



COMPANY OVERVIEW 2021

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# CORNERSTONE VALVE

SEVERE SERVICE ENGINEERING



## FOUNDATION

Cornerstone Valve was founded in 1990 by Bob Davenport on core principles of providing custom engineered, fit-for-purpose Ball Valves, Rotary Control Valves and Check Valves as well as continuous investment in development of customer-driven solutions.



# OVERVIEW

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## US Manufacturer

Cornerstone Valve is Woman Owned Privately held Company located in [Missouri City, Tx](#) with 30 years of continuous operation and a global reference list.



In-house Engineering  
Design, Testing & Inspection



Licensed to Monogram  
API 6D / 6DSS / 6A PSL 1, 2, 3,  
& 3G Certified



QMS Certified  
to ISO 9001, API Q1



# COMPANY VALUES

## Our Mission

Become the “go-to” manufacturer for custom engineered, fit-for-purpose valves for severe service application while providing best value addition to our customers.

## Our Vision

Stay true to our core expertise, nimble to market conditions by utilizing our 30 years of experience and deep understanding of huge spectrum of applications, metallurgical characteristics, supply chain reliability and tolerance stack-up.





**OUR #1 PRIORITY IS TO  
CUSTOMER SUPPORT 24X7**

# THE CORNERSTONE ADVANTAGE



1. Made-to-order fit-for-purpose Custom Engineered Ball Valves, Check Valves & Rotary Control Valves for Severe Service Applications.
2. Metal / Soft seated Designs.
3. ISO 5208 Leakage Rate A (Zero Leakage) for Metal Seated Designs.
4. Unique Customer/Application focused Designs from ASME Class 150 to API Class 20,000.
5. Above market average On-Time-Delivery record.
6. Reliable G7 based Supply Chain.
7. Best product solution in the shortest possible lead times from white paper design to finished product.
8. User reference list allowing huge insight into behavior of wide spectrum of metallurgies in various applications.
9. Well maintained library of our legacy designs allows aftermarket support.



WHITE PAPER



WEEKS  
PROCESS



16

COMPLETED  
CUSTOM VALVE



# COMPANY TIMELINE

START ●



**1991**

US Navy Works Begin,  
First Oil & Gas Order Shipped.



**1994**

First Subsea Valve  
Manufactured.



**1990**

Cornerstone Valve Was Founded.  
Aerospace Work Begins.



**1993**

Obtained API 6D & API  
6A PSL 1, 2, 3, 3G Licenses



**1998**

Metal Seated Valves For High Temperature  
Polypropylene Service Shipped.



**2000**

ISO 9001 Obtained.  
Launch Pad Valves For Nitrogen  
Service Shipped.



**2003**

First Major Deep Water  
Platform Topside Valves Shipped  
to Gulf of Mexico.



**1999**

Top Entry Valves For HP  
Maleic Acid Service Shipped.



**2001**

High-Pressure Gas System Valves  
& Metal-Seated valves for Hot Gas  
At 700 °F shipped.





**2008**

Hyperbaric Chamber Testing.



**2016**

CV Develops In House Cryogenic Testing Capabilities.

Launched Cryogenic Product Lines  
For Floating Ball Configuration.



**2014**

Cornerstone Valve Successfully Develops  
First 10K Positive Isolation Valves.



**OUR STORY  
CONTINUES**

# SEVERE SERVICE ENGINEERING

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## Extreme Sludge

After 2 Years Of Brutal Use, Cornerstone's Valves Are Still Working In A Paper Mill's Continuous Digester, Day In And Day Out.



## Extreme Depth

Our Top-entry Subsea Valves Are Qualified To 10,000 Ft Water Depth. Working Day In And Day Out.



## Extreme Hazard

SB-2 Workhorse Valves Still Operate Day In And Day Out - 8 Years After Replacing Brands That Cost A Company \$5,000 A Week In Maintenance.



## Extreme Savings

300 Miles Offshore, Every Ounce And Inch Make A Difference. Our Efficient Top-entry Valves With Integral Hub Ends Saved 100 Tons And Over \$450K, While Working Day In And Day Out.

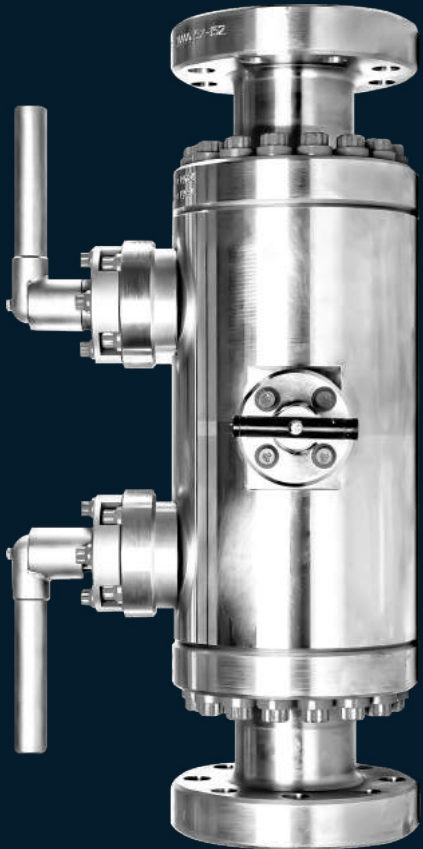


## Extreme Media

Cornerstone Valves Used In An Iron Ore Processing Facility Have Had A Service Life For 20 Times Those Of Previous Valves. They Continue To Work, Day In And Day Out.



