

H-4[®] subsea connectors

The industry standard for offshore drilling and production since 1964



H-4 subsea connectors

Since 1964, the VetcoGray family of H-4 connectors have been value-engineered to provide you with the best connector available. These connectors have reliable, simple operating characteristics, excellent bending and tensile load capabilities, field-proven, hydraulically operated, metal-to-metal sealing and a long, economical service life.

- BOP stack to wellhead connection
- LMRP to BOP stack connection
- Completion tree to wellhead
- TLP/subsea template tiebacks
- Production riser assembly to subsea manifold
- Single point mooring to anchor base
- Caisson completions and artificial island

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Leading the way to deeper water

Today's offshore drilling environment is progressing into water depths in excess of 10,000 feet. The DW HD H-4 and SHD H-4 connectors, paired with VetcoGray's DMS-700 and SMS-700 wellheads, are specifically designed for use in deepwater and other critical service applications where high bending loads are anticipated.



SHD H-4 connector with a studded top

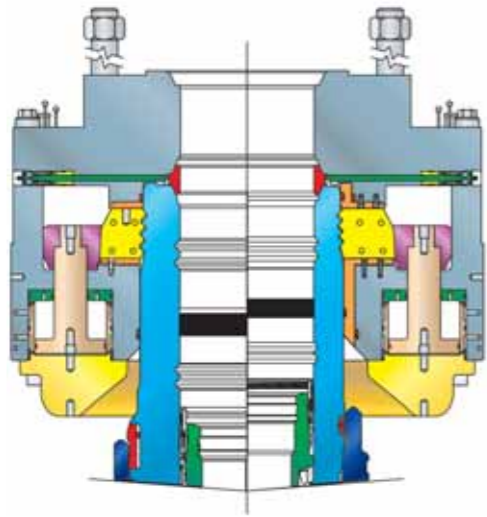
Reliable, field-proven technology



18-3/4" SHD H-4 connector

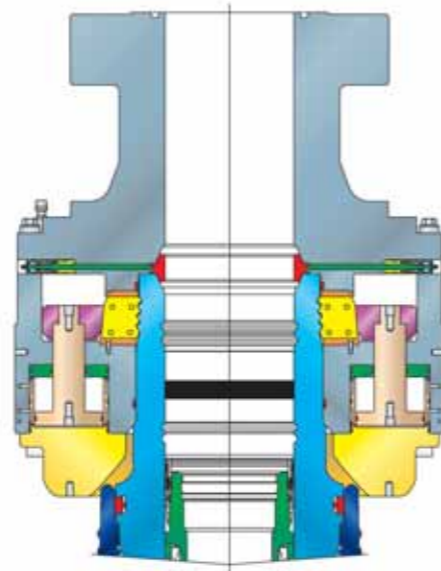
18-3/4" SHD H-4 connector shown with studded top and locking dogs engaged on SMS-700 30" outside diameter wellhead. Available with flanged top.

18-3/4" SHD H-4 connector shown with studded top, adapter kit and locking dogs engaged on MS-700 27" outside diameter wellhead. Available with flanged top.



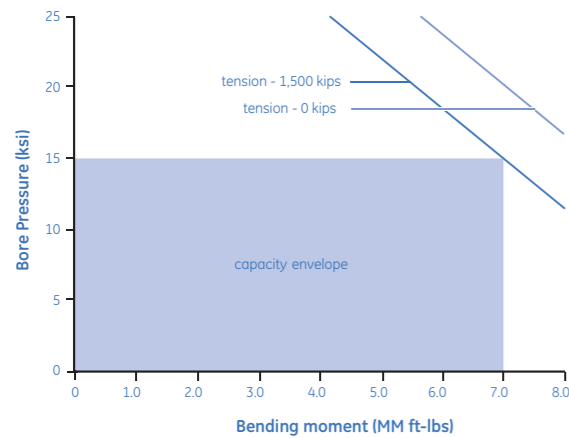
18-3/4" DW HD H-4 connector

18-3/4" DW HD H-4 connector shown with flanged top and locking dogs engaged on DMS-700 27" outside diameter wellhead. Available with studded top.



