

TRIV-H™ Injection Sleeve w/VOi™ Insert

TRSV w/Differential Hydraulic Actuation



Applications:

- Injection Wells
- Mild to severely corrosive environments
- Injection Wells
- Injection rates to 70,000 bpd [11,129 m³/day]
- Wells requiring injection pressure to 10,000 psi [68,948 kPa]

Benefits:

- Enables dual-barriers for subsea BOP removal
- Eliminates the need for external control lines to the surface
- Replaces expensive deep-set Safety Valves
- Prevents uncontrolled well flow and surge
- Eliminates flapper throttling
- Reduces erosion from high rate injection flow
- Maximizes injection rates
- Provides low differential back-pressure

Features:

- Tubing retrievable
- Subsurface controlled
- Wireline retrievable variable orifice choke
- Minimum pressure drop over entire injection rate range
- Erosion resistant materials in flow path
- Proven hard/soft seat flapper seal
- Orifice automatically adjusts in response to flow rate
- Designed in accordance with API 14A
- Metal to metal body joints

Description:

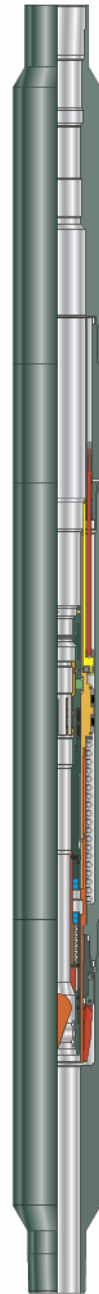
The Tejas tubing retrievable injection valve with hydraulics, or TRIV-H, is a subsurface controlled, injection safety valve that features the patent-pending Tejas VOi™ variable orifice insert. It is designed to prevent injection fluid from surging or flowing back out of the well when not actively injecting.

The TRIV-H hydraulic piston feature enables pressure integrity confirmation of the TRIV-H flapper and lower completion barrier valve (dual barriers) prior to removal of surface safety equipment. The hydraulic piston harnesses tubing pressure cycles to achieve the necessary operational sequence for run-in and pressure testing. After pressure testing, flow alone actuates the TRIV-H flapper ensuring the lower completion barrier valve can be cycled repeatedly until re-opened without any potential for hydraulic lock.

The design of the TRIV-H provides a reliable, extremely versatile system that is virtually maintenance free. Together with the VOi™, the TRIV-H provides full well integrity without the necessity of running a control line to the valve. The TRIV-H features metal-to-metal body joints and incorporates our proven flapper and hard/soft seat designs.

The TRIV-H, along with the wireline retrievable VOi™ choke system, are designed to provide a 20-year service life. The valve and insert have unlimited setting depths and are available in a wide variety of material selections that are suitable for both severely corrosive and highly erosive environments associated with water-injection applications.

The TRIV-H and VOi™ combination is designed to allow high flow injection rates without the need for a separate control system. The large-bore geometry provides the most efficient injection safety valve available on the market. The TRIV-H and VOi™ are designed to cover the entire range of injection rates up to 70,000 bpd [11,130 m³/d] and 10,000 psi [68,948 kPa] working pressure. The system is also capable of downhole temperatures ranging from 32 to 325 deg F [0 to 161 deg C].



TRIS™ Sleeve
Open Position



Q1-0099

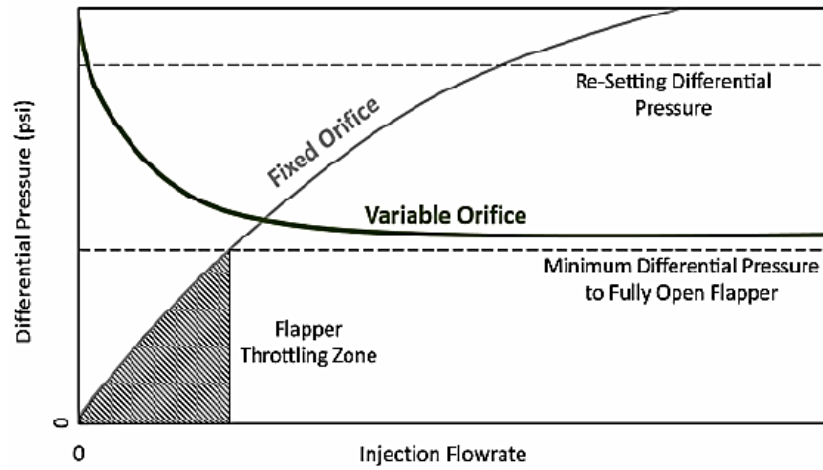
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TRSV w/Differential Hydraulic Actuation



VOi™ Insert
Closed
Position

Variable vs. Fixed Orifice
Insert Performance



Unlike conventional fixed-orifice injection safety valves, the variable orifice insert provides a constant, low back-pressure during injection regardless of the rate. The VOi™ also incorporates a patent-pending design that ensures the flapper valve in the TRIV-H is completely opened before any fluids are injected into the reservoir. This significantly increases the operational life of the TRIV-H by eliminating the potential for flapper damage and throttling associated with low-flow conditions found in conventional fixed-orifice designs.

The TRIV-H features several internal profiles for contingency operations if needed. The valve offers a wide variety of upper lock profiles for isolation, an upper flow tube exercise profile, and a lower flow tube profile for thru-tubing temporary lock-out. The system is also certified under the American Petroleum Institute (API) Specification 14A.

Engineering Data:

Tubing Size in [mm]	Max OD in [mm]	Min ID in [mm]	Working Pressure psi [kPa]	Tensile Strength lbf [kN]	Upper Landing Nipple		VOi Landing Nipple	
					Bore in [mm]	Type	Bore in [mm]	Type
4.500 [114.3]	6.765 [171.8]	3.668 [93.7]	10,000 [68,947]	475,000 [2,113]	3.812 [96.8]	DB	3.688 [93.7]	RJT
5.500 [139.7]	8.300 [210.8]	4.500 [114.3]	10,000 [68,947]	832,000 [3,701]	4.562 [117.5]	DB	4.500 [114.3]	RJT

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† The engineering data provided illustrate the scope of this product offering and are not all inclusive. Additional sizes and pressure ratings are available upon request.

Direct request for quotations to: product.sales@tejasre.com