



OPERATING & MAINTENANCE INSTRUCTIONS

ITEM: STAINLESS STEEL & CARBON STEEL SEAL WELDED BALL VALVE, 2-PIECE,
FULL PORT, THREADED ENDS, 2000 PSI W.O.G.

MODEL NO.: M22N

SIZES: 1/2" & 2"

A. BASIC FUNCTIONS OF THE VALVES AND THEIR APPLICATIONS

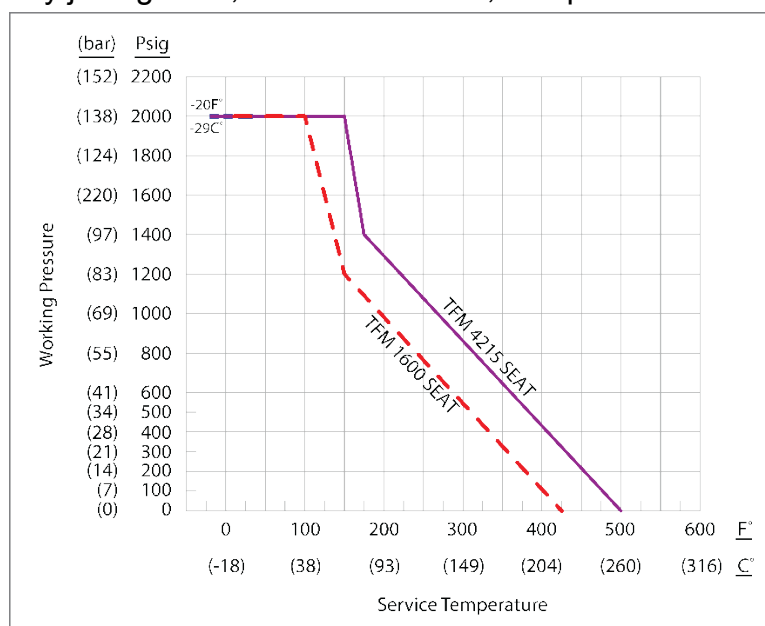
1. M22N series ball valves are designed for ON-OFF service. They should be used in either fully opened or fully closed position for shut-off service; they are not designed for throttling service, in which the valves are in partially opened or partially closed conditions. Leaving the valves partially opened or closed may cause the balls 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 fully opened 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 fully closed position; the handle will appear to be perpendicular to the pipeline to rotate the ball of valve to the fully closed status.

Note: Special attention must be given 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 the in-line position or at the perpendicular position to pipeline, the valve may not be fully opened or fully closed.

4. The materials used for the construction of M22N series ball valves are shown in the MATERIALS LIST section in the catalogue. The basic material of valve body & cap for M22N-S is Stainless Steel (ASTM Grade CF8M / SS 316), which has good corrosion & erosion resistance. The basic material of valve body & cap for M22N-C is Carbon Steel (ASTM Grade WCB). The valve ball is made of Stainless Steel (Grade CF8M / SS 316), and the stem is made of 316 Stainless Steel (ASTM A276-316). The seats are made of TFM 4215 material (Modified PTFE compound reinforced with 25% electro-graphitized Carbon; with features of increased thermal dimensional stability, increased surface hardness & temperature resistance, low deformation under load, reduced friction & wear, and denser polymer structure with fewer voids. TFM 4215 is a material produced by 3M). TFM 4215 is inert to most chemicals, but its ability to hold pressure decreases as the temperature of flow media rises. The decline starts at 121°C (250°F). At the temperature of 232°C (450°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 121°C (250°F), special attentions regarding the pipeline pressure must be considered. Valves with TFM 4215 seats are not recommended to be used at the temperature

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above 204°C (400°F). M22N ball valves also include firesafe features, including Graphite stem packing & body joint gasket, anti-static device, and post-fire metal-to-metal seal.



5. Ball valves are 2000 PSI rated (138 bar) for working pressure with the temperature of 121°C (250°F) and below. They should not be used under any working pressure higher than the above rated pressure. Temperatures higher than 121°C (250°F) will decrease the valves' ability to hold pressure due to the nature of seat materials stated above.
6. Ball valves are 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. It is recommended to use valves with locking device in such applications. M22N series ball valves are designed with a locking device on their handle. 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. INSTALLATION OF VALVES TO PIPELINE

SAFETY CAUTION: Before installing or servicing, please ensure 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 flange surface of pipe and valve by liquid flushing or blown air.
Valve installation: First, hold the pipe in a pipe vice. **Second,** wrap the threaded portion of the pipe with Teflon tape, or apply a thin coat of an appropriate liquid sealant (pipe compound) to the threaded portion. **Third,** screw the valve onto the pipe by applying a wrench on the hexagonal end of the valve near the pipe end. Please do not apply a wrench on the hexagonal end of the valve far from the pipe end, because it may generate torsional torque on the valve body joint. (Although M22N ball valves are seal welded at the body joint area to avoid distortion or unloosening of the body joint, it is still recommended to apply the wrench on the

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hexagonal end of the valve near the pipe end instead of applying the wrench on the hex. end far from the pipe end, so that unloosening the body & end cap joint can be avoided.)

- Notes:**
- a. **The valves may be installed in any position on the pipeline.**
 - b. **The pipeline should be free of tension during valve installation.**

C. MAINTENANCE INSTRUCTIONS

M22N series ball valves are designed for high performance and long durability. All components are produced of high-quality materials and are precisely machined, assembled, and tested. Therefore, under normal operation, the valves rarely require regular maintenance. Only after a long period of service time, very frequent ON-OFF operation, or high corrosive flow media service, should the maintenance become necessary and periodic.

The most common problem under the above service conditions is stem leakage due to wear-down of the resilient parts in the stem area. However, these ball valves feature live-loaded packing glands 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 catalogue) 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
1/2"	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.

If tightening the packing nut does not stop leakage, the stem packing has probably been worn out and require replacement. The steps for the replacement of stem packing are shown as below.

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

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taken out. **Third**, press the stem from the top toward the inside body to loosen the tightness between the stem and the packing. Take out the Carbon filled PTFE packing protector (black color), and try to take out the Graphite stem packing by scratching it to become powder and then blow the powder by air. Put a new Graphite stem packing & packing protector on the stem, and re-assemble the gland, Belleville washers, and tighten the packing nut. (The sizes of the packing nuts and the fastening torques are stated as above). After fastening the packing nut, the top surface of the packing nut should not be extruded above the mounting pad surface.

2. After replacements are done, the valve should be pressure-tested.

The second possible problem under the above service conditions is the seat leakage in close position due to damaged seats. However, since M22N ball valves are seal welded at the body joint area, their seats cannot be replaced. In this case, the valves should be replaced with new ones.

- 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 procedures must be taken before disassembling the valves.**

D. 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.