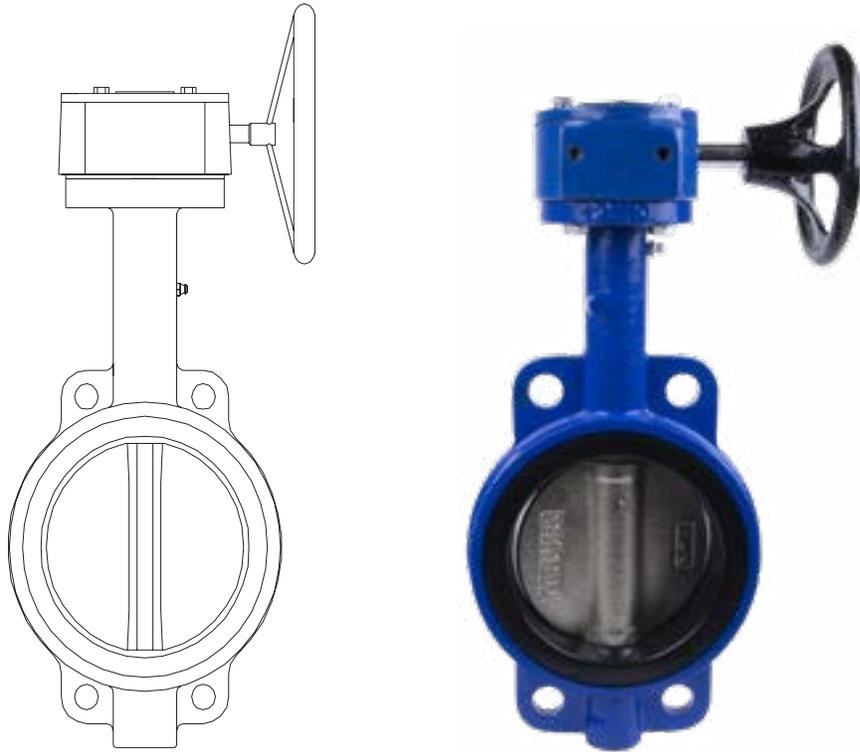


# Butterfly Valves Installation, Operation, & Maintenance Guide



# Installation, Operation, & Maintenance - BV/BV-D Butterfly Valves

## PREFACE

The following information should be followed in addition to the requirements set forth by an on-site, process engineer or professional pipe fitter. API recommends that only experienced, skilled personnel be allowed to install and maintain the API “BV” style butterfly valves and valve extensions.

## GENERAL INFORMATION

API “BV” butterfly valves are designed for installation between ANSI Class 125/150 flat or raised face flanges to regulate flow in a pipeline. Gaskets are not required. Lined pipe, heavy wall pipe, or flanges must have a minimum allowable inside diameter at the center body face to clear the disc sealing edge when opening the valve.

The disc, positioned in the center of the pipe, rotates so that the valve can be opened, closed, or partially opened (with 10 total locking position options).

Prior to selection, double-check the performance limits of the butterfly valves against the anticipated operating conditions including the following:

1. Material compatibility of the seat, disk, and body with the media.
2. Maximum start-up, test, and working pressure.
3. Maximum temperature.
4. Other operating conditions/media - including flow rates, viscosity... etc.
5. Space requirements for correct installation.

Butterfly valves should not be subjected to operating conditions beyond the capacity for the service recommendations of API International.

## UNPACKING & INSPECTION

Upon receipt of API “BV” butterfly valve product, we recommend the following unpacking & inspection procedures:

All valves are packaged and shipped in a manner designed to prevent damage during transportation. If obvious external damage to the shipping container or package is evident upon receipt of the product, please request a representative of the shipping carrier be present prior to unpacking the product.

Remove all packing materials surrounding the valve and carefully lift it from the container. Caution, for large or heavy valves, the appropriate material for handling equipment must be used to prevent injury and/or possible damage to the valve. API recommends keeping the shipping container and all packing material for reuse in storage or reshipment.

Visually inspect valves for any signs of damage including scratches, loose parts, broken parts, or any other physical damage that may have occurred during shipment. If damage is observed, immediately file a claim with the shipping carrier. Butterfly valves that are damaged during transportation are the responsibility of the customer.

# Installation, Operation, & Maintenance - BV/BV-D Butterfly Valves

## UNPACKING & INSPECTION (Continued)

Inspect further to confirm that there are no pieces of packaging left on the valve that could interfere with its operation.

If valves are not going to be installed immediately, they should be stored indoors in a clean, dry, corrosion-free environment without direct exposure to sunlight. The discs should remain in the nearly closed position to protect the sealing edge and to prevent distortion of the resilient seat. No other maintenance during storage or use is required.

