U.S. and international markets. The company's headquarters is based in Matthews, North Carolina with manufacturing plants and foundries located in Pageland and Conway, South Carolina.

Conbraco has a history of new product development and innovation that dates back to the company's inception in 1928. Today, the Conbraco line of products is marketed under the "Apollo Valves" brand and includes: ball valves, butterfly valves, backflow prevention devices, water pressure reducing valves, mixing valves, safety relief valves, water gauges, strainers, vacuum breakers, valve actuators and more.

Conbraco's vertically integrated manufacturing ensures a consistency of production, testing, quality and availability. It's your assurance that Conbraco flow control products will deliver long term performance advantages. All manufacturing facilities are ISO 9001:2008 certified.

The Conbraco line continues to expand - with new products, designs and advanced materials - to better serve the needs of our customers in the chemical processing, pulp and paper, petroleum, residential and commercial plumbing and heating markets, as well as manufacturing and other markets.



**PAGELAND, SC**  
Bronze Foundry and Manufacturing Plant



**PAGELAND, SC**  
Final Assembly and Distribution Center



**CONWAY, SC**  
Steel Foundry and Manufacturing Plant



**MATTHEWS, NC**  
Corporate Headquarters

Apollo® and Apollo International™ iron bodied butterfly valves offer an economical, bubble-tight shut-off design that's ideal for use in commercial HVAC and plumbing as well as irrigation and select industrial applications. These valves are rated to 200 psig in sizes 2" through 12" and 150 psig in sizes 14" and larger. Apollo® and Apollo International™ butterfly valves are available with a variety of options and are easily automated.

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# BUTTERFLY VALVES

## Advantages – 141 Series (Apollo International™) & 145 Series (Assembled & Tested in USA)

**WD141:** One-piece wafer-style, sizes 2" to 12"

**LD141:** Lug valves, sizes 2" to 24"

**WD145:** One-piece wafer-style, sizes 2" to 12"

**LD145:** Lug valves, sizes 2" to 12"

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.

### (1) 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.

### (2) Blowout Proof Seat with Molded in Stiffener Ring

Valves are equipped with a stretch-resistant, non-collapsible blowout-proof seat. Phenolic Stiffener Ring (2"-12") Aluminum Stiffener Ring (14"-24" LD141 only)

### (3) Seat – No Gaskets Required

Design of the seat eliminates the need to use flange gaskets with the valves.

### (4) Mounting Flange For Actuator

Valve's cast-in top plate is designed to ISO 5211 standard dimensions for mounting of Apollo® actuators and manual operators.

### (5) Through Shaft

Assures positive disc positioning and dependable performance.

### (6) Weather Seal

All models are equipped with a shaft weather seal that prevents external media from entering the shaft bore.

### (7) Square Shaft-to-Disc Connection

Provides a robust shaft-to-disc connection without pins or bolts. Easy maintenance.

### (8) Three Bushings

Supports shaft at three locations to enhance shaft alignment and absorb actuator side thrusts.

### (9) Profiled Disc Design

Precision disc assures bubble-tight shut-off with minimal torque and longer seat life.

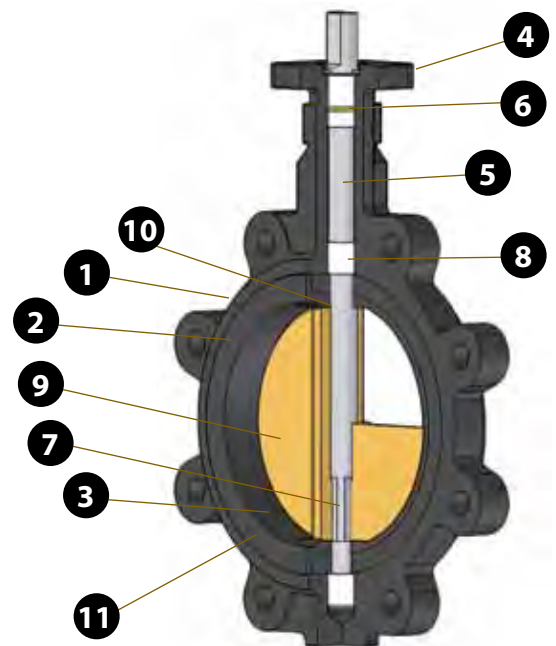
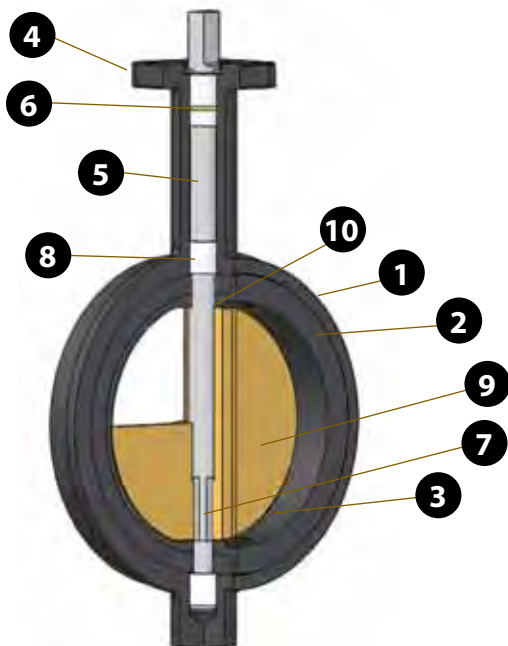
### (10) Shaft Seal

