Fab Valve

NPS ½ to NPS 6 (DN15 to DN150)
-58°F/ -50°C to 1100°F/593°C
Class 150, 300 and 600
Extremely Fast Delivery
(Including Exotic Materials)
what makes this valve different?
Use ASME B16.34 Code to calculate the minimum wall thickness requirements
TRADITIONAL BALL VALVE DESIGNS

Use ASME B16.34 Code to calculate the minimum bolting requirements
TRADITIONAL BALL VALVE DESIGNS

Combine the two ASME Code requirements into one common part.
TRADITIONAL BALL VALVE DESIGNS
TRADITIONAL BALL VALVE DESIGNS
ASME minimum wall thickness requirements (red)
TRADITIONAL BALL VALVE DESIGNS

ASME minimum bolting requirements (pink)
Only wetted areas need to be corrosion resistant

TRADITIONAL BALL VALVE DESIGNS

FAB VALVE

FABRICATED METAL SEATED BALL VALVES
TRADITIONAL BALL VALVE DESIGNS

Therefore, only the wetted areas need to be expensive material.
PATENTED DESIGN

Our patented design separates the two requirements of ASME B16.34

CORE COMPONENTS (MADE TO ORDER)

Designed to meet minimum wall thickness requirements

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
PATENTED DESIGN

Our patented design separates the two requirements of ASME B16.34

CORE COMPONENTS (MADE TO ORDER)

SUITABLE MATERIAL FOR PROCESS

MORE EXPENSIVE MATERIAL

BOLTING CONTAINMENT (STOCK PARTS)

Designed to meet minimum bolting requirements

FAB VALVE

FABRICATED METAL SEATED BALL VALVES
PATENTED DESIGN

Our patented design separates the two requirements of ASME B16.34

CORE COMPONENTS (MADE TO ORDER)

BOLTING CONTAINMENT (STOCK PARTS)

SUITABLE MATERIAL FOR PROCESS

ALWAYS WC6 (F11)

MORE EXPENSIVE MATERIAL

PAINTED TO RESIST EXTERNAL ENVIRONMENT/GALVANIC CORROSION

INEXPENSIVE TO MANUFACTURE

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
WHAT IS THE ADVANTAGE?

Common *body/bonnet plate* for Class 150, 300 and 600

**CLASS 150/300**

6pcs, 3/8” through holes (NPS 2 Valve)

**CLASS 600**

4pcs, 5/8” through holes (NPS 2 Valve)
WHAT IS THE ADVANTAGE?

*Horseshoe Plates* have dual bolting patterns

3/8” through holes (red)
WHAT IS THE ADVANTAGE?

*Horseshoe Plates* have dual bolting patterns

3/8” through holes (red)
5/8” through holes (blue)
Horseshoe plates are the same for both single and dual packing configurations.

WHAT IS THE ADVANTAGE?

FABRICATED METAL SEATED BALL VALVES

FAB VALVE
WHAT IS THE ADVANTAGE?

Common *internals* for Class 150, 300 and 600

BASED ON CLASS 600 SHAFT DIAMETER

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
WHAT IS THE ADVANTAGE?

Common *internals* for Class 150, 300 and 600

SAME AS OUR M-CLASS LINE
WHAT IS THE ADVANTAGE?
Only four components are manufactured for each application

BODY
MOSTLY LATHE WORK
MINIMAL MILLING WORK

FLANGES
MOSTLY LATHE WORK
MINIMAL MILLING WORK

BONNET
(Single/Dual Packing Bonnet)
LATHE WORK ONLY

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
HOW DOES THAT HELP YOU?

All bolting containment components are common (Class 150, 300, and 600)
HOW DOES THAT HELP YOU?

GOSCO stocks all bolting containment components
HOW DOES THAT HELP YOU?

All internal components are common (Class 150, 300, 600 and M-CLASS)
HOW DOES THAT HELP YOU?

GOSCO stocks all internal components

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
HOW DOES THAT HELP YOU?

GOSCO ONLY manufactures four core components for any valve configuration.
HOW DOES THAT HELP YOU?

COMPETITIVE PRICING
HOW DOES THAT HELP YOU?

