

NELES

Jamesbury™ Brand Ball Valves

Webinar presentation, April 8, 2021
Welcome and thank you for participating

April 9, 2021

Presenter

NELES

- Steve Atherton
- Product Manager since 2012, 30+ years of experience in engineering, manufacturing and sales
- Will be presenting the Jamesbury™ Brand Ball Valve training



In session question submittal

The screenshot displays a GoTo Webinar interface. The main window, titled 'Waiting to view Liz Davis's screen', shows a 'Webinar Housekeeping' screen. The screen content includes: 'Organizer: Liz Davis | Presenter: Liz Davis', 'Audio: Use your microphone and speakers (VoIP) or call in using your telephone.', contact information for the United States (+1 (951) 384-3421), an Access Code (400-696-084), an Audio PIN (19), and a link to 'List Additional Conference Call Numbers'. The sidebar on the right contains an 'Audio' section with 'Computer audio' selected, a 'MUTED' status, and microphone selection options. Below this is a 'Questions' section with a text input field labeled '[Enter a question for staff]' and a 'Send' button. A blue arrow points from the main content area to the 'Questions' section. The bottom of the screen shows a Windows taskbar with icons for the Start menu, Internet Explorer, File Explorer, Google Chrome, and the GoTo application.

A short history of valves

Roman Plug Valves, Pompei, 100 AD

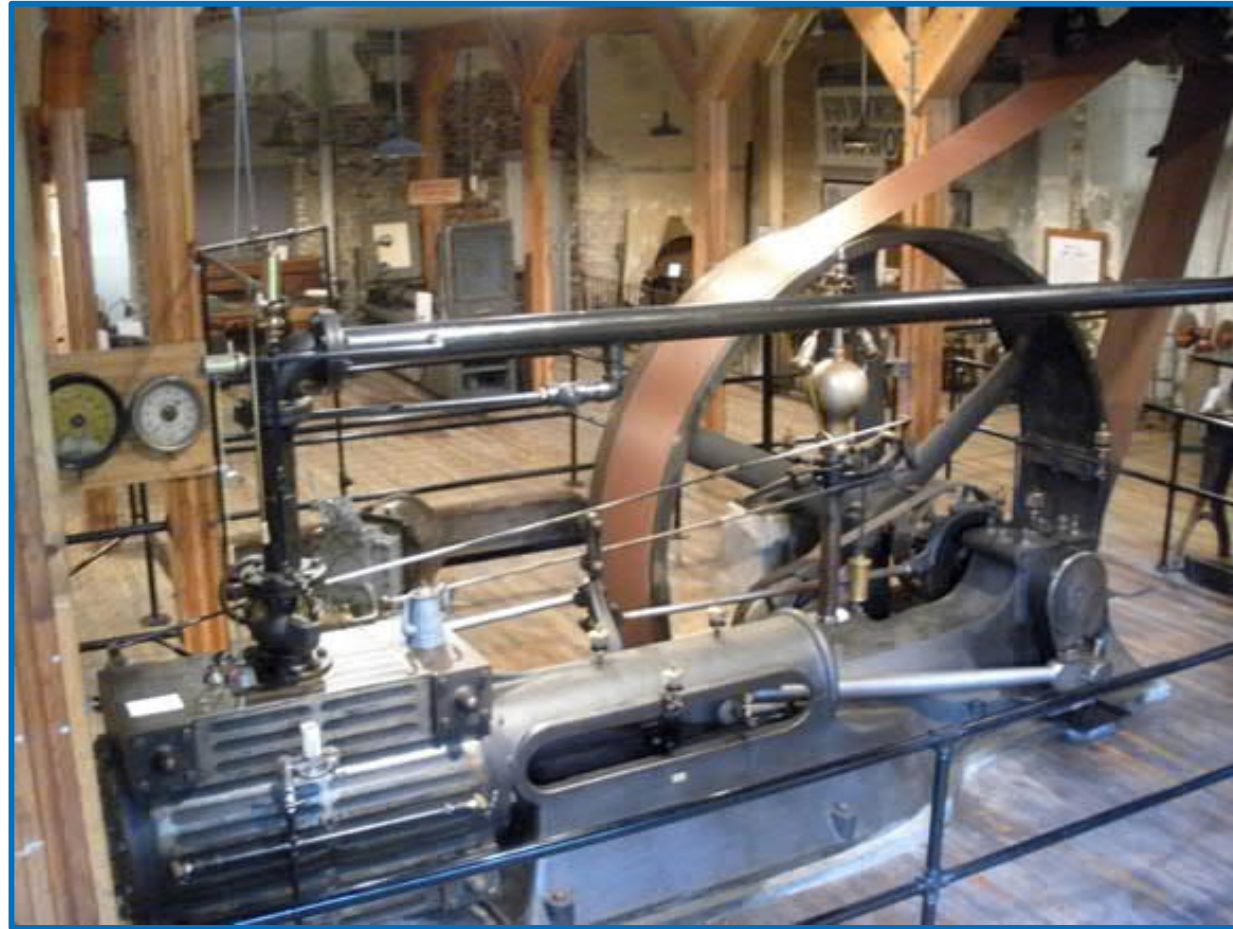
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A short history of valves

Corliss steam engine, ca. 1850

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A short history of valves

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Gate valve, ca. 1925



A short history of valves

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Valve types, each having different characteristics



Plug



Gate



Globe



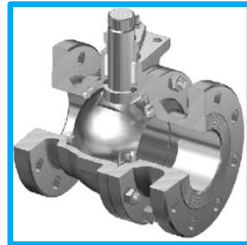
Safety Relief



Pressure
Reducing



Check



Ball



Butterfly



Pinch



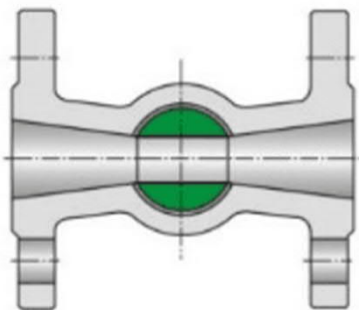
Diaphragm

A short history of valves

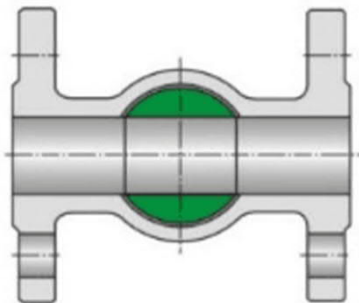
Ball valve design and fabrication

Bore size

Reduced bore

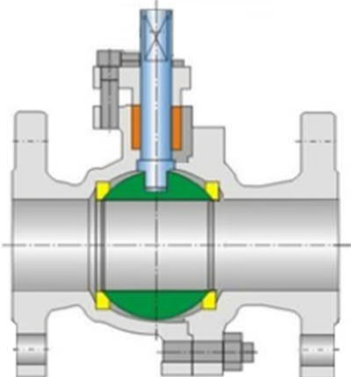


Full bore

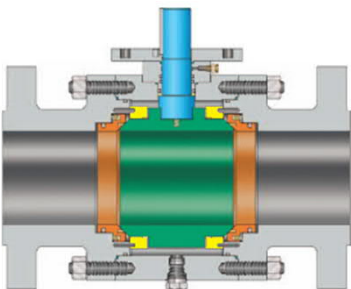


Ball support

Floating ball

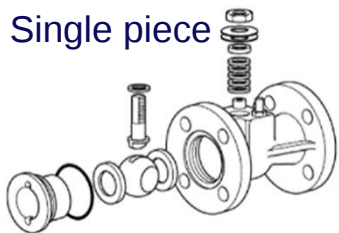


Trunnion ball



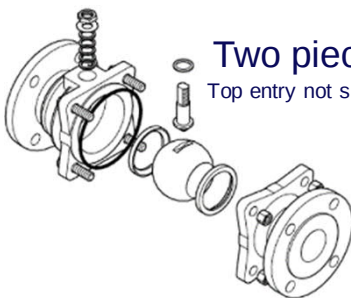
Body design

Single piece

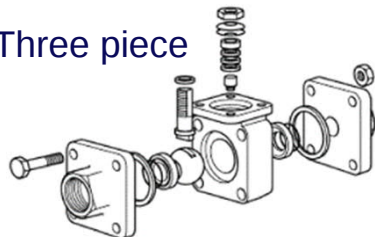


Two piece

Top entry not shown



Three piece



Body fabrication

Casting



Forging



Seat material

Soft seated
(polymer)



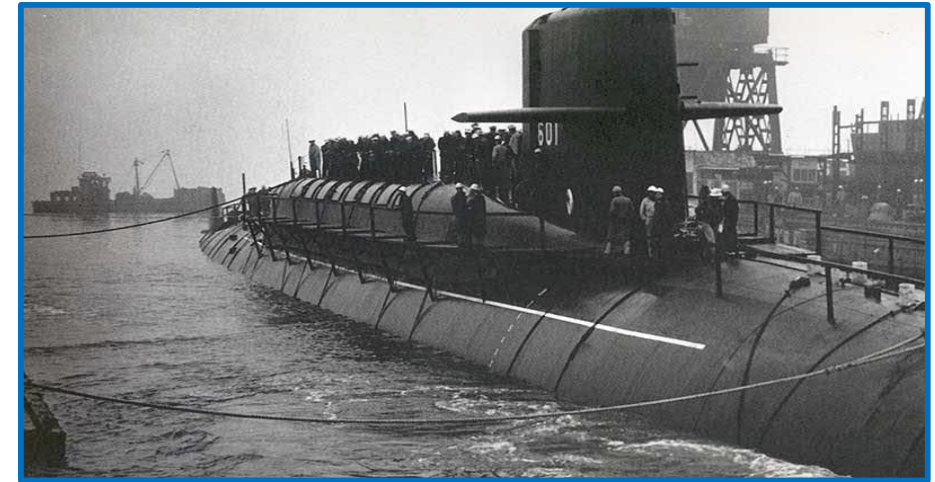
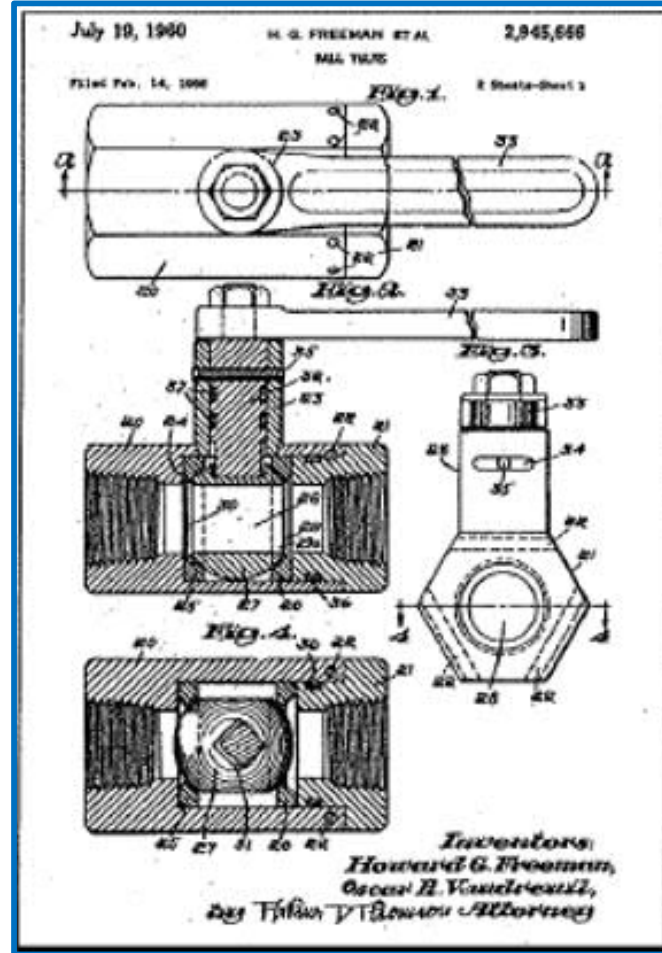
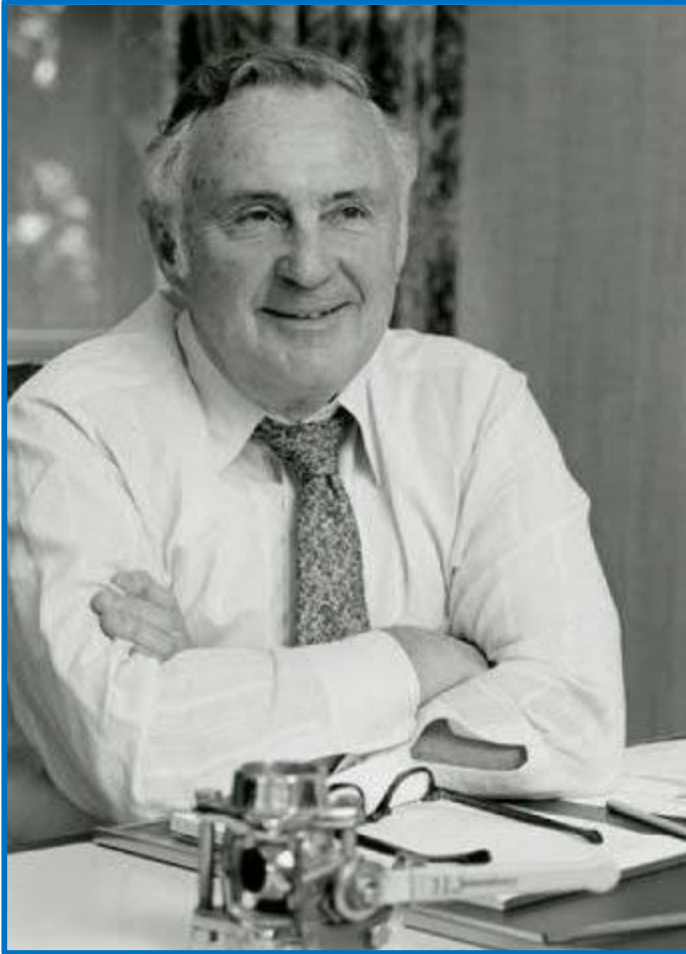
Metal seated



Jamesbury™ story

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First Teflon® seated bi-directional ball valve, 1954



Jamesbury™ Brand Ball Valves

Design features

Jamesbury™ Brand ball valves

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All valves are not equal!

