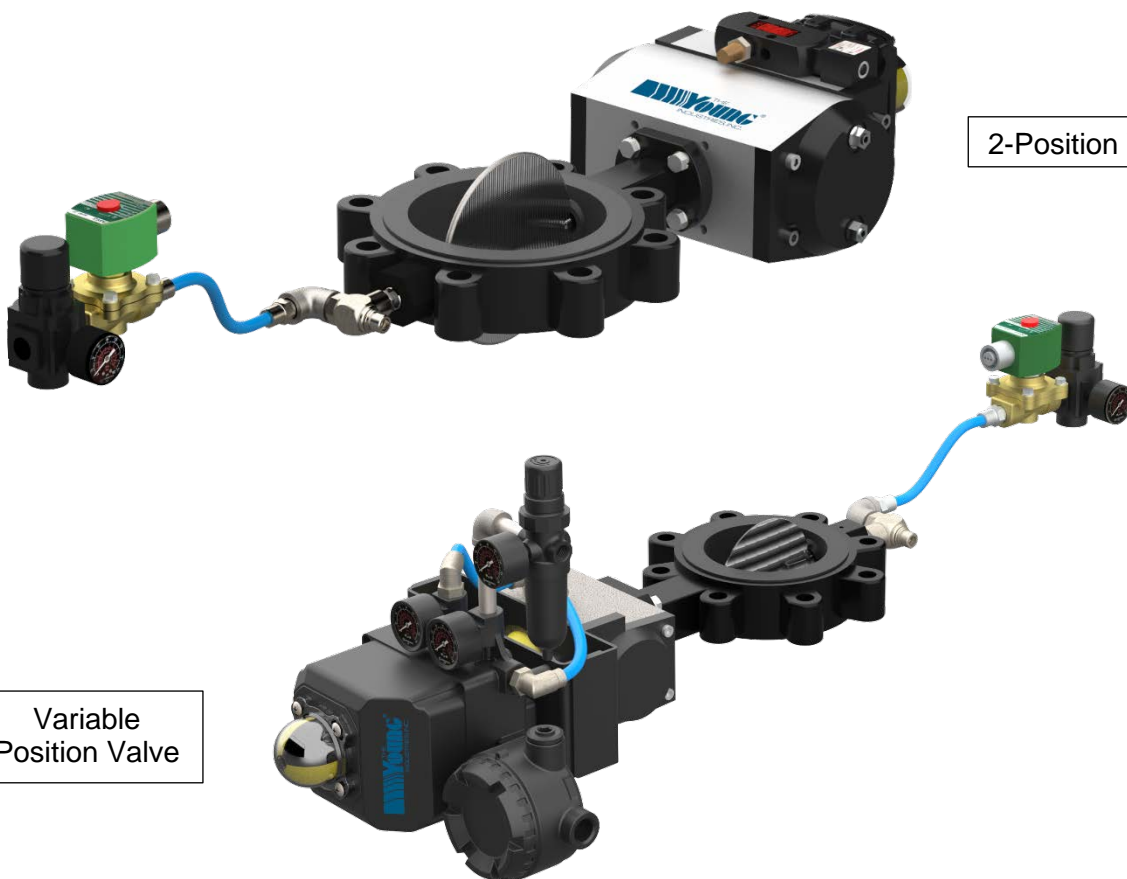


POWDERFLOW BUTTERFLY VALVE

Installation, Operation, and Maintenance Manual



2-Position Valve

Variable
Position Valve



INDUSTRIES, INC.
16 PAINTER STREET
MUNCY, PA 17756

FOREWORD

This manual contains instructions for installation, operation and maintenance of Young Industries PowderFlow Butterfly Valves. The care taken during receiving, storage, installation and continued maintenance will add to the reliable operation and long service life of this equipment.

These instructions must be read and understood completely by the installer, operator and plant safety director before installation, operation or performing maintenance upon this product. Copies of these instructions are supplied with each order to help ensure proper installation and operation. Contact The Young Industries, Inc. if you need additional copies of this instruction sheet.

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SAFETY

READ AND FULLY UNDERSTAND THIS MANUAL BEFORE OPERATING OR PERFORMING ANY WORK ON YOUNG INDUSTRIES TRANSFLOW EQUIPMENT

If you have previously received delivery of Young Industries PowderFlow Valve and are just now receiving this manual, please read this manual completely. Insist that both the equipment operator and the director of plant safety read and fully understand this manual before continued use of and/or performing any maintenance on this equipment.

Notify Young Industries if your PowderFlow equipment does not include any safety warning labels or devices recommended within this manual. Contact the Engineering Manager for assistance at (570) 546-3165 before continued use or maintenance.

Notify Young Industries if you have sold, leased, rented or given any Young Industries PowderFlow Valves to another user. Your assistance will allow Young Industries to contact the new user with updated safety and/or operational recommendations.

Safety is a fundamental factor that must always be considered. Use of proper tools and methods can prevent serious accidents that may result in injury to you and your fellow workers.

Several safety precautions are listed throughout this manual. Study them carefully and follow them; insist that those working with you do the same. Remember: someone's carelessness or negligence can easily cause an accident which can result in serious injury.

The various precautions and recommendations detailed within this manual are not all-inclusive. Young Industries has attempted to provide SAFETY AND OPERATIONAL GUIDANCE relating to typical installations with which we are familiar. We urge you to review your particular equipment installation to determine whether there are potential hazards beyond the warnings of this manual.

If you have any safety or operational questions pertaining to the design or application of your Young Industries equipment as it relates to your installation, please contact the Engineering Manager at (570) 546-3165.

Failure to observe and follow the safety precautions may result in serious personal injury, or property damage.

Young Industries looks to our customers to achieve a cooperative effort for the purpose of making each hopper installation as safe for the operator as is reasonably possible and to ensure proper maintenance and operating procedures are followed. Many times, we do not have access to the installation; therefore, your participation in the safe installation, operation and maintenance of this equipment is critical.

DESIGN

The Standard Young Industries PowderFlow Butterfly Valve is constructed of a Max-Air DeltaT Butterfly valve that is modified by Young Industries to include our Patented PowderFlow Valve Design. The primary construction of the DeltaT Butterfly valve is left largely intact after modifications which means that aside from the features of this valve relating to the modified TransFlow Disk and related gas flow controls, the installation, operation, and maintenance of the valve is the same as recommended by DeltaT. For this reason, several references are made within this manual to refer to the DeltaT manual which is affixed to the end of this document.

INSTALLATION

A. RECEIVING AND INSPECTION

1. Upon receipt of equipment and material from Young Industries the following basic steps should be taken:

a. Use the packing list to determine that all the items shipped have been received. Your equipment order was carefully crated or packaged for safe shipment then given to the carrier. Check for damage.

1. Damage in transit is the responsibility of the carrier. Be sure to have the driver sign a copy of the freight bill with a notation about any damage.

2. If a shipment was sent to you by parcel post, have the postmaster complete a damage claim report.

3. Concealed damage: If equipment or goods are damaged by shipment at a later date, contact the carrier and Young Industries immediately.

4. IN ALL CASES OF DAMAGE IN TRANSIT, CONTACT THE YOUNG INDUSTRIES ENGINEERING MANAGER AT (570) 546-3165 FOR ASSISTANCE IN DETERMINING WHETHER OR NOT THIS DAMAGE MAY IN ANY WAY AFFECT SAFETY OR PROPER OPERATION OF THE TRANSFLOW EQUIPMENT.

5. Keep all evidence for the inspector.

YOUNG INDUSTRIES CANNOT ASSUME ANY LIABILITY FOR SHORTAGES OR DAMAGED GOODS. CLAIMS MUST BE NEGOTIATED WITH THE CARRIER. CONTACT THE YOUNG INDUSTRIES ENGINEERING MANAGER AT (570) 546-3165 FOR ASSISTANCE IN RECTIFYING ANY SHORTAGE OR DAMAGE AS IT RELATES TO SAFE AND PROPER OPERATION OF YOUNG INDUSTRIES EQUIPMENT.

2. Moving the TransFlow equipment

a. Trained, experienced personnel, using safe and accepted rigging practices should always perform moving and installation.

CAUTION:
WHEN MOVING TRANSFLOW EQUIPMENT OR COMPONENT PARTS, BE SURE THAT MOVING PRACTICES USED ARE SAFE FOR BOTH PERSONNEL AND EQUIPMENT. CONTACT THE YOUNG INDUSTRIES ENGINEERING MANAGER IF THERE ARE ANY QUESTIONS RELATING TO WHAT CONSTITUTES SAFE AND ACCEPTED RIGGING PRACTICES FOR MOVEMENT AND/OR INSTALLATION OF TRANSFLOW EQUIPMENT.

3. Storing TransFlow equipment

a. If moved to storage, the equipment must be located in a dry area, preferably indoors. Outside storage will require adequate protection from the weather.

b. If your PowderFlow Valve was shipped as part of an assembly, it may have shipped with temporary guards or covers. Do not

NOTE:

remove these covers while the equipment is in storage.

c. After prolonged storage and before startup, the TransFlow equipment must be inspected by a qualified person. Contact Young Industries Engineering Manager at (570) 546-3165 for assistance.

