# M-Class

## The Most Extreme Applications Have Met Their Match

# M-CLASS

CUSTOM METAL SEATED

gosco VALVES

# M-Class

NPS ½ to NPS 16 (DN 15 to DN 400)

-253ºC / -423ºF to 875ºC / 1607ºF/

Up to and above Class 4500

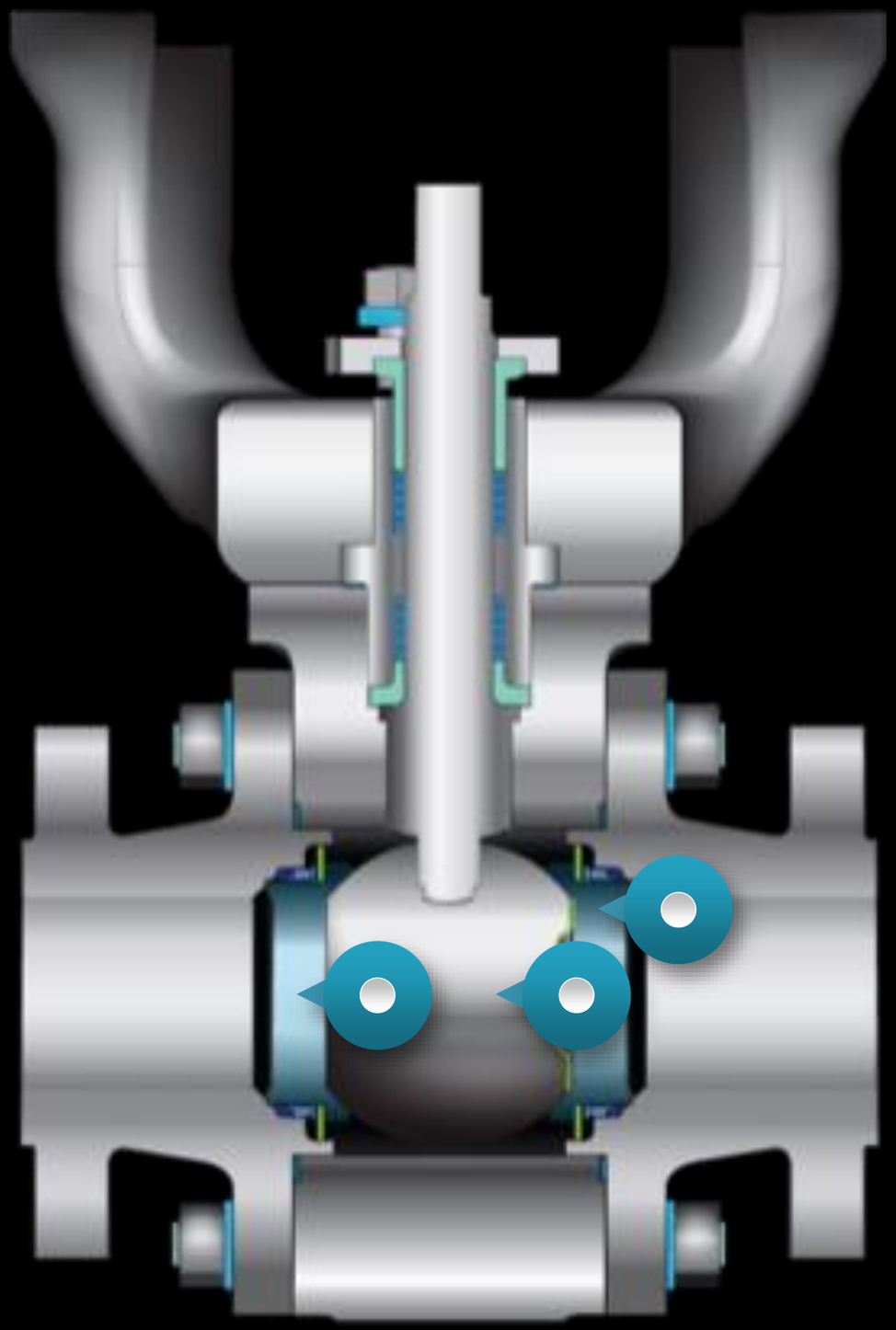
Most extreme applications

Different Price Options (“Valves as a Service”)

## M-CLASS

CUSTOM METAL SEATED

gosco VALVES



# FEATURES

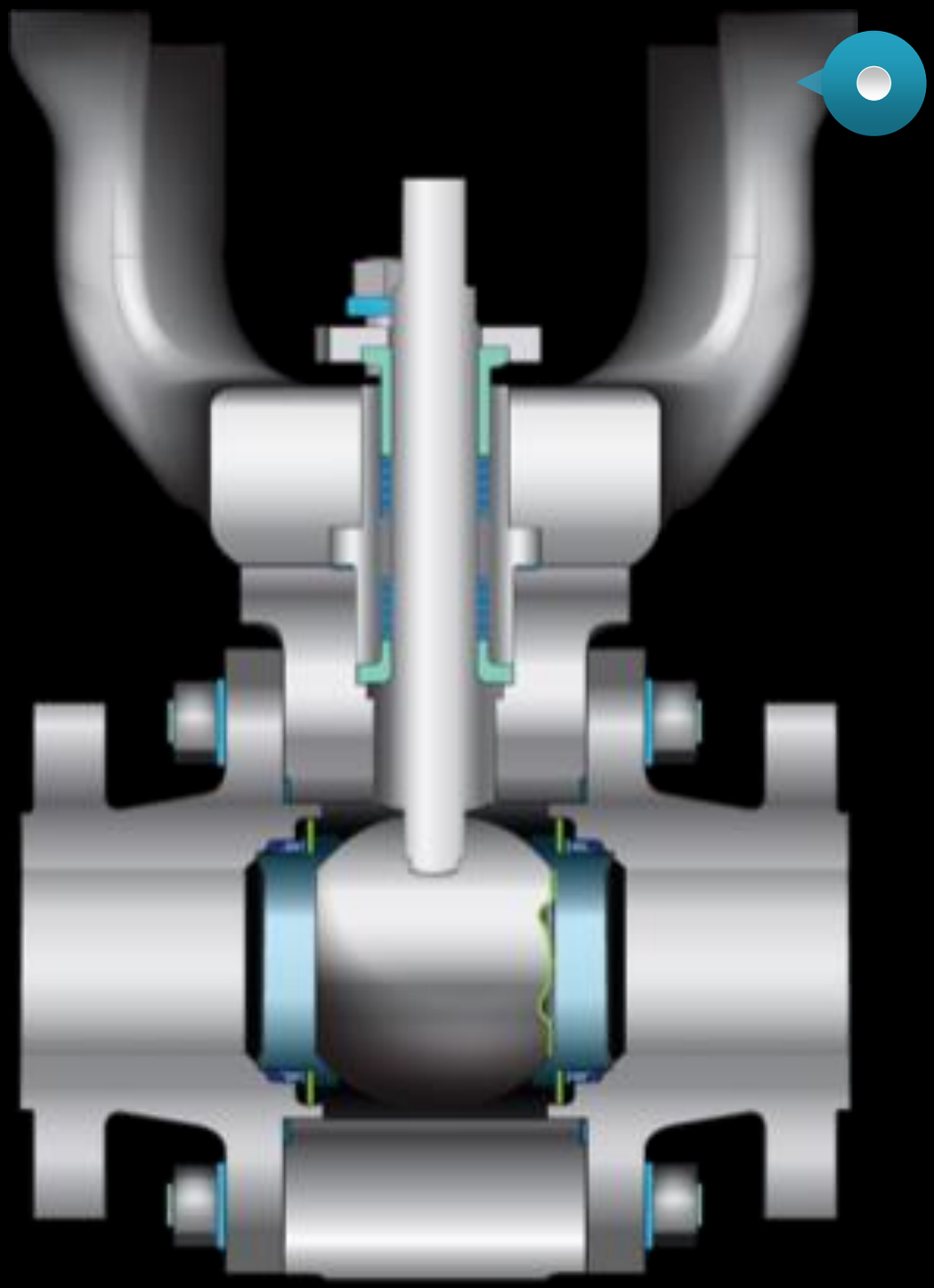
Superior Trim Hardening

M-CLASS

CUSTOM METAL SEATED

*“HARD ASS”*

GOSCO VALVES



# FEATURES

Superior Trim Hardening

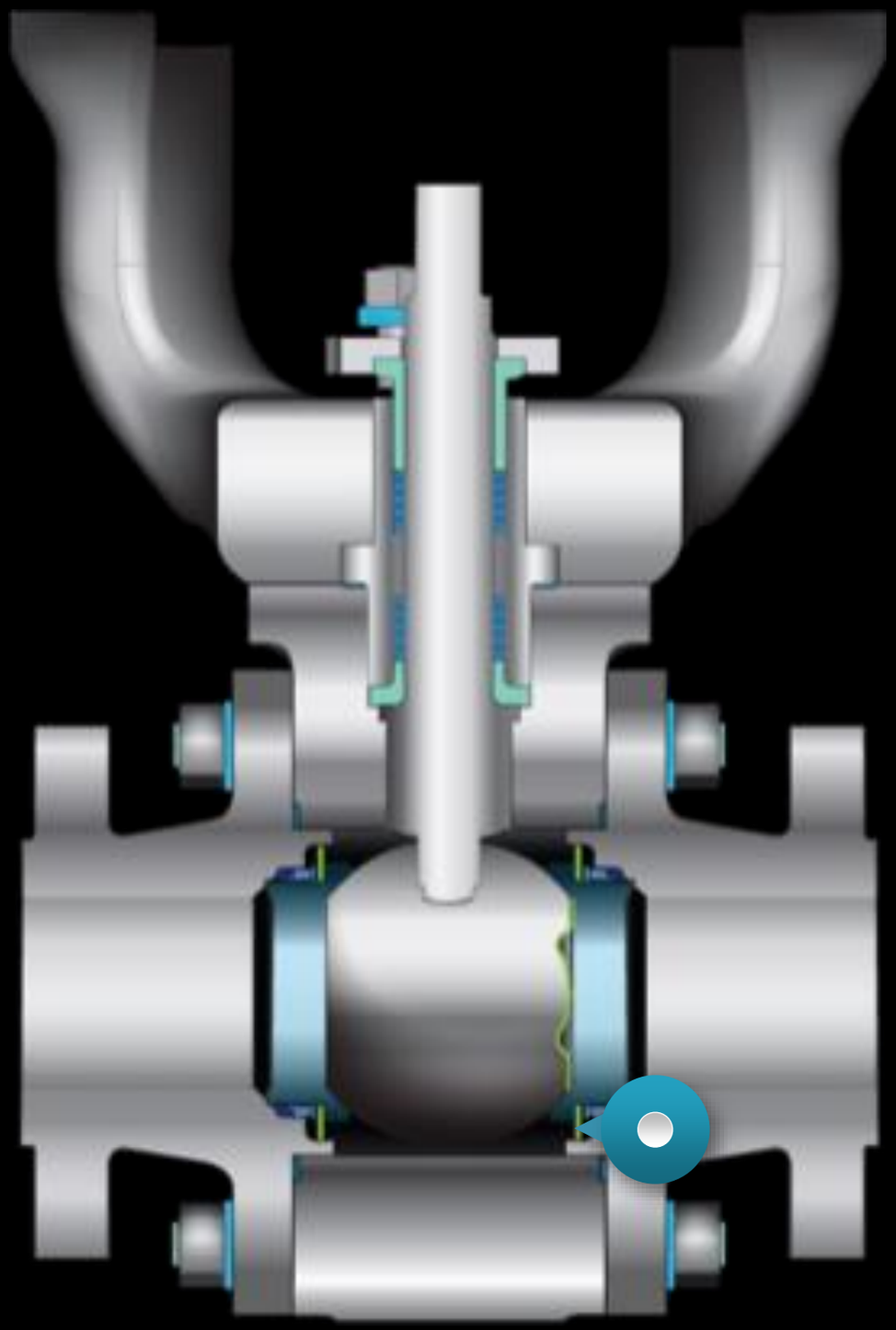
Tripod Mounting Bracket

M-CLASS

CUSTOM METAL SEATED

*“LEVEL HEADED”*

gosco VALVES



# FEATURES

Superior Trim Hardening

Tripod Mounting Bracket

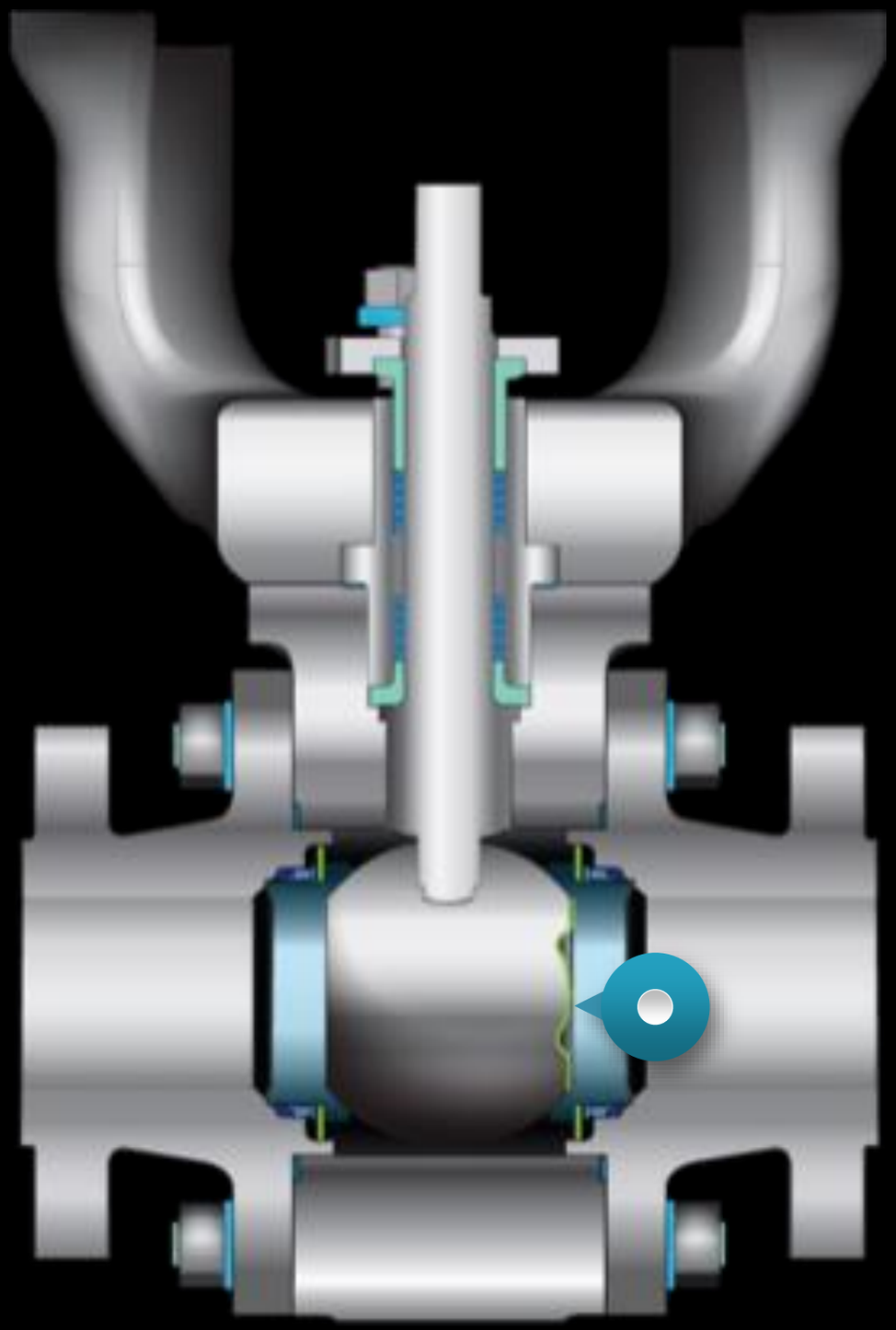
Seat/Spring Design

M-CLASS

CUSTOM METAL SEATED

*“FREE FALL”*

GOSCO VALVES



# FEATURES

Superior Trim Hardening

Tripod Mounting Bracket

Seat/Spring Design

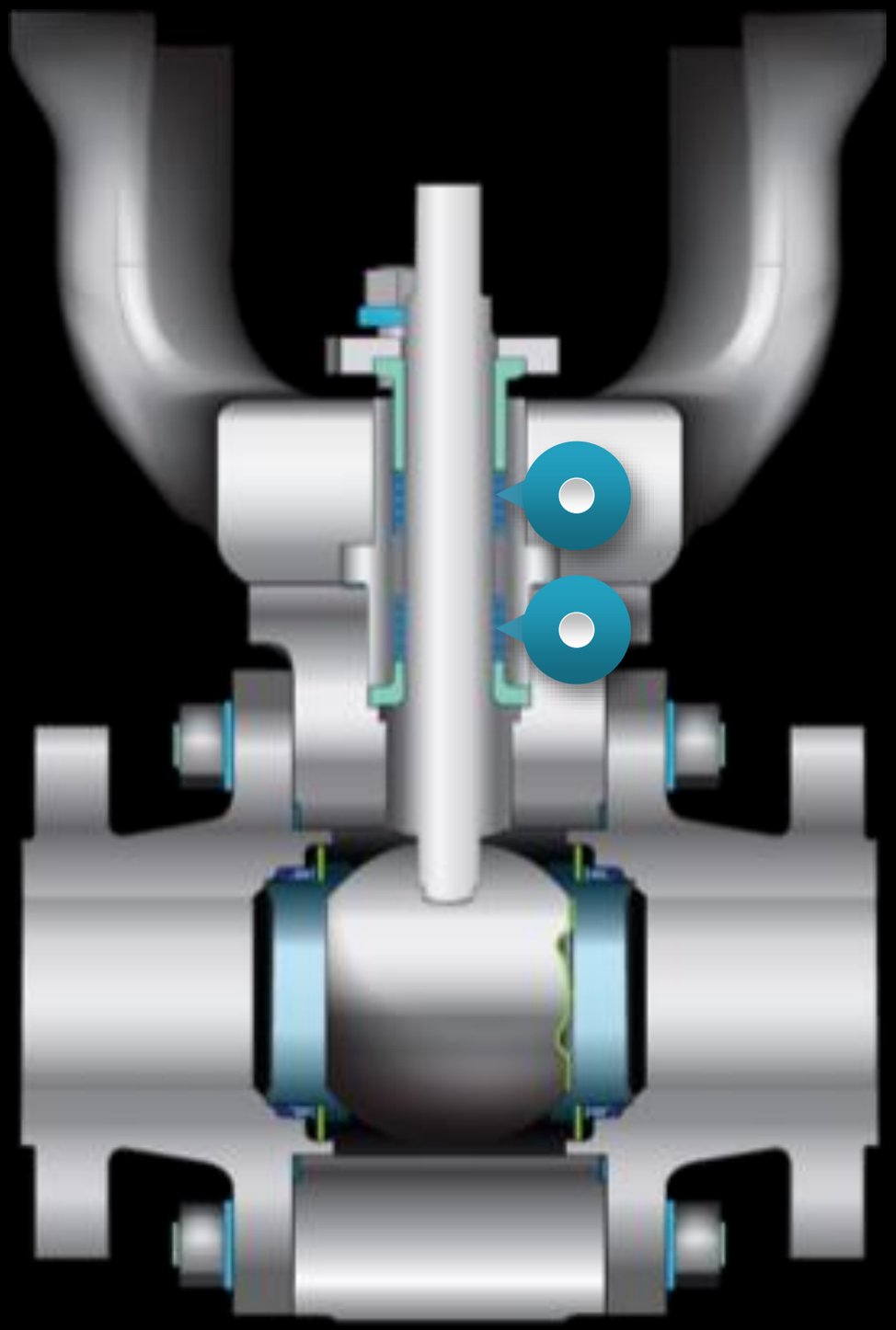
Arcuate Cut or Vari V Ball

M-CLASS

CUSTOM METAL SEATED

*“SLOW POKE / CONTROL FREAK”*

GOSCO VALVES



# FEATURES

Superior Trim Hardening

Tripod Mounting Bracket

Seat/Spring Design

Arcuate Cut or Vari V Ball

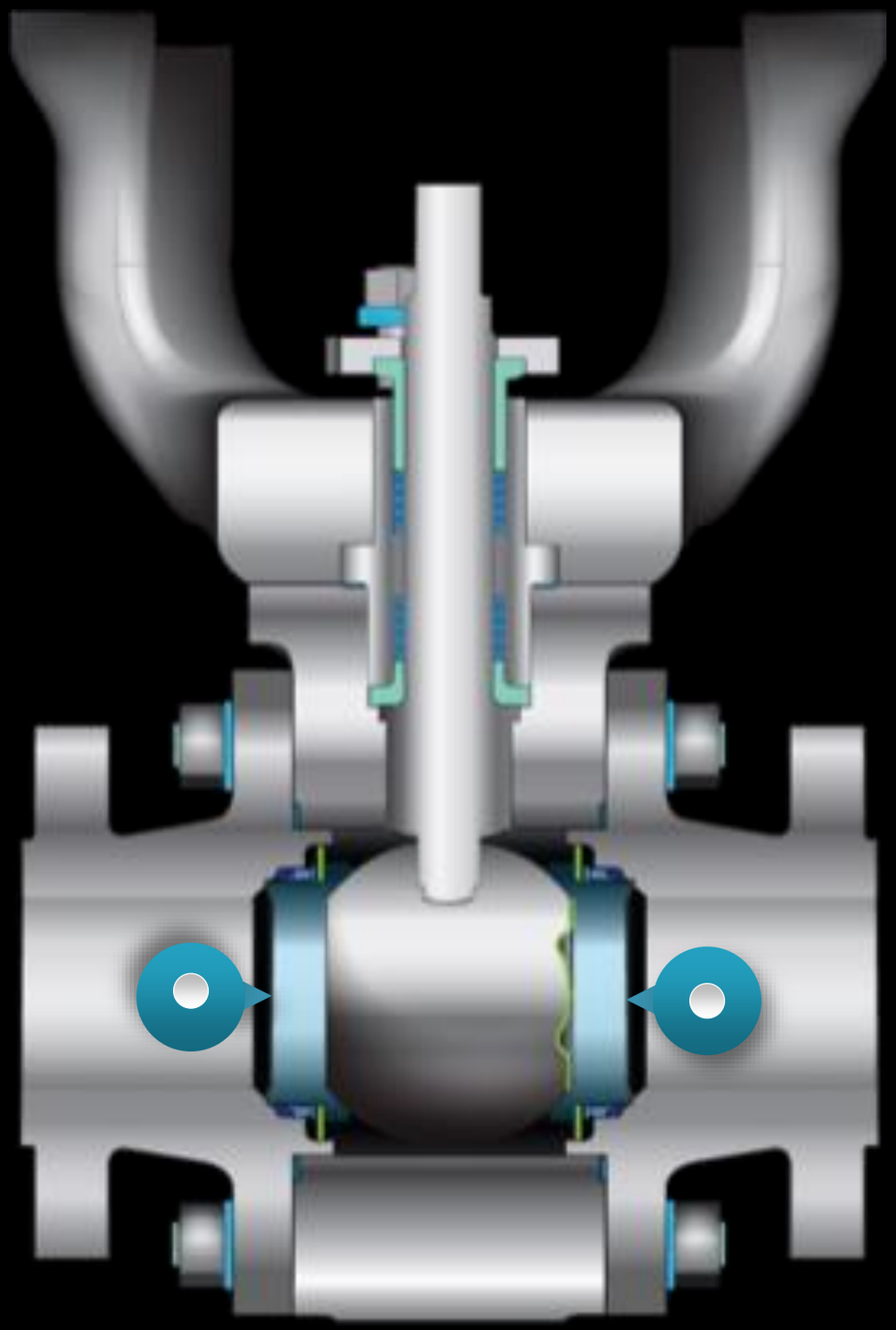
Dual Shaft Packing

M-CLASS

CUSTOM METAL SEATED

*“BACK UP PLAN”*

gosco VALVES



# FEATURES

Superior Trim Hardening

Tripod Mounting Bracket

Seat/Spring Design

Arcuate Cut or Vari V Ball

Dual Shaft Packing

Bi-directional Sealing

M-CLASS

CUSTOM METAL SEATED

*“WHAT CAN I SAY”*

gosco VALVES

# SUPERIOR TRIM HARDENING

M-CLASS

CUSTOM METAL SEATED

*“HARD ASS”*

gosco VALVES

# COMPETITION – HVOF

## HIGH VELOCITY OXYGEN FUEL

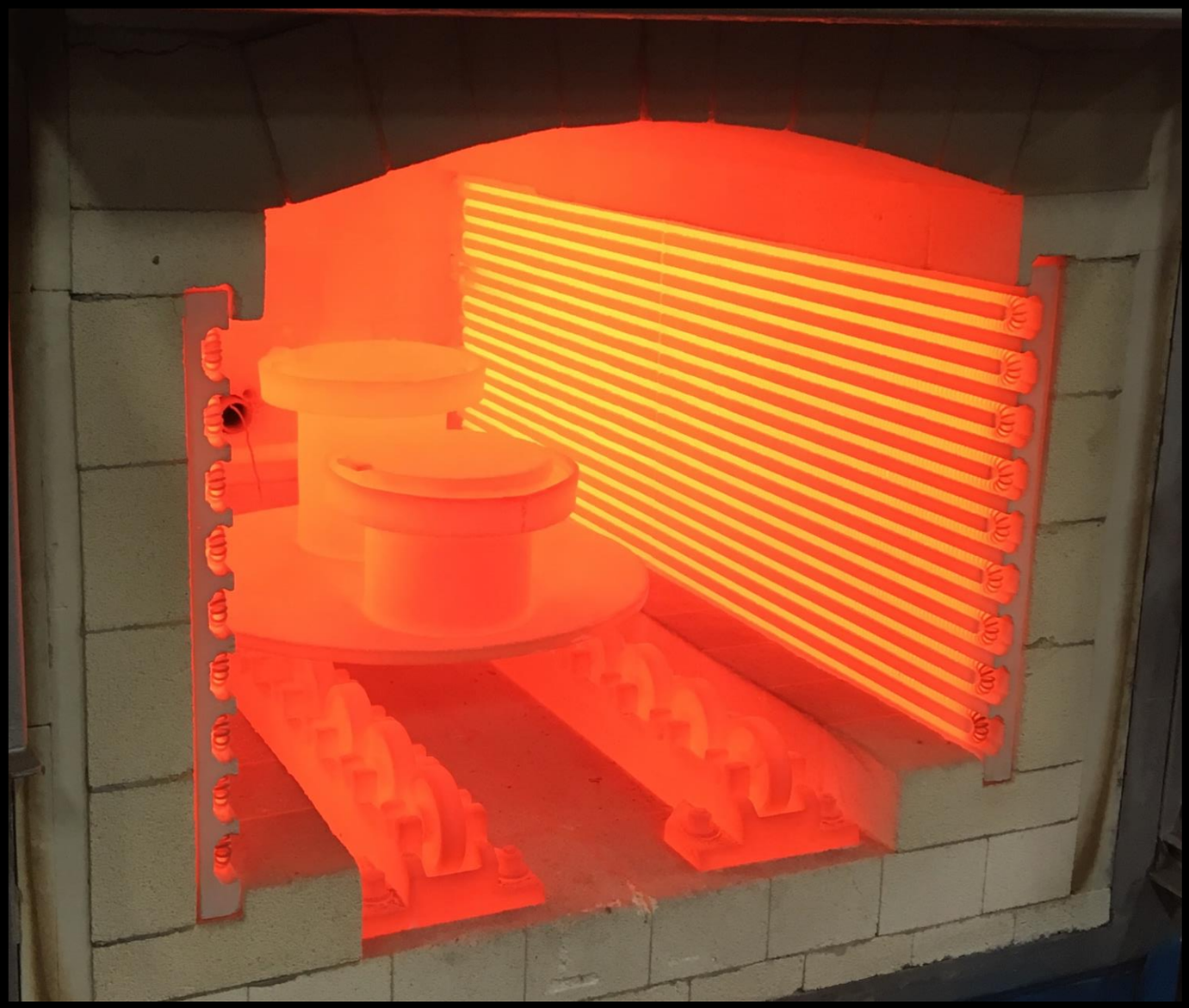
Uneven coating (line of sight)