Jamesbury™ Brand valves are engineered to provide superior performance

- Jamesbury™ is engineered sealing technology
 - ✓ Seat design
 - ✓ Stem sealing performance
 - ✓ Stem packing adjustment
- Designed for automation
- Quality a priority
- Certified performance



Designed for seat sealing performance

Flexible lip seat technology

- Provides consistent seal by applying stored energy gained by compression and elastic torsion
- Provides bubble tight shut-off in either direction
- Maintains seal by adjusting as seat wears



Challenge

Repeatable & reliable sealing

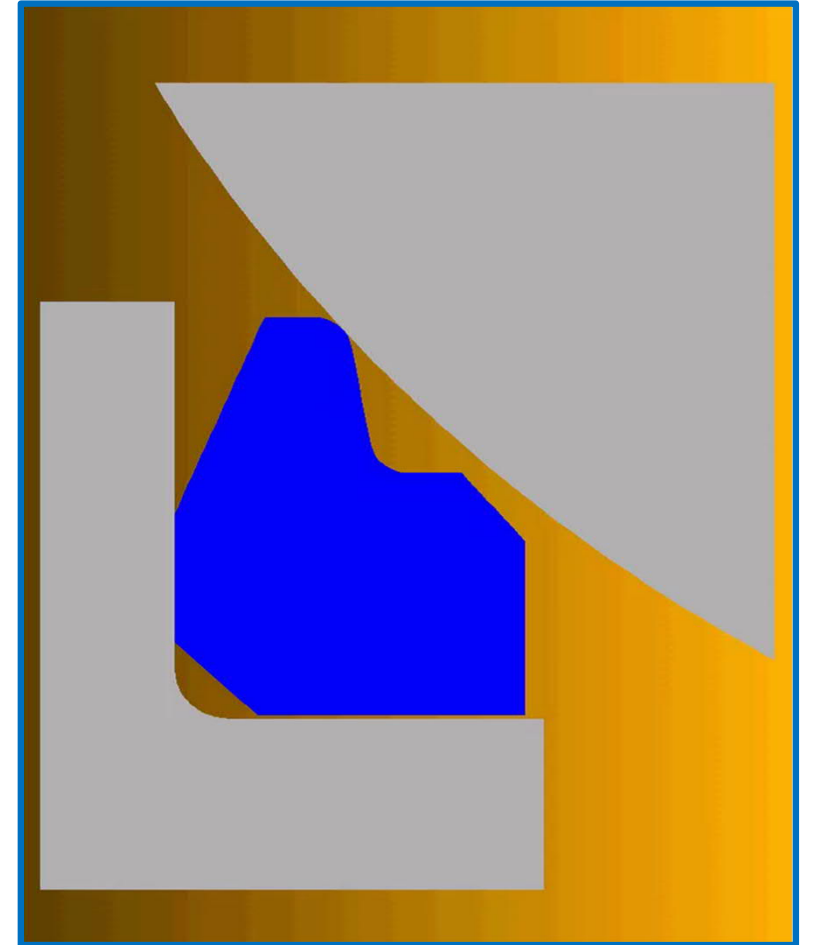
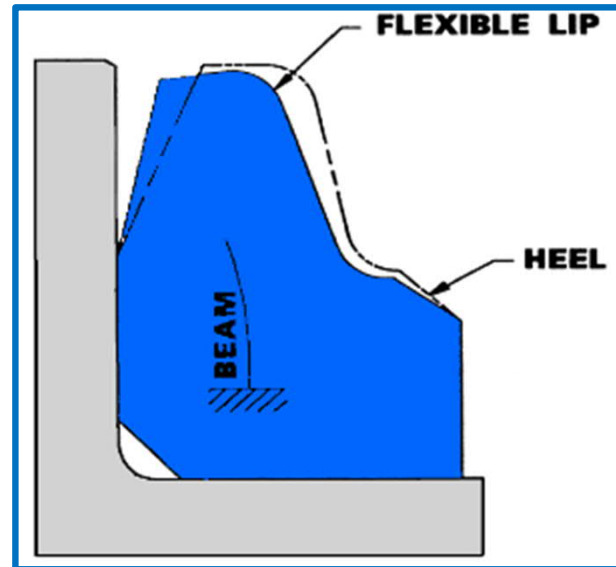
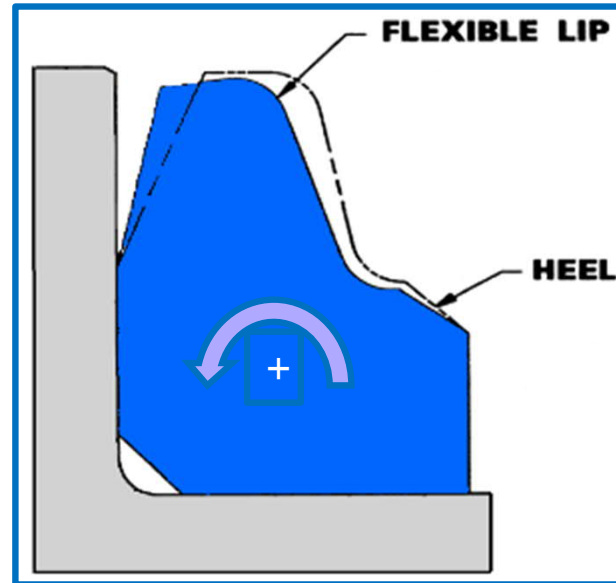
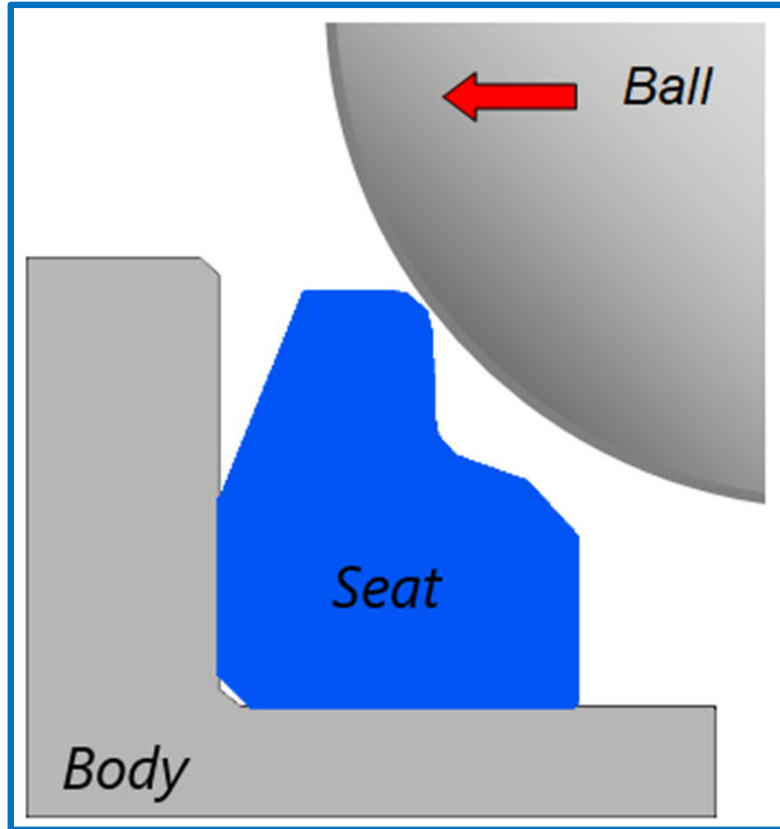
Solution

Flexible lip seat technology

Designed for seat sealing performance

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Flexible lip seat technology

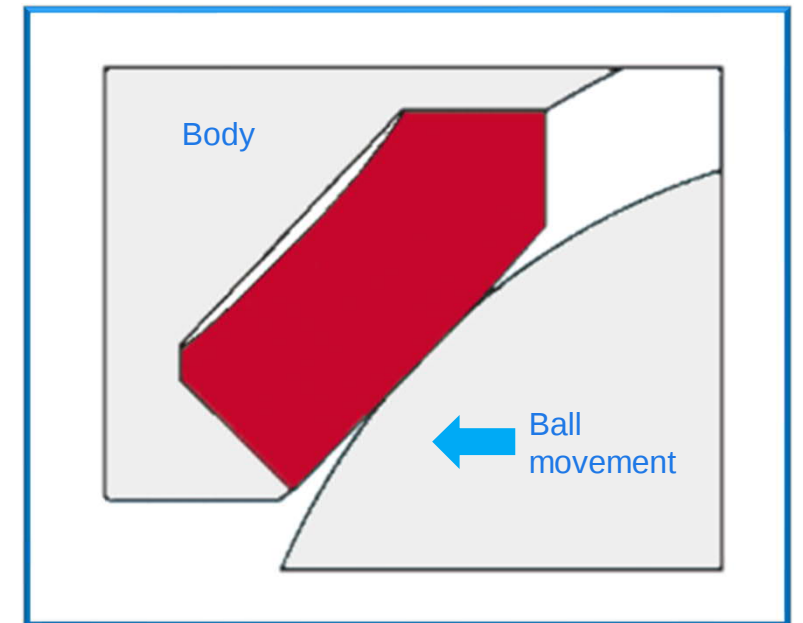
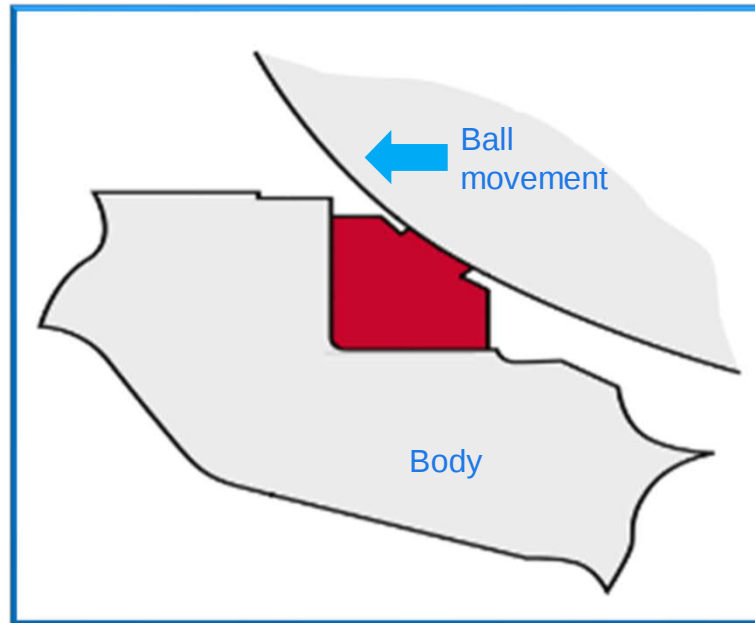
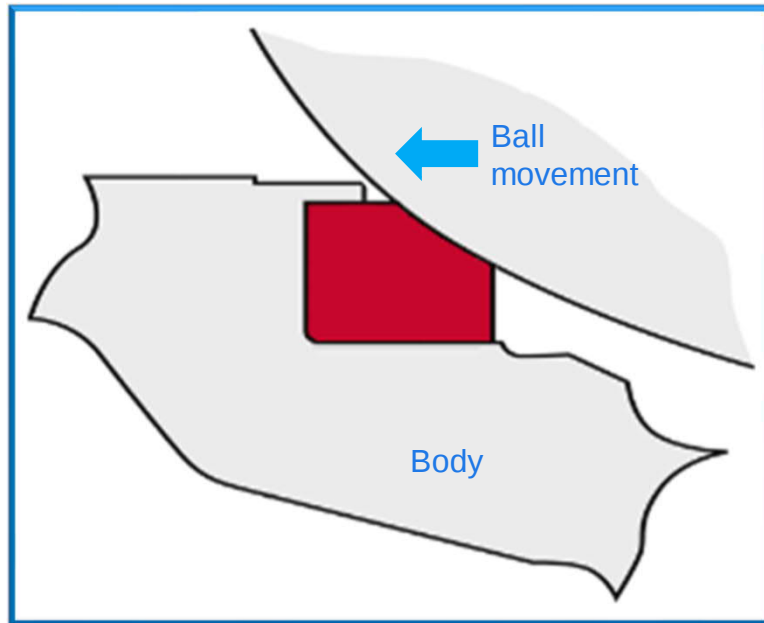


Designed for seat sealing performance

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Typical competitor jam seat designs

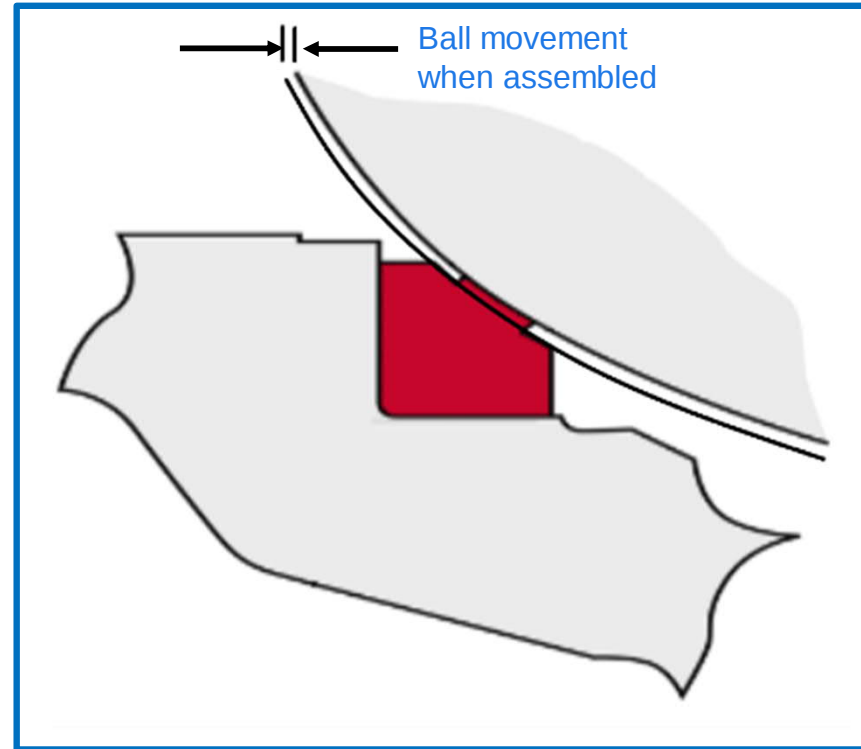
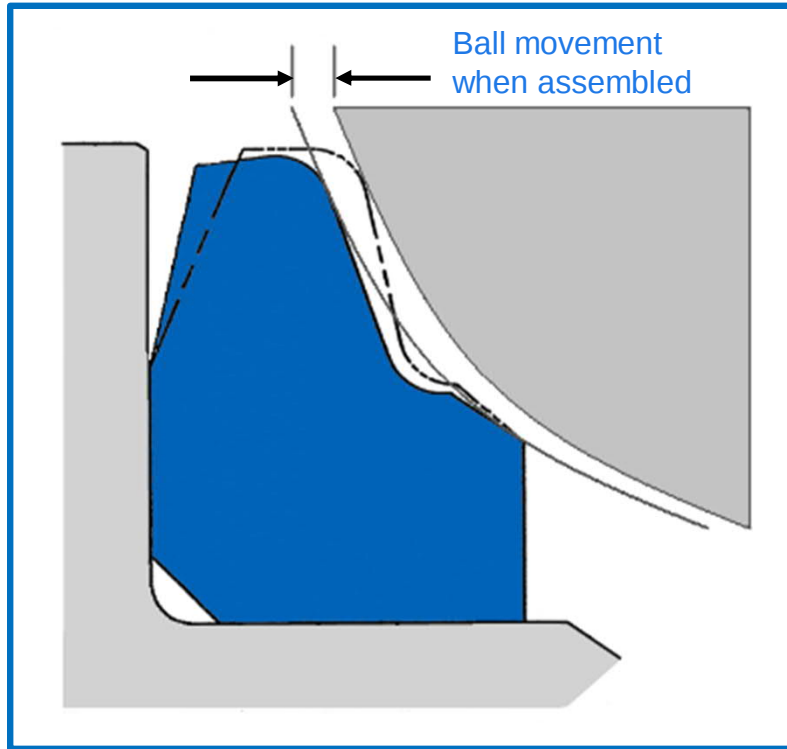
Primarily rely on polymer material alone for flexibility and recovery



Designed for seat sealing performance

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Jam seats have less compression & lower tolerance for wear



Jam seats often require grease lubrication to ensure relatively consistent torque

