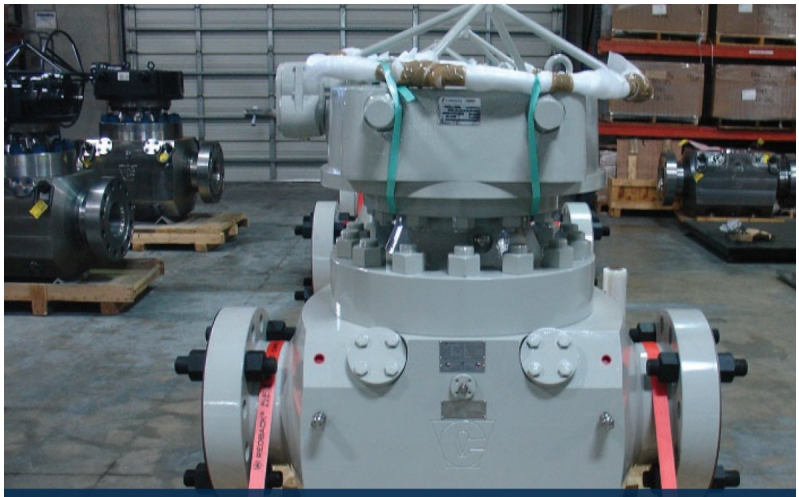
Cornerstone VALVE
SEVERE SERVICE ENGINEERING

Oil & Gas Topside

It can be lonely out there. Corrosive environments, weight and space constraints, mercurial weather, transport problems and high cost — all of it demands extreme reliability.



Top-entry ball valve — Noble Leviathan offshore project

CASE STUDY · GULF OF MEXICO TOPSIDE SKIDS

140+ top-entry, hub-end valves cut 100 tons from the platform and saved $460,000.

01 · CHALLENGE

Fit 140+ high-pressure valves into topside skids where deck space is fixed and every pound floated costs $2.30.

02 · SOLUTION

Top-entry, trunnion-mounted ball valves with integral hub ends. Skids were laid out around bonnet access, so internals are removed and reinstalled in-line.

03 · RESULT

One full service level eliminated from the major skids, more than 100 tons removed, and over $460,000 saved.

WEIGHT-SAVINGS MATH

100 tons × 2,000 lb/ton
= 200,000 lb removed
200,000 lb × $2.30/lb

= $460,000

140+
HP valves

-1
skid service level

VALVE CONFIGURATION	Cornerstone top-entry series capability
Design	Top entry, one-piece body, trunnion mounted, bi-directional shut-off
Maintenance	In-line repairable through the bonnet — no cutting or re-welding of the line
End connections	Integral hub ends (RF, RTJ and weld end also available)
Rating / standards	ASME 150–4500 · API 2,000–15,000 psi · API 6D, API 6A, ASME B16.34
Factory testing	API 6A PSL 3 hydrostatic; multiple shell holds; seat tests at full ΔP on each seat
Seats & seals	Pre-loaded, pressure-assisted seats; metal-to-metal, fire-safe body/bonnet seal
Corrosion protection	CRA overlay on sealing surfaces (316SS, Inconel 625); materials to NACE MR0175

Configuration shows the top-entry series envelope. Project-specific sizes, classes and test records are available on request.

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6DSS-0073
6D-0164
6A-0321
6A PSL 1, 2, 3, 3G
ISO 9001

Proven on Offshore Platforms

Operators in the Gulf of Mexico, West Africa and the North Sea specify Cornerstone top-entry valves for topsides, FPSOs and subsea tie-backs. Four projects in their own words and numbers:

BP Atlantis — GOM · 2004

145 valves delivered to the platform

TE1 ball · TC1 check · 1-13/16" to 26" · API 10K / 7,750 SC · ASME 1500

Topsides special-class high-pressure valves for oil & gas, blowdown, injection water and production/transmission service. Repeat orders followed — including 3" API 10K TE3 valves with Inconel 718 trim for methanol injection (2015).

Chevron Agbami FPSO — Nigeria · 2006–15

12" TE1 at 6,500 psi special class

TE1 to 12" · TE3 ½" to 8" · 8,000 SC / API 10K · API 6A PSL 1

10K and special-class valves for the FPSO in 4130, F316, F51 and duplex bodies with CF-PEEK seats — including 10" 8,000 psi TE1 valves for subsea gas-injection 4th-stage discharge. Re-ordered over nearly a decade.

