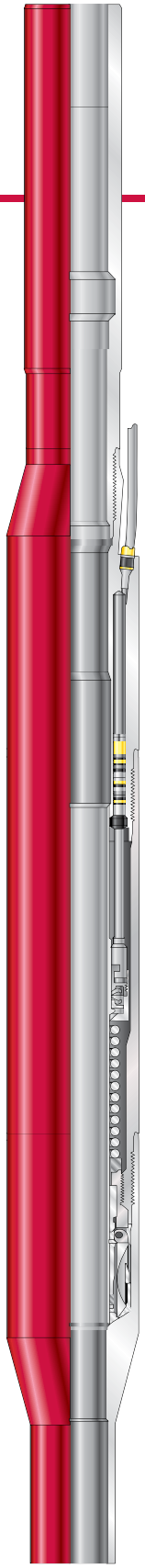
Weatherford®

Safety Systems

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

Model WSSP(E)-5



Weatherford's *Optimax* model WSSP(E)-5 tubing-retrievable surface-controlled subsurface safety valve (TRSCSSV) is a rod-piston, curved flapper-type safety valve 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, the WSSP(E)-5 TRSCSSV 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 model WSSP(E)-5 valve, like all *Optimax* series TRSCSSVs, is designed to maximize simplicity and reliability of operation. Through application of optimized design, the radically contoured flapper mechanism, and use of high-yield, corrosion-resistant alloys, this super-slim valve provides the smallest OD for any given bore, or the largest bore for any given OD. The premium piston has full-open and full-closed stop seals.

Applications

- Fluid and gas environments
- Production and injection applications

Weatherford International Ltd.
515 Post Oak Blvd., Suite 600
Houston, Texas 77027 USA
Tel: 713-693-4000
weatherford.com

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

Model WSSP(E)-5

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.
- Super-slim flapper technology enables a smaller OD than equivalently sized, curved-flapper safety valves, which permits installation in smaller casing strings than standard slim-line valves and accommodates bypass lines.
- Several features of the model WSSP(E)-5 valve 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 this valve 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.

Weatherford International Ltd.
515 Post Oak Blvd., Suite 600
Houston, Texas 77027 USA
Tel: 713-693-4000
weatherford.com

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

Model WSSP(E)-5

Specifications

Size (in./*mm*)	4-1/2 *114.3*	7[a] *177.8*	
Maximum OD (in./*mm*)	5.982 *151.943*	8.375 *212.725*	8.900 *226.060*
Overall length (in./*cm*)	103 *262*	113 *287*	
Housing threads (in.)[b]	5.495 and 4.500	7.625 and 7.000	8.125 and 7.625
Working pressure (psi/*MPa*)	5,000 *34.47*		10,000 *68.95*
Test pressure (psi/*MPa*)	7,500 *52.72*		15,000 *103.42*
Standard nipple profile	Petroline® QN profile[c]		
Control-line connection	Industry standard metal seal compression fitting for 1/4-in. control line		
Rated working temperature (°F/°*C*)	30° to 300° *–1° to 149°*		
Failsafe setting depth (ft/*m*)	1,000 *305*	2,000 *610*	
Operating pressure, full open (psi/*MPa*)	1,000 *6.9*	2,000 *13.8*	
Operating pressure, full closed (psi/*MPa*)	500 *3.4*	1,000 *6.9*	
Dynamic seal system	Proprietary design non-elastomeric rod-piston seal stack, verified in tests to 10,000-psi *(68.9-MPa)* gas differential pressure at 300°F *(149°C)*[d]		
Flapper soft seal	Proprietary design of filled plastic material to provide a reliable low-pressure seal, verified in tests to 10,000-psi *(68.9-MPa)* gas differential pressure at 300°F (*149°C).*		

[a]Contact Weatherford for availability.
[b]Weatherford premium threads.
[c]Other manufacturers' profiles available on request.
[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.

Weatherford International Ltd.
515 Post Oak Blvd., Suite 600
Houston, Texas 77027 USA
Tel: 713-693-4000
weatherford.com

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

Model WSSP(E)-5

Specifications (continued)

Standard metallic materials[a]	
Housing and internal components	25% chrome or equivalent, 120,000-psi *(827.4-MPa)* minimum yield
Internal components	9 chrome, 1 moly, or 13% chrome, 80,000-psi *(551.6-MPa)* minimum yield
Flapper and seat	INCONEL® 718
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, 3C2, and 4

[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

Weatherford International Ltd.
515 Post Oak Blvd., Suite 600
Houston, Texas 77027 USA
Tel: 713-693-4000
weatherford.com

