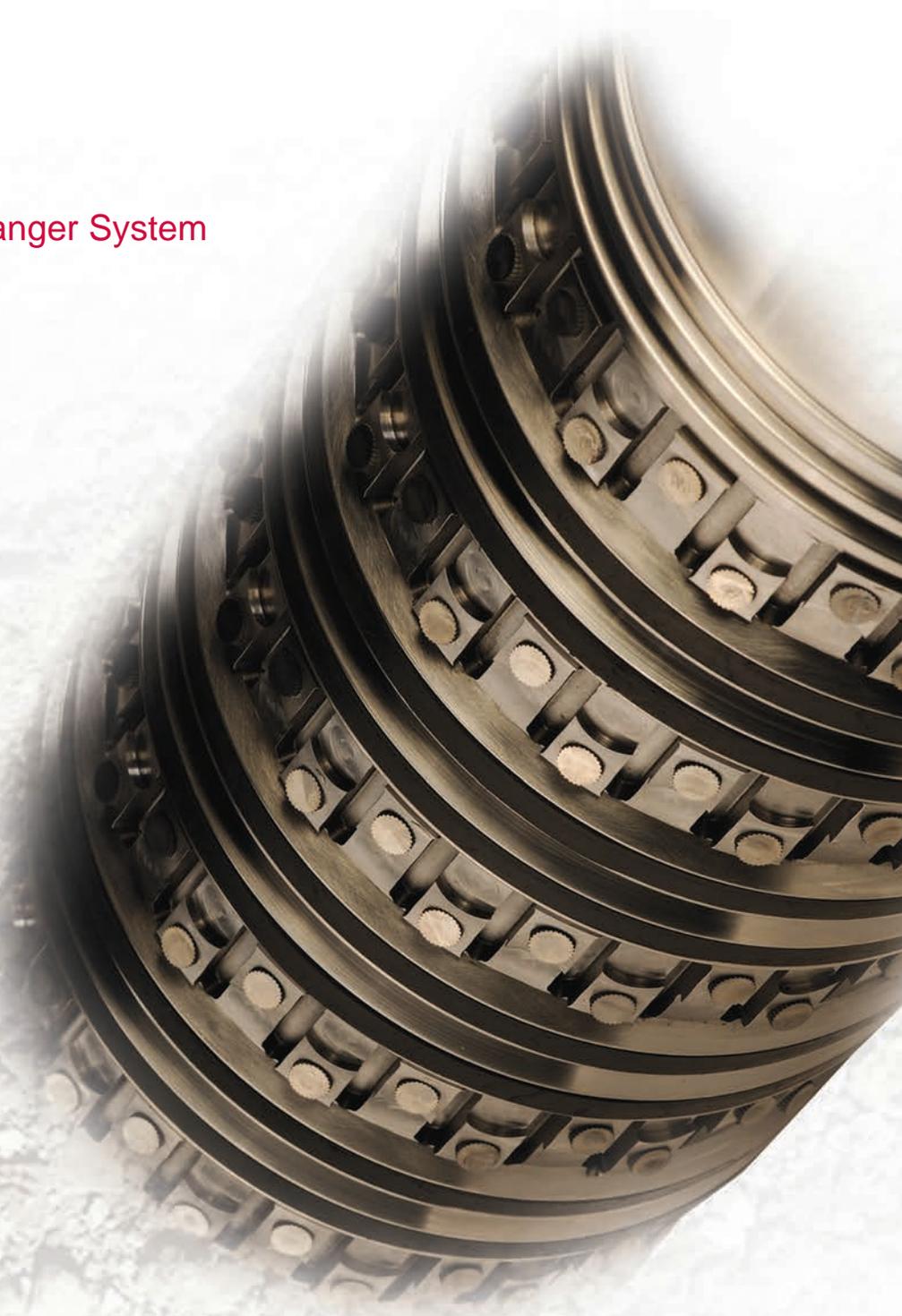




Weatherford[®]

TruForm[™]

Expandable Liner Hanger System



Hang Tough

From a world leader in expandable technology and premium liner systems comes a new expandable liner hanger—a system built with superior strength, hanging capacity, reliability and safety.



Born Tough

Weatherford brings the TruForm™ liner system into the world only after extensive testing and refinements assured us that it would be stronger, more reliable, more risk-free, and it would truly perform like no other expandable liner hanger system currently available.



