

# **SLS<sup>TM</sup> and DLS<sup>TM</sup> Compact Wellhead Systems**

Product Brochure

# SLS and DLS Compact Wellhead Systems

## Single Load Shoulder and Dual Load Shoulder Compact Wellhead

The SLS and DLS Compact Wellhead Systems are designed to provide multi-stage wellhead solutions that can accommodate wide range of casing programs, working pressures, and customer specific drilling and completion requirements.

The SLS Compact Wellhead comes with a single high capacity load shoulder, sufficient to suspend up to 3 strings of casings and tubing (3-stage). This unique solution provides the maximum number of interchangeable components.

The DLS Compact Wellhead comes with a separate dual load shoulder which can accommodate a split connection in between stages in the wellhead and provide more controlled stack tolerance.

The SLS and DLS Compact Wellhead Systems has many technical advantages over conventional wellhead systems including:

1. reduced rig and installation time
2. enhanced safety through less number of BOP make/break-up connections
3. decrease cost in wellhead cost through standardized and modular parts

Selecting a suitable and cost effective wellhead system is critical in all drilling and completion program. OMS offers a complete line of Wellhead Systems that meet or exceed API Specification 6A requirements. For customized wellhead solutions not covered in this brochure, please contact your OMS representative.

### SLS and DLS Compact Wellhead Features

#### Improved Safety

- Reduced number of BOP connections on wellhead.
- Minimum number of leak paths.
- High Capacity Lock Ring for hanger/packoff retention, NO lock screws.
- Thru BOP/Diverter stack installation.
- Options to have mud returns via riser or wellhead outlets.
- Continuous control line (up to 8 control lines).

#### Reduced Rig and Installation Time

- Simple and easy to operate system.
- Minimum torque for hangers and packoff assemblies installation.
- Quick make-up connectors for both lower housing and compact wellhead.

#### Effective Cost Solution

- Modular, simple and interchangeable components.
- Optimized wellhead footprint, reduced height and raw material.
- No plastic packing required, low wellhead maintenance.
- Packoff assemblies come with two options, "S" seals and "MSC" Seals.

#### Flexibility

- Wide range of casing and tubing programs is available.
- Up to three strings of casing and tubing in a single compact wellhead.
- Emergency slip type hangers for various casing sizes.
- High Strength Landing Ring is available for high pressure and high casing load applications.
- Available to cater for various well completions: conventional single and dual, smart well, frac, gas well, and HPHT completions.
- Smaller nested tubing hanger is available for workover job with smaller BOP.

#### SLS Compact Wellhead System

- Single piece housing for up to three strings (3-stage) of casing and tubing.
- Single high capacity load shoulder.
- Identical packoff assemblies for all casing hangers.

#### DLS Compact Wellhead System

- Dual Load Shoulder design, one each for the lower and upper housing.
- Optional split two-piece wellhead system, provides greater control for each casing and tubing completion.
- Wellhead can be "split" in the case of emergency casing stuck, allowing operator to perform conventional external casing cut.