Designed for seat sealing performance

Flexible lip seat technology

- Seats seal in both directions
- Double-seated valves can trap fluid in the center of the valve between the seats. When warmed, trapped fluid pressure can exceed valve rating
- Jamesbury™ Brand flexible-lip seat automatically relieves cavity pressure

Challenge

Trapped fluid pressure

Solution

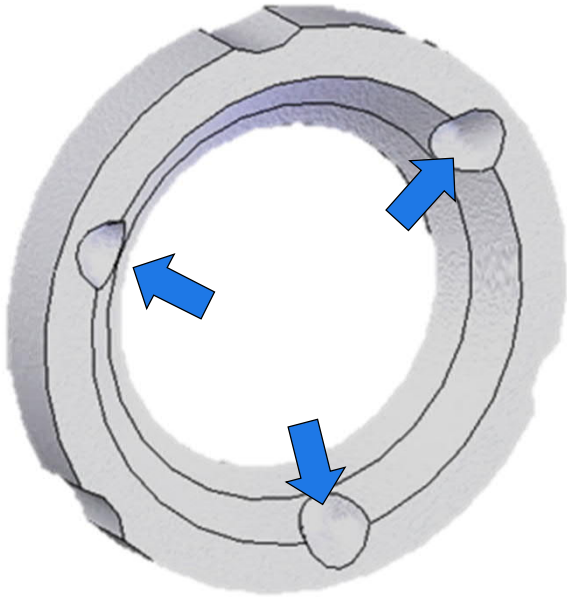
Flexible lip seat technology

Designed for seat sealing performance

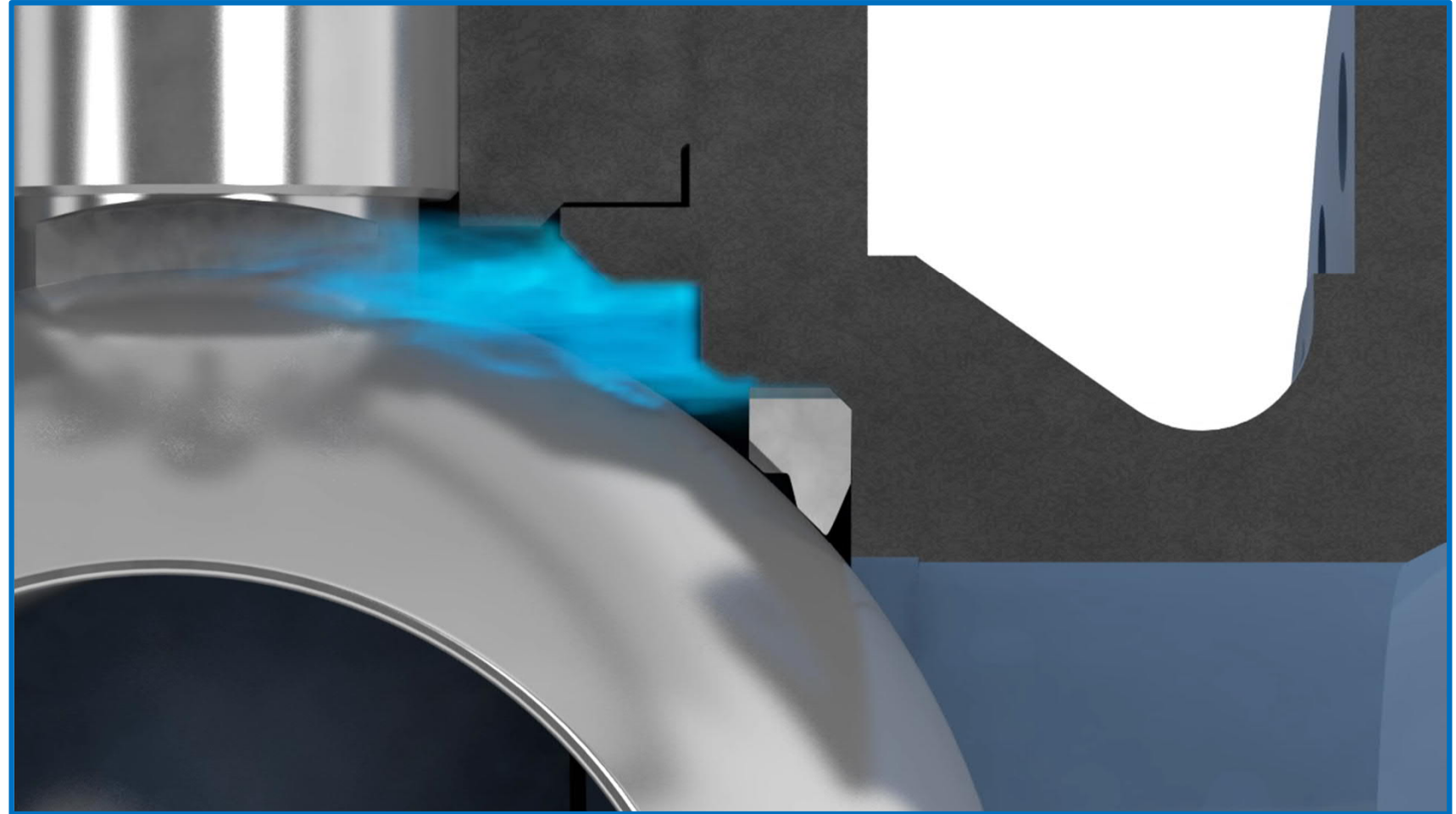
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Cavity pressure relief

Heel grooves



Heel groove allow cavity pressure to pass through ball support and push against flexible lip – releasing the pressure

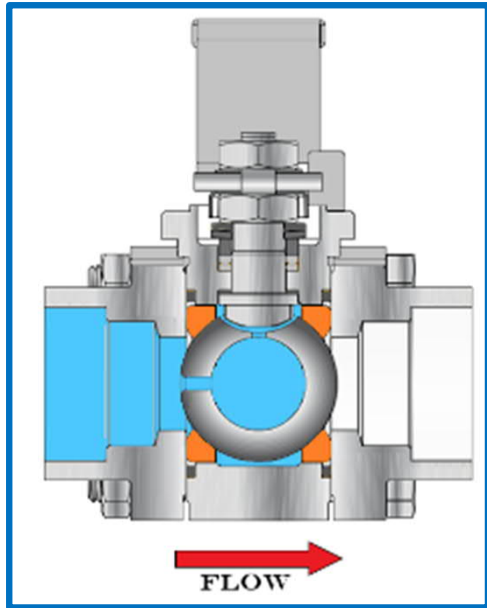


Designed for seat sealing performance

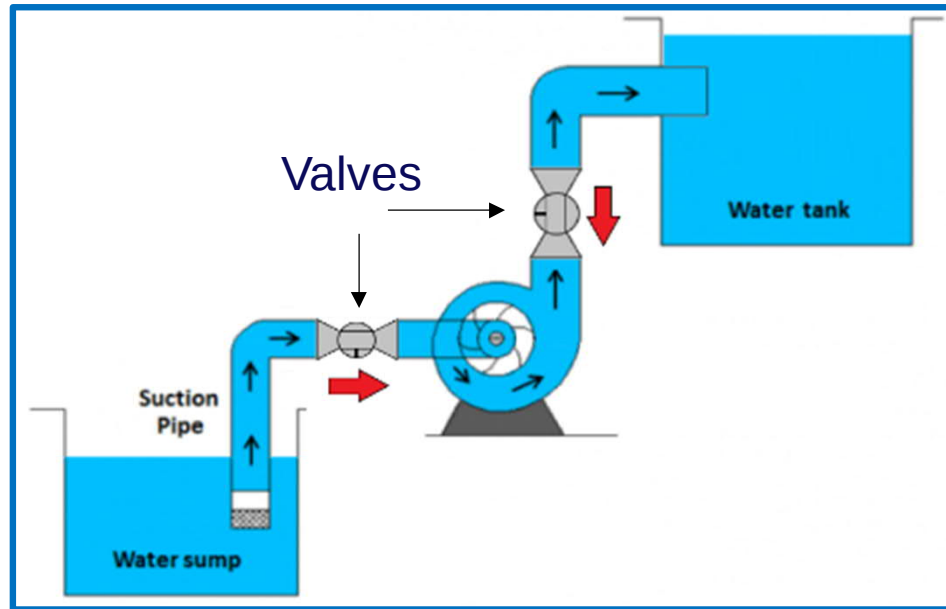
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Valves without self-relieving seats require a vent hole in the ball

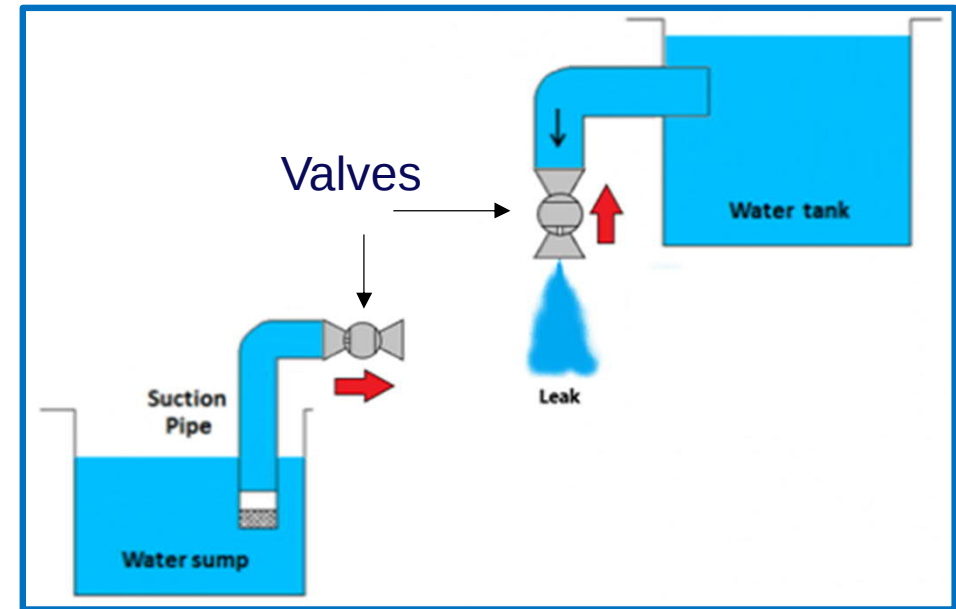
Vent hole causes serious safety problems when installed in wrong direction



Valve with vent hole has flow direction arrow to ensure correct installation direction



Correct installation of isolation valves around a pump will have the flow arrows towards the pump. Common mistake is that the downstream valve will be installed in the opposite direction, so flow arrow is the same as normal pump flow.

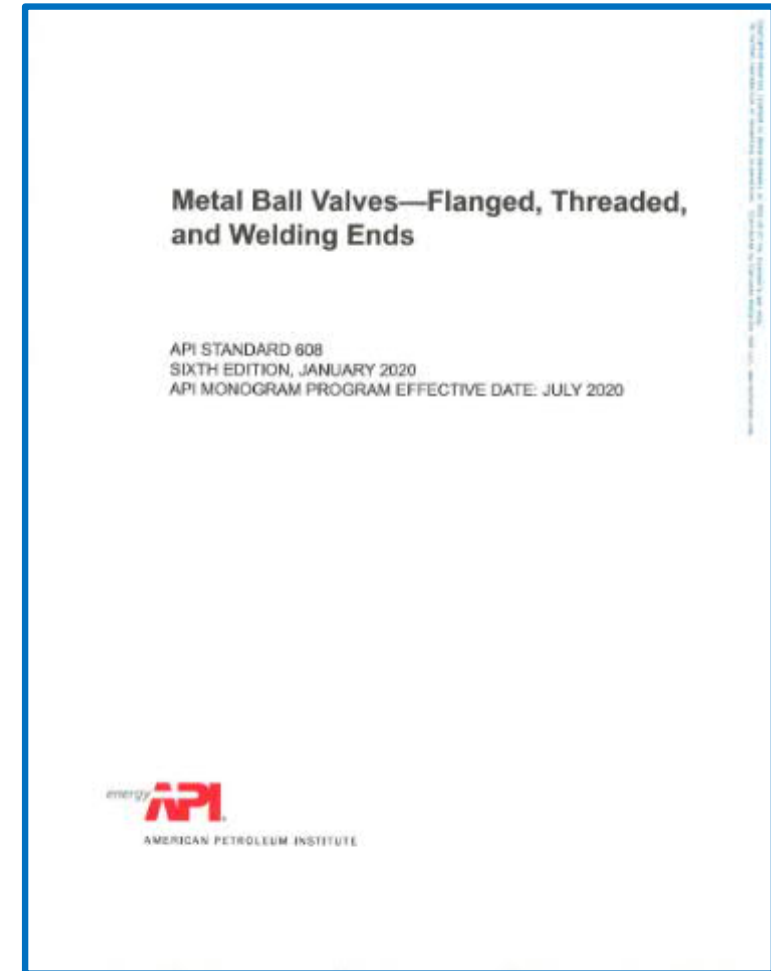


When valves are closed and pump is removed for maintenance, media in pipe can leak through vent hole to atmosphere.

Designed for seat sealing performance

Cavity pressure relief

- ASME B16.34 warns of cavity pressure in double seated valves
- API 608 requires ball valves to have a means of protection from excessive cavity pressure
- API 6D requires cavity pressure relief at less than 1.3x body rating
- Some customers mistakenly apply API 6D requirement to API 608 valves; seat designs are different
- Jamesbury™ Brand flexible lip seats comply with API 608, and relieve cavity pressure at less than body design capability
- Performance validated by testing



Questions?

