

Recovery Series Safety Valves

High-value, self-equalizing, API 14A Class II–certified rod-piston flapper valves rated to 10,000-psi working pressure

APPLICATION

- Standard to moderately corrosive applications from 40 degF to 300 degF [4 degC to 149 degC]

BENEFITS

- Long-term performance owing to internal equalizing system
- Cost-effective solution that is easy to run
- Maximum reliability through fewer potential leak paths
- Reduce problems associated with solids and scale deposition

FEATURES

- Inconel® 718 flapper and seat with full metal-to-metal sealing
- API 14A Class II sandy service certified
- Compliance with API and ISO criteria
- Flapper mounted, dart-based equalizing system
- Rod piston with a premium sealing system
- Minimum number of seals
- Optimal geometry and clearance between sliding components
- Suitability for setting depths to 8,000 ft [2,438 m]

The Recovery* slickline-retrievable subsurface safety valve is engineered to provide industry-leading reliability and high value. It features rod-piston operation with the rugged Camco* flapper and seat design and an internal equalizing system. This design maximizes long-term performance and reduces potential leak paths.

The versatile Recovery valve is available in a range of sizes and is designed to accept any manufacturer's lock assemblies for convenient use as a secondary valve in a disabled tubing-retrievable valve. The valve can also be used as a primary valve in applications requiring a value-engineered slickline-retrievable valve.

The Recovery valve is operated by a rod piston with a premium sealing system. The Inconel flapper mechanism also has full metal-to-metal sealing plus a secondary soft seat, and it meets a leakage-acceptance criterion that is substantially more stringent than American Petroleum Institute (API) and International Organization for Standardization (ISO) specifications.

Suitable for setting depths of approximately 8,000 ft [2,438 m] and a wide range of wells, the valves are rated to 10,000-psi [68,947-kPa] working pressure.

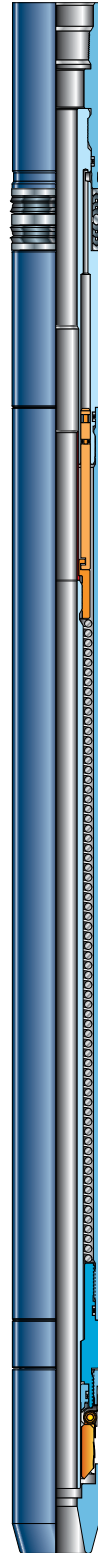
Recovery valves are a cost-effective solution to well safety. Designed with Schlumberger expertise, the Recovery series safety valves are priced economically—without sacrificing performance.

INTERNAL EQUALIZING FEATURE

The Recovery safety valve's flapper-mounted equalizing system is an industry-recognized, proven method of equalizing pressure across the flapper. The ports within the dart provide a dedicated flow path for the wellbore fluid. For wear resistance, Schlumberger manufactures equalizing system components from erosion-resistant materials and coatings. This design has been rigorously tested with sand slurry to ensure operational longevity, whatever the well conditions.

VALVE INSTALLATION

To install a Recovery safety valve, the valve is lowered and locked into the hydraulic landing nipple or disabled tubing-retrievable valve using the appropriate running tool and prong for the lock mandrel attached to the valve. Spacer bars are often used between the lock and insert valve for installation into a disabled tubing-retrievable valve to ensure complete isolation.



Recovery safety valve.

Recovery Series Safety Valves

VALVE OPERATION

Recovery safety valves are normally closed. They are opened by applying hydraulic pressure through a control line that extends from the hydraulic landing nipple or disabled tubing-retrievable valve, through the wellhead, to the control panel. Hydraulic pressure applied from the surface control panel pushes the rod piston and the flow tube down. This downward force compresses the power spring, moves the flapper off seat, and continues until the valve is in the fully open position. When the hydraulic control line pressure is released, the power spring lifts the flow tube and the rod piston. This upward movement permits the torsion spring on the hinged flapper to move the flapper into the flow stream, closing against the flapper seat and shutting in flow from the well.

EQUALIZING OPERATION

With pressure below the flapper, the preferred method of opening the valve is to apply wellbore pressure from above until the pressure level across the flapper is minimal. Then hydraulic pressure is applied to the actuating piston. The pressure on the piston forces the flow tube down, and it lands on the flapper-mounted dart. This force, in turn, opens the equalizing dart. The wellbore fluid travels through the port in the equalizing dart and into the bore of the valve above the flapper. The pressure above the flapper increases until it equals the pressure below the flapper. When the pressure is equalized, the flow tube continues to move down to the fully open position and shields the flapper closure and equalizing mechanism.

If equalization is not possible by increasing wellbore pressure, then the safety valve may be completely equalized using the equalizing system.

Tubing size [†] (in. [mm])	Valve Type	Valve Packing OD (in. [mm])	Min OD (in. [mm])	Working Pressure (psi [kPa])
2.875 [73.0] or 3.500 [88.9]	Recovery 7.5E	2.312 [58.7]	1.125 [28.6]	7,500 [51,713]
3.500 [88.9]		2.565 [65.1]		
		2.750 [69.9]		
		2.812 [71.4]		
5.500 [139.7]	Recovery 10E	4.562 [115.9]	2.300 [58.4]	10,000 [68,947]
7.000 [177.8]		4.500 [114]		
		4.437 [111]		
		4.312 [109.5]		
		5.937 [150.8]	2.837 [72.05]	
5.875 [149.2]				
5.812 [147.6]				
		5.750 [146.0]		

[†] The engineering data provided illustrate the scope of this product offering and are not all-inclusive. Additional sizes and pressure ratings are available upon request.

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