



Accuseal® Power Generation Valves

EXPERIENCE, DEDICATION AND VISION

Forum Energy Technologies (FET) is a global provider of manufactured technologies and applied products and services. FET brings together some of the most well-known brands in our industry with an extensive range of mission critical products and services. We offer innovative solutions to customers around the world. Forum is well positioned to supply our clients with the equipment and related services that improve safety and performance, and lower operating costs.

Forum's products and services range from the underground reservoir to the refinery, from the sea floor to the above ground transportation line, to power plants, mines, and heavy industry. We take pride in our comprehensive offering of solutions to maximize operations and improve end results. We partner with our customers to solve challenges.



Power Generation

FORUM provides a broad range of valves to meet most applications from basic manual operated to fully automated systems. As the industry continues to increase technology demands, operators select FORUM to obtain best-in-class service, performance and value. We are ISO-9001 certified, thus assuring design and manufacturing of the highest quality products available in the market.

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Why Accuseal®?

Why make Accuseal your Severe Service metal-seated ball valve of choice?

Demands on power generation plants are unprecedented. In combined cycle plants nearly every unit is required to perform as a flexible generating plant, swinging load in response to fluctuations in energy demand. As coal fired plants age, they experience more frequent outages and more starts. Mechanical equipment, including valves, must meet the ever increasing challenges relating to cycling and thermal transience.

Reliable, repeatable isolation has never been more critical.

There is a difference!

Many claim to be the best. All have a ball, seat and stem. But which valve most consistently provides tight shutoff under the most challenging of conditions? You choose severe service valves with care because the consequences of failure are severe. Accuseal Valves provides many advantages in power generation applications.

Accuseal® Valves deliver predictable reliability and performance

- Optimized Ball Valve Design and Engineering Software.
Proprietary software fast tracks optimal valve engineering.
- Superior Valve Coatings.
- Accuseal's state-of-the-art HP-HVOF (high pressure – high velocity oxygen fuel) coatings provide maximum protection for longer valve life.
- Exclusive Accuseal Fused and thermally stabilized coatings are metallurgically bonded to the base material, to handle even the most severe thermal stresses.
- Omni-Lap 360°™
The proprietary Accuseal mate-lapping process laps the entire spherical surface of the ball and seat surface, not just the sealing band areas.
- Vacuum Seal Test
Accuseal ball and seat sealing is tested prior to valve assembly, ensuring seal integrity.

Optimized ball valve design and engineering software

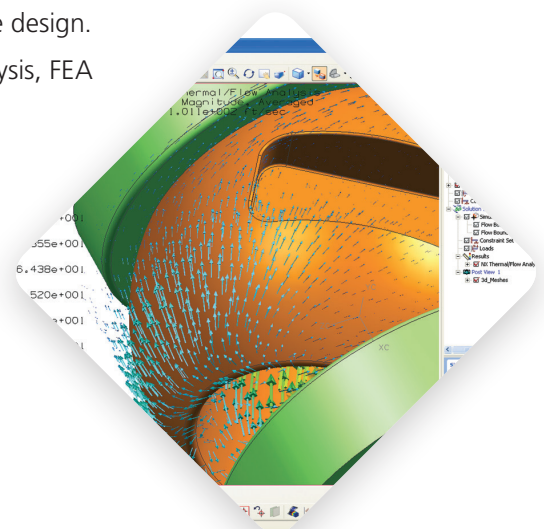
Extensive severe service ball valve engineering experience is combined with proprietary valve optimization CAD/CAM/CAE software and fast-tracks optimized valve design.

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:

- Optimized ball/seat sealing engagement
- Line of sight bore for totally unobstructed media flow
- Optimized ball/stem tang interface
- Thermally stabilized seat geometry allows for rapid sealing



**Computational Fluid Dynamics
Fast-tracks optimized designs**

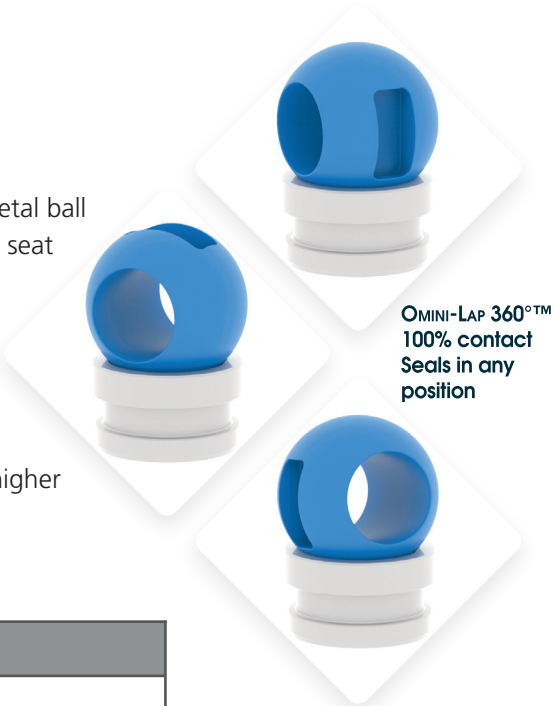
Superior valve coatings

- Not all HVOF coatings are equal.
- Accuseal's HVOF coating formulas are the most consistent and least porous available, matched to the ball/seat material. State of the art technology applies the coating at the highest velocity for greatest density coverage, superior bond strength and surface hardness. Ongoing research ensures the most reliable coating is matched to service conditions.
 - Accuseal's Fused carbide coating are thermally stabilized to handle high cycle and high thermal cycle applications.
 - Superior coating performance under thermal stress and 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 metal ball and 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

- Accuseal Valves vacuum testing of every ball and seat prior to assembly verifies 100% ball-to-seat 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

Plant Applications

Typical Combined Cycle

A. Feedwater System

- Deaerator Vent
- Isolation valves on Bypass Lines
- Extraction Steam Drain

B. HRSG

- Boiler Feed Pump Isolation
- Boiler Feed Pump Shell Drain
- Control Valve Isolation
- Boiler Feed Pump Warm-Up Line Drain
- Reheat / Superheat Spray Isolation
- Drum Blowdown Root Valve / Isolation Vents
- Drum Instrument Isolation
- Automatic Relief Valve
- Sight-Glass Block / Drain
- Tandem Blowdown
- Boiler Blowdown
- Primary Superheat Drain / Vent / Instrument Isolation
- Secondary Superheat Drain / Vent / Instrument Isolation
- Reheat Drain / Vent / Instrument Isolation
- Superheat Spray Block

- Reheat Spray Isolation Blocking
- LP Section HRSG Tube Drains
- IP Section HRSG Tube Drains
- HP Section HRSG Tube Drains
- Automated Bottom Blowdown