Cracks / spalls

Coating is porous

Internal bore of ball can not be coated

# GOSCO – BORONIZING



M-CLASS

CUSTOM METAL SEATED

*“HARD ASS”*

gosco 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
.0035” solid layer, .007” partial layer

# BORONIZING

## STARTS WITH THE BASE MATERIAL

Inconel 718 is the best material for severe service applications

Designed for high temperature applications

Extremely hard

Very corrosion resistant

Has a high nickel content to eliminate stress corrosion cracking

# THEN - IT'S ALL ABOUT PREPARATION OF THE PARTS

There are 6 steps before the trim sets are sent to be borided:

1. Rough machining
2. Stress relieving
3. Finish machining
4. Grinding
5. Four levels of lapping
6. Vacuum testing

# LAST – IT'S ALL ABOUT THE BORONIZING PROCESS

1. Cleaned to eliminate any residue
2. Boronized using our proprietary boronizing process
3. Finished lapped
4. Vacuum tested

# COMPETITOR ON COATINGS

**APPLICATION NOTE ON COATINGS**

## Common Coatings

| Method of Application | HVOF | | Fusion | Plasma | Diffused | | Patented |
|---|---|---|---|---|---|---|---|
| Material | Chromium Carbide | Tungsten Carbide | Chromium Carbide | Chromuim 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 ON 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 |
|---|---|---|---|---|
| | Chromuim 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"*

# COMPETITOR ON 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 |
|---|---|---|---|---|
| | Chromuim 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"*

# COMPETITOR ON 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 |
|---|---|---|---|---|
| | Chromuim 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"*

# COMPETITOR ON 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"*

# COMPETITOR ON 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"*

# COMPETITOR ON 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

M-CLASS

CUSTOM METAL SEATED

*“NO BRAINER”*

gosco VALVES

# ACTUATOR MOUNTING

M-CLASS

CUSTOM METAL SEATED

*“BALANCING ACT”*

gosco VALVES


# COMPETITOR'S MOUNTING

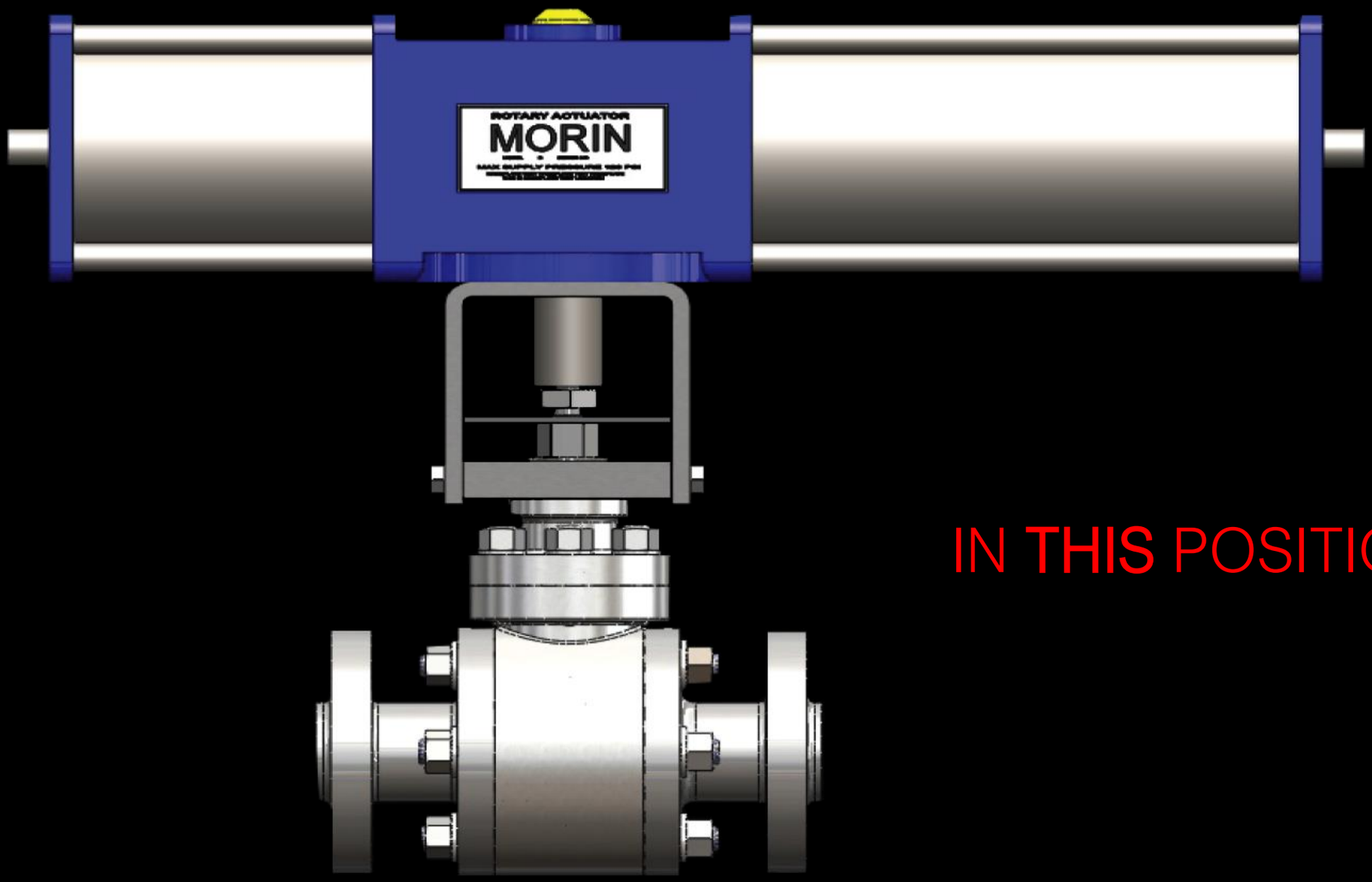
## BENT/WELDED BRACKET`

Not accurate - improper actuator alignment

Access to packing adjustments is limited

Bracket is weak in certain orientations

# BENT/WELDED BRACKET




IN **THIS** POSITION

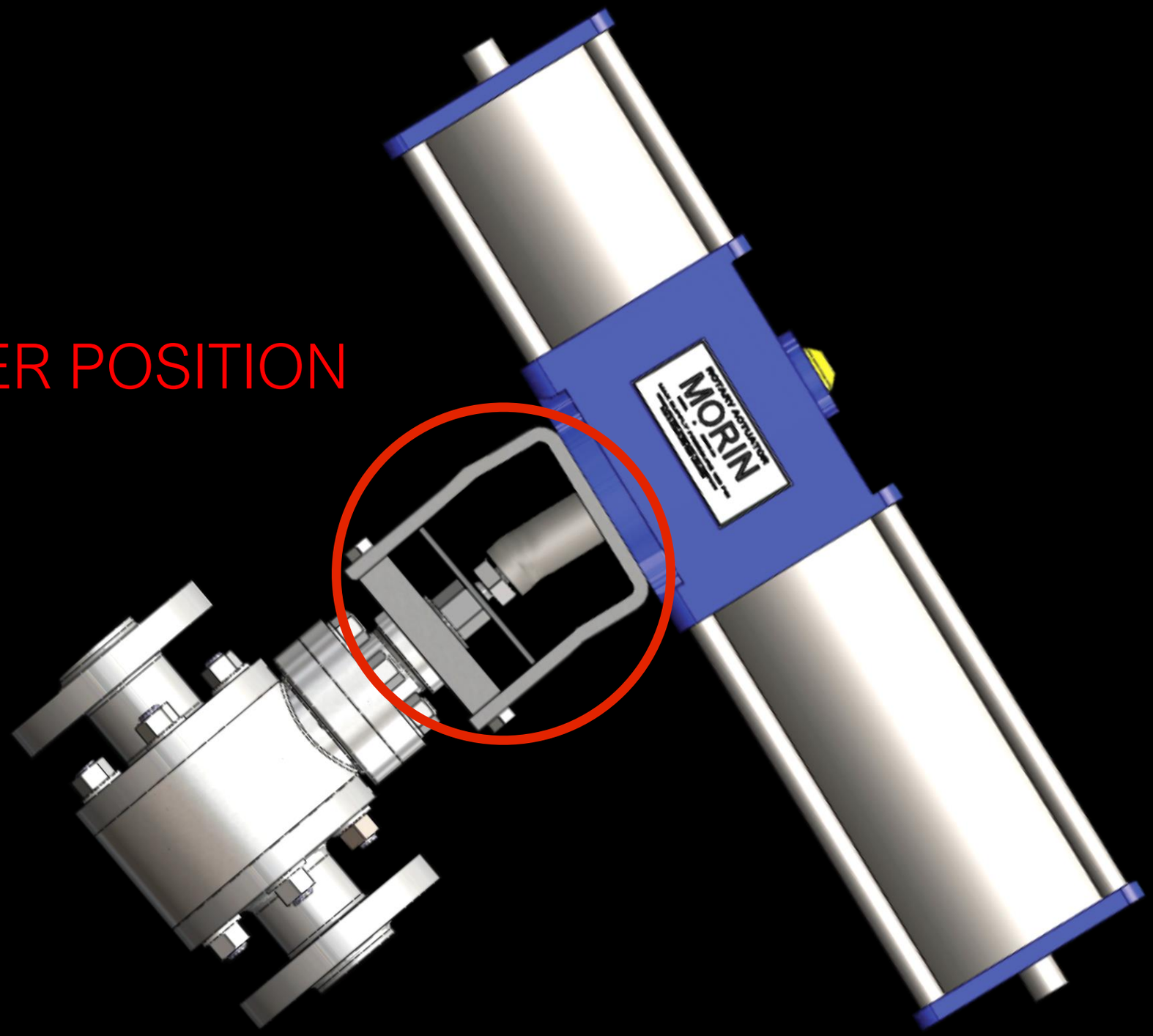
M-CLASS
CUSTOM METAL SEATED

*"BENT OUT OF SHAPE"*

GOSCO VALVES

# BENT/WELDED BRACKET

IN **ANY** OTHER POSITION



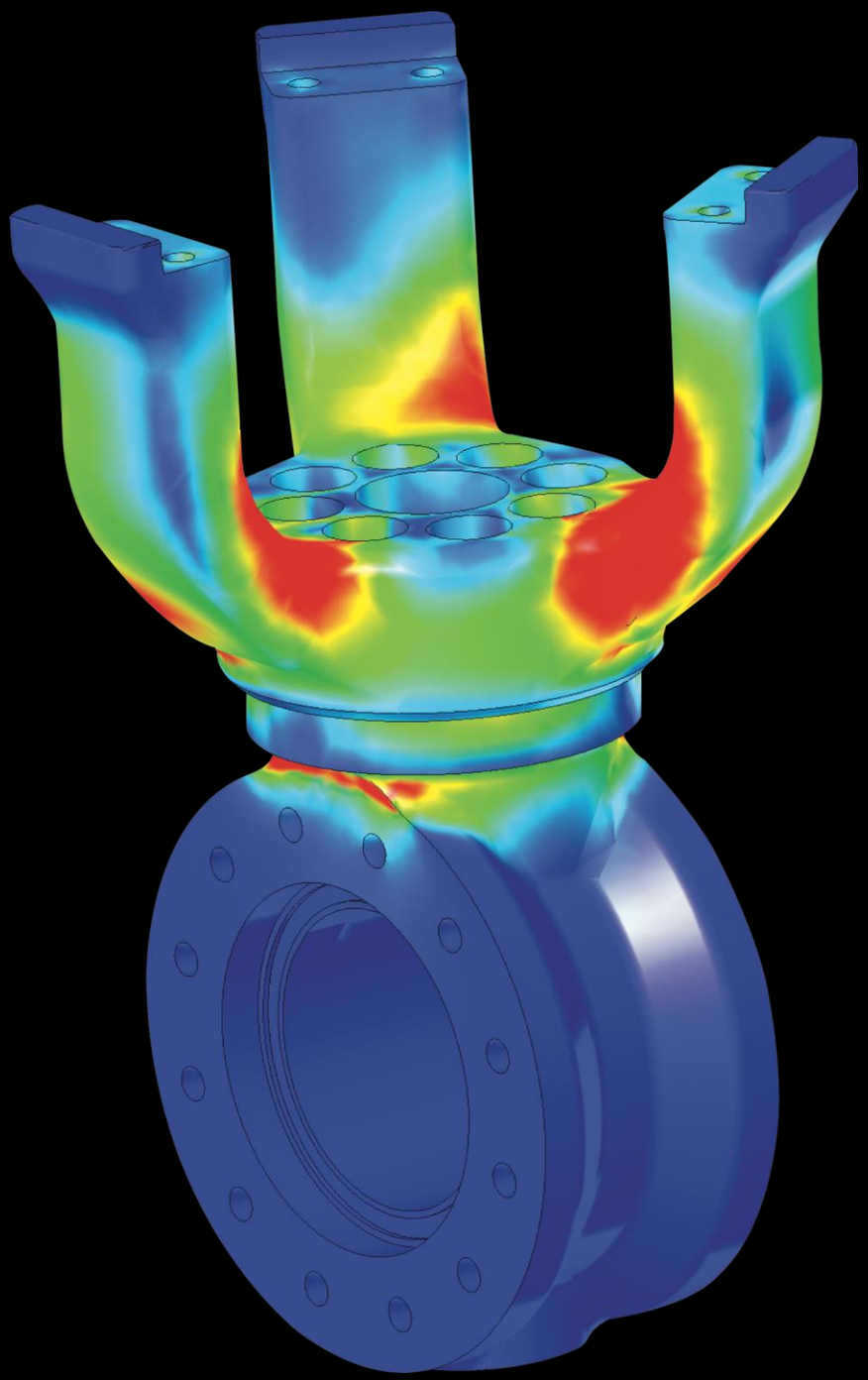

M-CLASS

CUSTOM METAL SEATED

*“BENT OUT OF SHAPE”*

gosco VALVES

# TRIPOD MOUNTING SYSTEM



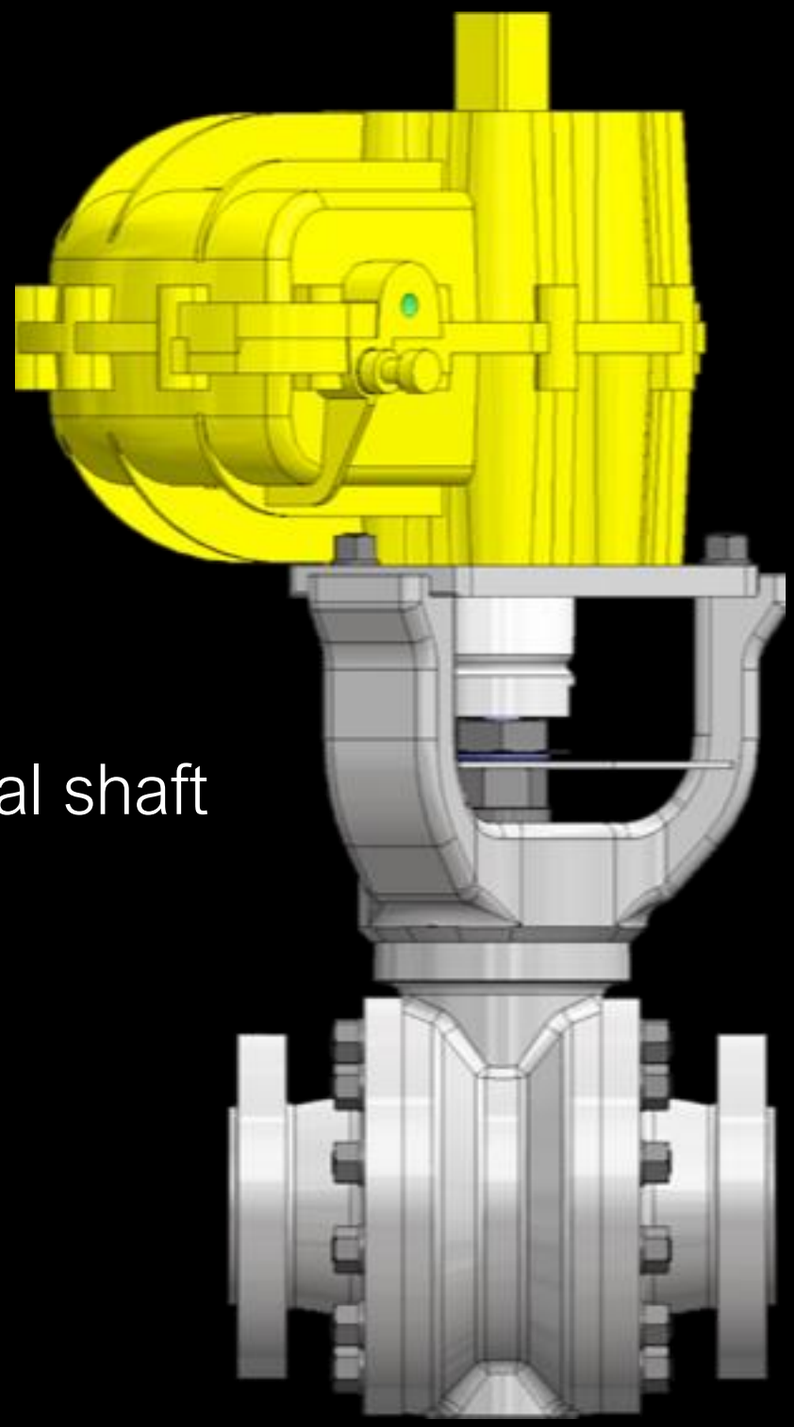
The tripod is designed to handle
“Worst Case Scenario”

Finite Element Analysis (FEA) shows ”Stressed” areas

Tripod is much larger than a traditional bracket

Supports the actuator regardless of valve orientation

# TRIPOD MOUNT



Horizontal pipeline, vertical shaft

☑

☐

☐

M-CLASS

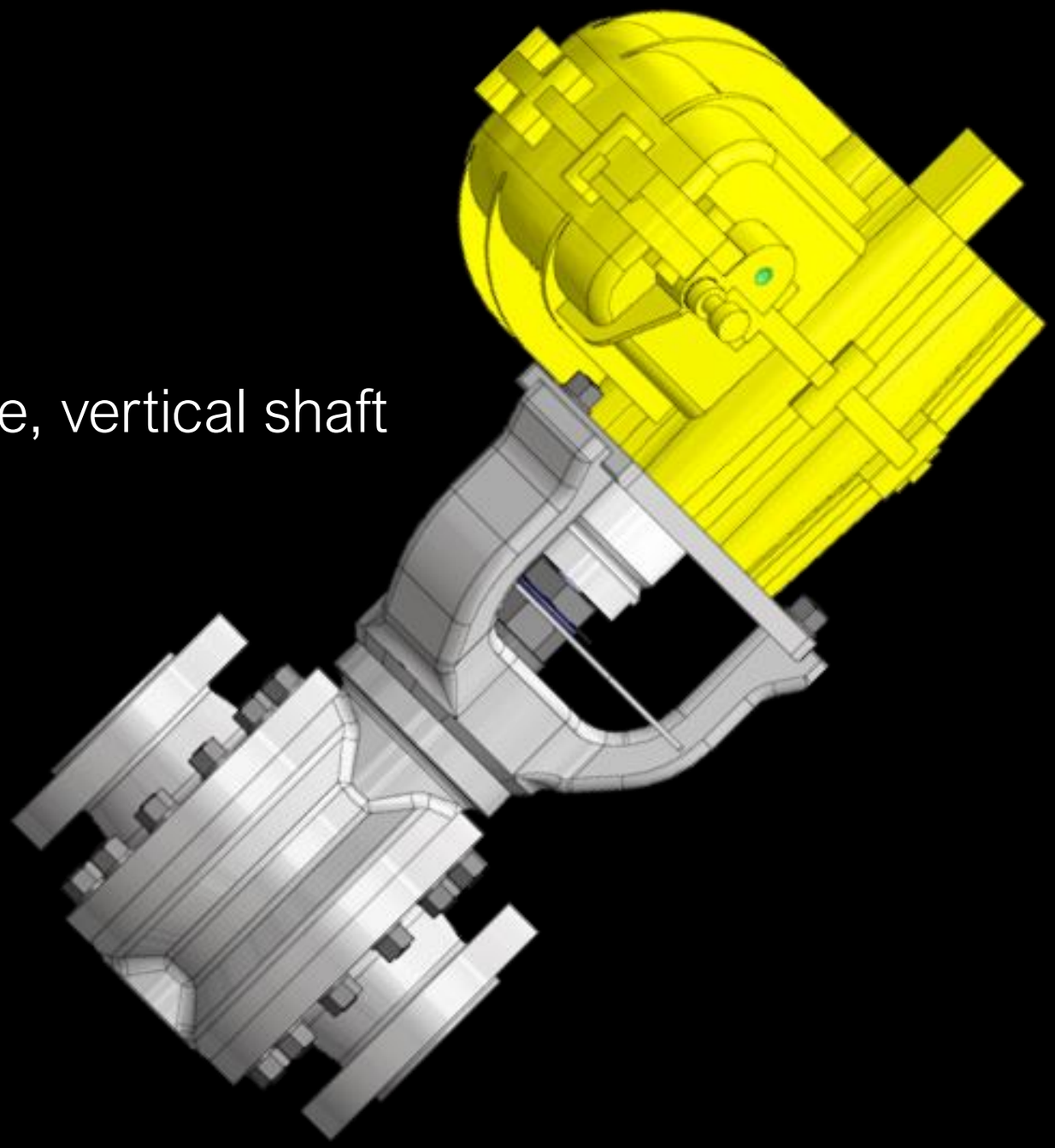
CUSTOM METAL SEATED

*“LEVEL HEADED”*

gosco VALVES

# TRIPOD MOUNT

45 degree pipeline, vertical shaft



- [x]
- [x]
- [ ]
- [ ]
- [ ]

