Contents

1 SCOPE

1.1 CAUTION

1.1.1 For your safety, read this manual before installation or servicing.

1.1.2 Before installing or servicing, please ensure the line pressure has been relieved and any hazardous fluids have been drained or purged from the system.

1.1.3 Ensure that all Lockout and Tagout procedures for the system have been properly implemented.

1.2 USE

1.2.1 A-T Controls ES Series Resilient Seated Butterfly Valves are available in lug and wafer style designs and are compatible with ASME B16.5 Class 125/150 flanges for sizes 1-1/2”-24” and ASME B16.47 Series A Class 150 for sizes 28”-48”. 1-1/2”-12” wafer style valves are also compatible with EN1092-2 PN10/16 and JIS B2220 10K flanges.

1.2.2 Maximum results and optimum valve life can be maintained under normal service conditions and in accordance with pressure/temperature ratings and corrosion data chart.

2 INSTALLATION

2.1 A-T Controls ES Series Resilient Seated Butterfly Valves are bi-directional and can be installed with the flow in either direction. The valve can be mounted in any position so that the handle, gear, or actuator has proper clearance, can be easily accessed, and the open/close indicator can be viewed. If the gear is equipped with a chain wheel, the valve shall be mounted in a way so that the chain does not come in contact with the valve or pipeline.

2.2 Before installation of the valves, the pipe must be flushed clean of dirt, burrs, and welding residues. Failure to do so can cause the seats and sealing surfaces to be damaged.

2.3 The pipe must be free from tension and in proper alignment.

2.4 Before installation of the valves, check to ensure that all flange seals are free from defects.

IMPORTANT NOTE: Flange gaskets shall not be used with A-T Controls ES Series Resilient Seated Butterfly Valves. The valves have a seal around the seat so that a gasket shall not be used.

2.5 Before installation of the valves, check to ensure that there is proper clearance for the disc to be able to fully open and close without being obstructed. This is especially important when using sch. 80 pipe as the clearances become smaller. See the ES Series catalog for valve dimensions.

2.6 A-T Controls ES Series Resilient Seated Butterfly Valves shall be installed in the pipeline completely assembled and open approximately 5 degrees from the closed position. The valves shall NOT be opened so that the disc is outside of the seat. Do NOT disassemble the valves or remove any handles, gears, or actuators to install.

2.7 Install the valve in the pipeline and tighten the flange bolts properly per the recommended minimum flange bolt torques in the table below. The bolts shall be torqued in a uniform pattern as to evenly compress the seat for sealing (no flange gaskets shall be used).

Recommended Minimum Flange Bolt Torques ES Series Resilient Seated Butterfly Valves			
Size	Torque (ft-lbs)	Size	Torque (ft-lbs)
1-1/2"	40-50	**10"**	95-120
2"	40-50	**12"**	120-150
2-1/2"	40-50	**14"**	225-250
3"	65-80	**16"**	215-240
4"	40-50	**18"**	300-330
5"	75-95	**20"**	275-300
6"	75-95	**24"**	440-470
8"	100-125		

2.8 DEAD-END SERVICE

A-T Controls ES Series Resilient Seated Butterfly Valves are not rated for dead-end service applications.

3 VALVE OPERATION

3.1 MANUAL

CAUTION: A-T Controls recommends a manual gear operator for all valves larger than 6".

3.1.1 HANDLES

3.1.1.1 10 Position Handles

To **OPEN** the valve; squeeze the handle to unlock it and turn it in the counter-clockwise direction. The handle can be locked in at 10 degree increments to adjust the flow. The valve will be locked into the 90 degree marker and parallel to the pipeline when fully open.

To **CLOSE** the valve; squeeze the handle to unlock it and turn it in the clockwise direction. The handle can be locked in at 10 degree increments to adjust the flow. The valve will be locked into the 0 degree marker and perpendicular to the pipeline when fully closed.

Note: The handles contain a pin that can be used to deter unwanted operation. The pin can be removed if unnecessary per the end user's requirement. A padlock (not included) can also be used through this hole in the handle to lock out operation of the handle.

