

## COMPLETION SOLUTIONS | MULTILATERAL SYSTEMS

# FlexRite® multilateral completion system

The industry's most robust and most versatile TAML level 5 multilateral completion system

## FEATURES

- For use in new wells
- Highly versatile and customizable
- Pre-milled FlexRite® aluminum window joint with orienting Latch Coupling for full ID, permanent, repeatable depth and orientation reference
- Flexible hanger for mechanical and hydraulic junction integrity
- Ability to install long lateral screens on the high-strength junction, increasing reservoir exposure for maximum drainage
- Maximized flow area at the lateral leg for optimized production
- Simple and reliable installation steps, no lateral cementing or washover operations required
- Offers through-tubing intervention and lateral re-entry with separate workover capabilities
- Well-proven in subsea applications, including in deep well applications

The FlexRite® multilateral completion system, part of the Halliburton advanced reservoir drainage solutions, is used to create a TAML Level 5 multilateral junction in wells that require hydraulic-pressure isolation, sand control, and mechanical integrity at the junction, using completion design. The system incorporates a flexible junction with two cold-worked, semi-circular sections on each leg to maximize the cross-sectional flow area in the lateral leg and to withstand greater compressional loads.

The multilateral system is designed for new well applications, providing significant additional per well reservoir exposure and reduced development costs and times, greatly improving field economics. The resultant reduction in required infrastructure is particularly beneficial in sensitive developments calling for a small environmental footprint. The system is also suited for infill developments, enabling access to previously unproduced reservoir sections.



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FlexRite® ICI threaded leg junction

The system integrates a pre-milled aluminum window joint, which is installed in the main-bore casing or liner string. The technology enables steel-free milling debris for easy well cleanout and also provides well-defined window geometry. The long, straight window profile is optimized for large OD, long drilling BHAs, and completions, therefore enabling safe and reliable window exits.

The Latch Coupling is installed below the pre-milled window. This coupling provides the service and completion tool interface that enables the junction creation. The full ID bore Latch Coupling provides accurate and repeatable depth and orientation reference relative to the window. The system is highly customizable, and able to be integrated with a variety of lateral and main-bore completion options such as:

- Open-hole gravel pack
- Open-hole lateral-liner deployments
- Comingled or segregated production
- Multizone and multibranch production control

Field proven since 2000 and constantly evolving, no other TAML 5 system in the industry has enjoyed a greater success rate and number of installations than the Halliburton FlexRite system. This is a testament to highly skilled engineers behind the system's creation, and the trained, experienced operations personnel who plan and execute installations worldwide.

## FlexRite® system specifications - window

|  | 9-5/8 IN. WINDOW   | 9-5/8 IN. XLS WINDOW       | 10-3/4 IN. WINDOW          | 7-5/8 IN. WINDOW             |
|--|--|----------------------------|----------------------------|------------------------------|
| System Casing Size in (mm)                 | 9-5/8 (244.5)  | 9-5/8 (244.5)              | 10-3/4 (273.05)            | 7-5/8 (193.67)               |
| Casing Weight – Special Drift lb/ft (kg/m) | 47 to 53.5 (69.9 to 79.6)  | 53.5 (79.6)                | 60.7 (90.3)                | 33.7 (50.13)                 |
| Minimum ID in (mm)                         | 8.525 (216.1)  | 8.525 (216.1)              | 9.630 (244.6)              | 6.675 (169.5)                |
| Minimum ID-Drift (Latch Coupling) in (mm)  | 8.508 (216.1)  | 8.508 (216.1)              | 9.55 (242.6)               | 6.640 (168.65)               |
| Lateral Hole Size in (mm)                  | 8-1/2 (215.9)  | 8-1/2 (215.9)              | 9-1/2 (241.3)              | 6-1/2 (165.1)                |
| Lateral Liner Type                         | Screens/ Slotted Liner/ Gravel Packed/ Hydraulic Stimulation Systems |                            |                            |                              |
| Lateral Liner Size in (mm)                 | Up to 6-5/8 (168)  | Up to 6-5/8 (168)          | Up to 7 (177.8)            | Up to 5-1/2 (139.7)          |
| Window Type                                | Pre-milled   |                            |                            |                              |
| Maximum OD in (mm)                         | 11.32 (287.5)  | 10.6, 10.88 (269.2, 276.4) | 12.055 (306.2)             | 8.16 (207.26)                |
| Window Opening ID in (mm)                  | 8.546 (217.1)  | 8.546 (217.1)              | 9.611(244.1)               | NA <sup>*1</sup>             |
| Window Length (Full Gauge) ft (m)          | 11.29 (3.44)   | 17.95 (5.47)               | 15.37 (4.68)               | NA <sup>*1</sup>             |
| Composition of Window Joint                | L-80, 13% Cr or P-110  | L-80, 13% Cr or P-110      | 13% Cr or P-110            | 7076 Al <sup>*2</sup>        |
| Weight of Window Joint lb/ft (kg/m)        | 53.5 (79.6)  | 53.5 (79.6)                | 60.7 (90.3)                | 33.7 (50.13)                 |
| Max. Differential Pressure psi (Mpa)       | 2,500 (17.2)<br>2,500 (17.2)   | 4,200 (29)<br>2,000 (13.8) | 2,173 (15)<br>2,000 (13.8) | 4,280 (29.5)<br>5,280 (36.4) |