The TruForm expandable liner hanger is built to Hang Tough.

We identified the weak points of existing competitor offerings and turned them into strong points for the TruForm system—all adding up to **true performance** for running long, heavy liners.

The TruForm system comes from hardy stock. As a world leader in liner hanger technology, we have gained expertise with more than **20,000 liner installations**—many in some of the world's toughest well environments, including record-breaking ultradeep, high-angle and extended-reach geometries.

We have **expanded more than 70 mi (113 km) of pipe** the world over. We have pioneered many expandable completion technologies and have the most far-reaching expandable engineering, manufacturing, distribution and service infrastructure in the world.

The TruForm expandable liner hanger system rounds out our offerings to give you a full line of **fit-for-purpose conventional and expandable liner hangers** along with our full planning and execution capabilities to reduce well construction costs and mitigate risks.

True Performance

The TruForm expandable liner hanger system has been tested to rigorous ISO 14310 (API 11D1) standards and is V0 qualified to 12,000 psi (82.7 MPa). The TruForm design uses the unique, thick-wall geometry of the hanger body to achieve this rating without requiring additional support mechanisms to improve performance. In addition, this system has equal pressure ratings from above and below the seal elements, overcoming a common limitation in other expandable systems on the market.

All Weatherford liner systems are Performance ProtectedSM

Like all of our liner systems, the TruForm system is *Performance Protected* with exclusive built-in reliability features. Nobody else has all these features:

- Balanced junk bonnet
- Redundant seals
- Anchor sections isolated from pressure
- Compliant cone
- Same high-differential pressure rating above and below elements
- Compatible with dual-cementing plugs

Fit-for-purpose systems

We have a full fleet of liner hanger products and capabilities that cover a broad range of contingencies—setting a liner, running a tieback, setting a second-run packer—you name it. Our conventional liner-hanger and TruForm expandable systems offer fit-for-purpose solutions for maximum efficiency and safety.

We are a global single-source well construction organization with liner and expandable systems that are hanging tough in quality-critical applications in every major oil and gas market in the world.



Truly Tough Liner Hanger

The TruForm™ system is built by a world class provider that combines liner hanger systems, cementing, drilling, and tubular running products and expertise under one roof. This totally integrated liner hanging/running tool/cementing system has every component designed and manufactured by Weatherford.

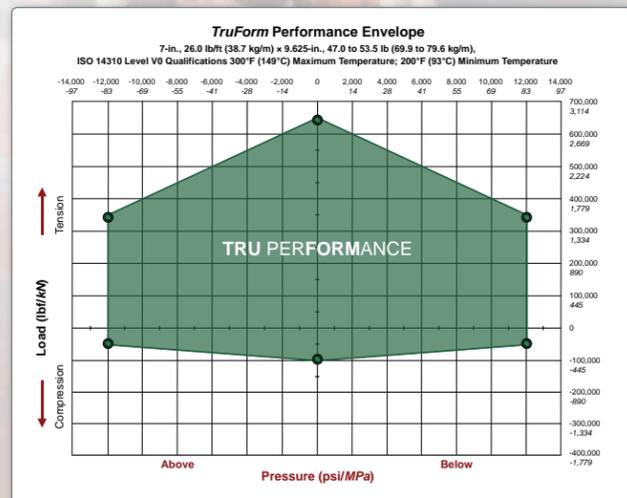
The result is superior quality control and compatibility that reduces nonproductive time, ensures more trouble-free installation, and provides life-of-well reliability with incredible strength and Hang Tough durability.



Solid one-piece, thick-wall expandable body

Using our proprietary expandable steel technology, the *TruForm* liner hanger is precisely engineered and built from a thick-walled, single-piece body to provide a superior performance envelope. The solid-body design integrates and protects independent anchor and seal sections that significantly differentiate it from any other expandable system on the market.

Additionally after expansion, the thicker steel-wall body can handle the same high pressures from above and below the elements. Combined with high burst and collapse ratings, the *TruForm* system provides a superior performance envelope.



Qualified to ISO 14310 V0 standards, the *TruForm* hanger's performance ensures maximum seal integrity and hanging capacity.