3.1.1.2 Infinite Handles

To **OPEN** the valve; loosen the lock bolt & nut to unlock it and turn the handle in the counter-clockwise direction. The handle can be set in infinite positions between fully open and fully closed to adjust the flow. Once in the desired position, tighten the lock bolt & nut to hold the handle in place. The valve will be fully counter-clockwise and parallel to the pipeline when fully open.

To **CLOSE** the valve; loosen the lock bolt & nut to unlock it and turn the handle in the clockwise direction. The handle can be set in infinite positions between fully open and fully closed to adjust the flow. Once in the desired position, tighten the lock bolt & nut to hold the handle in place. The valve will be fully clockwise and perpendicular to the pipeline when fully closed.

3.1.2 GEAR

To **OPEN** the valve; turn the hand wheel counter-clockwise. The indicator will be pointing to the open position and stop rotating when fully opened. The flow can be adjusted by stopping the indicator anywhere between open and close.

To **CLOSE** the valve; turn the hand wheel clockwise. The indicator will be pointing to the close position and the hand wheel will stop rotating when fully closed. The flow can be adjusted by stopping the indicator anywhere between open and close.

Note: The gears contain a locking device that allows handwheel operation to be locked out through the use of a padlock (not included). The locking device can be removed if unnecessary per the end user's requirement.

3.2 AUTOMATED

A-T Controls ES Series Resilient Seated Butterfly Valves can be mounted with quarter turn actuators. Valves with actuators shall be checked for proper valve stem alignment. Angular or linear misalignments may result in high operational torque and unnecessary wear on the valve stem. See the actuator IOM for information on operating the actuator.

Note: When closing the valve, the disc will begin to seal on the seat before it is perfectly perpendicular to the pipeline/flow. In certain circumstances this may be desired to reduce the torque required to "close" the valve or when moving from the closed to open position. Gear or actuator stops can be adjusted to achieve the new "closed" position. This would only be recommended for lower pressure applications as A-T Controls only rates the valves to the full pressure differential in the fully closed position.

4 DISASSEMBLY & ASSEMBLY

4.1 Drain and make sure there is no pressure in the pipeline and take necessary precautions for the media in the pipeline.

4.2 Set the valve in the closed position and remove it from the pipeline.

4.3 Reference the procedure below for disassembly & assembly.

Note: Where appropriate below, some pictures may show an NS Series valve as the reference. In these cases, even though the bodies may differ slightly, the process applies to both the ES & NS Series.

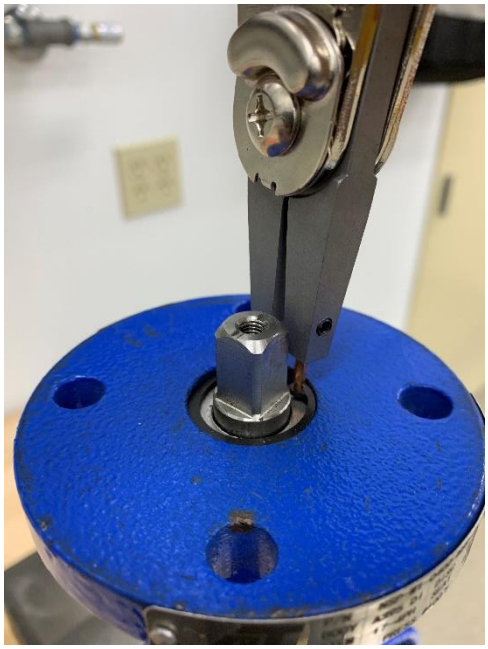
1-1/2”-12” ES Series RSBFV Disassembly & Assembly

