SS-15® Subsea Wellhead

DX® Wellhead Connector

18 3/4” SS-15 Subsea Wellhead

9 5/8” Wear Bushing

30” Wellhead

9 5/8” Casing Hanger

13 3/8” Casing Hanger

20” Supplemental Adapter

16” Positive Stop Casing Hanger
Recognized worldwide for cutting-edge drilling and production equipment technology, Dril-Quip’s state-of-the-art products, support and services offer unique advantages to the many challenges associated with today’s drilling and production operations.

Dril-Quip provides consistent high quality products in accordance with industry standards. Dril-Quip’s quality programs utilize the most advanced equipment and techniques available to ensure dimensional accuracy and performance reliability. Our engineering staff brings their proven skills and experience to resolve the most complex challenges encountered in the field, helping operators find viable product solutions for specific requirements.
Dril-Quip’s SS-15 Subsea Wellhead Systems are rated for 15,000 psi working pressure and feature a field-proven “weight-set” metal-to-metal annulus seal. The SS-15 system features the “weight-set” technique to install and retrieve all of the subsea wellhead components, including Nominal Bore Protector, wear bushings and test tools.

**SS-15 FEATURES**

- Reliable, trouble-free operation; fewer trips required
- Weight-set seal assemblies provide true dual metal-to-metal annulus seal
- Seal assemblies are designed for 15,000 psi working pressure from above, 10,000 psi from below, and H₂S service
- Same seal assembly fits all hangers 13½” and smaller
- Seal assemblies automatically lock to casing hangers and lock casing hangers to the wellhead
- Seal assemblies are retrieved by vertical pull; no rotation required
- All casing hangers are automatically centralized in the wellhead
- Large flow-by areas around casing hangers
- High pressure and high load capacity due to a unique single landing shoulder at the bottom of the 18¾” wellhead housing
- High bending load capacity between the conductor and 18¾” housing
- BOP stack can be tested with Nominal Bore Protector and wear bushings installed
- Tubing hanger sealing area and lockdown profile standard
- Threaded profile standard on all casing hangers for emergency situations
- Pressure-balanced, fail-safe “in-place” annulus shut-off system available
- The lower OD of the 18¾” wellhead has a reaction ring to transfer bending loads to the conductor wellhead
- Available with a variety of supplemental casing hanger systems
- In compliance with API 17D, 2nd Edition
- Field-proven performance
The SS-15 RLD Subsea Wellhead System is a 15,000 psi system that features weight-set metal-to-metal seals.

**SS-15 RLD Features**

- High bending, high pressure and high fatigue capacity
- Active RLD system preloads 18 3/4” wellhead to conductor wellhead during installation – 2 million lbs preload maximum
- Pressure-balanced annulus shut-off system activated when wellhead is locked down
- Subsea tie-back profiles standard
- Minimum number of tools and trips
- Simple, reliable, trouble-free operations
- Seal assemblies are designed for 15,000 psi working pressure from above, 10,000 psi from below, and H₂S service
- Same seal assembly fits all casing hangers in wellhead
- All casing hangers are automatically centralized and locked down
- Large flow-by areas around casing hangers
- BOP stack can be tested with Nominal Bore Protector, wear sleeves or wear bushings installed
- Tubing hanger profile standard
- Can accommodate all manufacturers’ subsea tubing hangers and subsea completion trees
- Simple installation steps
- In compliance with API 17D, 2nd Edition
- Field-proven performance
SS-15ES® Subsea Wellhead System

The SS-15ES Subsea Wellhead System is specially designed for use in deep water where higher bending capacities are required between the subsea wellhead and the BOP stack. Casing hangers, seal assemblies, wear bushings and running tools for the ES system are compatible with the standard SS-15 Subsea Wellhead System. The SS-15ES Subsea Wellhead System includes all the field-proven benefits found in the standard SS-15 Subsea Wellhead System, and is available with all industry-standard locking profiles.

