

**LC149 SERIES**

**BUTTERFLY VALVE**

**INSTALLATION,  
OPERATION, &  
MAINTENANCE**

DOCUMENT NO.: ES-1479

REVISION LEVEL: A

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## **INTRODUCTION**

### **DESIGN FEATURES**

#### **LC149 SERIES**

- Available in lug body only.
- Flange holes comply with ANSI Class 125/150 dimensions.
- Cast-in top plate with ISO-5211 mounting dimensions provides for direct-mounting of Apollo® actuators and manual operators.
- All body dimensions were designed to comply with MSS SP-67 and API 609.
- Through-shaft design with pinned connection from stem to disc. Disc-to-seat interface provides bubble-tight shut-off with reduced torque and extended service life.
- Equipped with a blowout-proof, phenolic-backed EPDM (food grade) cartridge seat.
- Factory tested to 110% of full rated pressure in both directions before shipping.

### **FLANGE AND PIPE COMPATIBILITY**

APOLLO® Butterfly Valves are designed to fit between the following piping flanges:

- ANSI 125 Cast iron flanges (all sizes)
- ANSI 150 Steel flanges, schedule 40 (all sizes)
- ANSI 150 Steel flanges, schedule 80 (all sizes)

**Note: When installing valves in schedule 80 piping, make sure the valve is properly centered between the pipe flanges to prevent disc edge damage since the clearance between the disc O.D. and the pipe I.D. is reduced. If there is a compatibility question, compare the minimum pipe I.D. with the disc chord dimensions in Table 1.**

### **OPERATING PRESSURES**

#### **LC149 SERIES:**

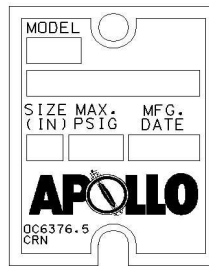
- **2"-12"** (50mm-300mm) – 200 psig (13.78 bar)

### **PRODUCT STORAGE**

- The valves should be stored with the disc in the partially open position.
- The valves should be stored indoors in a clean, dry, well-ventilated place away from corrosive materials and protected from excessive dust and dirt.
- The valves should be stored on a rack or pallet off the floor and arranged to prevent damage during handling.
- Keep valves out of direct sunlight and in a cool location to prolong elastomer life.
- Valves should be protected to prevent damage to the flange faces, disc sealing edge and operator.

### **PRODUCT MARKING**

All APOLLO® Butterfly Valves are equipped with an identification tag attached to the valve neck (Figure 1). This tag provides the model number, part number, size, max pressure rating, and date of manufacture.



**FIGURE 1: APOLLO® BUTTERFLY VALVE IDENTIFICATION TAG**

## **INSTALLATION INFORMATION**

APOLLO® butterfly valves are designed for use between the faces of ANSI Class 125 and 150 flat, raised face, slip-on or weld-neck flanges at the pressure indicated on the nameplate.

**Flange gaskets should not be used.** Due to the brittle nature of cast iron, consideration should be given to the proper piping alignment prior to the installation of any cast iron lug bodied valve. All APOLLO® resilient seated butterfly valves are bi-directional with the ability to control flow equally in either direction. All LC149 Series APOLLO® lug style butterfly valves may be used for dead-end service in either direction at their full pressure rating.

### **INSTALLATION INSTRUCTIONS**

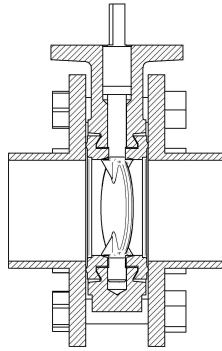
Step 1. Check to make sure that the pipe flange and valve sealing faces are clean and free from any debris (pipe scale, welding slag, etc.).

Step 2. Check the valve nameplate to ensure that the pressure and valve materials are correct for the application. See Table 3 for seat material temperature ratings.

