# Optimax™ Series Deep-Set Safety Valve

Achieves conventional safety-valve reliability in deepwater wells without the need for nitrogen-charged chambers

## Applications

- Fluid and gas environments in both production and injection wells
- Ultradeep setting depths
- Subsea environments

## Features and Benefits

- Conventional, field-proven, hydraulic-only functionality provides long-term, reliable operation.
- Heavy-duty power springs enable fail-safe closure.
- The tubing-pressure insensitive (TPI) operating system results in low operating pressures that reduce costs on subsea trees and umbilicals. These low pressures also enable functionality in shallow applications, which reduces the pressure requirements on the surface-control system.
- The field-proven, nonelastomeric, dynamic seal system is proven throughout the Optimax series of safety valves with no hydraulic failures.
- Fail-safe operation does not rely upon the long-term storage of nitrogen, which enhances reliability. No elastomers are required.
- The safety valve can be run with one or two control-line penetrations through the hanger for greater operational flexibility.
- The safety valve can be remotely exercised by running a second control line to the surface, which avoids the high costs and challenges associated with well intervention in the deepwater environment.
- Several features of the 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 safety-valve design eliminates the need for sleeves, plugs, or other mechanisms that can be inadvertently actuated and cause premature control-line communication or valve failure.
- Unlike conventional deep-set safety valves, the Optimax valve provides a contingency option that allows for the use of a wireline-retrievable insert safety valve operated with the same TPI system principle.

The V1-certified Optimax safety valve provides fail-safe closure without sensitivity to tubing pressure or reliance on long-term nitrogen storage.

Weatherford®

# Optimax™ Series Deep-Set Safety Valve

## Tool Description

The Weatherford Optimax deep-set, tubing-retrievable, surface-controlled, subsurface safety valve is a rod-piston, flapper-type safety valve that shuts in a well when damaged or failed equipment causes uncontrolled flow. The safety valve works in setting depths in excess of 12,000 ft (3,658 m) 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 safety valve is controlled by a primary hydraulic control line. Application of control-line pressure keeps the valve in the open position. When pressure is bled off, the valve closes to protect property, personnel, and the environment. A secondary upward-facing rod piston negates the effect of tubing pressure on the safety valve. Heavy-duty power springs enable fail-safe closure while keeping the hold-open pressure to a minimum.

Conventional deep-set valves typically require nitrogen-charged chambers to compensate for the high hydrostatic pressure of the control line. 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 repackages highly reliable, field-proven technology.

## Specifications

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| Model | WUDP-10 |
| Tubing size | 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[a] | 8.418 in. |
| Standard sealbore options | 4.562 or 4.437 in. |
| Standard nipple profile[b] | Petroline QN profile |
| Rated working temperature | 35 to 300°F (2 to 149°C) |
| Fail-safe setting depth | 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. control line |
| Dynamic seal system | Weatherford proprietary design nonelastomeric rod piston seal stack, verified in tests up to a 15,000-psi (103.5-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 |

[a] The maximum OD of the safety valve may be reduced by using higher yield strength outer housing materials.
[b] Other manufacturers' profiles are available upon request.
[c] Other setting depth options are possible upon request.