# EXTREME SCOPE



## Refining & Petrochemical

- Coker Applications
- High Temp/High Pressure Acid
- Split Body Floating – Metal Seated
- Catalyst Applications

## Process Systems

- Top Entry High Pressure 15k+

## Onshore & Offshore Production

- Wellheads
- API6A Ball Valves
- Subsea – 6DSS & 17D
- Rotary Control
- Boarding Valves

## Transmissions & Pipelines

- Ball Valves - USA
- API 6D – Global
- Flanged Floating

## Gathering Systems

- ESD Packages
- 10K+ Valves
- Positive Isolation
- Topsides
- Compact Valves
- Cryogenics for LNG

## Power Generation

- In-line Repairable
- Solids Proof
- Noise Control
- Metal Seated for Steam
- Steam Purge Ports

# CURRENT APPROVALS

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PARTIAL LIST



# FOCUSED ON SAFETY

- As engineers and specifiers, you must do your best to assure that what is installed ensures life, safety and performance!
- Remember! Your decisions really make a difference! We need to require suppliers to do 100% material documentation and testing.



- Start at the specification stage! Ensure that industry standards are followed.
- Subsea intervention costs are very high, far exceeding any "cost savings" that can be offered!

# QUALITY MANAGEMENT SYSTEM

**Committed to maintaining a quality management system that provides:**

- Continuous analysis for quality and process improvements
- Emphasizing Defect Prevention
- Compliance To Customer Requirements
- Promoting employee awareness
- Achieving customer satisfaction

**Process monitoring and measurement :**

- Internal and external audits
- Review Management
- Customer surveys
- Corrective/Preventive Action Program



6D-0164  
6DSS-0073  
6A-0321 6A PSL 1, 2, 3, 3G



Q1-0165



ISO 9001:2015  
Reg. No. 0450

# LICENSES & CERTIFICATES

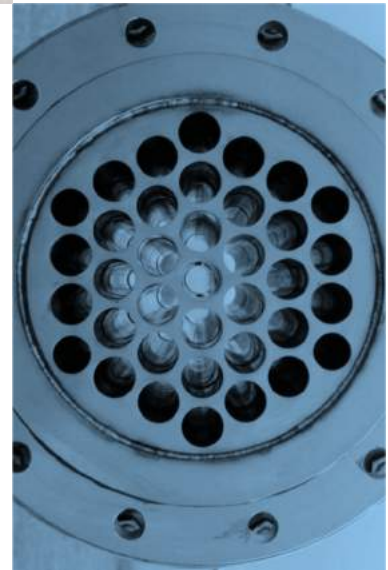
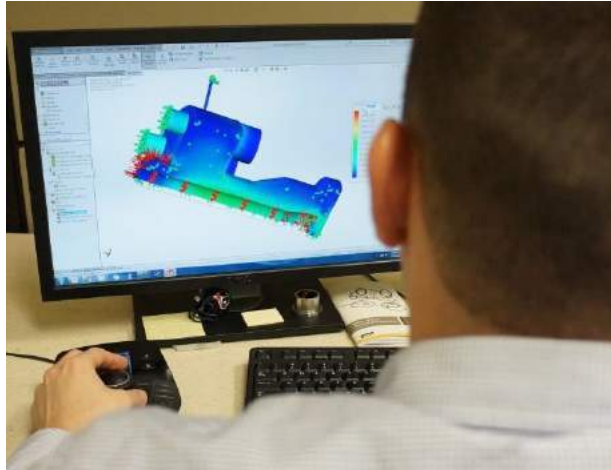


- U.S. manufacturer of API 6A, 6D 6DSS, B16.34, ASME Boiler Code valves (and combinations thereof).
- Serving the oil and gas markets (Upstream, Midstream and Downstream) Mining, Energy, Pipeline, Refining, Underwater and Cryogenic Applications.
- Multiple successful API 607/6FA fire tests in proprietary designs.
- Successful fugitive emission type tests in accordance with ISO 15848-1.