**WARNING! – Apollo butterfly valves should never be installed where service conditions could exceed the valve ratings. Failure to heed warning may result in personal injury or property damage.**

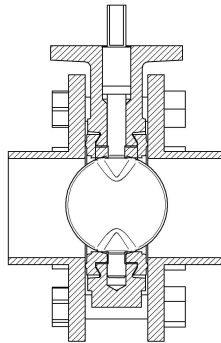
Step 3. The seat sealing face on the LC149 Series butterfly valves is wider than the valve body providing a leak-proof seal when compressed between pipe flanges. Therefore, no flange gaskets are required when installing an APOLLO® butterfly valve.

Step 4. To prevent damage to the disc sealing edge during installation, position the disc in the “partially open” position (Figure 2) so that the disc is still contained within the valve body.



**FIGURE 2: VALVE IN PARTIALLY OPEN POSITION**

- Step 5. Spread the pipe flanges apart allowing the valve to be slipped easily in between the flanges.
- Step 6. Center the valve between the flanges and loosely install all the flange bolts. Consult Table 2 for correct flange bolt size and quantity.
- Step 7. Slowly open the valve to the full open position (Figure 3) and back to the partially open position ensuring that the disc moves freely without any obstruction. If no obstruction is encountered, return the valve to the full open position and hand-tighten all flange bolts using the bolt tightening sequence shown in Figure 4.



**FIGURE 3: VALVE IN FULL OPEN POSITION**

- Step 8. Rotate the disc from the fully open position to the fully closed position and make sure that the valve is properly centered and the disc edge does not contact the pipe ID. Return the disc to the full open position and tighten the flange bolts following the bolt tightening sequence shown in Figure 4. However, do not fully tighten each flange bolt all at once. Tighten each bolt incrementally following the sequence in Figure 4 several times until the flange bolts are tight. After all flange bolts are fully tightened, cycle the valve from full open to full closed to ensure that there is proper disc clearance.

## MAINTENANCE AND REPAIR

APOLLO® butterfly valves are designed for extended service with minimal wear and servicing. No regular lubrication is required. Prior to any replacement or repair, the valve must be removed from the line following these precautions:

1. The pipeline on both sides of the valve must be depressurized and drained.
2. Ensure that the disc is in the partially open or fully closed position before removing the valve from the line.
3. **DO NOT** remove an actuator or operator from the valve while the line is still pressurized.