M-CLASS

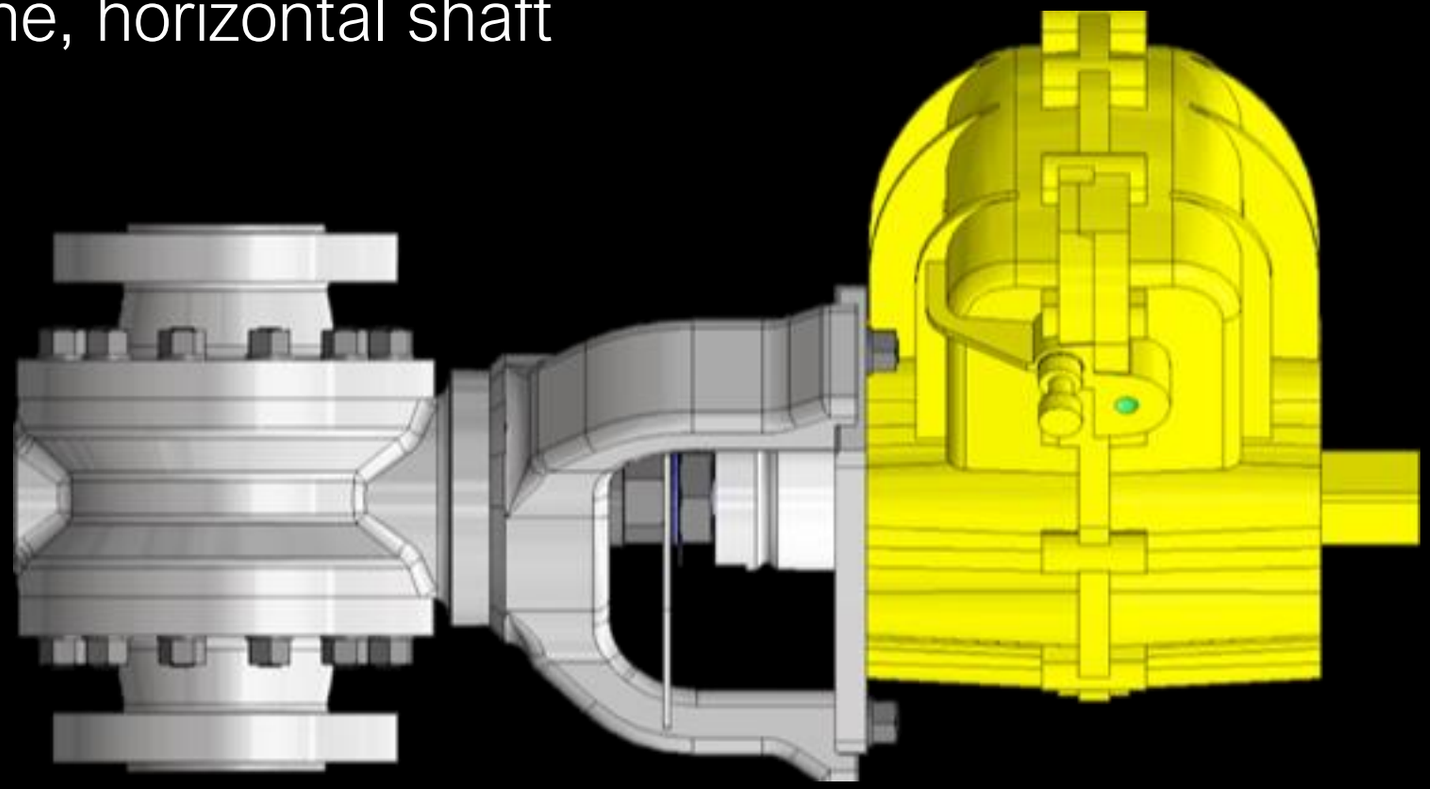
CUSTOM METAL SEATED

*“LEVEL HEADED”*

gosco VALVES

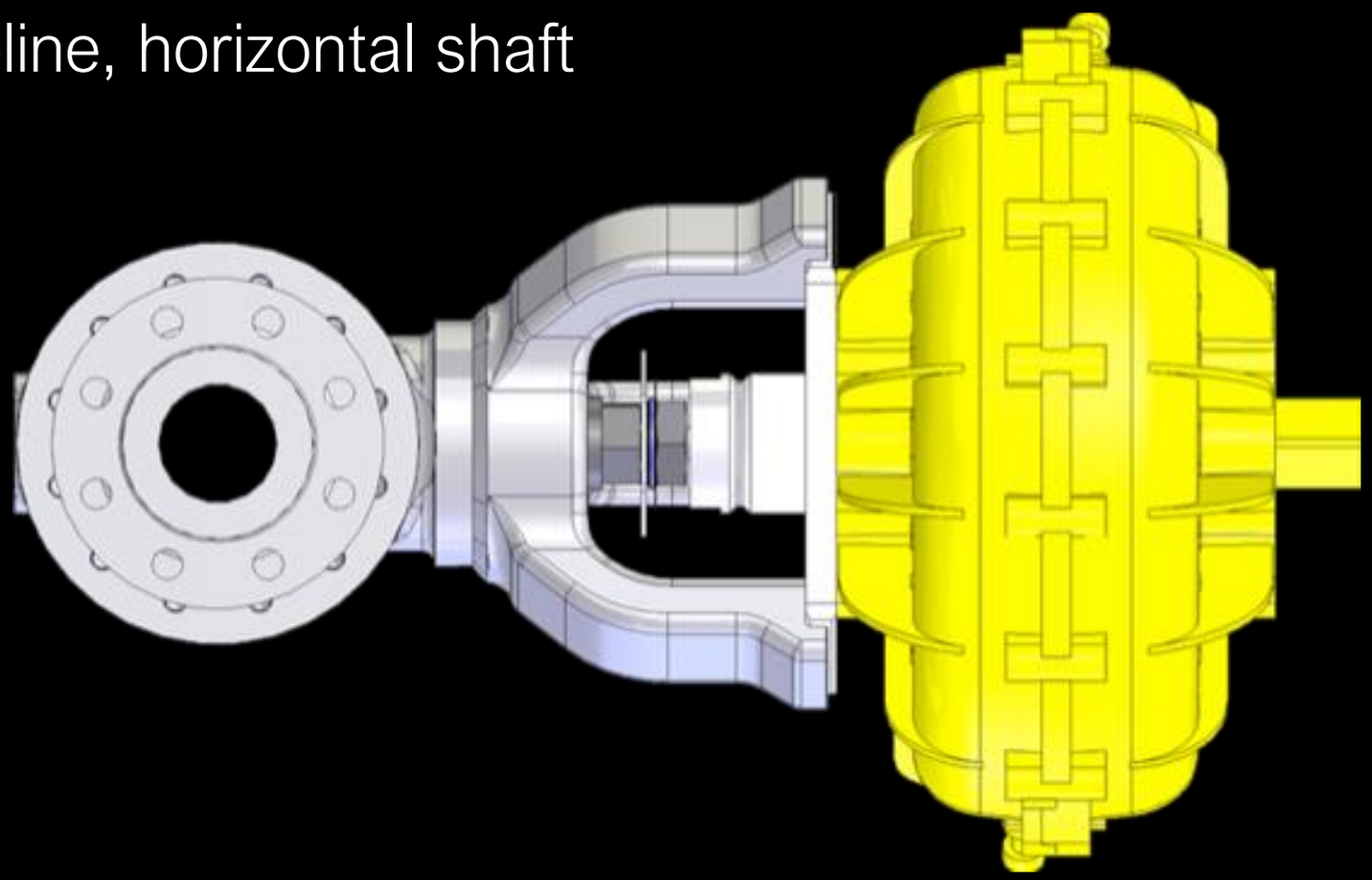
# TRIPOD MOUNT

Vertical pipeline, horizontal shaft



# TRIPOD MOUNT

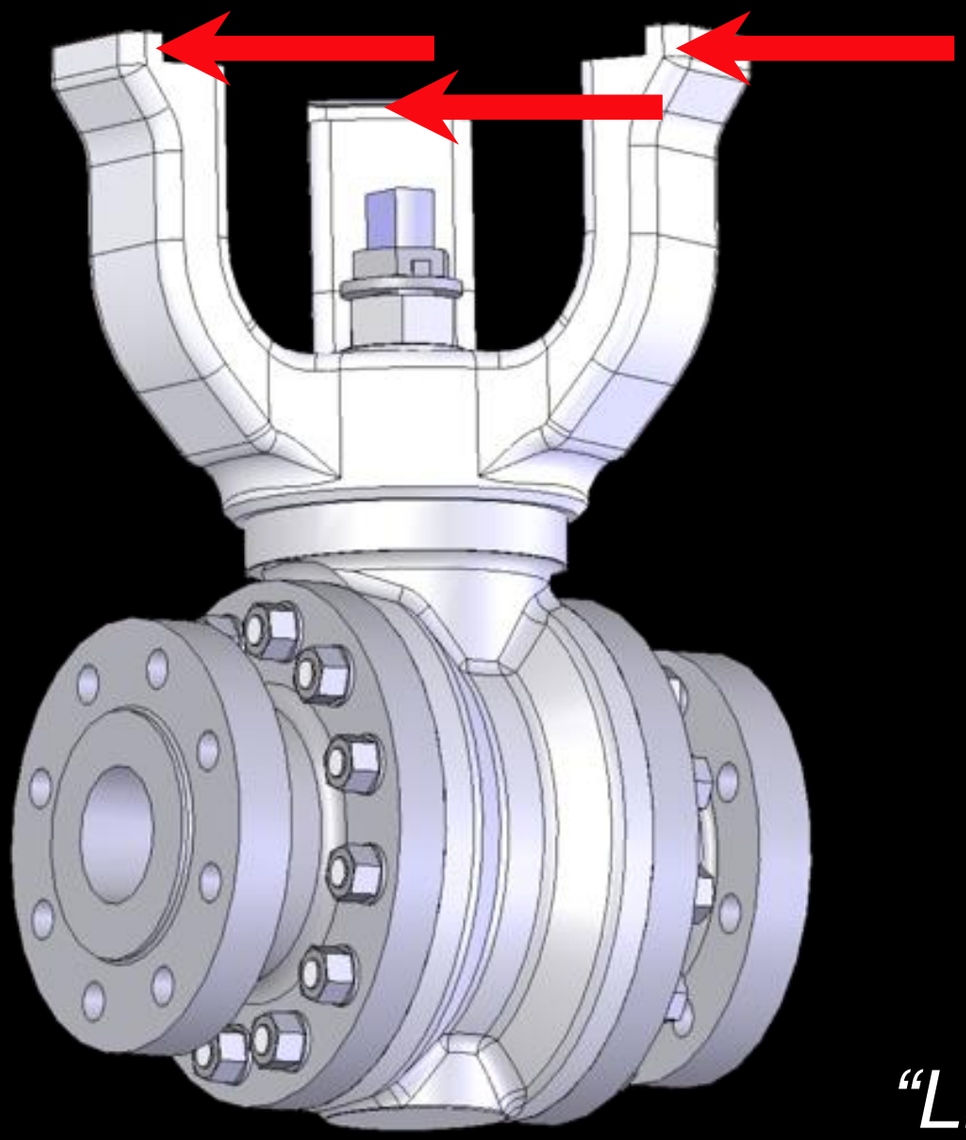
Horizontal pipeline, horizontal shaft



# TRIPOD MOUNT

Perfectly Flat

(3 points define a plane)



M-CLASS

CUSTOM METAL SEATED

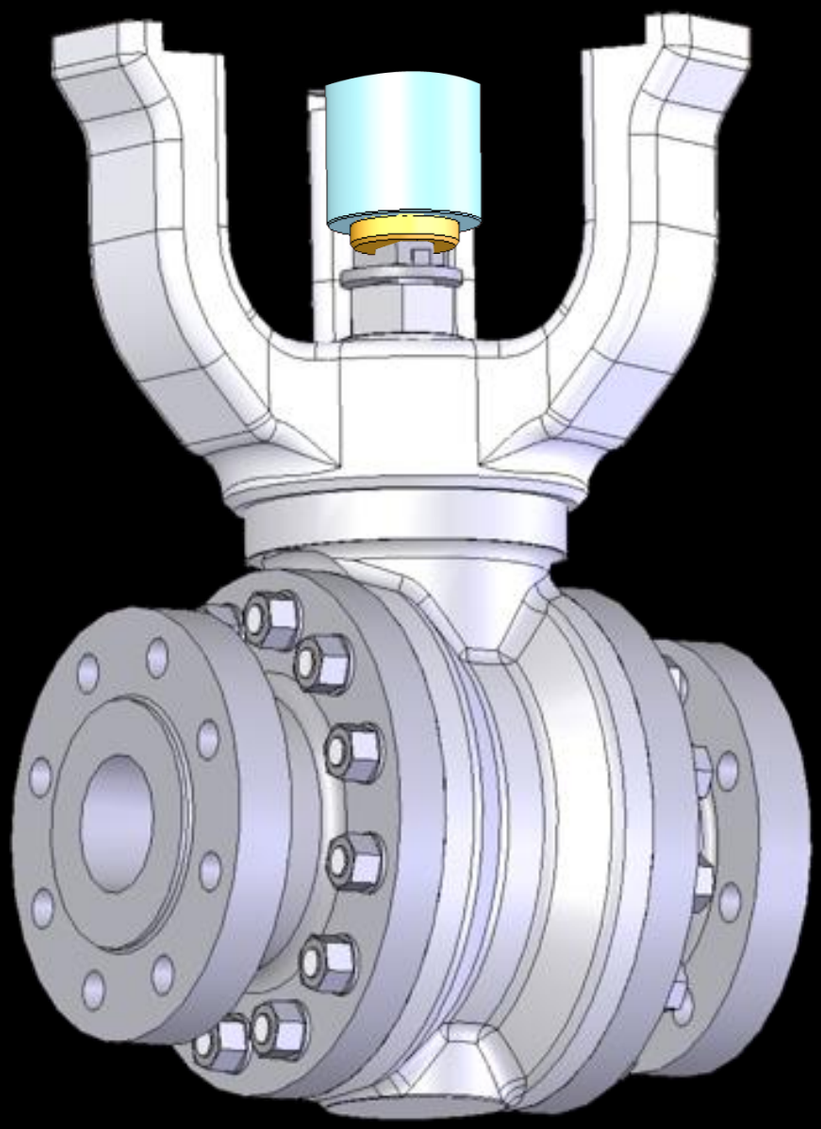
*“LEVEL HEADED”*

GOSCO VALVES

# TRIPOD MOUNT

Perfectly Flat
(3 points define a plane)

Easy to Assemble



M-CLASS
CUSTOM METAL SEATED

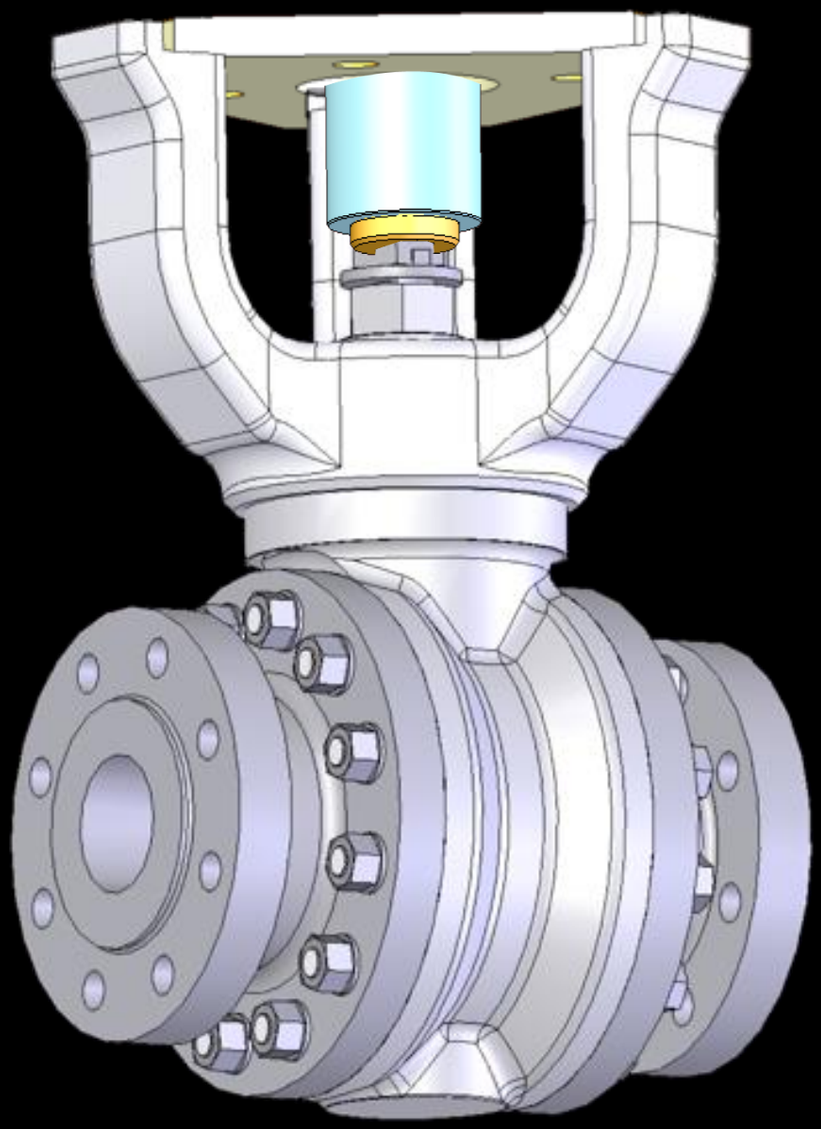
*“LEVEL HEADED”*

gosco VALVES

# TRIPOD MOUNT

Perfectly Flat
(3 points define a plane)

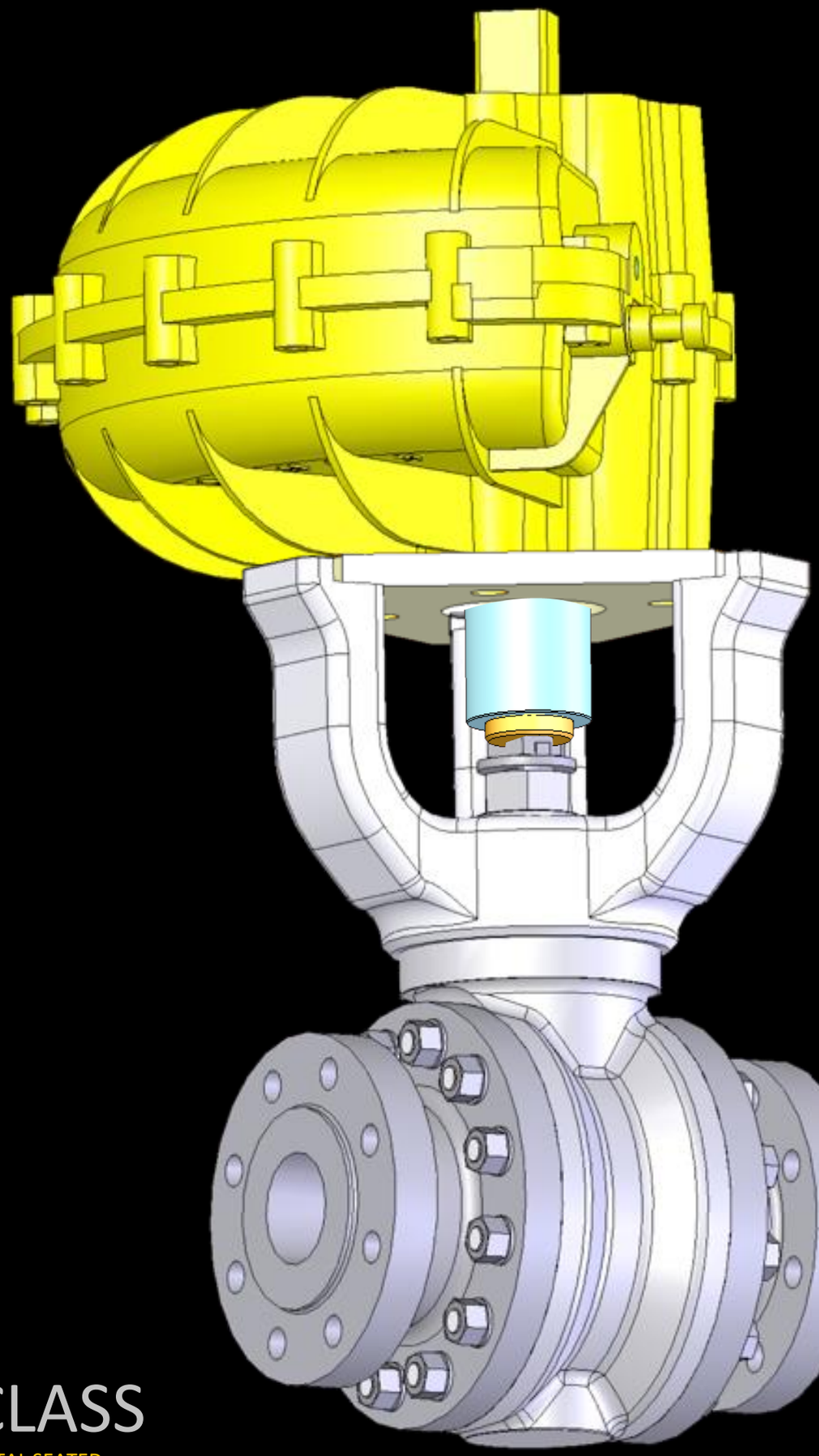
Easy to Assemble



M-CLASS
CUSTOM METAL SEATED

*“LEVEL HEADED”*

gosco VALVES



# TRIPOD MOUNT

Perfectly Flat
(3 points define a plane)

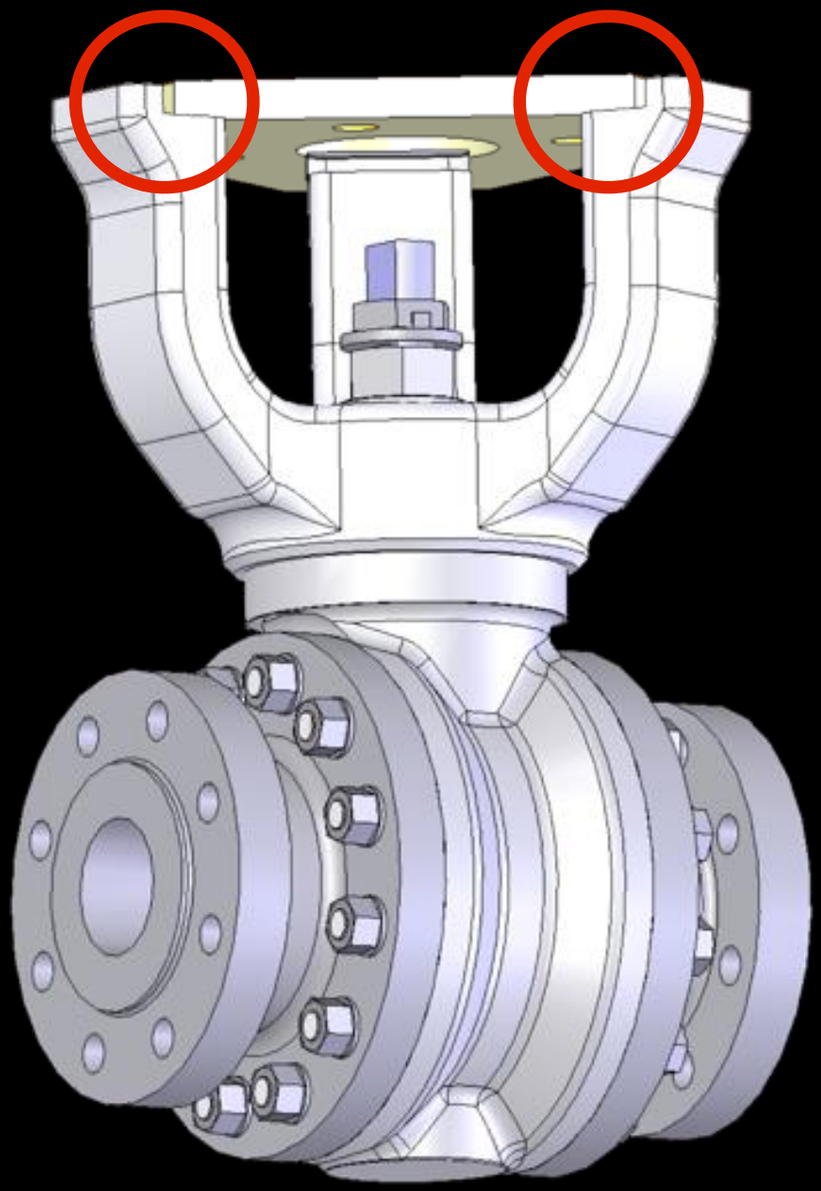
Easy to Assemble

M-CLASS
CUSTOM METAL SEATED

*“LEVEL HEADED”*

gosco VALVES

# TRIPOD MOUNT



Perfectly Flat
(3 points define a plane)