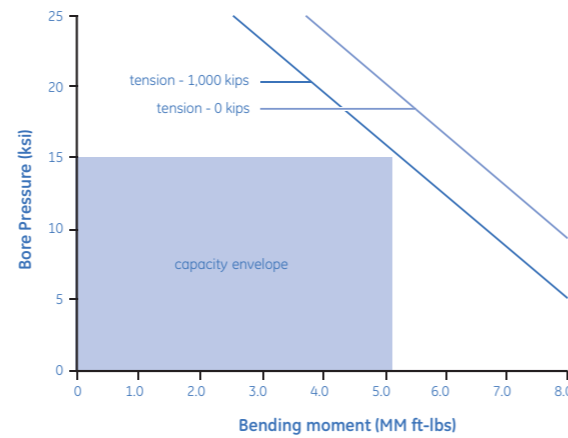
18-3/4" SHD H-4 load capacity envelope

Load capacity at 2/3 yield
Note: Tension values at the wellhead for 3,000 psi connector locking pressure.



18-3/4" DW HD H-4 load capacity envelope

Load capacity at 2/3 yield
Note: Tension values at the wellhead for 3,000 psi connector locking pressure.



Technical specifications: 18-3/4" SHD H-4

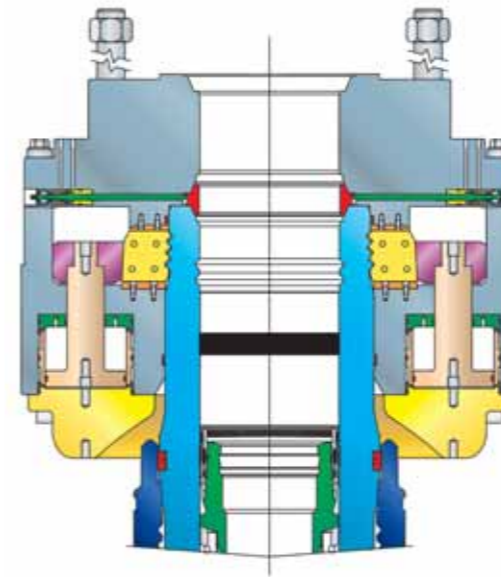
Based on connection with SMS-700	Measurement
Bending load capacity	7 MM ft-lbs
Preload	7.5 MM lbs
Hydraulic circuits	10
Lock fluid volume	12.10 US Gal
Unlock fluid volume	15.10 US Gal
Outside diameter	66 in
Weight	28,600 lbs
Swallow	32.25 in
Max. service pressure	15,000 psi
Max. hyd. oper. pressure	3,000 psi

Technical specifications: 18-3/4" DW HD H-4

Based on connection with DMS-700	Measurement
Bending load capacity	5.25 MM ft-lbs
Preload	6.25 MM lbs
Hydraulic circuits	10
Lock fluid volume	12.10 US Gal
Unlock fluid volume	15.10 US Gal
Outside diameter	62 in
Weight	25,770 lbs
Swallow	32.25 in
Max. service pressure	15,000 psi
Max. hyd. oper. pressure	3,000 psi

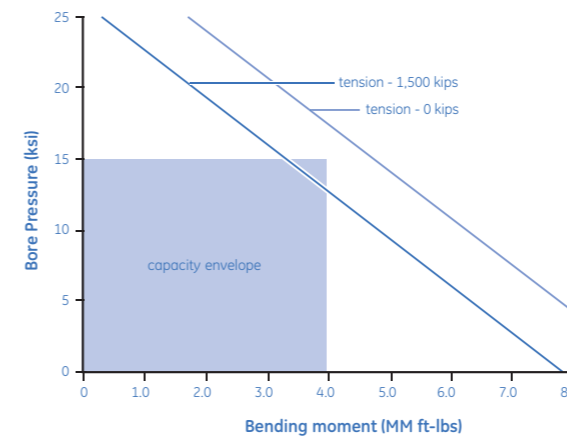
18-3/4" HD H-4 connector

18-3/4" HD H-4 connector shown with studded top and locking dogs engaged on MS-700 27" outside diameter wellhead. Available with flanged top.



18-3/4" HD H-4 load capacity envelope

Load capacity at 2/3 yield
Note: Tension values at the wellhead for 3,000 psi connector locking pressure.