FAST DELIVERY
Superior Trim Hardening

“HARD ASS”

FABICATED METAL SEATED BALL VALVES
Superior Trim Hardening
Seat/Spring Design

FAB VALVE

SMOOTH OPERATOR
FAB VALVE

FEATURES

Superior Trim Hardening
Seat/Spring Design
Arcuate Cut or Vari V Ball

“SLOW POKE / CONTROL FREAK”
Superior Trim Hardening
Seat/Spring Design
Arcuate Cut or Vari V Ball
Dual Shaft Packing

“BACK UP PLAN”
Superior Trim Hardening
Seat/Spring Design
Arcuate Cut or Vari V Ball
Dual Shaft Packing
Bi-directional Sealing
SUPERIOR TRIM HARDENING

FABRICATED METAL SEATED BALL VALVES

“HARD ASS”
Uneven coating (line of sight)
Cracks / spalls
Coating is porous
Internal bore of ball can not be coated
BORONIZING

Proprietary Gosco Process

Thermo-chemical surface hardening process

Boron atoms are diffused into the surface

Results in a case layer that is extremely hard, corrosion resistant, and capable of handling high temperature shocks

Inconel 718, 200x magnification
.0035” solid layer, .007” partial layer

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“HARD ASS”
BORONIZING

STARTS WITH THE BASE MATERIAL

Inconel 718 is the best material for severe service applications

- Designed for high temperature applications
- Extremely hard
- Very corrosion resistant
- Has a high nickel content to eliminate stress corrosion cracking

“HARD ASS”

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
THEN - IT’S ALL ABOUT PREPARATION OF THE PARTS

There are 6 steps before the trim sets are sent to be borided:

1. Rough machining
2. Stress relieving
3. Finish machining
4. Grinding
5. Four levels of lapping
6. Vacuum testing

“HARD ASS”
LAST – IT’S ALL ABOUT THE BORONIZING PROCESS

1. Cleaned to eliminate any residue
2. Boronized using our proprietary boronizing process
3. Finished lapped
4. Vacuum tested
# Application Note on Coatings

## Common Coatings

<table>
<thead>
<tr>
<th>Method of Application</th>
<th>HVOF</th>
<th>Fusion</th>
<th>Plasma</th>
<th>Diffused</th>
<th>Patented</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Material</strong></td>
<td>Chromium Carbide</td>
<td>Tungsten Carbide</td>
<td>Chromium Carbide</td>
<td>Chromium Oxide</td>
<td>Nitride</td>
</tr>
<tr>
<td><strong>Base Metals</strong></td>
<td>Any</td>
<td>Any</td>
<td>300 Series Stainless Nickel Alloys</td>
<td>Any, Duplex SS &amp; Ti Typical</td>
<td>Iron-Based Alloys</td>
</tr>
<tr>
<td><strong>Advantages</strong></td>
<td>High Strain to Fracture, Erosion-Resistant, Extreme Temperature</td>
<td>Erosion-Resistant, Wear-Resistant</td>
<td>Erosion-Resistant, Non-Porous, Thermal Shock, Metallurgical Bond, Corrosion Resistant</td>
<td>Very Corrosion Resistant at lower temperatures</td>
<td>Inexpensive Metallurgical Bond</td>
</tr>
<tr>
<td><strong>Disadvantages</strong></td>
<td>Some Porosity, Mechanical Bond</td>
<td>Some Porosity, Mechanical Bond, Thermal Cycling Can Produce Cracking</td>
<td>Not Suitable on 410 SS 17-4PH Carbon Steel, Expensive</td>
<td>Poor Thermal Shock, Poor Bond Strength, Porosity, &amp; Cracking are Typical</td>
<td>Reduces Corrosion Resistance, Lower Abrasion &amp; Wear Resistance than HVOF Coatings</td>
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<td></td>
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<td><strong>Uses</strong></td>
<td>General Severe Service, Power, Slurry Mining, Chemical</td>
<td>Specialized Severe Service, Mining, Food Processing, Corrosive Chemical</td>
<td></td>
<td></td>
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**Disadvantage Note:**
- Some Porosity, Mechanical Bond
- Thermal Cycling Can Produce Cracking

**Advantage Note:**
- High Strain to Fracture, Erosion-Resistant, Extreme Temperature
- Erosion-Resistant, Wear-Resistant

**Base Metals:**
- Any
- Any

**Uses:**
- General Severe Service, Power, Slurry Mining, Chemical
- Specialized Severe Service, Mining, Food Processing, Corrosive Chemical

**Materials:**
- Chromium Oxide
- Nitride
- Boride
- Nano Titanium Dioxide

**Uses:**
- Corrosive Service, Gold Mining
- General Service, Bearings, Hot Gas
- Specialized Severe Service, Power Corrosive Services, Thermal Shock
- Any, Duplex SS & Ti Typical

