

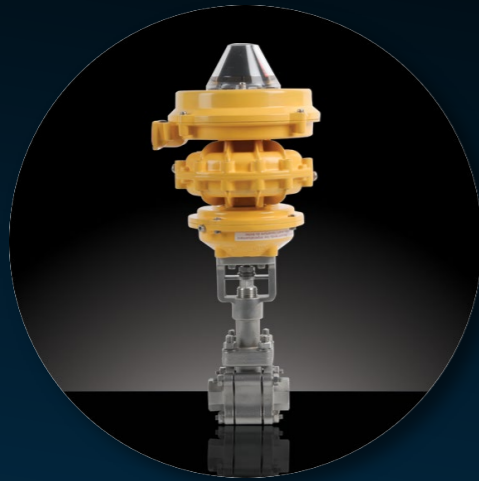
Gosco S-Class Valves



S-CLASS
CUSTOM SOFT SEATED

“FLEXIBILITY & PERFORMANCE”

gosco
VALVES



Overview



Vari-V Control Valve



Block and Bleed Valve



Cryogenic Valve

S-Class Core System



FM Approved Valve



3-Way Diverter Valve

S-Class Standard Features

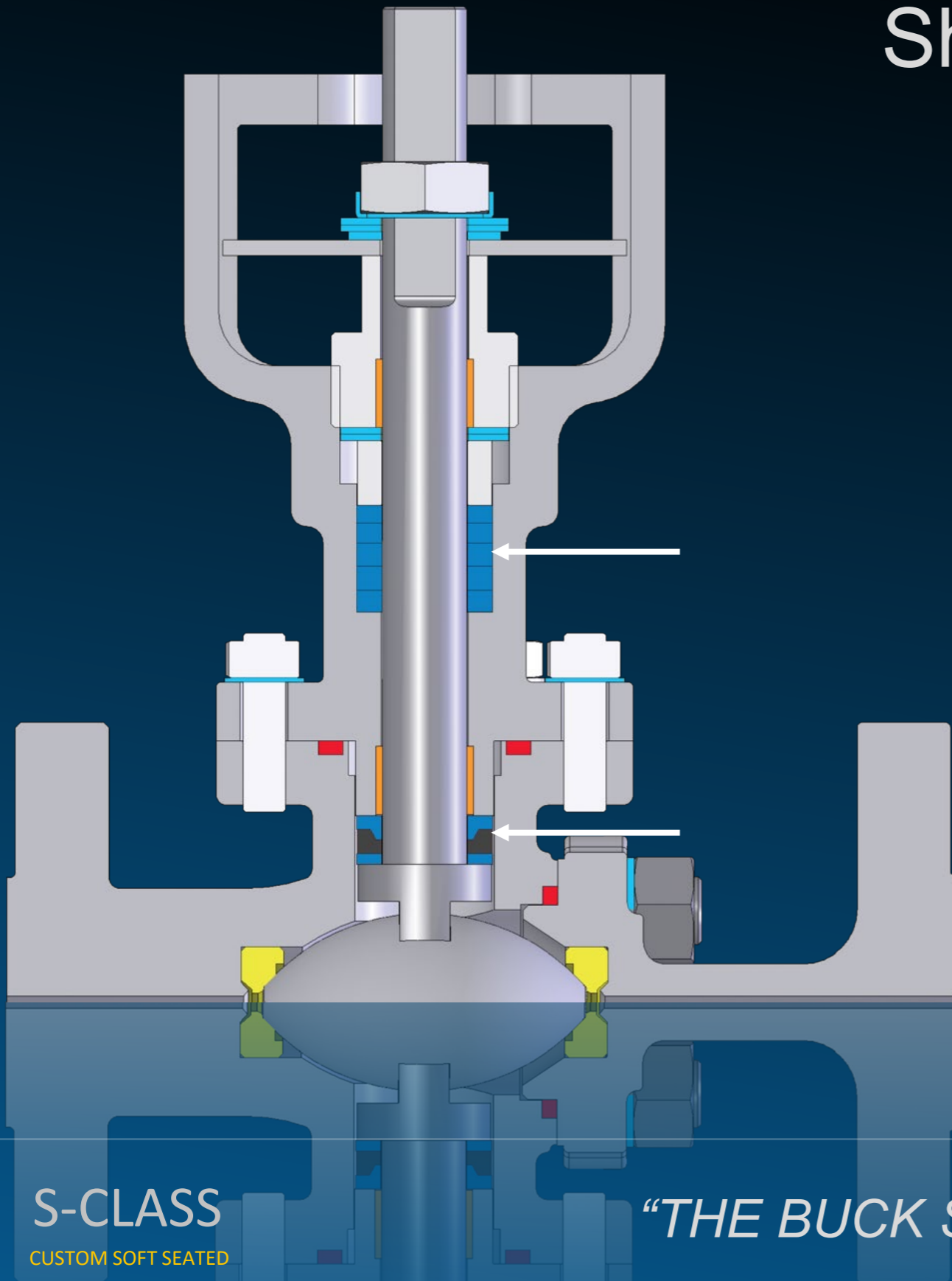


Shaft Sealing System
Fugitive Emissions Port
Extended Bonnet
Clearview Mounting Pad

Exotic Alloy Options
Arcuate Cut/Vari-V Balls
Hardened Ball Options
Encapsulated Seats

Shaft Sealing System

Dual live loaded packing

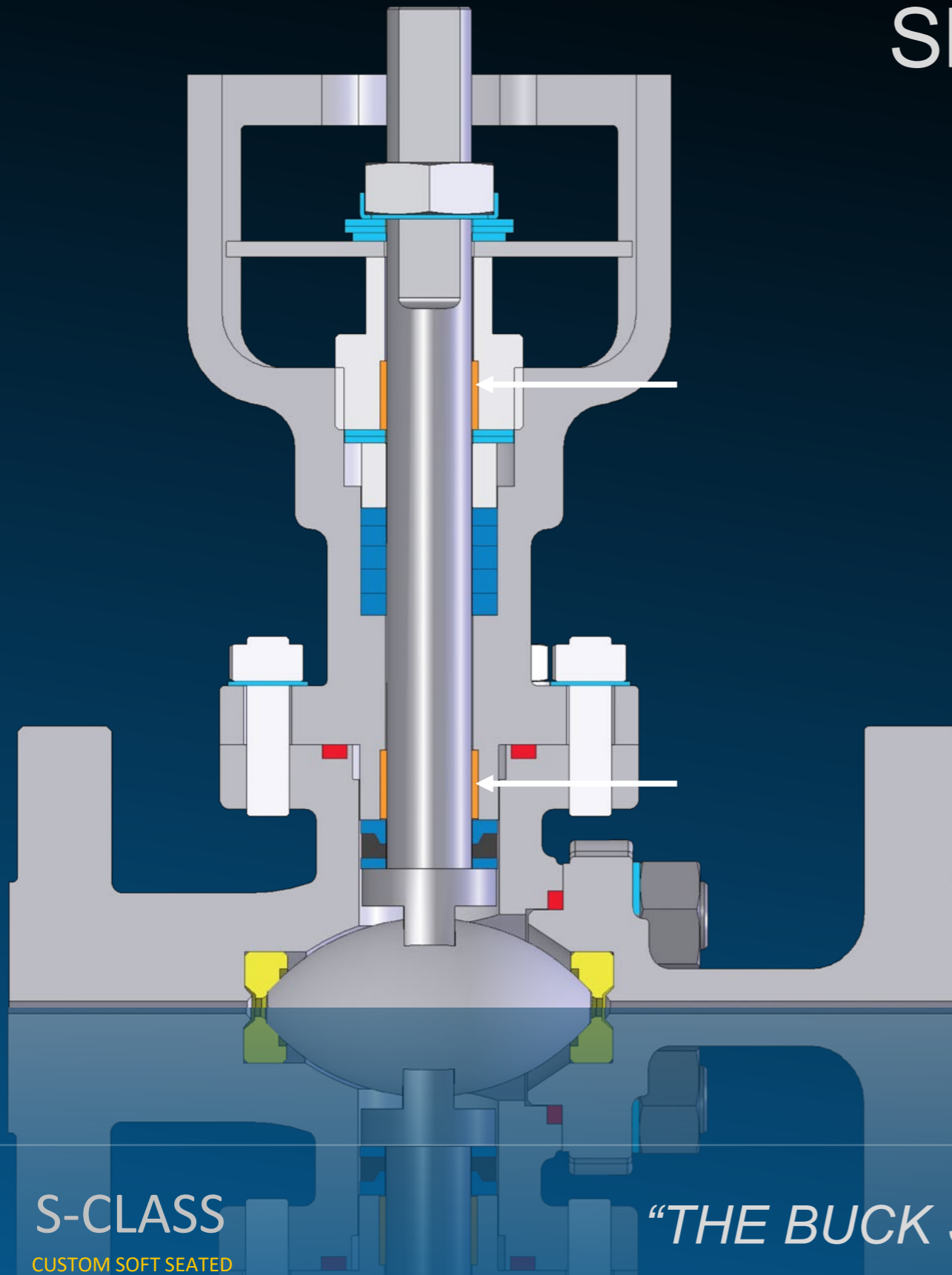


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"THE BUCK STOPS HERE"



Shaft Sealing System



Dual live loaded packing

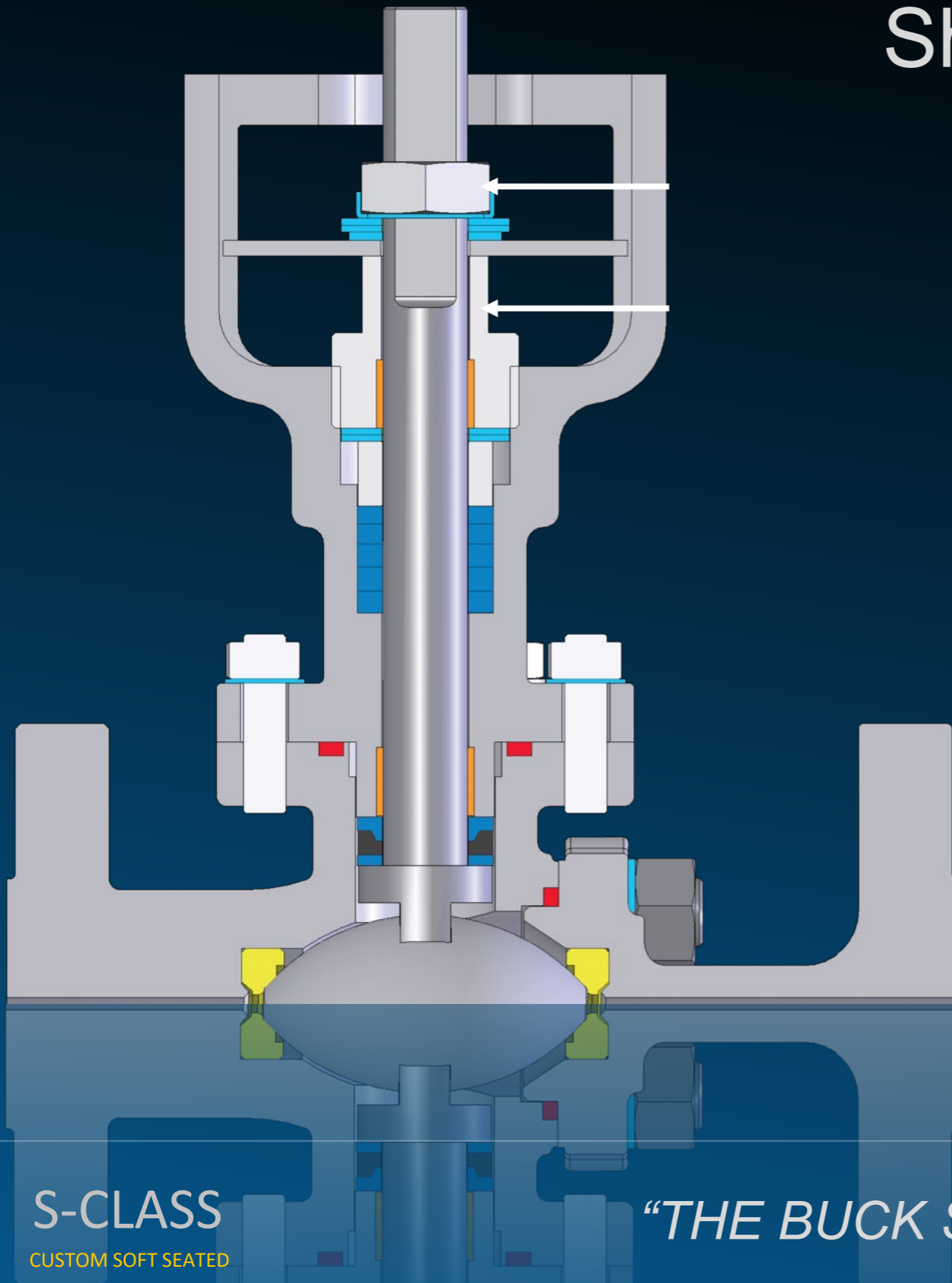
Upper and lower shaft guides

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Shaft Sealing System



Dual live loaded packing

Upper and lower shaft guides

Independent packing adjustments

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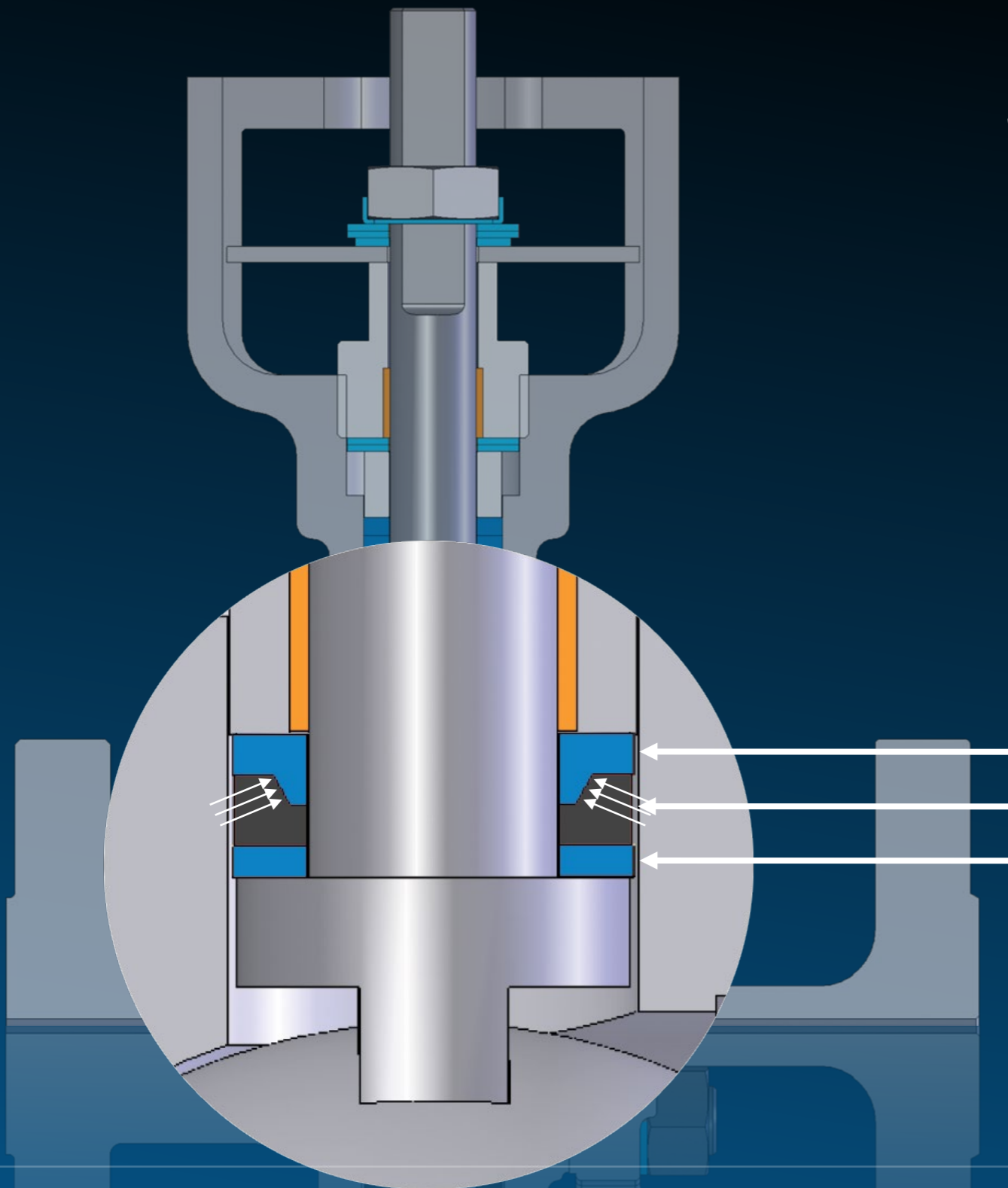
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Sealmaster Shaft Seal

