FLOWSEAL

Butterfly Valves
Series HP

CRANE

FLOWSEAL-Butterfly Valves Series HP

High Performance process valves for industrial applications

Areas of application

Flowseal is a leading provider of soft seat, metal seat and fire-safe high performance butterfly valves. Our products are manufactured under an ISO 9001 Quality Assurance Program that ensures each valve we produce meets or exceeds your exacting application requirements.

Flowseal high performance butterfly valves are a standard in many industries including heating, ventilating and air conditioning, power generation, hydrocarbon processing, water and waste water treatment, and marine and commercial shipbuilding. Our products are also installed in applications as diverse as food and beverage processing, snowmaking and pulp and paper production. Configurations are available for harsh conditions as well as applications requiring nominal pressure and temperature ratings.

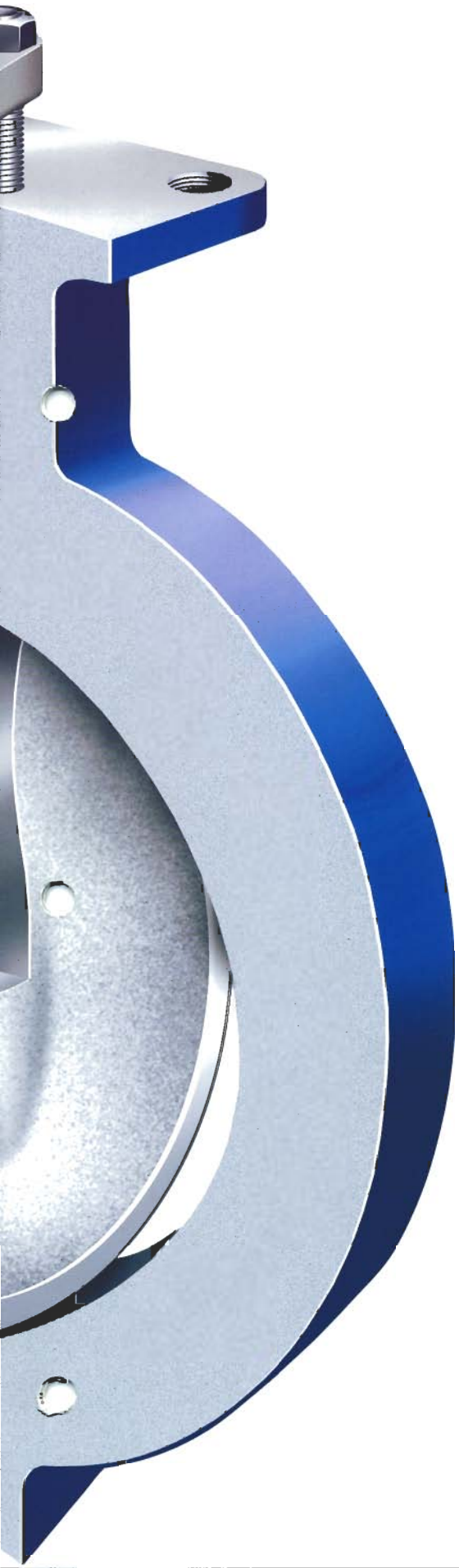
As part of Crane Valve Group, Flowseal high performance butterfly valves an backed by the resources and experience of one of the world's largest valve producers with a delivery and quality track record that is unparalleled in the industries we serve.

Main areas of application:

- Chemical
- Marine and Shipbuilding
- Petroleum Refining
- Power Generation
- Pulp and Paper
- Commercial Constructions
- Transmission
- Mining
- Snowmaking Systems
- Water and Sewage

Applications:

