Subsea Wellheads
For deep and shallow water applications
The Cameron family of STM™ and STC™ subsea wellheads delivers the economic benefits of modularity and the performance benefits of advanced design. These benefits mean faster delivery, easier installation and reduced costs in nearly every subsea drilling application. And that is especially important for today’s deepwater challenges.

With modularity at the component level, there are no performance trade-offs. Cameron subsea wellheads contain technology found nowhere else and reflect the depth of our pressure control experience. The STM wellhead, for example, demonstrates our no-compromise design approach with parallel bore metal seals, better connection options with BOPs and Christmas trees and interchangeable components.

A selection of running tools (including the unique CHSART tool - see page 7) and ancillary equipment is also part of the highest performing subsea wellhead systems in the world’s offshore oilfields.

Single Trip Metal Seal Subsea Wellhead System

The STM wellhead reduces drilling costs by eliminating unnecessary trips while providing the most advanced pressure control technology, at any depth, in any environment.

Cameron’s most advanced, field proven pressure-control technology is pre-engineered into the STM wellhead.
Central to STM wellhead performance is Cameron’s parallel bore metal (PBM) seal technology, completely different from competing tapered bore designs and far superior.

The STM wellhead is perfect for most subsea drilling and production applications with working pressures up to 15,000 psi WP, on single wells, multi-well templates or TLP operations. Versions of the STM are available for shallow or deep water, and it is adaptable to casing programs with five or six strings. Only four tools are required to run a five-string STM system.

Three BOP and Christmas tree connection profiles. Depending on your requirements, choose from a hub, mandrel or Cameron’s new deepwater, high-capacity (DWHC) profile on the high-pressure 18-3/4” housing. Cameron is offering the DWHC profile to the petroleum industry without charge, to promote standardization among deepwater producers and equipment suppliers.

High-pressure 18-3/4” housing. Rated up to 15,000 psi WP, Cameron’s high-pressure housing provides a parallel bore sealing surface design for the PBM casing hanger seals. The high-pressure housing will accommodate an optional 16” casing hanger and seal assembly. Because the receptacle for the hanger and seal is welded to the bottom of the housing or anywhere in the 20” string, it does not add to wellhead height. The receptacle does not restrict a 17-1/2” bit or full-bore running equipment.

This housing has a high-strength landing shoulder rated to 7 million lbs. The simple, passive design allows the 13-3/8” casing hanger to be reciprocated inside the 18-3/4” housing without the possibility of inadvertent setting. It is fully rated for H₂S service.

The STM design allows all BOP tests to be performed with the wear bushings in place, saving a round trip for each test.

Modular Subsea And Integrated Completion systems: The MOSAIC concept

MOSAIC is the result of a design philosophy that eliminates the usual tradeoffs you expect with a pre-engineered, modular system. With MOSAIC systems, you gain simplified installation procedures, reduced personnel training, and faster delivery.

Unlike ordinary systems, you don’t have to give up flexibility, expandability and desirable product features and benefits.

The ordinary approach to modularity is fixed assemblies run progressively to large structures, which are not appropriate for many applications. MOSAIC systems are modular at the component level, standardized to work together in many combinations. The result is a cost-effective system that can be adapted to virtually any subsea job. The MOSAIC system is easily expanded as field development needs evolve, and its components contain the technology that provides the performance you need.

Cameron’s subsea wellheads are an integral part of the MOSAIC system. They’re the perfect fit for today’s subsea economics.
A closer look at Cameron engineering reveals advanced but practical technology that works in the real world. A remarkable history of pressure-control experience has been pre-engineered into our subsea wellheads. You can see our no-compromise design in these features:

**Three STM wellhead-to-conductor housing lockdown options**

**Passively activated, preloaded lockdown.** This locks the high-pressure, 18-3/4" housing to the 30" conductor with twelve vertical pre-load segments, in a collet finger design. This pre-loaded lockdown offers superior fatigue resistance. When locked down, bending and axial loads are transferred from the BOP stack to the conductor. Fatigue loading of the 20" casing is eliminated. Lockdown is achieved without a separate trip, and the mechanism can be fully recoverable and reusable. Eight, two-inch diameter bypass holes provide for cement returns.

**Passively activated, standard lockdown.** An outwardly biased, split-metal ring is held in position with a keeper ring. The split ring is compressed by the inside diameter of the 30" conductor housing until it is landed in a retainer groove.

**High-capacity lockdown.** Cameron’s new high-strength, pre-loaded lockdown is engineered for high-temperature applications where thermal expansion is a critical factor. This hydraulically set lockdown offers outstanding bending resistance. It is also ideal for deepwater applications.

**Cameron’s proprietary sealing technology**

**STM Parallel Bore Metal seal.** This seal is for casing hangers in the 18-3/4" high-pressure housing and is interchangeable on 13-3/8", 10-3/4" (or 9-5/8") and 7-5/8" (or 7") hangers. It is radially engaged, bi-directional, and provides constant contact pressure on inner and outer sealing surfaces. Because the PBM seal is designed for a parallel-bore sealing surface, it provides equal seal protection from pressures above or below. The inability to effectively seal pressures from below is a weakness of tapered-bowl seal designs offered by some wellhead manufacturers.

The Cameron parallel bore design allows for slight vertical movement of the seal without affecting seal integrity. During lab testing, the seal assembly was moved as much as 1/4" while maintaining full test pressure of 15,000 psi. PBM seals are rated for continuous operation in temperatures of up to 350°F (177°C), with excursions to 400°F (204°C), and can be used in H2S environments.

