Dril-Quip’s BigBore II™ Subsea Wellhead System meets the demands of HPHT well environments. The BigBore II™ is fully verified and validation tested for structural capacity and high fatigue resistance.

The 18 ¾” nominal bore high-pressure wellhead housing is available with a 15,000 psi and a 20,000 psi working pressure (WP) rating. It is available with a 27” nominal O.D. and a 30” nominal O.D. mandrel. The wellhead is sized for mating to surface casing and accommodates 16” and 18” supplemental casing hanger systems.

The BigBore II Subsea Wellhead System is highly flexible to accommodate a complex casing program that satisfies deep HPHT well objectives.
Accommodates a variety of casing programs
The BigBore Ile Subsea Wellhead System is the next-generation wellhead system designed for HPHT service in deepwater / deep well applications.

- Designed for 15,000 psi (27") and 20,000 psi (30") rated working pressure and H2S service between 35° to 350° F with all metal-to-metal sealing
- Supports 8.8 million lbs of end-load (combination of casing weight and test pressure) at the bottom internal landing / load shoulder profile
- Highest available combination of bending, tension and load capacities using the Dril-Quip DX™ profile
- Utilizes adapters positioned in 22”/23” surface casing joints for landing 18” and 16” supplemental casing hanger systems
- 18” and 16” casing, casing hangers and testable / retrievable / replaceable seal assemblies can pass through 21” OD drilling riser, 18-3/4” BOP Stack and BigBore Ile wellhead housing
- All casing hangers and seal assemblies are run, set and tested on drill pipe running string in a single trip
- High pressure wellhead actively locked into low pressure wellhead with 2.0 millions lbs of preload to unitize both conductor and surface strings for superior bending load reaction and fatigue resistance
- Utilizes field proven BigBore II-H HPHT metal-to-metal sealing technology
- Incorporates ROV-assisted annulus shutoff monitoring systems for all casing strings cemented back to surface
- Large cement return flow-by areas on all casing hanger systems
- Bit-runnable wear sleeves and wear busings available
- Available with hydrate diversion plate option
- Alternate casing programs accommodated
- All component designs are based on existing BigBore II-H technology and long successful BigBore-II field history

**Next Generation Wellhead System reduces trips, saves rig time, and money**

The Seal Assembly lockdown capacity eliminates the need for additional drilling or production locking devices.
The BigBore Ile Casing Hanger Seal Assembly provides high lockdown capacity and bi-directional high pressure metal-to-metal sealing, suitable for liquid or gas HPHT service.

- Seals in a recessed groove in the wellhead bore, which protects against scoring in the seal bore
- Locks to the wellhead using the outer lock ring to hold down the seal and prevent excessive movement of casing hanger and seal when casing strings are exposed to thermal growth loading
- Locks to casing hanger using the inner lock ring to resist seal movement when seal is exposed to pressure from below
- Seal Assembly outer lock ring as 2,000,000 lbs lockdown capacity
- Successfully tested in gas medium per API 6A PR2 requirements with zero leakage and Group 4 Dynamic seal endurance testing with no elastomers
- Metal-to-Metal sealing element is weight set and pressure energized
- Lower portion of seal has pressure assisted puller element that acts as piston to pull seal into position using test pressure
- Same seal assembly is used on first and second position casing hangers; seal locks to both casing hanger and wellhead
- Can be retrieved with straight vertical pull – no rotation required
- Can be run separately with Seal Assembly Running Tool

The BigBore IIe Casing Hanger Seal Assembly provides high lockdown capacity and bi-directional high pressure metal-to-metal sealing, suitable for liquid or gas HPHT service.
**VERIFICATION AND VALIDATION TESTING**

In order to assure Dril-Quip delivers quality products that are fit for purpose, performs as expected and meets customer expectations, the company has developed an in-depth verification and validation methodology.

**Dril-Quip Subsea Wellhead Systems In-House Verification Analysis and Validation Testing Is Extensive**

- Design verification analysis using fine mesh 2-D and sophisticated 3-D FEA modeling tools are used to provide accurate information about the behavior of the wellhead system, the wellhead connector and the attached tubular components.

- A comprehensive program of analysis and physical testing at both the component and system level produces reliable results in determining how the subsea wellhead components will respond as a system.

- Physical validation testing of the complete wellhead system provides critical information that is needed to make proper adjustments to the 3-D FEA methodology used in wellhead system verification of the design.

- Design and capacity validation testing is performed with test machines capable of applying load scenarios to a complete wellhead system (wellhead connector, high pressure wellhead and conductor wellhead).

- The horizontal test machine is capable of producing and simultaneously applying various combined load scenarios to the limits of test specimen component.

- Dril-Quip’s validation test machines are the only reliable method currently available to evaluate the adequacy of a subsea wellhead system’s ability to meet site-specific load and fatigue conditions.

**Dril-Quip Subsea Wellhead and Components Are Qualified to the Latest Industry Standards**

- Designs are evaluated with the latest 3-D analytical software tools by experienced Dril-Quip stress engineers.

- The latest API standards are used for both design verification and validation testing.

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**Horizontal Test Machine - Capabilities**

- 20 million ft-lbf of bending loading
- 12.75 million lbf of tension / compression loading and 8 million lbf of compression loading
- 6+ million lbf of simulated casing weight
- Internal / External pressure and associated pressure end loads to test specimen capacities
• Wellhead components have been tested and qualified to API 17D 2nd Edition and 6A PR2 20th Edition requirements.
• High pressure/high temperature wellhead system components have been tested and qualified to API 6A Appendix F Group 4 in addition to dynamic seal testing over and above industry requirements.
• Complete system integrated verification and validation testing helps assure individual component capacities match or exceed the system capacity requirements.

Dril-Quip has taken a "systems" approach to evaluating the strength characteristics and overall performance of the Subsea Wellhead System, which includes speciality connectors.

Dril-Quip Specialty Casing Connectors for Large Diameter Wellhead Tubulars

• The company’s specialty connector designs and performance are validated through a rigorous testing program developed with the guidelines identified in API RP 5C5 and ISO-13679 standards and specifications.
• Specialty Connectors are analyzed using von Mises Equivalent Stress theory and capacity envelopes are developed for both the connector and the pipe under a wide range of pressure/axial load conditions and operating environments and parameters.
• The company is capable of testing its specialty connectors to each of the four assessment levels (CAL I, II, III, IV).
• Design and capacity validation testing is performed with test machines capable of applying multiple load scenarios to each connector.
• Fatigue validation tests are also performed in-house to develop realistic stress amplification factors (SAF) values that can be applied to customer-supplied well-site specific histograms.
• Fatigue validation uses DNVGL PR-C203, April 2016 to compare test points for LOW, MEDIUM and HIGH stress range imputes to each of three test specimens (9 total) for a particular connector design.