Patented design

TÜV approved for fugitive emissions

1,000,000 cycle guarantee



Upper Shaft Seal (Teflon, Devlon or PEEK)

Compression Ring (metal)

Lower Thrust Seal (Teflon, Devlon or PEEK)

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Fugitive Emissions Port

Located between upper/lower packing

Emission level monitoring

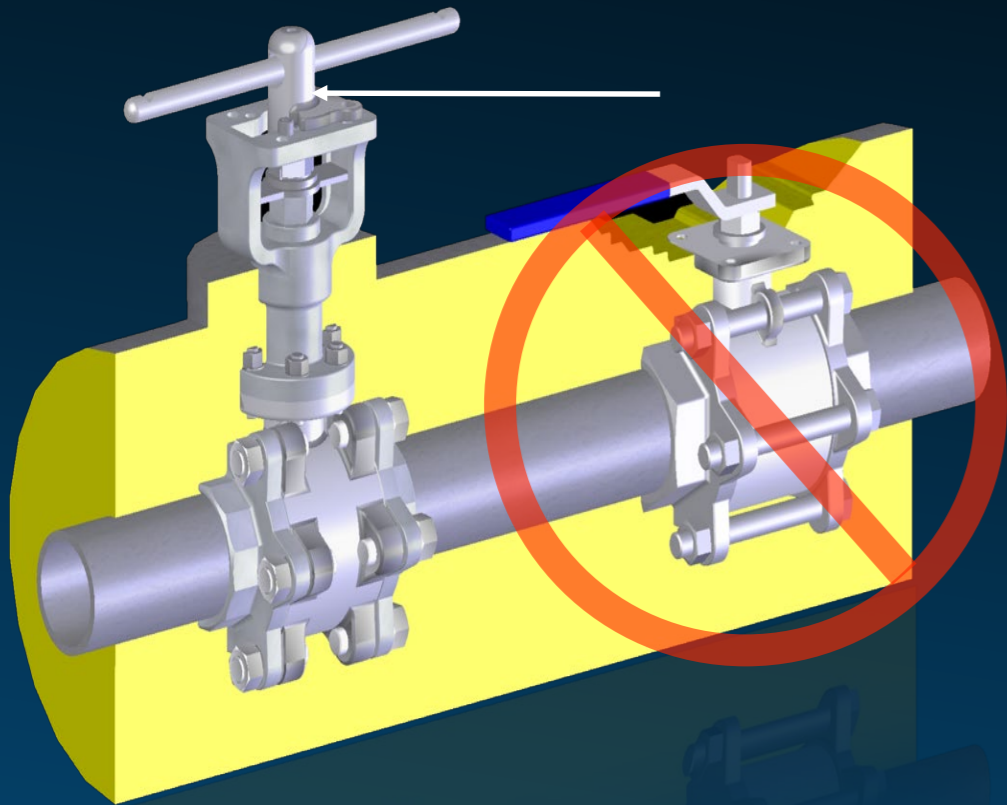
Purgeable

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“TEST THE WATERS”

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VALVES

Extended Bonnet



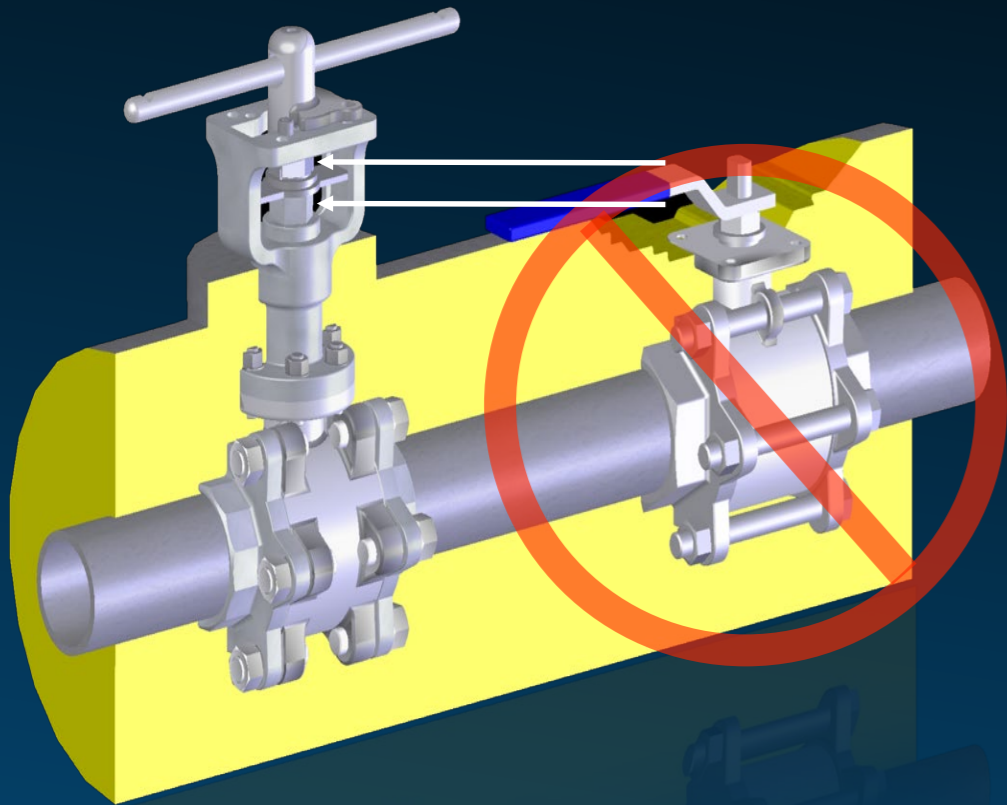
Handle / actuator is outside the insulation

Packing adjustments are outside the insulation

IF the packing leaks, it is visible (outside the insulation)

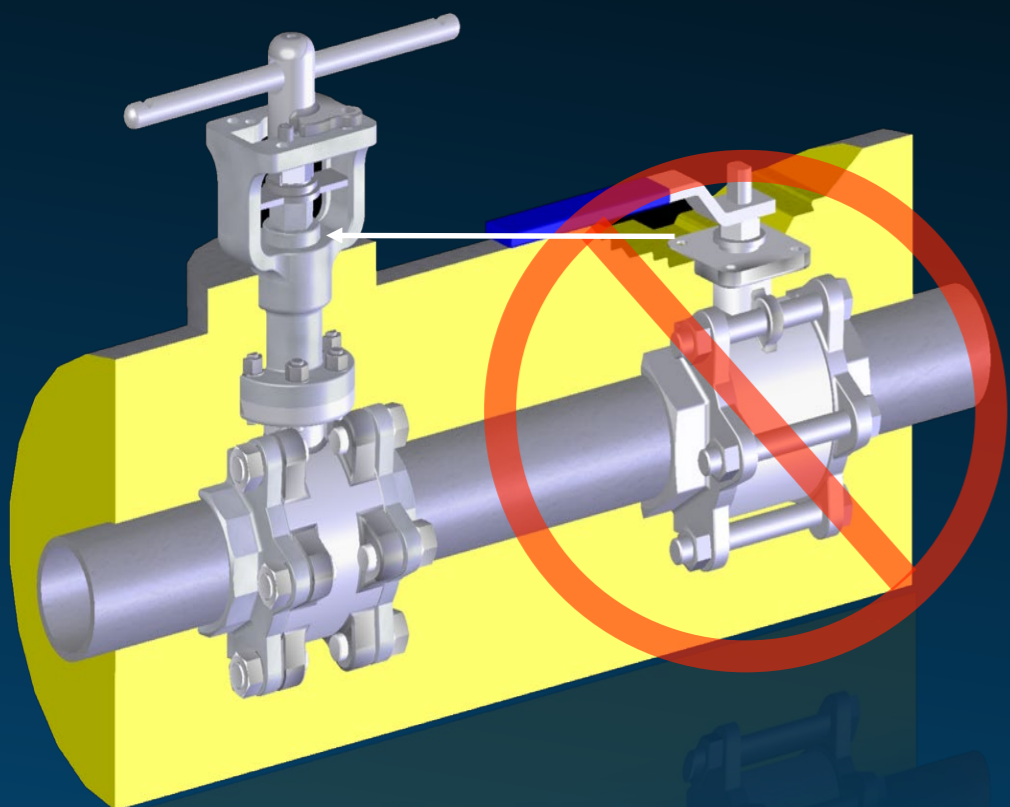
Protects the operator

Extended Bonnet

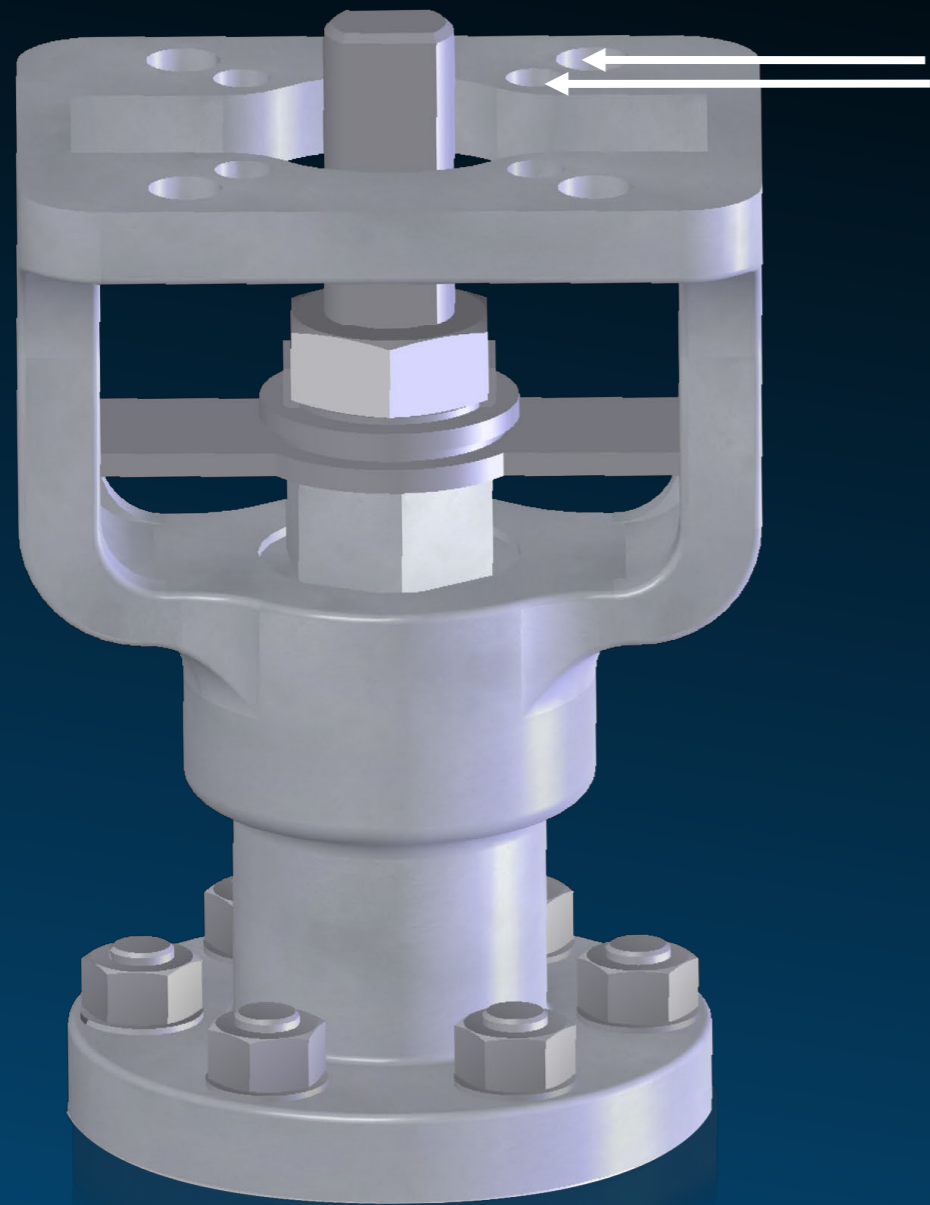


Handle / actuator is outside the insulation
Packing adjustments are outside the insulation
IF the packing leaks, it is visible (outside the insulation)
Protects the operator

Extended Bonnet



Handle / actuator is outside the insulation
Packing adjustments are outside the insulation
IF the packing leaks, it is visible (outside the insulation)
Protects the operator