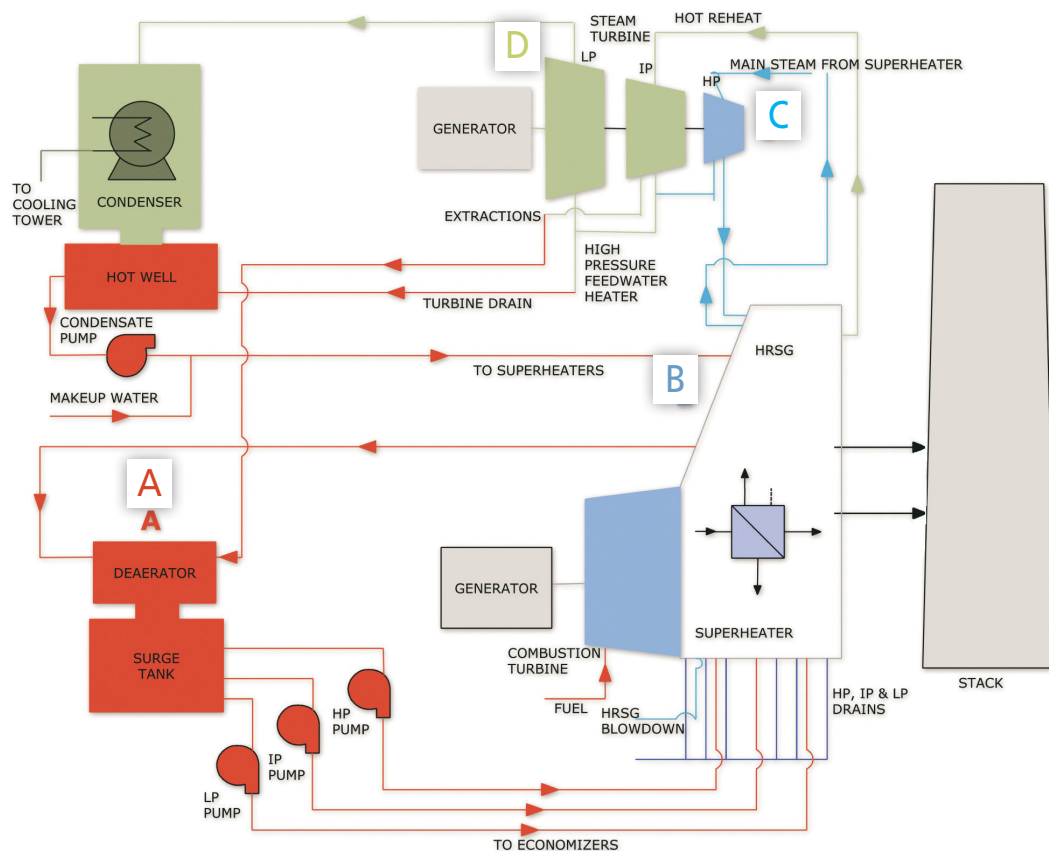
C. HP Turbine Steam Supply & Extraction Systems

- Main Steam Drain
- Main Steam Before and After Seat Drain
- Cold Reheat Drain
- Turbine Bypass Isolation
- Bypass Valves

D. IP & LP Turbine Steam Supply & Extraction Systems

Supply Extraction Systems

- Hot Reheat Drain
- Hot Reheat at the CRV Drain
- IP and LP Turbine Extraction Drain



Typical Fossil Fueled

A. Condensate System

Deaerator Vent

- Isolation Valves on Bypass lines
- Extraction Steam Drain
- Feedwater Heater Drain / Vent
- Shell Side Instrument Isolation

B. HP Feedwater

- Boiler Feed Pump
- Discharge Isolation
- Boiler Feed Pump Shell or
- Case Drain
- Boiler Feed Pump Minimum
- Flow Isolation
- Boiler Feed Pump Warming Line Isolation / Drain
- Reheat / Superheat Spray Isolation
- Feedwater Heater Isolation
- Bypass Valves
- Economizer Drain

C. Boiler System

- Drum Blowdown Root Valve
- Drum Instrument Isolation
- Sight-Glass Isolation
- Water Wall Drain / Vent
- Tandem Blowdown
- Mass Boiler Blowdown
- Primary Superheat Drain / Vent
- Secondary Superheat Drain / Vent
- Reheat Drain / Vent
- Superheat Spray Isolation
- Superheater Spray
- Automated Block
- Reheater Spray Isolation

D. HP Turbine Steam Supply and Extraction Systems

- Supply and Extraction Systems
- Main Steam Drain
- Main Steam Before and
- After Seat Drain
- Main Steam Lead Drain
- Turbine Bypass Isolation
- Bypass Valves

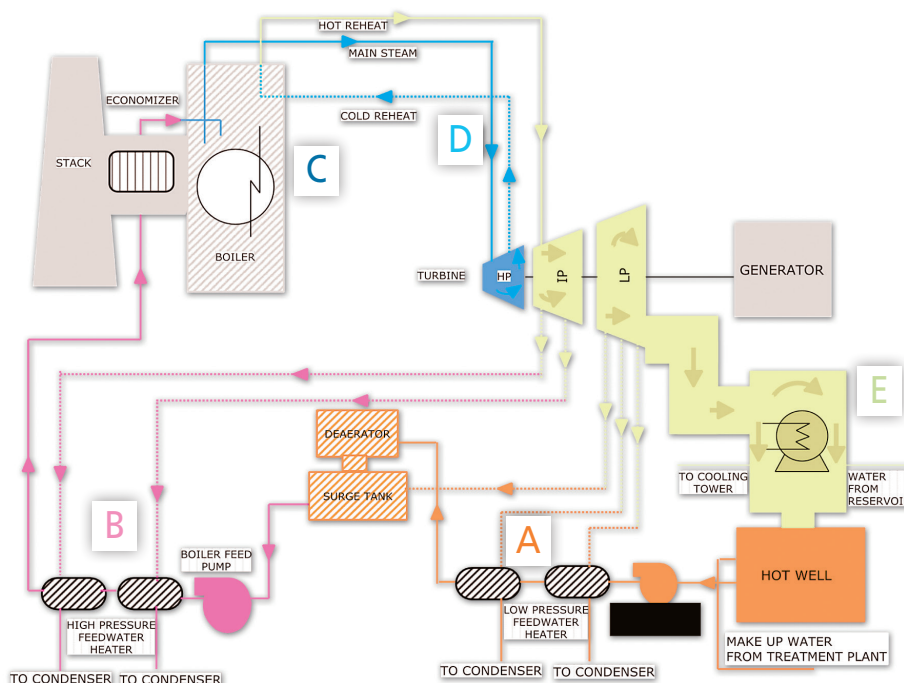
E. IP and LP Turbine Steam

Supply and Extraction Systems

- Supply Extraction Systems
- Hot Reheat Drain
- IP and LP Turbine Extraction Drain

Auxiliary Systems

- Sootblower Piping System
- Sootblowing Header Isolation
- Sootblower Regulator Isolation
- Sootblower Control Valve Block
- Sootblower System Crossover Header Isolation
- Sootblower Bank Isolation
- Individual Sootblower Isolation
- Air Heater Sootblower Steam Supply Line Shutoff
- Sootblower Thermal Drains / Bypass
- HP and LP Steam Supply System to the BFP Turbine
- Main Steam Supply Isolation Valve
- HP BFP Steam Supply Drain
- HP BFP Below and Above Seat Drain
- Bypass Lines
- Extraction Steam Supply to LP BFP Turbine Drains
- LP BFP Below and Above Seat Drain
- Inerting Steam System
- Inert Steam Inlet to Pulverizer Blocking / Automated Isolation
- Steam Supply to Inerting System Pressure Regulator Isolation
- Extraction Steam Supply line to the Inerting Steam Header Drain
- Isolation Valves on the Bypass Lines
- Inerting System Steam Header Thermal Drain



Accuseal[®] Features & Benefits

1. Body / End Connection

- Machined from forgings for highest material integrity.
- Wide variety of end connections available.

2. Ball + Seat – the sealing assembly

- Omni-Lap 360° optimizes the matched roundness of the ball and seat for 100% seal, regardless of positioning. The wide sealing surface provides a low stress metal to metal seal. 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 throughout the operating temperature range.
- Parts are robotically coated for uniform surface thickness, coating density, and excellent metallurgical bond to withstand severe thermal shocks.
- The seats are self-cleaning, removing all debris from the ball with every cycle, extending valve life.
- Proprietary Thermal Stabilization of ball and thermally stabilized and optimized seat geometry maintains maximum seal, even during thermal transience.

3. Wave Spring

- Superior performance to Belleville springs in small sizes.
- More predictable force on ball to seat seal even at low pressure.
- Longer spring life means longer valve life.

4. Stem

- One piece with surface hardening.
- Minimizes hysteresis between actuator and ball.
- Eliminates galling potential between rotating parts.
- Stem standard ASME keyed for reliable adaption.

5. Dual Inconel 718 Pins

- Oversized pins contained in thrust collars.
- Blow-out proof stem to ASME B16.34

6. Mounting Flange

- Precision machined to ISO 5 211.
- External mounting flange provides rigid mounting for ease of actuation.
- Direct mounting option reduces hysteresis and stem deflection.

7. Lockout Standard

- Fulfills Open/Closed lockout requirements.