Designed for consistent operating torque

Design & testing

- All seat designs are qualified by a rigorous test program
- Grooves on the seat OD are an original Jamesbury™ Brand innovation to minimize operating torque

Challenge

Inconsistent operating torque

Solution

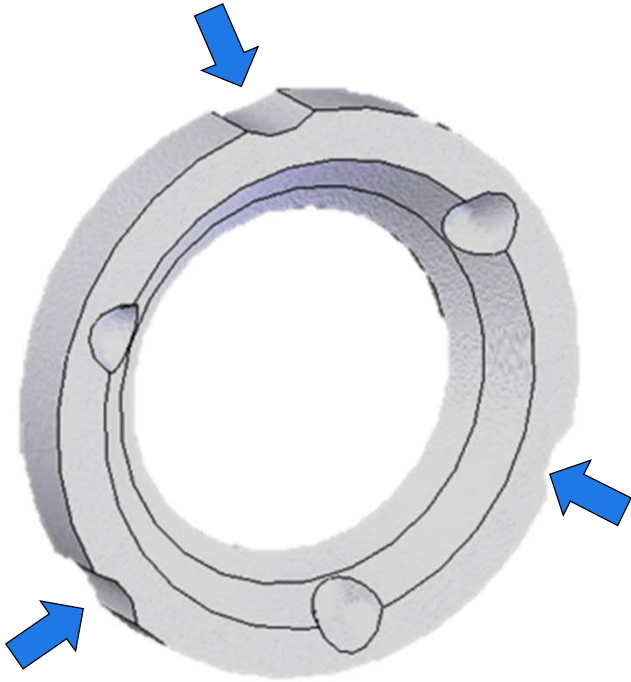
Design & testing

Designed for consistent operating torque

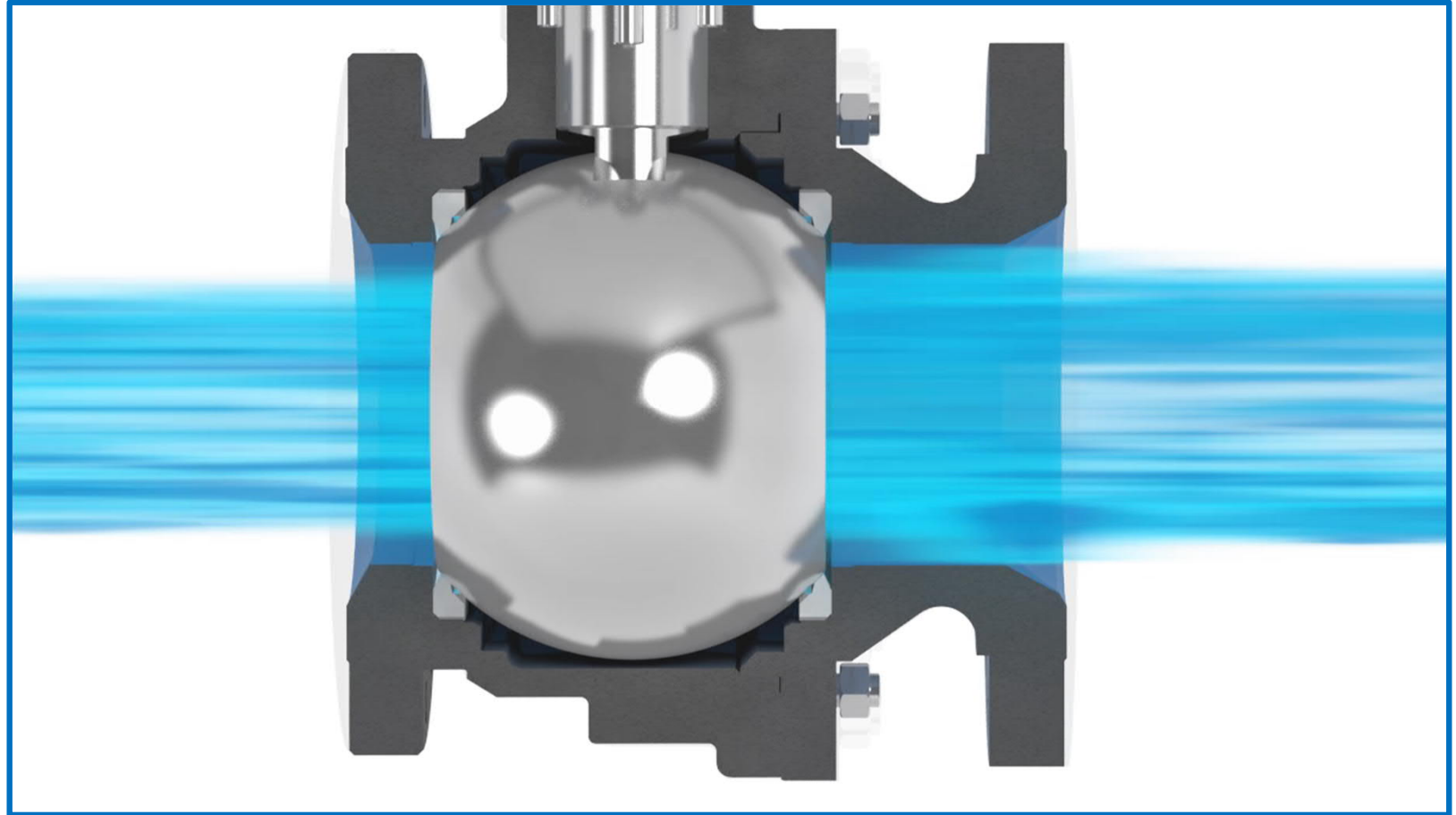
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Design & testing

Grooves on OD



OD grooves allow pressure to pass around the upstream seat, so it does not add to the torque required to operate the valve



Designed for maximum material performance

Xtreme™ seat material

- Xtreme™ is a unique polymer developed by Jamesbury™ Brand material engineers
- Improved seat recovery leading to higher pressure-temperature ratings for increased production
- Excellent chemical compatibility
- Chemical Processing Vaaler Award winner (1999)



Challenge

Higher operating temperatures and pressures

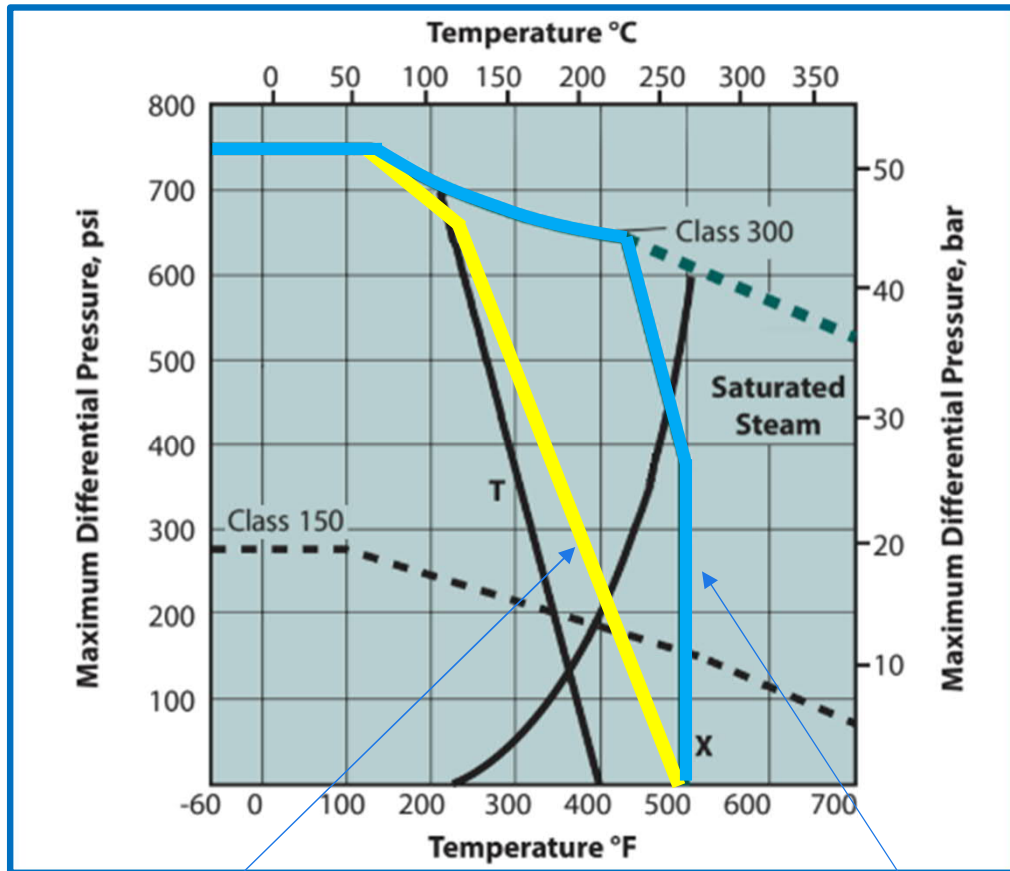
Solution

Xtreme™ seat material

Designed for maximum material performance

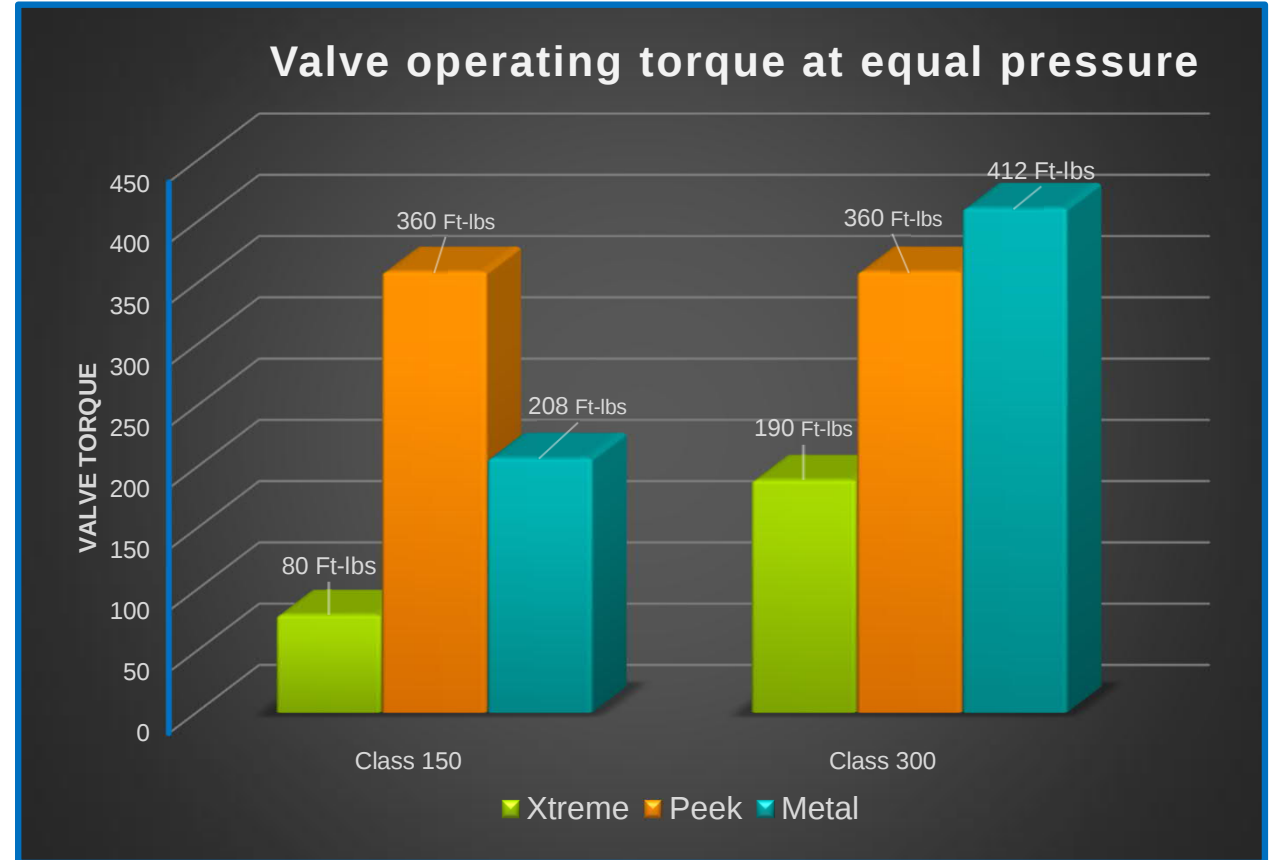
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Xtreme™ pressure-temperature ratings previously required PEEK or metal seats



Typical competitor seat

Xtreme™

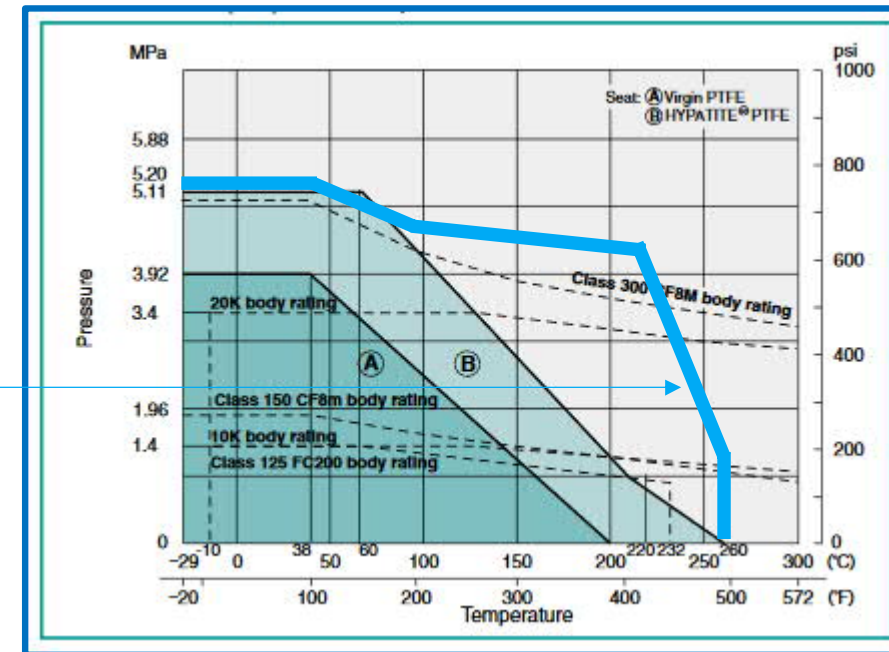
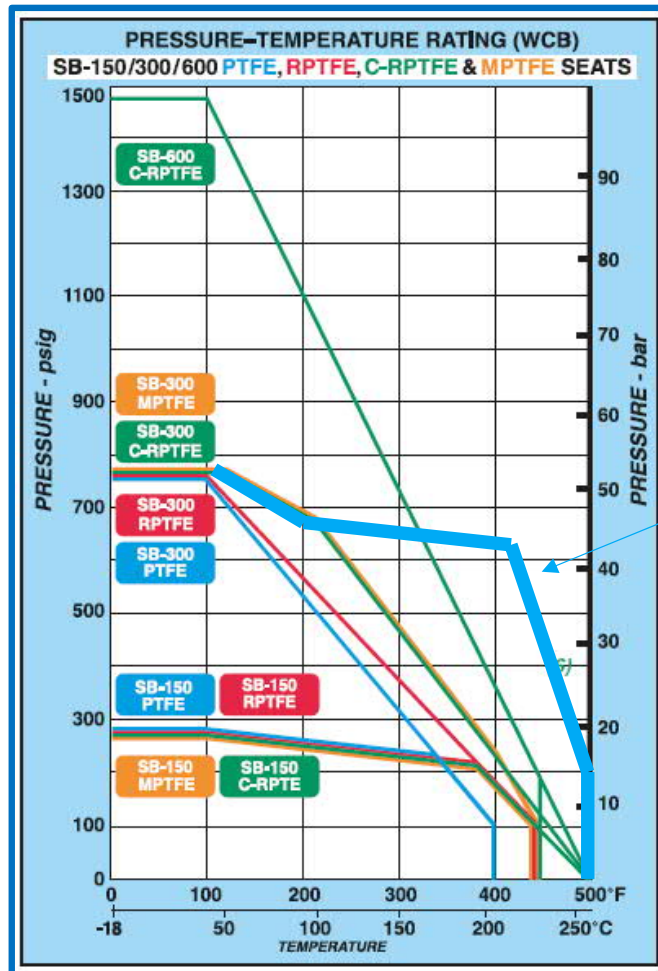


Operating torque and required actuator size is much lower than PEEK or metal seats

Designed for maximum material performance

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Xtreme™ seat material pressure-temperature rating versus competition



Designed for maximum cycle life

Xtreme™ seat material

- Xtreme™ is a unique polymer developed by Jamesbury™ Brand material engineers
- Excellent wear resistance for long life and reduced maintenance costs
- Low operating torque for cost-effective automated assemblies