Easy to Assemble

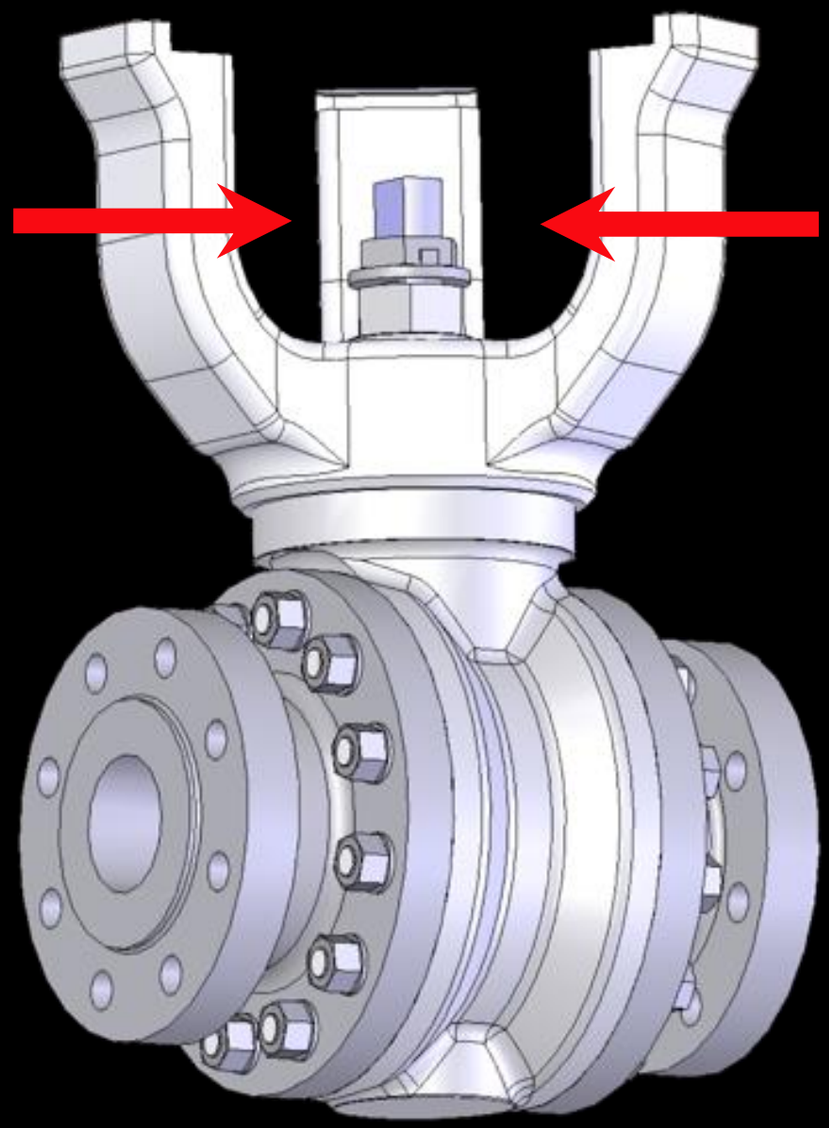
Perfectly Aligned
(Mounting plate/Tripod prongs are CNC machined)

M-CLASS
CUSTOM METAL SEATED

*"LEVEL HEADED"*

gosco VALVES

# TRIPOD MOUNT



## Perfectly Flat
(3 points define a plane)

## Easy to Assemble

## Perfectly Aligned
(Mounting plate/Tripod prongs are CNC machined)

## Open Between The Prongs
(Acts as a heat sink / easy access to packing)

M-CLASS
CUSTOM METAL SEATED

*“LEVEL HEADED”*

gosco VALVES

# SEAT DESIGN

M-CLASS

CUSTOM METAL SEATED

*“FREE FALL”*

gosco VALVES

# COMPETITOR'S SEAT/SPRING DESIGN

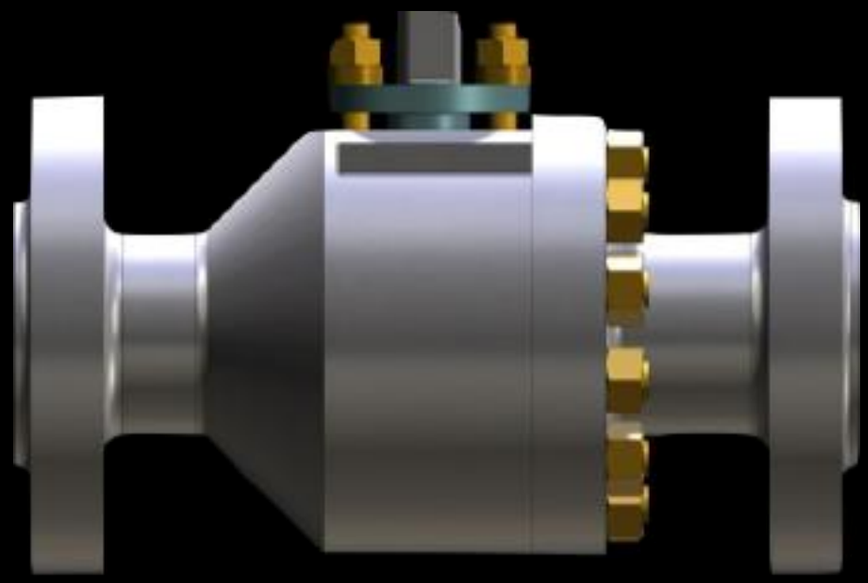
M-CLASS

CUSTOM METAL SEATED

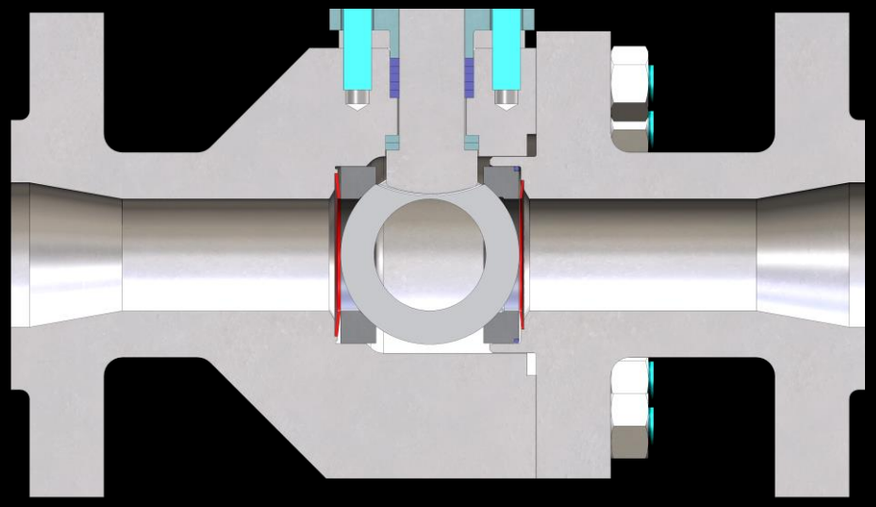
*"ALL PLUGGED UP"*

gosco VALVES

# COMPETITOR'S  SEAT/SPRING DESIGN

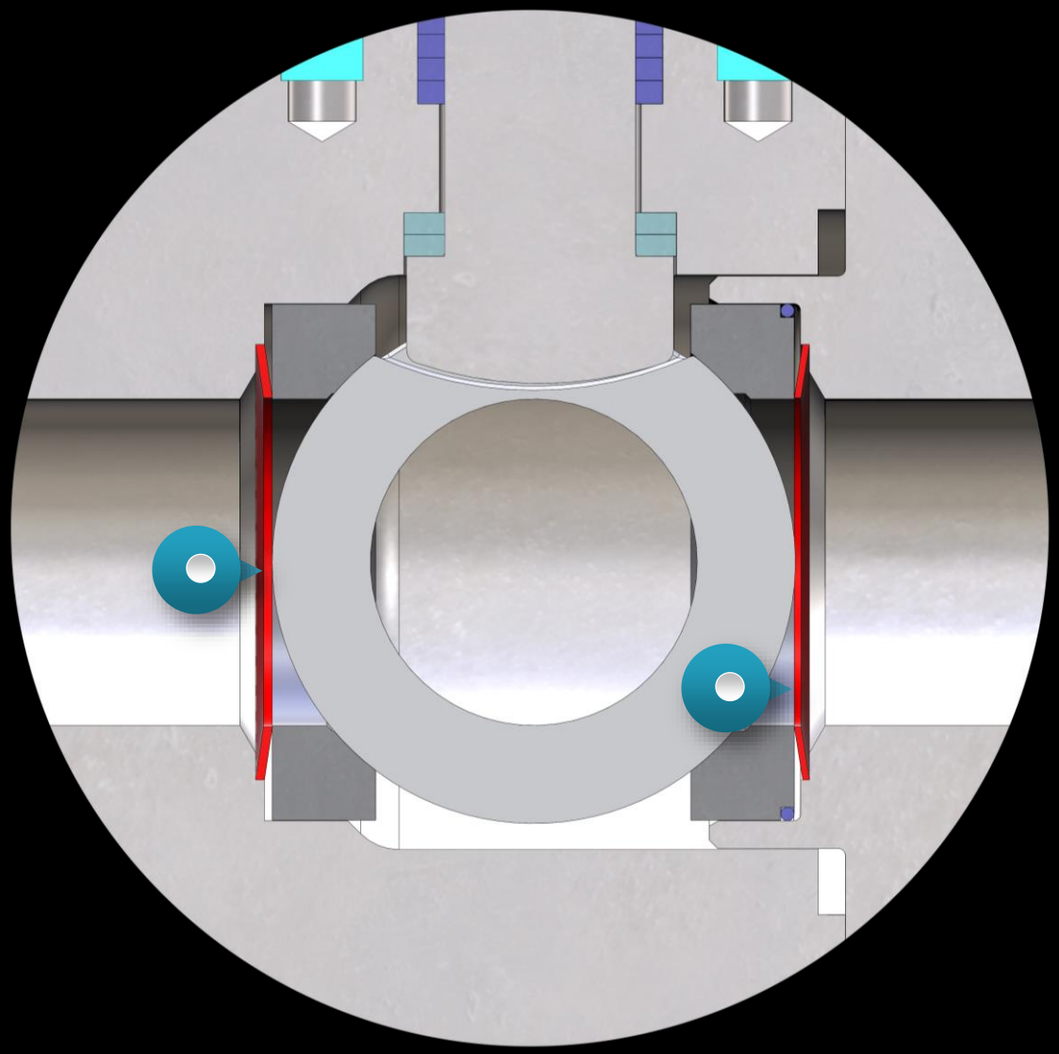


# COMPETITOR'S SEAT/SPRING DESIGN



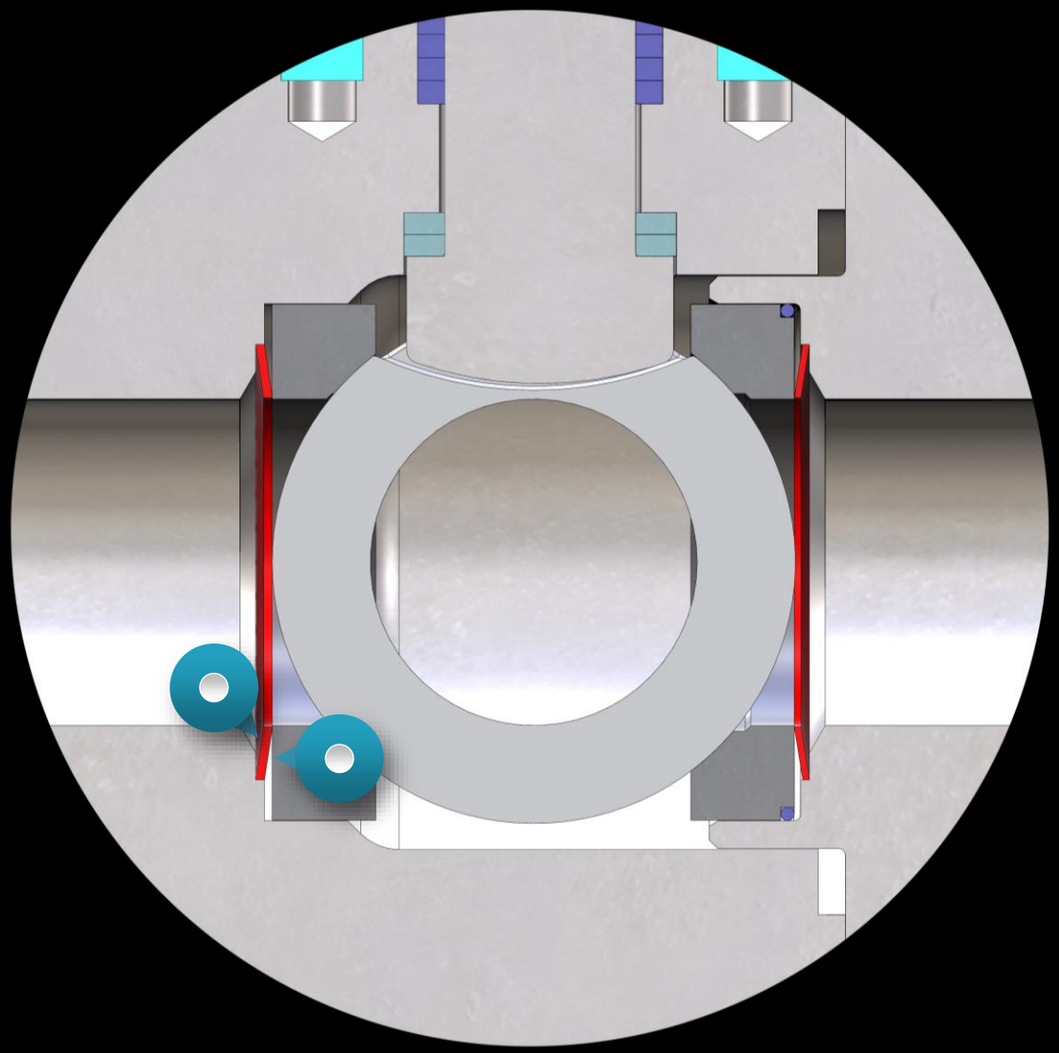
# COMPETITOR'S  SEAT/SPRING DESIGN

Belleville springs

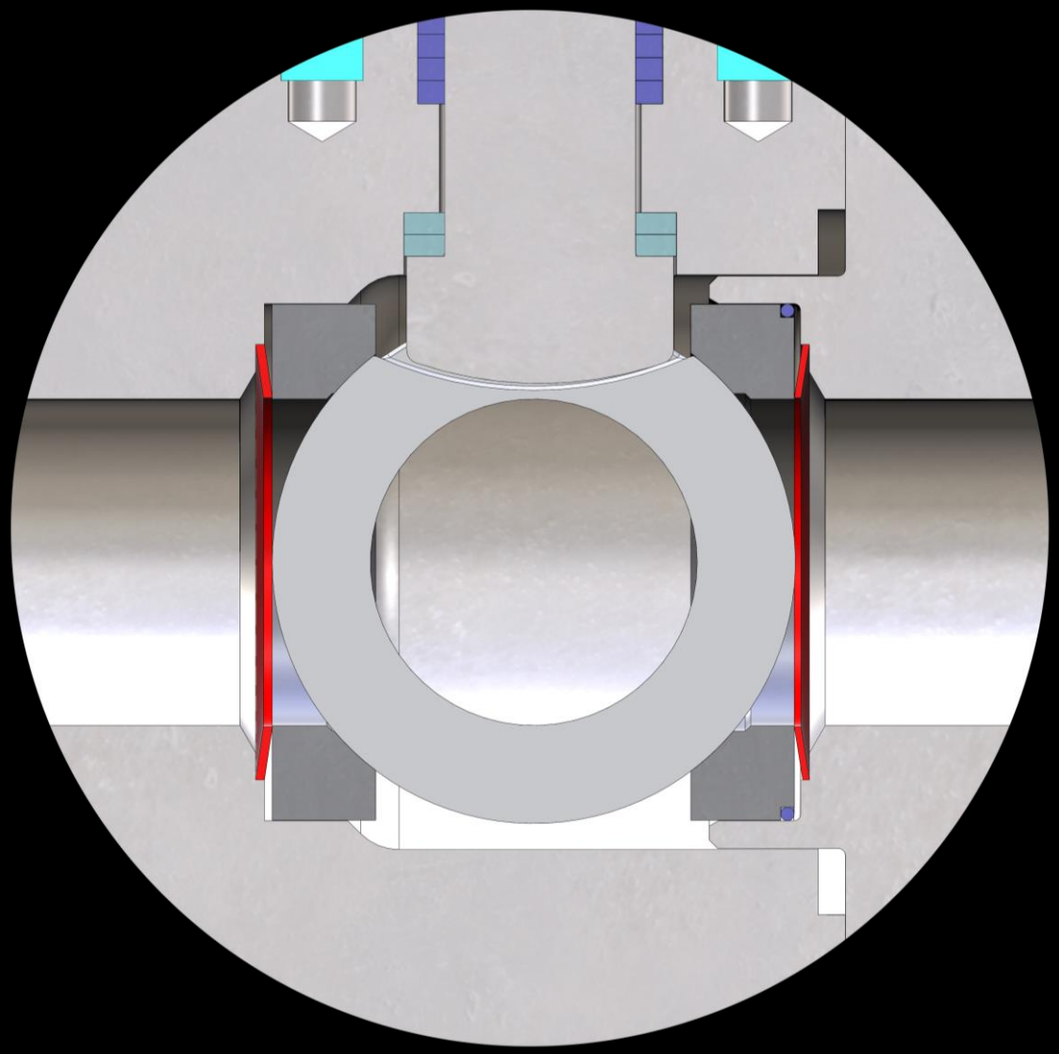


# COMPETITOR'S SEAT/SPRING DESIGN

Media gets trapped around the Bellevilles



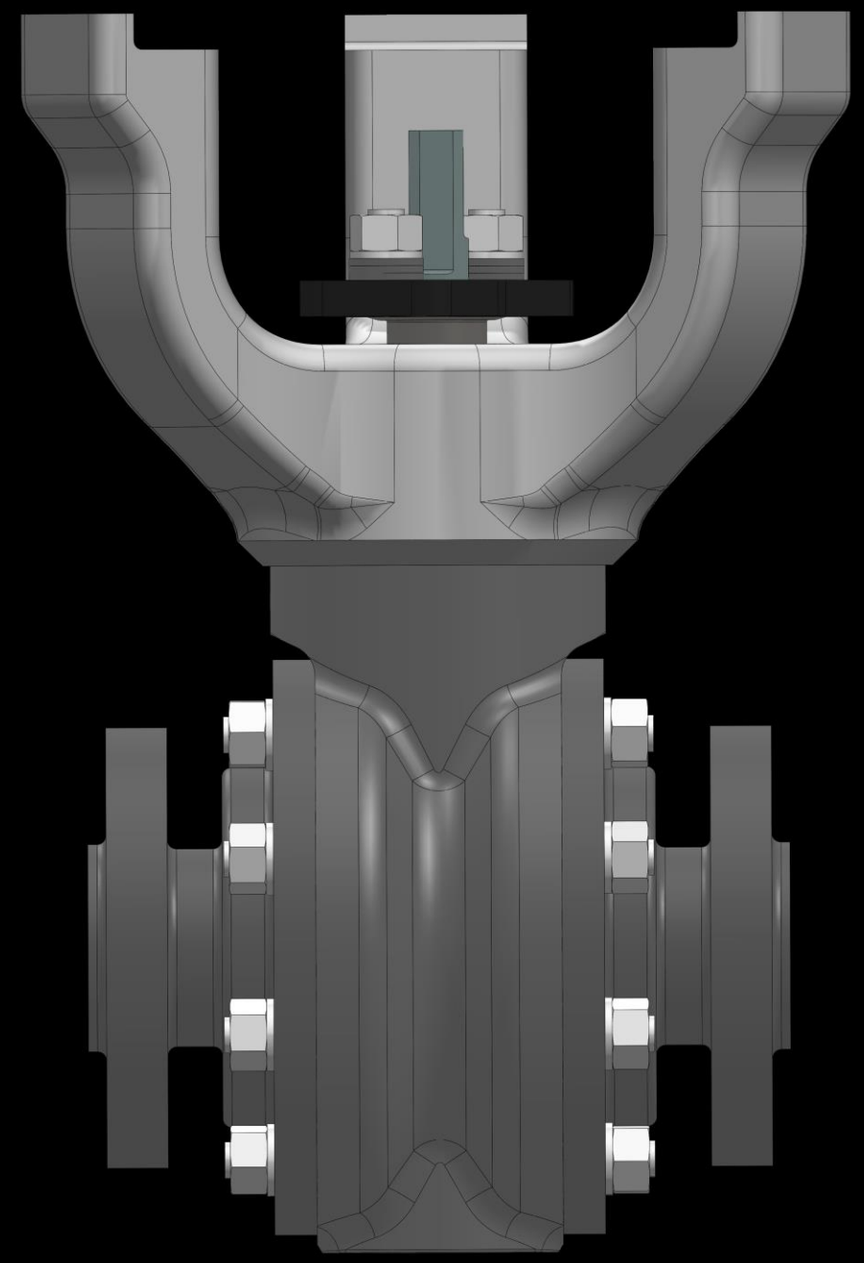
# COMPETITOR'S SEAT/SPRING DESIGN



Valve locks up

Springs can't "give" when ball needs to move back (as the valve opens)

