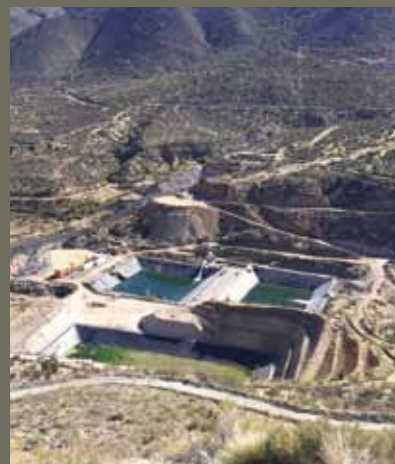
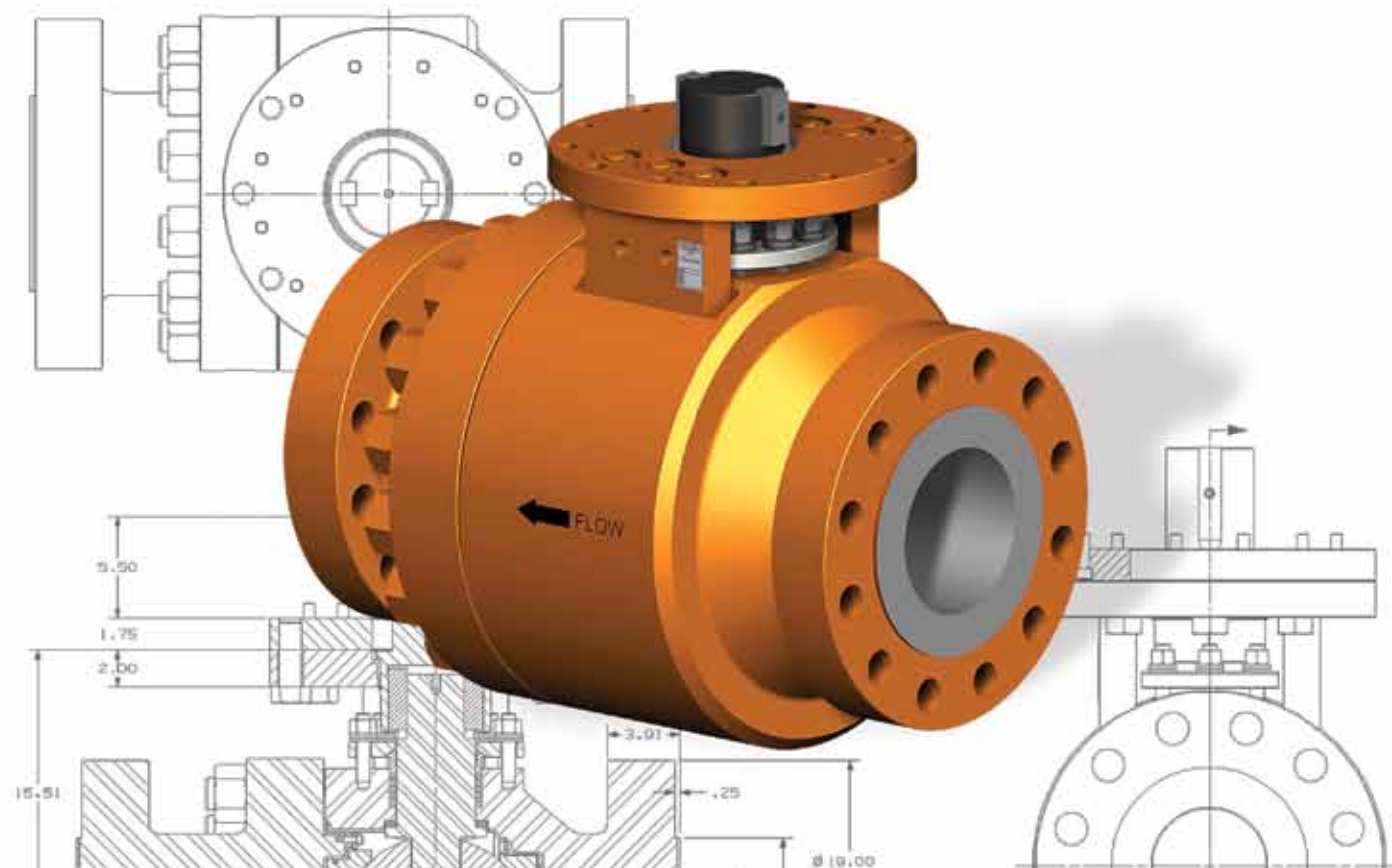