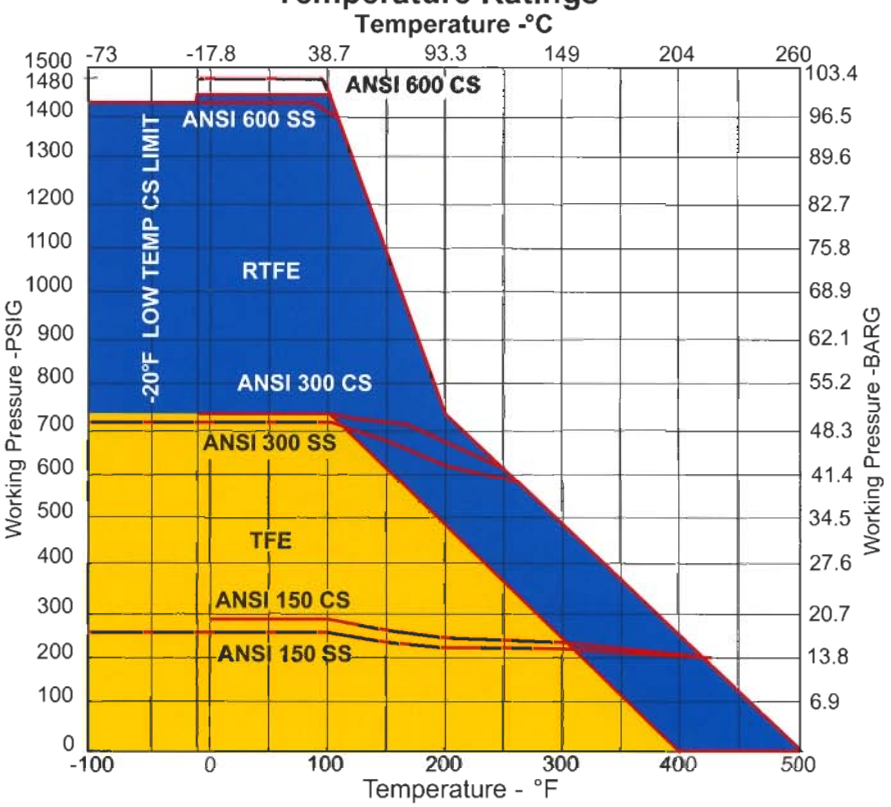
- Gas dryer / separation
- Waste water discharge
- Hot water
- Sugar / molasses separator
- Fresh and sea water
- Jet and Diesel fuel storage
- Fire protection systems
- Bottom ash / fly ash shut-off
- Chemical recovery systems
- Natural gas compressor stations



For highest demands over a wide range of pressures and temperatures

Pressure / Temperature Ratings:
As temperature increases, the pressure retaining capability of materials decreases. The graph below illustrates the pressure/temperature ratings of the Flowseal ANSI Class 150, Class 300 and Class 600 for sizes 2“ to 48“.

ANSI B16.34 Body and Flowseal Soft Seat Pressure - Temperature Ratings



The heavy lines define the ratings of the carbon steel and stainless steel valve body (or "shell") in conformance to ANSI B16.34. The shaded areas define the ratings of the soft seat.

Seat ratings are based on differential pressure with the disc in the fully closed position.

Soft Seat Design

The Flowseal Soft Seat valve provides a bi-directional bubble tight shutoff (zero leakage) by the use of a patented seat. This unique seat design creates a self-energized seal in vacuum-to-low pressure applications. Under higher pressure conditions, the seat is also designed to permit, confine and direct movement of the against the disc edge, up to the full ANSI Class 150, 300 and 600 Cold Working Pressures.

DISC SPACERS
Disc is centered by use of thrust spacers around shaft in sizes 2" to 5". Disc position stops or thrust bolt arrangements are used for larger valve sizes.

WEDGE PINS
Provide positive mechanical attachment of disc to shaft.

RETAINER RING
Retains seat in valve. Standard surface finish is 125 to 200 AARH and is compatible with both standard gaskets and spiral wound gasket designs. Outside diameter is recessed within gasket sealing surface to prevent external leakage.

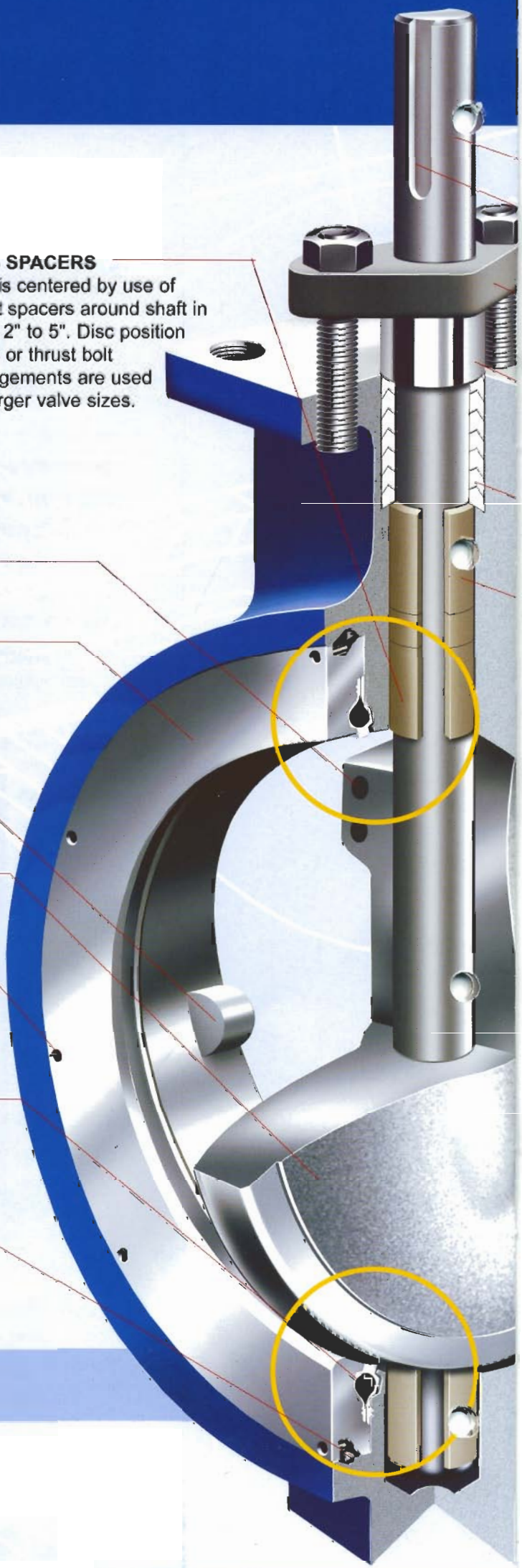
OVERTRAVEL STOP
Prevents disc from rotating into wrong quadrant.