Challenge

Poor cycle life

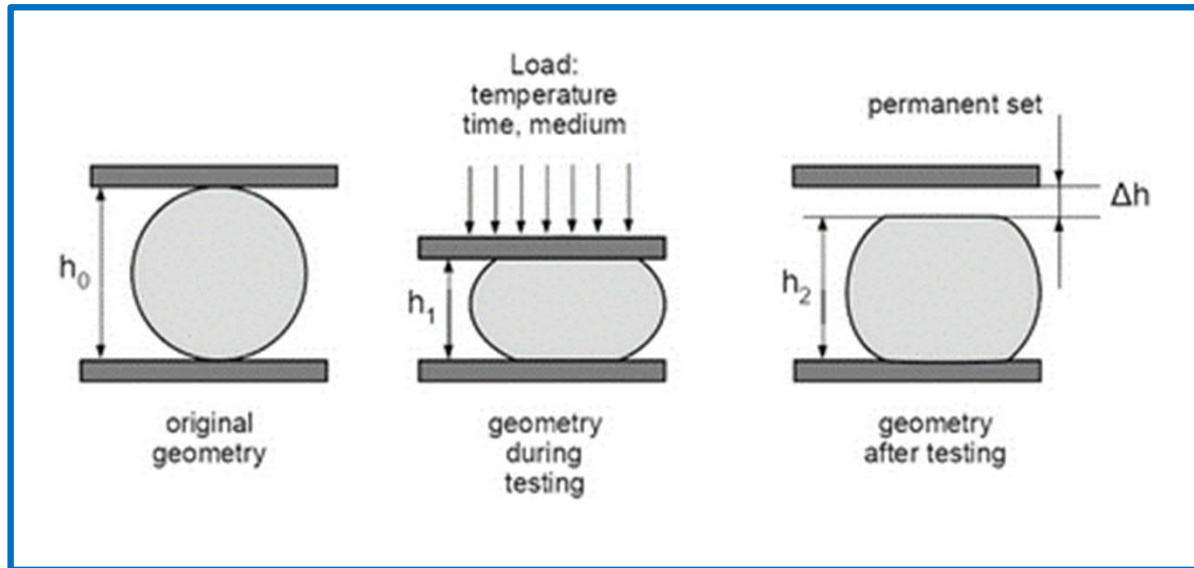
Solution

Xtreme™ seat material

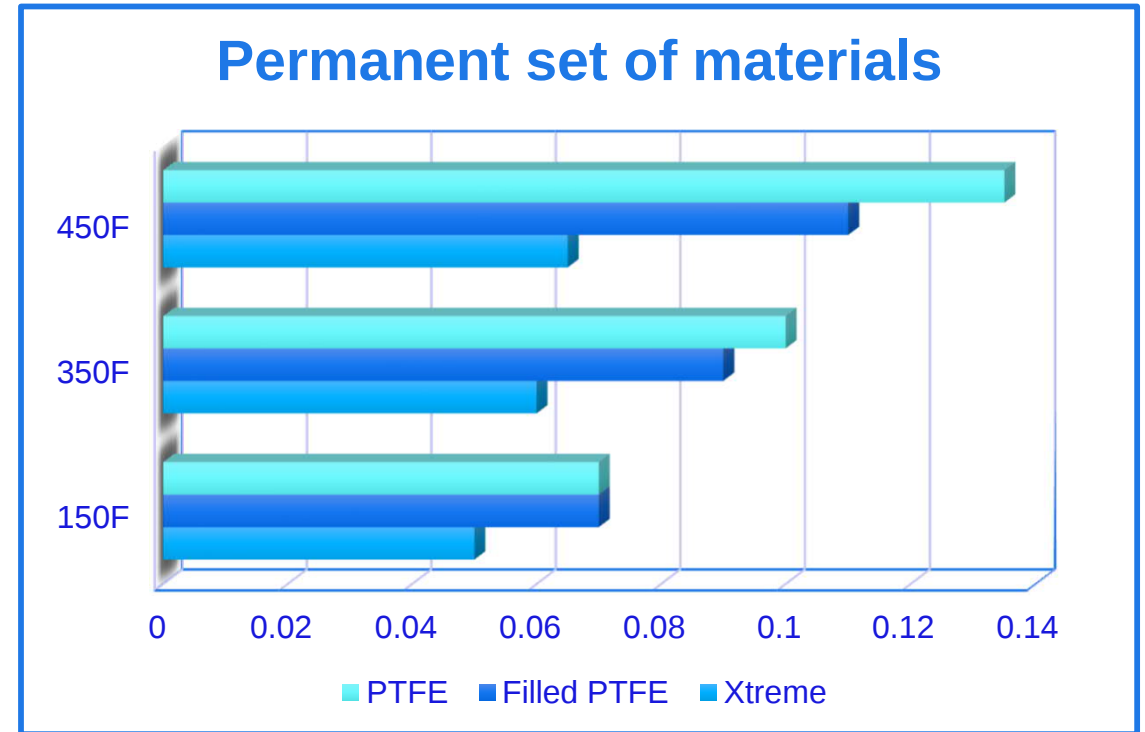
Designed for maximum cycle life

NELES

Seat recovery is key to maximize pressure-temperature ratings and cycle life



The greater the seat recovery to its original dimension after loading, especially at elevated temperature, leads to higher pressure-temperature rating and longer cycle life. More material can wear away and still provide an effective seal.

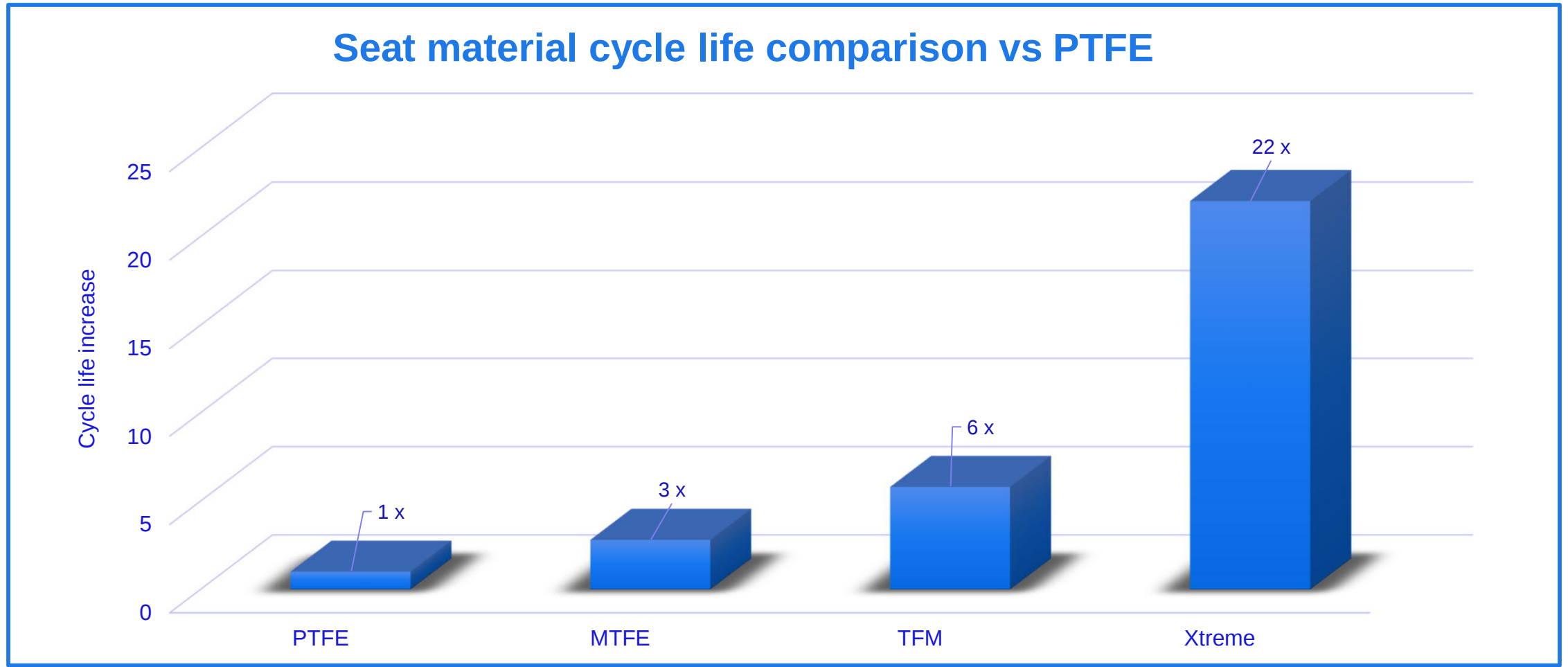


Permanent set of Xtreme is lower than PTFE and filled PTFE, especially at higher temperatures

Designed for maximum cycle life

NELES

Xtreme™ cycle life



Cycle life of Xtreme™ under the same conditions is 22 times greater than virgin PTFE, and more than 3 times greater than virgin TFM

Designed for maximum cycle life

NELES

Customer success story



- Wacker Chemical Corp., Charleston, TN
- Produces ultra-pure polysilicon with a proprietary process
- Original valves were only lasting 5 batch cycles before leaking and forcing plant shut-down for maintenance
- Neles Series 9000 valves with Xtreme™ seats were tested and approved
- Cycle life has increased to over 25 batch cycles

Questions?

Designed for stem sealing performance

Live loaded and robust stem seal design

- Spring loaded seal compensates for thermal expansion and contraction
- Extends cycle life by compensating for wear
- Live loading is a standard feature on most products
- V-ring packing & patented stem seals provide multiple sealing zones
- Enhanced PTFE material for tighter sealing performance



Challenge

Stem seal leaks

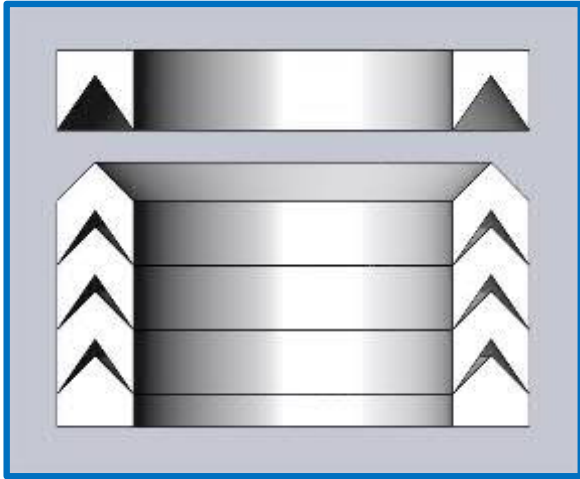
Solution

Live loaded and robust stem seals

Designed for stem sealing performance

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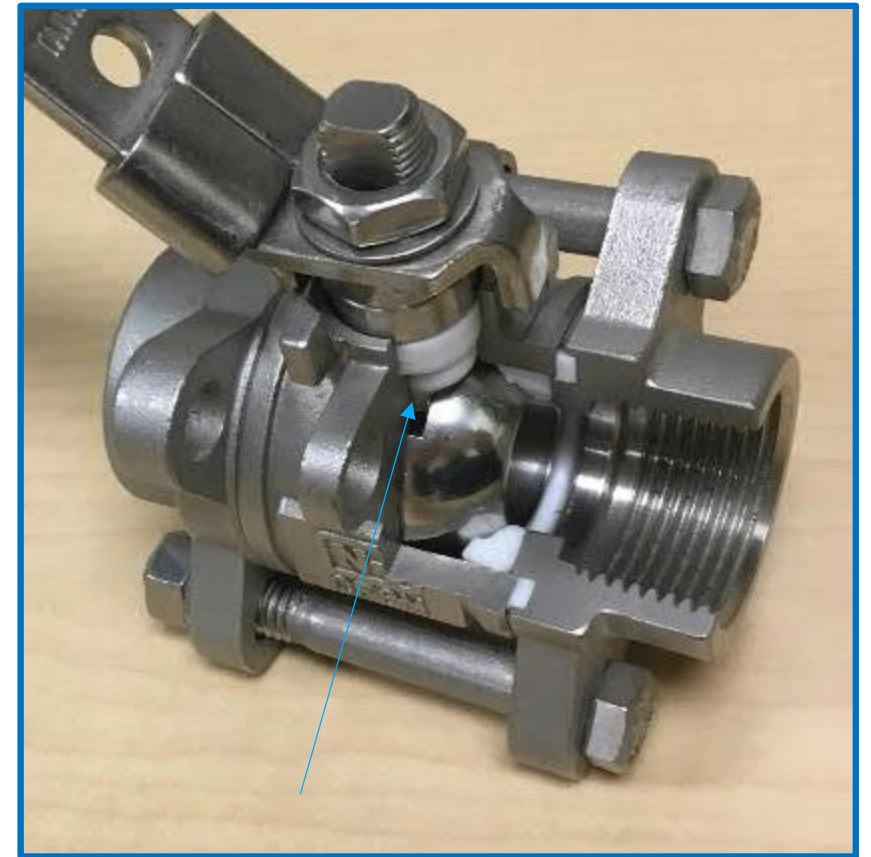
V-ring packing



Wedging action of V-shape causes seal to expand when compressed, increasing sealing against packing bore and stem.



Multiple sealing points along potential leak paths

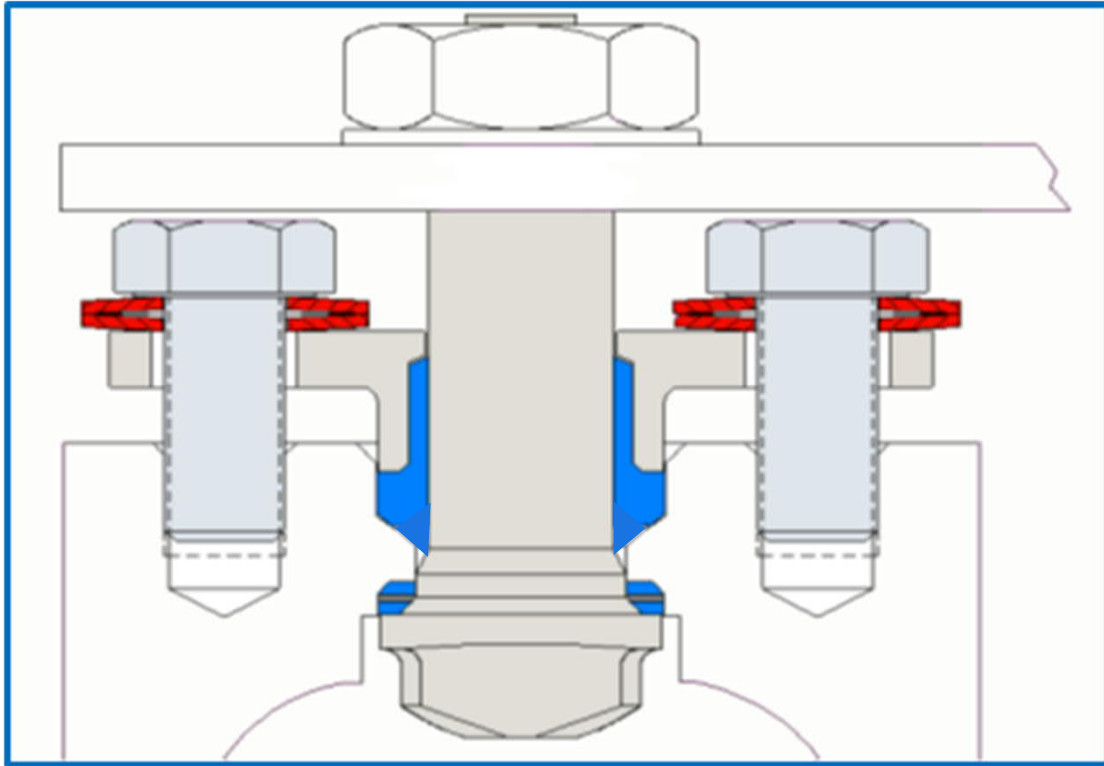


Challenge for small valves where there is not enough space to fit a tall stack of V-rings. How to get the benefit of multiple sealing points against the packing bore and stem?

