ISLIP FLOW CONTROLS Inc.

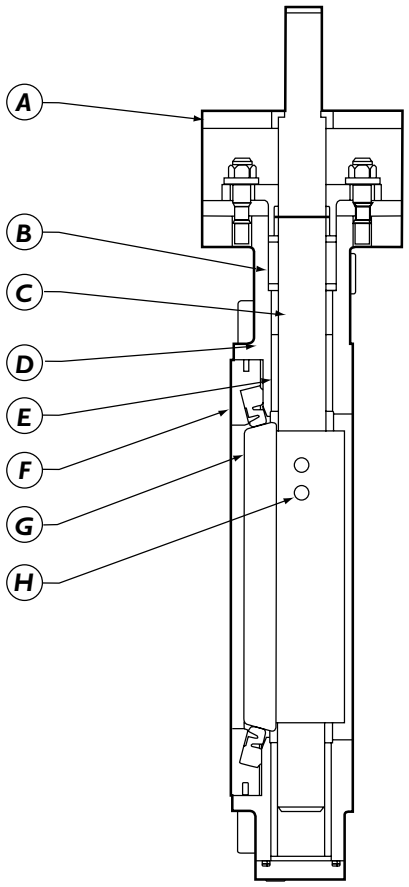
# IFC Series BH150W/L
# Design Features

**A**
**Mounting Pad**
The four-bolt actuator mounting pad readily accepts all types of actuation.

**B**
**Adjustable Vee-Ring**
Multiple Vee-Ring PTFE stem packing is adjustable and easily accessible without requiring removal of the actuator.

**C**
**One-Piece Shaft**
Constructed from 316 Stainless Steel. The shaft is internally retained meeting API 609 requirements.

**D**
**Body**
Available in a one-piece wafer body or lug style for dead-end service. The valves provide bi-directional sealing at full ASME Class 150 ratings.



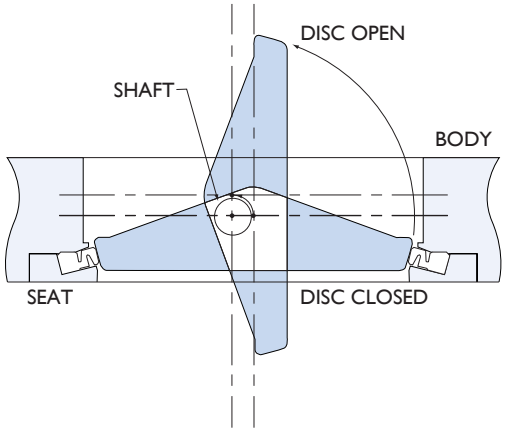

The IFC series BH150W/L high performance butterfly valve is available in sizes $2^{1}/_{2}$" thru 12", wafer or lug body design. Available body materials are A216-WCB Carbon Steel and A351-CF8M Stainless Steel. These valves were designed to meet the stringent requirements for HVAC, Oil and Gas and Industrial applications.

**E**
**Bushings**
High temperature fiberglass composite backed RPTFE ensuring maximum shaft support.

**F**
**Seat Retainer**
Employs an uninterrupted gasket surface meeting API 609 requirements.

**G**
**Disc Edge**
Machined and polished 360° to assure leak-proof positive shut-off. Standard material of construction is type 316 Stainless Steel.

**H**
**Taper Pins**
Used to provide a solid mechanical connection between the disc and shaft.




The double offset shaft design assures bi-directional sealing throughout the full pressure range of the valve. The cam-like action produced by the offset disc effectively lifts the disc off the seat during the initial opening of the valve thus reducing seat wear and eliminating seat deformation. When the disc is in the open position no contact exists with the valve seat. This effectively reduces operating torques while extending seat life.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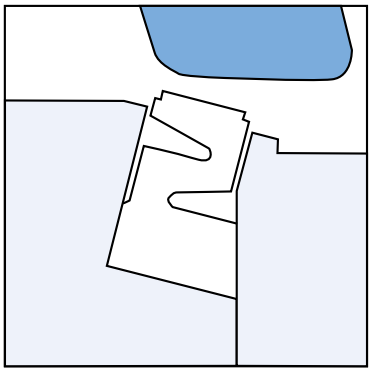
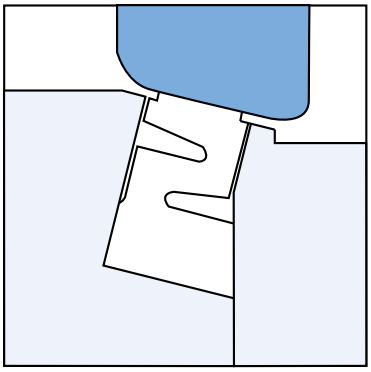
## Pressure Assisted Seat Design