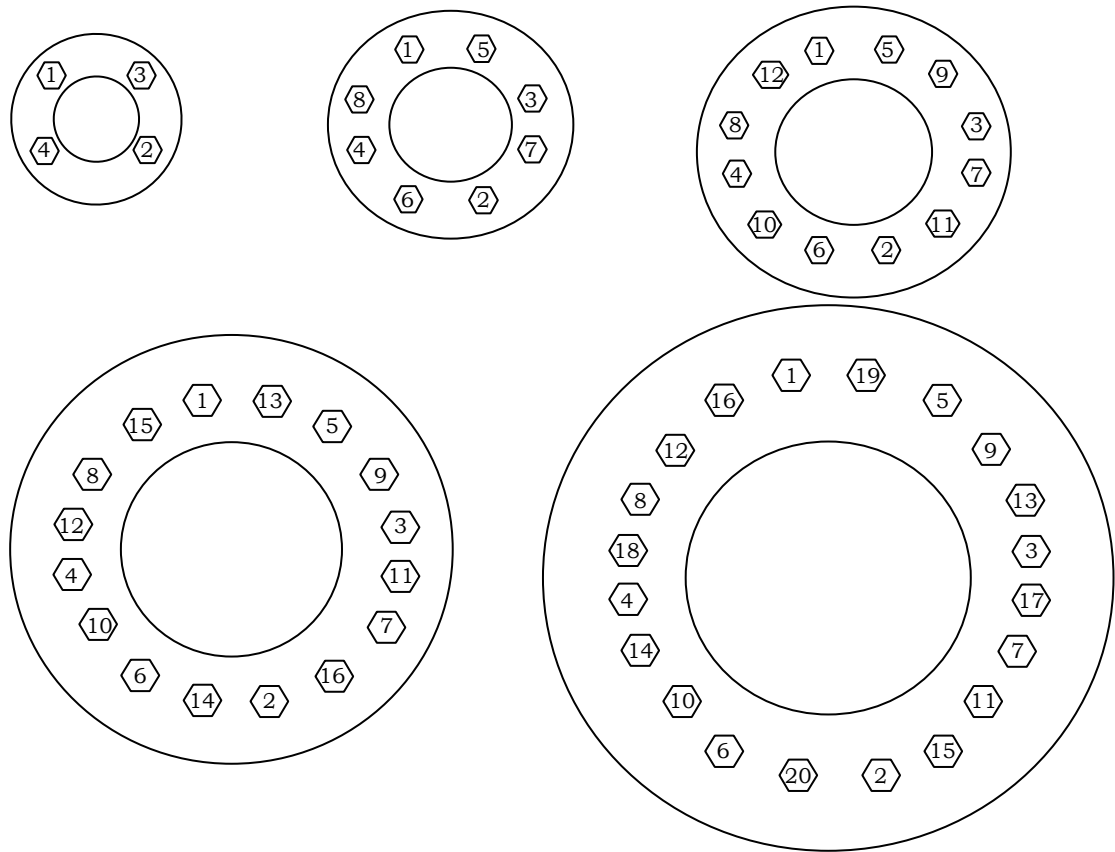
Valve Size		Disc Chord
(in)	(mm)	(in)
2	50	1.14
2.5	65	1.71
3	80	2.45
4	100	3.49
5	125	4.30
6	150	5.70
8	200	7.69
10	250	9.71
12	300	11.74

**TABLE 1: BUTTERFLY VALVE DISC CHORD DIMENSIONS**

## LUG BODY REGULAR HEX HEAD SCREWS WITH NC THREADS

Valve Size		Diameter	Length	Quantity
(in)	(mm)	(in)	(in)	
2	50	5/8"	1-1/2"	4
2.5	65	5/8"	1-1/2"	4
3	80	5/8"	1-3/4"	4
4	100	5/8"	1-3/4"	8
5	125	3/4"	1-3/4"	8
6	150	3/4"	2"	8
8	200	3/4"	2-1/4"	8
10	250	7/8"	2-1/4"	12
12	300	7/8"	2-1/2"	12

**TABLE 2: BOLT SPECIFICATIONS FOR LUG VALVES**



**FIGURE 4: FLANGE BOLT TIGHTENING SEQUENCE**

## **ASSEMBLY/DISASSEMBLY INSTRUCTIONS**

### **LC149 SERIES BUTTERFLY VALVE ASSEMBLY AND DISASSEMBLY**

The LC149 Series butterfly valves **DO NOT** have field replaceable parts. Therefore, assembly or disassembly is not permitted. Once the valve is removed from the line, inspect the parts for wear. If valve parts show wear, replacement is necessary. Contact your local APOLLO® distributor for a replacement valve.

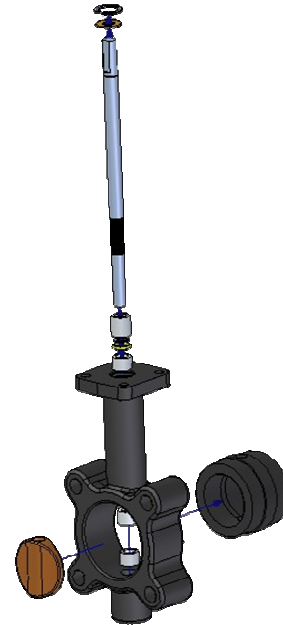
<b>Type</b>	<b>Min</b>	<b>Max</b>
EPDM	-30 °F (-34 °C)	+275 °F (135 °C)

