

Casing Equipment
Displacement Equipment

SSR-II™ cement plugs

Composite plug system

FEATURES

- Available in single-, dual-, or triple-plug configurations
- High-strength versions available with increased bump ratings to set expandable liner hanger and enable high-pressure casing test
- Combination plug sets available for tapered string
- Optional ball catcher available
- Dedicated landing collar required for bottom plug bypass
- Available for 7- to 20-in. casing

BENEFITS

- Composite construction provides improved drillability
- Increased flow area after bypass

Overview

For more than five decades, Halliburton has designed subsurface release (SSR®) plugs intended to cement casing string from subsurface hangers. These plugs enable precise cement slurry placement in offshore and liner operations. Accurate deployment of subsurface release plugs is crucial to provide fluid separation, prevent contamination, ensure zonal isolation, and avoid costly remedial operations and potential environmental hazards. As the industry's first patented reinforced plastic composite plug system, SSR-II™ plugs represent a step change in subsurface release plug design. Compared to conventional aluminum-constructed plug assemblies, SSR-II plugs offer improved reliability and drillability, particularly for high-pressure demanding operations.

Dual dart operated subsurface release plug system provides enhanced reliability

SSR-II cement plugs are designed to provide mechanical separation and prevent contamination between cementing fluids pumped down the landing string. The bottom plug is released by a dart ahead of the cement slurry. Applied pressure on the dart shears brass retaining pins, which release the plug from the assembly. The pins are positioned to prevent forces from affecting the top plug, which significantly reduces the risk of premature top plug release. A clear indication of the pressure drop is registered at surface to minimize the risk of over or under slurry displacement. Use of a collet system isolates the top plug release mechanism from pressure events. This helps reduce the risk of premature release and enables improved compatibility with pressure sensitive systems on the string.

At the lower end of the casing string, the SSR-II dedicated landing collar provides a landing profile for the bottom plug and creates the shoe track. Once landed, the bottom plug creates a pressure seal to allow internal pressure buildup behind the plug. A clear indication of the pressure drop is registered at surface and indicates bottom plug bypass, which can help calibrate casing string and final displacement volumes.

As the top plug lands on the bottom plug, a high-pressure seal is created between the components to enable a casing pressure test or expandable



hanger setting at the plug bump. This eliminates the need to wait for a dropped ball to free fall down the landing string into the hanger running tool. There is also no need to wait on cement (WOC) to perform a casing pressure test, which reduces the potential for microannulus generation.

Increased flow area after bypass

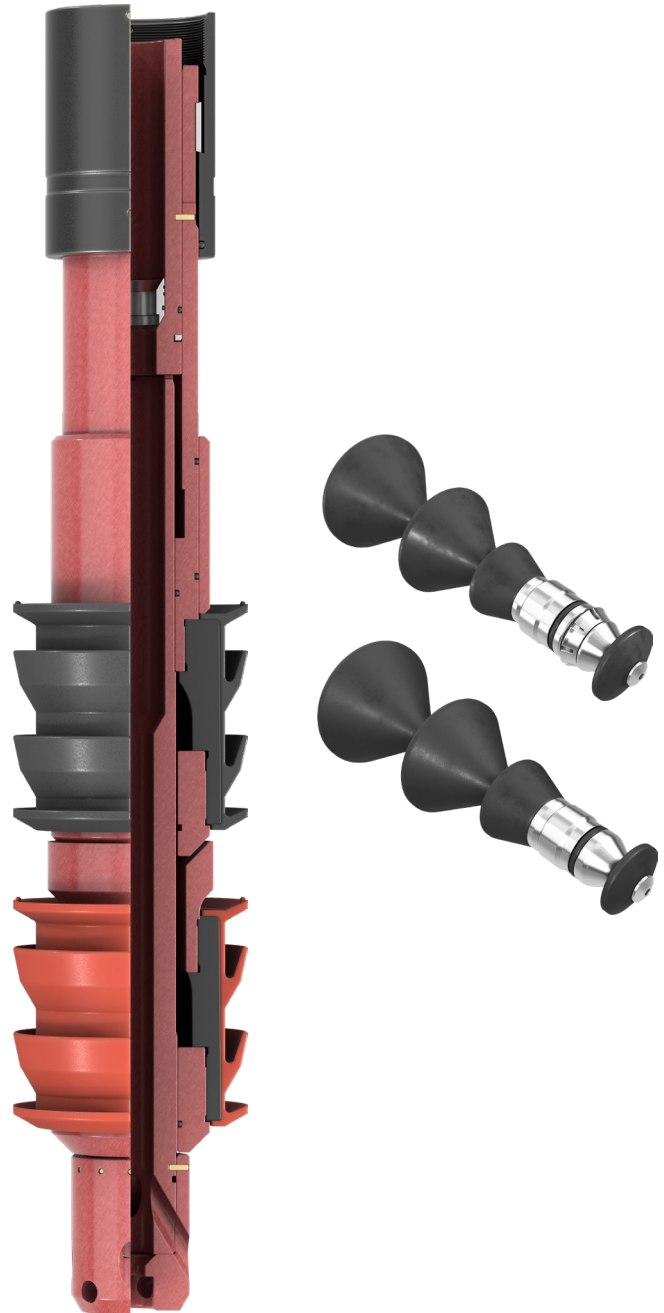
The unique bottom plug bypass design of the SSR-II plug system creates an unrestricted flow area on the landed plug. The bottom plug mandrel and its release dart are pumped away from the plug body, and the bypass creates a fullbore inner diameter (ID) on the landed bottom plug. Unlike conventional subsurface plug systems that require fluid to squeeze past restricted annular gaps in complex flow paths, the fullbore ID of the SSR-II plug enables deployment of cement slurries heavily loaded with lost-circulation material (LCM), without the risk of plugging off equipment.

With no restrictions, localized pressure drop through the bottom plug after bypass is reduced. This enables improved fluid flow and results in the capability to sustain higher flow rates for longer time periods. Component erosion is also minimized, which allows SSR-II plugs to provide improved compatibility with solid contents of fluid and increased reliability in longer casing string cement operations that require higher cement fluid volumes.

High-strength composite subsurface plug system enables improved drillability

The SSR-II plug assembly is designed to improve drillability. Aluminium mandrels common within the industry are replaced with materials that reduce drill-out time and drill-bit damage. The majority of the tool's components are constructed from synthetic rubber and reinforced plastic composite materials. This composite design provides the strength necessary for efficient casing

string wipe down throughout the cement operation, reliable mechanical fluid separation, and high-pressure ratings at the bump of the top plug.



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