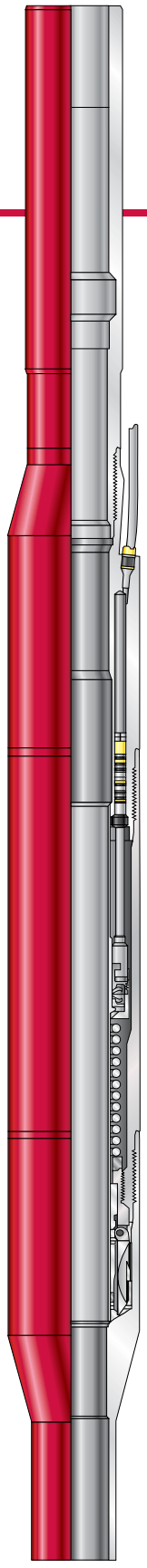
Weatherford®

Safety Systems

# *Optimax™ Series Tubing-Retrievable Surface-Controlled Subsurface Safety Valves*

## *Models WP(E)-5 and WP(E)-10*



Weatherford's *Optimax* models WP(E)-5 and WP(E)-10 tubing-retrievable surface-controlled subsurface safety valves (TRSCSSVs) are rod-piston, flapper-type safety valves designed to shut in a well in the event of uncontrolled flow caused by equipment failure or damage. An integral part of the completion string, each model is controlled by a single 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. In the unlikely event the safety valve malfunctions, Weatherford's *Optimax* WLT lockout tool and *Optimax* WCT control-line communication tool can be deployed to adapt the valve to accept the Weatherford's WIT-10 wireline-insert safety valve, thus minimizing disruption to production operations.

The models, like all *Optimax* series TRSCSSVs, are designed to maximize simplicity and reliability of operation. Both models have a premium piston with full-open and full-closed stop seals.

## *Applications*

- Fluid and gas environments
- High-pressure production and injection applications

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## *Models WP(E)-5 and WP(E)-10*

## *Features, Advantages and Benefits*

- Design, material, manufacturing, assembly, and test documentation retention in accordance with API Q1 and API 14A quality programs ensure design and manufacturing integrity and conformance to industry standards.
- Several features of the models maximize reliability:
  - The hydraulic control system has only two potential leak paths (the industry minimum).
  - Metal-to-metal premium housing connections are standard.
  - The non-elastomeric flapper soft seat reinforces the primary metal-to-metal seat for low-pressure seal integrity.
  - The simple design of the valves incorporates no sleeves, plugs, or other mechanisms that can be inadvertently actuated, causing premature control-line communication.
- The field-proven non-elastomeric dynamic seal system avoids fluid-compatibility and explosive-decompression issues, enhancing safety.
- Accessories can be deployed on slickline, avoiding complex operational requirements.
- The optimized safety valve design facilitates the use of control-line communication and lockout tools to insert a wireline-insert safety valve in the event of a malfunction, thus minimizing production disruption.
- The safety valve contains a premium piston mechanism for demanding gas or high-pressure applications.

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# *Optimax™ Series Tubing-Retrievable Surface-Controlled Subsurface Safety Valves*

## *Models WP(E)-5 and WP(E)-10*

## *Specifications*

| Model | WP(E)-5 | | | |
|---|---|---|---|---|
| Size (in./*mm*) | 2-3/8<br>*60.3* | 2-7/8<br>*73.0* | 3-1/2<br>*88.9* | 4-1/2<br>*114.3* |
| Maximum OD (in./*mm*) | 3.625<br>*92.075* | 4.610<br>*117.094* | 5.170<br>*131.318* | 6.925<br>*175.895* |
| Overall length (ft/*m*) | 5.1<br>*1.6* | 4.8<br>*1.5* | 5.5<br>*1.7* | 5.9<br>*1.8* |
| Standard sealbore (minimum bore) (in./*mm*) | 1.875<br>*47.625* | 2.313<br>*58.750* | 2.813<br>*71.450* | 3.813<br>*96.850* |
| Housing threads (in./*mm*)[a] | 3.300 and 2.400<br>*83.820 and 60.960* | 4.250 and 2.875<br>*107.950 and 73.025* | 4.687 and 3.500<br>*119.050 and 88.900* | 6.250 and 4.500<br>*158.750 and 114.300* |
| Working pressure (psi/*MPa*) | 5,000<br>*34* | | | |
| Test pressure (psi/*MPa*) | 7,500<br>*52* | | | |
| Standard nipple profile | Petroline® QN profile[b] | | | |
| Control-line connection | Industry-standard metal seal compression fitting for 1/4-in. *(6.35-mm)* control line | | | |
| Rated working temperature (°F/°*C*) | 30° to 300°<br>*–1° to 149°* | | | |
| Failsafe setting depth (ft/*m*) | 1,000<br>*305* | | | |
| Operating pressure, fully open (psi/*MPa*)[c] | 1,500<br>*10* | | | |
| Operating pressure, fully closed (psi/*MPa*)[c] | 500<br>*3* | | | |
| Dynamic seal system | Proprietary design non-elastomeric rod-piston seal stack, verified in tests to 10,000-psi *(69-MPa)* gas differential pressure at 300ºF *(149ºC)*[d] | | | |

