



**Weatherford®**

## MetalSkin® Openhole Liner System

Improving well architecture and mitigating hazards  
to enhance drilling efficiency and increase  
production capacity



**The Solid Choice.**



# Getting Bigger Pipe to Production

The Weatherford MetalSkin® openhole liner (MOL) is a solid expandable system often used in the early stages of the well life cycle to preserve completion size in challenging drilling applications.

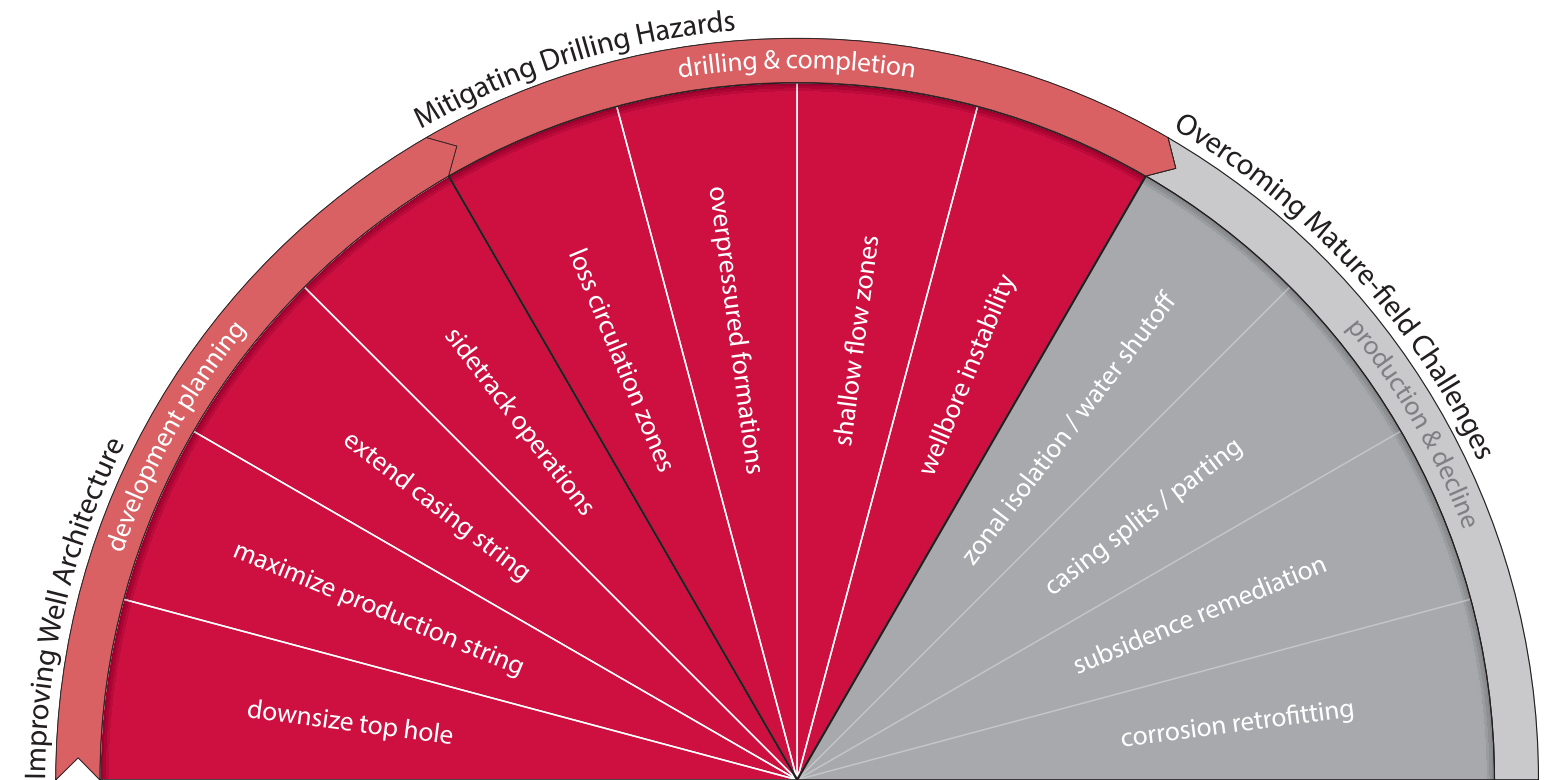
The MetalSkin openhole solid expandable system enhances reservoir value and improves return on investment by enabling you to land optimum size casing in the production zone.

The expandable MOL can be used as a drilling or production liner in new or existing wells for planned or contingency operations to improve well architecture or mitigate drilling hazards.

To improve well architecture, the MOL system is used in development planning to reduce construction costs and provide an additional casing string while conserving hole size. The system enables drilling of previously undrillable wells.

To mitigate drilling hazards, the MOL can be run as a contingency application during the drilling and completion phase to isolate unexpected, problematic sections. The system temporarily isolates the trouble zone until section TD can be reached and a permanent casing string can be installed.

