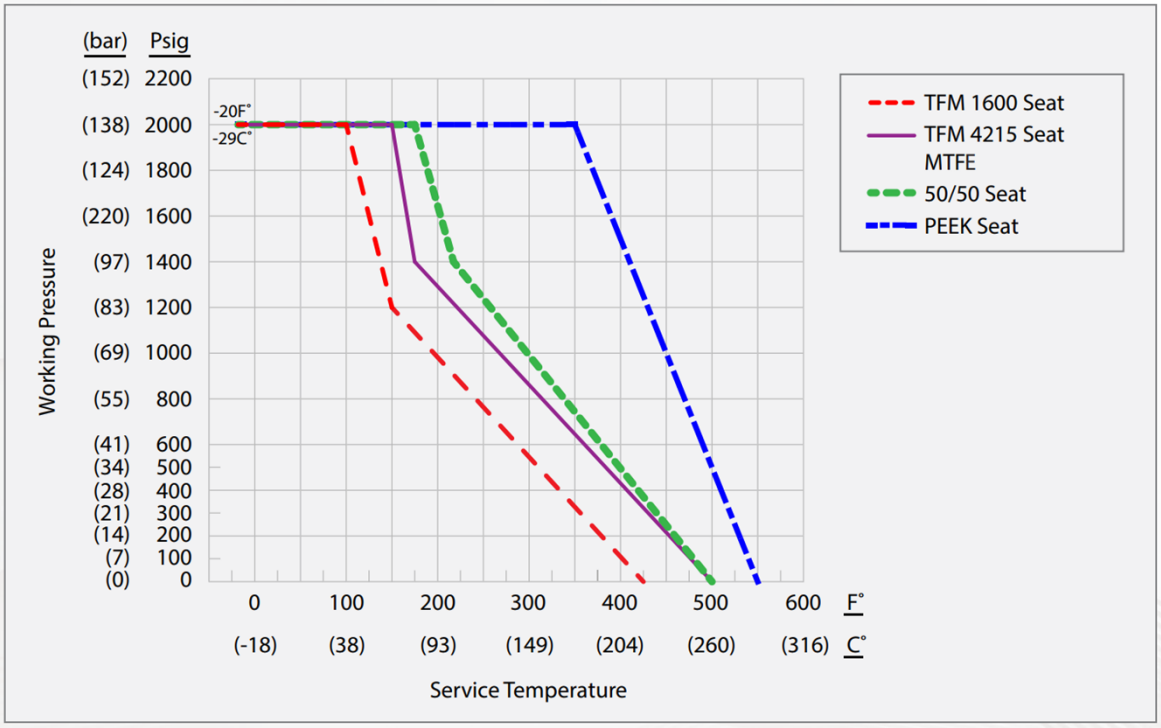
OPERATING & MAINTENANCE INSTRUCTIONS

ITEM: STAINLESS STEEL BALL VALVE, 3-PIECE, SOCKET WELD ENDS
MODEL NO.: SESTO M32S SERIES
SIZES: 1/4" ~ 2"

A. BASIC FUNCTIONS OF THE VALVES AND THEIR APPLICATIONS

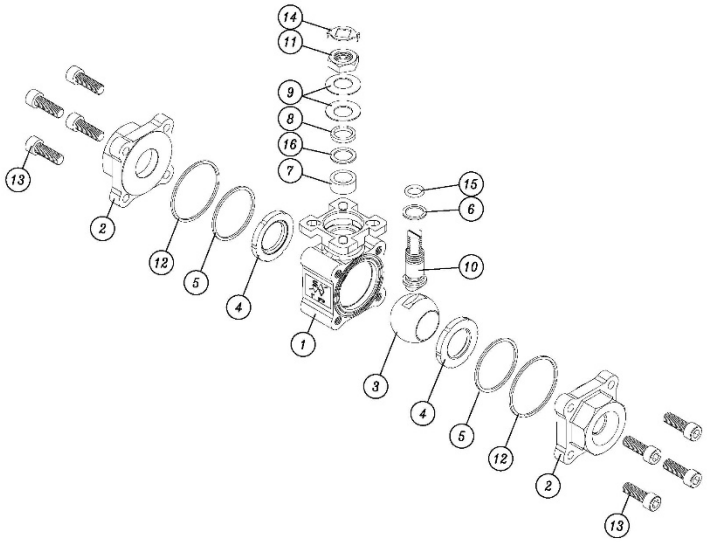
1. M32S ball valves are designed for ON-OFF service. They should be used in either fully opened or fully closed position for shut-off service; they are not designed for throttling service, in which the valves are in partially opened or partially closed conditions. Leaving the valves partially opened or closed will cause the ball to deform or to be damaged due to the fluid flow and the leading edge of ball.
2. To open the valve, simply turn the handle in the counterclockwise direction to its uttermost position; the handle will stop at the in-line position to make sure the ball inside the valve is at its fully opened status.
3. To close the valve, simply turn the handle in the clockwise direction to its uttermost position; the handle will appear to be perpendicular to the pipeline to rotate the ball inside the valve to the fully closed status.