<sup>\*1</sup> Aluminium Casing Exit Joint contains no steel pre-milled window. Window geometry a result of milling conditions

<sup>\*2</sup> Low Alloy Steel latch coupling and crossovers

## The flexrite® system can provide these benefits:

- Increases reservoir exposure
- Reduces environmental impact
- Reduces CAPEX and lowers production costs by enabling more wells per surface location
- Reduces field development cost and time, bringing in production sooner and vastly improving economics
- Improves field drawdown distribution, delaying water and gas production and extending field life
- Easy window drillout generating no steel debris, reducing costly trips for clean-out and minimizing risk for subsea applications
- Includes an isolated TAML Level 5 junction that helps eliminate sand production

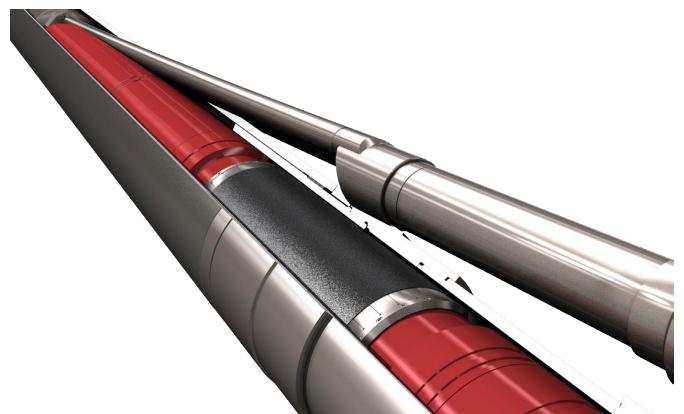
## Typical flexrite® system installation sequence

- Drill the main bore, and then install the main-bore casing with a FlexRite pre-milled window.
- Install the drilling whipstock.
- Drill the lateral, as required.
- Retrieve the drilling whipstock.
- Install the FlexRite deflector assembly.
- Run in the lateral-liner screens assembly with a bullnose and flexible junction. Stroke the flexible junction to depth, engaging the main-bore stinger in the deflector seal bore.
- Set the liner hanger packer, release and pull running tool to surface.
- Install upper completion and flow well.

## Flexrite® system variations

The FlexRite® system includes a host of variants, extending its capabilities into intelligent completions, long lateral liner deployments and existing well re-entry applications just to name a few.

- FlexRite LA and ELA—Lateral Access, and Enhanced Lateral Access, greater lateral leg ID for lateral access and enhanced pressure rating
- FlexRite ICI—Intelligent Completion Interface for lateral and main-bore flow control
- FlexRite LDS—Liner Deployment System, for long liner deployment, decoupled from the junction
- FlexRite XLS—eXtra Long Slim, extended window length and reduced OD window joint
- ReFlexRite® System—Multi award winning re-entry version of FlexRite
- FlexRite OHGP—FlexRite with Open Hole Gravel Packed main bore and laterals
- FlexRite MIC—Multibranch Inflow Control, award winning system giving downhole flow control for three or more laterals



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FlexRite® lateral access junction

## Awards

### FlexRite system

- Improved Oil Recovery (IOR) prize— Norwegian Petroleum Directorate (2006)

### ReFlexRite system

- Meritorious Award for Engineering Innovation— Exploration and Production E&P Magazine (2007)
- Offshore Energy Achievement Award in Well Construction —Offshore Engineering Magazine (2007)

### FlexRite MIC system

- Meritorious Award for Engineering Innovation— Exploration and Production E&P Magazine (2014)



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