8. Articulating Gland Flange

- Spherically engages with packing follower.
- Prevents stem binding and galling during adjustments.

9. Live Loaded Packing

- Standard with Belleville spring washers.
- Eliminates routine gland adjustments.
- Reduces maintenance.
- Guarantees zero stem emissions.

10. Open/Closed Indicator

- Scribed lines on stem and articulating gland flange.
- Ensures proper ball to seat alignment.
- Positive Open/Closed indicator.

CR2 Field Repair Kit

Ball & Seat

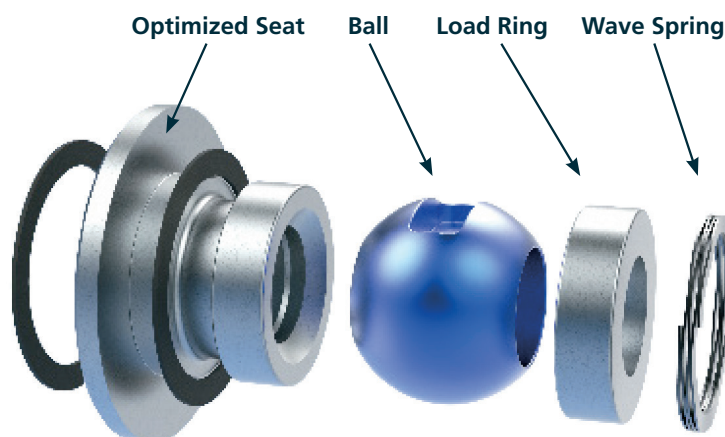
- Inconel[®] 718 ball and seat.
- Fused Carbide coating - thermally stabilized.
- Omni-Lap 360°

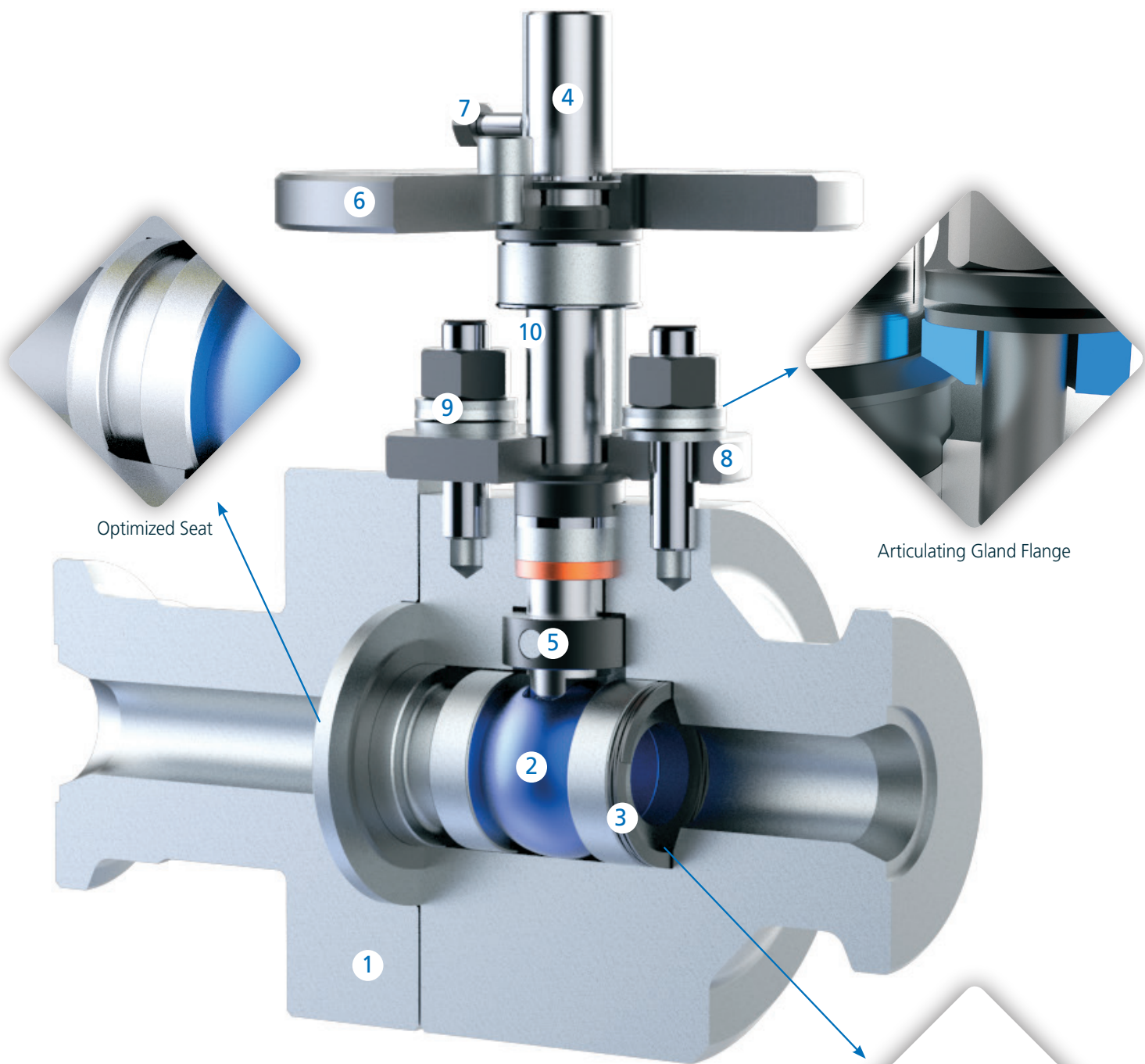
Computer optimized sealing geometry.

All field repair kits are vacuumed tested to ensure Class VI shut-off.

Wave Spring

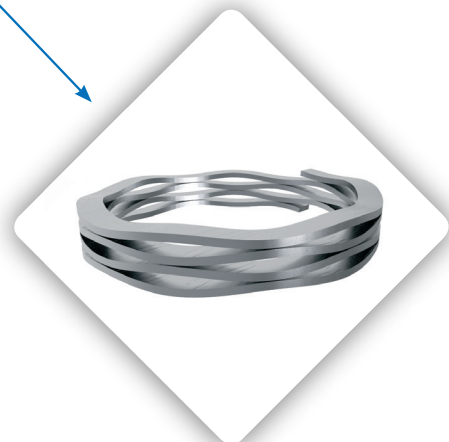
- Superior performance to Belleville springs.
- More predictable force on ball to seat seal — even at low pressure.
- Longer spring life means longer valve life.





<div> <div></div> <div>FLOW</div> </div>	
FORUM ACCUSEAL	
B16.34 LTD	
MODEL	
	2.00-SPV106-3200
MAX RATED PRESSURE	
	8000 PSIG
	@38°C (100°F)
RATING	3200#
BODY	A182 F22 CLASS 3
STEM	A-286
BALL	410 / CC
SEAT	410 / CC
	○

Nameplate



Wave Spring

Accuseal® - Steam Power Valve (SPV)

Applications

- Boiler Drains and Vents
- Turbine Drains and Vents
- Control Valve Isolation
- Equipment Isolation
- Longer lasting alternative to gate and globe valves

Size

½" – 2½" (various bore sizes available)

ASME Pressure Class

600 - 4500 Limited Class

End Connections

SW – ASME B16.11 (Standard)
Per customer specifications



Alternative to globe
and gate valves

Features and Benefits

- Omni-Lap 360° optimized roundedness and matched ball and seats assemblies ensure 100% seal
- 410 HVOF trim for boiler drains and vents
- 718 Fused Carbide trim for HP drains, HRH drains, turbine drains and any high cycle or high thermal stress applications
- Withstands severe thermal shocks
- Tight shutoff to API 598/MSS SP-61
- Wave spring maximizes thermal cycling strength for longer life
- ISO 5211 Mounting Patterns