CAUTION:

USE CAUTION TO PROTECT AGAINST OBJECTS OR DEBRIS FROM ENTERING OR DAMAGING THE TRANSFLOW EQUIPMENT.

C. BOLT TIGHTENING SEQUENCE

After Valve is positioned between flanges but before tightening fasteners, rotate disk to open position to ensure that valve is centered in flanges before tightening.

Prior to tightening flanges, ensure that Flange faces are parallel to valve face. Failure to do so may result in damage to valve or seat.

D. ASSEMBLY

1. The PowderFlow Valve is supplied fully assembled except for the air piping. The valve assembly must be bolted to a mating flange with adequate strength to safely support the valve assembly. Use the packing list to determine that all the items shipped have been received. Your equipment order was carefully crated or packaged for safe shipment then given to the carrier. Check for damage.

E. ELECTRICAL INSTALLATION

1. If your PowderFlow Butterfly Valve was supplied with a Solenoid Valve for actuation, be sure that coil voltage matches the supply voltage which will be used to actuate the valve. When wiring device, a qualified professional electrician should connect electrical power as needed. All wiring must be done per applicable electrical codes and inspected before operation.

DANGER:

DISCONNECT AND LOCK OUT POWER BEFORE OPENING TERMINAL BOX OR

B. SUPPORTS

1. Young Industries' PowderFlow Valves are designed to be supported from the Mounting Flange surface. Care must be taken to ensure that the Flange(s) which the valve mounts to are able to provide adequate support for the valve. See DeltaT IOM at end of this document for additional details.

When tightening Flange connections, be sure to snug all fasteners first and then working in a star pattern, gradually tighten fasteners the rest of the way by turning in 1 turn increments. This is particularly important when tightening a valve equipped with a PTFE Seat as uneven tightening may crack seal. See DeltaT IOM at end of this document for additional details.

SERVICING ANY ELECTRICAL DEVICE.

BE SURE TO LOCKOUT AIR SUPPLY AND BLEED ANY AIR TRAPPED IN LINES BEFORE SERVICING EQUIPMENT.

F. COMPRESSED GAS INSTALLATION

1. Connect the plant compressed air or gas supply to the PowderFlow Valve as shown in the Assembly Drawing. Air supply to valve is required in 2 places:

- The 4-Way Solenoid Valve which actuates the valve. This supply should be between 80 psig and 120 psig.
- The TransFlow Fluidizing Disk. Supply to the valve stem must not exceed 11 psig. A regulator is typically used to reduce plant pressure to limit pressure to 11 psig. Pressure supplied to regulator must be between 30 psig and 240 psig.

a. The air/gas supply must be clean, oil-free and dry with a minimum pressure of 60 PSIG at the inlet of the regulator on the TransFlow

equipment. The supply line should be at least the same size as the regulator.

WARNING:
COMPRESSED GAS: SHUT OFF, LOCK OUT AND BLEED SYSTEM TO ZERO PRESSURE BEFORE SERVICING.

DO NOT EXCEED MAXIMUM ALLOWABLE REGULATOR INLET PRESSURE RATING OF 240 PSIG

G. PRECOMMISSIONING

1. Before operating or test running the equipment, with the power and compressed gas shut off, check internally for cleanliness using caution to avoid physical harm to personnel and equipment. Ensure that there are no obstructions within the path of the disk.

DANGER:
ALWAYS FOLLOW CONFINED SPACE ENTRY PROCEDURES WHEN ENTERING ENCLOSED SPACES. SERIOUS INJURY OR DEATH ARE POSSIBLE IF CONFINED SPACE SAFETY PROCEDURES ARE NOT FOLLOWED.

2. Inspect the installation to confirm that the PowderFlow Valve and related equipment is installed properly and mounted securely.

3. If new air lines were installed, blow out air lines to remove any potential debris prior to connecting the airlines to the equipment. Failure to do so will result in debris getting stuck in regulator, solenoid valve, or behind TransFlow.

4. Determine that all electrical devices and wiring are properly installed and operating. Ensure that all devices meet code requirements for the electrical hazard location of the area. Mismatch between area classification and electrical device rating can result in injury, death or property damage.

5. Inspect the PowderFlow Valve and associated equipment to assure that all guards, covers, and safety equipment are in place and working properly.

6. We urge the installation crew to notify the plant safety committee and/or the plant engineer when installation is complete and before initial operation. Those in your plant responsible for plant safety should review the installation before operation. Contact the Engineering Manager at Young Industries, (570) 546-3165, if this review results in additional questions or uncertainty.

OPERATION

A. STARTUP

1. Before actual operation, the operator must understand the method of starting and stopping the PowderFlow Valve and the supporting utilities.

2. The general appearance of the PowderFlow Valve and surrounding area should be visually inspected to determine that the equipment can be operated safely.

3. Guards, covers and safety equipment must be in place whenever the PowderFlow Valve is in service.

4. If you recognize an unsafe condition unforeseen by Young Industries and beyond typical operating conditions, **CEASE FURTHER OPERATION** of the equipment and immediately notify both your safety committee and the Engineering Manager at Young Industries, telephone (570) 546-3165. The Young Industries Engineering Manager can

assist you in speeding the return of your PowderFlow Valve to a safe operating condition.

5. Without material in the equipment and without gas supply to the PowderFlow Valve disk, set the pressure regulator to 11 PSIG.

6. Verify that the flow control valves are set at one full turn open as set before shipment.

7. Verify the vessel above the PowderFlow Valve has sufficient ventilation or dust control to allow the gas from the TransFlow to escape. This gas can pressurize a closed vessel if not vented properly.

8. Turn on the gas supply to the valve disk TransFlow. Besides the noise the gas makes, you should observe a pressure drop on the gauge of the regulator. Verify that the fluidizing gas is not pressurizing the vessel.

9. If there are not any problems during the startup, continue with section B, operation with material.

10. If there are any problems or inconsistencies during the above process, CEASE FURTHER OPERATION of the equipment and immediately notify both your safety committee and the Engineering Manager at Young Industries, telephone (570) 546-3165. The Young Industries Engineering Manager can assist you in speeding the return of your PowderFlow Valve to its recommended operating condition.

B. OPERATION WITH MATERIAL FOR THE FIRST TIME

1. Complete Section A above and then fill the vessel with material.

CAUTION:
ANY NEWLY INSTALLED SYSTEM WILL CONTAIN DIRT AND CONSTRUCTION DEBRIS. REMOVE ALL DIRT AND CONSTRUCTION DEBRIS PRIOR TO FILLING VESSEL

2. With the PowderFlow Valve Closed:

a. Turn on the TransFlow gas supply to the Fluidizing Disk

b. Open the Valve

c. Ensure that the material discharges from the feed hopper at a consistent feed rate

If the flow is poor or sluggish, first adjust the flow control valve to increase the gas flow rate. Adjust flow control valves in one turn increments.

If the proper flow cannot be achieved with the flow control valve, the regular set pressure may be adjusted. **IF INCREASING THE SET PRESSURE, MAKE SURE THE REGULATOR PRESSURE GAUGE READING WITH THE GAS FLOW ON (BACK PRESSURE) DOES NOT EXCEED 11 PSIG. SET PRESSURE WITH THE GAS FLOW OFF SHOULD NOT EXCEED 30 PSIG.**

C. OPERATION WARNINGS

1. If there is a noticeable decrease in the conveying and discharging ability even after cleaning, please notify your maintenance personnel or call Young Industries for assistance or additional guidance in defining these conditions at 570-546-3165.

2. The PowderFlow Valve must be used only for the purpose for which it is designed. Refer to Young Industries quotation or the equipment drawings to determine the application for which this PowderFlow Valve was intended. Contact the Young Industries Sales Manager or Engineering Manager at 570-546-3165 if you need assistance in determining the proper application of this Young Industries equipment.

D. SHUTDOWN, SERVICE, CLEANING

WARNING:

DISCONNECT AND LOCK OUT POWER, SHUT OFF AND LOCK OUT COMPRESSED AIR OR GAS SUPPLY AND BLEED SYSTEM TO ZERO PRESSURE BEFORE SERVICING EQUIPMENT. DUST HAZARD-USE RESPIRATOR, GLOVES AND EYE PROTECTION WHEN CLEANING. BEFORE SERVICING.

DO NOT EXCEED MAXIMUM ALLOWABLE SET PRESSURE RATING OF 30 PSIG OR THE MAXIMUM ALLOWABLE BACK PRESSURE RATING OF 10 PSIG.

WHEN CLEANING, WET SURFACES CAN BE SLIPPERY

ALWAYS OBSERVE SAFE CONFINED SPACE ENTRY PROCEDURES

1. When shutting down Transflow equipment, shut off supporting utilities in accordance with

During the cleaning of TransFlow equipment, flow of clean and dry gas through the fluidizing membrane must be maintained at all times. Never exceed the 30 PSIG maximum regulator set pressure or the maximum back pressure rating of 10 PSIG of the TransFlow equipment and fluidizing membrane. Gas flow will help the cleaning of the TransFlow membrane surfaces and will help prevent blinding of the porous TransFlow material.