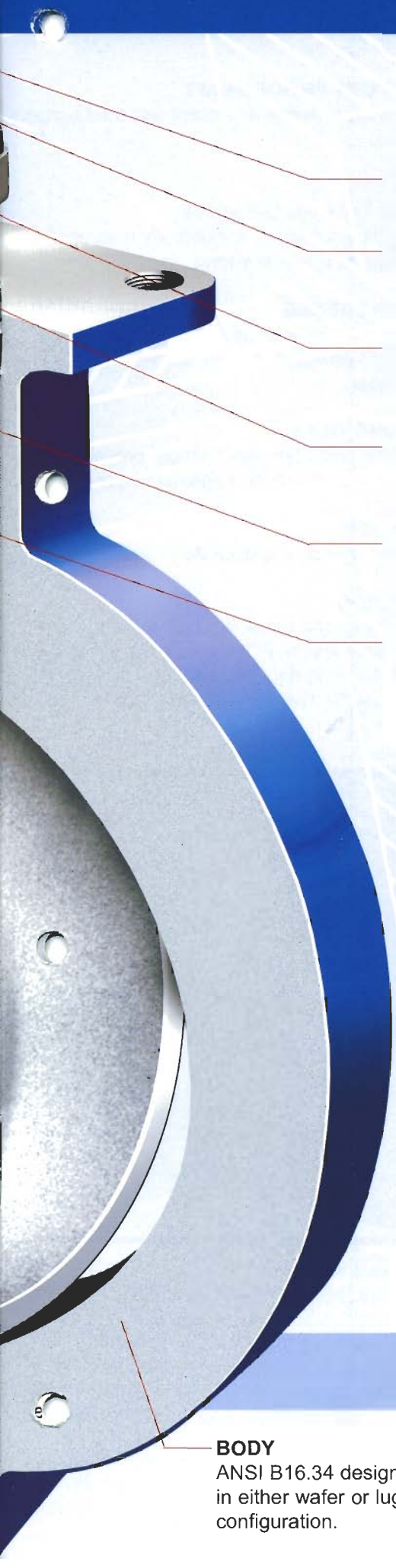
DISC
360° uninterrupted spherical edge for sealing. Profile is designed for maximum flow and equal percentage control.

SET SCREWS
Cone point screws force wedge ring outward to lock seat retainer in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.

SOFT-SEAT
Patented bi-directional seat with encapsulated elastomeric o-ring core for resiliency. Common seat materials include TFE, RTFE and UHMWPE.

WEDGE RING
Stainless steel band wedged between valve body and retainer ring by set screws to lock seat and retainer ring in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.through 30". Socket head cap screws are used on valve sizes 36" and larger.





BLOW OUT PROOF SHAFT
Solid shaft provides alignment and rigid support for disc.

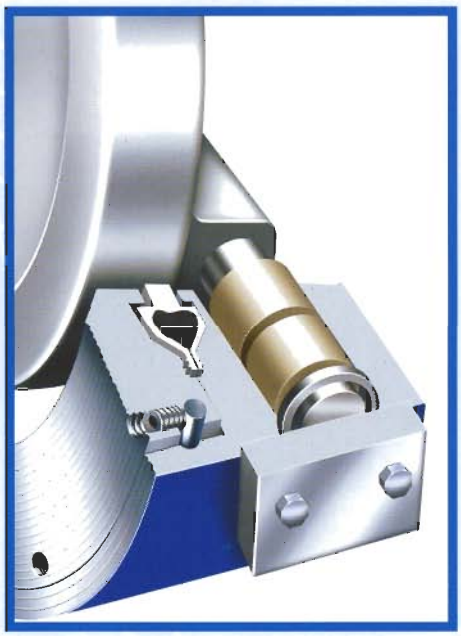
KEY
Square key valve-to-operator connection provides an externally controlled failure point upon over-torquing.