SS-15ES Features

- High pressure and high load capacity
- Standard 38” conductor wellhead housing
- High bending capacity between the conductor wellhead and 18 3/4” housings
- BOP stack can be tested with wear bushings or Nominal Bore Protector installed
- Subsea tie-back profile standard on all casing hangers
- 18 3/4” seal assembly outer lock ring locks seal assembly and casing hanger down
- Tubing hanger sealing area and lockdown profile standard
- Annulus shut-off system inhibits water surface flow
- Configured to work with dual-rig, dynamically positioned drilling vessels
- 38” conductor wellhead will drift 30” bit and bottom hole assembly
- Available with SS-15 BigBore II features and capabilities
- Reliable, trouble-free operation
- Same operational features as the standard SS-15 Subsea Wellhead System
- In compliance with API 17D, 2nd Edition
- Field-proven performance
Dril-Quip’s 18 3/4” BigBore II System is designed for wellbores that penetrate shallow water flow zones or require several casing strings to accommodate small pore pressure fracture gradient differentials. The 18 3/4” high pressure wellhead housing is run with 22” pipe and has a large minimum ID bore to pass 18” casing and an 18” casing hanger. Two supplemental hanger adapters are installed in the 22” casing to provide a landing shoulder and seal area for the 18” and 16” hangers and testable, retrievable and replaceable annulus seal assemblies.

SS-15 BigBore II Features

- Multiple conductor housings supply resistance to bending and are used to case off hazardous formations and accommodate complex casing programs
- Available with annulus shut-off system to inhibit surface flow of water/hydrates or ROV-operated ball valves
- Rigid lockdown system preloads wellheads together for high fatigue life
- Special 18 3/4” wellhead ID can safely pass 18” OD pipe with flush OD connections
- 18” intermediate casing string is drilled and set in a standard BOP controlled environment
- 22” adapters supply landing shoulder and seal area for 18” and 16” supplemental casing hanger systems
- 18” supplemental casing hanger system is rated for 3,500 psi working pressure with 1 million lbs casing load, or 5,000 psi working pressure with 660,000 lbs casing load, from above, and 2,500 psi working pressure from below
- 16” supplemental casing hanger system is rated for 6,500 psi working pressure with 1 million lbs casing load, from above, and 5,000 psi working pressure from below
- 16” supplemental casing hanger system is also available with 10,000 psi working pressure from above and 7,500 psi working pressure from below
- All casing hangers and seal assemblies are run, set and tested on drill pipe in a single trip
- Easily accommodates casing programs with the supplemental casing hanger systems
- 18 3/4” seal assembly outer lock ring locks seal assembly and casing hanger down
- Incorporates all other features of the field-proven SS-15 Subsea Wellhead System
- In compliance with API 17D, 2nd Edition
- Field-proven performance
The SS-10/SS-10C Subsea Wellhead Systems are 10,000 psi working pressure systems that utilize weight-set metal-to-metal seals.

**SS-10 Features**
- Reliable, trouble-free operation
- Fewer trips required
- Seal assemblies are weight set and true metal-to-metal seals
- Same seal assembly fits all hangers 13 3/8” and smaller
- Seal assemblies retrieved with vertical pull; no rotation required
- No left-hand rotation downhole
- All casing hangers are automatically centralized inside wellhead
- Large flow-by areas around all casing hangers
- 18 3/4” seal assembly outer lock ring locks seal assembly and casing hanger down
- BOP stack can be tested with wear bushings installed (with exception of 7”)
- Threaded tie-back profile standard in the top of the casing hangers
- Simple installation steps
- Minimum number of tools
- Field-proven performance
PERMANENT GUIDELINE AND GUIDELINELESS GUIDE BASES

Dril-Quip offers both permanent guideline and guidelineless guide bases to meet operator application requirements. Each guide base can be non-retrievable (expendable), diver-assisted, remote-retrievable or ROV-compatible. The guide bases feature identical center receptacles and are compatible with all SS-15 and SS-10 Conductor Wellheads. The guide bases are made of box beam material for greater torsional strength.

