DRIL-QUIP’s HorizontalBore™ Tree is a modular design subsea production component that accommodates numerous completion configuration possibilities.

The DRIL-QUIP HorizontalBore Tree is used for subsea wells that may require multiple work-over during the life of the well, for wells that have complex downhole electric configurations, and for wells that may require downhole submersible pumps. The horizontal tree offers the flexibility of running and pulling the tubing hanger without disturbing the tree-to-wellhead connection, the flowline connection or the subsea control module to the tree. DRIL-QUIP HorizontalBore Trees can be equipped with direct hydraulic, electro-hydraulic or fiber optic based multiplex control systems. Vertical or horizontal flowline connections are available, in either hydraulic or mechanical versions. The DRIL-QUIP HorizontalBore tree is available in 5-1/2” and 7” production tubing sizes and incorporates a 2-1/16” size annulus access.

- Standard API/ISO ROV interfaces ensure installation and maintenance accessibility
- Accommodates numerous downhole lines, including SCSSV, chemical injection, smart well, DHPT, and ESP; offering maximum completion flexibility

FEATURES

- Flexible compact modular tree design accommodates a variety of completion configurations and third party equipment
- Large 14.5” ID vertical access drill-through is available for passage of drill-bits, submersible pumps, coil tubing strings, and DRIL-QUIP’s slimline casing hanger system for maximum drilling and completion possibilities
- Metal-to-metal annulus sealing technology for reliable pressure isolation
- Passive tubing hanger orientation arrangement eliminates BOP orientation pins

STANDARD EQUIPMENT INCLUDES

- DRIL-QUIP’s field proven DH Gate Valves and latest generation DA Valve Actuators
- DRIL-QUIP’s latest generation DXe hydraulic tree connector

STANDARD EQUIPMENT SPECIFICATIONS

- Engineered for up to 10,000 psi working pressure
- Exceeds ISO/API 6A temperature class (0 to 300° F)
- -50° F temperature rated downstream of choke
- Footprint of less than 5m x 5m (16.4’x16.4’)  
- Material class HH for production and EE+ for annulus
- Manufactured and tested per ISO/API 17D

dril-quip.com/ HorizontalBore
Field Proven Penetrators

DRIL-QUIP’s HorizontalBore™ Tree penetrators utilize an industry standard design that offers dependable long service life. DRIL-QUIP’s HorizontalBore Tree can accommodate nine hydraulic plus two electrical down hole functions.

Industry Standard Annulus and Production Bore Seals

DRIL-QUIP’s tubing hanger annulus and production bore seals are metal-to-metal end cap seals with elastomeric backup design. The seals feature high level extrusion resistance necessary for high pressure/high temperature containment. The seal is weight set and pressure energized.

Availability of Valve Options for a Range of Completion Configurations

DRIL-QUIP’s field-proven DH (high performance) gate valve and DA hydraulic actuators are engineered for reliable service in shallow or deepwater applications. They are manufactured from high-grade materials and precision machined for dimensional accuracy and consistent high quality. DRIL-QUIP gate valves have been equipped with fail-safe close actuators and qualified to 10,000 feet per API 17D, 2nd Edition and API 6A, 20th Edition.

High Fatigue Tree for Long Service Life

The Horizontal Tree connector is a hydraulic connector with mechanical override. The connector has a secondary mechanical lockdown feature to ensure connection preload is maintained. The tree connector can be provided with a variety of industry standard locking profiles. A secondary unlock piston provides 88% more unlocking force than locking force and is standard.

Adapts to All 3rd Party Components

DRIL-QUIP’s HorizontalBore Tree can be configured to accommodate all industry standard subsea wellhead system locking profiles. Multiple interface options are available when integrating components from separate manufacturers. The tree is compatible and available with a variety of manufacturers’ chokes for production and annulus flow. The tree can accommodate all industry standard subsea control systems.
This illustration depicts the typical components of Dril-Quip’s HorizontalBore Tree Completion System and the tools required for installation and testing.

Contact your Dril-Quip Sales representative for more information on alternative specifications.

