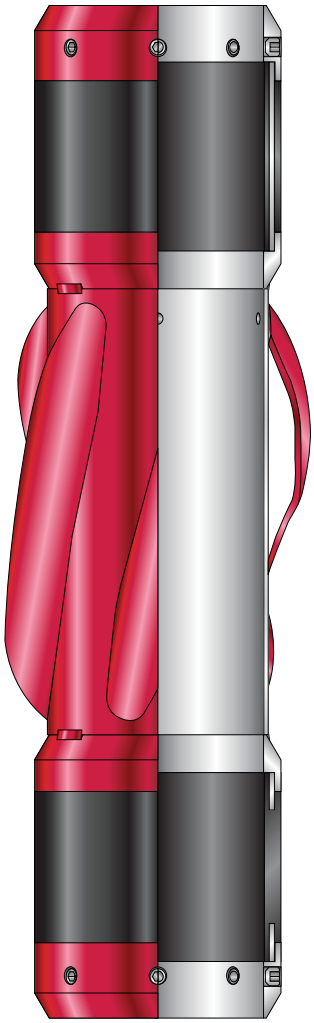
Micro-Seal™ Isolation System-Rigid (MSIS-R)

Weatherford's patent-pending *Micro-Seal* isolation system-rigid (MSIS-R) incorporates the *Micro-Seal* isolation system-unit (MSIS-U)—combining Weatherford's industry-leading centralization designs with its proprietary hybrid-swellable technology. After cementing, the hybrid-swellable elements prevent the unwanted migration of well fluids through microannulus leak paths between the casing and cement sheath.



The MSIS-R offers a low-risk, cost-effective alternative to expensive and time-consuming remedial cementing operations, which are often necessitated by microannulus gas migration. Part of the *Micro-Seal* isolation system, the MSIS-R is a slip-on device with rigid blades designed to optimize mud displacement for vertical, inclined, and horizontal wells. The rigid blades minimize drag forces while running-in-hole—easily gliding over restrictions—and are designed to collapse with a predetermined side force if a restriction is encountered. This feature enables the casing to be either run or pulled without the risk of a stuck pipe.

This MSIS-R system creates at least one point in the well with total annular isolation. The rigid blades provide maximum standoff to achieve the most efficient displacement of mud and the most effective placement of the cement. The swellable MSIS-U is designed to swell in microannular spaces that can form after the cement is in place as well as against the OD of the casing on which it was deployed. The combination of these tools results in a system that provides multiple locations in the annulus, each with the best possible chance of achieving isolation.

The system incorporates Weatherford's proprietary hybrid-swellable technology, therefore, the element swells when immersed in water- and hydrocarbon-based wellbore fluids and/or wet gasses or any combination of these, ensuring that any potential microannulus is effectively sealed. The MSIS-R is available in heavy-duty (HD) or single-collar (SC) spiral-blade contour configurations with either straight or spiral blades, and it can be used with Weatherford's other industry-leading mechanical cementing products.

Micro-Seal™ Isolation System-Rigid (MSIS-R)

Applications

- Vertical, inclined, and horizontal wells where the risk of microannulus gas migration is present
- Extended-reach wells or wells with high-dogleg severity
- Any well where the risk of microannulus gas migration is present
- Gas or liquefied petroleum gas (LPG) storage and injection wells
- Wells that must be fractured or acidized
- Wells with perforation damage to cement sheath
- Multiple completion wells (one or multiple casing strings)
- Wells to be stimulated by steam or other thermal processes and experience wide variances in temperature and/or pressure
- Any well location where there is a history of wellhead pressure buildup

Features, Advantages and Benefits

- The MSIS-R is a cost-effective solution to prevent microannulus gas migration, eliminating the need for expensive remedial cementing operations, thereby saving significant costs.
- The swellable element effectively seals against the OD of the casing and the ID of the cement sheath, sealing regular and irregular annular geometries.
- The hybrid-swellable element can be activated by water/hydrocarbon based fluids and/or wet gasses or any combination of these, ensuring zonal isolation in any environment.
- Swellable elements can operate in downhole temperatures of up to 300°F (150°C), providing operational flexibility. Swellable elements with higher temperature requirements are available upon request.
- Both spiral- and straight-blade configurations capitalize on the “sled effect” to minimize drag forces while running tubing/casing into the wellbore and help guide the string through wellbore obstructions.
- The hydrodynamic shape of the system’s blades helps optimize mud displacement and cement placement, minimizing pressure drop and encouraging turbulences across the tool.
- The large flow-by area of the system minimizes equivalent circulating density to prevent formation damage that ultimately induces fluid loss.

Micro-Seal™ Isolation System-Rigid (MSIS-R)

Specifications

Tubular Size (in./*mm*)	Maximum Rigid OD (in./*mm*)	Overall Length (in./*mm*)	Number of Blades	Hole Size (in.)
4-1/2 *114.30*	5.75 *146.10*	25.83 *656.00*	4	6
5 *127.00*	8.25 *209.55*	26.81 *681.00*	4	8-1/2
5-1/2 *139.70*	8.25 *209.55*	26.81 *681.00*	5	8-1/2
7 *177.80*	8.25 209.55	25.83 *656.00*	6	8-1/2
7-5/8 *193.70*	9.63 *244.50*	25.83 *656.00*	6	9-7/8
8-5/8 *219.00*	10.38 *263.50*	25.81 *655.60*	6	10-5/8
9-5/8 *244.50*	11.75 *298.45*	25.81 *655.60*	7	12
9-5/8 *244.50*	12.00 *304.80*	25.81 *655.60*	7	12-1/4
13-3/8 *339.70*	17.25 *438.15*	26.81 *681.00*	7	17-1/2

Straight- and spiral-blade configurations are available with SPIRAGLIDER® centralizer designs in:
4 1/2-, 5-, 5 1/2-, 7-, 7 5/8-, 8 5/8-, 9 5/8-, and 13 3/8-in. sizes.