Technical specifications: 18-3/4" HD H-4

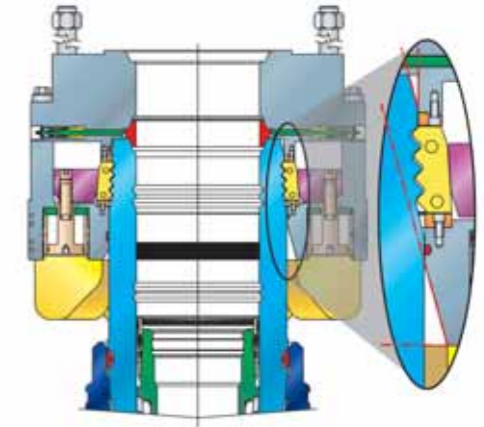
Based on connection with HC MS-700	Measurement
Bending load capacity	4 MM ft-lbs
Preload	6.25 MM lbs
Hydraulic circuits	10
Lock fluid volume	12.10 US Gal
Unlock fluid volume	15.10 US Gal
Outside diameter	62 in
Weight	25,770 lbs
Swallow	32.25 in
Max. service pressure	15,000 psi
Max. hyd. oper. pressure	3,000 psi

18-3/4" ExF H-4 connector

18-3/4" ExF H-4 connector shown with studded top and locking dogs engaged on MS-700 27" outside diameter wellhead. Available with flanged top.

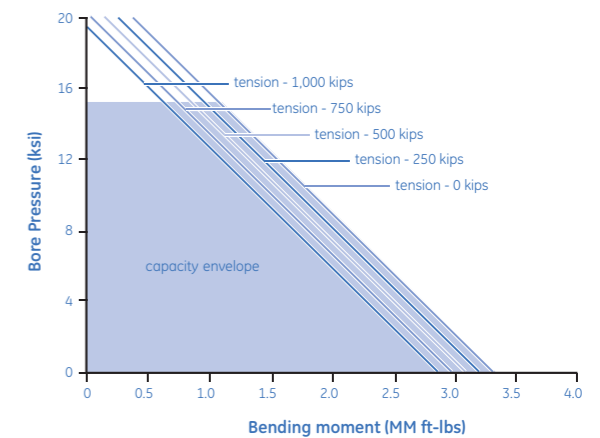
18-3/4" ExF HAR H-4 connector shown with studded top and locking dogs engaged on MS-700 27" outside diameter wellhead. Available with flanged top.

The ExF HAR H-4 connector (shown in detail below) is designed for disconnection with large vessel offset. This connector has the same specifications as the ExF H-4 connector with specific modification for High Angle Release.



18-3/4" ExF HAR H-4 load capacity envelope

Load capacity at 2/3 yield
Note: Tension values at the wellhead for 3,000 psi connector locking pressure.

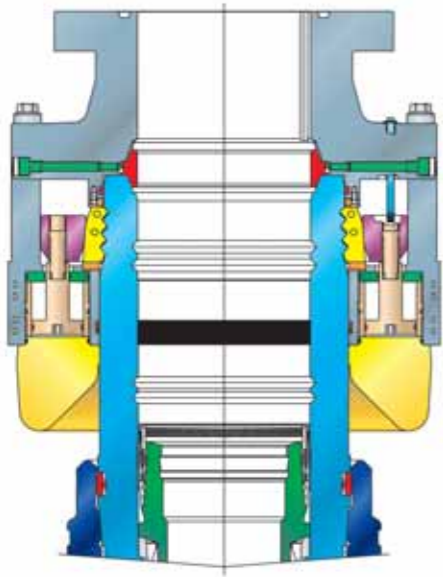


Technical specifications: ExF H-4

Based on connection with MS-700	Measurement
Bending load capacity	3.1 MM ft-lbs
Preload	2.51 MM lbs
Hydraulic circuits	12
Lock fluid volume	4.14 US Gal
Unlock fluid volume	5.16 US Gal
Outside diameter	51.5 in
Weight	14,200 lbs
Swallow	27.5 in
Max. service pressure	15,000 psi
Max. hyd. oper. pressure	3,000 psi

18-3/4" E H-4 connector

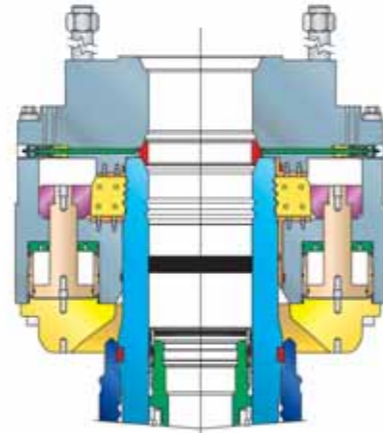
18-3/4" E H-4 connector shown with flanged top and locking dogs engaged on MS-700 27" outside diameter wellhead. Available with studded top.