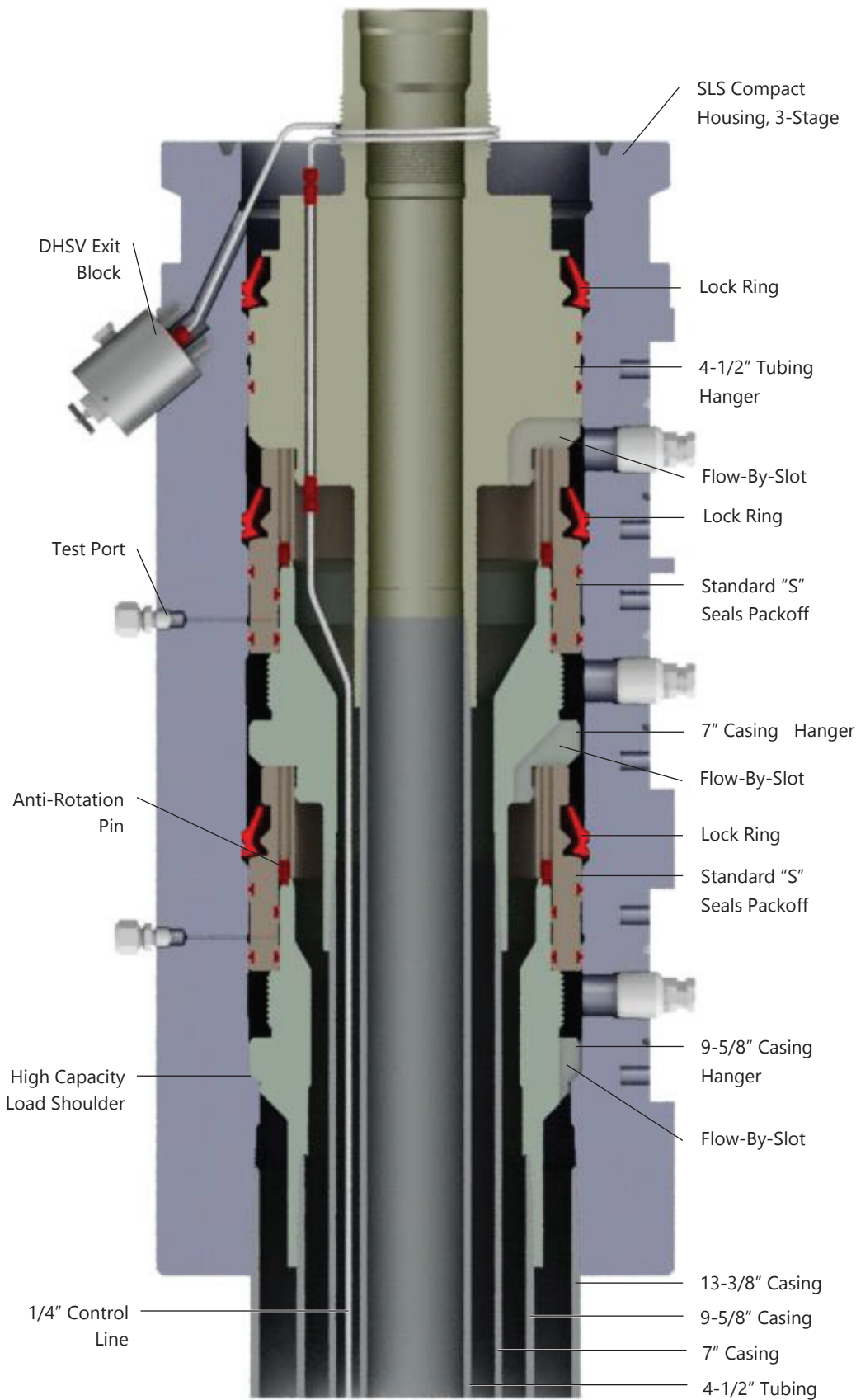
System	Nominal Size	No. of Stages	Maximum Working Pressure	Packoff Assembly	Tubing Hanger Sealing
SLS-11	11"	2	10,000 Psi   69,0 MPa	"S", "MSC"	"S", "MSC"
SLS-13	13-5/8"	3	10,000 Psi   69,0 MPa	"S", "MSC"	"S", "MSC"
SLS-18	18-3/4"	3	10,000 Psi   69,0 MPa	"S", "MSC"	"S", "MSC"
DLS-11	11"	2	10,000 Psi   69,0 MPa	"S", "MSC"	"S", "MSC"
DLS-13	13-5/8"	2	15,000 Psi   103,5 MPa	"S", "MSC"	"S", "MSC", "CTM"
DLS-18	18-3/4"	2	10,000 Psi   69,0 MPa	"S", "MSC"	"S", "MSC", "CTM"

S – Spring seal, MSC – Metal Shell Cap seal, CTM – Control Tapered Metal seal

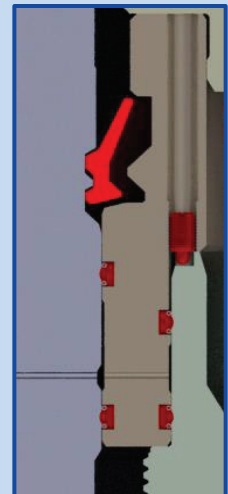
# SLS Compact Wellhead System

The SLS Compact Wellhead system is available in three nominal sizes, 10", 13-5/8", and 18-3/4" and in working pressures up to 10,000 Psi (69,0 MPa). The system is designed and manufactured to meet the complete range of material class, temperature rating, and PSL requirements of API Spec. 6A.

