



**Flange Requirements:**

DEI's resilient seated (RS) valves are designed for installation between ANSI Class 125/150 flat or raised faced flanges. Gaskets are not required. Lined pipe, heavy wall pipe or flanges must have a minimum allowable inside diameter at the centered body face to clear the disc sealing edge when opening the valve.

**Storage:**

The valves should be stored on a pallet or "skid" in a clean, dry location.

**Service Locations:**

For service or technical information, please contact us: Toll free (877)334-2875, e-mail: mail@DEIcontrols.com or at our website: deicontrols.com.

**Maintenance - Resilient Seated Valves:**

Routine maintenance or lubrication is not required. Periodic cycling of the valve is highly recommended.

**Insulation Instructions:**

All control valves must be fully insulated appropriate for the application.

**Direct Mount Actuator Applications:**

RE actuator direct mount applications are designed for chilled water and hot water less than 170°F. For high temp applications consult the factory regarding the application, bracket and valve orientation.

**Valve Operation**

All Series B Butterfly Valves are 1/4 turn operation. Turning the valve 90° will fully open or close the valve. When the flats on the stem are parallel to the pipe, the valve is open. When the flats are perpendicular to the pipe, the valve is closed. All of our Series B Butterfly Valves provide bubble-tight shut-off.

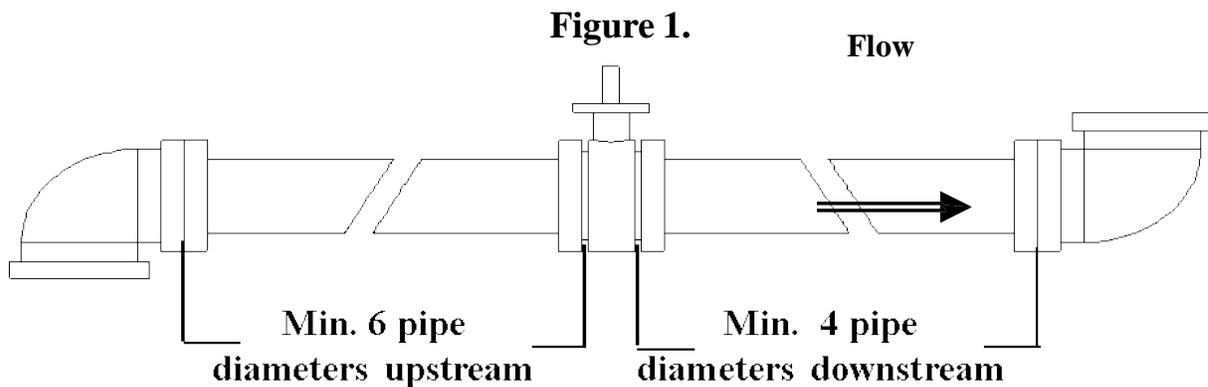
The actuator must be selected for maximum break-away torque appropriate for the line pressure, media and location. (Certain highly viscous or abrasive services or installation locations could cause an increase in torque requirements).



## Installation Instructions:

For the best results in slurry service regarding sedimentation, position the valve assembly so that the valve stem is in the horizontal position and the lower disc edge opens downstream. This will create a self-flushing effect, thereby extending the service life of the valve. (See Figure 3 on Page 10).

Consideration should be given to the location of the valves in the piping system. The valve should not be placed too close to other valves, elbows, etc. as its performance and torque requirements may be affected. It is recommended that the valve have a minimum of six pipe diameters upstream (see Figure 1) and four pipe diameters downstream between it and other valves, elbows, etc. in the piping system. (See Figures 4 - 10 on pages 10 - 12 for pump applications, elbows, pipe reduction and other special applications).



### Installation in New Construction Using ANSI Welding Type Flange:

1. With the disc in the nearly closed position, align and center the companion flange bolt holes to the body lug holes.
2. Assemble the body and flanges with the flange bolting and mate-up the bolting using the flange-body-flange assembly for fit-up and centering to the pipe.
3. Tack weld the flanges to the pipe.
4. Remove the flange bolting and valve assembly from between the flanges.  
*Note: Do not finish weld the flanges to the pipe with the valve bolted between the flanges as this will result in serious heat damage to the valve seat.*
5. Finish welding the flanges to the pipe and allow the flanges to cool completely before proceeding.
6. Follow steps on pages 3-7 for installation between Pre-existing ANSI Flanges.