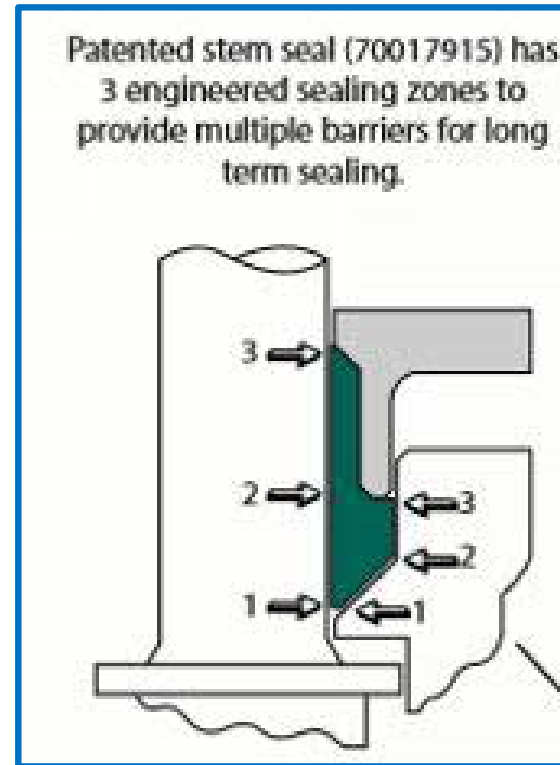
Designed for stem sealing performance

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Patented stem seal – another Jamesbury™ Brand engineering innovation



Angled contact surfaces create multiple sealing points at the OD and ID

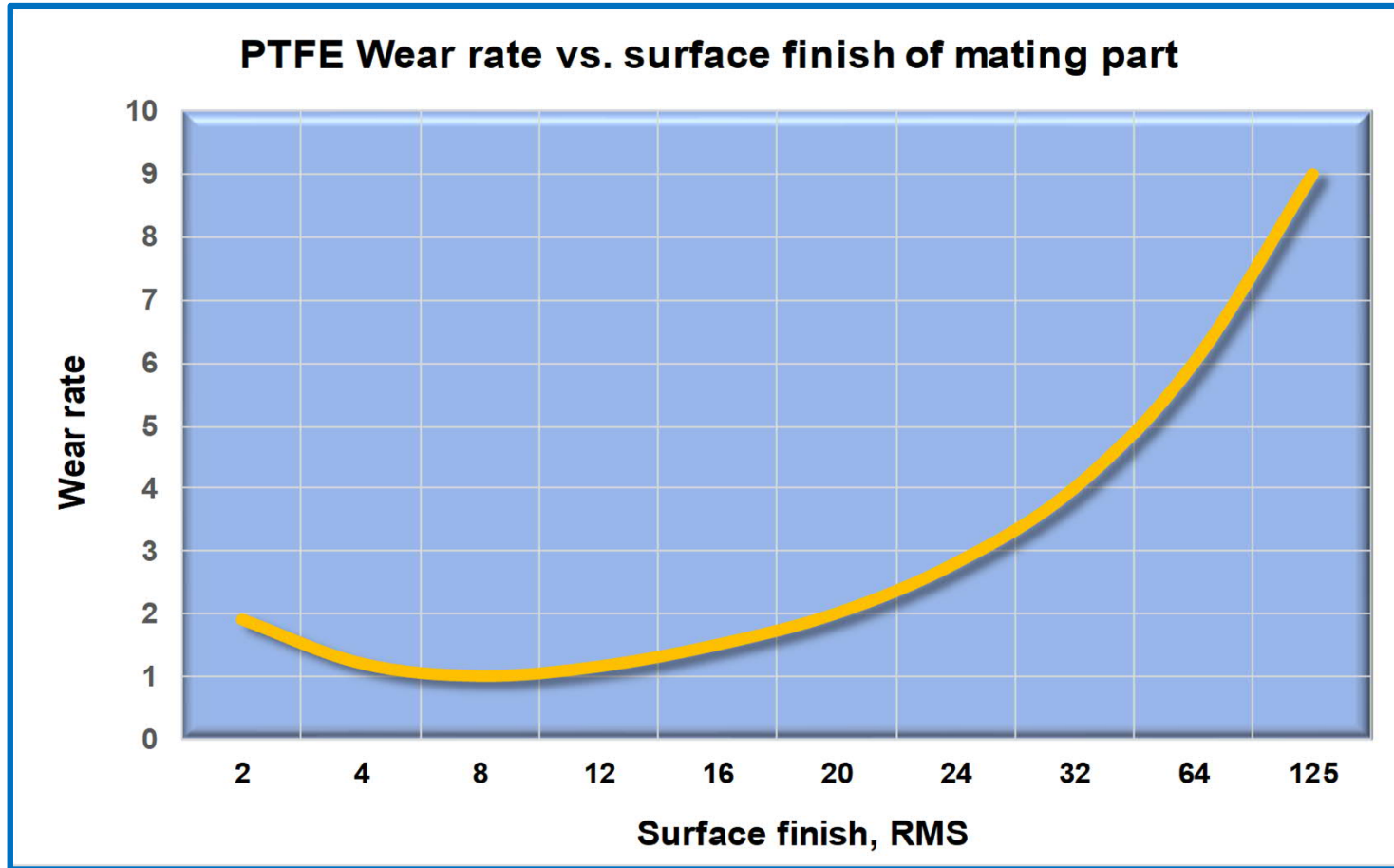


Compact design easily fits into small valves and provides the sealing performance of V-ring type packing

Designed for stem sealing performance

NELES

Surface finish



Our laboratory studies have revealed the optimum surface finish for longest cycle life. When polished below 8 RMS, the wear rate of PTFE materials actually begins to increase.



Jamesbury balls & stems manufactured with an 8 RMS finish

Designed for stem sealing performance

NELES

Our design features along with Xtreme™ provides longest cycle life available

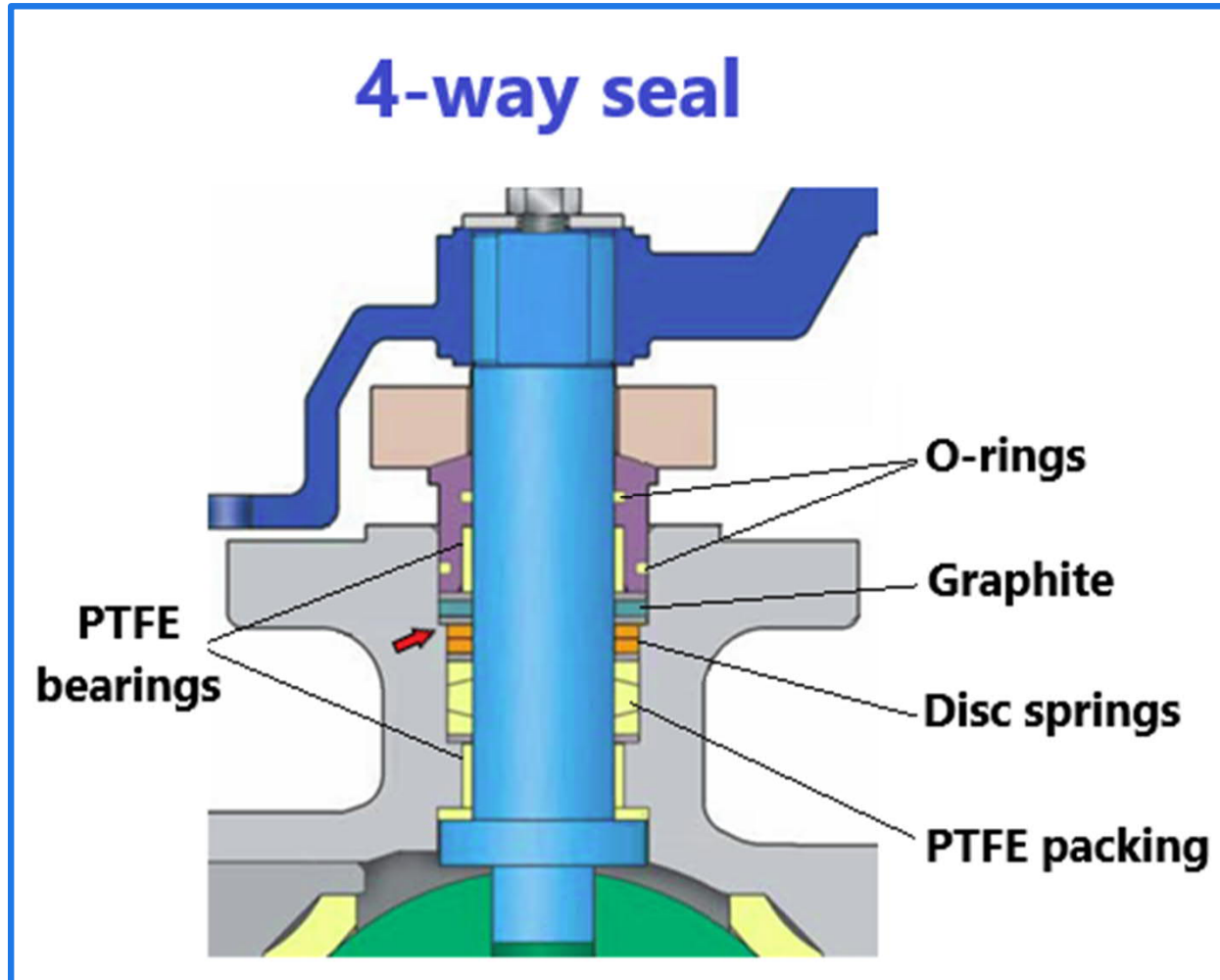
	Typical stem seal cycle life	Frequency of adjustment	Seat leakage
Competitor A	2,000 - 6,000	Continuous	None
Competitor B	20,000 - 35,000	Several	None
Competitor C	3,000 - 3,500	Several	2,000 cycles
Competitor D	40,000 - 70,000	Infrequent	None
Competitor E	500 - 5,000	Continuous	Stem Broke
Competitor F	1,500	Infrequent	None
Neles Valves	400,000 - 700,000	Infrequent	None

Cycle life performance of ball valves opening and closing against 10 bar air at ambient temperature
Monitored stem seal and seat leakage, as well as number of times stem seal required adjustment

Designed for stem sealing performance

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Competitor design evaluation



- Complex design with many parts that are advertised as features
- Step in packing bore below graphite seal prevents additional compression of PTFE packing when packing nuts are tightened
- No additional adjustment possible once primary PTFE seal wears
- Clearly a problem since additional O-rings added at OD and ID
- O-rings limit temperature rating and have limited media compatibility
- Additional PTFE bearings added to increase tolerance to side loading during manual operation or by misaligned actuator

Designed for stem sealing performance

Certified performance

- ISO 15848 Rate AH & BH
- API 641 to 10" NPS
- EPA Method 21 to < 100ppm
- Certified Low Leak Technology



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Challenge

Fugitive emissions

Solution

Certified performance

Designed for stem sealing performance

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Customer success story

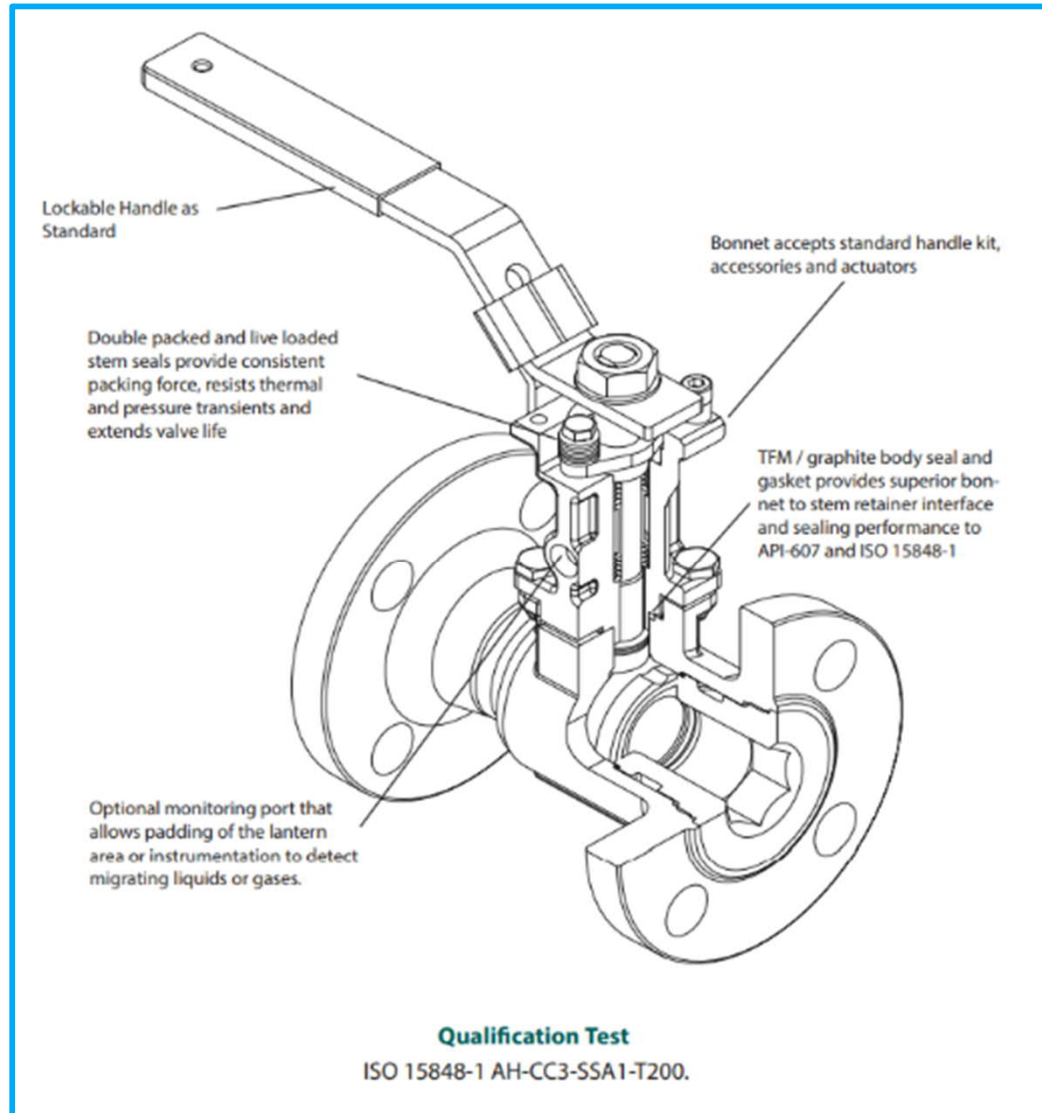


- Eastman Chemical, Springfield, MA
- Placed under EPA consent decree
- Required products to meet EPA requirements and monitoring
- Neles provided emissions test data and test certificates for standard product
- EPA approved Neles™ Jamesbury™ products and customer installed them
- EPA monitoring confirmed performance

Optional Emission-Pak™ for hazardous applications

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When double-packing or leak-off monitoring port is desired