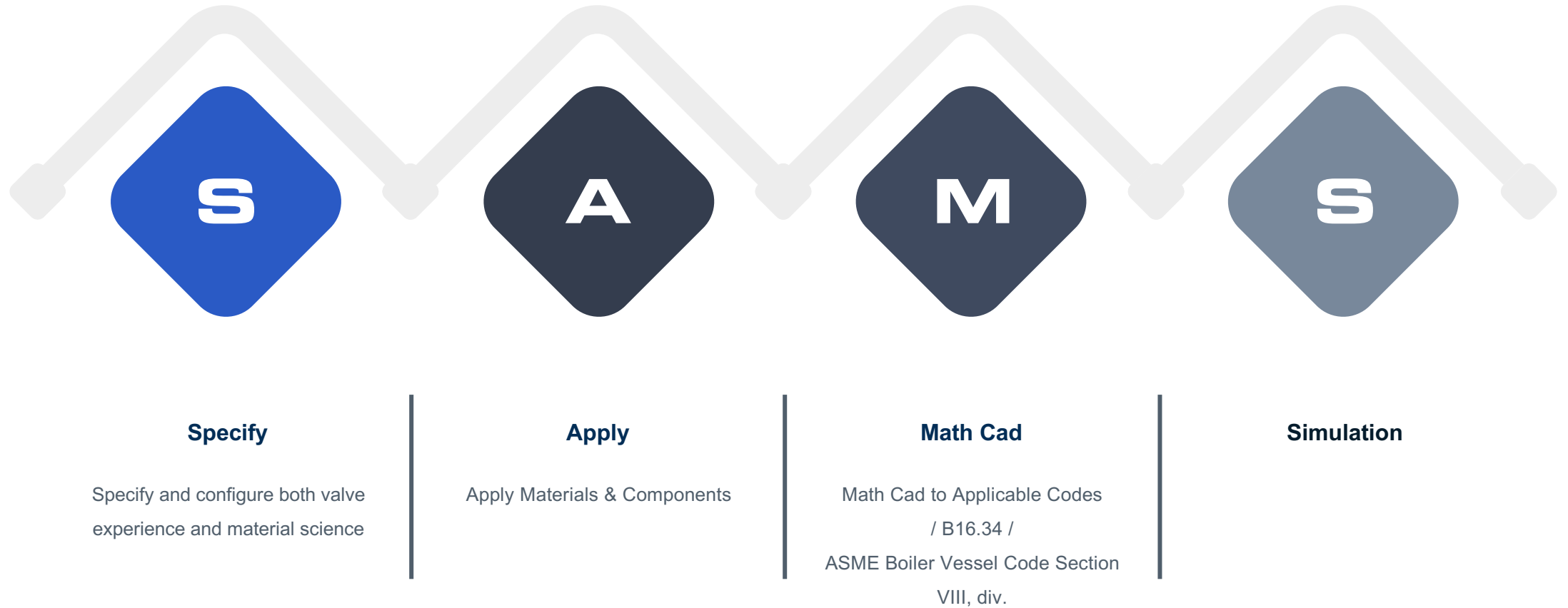
# OUR TECHNOLOGY

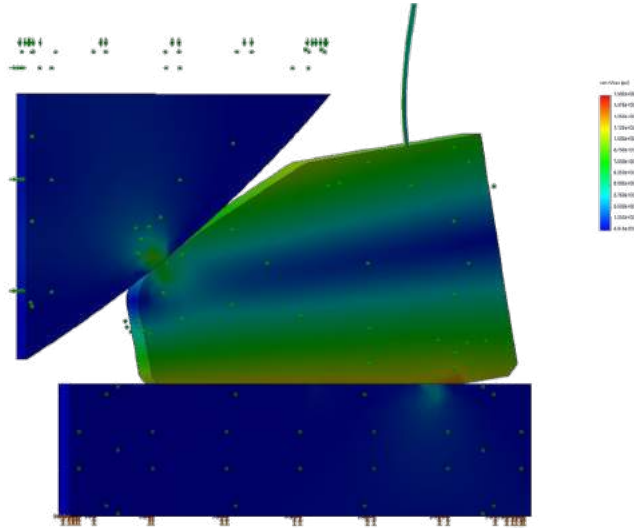
- Subsea design experience at 10,000 feet depth of water.
- High pressure design (API6A) and experience at 15,000 psig.
  - ◆ Liquid & Gas Zero Leakage
  - ◆ Subsea, Onshore, Offshore, & Aerospace
- High-temperature design and experience to 1,600° F
- Low-temperature design and experience to -320° F
- Abrasive service – "Solids Proof"
- Power and Refinery Valves
- Rotary ball control technology
  - ▶ Trim for D-Ball
  - ▶ Multistage Slot Trim (developed for the U.S. Navy.)
  - ▶ Noise reduction