## Lug Butterfly Valve

- 1) Thoroughly clean and prepare the piping system before valve installation.
- 2) Inspect the valve port and seating surfaces for cleanliness just prior to installation.
- 3) Support the valve to prevent unnecessary stresses induced by connecting pipe.
- 4) Be sure the rating of the valve is compatible with the intended service conditions.
- 5) Operate the valve from the open to closed position.
- 6) These butterfly valves are designed for installation between Class 125 cast iron or Class 150 flanges. Resilient seated butterfly valves do not require gaskets for installation.
- 7) The valve should be installed with the disc in the almost closed position. It is recommended that butterfly valves on horizontal pipelines have the stem in the vertical position, unless it is a high temperature application, in which case the valve and actuator should be tilted over on its side so that the stem is horizontal. Call DEI for more information.
- 8) Prior to tightening any flange bolts, the valve should be carefully cycled to the open position to check for possible disc interference. Interference may occur when the butterfly valve is installed on systems using pipe that has extra heavy wall thicknesses. Corrective action would include tapering the pipe ID, or the use of spool pieces.
- 9) Center the valve between the flanges, small valves may be supported by hand; larger valves may require a strap or lifting device. (This is to ensure raised face flanges contact the valve properly, concentric and metal-to-metal all around except for 2-1/2" and smaller. For wafer valves, spacers over threaded rod on the bottom may be used to support/center the valve.)
- 10) Lug valves should be installed using the crossover method for tightening. See page 5 for bolt size and tightening information. This distributes the bolt loads evenly across the valve. **Do not over-tighten the bolts.** In dead end service (lug only) the side of the valve marked "INLET" should face the pressure side of the system. For safety, a downstream flange is recommended.
- 11) For hand operated valves, verify the travel stops after installation. Adjust as necessary. For automated valves, manually over-ride the valve and check its rotation from full open to the closed position. The torque required should be smooth without any binding. Do not force or over-torque the actuator manual over-ride shaft or damage will occur. If any binding is present, loosen then retighten the valve until the torque required to close the valve is smooth.  
For pneumatic actuators without manual override, appropriate air pressure is required to check the rotation of the valve as indicated above.



## Wafer Butterfly Valve

- 1) Thoroughly clean and prepare the piping system before valve installation.
- 2) Inspect the valve port and seating surfaces for cleanliness just prior to installation.
- 3) Support the valve to prevent unnecessary stresses induced by connecting pipe.
- 4) Be sure the rating of the valve is compatible with the intended service conditions.
- 5) Operate the valve from the open to closed position.
- 6) These butterfly valves are designed for installation between Class 125 cast iron or Class 150 flanges. Resilient seated butterfly valves do not require gaskets for installation.
- 7) Wafer butterfly valves should be centered between the flanges by installing bolts through the alignment lugs and rotating the valve into position. There should be full and even contact between the elastomer and the flange face. The valve should be installed with the disc in the almost closed position. It is recommended that butterfly valves on horizontal installations have the stem in the vertical position, unless it is a high temperature application, in which case the valve and actuator should be tilted over on its side so that the stem is horizontal. Call DEI for more information. Never force the valves into place if flange spacing is incorrect as damage can occur to the elastomer.
- 8) Prior to tightening any flange bolts, the valve should be carefully cycled to the open position to check for possible disc interference. Interference may occur when the butterfly valve is installed on system using pipe that has extra heavy wall thickness. Corrective action would include tapering the pipe ID, or the use of spool pieces.
- 9) Tighten the bolts to obtain metal to metal contact between the body and the flange. Consult the catalog for bolt or cap screw length and diameter. See page 5 for bolt size and tightening information.
- 10) For hand operated valves, verify the travel stops after installation. Adjust as necessary. For automated valves, manually over-ride the valve and check its rotation from full open to the closed position. The torque required should be smooth without any binding. Do not force or over-torque the actuator manual override shaft or damage will occur. If any binding is present, loosen then retighten the valve until the torque required to close the valve is smooth.  
For pneumatic actuators without manual override, appropriate air pressure is required to check the rotation of the valve as indicated above.



### B Series Resilient Seated Butterfly Valve Bolt Torques

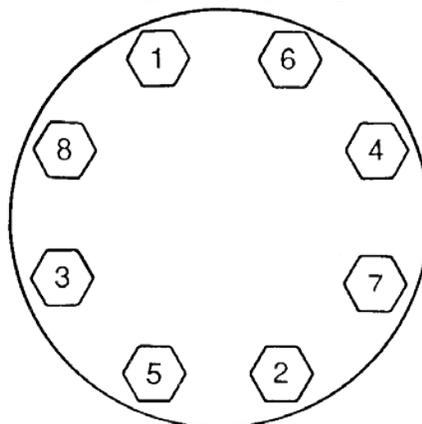
Evenly tighten the bolts to obtain a metal to metal contact between the body and the flanges.

The following is a range of recommended torque figures.

Over-tightening or uneven tightening can cause undue stresses in the valve body and can increase the torque required to turn it.

Valve Size	Bolt Size	Torque (In-Lbs)	Torque (Ft-Lbs)
2"	5/8-11	80	7
2 1/2"	5/8-11	80	7
3"	5/8-11	80	7
4"	5/8-11	80	7
5"	3/4-10	118	10
6"	3/4-10	118	10
8"	3/4-10	118	10
10"	7/8-6	164	14
12"	7/8-6	164	14
14"	1-8	215	18
16"	1-8	215	18
18"	1-1/8-7	262	22
20"	1-1/8-7	262	22
24"	1-1/8-7	262	22

**Figure 2.**  
**Bolt Tightening Sequence**





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## High Performance Butterfly Valve

Dodge Engineering's Series B High Performance Butterfly Valve is designed to fit between standard ANSI flanges, Class 150 lb. and 300 lb., meeting ANSI B16.5 flange specifications. Use gaskets suitable for the line media, 1/16" or less thickness sheet gasket meeting the dimensional requirements of ANSI B16.21. Do not use thick elastomeric gaskets.