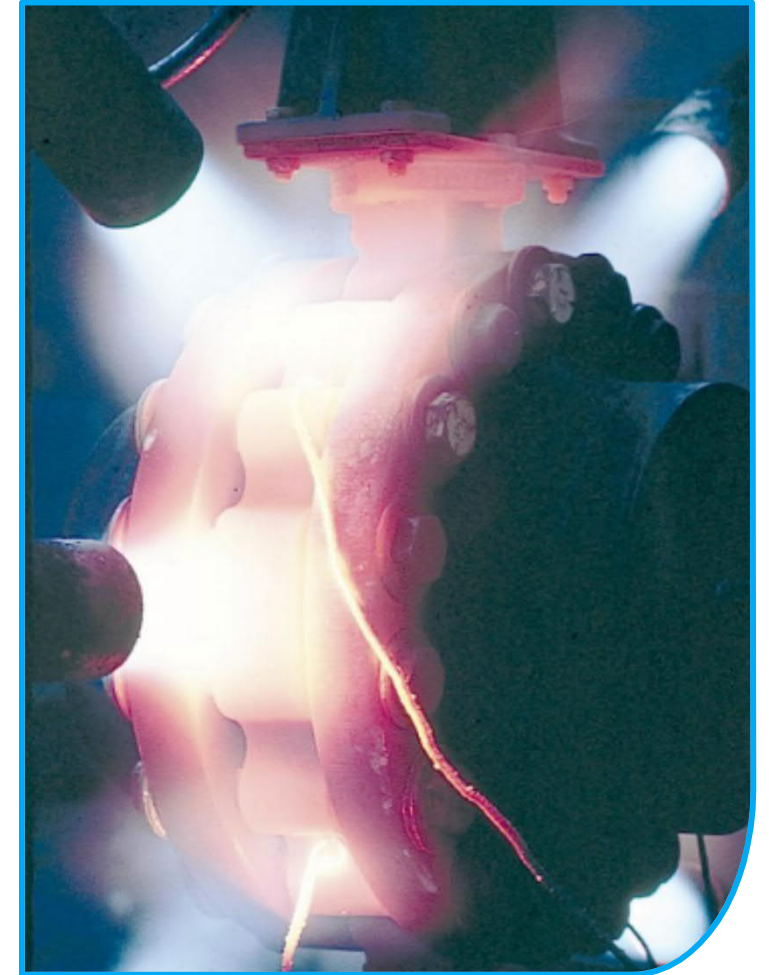


- Available option for 4000, 7000, and 9000 series valves
- Available with or without monitoring port
- Same sealing performance as standard valve without Emission-Pak™
- Useful for lethal media or highly hazardous applications where monitoring for leaks is essential or to inject pressure above packing to prevent leak

API-607, 7th Edition

Fire Test for Quarter-turn Valves and Valves equipped with Nonmetallic Seats

- Proves the valve design is capable of limited exposure to fire and not leak enough to feed and expand the fire
- Fire duration is 30 min “maximum time required to extinguish most fires”
- Test Temperature is 1400°F – 1800°F “typical for petroleum-based fire”
- Completely envelop the valve in flames
- Test pressures:
 - Nonmetallic seated valves Class 150 and 300 is 0.2MPa (30 psi), based on remaining pressure head when pumps are shutdown
- Measure through and external leakage before cooldown
- Cooldown is forced with water spray within 5 min
- Post cooldown pressure test for through and external leakage and operate valve

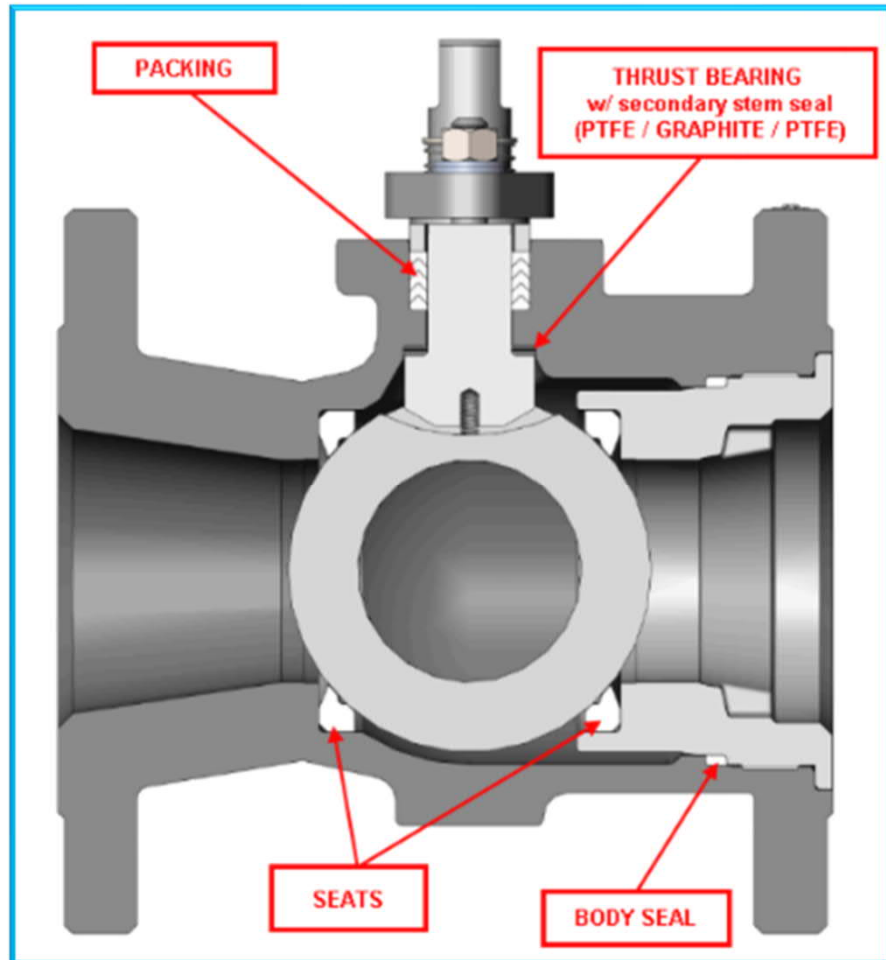


Neles™ Jamesbury™ Fire-tite™ ball valve design

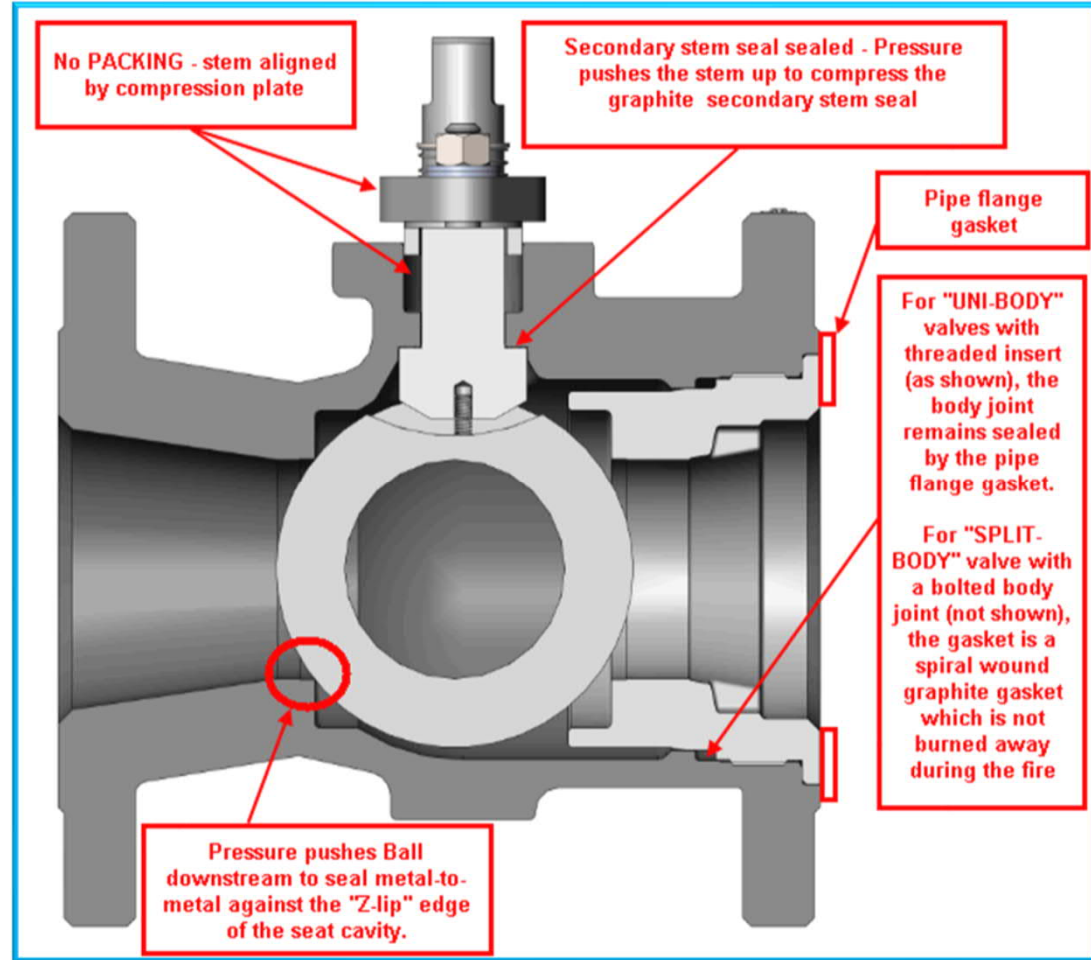
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Post Fire-Test the Polymeric parts are burned away

Pre-burn



Post-burn



Neles™ Jamesbury™ Fire-tite™ ball valve design

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Post Fire-Test the Polymeric parts are burned away

Post-burn



Questions?

Designed for stem seal adjustment

Competitor design

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Inaccessible with
actuator mounted



Permanent locking tab

Challenge

Difficult adjustment

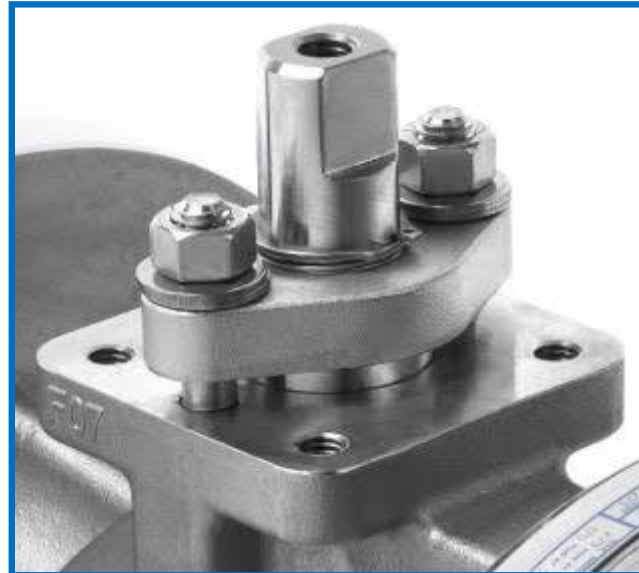
Solution

Compression plate design
& access built in

Designed for stem seal adjustment

Compression plate design & access built in

- Adjustment screws separate from stem
- Designed to ensure access
- Gland bolting is sized to prevent overloading the stem packing



Challenge

Difficult adjustment

Solution

Compression plate design
& access built in

Designed for stem seal adjustment

NELES

Access & tooling size



Competitor valves using nuts on stem to compress packing require a wrench size that will easily crush the seal when tightened



Jamesbury adjustment is easy and accessible

Designed for stem seal adjustment

NELES

Competitor design examples



Access to the packing is not possible when actuator is mounted. Even with actuator removed, access to the stem seal adjustment nut is difficult.

Designed for automated assembly performance

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Complete Neles™ assembly

- Valves designed for automation
- Interface tolerances optimized
- Ergonomic factors considered in design
- Neles™ owns responsibility



Challenge

Who is responsible?

Determining responsibility when there are multiple suppliers involved

Solution

Complete Neles assembly

Designed for automated assembly performance

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Innovative mounting kit design

- Engineered cast machined stainless brackets
- Interface surface with actuator is machined to be parallel with actuator face and perpendicular to stem axis
- Self-aligning coupling
 - Coupling aligns with bracket with PTFE bearing
 - Coupling is machined with extension feature that ensures alignment with stem
- Automatically provides correct alignment of stem and actuator drive, eliminating lateral forces



Challenge

Ensuring proper alignment between valve and actuator interfaces

Solution

Innovative mounting kit design

Designed for automated assembly performance

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Ensuring alignment



Competitor coupling allows misalignment in drive slot and tilting of the coupling axis relative to stem axis

Neles coupling is machined with extensions that fully align to stem



Competitor bracket is made from rectangular tube stock
Does not ensure alignment with coupling

Neles bracket is machined and is aligned with coupling with PTFE bearing



Competitor bracket has limited access to fasteners making it difficult to assemble and properly tighten bracket bolting

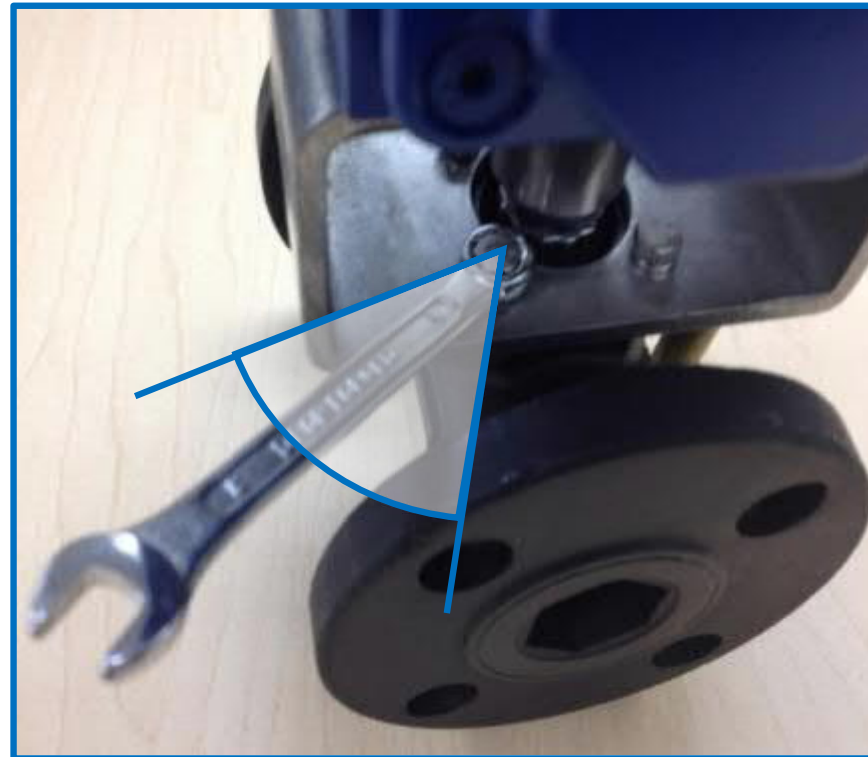
Designed for easy assembly

NELES

Ease of access to fasteners



Neles bracket design provides easy access to bracket bolting and permits wide range of rotation for fast and correct assembly / disassembly



Competitor bracket design limits access to bracket bolting and limits range of rotation between side of bracket and valve flange.

Often multiple flipping-over of wrench is needed to tighten each bolt

Designed for automated assembly performance

Rugged design tolerates overload and software to ensure correct actuator size selection

- Stem dimensions are larger than competitor valves of the same size and pressure rating
- Ensure correct actuator size selection
- Bulletins with torque data
- Nelprof™ sizing software
- Linkage wizard



Jamesbury™ Brand stem (left) versus competitor

Note difference in drive connection size on each end. Which is more tolerant to stalled actuator overloading?

