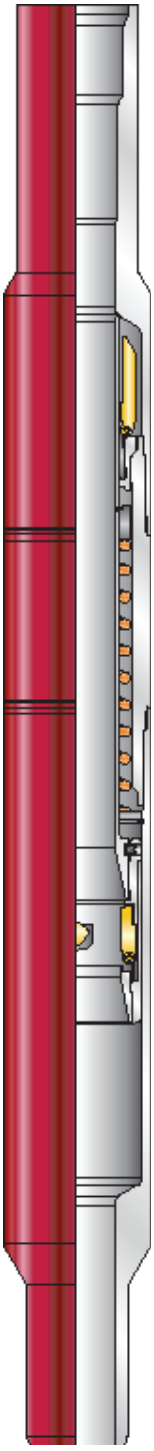
FormationSaver Valve



Weatherford's FormationSaver valve is an advanced-design check valve typically installed below an electric submersible pump (ESP) to protect against formation-damaging fluid loss. High-performance features set the FormationSaver valve apart from conventional check valves. It uses three triangular actuator flappers that are spring-biased closed and a safety-valve flapper. This design gives the valve self-piloting capability, enabling totally remote actuation of the valve and eliminating dependence on a hydraulic control line and other mechanical components. The flapper has proved to be one of the industry's most reliable, durable, and effective sealing devices.

Applications

- Wells using an ESP (to prevent formation-damaging fluid loss when pulling the pump)
- Multilateral completions (installed in each lateral to prevent cross-flow)
- High-rate flowing applications

Features, Advantages and Benefits

- The FormationSaver valve eliminates damaging fluid loss to the formation and associated losses in overall well productivity. Valuable ESP rotating days are spent producing crude rather than cleaning out fluids lost to the formation.
- The FormationSaver valve increases ESP life by preventing reverse of pump rotors.
- The self-piloting, tri-flapper closure mechanism is actuated by the reverse flow of fluid. Self-piloting enhances sealing reliability by eliminating hydraulic or mechanical controls and external signals.
- All sealing components, including the surface of the main flapper (API qualified), are protected from erosive effects by the flow tube. This patent-pending design reduces seal damage and solids deposition to ensure greater reliability and longer life than the industry standard ball-and-seat configurations.
- The tri-flapper design, with its full-bore, unrestricted ID, automatically opens or closes the valve with minimal pressure drop while providing maximum sealing capability to protect the reservoir.
- The self-piloting design enables installation below ESPs in two-trip completion, enabling unlimited setting depths.

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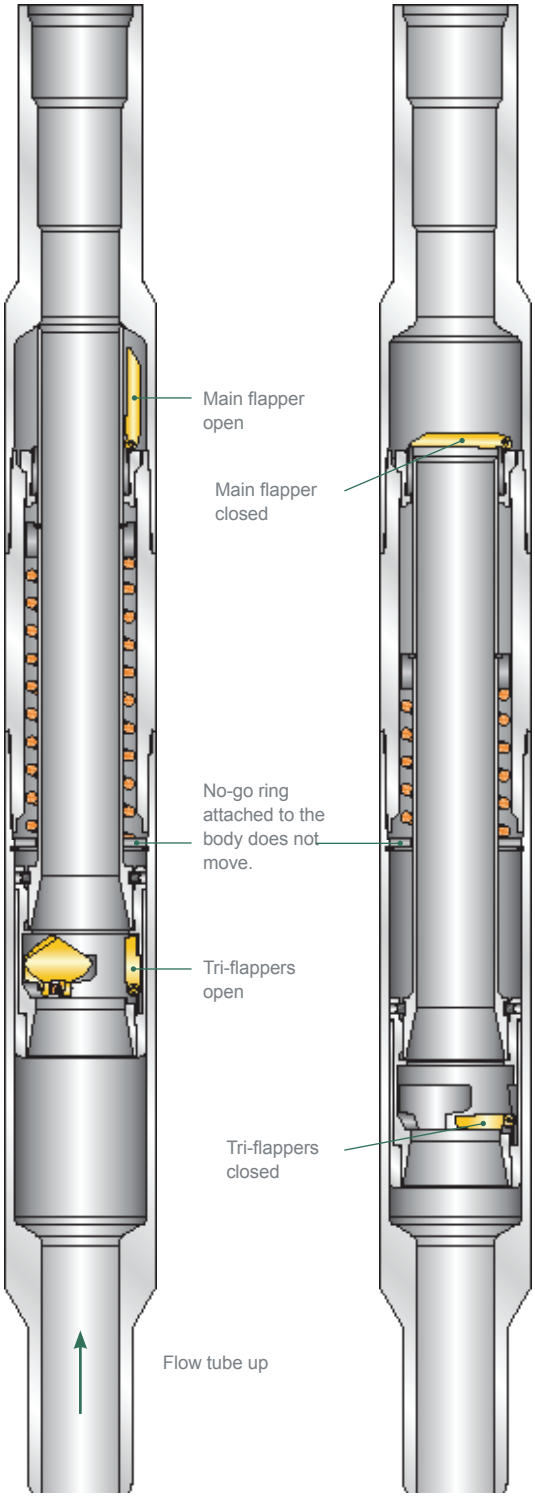
Self-piloting mechanism, producing well. When the FormationSaver valve is in the normal position, the main sealing flapper is open. The tri-flappers are held closed with a light spring force. When production starts, the spring force is overcome by the upward force of the producing fluids, and the tri-flappers open as well. In this position the flow tube protects the sealing surfaces and the flapper from erosion.



Self-piloting mechanism, production shut off. Production is shut off, and the produced fluid starts to backflow. The tri-flappers close, and the differential across them pulls the flow tube down and then holds down the main flapper to stop fluid losses to the formation.

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Specifications

Size (in./*mm*)	**7 × 3-1/2 *177.8 × 88.9***	**9-5/8 × 4-1/2 *244.5 × 114.3***	**9-5/8 × 5-1/2 *244.5 × 139.7***
Casing size (in./*mm*)	7 *177.8*	9-5/8 *244.5*	9-5/8 *244.5*
Casing weight (lb/ft, *kg/m*)	29.0 *43.1*	47.0 *69.9*	
Tubing size (in./mm)	3-1/2 *88.9*	4-1/2 *114.3*	5-1/2 *139.7*
Tubing weight (lb/ft, *kg/m*)	9.2 *13.7*	12.6 *18.8*	20.0 *29.8*
Burst pressure rating (psi/*MPa*)	7,500 *52*		10,000 *69*
Collapse pressure rating (psi/*MPa*)			
Maximum temperature rating (°F/°*C*)	375° *191°*		
Metallic material	13 Cr, 80ksi		
Wiper material	PEEK™		N/A
Flapper seal material	Teflon®		
Maximum OD (in./*mm*)	5.50 *139.70*	7.90 *200.66*	8.25 *209.55*
Overall length (in./*mm*)	135 *3,429*	145 *3,683*	
Minimum ID (in./*mm*)	2.750 *196.85*	3.812 *96.82*	4.580 *116.3*
Tensile rating (lb/kg)	250,000 *113,398*	300,000 *136,078*	

For internal use
Link to Endeca assembly part numbers: FormationSaver Valve

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