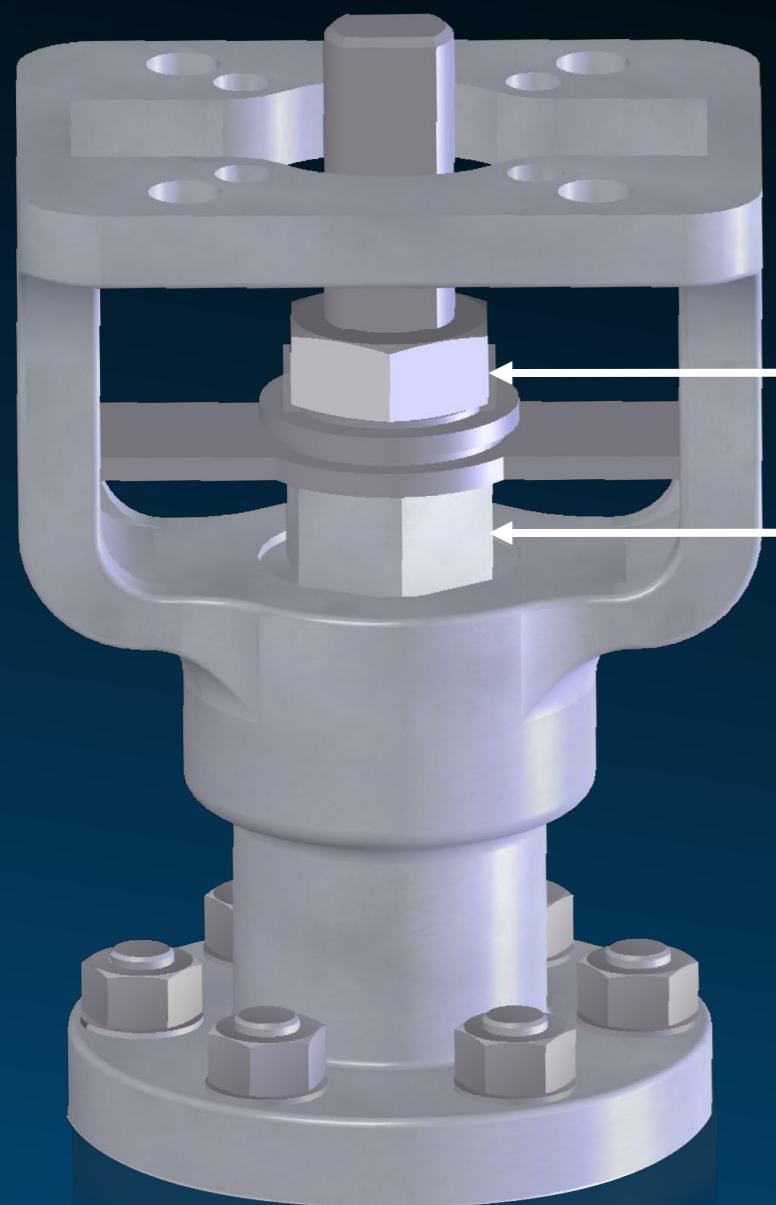
Clearview Mounting Pad

Dual ISO 5211 mounting patterns



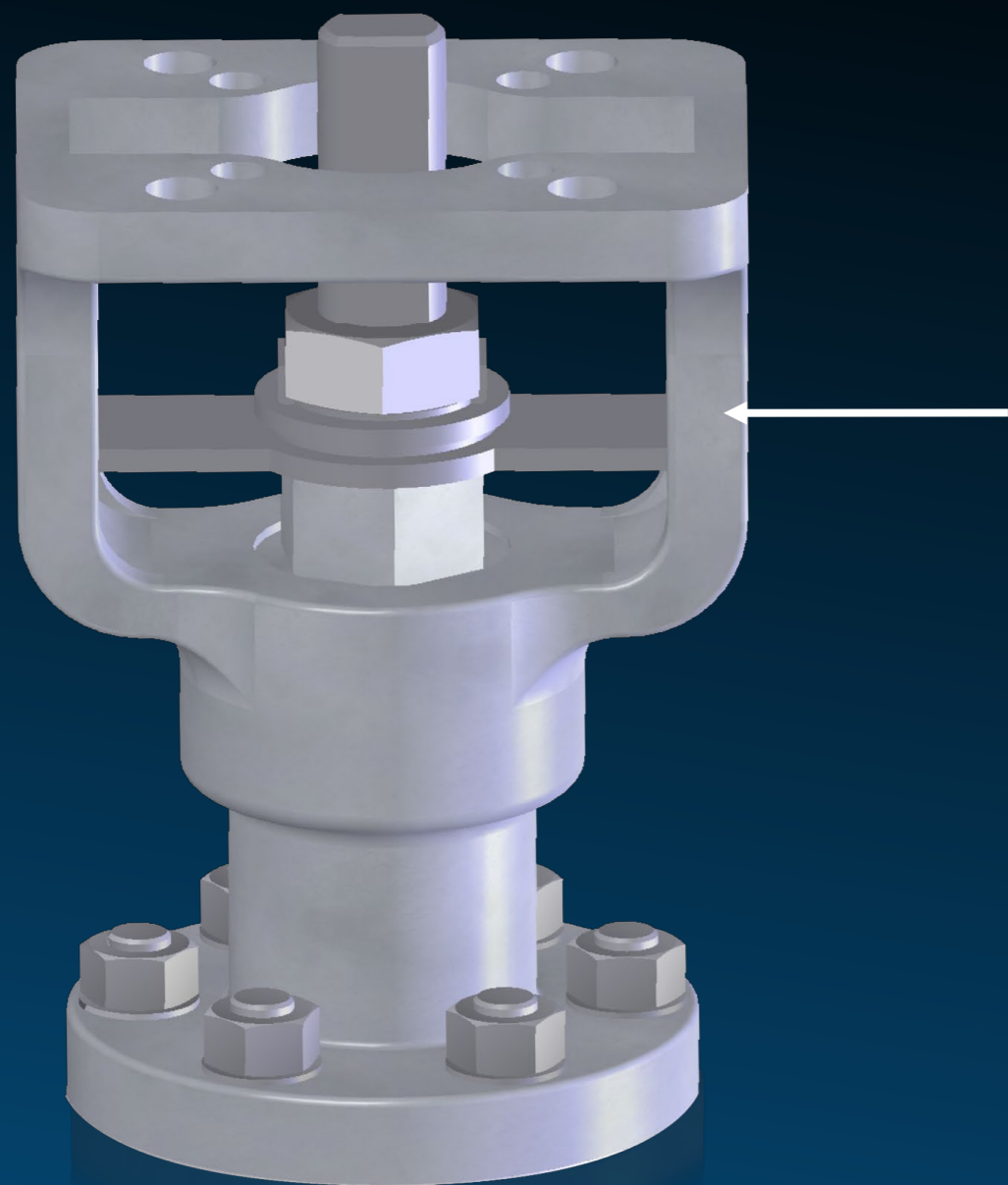
Clearview Mounting Pad

Dual ISO 5211 mounting patterns
Shaft flats visible



Clearview Mounting Pad

- Dual ISO 5211 mounting patterns
- Shaft flats visible
- Packing adjustments above insulation



Clearview Mounting Pad

Dual ISO 5211 mounting patterns
Shaft flats visible

Packing adjustments above insulation

Acts as a heat sink for actuator

High Alloy Body / Ball Options



Hastelloy
Alloy 20
Titanium
Zirconium
Duplex/Super Duplex

Monel
Inconel
Tantalum
Incoloy
Customer Specified

Arcuate Cut Ball



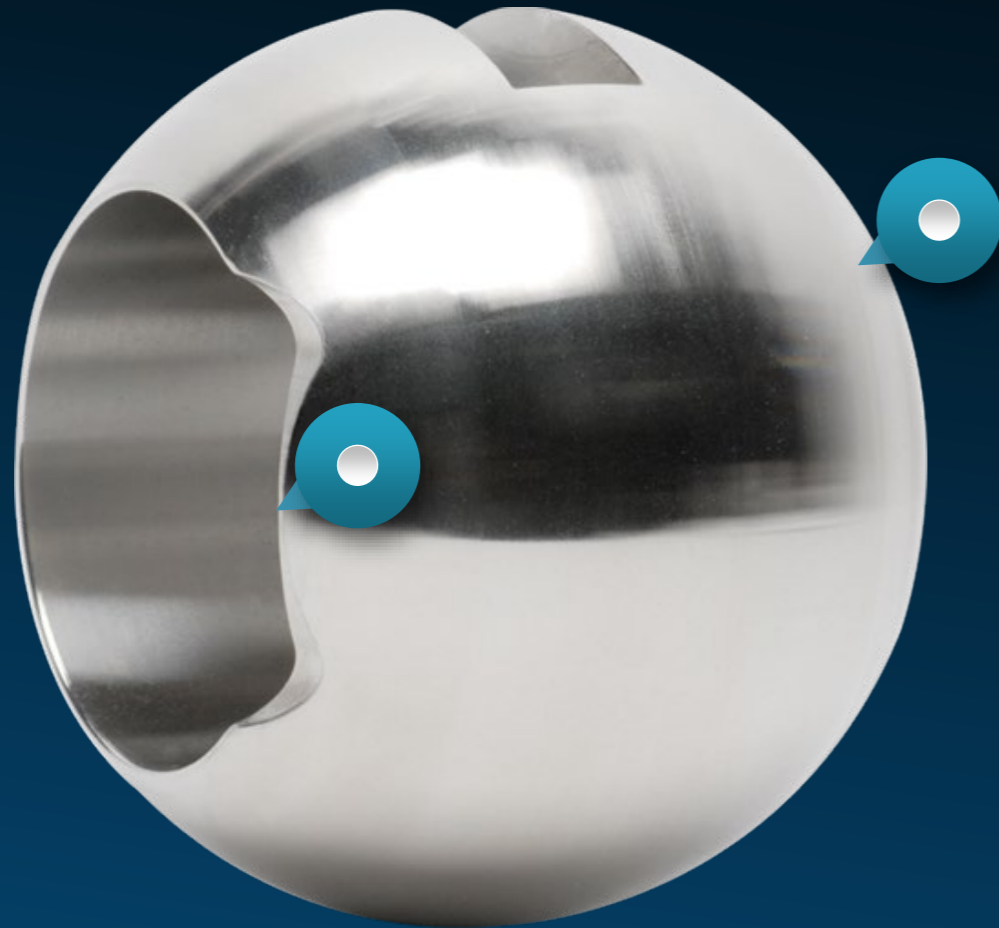
Specific profile cut in to the ball to reduce velocities

Arcuate Cut Ball



Arcuate cut can be hardened using the boronizing process

Arcuate Cut Ball



Both sides of ball have an arcuate cut (not visible in image)

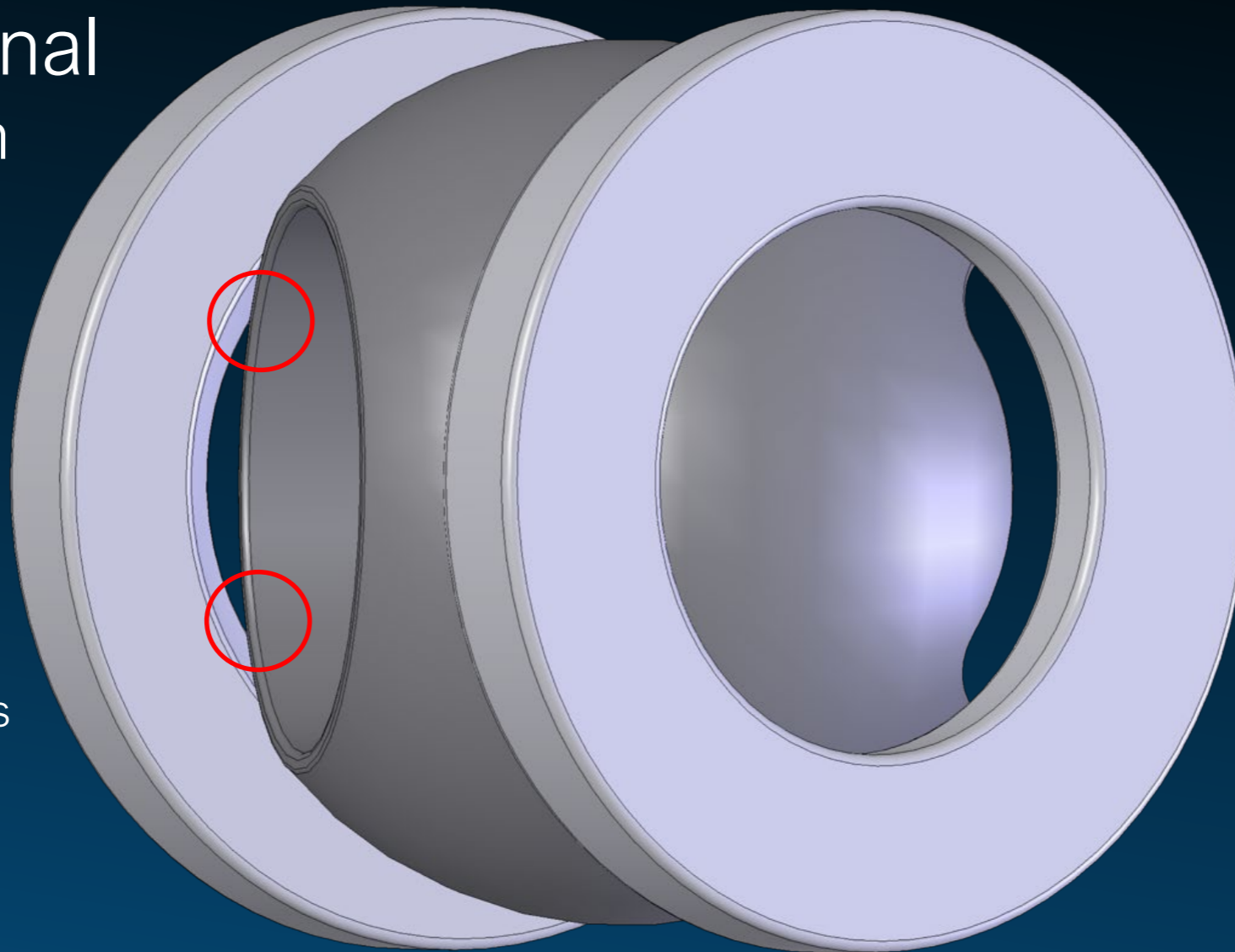
Conventional Vs. Arcuate Cut Ball

Conventional 5% Open

Opening is an
elliptical shape

High velocities in
the sharp corners

Trim damage
from high velocities



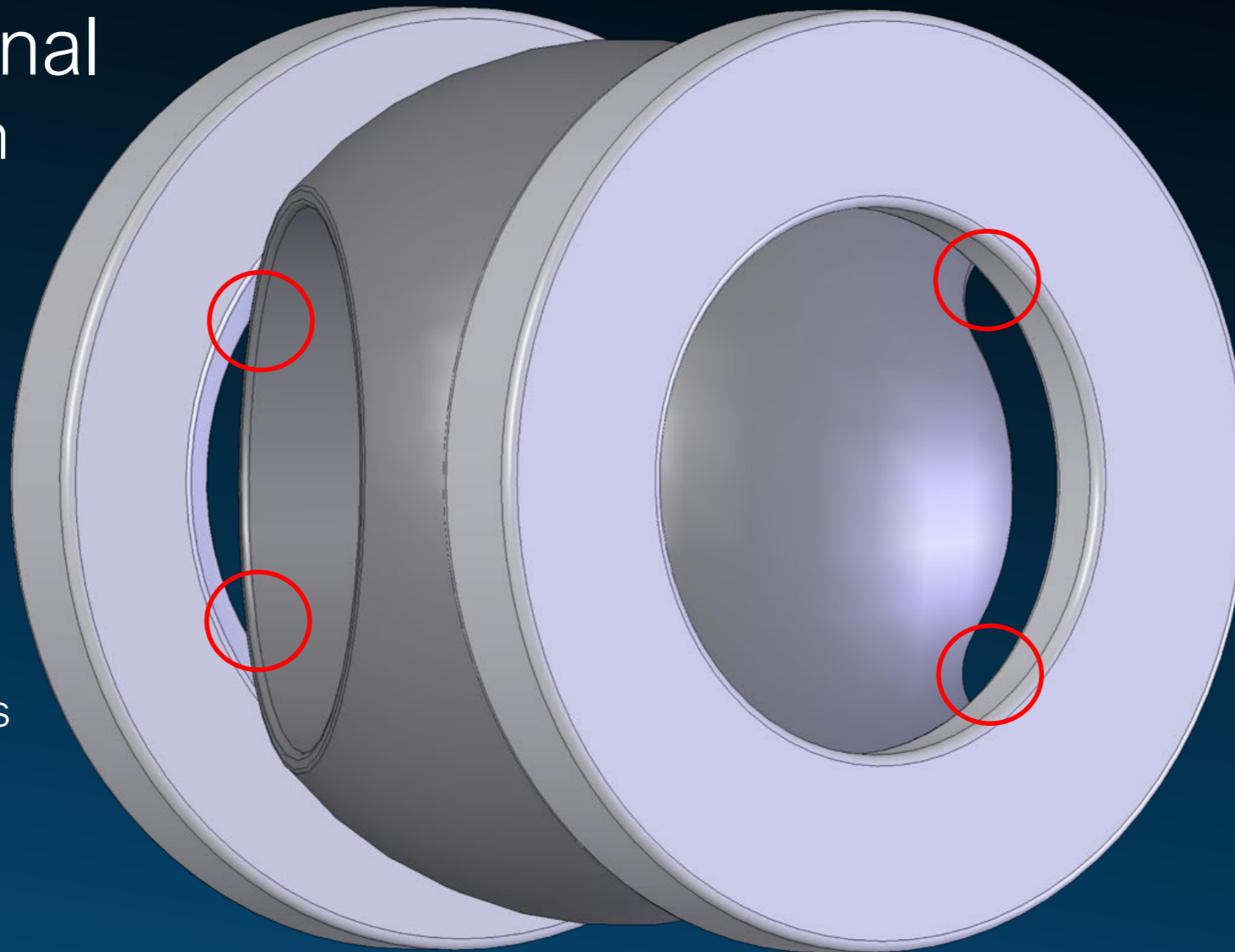
Conventional Vs. Arcuate Cut Ball

Conventional 5% Open

Opening is an elliptical shape

High velocities in the sharp corners

Trim damage from high velocities



Arcuate Cut 5% Open

Opening is significantly increased (3 times)

No sharp corners
(Flow is spread out/slower)

Less damage to the ball and seats

Computational Fluid Dynamics (CFD)



Conventional Ball



Arcuate Cut Ball

Ball Hardening Options for Abrasive/High Cycle Applications



High Velocity Oxygen Fuel (HVOF)

Boronizing

Ceramics

Competition - HVOF

High Velocity Oxygen Fuel



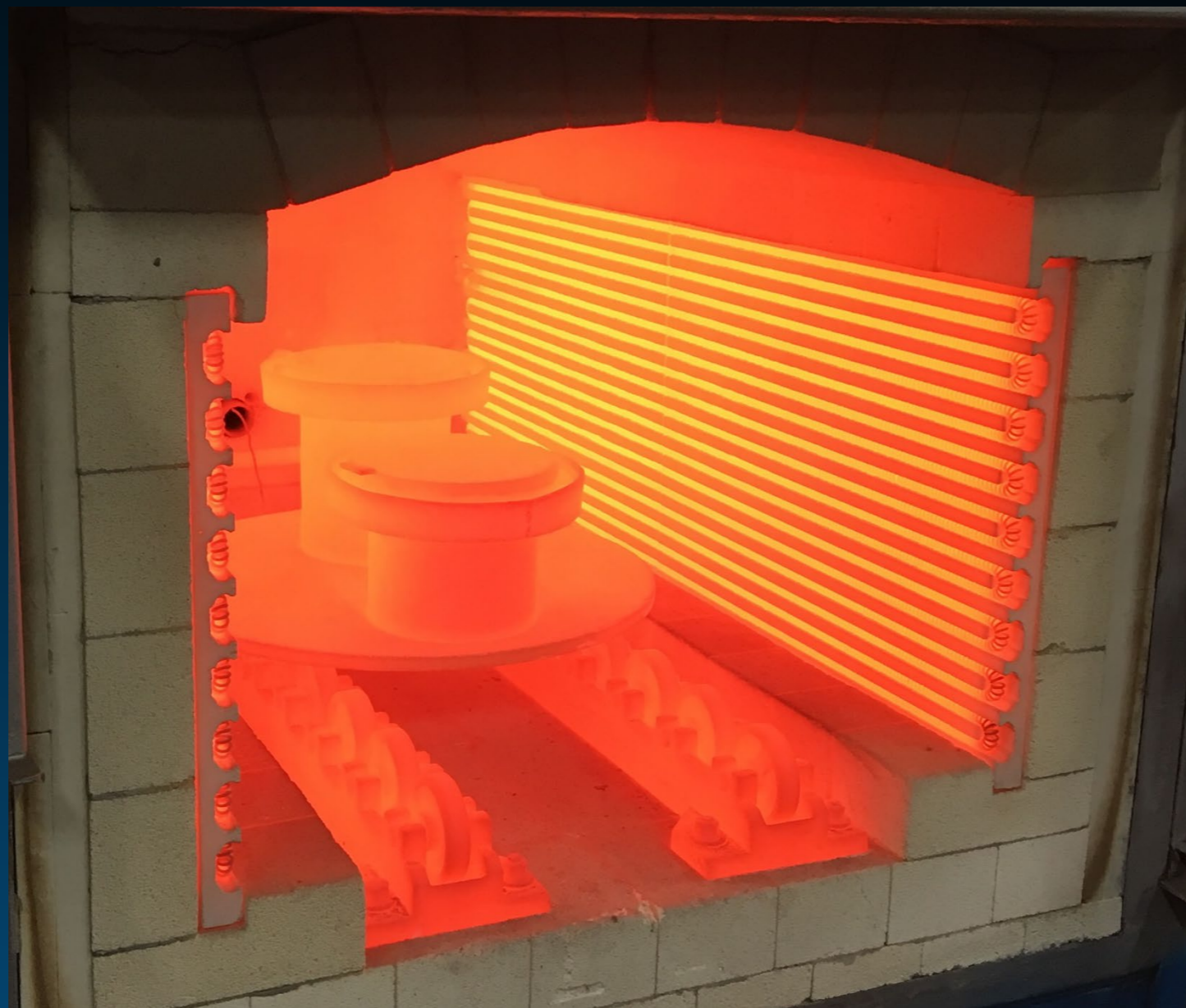
Uneven coating (line of sight)