GLAND FLANGE
Applies load against packing gland to prevent external leakage. Fully adjustable.

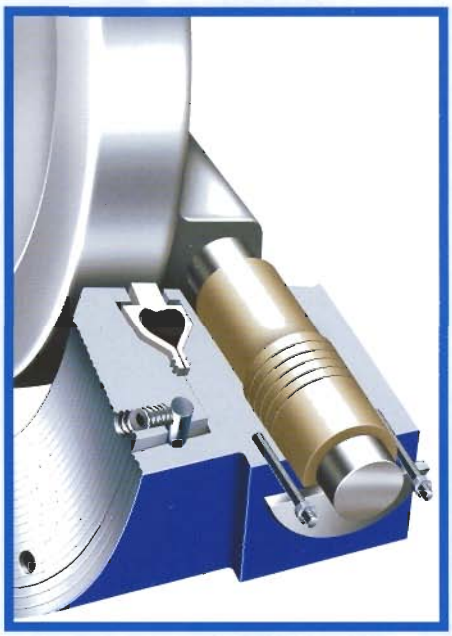
PACKING GLAND
Separate part from gland flange, preventing uneven load distribution against packing.

PACKING
Chevron design TFE prevents external leakage out valve neck to full ANSI hydrostatic shell test pressures (150% of C.W.P.).

BEARINGS
Both above and below the disc, bearings are of composite design: PTFE bonded to epoxy- glass filament wound ring. Used to align shaft, with high capacity, low wear and low friction coefficient.



End Seal Variation
The ANSI 150 14" through 24" sizes feature a two-piece shaft design. The lower shaft utilizes an end seal in the body to prevent external leakage. The component parts include an end seal, an end cap and end cap bolts.



Lower Packing Variation
The ANSI 150 30" through 48"; ANSI 300 14" through 30"; ANSI 600 10" through 16" sizes feature a two-piece shaft design which utilizes a lower packing seal in the valve body to prevent external leakage. The component parts are of the same design used in the packing assembly in the top of the valve body neck.

BODY
ANSI B16.34 design in either wafer or lug configuration.

Principle of Sealing

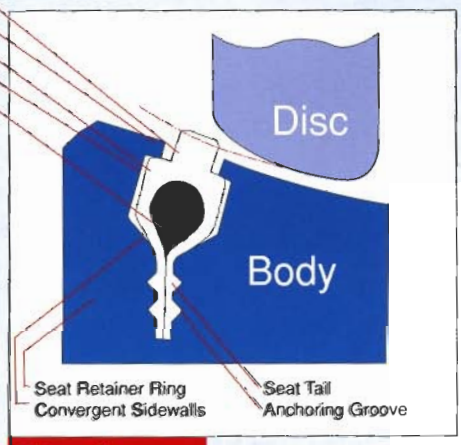


Figure 1

Disc open
In Figure 1, the disc and seat are not engaged. In this position, the shoulders of the seat are forced against the cavity shoulders by the compression of the o-ring. The seat is recessed inside the seat cavity and acts as a gasket in the anchoring groove area. The seat cavity is sealed from exposure from the process fluid and protects the seat from abrasion and wear. The o-ring, which is completely encapsulated by the seat, is also isolated from exposure to the process fluid.

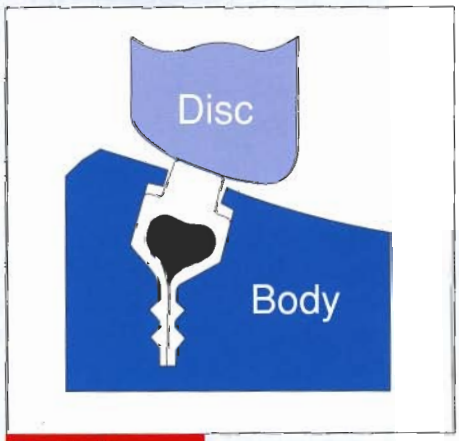


Figure 2

Disc closed, Self-Energized Seal
In Figure 2, the Flowseal disc and seat are engaged, and the process fluid is under low pressure. The edge of the disc, with a larger diameter than the seat tongue, directs movement of the seat radially outward, causing the seat to compress against the convergent sidewalls of the cavity.
The elastomeric o-ring imparts a mechanical pre-load between the disc and seat tongue as it is compressed and flattened by the disc; this is the self-energized mode for sealing at vacuum-to-60 psig. As the seat moves radially outward, the seat shoulders move away from the cavity shoulders and open the cavity to the process media.