### *Pre-Installation*

- Inspect the valve to be certain the waterway is free from dirt and foreign matter such as dust, pipe-scale, welding slag, etc.
- Note the valve's open and closed positions to assure that necessary clearance is available when installed.
- Rotate the valve disk, ensuring the valve will open and close properly.
- Check the valve identification tag for valve class materials and operating pressure to be sure they are correct for the application.
- **WARNING:** Personal injury or property damage may result if the valve is installed where service conditions could exceed the valve ratings.
- Check the flange bolts or studs for proper size, threading, type and length.
- See Page 2 for control valve/actuator orientation.

### *Installation*

Our Series B High Performance Butterfly Valve can be installed in the pipeline with the shaft in the vertical, horizontal or other intermediate diagonal position, based on the application. However, in mediums with concentrations of solid or abrasive particles or media subject to solidification buildup, valve performance and service life will be enhanced by mounting the valve with the shaft in the horizontal position. When installing flange bolts, initially tighten bolts in the star pattern. Apply final target torque to bolts in the sequential pattern. Bolts should be tightened to the appropriate torque as specified by SAE for the bolting material used. Although Series B High Performance Valves are designed for bi-directional service, the preferred installation is with the seat retainer installed down stream of system pressure. It is always recommended to install a blind flange downstream on dead-end service regardless of valve design or service conditions.

**WARNING:** As the case with most valves, stem seals may require periodic adjustment, therefore, installation that does not allow access to the valve stem should be avoided.



## High Performance Butterfly Valve cont.

### *Maintenance*

Our Series B High Performance Butterfly Valves are low maintenance valves during normal service. Periodic stem packing adjustment may be required. If necessary, tighten the packing nuts equally just until the leakage stops. **DO NOT OVERTIGHTEN AS PREMATURE WEAR COULD RESULT.** Stem leaks should not go unattended. Lack of maintenance of stem leakage could cause a premature need to replace stem seals.

If the operating temperature of system is substantially higher or lower than 80°F, initial stem seal adjustment may be required.

### *Removal of Valve*

In all cases relieve line pressure. Most High Performance Butterfly Valves can trap fluid in the valve cavities when closed (regardless of manufacturer). If the valve has been used to control a hazardous media, the following steps must be taken prior to removal from the line and disassembly. Place valve in its half-open position and flush the line to remove the hazardous material from the valve cavities.

**CAUTION:** Always fully close valve before removing from line to avoid damage to disc.

**NOTE:** Always advise maintenance personnel when they are maintaining or rebuilding a valve that has been in contact with hazardous material. Proper protective clothing and eye protection should always be utilized.

### *Common Problems/Troubleshooting*

#### *Shaft Leakage*

- Tighten the gland retainer nuts, just enough so the leakage stops.
- Replace the gland packing if the leakage does not stop.

#### *Leakage between flange and valve*

- Tighten flange bolts.
- Replace flange gasket if the leakage does not stop.

#### *Leakage through valve seat*

- Ensure the valve is fully closed (check handle/stem position or adjust operator stops).
- Cycle valve to clear debris.



# Flange Bolting

Note: 10” through 24” Wafers have blind holes tapped each side of shaft, thus requiring capscrews or shorter studs. Numbers in parenthesis ( ) reflect quantities needed.

## 150 Class

150 Class	Flanged Data		Wafer Style		Lugged Style	
	Valve Size	No. of Holes	Thread Size	Bolt / Nut / Capscrew	Stud / Nut & Stud / Nut	Capscrew
3	4	5/8-11	(4) 4.75 / NA	(4) 5.25 / NA	(8) 2.00	(8) 2.50
4	8	5/8-11	(8) 5.00 / NA	(8) 5.50 / NA	(16) 2.00	(16) 2.75
5	8	3/4-10	NA	NA	(16) 2.00	(16) 2.75
6	8	3/4-10	(8) 5.25 / NA	(8) 6.00 / NA	(16) 2.00	(16) 2.75
8	8	3/4-10	(8) 6.00 / NA	(8) 6.75 / NA	(16) 2.50	(16) 3.25
10	12	7/8-9	(8) 6.25 / (8) 2.50	(8) 7.25 / (8) 3.25	(24) 2.50	(24) 3.25
12	12	7/8-9	(8) 6.75 / (8) 3.00	(8) 7.75 / (8) 3.75	(24) 3.00	(24) 3.75
14	12	1-8	(10) 7.75 / (4) 3.25	(10) 8.75 / (4) 4.25	(24) 3.25	(24) 4.25
16	16	1-8	(12) 8.25 / (8) 3.25	(12) 9.25 / (8) 4.50	(32) 3.25	(32) 4.50
18	16	1 1/8-8	(12) 9.00 / (8) 3.75	(12) 10.25 / (8) 5.00	(32) 3.75	(32) 5.00
20	20	1 1/8-8	(16) 9.75 / (8) 4.25	(16) 11.00 / (8) 5.50	(40) 4.25	(40) 5.50
24	24	1 1/4-8	(16) 11.25 / (8) 5.00	(16) 12.75 / (8) 6.25	(40) 5.00	(40) 6.25