Cracks / spalls

Coating is porous

Internal bore of ball can not be coated

Gosco - Boronizing



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“HARD ASS”

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VALVES

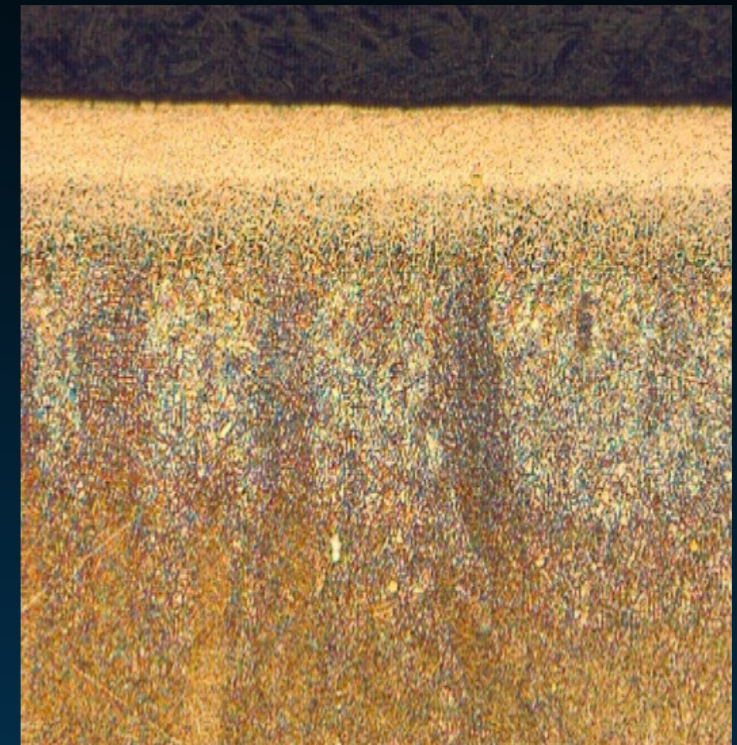
Boronizing

Proprietary Gosco Process

Thermo-chemical surface hardening process

Boron atoms are diffused into the surface

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



Inconel 718, 200x magnification
.004" solid layer, .007" partial layer

Competitor about "Coatings"

APPLICATION NOTE ON COATINGS

Common Coatings

Method of Application	HVOF		Fusion	Plasma	Diffused		Patented
Material	Chromium Carbide	Tungsten Carbide	Chromium Carbide	Chromium Oxide	Nitride	Boride	Nano Titanium Dioxide
Uses	General Severe Service, Power, Slurry Mining, Chemical	Specialized Severe Service, Mining, Food Processing, Corrosive Chemical	Specialized Severe Service, Power, Thermal Shock, Extreme Temperature	Corrosive Service, Gold Mining	General Service, Bearings, Hot Gas	Specialized Severe Service, Power Corrosive Services, Thermal Shock	Corrosive Service, Gold Mining, Nickel Mining, High Pressure Acid Leach
Base Metals	Any	Any	300 Series Stainless Nickel Alloys	Any, Duplex SS & Ti Typical	Iron-Based Alloys	Nickel-Based Alloys	Any, Duplex SS & Ti Typical
Advantages	High Strain to Fracture, Erosion-Resistant, Extreme Temperature	Erosion-Resistant, Wear-Resistant	Erosion-Resistant, Non-Porous, Thermal Shock, Metallurgical Bond, Corrosion Resistant	Very Corrosion Resistant at lower temperatures	Inexpensive Metallurgical Bond	Extremely Hard, Metallurgical Bond, Non-Porous, Corrosion Resistant	Very Corrosion Resistant at low and high temperatures, superior wear to conventional ceramic coatings
Disadvantages	Some Porosity, Mechanical Bond	Some Porosity, Mechanical Bond, Thermal Cycling Can Produce Cracking	Not Suitable on 410 SS 17-4PH Carbon Steel, Expensive	Poor Thermal Shock, Poor Bond Strength, Porosity, & Cracking are Typical	Reduces Corrosion Resistance, Lower Abrasion & Wear Resistance than HVOF Coatings	Very Thin .001" Finished, Bore Size Limit 1.5"	Ceramic coatings are not as tough as HVOF cermets

Competitor about "Coatings"

Method of Application	HVOF	
Material	Chromium Carbide	Tungsten Carbide
Uses	General Severe Service, Power, Slurry Mining, Chemical	Specialized Severe Service, Mining, Food Processing, Corrosive Chemical
Base Metals	Any	Any
Advantages	High Strain to Fracture, Erosion-Resistant, Extreme Temperature	Erosion-Resistant, Wear-Resistant
Disadvantages	Some Porosity, Mechanical Bond	Some Porosity, Mechanical Bond, Thermal Cycling Can Produce Cracking

Plasma	Diffused		Patented
Chromium Oxide	Nitride	Boride	Nano Titanium Dioxide
Corrosive Service, Gold Mining	General Service, Bearings, Hot Gas	Specialized Severe Service, Power Corrosive Services, Thermal Shock	Corrosive Service, Gold Mining, Nickel Mining, High Pressure Acid Leach
Any, Duplex SS & Ti Typical	Iron-Based Alloys	Nickel-Based Alloys	Any, Duplex SS & Ti Typical
Very Corrosion Resistant at lower temperatures	Inexpensive Metallurgical Bond	Extremely Hard, Metallurgical Bond, Non-Porous, Corrosion Resistant	Very Corrosion Resistant at low and high temperatures, superior wear to conventional ceramic coatings
Poor Thermal Shock, Poor Bond Strength, Porosity, & Cracking are Typical	Reduces Corrosion Resistance, Lower Abrasion & Wear Resistance than HVOF Coatings	Very Thin .001" Finished, Bore Size Limit 1.5"	Ceramic coatings are not as tough as HVOF cermets

"NOT ALL IT'S CRACKED UP TO BE"

HVOF Coatings
Resistance than
& wear
lower abrasion
resistance

HVOF cermets
are as tough as
ceramic coatings

Competitor about "Coatings"

Method of Application	HVOF	
Material	Chromium Carbide	Tungsten Carbide
Uses	General Severe Service, Power, Slurry Mining, Chemical	Specialized Severe Service, Mining, Food Processing, Corrosive Chemical
Base Metals	Any	Any
Advantages	High Strain to Fracture, Erosion-Resistant, Extreme Temperature	Erosion-Resistant, Wear-Resistant
Disadvantages	Some Porosity, Mechanical Bond	Some Porosity, Mechanical Bond, Thermal Cycling Can Produce Cracking

Method of Application	Diffused	
Material	Nitride	Boride
Uses	General Service Bearings, Hot Gas	Specialized Severe Service, Power Corrosive Services, Thermal Shock
Base Metals	Iron-Based Alloys	Nickel-Based Alloys
Advantages	Inexpensive Metallurgical Bond	Extremely Hard, Metallurgical Bond, Non-Porous, Corrosion Resistant
Disadvantages	Reduces Corrosion Resistance, Lower Abrasion & Wear Resistance than HVOF Coatings	Very Thin .001" Finished, Bore Size Limit 1.5"

"NOT ALL IT'S CRACKED UP TO BE" "HARD ASS"

Gosco's Proprietary Boronizing Process



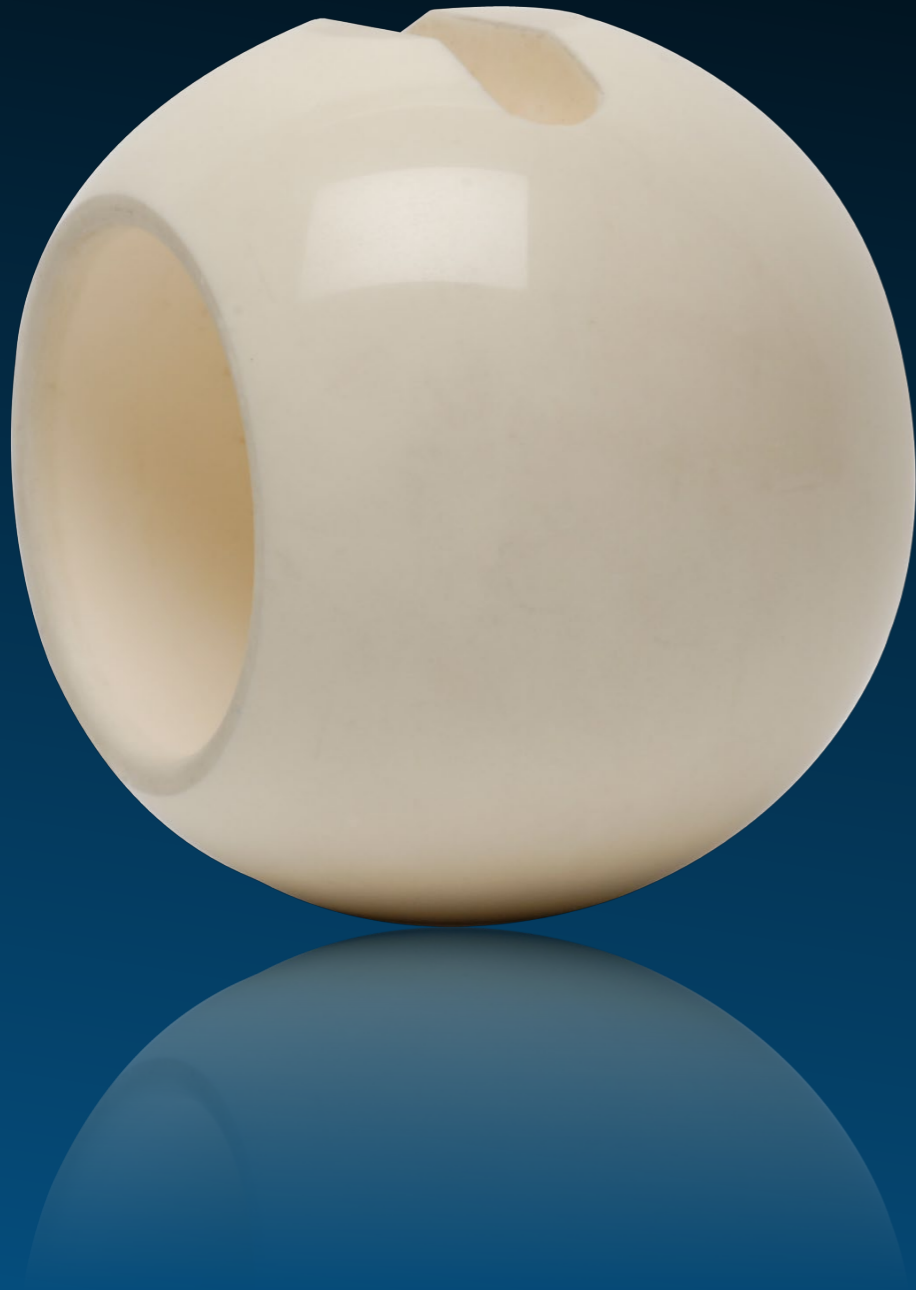
0.004" to 0.007" depth

No size limit

Considerably harder than any coating

All the advantages, no disadvantages

Alumina / Zirconia based Ceramic



Extreme abrasion resistance

Corrosion resistance

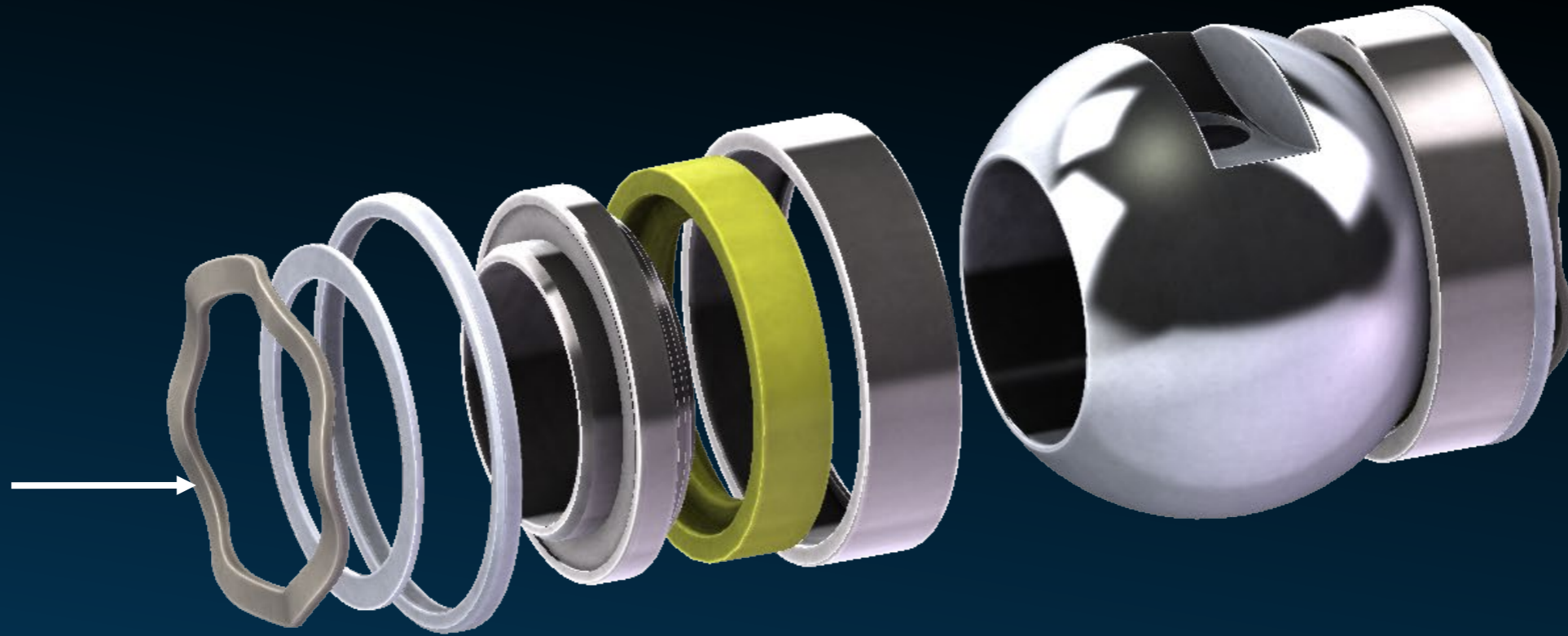
Dimensional stability at high temperatures