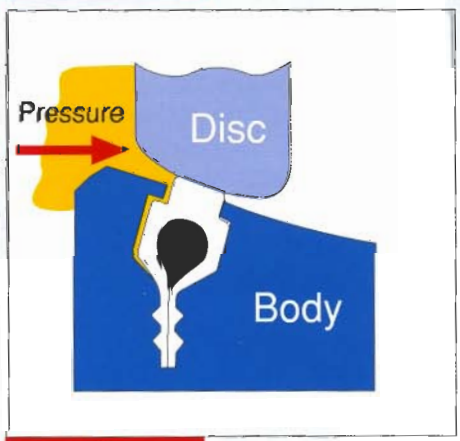


Figure 3

Disc Closed, Pressure-Energized Seal (Seat Upstream)
As line pressure increases, the process fluid enters the sidewall area and applies a load against the parallel-spaced sidewall and convergent sidewall of the seat. The seat and cavity design permits the seat to move axially to the down-stream sidewall, but confines the movement and directs the movement radially inward towards the disc; the higher the line pressure, the tighter the seal between the disc and seat. Because the o-ring is elastic, it is able to flex and deform under loads and return to original shape after removal of the load; it is the rubber which deforms, not the thermoplastic material. This dynamic seal, patented by Flowseal, is totally unique among high performance butterfly valves.

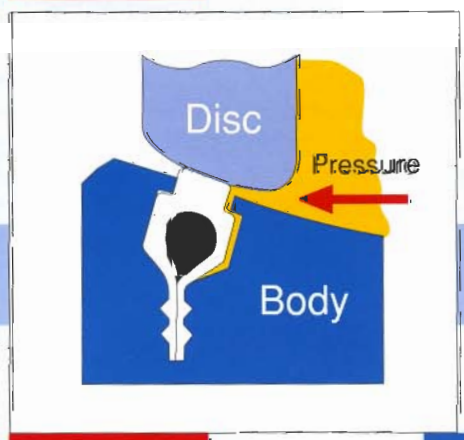


Figure 4

Disc Closed, Pressure-Energized Seal (Seat Downstream)
The Flowseal valve is bi-directional (in some instances, modifications may be required to operate this arrangement for dead end service). The cavity and seat sidewalls are symmetrically designed to permit, confine and direct movement of the seat to the disc to dynamically seal with line pressure in the reverse direction. The disc edge is the segment of a sphere, and the seat is angled towards the disc edge to seal with pipeline pressure in either direction. Recommended installation direction is "SUS" (seat up-stream), as in Figure 3.

Fire Flow Design

Firesafe

The Flowseal Fire-Flow™ high performance butterfly valve (HPBFV) is a fire-safe, soft seat quarter-turn valve.

The Fire-Flow™ design incorporates a patented seat which function together to seal off pipeline flow. In normal operation, the soft seat provides a bi-directional "bubble tight" shutoff (zero leakage); in conformance to industry firesafe requirements.

DISC SPACERS
Disc is centered by use of thrust spacers around shaft in sizes 2" to 5". Disc position stops or thrust bolt arrangements are used for larger valve sizes.

WEDGE PINS
Provide positive mechanical attachment of disc to shaft.

RETAINER RING
Retains seat in valve. Standard surface finish is 125 to 200 AARH and is compatible with both standard gaskets and spiral wound gasket designs. Outside diameter is recessed within gasket sealing surface to prevent external leakage.