# ENGINEERING METHODOLOGY

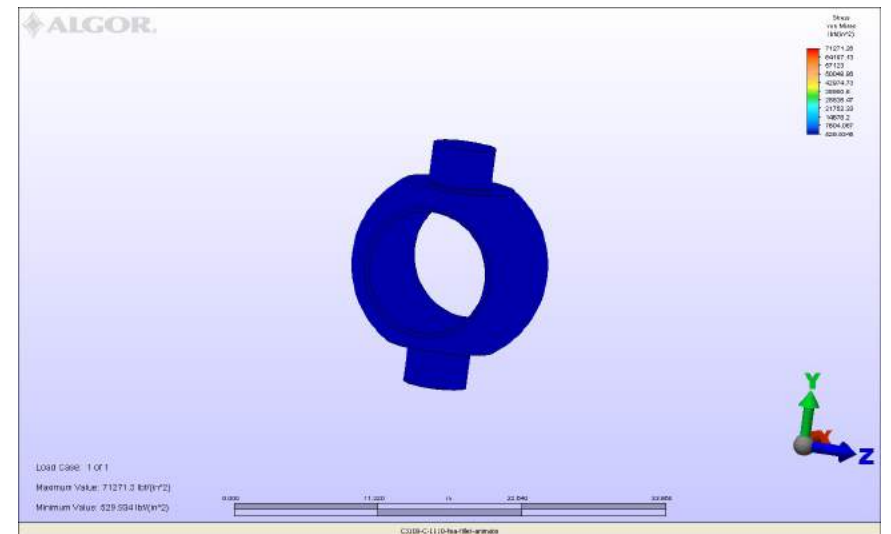




# FINITE ELEMENT ANALYSIS (F.E.A.)

- Valve bodies
- Spheres & Vastagos
- Bonnets & Bolting

We use Solid-Works F.E.A as a tool to develop the design and analysis of each pressure component that contains/control our valves to API, ASME and other codes to ensure the performance and reliability of structural integrity.



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# CORNERSTONE VALVE

SEVERE SERVICE ENGINEERING



## PRODUCT LINE

Our core competencies of providing custom engineered, fit-for-purpose valves and continuous development of new technology have resulted in the growth and ongoing success of our company. Our line of **metal seated - zero leakage** products include the most sophisticated and unique valve installations globally.

**Our Valves Work!**

## EE/ES SERIES

# Ball Valve Side Entry

**SIZES: 1" - 48"** Full or  
Reduced Bore

- 2 and 3 Pc Design, Bolted Body, Forged Materials
- Trunnion Mounted, Bi-Directional Shut-off
- Pressure Class:
  - ANSI B16.34, API 6D – Class 150 to 4500
  - API 6A – 2,000 to 15,000 PSIG
- Rigid Ball, Stem & Trunnion Design
- DBB / DIB, Soft Seats or Metal Seat Option for Zero Leakage

 **-50°F to +1500°F**  
(High-Temp)





## TE-1 SERIES

# Top Entry Trunnion Ball Valve

**SIZES: 1.5" - 26"**

- 1 Piece, Forged Body Design
- Trunnion Mounted, Bidirectional Shut-Off
- Pressure Class:
  - ANSI B16.34, API 6D – Class 150 to 4500
  - API 6A – 2,000 to 15,000 PSIG
- Single Piece Ball / Stem / Trunnion
- Top Entry, In-line Repairable
- DBB / DIB, Soft Seats or Metal Seat Option for Zero Leakage

 **-50°F to +1500°F**  
(High-Temp)



## TE-3 SERIES

# Top Entry Trunnion Ball Valve

**SIZES: 1/2" - 26"** Full or  
Reduced Bore

- 3 Piece, Forged Body
- Trunnion Mounted, Bidirectional Shut-Off
- Pressure Class:
  - ANSI B16.34, API 6D – Class 150 to 4500
  - API 6A – 2,000 to 15,000 PSIG
- Top Entry, Single Piece Ball / Stem / Trunnion
- DBB / DIB, Soft Seats or Metal Seat Option for Zero Leakage



## S-BALL SERIES

# Subsea Ball Valve

**SIZES: 1" - 48"** Full or  
Reduced Bore

- 2 and 3 Pc Design, Bolted Body, Forged Materials
- Trunnion Mounted, Bi-Directional Shut-Off
- Pressure Class:
  - ANSI 6DS – Class 150 to 2500
  - API 17D – 5,000 to 15,000 Psig
- Rigid Ball, Stem & Trunnion Design
- DBB / DIB, Soft Seats or Metal Seat Option for Zero Leakage
- Water Depths to 10,000 ft
- Hyperbaric Tested to 11,000 ft