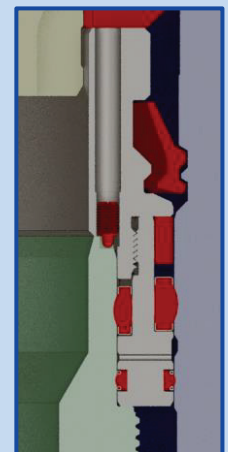
Standard "S" seals are available for each stage of casing/tubing hanger completion. Optional "MSC" Seals provides a high performance Metal Shell Cap sealing, capable of fluid and gas tight sealing in severe environment. Both seals share the exact same hanger and sealing profiles and rated to 10,000 Psi working pressure.



Typical 13-5/8" Nominal 3-Stage SLS Compact Wellhead



Standard "S" Seals Packoff Assembly



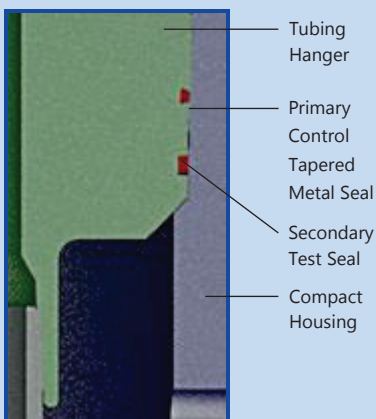
Optional "MSC" Seals Packoff Assembly

# DLS Compact Wellhead System

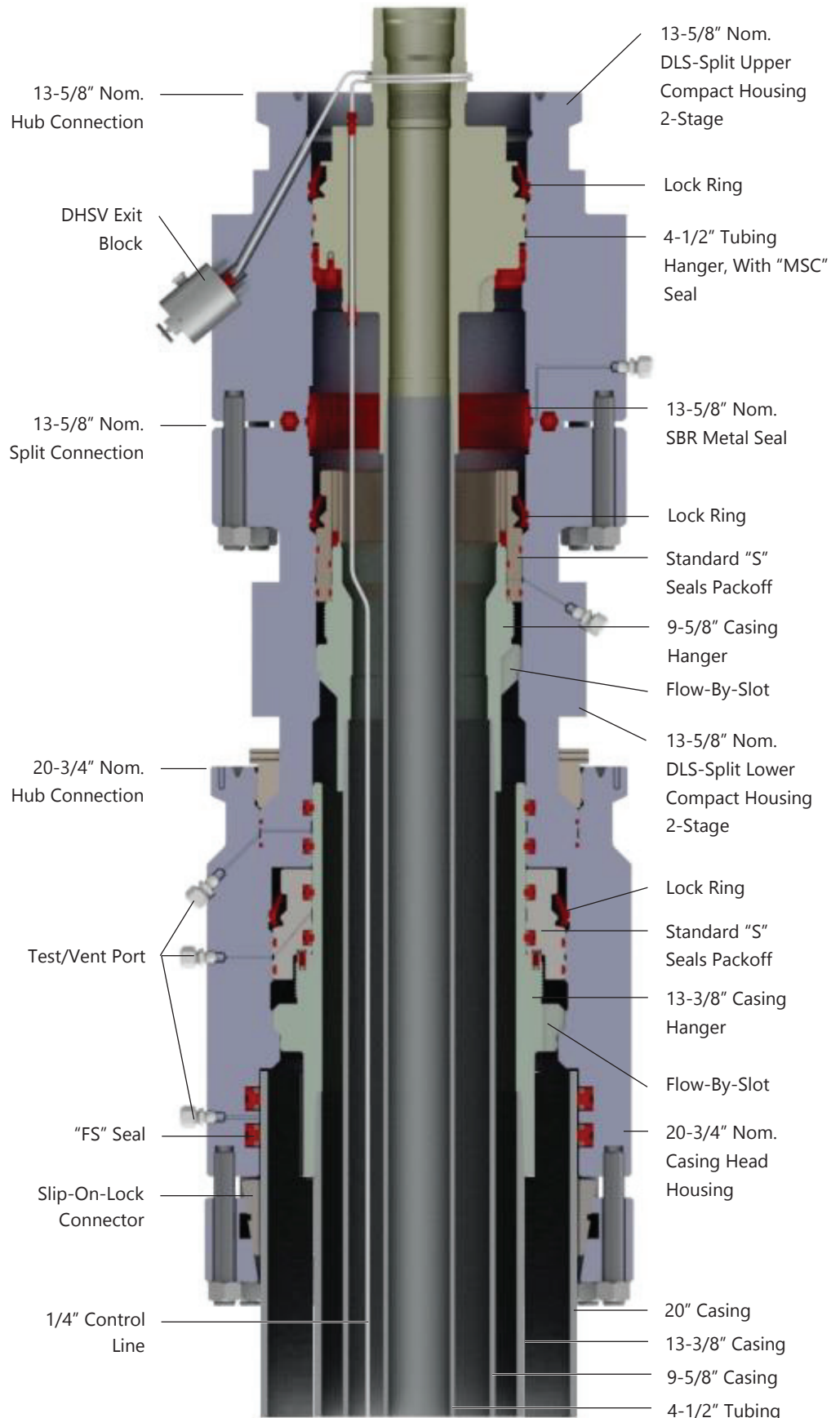
The DLS Compact Wellhead comes with separate dual load shoulders, one each for production casing hanger and tubing hanger. This design is suitable when stack-up tolerance is critical and when side outlets annulus full access is required. The DLS-Split variant provides an intermediate connection between casing and tubing hangers. In the case of casing stuck emergency, this connection can be broken up, providing full access to the stuck production casing.