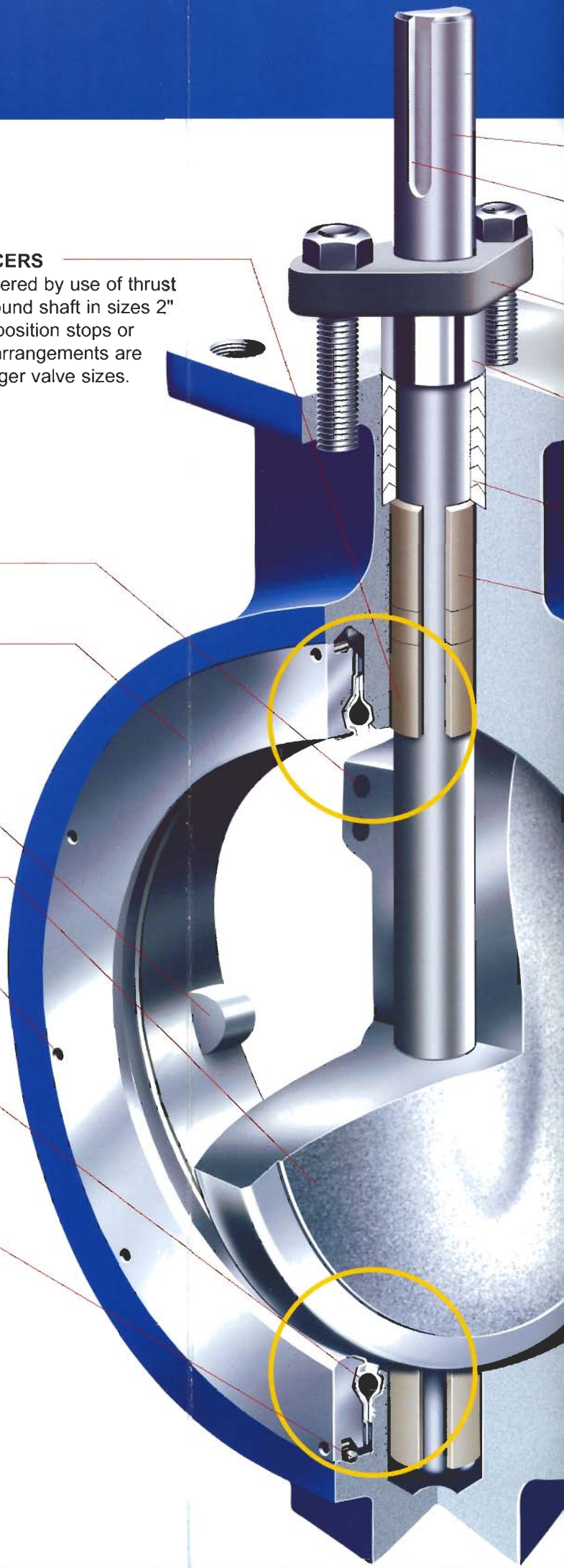
OVERTRAVEL STOP
Prevents disc from rotating into wrong quadrant.

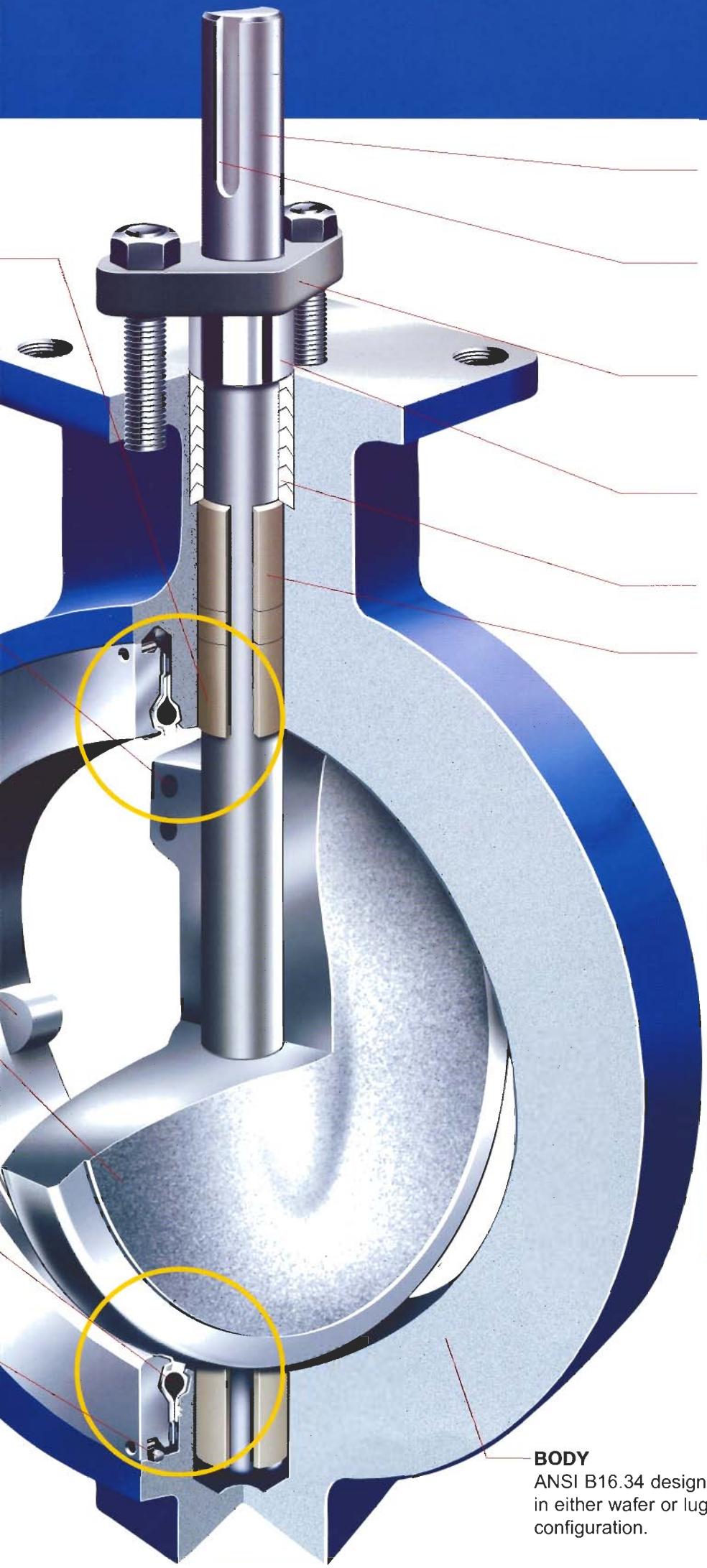
DISC
360° uninterrupted spherical edge for sealing. Profile is designed for maximum flow and equal percentage control.

