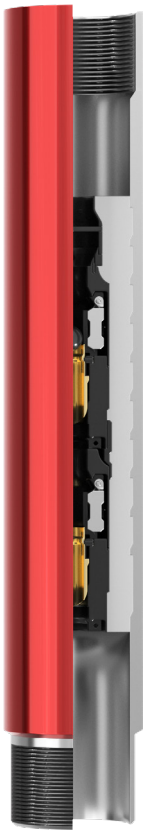
SuperFill™ Surge Reduction Equipment

REDUCES SURGE PRESSURE TO OPTIMIZE CASING RUNNING SPEEDS



SuperFill™ type FVB
> *Deactivation of the auto-fill feature occurs with the first circulation.*

OVERVIEW

Running casing in the well at an operationally efficient speed without resulting surge pressure damaging the formation has been a long-standing challenge within the oil and gas industry. Hours of rig time can be consumed by manually filling the casing from the surface or running in with reduced running speeds. Conventional poppet valve float equipment can allow wellbore fluid to enter the string but this equipment does not provide the benefit of surge reduction. Casing running speeds can be optimized while protecting the formation with SuperFill™ surge reduction equipment, a reliable auto-fill system.

The Halliburton SuperFill family of float equipment is designed to help reduce the effect of surge pressure during casing running operations in tight annular clearance or in wells with narrow margins between the fracture gradient and pore pressure. SuperFill equipment is available for use in casing sizes 5-in. and larger, in either shoe or collar configurations. Deactivation of the auto-fill feature is achieved by selecting one of three design types that provide the flexibility to suit a variety of well conditions.

- **SuperFill™ type FV (Flapper Valve)**
- **SuperFill™ type FVB (Ball Retained)**
- **SuperFill™ type FVB+ (Multi-circulation Ability)**

FEATURES

- Industry leading auto-fill flow area
- Redundant flapper closing mechanism
- Flexible deactivation method of auto-fill feature
- PDC drillable

BENEFITS

- Reduces surge pressure into the formation while RIH
- Optimizes casing running speeds
- Reduces/eliminates casing fill-up times

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SuperFill™ type FV (Flapper Valve)

The auto-fill feature for type FV designs is deactivated with a drop ball from the surface. Applications for the type FV feature include extended circulation or washing down to total depth (TD) without risking deactivation of the auto-fill flapper valves. SuperFill type FV float shoes are available with a single valve, which add a redundancy to the float collars to prevent backflow after the cementing operation. The type FV shoe can be used with any of the SuperFill float collar deactivation types.

SuperFill™ type FVB (Ball Retained)

Deactivation of the auto-fill feature for the type FVB design occurs with the first circulation. By housing the deactivation ball inside the collar, the string can quickly convert to close-ended. This feature is ideal for rapidly achieving well control after the first circulation or for use in wells where it may be difficult to achieve the required flow rate/differential pressure to deactivate the auto-fill floating equipment. SuperFill type FVB is especially useful in applications where the liner/casing hanger systems create an ID restriction that would limit the size of an auto-fill deactivation ball.

SuperFill™ type FVB+ (Multi-circulation Ability)

Type FVB+ float collars also retain a deactivation ball that is carried within the tool. Unique flow area within the type FVB+ valve allows for limited circulation without auto-fill deactivation. This feature provides the ability to circulate through the valve to wash past ledges or restrictions while running casing to TD and maintain auto-fill capability afterwards. Similar to SuperFill type FVB, the retained deactivation balls do not have to pass through the landing string and can be sized to maximize flow area through the valves, resulting in improved surge reduction.

SuperFill™ II Big Bore surge reduction equipment

To maximize surge reduction, all SuperFill float equipment that is 9 5/8-in. and larger is equipped with the new SuperFill II Big Bore design. SuperFill II Big Bore equipment is converted with a 3 1/2-in. deactivation ball and offers a pre-conversion flow area of 8.95-sq.in., offering industry leading reduction in surge pressure while running casing in the well.

Mousetrap spring design enhances reliability

The SuperFill II Big Bore float valve utilizes an updated spring design that triples the strength of the previous model. The design consists of double coils that provide more contact between the spring and the flapper. This increased contact results in improved flapper closing reliability for better backpressure sealing at the end of the cement job.

Ball catching collet improves sleeve reliability

A ball catching collet mechanism retains the deactivation ball until the flapper is fully unsupported. This ensures that the ball only exits the collar when both flappers have had their auto-fill features disabled. The redundant sleeve mechanisms provide improved reliability by deactivating independently from one another.

Complete string of compatible surge reduction components

The SuperFill Diverter and the Closing Confirmation Sub complete the surge reduction package in liner/casing hanger applications. The SuperFill Diverter tool enhances the benefits of SuperFill auto-fill float equipment by relieving additional pipe running surge forces caused by frictional pressure inside the work string. The Closing Confirmation Sub is designed to run in conjunction with the SuperFill Diverter to provide confirmation that the ports in the diverter tool have closed prior to beginning cementing operations.

SuperFill™ II Big Bore FVB+

> *Provides an industry leading auto-fill flow area to reduce surge pressure while running casing in the well.*

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For more information, contact your Halliburton representative of visit us at halliburton.com