COOPER[®] ACCUSEAL

a COOPER[®] Valves brand.

UPGRADE YOUR EXPECTATIONS



COOPER[®]
Valves

Table of contents

Why COOPER® Accuseal

Why make COOPER® Accuseal your severe service metal-seated ball valve of choice?	2
There is a difference!.....	2
COOPER® Accuseal advantages deliver predictable reliability and performance.....	2
Optimized ball valve design and engineering software.....	2
Superior valve coatings	3
OMNI-LAP 360°™	3
Vacuum seal test.....	3

Applications

Critical isolation for slurry transport.....	4
Reliable isolation = Profits	4
Typical Severe Service Valve locations	4
Slurry ore concentrates	4
Upgrade Your Expectations & Enjoy Longer Run-times	5

CSV features & benefits

Features & Benefits	6
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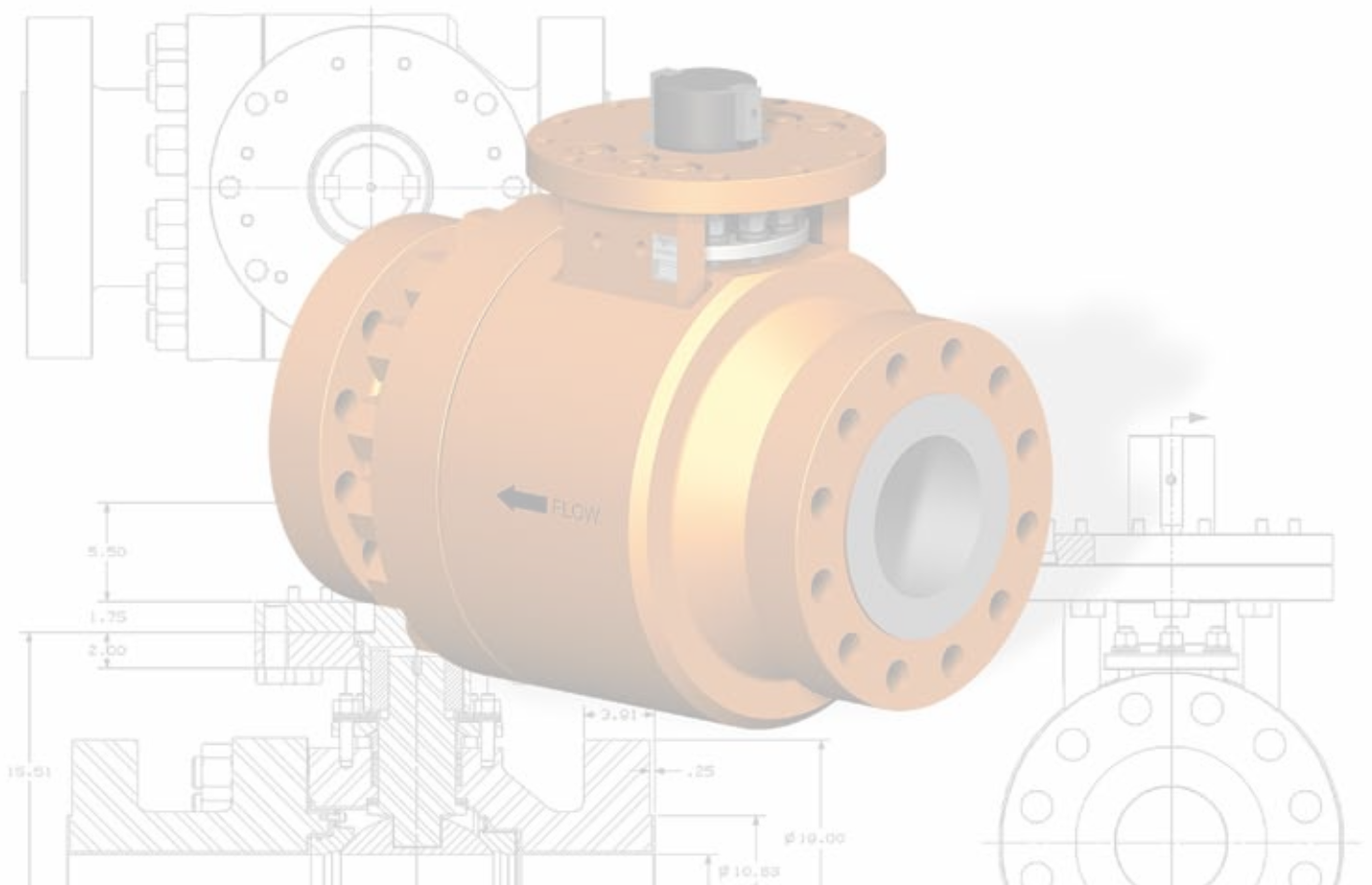
CSV - slurry transport valve