## 300 Class

2 1/2	8	3/4-10	NA	NA	(16) 2.00	(16) 2.75
3	8	3/4-10	(8) 5.25 / NA	(8) 6.00 / NA	(16) 2.25	(16) 3.00
4	8	3/4-10	(8) 5.75 / NA	(8) 6.50 / NA	(16) 2.50	(16) 3.25
5	8	3/4-10	(12) 6.00 / NA	(8) 6.75 / NA	(16) 2.50	(16) 3.25
6	12	3/4-10	(12) 6.25 / NA	(12) 7.00 / NA	(24) 2.50	(24) 3.25
8	12	7/8-9	(12) 7.50 / NA	(12) 8.75 / NA	(24) 3.25	(24) 4.00
10	16	1-8	(12) 8.50 / (8) 3.50	(12) 9.50 / (8) 4.50	(32) 3.50	(32) 4.50
12	16	1 1/8-8	(12) 9.25 / (8) 3.75	(12) 10.25 / (8) 5.00	(32) 3.75	(32) 5.00
14	20	1 1/8-8	(16) 10.50 / (8) 4.50	(16) 11.50 / (8) 5.50	(40) 4.50	(40) 5.50
16	20	1 1/4-8	(16) 11.50 / (8) 4.75	(16) 13.00 / (8) 6.00	(40) 4.75	(40) 6.00