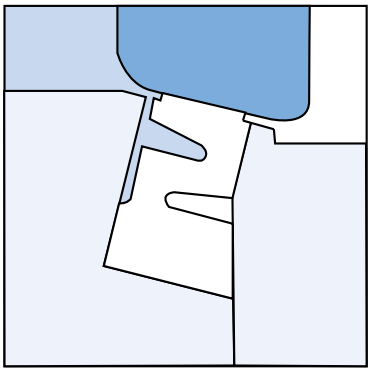
As the seat cross section is bellow shaped, line pressure exerts an upwards force on the seat independent of which side of the seat is under high pressure. This action forces the seat against the disc. Increased line pressure causes tighter sealing, thus ensuring bubble tight sealing at all differential pressures.



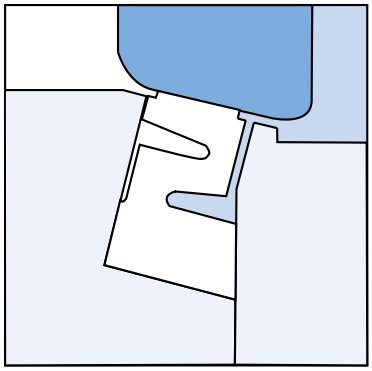
Seat is non-compressed as disc approaches.



Disc is closed with no line pressure.



Disc in closed position; Line pressure applied from left side.



Disc in closed position; Line pressure applied from right side.

## Sealing System Advantages

The IFC Series BH150W/L Butterfly Valve incorporates an innovative seat design that ensures bi-directional bubble tight seating at all differential pressures. Advantages of the IFC sealing system include:

- As system differential pressure increases the seat-disc interface proportionally tightens to maintain an effective seal.
- The seat assembly is locked and slightly compressed in the body recess by a full-faced seat retainer, thus ensuring the seat is secure regardless of the disc position.
- The seat is self adjusting to temperature changes and wear.
- The full face seat retainer is held in place by a circumferential snap spring constructed from Inconel. Unlike competitive designs that use bolts to retain the seat and seat retainer, the IFC design results in "ZERO" interruption across the full gasket seating surface.
- Since no special tools are required for the removal of the seat retainer, seat replacement is extremely easy. Remove the seat retainer by rotating it counter-clockwise, rotate the disc into the closed position and place a new seat into the seat chamber machined into the valve body.

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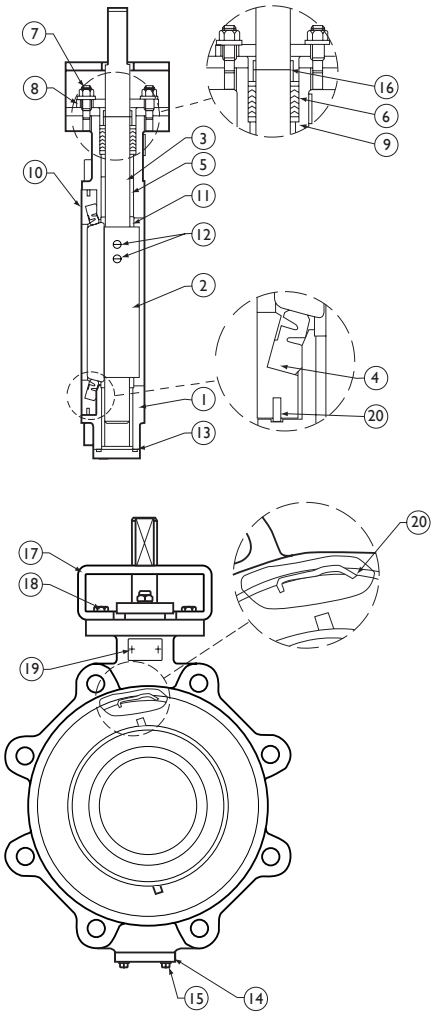
# IFC Series BH150W/L
# Valve Construction Data