Applications	8
Bidirectional with preferred flow	8
End Connections	8
Actuator Options	8
Features and Benefits	8

Certifications/Testing

COOPER® Accuseal manufactures to ASME B16.34	9
COOPER® Accuseal Test Procedures	9

*Discover
the COOPER® Accuseal
advantages...*



Why COOPER® Accuseal

Slurry transport is a complicated engineered process. Optimizing transport of solids via a carrying medium from remote, often arid locations to distant beneficiation destinations is a science. Valve failure can cause dewatering and other serious delays. Reliable isolation from the mine through choke and pump stations to distant destinations is crucial.

In slurry transport, time is money — and so is water. Unscheduled downtime equals big money lost. When it comes to pipeline transport of slurry and other materials — viscous liquids, reagents or concentrates — the longer a valve can isolate without maintenance or failure, the better.

There is a difference in severe service metal-seated ball valves

Many claim to be the best. All have a ball, seat and stem. But which valve most consistently provides isolation under the most challenging of conditions? You choose severe service valves with care because the consequences of failure are severe. COOPER® Accuseal valves provide many advantages in slurry transport applications.

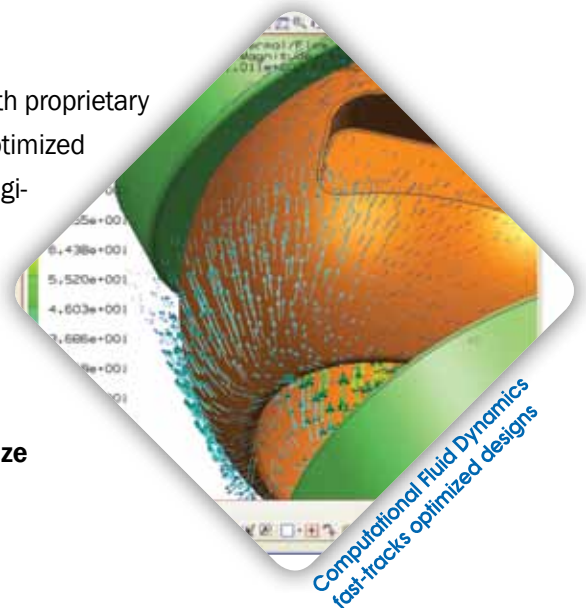
COOPER® Accuseal advantages deliver predictable reliability and performance