Disassembly

1. Remove any manual handles, gears, or actuators.

2. Place the valve in a vise for stability.

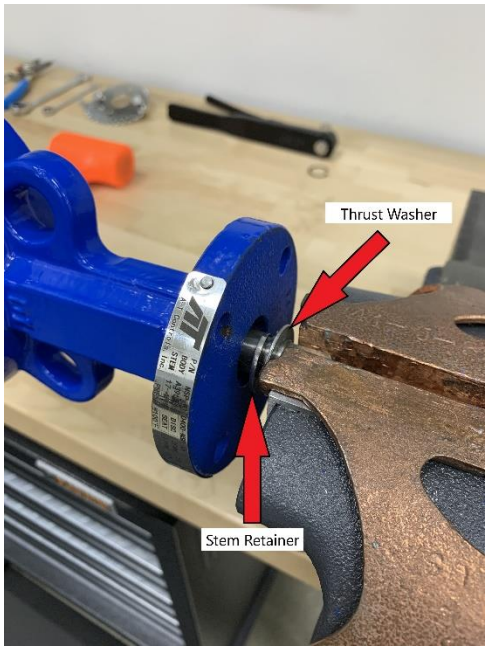
3. Remove the snap ring at the top of the stem.



4. Remove the valve from the vise and clamp the top of the upper stem in the vise horizontally with soft jaws to prevent damage.

5. Before removing the stem completely, remove the stem retainer once it is exposed to ensure it is not lost. Once this is removed, proceed with removing the stem the rest of the way. With the stem removed from the vise, remove the thrust washer and place it with the stem retainer.

Remove the upper stem by sliding the body off the upper stem. A rubber mallet can be used to hit against the mounting pad to slide the body off the upper stem.



6. With the upper stem removed, place the valve back in the vise as done in step 2.

7. Thread the M8 threaded rod into the lower stem.

8. Using a pry bar on the adjustable nut, pull the lower stem fully up in the disc.

9. Slightly move the bottom of the disc so that the lower stem is not able to move back down into the hole and remove the M8 threaded rod.

10. With the M8 threaded rod removed, the disc and lower stem can now be removed from the valve.

11. Remove the cartridge seat using a hydraulic press to push the seat out.

Note: Stem bushings and seals should stay in the valve body during disassembly. If they are removed, please reference the BOM.

Assembly

1. Install the cartridge seat using a hydraulic press to push the seat in. Ensure the seat stem holes are aligned with the body stem holes before pressing the seat in the body.

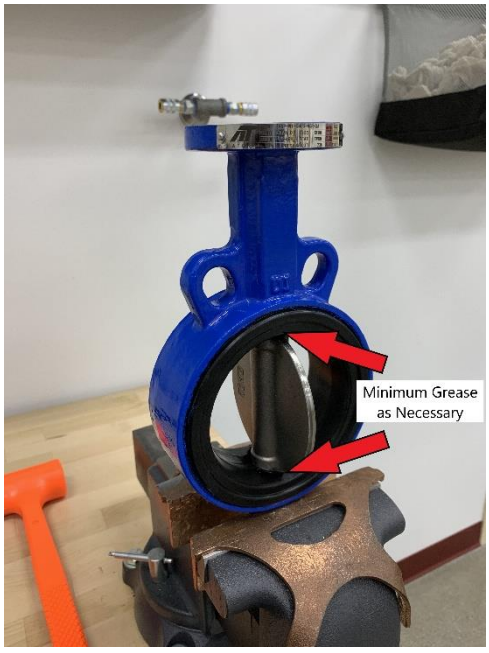
2. Place the valve body in a vise for stability. Note: The valve body shall already contain the seat and all necessary stem seal components.

3. Orient the valve disc so that the stem engaging flats are closer to the top of the valve.

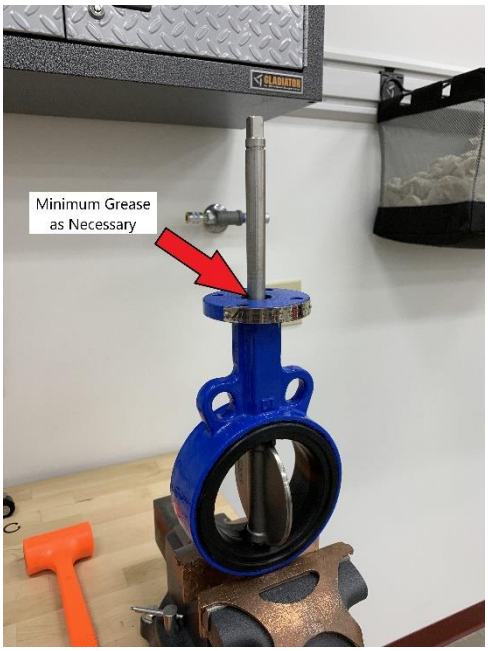
Note: 1-1/2" -3" valves will have a one-piece stem; for these valves, the disc will be oriented so that the stem engaging flats are closer to the bottom of the valve.