Expensive

150°F temperature shock max

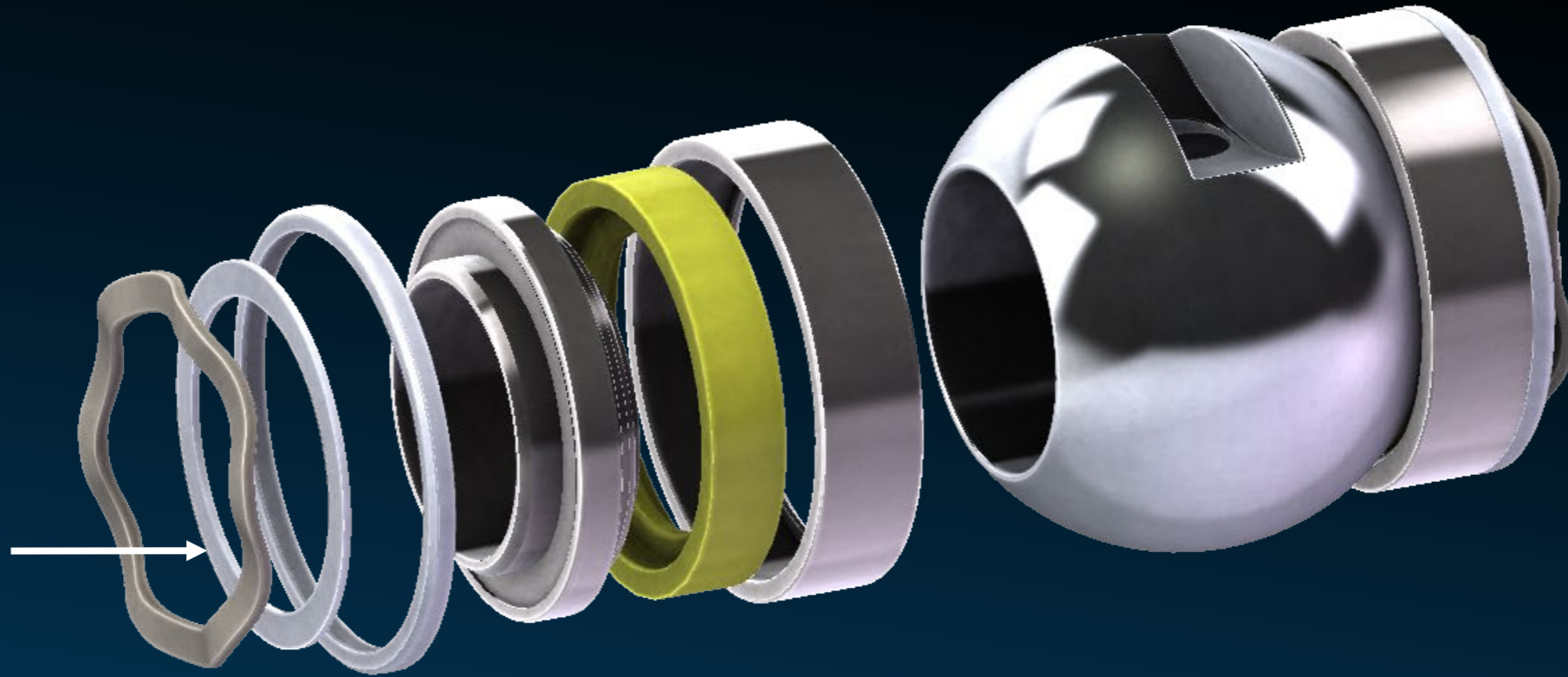
Low tensile/shear strength

Encapsulated Seats



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

Encapsulated Seats



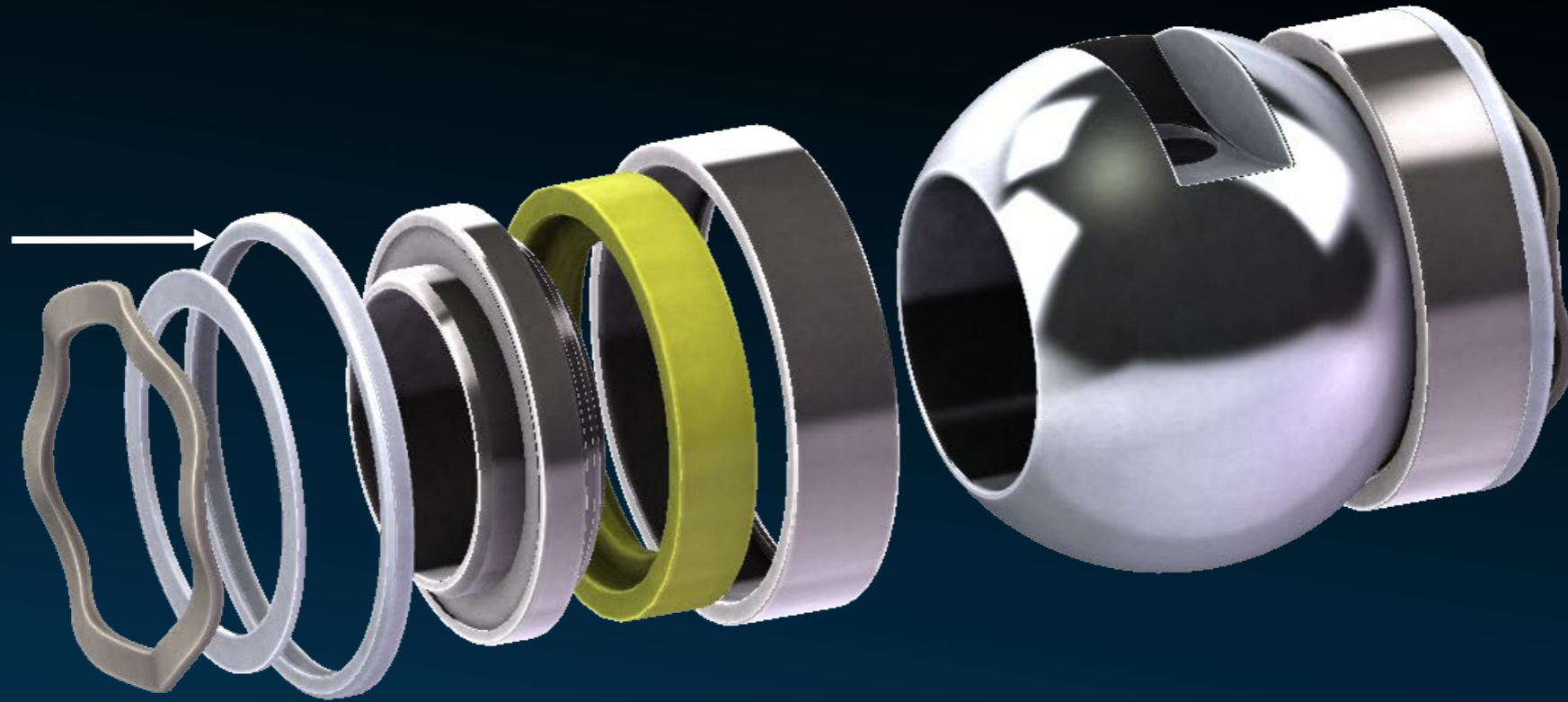
Compression Ring for API 607 fire-safe applications

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“STRAIGHT JACKET”

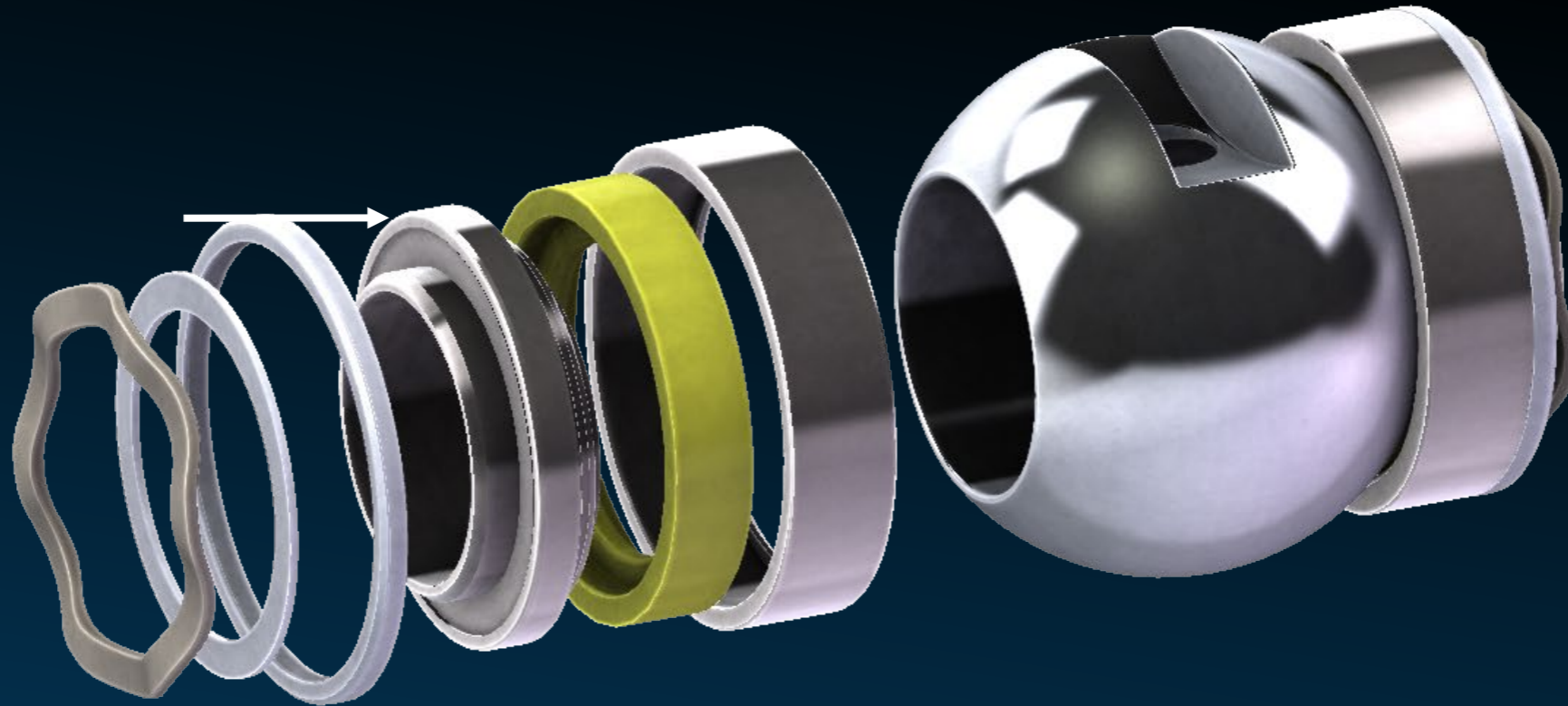
gOSCO
VALVES

Encapsulated Seats



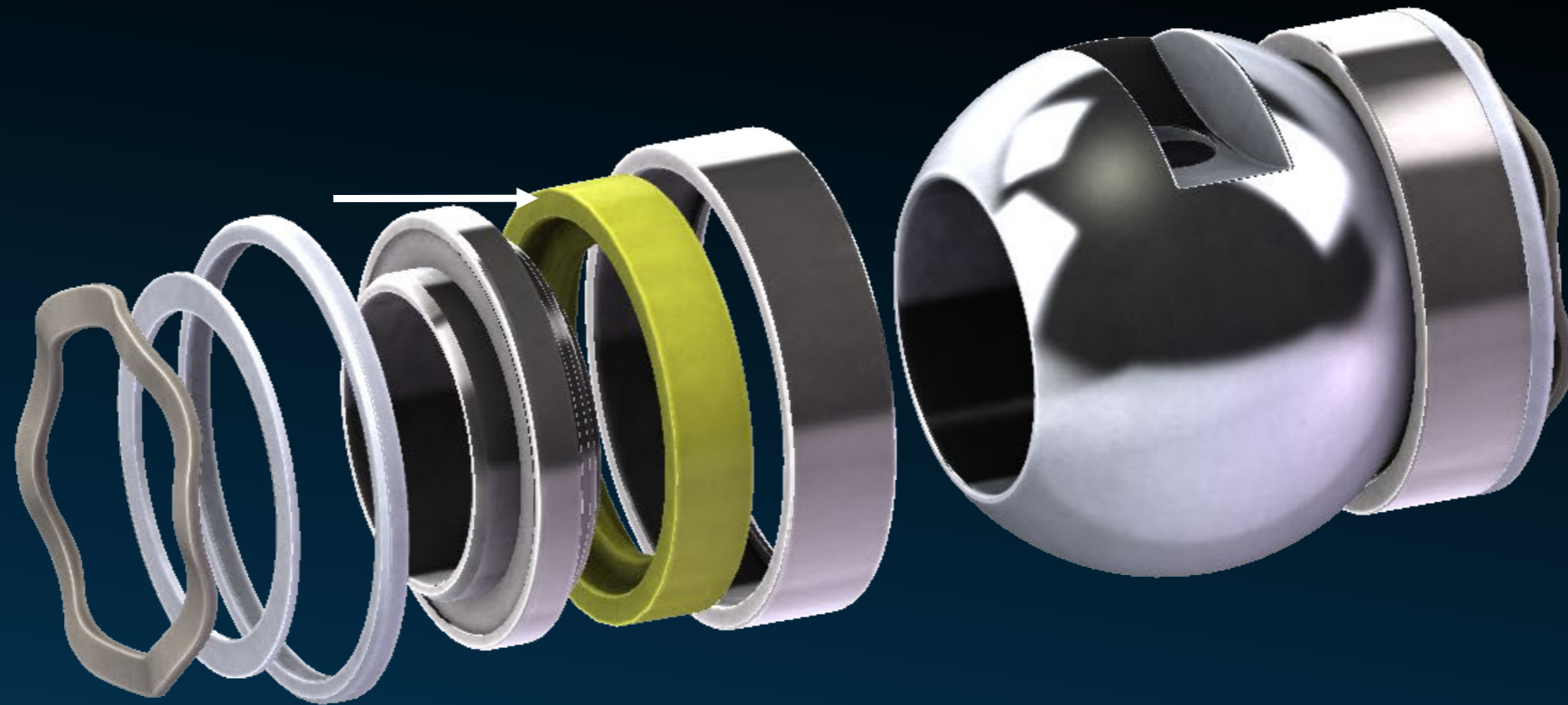
Spring loaded Outer Seal provides sealing on the seat assembly circumference

Encapsulated Seats



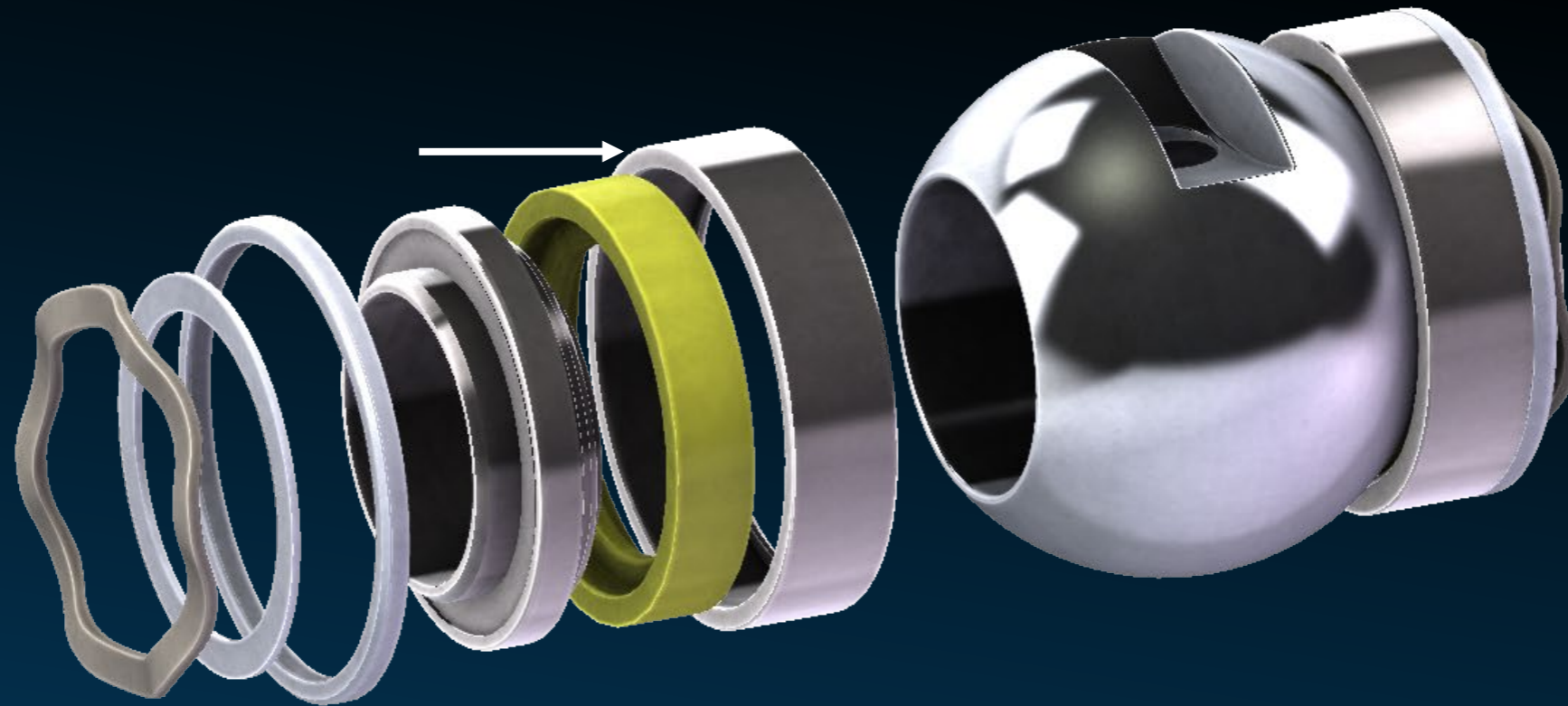
Inner Carrier encapsulates the seat insert on the inner circumference