   Note: Special attentions must be drawn regarding the movement of handle to its fully opened and closed positions. In case the handle is not stopped at its uttermost position either at in-line position or at perpendicular position of pipeline, the valves may not be fully opened or fully closed.
4. The materials used for the construction of M32S are shown in the MATERIALS LIST in the BOM section. The basic material of valve body & trim (ball and stem) for M32S is Stainless Steel (ASTM Grade CF8M), which has good corrosion & erosion resistance. The seats are made of TFM 1600 material (Modified PTFE compound; TFM 1600 is a material produced by 3M). TFM 1600 is inert to most chemicals, but its ability to hold pressure decreases as the temperature of flow media rises. The decline starts at 38°C (100°F). At the temperature of 204°C (400°F), the seats are almost incapable to hold pressure (See the below Pressure-Temperature Ratings chart). Therefore, when the temperature of flow media is higher than 38°C (100°F), special attentions regarding the pipeline pressure must be considered. Valves with TFM 1600 seats are not recommended to be used at the temperature above 180°C (356°F).



5. M32S are designed for the service under 2,000 psi (138 bar) working pressure with temperature of 38°C (100°F) and below. They should not be used under any working pressure higher than 2,000 psi. Temperatures higher than 38°C (100°F) will decrease the valves' ability to hold pressure due to the nature of seat materials stated above.
6. M32S are of full port design. Thus, the pressure drop in the system is minimized.
7. For lines with high risk of accidents due to valve operation errors, appropriate markings (tags or color-coded classification) should be attached at the location of valves. M32S is equipped with a locking device on handle for such applications. Simply use a pad lock to get through the lockable hole on the lever handle, and the valve can be locked in either OPEN or CLOSE position.

B. BOM WITH VALVE EXPLODED VIEW



MATERIALS LIST:

ITEM	PARTS	Stainless Steel	Carbon Steel
1	BODY	ASTM A351-CF8M	ASTM A216-WCB
2	END CAP	ASTM A351-CF8M	ASTM A216-WCB
3	BALL	ASTM A351-CF8M/316	ASTM A351-CF8M/316
4	SEAT	TFM1600	TFM1600
5	GASKET	PTFE	PTFE
6	THRUST WASHER	PTFE	PTFE
7	STEM PACKING	GRAPHITE	GRAPHITE
8	GLAND	AISI 304	AISI 304
9	BELLEVILLE WASHER	AISI 301	AISI 301
10	STEM	ASTM A276-316	ASTM A276-316
11	PACKING NUT	AISI 304	AISI 304
12	GASKET-1	GRAPHITE	GRAPHITE
13	BOLT	AISI 304	AISI 304
14	NUT LOCK	AISI 304	AISI 304
15	O-RING	VITON	VITON
16	PACKING PROTECTOR	CARBON 25% PTFE	CARBON 25% PTFE

C. INSTALLATION OF VALVES TO PIPELINE

SAFETY CAUTION: Before installing or servicing, please ensure that the line pressure is relieved and any hazardous fluid is drained or purged from the system. Please also observe the maximum temperature and pressure rating of the valve & the system.

1. **Cleaning:** Prior to connecting ball valves to pipeline, remove sand, mud, rust particles and any other foreign materials from the threads of pipe and valve by liquid flushing or blown air.
2. **Valve installation: First,** turn valves into open position (handle parallel to pipe line). **Second**, insert the pipe ends into the socket weld ends of the valves. **Third**, tack-weld in four points between the valve end and the pipe. **Fourth**, loosen two of the upper body joint screws adjacent to the stem and loosen and take out the other bolts, in order for the valve body to be swung out of pipe line (see more details on the MAINTENANCE INSTRUCTIONS section). **During this procedure, it is important to hold the ball, seats, and body joint seals to their original positions without removing out of the body cavity. Fifthly,** complete the entire welding for both end caps on the pipe. **Sixthly,** after the temperature cools down, clean the valve and welding surface, and re-assemble the valves by evenly tightening the body joint bolts properly.

Notes:

a. The valves may be installed in any position on the pipeline.

b. It is allowed to weld directly without disassembling the valves as long as the temperature of end caps at body joint gasket area can be controlled under 150°C (302°F) during the entire welding process.

c. The inner body joint seal (Part No. 5, see BOM section) has two sides – one side was originally faced to the ball and the other side was originally faced to the end cap; if the seal is removed out of the body cavity during the welding procedure, it must be fit back in the same original position. This can be achieved by matching the seal with the notched groove on the external diameter of the ball seat. However, it is highly recommended that new body joint seals should be used after any dismantling between valve body & end cap, since the body seals have no elastic memory and cannot be fully recovered back to its original shape after compression.

d. The pipeline should be free of tension during the valve installation.