- **Optimized ball valve design and engineering software** — Proprietary software fast tracks optimal valve engineering.
- **Superior valve coatings** — COOPER® Accuseal state-of-the-art HP-HVOF (high pressure — high velocity oxygen fuel) coatings provide maximum protection for longer valve life.
- **OMNI-LAP 360°™** — COOPER® Accuseal's proprietary mate-lapping process laps the entire spherical surface of the ball and seat, not just the sealing band areas.
- **Bidirectional Flow Options**
 - Bidirectional with preferred flow direction, but can overcome back-flow
 - Bidirectional flow
 - Bidirectional, redundant seal (**First designed by COOPER® ACCUSEAL engineer in mid 1990's for lethal service isolation.**)
- **Vacuum seal test** — Factory vacuum seal tested ball and seat assemblies make field repair simple, when needed.

Optimized ball valve design and engineering software

Extensive severe service ball valve engineering experience is combined with proprietary valve optimization CAD/CAM/CAE software that informs and fast-tracks optimized valve design. Service conditions are simulated, providing feedback with engineering analysis, FEA (Finite Element Analysis) and CFD (Computational Fluid Dynamics). Beginning to end, the most current Product Life-Cycle Management (PLM) software is used. Advantages include:

- **Weld inlays protect wetted internal surfaces**
- **Optimized ball/seat sealing engagement**
- **Line of sight bore for unobstructed media flow matched to pipe size**
- **Optimized ball/stem tang interface**



Superior valve coatings

Not all HVOF coatings are equal. COOPER® Accuseal specified HP-HVOF coating formulas are the most consistent and least porous available, matched to the ball/seat material. State of the art technology high pressure application of the coating at the highest velocity provides the greatest density coverage, superior bond strength and surface hardness. Ongoing research ensures the optimal coatings are matched to service conditions.

- Superior coatings perform under abrasive, erosive and corrosive media bombardment.
- Longer valve life with smooth surface integrity
- No place for leak paths to develop
- Reduced torque values to operate the valve

OMNI-LAP 360°™

Proprietary mate-lapping produces the tightest, most reliable seal available.

All metal seated ball valves rely on continuous, unbroken contact between the ball and metal seat to create an isolating seal.

OMNI-LAP 360°™ mate-laps the entire ball and seat for optimal roundness, producing 100% ball to seat contact, regardless of positioning.

Traditional cup-lapping methods mate only the sealing band of the ball to seat surfaces creating ridges that distort the ball’s roundness and compromise the coating thickness. The sealing “sweet spot” originates a leak path if even slightly misaligned resulting in reduced valve life, more maintenance and higher actuation costs.

OMNI-LAP 360°™	Traditional Lapping
<ul style="list-style-type: none">• Automated lapping of the entire spherical surface• Consistent 100% roundness• Uniform coating thickness• Seals in any position• 100% ball to seat contact• Smooth surfaces reduce friction for lower torques	<ul style="list-style-type: none">• Laps only a sealing band• Distorts roundness• Compromises coating thickness• Creates ridges around “sweet spot”• Surface irregularities cause higher torques



Vacuum seal testing

COOPER® Accuseal vacuum testing of every ball and seat prior to assembly verifies 100% seal to Class VI shut-off.

- Seal reliability is ensured
- Greater manufacturing efficiency means lower cost
- Easier valve assembly — in the factory and in the field

Critical Isolation for Slurry Transport

COOPER® Accuseal Severe Service Valves provide critical isolation for applications with extreme service conditions that exceed commodity valve parameters:

- High Temperature
- High Pressure
- Heavy Solids
- Abrasive, Erosive and/or Corrosive
- Critical Plant Safety
- Lethal Service
- Other Problematic Conditions

Reliable Isolation = Profits

Severe service valves must isolate reliably as mineral ore slurries are transported and processed. Dependable valve isolation means more productivity, less maintenance and more profitable operations.