Challenge

Failure of valve to operate on demand

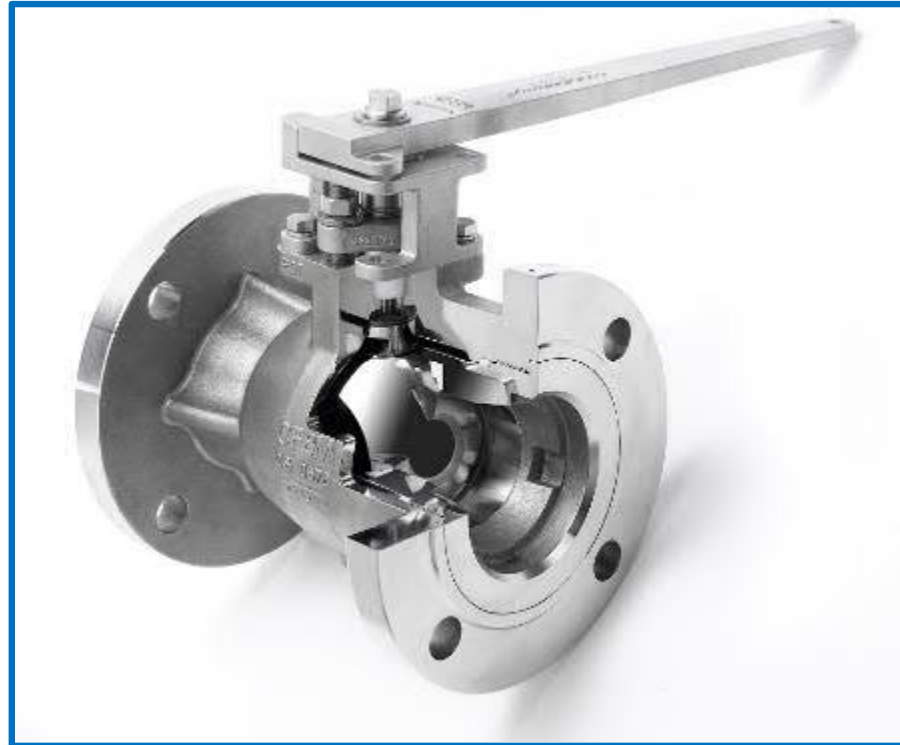
Solution

Rugged design and sizing & selection tools

Quality

Additional measures taken to ensure product quality

- Supplier selection & quality programs
- Material quality audits



Challenge

Unacceptable product quality

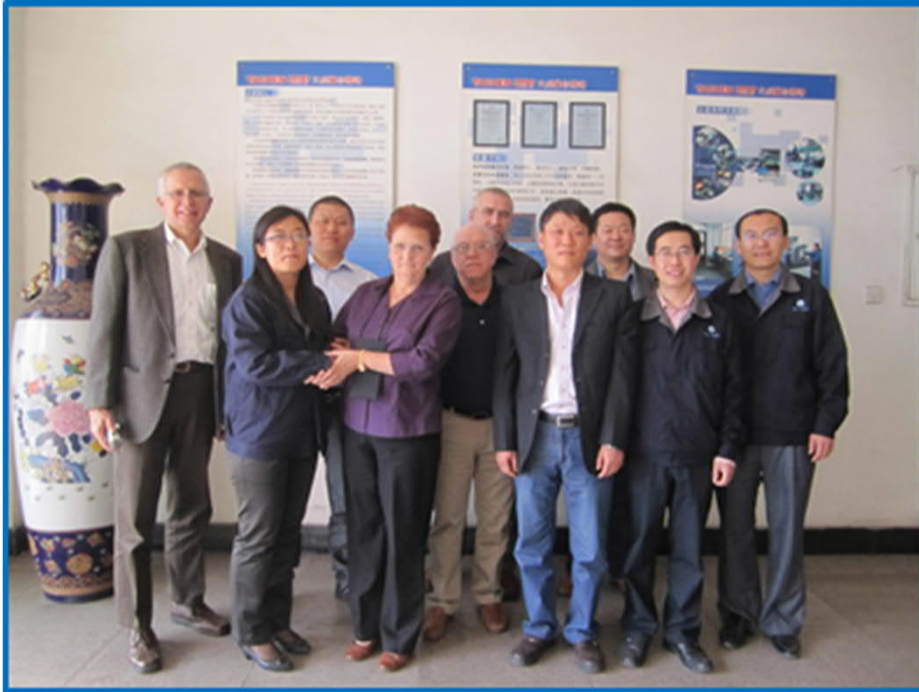
Solution

Additional quality processes

Supplier selection and quality programs

NELES

Vendor audit team



It is not easy to become a supplier to Neles™

Potential suppliers are audited by a cross-functional team of experts including Quality, Purchasing, and Engineering

Supplier's end-to-end processes are reviewed for compliance with Neles requirements, including material quality

Correct chemistry



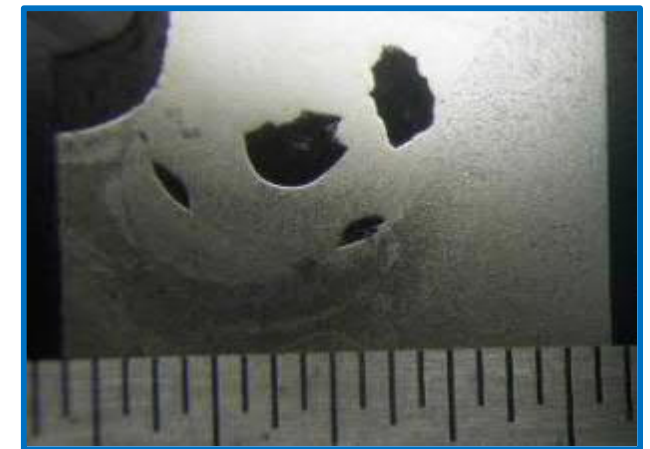
Cleaning of stainless



Casting porosity



Improper weld repair



Material quality audits

NELES

Metallographic analysis is done for all suppliers and materials at least annually

CORRECT



Properly annealed stainless steel will look like this when etched and viewed at 400x magnification

WRONG CHEMISTRY or INSUFFICIENT TIME or TEMPERATURE



If supplier only follows the minimum times and temperatures during heat treatment, alloy elements may not fully combine

QUENCH TOO SLOW or NOT SOLUTION ANNEALED AT ALL



If the supplier does not fully quench in an agitated cool liquid bath, alloy elements critical to providing corrosion resistance will release from mixture

Material quality audits

NELES

Why this is important



If not properly annealed, stainless steel in Nitric acid, corrosion in just 3 weeks penetrated through the wall

Questions?

Service & support

Local distributor & Neles support

- Product bulletins, installation & maintenance (IMO) documents readily available on our website
- Local sales and service expertise
- Neles repair kits and stocking
- Neles Service Center support
- Neles factory technical returns support

Challenge

Lack of local service and support

Availability of spare parts

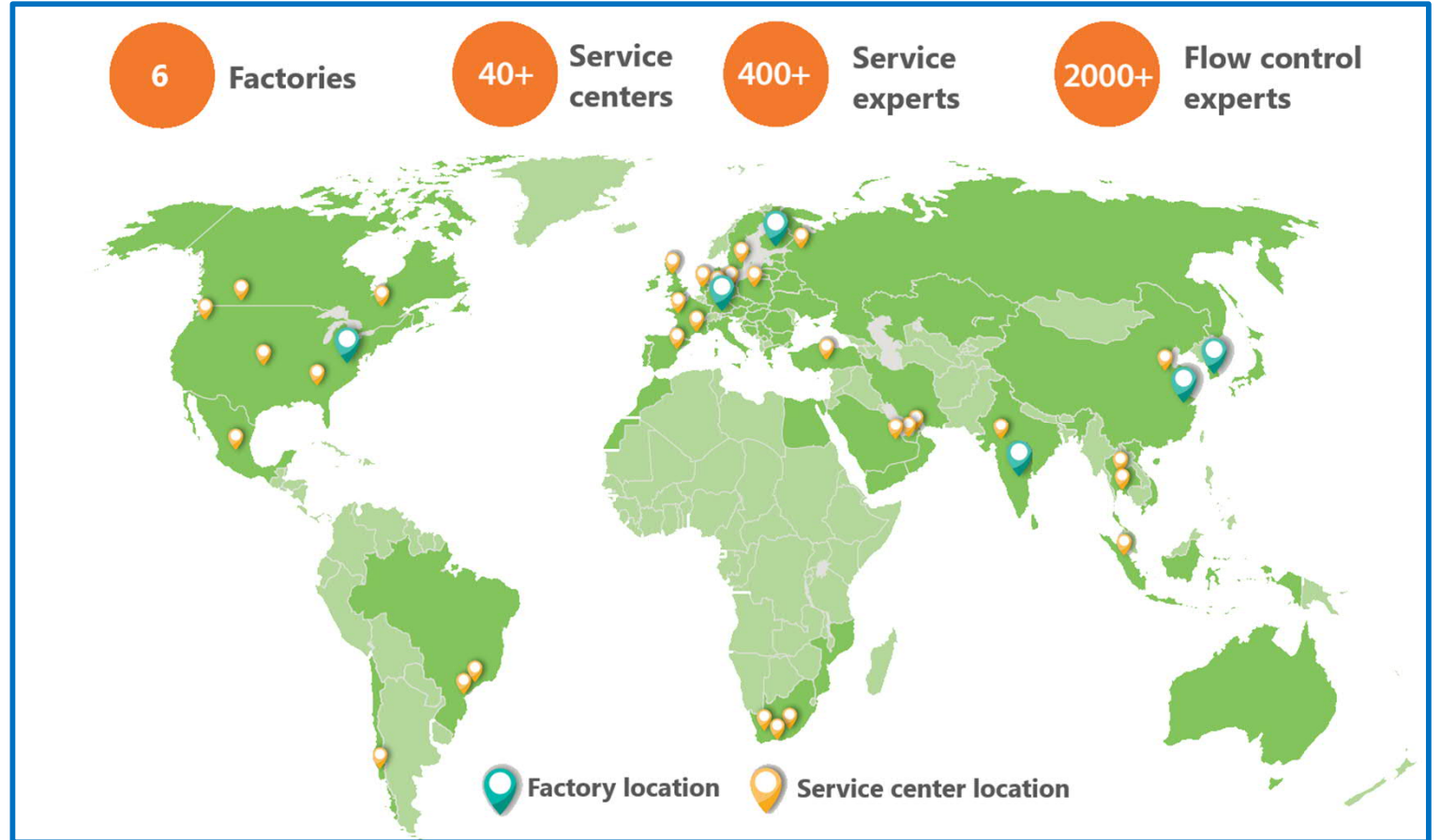
Solution

Local distributor & Neles support

Service & support

Regional and global network

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Jamesbury™ Brand Ball Valves

Product scope

Jamesbury™ Brand thread end ball valves

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Series 100



**DN 8 – 50 (NPS 1/4 - 2)
CWP 138 bar (2,000 psi)
NPT Threaded end**

Series 5H



**DN 8 – 50 (NPS 1/4 - 2)
CWP 310 bar (4,500 psi)
NPT Threaded end**

Series 3000



**DN 8 – 50 (NPS 1/4 - 2)
CWP 138 bar (2,000 psi)
Double-reduced bore
NPT Threaded end**

Jamesbury™ Brand thread end ball valves

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Series 2000



**DN 8 – 50 (NPS 1/4 - 2)
CWP 41 bar (600 psi)
NPT Threaded end
Unique split body**

Series 6F



**DN 8 – 50 (NPS 1/2 - 3)
CWP 69 bar (1,000 psi)
Full bore
NPT Threaded end**

Eliminator



**DN 8 – 50 (NPS 1/4 - 2)
ASME Class 600
CWP 138 bar (2,000 psi)
NPT Threaded end**

Jamesbury™ Brand thread end, weld end ball valves NELES

Series 3A/3C



**DN 8 – 50 (NPS 1/4 - 2)
CWP 69 bar (1,000 psi)
NPT Threaded end
Socket weld**

Series 4000



**DN 15 – 65 (NPS 1/2 – 2 1/2)
ASME Class 800
CWP 172 bar (2,500 psi)
NPT, Socket weld, Butt weld**

Jamesbury™ Brand flanged ball valves

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Series 7000 reduced port



**DN 15 – 500 (NPS 1/2 – 20)
ASME Class 150, 300
Floating and Trunnion**

Series 9000 full port



**DN 15 – 600 (NPS 1/2 – 24)
ASME Class 150, 300
Floating and Trunnion**

Value-line™ products

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These are older designs we continue to support, future upgrades planned

- Series 100; Most economical, utility applications
- Series 5H; High pressure applications
- Series 3000; Instrument and lower flow applications
- Series 6F; Higher flow threaded applications
- Series 3A/3C; Economical thread and welded end applications

Questions?

Thank you for your time today, we hope this session was informative

Please contact steve.atherton@neles.com or danielle.fisher@neles.com for any additional questions or information

See our website, [Neles.com](https://neles.com) for product information and guidance

Submitted Questions

Jamesbury™ Brand ball valves with Steve Atherton

- Do you test your valves to API 598? **Yes**
- What kind of spares do you recommend for 2 years service? **Repair kit only**
- What kind of material would you recommend for ball valve seat, stem, and packing for sea water service? **Xtreme seat, monel body and trim**
- What is the best valve for Hydrogen service? **Any of Eliminator, 4000, 7000/9000; Xtreme seat, carbon or stainless body**
- Will we bring back the soft seated cryogenic 5K and 6K ball valves? **Yes as 7K and 9K**
- Are our MAST values always higher than the actuators (VPVL, RNP, B1J) torques calculated at maximum operating supply pressure? **That depends on the size actuator selected**
- Do we have a library of MAST values? **Yes, however it is an internal document currently**
- Can you provide a comparison between PEEK and Xtreme materials? **PEEK is a very hard plastic, Xtreme is a much softer PTFE**
- Is Xtreme considered the same as TFM? **No, Xtreme is a modified form of TFM**
- Will you be covering API 641 low emissions? **Yes, we are now qualified up to 10" NPS for Eliminator, 4000, 7K and 9K**
- How do you know that the adjustment (of stem packing) is enough? **Our guidance is only use ¼ turn adjustments**
- Considering high cycling, what should be the selection in Jamesbury ball valve specifically 9000 series? **Xtreme seat, standard constructions**

Submitted Questions

Jamesbury™ Brand ball valves with Steve Atherton

- Will we have access to this recording? **Yes**
- With the seat design, you will not get any dirt behind the seat? **If there are particulates in the media or dry powders, it is possible to get particulates behind the seat, for such cases we would recommend a “Barrier” seat, which has an o-ring to seal behind the seat to seal off the particulates and prevent that from occurring**
- General question you mentioned that we are not the cheapest, however how is our price compared to BAC, Kitz ISO, Hindle and JC valves. These are brands that are well accepted and appear on all AML of large end users? **We are likely 10% to 20% higher unless we discount very aggressively, our challenge is communicating the performance and cycle life benefits our designs provide**
- We get questions from customers regarding the need for a vented ball vs cavity relief on the Jamesbury – are there instances where a relief hole is required for Jamesbury valve, i.e. chlorine service? **Only Hydrogen Peroxide to my knowledge**

Reinventing reliability

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