## TP1 SERIES

# Trunnion Power Ball Valve

**SIZES: 5/8" - 4"**

- 
- 1 Pc Body Design, Top Entry, In-Line Repairable
- 

- Metal Seated, Single or Double Seated
- 

- Pressure Class
- 

ANSI 600 to 4500

- 
- Metallurgy, End Connections & Actuation to Customer Specs.
- 

- Leakage Class to Customer Specifications
- 



**-50°F to +1,200°F**



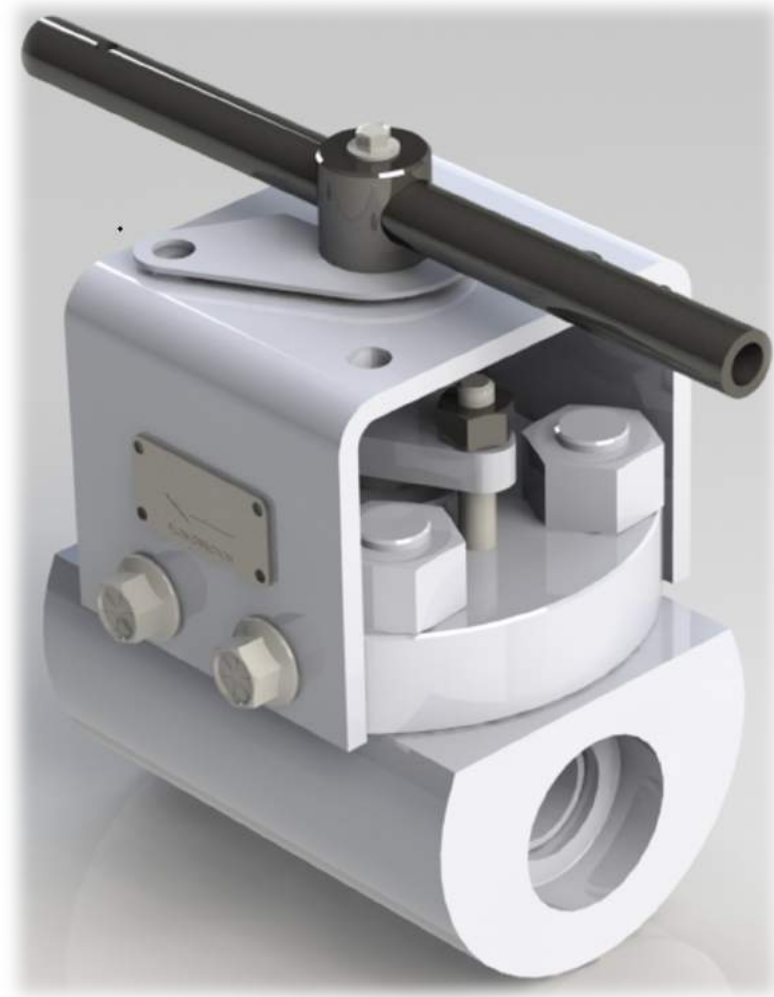


## TE-4 SERIES

# Top Entry Floating Ball Valve

**SIZES: ½" - 4"** Full or Reduced Bore With Custom Sizes Available

- 
- In-Line Repairable, Top-Entry, Floating
- 
- Metal-Seated, Compact Modular Design
- 
- Pressure Class
    - ANSI B16.34, API 6D – Class 150 to 4500
    - API 6A – 2,000 to 15,000 PSIG
- 
- "Fits only one way" Lever Handle & Standardized ISO-5211 mounting bracket included
- 
- GEN2 Features ~70% weight reduction, torque reductions, and standardized repair kits; inventory friendly for quick turns and standardization
- 
- First Cornerstone Power Valve to offer standard 60 MONTH ZERO LEAKGE WARRANTY (certain terms and conditions apply)
- 



**FBC SERIES**

# Cryogenic Ball Valve

**SIZES: ½" - 12"**

- 2- or 3-Piece Design, Forged Material
- Soft Seated Design, Bi-Directional / Uni-Directional
- Pressure Class

ANSI B16.34, API 6D – Class 150 to 2500

- Side Entry, Supported Ball, Extended Bonnet
- Leakage Classification Per Chevron SPC0118
- ISO 15848 Type 1 Certified