Typical Severe Service Valve Locations

- Choke Stations
- Filter Plants
- High Pressure Slurry Transport Systems
- Isolation Stations
- Mineral Concentrators
- Pump Stations
- Upgraders
- Waste Disposal

Typical Severe Service Valve Functions

- By-pass Valves
- Charge Valves
- Discharge Valves
- Drain Valves
- Emergency Shut Down Valves
- Emergency Dump Valves
- Feed Valves
- Injection Valves
- Instrument Bleed Valves
- Instrument Isolation Valve
- Main Isolation Valve
- Pigging Isolation Valve
- Pig Launch Charge Valves
- Pig Receiver Discharge Valves
- Vent Valves

Slurry Ore Concentrates

- Copper
- Gold
- Nickel
- Coal
- Tar Sands
- Iron
- Silicon (ultra-pure granular polysilicon)
- Lithium, Molybdenum and others

Upgrade Your Expectations & Enjoy Longer Run-times

These photographs demonstrate the effectiveness of COOPER® Accuseal's Slurry Transport valve in punishing copper concentrate slurry transport service in Chile. This 8 inch 1500 ASME Class valve was removed from the choke station pipeline after approximately 1500 cycles at a differential pressure of 2700 psig. Close inspection of the primary sealing side of the ball clearly shows the integrity of the HP-HVOF coating on Omni-Lap 360°™ ball and seat sealing components.



COOPER® Accuseal 8 inch, 1500 ASME Class Slurry Transport Valve in choke station pipeline for copper concentrate in Chile



Valve removal for inspection



View through downstream bore, open position



Close-up view of primary sealing surface of closed ball after approximately 1500 cycles at 2700 psig differential pressure

Choose the COOPER® Accuseal Advantage on your next project.

1. Body/End Connection

- Machined from forgings for material structural integrity.
- End Connections: RFF- raised face flange – Standard.
- Options available on request: BW-Butt Weld, SW-Socket Weld, RTJ, Hub Connectors, Threaded, Lens Joint, Wafer, etc.
- Weld overlay of wetted surfaces to protect from corrosion and erosion – available upon request.

2 & 3. Ball + Seats = the sealing assembly

- **OMNI-LAP 360°™** optimizes the matched roundness of the ball and seat for 100% seal, regardless of positioning. The sealing surface is maximized, providing the widest metal to metal seal possible. The seal is consistently reliable.
- Corrosion resistant materials with matched rates of thermal expansion are used on the sealing components to maintain seal integrity and reliability.
- Coatings are robotically applied with HP-HVOF (high velocity oxygen fueled) or Spray and Fuse processes for uniform surface thickness, coating density and maximum metallurgical bond to withstand extreme service conditions.
- Self-cleaning – the seats remove all debris from the ball with every on/off cycle, extending valve life.
- Field repair is simpler and faster, when required. The ball and seat assembly is vacuum seal verified at the factory and easily replaced on site.

4. Dual Belleville Springs

- Provides resilient loading of ball to seat.
- Provides effective particulate exclusion.

5. Stem

- Surface modification eliminates galling with rotation.
- Blow-out proof per ASME B16.34.

6. Inner Stem Seal

- Provides primary metal-to-metal stem seal.

7. Packing Bushing

- Prevents stem packing intrusion into body
- Works with stem bearing to prevent lateral stem motion.

8. Packing Rings

- Reinforced graphite.

9. Anti-extrusion Rings

- Prevents packing extrusion.

10. Packing Follower

- Thermally matched to stem material
- Prevents galling and contains upper packing.

11. Articulating Gland Flange

- Spherically engages the packing follower to prevent stem binding and galling during adjustments.

12. Belleville Springs

- Live load on the bolted joint eliminates routine gland adjustments.
- Reduces maintenance.

