



WELL CONSTRUCTION

## IntegraLine™

High-Performance Liner System with Swage Technology

Secure the integrity of your well in critical applications





# The IntegraLine liner system helps secure well integrity in even the most critical conditions.

Reliable technology is at a premium in critical wells. In these challenging environments, well pressures, temperatures, and depths increase—and the cost of failure can be enormous. Your liner-hanger system is an essential line of defense that helps mitigate risks and maintain well integrity.

Our IntegraLine high-performance liner system with swage technology provides maximum reliability in quality-critical applications. With enhanced performance capabilities, our system meets challenges of such demanding operating environments as ultradeepwater, extended-reach, and sour gas wells with high pressures and temperatures.

## Our legacy

Weatherford is one of the largest global providers of liner-hanger systems and associated accessories. Originally developed for the hostile wells of the North Sea, our liner systems have set multiple records both onshore and offshore throughout the world.

## Our people

At Weatherford, we focus our technologies, knowledge, and experience to align with your well objectives. Our engineers consider your specific needs to create a complete liner system integral to the integrity of your well. Using components designed and manufactured in-house, we can accommodate a wide range of operating conditions.

Maintained  
**ZERO  
PRESSURE  
LOSS**  
in frac application

In a gas and condensate well, the Weatherford IntegraLine system with SwageSet packer established a gas-tight seal that enabled high-pressure stimulation up to 8,288 psi (57,144 MPa).

**Alberta, Canada**







Our engineers consider your specific needs to create a complete liner system integral to the integrity of your well.







# System capabilities by the numbers

Packer sealing qualified to **V0 criteria**

Operating temperatures as high as **400°F**  
(204°C)

Bottomhole pressures as high as **15,000 psi**  
(103 MPa)

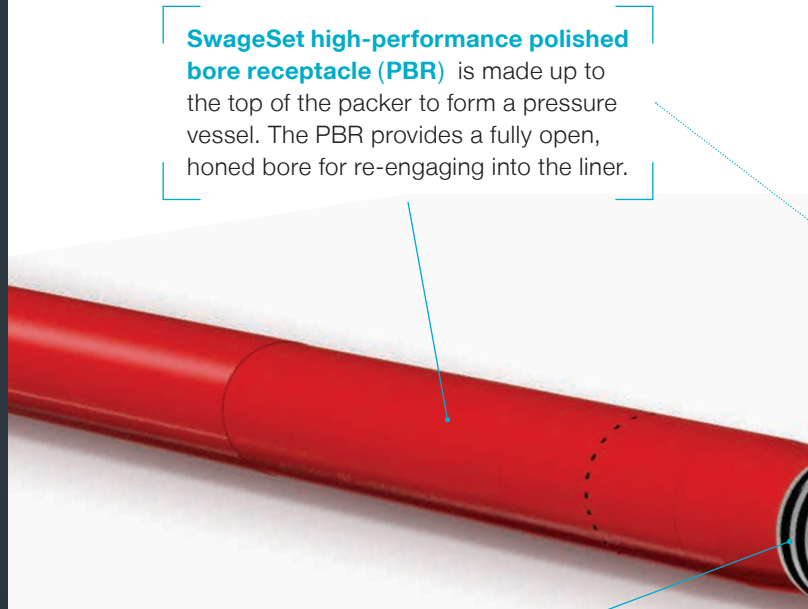
Hanging capacity of up to **1 million lb**  
(453,592 kg)

Torque capability of up to **68,000 lb-ft**  
(92,208 N-m)

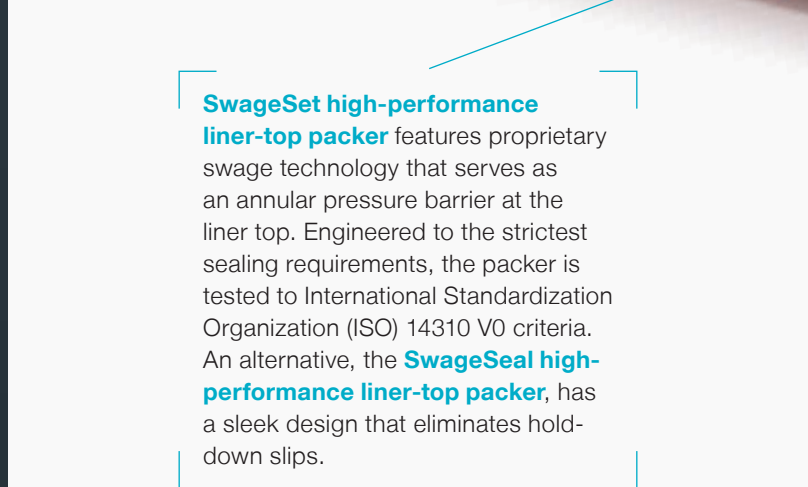
Setting depths beyond **25,000 ft**  
(7,620 m)