DLS Compact Wellhead System is available in three nominal sizes, 10", 13-5/8", and 18-3/4" and in working pressures up to 15,000 Psi (103,5 MPa). The system is designed and manufactured to meet the complete range of material class, temperature rating, and PSL requirements of API Spec. 6A.

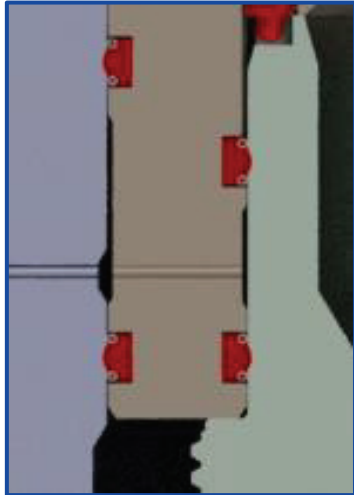
Standard "S" and optional "MSC" seals are available for Casing Hanger Packoff. Standard "S" Seals and optional "MSC" and "CTM" (Control Tapered Metal) Seals are available for Tubing Hanger.



**Optional "CTM" Metal Seals on Tubing Hanger**

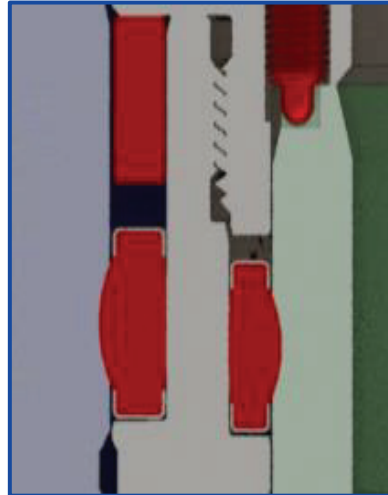


**Typical 13-5/8" Nominal 2-Stage DLS-Split Compact Wellhead With Casing Head Housing**



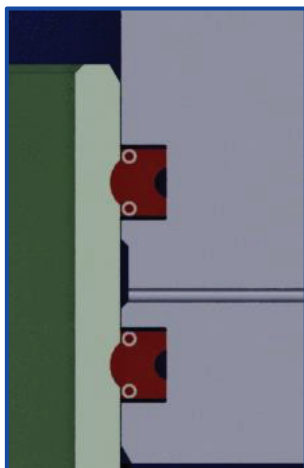
**"S" Seal**

One Piece Interference Type Seal  
316SS Anti-Extrusion Coil  
Standard offering for SLS and DLS



