

Self-Fill Tubing Tester Valve (SF-TTV)

The Expro SF-TTV is a flapper-type self-filling tubing tester valve which provides a means of filling and pressure testing the tubing string whilst running in the hole. The unique, patented bi-directional tubing-to-tubing bypass means the flapper never leaves its seat, therefore is protected from debris and washout. This valve provides for an unlimited number of string pressure tests and is locked out of service leaving an unobstructed full through bore. Also, unlike conventional flapper-type TTVs, forward circulation is possible.

The tubing-to-tubing bypass design means the string is not compromised when pulling from a seal-bore packer and allows drain back of mud during heave conditions on floating vessels; thus promoting a safe operating environment when making connections and avoiding non-productive (rig-) time (NPT). In HP/HT applications an upper and lower SF-TTV can be deployed, with lower valve used to test the DST tool bottom hole assembly (BHA) and the upper valve isolating the BHA, including pressure-temperature gauges, from unnecessary multiple high pressure tests on the tubing string.

Specifications:

Working pressure		15,000 psi / 103.42 Mpa
Working temperature ¹		350°F / 177°C
Max. OD		5.00 in / 127 mm
Min. ID		2.25 in / 57.2 mm
Upper thread connection	Standard (Premium)	3 1/2-in. API IF box (3 1/2-in PH6 box)
Lower thread connection	Standard (Premium)	3 1/2-in. API IF pin (3 1/2-in PH6 pin)
Tensile strength lbf (daN)		350,000 (155,600)
Torque strength ft-lbs (N m)		10,000 (13,550)
Make-up torques ft-lbs (N m)	Service breaks	4,000 (5,420) max.
	Tool connection ²	6,000 (8,130) max.
Tool length ³ ft (m)		8.61 (2.624)
Approximate tool weight lb (kg)		428 (194)
Service ⁴		H ₂ S per NACE MR-01-75;CO ₂

1. Standard seal trim. Premium seal trim for 15,000 psi (103.42 MPa) up to 450°F (232°C)
2. Torque for standard connections. Refer to manufacturer's torque recommendation for premium connections
3. Make-up length (shoulder-to-shoulder)
4. CO₂ and acid tolerant. Limits determined by application

Operation:

The SF-TTV is run with the flapper pinned closed and is situated as close to the packer or locator-seal assembly as practicable to allow all connections between the flapper and the packer/locator seals to be tested prior to installing in the BHA. The fully assembled BHA and the test string can now be pressure tested as many times as required whilst running in hole by pumping down the tubing at 1.5 to 2.2 bbl/min, which creates the required back-pressure to close the flapper bypass. When tubing pressure is bled to zero, a spring returns the flapper assembly to the run-in-hole (self-filling) position. When the final string pressure test has been completed the SF-TTV can be permanently locked open by applying pressure to the annulus (~500 psi) to burst a pre-selected rupture disk; this drives the flow mandrel upwards, opening the flapper before locking out. This can be programmed before or after setting the packer, or stabbing seals, depending on the well's status.

