



# Weatherford®

Expandable Completion

## *Application Answers*

### Well Design to Energize Assets



### *Challenge*

Complete a long, high-angle or horizontal reservoir section in a multizone formation.

### *Constraints*

- Unsupported barefoot completion is not an option. Sand control is a necessity.
- Multiple reservoir sections require isolation to allow commingled zonal production allocation or to facilitate anticipated zonal isolation.
- Completion ID must be maximized for the possible installation of an intelligent completion or for optimization of future well interventions.
- Friction-induced flowing pressure losses must be minimized to control drawdown and reduce tendency toward water and/or gas coning at the heel of the well.
- Rig time is at a premium. Fast, low-risk installation is required.
- Post-installation well productivity must be optimized.

## The Expandable Completion System Combines Openhole Productivity with Cased-Hole Functionality

### *Answer*

Expandable sand screen (ESS®) combined with solid expandable zonal isolation (EZI™) technology: Weatherford's expandable completion system for multi-layer formations.

Weatherford's expandable completion system offers the remarkable advantages of long-term zonal isolation without cementing and perforating and superior sand control without gravel packing. Expandable slotted tubular technology and solid expandable technology combine to make it all possible.



### Openhole Productivity with Cased-Hole Functionality

Open up a whole new world of applications with Weatherford's expandable completion system. It is now possible to have the superior production performance and economy of high-angle, openhole completions in multizone formations that were previously cased and perforated or completed with sand screens and inflatable packers.

Benefit from the higher production capabilities of open hole and the greater reservoir exposure of horizontal wells while gaining all of the hydraulic zonal isolation and functionality of cased-hole completions.

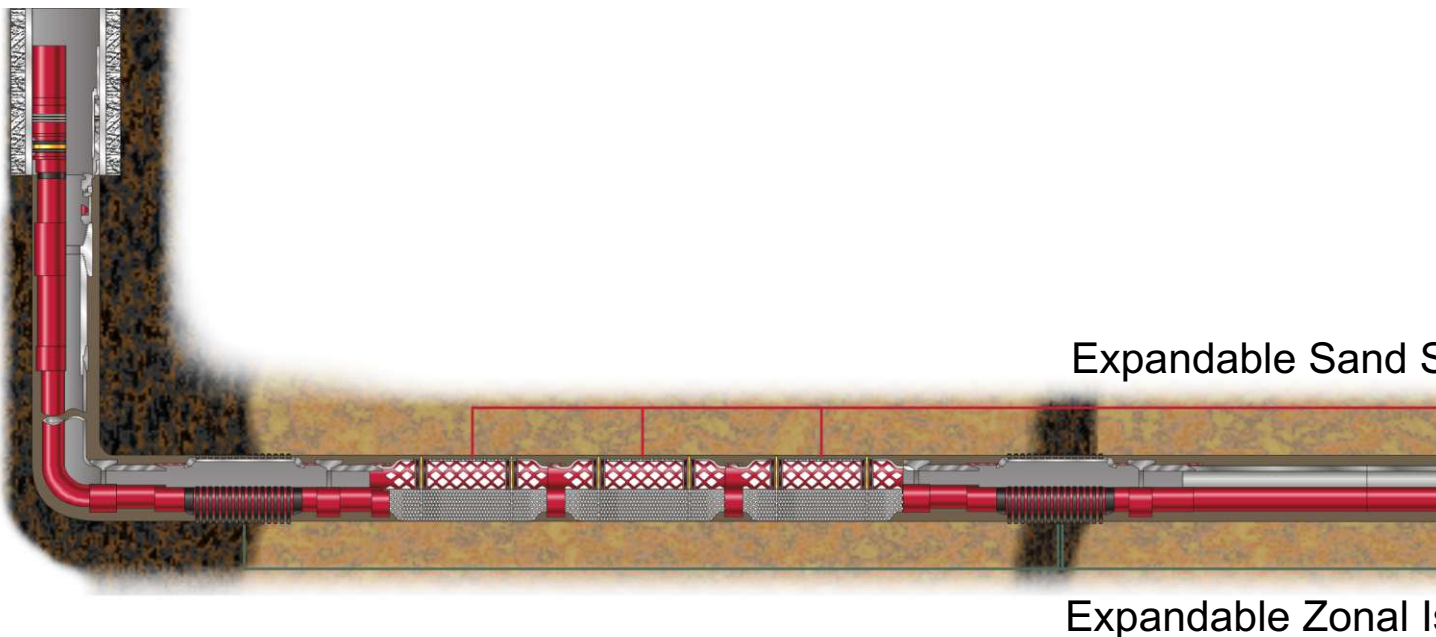
### Natural Extension of Proven ESS® Technology

Since 1999, Weatherford's ESS system has been improving well productivity while providing significant savings over conventional downhole sand control systems. This success, particularly in long, single-zone reservoir sections, inspired the next stage of evolution in sand control: combining ESS technology with our MetalSkin® solid expandable tubular system to create the expandable completion system.