Industry experience totaling more than **40 years**

Global liner service and support from **50+ bases**

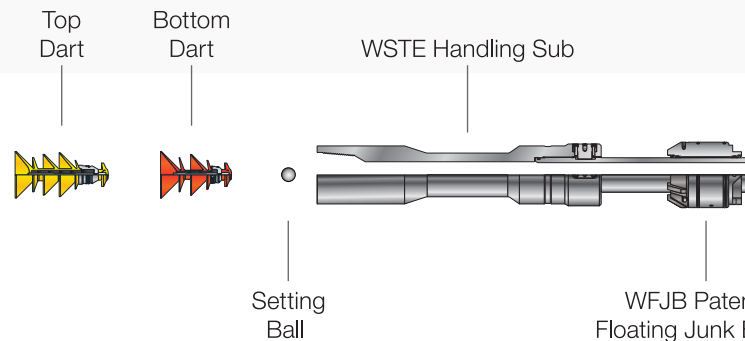


**SwageSet high-performance polished bore receptacle (PBR)** is made up to the top of the packer to form a pressure vessel. The PBR provides a fully open, honed bore for re-engaging into the liner.



**SwageSet high-performance liner-top packer** features proprietary swage technology that serves as an annular pressure barrier at the liner top. Engineered to the strictest sealing requirements, the packer is tested to International Standardization Organization (ISO) 14310 V0 criteria. An alternative, the **SwageSeal high-performance liner-top packer**, has a sleek design that eliminates hold-down slips.

## IntegraLine liner deployment system.....

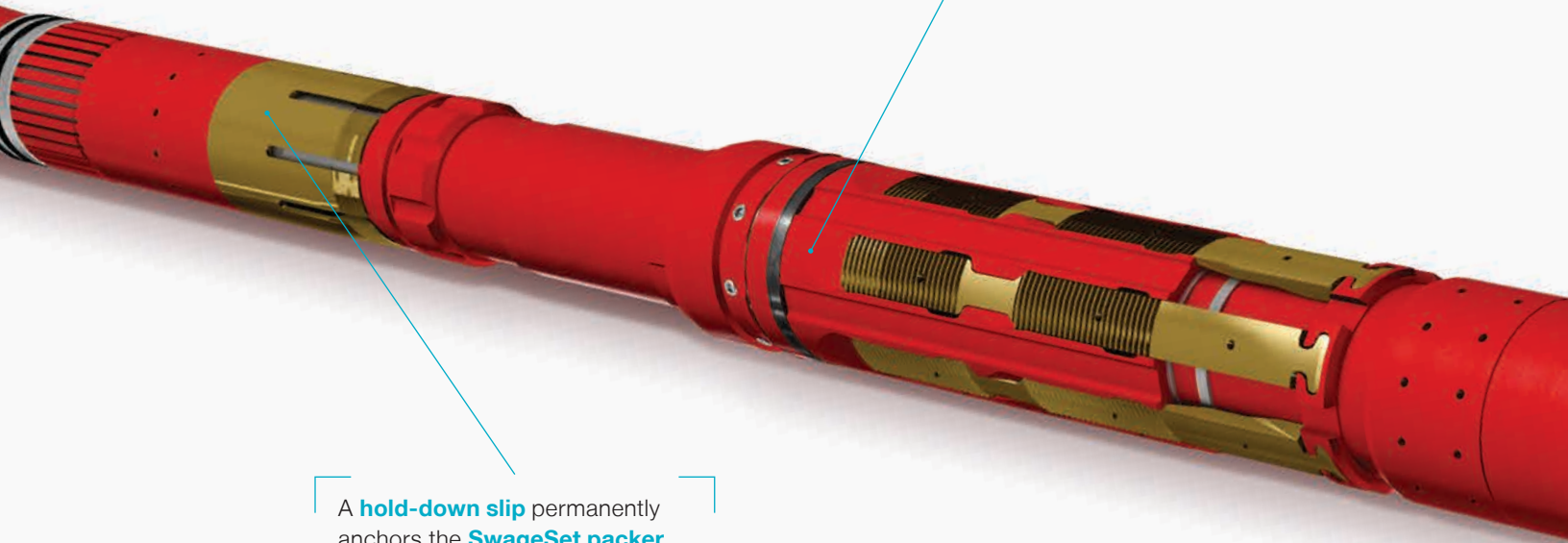


# Key components of the IntegraLine liner system

An optional accessory, the **IntegraLine tieback seal stem**, is designed for use with the PBR.