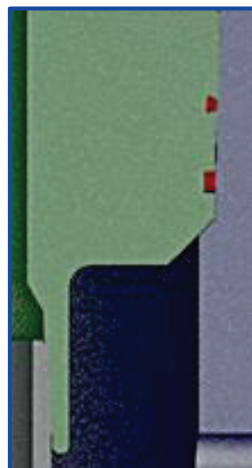
**"MSC" Seal**

Radially Energized Seal  
Metal Shells as Primary Sealing  
Highly Tolerant to Bore Imperfection



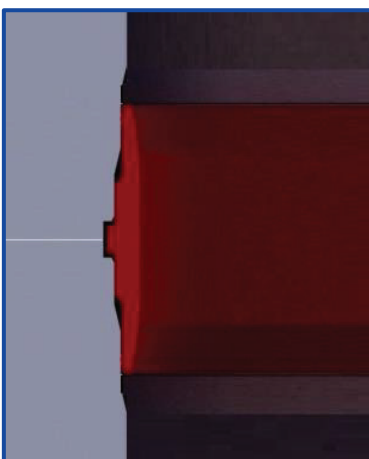
**"FS" Seal**

One Piece Interference Type Seal  
316SS Anti-Extrusion Coil, Back Groove  
Seals against Rough Casing



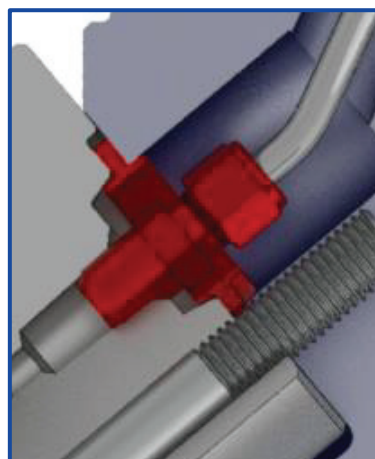
**"CTM" Seal**

Metal-to-Metal, Weight Energized Seal  
Positive Lockdown  
Primary DLS Tubing Hanger Seal



**"SBR" Seal**

Straight Bore Radial Metal Seal  
Primarily used on Tubing Hanger Neck and  
Other End Connector (OEC)



**"T" Metal Seal**

Tapered Metal Seal  
Primarily used on DHCV Block and as  
Secondary Metal Seal

One of the most critical elements of a wellhead system is the integrity of its sealing system. It determines the ability of the wellhead to withstand pressure and to a great extent the service application.

The SLS and DLS Wellhead Systems are designed with sealing capability as the main input parameter. Seals available for the SLS and DLS Wellhead System include "SBR" metal seals for primary wellbore sealing, "CTM" Seals for metal-to-metal seal on Tubing Hanger body, "MSC" seals and "S" seals on Tubing Hanger and Casing Hanger Packoff Assembly. All elastomeric seals are available in premium elastomer materials capable to withstand Rapid Gas Decompression (RGD) as per NORSOK M-710.

The "MSC" (Metal Shell Cap) seals combine 316SS metal shells with premium elastomer. The metal shells provide the primary sealing while the elastomer provides the radial sealing force. This unique sealing arrangement has been proven to be highly tolerant to seal bore imperfection while extending service life and ease of operation of the wellhead.

The "CTM" (Control Tapered Metal) Seal on Tubing Hanger offers a field proven design and reliable metal-to-metal sealing on the hanger body. The CTM Seals are energized by tubing load and simple-to-operate lock ring actuation.

# Wear Bushing, Running, and Test Tools

OMS understands the importance of proper tools design. It is paramount in ensuring trouble-free wellhead installation.

Each of the tools supplied with SLS and DLS systems have been thoroughly designed and tested to ensure ease of operation and lasting field life. Where applicable, required torque value requirement has been minimized by eliminating unnecessary load path and applying friction reduction coating.