**TABLE 3 : LC149 SERIES SEAT MATERIAL TEMPERATURE RANGES**

## **BUTTERFLY VALVE PART LISTS**

### **LC149 SERIES PARTS LIST**

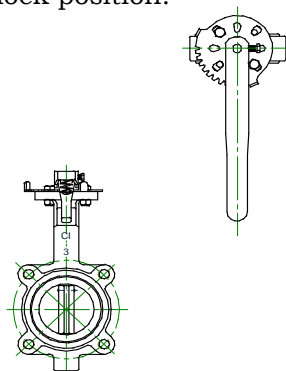
Item	Quantity	Description
1	1	Body
2	1	Seat
3	1	Shaft
4	1	Disc
5	1	Bushing
6	1	Stem Seal
7	1	O-ring
8	2	Snap Ring
9	1	Washer



## **MANUAL OPERATOR INSTALLATION**

### **LEVER HANDLE MOUNTING PROCEDURE**

- Step 1. First, start by loosely assembling the notch plate on the valve top plate. The notchplate should be installed with the notches in the third quadrant of the valve top plate with the stop tabs at the 6 o'clock and 9 o'clock position. The notchplate should be installed with the stop tabs pointing upward (Figure 5).
- Step 2. Next, install the handle so that the lever fully engages in the notches when the lever is released and tighten the handle set screw.
- Step 3. Compress the handle lever and position the disc so that the valve is in the fully closed position. Align the last notch on the notchplate at the 9 o'clock position with the handle lever and tighten the notch plate screws.
- Step 4. Compress the handle lever and position the disc so that the valve is in the fully open position and release the lever. The lever should line-up with the last notch on the notchplate at the 6 o'clock position.

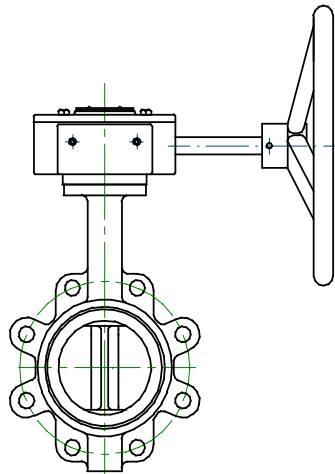


**FIGURE 5: NOTCHPLATE INSTALLATION POSITION**



### **MANUAL GEAR OPERATOR MOUNTING PROCEDURE**

- Step 1. First, rotate the valve disc to the fully open position.
- Step 2. Slide the handwheel onto the end of the gear operator shaft. Line-up the hole in the handwheel with the hole in the gear operator shaft. Install the shear pin and rotate the gear operator to the open position.
- Step 3. Line-up the valve stem with the gear operator bore and slide the gear operator onto the valve with the handwheel pointing to the right of the valve when looking at the nameplate (Figure 6).
- Step 4. Position the gear operator so the tapped holes in the bottom of the gear operator line-up with the valve top-plate mounting holes and install the mounting screws with lock washers.
- Step 5. Loosen the gear operator travel stops and rotate the handwheel until the valve is in the fully closed position. Tighten the gear operator stop on the right-hand side of the gear operator. (Note: There are two hex head set screws in tandem that represent the gear operator travel stops. Ensure that the first hex head screw is fully removed before loosening the travel stops.)
- Step 6. Rotate the handwheel until the valve is in the fully open position. Tighten the gear operator stop on the left-hand side of the gear operator.
- Step 7. Cycle the valve from the fully open position to the fully closed position to make sure that the stops are set correctly.



**FIGURE 6: GEAR OPERATOR INSTALLATION POSITION**

**AMENDMENT REGISTER**

<u>DATE</u>	<u>REV</u>	<u>SECTION</u>	<u>PAGE</u>	<u>DESCRIPTION</u>
09/30/10	A	All	All	Released new engineering standard