WARNING:

ALWAYS OBSERVE ALL CONFINED SPACE ENTRY SAFETY PROCEDURES. A SELF-CONTAINED BREATHING APPARATUS WITH ITS OWN AIR SUPPLY MUST ALWAYS BE USED BY PERSONNEL ENTERING ANY VESSEL EQUIPPED WITH A TRANSFLOW FLUIDIZING HOPPER EVEN IF THE

plant operating procedures.

2. When servicing is required on the TransFlow equipment, proper lock-out of electrical, compressed gas and mechanical equipment must be completed before the work is started.

3. When washing the TransFlow material, the compressed gas and electrical supplies must not be locked-out because the TransFlow aeration must be turned on. All other possible precautions must be implemented to insure operator safety.

At a minimum, the operator should wear safety goggles, gloves, and a respirator during cleaning. Also, any other safety gear or safety measures required by local plant regulations should be utilized.

WARNING:

IF NITROGEN IS USED DURING THE WASHING PROCESS, THE VESSEL MUST BE VENTED AWAY FROM ALL PERSONNEL. ENTRY TO THE VESSEL CANNOT BE ALLOWED.

FLUIDIZING GAS IS AIR. BREATHING OF AIRBORNE DUST CAN CAUSE SERIOUS HEALTH PROBLEMS AND CAN LEAD TO DEATH.

Breathing of nitrogen gas will quickly cause suffocation and death. Breathing of air which has passed through an air compressor may cause serious health problems and must be avoided.

We recommend using water only or a water and detergent mixture followed by a clean water rinse. The water should be delivered by either spray halls or a moderate pressure hand wand to remove material from the surface of the cone. If a hand wand is used, the spray must be directed parallel to the surface rather than perpendicular to the surface.

CAUTION:
STOP THE CLEANING OPERATION IF YOU DO NOT SEE GAS BUBBLING UP THROUGH THE TRANSFLOW MEDIA. PRODUCTOR WATER MUST NOT BE FORCED INTO THE PORES OF THE YOUNG INDUSTRIES TRANSFLOW FLUIDIZING MEDIA.

The air or gas flow through the TransFlow material will cause turbulence on the surface which will assist in the cleaning process. The surfaces are easily dried upon completion of the washing by allowing the air or gas flow to continue for a few minutes. If water

continues to drain from above the cone during the drying, it will take longer to sufficiently dry out TransFlow. It is critical that all liquid, moisture, or solvents used during the washing process be removed prior to returning the PowderFlow Valve to service. It is good practice to leave compressed air on to TransFlow for several hours following cleaning to sufficiently dry out TransFlow. If TransFlow is not completely free of all liquids or moisture prior to contact with powder, the TransFlow may be plugged or blinded.

MAINTENANCE

A. LUBRICATION

1. **No lubrication** if any kind is required for the TransFlow equipment or the valve assembly. **DO NOT USE LUBRICATED AIR** or fluidizing gas.

B. GENERAL INSPECTION

1. Observe all air or gas connections and check for leaks.
2. Check pipe connections for tightness and leaks.
3. Inspect all safety equipment, guards, covers and labels to assure the PowderFlow Valve and auxiliary equipment can be operated safely. If an unsafe condition is observed, cease further operation of the equipment and immediately notify both your safety committee and the Engineering Manager at Young Industries, telephone (570) 546- 3165.

C. SEAT AND SEAL REPLACEMENT

Though each PowderFlow Valve is designed to provide consistent and reliable

service, over time moving parts will wear and may need replaced. All valve components are field replaceable. Replacement parts are available from Young Industries. Consult the Spare Parts list provided with this equipment or contact the Young Industries Spare Parts Manager at 570-546-3165 for replacement parts information.

Replacement components for a typical young industries valve can be found in the appendix.

It is important to understand that valve component life span will vary depending on the characteristics of the material being controlled with the PowderFlow Valve as well as the number of cycles. A Typical valve requires maintenance after about 150K to 200K cycles. See MAINTENANCE in the appendix for more information.

D. TROUBLESHOOTING

When properly installed, operated and maintained your Young Industries TransFlow equipment will give years of dependable service. Table One, "Troubleshooting", provides symptoms, causes, and remedies for most problems that may be encountered.

TROUBLESHOOTING POWDERFLOW VALVE

<u>SYMPTOM</u>	<u>CAUSE</u>	<u>REMEDY</u>
Valve is not sealing properly after being newly installed	Valve not closing completely	<ul style="list-style-type: none"> - Ensure that valve disk is not being obstructed - Ensure that Actuator has sufficient air pressure - Ensure that Actuator Travel Limits are adjusted properly
Valve is not sealing properly after being in service	Valve Seat is worn	- Replace Valve Seat
	Travel Limits are set for angle seating disk for quicker opening. As seat wears in, disk no longer has sufficient sealing around its perimeter	- Adjust Travel Limits to allow valve to close enough to provide a seal around the disk
Valve is not moving when Solenoid coil is energized	Solenoid Valve failed	- Replace Solenoid Valve
	Insufficient Air Supply to Solenoid	- Ensure that air supply to solenoid is a minimum of 80 psig
	Solenoid Valve is plumbed incorrectly	- Correct Plumbing
	Solenoid Valve manual override screw is set to ON / 1 Position	- Rotate Manual Override screw to OFF / 0 position
Insufficient material flow	Poor gas flow to TransFlow.	Adjust the flow control valves or the pressure regulator to a higher setting. Do not exceed 30 PSIG Regulator Set Pressure with gas flow OFF or 10 PSIG maximum with gas flow ON.
	TransFlow is plugged or extremely dirty	Clean TransFlow. See Young Industries Cleaning Procedure for TransFlow Fluidizing Media
	TransFlow is damaged	Inspect TransFlow for leaks or damage

	Seat O-Ring Seal leaking	Each Valve seat has an O-Ring seal molded into the seat where the Air Inlet stem passes through the seat. Be sure that O-Ring Seal is not damaged or leaking as this would prevent fluidizing gas from building pressure under the TransFlow. See Appendix for seal location
Material buildup on the TransFlow material.	Low gas supply pressure.	Adjust the flow control valves or the pressure regulator to a higher setting. Do not exceed 30 PSIG maximum set pressure or 10 PSIG maximum back pressure.
	Moisture in material	Clean TransFlow material and remove moisture source.

APPENDIX

SPARE PARTS

A nameplate is furnished with all PowderFlow Valves. The necessary information for ordering spare parts is found on this nameplate. When ordering, please provide (a) SHOP NUMBER and (b) SERIAL NUMBER. Contact the Parts Department Manager at Young Industries, telephone 570-546-3165, for assistance. Recommended spare parts list is provided with final drawings and will include all replacement parts specific to your valve. The table below lists common spare parts for standard valve configurations based on Valve Size. If you are unsure of which parts from the table below applies to your valve, consult The Young Industries Spare Parts Manager or the Spare Parts list that was supplied with your valve.

YOUNG INDUSTRIES SPARE PARTS NUMBERS FOR STANDARD VALVES				
VALVE SIZE	BUSHING & SEAL KIT	SEAT		
		BLACK EPDM SEAT	WHITE EPDM SEAT	PTFE
2"	1007009	1007046	1010940	1007056
3"	1007010	1007047	1010941	1007057
4"	1007011	1002201	1010942	1007058
5"	1007012	1007048	1010943	1007059
6"	1007024	1007049	1010944	1007060
8"	1007025	1007050	1007111	1007061
10"	1007026	1007054	1010945	1007062
12"	1007027	1010939	1008538	1007064

MAINTENANCE INTERVALS

REPLACEMENT PARTS	ESTIMATED REPLACEMENT FREQUENCY
Valve Seat	100,000 Cycles
Bushings, O-Rings	250,000 Cycles

TYPICAL POWDERFLOW VALVE ASSEMBLY WITH 2-POSITION OPERATION

Fig. 1
(Ref. D-21088-50)