16-3/4" HD H-4 connector

16-3/4" HD H-4 connector shown with studded top and locking dogs engaged on MS-700 25-3/4" outside diameter wellhead. Available with flanged top.

16-3/4" HD H-4 connector shown with studded top, adapter kit and locking dogs engaged on MS-700 25-3/4" outside diameter wellhead. Available with flanged top. Adapter kit options allow interface with both 25-3/4" and 27" outside diameter wellheads.



H-4 design ensures reliable, quick lock and release

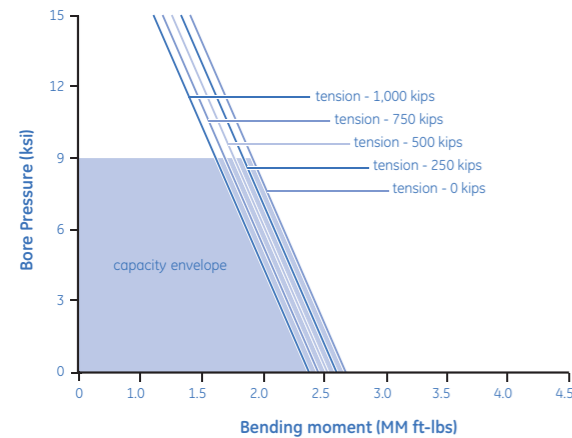
Design of the hydraulic piston provides for a releasing force 25% greater than locking force for the same operating pressure, using the primary release only. Using the primary and secondary release systems together results in a releasing force 125% greater than the locking force.

The H-4 locking dog segments positively retract from the wellhead profile through the over-pull, ensuring release of the connector. Springs between the locking dog segments keep the dogs retracted until they are energized.

Time-tested, durable design ensures release

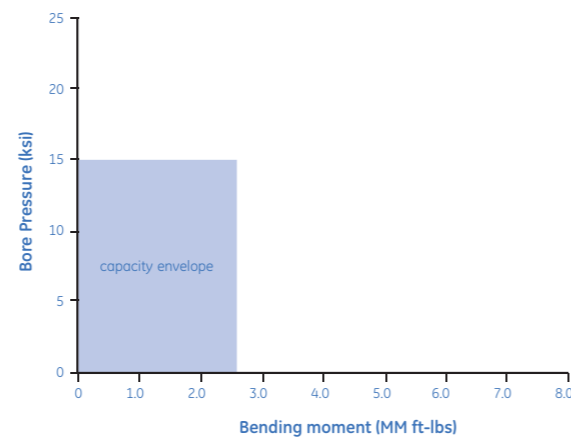
18-3/4" E H-4 load capacity envelope

Load capacity at 2/3 yield
Note: Tension values at the wellhead for 3,000 psi connector locking pressure.



16-3/4" HD H-4 load capacity envelope

Load capacity at 2/3 yield
Note: Cylinder locking pressure of 3,000 psi.