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.

### (11) End of Line Service

All LD Model valves are equipped with retainer screws for dead end service; 2" through 12" to 200 psig, 14" through 24" LD141's to 150 psig.

*Testing: All valves are 100 percent factory tested before shipping.*

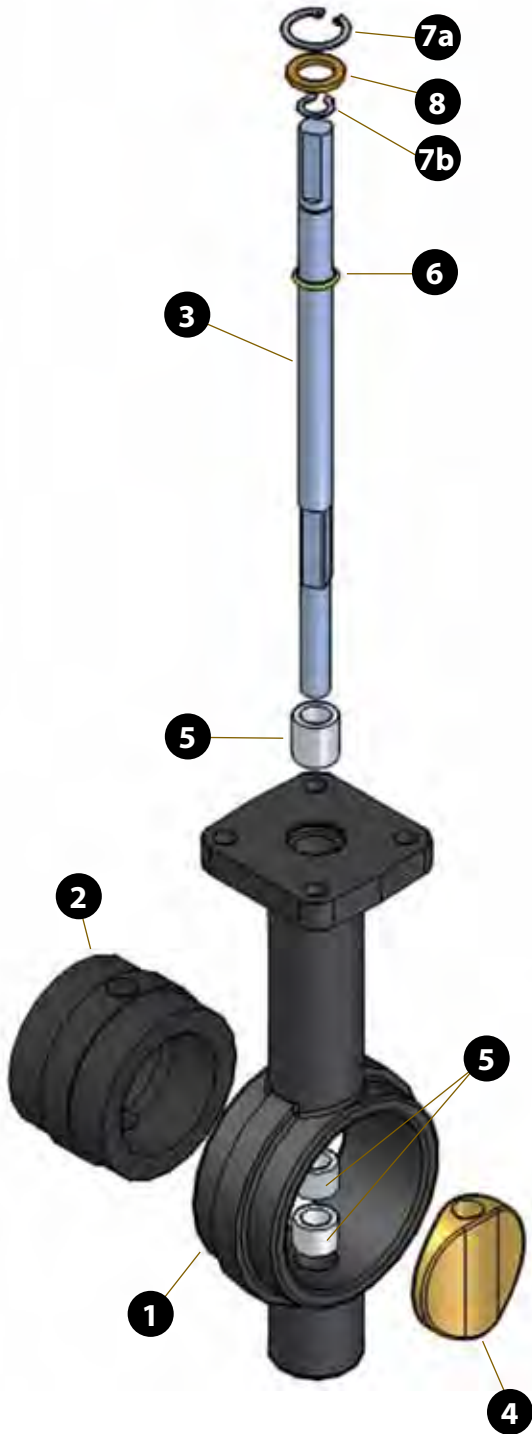


# BUTTERFLY VALVES

## General Purpose Butterfly Valves – 141 Series & 145 Series

141 Series: Apollo International™

145 Series: Assembled & Tested in USA



**Exploded View**  
WD141 – Wafer Design Shown

| PARTS LIST – 141 SERIES & 145 SERIES |                            |  |        |
|--------------------------------------|----------------------------|--|--------|
| Item                                 | Description                | Material   | Qty    |
| 1                                    | Body                       | Ductile Iron<br>ASTM A536 (65-45-12)   | 1      |
| 2                                    | Seat                       | EPDM*<br>--- or ---<br>Buna-N (Nitrile)*<br>--- or ---<br>Viton®B*   | 1      |
| 3                                    | Shaft                      | 416 Stainless Steel ASTM A564  | 1      |
| 4                                    | Disc                       | Nickel Plated Ductile Iron<br>ASTM A536 (65-45-12)<br>--- or ---<br>Aluminum-Bronze<br>ASTM B148, C95400<br>--- or ---<br>316 Stainless Steel A<br>STM A351, Type CF8M | 1      |
| 5                                    | Bushing                    | PTFE   | 3      |
| 6                                    | Weather Seal               | EPDM   | 1      |
| 7a                                   | Retainer                   | Steel with Protective Finish   | 1      |