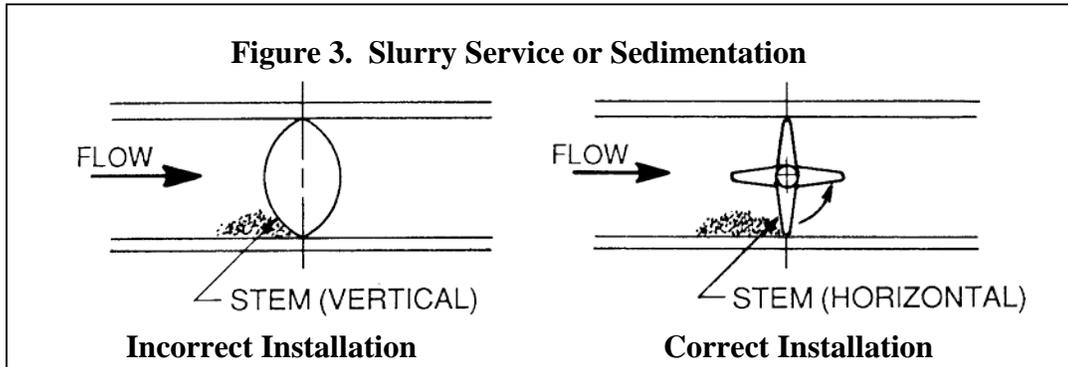


## Troubleshooting

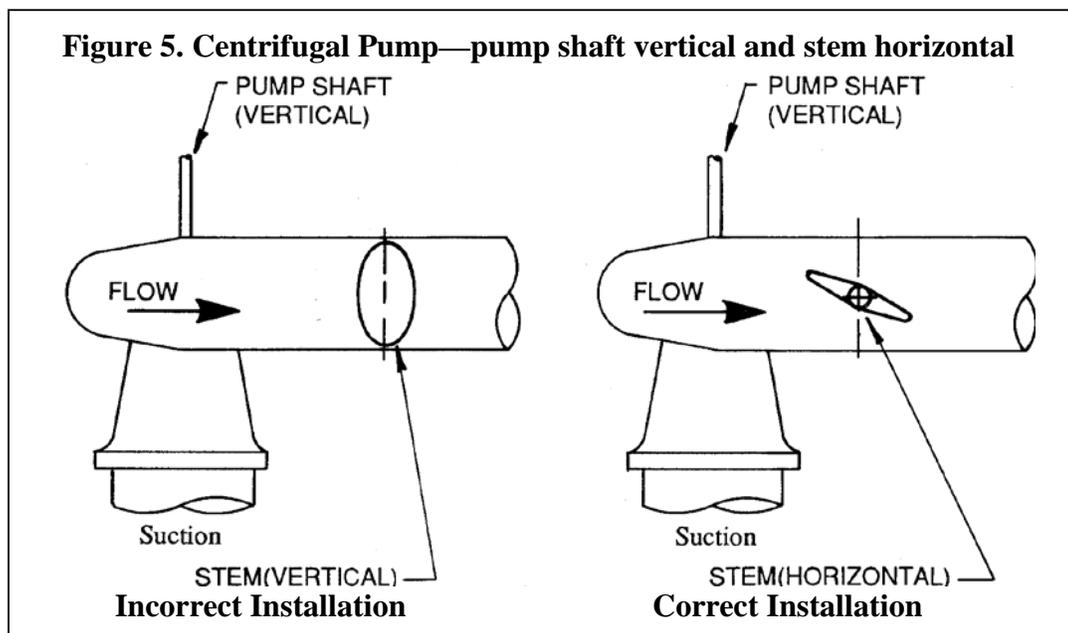
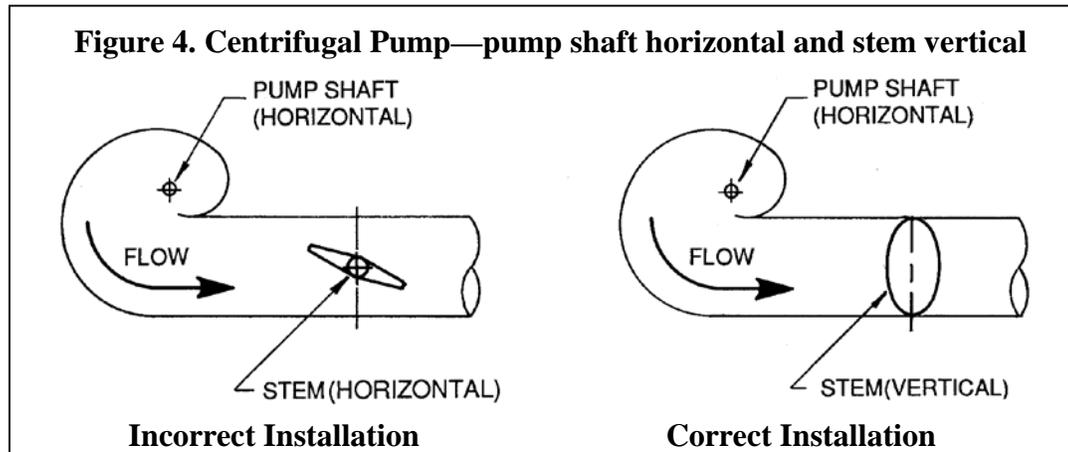
Symptom	Probable Cause	Solution
<b>Excessively High Torque</b>	1. Pinched Seats: A. Flange bolts are not evenly torqued. B. Over-torqued bolts. C. Flanges not parallel when bolted.	1. Loosen the Flange Bolts around valve. Manually spin disk through butterfly valve a couple of times to attempt to reshape the seat. Tighten the Flange Bolts in the proper sequence (see Page 5) to correct torque per ANSI requirements. Note: If valve face seal has been damaged, or if the valve has been installed incorrectly for an extended period of time and this does not help, the valve may need to be replaced. (Call DEI)
	2. Valve installed too close to an elbow, strainer, pipe reduction or other obstruction.	2. Either change piping, change the location of the valve or upgrade the torque of the actuator.
	3. Valve oriented in incorrect position for the application.	3. See Page 10. Reinstall valve to the correct position.
	4. Obstruction in the pipeline.	4. Remove valve from pipeline and remove the obstruction.
	5. Valve stem or disc bent.	5. Return valve to factory for disc/stem replacement (check for water hammer or freezing of line material).
	6. Scale build-up on stem or seat or valve sitting in one position for a long period of time.	6. Open and close the valve several times. Operate the valve at least once a week. Check the valve seat for deterioration. Flush system periodically and ensure proper chemical treatment program is implemented on a consistent basis. Excessive addition of system chemicals at one time may coat the surfaces of the valve seats and disks, (i.e. once a year water treatments).
	7. Improper pipe supports.	7. Add pipe supports.
	8. Improperly welded flanges (NOT perpendicular).	8. Re-weld flange properly.
<b>Leakage in the Closed Position (Leakage in the Pipeline)</b>	<b>The Disc is not closing fully:</b> 1. Actuator is not adjusted properly.	1. Refer to Actuator Adjustment procedures in RE Troubleshooting Guide.
	2. Line pressure exceeds control valve's rated close-off pressure.	2. Reduce line pressure to control valve's rated close-off pressure or upgrade the torque of the actuator.
	3. Excessively high torque.	3. See Excessively High Torque above.
<b>Leakage Past the Flange Face</b>	1. Flange bolts are not evenly torqued.	1. Loosen the Flange Bolts and tighten the Flange Bolts to correct torque per ANSI requirements. (See Page 5)
	2. Improper Flanges.	2. Refer to "Flange Requirements" on Page 1.
<b>Valve opens only a few degrees and stops (it will not open to the full angle desired)</b>	1. Improper Installation. The valve is improperly aligned.	1. Loosen the flange bolts, realign the valve with flanges, and retighten the flange bolts to correct torque per ANSI requirements. (See Page 5)
	2. The actuator torque has been exceeded (See RE Troubleshooting Guide).	
<b>Water Hammer or Vibration</b>	1. The valve is closing too quickly.	1. Adjust the Actuator speed if possible, or change control signal rate of speed.
	2. Valve Orientation	2. See Pages 10-13.