Higher hanging capacity with tungsten carbide inserts

The *TruForm* system can withstand the weight of long liners and high-piston forces created during installation. Hanging capacity and reliability are enhanced by precision placement of tungsten carbide inserts that are recessed to protect the casing from damage while running in hole. When expanded, the inserts provide holding power and life-of-well durability not found in hangers that rely on rubber elements for hanging capacity.

Multiple redundant elastomeric packer elements

The packer system has been designed and tested to ISO 14310 V0 standards. It has multiple redundant elastomeric elements flanked with solid antiextrusion barriers that deform during expansion to eliminate extrusion gaps. This process creates a positive seal between the expanded liner hanger and host casing, and provides maximum differential pressure capability after expansion. The elastomers are bonded to the body to resist high flow rates and swabbing during run-in and circulation.

The seals also isolate sections of the anchoring system from differential pressure. This unique, patented design with seals and anchors interlaced to function autonomously provides maximum hanging and sealing capacity. Body ratings do not limit pressure rating above or below the seals—a common characteristic of other expandable systems.



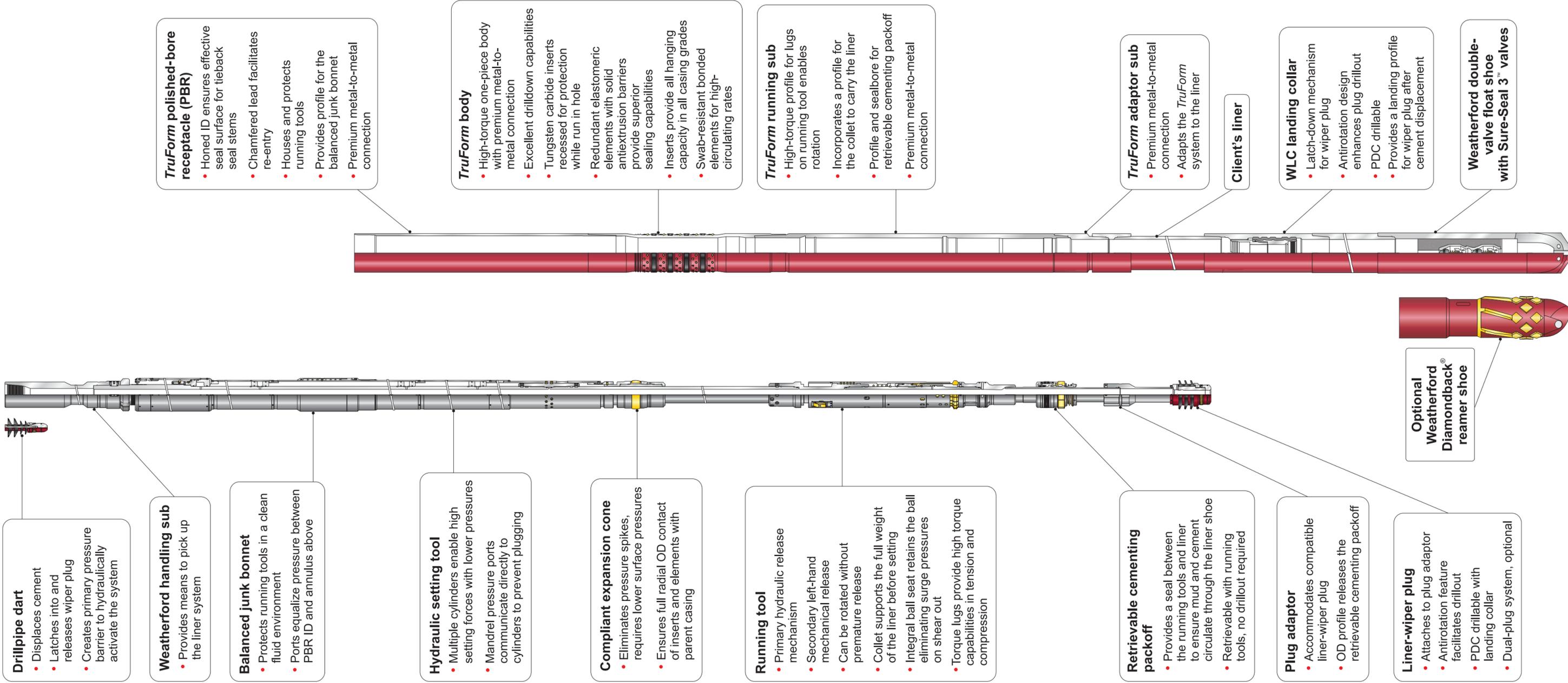
Bonded elastomeric elements provide liner-top isolation and enable higher circulation rates for more effective removal of mud and debris during well conditioning and cement displacement.