FEATURES (NON-RETRIEVABLE PERMANENT GUIDE BASE)
- Accepts either 36” or 30” housing (other sizes available on request) and housing is locked down to guide base with a self-locking retaining ring
- Multiple cement holes in conductor wellhead for maximum flow-by
- Post tops are customer specified
- Post length is customer specified (typically 10-13 ft)

FEATURES (REMOTE-RETRIEVABLE PERMANENT GUIDE BASE)
- Guidelineless guide bases are available for a variety of operations
- Easily retrievable with a drill pipe tool
- Split-retrievable gimbal
- Suitable for drilling operations using dual activity drilling vessels
- Accepts 38”, 36” or 30” conductor housings and housing is locked down to guide base with a self-locking retaining ring
- Multiple cement holes mate with the conductor wellhead for maximum flow-by
- Post tops are customer specified
- Post length is customer specified (typically 10-13 ft)

FEATURES (GUIDELINELESS REMOTE-RETRIEVABLE GUIDE BASE)
- A variety of guide bases are available for operations with dynamically positioning drilling vessels
- Suitable for drilling operations using dual activity drilling vessels
- Accepts 38”, 36” or 30” housing and housing locks down to guide base with a self-locking retaining ring
- Twelve 3 ½” cement holes
- 10-foot diameter reentry funnel to guide BOP onto wellhead
- Easily retrievable with a drill pipe tool
Dril-Quip offers 30” and 36” standard conductor wellheads that can be adapted for a variety of sizes and types of conductor strings. Each conductor wellhead incorporates a dual grooved running profile and anti-rotation slots for a cam-actuated running tool.

The upper ID section of the conductor wellhead incorporates a locking profile and a landing shoulder for the high-pressure wellhead housing. The lower ID section includes a bending reaction surface that interfaces with the bending reaction ring of the high-pressure wellhead housing for a higher bending capacity.

**Features (30”/36” Wellhead)**

- Bottom has 30” (or 36”) OD in a variety of wall sizes and buttweld preparations
- Accommodates standard 18 ¾” wellhead housing
- Multiple large diameter holes for cement returns
- OD has profile with alignment slots for guide base

**Conductor Wellhead Running Tool**

The Dril-Quip Conductor Wellhead Running Tool features a cam-actuated locking mechanism and low friction bearing surfaces that minimizes torque while the tool is being released from the conductor wellhead. Five rotations of the running string lock and release the tool to and from the wellhead. The running tool is unaffected by ambient pressure and cannot get “pressure locked.” An ascending/descending indicator rod is used to provide visual confirmation of the tool’s lock or unlock status.

**Features**

- Runs wellhead housing and guide base in one trip
- Removable plugs provide large flow-by area for returns while jetting or turbo drilling
Dril-Quip’s SS-15 Subsea Wellhead is designed for 15,000 psi working pressure and H₂S service.

The standard 18 3/4" wellhead has a primary landing shoulder in the lower ID that supports up to a 7 million lb load, created by a combination of casing weight and BOP stack pressure test. The SS-15 Wellhead Housing is long enough to contain a three-casing-hanger program plus a subsea tubing hanger.

**Features**
- The 18 3/4" wellhead can be provided with a Dril-Quip DX®, H-4, or CIW hub-type locking profile
- The 18 3/4" wellhead has a primary landing shoulder on the lower ID to allow all casing weight and pressure loads to be carried at the bottom of the wellhead
- The wellhead minimum ID will pass a 17 1/2" bit and is available with a variety of buttweld prep sizes and wall thicknesses
- The 18 3/4" wellhead has a seal area located in the top ID that allows the wear bushing to remain in place while testing the BOP stack with the BOP isolation test tool
- The lower OD of the 18 3/4" wellhead has a reaction ring to transfer bending loads to the conductor wellhead
- The 18 3/4" wellhead is designed for 15,000 psi working pressure and H₂S service
- The 18 3/4" wellhead incorporates a subsea tubing hanger lockdown profile standard

**Subsea Wellhead Running Tool**
All Dril-Quip wellhead running tools are cam-actuated and feature left-hand make-up and right-hand release. All wellhead running tools have low friction bearing surfaces to carry tensile and bending loads. The running tools are unaffected by ambient pressure and have ample air exhaust and/or jet return ports.