Encapsulated Seats



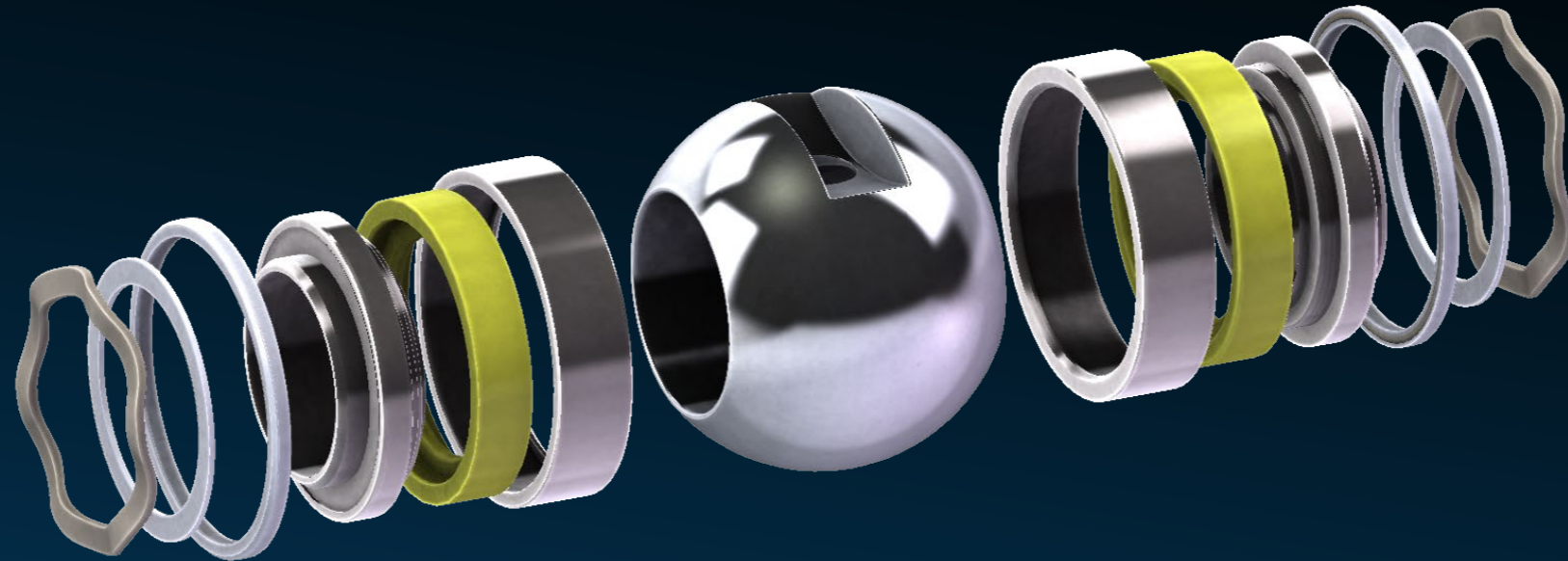
Seat Insert seals against the ball

Encapsulated Seats



Outer Carrier encapsulates seat insert on the outer circumference

Encapsulated Seats



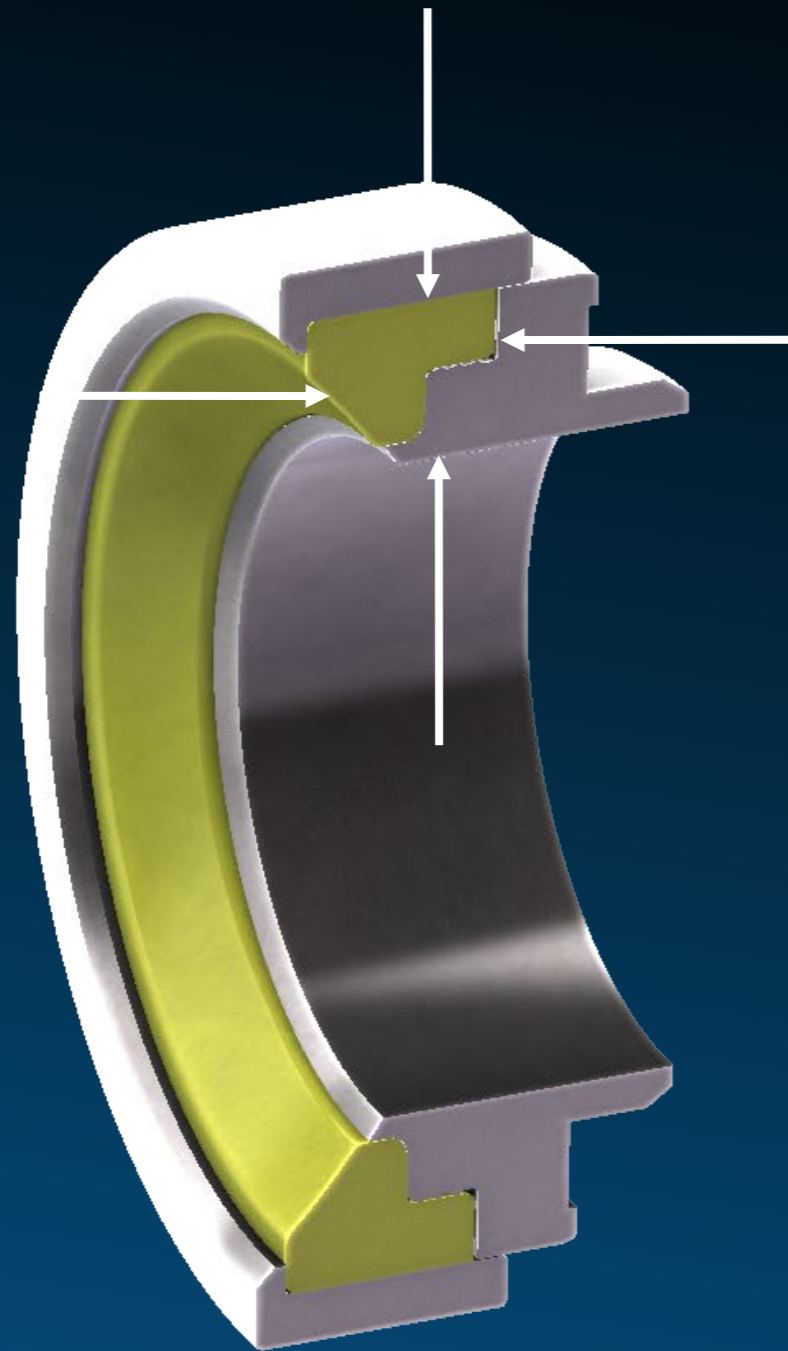
Proprietary Gosco Design

Live-loaded for sealing at low pressures

Utilized in high temperatures and/or pressures

Encapsulates “Soft” insert on all 4 sides

Encapsulated Seats



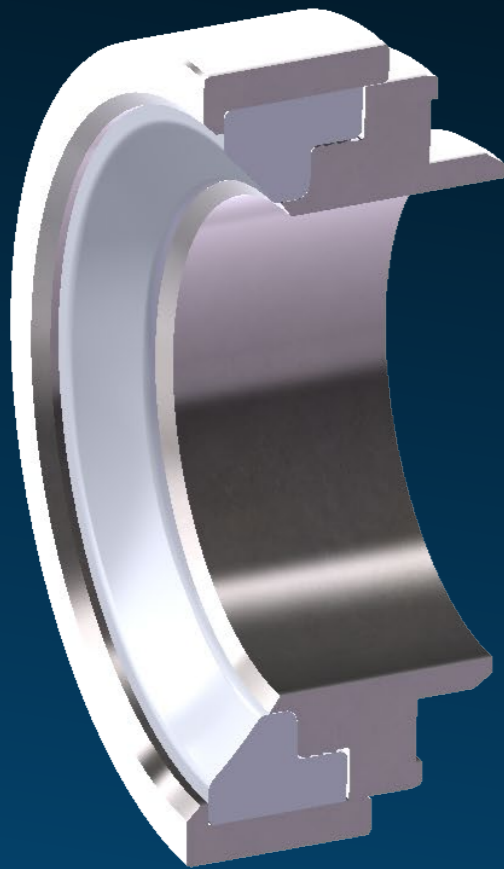
Encapsulates "Soft" insert on all 4 sides

Encapsulated Seats

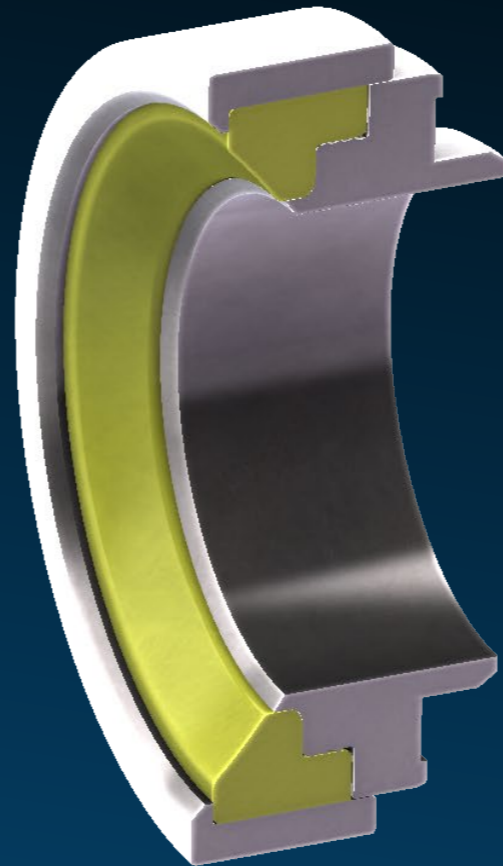
“Soft” insert can be different materials
depending on the application

Encapsulated Seats

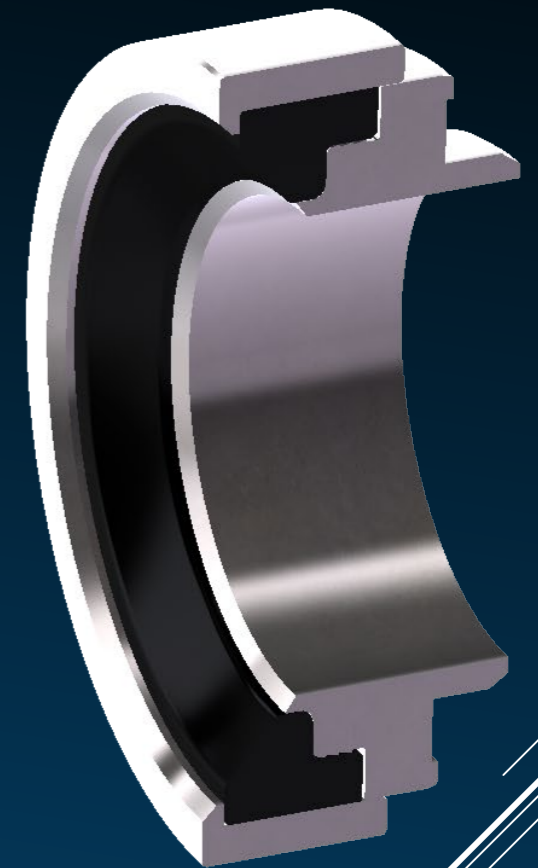
Teflon/TFM 1600
(Standard applications)

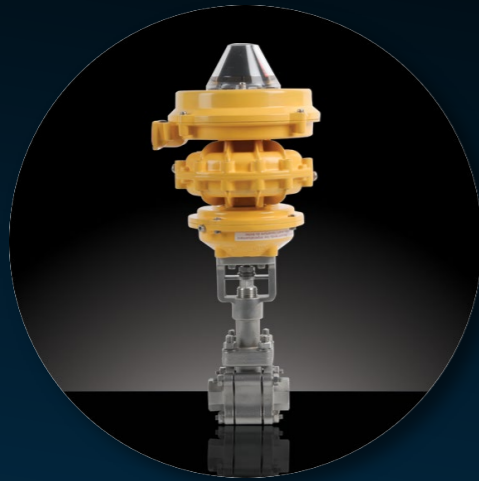


Devlon
(Abrasive/High
cycle applications)



PEEK/Graphite
(High
temperature applications)





Overview



Vari-V Control Valve



Block and Bleed Valve



Cryogenic Valve

S-Class Core System



FM Approved Valve



3-Way Diverter Valve



Vari-V Control Valve

S-Class Core System



Standard Vari-V Balls

high turndown V



90° V ball



10° V ball



60° V ball



30° V ball



linear V



filler V

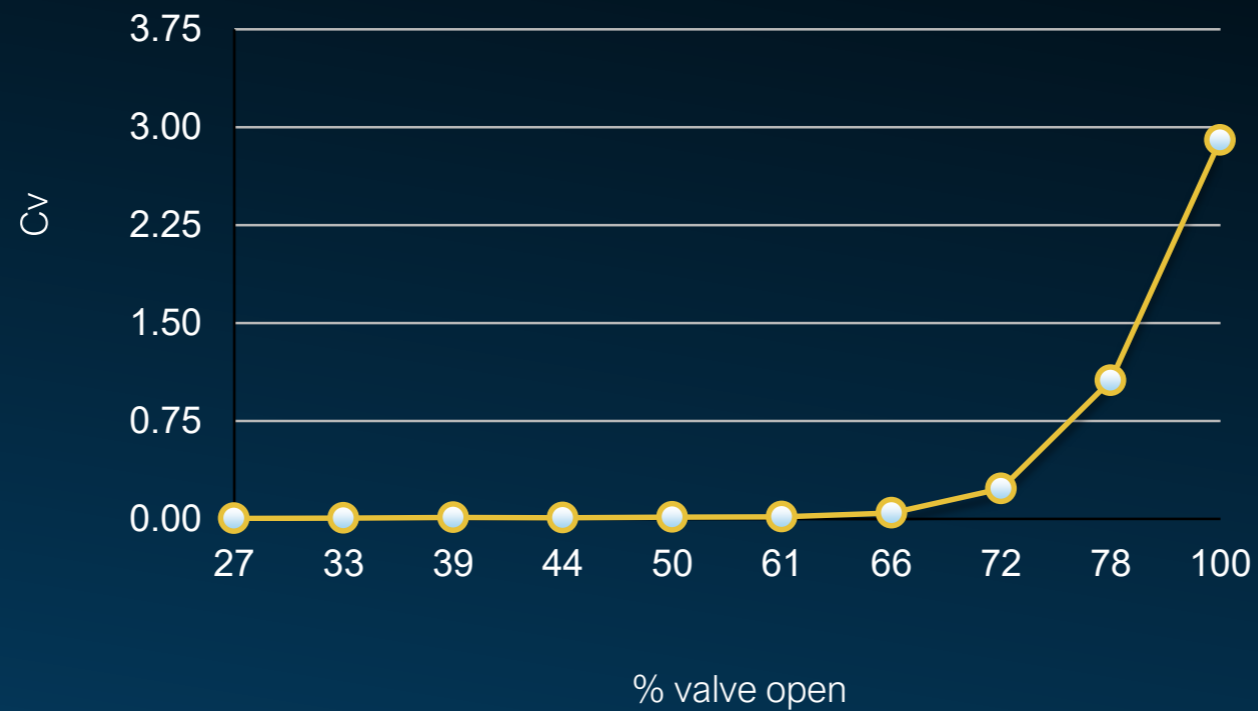


Custom Vari-V Balls



Gosco can custom design any profile for your application

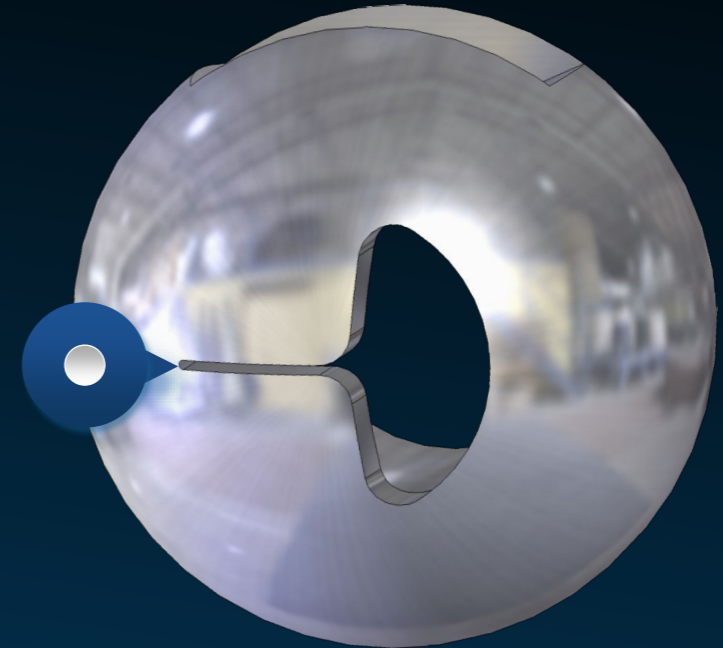
Custom V-ball C_v Curve



Flow requirements for one of our custom V-balls.

