

Casing Equipment

SUPERFILL™ SURGE REDUCTION EQUIPMENT

SuperFill™ II Diverter

Reduces surge pressure to optimize casing run speed

FEATURES

- Innovative glass seat disintegrates into fine, sand-like particles
- Large diverting port flow area
- Single-body design provides high torque and tensile ratings

BENEFITS

- Fullbore ID
- Alleviates surge pressure while running casing in tight-clearance applications or at high RIH speeds
- Versatile compatibility with downhole tools

Overview

Running casing in the well at operationally efficient speeds can result in induced surge pressure that can lead to formation damage and wellbore integrity loss. In liner and offshore operations this is more critical since pipe speed can generate excessive fluid frictional pressure loss through the length of the landing string. Proper management of pipe run in hole (RIH) speed can help reduce surge pressure. However, this can increase the time necessary to reach the casing final depth. Use of auto-fill float equipment is an effective solution to overcome induced surge pressure. This is because the equipment is designed to allow flow into the casing through fully opened valves without creating a significant pressure drop as it is RIH. To enhance auto-fill float equipment benefits and significantly reduce induced surge pressure on the formation, a diverter tool is installed on the landing string above the casing/liner hanger running tool to redirect fluid flow from inside the landing string to the annulus.

The deactivation mechanism of conventional diverters can create restrictions to the tool inner diameter that limit the use of certain subsurface plug and liner hanger systems. Unlike conventional diverters, the Halliburton SuperFill™ II glass seat diverter imposes no restrictions. Once the diverter is closed, the tool provides an open internal path that maximizes compatibility with downhole tools.



Innovative glass seat delivers fullbore access

Conventional diverters close when a metal sleeve or flapper mechanism, which operates by a surface dropped ball and a dedicated metal ball seat, deactivates them. Once the diverter tool closes, the ball seat is mechanically deformed to allow circulation, which results in an inner diameter (ID) restriction. This restriction can limit the use of subsurface released plug systems. This is because their releasing darts must pass through the diverter during a cementing operation. Liner hanger systems can experience a similar limitation because setting procedures or additional features commonly rely on dropped ball mechanisms. As darts or balls pass through the diverter, they can suffer premature damage and fail to function properly. They can also potentially cause high surface pump pressure that exceeds rig or well equipment limitations.

As part of its closing mechanism, the SuperFill II diverter features a glass ball seat installed to the closing sleeve. Pressure applied to the seated ball causes retaining pins to shear and the sleeve to close communication from the inside out. Increased pressure causes the seat to disintegrate into fine, sand-like particles that flow down the pipe with the ball after tool closure. The innovative glass seat, however, leaves no debris after deactivation for fullbore access. This feature increases the compatibility of the tool with subsurface released plug systems. It also increases compatibility with other downhole tools for which use is limited with conventional diverters because of the ID restrictions that expandable metal seats impose.

Single-body design with large diverting flow port area

The SuperFill II glass seat diverter features a single-body design that leaves no weak spots in the landing string. Unlike assembled designs that can present potential leak paths and string rotation limitations, the single mandrel

design is more robust and does not limit torque and tension applications.

Large ports in the SuperFill II glass seat diverter provide an open bypass area for auto-fill wellbore fluid to divert from inside the landing string out to the annulus, right above the casing/liner hanger. This feature significantly reduces the surge effect on the formation. By re-establishing a conventional wellbore flow pattern with returns to the surface received at the return line of a rig, the SuperFill II glass seat diverter facilitates proper mud flow management at the surface. This helps to minimize the risk of mud overflow on the rig floor.

Complete string of compatible surge-reduction components

The Halliburton SuperFill™ float equipment and the closing confirmation sub complete the surge-reduction system in casing/liner hanger applications. The design of the SuperFill family of float equipment helps reduce the effects of surge pressure while casing is run in a tight annular clearance or in wells with narrow margins between the fracture gradient and pore pressure. The design of the closing confirmation sub allows it to run in conjunction with, and a couple of stands below, the SuperFill II diverter. This provides confirmation that the ports in the diverter tool are closed before cement operations begin.

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