**Features**
- Cam-actuated mechanism is not affected by water depth
- Lock/unlock indicator rod allows visual confirmation of tool status
- Low friction-bearing surfaces to carry tensile and bending loads and to ensure easy release even under high bending moments
- Removable plugs provide large flow-by area for water fill-up and air vent
Dril-Quip’s Rigid Lockdown (RLD) Conductor Wellhead is designed to eliminate any alternating load between the conductor wellhead/high pressure wellhead locking interface. This makes the RLD system particularly suitable for well development applications, and is used for most deepwater applications. Working with the preload features of the 18 ¾” RLD high-pressure wellhead housing, the dual running grooves at the top and the five degree tapered interface at the bottom of the wellhead conductor housing lock the two housings together with up to 2 million lbs of preload, which increases the bending resistance and fatigue life of Dril-Quip’s RLD Wellhead System.

The RLD Wellhead Housing incorporates a dual groove profile and anti-rotation slots for the cam-actuated drill-ahead running tool. In addition, it includes a lockdown groove for the 18 ¾” housing and can be adapted for a variety of conductor sizes.

**Features (30”/36” Wellhead)**
- Accommodates standard SS-15 18 ¾” Rigid Lockdown Wellhead
- Bottom has buttweld prep for 30” (or 36”) OD in a variety of wall sizes
- Accommodates 18 ¾” Rigid Lockdown wellhead housing
- Multiple large diameter flow-by holes for cement returns
- OD has profile with alignment slots for guide base

**Features (38” Wellhead)**
- Accommodates 18 ¾” Rigid Lockdown ES Wellhead Housing
- Bottom has buttweld prep for 38” OD conductor in a variety of wall sizes – can be swedged to 36” if desired
- Multiple large diameter flow-by holes for cement returns
- SS-15ES conductor wellheads have an extended bore on ID to interface with 18 ¾” housing bending reaction ring

**Cam-Actuated Drill-Ahead (CADA) Running Tool**

The Dril-Quip CADA Tool incorporates all the features of the standard conductor wellhead running tool. In addition, the CADA Tool allows the operator to drill the next hole section (once the conductor wellhead is installed) in the same trip. Spring-loaded shear pins trap the outer body in the conductor wellhead to act as a centralizer bushing during the drill-ahead phase, and allow the body of the tool to be sheared out of the wellhead when the tool is retrieved.

**Features**
- Simple right-hand rotation puts tool in drill-ahead mode
- Includes large flow-by area for returns while jetting and drilling ahead
- Allows passage of 10” drill collars
- Simple overpull retrieval process to recover tool back to the surface
- Has a 10” stroke to allow bottom hole assembly to be raised and cleared prior to drilling ahead
**18 3⁄4" Rigid Lockdown Wellhead and Annulus Shutoff**

The 18 3⁄4" Rigid Lockdown Wellhead incorporates all the field-proven features of Dril-Quip’s standard wellhead. The Rigid Lockdown Wellhead includes a locking mechanism that preloads the 18 3⁄4" wellhead to the conductor wellhead. This is to increase resistance to bending and increase the fatigue life. The rigid lockdown system can incorporate a pressure-balanced annulus shut-off sleeve that closes off the 30” (36”) x 20” annulus after the 20” casing has been cemented into place.

**Features**
- Incorporates a locking mechanism that preloads the 18 3⁄4" housing to the 30”/36” housing
- Designed and manufactured for 15,000 lbs H₂S service
- Run, landed, preloaded and locked using Mechanical Rigid Lockdown Running Tool and drill pipe pull
- Customer-specified wellhead connector profile
- Bending reaction ring on the OD transfers bending loads to the 30”/36” wellhead housing
- Primary load shoulder can carry all loads at the bottom of the wellhead for 7 million lbs

**Mechanical Rigid Lockdown and Wellhead Running Tool**

The Mechanical Rigid Lockdown and Wellhead Running Tool is a drill pipe running tool that allows the running, installation and cementing of the 18 3⁄4" Rigid Lockdown Wellhead and casing in a single trip.