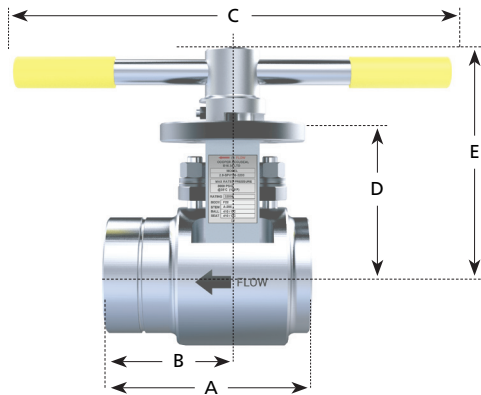
5 year warranty standard for all steam and feedwater services

Bill of Materials - Accuseal® SPV		
ITEM	DESCRIPTION	MATERIAL
1	Body	A105 A182 F22 Cl.3 A182 F91
2	Ball	410 HVOF / CC Coating (Std. 600-3200 Cl.) Inconel 718 / Spray & Fuse (Std. 3200 – 4500 Cl.)
3	Seat	410 HVOF / CC Coating (Std. 600-3200 Cl.) Inconel 718 / Spray & Fuse (Std. 3200 – 4500 Cl.)
4	Wave Spring	A-286
5	Stem	Inconel 718 / A-286 Hardfaced
6	Packing Bushing	316 SS Hardfaced
7	Packing Rings	Grafoil
8	Anti-Extrusion Ring	Inconel Wire Reinforced Grafoil®
9	Packing Follower	316 SS Hardfaced
10	Articulating Gland Flange	4130 Hardfaced
11	Live Loading Belleville Springs	Stainless Steel
12	Retaining Pins	Inconel 718
13	Guide Bearing	Ni-Al-Brz
14	Stem Retaining Ring	Stainless Steel
15	Mounting Flange	Carbon Steel
16	Transition Piece	410 SS
17	Load Ring/Retaining Ring	A-286

Special alloys & coatings available upon request CC=Chrome Carbide coating



Socketweld ends
per ASME B16.11



Dimension – ASME 600, 900, 1500 Limited Class (MAX dp = 2500)

Model	Bore	Class	SW End	A		B		C		D		E		Weight		Cv		
				in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg	Sch 80	Sch 160	XXS
Accuseal SPV055	0.55	1500	0.50	7.51	190.75	4.00	101.60	15.00	381.00	4.45	113.03	7.15	181.61	19	8.61	6	7	-
	0.55	1500	0.75	6.00	152.40	4.00	101.60	15.00	381.00	4.45	113.03	7.15	181.61	19	8.61	-	-	-
	0.55	1500	1.00	6.00	152.40	4.00	101.60	15.00	381.00	4.45	113.03	7.15	181.61	20	9.07	-	-	-
Accuseal SPV072	0.72	1500	1.00	6.00	152.40	3.63	92.08	15.00	381.00	4.45	113.03	7.15	181.61	19	8.61	24	23	-
	0.72	1500	1.50	6.00	152.40	3.63	92.08	15.00	381.00	4.45	113.03	7.15	181.61	20	9.07	21	22	-
Accuseal SPV106	1.06	1500	1.50	7.25	184.15	4.63	117.48	18.00	457.20	5.24	133.10	7.94	201.68	31	14.06	51	69	-
	1.06	1500	2.00	7.25	184.15	4.63	117.48	18.00	457.20	5.24	133.10	7.94	201.68	34	15.42	45	56	-
Accuseal SPV134	1.34	1500	2.00	8.25	209.55	5.13	130.18	18.00	457.20	5.63	143.00	8.73	221.74	45	20.41	100	121	-
	1.34	1500	2.50	8.25	209.55	5.13	130.18	18.00	457.20	5.63	143.00	8.73	221.74	47	21.31	82	91	-
Accuseal SPV169	1.69	1500	2.00	11.50	292.10	6.25	158.75	N/A	N/A	7.08	179.80	N/A	N/A	70	31.80	175	347	-
	1.69	1500	2.50	9.50	241.30	6.25	158.75	N/A	N/A	7.08	179.80	N/A	N/A	70	31.80	119	139	-

Dimension – ASME 3200 Limited Class (MAX dp = 4500)

Model	Bore	Class	SW End	A		B		C		D		E		Weight		Cv		
				in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg	Sch 80	Sch 160	XXS
Accuseal SPV055	0.55	3200	0.50	7.51	190.75	4.00	101.60	15.00	381.00	4.45	113.03	7.15	181.61	19	8.61	-	-	1
	0.55	3200	0.75	6.00	152.40	4.00	101.60	15.00	381.00	4.45	113.03	7.15	181.61	19	8.61	-	16	6
	0.55	3200	1.00	6.00	152.40	4.00	101.60	15.00	381.00	4.45	113.03	7.15	181.61	20	9.07	-	-	-
Accuseal SPV072	0.72	3200	1.00	6.00	152.40	3.62	91.94	15.00	381.00	4.54	115.31	7.24	183.89	21	9.52	-	23	10
	0.72	3200	1.50	6.00	152.40	3.62	91.94	15.00	381.00	4.54	115.31	7.24	183.89	24	10.88	-	26	34
Accuseal SPV106	1.06	3200	1.50	7.25	184.15	4.63	117.60	18.00	457.20	5.27	133.85	8.27	210.05	36	16.32	-	69	56
	1.06	3200	2.00	7.25	184.15	4.63	117.60	18.00	457.20	5.27	133.85	8.27	210.05	40	14.51	-	59	66
Accuseal SPV134	1.34	3200	2.00	8.25	209.55	5.13	130.30	18.00	457.20	6.25	158.75	9.25	234.95	56	25.40	-	144	103
	1.34	3200	2.50	8.25	209.55	5.13	130.30	18.00	457.20	6.25	158.75	9.25	234.95	61	27.66	-	90	95
Accuseal SPV169	1.69	3200	2.00	11.75	298.45	6.00	152.40	N/A	N/A	8.00	203.20	N/A	N/A	100	45.35	-	347	271
	1.69	3200	2.50	9.50	241.30	6.00	152.40	N/A	N/A	8.00	203.20	N/A	N/A	99	44.90	-	139	225

Dimension – ASME 4500 Limited Class (MAX dp = 6500)

Model	Bore	Class	SW End	A		B		C		D		E		Weight		Cv		
				in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg	Sch 80	Sch 160	XXS
Accuseal SPV055	0.66	4500	0.75	8.5	215.9	4.75	120.65	18	457.20	5.09	129.28	7.79	197.86	31	14.06	-	12	5
	0.66	4500	1.00	7.25	184.15	4.75	120.65	18	457.20	5.09	129.28	7.79	197.86	30	13.60	-	21	14
	0.66	4500	1.50	7.25	184.15	4.75	120.65	18	457.20	5.09	129.28	7.79	197.86	35	15.87	-	21	21
	0.66	4500	2.00	8.00	203.20	4.75	120.65	18	457.20	5.09	129.28	7.79	197.86	41	18.59	-	15	16
Accuseal SPV106	1.00	4500	1.50	8.25	209.55	5.38	136.65	18	457.20	6.25	158.75	9.35	237.49	54	24.49	-	49	50
	1.00	4500	2.00	8.25	209.55	5.38	136.65	18	457.20	6.25	158.75	9.35	237.49	60	27.21	-	48	54
	1.00	4500	2.50	8.25	209.55	5.38	136.65	18	457.20	6.25	158.75	9.35	237.49	63	28.57	-	44	48

(1) Not recommended for prolonged use above 800°F / 427°C

(2) Not recommended for prolonged use above 1100°F / 593°C

Contact FORUM – Accuseal for pressure classes not listed. Reduced ratings shown above are limited by material design considerations.

The valve body is designed in accordance with ASME B16.34 Limited Class pressure rating requirements for the designated pressure class.