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<tr>
<th>Horizontal Tree Size and Pressure Rating Availability</th>
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Dril-Quip’s innovative communications system takes advantage of over 15 years of experience using fiber optics in subsea communication applications. Dril-Quip designs and manufacturers modular control systems for a range of applications from a one-off production well through a complex field development incorporating multiple production trees, production manifolds, and distribution manifolds. Dril-Quip’s Subsea Control System can be designed to support all tree and downhole functions for any Horizontal or Vertical Tree Subsea Completion System. These control systems can be direct hydraulic, electro-hydraulic, multiplex or any combination that meets or exceeds customers’ specifications.

CONTROL SYSTEM FEATURES:
- All components meet or exceed ISO 13628-6 and API 17F standards for functionality, expandability and reliability.
- Subsea Electronics Module (SEM) provides users real-time access to tree functions, tree equipment status and sensor performance monitoring.
- Open architecture using industry standard interfaces allows for control and monitoring of over fifty wells and the collection of all data within five seconds with fault tolerant redundancy.
- Fiber-optic-based communications in applications with over 50 mile offset and demonstrated reliable communications in tests of over 100 miles.
- Reliable noise-free communication provides high data rate based on Modbus over TCP/IP between the Master Control Station (MCS) and a Subsea Router Module (SRM).
- The SRM provides broadband transfer rates for large data volumes demanded by today’s Subsea Tree and downhole instrumentation.
- Dril-Quip can provide a Control System for use in shallow water (up to 1,500 feet) or deep water (up to 10,000 feet) applications.

SUBSEA PRODUCTION CONTROL SYSTEM INCLUDES THE FOLLOWING MAJOR COMPONENTS:
- The Master Control Station (MCS) is a windows-based system with flexible open architecture and redundant systems for high reliability. This assures easy integration with other subsea functions and topsides production control systems.
- Bump-less transfer between main and backup systems
- Incorporates highly reliable Emerson Delta V hardware and software
- Production Hydraulic Power Unit (HPU) is a self-contained
- Topside Umbilical Termination Unit (TUTU) standard
- Subsea Umbilical Termination Assembly (SUTA)
- Subsea Distribution and Router Unit
- Shallow Water Subsea Control Module (SW SCM)
  - Economic modular design
  - Qualified up to 1,500 feet water depth
  - 20 year design life
  - Keep up to 7 downhole functions standard
  - ROV compatible retrievable design
• Deep Water Subsea Control Module (DW SCM)
• 10,000 feet water depth rated
• 20 year design life
• Up to 30 functions
• ROV compatible retrievable design
• ROV latch, no running tool required
• Dual SEM unit available
• 4 electrical, fiber, or hybrid top connectors
• 6 electrical connectors through base plate available
• Sensor interfaces
• Flying Leads available

SPECIAL EMPHASIS IS PLACED ON THE TESTING OF CONTROL SYSTEM COMPONENTS. ALL UNITS RECEIVE A NUMBER OF IN-HOUSE TESTS:
• Systems Integration Testing (SIT)
• MCS and SCM, SRU, etc. supplied by Dril-Quip
• Flow meters, trees, etc. supplied by customer
• Subsea Electronic Modules (SEMs)
• Printed circuit board function testing
• Canister hydrostatic testing
• Extended Stress Screening (ESS) involving (thermal and vibration)
• Function testing
• Subsea Control Modules (SCMs)
• Hydraulic sub-assembly proof pressure testing
• Hyperbaric chamber pressure testing to validate unit water depth rating
• Electric and hydraulic factory acceptance testing

CONTROL SYSTEM ANALYSIS PERFORMED DURING THE DESIGN PHASE:
• Hydraulic analysis
• Electrical power analysis
• Communications analysis
• Failure Mode Effect and Criticality Analysis (FMECA)
• Reliability, availability, and maintainability analysis

DRIL-QUIP provides full installation and commissioning services for Control Systems required for subsea application, including a team of qualified technicians who advise and assist with systems integration testing, installation, workover and commissioning.