## INSTALLATION

### Pre-Installation Information/Checklist:

1. Ensure working conditions (pressure and temperature) are within the specified capacity of the product being installed.
2. Make sure that the construction material of the butterfly valve is chemically compatible with the media flowing in the pipeline.
3. Inspect the valve's flange ends and the pipeline's mating flanges to ensure the surfaces are clean and free of defects. The pipeline should also be checked for proper alignment. API butterfly valves should never be utilized to realign an existing piping system.
4. The distance between pipe flanges should be checked to assure sufficient clearance for valve installation.
5. The appropriate material handling equipment should be available to lift larger valves into position.
6. API butterfly valves are bi-directional and may be installed with flow in either direction, vertically, or horizontally. If a choice of stem position exists, the valve should be installed with the stem in the horizontal position; this will minimize seat wear by distributing the stem and disc weight evenly. Also, if the media is abrasive, the horizontal stem position creates a self-flushing effect that will extend the service life-expectancy of the valve.
7. Check that the existing pipe sizes match the inlet and outlet sizes of the unit being installed and that no interference exists. If pipeline strain is a concern with larger valves (due to weight), additional support may be necessary.
8. Since the rubber seat also functions as the seal between the flanges, additional gaskets are not required.
9. If possible, butterfly valves are recommended to be installed a minimum of six (6) pipe diameters from upstream components, and a minimum of four (4) pipe diameters from downstream components.

### Installation Procedure:

1. Install lever (for manual operated valve) or hand-wheel (for gear operated valve).
2. Using lever or hand-wheel, turn (clockwise) to ensure valve is in full closed position. Disc should be aligned parallel to the ends.
3. If disc is not aligned parallel to the ends, for lever style - slightly loosen top plate (by loosening 2 bolts), turn lever clockwise until disc is centered & parallel to ends, and retighten top plate. For gear operated valve, adjust hex nuts on side of gearbox. Fully open and close disc several times to assure proper operation. If re-alignment is necessary, repeat.
4. Proceed with valve installation into piping system. Note that "wafer" style valves are placed between flanges and installed with fully threaded studs, whereas tapped "lug" style valves are installed between flanges with small cap screws on the inlet and the outlet of the valve.
5. Spread the mating flanges to exceed the valve's face-to-face dimension by  $\frac{3}{16}$ " before placing the valve into position to prevent distortion and/or damage to the sealing face of the seat.

# Installation, Operation, & Maintenance - BV/BV-D Butterfly Valves

## Installation Procedure (continued):

6. Ensure that the pipe flange faces are clean of any foreign material such as scale, metal shavings or welding slag.
7. With disc in the closed position, carefully insert between the flanges, line up, and center. Note that accurate centering between upstream and downstream pipe ends is essential for trouble-free operation of the valves.
8. While gradually removing the flange spreader and verifying that the valve is centered to the flanges, secure by hand-tightening flange bolts.
9. Open the valve slowly to the full open position to assure free unobstructed disc movement and that there is no contact with the piping or mating flanges. Note that disc interference may result when valves are installed in pipelines having smaller than normal inside diameters, such as heavy wall pipe, plastic-lined pipe, as-cast flanges or reducing flanges. Interference can also occur when connecting directly to a swing check or silent check. Suitable corrective measures must be taken to remove these obstructions, such as taper boring the pipe, or installing a spacer or spool piece.
10. After proper operation is verified, flange bolts should then be tightened, using a star or crisscross pattern to evenly load the bolts, to the torque values shown below in table 1.
11. Pressurize piping to valve and inspect for leakage. If leakage is observed, tighten bolts using cross-over pattern, increasing torque until leak stops. Note that recommended torques are made without warranty. Installer must verify proper strength bolts for applications. Bolts should be clean and un-lubricated.

**Table 1 Recommended bolt torque**

Size	Ft-Lbs.
2" - 4"	36
5" - 8"	65
10" - 12"	87
14" - 16"	200
18" - 20"	270

# Installation, Operation, & Maintenance - BV/BV-D Butterfly Valves

## Installation/General Cautions:

1. Class 250 cast iron and Class 300 steel flanges can not be used on these valves.
2. Rubber faced or mechanical flanges are not recommended.
3. BV/BV-D valves are not recommended for steam service.
4. To avoid damage to the seat from heat, valves should not be assembled to flanges when welding flanges into the piping system.
5. Valves should not be installed in areas where inspection is not possible.
6. Lever style valves are available up to 12", but depending on flow velocity and other factors, 8" and larger valves may require gear operator to fully close.
7. Ensure to fully open valves before a loop test of the piping system is carried out with line pressure of tested valves.
8. When valves need to be dismantled from pipes for maintenance or any other cause, ensure to thoroughly relieve the line pressure beforehand. Loosening piping bolts under line pressure is dangerous and can cause damage to the valve. Any residual fluid left inside the pipeline must be completely drained.

## MAINTENANCE

API BV/BV-D butterfly valves require only minimal regular maintenance. The following represents a preventive checklist:

1. Check (and adjust if necessary) that the valve is operating properly in the full closed and full open position.
2. Visually inspect the valve and around the valve for any signs of leakage.
3. Visually inspect bolts, piping, wiring, and any other related equipment for problems that could hinder operation (such as loosening or corrosion).

## OTHER NOTES

API BV/BV-D valves come equipped with grease/zerk fittings for easy injection of grease. For severe applications (where valve may be completely submerged), to prevent internal rusting, grease should be fully injected as follows:

1. Valve Body - Grease fitting is located on the neck of the valve. As received, the body does not contain grease. For severe applications, slowly apply grease through fitting until excess can be seen between the shaft and Teflon seat. If Teflon bushing begins to "blow" out, relieve excess pressure by removing grease fitting. Once pressure is relieved, push Teflon bushing back into valve, and re-install grease fitting.
2. Gear Operator - Grease/Zerk fitting is located on the side of the gear box. There is sufficient grease in the gear box for standard applications, however for severe applications, fill with lithium based grease either by removing top plate, or using grease fitting.