Accuseal® CR2

Applications

- Boiler Drains and Vents
- Turbine Drains and Vents
- Control Valve Isolation
- Equipment Isolation
- Longer lasting alternative to gate and globe valves

Size

1" - 3" (various bore sizes available)

ASME Pressure Class

600 - 4500 Limited Class

Socket weld, Buttweld & Hub Connections

Complies with the ASME Section VIII Div. 1, 2 and 3

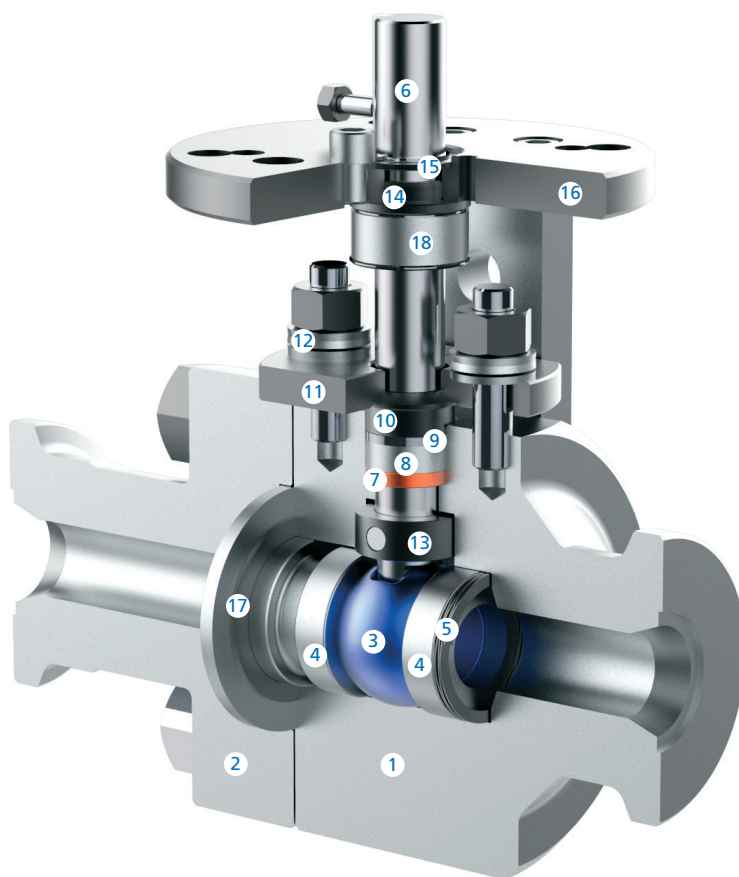
Boiler and Pressure Vessel codes.

ASME Certificates of Authorization for ASME Section VIII Div. 1 ("U"), 2 ("U2") and 3 ("U3") are currently maintained.

Bill of Materials - Accuseal CR2		
ITEM	DESCRIPTION	MATERIAL
1	Body	A105 A182 F22 Cl.3 A182 F91
2	End Connect	A105 A182 F22 Cl.3 A182 F91
3	Ball	Inconel 718 / Spray & Fuse
4	Seat	Inconel 718 / Spray & Fuse
5	Wave Spring	A-286
6	Stem	Inconel 718 / A-286 Hardfaced
7	Packing Bushing	316 SS Hardfaced
8	Packing Rings	Grafoil®
9	Anti-Extrusion Ring	Inconel Wire Reinforced Grafoil®
10	Packing Follower	316 SS Hardfaced
11	Articulating Gland Flange	4130 Hardfaced
12	Live Loading Belleville Springs	Stainless Steel
13	Retaining Pins	Inconel 718
14	Guide Bearing	Ni-Al-Brz
15	Stem Retaining Ring	Stainless Steel
16	Mounting Flange	Carbon Steel
17	Gasket	Graphite
18	Retaining Sleeve	304 SS

Features and Benefits

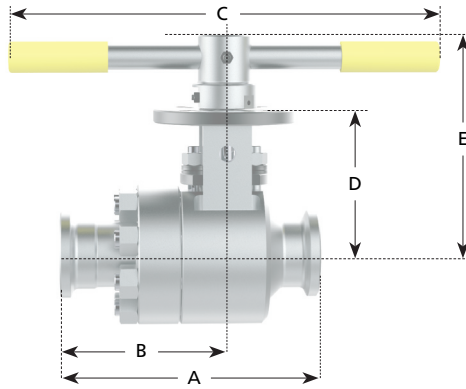
- Provides reduced total cost of ownership for operator
- Hub eliminates welding and PWHT requirements after installation
- Designed for extended lifespan with easy disassembly, maintenance, and complete repairability in the field
- Omni-Lap 360° optimized roundness and matched ball and seat assemblies ensure 100% seal
- Tight shut-off to API 598/MSS SP-61
- Withstands severe thermal shocks
- Field repairable



Bi-directional designs available.

Special alloys and coatings available upon request.

The Accuseal Hub-End CR2 allows repair or replacement with no welding or hot work permit. A field repair kit and 2 new hub gaskets are all that is required.



Cv – ASME 600, 900, 1500 Limited Class

Bore (inches)	Pipe Size (inches) / Schedule									
	0.75 SCH 80	0.75 SCH 160	1.00 SCH 80	1.00 SCH 160	1.50 SCH 80	1.50 SCH 160	2.00 SCH 80	2.00 SCH 160	2.50 SCH 80	2.50 SCH 160
0.72	47	40	24	23	21	22	-	-	-	-
1.06	-	-	104	73	51	69	45	56	-	-
1.34	-	-	-	-	137	212	100	121	82	91
1.69	-	-	-	-	-	-	175	347	119	139

Dimension – ASME 1500, 3100, 4500 Limited Class

Model	Bore	Class	A		B		C		D		E		Weight	
			in	mm	in	mm	in	mm	in	mm	in	mm	lb	kg
Accuseal CR2072	0.72	1500	8.50	215.90	5.52	140.21	15.00	381.00	4.54	115.31	7.24	183.89	26	11.79
	0.72	3100	9.50	241.30	6.15	156.21	15.00	381.00	5.13	130.30	7.83	198.88	32	14.51
Accuseal CR2106	1.06	1500	9.00	228.60	5.71	145.03	18.00	457.20	5.56	141.22	8.56	217.42	42	19.05
	1.06	3100	11.00	279.40	6.99	177.54	18.00	457.20	5.86	148.84	8.56	217.42	62	28.12
Accuseal CR2134	1.34	1500	10.50	266.70	6.81	172.97	18.00	457.20	6.25	158.75	9.25	234.95	66	29.93
	1.34	3100	12.50	317.50	7.66	194.56	18.00	457.20	6.82	173.99	9.82	249.42	92	41.73
Accuseal CR2169	1.69	1500	11.75	298.45	7.22	183.38	-	-	7.73	196.34	-	-	107	48.53
	1.69	3100	14.00	355.60	8.70	220.98	-	-	8.40	213.36	-	-	147	66.67
Accuseal CR2066	0.66	4500	11.75	298.45	7.68	195.07	18.00	457.20	5.46	138.68	8.16	207.26	61	27.66
Accuseal CR2100	1.00	4500	13.75	349.25	8.81	223.77	18.00	457.20	6.93	176.02	9.93	252.22	115	52.16

Maximum Operating Pressure Rating vs. Temperature

	Temp (°F)	-20° to 100°	200°	300°	400°	500°	600°	650°	700°	750°	800°	850°	900°	950°	1000°	1050°	1100°
	Temp (°C)	-29° to 38°	93°	149°	204°	260°	316°	343°	371°	399°	427°	454°	482°	510°	538°	566°	593°
ASME 1500 LTD	A 105 (1)	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	-	-	-	-	-	-
	A 182 Gr. F22 Cl.3 (2)	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2411	1784	1170	732
	A 182 Gr. F91	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2500	2411	2249	2249	2014
ASME 3100 LTD	A 105 (1)	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	-	-	-	-	-	-
	A 182 Gr. F22 Cl.3 (2)	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4131	2703	1693
	A 182 Gr. F91	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4500	4495
ASME 4500 LTD	A 105 (1)	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	-	-	-	-	-	-
	A 182 Gr. F22 Cl.3 (2)	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	4063	2546
	A 182 Gr. F91	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000	6000

(1) Not recommended for prolonged use above 800°F / 427°C (2) Not recommended for prolonged use above 1100°F / 593°C

NOTE: MAXIMUM differential pressure across valve = 6000 psig

Reduced ratings shown above are limited by material design considerations.