| 7b                                   | Retainer                   | Steel with Protective Finish   | 1      |
| 8                                    | Washer                     | Brass  | 1      |
| 9                                    | Set Screws<br>(Flat Point) | Steel with Protective Finish   | 2 to 6 |
| 10                                   | Set Screws<br>(Cone Point) | Steel with Protective Finish   | 2 to 6 |
| 11                                   | Nameplate                  |  | 1      |

\* 2" - 12" has a phenolic stiffening ring molded into the seat.  
14" - 24" has an aluminum stiffening ring molded into the seat.

### AVAILABLE 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

# BUTTERFLY VALVES

## Specifications – 141 Series & 145 Series

### DESIGN 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
- 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
- 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, 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)
- Blow-out 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

### SPECIFICATIONS

#### 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 inches of Hg (737 mm of Hg)

#### TEMPERATURE RATING - SEATS

EPDM -30° F to 275° F (-34° C to 135° C)

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

Viton® B -15° F to 400° F (-26° C to 204° 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.

# BUTTERFLY VALVES

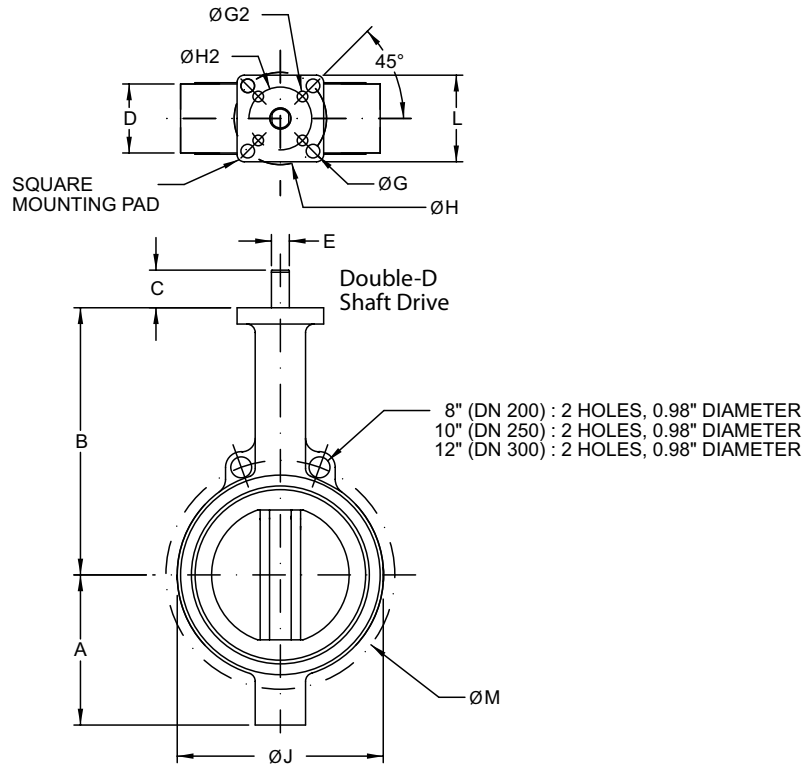
## General Purpose Butterfly Valves – 141 Series & 145 Series

141 Series: Apollo International™

145 Series: Assembled & Tested in USA

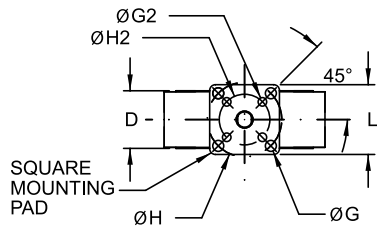
### WD MODEL

2" - 12"