### Installation Illustrations (Do's and Don'ts)

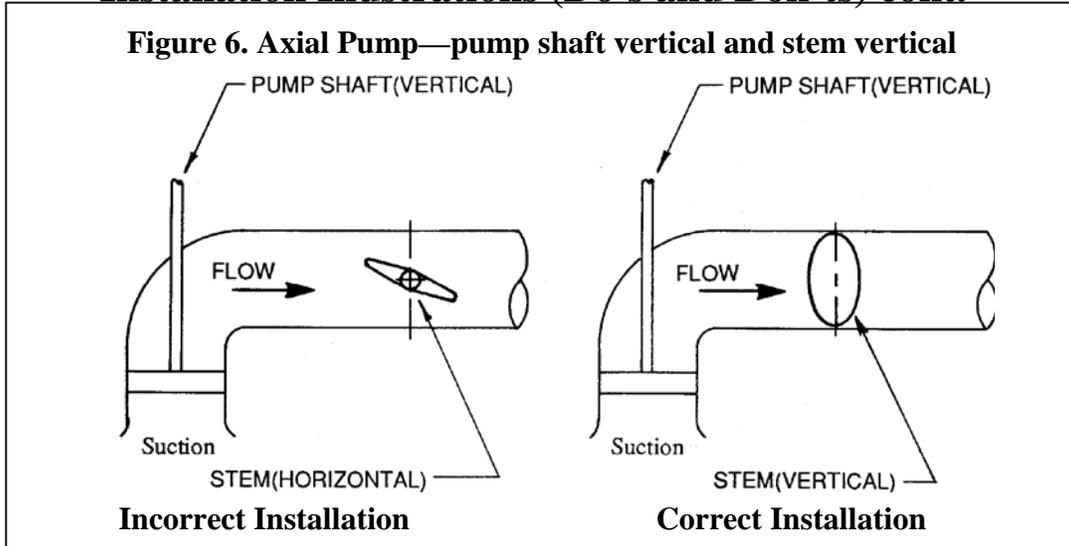


**Note Butterfly Valves Located at the Discharge of a Pump**  
(See Page 2 for distance between pump and valve)

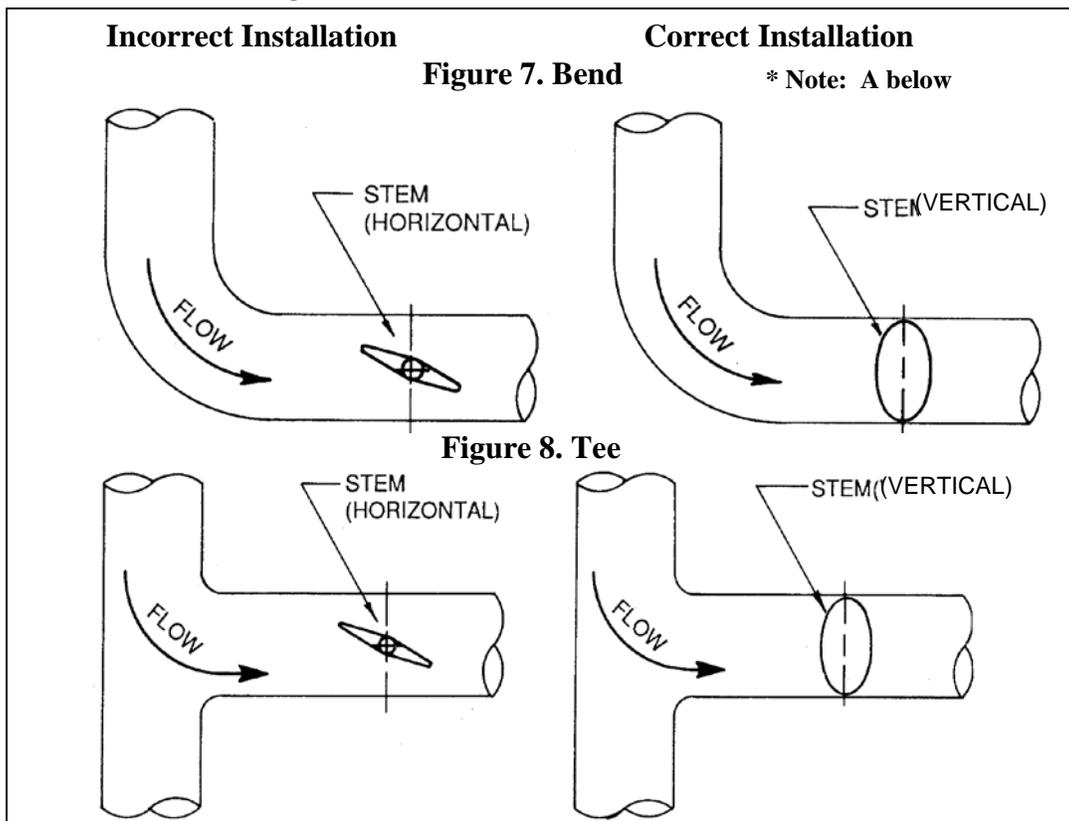




**Installation Illustrations (Do's and Don'ts) cont.**



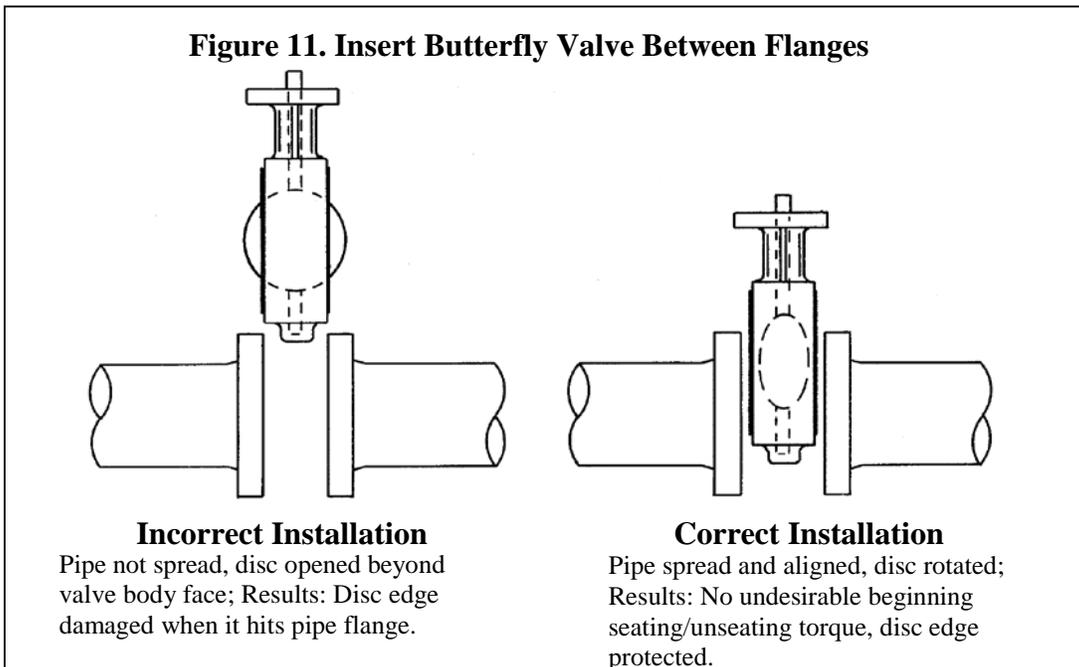
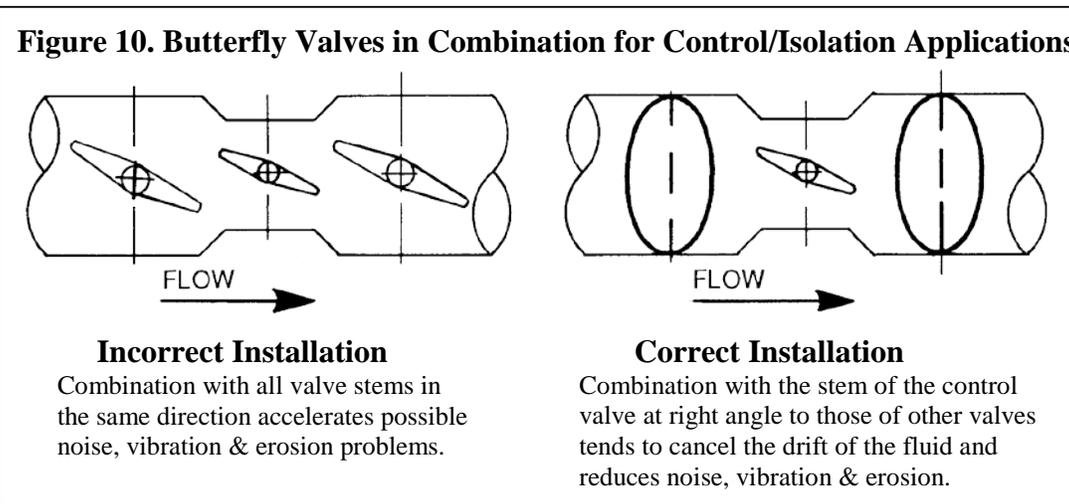