The valve body is designed in accordance with ASME B16.34 Limited Class pressure rating requirements for the designated pressure class.

Weld end valves are rated to ASME Limited Class.

Hub end valves are rated to ASME Standard Class.

Accuseal® Critical Service Ball Valve (CSV)

Applications

- Critical Isolation
- Custom designed to solve problem applications

Size

½" – 30" (larger sizes available)

ASME Pressure Class

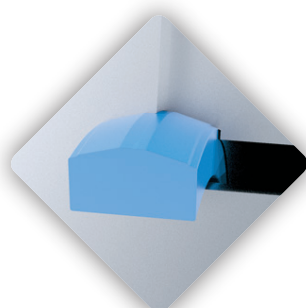
150 - 4500 Standard, limited and special classes

Sealing Options

- Uni-directional - Standard
- Bi-directional - Optional

End Connections

Per customer specifications



Engineered Body Seal
2500 pressure class
and above

Features and Benefits

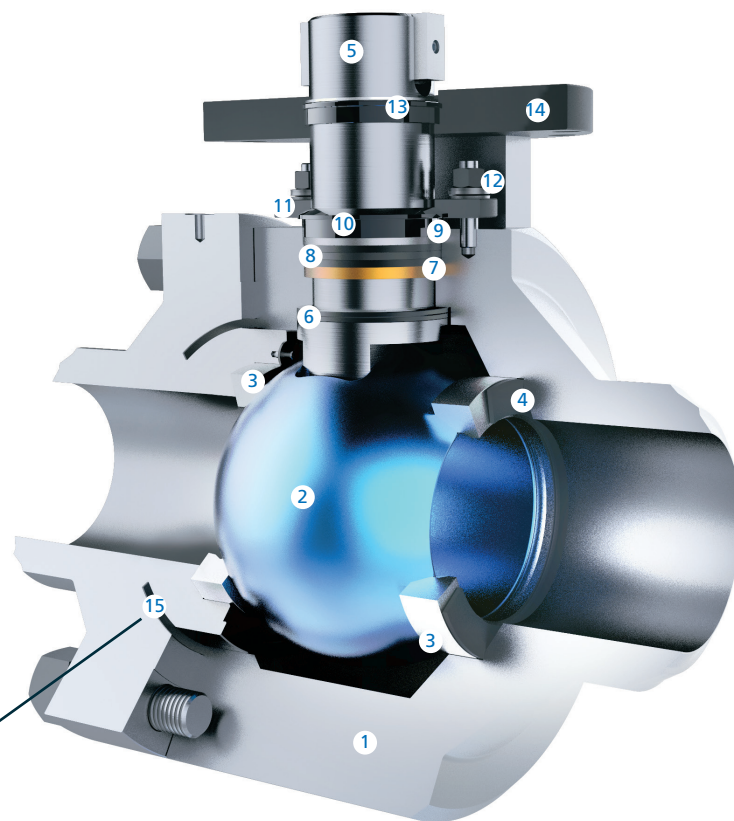
- Omni-Lap 360° ball and seat
- Application specific coatings
- Coating matched to ball and seat materials to withstand thermal shocks
- Articulating gland flange prevents stem binding and galling during adjustments
- External and internal guide bearings ensure proper alignment preventing lateral motion of the stem, even during side loading
- Replaceable ball and seats provide field repairability

1 year warranty on standard service
(Contact Accuseal Valves for details)

Bill of Materials - Accuseal CSV		
ITEM	DESCRIPTION	MATERIAL
1	Body	A105 A182 F22 Cl.3 A182 F91
2	Ball	410 SS / CC Coating Inconel 718 / Spray & Fuse
3	Seats	410 SS / CC Coating Inconel 718 / Spray & Fuse
4	Belleville Spring	Inconel 718
5	Stem	A-286 Hardfaced
6	Inner Stem Seal	410 SS / CC Coating Hardfaced
7	Packing Bushing	316 SS Hardfaced
8	Packing Rings	Grafoil
9	Anti-Extrusion Ring	Inconel® Wire Reinforced Grafoil®
10	Packing Follower	316 SS Hardfaced
11	Articulating Gland Flange	410 SS Hardfaced
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/ Inconel 718 Gold Plated

Special alloys & coatings available upon request

CC=Chrome Carbide coating



Buttweld ends
per ASME B16.25

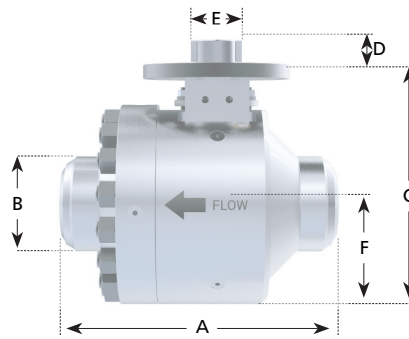
Body Gaskets

Spiral Wound Gaskets

- Grafoil® filled
- 1500 pressure class & below

Engineered Body Seal

- 2500 pressure class and above
- Gold plated Inconel® 718
- Pressure assisted seal



Accuseal® CSV – Bore							
NPS (inches)	150	300	600	900	1500	2500	4500
0.5	0.55	0.55	0.55	0.55	0.55	0.55	Note 1
0.75	0.72	0.72	0.72	0.72	0.72	0.72	Note 1
1	1.06	1.06	1.06	1.06	1.06	1.06	Note 1
1.5	1.50	1.50	1.50	1.50	1.50	1.06	Note 1
2	2.00	2.00	2.00	2.00	2.00	1.50	Note 1
2.5	2.50	2.50	2.50	2.13	2.13	1.77	Note 1
3	3.00	3.00	3.00	3.00	2.62	2.30	Note 1
4	4.00	4.00	4.00	3.62	3.44	3.15	Note 1
6	6.00	6.00	6.00	5.50	5.19	4.90	Note 1
8	8.00	8.00	7.87	7.19	6.81	6.81	Note 1
10	10.00	10.00	9.75	9.06	8.50	8.50	Note 1
12	12.00	12.00	11.75	10.75	10.13	10.13	Note 1

Accuseal® CSV Cv – Full Bore							
Valve Size (inches)	150	300	600	900	1500	2500	4500
0.5	25	22	21	18	18	16	Note 1
0.75	54	48	43	39	39	36	Note 1
1	144	126	110	102	102	92	Note 1
1.5	270	251	223	198	198	83	Note 1
2	549	498	429	382	382	163	Note 1
2.5	948	842	720	421	421	236	Note 1
3	1474	1250	1114	1076	682	438	Note 1
4	2932	2539	2134	1600	1283	919	Note 1
6	6393	6316	5366	4101	3281	2482	Note 1
8	12497	11931	9966	7468	6106	5508	Note 1
10	20612	19966	15889	12737	9933	8772	Note 1
12	30897	29974	24953	18475	14641	13051	Note 1

