MOGAS Severe Service Ball Valves Specifications

Isolation Valve Design Features

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1.0 General

MOGAS Industries, Inc. executes the design and manufacture of its valves to the mutual satisfaction of the client and MOGAS in a manner commensurate with excellence in safety and quality. The overall management of MOGAS promotes and pursues innovation, service support, efficient working methods and problem solving.

MOGAS maintains an environment that supports its working practices supported by measurable continuous performance improvement.

MOGAS specializes in the development, design, manufacture, and testing of Severe Service Ball Valves and their associated equipment. Manufacturing is based on the latest technology and techniques that are available, which are closely supervised by our skilled staff. Our vast experience in designing and manufacturing these critical elements ensures that quality is of the highest in the industry.

Valve production including engineering, procurement, manufacturing, assembly, and testing would be undertaken at our factory in Houston, Texas USA.

2.0 Valve Design

MOGAS ball valves for severe service applications are dual-seated, floating ball design capable of uni- or bi-directional sealing. These valves are inherently fire-safe designs by utilizing all metallic sealing components.

2.1 Materials

2.1.1 Valves are designed and constructed using approved materials listed in ASME Section VIII.

2.1.2 Materials are chosen for best performance and compatibility based on Customer's service applications.

2.1.3 When specified, materials are designed and purchased to the requirements of NACE MR0103.

2.2 Coatings

2.2.1 Thermal sprayed coatings, such as High Velocity Oxy Fuel (HVOF) and metallurgical bonded coating, spray and fused, are selected based on trim material and service applicability.

2.2.2 The same coating is applied to the valve trim components – ball and seats to exactly match thermal and mechanical properties of the trim design.

2.2.3 Optional hard surfacing, weld inlays, or liners may be added to the flow path for applications with high erosive characteristics.

MOGAS® SEVERE SERVICE BALL VALVES

2.3 Bore Sizes

2.3.1 Valves are designed as full bore as specified in ASME B16.34 Appendix A. Deviations to the bore is identified in document number TDD-1005: "MOGAS Standard Bores".

2.3.2 Optional bore sizing to match specific pipe internal diameters can be provided where required. In all cases, smooth transition from connecting pipe ID to ball bore will be provided.

2.4 Body Design

2.4.1 The pressure-temperature rating of the valve is calculated in accordance with ASME B16.34 to select the appropriate class rating.

2.4.2 Minimum body thickness shall comply with ASME B16.34 requirements. Valves are generally forged constructed with wall thicknesses more than the minimum specified requirements.

2.4.3 End configurations shall be designed to its applicable standards. Customer can specify other end configurations – such as clamps, nipolets, etc.

2.4.4 Valve body design shall be capable of installing purge or drain ports without major parts replacement.

2.4.5 For alloy steel valves, the seat pocket(s) shall contain a non-corrosive inlay preventing damage due to corrosion at the lapped sealing surfaces.

2.4.6 Generally, NPS ≤ 12" valves are designed as two-piece assemblies. NPS > 12" valves are designed as three-piece assemblies.

2.4.7 End-to-End or Face-to-Face dimension complies with ASME B16.10 'long pattern' designation for butt welding and flanged ends ball valves. Valves that do not comply shall be stated so on the submitted drawing.

2.5 Gasket

2.5.1 Valves that are 1500 class rated and lower use an Inconel 600 spiral-wound graphoil filled gasket to seal the bolted joint(s).

2.5.2 Valves that are 2500 class rated and higher use a metal pressure-energizing gasket ring to seal the bolted joint(s).

2.5.3 Valves can utilize elastomeric o-rings as seals for body joints for applications less than 400^{o}F.

2.6 Bolted Joint

2.6.1 The bolted-joint is designed to ASME Section VIII, Appendix 2.

3.0 Trim Components

3.1 Ball

3.1.1 The ball material is the same material as the seat to exactly match the coefficient of thermal expansion (CTE) allowing the radii of the ball and seats to thermally grow dimensionally at an identical rate.

3.2 Seat Design

3.2.1 The seat design utilizes two (2) separate and replaceable seats. These seat rings are made of the same material to match CTE.

3.2.2 The sealing surfaces are wide and in full contact with the surface of the ball 100% after the final mate lapping operation.

3.2.3 The seats are designed to resist and prevent contamination of media to damage the sealing surfaces. Each seat has sharp leading edges to scrape debris away from the ball during opening and closing.

3.2.4 Optional tracking seat ring design can prevent contamination of media between ball and seats during pressure shifts for applications less than 400^{o}F.

3.3 Spring

3.3.1 The valve load spring (belleville type) provides continuous loading of the ball onto the seats.

3.3.2 At transient state, the spring is ‘energized’ and contains adequate compression to compensate for the ball and seats growth.

3.3.3 There are features within the valve design to prevent any possibility of inverting the spring.

4.0 Drive Train

4.1 Ball

4.1.1 The ball diameter is large enough to protect the entire seat sealing surface areas and does not allow exposure of the seat sealing surfaces during the during the full open or closed position.