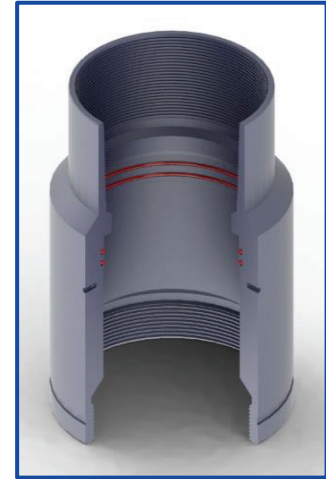
All test tools come with dove-tail type seal groove to ensure seals are properly retained after testing. Standard seals are chosen to reduce turnaround time.

All running and retrieval tools come with high-capacity Stub ACME (Left Hand) threads. The Tubing Hanger Running and Retrieval Tool provides a uninterrupted control line access, ensuring continuous communication with the Down Hole Safety Valve. Casing and Tubing Hanger Running Tools come with matching threads on top.

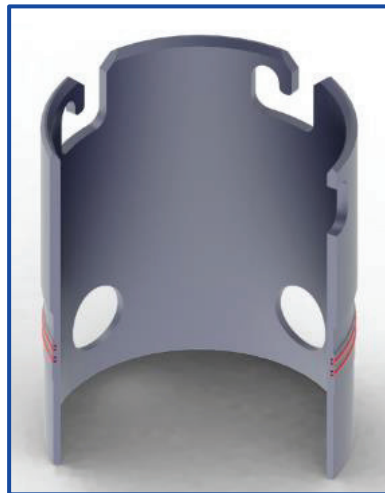
Whenever required, tools can be designed to meet API Spec. 6A Annex L requirement.



**Compact Housing Running Tool**  
 Stub ACME (Left Hand) Threads  
 Friction Reduction Coating on ACME  
 4-1/2" IF Box Thread Top



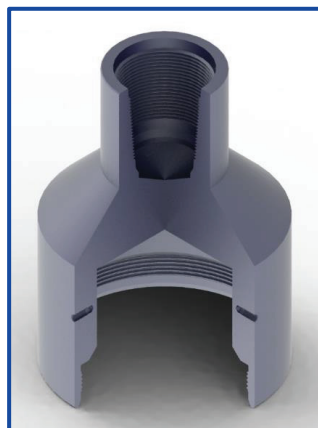
**Casing Hanger Running Tool**  
 Stub ACME (Left Hand) Threads  
 Friction Reduction Coating on ACME  
 Fully Sealed Internal Bore  
 Top Threads to match Casing Threads



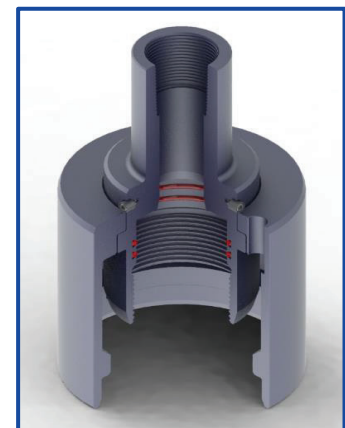
**Wear Bushing**  
 "J" Slot Mechanism  
 Retention Features  
 Protect Wellhead ID Bore



**Combination Tool**  
 Wear Bushing Running Retrieval Tool  
 BOP Test Tool  
 4-1/2" IF Box Thread Top

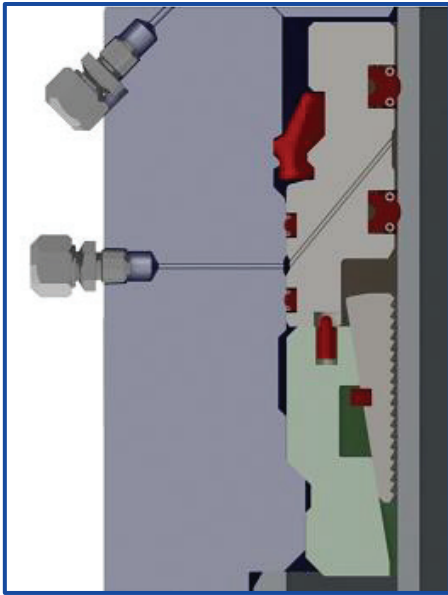


**Packoff Assembly Running Tool**  
 Stub ACME (Left Hand) Threads  
 Low Torque to Collapse the Lock Ring  
 4-1/2" IF Box Thread Top