Accuseal® CSV 0.5" - 12" Dimensions								
	Size (inches)	Bore	A	B	C	D	E	F
ASME150	0.5	0.55	4.25	0.90	4.17	1.10	0.50	1.88
	0.75	0.72	4.62	1.18	4.87	1.10	0.50	2.09
	1	1.06	5.00	1.50	5.24	1.31	0.75	2.44
	1.5	1.50	6.50	2.09	5.64	1.63	0.88	2.75
	2	2.00	7.00	2.57	5.87	1.31	0.75	3.00
	2.5	2.50	7.50	3.00	6.12	1.66	1.19	3.50
	3	3.00	8.00	3.63	5.56	1.18	0.88	3.75
	4	4.00	9.00	4.59	7.29	2.02	1.38	5.00
	6	6.00	15.50	6.73	9.92	2.59	2.25	7.00
	8	8.00	18.00	8.68	11.51	2.03	2.50	8.13
	10	10.00	21.00	10.75	13.86	2.68	2.75	10.50
	12	12.00	24.00	12.82	15.68	2.50	3.00	12.00
ASME 300	0.5	0.55	5.50	0.94	4.36	1.10	0.50	1.88
	0.75	0.72	6.00	1.22	4.87	1.10	0.50	2.09
	1	1.06	6.50	1.56	5.24	1.31	0.75	2.44
	1.5	1.50	7.50	1.94	5.98	1.63	0.88	2.75
	2	2.00	8.50	2.63	5.97	1.66	1.06	3.25
	2.5	2.50	9.50	3.06	6.12	1.66	1.19	3.50
	3	3.00	8.00	3.63	5.56	1.18	0.88	3.75
	4	4.00	9.00	4.59	7.29	2.02	1.38	5.00
	6	6.00	15.50	6.73	9.92	2.59	2.25	7.00
	8	8.00	18.00	8.68	11.51	2.03	2.50	8.13
	10	10.00	21.00	10.75	13.86	2.68	2.75	10.50
	12	12.00	24.00	12.82	15.68	2.50	3.00	12.00
ASME 600	0.5	0.55	6.50	0.94	4.36	1.10	0.50	1.88
	0.75	0.72	7.50	1.18	5.13	1.10	0.50	2.09
	1	1.06	8.50	1.56	5.24	1.31	0.75	2.44
	1.5	1.50	9.50	2.00	5.98	1.63	0.88	2.75
	2	2.00	11.50	2.56	6.25	1.66	1.06	3.25
	2.5	2.50	13.00	3.12	6.25	1.87	1.50	3.75
	3	3.00	14.00	3.69	7.31	1.27	1.38	4.13
	4	4.00	17.00	4.82	7.83	3.00	2.06	5.75
	6	6.00	22.00	7.06	10.66	2.38	2.50	7.25
	8	7.87	26.00	9.17	13.92	2.72	3.25	8.44
	10	9.75	31.00	11.31	17.32	4.50	4.00	11.63
	12	11.75	33.00	13.63	20.40	4.00	5.00	12.75

Accuseal® CSV 0.5" - 12" Dimensions								
	Size (inches)	Bore	A	B	C	D	E	F
ASME 900	0.5	0.55	8.50	4.75	4.17	0.50	1.10	2.25
	0.75	0.72	9.00	5.12	4.89	0.50	1.10	2.25
	1	1.06	10.00	5.88	5.62	0.75	1.31	2.94
	1.5	1.50	12.00	7.00	7.22	1.06	1.66	3.50
	2	2.00	14.50	8.50	6.38	1.19	1.66	3.50
	2.5	2.13	16.50	9.63	6.53	1.50	1.87	3.75
	3	3.00	15.00	3.90	8.32	2.50	1.50	4.25
	4	3.62	18.00	4.64	10.46	3.00	2.06	5.75
	6	5.50	24.00	7.00	11.13	2.25	3.00	7.50
	8	7.19	29.00	8.97	12.96	2.94	3.63	9.25
	10	9.06	33.00	11.25	14.56	4.50	4.50	10.75
	12	10.75	38.00	13.29	16.44	4.50	5.50	12.00
ASME 1500	0.5	0.55	8.50	4.75	4.17	0.50	1.10	2.25
	0.75	0.72	9.00	5.12	4.89	0.50	1.10	2.25
	1	1.06	10.00	5.88	5.62	0.75	1.31	2.94
	1.5	1.50	12.00	7.00	7.22	1.06	1.66	3.50
	2	2.00	14.50	8.50	6.38	1.19	1.66	3.50
	2.5	2.13	16.50	9.63	6.53	1.50	1.87	3.75
	3	2.62	18.50	3.92	9.28	2.50	1.75	4.50
	4	3.44	21.50	5.00	9.10	2.84	2.50	6.12
	6	5.19	27.75	7.43	13.04	3.00	3.38	7.75
	8	6.81	32.75	9.69	16.49	5.00	4.00	9.50
	10	8.50	39.00	11.94	17.40	4.50	5.50	11.50
	12	10.13	44.50	14.19	18.20	4.50	6.75	13.25
ASME 2500	0.5	0.55	10.38	1.20	5.25	1.10	0.50	2.50
	0.75	0.72	10.75	1.60	6.13	1.31	0.69	2.75
	1	1.06	12.12	2.18	6.67	1.63	0.88	3.00
	1.5	1.06	15.12	2.80	6.67	1.66	1.19	3.00
	2	1.50	17.75	3.64	6.49	2.63	1.75	3.50
	2.5	1.77	20.00	3.33	9.24	2.82	1.63	4.25
	3	2.30	22.75	4.26	10.42	1.81	1.75	4.50
	4	3.15	26.50	5.79	11.44	2.84	2.50	6.50
	6	4.90	36.00	8.58	13.21	6.80	3.38	8.50
	8	6.81	40.25	11.89	16.80	5.00	5.25	9.75
	10	8.50	50.00	14.62	17.66	6.50	7.50	11.75
	12	10.13	56.00	17.47	18.88	6.50	8.00	13.50

1. ASME 4500 pressure class bore /Cv varies according to application (values determined based on customer needs).
Contact FORUM – Accuseal for sizes and pressure classes not listed.

Low Pressure-Steam Power (SP2) Valve

Features and Benefits

- Full Bore
Straight through, smooth full bore flow path allows for highest flowing capacity (Cv or Kv) with no flow interruptions.
- Automated Lapping
An automated mate-lapping system laps the ball and seat in unison, creating 100% matched sealing surfaces (a mirror-like finish) that equates to gas-tight sealing.
- Field Repairable 2-Piece Flanged seat design, Nitrided 410 SS Ball and Seat
- Zero Leakage Seat Tightness
All (100%) valves are tested to 'Zero Leakage' acceptance criteria API 598 with low pressure gas test.
- Mounting Flange For Automation
Allows user to adapt many actuators with ease.
- Repairable Valve is repairable and can be supplied with spare parts kit.

Actuation and Controls

Accuseal Valves has access to all types of Actuation and Controls:

- Pneumatic and Hydraulic actuators
- Spring Fail and Double-Acting
- Electric actuators
- Volume boosters & tanks
- Solenoids, Filters, Positioners

Industries Served:

- Power
Condensate Isolation. LP, IP, and CRH Vents and Drains, Heater drains and vents, Instrument Isolation, Tight Shutoff to API 598/MSS SP-61
- Refining
Petrochemical, Chemical, Hydrocracking and Hydro-processing
- Mining
Vent and Drains, Water Service with Solids

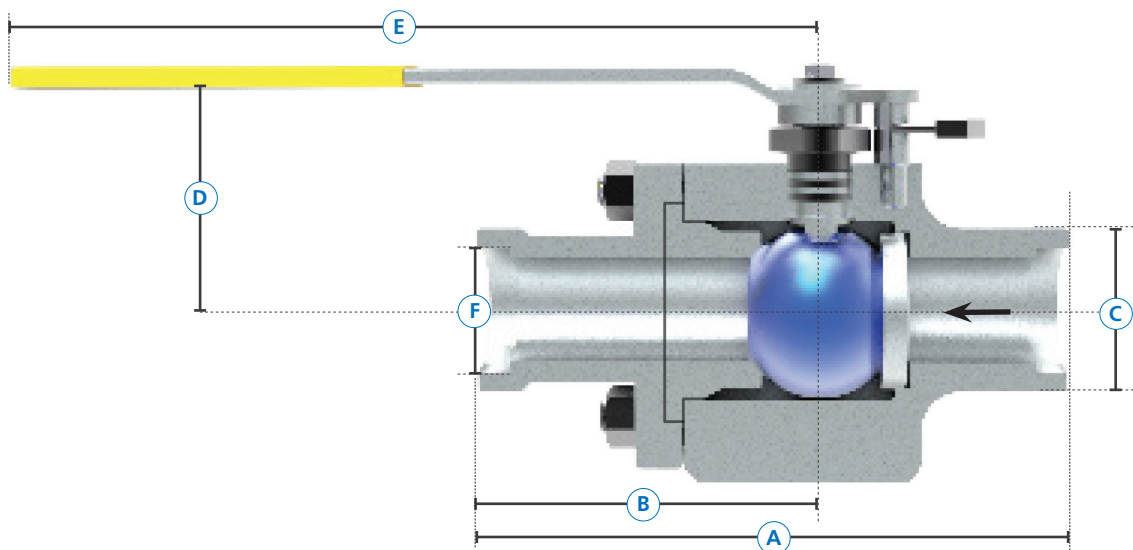
BILL OF MATERIALS - SP2 VALVE			
ITEM	DESCRIPTION	CARBON & LOW ALLOY STEEL ¹	AUSTENITIC STAINLESS STEEL ¹
1	Body	A105 A182 F22 A182 F5, F9, F91	A182 F316 A182 F317 A182 F347
2	End Connect	A105 A182 F22 A182 F5, F9, F91	A182 F316 A182 F317 A182 F347
3	Ball	410 SS Nitrided HVOF Chromium Carbide	316 SS Nitrided, HVOF Chromium Carbide
4	Seat	410 SS/ Nitrided	
5	Stem	410 SS/ Nitrided	
6	Spring ²	Inconel 718	
7	Gland	316 SS	
8	Inner Stem Bearing ²	410 SS Nitrided	
9	Body Bolting	B7 & B16	B8
10	Gland Bolting	B8	
11	Body Gasket ²	Spiral Wound	
12	Packing	Graphite Per API 622	
13	Live Load Springs ²	17-7 PH SS	
14	Lever	Steel with Handle Grip	

