M-CLASS
METAL SEATED BALL VALVES
A Cut Above

- 1/2” TO 16” standard port
- 150# up to 4500#
- -270°C (-454°F) TO 788°C (1450°F)

One year guarantee or extended guarantee options for special applications
ON/OFF VALVE

The On/Off Ball Valve is an elite, made-to-order, metal seated ball valve, unparalleled in quality and performance.

They are designed for any combination of abrasive, corrosive, high temperature, high pressure, and high-cycle applications. Options include Vari-V and arcuate cut balls, exotic alloys, and scalloped seats. Not only do M-Class Ball Valves provide superior performance for the toughest applications, they are truly bi-directional and provide bubble-tight shut-off.
Our Cryogenic Valves are designed to withstand temperatures of -270°C (-454°F) and have a minimum 12” bonnet extension to protect the actuator and handle from ice build-up. The valve features the patented M-Class Stem Sealing System, a detachable bonnet, and metal seats. M-Class Cryogenic Valves feature a drilled ball, to relieve pressure, and a fully grounded stem. A bolt-on retrofit kit is also available.
Gosco’s Block+Bleed Valves combine live loaded seat technology, the patented M-Class seating system, and completely bi-directional seating. This configuration makes our Block+Bleed Valves extremely versatile, enabling them to tackle the toughest severe service applications.
The 3-Way Diverter Valve offers superior reliability in a metal-seated package. Configurations include a “Single-L Port” ball for 180° applications, specifically for when there is no mix of the media between the two ports, and a “Double-L Port” ball for 90° applications in which mixing is expected to occur between the ports. Whatever the application, the 3-Way Diverter Valve is guaranteed to outperform its competitors and surpass all expectations.
When precise control of flow or pressure is required in a metal seated ball valve, the M-Class Vari-V Control Valve is perfect for your tough applications. Standard 10°, 30°, 60°, 90° V’s are cut into the ball for a complete range of CV’s and control requirements. Custom profile V’s are used for unusual applications requiring special flow characteristics.

The Vari-V Ball Valve offers precise flow control through a specific profile that is machined into the ball.
At the heart of every Gosco M-Class control valve is the Vari-V ball. The profile of the V-ball determines the flow characteristic of the valve and can be changed to suit the application. 10°, 30°, 60° and 90° V-balls are the most commonly used, but several other profiles are available. The transition between high flow and fine control with the Vari-V is extremely smooth.

Custom V-balls are available for applications where specific flow requirements can not be met with the standard V-balls. Using Computational Fluid Dynamics (CFD), we can create a V-ball with a specific profile to fit any application. Anti-cavitation trim is also available. For examples of custom V-ball applications, including videos and specifications, visit www.goscovalves.com

**Control Freak**

- **Linear-V** is a slot in the ball that can be machined for precise flow requirements
- **Filler-V** is used when you need maximum flow for filling, followed by precise flow to accurately control the levels
- **High Turndown-V** maximizes flow in the open position, and provides fine flow control when the valve is partially closed

**Free Spirit**

Custom V-balls are available for applications where specific flow requirements can not be met with the standard V-balls. Using Computational Fluid Dynamics (CFD), we can create a V-ball with a specific profile to fit any application. Anti-cavitation trim is also available. For examples of custom V-ball applications, including videos and specifications, visit www.goscovalves.com
An arcuate cut is a profile in the ball that reduces velocity both when the valve opens, and as it closes. When a standard ball valve is in the first and last ten degrees of opening, the gap between the ball and seat is an elliptical shape. The velocities are very high (especially in the corners), and erosion occurs. With an arcuate cut, the opening on the ball is close to three times larger. This reduces the velocity by spreading out the flow through a larger opening, which ultimately reduces wear on the ball and seats. An arcuate cut ball is best utilized in abrasive and high cycle applications.

A common problem with metal seated valves is the build-up of material between the upstream seat and the body. Our approach to this problem is very different from traditional valve manufacturers. Their valve designs attempt to prevent media from getting behind the seat by sealing the outer edge and back of the seat. Our philosophy is the opposite: let the media flow behind the seat, as the seat’s design allows material to escape just as easily. This is done with angled scallops at the back and outer edge of the seat. The size, steepness of the angle, and spacing of the scallops vary with the particle sizes and the pressure inside the valve.
The M-CLASS Tripod Mount is designed to eliminate the problems associated with traditional brackets.

**Simple**
No bracket - only a plate and coupling is needed.

**Dead Centered**
The mounting plate is secured between the C&C machined tripod prongs and cannot move in any direction. This guarantees perfect alignment of the actuator to the valve.

**Easy to Assemble**
The plate can be mounted on the actuator first, then the actuator will automatically be aligned by the three prongs.

**Perfectly Flat**
Three points define a plane, meaning the actuator will not rock.

**Fully Visible**
The double “D” on the stem is easily seen, giving a constant visual indication of the valve’s position.