4. Insert the lower stem into the bottom of the disc with the threads up.

5. Insert the disc and lower stem combination in the valve. Note: Molykote 111 NSF 61 approved grease may be applied conservatively on the upper and lower disc/seat contact points.

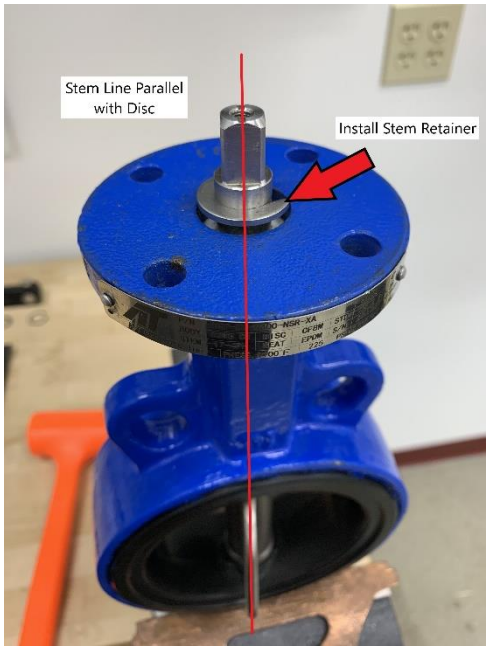


6. With the disc in place, insert the upper stem. Note: Molykote 111 NSF 61 approved grease may be applied conservatively on the upper stem contact points.



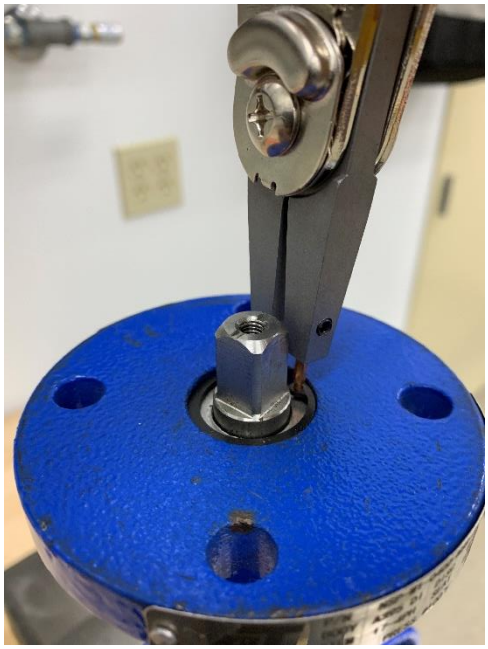
Before fully inserting the upper stem into the disc and valve, ensure that the line on the top of the stem is parallel with the disc so that the stem flats engage properly with the disc. Also, install the stem retainer into the stem groove before inserting the stem the rest of the way.

A rubber mallet may be used to tap the upper stem down into the valve. If it seems that the stem is not moving down easily, work the disc back and forth as it may not be lined up sufficiently with the upper stem. As the upper stem is inserted, it will contact the lower stem and push it down into the body.



7. Install the thrust washer.

8. Install the snap ring.



9. Cycle the valve to ensure proper operation.

5 STORAGE

A-T Controls ES Series Resilient Seated Butterfly Valves should be clean and bagged sufficiently to prevent contamination and stored in a cool, dark place.

6 REPAIR KITS

Repair kits are not available for A-T Controls ES Series Resilient Seated Butterfly Valves. A-T Controls does not recommend repairing the valves due to the tools and equipment that can be required to properly disassemble and assemble the valves. A-T Controls does have some spare parts available if desired by the customer, however, any repair by the customer is done at their own risk.