# GOSCO’S SEAT/SPRING DESIGN



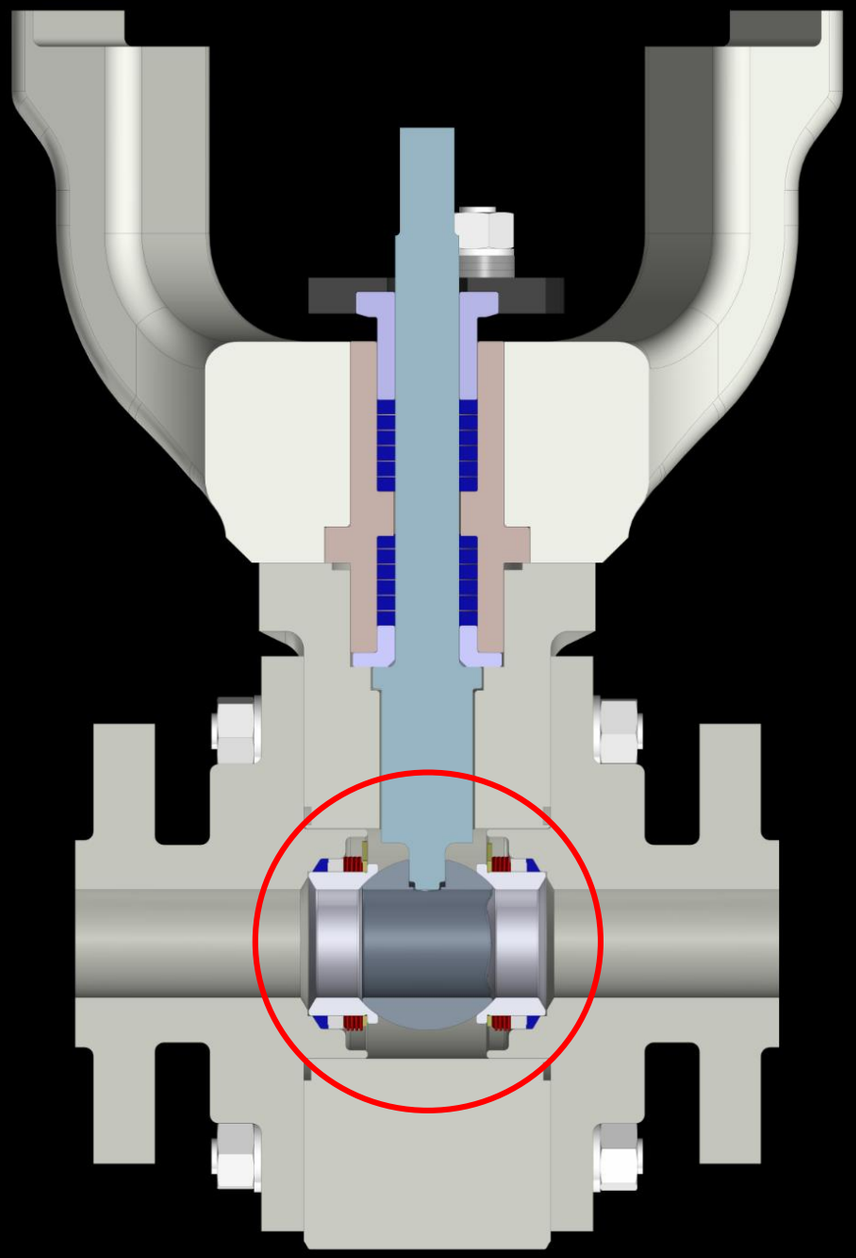
M-CLASS

CUSTOM METAL SEATED

*“FREE FALL”*

gosco VALVES

# GOSCO’S SEAT/SPRING DESIGN



M-CLASS

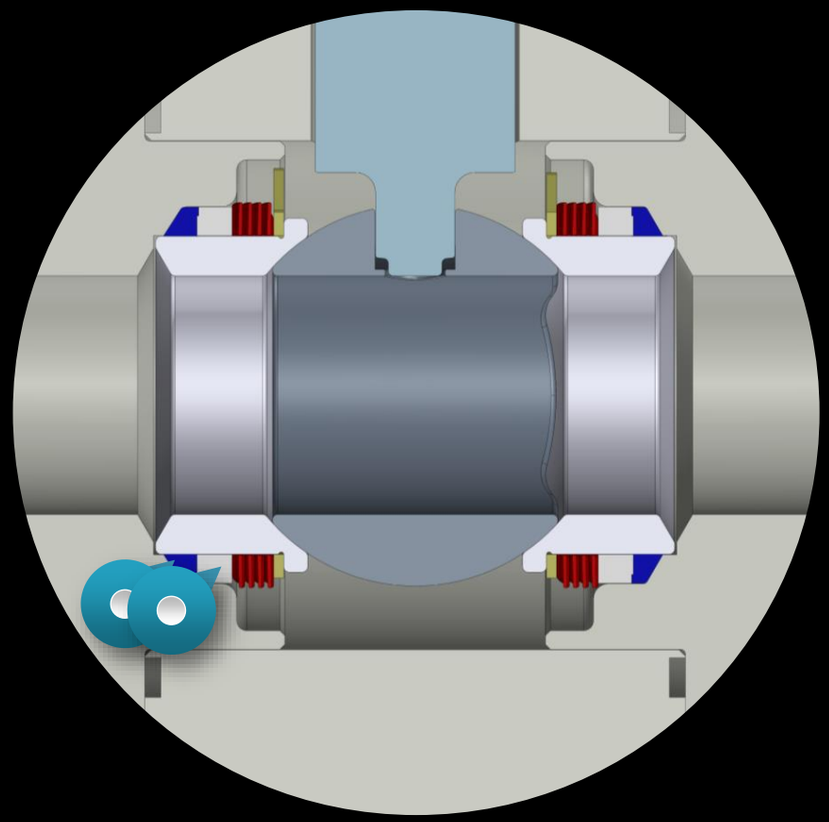
CUSTOM METAL SEATED

*“FREE FALL”*

gosco VALVES

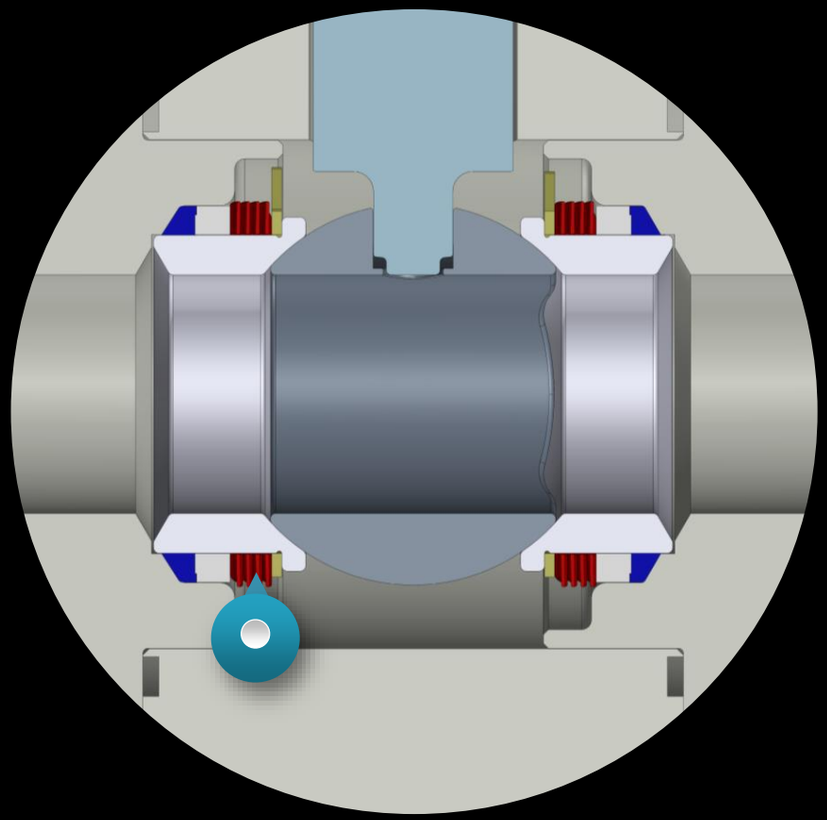
# GOSCO'S SEAT/SPRING DESIGN

Graphite wedge seal and
compression ring
(Secured in the valve flange)



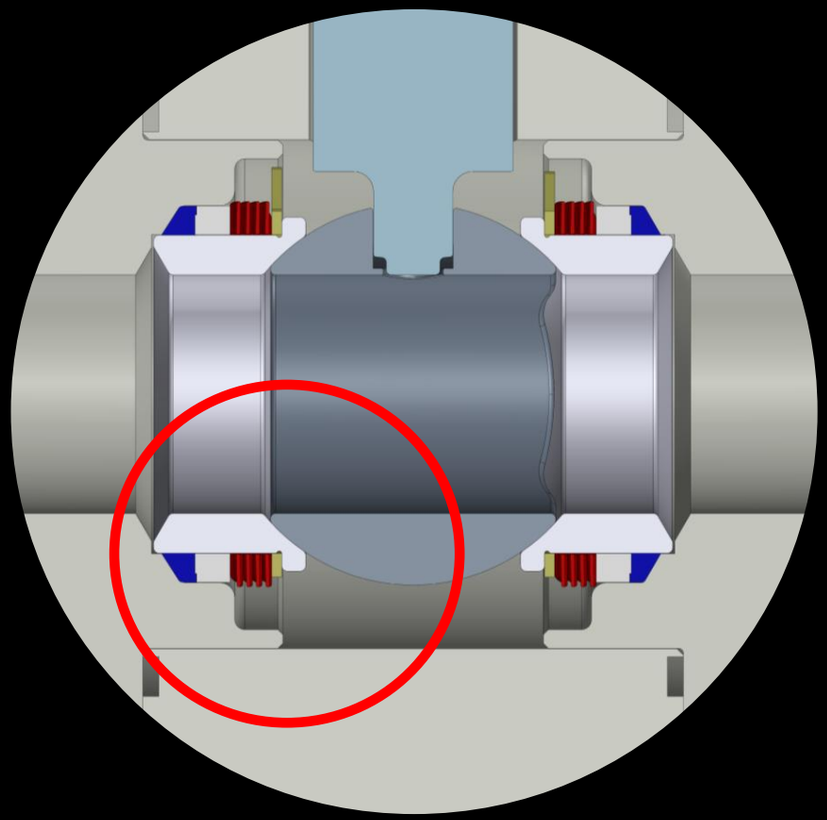
# GOSCO'S SEAT/SPRING DESIGN

Nested wave spring
(Downstream of wedge seal)



# GOSCO'S SEAT/SPRING DESIGN

Spring is completely open to media

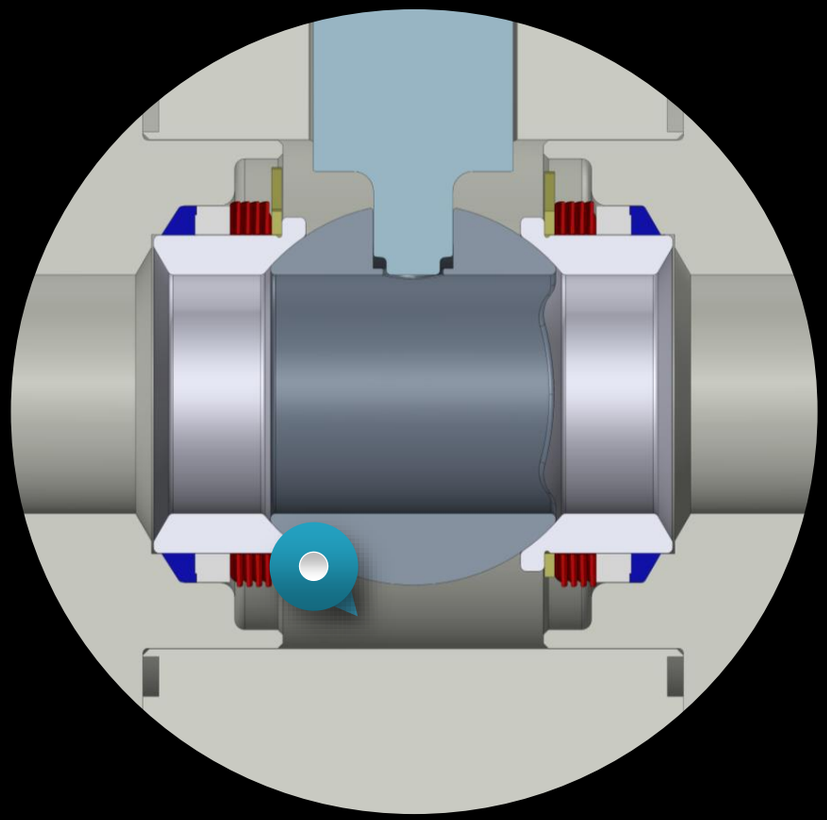




*"FREE FALL"*

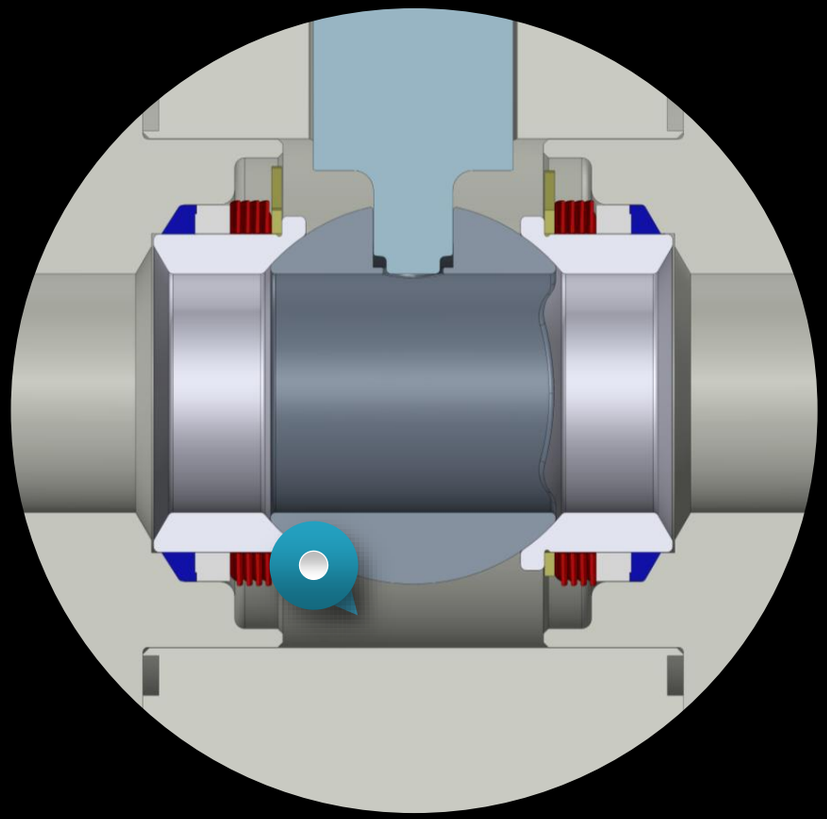
# GOSCO'S SEAT/SPRING DESIGN

Media can get in to the spring cavity, but also escapes just as easily



# GOSCO'S SEAT/SPRING DESIGN

Line pressure assists to pull media out of the spring cavity



M-CLASS

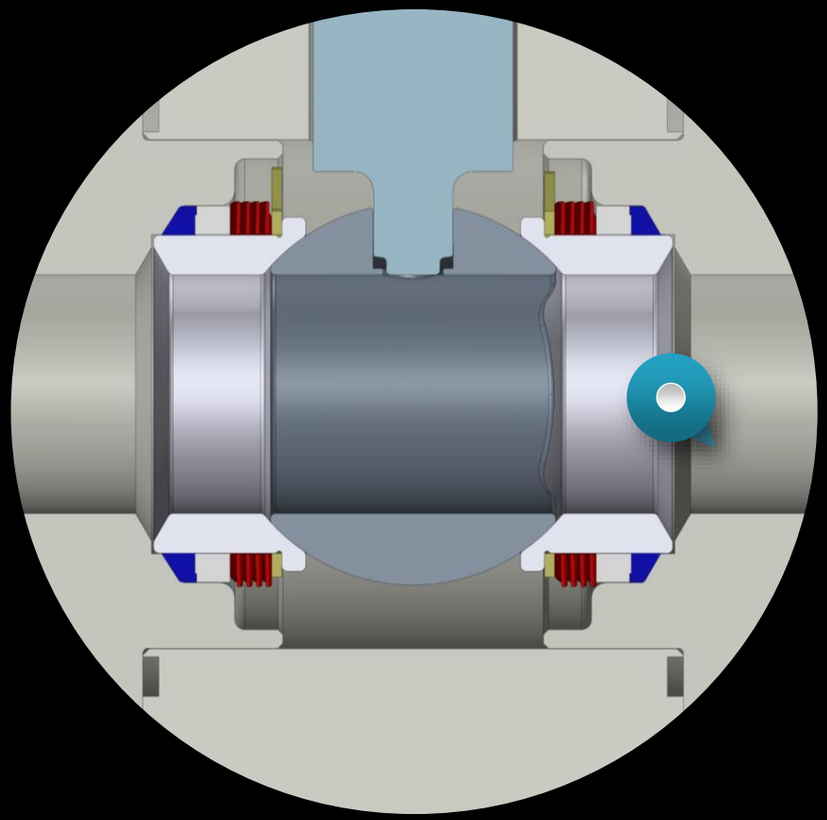
CUSTOM METAL SEATED

*"FREE FALL"*

gosco VALVES

# GOSCO'S SEAT/SPRING DESIGN

Line pressure assists to pull media out of the spring cavity



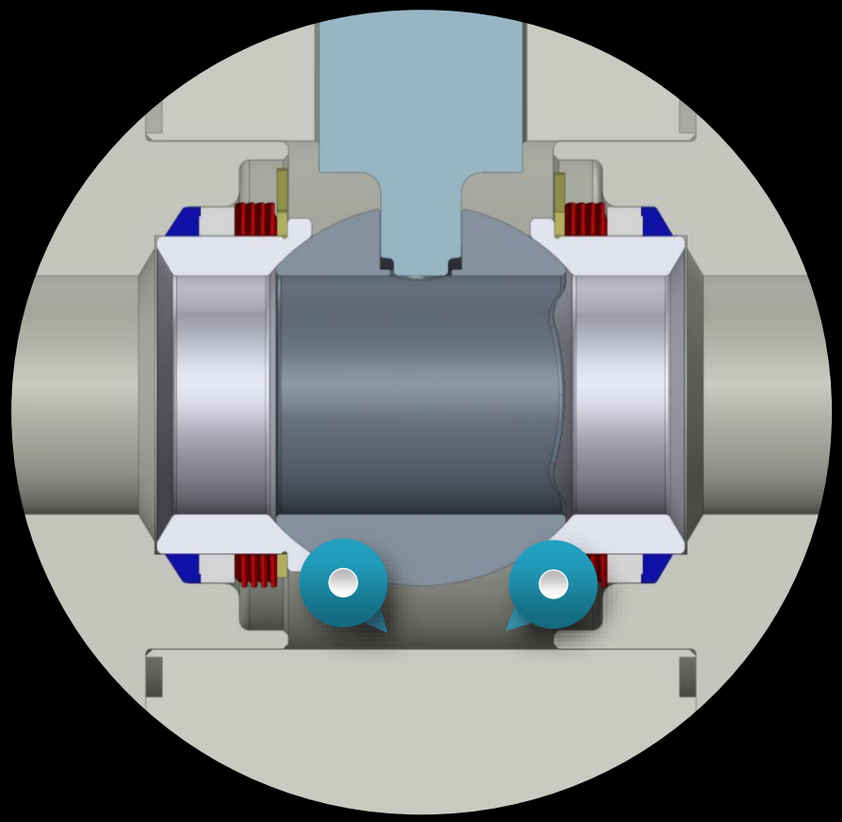
M-CLASS

CUSTOM METAL SEATED

*"FREE FALL"*

gosco VALVES

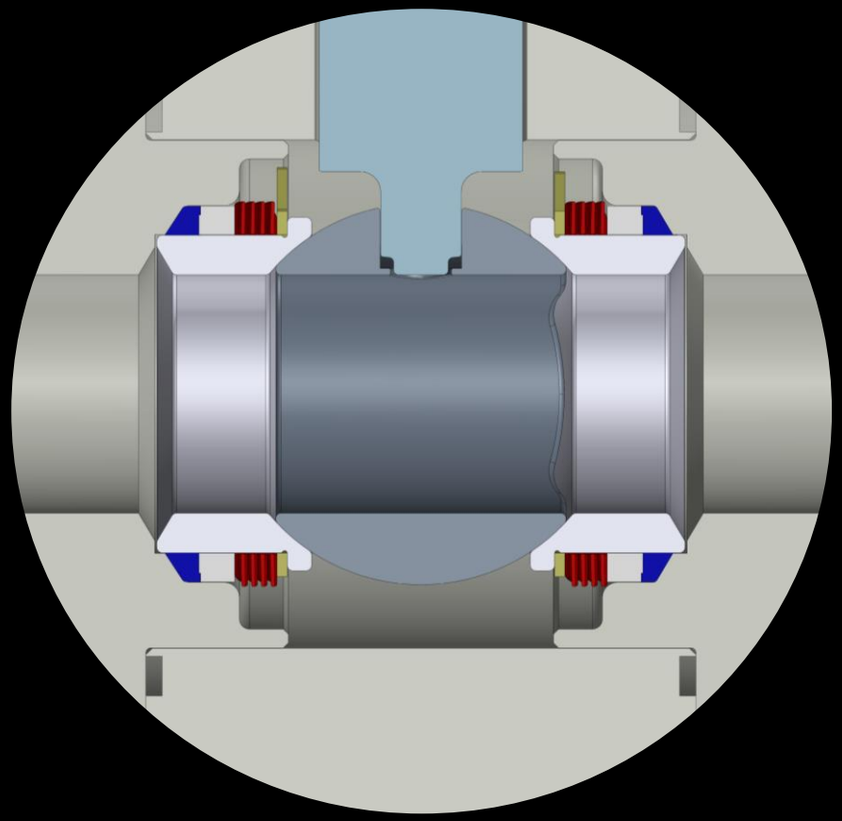
# GOSCO'S SEATS



Media flows freely around the springs

*"FREE FALL"*

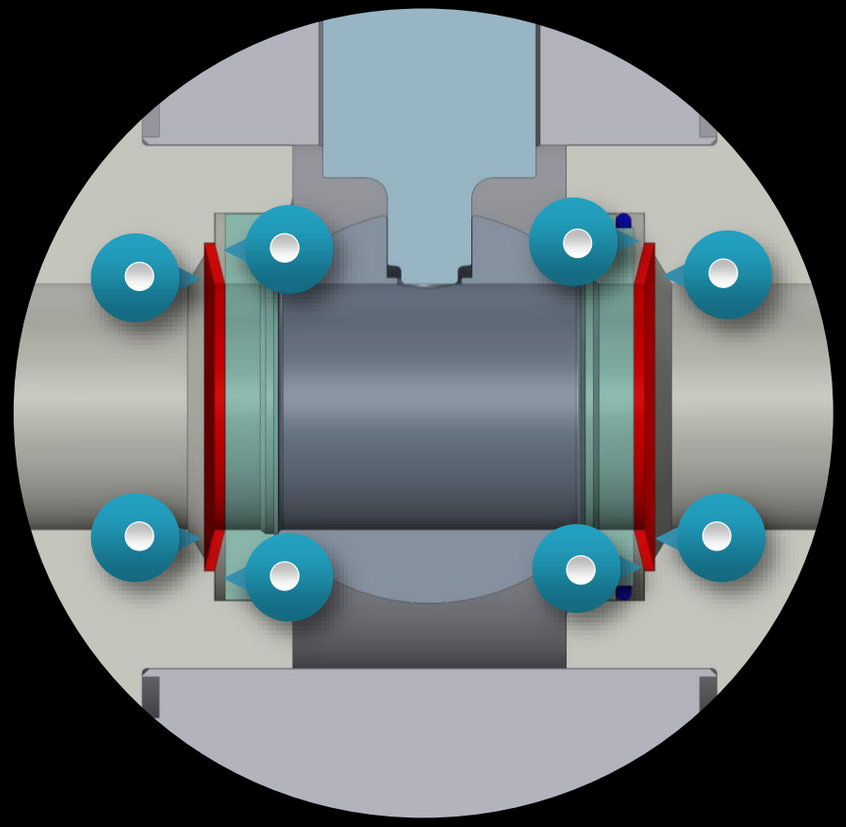
## GOSCO'S SEATS



Media flows freely around the springs

*"FREE FALL"*

## COMPETITOR'S SEATS



Media compacts around the Bellevilles

*"ALL PLUGGED UP"*

# BALL DESIGN

M-CLASS

CUSTOM METAL SEATED

*“SLOW POKE”*

gosco VALVES

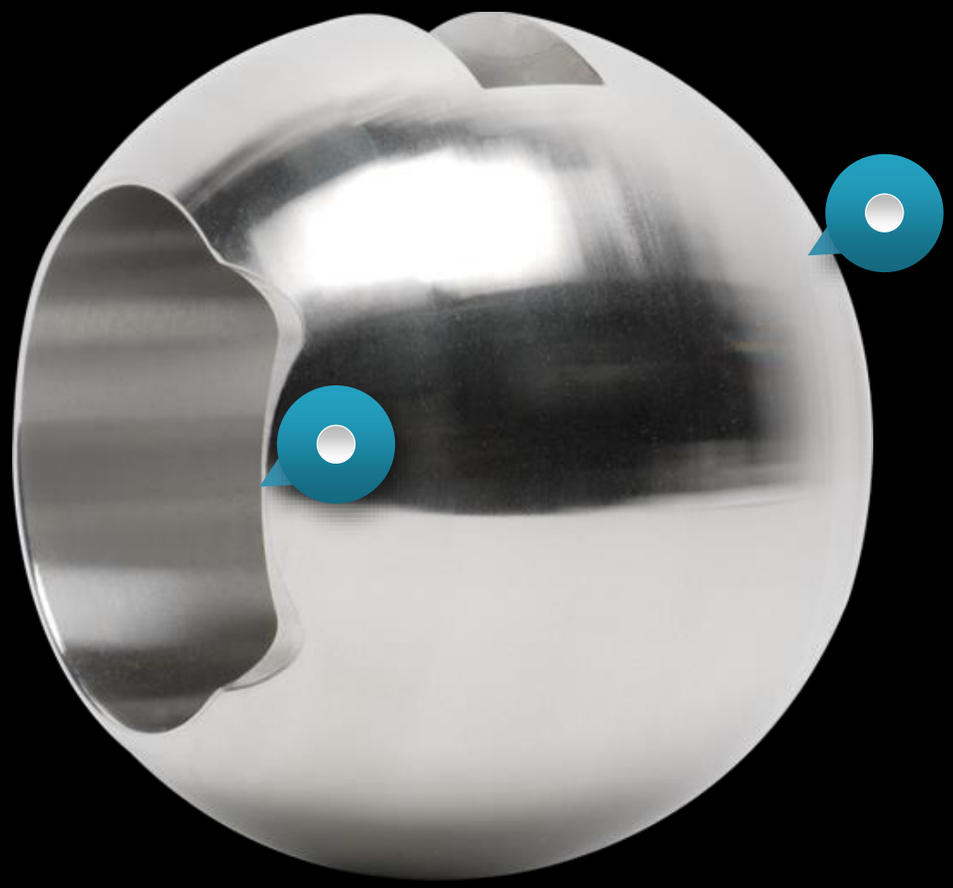
# GOSCO'S ARCUATE CUT BALL

Specific profile is cut on the ball to reduce velocities

# GOSCO'S ARCUATE CUT BALL

Arcuate cut is then hardened in the boronizing process

# GOSCO'S ARCUATE CUT BALL



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

# STANDARD BALL vs ARCUATE CUT

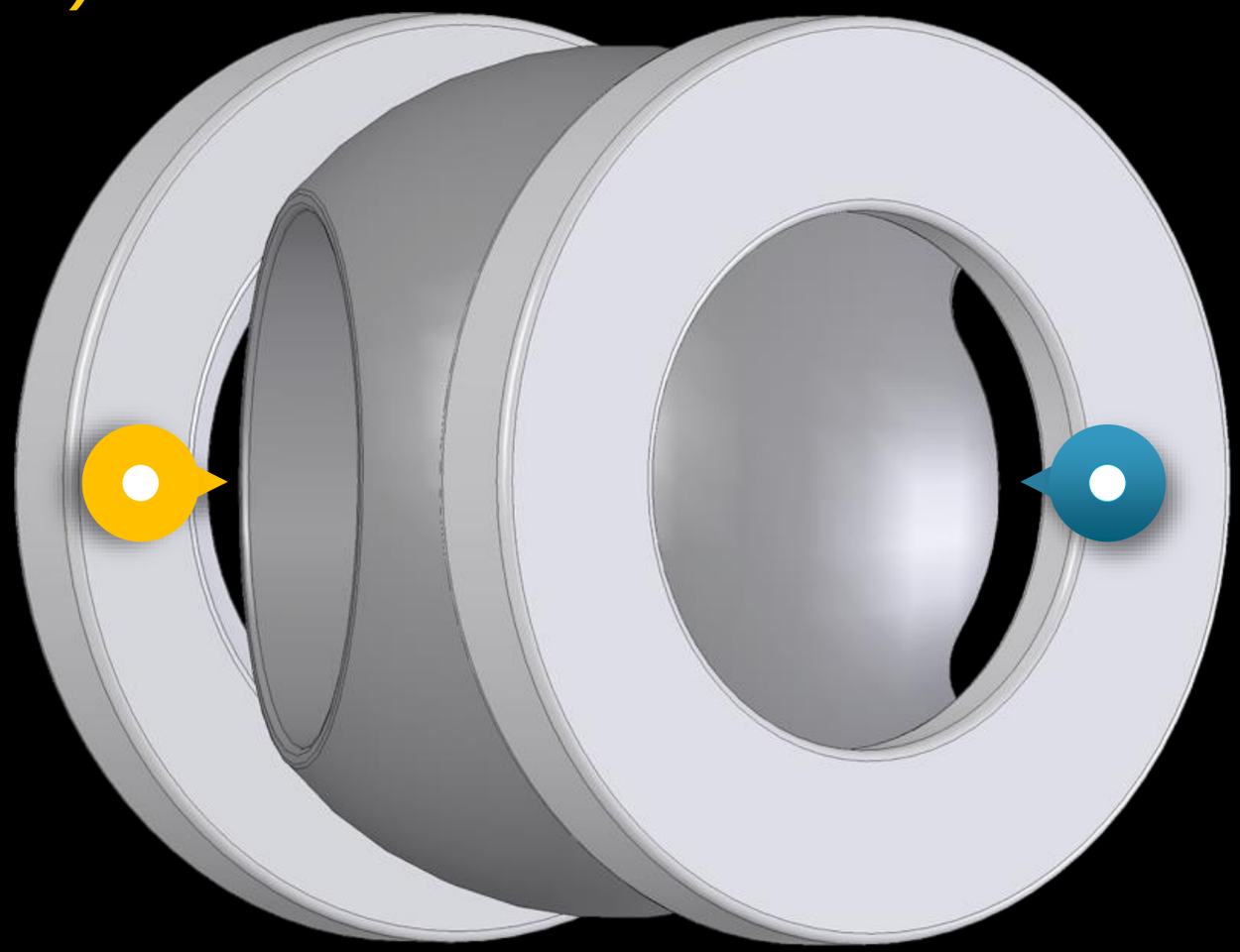
Illustration below shows a ball at 10% open.