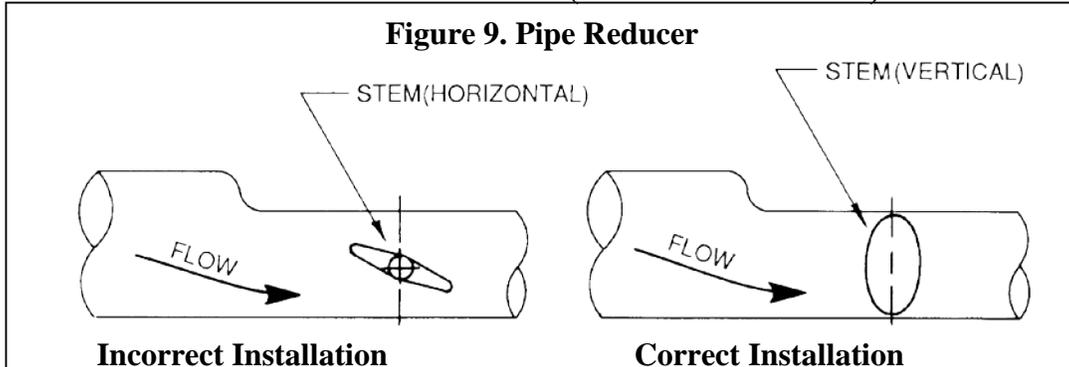
**Note Butterfly Valves Located Downstream of a Bend or Pipe Reducer  
(See Page 2 for distance between bend/tee and valve)**



\* Note A: Locating the valve next to the elbow will significantly increase the torque required to turn the valve and may subject the valve to high vibration. To minimize the torque requirements and vibration, see Figure 1 on Page 2.