7 BILL OF MATERIALS

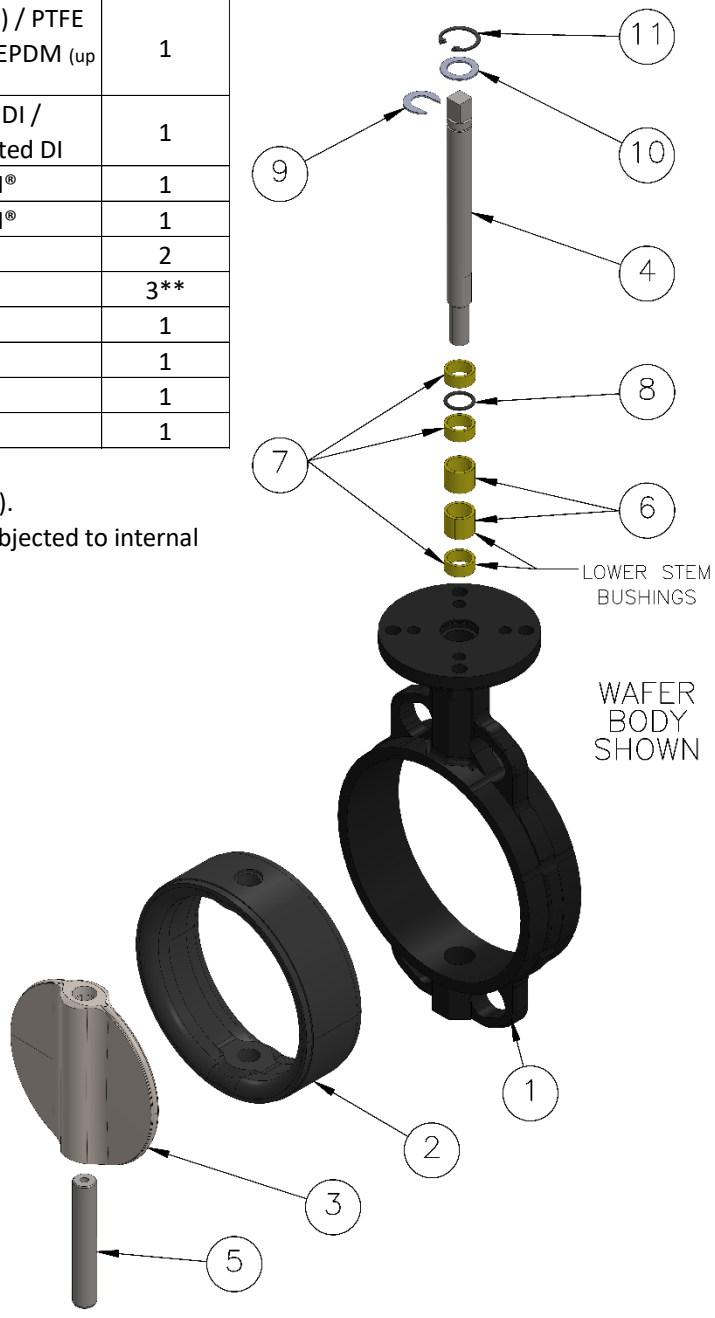
Bill of Materials (1-1/2"-14")

Item No.	Description	Material	Qty
1	Body	ASTM A395 / A351 CF8M	1
2	Seat	EPDM / Buna-N / (FKM / Viton®) / PTFE over EPDM / White Food Grade EPDM (up to 12" only)	1
3	Disc	A351 CF8M / Nylon Coated DI / Aluminum Bronze / Nickel Plated DI	1
4	Upper Stem*	ASTM A276 431 / 17-4 PH®	1
5	Lower Stem*	ASTM A276 431 / 17-4 PH®	1
6	Long Bushing	FRP #	2
7	Short Bushing	FRP #	3**
8	O-Ring	Buna-N #	1
9	Stem Retainer	ASTM A276 304	1
10	Thrust Washer	ASTM A276 304	1
11	Snap Ring	SK7 Steel	1

* 1-1/2"-3" valves have a one-piece stem.