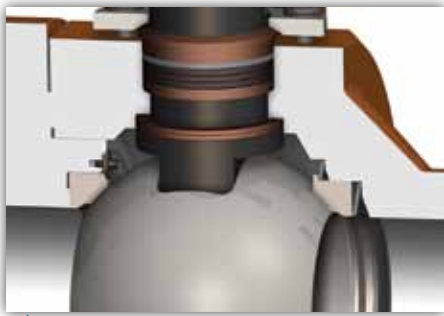
13. Stem Retaining Ring

- Prevents stem misalignment during actuator installation.
- Stem cannot be forced into ball stem slot.

14. Mounting Flange

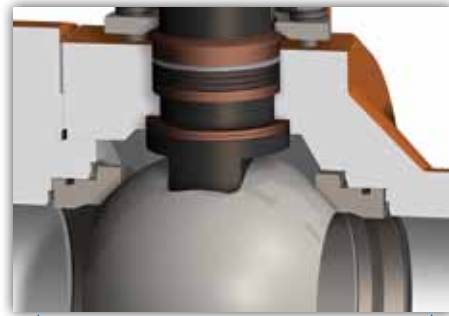
- Precision machined to ISO 5211.
- External mounting flange provides rigid mounting for ease of adjustment.
- Direct mounting option reduces hysteresis and stem deflection.

15. Body Gasket



Unidirectional flow

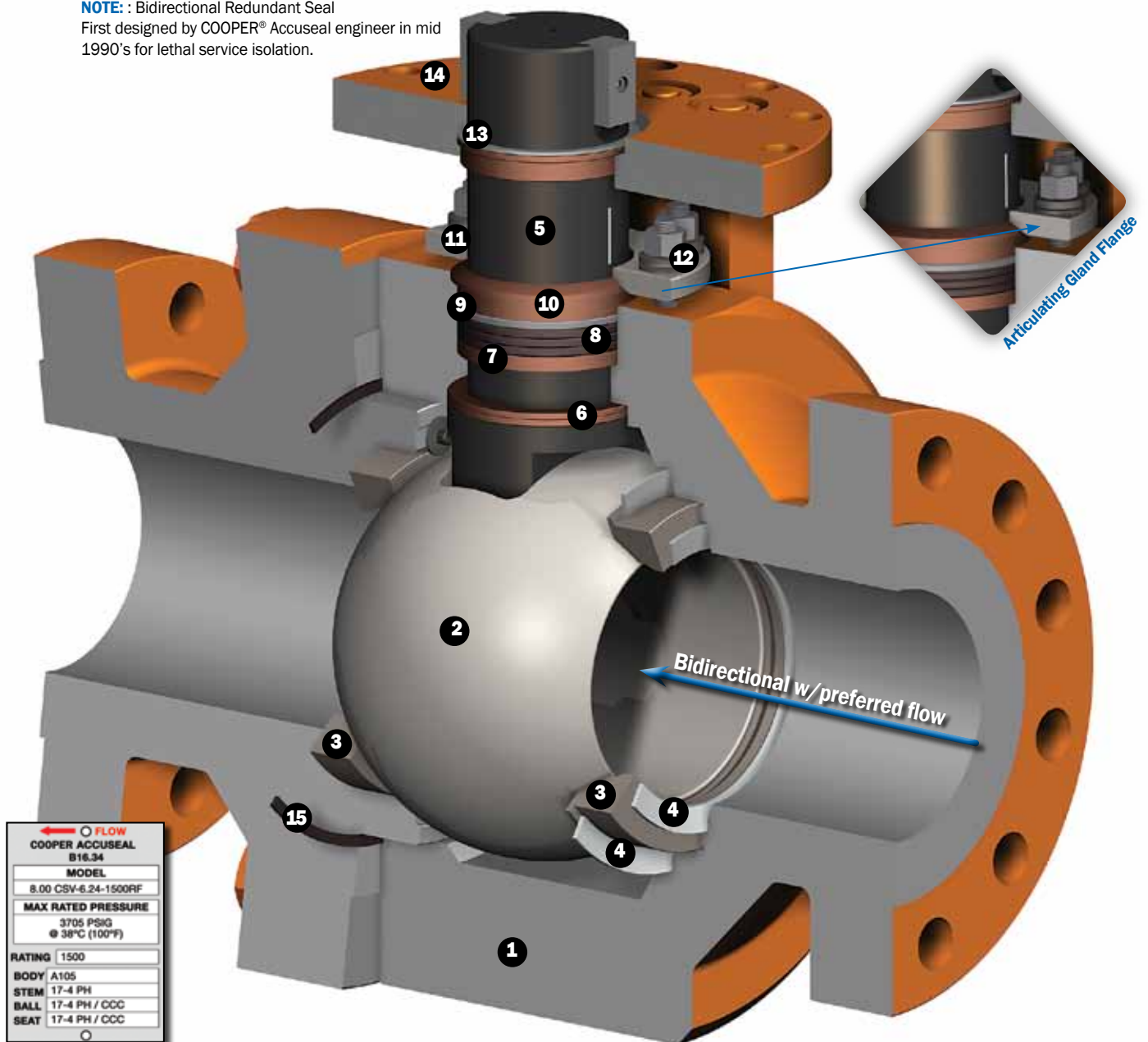
- Locked-in downstream seat
- Dual Belleville load springs provide effective particulate exclusion of critical annular area between load ring and body