**IntegraLine R high-performance rotational hanger** features a bearing that allows rotation of the liner after setting the hanger and during cementing operations. An alternative, the **IntegraLine S high-performance static hanger**, has a design that prevents liner rotation after setting the hanger.

A **hold-down slip** permanently anchors the **SwageSet packer** into the host casing to prevent the packer from becoming unseated.

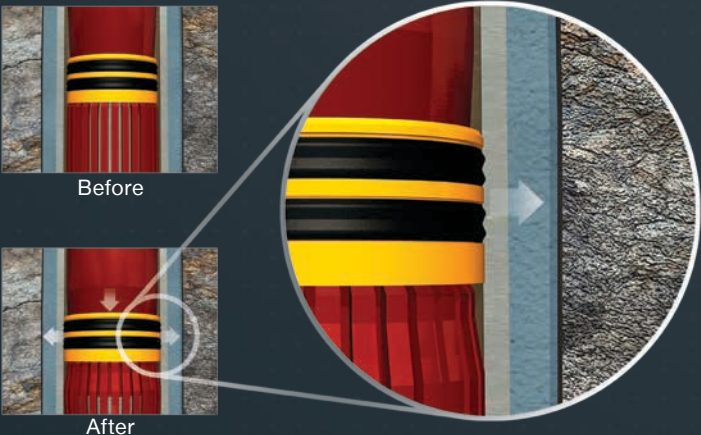


# Increasing reliability with swage technology

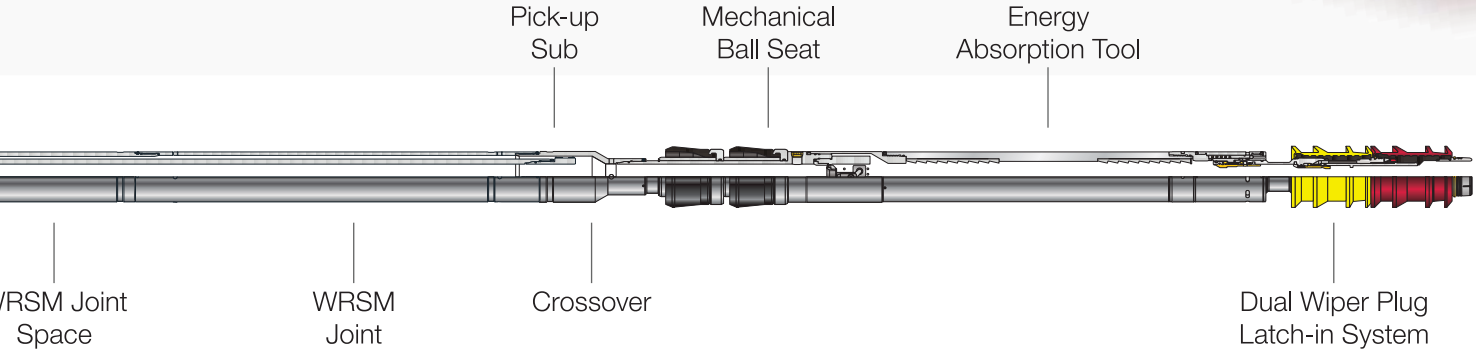
Our unique swage technology consists of ridge-shaped Atlas® elastomers bonded to an expandable metal ring. The V0-validated seal is formed by transferring set-down weight through the PBR into the integral ring, which swages out against the casing to seal the packer element against the host-casing ID.

The anti-extrusion seal not only prevents gas migration and isolates annular pressures, but also offers less susceptibility to swabbing off than conventional, all-elastomer seals when running in the hole, drilling, reaming, or circulating at high flow rates during well cleanup or cementing.