** 1-1/2" & 10" valves only have qty 2 (not in lower stem area).

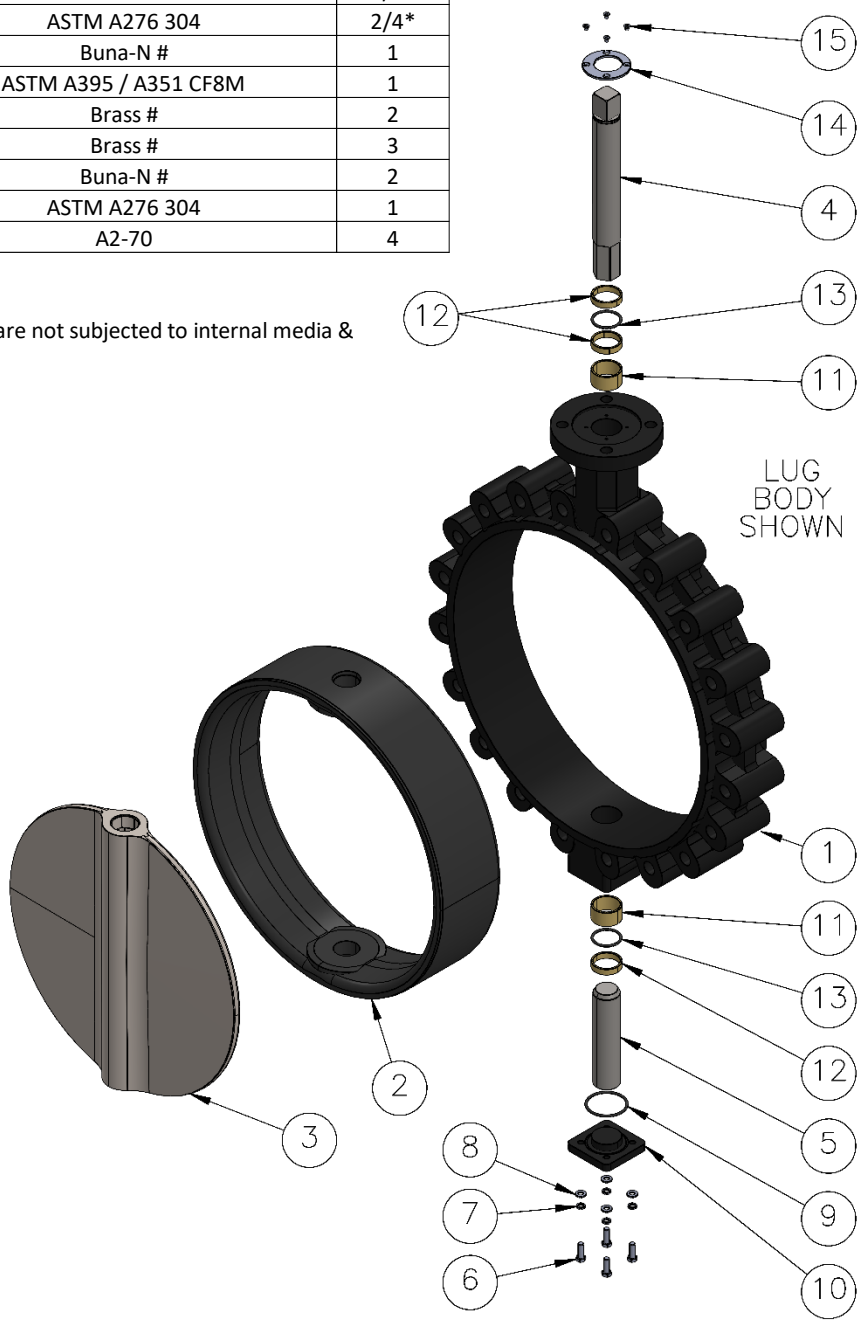
Under normal operation, the O-Ring and Bushings are not subjected to internal media & pressure.