## Material Specifications

| Part No. | Part Name | Material: Carbon Steel | Material: Stainless Steel |
|---|---|---|---|
| 1 | Body | ASTM A216-WCB | ASTM A351-CF8M (316 SS) |
| 2 | Disc | ASTM A351-CF8M (316 SS) | ASTM A351-CF8M (316 SS) |
| 3 | Shaft | ASTM A276-316 | ASTM A276-316 |
| 4 | Seat | PTFE/RPTFE | PTFE/RPTFE |
| 5 | Bushings x 2 | High Temperature Fiberglass Composite Backed RPTFE | High Temperature Fiberglass Composite Backed RPTFE |
| 6 | Packing | PTFE - V-Type | PTFE - V-Type |
| 7 | Packing Hardware | 300 Series Stainless Steel | 300 Series Stainless Steel |
| 8 | Gland Retainer | ASTM A216-WCB | ASTM A351-CF8M (316 SS) |
| 9 | Inner Gland Ring | ASTM A276-316 | ASTM A276-316 |
| 10 | Seat Retainer | ASTM A351-CF8M (316 SS) | ASTM A351-CF8M (316 SS) |
| 11 | Thrust Washer | ASTM A276-316 | ASTM A276-316 |
| 12 | Disc Pin | ASTM A276-316 | ASTM A276-316 |
| 13 | O-Ring | Viton | Viton |
| 14 | End Cap | ASTM A351-CF8M (316 SS) | ASTM A351-CF8M (316 SS) |
| 15 | End Cap Hardware | 300 Series Stainless Steel | 300 Series Stainless Steel |
| 16 | Shaft Retainer Ring | ASTM A276-302 | ASTM A276-302 |
| 17 | Support | ASTM A216-WCB | ASTM A351-CF8M (316 SS) |
| 18 | Support Hardware | Plated Carbon Steel | 300 Series Stainless Steel |
| 19 | Name Plate | 300 Series Stainless Steel | 300 Series Stainless Steel |
| 20 | Spring | Inconel X750 | Inconel X750 |




## Standards of Construction

| Component | Standard |
|---|---|
| General Design | API 609, ASME B16.34 |
| Laying Length | MSS-SP-68 |
| Inspection and Testing | API 598 |

## Steam Rating (Saturated)

| Seat Material | W.S.P. psig (Bars) |
|---|---|
| RPTFE | 150 (10.34) |
| PTFE | 70 (4.82) |

**Note:** Steam ratings refer to On-Off service only. For throttling applications, consult factory.

## Upper Pressure Limits (Non-Shock)

| Body Material | M.A.W.P. psig (Bars) [1] |
|---|---|
| WCB | 285 (19.65) |
| CF8M | 275 (18.96) |

**Notes:** 1. Pressures refer to valve body only. Seat ratings may limit M.A.W.P.
2. Standard vacuum rating is 10 mm Hg.

## Lower Temperature Limits

| Body Material | Lower Limit ¡F (¡C) |
|---|---|
| WCB | -20 (-28.9) |
| CF8M | -20 (-28.9) |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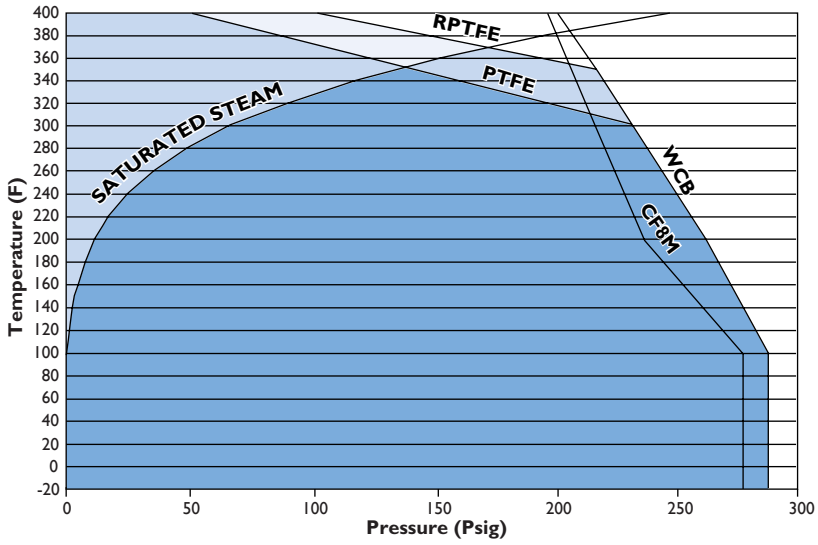
# IFC Series B1150W/L Valve Sizing Data

## IFC BH150W/L Pressure Temperature Chart




## CV Values (US-GPM @ 1 Psid)

| Size in. | CV Rating |
|---|---|
| 2 1/2" | 90 |
| 3" | 205 |
| 4" | 403 |
| 6" | 1075 |
| 8" | 2243 |
| 10" | 3885 |
| 12" | 5925 |

**Note:** CV is defined as the volume of water in USGPM that will flow through a given restriction or valve opening with a pressure drop of one (1) psi at room temperature.