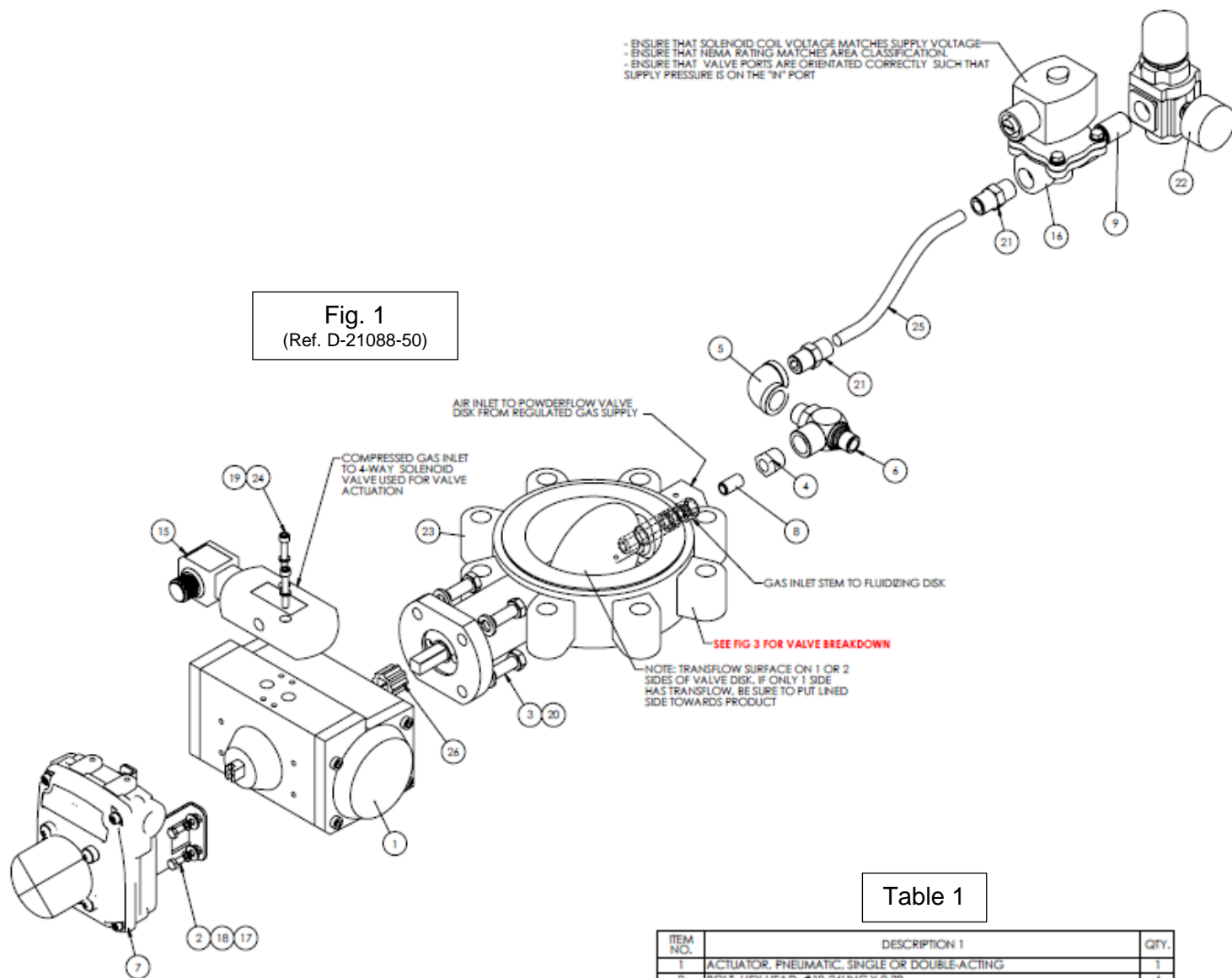


Table 1

ITEM NO.	DESCRIPTION 1	QTY.
1	ACTUATOR, PNEUMATIC, SINGLE OR DOUBLE-ACTING	1
2	BOLT, HEX HEAD, #10-24UNC X 0.38	4
3	BOLT, HEX HEAD, .38-16UNC X 1.00, PLATED	4
4	BUSHING, PIPE, HEX HEAD, .38" X .12"	1
5	ELBOW, PIPE, 90°, .38" NPT, 150#	1
6	FLOW CONTROL VALVE, .38IN NPT X .38IN NPT	1
7	LIMIT SWITCH ASSEMBLY	1
8	NIPPLE, PIPE, .12" NPT X CLOSE, 304 S/S	1
9	NIPPLE, PIPE, .38" NPT X CLOSE	1
15	SOLENOID VALVE, 4-WAY	1
16	SOLENOID VALVE, 2-WAY	1
17	WASHER, FLAT, TYPE A, #10 DIA., 18-8 S/S	4
18	WASHER, LOCK, REGULAR, #10 DIA., 18-8 S/S	4
19	WASHER, LOCK, REGULAR, #10 DIA.,	2
20	WASHER, LOCK, 3/8	4
21	ADAPTER, 3/8" TUBE TO 3/8" PIPE	2
22	AIR PRESSURE REGULATOR	1
23	POWDERFLOW VALVE ASSEMBLY	1
24	SOCKET HEAD CAP SCREW, A1	2
25	TUBE, 3/8" O.D.	1
26	VALVETO ACTUATOR ADAPTER	1

TYPICAL POWDERFLOW VALVE ASSEMBLY WITH VARIABLE POSITION OPERATION

Fig. 2
(Ref. D-21088-50)

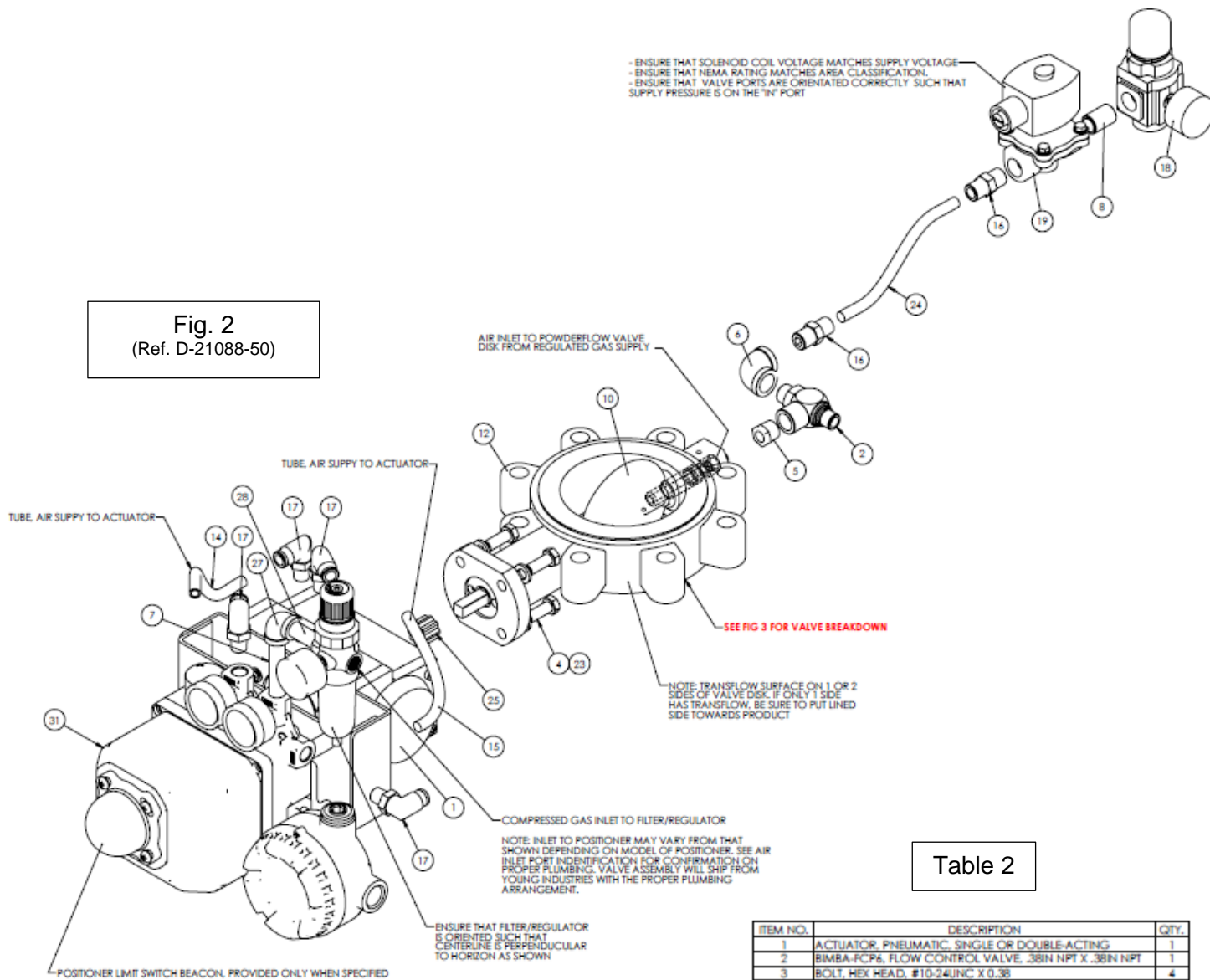


Table 2

ITEM NO.	DESCRIPTION	QTY.
1	ACTUATOR, PNEUMATIC, SINGLE OR DOUBLE-ACTING	1
2	BIMBA-PCPS, FLOW CONTROL VALVE, .38IN NPT X .38IN NPT	1
3	BOLT, HEX HEAD, #10-24UNC X 0.38	4
4	BOLT, HEX HEAD, .38-16UNC X 1.00	4
5	BUSHING, PIPE, HEX HEAD, .38" X .12"	1
6	ELBOW, PIPE, 90°, .38" NPT, 1.50#	1
7	NIPPLE, PIPE, .12" NPT X CLOSE	1
8	NIPPLE, PIPE, .38" NPT X CLOSE	1
10	POWDERFLOW VALVE DISK	1
12	PRT-00374034	1
14	TUBE, POLYFLOW, 0.38" O.D.	1
15	TUBE, POLYFLOW, 0.38" O.D.	1
16	PUSH-IN TUBE FITTING, .38 TUBE TO .38 NPT	2
17	PNEUM. MALE ELBOW, SWIVEL, .38 O.D. X .25 NPT	4
18	REGULATOR, SERIES R72	1
19	SOLENOID VALVE, 2-WAY	1
21	WASHER, FLAT, TYPE A, #10 DIA.	4
22	WASHER, LOCK, REGULAR, #10 DIA.	4
23	WASHER, LOCK, REGULAR, 3/8"	4
24	TUBE, 3/8" O.D.	1
25	VALVE TO ACTUATOR ADAPTER	1
26	FILTER-REGULATOR, SERIES 807, .25 NPT	1
27	ELBOW, PIPE, 90°, .25" NPT, 1.50#, 304 S/S	1
28	NIPPLE, PIPE, .25" NPT X 2.00" LG., 304 S/S	1
29	NIPPLE, PIPE, .12" NPT X CLOSE, 304 S/S	1
31	VALVE POSITIONER, ANALOG 4-20MA COMMANG SIGNAL	1

NOTES:

- ARRANGEMENT AND APPEARANCE OF POSITIONER MAY VARY FROM THAT SHOWN DEPENDING ON POSITIONER MODEL SUPPLIED WITH EQUIPMENT. SEE ASSEMBLY DRAWING PROVIDED WITH YOUR EQUIPMENT FOR MORE DETAIL.
- PORT PLUMBING TO POSITIONER MAY VARY FROM THAT SHOWN DEPENDING ON MODEL OF POSITIONER PROVIDED. SEE IOM FOR POSITIONER PROVIDED TO DETERMINE PROPER PLUMBING ARRANGEMENT.