**-320°F to +400°F**



## SB2 SERIES

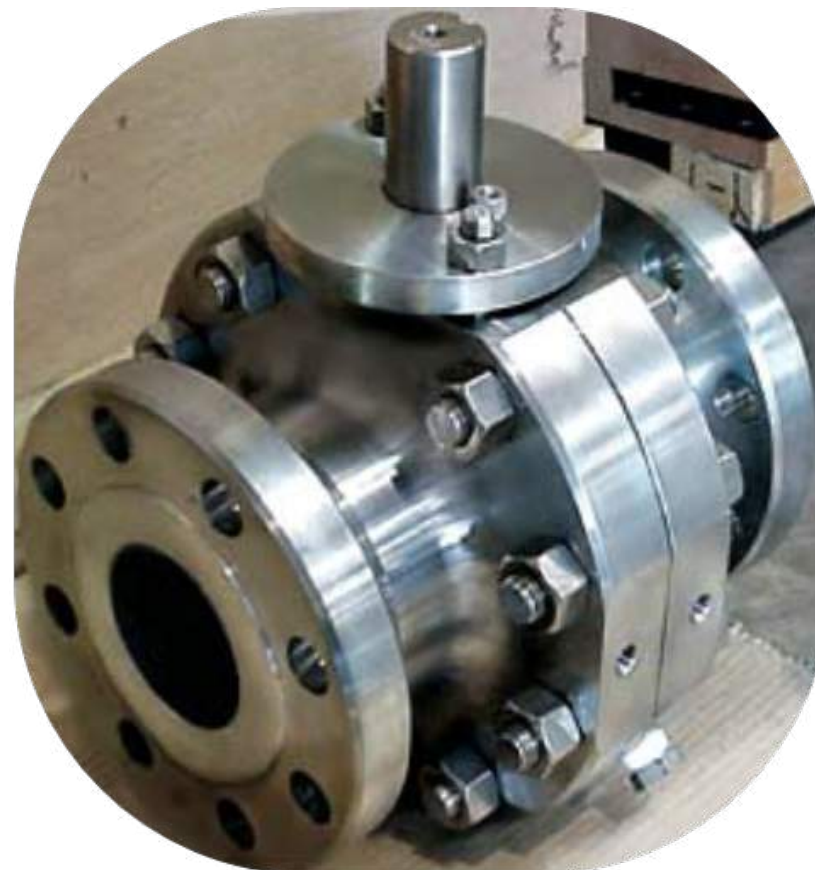
# Split body Ball Valve

**SIZES: 1" - 16"** Full and  
Reduced Bore

- 
- 2 Pc Forged Body
- 
- Metal Seated, Single or Double Seated
- 
- Leakage Class – Bubble Tight (Soft Seated)
- 
- ANSI / FCI 70.2 – Class V & VI (Metal Seated)
- ANSI B16.34 & API 598
- 
- End Connections – RF/ RTJ / Weld Ends / Hub Ends / Special
- 
- Trunnion Mounted, Bi-Directional Shut –Off
- 
- Pressure Class ANSI CL150 to 1500
- 



**-50°F to +1,600°F**



**BNB SERIES**

# Ball Needle Ball Valve

**SIZES: 1" - 24"**

- 1 Pc Forged Body
- Metal Seated, Single or Double Seated
- Pressure Class:
  - ANSI B16.34, API 6D – 150 to 4500
  - API 6A – 2,000 to 15,000
- Double Block & Bleed Application
- Side Entry & Top Entry Designs
- Industries Served:
  - Refinery / Chemical & Petrochemical / LNG /
  - Oil & Gas – Subsea to Pipeline / Cryogenic





## D-BALL SERIES

# Rotary Control Valve (D-Trim)

**SIZES: 1.5" - 12"**

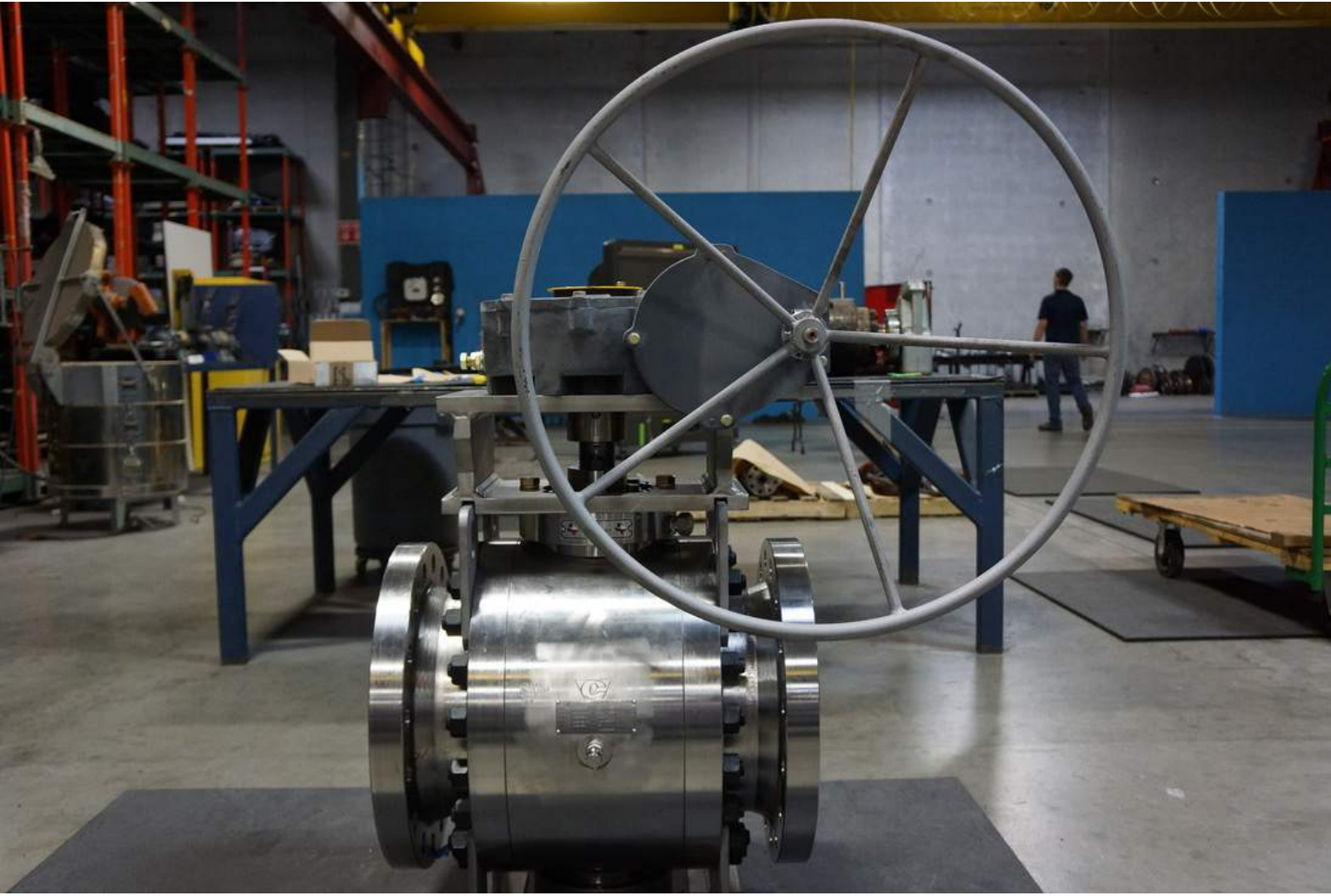
- 
- High Rangeability – Max Cv / Min Cv
- 
- Space – Typically Smaller Than Globe
- 
- Pressure Class:
    - ANSI B16.34, API 6D – 150 to 4500
    - API 6A – 2,000 to 15,000
- 
- Ease of Automation
- 
- Tight Shut-Off (Typically ANSI / FCI CL V or VI)
- 
- Uni-directional Sealing Up-Stream
- 
- In-Line Serviceable
- 
- Noise Reducing
- 