The PBM seal assembly and high-pressure housing design provides for two additional contingency seals: an optional elastomer seal and a metal seal in a recessed bore. The metal seals on the OD and ID always retain pressure before the elastomer seal. The elastomer seal is a true secondary seal.

PBM seals are set hydraulically with Cameron’s CHSART running tool, which runs the casing hanger and seal assembly in one trip.

**STC Metal-End Cap seal.** Field proven in hundreds of wells, the MEC seal assembly is used in the 10,000 psi STC wellhead. Rated for temperatures up to 250°F (121°C), the proprietary CAMLAST™ elastomer seal element is resistant to H2S, CO2, chlorides, diesel fluid and oil or water-based amine corrosion inhibitors.

Stainless steel caps on the upper and lower surfaces of the elastomer prevent extrusion, limit the elastomer’s exposure to corrosive wellbore fluids and prevent seal roll-off during installation. The Metal-End Cap seal will often work when ordinary seals won’t because the seal is highly tolerant of sealing surface damage. The seal is radially energized and requires less energy to set than ordinary seals. Well or test pressure compresses the elastomer, which adds to seal quality.
Optional 16-inch casing hanger

The 16" hanger and seal assembly are available for both the STM and STC wellheads in six-string casing programs. The receptacle can be welded to the bottom of the 18-3/4" high-pressure housing extension or anywhere in the 20" string so height is not added to the wellhead. The receptacle contains a passive load shoulder with a 17-9/16" minimum ID. The shoulder is rated to 1.2 million lbs. Full-bore running tools or a 17-1/2" bit can be used without restriction.

The 16" boll weevil style hanger and seal assembly are installed and tested in a single trip without having to pull the bore protector in the 18-3/4" housing. A CAMLAST elastomer seal in the assembly is energized to seal in the bore of the receptacle. The seal location is protected from drill string damage.

Single Trip Compact Subsea Wellhead System

The totally weight-set and compact STC wellhead is a popular choice for lower pressure wells to 10,000 psi WP. Attractive pricing and rig-time savings during installation make it the most cost-effective wellhead in its operating range.

The STC wellhead shares some of the same benefits as Cameron’s STM wellhead. It has a compact design, casing hangers and seal assemblies that can be run in a single trip and interchangeable parallel bore elastomeric seal assemblies. It is supplied with the “passive” lockdown, which is standard on the STM wellhead. The 18-3/4" high-pressure housing is available with hub or mandrel BOP and Christmas tree connection profiles.

The STC wellhead uses Cameron’s proprietary Metal-End Cap seals with CAMLAST elastomer. When setting the seals in the STC wellhead system, the seal cannot be completed unless the seal assembly is locked in place correctly, eliminating the possibility of a false test. Like the STM, only four tools are required to run a five-string STC system.

An optional 16" hanger can be used in six-string casing programs. The 16" hanger and seal assembly are run in one trip.
The benefits of modularity are pre-engineered into Cameron’s remotely retrievable/reinstallable guidebase (RRGB). Guideline or guidelineless versions of the RRGB are available. Guide posts are permitted to stroke approximately six inches to allow BOP orientation prior to loading the post. This reduces the risk of damage when landing the BOP stack. Multiple guidebases can be combined into a single, pre-tested template. Any number of wells can be accommodated through multiples of the guidebases. Multi-well units allow wellbores to be spaced as closely as 7-1/2 ft on center.

CHSART (Casing Hanger Seal Assembly Running Tool)
Cameron’s advanced wellhead technology includes running tools that contribute to system cost savings and ease of use. The CHSART tool is a perfect example. In the STM system, it allows installation of casing hangers and PBM seal assemblies in one trip. The tool is then used to hydraulically set the casing hanger seal assembly in a unique way. Unlike ordinary systems, which set the seals by pressurizing the BOP stack to pump the seal down, the CHSART tool sets the seal assembly by pressurizing down the drill pipe. This allows the seal to be set before stack pressure is applied. After the seal is fully set and in position, the seal is tested using the CHSART tool with stack pressure.

Ancillary equipment
Cameron’s STM/STC Running Tool Packages are normally all that’s required to run five-string systems under most conditions. In addition, Cameron offers a complete line of special-purpose tools:
• Jetting tool
• Boll weevil test tool with redundant seals
• Weight-set BOP tester
• One-trip Seal Assembly Retrieval Tool (SART)
• Temporary abandonment (TA) caps
• Emergency drill pipe hang-off tool
• Full-bore casing hanger running tools
• Hydraulic 30” running and tieback tool
• Casing hanger cleanout tool
• 30”/36” housing drill-ahead tool
• 18-3/4” housing retrieval tool
• Shallow water flow shutoff systems
• Tieback system
• CAMSMART™ downhole measurement tool
30" STM Conductor Housing Running Tool
The 30" conductor housing running tool is cam-actuated and has a non-rising stem. Only 6-1/2 rotations fully make up and release the tool.

Wear Bushing Running and Retrieval Tool
This is the only tool needed to set or retrieve all wear bushings in a five-string system including the bore protector.

CHSART Multipurpose Running Tool
In a single trip, the Casing Hanger Seal Assembly Running Tool runs each casing hanger and seal assembly and hydraulically sets the seal.

Running Tool for 18-3/4" Housing
After running the high-pressure housing, this tool is used to test the BOP. A position indicator rod provides visual verification of tool lock/unlock.