Custom V-ball C_v Curve

Slot opening is almost as thin as a human hair





Overview



Vari-V Control Valve



Block and Bleed Valve



Cryogenic Valve

S-Class Core System



FM Approved Valve



3-Way Diverter Valve



Block and Bleed Valve

S-Class Core System



Block and Bleed Valves

True double isolation and bleed



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CUSTOM METAL SEATED

“NFL LINEMAN”

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Block and Bleed Valves



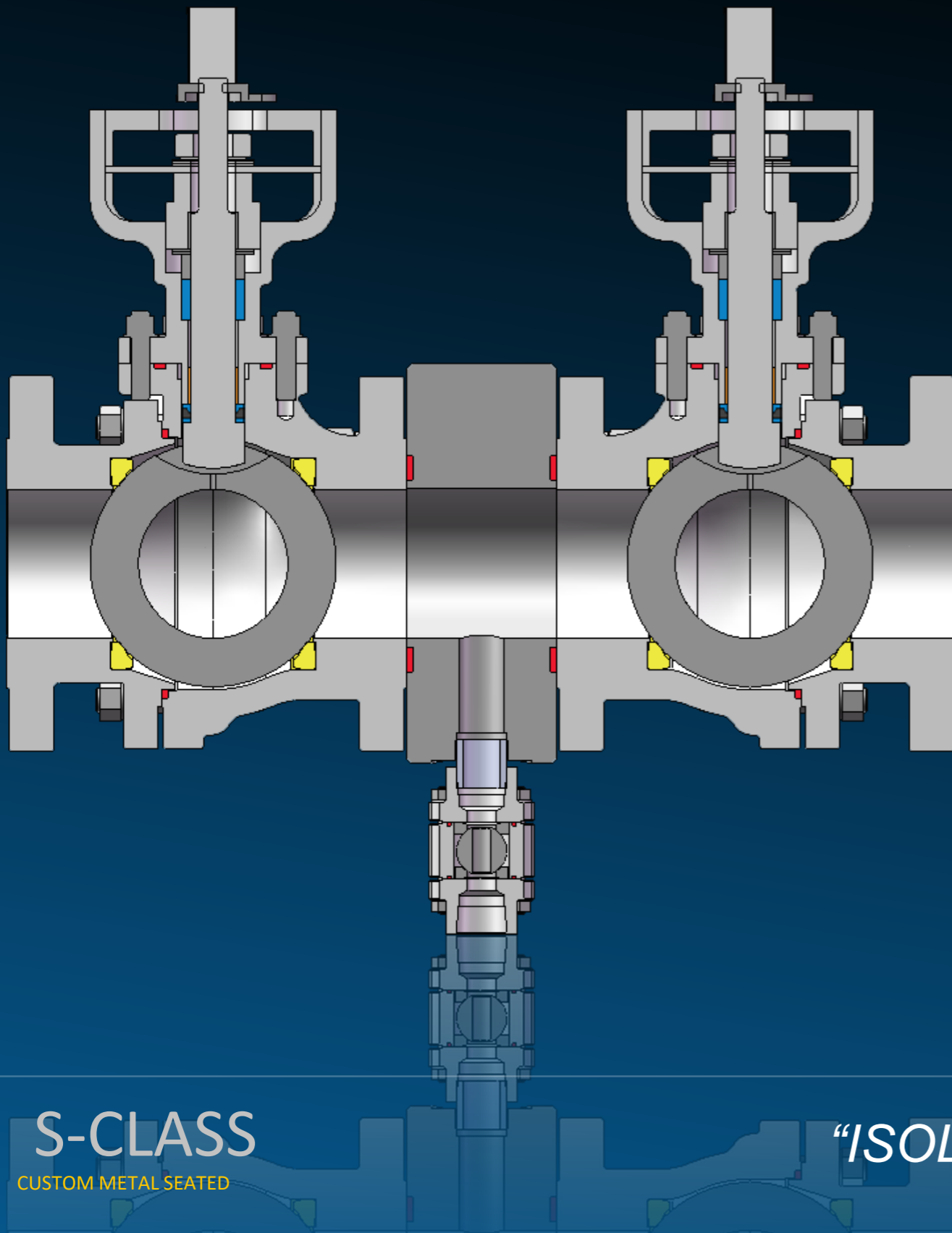
True double isolation and bleed
Available in integral body
Multiple end connections
Up to Class 4500
Fire safe
Exotic alloys

S-CLASS
CUSTOM METAL SEATED

“NFL LINEMAN”

gOSCO
VALVES

True Double Isolation and Bleed

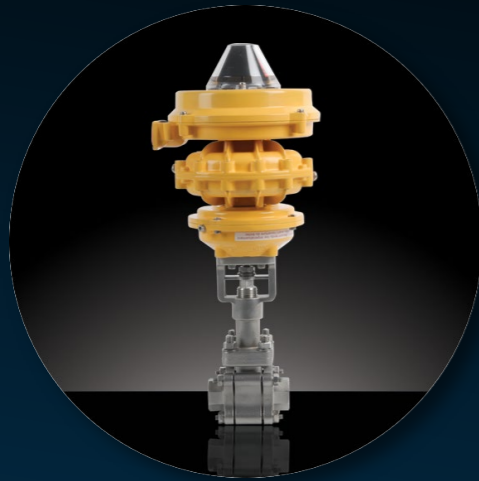


- Block valves (isolate media)
- Bleed valve (proves integrity/diverts media)
- Downstream valve always blocks media

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“ISOLATED”

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VALVES



Overview



Vari-V Control Valve



Block and Bleed Valve



Cryogenic Valve

S-Class Core System



FM Approved Valve



3-Way Diverter Valve

S-Class Core System



Cryogenic Valve

Gosco Cryogenic Valve



Continuous services with temperatures to -270°C (-454°F)

Pressures up to Class 4500

Drilled ball (uni-directional) or live loaded seats (bi-directional)

Monel trim, oxygen cleaning and anti static device

S-CLASS
CUSTOM METAL SEATED

“ICE ICE BABY”

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VALVES

Extended Bonnet

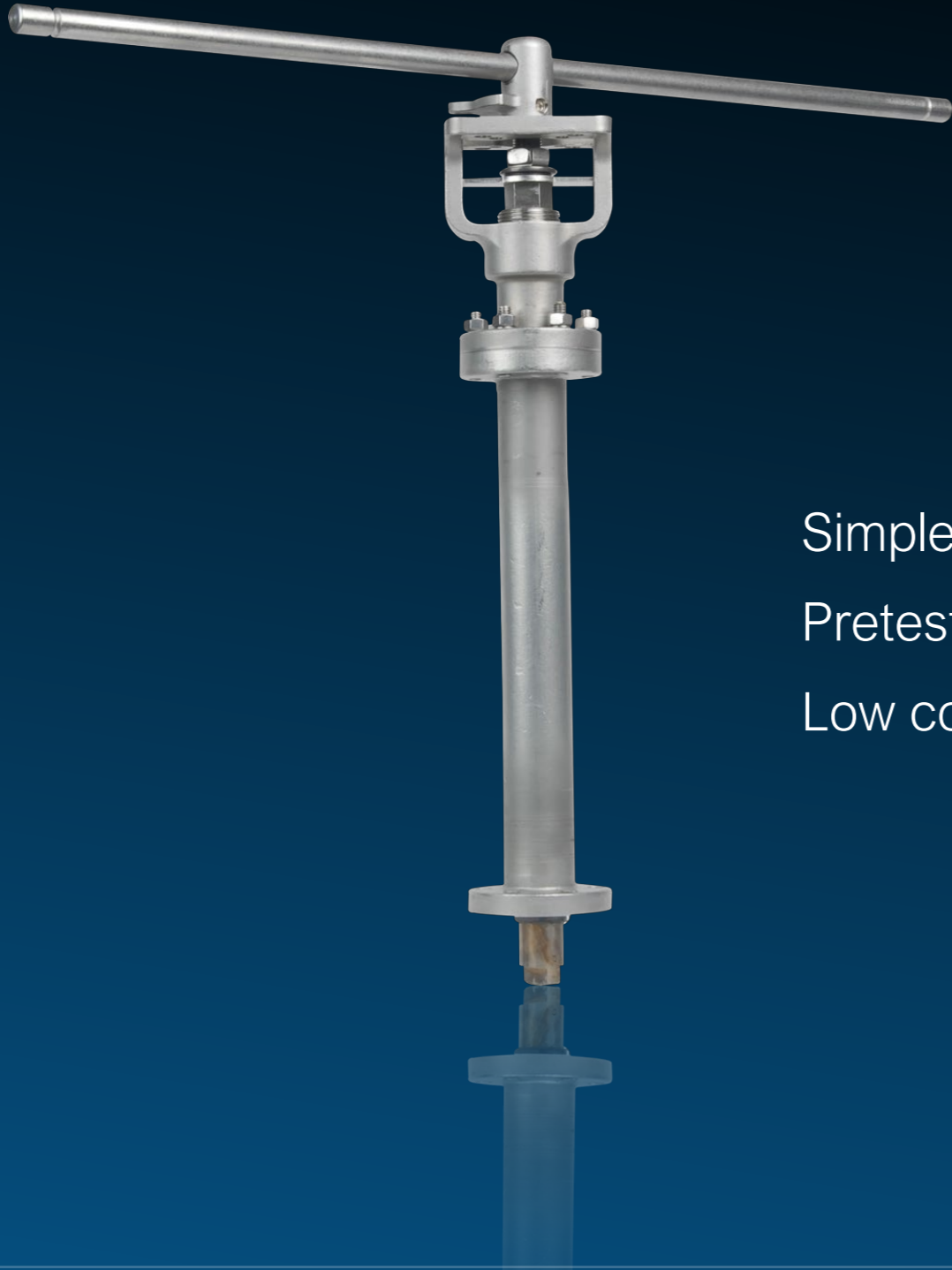


Separates actuator/handle from cold process

Packing adjustments are above the ice ball

Creates a "Gas Pad" between the process and the packing

Bolt-on retrofit kit



Simple installation

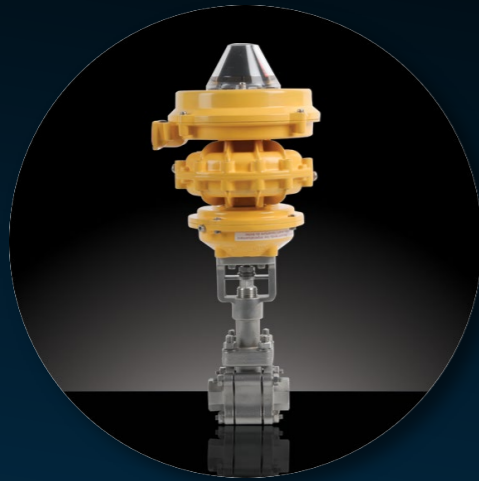
Pretested and torqued to factory specs

Low cost, minimal downtime

S-CLASS
CUSTOM METAL SEATED

“ICE ICE BABY”

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VALVES



Overview



Vari-V Control Valve



Block and Bleed Valve



Cryogenic Valve

S-Class Core System



FM Approved Valve



3-Way Diverter Valve

S-Class Core System



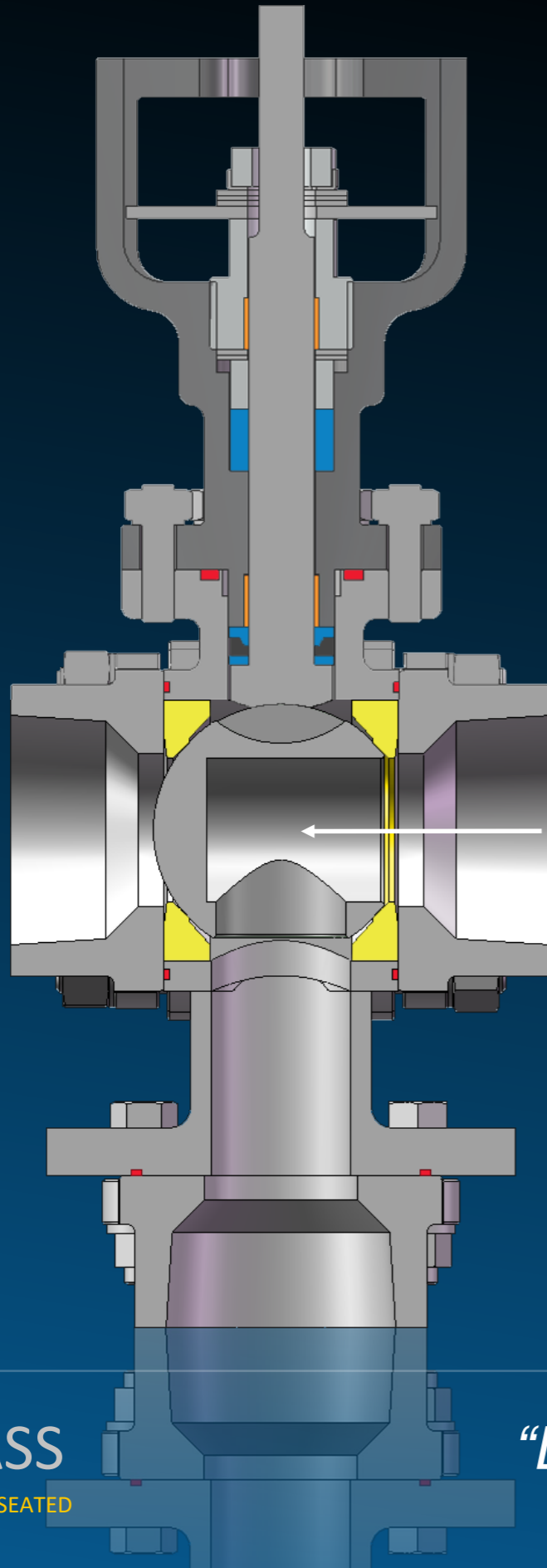
3-Way Diverter Valve

3-Way Diverter Valve

Bottom entry (flow to left or right)

Multiple end connections

3-Way ball (double or single "L" Port)



S-CLASS
CUSTOM SOFT SEATED

"DIVERTS YOUR ATTENTION"

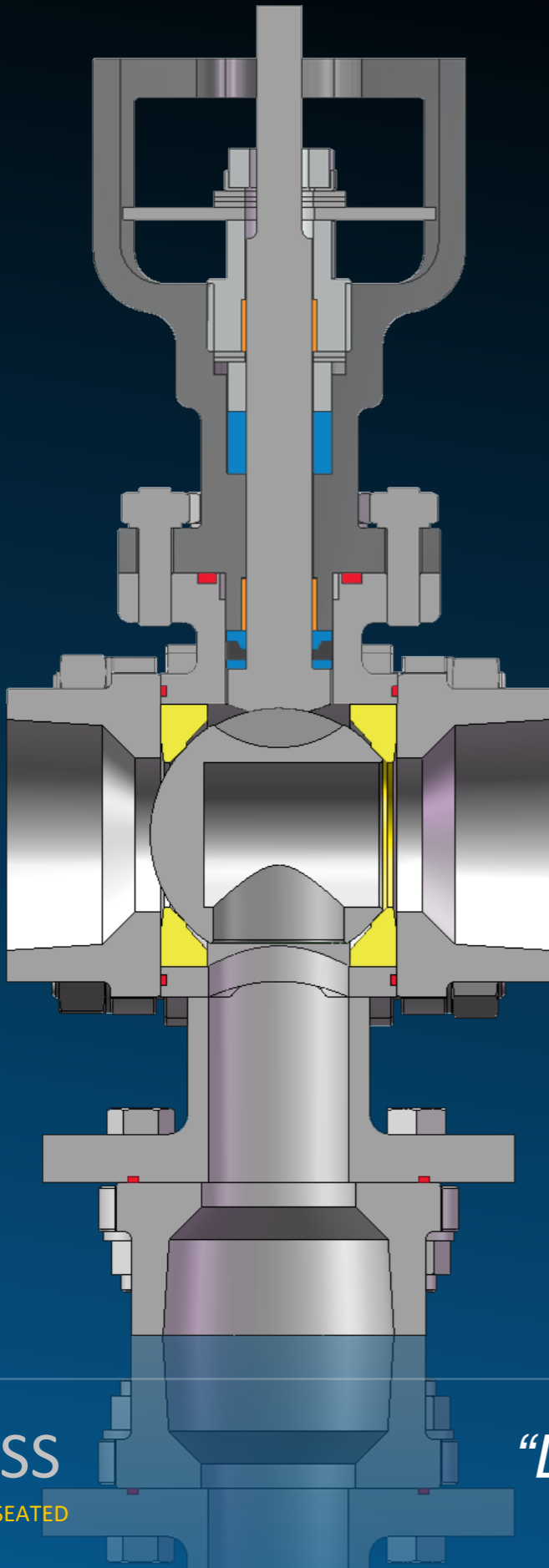
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3-Way Diverter Valve

Bottom entry (flow to left or right)

Multiple end connections

3-Way ball (double or single "L" Port)



Double "L" Port



Single "L" Port

S-CLASS
CUSTOM SOFT SEATED

"DIVERTS YOUR ATTENTION"





Overview



Vari-V Control Valve



Block and Bleed Valve



Cryogenic Valve

S-Class Core System



FM Approved Valve



3-Way Diverter Valve

S-Class Core System



FM Approved Valve

Gosco FM Approved Ball Valve



FM-7412 approved
1/2" through 10"
Broad range of FM options
Bubble-tight shut off
-40 °C / °F to 85 °C / 185 °F
Double Isolation and Bleed
Metal Seated

S-CLASS
CUSTOM SOFT SEATED

"HOT STUFF"

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VALVES

Design Specifications

ASME B16.34, B16.5, B16.10, B16.11, B16.20

API 607, 598

MSS SP-25, SP-54, SP-55

CRN 0911851.34567890YT

ISO 9001:2015

PED 97/23/EC/Annex III, Module H

Customer Specified



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“ALL OF THAT AND ...”

