



ST RESILIENT SEATED

Installation, Operation, and Maintenance Manual

This manual is intended as a guide to assist in the installation, operation, and maintenance of the ST Resilient Seated Cartridge and Boot style butterfly valves. For best performance the process application of the butterfly valve must be in accordance with the pressure and temperature ratings for the valve body and seals. Installation and valve operation must comply with municipal codes and regulations.

Storage

Proper storage is required if the butterfly valves are not for immediate usage. The valves should remain packaged in the almost closed position so the seat is not under compression. Store valves out of the environment in a clean and waterproof area to safeguard against dirt and moisture.

Manual Operation

These butterfly valves are quarter-turn valves where the lever handle can rotate 90 degrees. To close the butterfly valve, lift the locking device up and turn the lever handle clockwise. When the handle is at a right angle the valve is in the closed position. The valve is in the open position when the handle is parallel with the pipeline. It is usually recommended that gear operators be used for valves 8" size and larger. Gear operators provide position indication with an indicator dial located on top of the operator. To close the valve rotate the hand wheel clockwise, and counter clockwise to open. Verify the gear operator travel stops after installation and adjust as necessary.

Flange Requirements

Both Wafer and Lug styles can be installed directly between ANSI 125/150lb flat or raised faced flanges. It is best to use weld-neck or socket weld flanges with the Cartridge style butterfly for ideal sealing. The Lug style may be used in dead end service with weld-neck or socket weld flanges and the side of the valve marked "INLET" facing the pressure side of the system. For safety and to protect the valve a blind flange is recommended after the downstream piping has been removed.

Valve Installation

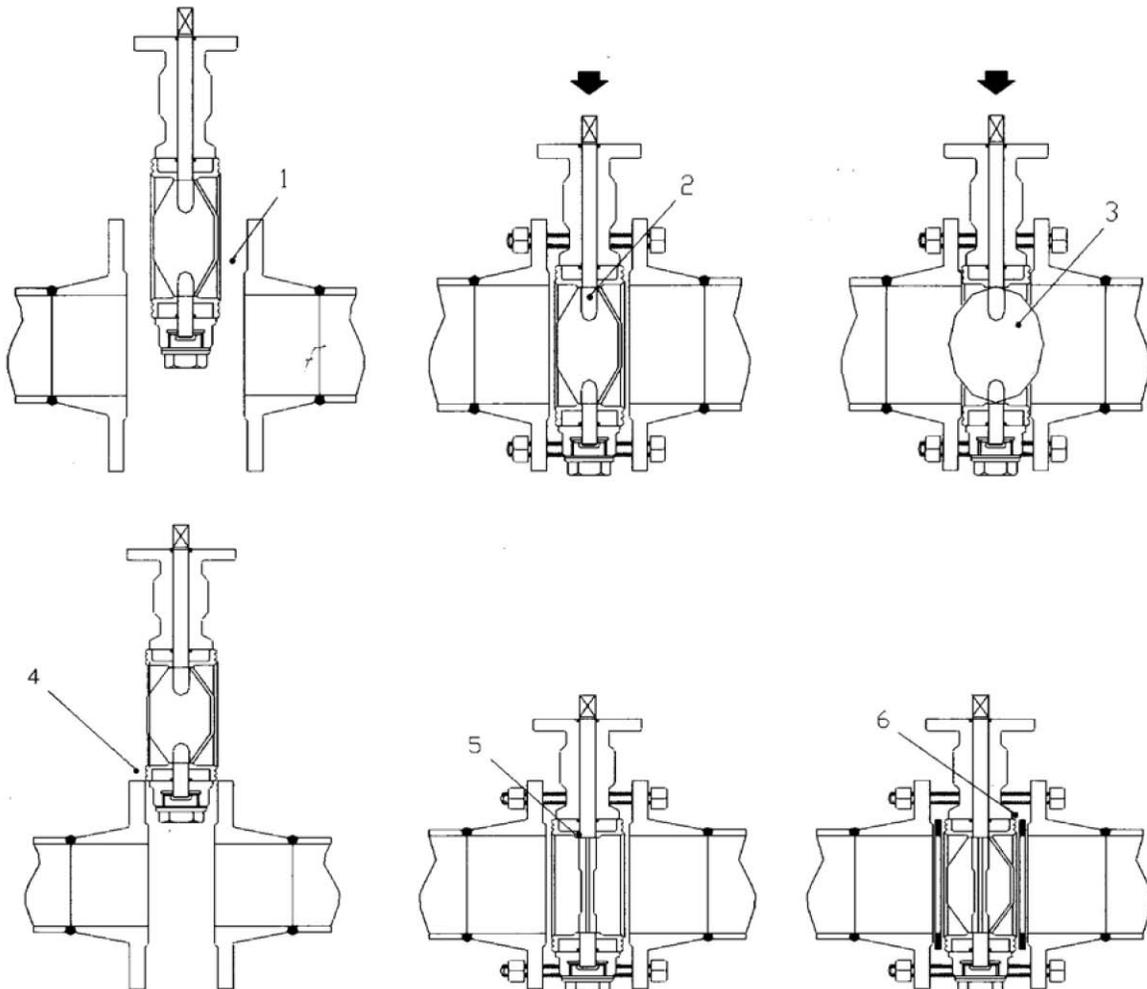
The ST butterfly valves are bi-directional and can be installed in position with the flow in either direction. It is recommended that between the butterfly and other valves or fittings there should be a minimum distance of six pipe size diameters.