**Base Metals:**
- Chrome
- Iron-Based Alloys
- Nickel-Based Alloys
- Any, Duplex SS & Ti Typical

**Advantages:**
- Inexpensive
- Metallurgical Bond, Non-Porous, Corrosion Resistance
- Very Corrosion Resistant at low and high temperatures, superior wear to conventional ceramic coatings

**Disadvantages:**
- Some Porosity, Mechanical Bond, Thermal Cycling Can Produce Cracking
- Crack Resistance, Lower Abrasion & Wear Resistance than HVOF Coatings
- Ceramic coatings are not as tough as HVOF cermets

**Competitor on Coatings:**
- Ceramic coatings are not as tough as HVOF cermets
- Ceramic coatings are not as tough as HVOF cermets

**Fabricated Metal Seated Ball Valves:**
- MOGAS
- FAB VALVE
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<td>General Service, Bearings, Hot Gas</td>
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<td>Inexpensive Metallurgical Bond</td>
<td>Extremely Hard, Metallurgical Bond, Non-Porous, Corrosion Resistant</td>
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<td>Reduces Corrosion Resistance, Lower Abrasion &amp; Wear Resistance than HVOF Coatings</td>
<td>Very Thin .001&quot; Finished, Bore Size Limit 1.5&quot;</td>
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GOSCO’ S PROPRIETARY BORONIZING PROCESS

0.003” to 0.005” depth
No size limit
All the advantages, no disadvantages

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
SEAT DESIGN

FABRICATED METAL SEATED BALL VALVES

“SMOOTH OPERATOR”
COMPETITORS’ SEAT/SPRING DESIGN

“ALL PLUGGED UP”
COMPETITORS’ SEAT/SPRING DESIGN

"ALL PLUGGED UP"
COMPETITORS’ SEAT/SPRING DESIGN

Belleville spring

“ALL PLUGGED UP”
COMPETITORS’ SEAT/SPRING DESIGN

Media gets trapped around the Belleville

“ALL PLUGGED UP”
COMPETITORS’ SEAT/SPRING DESIGN

Valve locks up
(Floating ball design)

“ALL PLUGGED UP”

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
GOSCO’S SEAT/SPRING DESIGN

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“SMOOTH OPERATOR”
GOSCO’S SEAT/SPRING DESIGN

“SMOOTH OPERATOR”
GOSCO’S SEAT/SPRING DESIGN

Graphite wedge seal and compression ring
(Secured in the valve flange)

“SMOOTH OPERATOR”
GOSCO’S SEAT/SPRING DESIGN

Nested wave spring
(Downstream of wedge seal)

“SMOOTH OPERATOR”
GOSCO’S SEAT/SPRING DESIGN

Spring is completely open to media

“SMOOTH OPERATOR”
GOSCO’S SEAT/SPRING DESIGN

Media can get in to the spring cavity, but also escapes just as easily.

“SMOOTH OPERATOR”
GOSCO’S SEATS

Media flows freely around the springs

“SMOOTH OPERATOR”
GOSCO’S SEATS

“SMOOTH OPERATOR”

Media flows freely around the springs

COMPETITOR’S SEATS

“ALL PLUGGED UP”

Media compacts around the Bellevilles
Encapsulated Seats

Wave Spring provides "Live-load" on the seat assembly

"STRAIGHT JACKET"
Encapsulated Seats

Compression Ring for API 607 fire-safe applications

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“STRAIGHT JACKET”
Encapsulated Seats

Spring loaded Outer Seal provides sealing on the seat assembly circumference

“STRAIGHT JACKET”
Encapsulated Seats

Inner Carrier encapsulates the seat insert on the inner circumference

“STRAIGHT JACKET”
Encapsulated Seats

Seat Insert seals against the ball
Encapsulated Seats

Outer Carrier encapsulates seat insert on the outer circumference
Encapsulated Seats

Proprietary Gosco Design
Live-loaded for sealing at low pressures
Utilized in high temperatures and/or pressures
Encapsulates “Soft” insert on all 4 sides
Encapsulated Seats

Encapsulates “Soft” insert on all 4 sides
Encapsulated Seats

“Soft” insert can be different materials depending on the application
Encapsulated Seats

- Teflon/TFM 1600 (Standard applications)
- Devlon (Abrasive/High cycle applications)
- PEEK/Graphite (High temperature applications)
BALL DESIGN

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“SLOW POKE”
Specific profile is cut on the ball to reduce velocities.
Arcuate cut is then hardened in the boronizing process.
GOSCO’S ARCUATE CUT BALL

Both sides of ball have an arcuate cut (not visible in image)
STANDARD BALL vs ARCULATE CUT

Illustration below shows a ball at 10% open.