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Fast Track

Expedited machining/assembly/shipping

Fee is based on costs incurred

Not on time? No Fast Track charge

Kinetrol Actuator



Simple design

One moving part

Kinetrol manufactured accessories

Low maintenance cost

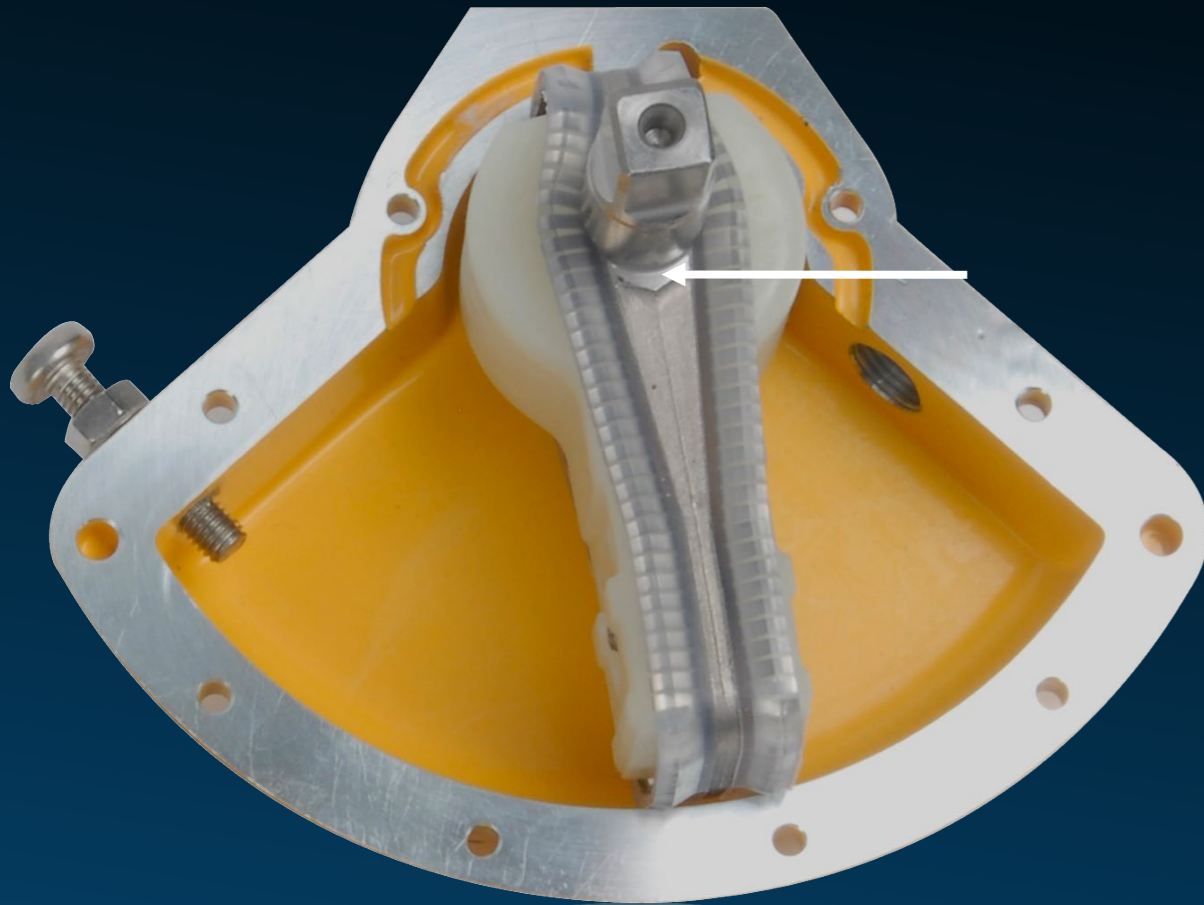
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“PLAIN AND SIMPLE”

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Vane Style Actuator

Integral vane and shaft



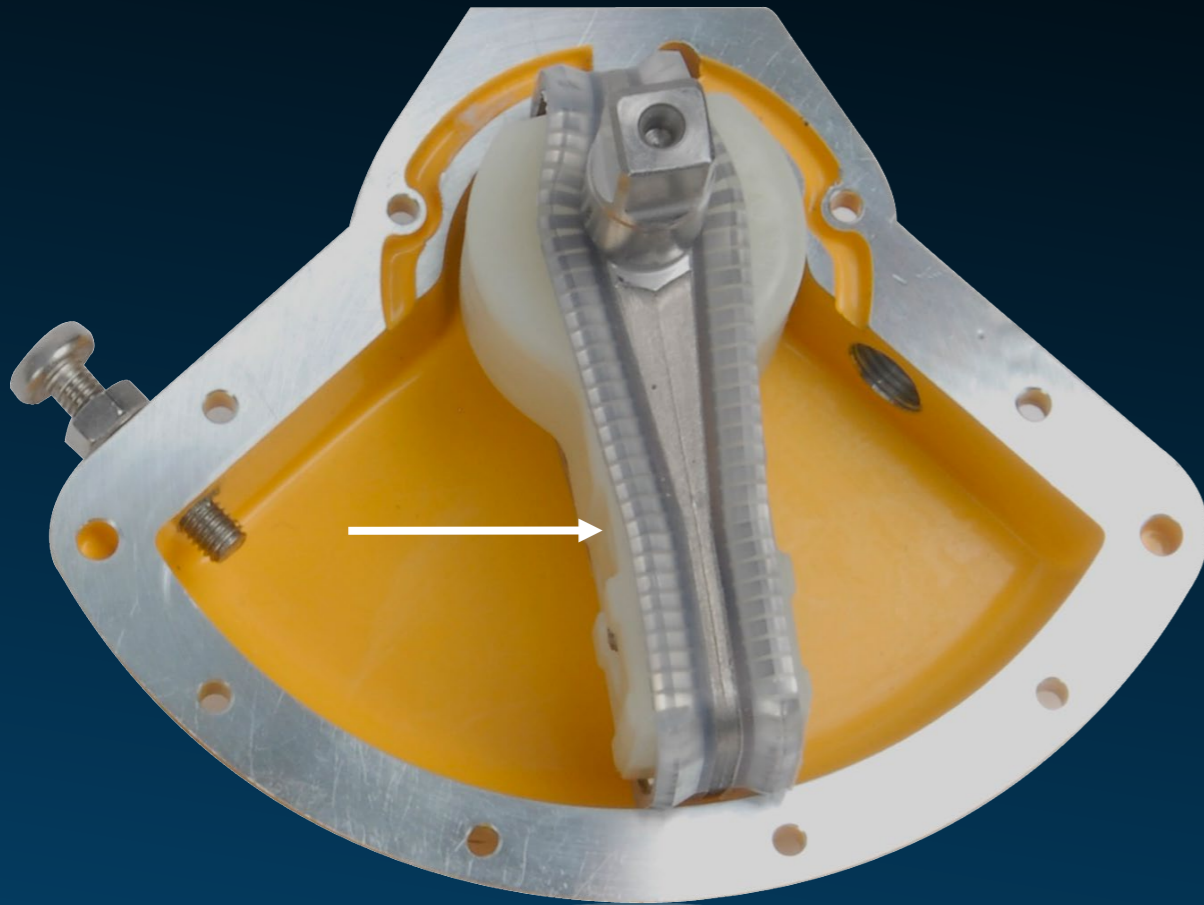
S-CLASS
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“DON’T BE VAIN”

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VALVES

Vane Style Actuator

Integral vane and shaft
Energy absorbent side plates

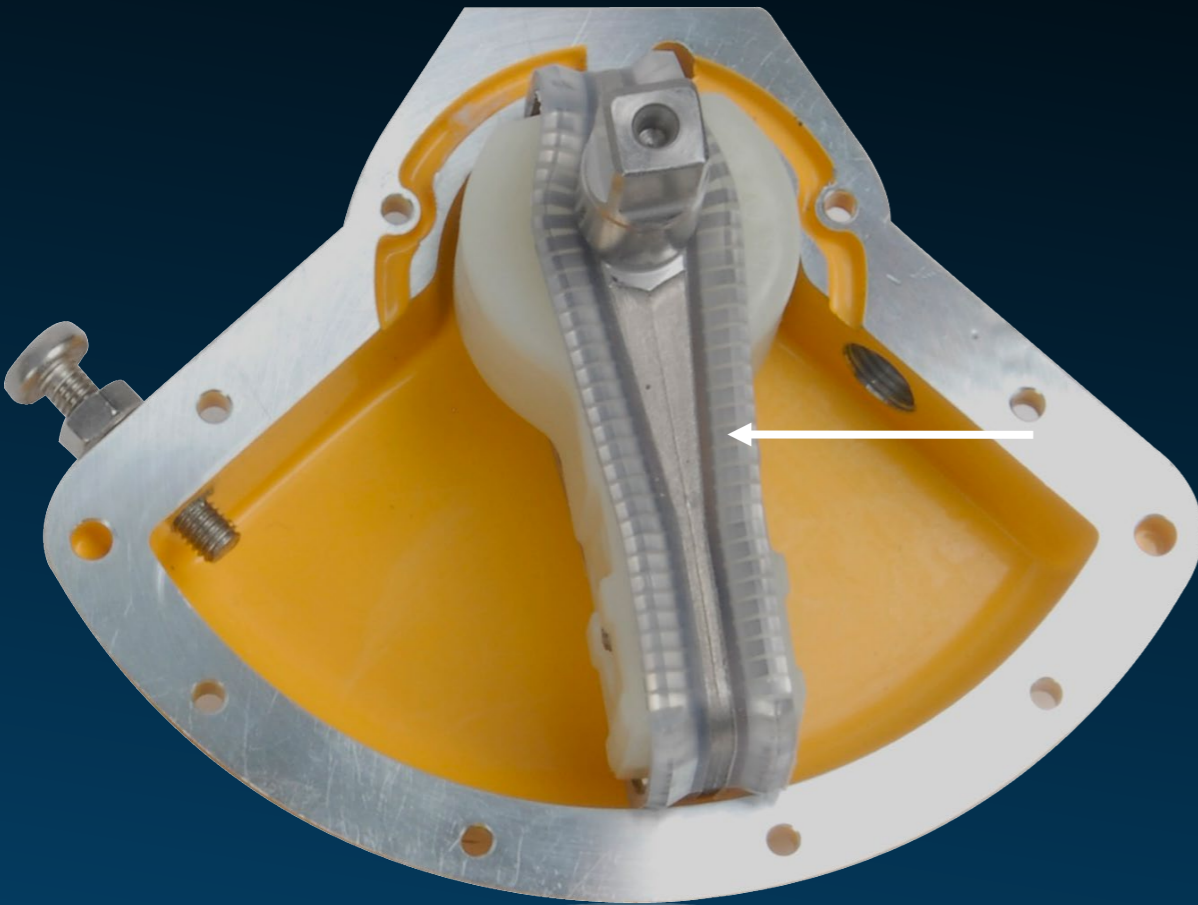


Vane Style Actuator

Integral vane and shaft

Energy absorbent side plates

Pressure assisted seals



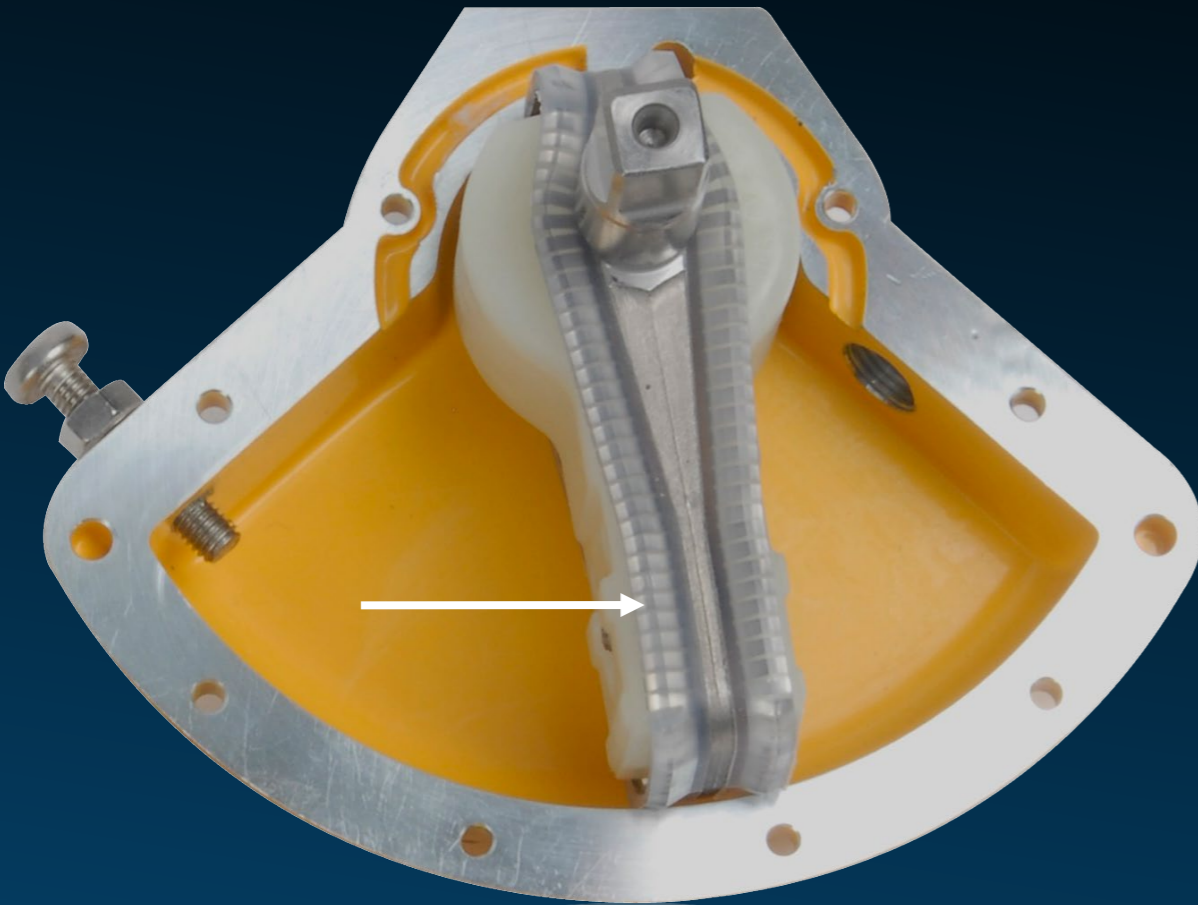
Vane Style Actuator

Integral vane and shaft

Energy absorbent side plates

Pressure assisted seals

Stainless steel expanders for long term contact



Reference Letter

"We have approximately 250 Devlon seated valves at Pasadena Refining. They are installed at various locations in the plant, including the S Zorb, Crude, Coker and Alky at this time.

These valves were originally specified as metal seated valves because the process is so abrasive. However, we went with the Gosco Valves' recommendation and they have been working completely problem free for the last 9 months now.

Gosco Valves has provided us with exceptional after sales, service, faster delivery, and high quality product than any of our current valves supplier. They understand our processes and I have confidence in any valve they specify.

I would recommend Gosco Valves to any prospective customer and again I tell you the services, quality of this Gosco Valve is above 1st rate."

- Christopher Owens, TAR Planning and Execution Procurement/
Contracts Coordinator, Pasadena Refining

Satisfied Gosco Customers



Bayer

EXXON



The miracles of science™

HUSKY

ConocoPhillips



The Gosco Advantage



High Quality

High Performance

Flexibility in design and customer needs

Severe service specialists

S-CLASS
CUSTOM METAL SEATED

“THE COMPLETE SOLUTION”

gosco
VALVES

Other Products

Gosco M-Class Valves



Kinetrol Actuators



GOSCO FAB VALVE



S-CLASS
CUSTOM METAL SEATED

“ENCORE”