TYPICAL POWDERFLOW VALVE – EXPLOSION VIEW

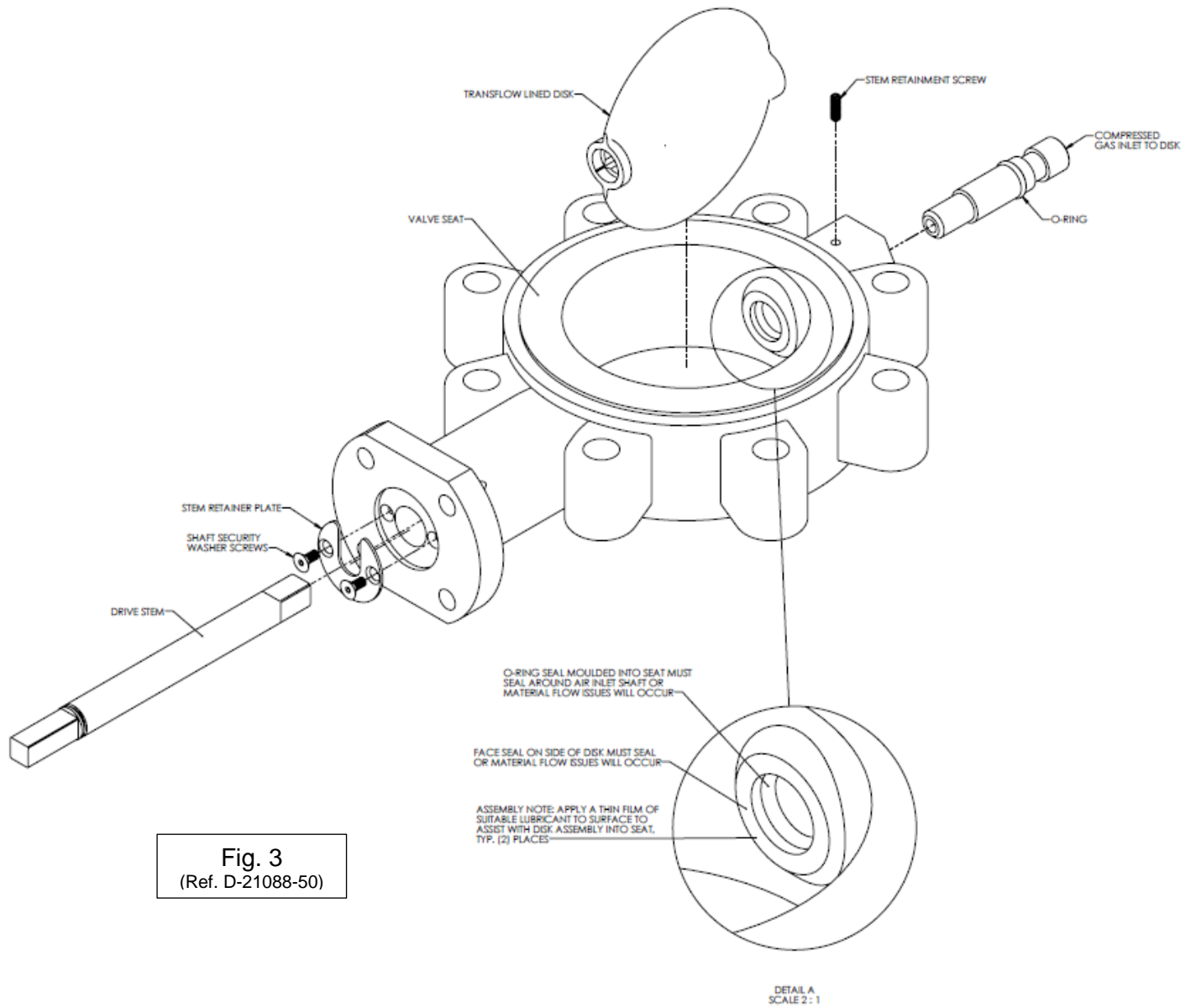


Fig. 3
(Ref. D-21088-50)

The brand by which all others are measured.

050/051/650/651 Series
Resilient Seated Butterfly Valves



**INSTALLATION, OPERATION
& MAINTENANCE MANUAL**

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INTRODUCTION

Product Description

The Delta T Products Series 050/051 and 650/651 resilient seated butterfly valves are designed for use in ASME Class 150 piping systems and are available in wafer and lug configurations. The standard size ranges for these series is as follows:

Series	Wafer	Lug	Class
050/051	1-1/2" thru 24"	2" thru 24"	125/150
650/651	2" thru 24"	2" thru 24"	125/150

Additional sizes thru 48" are available in Series 050/051, as well as double flanged versions. Please call factory for details.

Design Features

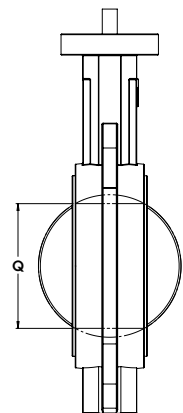
The durability and reliability of the specially designed Delta-T cartridge seat has proven its reliability time and time again. The uniqueness of the rigid seat ensures positive valve sealing while maintaining low and consistent operating torque. The cartridge style seat incorporates various elastomers carefully bonded to a phenolic or aluminum stabilizing ring, guaranteeing no elastomer flow or movement, and virtually eliminating seat tearing or degradation due to bunching. In addition, the cartridge style seat reduces seat swell, which is very common in booted seat designs. The triple bushing design completely isolates the valve shaft from the valve body, allowing precise control of the valve disc and stem, and ensuring the lowest possible operating torque, and significantly increased valve service life.

Flange and Pipe Compatibility

The Delta T 050/051 and 650/651 Series butterfly valves are designed to fit between standard piping flanges, as follows:

- ASME 125 Cast Iron Flanges (all sizes)
- ASME 150 Steel Flanges, Schedule 40 (all sizes)
- ASME 150 Steel Flanges, Schedule 80 (2" thru 10")
- ASME 300 Steel Flanges, Schedule 40

It is important to mention that when using Schedule 80 lined pipe or plastic pipe, special care must be used to ensure that the valve is centered between the flanges to prevent damage to the edge of the valve disc when moving from the full open to the full closed position*. If there is any question about compatibility, check the disc chord ("Q") dimensions of the valve against the pipe ID dimensions.



Size (in)	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24
Q (in)	0.8	1.1	1.8	2.5	3.5	4.6	5.7	7.8	9.8	11.7	13.9	15.7	17.6	19.6	23.4

 **NOTE:** *For plastic flanges, be careful not to overtighten the flange bolts which may cause warping and prevent proper sealing.

Gasket Considerations

The cartridge seat design of the Delta T 050/051 and 650/651 Series butterfly valves are such that the elastomer seat extends beyond the valve face and provides a tight seal between the valve and the mating surface (pipe flange face). Gaskets are not required, and should NOT be used when the valve is installed between standard slip-on and weldneck type flanges.

Operating Pressures

All Delta T Series resilient seated butterfly valves are rated to 200 psi bubble tight shut-off for sizes 2" through 12", and 150 psi bubble tight shut-off for sizes 14" and larger. Ductile iron lug style valves are capable for 200 psi uni-directional dead-end service through 12" per the directional arrow as indicated on the valve body, and up to 100 psi dead-end bi-directional service.



NOTE: All PTFE seated butterfly valves are only rated to 150 psi bubble tight shut off for sizes 2" through 12".

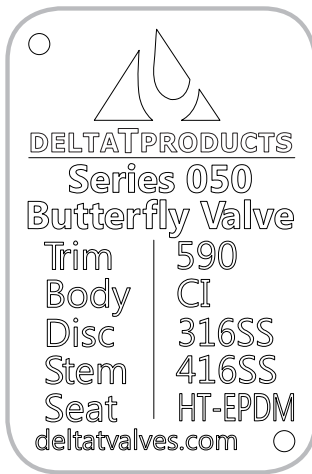


Figure 1

Product Identification

All Delta T Series resilient seated butterfly valves have an identification tag attached to the valve body. Please see Figure 1, showing an example of the typical information provided for reference:

INSTALLATION GUIDELINES

Ratings

All Delta T Series resilient seated butterfly valves are intended for use at the maximum pressure and temperature ratings or less, as referenced by the part number for the applicable elastomer and seat combination. Please pay special attention to the selection of the correct configuration in regards to operating pressure, operating temperature, and compatibility of a specific elastomer with the intended line media. In addition, proper installation is critical to ensure the valve performs according to its rated pressure and operating torques.