The packer seal rating is the same from above and below. No other expandable liner hanger system provides this vital level of protection against unexpected pressure increases caused by problems with the cement job or well life cycle events, such as high-pressure stimulation and conversion to injection operations.

A Performance ProtectedSM expandable liner hanger system built with superior strength, hanging capacity, reliability and safety for the toughest well environments.

Hang Tough with True Performance



Drillpipe dart

- Displaces cement
- Latches into and releases wiper plug
- Creates primary pressure barrier to hydraulically activate the system

Weatherford handling sub

- Provides means to pick up the liner system

Balanced junk bonnet

- Protects running tools in a clean fluid environment
- Ports equalize pressure between PBR ID and annulus above

Hydraulic setting tool

- Multiple cylinders enable high setting forces with lower pressures
- Mandrel pressure ports communicate directly to cylinders to prevent plugging

Compliant expansion cone

- Eliminates pressure spikes, requires lower surface pressures
- Ensures full radial OD contact of inserts and elements with parent casing

Running tool

- Primary hydraulic release mechanism
- Secondary left-hand mechanical release
- Can be rotated without premature release
- Collet supports the full weight of the liner before setting
- Integral ball seat retains the ball eliminating surge pressures on shear out
- Torque lugs provide high torque capabilities in tension and compression

Retrievable cementing packoff

- Provides a seal between the running tools and liner to ensure mud and cement circulate through the liner shoe
- Retrievable with running tools, no drillout required

Plug adaptor

- Accommodates compatible liner-wiper plug
- OD profile releases the retrievable cementing packoff

Liner-wiper plug

- Attaches to plug adaptor
- Antirotation feature facilitates drillout
- PDC drillable with landing collar
- Dual-plug system, optional

TruForm polished-bore receptacle (PBR)

- Honed ID ensures effective seal surface for tieback seal stems
- Chamfered lead facilitates re-entry
- Houses and protects running tools
- Provides profile for the balanced junk bonnet
- Premium metal-to-metal connection

TruForm body

- High-torque one-piece body with premium metal-to-metal connection
- Excellent drilldown capabilities
- Tungsten carbide inserts recessed for protection while run in hole
- Redundant elastomeric elements with solid antiextrusion barriers provide superior sealing capabilities
- Inserts provide all hanging capacity in all casing grades
- Swab-resistant bonded elements for high-circulating rates

TruForm running sub

- High-torque profile for lugs on running tool enables rotation
- Incorporates a profile for the collet to carry the liner
- Profile and sealbore for retrievable cementing packoff
- Premium metal-to-metal connection

TruForm adaptor sub

- Premium metal-to-metal connection
- Adapts the TruForm system to the liner

Client's liner

WLC landing collar

- Latch-down mechanism for wiper plug
- Antirotation design enhances plug drillout
- PDC drillable
- Provides a landing profile for wiper plug after cement displacement