- Before installation the pipeline must be clean and needs to be flushed to remove dirt, welding residues or other particles that could result in seat damage.
- Proper support for the weight of the pipeline is required to prevent stress and tension on the valve.
- Both flange and valve seats should be free of dirt or any surface irregularities.
- Spread flanges to facilitate valve insertion with the disc in the semi-closed position to prevent damage to the disc (Diagram 1). The distance between the two flanges must be equal and should exceed the valve's face-to-face dimension by 3/16". If the pipe flanges are not spread far enough apart the face of the seat may be damaged (Diagram 4).
- Do not use gaskets (Diagram 6). The resilient seat extends past the valve face so that gaskets are not required. As the flanges are tightened the seat is compressed to provide the sealing.
- Install flange bolts (Diagram 2)
- For Wafer style first partially tighten the flange bolts that go through the body alignment holes. Then hand tighten the remaining bolts.

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- For Lug style insert bolts aligning valve with flanges and hand tighten.
- Open and close the valve and ensure that nothing is obstructing the disc. The inside diameter of the pipe and flanges must be large enough to allow for smooth operation (Diagram 3).
- Fully open the butterfly valve and complete the tightening of the bolts in a crossover or star pattern to the recommended torque. For lug valves switch back and forth from the upstream and downstream flanges so that they will uniformly be bolted together. Valve installation with a totally closed disc can distort the seat during bolt tightening and may increase the initial torque (Diagram 5).
- Again open and close the valve to ensure that nothing is obstructing the disc
- Tack-weld the flanges to the pipe.
- Loosen the bolting and remove the valve from between the flanges.
- Weld flanges to pipe and wait until completely cooled. Do not complete flange welding with valve in place since the high temperature can damage the seat.
- Once installed the whole piping system should be pressure tested and the operating function of the valve tried about three times to ensure correct performance.

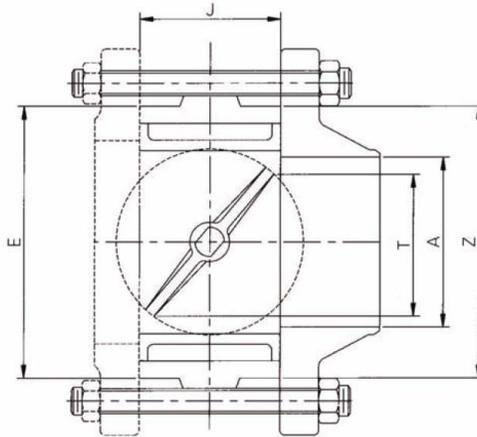
Diagrams 1 to 6





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Flange Dimensions with Butterfly



DIMENSIONS		VALVE SIZE (unit:inches)													
		2"	2-1/2"	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"
A	ANSI 150lb Weld Neck Flange	2.07	2.47	3.07	4.03	5.05	6.07	7.98	10.02	12.00	13.25	15.25	17.25	19.25	23.25
	ANSI 150lb Slip-On Flange	2.44	2.94	3.57	4.57	5.66	6.72	8.72	10.88	12.88	14.14	16.16	18.18	20.20	24.25
E	SEAT O.D.	3.29	3.94	4.50	5.46	6.67	7.71	9.76	12.20	14.06	15.94	17.91	20.53	22.52	26.18
T	Disc Chord	2.05	2.64	3.15	3.94	4.92	5.93	7.74	9.72	11.63	12.99	15.00	17.20	19.29	22.76
J	Body Face to Face	1.69	1.81	1.81	2.05	2.17	2.17	2.36	2.68	3.07	3.07	4.02	4.49	5.00	6.06
Z	Maximum Contact with Flange	3.66	4.25	4.80	5.91	7.09	8.19	10.16	12.44	14.45	16.14	18.43	20.75	22.76	26.77

Recommended Flange Bolting

Flange bolts are not included with the ST butterfly valves. The bolt tightening should be completed in a crossover or star pattern to ensure even sealing. The use of lock washers and/or lubricant will affect the torque values. Do not over tighten the bolts.

Valve Size	Thread Size	WAFER STYLE			LUG STYLE		Recommended Torques (ft. lbs.)	
		Qty	Bolt Length	Stud Length	Qty	Bolt Length	Min.	Max.
2"	5/8" - 11	4	4-1/4"	5-1/8"	8	1-1/2"	20	60
2-1/2"	5/8" - 11	4	4-3/4"	5-1/8"	8	1-1/2"	20	60
3"	5/8" - 11	4	5"	5-1/2"	8	1-1/2"	20	60
4"	5/8" - 11	8	5-1/4"	5-1/2"	16	1-3/4"	20	60
5"	3/4" - 10	8	5-1/2"	6-3/8"	16	1-3/4"	30	100
6"	3/4" - 10	8	5-1/2"	6-3/8"	16	2"	30	100
8"	3/4" - 10	8	6"	6-3/4"	16	2-1/4"	30	100
10"	7/8" - 9	12	6-1/2"	7-1/2"	24	2-1/4"	50	200
12"	7/8" - 9	12	7-1/4"	8-3/8"	24	2-1/2"	50	200



