

# Optimax™ Ultra Deep-Set Safety Valve

## Model WUDP-10

Sets in ultradeep environments to shut in wells at pressures up to 10,000 psi

### Applications

- Production and injection wells
- Deepwater wells
- Liquid and gas environments
- Ultradeep setting depths

### Features and Benefits

- The WUDP-10 valve can be set as deep as 12,000 ft (3,658 m).
- The conventional, field-proven, hydraulic-only functionality provides long-term, reliable operation.
- The tubing-pressure insensitive (TPI) operating system results in low operating pressures that reduce costs on subsea trees and umbilicals. These lower pressures also enable the valve to be set at shallow depths, which reduces pressure requirements on the surface control system.
- Fail-safe operation does not rely upon long-term storage of nitrogen, which enhances reliability.
- This valve features the same reliable nonelastomeric, dynamic seal system used throughout the Optimax series of safety valves.
- Heavy-duty springs enable fail-safe closure.
- The safety valve can be run with one or two control lines, for greater operational flexibility. The valve can be remotely exercised using pressure applied through the second control line to help shift the valve.
- Several features of the model WUDP safety valve maximize reliability:
  - The hydraulic operating system has only two leak paths.
  - Metal-to-metal, premium-thread housing connections are standard.
  - The flapper uses a primary metal-to-metal, hard-seat seal with a nonelastomeric soft seat for additional sealing integrity.
  - The simple design of the WUDP safety valve eliminates the need for sleeves, plugs, or other mechanisms that might be inadvertently actuated and cause premature control-line communication or valve failure.
- For deep-set applications, the Optimax model WUDP-10 valve provides the option of using a wireline-retrievable insert safety valve that operates on the same TPI system principle.



The Optimax WUDP-10 ultra deep-set safety valve provides fail-safe closure without sensitivity to tubing pressure or reliance on long-term nitrogen storage.



# Optimax™ Ultra Deep-Set Safety Valve Model WUDP-10

## Tool Description

The Weatherford Optimax model WUDP-10 ultra deep-set safety valve is a tubing-retrievable, surface-controlled, subsurface safety valve. This rod-piston, flapper-type safety valve shuts in a well in the event of uncontrolled flow caused by damaged or failed equipment. The WUDP-10 safety valve can be set at depths of 12,000 ft (3,658 m) or less, and has several standard options, including designs for 5,000-, 7,500-, and 10,000-psi (34.5-, 51.7-, 68.9-MPa) working pressures.

An integral part of the completion string, the Optimax WUDP-10 safety valve is controlled by a primary hydraulic control line. The valve is kept open through application of control-line pressure, and closes when pressure is bled off. This safety valve is tubing-pressure insensitive, with two identical rod pistons acting in opposite directions within a single chamber housing. The pistons are attached to the flow tube, which closes a force loop allowing tubing pressure to act equally and in opposite directions, canceling the effects of tubing pressure and making the valve tubing-pressure insensitive.

Unlike conventional deep-set valves, the Optimax WUDP-10 valve does not rely on nitrogen-charged chambers to compensate for the high hydrostatic pressure of the control line. Conventional valves with nitrogen-charged chambers require lifetime containment of high-pressure gas, which are likely to bleed off over time. The Optimax deep-set safety valve overcomes the challenges of nitrogen-charged safety valves with a design that uses highly reliable, field-proven technology.

## Specifications

Optimax safety valve model	WUDP-10	
Tubing size	4-1/2 in. (114.3mm)	5-1/2 in. (139.7 mm)
Rated working pressure	10,000 psi (68.9 MPa)	
Test pressure	15,000 psi (103.4 MPa)	
Maximum control chamber pressure	15,000 psi (103.4 MPa)	
Maximum OD <sup>a</sup>	7.410 in.	8.418 in.
Standard sealbore options	3.813, 3.750, 3.688 or 3.562 in.	4.578, 4.562, or 4.412 in.
Standard nipple profile <sup>b</sup>	Petroline QN profile	
Rated working temperature	35° to 350°F (2 to 177°C)	
Fail-safe setting depth <sup>c</sup>	≤12,000 ft (3,658 m)	
Operating pressure, full open test rack	Varies depending on the spring package selected for the fail-safe setting depth	
Operating pressure, full closed test rack	Varies depending on the spring package selected for the fail-safe setting depth	
Control line connection	Industry-standard metal-seal compression fitting for 1/4-in. (6.35-mm) control line	
Dynamic seal system	Weatherford proprietary design nonelastomeric rod piston seal stack, verified in tests up to a 10,000-psi (68.9-MPa) gas differential at 300°F (149°C)	
Tubing thread connection	As requested	
API-14A validation grade	V1 (per API-14A 12th edition)	
Design and manufacturing compliance	API Q1 and API-14A	

<sup>a</sup> The maximum OD of the safety valve may be reduced by using higher yield strength outer housing materials.

<sup>b</sup> Other manufacturers' profiles are available upon request.

<sup>c</sup> Other setting depth options are possible upon request.