## STANDARD BALL (Competition)

Small opening

High velocities

Trim damage



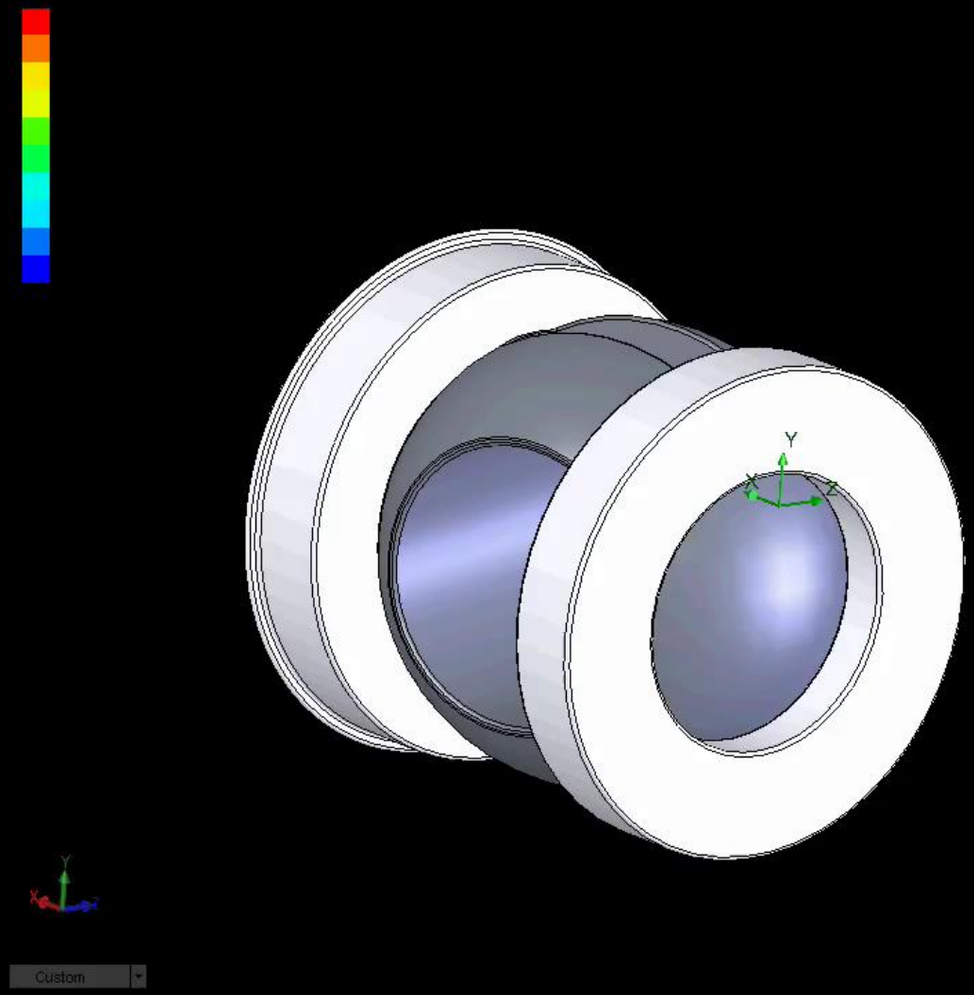
## ARCUATE CUT BALL (Gosco Valves)

3 times larger opening

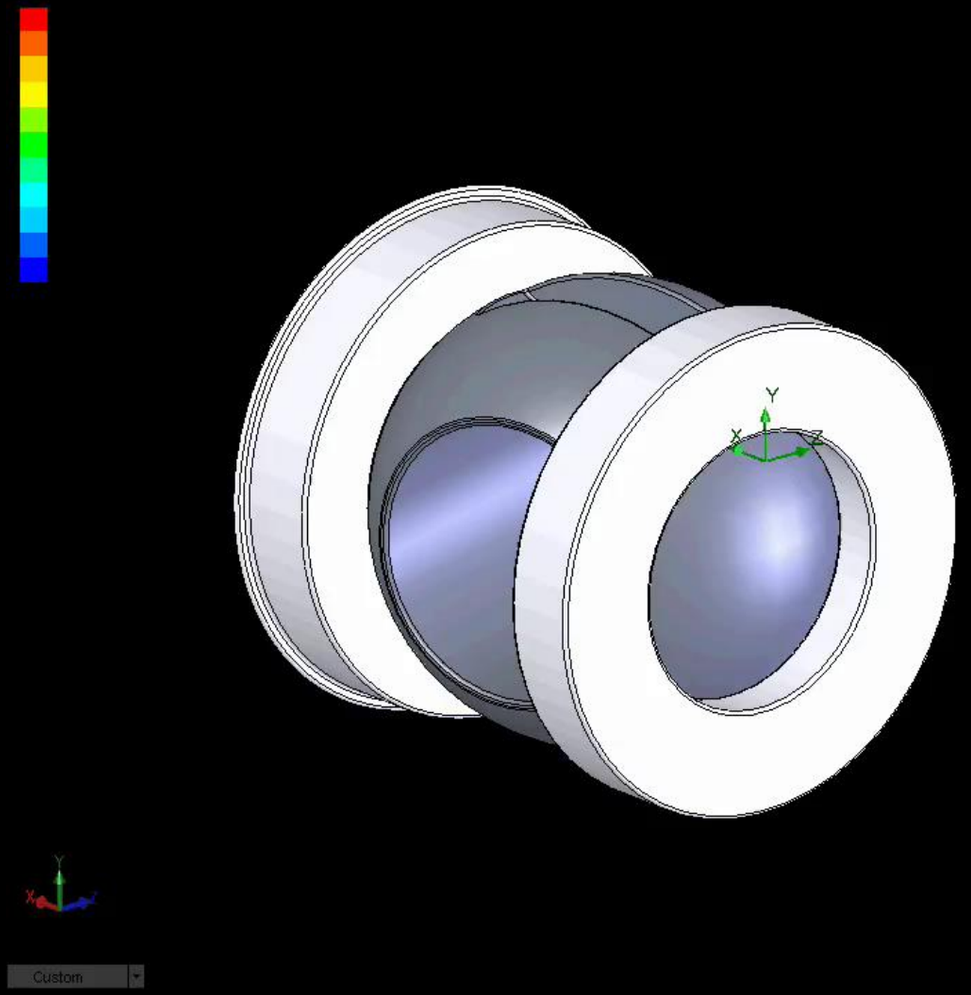
Velocities reduced by 2/3

Less trim damage
(Flow is spread out)

# COMPUTATIONAL FLUID DYNAMICS ANALYSIS (CFD)




STANDARD BALL




ARCUATE CUT BALL

M-CLASS

CUSTOM METAL SEATED

*“SLOW POKE”*

gosco VALVES

# GOSCO VARI-V BALLS

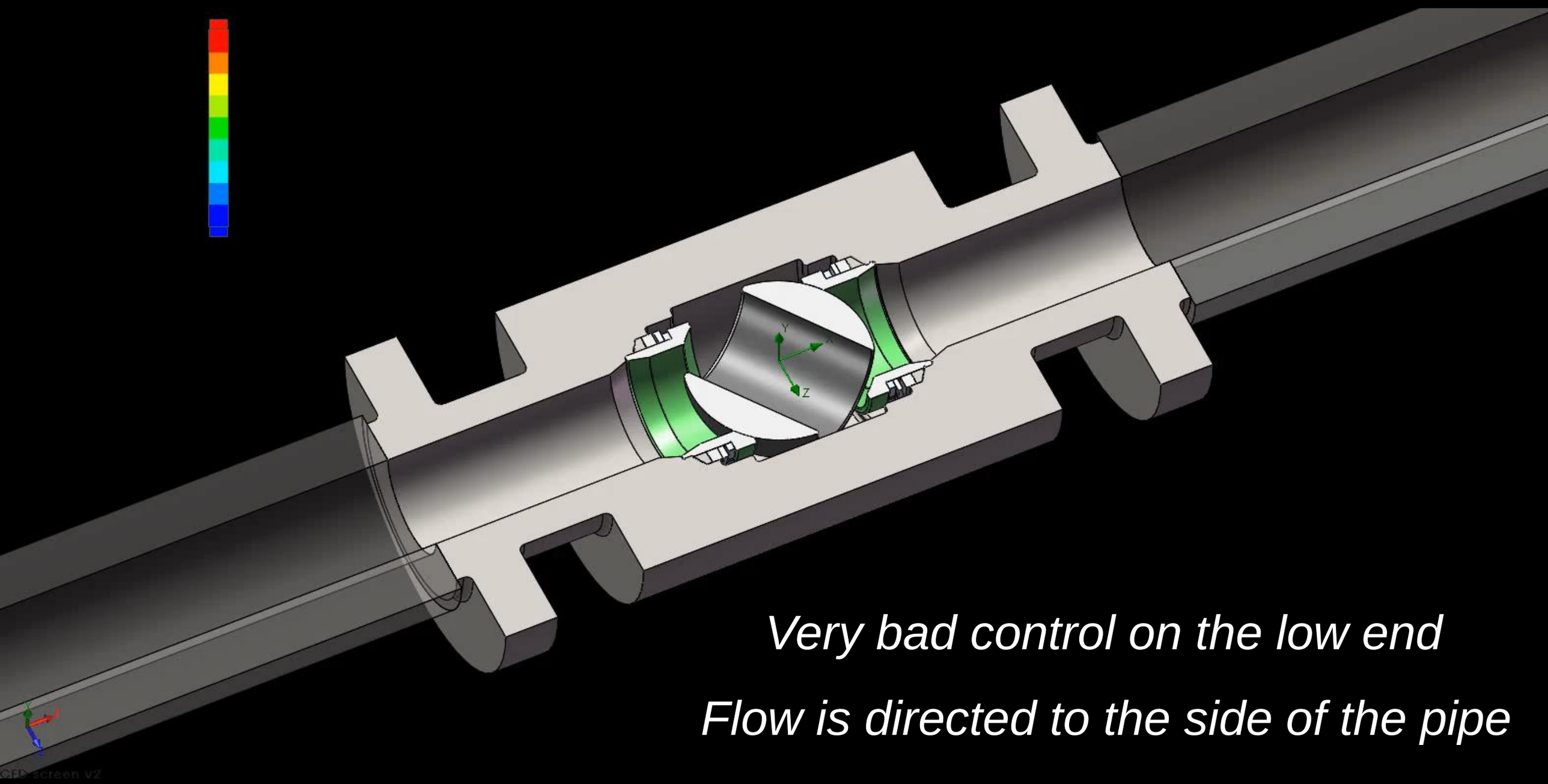

M-CLASS

CUSTOM METAL SEATED

*“CONTROL FREAK”*

gosco VALVES

# STANDARD BALL




*Very bad control on the low end*

*Flow is directed to the side of the pipe*

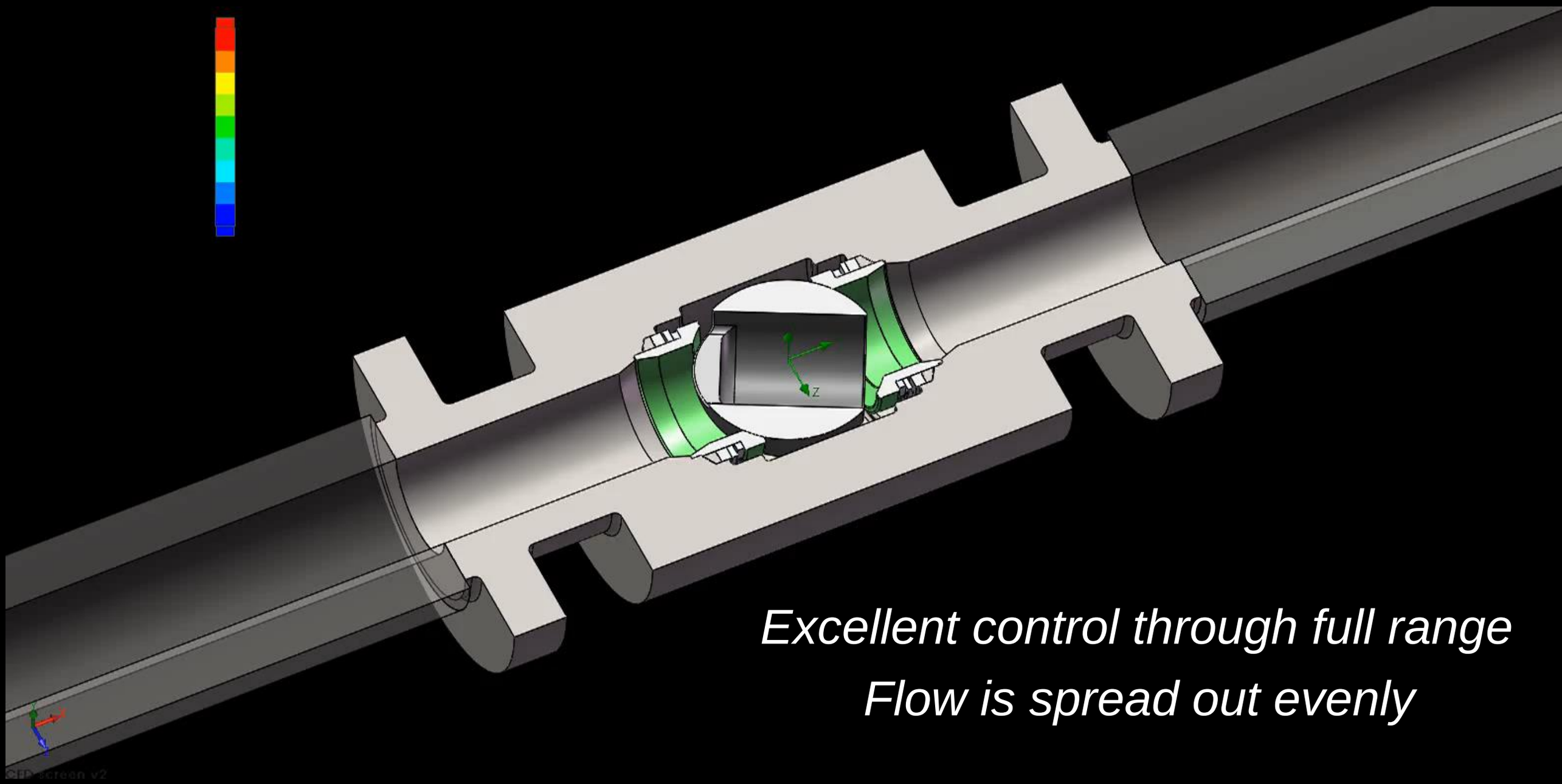
M-CLASS

CUSTOM METAL SEATED

*“OUT OF CONTROL”*

gosco VALVES

# GOSCO VARI-V BALL



*Excellent control through full range*

*Flow is spread out evenly*

M-CLASS

CUSTOM METAL SEATED

*“CONTROL FREAK”*

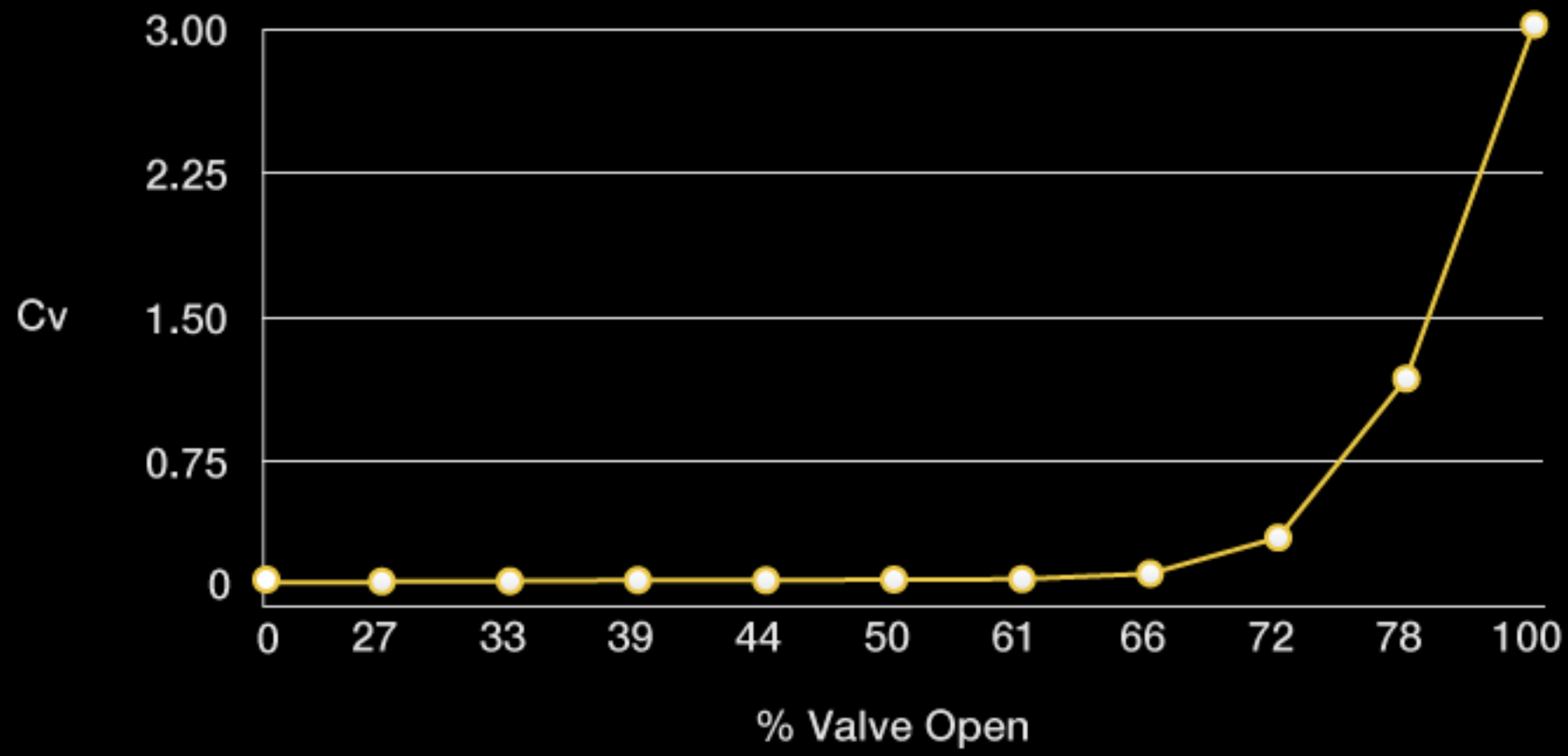
gosco VALVES

# CUSTOM VARI-V BALLS

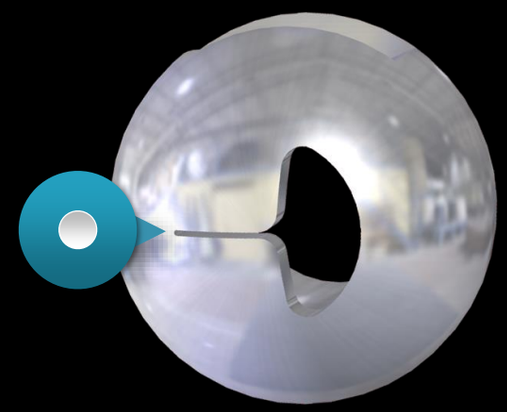
GOSCO can custom design any profile for your application

# CUSTOM V-BALL $C_V$ CURVE

Flow requirements for one of our custom V-balls.