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Recommended Flange Bolting continued

Valve Size	Thread Size	WAFER STYLE			LUG STYLE		Recommended Torques (ft. lbs.)	
		Qty	Bolt Length	Stud Length	Qty	Bolt Length	Min.	Max.
14"	1" - 8	12	8"	8-3/4"	24	2-1/2"	70	250
16"	1" - 8	16	8-3/4"	10"	32	3-1/4"	70	250
18"	1-1/8" - 7	16	9-1/2"	11-1/8"	32	3-1/4"	100	350
20"	1-1/8" - 7	20	10-1/2"	12"	40	3-1/4"	100	350
24"	1-1/4" - 7	20	12"	13-13/16"	40	3-1/2"	150	450

Maintenance & Repair

- With normal use these butterfly valves don't require regular maintenance or internal lubrication during service.
- Valves that are used infrequently should be cycled on a regular basis from open to close to prevent the build up of material inside the valve.
- If there is leakage and the valve is closing perfectly, the leakage is due to seat or disc damage. It will then be necessary to disassemble the valve and replace damage parts.

WARNING: Don not attempt to disassemble the valve while under pressure

Valve Disassembly

Appropriate protection like gloves and a face shield should be worn when maintenance and disassembly is performed. If harmful or flammable media was being used in the piping system the valve must be decontaminated prior to disassembly. Caution is needed when removing the valve from the pipeline since fluids can be trapped.

- Put the valve in a semi-open position and flush the pipeline to help remove any hazardous media.
- Relieve all pressure from the pipeline with the valve in the open position. By closing a valve upstream and downstream the valve could be isolated.
- Turn the handle to an almost closed position.
- Remove the bolts and nuts with the exception of the two lowest sustaining the valve.
- Spread the flanges with proper tools and remove the valve. Do not use the valve to spread flanges since it could cause damage to the seat.

Disassembly of Valve

- For valves with gear operator, remove locking screws between valve top parts of stem and operator or remove fixing bolts and nuts between top flange and gear operator. In case of lever operator, remove fixing bolts and nuts between top flange & indicator plate.
- Remove retainer plate screw.
- Pull out upper stem & packing.
- Un-tighten screw on the lower stem to pull it out.
- Remove disc by pushing and turning it out from the seat.
- Remove seat from the valve body by applying pressure with a light wooden hammer blow or use another soft tool.



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Assembly of Valve

- Lubricate with seat protection grease outside seat area and insert it in the valve body for longer seat life.
- Perfectly match seat holes with the body holes using a round bar with a conical end.
- Apply seat protection grease on internal seat surface where it contacts with disc edge.
- Insert disc by pushing and rotating it towards the seat location and the square connection aligned to the valve neck.
- Before inserting the upper stem, put packing into body, retainer plate to stem, and then pull upper stem down to disc.
- Fasten retainer plate screw.
- Assemble gear operator. For valves with lever operator install indicator plate and then insert handle into stem with wooden hammer and fasten bolt.

Valve Seating Torques

All torques based on wet, lubricating service at ambient temperature. Please contact Howell for special temperature or dry applications.

Torque (in/lbs)

Valve Size	BOOT STYLE		CARTRIDGE STYLE		
	Seat EPDM, BUNA-N		Seat EPDM, BUNA-N		Seat Teflon
	145psi	255psi	145psi	255psi	165psi
2"	226	226	226	226	122
2-1/2"	226	238	226	226	165
3"	226	384	226	338	347
4"	451	507	226	451	347
5"	477	607	451	507	703
6"	477	694	564	733	981
8"	825	1,084	902	1,353	1,910
10"	1,650	2,517	1,850	1,906	2,430
12"	1,996	2,604	2,187	2,803	4,340
14"	7,928	10,296	5,443	10,296	
16"	10,365	13,466	12,267	13,466	
18"	13,934	18,109	13,807	18,109	
20"	17,206	22,366	15,073	22,366	
24"	27,731	36,036	37,005	36,036	

Actuator Installation

The ST butterfly valves have an ISO 5211 direct mounting pad that eliminates the extra cost of brackets and ensures accurate stem to actuator alignment. Howell actuators are available for each valve size. It is important to size the appropriate actuator based on the operational torque. If an overload of torque is applied by the actuator it may transfer the unintended load to the butterfly valve or piping joints. The setting of the input power or pressure of the actuator is not to exceed 1.5 times of the operational torque. Refer to the installation and operating manuals supplied with the actuator and accessories.



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Warranty

The ST butterfly valves have a warranty of 12 months from the date of purchase that the valves will be free from defects in workmanship and materials. Warranty is void for improper installation, usage, application, maintenance or modifications made to the valve. Under warranty identical valves, parts or a refund of the original price will be issued. Any extra installation, engineering or other coincidental costs incurred in connection with repair or replacement are not covered under warranty.