SET SCREWS
Cone point screws force wedge ring outward to lock seat retainer in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.

FIRE–FLOW SEAT
Patented bi-directional soft seat design for zero-leakage in normal operation and a metal-to-metal seal after fire, meeting or exceeding industry "fire-safe" specifications.

WEDGE RING
Stainless steel band wedged between valve body and retainer ring by set screws to lock seat and retainer ring in position on valve sizes 2" through 30". Socket head cap screws are used on valve sizes 36" and larger.through 30". Socket head cap screws are used on valve sizes 36" and larger.





BLOW OUT PROOF SHAFT
Solid shaft provides alignment and rigid support for disc.

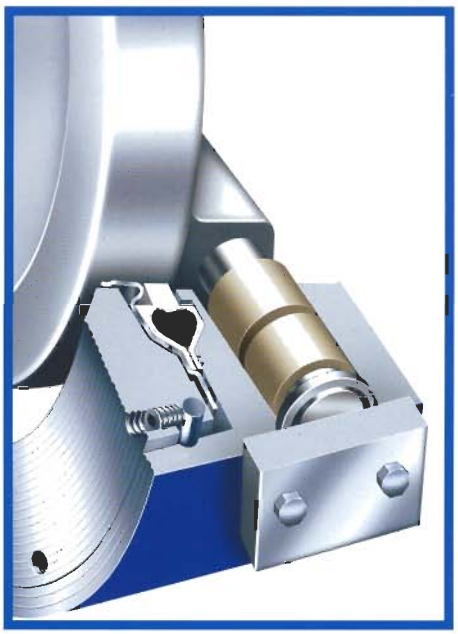
KEY
Square key valve-to-operator connection provides an externally controlled failure point upon over-torquing.

GLAND FLANGE
Applies load against packing gland to prevent external leakage. Fully adjustable.

PACKING GLAND
Separate part from gland flange, preventing uneven load distribution against packing.

PACKING
Standard material is graphite.

BEARINGS
Both above and below the disc, bearings are of composite design: PTFE bonded to epoxy-glass filament wound ring. Used to align shaft, with high capacity, low wear and low friction coefficient.



End Seal Variation
The ANSI 150 14" through 24" sizes feature a two-piece shaft design. The lower shaft utilizes an end seal in the body to prevent external leakage. The component parts include an end seal, an end cap and end cap bolts.

BODY
ANSI B16.34 design in either wafer or lug configuration.

Principle of Sealing

Specifications

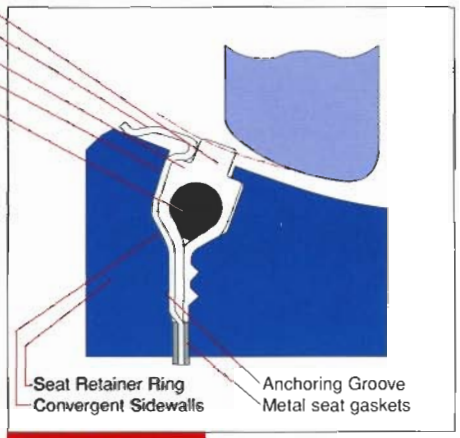


Figure 1

DISC OPEN, Normal Operation
In Figure 1, the disc and seat assembly are not engaged. In this position, the metal seat acts to keep the soft seat inside the seat cavity while the soft seat shoulders seal the cavity from exposure to the process fluid. (The o-ring is under tension and imparts a load against the soft seat.) The soft seat is protected from abrasion and wear because it is recessed inside the seat cavity area. The o-ring is isolated from exposure to the fluid because it is completely encapsulated by the seat tails which act as a (soft) gasket in the anchoring groove area. The metal seat gaskets add further high temperature protection past the anchoring grooves.