**Features**
- Operates in conjunction with the 18 3⁄4" Housing Running Tool and runs the 18 3⁄4" wellhead equipped with the rigid lockdown system
- Tool activates the rigid lockdown mechanism on the 18 3⁄4" wellhead housing
- Position indicator plate on the OD of the outer sleeve verifies lockdown stroke
- Mechanical advantage of the system is drill pipe overpull at the wellhead creates a preload between the 30”/36” and 18 3⁄4” wellhead
- Drill pipe overpull on the Tool creates a preload of 2 million lbs maximum
**SS-15 18 3/4" Seal Assembly**

The SS Series weight-set 18 3/4" Seal Assembly provides a true dual metal-to-metal seal between the casing hanger OD and the wellhead ID. The Seal Assembly is rated to 15,000 psi working pressure from above and 10,000 psi from below.

**Features**

- Seal system incorporates resilient (*Viton®*) backup seals
- Single trip runs seal assembly and casing hanger (seal assembly can also be run separately)
- Seal assembly is radially energized over a 4-degree tapered sealing area on the casing hanger
- Seal assembly locks to the casing hanger and locks casing hanger to the wellhead
- Same seal assembly fits all hangers within a nominal wellhead size

**SS-15 Casing Hangers**

All casing weights and pressure loads are transferred to the first position casing hanger. Each casing hanger is centralized and lands on a 40-degree shoulder. Each casing hanger is designed to pass 14 square inches of flow-by when running and during the cementing operations.

**Features**

- Rated load capacity of 7 million lbs (4.1 million lbs of pressure load and 2.9 million lbs casing load)
- First position casing hanger rated for 12,500 psi working pressure and H₂S service, and 15,000 psi standard service; all other casing hangers rated for 15,000 psi working pressure
- Second position casing hangers with annulus access are available
- Can be configured to accommodate any casing size 14" or smaller

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Casing Hanger Seal Assembly Running Tool
The SS Series 18 ¾” Casing Hanger Seal Assembly Running Tool is designed to minimize the process associated with installation of the casing hanger and seal assembly in the wellhead. The Casing Hanger Seal Assembly Running Tool is a single-trip, cam-actuated running tool that runs all casing hangers 14” and smaller and all seal assemblies within a given wellhead size.

- Interchangeable between all Dril-Quip wellheads within a given size
- Has up to 1.5 million lb load-carrying capacity with 2.0 million lb capacity available upon request
- Seal assembly is mounted on tool when running, providing maximum amount of flow-by available
- Running tool automatically locks down seal assembly to casing hanger during first pressure test; seal assembly is retrieved when running tool is recovered if seal assembly is not properly locked down
- Running tool seals in casing hanger to allow a full test of seal assembly and BOP stack
- Field-proven performance
MULTI-PURPOSE TOOL, ADAPTERS, WEAR BUSHING, AND NOMINAL BORE PROTECTOR

MULTI-PURPOSE TOOL
The Multi-Purpose Tool (MPT) runs and retrieves the Nominal Bore Protector and Wear Bushings. The MPT retrieves the Seal Assembly and can be used for emergency drill pipe hang-off. The MPT includes a set of running and retrieving adapters, jet subs, cup testers, and a mill and flush adapter. Each accessory is designed to facilitate the running, installation and retrieving operations, including washout, mill and flush, and BOP stack testing associated with the drilling program. All bore protectors and wear bushings are weight-set installed and weight-set retrieved.

NOMINAL BORE PROTECTOR
Dril-Quip’s Nominal Bore Protector (NBP) protects the sealing surfaces in the wellhead ID when the 16” or 13 3/8” hole section is being drilled. O-ring seals on the OD of the NBP provide a trash barrier and lock the NBP into the wellhead.