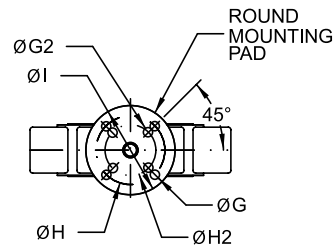


### LD MODEL

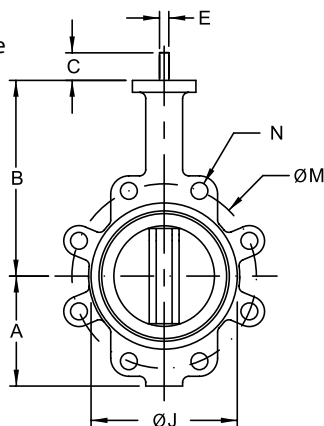
2" - 12"



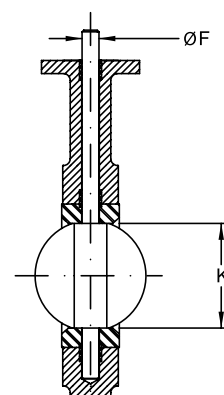
14" - 24"



Double-D  
Shaft Drive



Shaft Drive:  
Double-D (14")  
Round & Keyed (16" & larger)



# BUTTERFLY VALVES

## General Purpose Butterfly Valves – 141 Series & 145 Series

| Size Inches | Size DN | Dimensions in Inches – 141 Series & 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 | --    | --      |
| 2.5         | 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 |

\*LD141 Series only

| Size Inches | Dimensions in Inches – 141 Series & 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     |
| 2.5         | 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     |

\*LD141 Series only

### Approximate Weight for Bare Shaft Valve

| Valve Size |     | WD Model<br>Lbs (kg) | LD Model<br>Lbs (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)            |
| 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)          |

\*LD141 Series only

141 Series: Apollo International™  
145 Series: Assembled & Tested in USA



For additional information, submittal sheets and manuals, visit [www.apollovalves.com](http://www.apollovalves.com)

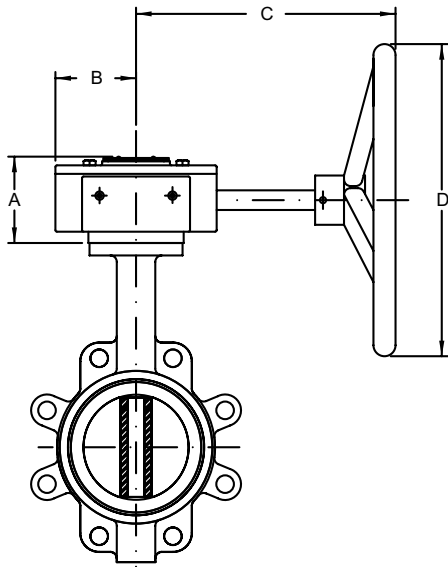
Customer Service (704) 841-6000

# BUTTERFLY VALVES

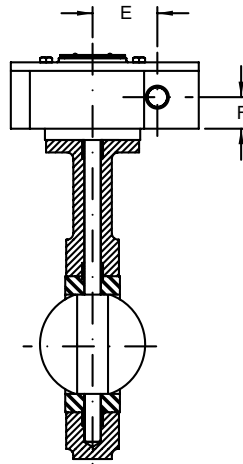
## Handle and Gear Dimensions – 141 Series & 145 Series

141 Series: Apollo International™

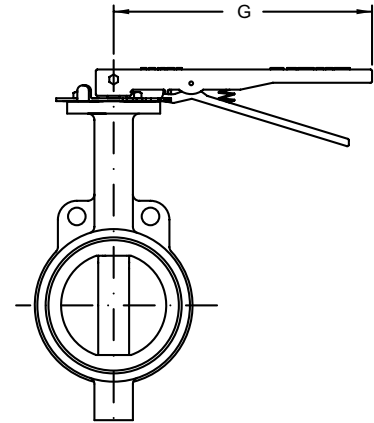
145 Series: Assembled & Tested in USA



with Manual Gear



with Manual Gear



with Handle

| Valve Size |      | Gear Ratio | Dimensions in Inches |     |      |      |     |     |      |
|------------|------|------------|----------------------|-----|------|------|-----|-----|------|
| 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