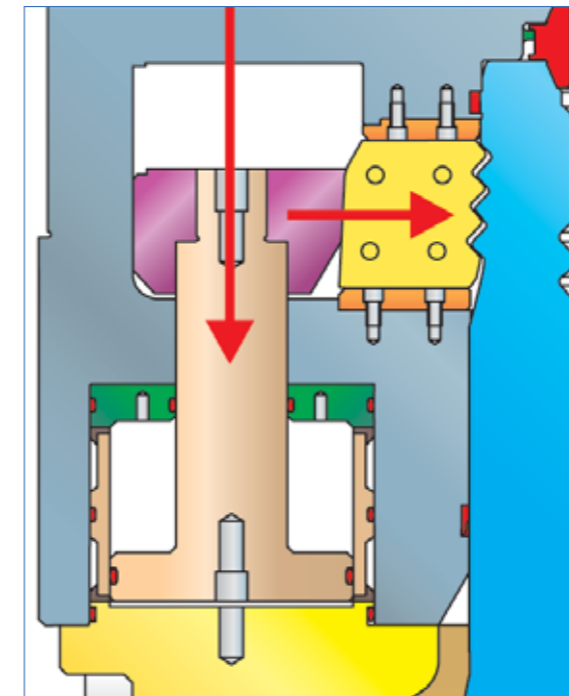


Technical specifications: 18-3/4" E H-4

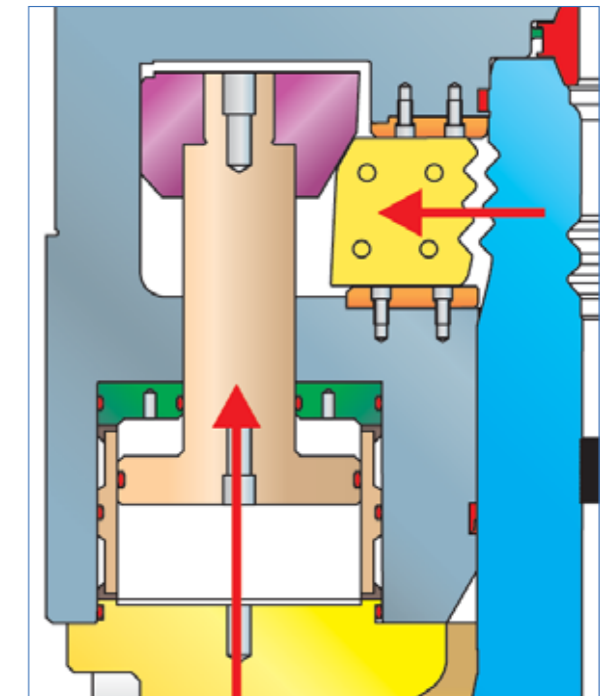
Based on connection with MS-700	Measurement
Bending load capacity	2 MM ft-lbs
Preload	2.10 MM lbs
Hydraulic circuits	10
Lock fluid volume	3.45 US Gal
Unlock fluid volume	4.30 US Gal
Outside diameter	46.88 in
Weight	10,500 lbs
Swallow	27.5 in
Max. service pressure	10,000 psi
Max. hyd. oper. pressure	3,000 psi

Technical specifications: 16-3/4" HD H-4

Based on connection with 25-3/4" MS-700	Measurement
Bending load capacity	2.5 MM ft-lbs
Preload	5.0 MM lbs
Hydraulic circuits	10
Lock fluid volume	12.10 US Gal
Unlock fluid volume	15.10 US Gal
Outside diameter	62 in
Weight	29,662 lbs
Swallow	32.25 in
Max. service pressure	15,000 psi
Max. hyd. oper. pressure	3,000 psi



Locking



Release

VX-2®, VGX-2®, and VT-2® gaskets are designed to seal internal pressure in H-4 connectors

The stainless steel VX-2 gasket is the standard gasket for drilling and production; it is rated for 15,000 psi internal pressure, 250 degrees F, and is manufactured from corrosion resistant material.

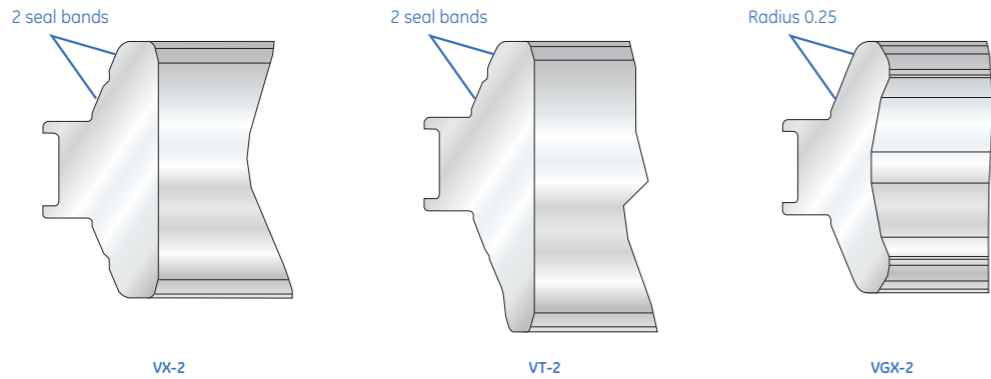
The carbon steel VX-2 gasket is a lower cost/lower performance version. It is rated for 10,000 psi internal pressure, 250 degrees F, and is coated for corrosion resistance.