Weatherford double-valve float shoe with Sure-Seal 3™ valves

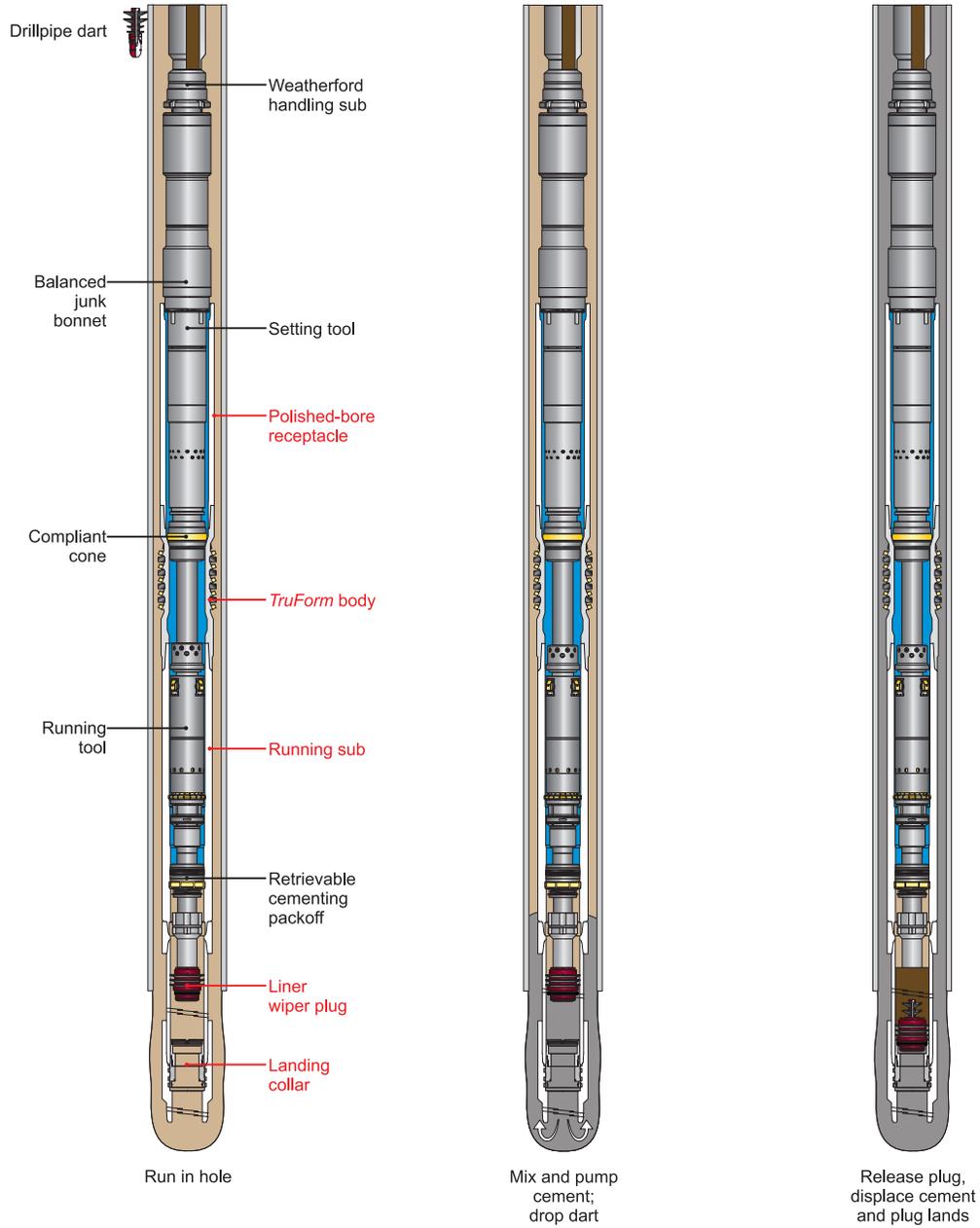
Optional Weatherford Diamondback® reamer shoe



How the job flows

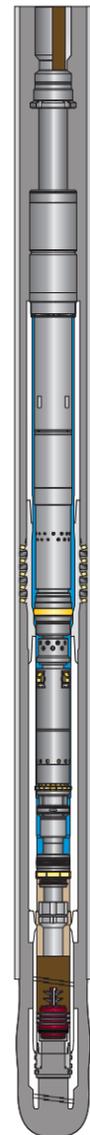
Steps 1 through 3

Key: **Red** denotes items that are a permanent part of the wellbore.
Black denotes installation tools.