[a]Weatherford premium threads.
[b]Other manufacturers' profiles available on request.
[c]Values shown are estimates, subject to verification.
[d]P feature safety valve also contains a non-elastomeric piston stop seal, which isolates the dynamic seals at the full-open and full-closed positions.

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# *Optimax™ Series Tubing-Retrievable Surface-Controlled Subsurface Safety Valves*

## *Models WP(E)-5 and WP(E)-10*

## *Specifications (continued)*

| Model | WP(E)-10 | | | |
|---|---|---|---|---|
| Size (in./*mm*) | 2-3/8<br>*60.3* | 2-7/8<br>*73.0* | 3-1/2<br>*88.9* | 4-1/2<br>*114.3* |
| Maximum OD (in./*mm*) | 3.625<br>*92.075* | 5.110<br>*129.794* | 5.810<br>*147.574* | 7.470<br>*189.738* |
| Overall length (ft/*m*) | 5.1<br>*1.6* | 4.8<br>*1.4* | 5.5<br>*1.7* | 6.1<br>*1.9* |
| Standard sealbore (minimum bore) (in./*mm*) | 1.875<br>*47.625* | 2.313<br>*58.750* | 2.813<br>*71.450* | 3.813<br>*96.850* |
| Housing threads (in./*mm*)[a] | 3.300 and 2.400<br>*83.820 and 60.960* | 4.250 and 2.875<br>*107.950 and 73.025* | 4.687 and 3.500<br>*119.050 and 88.900* | 6.250 and 4.500<br>*158.750 and 114.300* |
| Working pressure (psi/*MPa*) | 10,000<br>*69* | | | |
| Test pressure (psi/*MPa*) | 15,000<br>*103* | | | |
| Standard nipple profile | Petroline® QN profile[b] | | | |
| Control-line connection | Industry-standard metal seal compression fitting for 1/4-in. *(6.35-mm)* control line | | | |
| Rated working temperature (°F/°*C*) | 30° to 300°<br>*–1° to 149°* | | | |
| Failsafe setting depth (ft/*m*) | 2,000<br>*610* | | | |
| Operating pressure, fully open (psi/*MPa*)[c] | 2,000<br>*14* | | | |
| Operating pressure, fully closed (psi/*MPa*)[c] | 1,000<br>*7* | | | |
| Dynamic seal system | Proprietary design non-elastomeric rod-piston seal stack, verified in tests to 10,000-psi *(69-MPa)* gas differential pressure at 300ºF *(149ºC)*[d] | | | |

[a]Weatherford premium threads.
[b]Other manufacturers' profiles available on request.
[c]Values shown are estimates, subject to verification.
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## *Models WP(E)-5 and WP(E)-10*

## *Specifications (continued)*

| Model | WP(E)-5 and WP(E)-10 |
|---|---|
| Standard metallic materials[a] | |
| Housing and internal components | 9 chrome, 1 moly or 13% minimum chrome; 80,000-psi *(552-MPa)* minimum yield |
| Flapper and seat | INCONEL® |
| Power spring, piston rod, flapper pin, and torsion spring | MP 35 N |
| Tubing thread connection | As requested |
| Design and manufacturing compliance | API Q1 and API 14A |
| Class of service | API 14A 3S2 |

[a]All materials heat-treated in accordance with NACE MR 01 75.

## *Options*

- An optional internal through-the-flapper self-equalizing feature simplifies safety valve operation while ensuring reliability.

## *Available Accessories*

- *Optimax* WLT lockout tool
- *Optimax* WCT control-line communication tool
- *Optimax* WIT-10 wireline-insert safety valve



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