

Zenith tubing drain valves for PCPs

Protect PCPs with reliable, effective fluid management

Applications

- PCP wells with high sand cut, entrained coal fines or suspended debris in well fluids
- PCP wells producing heavy oil and high viscosity fluids

Features and benefits

- Safeguards pumping equipment from damage or blockage caused by descending debris when pumps are shut down
 - Diverts fluid and entrained solids from the production tubing to annulus when flow to surface stops
 - Annular piston rises once fluid column drops to a customer-defined differential head, closing off ports
- Prohibits backspin, shaft or rotor breakage at start up
- Protects from pumpoff and running dry
- Shields internal components of the valve from abrasive content in the fluid column
- Prevents losses from downtime, deferred production, and time required to pull, clean, and rerun the completion
- Simplifies backflush operations with a specialist design for PCP wells, reducing downtime and workover costs.

Debris suspended in the fluid column descending into progressing cavity pump (PCP) systems following a shutdown can result in a complete loss of production. The efficient fluid management system in **Zenith™ tubing drain valves (TDV)** effectively safeguards pumping equipment from damage or blockage caused by high sand cut, coal fines and entrained solids each time the pump is shut down.

The **Zenith tubing drain valve for progressing cavity pumps (TDV-PCP)** is a tubing-mounted downhole tool installed as part of a PCP completion. The TDV-PCP protects the pump from debris settlement and prevents pump off by diverting fluid from the production tubing to annulus when flow to surface stops.

In addition, the TDV-PCP with backflush capability is designed to allow the pump rotor to be retracted and reset without running out of the hole, simplifying backflush operations.

TDV-PCP operation

1. Pump on

The valve is installed above the stator, allowing passage of well fluids upward through production tubing to the surface.

2. Pump shutdown

The valve immediately shuts off the flow path through the pump, opening annular ports to divert the fluid column from upper tubing into the annulus along with any debris.

3. Backflush

Retract the rotor to clear the stator then flush fluids and chemicals down the tubing through the stator. On completion of backflush, run the rotor back to depth. Pump operation can recommence.

4. Natural flow

Retract the rotor to clear the stator, allowing natural flow through the stator and tubing to surface. To return to artificial lift operations, run the rotor back to depth.



Specifications	TDV-PCP (2-7/8 in.)	TDV-PCP (3-1/2 in.)
Product number	12350025202	12350026202
Upper thread	2-7/8 in. x 6.5 lb/ft EUE box	3-1/2 in. x 9.2 lb/ft EUE box
Lower thread	2-7/8 in. x 6.5 lb/ft EUE pin	3-1/2 in. x 9.2 lb/ft EUE pin
Annulus flow area	12 in ² (77.4 cm ²)	12 in ² (77.4 cm ²)
Tubing flow area	3.9 in ² (25.2 cm ²)	5.4 in ² (34.8 cm ²)
Maximum outside diameter	4.615 in. (11.7 cm)	5.200 in. (13.2 cm)
Minimum internal diameter	2.230 in. (5.7 cm)	2.625 in. (6.7 cm)
Overall length	60.61 in. (153.9 cm)	59.93 in. (152.2 cm)
Makeup length	58.49 in. (148.6 cm)	56.90 in. (144.5 cm)
Differential pressure rating (internal)	5,000 psi (345 bar)	5,000 psi (345 bar)
Differential pressure rating (external)	1,200 psi (See note 1)	1,200 psi (See note 1)
Differential tubing actuation pressure	625-850 psi (43-59 bar) (See note 2)	558-750 psi (38.5-52 bar) (See note 2)
Torque rating (reverse)	2,250 lb/ft	3,030 lbs/ft
Flow rate	0 – 5,000 B/D (0 – 794 m ³ /d)	0 – 5,000 B/D (0 – 794 m ³ /d)
Temperature	302°F (150°C)	302°F (150°C)
Metallurgy	4140-80 ksi, 22 HRc max.	4140-80 ksi, 22 HRc max.
Elastomers / polymer	Viton and PTFE	Viton and PTFE

Notes:

1. When the tubing actuation pressure has been applied and the locking piston sheared, the TDV-PCP loses the ability to hold external pressure.
2. The internal pressure rating of the tool is initially limited to this shear value. When sheared, the internal pressure rating is 5,000 psi but per note 1 above, no external pressure can be held as the TDV-PCP will pump open.