WEAR BUSHING
After installing a casing hanger, the Wear Bushing is run to protect the wellhead ID during the drilling operation. Wear Bushings are available in a variety of sizes to match the casing program and casing hanger size specified. BOP stack testing can be performed with the Wear Bushing installed. Each Wear Bushing is locked to the wellhead with eight spring-loaded shear pins.

WEAR SLEEVES AND SELECTABLE WEAR BUSHINGS
In order to facilitate rig operations for deepwater drilling programs, Dril-Quip offers a variety of bit-runnable Wear Sleeves and Selectable Wear Bushings for selected applications. Contact your nearest Dril-Quip Sales Representative for more information on these products.
Multi-Purpose Tool configured with the Wear Bushing Running Adapter to run the Wear Bushing (the Wear Bushing can also be run with the Multi-Purpose Tool configured with the Wear Bushing Retrieval Adapter and a Jet Sub)

Multi-Purpose Tool configured with the Wear Bushing Retrieval Adapter to retrieve the Wear Bushing

Multi-Purpose Tool configured with the Wear Bushing Retrieval Adapter and Cup Tester
**BOP Isolation Test Tool**

The BOP Isolation Test Tool is a weight-set tool that allows testing of the BOP stack and the wellhead housing while drilling. The BOP test tool seals on the ID of the wellhead and cannot be pre-energized. The seal element can only be activated when a release ring engages a known bore in the wellhead, wear bushing or casing hanger.

**Features**

- Allows testing of the BOP stack and the wellhead after removal of the Nominal Bore Protector (a slip-on adapter allows landing of the tool on the primary shoulder of the wellhead)
- Allows testing of the BOP stack with any wear bushing installed (this method tests the BOP stack while isolating the casing hanger seal assembly from test pressure)
  - Can be landed on top of a casing hanger with the wear bushing removed (the seal assembly is isolated from test pressure)
  - Seal activation mechanism does not allow premature activation of the seal element
  - Ample flow-by facilitates running and prevents swabbing when the tool is retrieved

**Special BOP Test Tool**

Dril-Quip’s Special BOP Test Tool allows testing of the BOP stack with the Nominal Bore Protector installed. The tool is designed to isolate the Nominal Bore Protector and transfer the loads of the BOP test into the wellhead.

**Features**

- Allows testing the BOP stack with the Nominal Bore Protector installed
- Seal element activation mechanism does not allow seal element to prematurely set
- Ample flow-by area facilitates running and prevents swabbing when the tool is retrieved
Dril-Quip supplies low-pressure and high-pressure supplemental casing hanger systems that provide field-proven, reliable, trouble-free operations, adding flexibility to customers’ casing programs.

**SS-Series Low-Pressure Supplemental Casing Hangers**

The low-pressure supplemental casing hanger is used for intermediate conductor strings in a variety of configurations and is run outside of BOP control.

**Features**

- Runs on a cam-actuated drill pipe tool and lands in 30”, 36” or 38” supplemental adapter
- Automatically locks down to supplemental adapter with a self-locking retaining ring, which can support sinking primary conductor pipe up to 1.3 million lbs
- Incorporates either flow-by or annulus sealing

**SS-Series 20” x 16” (5,000 psi H₂S Service) Supplemental Casing Hanger System**

Dril-Quip’s standard 20” x 16” Supplemental Casing Hanger System provides a means of installing and sealing supplemental casing strings in the standard wellhead system. The 16” supplemental casing hanger and seal assembly is run on a cam-actuated running tool, landed, cemented, seal assembly weight set and tested all in one trip inside BOP control.

**Features**

- Weight-set metal lip elastomeric seal assembly that locks to casing hanger but can be retrieved and then run separately
- Multiple load shoulder profile of the split ring mechanism automatically engages matching profile in adapter, providing a positive landing point for the casing hanger
- Shear pins automatically lock casing hanger down, provide overpull verification to confirm casing hanger is properly landed, and prevent casing “float” during cementing operations
- Large flow-by areas around casing hanger for cementing operations
- 20” x 16” casing hanger adapter can be located anywhere in the 20” casing string, thereby reducing the amount of 16” casing needed