**SLOT WIDTH WAS ALMOST AS THIN AS A HUMAN HAIR**



M-CLASS

CUSTOM METAL SEATED

*"CONTROL FREAK"*

gosco VALVES

# SHAFT PACKING

M-CLASS

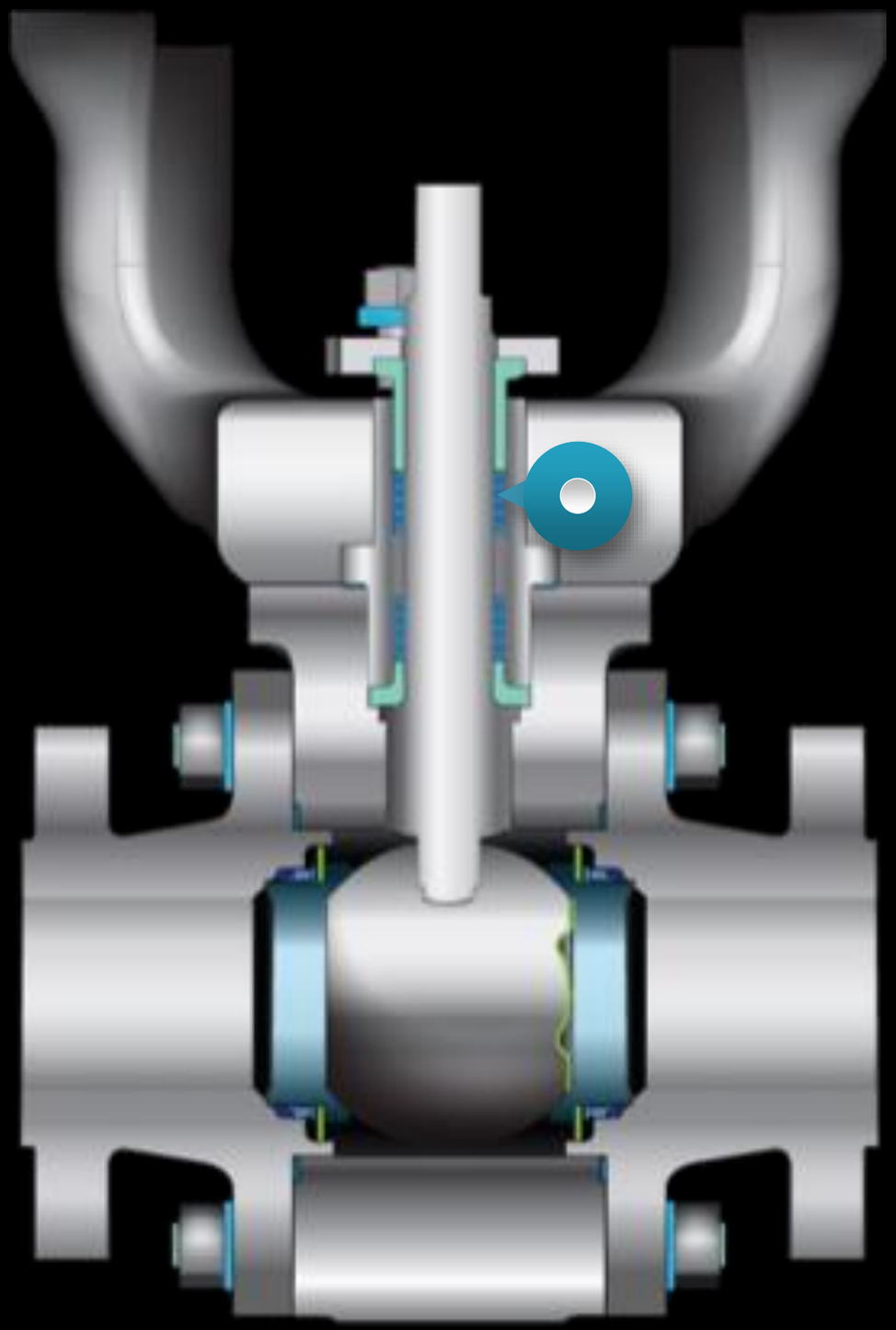
CUSTOM METAL SEATED

*“THE BUCK STOPS HERE”*

gosco VALVES


# COMPETITOR'S VALVE
## (SINGLE PACKING)

When packing leaks, there is risk of downtime, expense and injury



# GOSCO'S VALVE
## (DUAL PACKING)

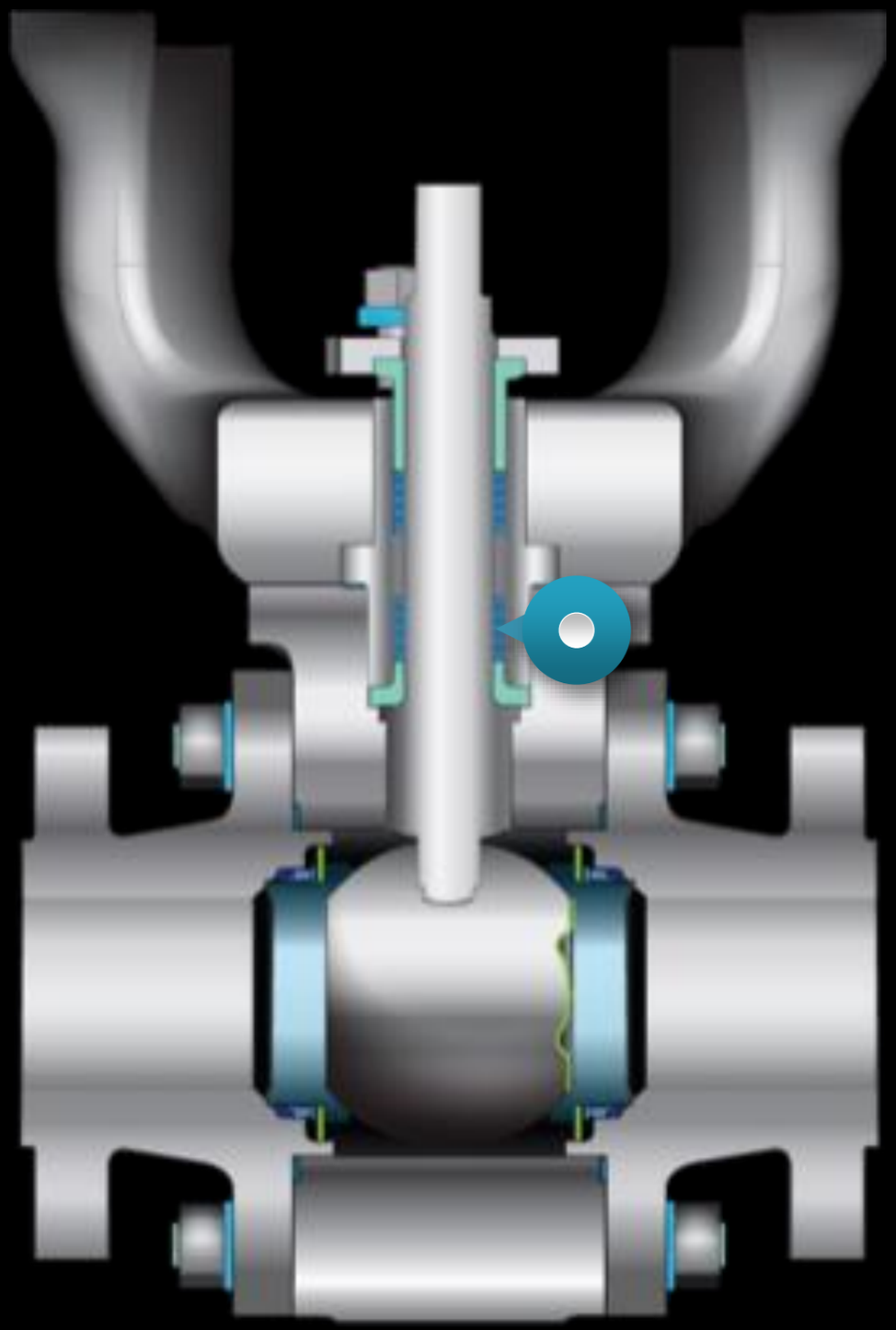
Live loaded upper packing

M-CLASS

CUSTOM METAL SEATED

*"THE BUCK STOPS HERE"*

gosco VALVES



# GOSCO'S VALVE
## (DUAL PACKING)

Live loaded upper packing

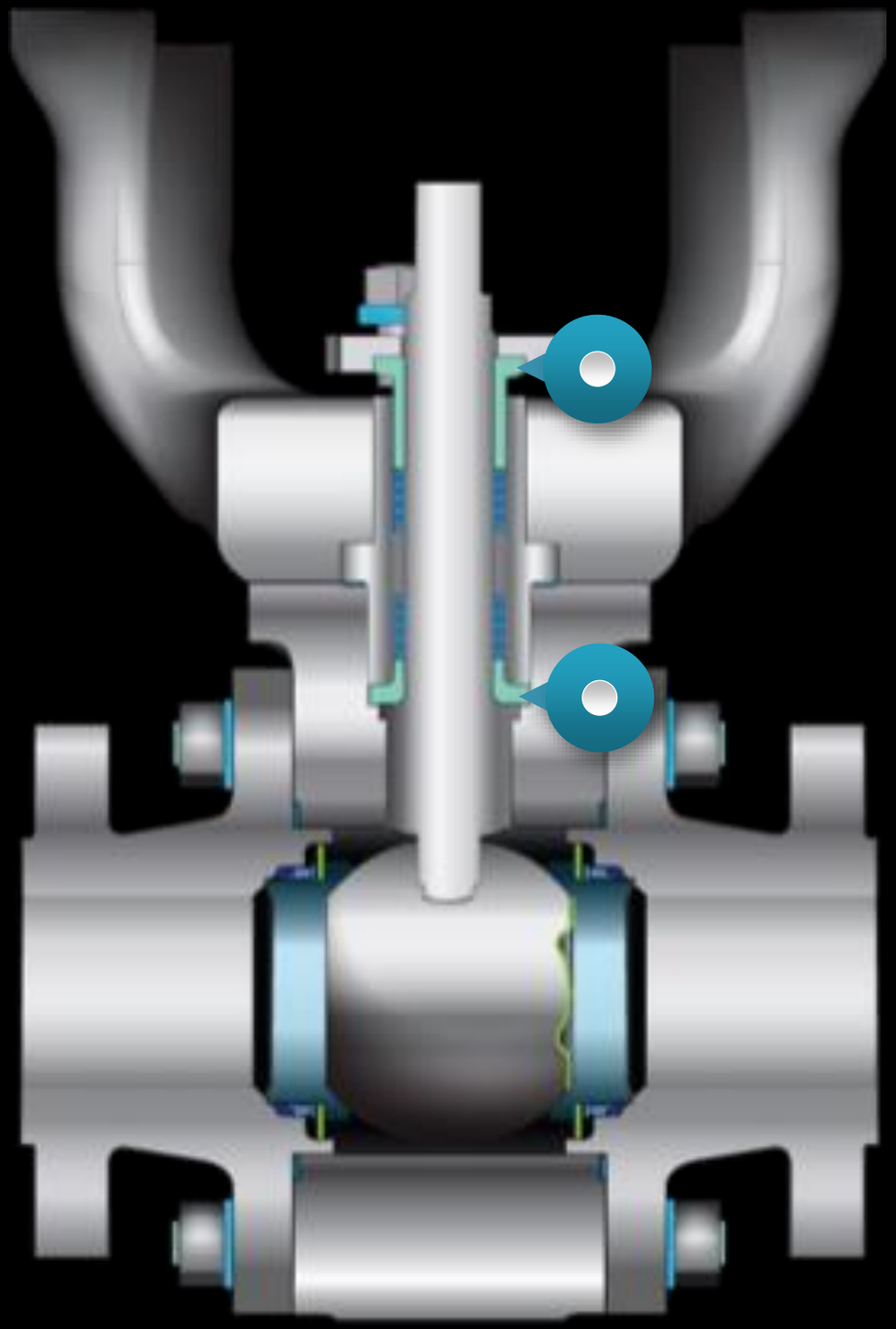
SmartPak™ lower packing

M-CLASS

CUSTOM METAL SEATED

*"THE BUCK STOPS HERE"*

gosco VALVES



# GOSCO'S VALVE
## (DUAL PACKING)

Live loaded upper packing
SmartPak™ lower packing
Dual shaft guides

M-CLASS
CUSTOM METAL SEATED

*"THE BUCK STOPS HERE"*

gosco VALVES

# ALLOY OPTIONS

M-CLASS

CUSTOM METAL SEATED

*“CHAMELEON”*

gosco VALVES

# ALLOY OPTIONS

Hastelloy

Inconel

Alloy 20

Titanium

Monel

Incoloy

Super Duplex

Duplex

Tantalum

Carbon Steel

## CUSTOMER SPECIFIED

M-CLASS

CUSTOM METAL SEATED

*“CHAMELEON”*

gosco VALVES

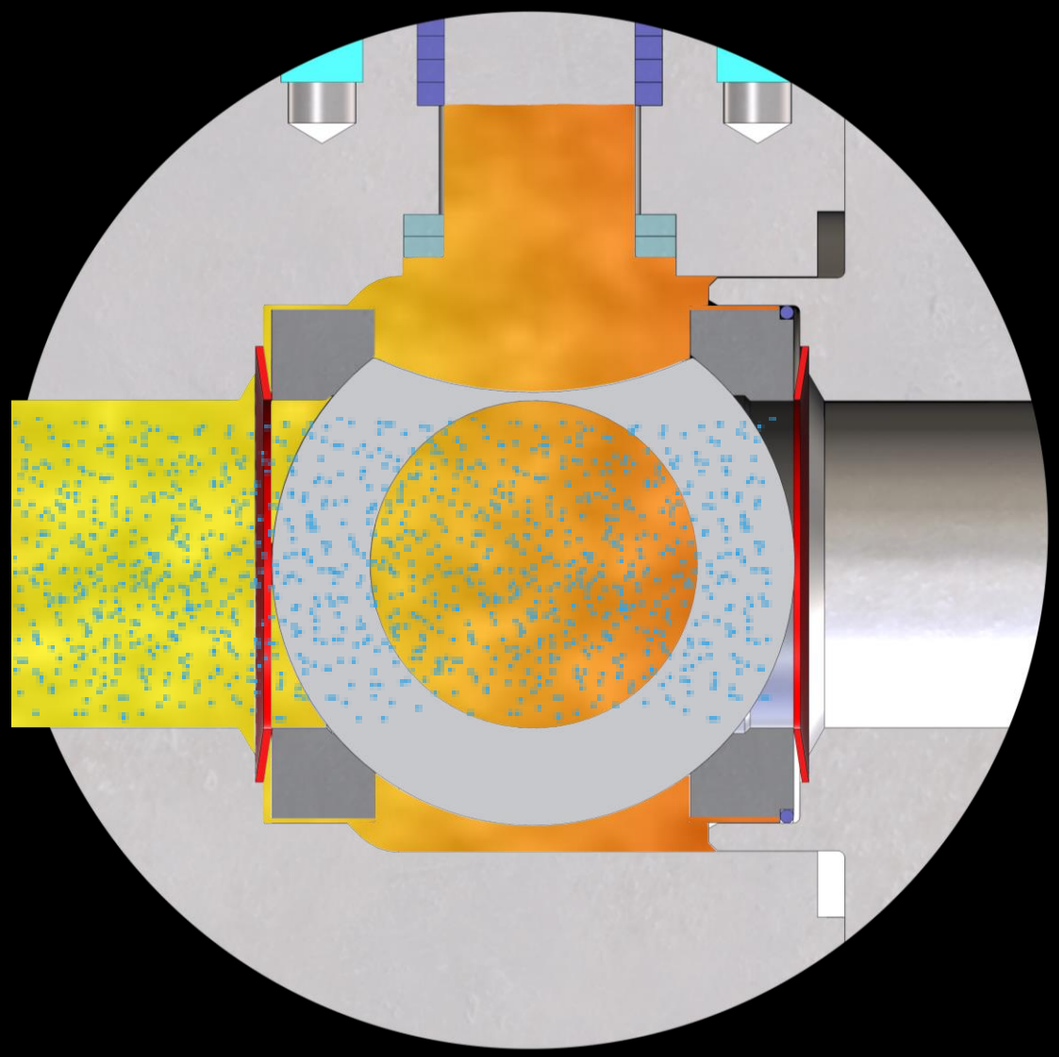
# TRULY BI-DIRECTIONAL

M-CLASS

CUSTOM METAL SEATED

*“WHAT CAN I SAY”*

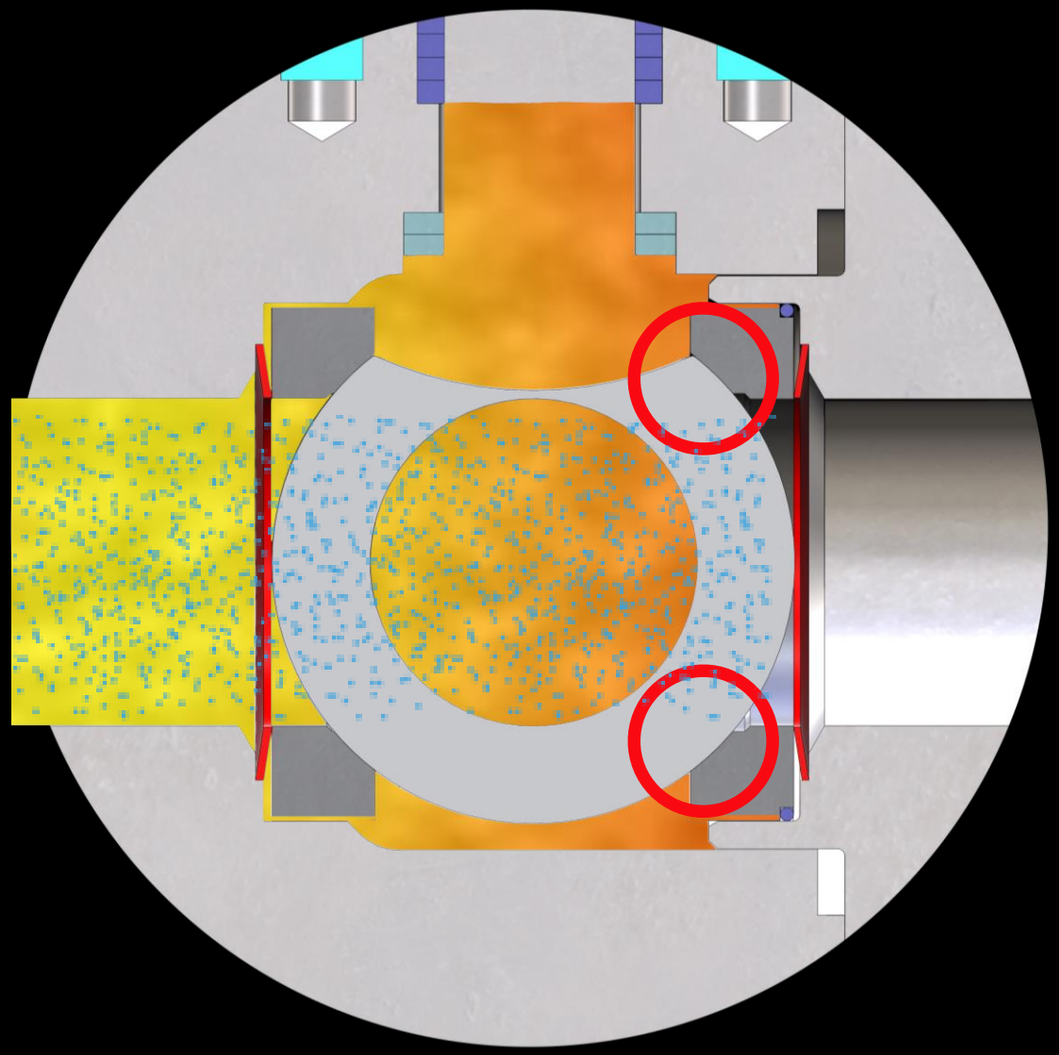
gosco VALVES



# COMPETITOR'S VALVE
## (UNI–DIRECTIONAL SEALING)

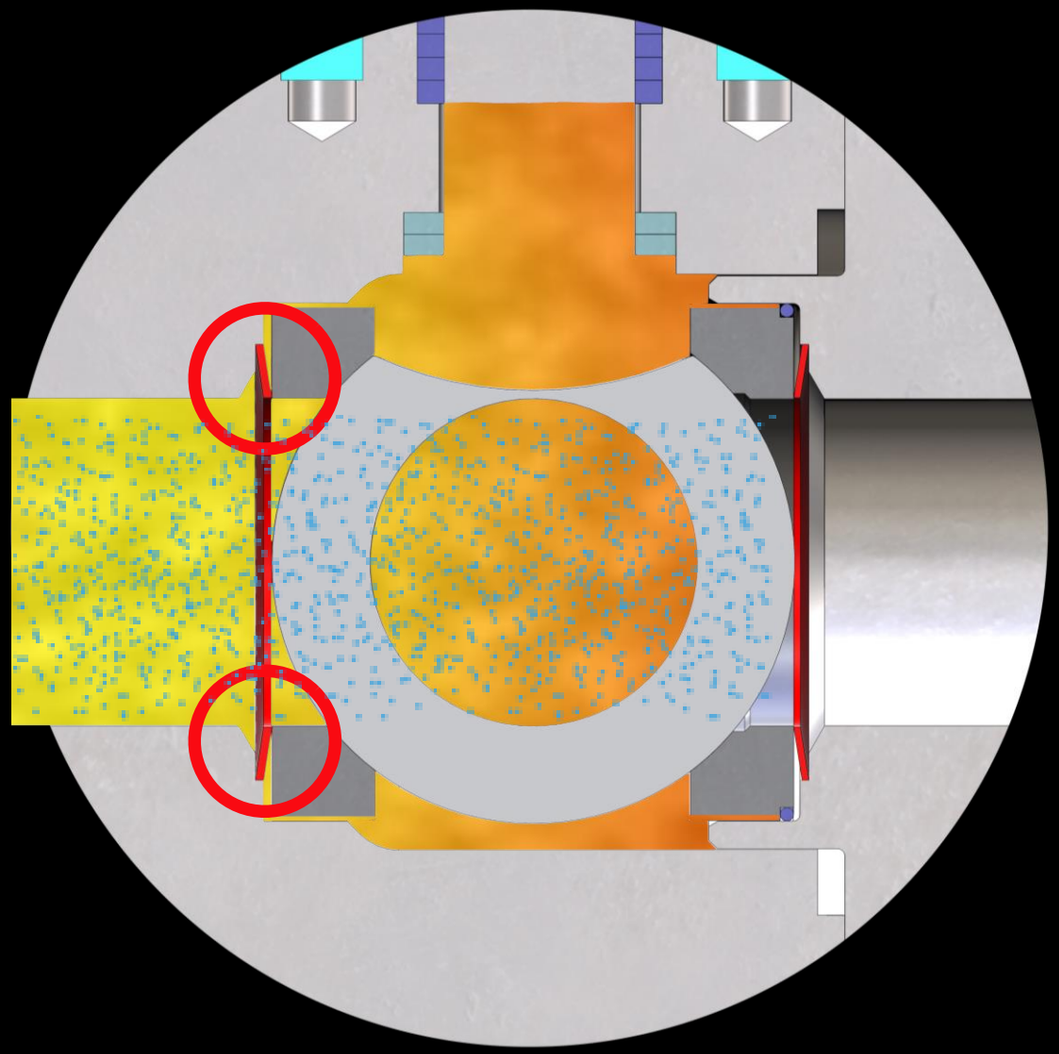
With upstream flow

# COMPETITOR'S VALVE
## (UNI–DIRECTIONAL SEALING)



Seal is created between the downstream seat and ball

# COMPETITOR'S VALVE
## (UNI–DIRECTIONAL SEALING)

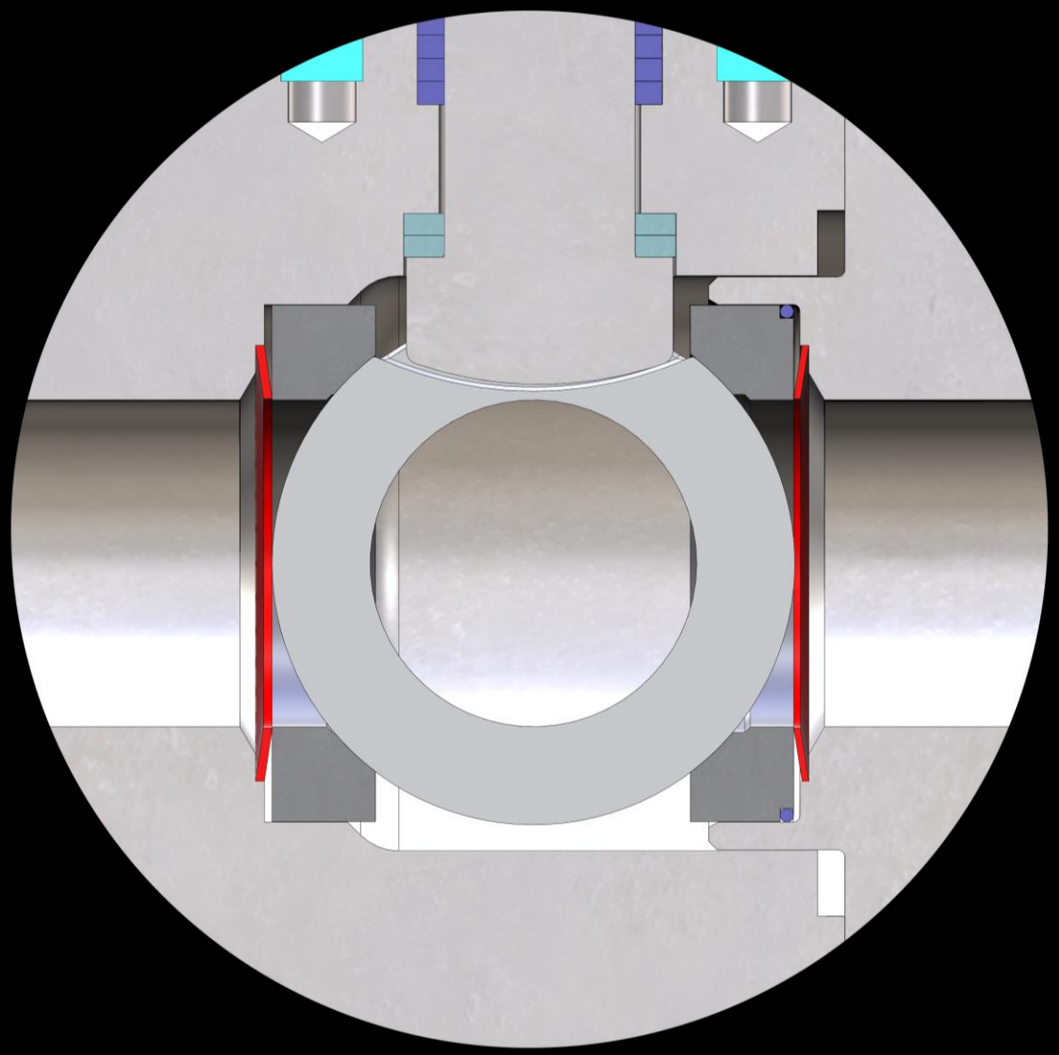


Spring is still exerting force on the upstream seat



*"ONE WAY STREET"*

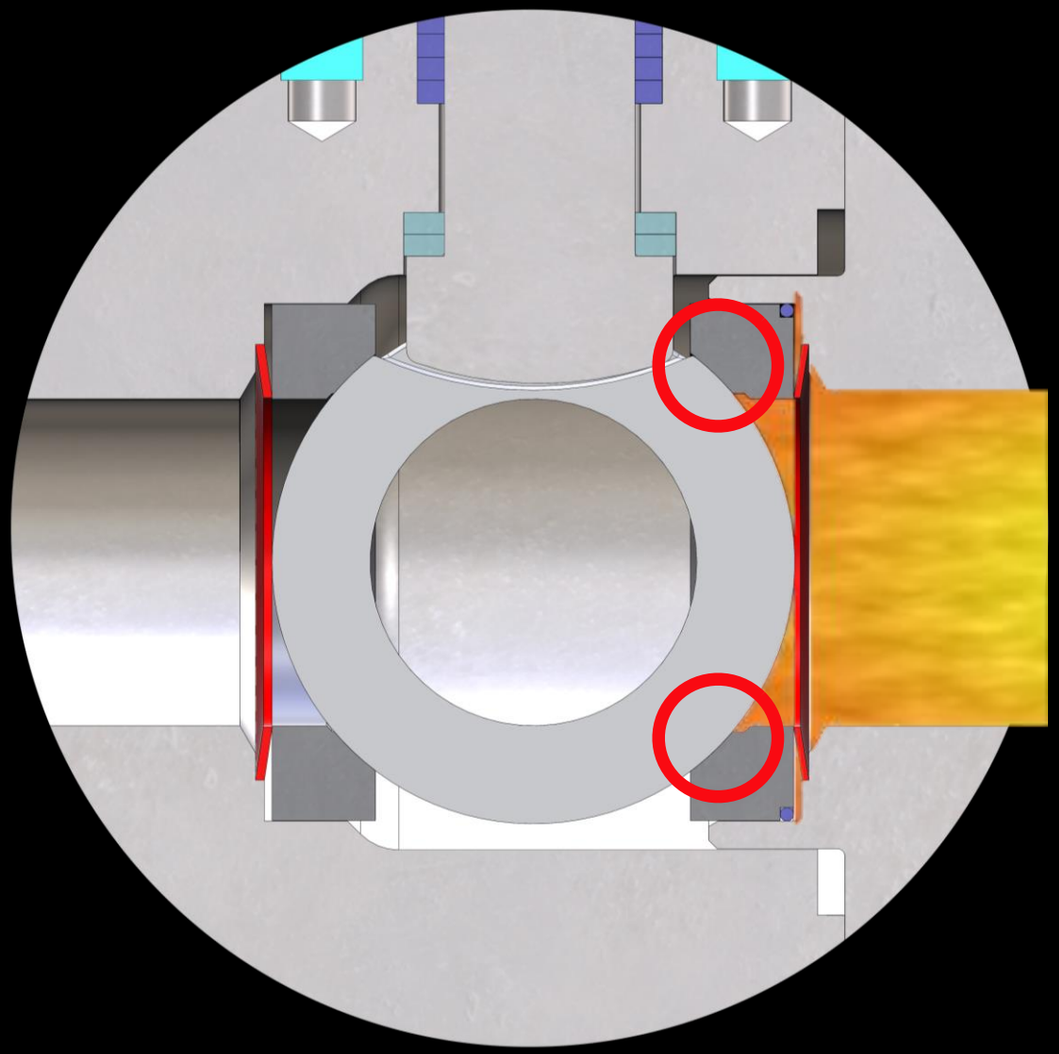
# BACK PRESSURE or REVERSE FLOW



## COMPETITOR'S VALVE
(UNI–DIRECTIONAL SEALING)

However, with back-pressure or reverse flow, the valve fails

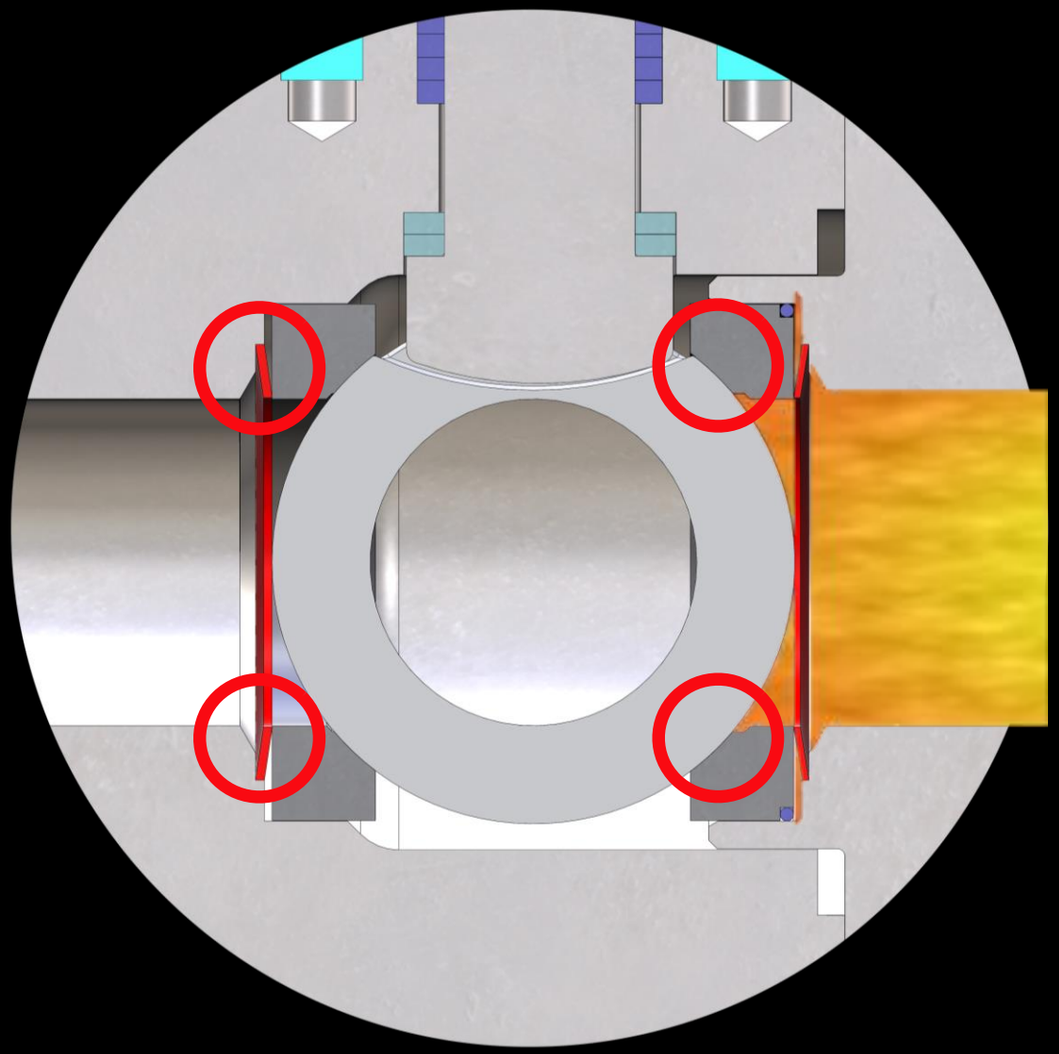
# BACK PRESSURE or REVERSE FLOW



## COMPETITOR'S VALVE
(UNI–DIRECTIONAL SEALING)

Back-pressure pushes the ball back

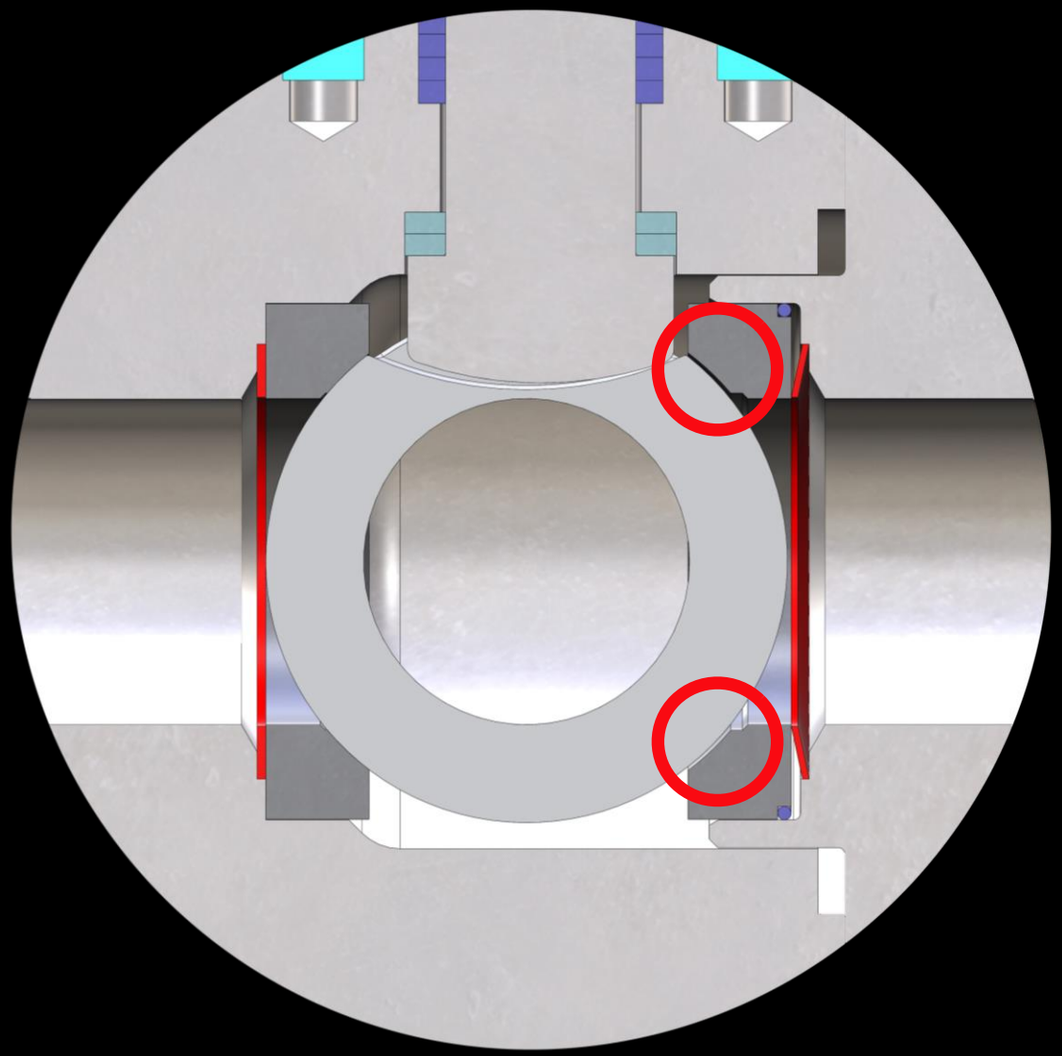
# BACK PRESSURE or REVERSE FLOW



## COMPETITOR'S VALVE
(UNI–DIRECTIONAL SEALING)

Back-pressure pushes the ball back and flattens the spring

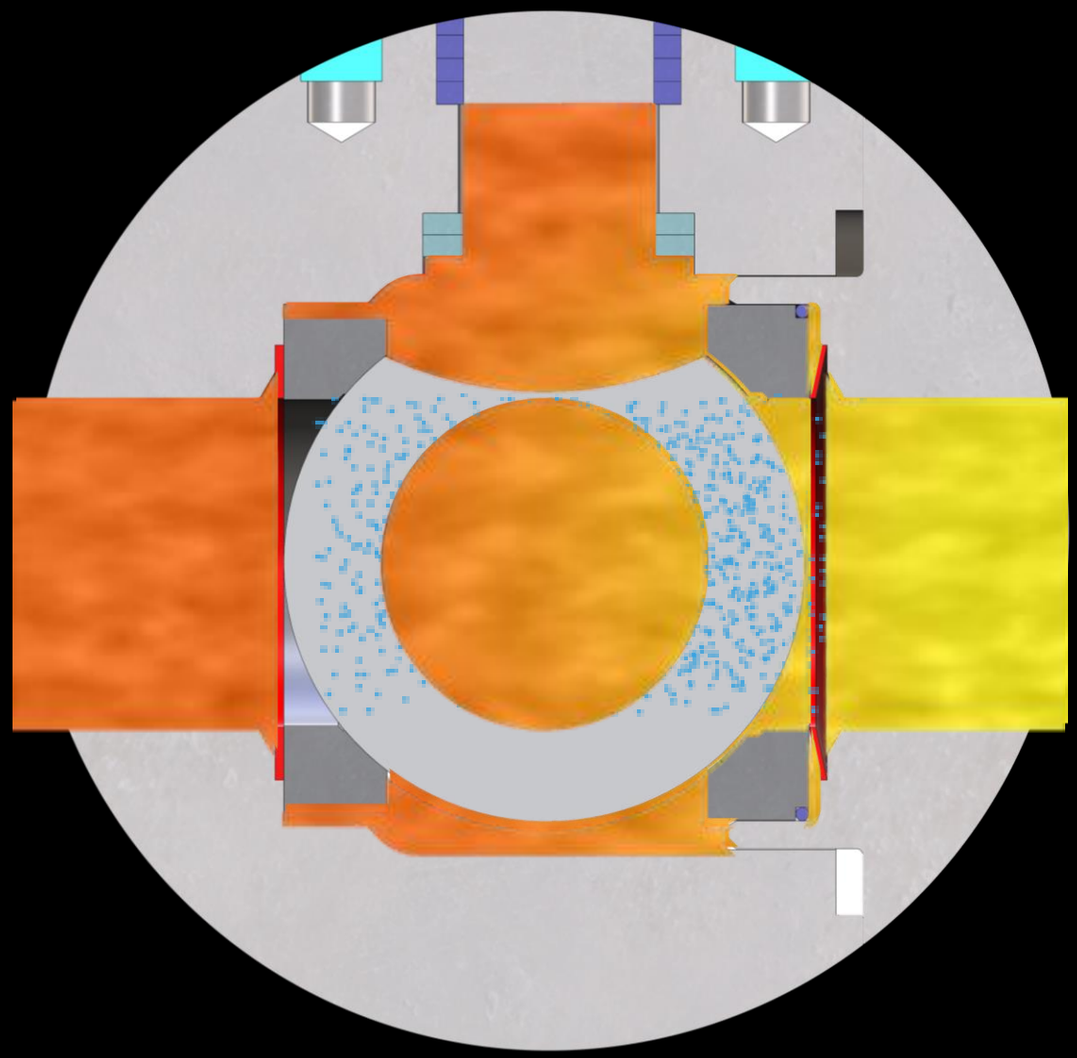
# BACK PRESSURE or REVERSE FLOW



## COMPETITOR'S VALVE
(UNI–DIRECTIONAL SEALING)

A gap is created between the ball and seats

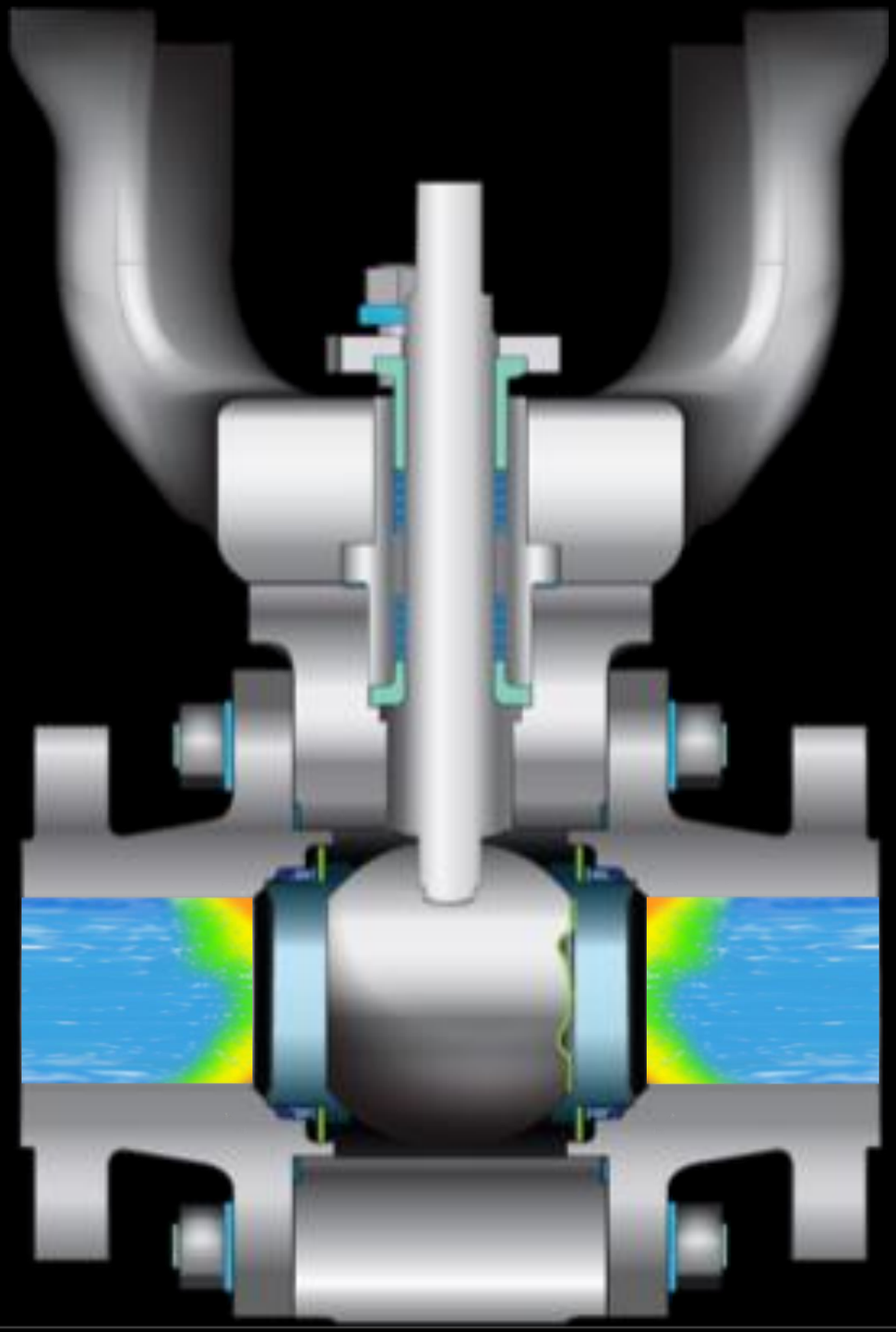
# BACK PRESSURE or REVERSE FLOW



## COMPETITOR'S VALVE
(UNI–DIRECTIONAL SEALING)

Valve leaks past the seats

# GOSCO'S VALVE
## (BI–DIRECTIONAL SEALING)

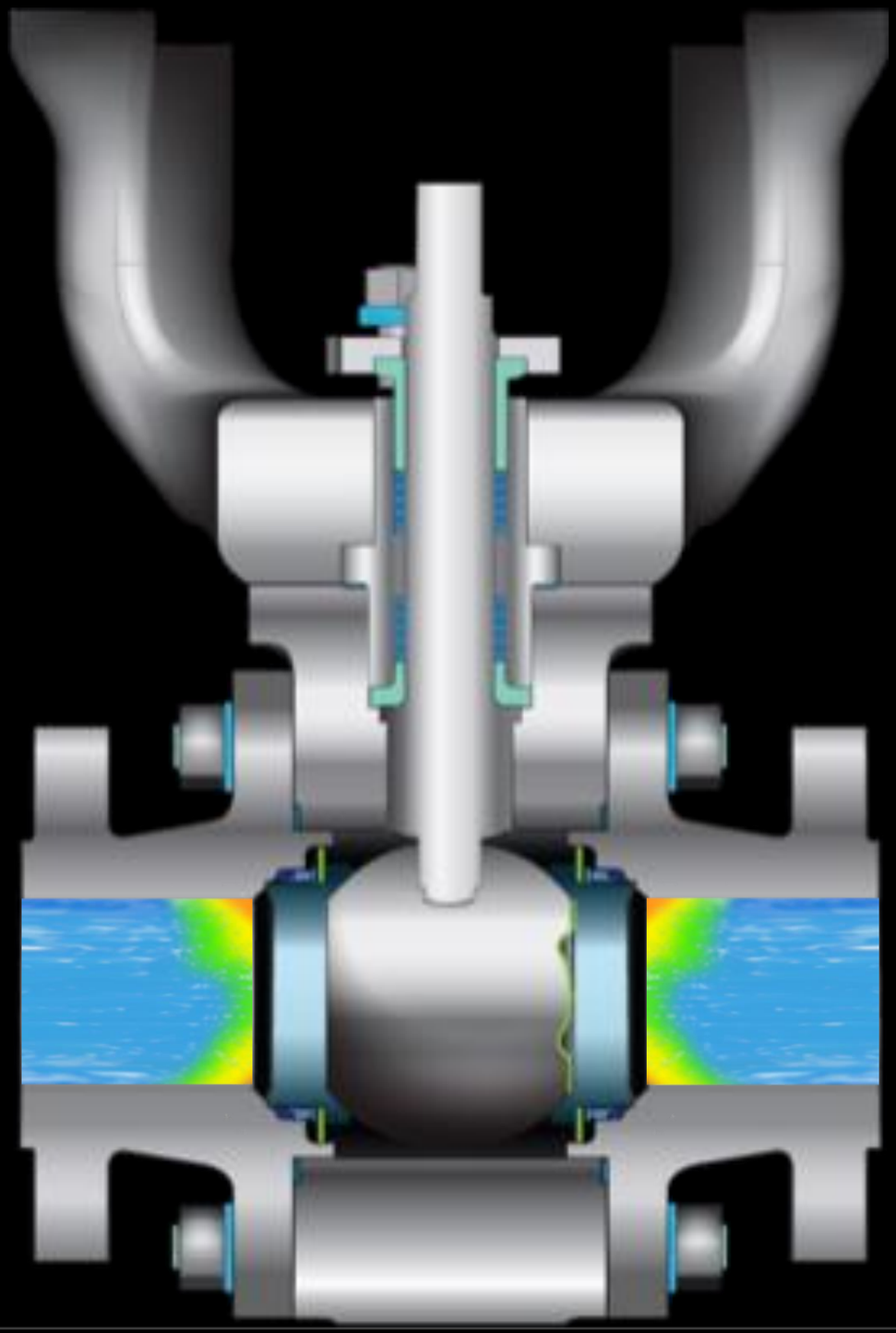


Valve can withstand pressure
from upstream or downstream

M-CLASS
CUSTOM METAL SEATED

*"WHAT CAN I SAY?"*

gosco VALVES



# GOSCO'S VALVE
## (BI–DIRECTIONAL SEALING)

Valve design is completely symmetrical, and seals bubble tight in both directions

Seals with full differential pressure

Seals with 1 psi differential pressure

M-CLASS

CUSTOM METAL SEATED

*"WHAT CAN I SAY?"*

gosco VALVES

# M-CLASS CONFIGURATIONS

ON/OFF

VARI-V CONTROL

CRYOGENIC

3-WAY DIVERTER/ 3-WAY

DOUBLE ISOLATION & BLEED

CUSTOM

# SATISFIED CUSTOMERS

SUNCOR ENERGY