## Method Of Calculating Flow

### Liquid Flow

$$QL = C_v \sqrt{\frac{\Delta P}{g}}$$

QL = flow rate of liquid (gal./min.)
ΔP = differential pressure across the valve (psi)
g = specific gravity of liquid: water = 1.000

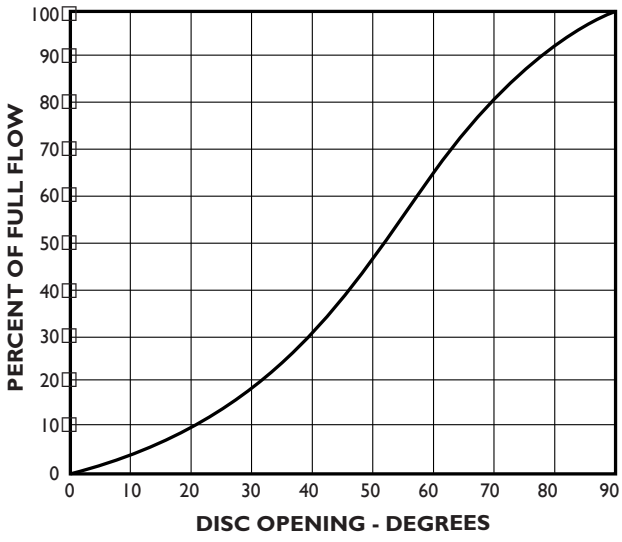
### Gas Flow

For non-critical flow ( $\frac{\Delta P}{P_2} < 1.0$)

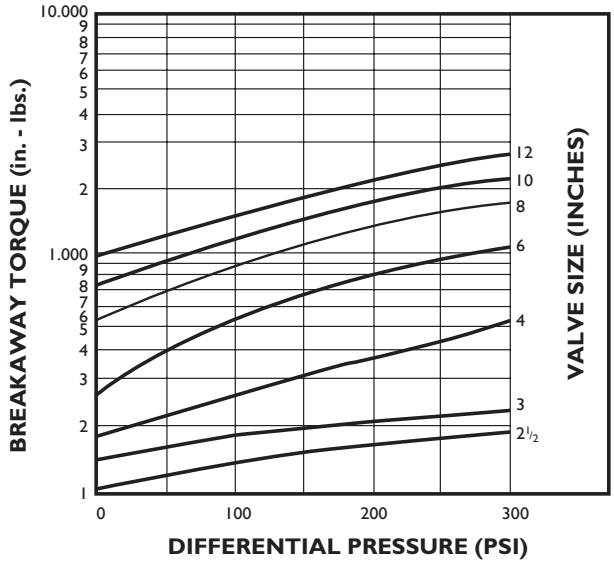
$$Qg = 61\ C_v \sqrt{\frac{P_2\ \Delta P}{g}}$$

Qg = flow rate of gas (CFH at STP)
$P_2$ = outlet pressure (psia)
g = specific gravity of gas: air = 1.000

## Typical Flow Characteristic Curve

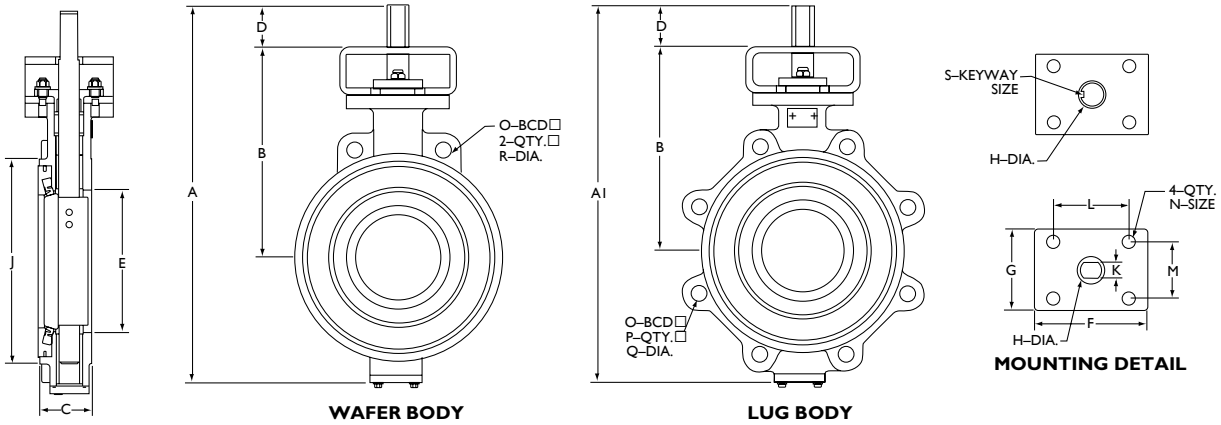



## Valve Breakaway Torque (In. Lbs.)




**Notes:** 1. Selection of actuator torque output must meet or exceed the maximum torque required by the valve.
2. Under certain conditions, hydrodynamic torque can exceed the breakaway torque and must be considered in selection of actuators.