NOTE: Special consideration for PTFE/EPDM seated valves must be taken into consideration during the installation process. The pressure rating for all PTFE seated valves is limited to 150 psi differential pressure.

Valve Seats

Delta T Series resilient seated butterfly valves are designed for bi-directional service; therefore, installation is not dependent upon the orientation of the seat. However, if lug valves are to be used in dead-end service, care should be taken as noted in the section titled “operating pressures”.

Installation Positioning

Before installation of any Delta T Series resilient seated butterfly valve, it is critical to ensure the ID of the pipe and the pipe flanges are large enough to allow the disc edge to operate into the opening position without interference. This is the main technical issue with the installation of these types of resilient seated butterfly valves. Special care must be taken, and it is highly suggested to consult with an experienced installation technician to eliminate difficulties. Flange and pipe schedule compatibility is shown on page 3 of this installation and operation manual.

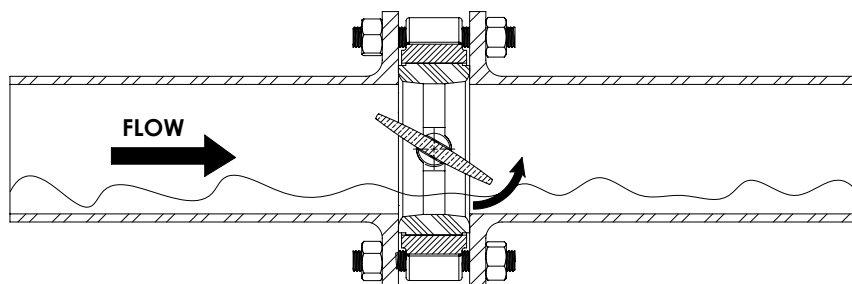
In order to prevent damage to the disc and the seat during the installation process, the valve disc should be slightly open but not extending beyond the face of the elastomer seat. Positioning the disc in this way, which is also referred to as “just about closed”, will ensure that the seat interference and resultant torque increase from installation, will be minimized.

Valve Location and Orientation

As a best practice, Delta T series resilient-seated butterfly valves should be installed at least six (6) pipe diameters away from other piping elements, which includes pumps, other valves, pipe reducers, tees, elbows, etc. This is to minimize irregular flow patterns and maintain uniform flow throughout the system. If this minimum distance is impractical, at a minimum ensure that the disc of the valve does not interfere with nearby equipment.

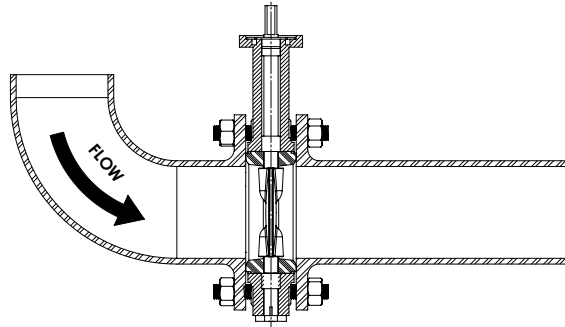
Note that resilient-seated butterfly valves are designed to operate between two (2) flanges. For applications that require the use of only one (1) flange, such as **dead-end service**, special care must be taken in regards to installation orientation depending on the intended operating pressure. Please reference the section titled “Operating Pressures” for more detail.

Generally, it is best to install the valves with the shaft in the horizontal orientation. In this position, the stem and disc weights are distributed such that no additional gravitational forces contribute to wear and tear, which maximizes valve life. A horizontal valve stem also has the advantage of keeping the disc out of the flow path for fluid levels below $\frac{1}{2}$ of the pipe diameter, which is especially critical for highly viscous or sludge type media. For applications like this, the lower edge of the disc should open toward the downstream direction.

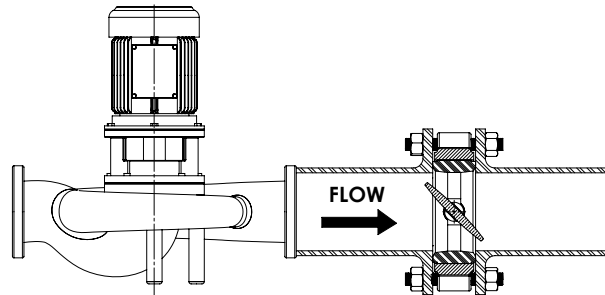


There are some applications where it may be more desirable to mount the valve vertically. **(Note: It is NOT recommended to mount the valve upside-down.)** In these instances, the vertical orientation is to help make the flow more uniform when the valve is placed downstream from some piping element, reducing noise, vibration, and wear to the piping system. This becomes more important as the valve gets closer to adjacent piping elements. The recommended shaft orientation after a given piping element is dependent on the orientation of that element.

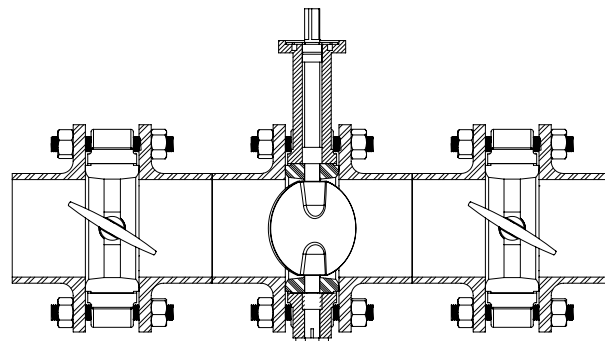
After vertical elbows or tees, the downstream valve shaft should be vertical; for horizontal elbows or tees, the valve shaft should be horizontal.



Valves downstream from an adjacent centrifugal pump should be oriented perpendicular to the shaft of the pump.



Adjacent valves used in combination should be installed at right angles to one another.



Valve and Flange Preparation

It is essential that the valve and mating pipe are properly prepared for the installation process. Future problems can easily be avoided if best installation processes are followed. All valve seat and pipe flange faces should be free of dirt, grit, dents, scrapes, and other surface malformations which may interfere with the ability of the sealing surface to properly mate or adhere cleanly. The valve disc sealing surface should also be properly inspected to ensure no foreign debris will adversely affect the operation of the valve.

Tool Requirements

Typically, the only tools required for installation are suitable wrenches for tightening the flange bolts and/or nuts required to secure the valve in service between the sealing surfaces. In some instances, a hoist may be required to secure placement of valves 10" and larger into service. Smaller valves can typically be installed by hand. Additional temporary pipe supports may be used to maintain the parallel alignment of flange faces.

Bolting Requirements

The required bolting information is listed on page 11 (see Table 1), and is designed to provide information regarding size, type, and quantity of bolting recommended for installation of the Delta T Series resilient seated butterfly valves. All recommendations are in accordance with ASME 125/150 specifications. Please note flange bolting is not included with shipment of any valve.

Handling and Storage Suggestions

It is recommended that the following steps be taken to ensure what we ordered was received in the intended manner:

- i) Check packing list to verify correct valve was received as ordered
- ii) Check for any damage during shipment
- iii) When moving the valve, take care to avoid damaging the flange face, disc sealing edge, and operators
- iv) If storage is required before installation, care should be taken to protect the valve from harsh environmental conditions
- v) Store the valve in such a manner to protect the disc sealing edge and the valve seat
- vi) Store the valve in a dry area with flanges protected in a suitable manner away from an unintended damage
- vii) If possible, keep the valve in a cool location, and away from direct sunlight