Bidirectional

- Fully bidirectional - completely independent of flow direction
- Redundant isolating seats - both upstream and downstream seat are in continuous sealing engagement with ball.
- Dual Belleville load springs provide effective particulate exclusion and protect elastomeric/polymeric seal at the O.D. of each seat ring.

NOTE : Bidirectional Redundant Seal
First designed by COOPER® Accuseal engineer in mid 1990's for lethal service isolation.



Nameplate

- LOCKED-IN DOWNSTREAM SEAT
- DUAL SPRING + LAPPED SEAT LANDING UPSTREAM

CSV - slurry transport valve

Applications

- Critical isolation of Slurry, Liquids, Solids, and Gases
- Custom designs to solve problematic applications

Any application with service conditions too hot and/or abrasive/erosive for commodity valves

Bidirectional with Preferred Flow

- Size: 1/2" - 36"
- Full and reduced port valves
- Bore to match pipe ID – available
- ASME Pressure Class: 150 thru 4500

End Connections

- **RFF Standard** or to customer specifications (Butt Weld, Socket Weld, RTJ, Hub Connectors, Threaded, Lens Joint, and Wafer)

Actuator Options

- Factory installation of actuator of your choice
- Mounting kits provided to mount to existing actuators

Features and Benefits

- Directional Flow Isolation Options
 - Bidirectional – Preferred flow direction - Standard
 - Unidirectional – isolates in one direction
 - Bidirectional – with redundant seals
- Positive mechanical stops prevent over-travel
- Operator – T-handle, lever, gear or actuated
- Easily automated with ISO 5211 standard mounting pads
- Self-cleaning ball and seats
- Positive positioning feature prevents misalignment during actuation. Stem cannot force ball out of correct position
- Field repairable with **OMNI-LAP 360°™** ball and seat assemblies, vacuum seal pretested at the factory

1 year warranty standard (contact COOPER® Accuseal for details)