Chevron Nemba HPCI — Cabinda, Angola

2 weeks design to tested valve

1-13/16" API 10K blowdown · 5,000 psig to atmosphere · lapped metal seats

At final commissioning of the compressor installation, a blowdown valve would not hold pressure. Design review, exotic-material procurement, fabrication and testing were completed in two weeks.

> *"As promised you accomplished the delivery schedule to the day."* — Project Manager, Chevron

BHP Shenzi — GOM · 2008–20

~10 yrs critical-function service

12" ASME 1500 dual-ball (T2B) · topsides with Modec

During the 2020 Shenzi TLP shut-in, Cornerstone engineering and service support kept the maintenance schedule on track through COVID-19.

> *"They have gone above and beyond… a valuable resource to the continued uptime of our assets."* — BHP, March 2020

BP MAD DOG · GOM TOPSIDES · 2003

59 high-pressure gas valves — TE1 and TE3, 2" to 8", API 10K and ASME 1500.

NOBLE ENERGY · LEVIATHAN · 2017

API 10K valves with compact flanges for sweet process hydrocarbon service.

API 6A PSL 3G GAS TEST

Submerged in nitrogen: body and each seat held 15 min at rated pressure, plus 300 psig seat test — no visible bubbles.

NOBLE LEVIATHAN · 2018
10" & 12" TE1 metal seat · 6,750 psi
PSL 3G at 6,750 psig

BP COLOMBIA
6" & 8" API 10K · 16" API 6A TE
Zero leakage on N_2

CHEVRON
10" & 12" 8,000 psi soft seat
N_2-tight at rated pressure

CLIPPER · 2009
2-1/16" API 10K TE-1 · Inconel 718 ball
PSL 3G at 10,000 psig

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Offshore Reference List

401
valves delivered to BP across 12 platforms and locations

API 10K
and special-class 6,500–8,000 psi valves on FPSOs and platforms

Since 1994
offshore and subsea installs, to 10,000 ft water depth

OPERATOR · PROJECT	LOCATION	SERVICE	VALVES SUPPLIED
BP · Atlantis (2004)	Gulf of Mexico	Topsides oil & gas, blowdown, injection water	145 · TE1, TC1 · to 26" · 10K / 7,750 SC
BP · Mad Dog (2003)	Gulf of Mexico	Topsides high-pressure gas	59 · TE1, TE3 · 2"–8" · 10K / 1500
BP · Na Kika	Gulf of Mexico	Production & transmission	35 · TE3, D-ball, chokes · 10K
BP · Troika (1997)	Gulf of Mexico	Subsea, 3,100 ft	10 · TE1 · 2-1/16" 10K
BP · Ula & Gyda	North Sea, Norway	HP gas with sand; sour gas offshore	11 · TE1 6" 2500 · SB2 1"–4"
Chevron · Agbami FPSO	Nigeria	10K & special-class topsides; subsea gas injection	TE1 to 12" · TE3 ½"–8" · 8,000 SC / 10K
Chevron · Nemba	Cabinda, Angola	FPSO 10K; HPCI blowdown	TE1, TE2 · to 7-1/16" 10K · metal seated, PSL 3
BHP / Modec · Shenzi (2008)	Gulf of Mexico	Topsides production & transmission	12" ASME 1500 dual-ball
Noble Energy · Leviathan (2017)	East Mediterranean	Sweet process hydrocarbon	API 10K with compact flanges
Noble Energy (2015)	Gulf of Mexico	Compact high-pressure isolation	ES2C 10" × 6" API 10K · API 6A
Marathon (2003)	Equatorial Guinea	High-pressure production system	High-pressure ball valves
Exxon · Mobile Bay	Alabama, GOM	Sour gas offshore	TE1 10" 2500 · Inconel 625 trim
Qatar Petroleum (1995)	Qatar	Offshore ESD, tri-ethylene glycol	TE1 8" × 6" ASME 1500
Petrobras · Keppel FELS	Brazil	HP oil & gas offshore	TE1 6" API 5000
Esso Production	Malaysia	Oil & gas offshore	TE1 4"–6" ASME 1500
Amerada Hess	North Sea, UK	HP gas offshore	TE1 3"–4" ASME 900
SEREPT (2005)	Tunisia	Offshore production gas with H_2S & CO_2	TE1 2" ASME 1500
Bluewater / ATP · Mirage (2008)	Gulf of Mexico	Subsea export gas, 4,050 ft · API 6A PSL 3	TE1 & TC1 · 2"–12" API 3000

Selected from Cornerstone install-base records (offshore applications 1991–2016, BP project history and recent-projects list). Full reference lists by operator, region and pressure class are available on request.