### Unparalleled Flexibility in Completion Design

Completion design concerns related to commingled production, segregated production, maximizing rate and controlling drawdown are easily resolved with the design flexibility of the modular expandable completion system. The system allows sections of blank pipe with premium connectors to remain unexpanded between the EZI™ and ESS systems.

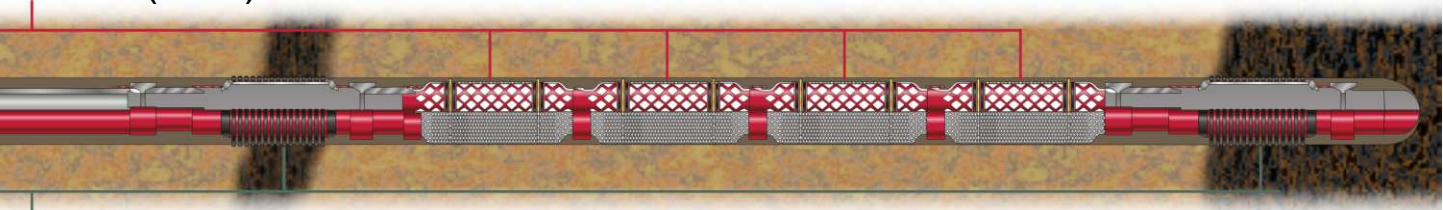
Conventional equipment—including packers and other completion jewelry—can be easily set inside the string.



### *Features, Advantages and Benefits*

- The ESS<sup>®</sup> system expands compliantly against the wellbore to eliminate the annular space and provide borehole support and filtration, thus removing the expense and risk of placing gravel packs.
- Combining ESS technology with our proprietary MetalSkin<sup>®</sup> solid and compliantly expandable tubular technology delivers well productivity usually associated with openhole completions with the functionality of a cased hole.
- The modularity of the expandable completion system enables optimized well designs, irrespective of the number of formation layers or the level of sand concentration.
- *MetalSkin* technology provides secure zonal isolation by compliantly expanding the solid expandable tubular against the wellbore, sealing against impermeable strata to prevent unwanted production flow along the annulus.
- Simple, single-trip system installation eliminates the risks and expenses associated with cementing longer horizontal wells and using long, complex perforating gun strings.
- Unique compliant expansion technique adapts to non-cylindrical holes and expands the completion to contact the wellbore, maximizing production while minimizing sanding potential. The greater surface area created by full expansion allows more production to enter the well and reduces flowing pressure. The greater surface area also reduces the potential for plugging of the filter media.
- Compliant expansion eliminates the annular void and reduces inflow velocity to help prevent erosion and reduce the potential for localized plugging or hot spotting.
- Screen contact with the borehole wall supports the near-wellbore sand grains to form a stable arch, allowing the formation to support itself and giving the system a high collapse rating.
- EZI<sup>™</sup> joints fit tightly against the irregular borehole wall, providing an excellent seal to eliminate erosion and zonal communication problems.

### Screen (ESS) Joints



### Isolation (EZI) Joints



## *Operational Outline*

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1. Conduct pre-operational analysis: expansion bottomhole assembly (BHA) design, torque-and-drag analysis, filter media sizing (sand exclusion and mud flowback), HAZID, HAZOP, and CWOP.
2. Drill a high-angle, horizontal gauge hole (8-1/2 to 9-1/4 in.).
3. Run a clean-up scraper assembly, and condition the mud system.
4. Run an imaging log to establish the hole condition. Confirm the setting points for EZI™ joints.
5. Flow-test the expansion BHA. Make up and run in the expandable completion system, consisting of liner hanger and ESS®, EZI and shoe assemblies.
6. Set the hydraulic single-trip hanger system, perform an annular pressure test, release from the hanger, and prepare for system expansion.
7. Function-test the expansion tools in the casing about the hanger before the expansion run.
8. Tag the first EZI joint to confirm space-out, and commence hydraulic/rotational expansion of the expandable completion system (about 7 min to expand one EZI joint, 4 min to expand one ESS joint).
9. Repeat step 8 until all ESS and EZI joints have been expanded.
10. Retrieve the expansion string and the BHA.
11. Install the inner-string completion to facilitate selective production or isolation.

## *Global Operational Centers of Excellence*

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Weatherford is poised to provide you with an expandable completion system to suit your specific application. Our staff of well system application engineers is ready to help assess your needs and design the best system for meeting them.

## **The Expandable Completion Experts™**