D. MAINTENANCE INSTRUCTIONS

M32S ball valves are designed for high performance and long durability. All the components are produced of high quality materials and are precisely machined, assembled, and tested. Therefore, under normal operation, the valves rarely require regular maintenance. Unless after long period of service time, very frequent ON-OFF operation, or highly corrosive flow media service, should maintenance become necessary and periodic.

The most possible problem under the above service conditions is the stem leakage due to wear-down of the resilient parts in the stem area. However, M32S are functioned with live-loaded packing gland for self-adjustment of stem packing compression, so there is almost no need to manually adjust the packing gland unless after long service hours or under critical conditions. In the case of stem leakage, the following steps are to be taken:

1. **First**, apply appropriate wrench to unfasten the handle nut. Take out the handle washer, handle, & nut lock. **Second**, tighten the packing nut clockwise (see the drawing in the BOM section) by a wrench. Tightening the packing nut will increase pressure to the gland and Belleville washers in order to compress the Graphite stem packing (which may have already worn down) to cause tighter contacts with body neck & stem to stop leakage. The sizes of the packing nuts and the fastening torques are as below. Under normal conditions, the torques applied to the packing nut should not exceed the below ranges:

VALVE SIZE	SIZE OF PACKING NUT	FASTENING TORQUES
1/4”	M12	133 In-lbs (15 N-m)
3/8”	M12	133 In-lbs (15 N-m)
1/2”	M12	133 In-lbs (15 N-m)
3/4”	M12	133 In-lbs (15 N-m)
1”	M14	221 In-lbs (25 N-m)
1 1/4”	M14	221 In-lbs (25 N-m)
1 1/2”	3/4”-10 UNC	301 In-lbs (34 N-m)
2”	3/4”-10 UNC	301 In-lbs (34 N-m)

Note: Tolerances of +/- 10% of the above Fastening Torques are within the acceptable range.

2. If tightening gland does not stop leakage, the stem packing & thrust washer are probably worn out and require replacement. The steps for the replacement are shown in the next section.

The second possible problem occurred under the above service conditions is the seat leakage in close position due to damaged seat. In this case, damaged seats should be replaced with new ones.

M32S ball valves are of 3-piece construction for fast, economical in-line maintenance, so the replacement of resilient parts such as stem packing, thrust washer, seats, and body joint gasket become an easy job; there is no need to disturb the pipeline system to do the replacement. The following steps are to be taken:

a. There are eight (for 1/4" ~ 1-1/2" valves) or twelve (for 2" valve) body joint screws on each valve. Firstly, turn the valve to its opening position (with handle parallel to pipeline); then loosen two of the upper screws of body, and remove the remaining screws. The torque ranges applied to the screws are shown in the table below.
b. The valve body can then be swung out of the pipeline.
c. Turn the valve partially open, so that the damaged seats and body joint gaskets can be taken out at this position and replaced with new ones.

In case there is need to replace stem packing & thrust washer (see the drawing on the BOM section), **first**, loosen the handle nut and take out the handle. **Second**, loosen the packing nut counterclockwise by a wrench, and then the packing nut, Belleville washers, and gland can be taken out. After that, turn the valve to its closing position; the ball and stem can be taken out of valve body for replacing the stem packing & thrust washer.

VALVE SIZE	SIZE OF BODY JOINT SCREW	NUMBER OF SCREWS	FASTENING TORQUES
1/4"	M8	8	250 In-lbs (28 N-m)
3/8"	M8	8	250 In-lbs (28 N-m)
1/2"	M8	8	250 In-lbs (28 N-m)
3/4"	M8	8	275 In-lbs (31 N-m)
1"	M8	8	310 In-lbs (35 N-m)
1-1/2"	M10	8	487 In-lbs (55 N-m)
2"	M12	12	708 In-lbs (80 N-m)

Note: Tolerances of +/- 10% of the above Fastening Torques are within the acceptable range.

d. If it is necessary to remove the entire valve body out of pipeline for further service, remove the screws then the valve body can be lifted.

e. After the replacements are done, the valves should be re-assembled and pressure tested. It is important that the gland & body joint screws are tightened properly. The fastening torques are listed in the above tables. The body joint screws should be tightened when the valve is in its closing position. Evenly tighten the screws to keep the body and caps in perfectly parallel position; thus, to prevent any distortion to the end caps that may cause leakage. When tightening the bolts, please pay special attentions on the tightening sequence – the screws should be tightened in a cross corner sequence, to avoid any uneven tightness. The screws should be tightened evenly until end caps contact body (metal to metal).

Notes: 1. ***The pressure in pipeline should be relieved before disassembling the valves. Any fully closed valves or fully opened valves could hold pressure on body cavity for an extended period of time, especially with high temperature media. Therefore, before removing valves from the pipeline, turn the valves to their partially opened position to relieve pressure.***
2. ***For valves in hazardous media service, decontamination procedure must be taken before disassembling the valves.***

E. STORAGE OF VALVE

When storing ball valves, care should be taken to leave the valves fully opened to protect the surfaces of balls and seats.