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Topside Solutions & Support

01 Marine Environment

For salt water and salt air, internal sealing surfaces are overlaid with a corrosion resistant alloy — available on any Cornerstone product.

02 Weight and Space

Hub end connections reduce overall weight. Non-flanged ends give a shorter face-to-face, requiring less space on crowded skids.

03 Reliability

Tested to API 6A and 6D with multiple holding times for pressure envelopes and seat tests at full differential pressure on each seat.

04 Serviceability

Top-entry trunnion design is serviceable in-line — all internals come out through the bonnet, saving hours of production downtime.

CORNERSTONE PRODUCTS FOR OIL & GAS TOPSIDE

- Top Entry Ball Valves
- Top Entry Swing Check Valves
- End Entry Ball Valves
- Rotary Control Valves / Chokes

API 6A PR2 PERFORMANCE TEST · 10K TE-3

Off the shelf, 200 cycles at full differential, zero leakage.

A standard production valve, not a hand-built test article, re-passed its PSL 1 hydrotest after 15 months on the shelf, then completed 200 full-differential cycles per API 6A 20th Ed. PR2 (Feb 2016). Post-cycle seat test with hold: zero leakage.

2-1/16" 10K TE-3 · 6BX · 4130 75K · 17-4PH · CF-PEEK seats

200 full-ΔP cycles

15 months on shelf

0 leakage after test

Solutions for These Application Areas

- Compressor systems
- Water injection
- Emergency shut-down (ESD)
- Gas processing
- HIPPS
- Production manifolds
- PRV isolation
- Control and block valves
- Main export valves
- Compressor anti-surge
- Main boarding valves
- Block valves
- Chemical injection
- Pig launcher / receiver
- Gas injection
- Shut-down valves (SDV)
- Gas to flare / vent / blowdown
- Control valves / chokes
- Riser valves
- Process on-off valves
- Isolation & blowdown

Cornerstone Services

In-House Repair

Skilled technicians and authorized workshops in strategic markets, able to render any kind of service.

On-Site Repair

Trained, certified field service personnel ready to travel to your site — onshore or off.

Training

Operation and maintenance training for your staff on Cornerstone valve products.

EXTREME ENGINEERING

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Asset Management Services

Cornerstone's support does not end when the valve ships. OEM engineering guidance lasts the life of your valve — and carries into the next one, even when the platform changes hands.

Since 1991
every valve sold logged in one electronic install-base database

≤ 15 min
to pull the original design revision of a decades-old valve

Life of valve
OEM technical engineering support for every customer

01 Technical & Engineering Support

In-house and on-site field assessments for troubleshooting, plus post-installation and commissioning guidance from the engineers who designed the valve.

02 Spares & Repair Kits

"Soft Goods" kits (elastomeric seals) and "Full Goods" kits (ball, seats, bearings and metallic parts), or loose spares — built to the original OEM bill of materials. No reverse engineering or 3D scans.

03 Refurbishment & Upgrades

Return your valve for teardown, findings, rebuild and re-test to the original code. Upgrades to amended specifications, emissions classes and new compliance standards.

04 Partnership & Distribution

Houston-based near the Port of Houston, IAH and Hobby, with an Alliance Partner Network supporting customers across North America and worldwide.

IN-HOUSE ASSESSMENT & TEARDOWN · RMA FINDINGS REPORT

Technicians tear the valve down under engineering oversight and issue a report: general condition, teardown and component photos, likely cause of wear or damage, and the recommended rebuild or replacement parts. Every valve gets one of three findings:

No finding
No damage or wear: cleaned, re-assembled, re-tagged, re-tested to the original code and returned.

Salvageable
Minor to significant wear: you choose to proceed with the recommended work or have the valve returned.

Non-salvageable
Damage beyond repair: recommendation to scrap or return, and replace with a new valve.

ON FILE FOR EVERY CORNERSTONE VALVE

- GA drawings with the original bill of materials
- Revision control and design-modification history
- O&M manuals for teardown, kit install and field rebuild
- Delivery records, tags, photos and location
- Legacy vendor sources for original components

Long-Term Master Service Agreements

Fixed pricing, lead times, inventories and prioritization, with OEM preferred pricing that resists PPI and market-index swings.

Supply-Chain Continuity

Decades of sub-component supplier records. If an original part is obsolete, Procurement and Engineering jointly qualify a compatible substitute.

Have a serial number? We have the history. Call your salesperson at Cornerstone Valve

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