OPTI CANADA INC.

noranda

EXXON

nexen

DOW

ConocoPhillips

中国石化 SINOPEC

GE

Chevron Phillips Chemical Company

JIM BEAM

NASA

DUPONT

The miracles of science™

SUNCOR ENERGY

Size & Location: 8” 150# control valves in the Alberta Oil Sands

Description: Used on quenched desand water to desand tank

Process Conditions: Exposure to high level of solids at high velocity (85˚C/185˚F, 16 bar/235 psi with a 13 bar/191 psi drop)

Success Story: We were chosen because we could characterize our Vari-V profile to direct the process flow down to the centre of the pipeline. This reduced valve wear and pipeline wear.

ConocoPhillips

Size & Location: 1” to 6” 600# valves in U.S.A., and China

Description: Installed on the lockhopper in refineries on a sorption-based technology that removes sulfur from FCC gasoline with minimal octane loss

Process Conditions: Extremely abrasive application at 538˚C/1000˚F, 69 bar/1000 psi

Success Story: ConocoPhilips started up their “SZorb” unit in 2005. Mogas valves were installed on every sorbent position. Last year, ConocoPhilips replaced every single Mogas valve with a GOSCO valve

DUPONT

Size & Location: 1000+, 1/2” to 4” 150# valves installed in U.S.A.

Description: Used in various processes in a chemical plant (Kevlar, Mylar etc)

Process Conditions: Mostly ambient temperatures, but extremely corrosive applications ranging from sulphuric acid (Alloy 20 body and trim) to other corrosive applications (chloroform, DMAC, ICL, MPD)

Success Story: To date we have $2,000,000 worth of valves in their plants and there has never been a failure.

Size & Location: 1000+, 1/2” to 8” valves installed in U.S.A.

Description: Used in highly severe and corrosive polysilicon applications at one of Dow’s semiconductor plants

Process Conditions: - 600 psi/41 bar, 510˚C/950˚F with extremely abrasive particles

Success Story: Dow purchased over a thousand valves from GOSCO because they outlasted all the competition


Size & Location: 50+, 1/2” to 4” valves installed in the U.K.

Description: Our valves are used to control the steam entering in to the stills

Process Conditions: GOSCO valves ensured the steam is at the ideal pressure and temperature for the distillation process

Success Story: Our valves are utilized for their reliability, performance, and equal percentage control range with the ability to fully isolate the steam when the valves are in the closed position

Size & Location: 150+, 2” to 6” valve in the Alberta Oil Sands

Description: Used on raw syngas, asphaltene, steam, methane, nitrogen

Process Conditions: Used in extremely abrasive and corrosive conditions at 364ºC/687ºF
241 bar/3500 psi

Success Story: Although all of our valves had a higher initial cost, the cost of ownership in 2-3 years was less than half for every valve we installed

Image courtesy of: Suncor

M-CLASS
CUSTOM METAL SEATED

gosco VALVES

# M-Class

NPS ½ to NPS 16 (DN 15 to DN 400)

-253ºC / -423ºF to 875ºC / 1607ºF/

Up to and above Class 4500

Most extreme applications

Different Price Options (“Valves as a Service”)

## M-CLASS

CUSTOM METAL SEATED

gosco VALVES

# M-Class

## The Most Extreme Applications Have Met Their Match

# M-CLASS

CUSTOM METAL SEATED