**Open Between the Prongs**
Allows full access to the packing adjustment without removal of the actuator.

**Insulatable**
A minimum of 2” between the top of the flange and the tripod allows insulation to be installed without covering the packing adjustments.
Finite Element Analysis (FEA) is used in Gosco Valves’ design process to predict the behavior of a valve’s components by subjecting them to varying loads. This ensures structural integrity. The analysis is based on variables such as maximum pressure and temperature inside the valve, and maximum actuator torque. The illustration shows the stress distribution in a body and bonnet assembly, based on FEA analysis.

Computational Fluid Dynamics (CFD) is used to calculate the flow through the trim of a valve. It determines locations of high velocity and high flow, and assists in trim engineering for specific applications where velocities need to be controlled. CFD is also used to determine the flow coefficient ($C_v$) of Gosco Vari-V balls and aids in designing them to custom specifications. The illustration shows flow through a trim set at 45° open.
HIGH VELOCITY OXYGEN FLAME (HVOF) is a thermal spray system that fuses a powdered metal feed (generally Chrome or Tungsten Carbide) onto a base material. In this process, the oxygen flame, paired with a number of fuel gases, accelerates and propels the feed stock at supersonic speeds (1800 ft/sec or 549 m/sec) directly onto the base material. Temperatures can reach upwards of 2300°C (4172°F). When particles strike the base material, they form a “splat”, quickly cooling to create a high density coating.

BORONIZING

A thermochemical surface treatment in which Boron atoms are diffused into the surface of a base metal to form borides. It creates a new intermetallic layer with a hardness off the Rockwell C scale. The base metal is chosen to handle the temperature, abrasion and corrosion of the process, and has a superior wear resistance to that of coatings.

CERAMICS

Gosco also manufactures trim sets from a variety of different ceramics including a proprietary Alumina/Zirconia based ceramic. This type of ceramic offers the chemical resistance and hardness of an alumina, combined with the toughness of zirconia. It does not shatter on impact and is abrasion and thermal shock resistant.
| Valve Size | A (inch) | B | C | D (inch) | E | F | G | 150# | 300# | 600# | 900# | 1500# | 2500# | Weight$^a$ |
|------------|--------|---|---|--------|---|---|---|------|------|------|------|------|------|------|--------|
| 1/2"        | 14.50  | 3.65 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25 | 15.51  |
| 3/4"        | 15.50  | 3.65 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 1"          | 16.50  | 3.65 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 1 1/4"      | 17.50  | 4.00 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 1 1/2"      | 18.50  | 4.00 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 2"          | 19.50  | 4.00 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 2 1/2"      | 20.50  | 4.00 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 3"          | 21.50  | 4.00 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |
| 4"          | 22.50  | 4.00 | 9.00 | 0.75   | 1.25| 2.00| 2.50| 6.00 | 7.00 | 7.25 | 8.00 | 8.75 | 10.00| 11.25| 15.51  |

For valve sizes larger than 10", please contact Gosco Valves for dimensional information.

$^a$ Meets dimensions as per changes in latest edition or addenda configurations.

Note: All dimensions are in inches. For size and pressure classes not listed, please contact Gosco Valves for dimensional information.
liable for any consequential or special damages arising from any breach of these terms and conditions from the use of its products.

warranty as to merchantability or fitness for any particular purpose. Special and consequential damages: In no event shall Seller be

from use of Seller's product. This warranty is expressly in lieu of all other warranties, either express or implied, including any implied

repair or replacement at Seller's option of such defective products, F.O.B. factory, upon proof of defect satisfactory to Seller. Seller

by the Seller, for a period of one (1) year from date of original shipment. The Seller's liability under this warranty shall be limited to

WARRANTY - The Seller warrants its products against defects in material or workmanship, when used on those services approved

by the Seller, for a period of one (1) year from date of original shipment. The Seller's liability under this warranty shall be limited to

repair or replacement at Seller's option of such defective products. F.O.B. factory, upon proof of defect satisfactory to Seller. Seller

shall have no further liability for damages of any kind, including but not limited to personal injuries and property damage, resulting

from use of Seller's product. This warranty is expressly in lieu of all other warranties, either express or implied, including any implied

warranty as to merchantability or fitness for any particular purpose. Special and consequential damages: In no event shall Seller be

liable for any consequential or special damages arising from any breach of these terms and conditions from the use of its products.

Warranty Specifications

- ASTM A 193/ A194M-96b Alloy Steel and Stainless Steel Bolting Materials for High Temperature Service
- ASTM A 194/ A193M-96 Carbon and Alloy Steel Nuts for High Pressure and High Temperature Service
- ANSI/ ASME B16.34 Valves - Flanged, Threaded and Welding Ends
- ANSI/ ASME B16.10 Face-to-Face and End-to-End Dimensions of Valves
- ANSI/ ASME B1.3M Screw Thread Gauging System for Dimensional Acceptability
- ASTMA 194/ A193M-96 Carbon and Alloy Steel Nuts for High Pressure and High Temperature Service
- VAES-SP-25 Standard Marking System for Marking Valves, Fittings, Flanges and Unions
- CSA B51-95 Boiler, Pressure Vessel and Pressure Piping Code
- Mill certificates and additional non-destructive testing are available if required
- API 6D Metal Bell Valves - Ranged, Threaded and Welding ends
- API 608 Valve Inspection and Testing
- API 6D Pipe Line Valves
- ISO 9001: 2000