# IFC Series BH150W/L
# Dimensions - Sizes 2 1/2 to 12

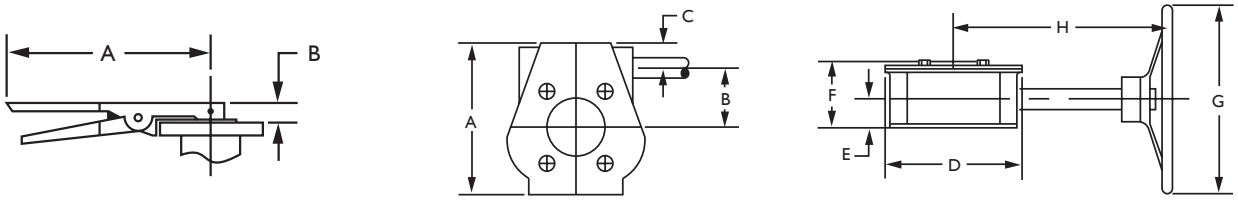



## Valve Dimensions

| Size in (mm) | A in (mm) | A1 in (mm) | B in (mm) | C in (mm) | D in (mm) | E in (mm) | F in (mm) | G in (mm) | H in (mm) | J in (mm) | K in (mm) | L in (mm) | M in (mm) | N in (mm) | O in (mm) | P | Q in | R in (mm) | S in (mm) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2 1/2" | 10.91 | 10.91 | 6.61 | 1.88 | 1 | 2.75 | 3.56 | 2.75 | 0.5625 | 4.41 | 0.375 | 3.25 | 1.50 | 0.35 | 5.5 | 4 | 5/8"-11 UNC | 0.69 | - |
| 65 | 277 | 277 | 168 | 48 | 25 | 70 | 90 | 70 | 14 | 112 | 10 | 83 | 38 | 9 | 140 | | | 18 | |
| 3" | 11.75 | 11.75 | 7.00 | 1.88 | 1 | 3.38 | 3.56 | 2.75 | 0.5625 | 5.19 | 0.375 | 3.25 | 1.50 | 0.35 | 6 | 4 | 5/8"-11 UNC | 0.69 | - |
| 75 | 298 | 298 | 178 | 48 | 25 | 86 | 90 | 70 | 14 | 132 | 10 | 83 | 38 | 9 | 152 | | | 18 | |
| 4" | 13.88 | 14.38 | 8.56 | 2.13 | 1 | 4.31 | 3.56 | 2.75 | 0.6250 | 6.38 | 0.500 | 3.50 | 2.00 | 0.41 | 7.5 | 8 | 5/8"-11 UNC | 0.69 | - |
| 100 | 353 | 365 | 217 | 54 | 25 | 109 | 90 | 70 | 16 | 162 | 13 | 89 | 51 | 10 | 191 | | | 18 | |
| 6" | 16.13 | 16.56 | 9.75 | 2.25 | 1 | 6.25 | 5.31 | 3.75 | 0.8750 | 8.56 | 0.625 | 3.50 | 2.00 | 0.41 | 9.5 | 8 | 3/4"-11 UNC | 0.81 | - |
| 150 | 410 | 421 | 248 | 57 | 25 | 159 | 135 | 95 | 22 | 217 | 16 | 89 | 51 | 10 | 241 | | | 21 | |
| 8" | 18.75 | 19.25 | 10.63 | 2.5 | 1.75 | 8.25 | 5.31 | 3.75 | 1.1250 | 10.63 | 0.875 | 4.00 | 2.50 | 0.56 | 11.75 | 8 | 3/4"-11 UNC | 0.81 | - |
| 200 | 476 | 489 | 270 | 64 | 44 | 210 | 135 | 95 | 29 | 270 | 22 | 102 | 64 | 14 | 298 | | | 21 | |
| 10" | 22.75 | 23.63 | 12.25 | 2.81 | 2.93 | 10.31 | 5.31 | 3.75 | 1.1250 | 12.81 | 0.875 | 4.75 | 3.25 | 0.56 | 14.25 | 12 | 7/8"-11 UNC | 0.94 | - |
| 250 | 578 | 600 | 311 | 71 | 74 | 262 | 135 | 95 | 29 | 325 | 22 | 121 | 83 | 14 | 362 | | | 24 | |
| 12" | 26.25 | 27.38 | 14.38 | 3.19 | 3.03 | 12.25 | 4.93 | 3.75 | 1.2500 | 15.25 | - | 5.00 | 3.50 | 0.69 | 17 | 12 | 7/8"-11 UNC | 0.94 | 0.25x1.38 |
| 300 | 667 | 695 | 365 | 81 | 77 | 311 | 125 | 95 | 32 | 387 | | 127 | 89 | 18 | 432 | | | 24 | |