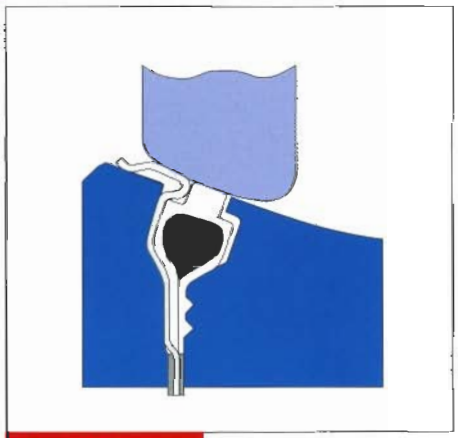


Figure 2

Disc Closed, Normal Operation
In Figure 2, the disc and seat assembly are engaged; both the metal seat and the Ssoft seat are in contact with the disc. Under little to no pressure conditions, the metal and soft seats are self-energized. The disc edge, with a larger diameter than the seat tongues, moves the seats radially outward; the metal seat shape, with a mechanical and dynamic flexibility, is designed to be hoop-loaded and impart a spring force against the disc, while the soft seat o-ring is stretched and flattened (without deformation of the thermoplastic material) and imparts a mechanical pre-load against the disc. With increased line pressure, the process fluid enters the cavity sidewall area and applies loads against the seat sidewalls. The cavity design permits the seats to move toward the downstream sidewalls, but confines and directs the movement radially inward towards the disc; the higher the pressure the tighter the seal between the disc and seats.The symmetrical shape and angle of the cavity permit the seal to be bi-directional.

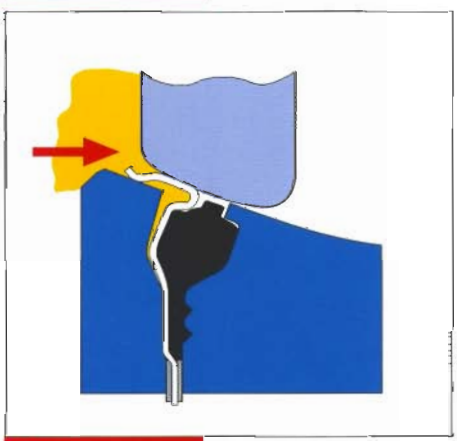


Figure 3

Disc Closed, After Fire (Seat Upstream)
After a fire, with partial or complete destruction of the soft seat, the metal seat maintains metal-to-metal contact with the disc and restricts leakage of the process fluid in conformance to industry fire-safe requirements. With little or no line pressure, the spring force and hoop load of the metal seat maintain a "line contact" seal against the disc edge. Under higher pressures,the process fluid enters the cavity sidewall areas and applies loads against the seat sidewalls (Figure 3). The geometry of the metal seat permits the seat to move axially, but directs the movement radially inward toward the disc; The higher the pressure, the tighter the line contact seal. Graphite gaskets, on both sides of the metal seat tail, seal the anchoring groove and prevent leakage of the process fluid.

Figure 4

Disc Closed, After Fire (Seat Downstream)
The Flowseal Fire-Flow™ valve is bi-directional, however, modifications are required to operate for bi-directional dead end service. The angle and shape of the cavity and metal seat maintains metal-to-metal contact in the event of partial or complete soft seat destruction with line pressure in the reverse direction (Figure 4). While the preferred flow direction is "seat upstream" (SUS), the bi-directional seat design is both self-energized and pressure-energized if the flow direction is "seat downstream" (SDS).

Design:	ANSI B16.34 MSS SP-68 MIL-V-24624 API 609
Face to Face:	API 609
Flange connection:	ANSI B16.5 MSS SP-44
Testing:	MSS SP-61 API 598 ANSI / FCI 70-2
Fire-Safe Testing:	API 607
Marking:	MSS SP-25
Quality control:	MIL-I-45208 A MSS SP-6 MSS SP-55 ISO 9001

Actuation Options

REVO Pneumatic Actuators

- Compact rack and pinion design
- Travel stops in both directions
- Corrosion protection
- NAMUR solenoid and accessory mounting
- Extruded aluminium body with anodizing

Worm Gear Operators

With standard aluminum handwhweel

- High temperature service
- Buried service
- Submersible service
- Marine service

Optional accessories

- Chain wheel
- Output or input shaft extention
- Military operator
- AWWA operator

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