Unlike conventional methods, the MOL system allows you to reach the reservoir faster and more economically so you can put the well into production more quickly and with larger capacity for faster payout and improved ROI. The installation of a MOL system is quick and reliable. Hydraulic pressure expands the solid liner against previous casing sets to provide a permanent, long-term isolation solution for drilling complex and previously undrillable wells.



The MetalSkin® openhole liner system is run and tied back to the previous casing shoe to isolate unplanned pressure anomalies. The system minimizes well telescoping and is recommended in planned drilling applications. The result is reduced well costs and optimized completion design to maximize production.

## MetalSkin Solid Expandable Systems | Solid Results

MetalSkin system isolates high-pressure shale zone, increases hole size by

**43%**

A MetalSkin openhole liner effectively isolated an overpressured shale zone located directly under a 7-in. casing shoe and above the reservoir during an operation in the prolific Hassi Messaoud field. The expandable system enabled the operator to drill with a larger, high-performance BHA to create a 5-in. hole rather than a 3 1/2-in. hole. Use of the larger drill bit accelerated drilling, reduced rig time and operating costs, and helped increase the production rate to 1,056 BOPD.

Openhole liner mitigates high-pressure drilling hazard, maintains hole size, improves production capacity by

**56%**

When wellbore stability issues occurred under 7 5/8-in. casing, the operator considered installing a conventional liner but decided that cementing would be problematic. Moreover, if a conventional liner were installed, production would be through a 4 1/2-in. open hole. The Weatherford solution of setting a 6-in. MetalSkin expandable liner enabled installing a 5-in. production liner as originally planned rather than trying to produce from an open hole or abandoning the well.

Openhole liner isolates water-swellable shale, maintains hole size,

**saves well**

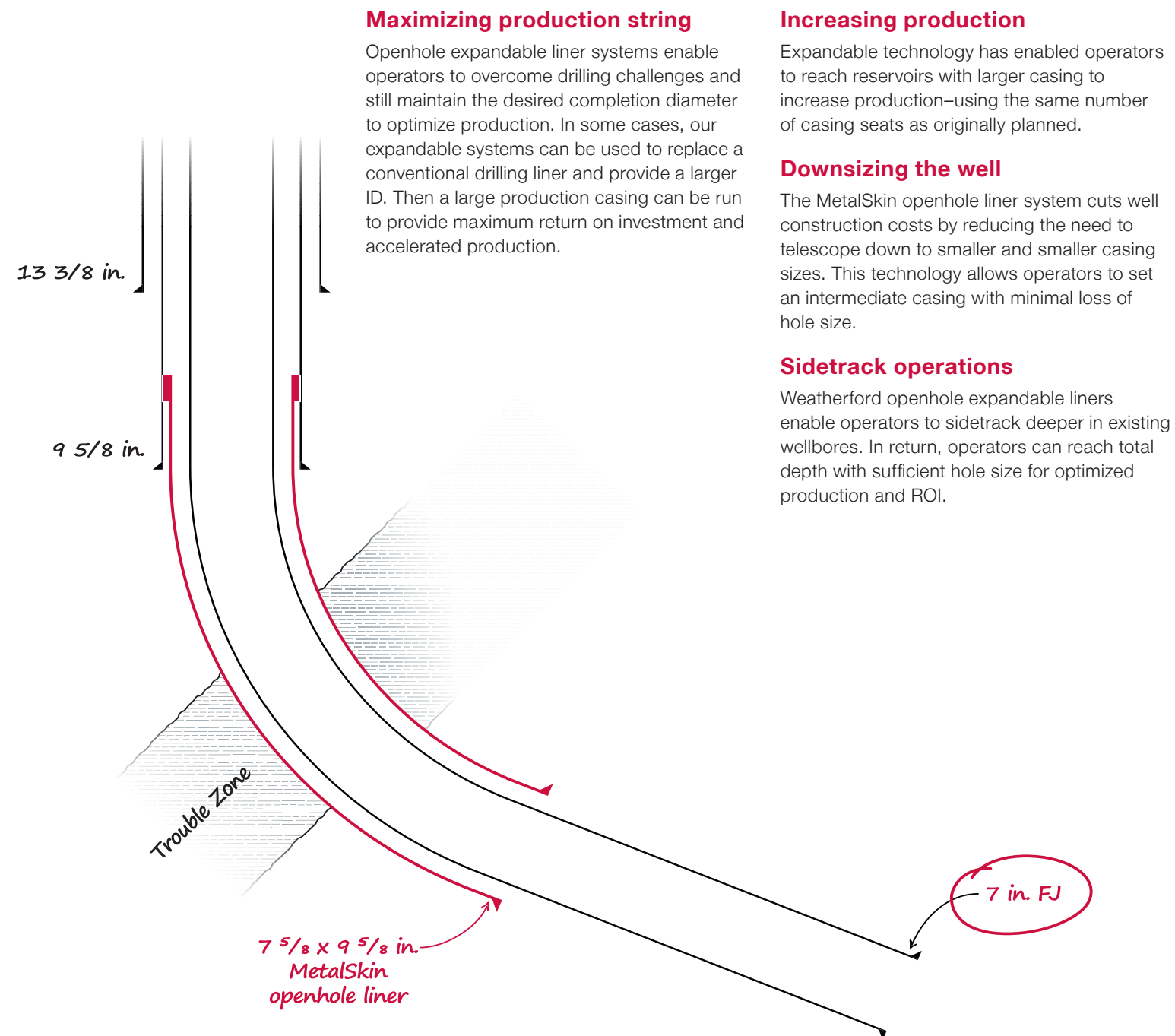
An operator drilled out from under 9 5/8-in. casing and into a pressure transition zone. A 7 5/8-in. MetalSkin expandable liner installed across the 295-ft (90-m) length of open hole enabled drilling of the 8 1/2-in. hole to continue. This process enabled drilling a 6-in. hole into the production reservoir and completion with 5-in. casing as planned. The result was a 56% improvement in production capacity over the alternative solution.