The VGX-2 gasket is a higher performance/higher cost version. It is rated for 15,000 psi internal pressure, 350 degrees F, and is manufactured from high yield strength stainless steel with a silver coating. The higher yield strength material provides a larger range of elastic action, while the silver coating provides resistance to galling. The coefficient of thermal expansion of

the gasket approximates that of the wellhead and the H-4 upper body.

The VT-2 gasket seals on a secondary independent seal surface and is used when the primary VX sealing surface is damaged. It is rated for 15,000 psi internal pressure, 250 degrees F and is manufactured from corrosion resistant material.

Other API sizes and optional configurations are available. Insert options include Hycar, lead, and tin indium materials.



High pressure, high temperature performance

Dimensional data: VX-2, VT-2 and VGX-2 gaskets

	VX-2 gasket (gas/liquid)	VX-2 gasket (gas/liquid)	VT-2 gasket (gas/liquid)	VGX-2 gasket (gas/liquid)
Working pressure (psi)	15,000	10,000	15,000	15,000
Temperature range (°F)	35-250	35-250	35-250	35-350
External pressure rating (psi)	1000	2500	1000	3500
Seal material	Stainless steel (316)	Mild steel	Stainless steel (316)	Stainless steel / corrosion resistant alloy
Surface coating	Moly based	Moly based	Moly based	Moly based
PSL-4 qualifications	Yes	Yes	Yes	Yes

Safe, simple, user-friendly design

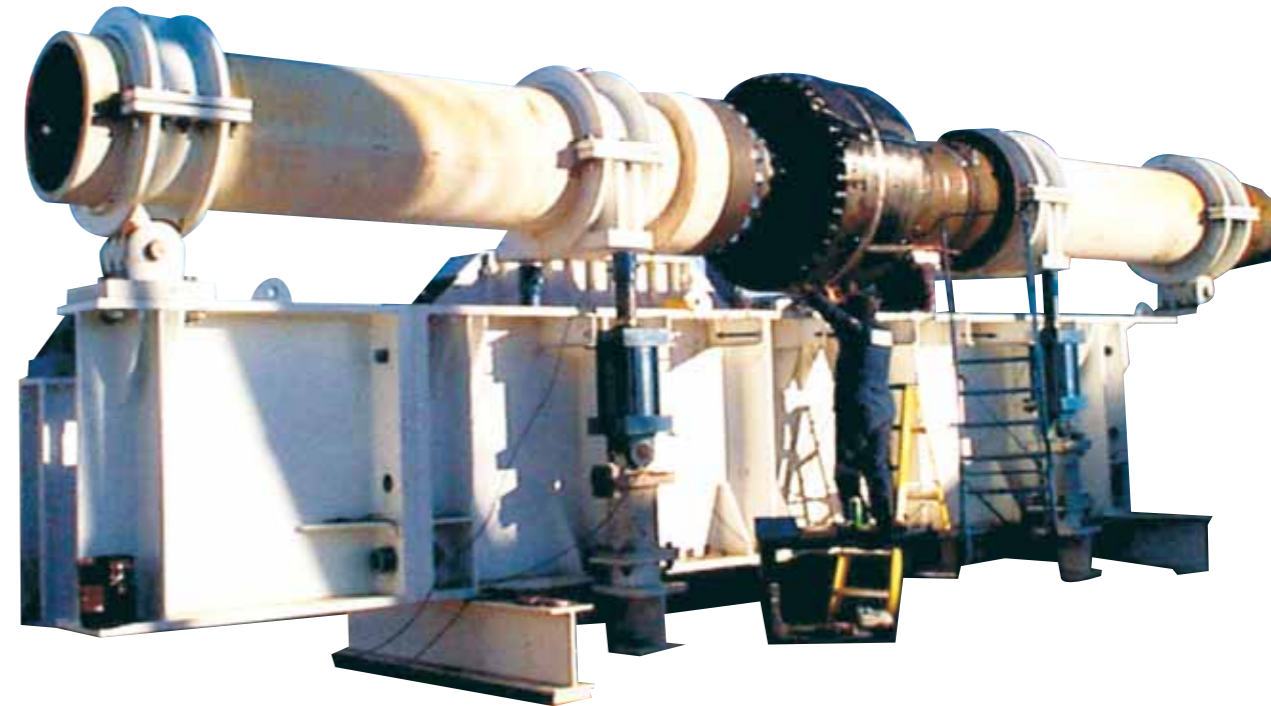
- Optional upper body configurations available
- Easy primary seal replacement

Safety

- Replacement of seal ring does not require personnel to be under connector / BOP.