VALVE INSTALLATION PROCEDURE

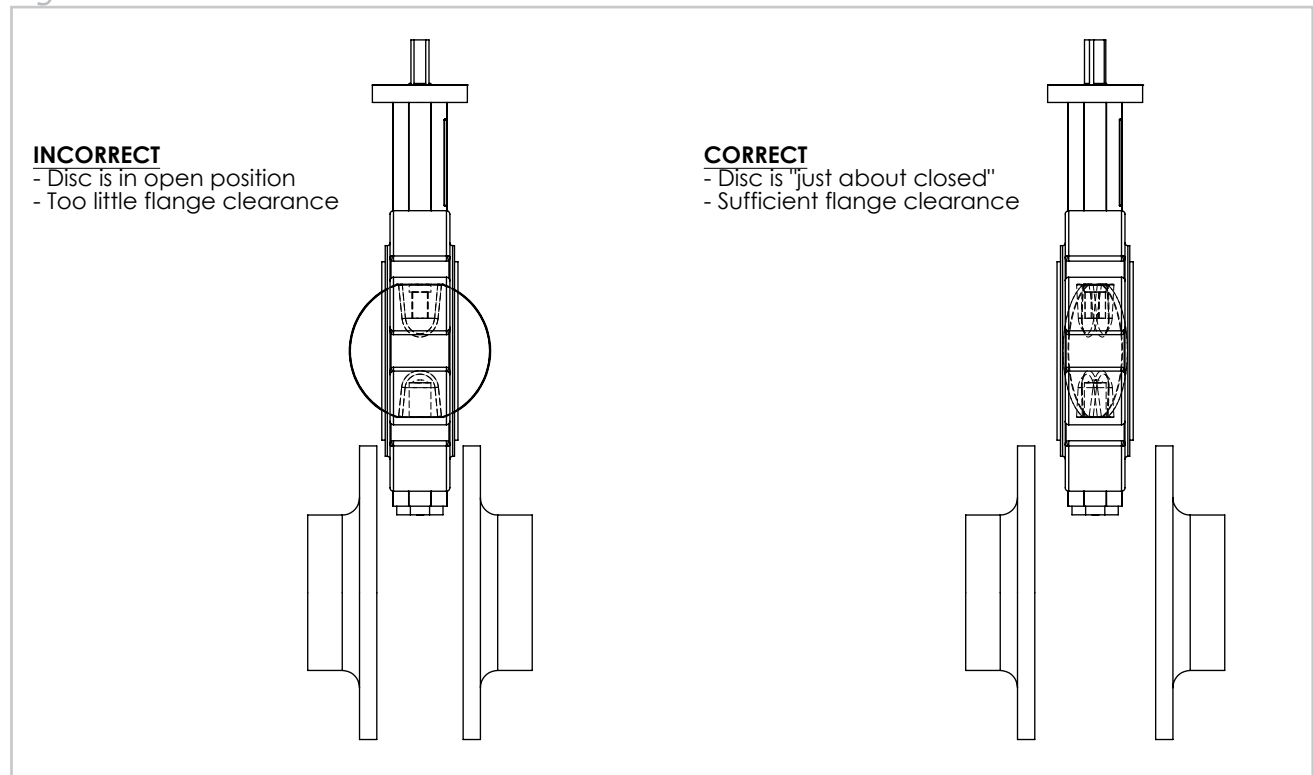
Pre-installation Checklist

1. Remove any protective flange covers from the valve
2. Inspect the valve to ensure the flow path is free from dirt and debris
3. Be careful that the mating pipeline is also free from dirt and debris, such as rust, pipe scale, welding slag and debris, which can easily damage the seat and disc surfaces
4. Any operators, either manual or automated, should be installed PRIOR to installation, to ensure proper alignment of all connecting hardware, and also proper alignment of the disc and valve seat
5. Double check the valve identification tag to ensure that the valve materials meet the intended operating conditions. It is always critically important to double check all factors during the installation process
6. Check flange bolts or studs for proper size, threading, and length

WARNING: PERSONAL INJURY OR PROPERTY DAMAGE MAY RESULT IF THE VALVE IS INSTALLED WHERE SERVICE CONDITIONS EXCEED VALVE RATINGS. PLEASE TAKE SPECIAL CARE TO DOUBLE CHECK ALL FACTORS DURING THE INSTALLATION PROCESS.

Initial Valve Positioning

Figure 2



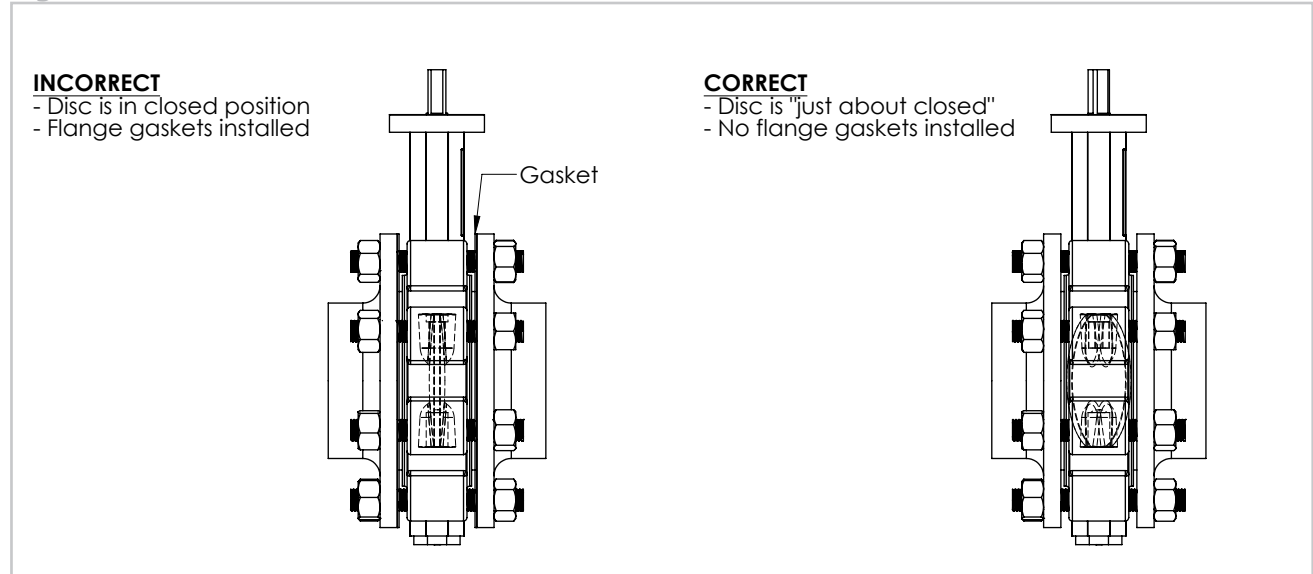
Before valve installation, it is important to properly align the mating pipe flanges. To install the valve, create enough space between the two flanges so that the valve body will fit without contact and carefully move the valve into position. Make sure the valve disc is in the "just about closed" position before insertion (See Figure 2 above).



IMPORTANT NOTE: For schedule 10 and/or thin wall pipe or when using slip on flanges, extra care must be taken to align seat on flange face to avoid valve damage and ensure proper "gasketing".

Valve Alignment and Flanging

Figure 3



Do not install flange gaskets – the butterfly valve seat is designed to mate directly to the flange and provides the seal. Leave the disc in the “just about closed” position and center the disc with the pipeline (See Figure 3 above). The next step is to insert all necessary bolts to attach the valve to the flanges, which varies depending on wafer or lug style.

For wafer style valves, loosely install the four bolts that pass through the upper and lower body alignment holes as shown in Figure 4 below. Next, insert the remaining flange bolts until all bolts are in position, then hand tighten all bolts. For lug valves, loosely install all bolts between the flanges and the lugs and hand tighten when complete if using style C as shown below. If using lug style B, first insert threaded studs, then hand tighten the nuts on each side.

Figure 4

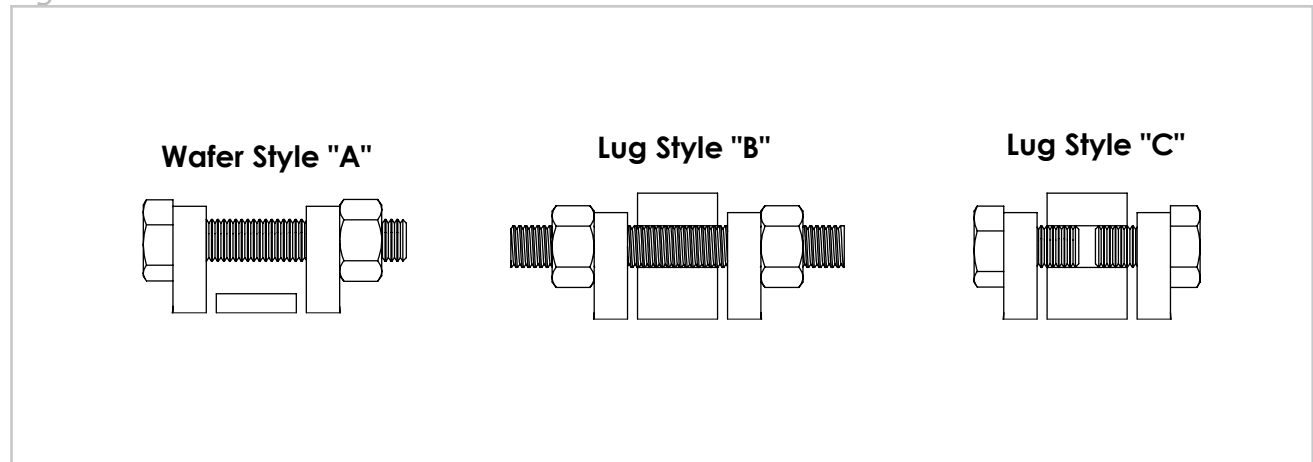
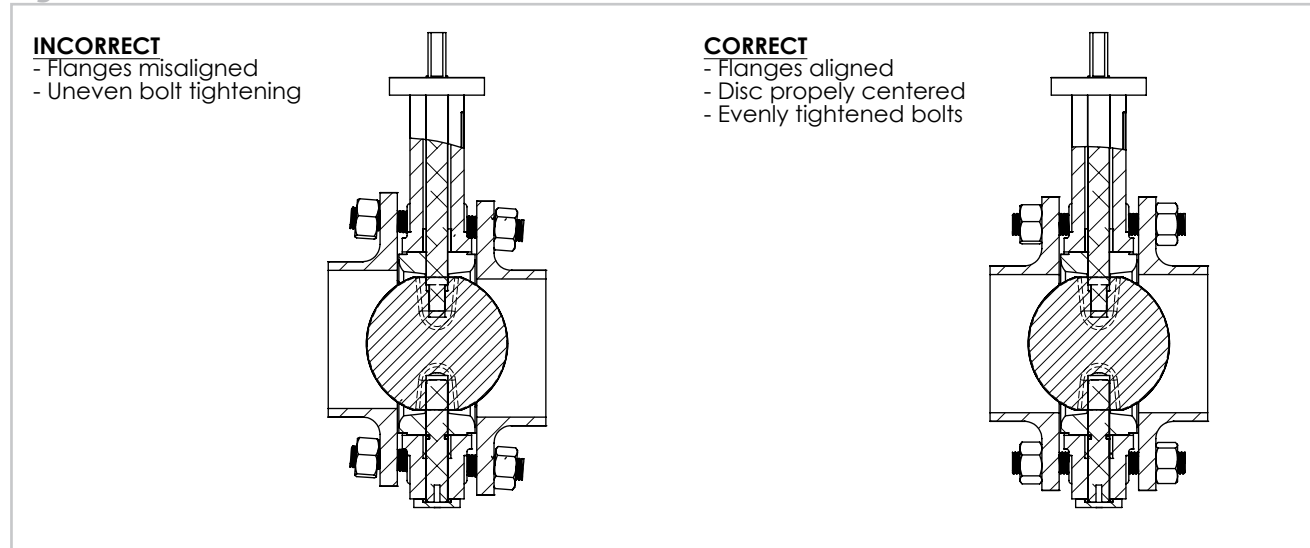


