

ReFlexRite® Milled Exit Multilateral Completion System

TAP INTO NEW PRODUCTION FROM EXISTING WELLBORES

Breathing new life into old reservoirs and making marginal reservoirs economical are key drivers for multilateral technology. The award-winning ReFlexRite® system from Halliburton is a re-entry multilateral solution that enables new lateral branches to be added to existing wells where no preparations were originally made to accommodate a multilateral junction. This enables access to unproduced reservoir sections on existing platforms without performing slot recovery operations or sacrificing production of existing wellbores.

A window exit is created in the existing mainbore utilizing the MillRite® milling machine, producing a straight, near-rectangular window at a precise depth and orientation. Problems associated with conventionally milled windows include window geometry that is typically elliptical and spiraled, and limited control over depth, orientation, or full-gauge section length. The MillRite machined window eliminates these problems, easing window exit operations and removing the risk of damaging premium screens and packers when exiting a window of unknown geometry.

A ReFlexRite multilateral well is completed with the FlexRite® multilateral completion system, providing a TAML 5, hydraulically isolated junction. The system comes with Halliburton SmartWell® completion options, enabling independent control and monitoring of both the existing main bore and the new laterals.

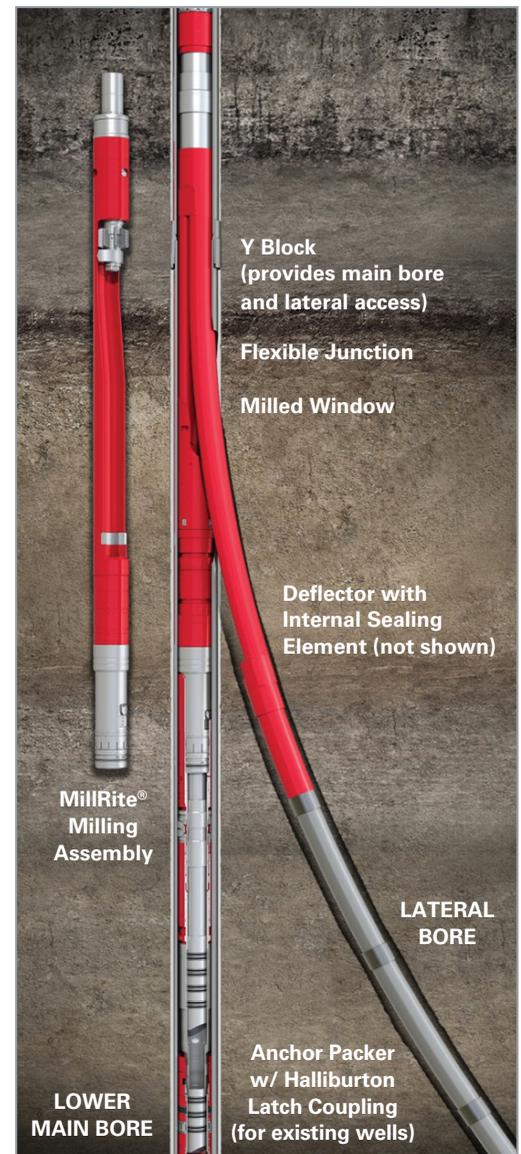
Field-proven since 2001 and constantly evolving, the FlexRite multilateral completion system has unrivaled run history and reliability.

BENEFITS

- » Economically unlocks new reserves without sacrificing existing production
- » Simple installation with a minimal number of steps
- » Significantly reduces cost per meter of reservoir exposed for mature field infill laterals
- » Can increase production and recovery rates in aging fields
- » Increases reservoir exposure without requiring new infrastructure

FEATURES

- » Hydraulically isolated TAML Level 5 sealed junction (sand control)
- » Precise azimuth and depth control provided by anchor packer
- » SmartWell completion options, giving flow control of existing mainbore and lateral
- » Consistent, geometrically controlled window created with a track guided milling system
- » Fully stackable, enabling multiple junctions per well
- » Maximized flow area at the lateral junction for production optimization
- » Longest track history in the industry
- » Unrivaled reliability



TYPICAL REFLEXRITE SYSTEM INSTALLATION SEQUENCE

1. Decomplete the existing well, leaving lower main bore section completed with liner or screens. Run multilateral anchor packer with mule shoe guide Ratch Latch™ interface. Packer orientation is achieved using MWD survey tool in the packer setting tool assembly.
2. Set first-pass milling machine in the anchor packer muleshoe Ratch Latch interface and mill-straight window. The muleshoe contains an indexing key guide which orients the Ratch Latch assembly of the milling machine, drilling whipstock, and completion deflector into correct orientation. This provides guaranteed orientation control for window creation.
3. Run drilling whipstock on shear-bolted milling assembly and set in packer Ratch Latch interface. Shear off mills from whipstock tip and dress window to full gauge.
4. Drill lateral hole section.
5. Retrieve drilling whipstock with hydraulic retrieval tool. Three other whipstock retrieval options are also available: spear, die collar, or washover assembly.
6. Run completion deflector, setting in the packer Ratch Latch interface.
7. Run lateral bullnose, liner or screens, and FlexRite junction hanger.
8. Orient and land the FlexRite junction in the into the completion deflector.



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)



ReFlexRite® System Specifications

| | | |
|--|---|---|
| Casing Size in (mm) | 9-5/8 (244.5) | 10-3/4 (273.1) |
| Casing Weight lb/ft (kg/m) | 53.5 (79.6) | 60.7 (90.3) |
| Window Type | Milled | Milled |
| Flexible Junction Access ID in (mm) | 8,503 x 3,437 x 3,375 (216.1 x 87.3 x 85.7) | 8,525 x 3,437 x 3,375 (216.5 x 87.3 x 85.7) |
| Lateral Hole Size in (mm) | 8-1/2 (216) | 8-1/2 (216) |
| Lateral Liner Size in (mm) | 5-1/2 to 6-5/8 (130 to 178) | 5-1/2 to 7 (130 to 178) |
| Lateral Access in (mm) | 3,437 (87.3) | |
| Lower Main Bore Access in (mm) | 3,375 (85.7) | |
| Table Category in ² (mm ²) | 6,166 (3,978) | |
| Sectional Flow Area Lower Main Bore Cross-Sectional Flow Area in ² (mm ²) | 6,166 (3,978) | |
| Burst/Collapse Rating psi (kPa) | 1,000 (6,895) | |
| Compressive Rating lb (kg) | 200,000 (90,718.5) | |
| Tensile Rating lb (kg) | 400,000 (181,436.9) | |

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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