Bill of Materials (16"-24")

Item No.	Description	Material	Qty
1	Body	ASTM A395 / A351 CF8M	1
2	Seat	EPDM / Buna-N / (FKM / Viton®) / PTFE over EPDM	1
3	Disc	A351 CF8M / Nylon Coated DI / Aluminum Bronze / Nickel Plated DI	1
4	Upper Stem	ASTM A276 431 / 17-4 PH®	1
5	Lower Stem	ASTM A276 431 / 17-4 PH®	1
6	Bottom Cover Bolt	A2-70	2/4*
7	Bottom Cover Lock Washer	ASTM A276 304	2/4*
8	Bottom Cover Flat Washer	ASTM A276 304	2/4*
9	Bottom Cover O-Ring	Buna-N #	1
10	Bottom Cover	ASTM A395 / A351 CF8M	1
11	Long Bushing	Brass #	2
12	Short Bushing	Brass #	3
13	O-Ring	Buna-N #	2
14	Stem Retainer	ASTM A276 304	1
15	Stem Retainer Bolt	A2-70	4

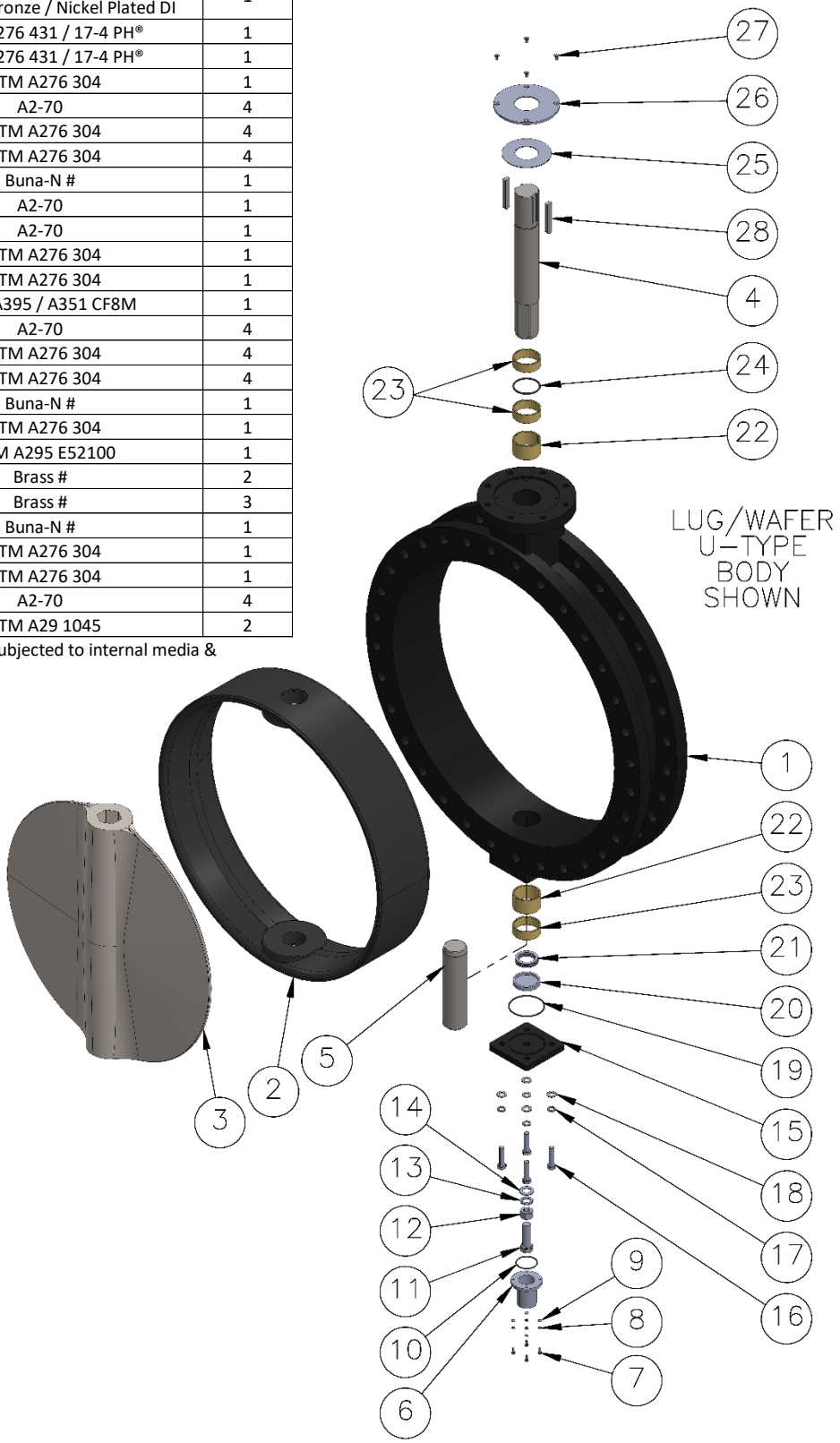
* Wafer: 16"-18" - qty 2, 20"-24" - qty 4.
* Lug: 16"-24" - qty 4.
# Under normal operation, the O-Ring and Bushings are not subjected to internal media & pressure.