¹ Please consult factory for materials not listed.

² Not shown.

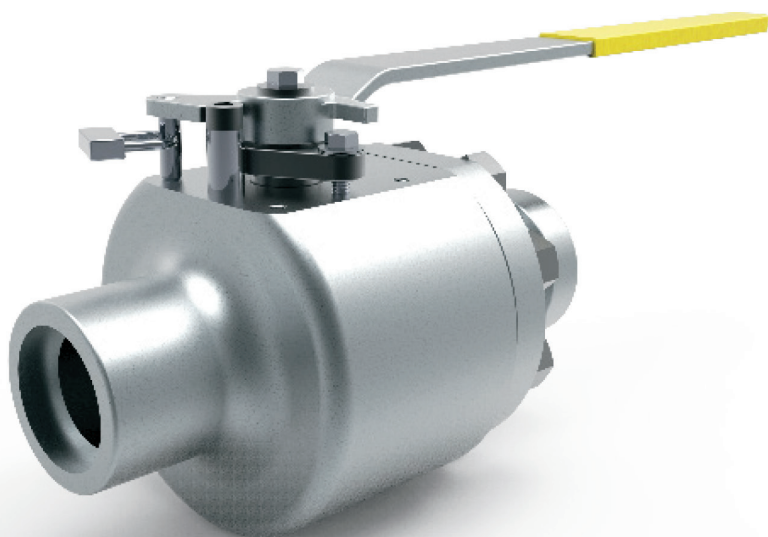


IBR



DIMENSIONS in/mm									
NPS (inches)	DN	A	B	C	D	E	F	WEIGHT lb / kg	Cv Kv
0.5	15	6.50	3.74	1.61	3.32	7.09	0.86	13	25
		165.1	95.0	41.0	84.5	180.0	21.8	6	21.6
0.75	20	6.50	3.74	1.61	3.32	7.09	1.07	15.5	60.4
		165.1	95.0	41.0	84.5	180.0	27.1	7	52.2
1	25	8.00	4.92	1.89	3.66	8.66	1.34	20	104
		203.2	125.0	48.0	93.0	220.0	34.0	9	80.0
1.5	40	9.50	5.83	2.52	4.59	11.81	1.94	31	270
		241.3	148.0	64.0	116.5	300.0	49.2	14	233.5
2	50	11.50	6.70	3.15	4.92	15.75	2.42	57	467
		292.1	170.0	80.0	125.0	400	61.4	26	403.7

STEAM POWER VALVE, LOW PRESSURE – SP2		
ITEM	TYPE	CHARACTERISTICS
1	Design	ASME B16.34
2	Temperature	-20 to 1,000°F (537°C)
3	ASME Class Ratings	150, 300, and 600
4	Size	1/2 to 2 (DN15 to DN50)
5	Material Type	Forgings
6	End Types	Buttwelding Ends Socketwelding Ends Threaded Ends Flanged Ends
7	Sealing	Uni - Directional
8	Testing	Zero Leakage API 598
9	Special	NACE MR0103 Non Destructive Examination (NDE) Positive Material Identification (PMI) Low-E Packing for Fugitive Emissions
10	Certifications	ISO 9001-2008 PED / CE, API 607 Canadian Registry Number (CRN) Indian Boiler Regulations (IBR)



Grayloc® Connectors

A Grayloc Connector has three components:

Metal Seal Ring

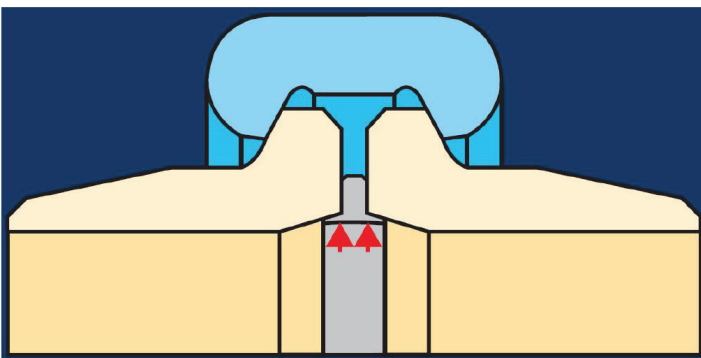
The Grayloc® seal ring achieves a self-energized and pressure energized bore seal that will hold vacuum or external pressures. The metal Grayloc seal ring consists of a rib and two lips. During make-up, the seal ring lips deflect inward as the connector is assembled. This deflection is controlled and is within the elastic limits of the seal ring material.

Two Hubs

The clamp fits over the two hubs and forces them against the seal ring rib. As the hubs are drawn together by the clamp assembly, the seal ring lips deflect against the inner sealing surfaces of the hubs. This deflection elastically loads the lips of the seal ring against the inner sealing surface of the hub, forming a self-energized seal.

Clamp Assembly

The clamp is the primary pressure-retaining member of the Grayloc connector, not the bolting. The two-piece clamp configuration ensures equal loading around the entire connector. The clamp carries all of the internal pressure loads as well as axial and bending loads transmitted by the pipe. No specific orientation is required when the clamps are installed around the hubs.



Service Extremes

Vibration, heat, cold and thermal shock often accompany service where Grayloc connectors are heavily loaded. These connectors consistently withstand severe situations without routine maintenance. Special designs permit maintenance-free service even under the extreme conditions shown at left.

Accuseal® Valves Quality

Accuseal Valves manufactures to ASME B16.34

Certifications

- ISO 9001: 2008
- PED/CE
- CRN
- IBR

Actuation

- ISO 5211 mounting patterns
- Accuseal Valves automates to customer specifications

Accuseal Product Warranty

- Contact Accuseal for additional warranty information

Accuseal SPV, CR2 – Steam Power Ball Valves

- Standard: 5 years
- High cycle: 1 year

Accuseal CSV – Critical Service Ball Valves

- Standard: 1 year

Accuseal SP2 – Low Pressure Steam Power Valves

- Standard: 1 year

Accuseal Product Test Procedures

- Standard valve testing to meet or exceed MSS SP-61, FCI 70-2, and API 598
- Exclusive vacuum testing of ball and seat to verify seal prior to valve assembly

Our Core Values

No one gets hurt

The safety of our employees and customers is our first priority coupled with a healthy respect for the environment.

Integrity

In everything we do, in every interaction, both internally and externally, we strive to operate with the utmost integrity and mutual respect.

Customer focused

Our products enhance our customer's performance and we listen to their needs and work with them to solve their challenges.

Good place to work

We are committed to creating a workplace that fosters innovation, teamwork and pride. Every team member is integral to our success and is treated equally and fairly.



Forum US, Inc.

Accuseal Severe Service Valves
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