Figure 5



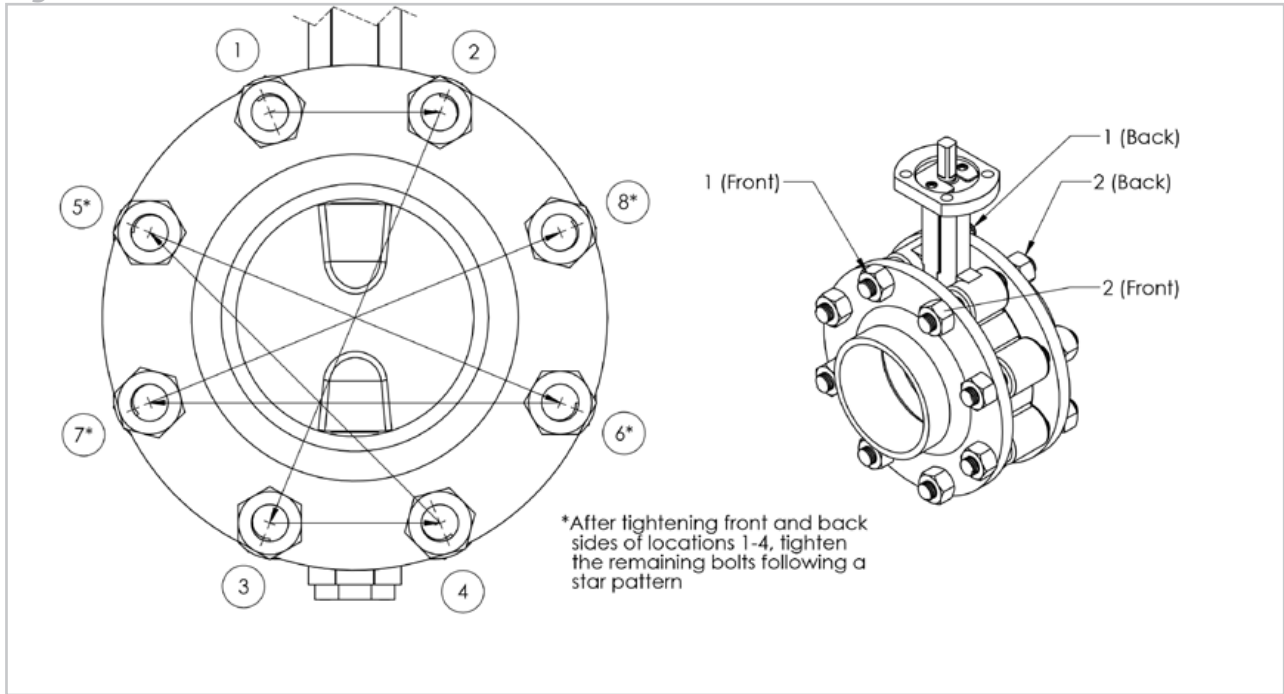
Before tightening the bolts, the valve needs to be positioned so that disc movement is free and unobstructed. Carefully open the disc to the fully open position and verify that there is no interference between the disc and the flanges. In addition, ensure that the flanges are properly aligned during tightening to minimize uneven stress or damage on the valve body or seat (See Figure 5 above). It is recommended to follow the Bolt Tightening Procedure below.

Bolt Tightening Sequence

For lugged style valves (particularly important for PTFE seated valves), it is essential to tighten the flange bolting uniformly on both sides of the valve to assure that the cartridge seat is not forced out of position. Improper tightening can result in leakage through the stem seals. The proper tightening procedure is as follows (See Figure 6 on page 11):

1. If using a long stud and nuts as in style "B", after positioning the valve between the mating flanges, install the nuts in all positions to hand tight or just until they contact the flange face only. If using bolts as in style "C", tighten the bolts on both sides of the valve until they are hand tight or just contacting the flange face.
2. The nuts or bolts immediately on either side of the upper stem (position 1 & 2) should be tightened first. Start with position 1 and tighten bolts/nuts in ½ turn increments, alternating between the front and back flanges.
3. Once that position is tight, proceed to tighten the bolt/nut pair opposite from the pair that was just tightened and tighten in the same fashion (position 2).
4. Follow the same sequence as in steps 2 and 3 above on the opposite end of the valve near the lower stem (positions 3 & 4).
5. Tighten the remaining bolts (if any) in a star pattern around the valve and then re-check all bolts/nuts for tightness in a star pattern for all bolts/nuts (position 5, 6, 7, 8, etc). Make sure to alternate sides and tighten in 1/2 turn increments.

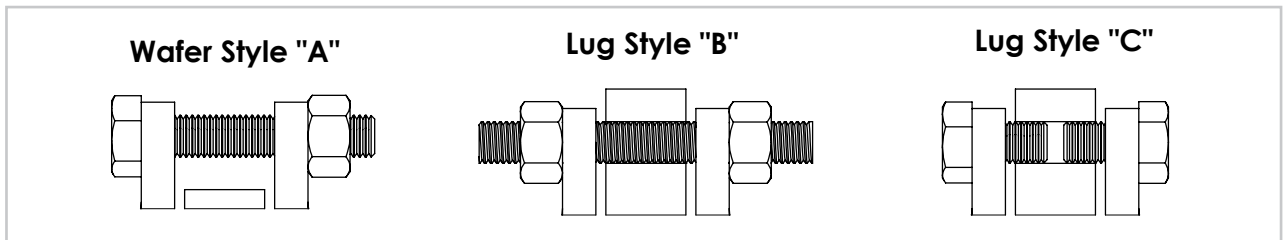
Figure 6



Flange Bolting Requirements

Table 1

Valve Size	Diameter	Number		Bolt Length A	Stud Length B	Cap Screw Length C	Recommended Minimum Bolt Torque (ft-lbs)*
		Machine & Stud	Cap Screw				
2"	0.625	4	8	4.00	5.00	1.25	20-30
2.5"	0.625	4	8	4.25	5.25	1.50	20-30
3"	0.625	4	8	4.50	5.25	1.50	20-30
4"	0.625	8	16	5.00	6.00	1.75	20-30
5"	0.750	8	16	5.50	6.50	1.75	33-50
6"	0.750	8	16	5.50	6.75	2.00	33-50
8"	0.750	8	16	6.00	7.00	2.25	33-50
10"	0.875	12	24	6.75	8.00	2.25	53-75
12"	0.875	12	24	7.00	8.25	2.50	80-110



***NOTE:** These torque values are a general recommendation ONLY for minimum tightening torques. Many factors affect tightening requirements including bolt grade, pipe alignment, flange material and others. Field engineering personnel must make final torque value decisions. Call factory for flange bolting requirements up to 48" size.



Maintenance

Basic Maintenance

Delta T Series 050/051 and 650/651 resilient seated butterfly valves do not require regular maintenance unless the valve starts to leak. However, to lengthen the life of service, and to ensure safety, scheduled inspections are recommended. Here is a quick list of steps when performing an inspection:

- A) Visually inspect the body for any leaks and/or signs of wear and tear
- B) Operate the valve from full open to full closed to assure operability
- C) Check the valve for unusual sounds during operation
- D) Routinely check the tightness of flange bolting

Safety Precautions

IMPORTANT: BEFORE REMOVING VALVE OR LOOSENING FLANGE BOLTS

- A) Verify that the pipeline is depressurized and adequately drained
- B) Identify flowing media and take any precautions necessary for toxic or flammable residual fluids
- C) Verify that the valve disc is closed before removing the valve
- D) Leave the operator (e.g. manual lever, actuator, etc.) attached when removing valve
- E) Do not detach the operator at any time while the line is pressurized