Subsea

- Seal is ROV replaceable and retrievable.
- Visual position indicator rod – Indicator rod provides positive, visual indication of locked and unlocked position as well as cam ring travel.
- Pressure-tight self-energizing seal – Positive compression loading of the seal ring into the corrosion and damage resistant seal surface provides reliable sealing integrity.
- Primary and secondary hydraulic circuits – The dual hydraulic operating system generates 25% more releasing force than locking force.
- Positive mechanical release – Dog profile design (45 degrees) assures positive retraction of locking dog segments at separation.



MS-700 wellhead and H-4 connector in bend test fixture at VetcoGray's Houston test facility

Breadth and depth

GE's VetcoGray business has been developing industry-leading solutions for more than a century. Our specialty systems enable superior performance around the globe – in harsh environments on land, offshore and subsea.

As the oil and gas industry matures, we provide the knowledge and technologies to take drilling, completion and production further and deeper than they have ever gone.

Onshore

Surface wells are drilled and completed in every kind of environment from desert sand to Arctic snow. We provide expertise and equipment for them all. Our experience covers production of oil, gas and combinations with other products such as water, CO₂ or H₂S. Our products and services span the entire range of applications, whether for simple low pressure oil wells or the extreme High Pressure High Temperature (HPHT) wells now being developed worldwide.

Offshore

Offshore facilities are becoming more diversified as a result of vast differences in water depths and field characteristics. We offer an extensive portfolio of proven systems and products including fixed platforms, jackups and MODUs, TLP/Spars and FPSOs, and we frequently partner with our customers in offshore field development and exploitation – providing a full range of industry-leading technologies from drilling and compression equipment to power generation modules.

Subsea

With offshore development moving into deeper waters and marginal fields, more advanced technologies are needed to increase reliability, flexibility, speed and performance. Our subsea wellheads and connectors have provided solid foundations for more than 40 years. We are also at the forefront of subsea field development, with advanced system integration capabilities and over 1,000 systems installed worldwide. Our portfolio also includes the industry's latest and most advanced trees, production controls, manifolds and connections, processing and distribution systems.

One source, many solutions

Strength and stability

As part of GE's Oil & Gas business, VetcoGray benefits from the broad strategic and financial stability that enables strong, long-term investment in and development of new technologies, tools, services and human resources.

Investment

VetcoGray is committed to investing significant time and resources in order to deliver greater advantages to our customers. We invest in new technologies – researching, developing and testing extensively to ensure that only the best solutions go to market. We also invest in regional economies by spreading our research, manufacturing and service facilities around the world.

Knowledge

VetcoGray has over 100 years of experience serving the Oil & Gas industry with our field proven technology. Our customers are in a unique position to benefit, not only from our advancements in this industry, but also from the products and services proven by other high-tech parts of our organization. Technologies can be modified and injected from GE's Aviation, Energy, Healthcare and other businesses to improve product performance in oil and gas applications. We also work very closely with key customer engineering teams to create solutions customized to their operations.

Training

In addition to extensive and demanding training requirements for our own personnel, we provide a variety of standard and specialized programs for our customers. Our courses cover any of our product lines or they may be project specific. Training methods and course documentation is tailored to each customer's particular needs and equipment. We can accommodate programs at any of our global facilities or at customer sites.

Service

We provide inspection, maintenance, repair, spare parts and upgrade services for our current and legacy equipment in every region of the world. VetcoGray has 61 locations in 32 countries. Our well established global service locations continue to support our customers' needs worldwide. Our crews perform extensive onsite support, plus ongoing design and engineering solutions that help prolong equipment life, reduce costs, and improve performance.

Commitment

VetcoGray is fully committed to helping our customers achieve greater levels of performance and productivity through all phases of Oil & Gas drilling and completion.

On land and at sea



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GE imagination at work