**Notes:** 1. Quantity P and dimension Q refer to lug style. Dimension R refers to wafer style.
2. Valves are designed for installation between ASME B16.5 Class 150 flanges.
3. Gaskets are required.
4. Dimension H is +/- 0.0008"
5. Dimension K is +/- 0.001"
6. Dimension S is +/- 0.001"

# Manual Actuator Dimensions




## Lever

| Valve Size in (mm) | A in (mm) | B in (mm) | Weight Lb. (Kg) |
|---|---|---|---|
| 2 1/2" - 4" | 10.50 | 1.25 | 2 |
| 65-100 | 267 | 32 | 0.9 |
| 6" - 12" | 14.13 | 1.97 | 5 |
| 150-300 | 359 | 50 | 2.3 |

**Note:** It is recommended that handles be used thru 6" valve size for liquid or rated pressure service. 8" - 12" valves with handles should only be used on gas and low pressure applications.

## Gear

| Valve Size in (mm) | A in (mm) | B in (mm) | C in (mm) | D in (mm) | E in (mm) | F in (mm) | G in (mm) | H in (mm) | Weight Lb. (Kg) |
|---|---|---|---|---|---|---|---|---|---|
| 2 1/2" - 6" | 5.00 | 1.75 | 1.13 | 4.13 | 1.31 | 2.63 | 6.00 | 7.63 | 10.4 |
| 65-150 | 127 | 44 | 29 | 105 | 33 | 67 | 152 | 194 | 4.7 |
| 8" - 12" | 7.00 | 2.63 | 1.38 | 6.00 | 1.69 | 3.38 | 12.00 | 10.57 | 26.5 |
| 200-300 | 178 | 67 | 35 | 152 | 43 | 86 | 305 | 268 | 12 |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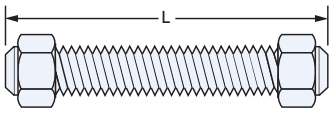
# IFC Series BH150W/L
# Required Bolt Lengths

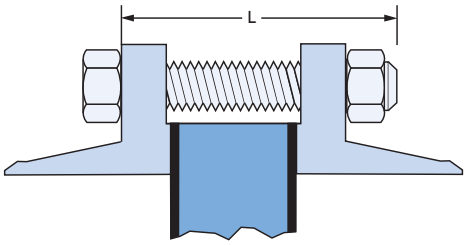
## Wafer- Recommended Flange Bolt Lengths

| Valve Size | Qty. | Bolt Size | Length Of Fasteners (L) Threaded Studs | Bolts |
|---|---|---|---|---|
| 2 1/2" | 4 | 5/8"-UNC | 5 1/8" | 4 5/8" |
| 3" | 4 | 5/8"-UNC | 5 3/8" | 4 5/8" |
| 4" | 8 | 5/8"-UNC | 5 3/8" | 4 7/8" |
| 6" | 8 | 3/4"-UNC | 6 1/8" | 5 3/8" |
| 8" | 8 | 3/4"-UNC | 6 5/8" | 5 7/8" |
| 10" | 12 | 7/8"-UNC | 7 3/8" | 6 3/8" |
| 12" | 12 | 7/8"-UNC | 7 7/8" | 7 1/8" |

**Note:** Bolt lengths are based on ANSI class 150 weld neck flanges per ASME B16.5 and a gasket thickness of 0.13".




THREADED STUDS

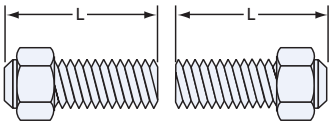



BOLTS

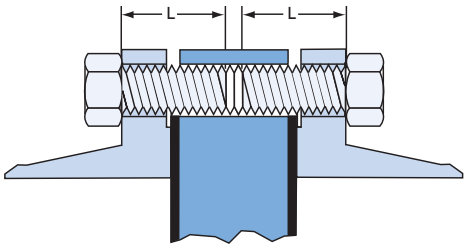
## Lug-Recommended Flange Bolt Lengths

| Valve Size | Qty. | Bolt Size | Length Of Fasteners (L) Threaded Studs | Bolts |
|---|---|---|---|---|
| 2 1/2" | 4 | 5/8"-UNC | 2 5/8" | 2 1/4" |
| 3" | 4 | 5/8"-UNC | 2 3/4" | 2 1/4" |
| 4" | 8 | 5/8"-UNC | 2 7/8" | 2 5/8" |
| 6" | 8 | 3/4"-UNC | 3 1/8" | 2 5/8" |
| 8" | 8 | 3/4"-UNC | 3 3/8" | 2 7/8" |
| 10" | 12 | 7/8"-UNC | 3 3/4" | 3 1/8" |
| 12" | 12 | 7/8"-UNC | 4" | 3 1/2" |