STANDARD BALL
(Competition)

Small opening
High velocities
Trim damage

ARCULATE CUT BALL
(Gosco Valves)

3 times larger opening
Velocities reduced by 2/3
Less trim damage
(Flow is spread out)

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“SLOW POKE”
GOSCO VARI-V BALLS

- TURNDOWN V
- 90° V BALL
- 10° V-BALL
- 60° V-BALL
- 30° V-BALL
- LINEAR V
- FILLER V

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“CONTROL FREAK”
CONVENTIONAL BALL

Very bad control on the low end
Flow is directed to the side of the pipe

"OUT OF CONTROL"
GOSCO VARI-V BALL

Excellent control through full range
Flow is spread out evenly

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“CONTROL FREAK”
CUSTOM VARI-V BALLS

GOSCO can custom design any profile for your application
CUSTOM V-BALL Cv CURVE
Flow requirements for one of our custom V-balls.

SLOT WIDTH WAS ALMOST AS THIN AS A HUMAN HAIR

“CONTROL FREAK”
SHAFT PACKING

“THE BUCK STOPS HERE”

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
DUAL PACKING

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“THE BUCK STOPS HERE”
THE BUCK STOPS HERE
DUAL PACKING

Our PREMIUM version uses a dual packing design for shaft sealing

Live loaded upper packing

“THE BUCK STOPS HERE”
DUAL PACKING

Our PREMIUM version uses a dual packing design for shaft sealing

SmartPak™ lower packing

"THE BUCK STOPS HERE"
DUAL PACKING

Our PREMIUM version uses a dual packing design for shaft sealing

Dual shaft guides

“THE BUCK STOPS HERE”
ALLOY OPTIONS

FABRICATED METAL SEATED BALL VALVES

“CHAMELEON”
Alloy options

- Hastelloy
- INCONEL
- Alloy 20
- Titanium
- MONEL
- Incoloy
- Carbon Steel
- Tantalum
- Super Duplex
- CUSTOMER SPECIFIED

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
COMPETITOR’S VALVE

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
COMPETITOR’S VALVE

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
COMPETITOR’S VALVE

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)
COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)

With upstream flow

“ONE WAY STREET”
Seal is created between the downstream seat and ball

COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)

Seal is created between the downstream seat and ball

FAB VALVE
FABRICATED METAL SEATED BALL VALVES

“ONE WAY STREET”
COMPETITOR’S VALVE  
(UNI–DIRECTIONAL SEALING)

Spring is still exerting force on the upstream seat.

“ONE WAY STREET”
However, with back-pressure or reverse flow, the valve fails.
BACK PRESSURE or REVERSE FLOW

COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)

Back-pressure pushes the ball back and flattens the spring

FABRICATED METAL SEATED BALL VALVES

"ONE WAY STREET"
BACK PRESSURE or REVERSE FLOW

COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)

Back-pressure pushes the ball back and flattens the spring

“ONE WAY STREET”
BACK PRESSURE or REVERSE FLOW

COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)

A gap is created between the ball and seats

FABRICATED METAL SEATED BALL VALVES

“ONE WAY STREET”
BACK PRESSURE or REVERSE FLOW

COMPETITOR’S VALVE
(UNI–DIRECTIONAL SEALING)

Valve leaks past the seats
BI-DIRECTIONAL SEALING

Valve can withstand pressure from upstream or downstream

“UNBIASED OPINION”
BI-DIRECTIONAL SEALING

Valve design is completely symmetrical, and seals bubble tight in both directions.

Seals with full differential pressure
Seals with 1 psi differential pressure
FAST TRACK

Expedited machining/assembly/shipping
Fee is based on costs incurred
Not on time? No Fast Track charge
OTHER VALVES (M-CLASS/S-CLASS)

ON/OFF

VARI-V CONTROL

CRYOGENIC

3-WAY DIVERTER/ 3-WAY

BLOCK & BLEED

CUSTOM

FAB VALVE
FABRICATED METAL SEATED BALL VALVES
Fab Valve

NPS ½ to NPS 6 (DN15 to DN150)
-58°F/-50°C to 1100°F/593°C
Class 150, 300 and 600
Extremely Fast Delivery
(Including Exotic Materials)