*Atlas is a registered trademark of the Asahi Glass Co., Ltd.*



Deployable on any of our field-proven running tools, the IntegraLine liner system comprises **THREE MAIN COMPONENTS THAT MEET YOUR CRITICAL WELL NEEDS.**





# Meeting challenges in critical applications



Today, you operate less in routine environments and more in extreme ones.  
Our IntegraLine liner system combines premium technologies built to  
perform in any critical operating condition.



# SwageSet high-performance polished bore receptacle

Resistant to backoff during vigorous liner rotation

Designed for use with the IntegraLine tieback seal stem, our SwageSet PBR provides a means of tying back into the liner and an extension for setting integral liner-top packers. The PBR houses and protects the running tool assembly during deployment. Using the PBR with a debris-protection system enhances this protection.

The PBR connects directly to the SwageSet packer body for gas-tight, extrusion-resistant performance that eliminates the need for a high-pressure connection seal. The PBR-packer connection forms a hydrostatically locked chamber that prevents the PBR from backing off and makes it well suited for drill-down applications.

**Chamfered upper end** facilitates liner-top re-entry to minimize the risk of damage to the liner top.

**Honed ID** provides a reliable seal bore for effective sealing of the PBR and the IntegraLine tieback.

**Threaded lower end** makes up to the threaded connection with O-ring seals on the SwageSet packer.

- Extended-reach wells
- High-angle wells
- Horizontal wells
- HPHT wells
- Ultradeepwater wells
- Carbon dioxide environments
- Hydrogen sulfide environments



# SwageSet high-performance liner-top packer

High-performance value in cemented and uncemented liners

An integral component of the IntegraLine liner system, our SwageSet packer provides a high-integrity seal for annular isolation. Our design makes this packer especially effective for drill-down applications: A high-torque connection with seals between the SwageSet PBR and the packer prevents PBR backoff while rotating. The castellated profile provides compatibility with high-torque running tools used to ream or drill liner to depth.

Applying weight to the SwageSet PBR activates the SwageSet packer. Once the set-down weight is transferred, the hold-down slips and the packer element are set. This unique design directs all the available setting force to the element after the hold-down slips are set, thereby retaining the setting force within the element and body-lock rings.

The V0-rated packer is validated for safe operation up to 400°F (204°C) and 12,500 psi (86 MPa) as a standard. Some sizes of SwageSet packers are validated for extended service up to 15,000 psi (103 MPa).

**Swage sealing technology** swages to casing ID to form an anti-extrusion, gas-tight barrier between the packer body OD and host casing ID.

**Aflas elastomers** resist swab off to enable high circulation rates past the packer assembly, remove debris during well cleaning, and improve cement quality.

**High-torque one-piece mandrel** provides superior hydraulic sealing and improved tensile capacity.

**Hold-down slips** lock the applied setting force to ensure the packer stays set.

**XYLAN®-coated cone** reduces the setting force required to energize the packing element for such applications as extended-reach wells.

*XYLAN is a registered trademark of Whitford Corporation.*



## SwageSet Applications

- Cemented and uncemented liners that need a seal between the liner OD and the host casing ID
- High-pressure environments
- High-temperature scenarios
- High-angle, horizontal, or extended-reach wells

## SwageSet Specifications

ISO 14310 / API 11D1 V0 validated	Yes
Maximum pressure rating	15,000 psi @ 400°F (103 MPa @ 204°C)
Hold-down slip	Yes
Cemented liner applications	Yes
Uncemented liner applications	Yes
Integral cementing packoff profile	Yes
Bottom connection type	Pin
Standard elastomer package	Aflas
Typical body length	72 in. (1,829 mm)
Number of machine parts	10



# SwageSeal high-performance liner-top packer

## Cost-effective reliability in cemented liners

Based on the field-proven SwageSet packer, our SwageSeal high-performance liner-top packer also offers a high-integrity annular seal against gas migration. The SwageSeal packer has a streamlined design that eliminates hold-down slips and associated components, which makes it well suited to applications with cemented liners.

Designed for compatibility with our other proven technologies, the SwageSeal liner-top packer can be used with the Weatherford WRSM retrievable cementing packoff and R, S, or HNG running tools. The polished bore receptacle seals directly to the packer body by way of a high-performance seal. The resulting gas-tight, extrusion-resistant connection eliminates the need for a high-pressure seal.

The V0-rated SwageSeal packer supports safe operations in applications up to 400°F (204°C) and 12,500 psi (86 MPa).

**Swage sealing technology** swages to casing ID to form an anti-extrusion, gas-tight barrier between the packer body OD and host casing ID.