**Note:** Bolt lengths are based on ANSI class 150 weld neck flanges per ASME B16.5 and a gasket thickness of 0.13".




THREADED STUDS




BOLTS

## IFC Series BH150W/L Valve Weights

| Valve Size | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|---|
| Wafer (Lb.) | 12 | 12 | 16 | 30 | 50 | 80 | 150 |
| Wafer (Kg.) | 5.4 | 5.4 | 7.3 | 13.6 | 22.7 | 36.3 | 68.0 |
| Lug (Lb.) | 17 | 17 | 23 | 42 | 70 | 112 | 210 |
| Lug (kg.) | 7.7 | 7.7 | 10.4 | 19.1 | 31.8 | 50.8 | 95.3 |

**Note:** Valve weights refer to valve only.

# IFC Series BH150W/L Installation And Maintenance Instructions

## 1.0 Piping and Flange Considerations

The IFC Series BH150W/L butterfly valves are to be installed between pipeline flanges that conform to ASME B16.5 Class 150. The use of slip-on or weld neck flanges has no effect on the pressure temperature rating of the valves.

## 2.0 Installation

Prior to installation, inspect valve and mating flanges to assure gasket surfaces are free of defects. Remove all foreign material such as weld spatter, oil, grease and dirt from the valve, flanges and pipeline. Do not mount valves between flanges having defective gasket surfaces.

A. Check the distance between pipe flanges to ensure clearance for valve. Check piping for proper alignment.

B. Place valve so that the disc has been positioned to a partially open position, with the disc edge about $^{1}/_{4}$" to $^{3}/_{8}$" from the face of the seat (approximately 10° open). In general, IFC recommends that the valve be installed with the stem in the vertical position and the actuator mounted directly above the valve.

C. Check valve for proper alignment
- On wafer valves, visually center the valve with respect to the flange faces.
- Center lugged valves with the flange bolting. Never use lugged butterfly valves to align improperly positioned piping.

D. Operate the valve to assure that no binding or interference exists.

E. Tighten flange bolting evenly in a crisscross pattern. The flange joint is complete when there are no gaps between the valve body and the flange faces. Bolting should then be tightened sufficiently to prevent loosening.

The following additional procedures should be observed when installing butterfly valves between welding flanges.

A. Assemble inlet and outlet flanges to the valve body and tighten.

B. Align the flange/body/flange assembly to the pipe in which the valve is being installed.

C. Tack weld flanges to the pipe.

D. After tack welding, remove the bolts and valve from the pipe flanges and complete the welding of the valve installation flanges.

**Important:** To prevent seat damage, allow the flanges to cool before final installation of the butterfly valve.

## 3.0 Valve Removal

**Warning: Pipeline pressure can cause personal injury or equipment damage. Relieve pipeline pressure before loosening flange bolts and disable/lock valve actuator before valve removal.**

A. Discontinue pipeline flow, relieve pressure where the valve is located in the pipeline and close the valve.

B. If the actuator is powered, disconnect and lock out the power to prevent accidental operation of the actuator.

C. Support the valve and remove the mounting bolts or studs.

D. Carefully lift the valve from the pipeline.

## 4.0 Operation

The IFC Series BH150W/L operates such that clockwise rotation of the valve shaft closes the disc into the seat.

A. SHAFT SEAL: The shaft seal consists of Teflon packing that is contained and compressed by the packing gland. If the packing leaks, tighten the two adjustment nuts on top of the packing gland. If tightening cannot stop the leak replace the packing.

B. DISC SEAT: The disc seat is constructed from Teflon and has a bellow shaped cross-section. A seat retainer that utilizes circumferential snap springs to hold the seat retainer in place retains the seat. The benefit to this design is that there is no interruption across the full gasket-seating surface, thus eliminating any potential emission leak path. If the seat requires replacement place the valve in the horizontal position with the seat retainer side upwards. Remove the seat retainer by rotating it counter clockwise. Rotate the disc clockwise into the closed position and remove the damaged seat. Clean the seat chamber machined into the body and install the new seat. Ensuring that the circumferential snap rings are positioned correctly place the seat retianer into the seat chamber and rotate clockwise until the snap rings engage. Seat replacement is complete.