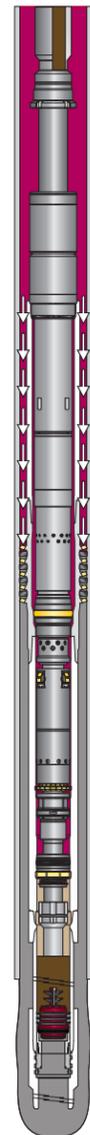


How the job flows

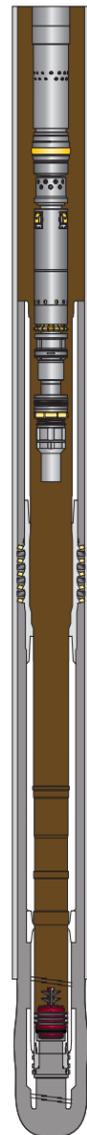
Steps 4 through 6



Apply pressure to expand TruForm™ body



Pressure test TruForm packer and release running tools



Retrieve running tools

Truly Reliable Installation

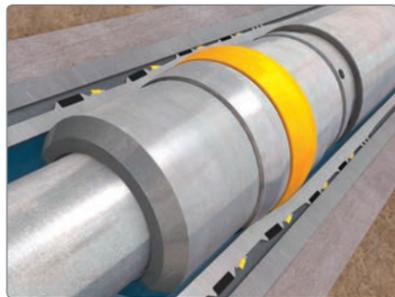
The *TruForm* system is mechanically less complicated than any other expandable liner hanger system. Our system reduces installation risks and has a simplified installation procedure that reduces the potential for human error. The *TruForm* body has no moving parts, no slips, no cylinders, no cones and no elements exposed to the annulus that can be damaged when running into the hole.

Installation procedures are very straightforward so that you can run in the hole and get to the bottom—problem free. You stay connected to the liner during well conditioning and cementing, then you pressure up, pull out and you are done. The advantage of being able to rotate and reciprocate significantly enhances the cement job.





Key Service Tool Performance



High-reliability expansion cone

Isolation performance of the packer is enhanced with our patented, one-piece, self-adjusting, compliant expansion cone. This cone ensures full 360° radial OD contact of the hanger inserts and packing elements with the parent casing. It provides uniform expansion with greater reliability at lower-pressure and no-pressure spikes than segmented cone designs.

Our cone design expands the TruForm™ body to be compliant with parent casing ovality.

Exclusive full-time debris protection

The patented balanced junk bonnet, provides exceptional value and reliability by isolating the running tools in clean fluid during installation of the *TruForm* liner system. It is the only debris barrier on the market that provides total debris protection while running in hole, cementing, rotating, reciprocating, setting the hanger/packer and pulling out of the liner top.



Balanced junk bonnet

Field-proven running tool and expansion system

We have integrated running and expansion tool concepts that have literally thousands of runs in legacy Weatherford product lines to provide installation predictability and reliability.

The running tool concept has been used in conventional liner hanger systems for many years. The collet and high-torque lugs make up to the running sub below the hanger. This running tool is robust enough to rotate, ream, push, pull and drill the liner to bottom. Once the *TruForm* body has been expanded, the running tool is released with a combination of applied weight and pressure. It also has a secondary mechanical left-hand release.

The hydraulic expansion cylinders are based on one of the industry's most reliable, field-proven expansion systems. With thousands of field runs, the hydraulic cylinders convert applied pressure into force to activate the expansion cone that expands the liner hanger body from top down.



Running tool torque lugs

True Support

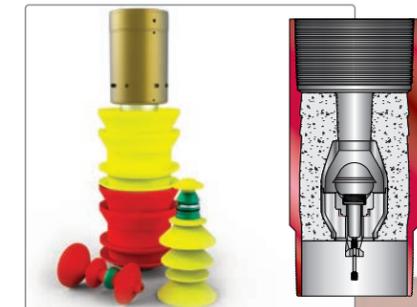
The strength of a global liner hanger and expandable products infrastructure

Our global infrastructure of dedicated liner hanger and expandable specialists has the experience and expertise to get liners installed successfully. They know how to avoid problems and how to deal with problems that may arise. For example, if there is a need to go back and isolate the top of the liner, we have the equipment and experience to handle it. Other liner providers call us to provide this service.

We are your true single-source liner hanger and expandable provider—a genuine well construction company that you can trust.

Cementing products compatibility

Another *TruForm* strong point: it is compatible with our cementing products, such as our auto-fill float equipment, SurgeMaster™ diverter tool and dual-plug systems. With today's complex wells and high operating costs, the installation reliability of the *TruForm* system is a vital advantage.



The *TruForm* system is also compatible with our industry-leading mechanical cementing products, auto-fill float equipment and dual-wiper plugs.

Global quality system and complete documentation package

We have developed and implemented a comprehensive global quality operations system. Documentation and training are critical in achieving operational success. A full quality process with all assembly, testing, redress requirements and field-installation procedures are developed, documented and distributed. We have also developed comprehensive technical and training competency standards to ensure quality, reliable installation of the *TruForm* system.



TruForm™ Expandable Liner Hanger System

Hang Tough

Find out more about the *TruForm* expandable liner hanger system backed by one of the world's most experienced providers of expandables and premium liner hangers. Contact your local Weatherford representative, or visit weatherford.com/TruForm.



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