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# CORNERSTONE VALVE

SEVERE SERVICE ENGINEERING



## PROJECTS & SOLUTIONS

Cornerstone Valve's strategy has always been focused on development of products designed to our [customers' specific requirements](#). By developing exclusive products, we have distinguished ourselves and gained prominence within this competitive industry.

# Severe Service Aerospace

TE1 - 6" - 1500

- 3,000 psig N2 Service
- 36 installed on Launch Pads
- Each opens in 0.016 seconds under full differential pressure
- [limit switch-limit switch]



# Severe Service API17D Subsea

## Bluewater Project

- API 17D, 2-1/16" 10K Top Entry Ball
- ROV Operated Actuation for Subsea





# High-Cycle Isolation For LNG

- Rising demand for gas processing has led to higher volume at LNG and FLNG facilities. New operations expect more from valve functionality in the field.
- Why robust designs?
  - Longevity of service
  - Reduce maintenance cost/downtime
  - Safety
  - Versatility of operation--same valve can be used for multiple temperature ranges



# Petrochemical Industry

## Polypropylene Service (1022 °F)

Formosa Plastics' polypropylene reactor let-down service struggled to keep its severe-service valves working. Spending an average of \$5,000 per week, constantly repairing valves, attempting to maintain operating standards.

Cornerstone proposed and installed our solids-proof severe-service split-body design (SB-2) in replacement to the problem valves.

- The SB-2's scraper seat face cleans the ball as it cycles 4x/minute—preventing product from jamming the valve components and polymerizing onto the ball face.

Cornerstone's model SB-2 valves have been in continuous service at this facility, without issue, for 20 years!

Valve Specs: 2" ANSI 600 Split-Body Trunnion Mounted Ball Valve.

Body: 410SS, Trim: 17-4PH / HCP, Seat: Stellite



# Refining Industry

## FCC Catalyst Switching Application (1472 °F)

PEMEX's Cadereyta Refinery contacted Cornerstone Valve to produce custom valves for an FCC catalyst fines separator system—a highly corrosive, high temperature service. Third-stage catalyst fines particles are extremely fine, each particle being 1/5<sup>th</sup> the diameter of a particle of baking flour—an extremely toxic inhalant.

Cornerstone was called in to implement a trunnion mounted split-body design capable of handling this service, when competitor valves had failed after a few weeks of service. Produced in 1993/94, those valves still operate in a North American refinery without requiring service. Subsequently, valves installed in many refineries in both North & South America, in both fines removal and catalyst recirculation systems, remain trouble-free.

Not one trunnion-mounted SB-2 has required replacement since installation at this facility.

Valve Specs: 6" ANSI 300, Split Body Trunnion Mounted Ball Valve.

Body: 316, Trim: 316 / NBC, Seat: Stellite





# O&G Production Industry

## Natural Gas Injection Service (250°F)

In a major oil field in Boquerón, Venezuela, ARCO/BP needed to maintain field production pressures by compressing and re-injecting natural gas.

Cornerstone was called upon to supply the high pressure (API 10K) hub-end ball valves in several sizes. After several years of operation, a number of other brands of valves developed multiple seal failures causing both leak-through (internal) and external leaks. But not Cornerstone's!