Bill of Materials (28"-48")

Item No.	Description	Material	Qty
1	Body	ASTM A395 / A351 CF8M	1
2	Seat	EPDM / Buna-N / (FKM / Viton®)	1
3	Disc	A351 CF8M / Nylon Coated DI / Aluminum Bronze / Nickel Plated DI	1
4	Upper Stem	ASTM A276 431 / 17-4 PH®	1
5	Lower Stem	ASTM A276 431 / 17-4 PH®	1
6	Adjust Bolt Cap	ASTM A276 304	1
7	Adjust Bolt Cap Bolt	A2-70	4
8	Adjust Bolt Cap Lock Washer	ASTM A276 304	4
9	Adjust Bolt Cap Flat Washer	ASTM A276 304	4
10	Adjust Bolt Cap O-Ring	Buna-N #	1
11	Adjust Bolt	A2-70	1
12	Adjust Bolt Nut	A2-70	1
13	Adjust Bolt Lock Washer	ASTM A276 304	1
14	Adjust Bolt Flat Washer	ASTM A276 304	1
15	Bottom Cover	ASTM A395 / A351 CF8M	1
16	Bottom Cover Bolt	A2-70	4
17	Bottom Cover Lock Washer	ASTM A276 304	4
18	Bottom Cover Flat Washer	ASTM A276 304	4
19	Bottom Cover O-Ring	Buna-N #	1
20	Adjust Bearing Housing	ASTM A276 304	1
21	Thrust Bearing	ASTM A295 E52100	1
22	Long Bushing	Brass #	2
23	Short Bushing	Brass #	3
24	O-Ring	Buna-N #	1
25	Stem Retainer	ASTM A276 304	1
26	Gland	ASTM A276 304	1
27	Gland Bolt	A2-70	4
28	Key	ASTM A29 1045	2

Under normal operation, the O-Ring and Bushings are not subjected to internal media & pressure.



8 STUD & BOLT SIZING

ES Series Resilient Seated Butterfly Valve Stud & Bolt Sizing							
Class 150							
Valve Size	Thread Size	Wafer Studs		Lug Studs		Lug Bolts	
		Qty	Length	Qty	Length	Qty	Length
1-1/2"	1/2 - 13	4	4.25	4	2.25	4	NR
2"	5/8 - 11	4	5.00	4	2.50	4	1.25
2-1/2"	5/8 - 11	4	5.50	4	2.75	4	1.50
3"	5/8 - 11	4	5.50	4	2.75	4	1.50
4"	5/8 - 11	8	5.75	8	3.00	8	1.75
5"	3/4 - 10	8	6.25	8	3.25	8	1.75
6"	3/4 - 10	8	6.50	8	3.25	8	1.75
8"	3/4 - 10	8	6.75	8	3.50	8	2.00
10"	7/8 - 9	12	7.50	12	3.75	12	2.25
12"	7/8 - 9	12	8.00	12	4.00	12	2.50
14"	1 - 8	12	8.75	12	4.50	12	2.50
16"	1 - 8	16	9.75	16	5.00	16	3.00
18"	1-1/8 - 7	16	10.75	16	5.50	16	3.50
20"	1-1/8 - 7	20	11.50	20	5.75	20	3.75
24"	1-1/4 - 7	20	13.25	20	6.75	20	4.50

• Lengths are based on basic heavy hex nuts and flange thicknesses per ANSI B16.5.

• Lug Stud and Bolt quantities are per side.

• A-T Controls recommends using studs to ensure full engagement in tapped holes.

• This table is provided by A-T Controls for reference only, it is the end user's responsibility to select the correct material, grade, and size of fasteners for their application.

• NR - Not Recommended.

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