CSV for Slurry Transport: Bill of Materials with Options

ITEM	DESCRIPTION	STANDARD		OPTIMIZE WITH APPLICATION SPECIFIC OPTIONS	
		MATERIAL	COATING	MATERIAL	COATING
1	Body	A105 (316 SS overlay on wetted surfaces available)		Stainless Steel, Duplex & Super Duplex Gr, F51, F53 Titanium, Gr. 2 or 12,	HP-HVOF applied Chrome Carbide, Tungsten Carbide
2	Ball	17-4 PH	Chrome Carbide HP-HVOF applied	Stainless Steel, Duplex & Super Duplex Gr, F51, F53 Titanium, Gr. 2 or 12,	Tungsten Carbide, Fused Carbide
3	Seats	17-4 PH	Chrome Carbide HP-HVOF applied	Stainless Steel, Duplex & Super Duplex Gr, F51, F53 Titanium, Gr. 2 or 12,	Tungsten Carbide, Fused Carbide
4	Belleville Spring	17-4 PH			
5	Stem	17-4 PH		Inconel 718, Ti Gr.5	
6	Inner Stem Seal	410 SS	Chrome Carbide HP-HVOF applied		
7	Packing Bushing	410 SS			
8	Packing Rings	Grafoil			
9	Anti-Extrusion Ring	Inconel Wire Reinforced Grafoil			
10	Packing Follower	410 SS			
11	Articulating Gland Flange	410 SS			
12	Live Loading Belleville Springs	Stainless Steel			
13	Stem Retaining Ring	Stainless Steel			
14	Mounting Flange	Carbon Steel			
15	Body Gasket	Spiral Wound Grafoil Filled			

Special alloys available upon request



Dimensions

- End to End dimensions per ASME B16.10
- Bore to match pipe ID available

COOPER® Accuseal manufactures to ASME



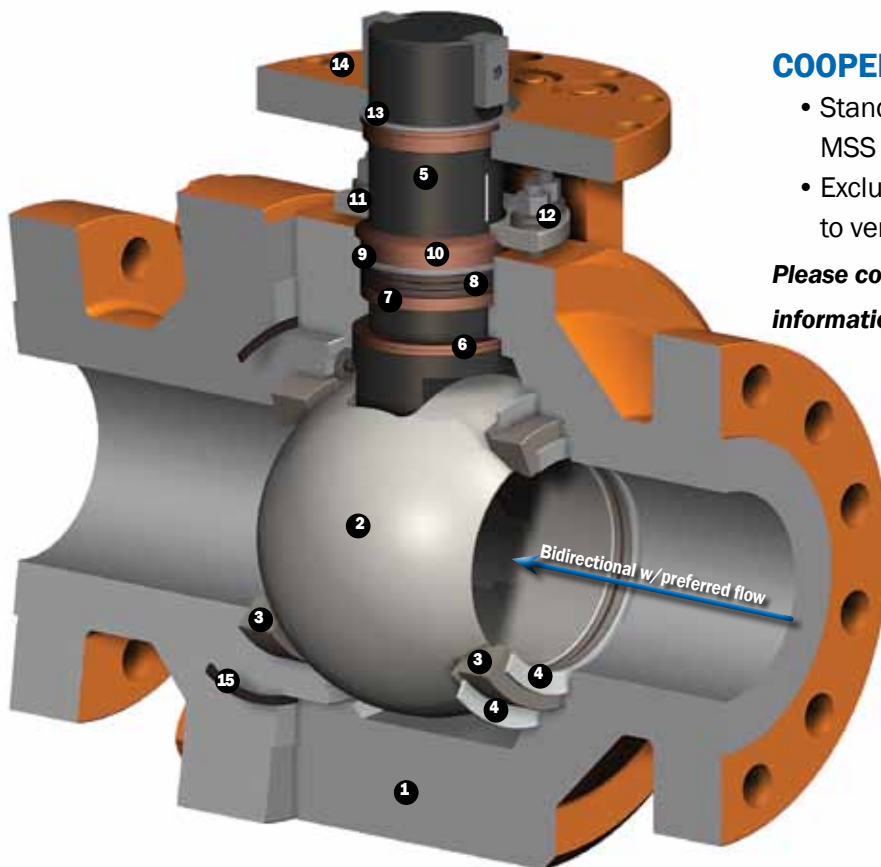
ISO 9001: 2008



PED/CE



CRN



COOPER® Accuseal Testing Procedures

- Standard valve testing to meet or exceed MSS SP-61 and FCI 70-2 Class VI
- Exclusive vacuum testing of ball and seat to verify seal prior to valve assembly

Please contact COOPER® Accuseal for warranty information.



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