



Weatherford®

Safety Systems

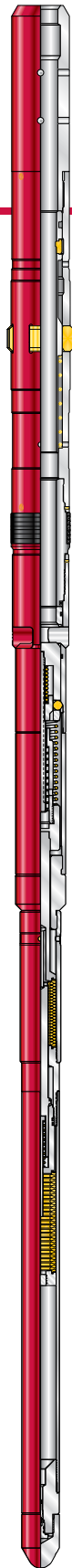
Wireline-Retrievable Subsurface-Controlled Subsurface Safety Valve Models PB and HP-PB

Weatherford's Model PB and Model HP-PB safety valves are wireline-retrievable, poppet-type, subsurface-controlled subsurface safety valves, available in 3,000 psi (20.6 MPa) and 10,000 psi (68.9 MPa) operating pressure variants. There is no setting depth limitation associated with this design. Each valve model is tubing-pressure sensitive and can be adjusted to close at a pre-set tubing pressure. Weatherford's subsurface-controlled, gas-lift valve technology has been applied to create a Nitrogen dome-charged, bellows-operated safety valve which can be adjusted to close at a predetermined tubing pressure between 50 psi (0.344 MPa) and 10,000 psi (68.9 MPa).

Each valve model is normally open and will remain in this position in the well to allow production to flow to the surface. If well control is compromised, the tubing pressure will fall to a predetermined pressure where the valve is set to close. Following closure, each model is designed to automatically "re-cock" and re-open as soon as equalization is achieved, either by pressuring the tubing string or deploying a wireline equalizing prong. The safety valve is then automatically returned to the open position. Each valve model has no setting depth limitation and can be installed in any existing seating nipple or, by utilizing the PB Packer, set in tubing strings with damaged or no pre-existing nipple profiles.

These valve models are particularly suited for installation in tubing-retrievable safety valves that have suffered control-line failure, offering the advantage that communication is not required.

The Model PB valve has an operating range of 50 to 3,000 psi (0.344 to 20.6 MPa); the Model HP-PB valve has an operating range of 100 to 10,000 psi (0.689 MPa to 68.9 MPa). The standard safety valve lock for the Model PB and Model HP-PB safety valves is the Optimax™ OQXSV lock, which is a large-bore version of the Petrolite® QX lock. This ambient pressure safety valve, however, can be configured to accept any manufacturer's lock.





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Applications

- Fluid and gas environments
- Production and injection situations where a barrier is needed to flow

Features, Advantages and Benefits

- Design, material manufacturing, assembly, and test documentation retention are in accordance with API Q1 and API 14A quality programs and are certified to OCS/API specifications, ensuring integrity to industry standards.
- Several features of the Model PB and Model HP-PB safety valves maximize reliability, safety, and repeatable performance:
 - These valves are wireline installed and retrieved.
 - Each model offers a large flow area with no flow through the internal working parts of the safety valve.
 - Since closing force is transmitted through the liquid-filled bellows, there are no hydraulic seals.
 - The operating bellows protection unit is self-contained.
 - The valve's snap-action closure avoids valve disc “throttling” in the flow stream.
 - With the appropriate test stand, the safety valve can be field tested and reset.
 - These safety valves can be retrofitted in wells with no existing hydraulic control line or emergency shut down (ESD) system. Since each valve model is subsurface controlled, there is no practical setting-depth limitation.
 - Each valve model can be adapted to any manufacturer's lock or tubing plug.
 - Re-opening the valve is accomplished in-situ, either by applying pressure down the tubing string or with an “equidapter” sub fitted by a wireline-deployed equalizing probe.



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Specifications

PB Technical Data*

Tubing Nominal OD (in./mm)	Maximum Valve OD (in./mm)	Minimum Nipple Required (in./mm)	Minimum Tubing ID around Valve (in./mm)	Seat ID (in./mm)	Minimum Flow Area (in./mm)	Part Number
2.375 60.325	1.750 44.450	1.875 47.625	1.845 46.863	0.875 22.225	0.601 15.265	281005
2.875 73.025	2.250 57.150	2.312 58.725	2.358 59.893	1.250 31.750	1.227 31.166	281010
3.500 88.900	2.500 63.500	2.750 69.850	2.878 73.101	1.625 41.275	2.074 52.680	281015
4.500 114.300	3.000 76.200	3.812 96.825	3.606 91.592	2.000 50.800	3.141 79.781	281020
5.000 127.000	3.718 94.437	4.125 104.775	4.480 113.792	2.500 63.500	4.908 124.663	281025

HP-PB Technical Data*

Tubing Nominal OD (in./mm)	Maximum Valve OD (in./mm)	Minimum Nipple Required (in./mm)	Minimum Tubing ID around Valve (in./mm)	Seat ID (in./mm)	Minimum Flow Area (in./mm)	Part Number
2.063 52.400	1.406 35.712	1.625 41.275	1.454 36.932	0.625 15.875	0.307 7.798	77540
2.375 60.325	1.625 41.275	1.710 43.434	1.845 46.863	0.875 22.225	0.601 15.265	281056
2.875 73.025	2.135 54.229	2.188 55.575	2.358 59.893	1.250 31.750	1.227 31.166	281061
3.500 88.900	2.500 63.500	2.562 65.075	2.878 73.101	1.625 41.275	2.074 52.680	281065

* Contact Weatherford for availability.