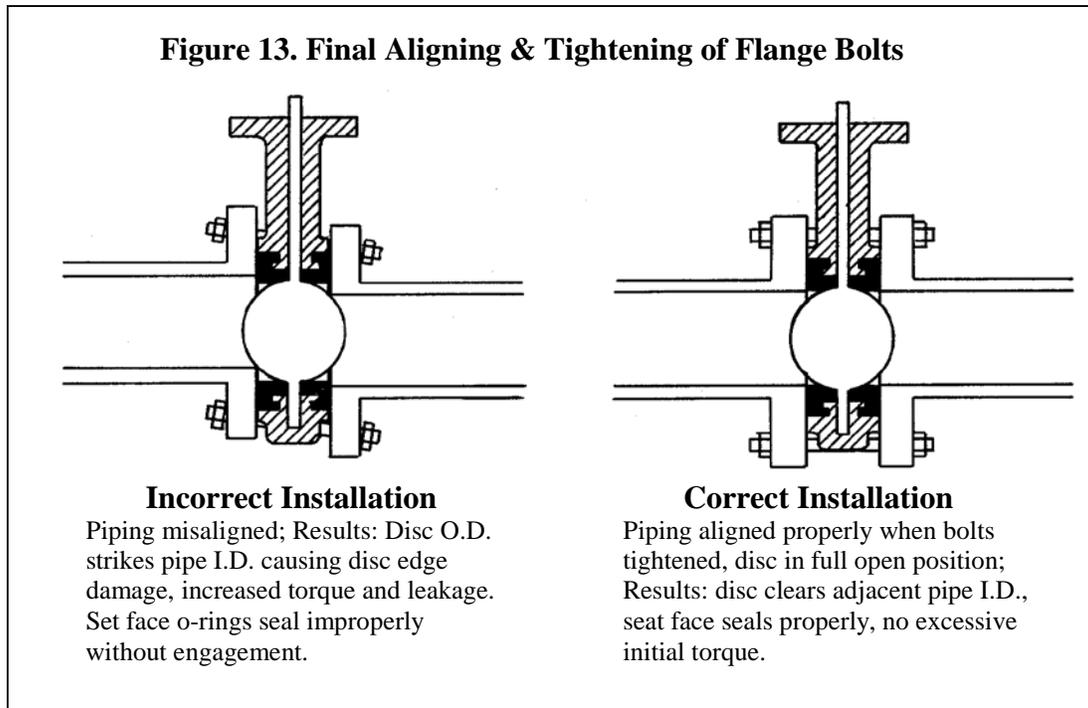
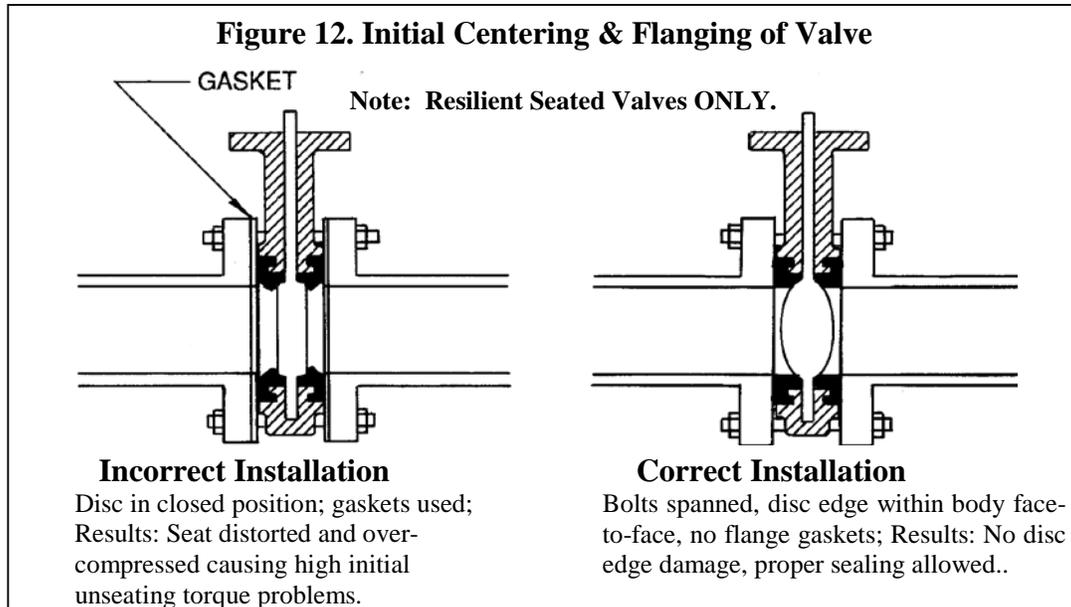


### Installation Illustrations (Do's and Don'ts) cont.



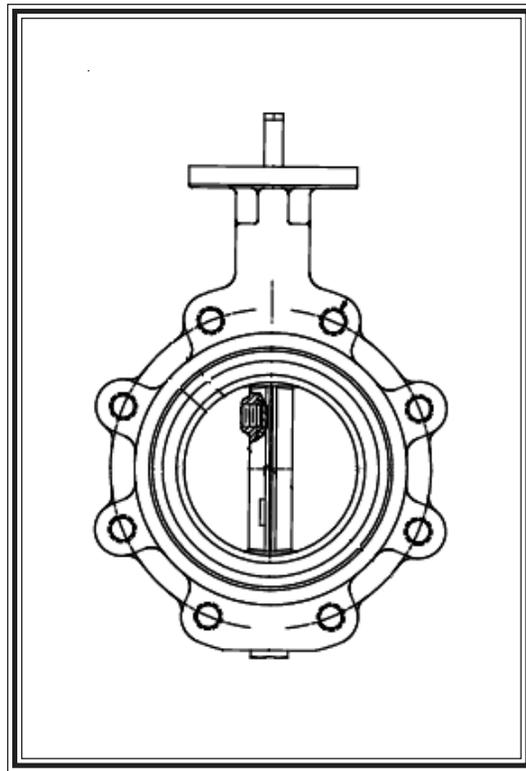


## Installation Illustrations (Do's and Don'ts) cont.





# BUTTERFLY VALVES



## INSTALLATION AND MAINTENANCE MANUAL Series B



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