Cornerstone's trunnion mounted valves continue to work, without issue – many installed more than 17 years ago.

Valve Specs: 5-1/8" API 10k, 1-Piece Top Entry Trunnion Mounted Ball Valve. Body: 4C, Trim: 17-4PH + CC, Seat: Chrome Carbide





# API 6D Subsea

## BHP Shenzi

- Ball Valves - Metal & Soft Seated
- Pressure Class 150 – 2500 Lbs
- Connections: Flanged RTJ, RF, Hub, BWE & SWE Available
- Water Depth To 10,000 Ft
- Hyperbaric Tested
- 1 Of 2 US Manufacturers Licensed To Monogram  
API 6DSS Products (Ref. Composite List)

Skid Used On Devil's Tower Top Entry Riser

Isolation Shutoff 12" 1500... Zero Leak Ball



# Atlantis

British Petroleum

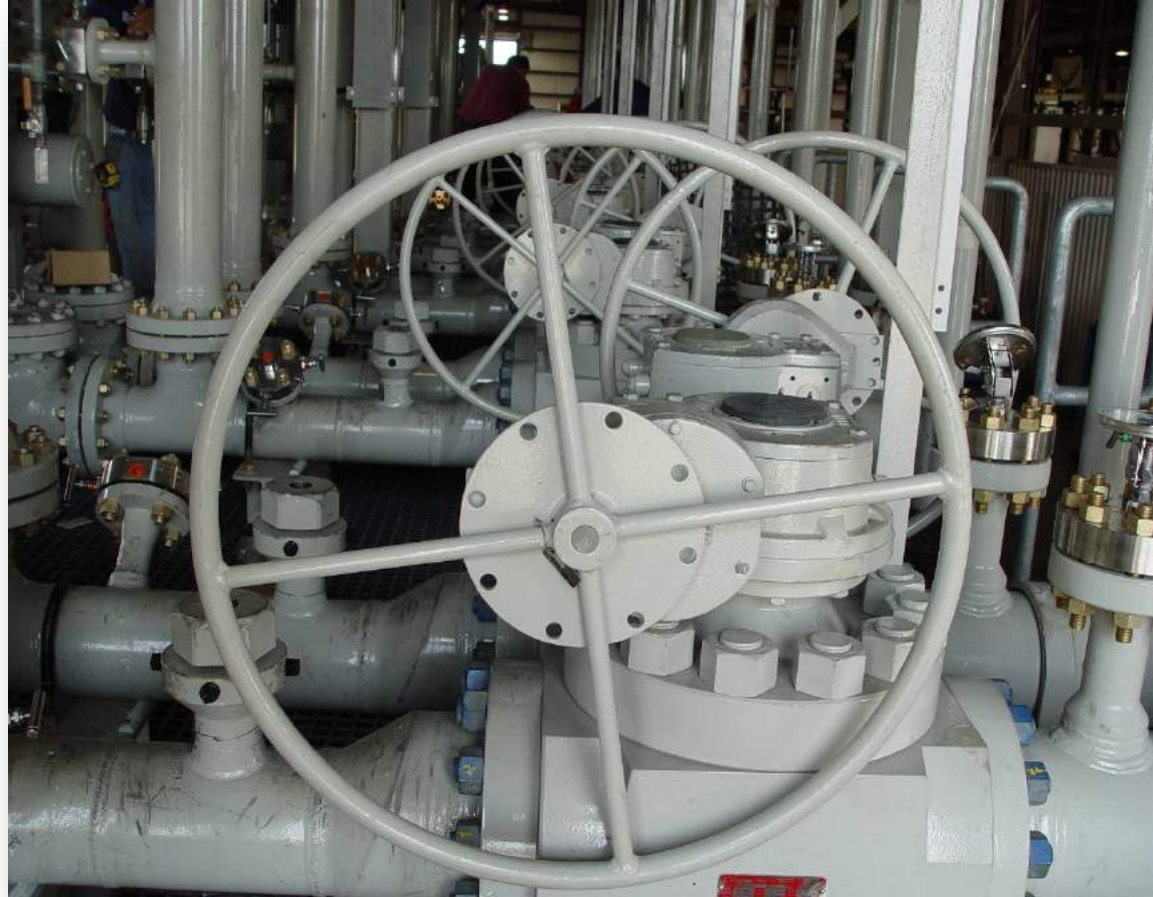
Main Export Valve on BP Atlantis  
170K Barrels/Day Crude Oil



**24" 1500 ZERO LEAK**

# Mad Dog

British Petroleum



**8" API 10,000 BALL VALVE**



# Mad Dog

British Petroleum



**3-1/16" API 6A 10,000**

CORNERSTONE VALVE

1535 Industrial Drive  
Missouri City, TX 77489

Phone: 281-880-8188  
Fax: 281-880-8191



[sales@cornerstonevalve.com](mailto:sales@cornerstonevalve.com)  
[www.cornerstonevalve.com](http://www.cornerstonevalve.com)