## 5.0 Maintenance

The many IFC features minimize wear and maintenance requirements. IFC Series BH150W/L valves require no periodic maintenance or lubrication. IFC does recommend the following actions on a monthly basis:

A. Operate the valve from full open to full close to assure operability.

B. Check bolting for evidence of loosening and correct as required.

C. Inspect flange faces and valve stem for signs of leakage. Tighten packing gland if necessary.

D. Check piping and related accessories (i.e. actuator) for looseness, corrosion or defects. Correct as required.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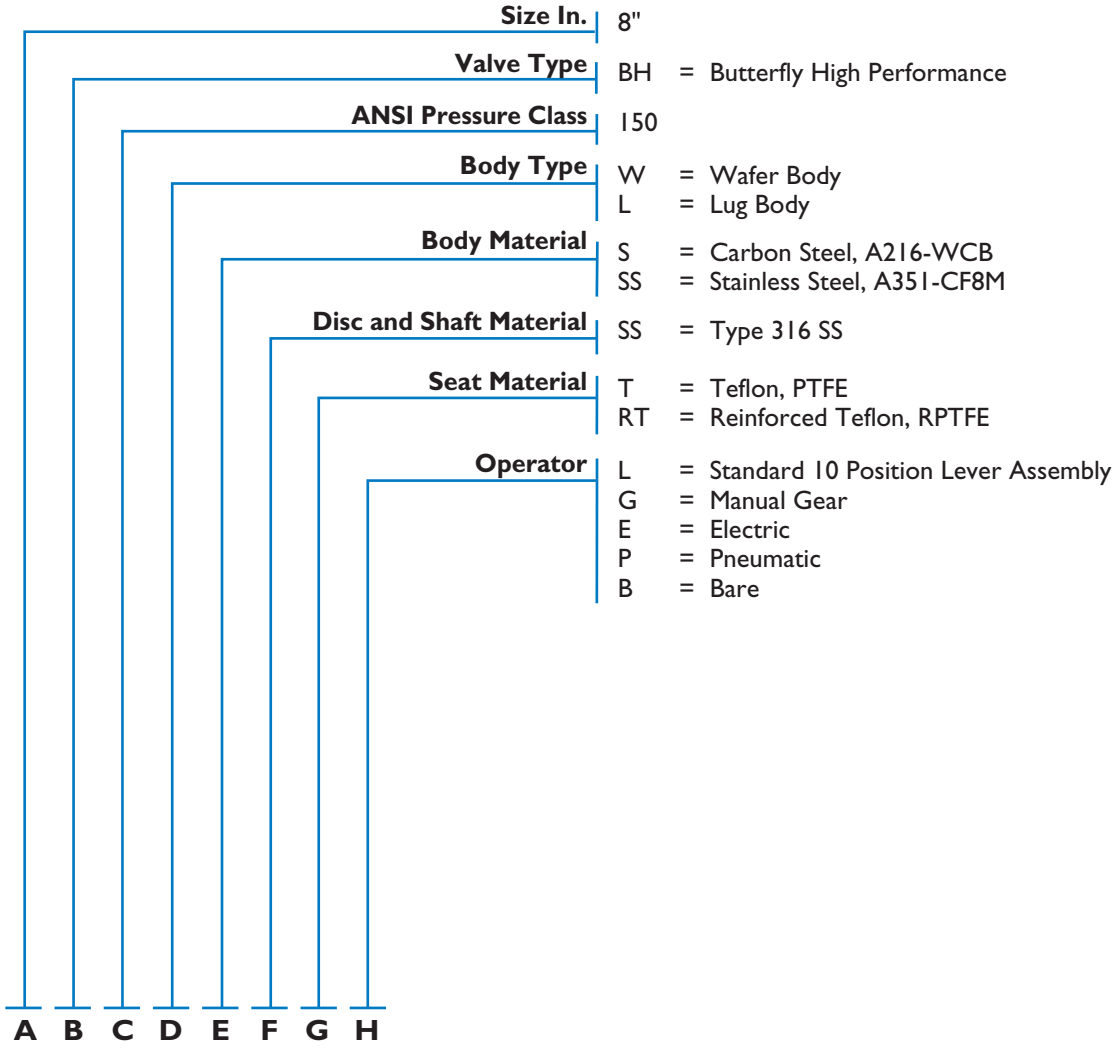
Size In.
8"
Valve Type
BH = Butterfly High Performance
ANSI Pressure Class
150
Body Type
W = Wafer Body
L = Lug Body
Body Material
S = Carbon Steel, A216-WCB
SS = Stainless Steel, A351-CF8M
Disc and Shaft Material
SS = Type 316 SS
Seat Material
T = Teflon, PTFE
RT = Reinforced Teflon, RPTFE
Operator
L = Standard 10 Position Lever Assembly
G = Manual Gear
E = Electric
P = Pneumatic
B = Bare
A B C D E F G H