**Aflas elastomers** resist swab off to enable high circulation rates past the packer assembly, remove debris during well cleaning, and improve cement quality.

**High-torque one-piece mandrel** provides superior hydraulic sealing and improved tensile capacity.



### SwageSeal Applications

- Cemented and uncemented liners that need a seal between the liner OD and the host casing ID
- High-pressure environments
- High-temperature scenarios
- High-angle, horizontal, or extended-reach wells

### SwageSeal Specifications

ISO 14310 / API 11D1 V0 validated	Yes
Maximum pressure rating	12,500 psi @ 400°F (86 MPa @ 204°C)
Hold-down slip	No
Cemented liner applications	Yes
Uncemented liner applications	Limited
Integral cementing packoff profile	Yes
Bottom connection type	Box
Standard elastomer package	Aflas
Typical body length	48 in. (1,219 mm)
Number of machine parts	4



# IntegraLine R high-performance rotational hanger

Dependable setting for deep, highly deviated wells

Engineered to meet stringent ISO 14310 V0 criteria, our IntegraLine R high-performance rotational hanger is the first liner hanger tested and qualified to 15,000 psi (103 MPa) at 400°F (204°C). The IntegraLine R hanger suits deep and highly deviated wells, which commonly include high pressures and temperatures.

Differential hydraulic pressure across the hydraulic cylinder activates the IntegraLine R liner hanger. Setting weight sets the hanger, which forces the slips to bite into the host casing. A bearing enables rotation after the hanger is set. For applications that do not require rotation, we offer our IntegraLine S high-performance static hanger, which features a spacer ring rather than a roller bearing.

**High-torque, one-piece mandrel** meets or exceeds the torque of liner connections.

**Heavy-duty bearing** enables rotating the liner after setting the hanger and during cementing operations.

**Hardened slips** have up to 1,000,000 lb (453,592 kg) of hanging capacity to enable setting the liner in even the hardest grades of casing.

**Steel shear screws** support predetermined pressure settings, even in high temperatures.

**Custom-designed seal** helps the liner hanger withstand high pressures and temperatures.

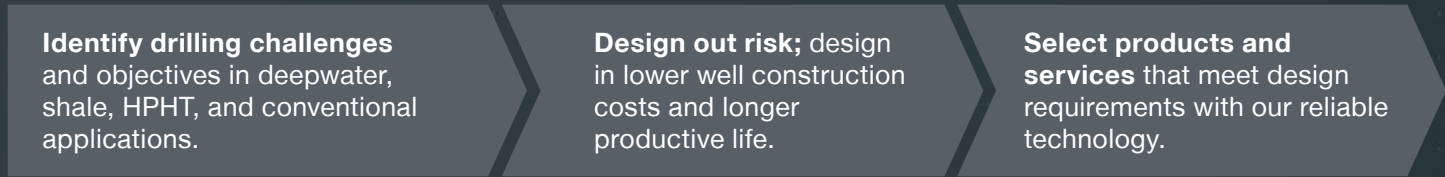
**Cone-and-slips section** protects the slips and optimizes bypass to suit drill-down and liner-reaming applications.

**Stroke eliminator** prevents the slips from overstroking in worn and oversized well casings.



# There's more to well integrity than just cement

With a proper cement job, you can help ensure zonal isolation and well integrity for the life of the well. However, proper casing and liner placement can help increase the effectiveness of this initial protective barrier. After the cement job, the liner-top packer creates the next well-integrity barrier. Enhance well integrity through optimized liner system selection.



## Casing centralization

Increase stand-off, prevent differential sticking, and eliminate channeling

- Casing accessories
- Centralizers
- Placement software services



## Casing installation

Reach total depth safely and efficiently

- Float equipment
- Surge reduction systems
- Torque-and-drag reduction
- Liner hanger system



## Wellbore isolation

Prevent fluid migration and reduce well construction costs

- Inflatable packers
- Isolation systems
- Swellable packers



## Integrity confirmation

Measure cement bond quality

- Cement-bond-logging tools
- Liner-top packers



## Cement placement

Ensure effective cement slurry displacement

- Stage cementing tools
- Wiper plugs and darts
- Plug Locator System
- Cement Heads





The IntegralLine high-performance liner-hanger system is a premium offering in our trusted portfolio of liner technology. Count on us for any of your liner-hanger needs, and contact your Weatherford representative today at [weatherford.com](http://weatherford.com)



**Weatherford**<sup>®</sup>

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