4.2 Stem

4.2.1 The stem shaft diameter shall be selected based on the application and shall not exceed the materials yield strength at the maximum rated pressure of the valve plus a suitable safety factor.

4.2.2 Stems are one-piece construction with an integrated upset diameter preventing blow-out.

4.2.3 The stem ‘driving’ mechanism, i.e. keyways, splines, is designed as the first fail-safe position in the valve assembly. Its torque rating is 90% of the stem shaft rating.

4.2.4 The stem length extends from the ball stem slot and is supported at two separate bearing locations.

4.3 Operators: Actuator, Manual Gears

4.3.1 The operator for each valve is selected based on the lowest output torques (usually the run torque on a scotch-yoke design actuator) with a safety margin of 20-30% higher than the calculated valve service break torque.

4.3.2 The stem adaptor allows the operator to be rotated in 90 degree increments.

4.3.3. The mounting adaptation assembly is designed to protect the elastomeric seals in the operator from the service conditions.

4.4 Packing Box

4.4.1 The packing box consists of two (2) anti-extrusion rings and three (3) expanded graphoil rings. For NPS <1” valves, there may be two (2) expanded graphoil rings due to relative size.

4.4.2 Valves with graphite packing are designed with live-loaded packing box utilizing Belleville springs to provide adequate load (force) onto the packing set.

4.4.3 For lower temperature applications, polypak rings can be utilized. These rings have lower stress values which lower the operating torques.

4.5 Bearings

4.5.1 The valve’s drive-train consists of two bearing locations fully supporting the entire length of the stem to prevent packing leaks due to side-loading.

4.5.2 Two-piece coated bearings are utilized to prevent the migration of aggressive media from damaging the soft-goods in the packing box.

4.5.3 An outer bearing is positioned on the mounting flange to support the outer-most part of the stem. This bearing is independent of the bearings usually incorporated in the actuator/manual gear.

4.5.4 An optional one-piece elastomeric bearing can be utilized in low temperature applications allowing for lower operating torque.

4.6 Mounting Flange

4.6.1 The mounting flange is permanently attached to the valve preventing removal and interchangeability of the said part.

4.6.2 The bearing surfaces are post-machined after the mounting flange is affixed to valve and are relative to the stem thru bore position. The post-machining creates an uncompromised stem position.

4.7 Operating Torque

4.7.1 The standard valve operating torque is calculated using a coefficient of friction factor that accounts for severe service operation of metal-to-metal sealing surfaces. A service factor is multiplied to the base break torque resulting in the anticipated service operating break torque.

The service factor is dependent on the harshness of the application. For example, steam is less severe service than hydrocarbon processing application; therefore, the service factor for steam applications will be lower than hydrocarbon processing applications.

5.0 Testing

5.1 Pressure Testing

5.1.1 The standard testing parameters are based on MSS-SP-61 for all valves. Customer can specify different testing parameters or special testing requirements.

5.1.2 All valves are hydrostatically tested at 150% of the maximum rated pressure.

5.1.3 All valves are hydrostatically seat tested at 110% of the maximum rated pressure.

5.2 Gas Testing

5.2.1 When specified, a low pressure gas test is conducted at 80-100 psig based on API 598 parameters. The test medium is Nitrogen gas.

6.0 Identification

6.1 Valve Tracking

6.1.1 Each valve has a unique serial number stenciled onto the valve identifying the entire valve information – from order placement to shipment.

6.1.2 Each replaceable valve component is stenciled with its part number and heat lot number. The part number identifies the design, material and coating/special processes of that the part. The heat lot number can trace the heat treatment and material test report for the part.

6.2 Valve Markings

6.2.1 The valve is **marked** (stenciled) with the following information, as a minimum:
Manufacturer: MOGAS
NPS, Pressure rating, Model: 8: 1500# CST-1
Material: ASTM A105
Serial Number: XXXXX

6.2.2 The valve ends are stamped with the configuration type, rating and size: 8" 1500 RF.

6.2.3 The preferred 'Pressure End' is designated on the valve end to denote the direction of the higher pressure when the valve is in the closed position.

7.0 Quality Assurance

MOGAS has always maintained a staunch commitment to quality in our products, practices and procedures, and by doing so has earned ISO 9001:2008 certification. Our commitment to quality in design and manufacturing is recognized world wide. ISO 9001:2008 encompasses the International Organization for Standardization's eight quality management principles. These principles, derived from the collective experience and knowledge of international engineering and manufacturing experts, are accepted around the world as the framework by which organizations can administer quality management processes.

We are proud to have achieved ISO certification, but in order to maintain our certification, as well as meet our own high standards, every MOGAS employee must undergo training to understand how they can help to ensure MOGAS upholds its quality-oriented principles. At MOGAS, our commitment to quality is ingrained in our culture and permeates the entire organization. It has always been that way and it will always be that way.