**Tubing Hanger Running Tool**  
 Stub ACME (Left Hand) Threads  
 Friction Reduction Coating on STUB ACME  
 Full Continuous DHSV Line Access  
 Top Threads to match Tubing Threads

# Emergency Equipment and Quick Connectors

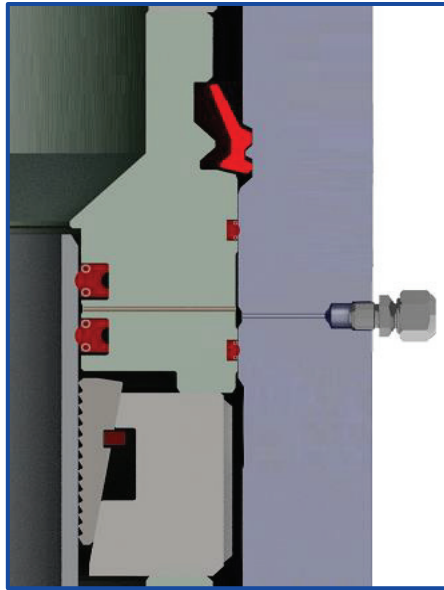


## Surface Casing Emergency

Slip-Type Casing Hanger

Packoff Assembly for Rough Casing

Internal Lockdown Mechanism



## Production Casing Emergency

Slip-Type Casing Hanger

Packoff Assembly for Rough Casing

Internal Lockdown Mechanism

## Emergency Equipment

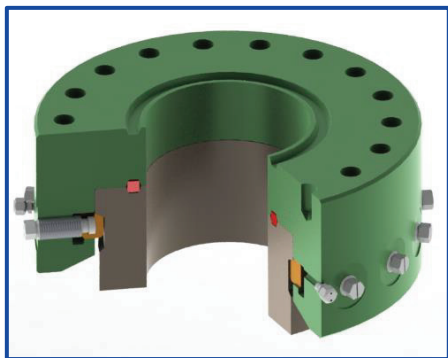
The SLS and DLS compact wellhead systems include a full range of emergency slip-type casing hangers and emergency packoff assemblies. This emergency equipment is used in the case of casing “stuck” during installation. In SLS and DLS non-split wellhead, internal casing cutters are used to cut and prep the casing before the hanger and the packoff assembly installation. In the case of DLS-Split wellhead, after breaking-up the wellhead intermediate connection, external casing cutter are used to cut and prepped the casing.

## Quick Make-Up Connections

The SLS and DLS compact wellhead system includes two quick make-up methods, the Multi-Bolt Quick (MBQ) Connectors and Multi-Bolt Flange (MBF) Connectors. Both connectors are typically installed on the Christmas Trees for quick completion and on the Drilling Adapters for quick make-up and break-up during drilling operations.

The MBQ Connectors are compatible with API Spec. 16A Hub profiles allowing greater compatibility with other drilling equipment. Dog segments are radially actuated from the connector’s external diameter to fully make up the connection.

The MBF Connectors are designed to achieve cost effective wellhead and tree completion. They require less installation time and bolt torque value as compared to standard API Spec. 6A flanges.

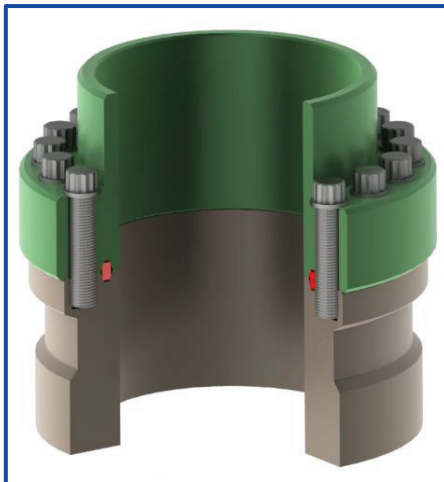


## “MBQ” Connectors

Radially Energized Quick Connector

API Spec. 16A Hub Compatible

External Dog Segments Actuation



## “MBF” Connector

Flange type Quick Connector

Low Torque Requirement



# OMS Locations

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