# BUTTERFLY VALVES

## Operating Torque – 141 Series, 145 Series & 149 Series

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 (lbf-in)

| Valve Size |      | 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   |

\*LD141 only

## Cv Data – 141 Series, 145 Series & 149 Series

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/cm<sup>2</sup>. 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.*

# BUTTERFLY VALVES

## 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

## Applications

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.

| <b>EPDM Cartridge Style Seat</b><br><b>Ethylene propylene rubber</b>  | <b>Buna-N Cartridge Style Seat</b><br><b>Nitrile rubber</b><br><b>Also known as NBR</b>  | <b>Viton® B Cartridge Style Seat</b><br><b>Fluorocarbon rubber</b>  |
|---|--|---|
| Temperature rated from -30°F to 275°F   | Temperature rated from 10°F to 180°F   | Temperature rated from -15°F to 400°F   |
| <p><b>Typical applications:</b></p> <ul style="list-style-type: none"> <li>➤ Food Grade EPDM is Standard</li> <li>➤ Typically offered for general service and elevated temperatures</li> <li>• Hot water</li> <li>• Chilled water</li> <li>• Glycols</li> <li>• Detergents</li> <li>• Phosphate esters</li> <li>• Ketones</li> <li>• Alcohols</li> <li>• Steam</li> <li>• Dilute acids</li> <li>• Phosphate based hydraulic oils and fluids</li> <li>• Silicone greases and oils</li> <li>• Alkalies</li> </ul> | <p><b>Typical applications:</b></p> <ul style="list-style-type: none"> <li>➤ Food Grade Buna-N is Standard</li> <li>➤ Good for most general services</li> <li>• Water – ambient temperature</li> <li>• Vacuum</li> <li>• Compressed air</li> <li>• Salt solutions</li> <li>• Alkaline solutions</li> <li>• Dilute acids</li> <li>• Petroleum oils &amp; fluids</li> <li>• Silicone oils &amp; greases</li> <li>• Ethylene glycol</li> </ul>  | <p><b>Typical applications:</b></p> <ul style="list-style-type: none"> <li>➤ A fluorocarbon rubber with a wide spectrum of chemical resistance (exceptional resistance to oils and chemicals at higher temperatures).</li> <li>➤ A fluorocarbon rubber that typically has better chemical resistance than Buna-N.</li> <li>• Hydrocarbons</li> <li>• Mineral acids</li> <li>• Alcohols</li> </ul>   |
| <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>⊗ EPDM is not recommended for any hydrocarbon-based oils, petroleum oils, hydrocarbon-based lubricants, or di-ester based lubricants, or air systems with hydrocarbons.</li> </ul>  | <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>⊗ Buna-N can swell in hot water applications, and increase operating torque.</li> <li>⊗ 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</li> </ul> | <div style="text-align: center;">  </div> <ul style="list-style-type: none"> <li>⊗ Viton® can swell in higher temperature water applications.</li> <li>⊗ At low temperatures, Viton®'s flexibility decreases (hardens), which often increases operating torque.</li> <li>⊗ Viton® is not recommended for ketones, Skydrol fluids, amines, anhydrous ammonia, low molecular weight esters and ethers, hot hydrofluoric chlorosulfonic acids.</li> </ul> |

### VELOCITY LIMITS

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

# BUTTERFLY VALVES

## Installation

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. Tighten bolts to spec with disc in full open position. 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.

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



Closed



Partially Open



Open

# BUTTERFLY VALVES

## Contractor Grade Butterfly Valves – 149 Series



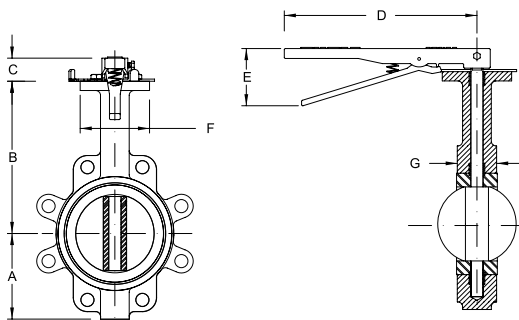
The Apollo® LC149 Series Cast Iron Butterfly Valves are ideal for use in Industrial and HVAC/Mechanical applications. The LC149 Series is a lug style valve designed to be economical yet full featured.