# MetalSkin Openhole Liner Systems

## Improving Well Architecture

Our solid expandable MetalSkin openhole liner systems provide the most value when they are built into the development phase of the well life cycle. Our MOL systems significantly reduce well construction costs by downsizing the well, maximizing the production string, optimizing production rates, and providing sidetrack options in existing wells.



## Mitigating Drilling Hazards

Our MetalSkin openhole liner systems isolate problematic sections of a wellbore with minimal loss in hole size. The systems temporarily isolate trouble zones to ensure that section total depth is reached and a permanent casing string can be installed.

### Contingency applications

When drilling hazards are encountered, the system can be deployed to isolate the trouble zone and enable drilling to continue without downsizing the casing or completion.

### Lost circulation zones

Fighting lost circulation zones can be both costly and risky. These zones usually require extra rig time and significantly higher fluid-related cost. In severe cases, using a conventional solution can result in stuck pipe or a high casing seat, which may require a sidetrack or reduced hole size at target depth.

However, using openhole solid expandable liners for maximum pass-through ID, even after installation, enables maintaining the planned completion design.

### Wellbore instability

Whether chemically or mechanically induced, wellbore instability is a common drilling problem that causes significant nonproductive time or even loss of hole section. Using solid expandable liners to isolate the trouble zone provides a solid steel barrier to keep the formation from sloughing in and fluid from flowing out.

### Overpressured formations

Casing strings or drilling liners are typically required to isolate pressure transitions in the well—either to isolate uncased formation from higher pressures below it or to isolate lower pressured formation from abnormal pressures above it. In either case, the use of a solid expandable liner can isolate the pressure transition to allow drilling to continue.

### Minimizing loss of hole size

Once installed, low-risk MetalSkin systems minimize loss of hole size.

Use of MetalSkin openhole liner systems enables operators to set intermediate casing with minimal loss of hole size. Building expandable liners into field development as a planned or contingent casing string enables operators to downsize casing plans from the surface.

# MetalSkin Openhole Liner Systems

## Advancing the Design of Solid Expandable Liner Connections

Weatherford established the Oil Country Tubular Goods (OCTG) Technology Center to define more precisely the performance parameters of threaded connections in solid expandable liners and ultimately to enhance their design.

The first of its kind, the Weatherford OCTG Technology Center uses data from the specialized testing equipment to design next-generation connections that have better strength and sealing properties than their conventional equivalents—before, during, and after expansion.

Conventional methods of testing threaded connections are inadequate in two ways: They create samples that don't accurately represent their downhole counterparts; and they don't adequately account for factors that can affect connection performance, such as high-dogleg severity, variations in pre- and post-expansion loads, pressure, and constraint (fixed-free versus fixed-fixed).

The Weatherford dynamic load expansion (DLX) simulator (patent pending) can replicate mechanical, variable-load, and fixed-load liner expansion. It produces simulated samples that accurately represent their downhole counterparts and therefore contribute to more accurate test results.

The one-of-a-kind DLX simulator has two 15-ft (4.6-m) stroke cylinders that apply compression to the work piece; a third applies tension and adjusts for length change during expansion. The ability to maintain a pre-expansion load in front of the expansion cone and a post-expansion load behind the cone makes the DLX simulations uniquely realistic.

**Unlike conventional testing of expandable connections, the Weatherford DLX simulator can uniquely and accurately replicate downhole conditions that the expanding casing experiences in a real well environment.**



Weatherford MetalSkin openhole solid-expandable systems enable the cost-effective application of solid-expandable systems to improve well architecture and mitigate drilling hazards. To find out more about our MetalSkin systems, please contact an authorized Weatherford representative or visit [weatherford.com/metalskin](http://weatherford.com/metalskin).



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