### 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  |

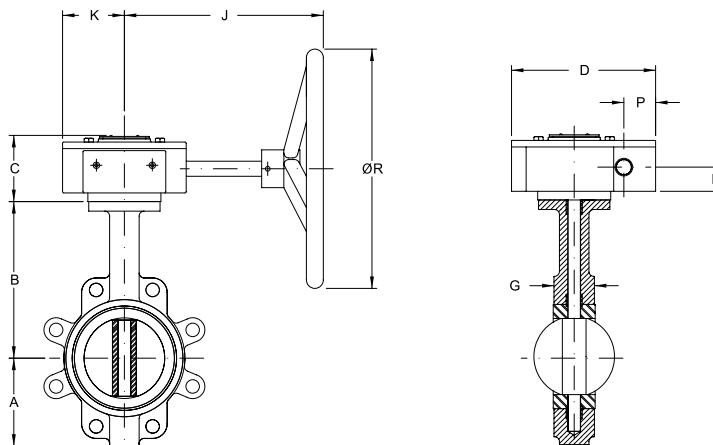
### PERFORMANCE RATING

- Max Operating Pressure: 200 psi (13.8 bar)
- Temperature Range: -30°F to 275°F (-34°C to 135°C)



| Size (in) | Dimensions in Inches – 149 Series with Handle |       |      |      |     |      |      |
|-----------|---|-------|------|------|-----|------|------|
|           | A   | B     | C    | D    | E   | F    | G    |
| 2         | 3.25  | 6.38  | 1.25 | 10.5 | 3.1 | 2.70 | 1.75 |
| 2.5       | 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 |

| Size (in) | Dimensions in Inches – 149 Series with Gear Operator |       |      |      |      |      |      |      |      |       |
|-----------|--|-------|------|------|------|------|------|------|------|-------|
|           | 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

## How to Order WD and LD Butterfly Valves

### MODEL NUMBER:

| <b>WD</b>                            | <b>141</b>                          | <b>06</b>  | <b>B</b>                                    | <b>E</b>   | <b>1</b>  | <b>1</b> |
|--------------------------------------|-------------------------------------|--|---|--|---|----------|
| <b>MODEL</b>                         | <b>SERIES</b>                       | <b>SIZE (IN.)</b>  | <b>DISC MATERIAL</b>                        | <b>SEAT MATERIAL</b>                                       | <b>OPERATOR</b>   |          |
| <b>WD</b> Wafer Body<br>Ductile Iron | <b>141</b> Apollo<br>International™ | <b>02</b> 2"   | <b>B</b> Aluminum Bronze                    | <b>E</b> Black EPDM **<br>-30°F to 275°F<br>-34°C to 135°C | <b>0</b> Bare Shaft<br><b>1</b> 10 Position Handle<br><b>2</b> Gear Operator - Direct Mount<br><b>3</b> Infinite Position Handle<br><b>4</b> Locking Handle<br><b>5</b> Gear Operator<br>w/Chainwheel<br><b>7</b> Locking Gear Operator<br><b>8</b> Locking Gear Operator<br>w/Chainwheel |          |
|                                      |                                     | <b>25</b> 2.5"   | <b>D</b> Ductile Iron A536<br>Nickel Plated |  |   |          |
|                                      |                                     | <b>03</b> 3"   | <b>S</b> Stainless Steel,<br>CF8M           |  |   |          |
|                                      | <b>04</b> 4"                        | <b>N</b> Black BUNA-N **<br>10°F to 180°F<br>-12°C to 82°C |   |  |   |          |
|                                      | <b>05</b> 5"                        |  |   |  |   |          |
|                                      | <b>06</b> 6"                        |  |   |  |   |          |
|                                      | <b>08</b> 8"                        |  |   |  |   |          |
|                                      | <b>10</b> 10"                       |  |   |  |   |          |
|                                      | <b>12</b> 12"                       |  |   |  |   |          |
|                                      | <b>LD</b> Lug Body<br>Ductile Iron  |  | <b>145</b> Assembled &<br>Tested in USA     | <b>14</b> 14"*   |   |          |
| <b>16</b> 16"*                       |                                     |  |   |  |   |          |
| <b>18</b> 18"*                       |                                     |  |   |  |   |          |
| <b>20</b> 20"*                       |                                     |  |   |  |   |          |
| <b>24</b> 24"*                       |                                     |  |   |  |   |          |

\*LD141 Only

### 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

## How to Order LC149 Butterfly Valves - Contractor Grade

### MODEL NUMBER:

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

### EXAMPLE:

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