

# TRC-II Series Safety Valves

## APPLICATION

- Sweet to severely corrosive environments with temperatures from 40 degF to 300 degF [4 degC to 149 degC]

## BENEFITS

- Substantially extends the effective life of the completion
- Improves the operating life cycle and reliability
- Decreases the need for a high-pressure control system
- Provides setting-depth and control-system flexibility
- Lowers operating pressure and reduces control system costs
- Provides increased reliability and long life in hostile environments
- Is proven in all control line fluids typically available

## FEATURES

- Redundant actuation hydraulic systems
- Integral control fluid filter system
- All-metal, premium body joints
- Tubing pressure insensitivity
- Computer-calibrated operating pressures
- Patented rod-piston actuators
- Disconnect-type rod piston with debris-insensitive check-dart system
- Spring-energized, filled Teflon® piston seals
- Reliable nose seal technology and a proven full metal-to-metal sealing
- Inconel® flapper mechanism

Deepset, low-operating pressure, dual independent hydraulic piston, flapper valve with working pressures to 15,000 psi [103,425 kPa]

The TRC-II\* valves, which build on the reliable, unsurpassed TRC-DH design, are reduced-operating-pressure valves that perform effectively at depths where other technologies are ineffective. Because these valves can be run at depths greater than 12,000 ft [3,658 m], they can be positioned below the hydrate- or paraffin-deposit regions to increase operating efficiency. All TRC-II valves provide complete operating redundancy, with two separate and complete operating piston systems connected by individual control lines. Either piston system can fully operate the valve at hydraulic pressures that are substantially lower than those required by conventional valve designs. TRC-II safety valves provide an exceptionally reliable and versatile product for deepset and low-operating-pressure applications.

The field-proven TRC-II design also permits the precise matching of the operating parameters of the valve to the actual well conditions before the valve is installed. A proprietary Schlumberger computer program predicts the operating pressure of the valve for a specific application, and an integral gas-powered spring is set at the factory to the pressure calculated to match the well conditions.

Incorporating the best of the laboratory- and field-proven Schlumberger technologies, TRC-II valves feature rod-piston actuators insensitive to tubing pressure, a rugged flapper-closure system with a leakage-acceptance criterion substantially more stringent than API and ISO specification. They also incorporate a minimum number of critical, dynamic, and static seals; a 5-micron filtered control fluid filter; and a gas-powered spring to offset the hydrostatic control line pressure.

The design of the TRC-II series allows a maximum number of material and design options to fit specific applications. TRC-II valves are available with working pressures to 15,000 psi [103,425 kPa], setting depths exceeding 12,000 ft [3,658 m], dual independent rod pistons, permanent lock open, and intelligent completion control conduit applications.

Schlumberger also offers a special optional ScaleGard\* surface treatment that minimizes the buildup of solids on internal surfaces. This treatment is particularly effective in environments where severe scaling occurs.



TRC-II series safety valve.

# TRC-II Series Safety Valves

## VALVE OPERATION

The TRC-II valve is normally closed. It is opened by applying hydraulic pressure through a control line that extends from the safety valve through the wellhead to the control panel. The hydraulic pressure from the control panel moves the rod piston down to compress the power spring and open the valve. The dual control lines may be used simultaneously or independently without affecting the opening and closing pressure of the valve. The opening and closing pressures are totally independent of the tubing pressure and only have to overcome the force of the power spring to operate the valve.

When hydraulic pressure from the surface control panel is released, the energy for valve closure comes from the power spring and a separate gas-powered spring for each piston system. With the flow tube in the up, or closed, position, the flapper torsion spring moves the flapper into the flow stream to close and shut in the well.

The operating pressure is set at a level that matches the annulus pressure and control system limitations. This process utilizes well-specific data, including temperature, to assure fail-safe operation.

## LOCKOUT OPERATION

Due to the customized nature of the TRC-II valves and the extreme setting depths at which these valves may be used, Schlumberger recommends contacting your local representative for specific lockout procedures for each application.

## Specifications

Tubing Size <sup>†</sup> (in. [mm])	Valve Type	Max OD (in. [mm])	Nipple Bore (in. [mm])	Working Pressure (psi [kPa])	Tensile Strength <sup>‡</sup> (lbf [kg])
4.500 [114.3]	TRC-II-10	7.437 [188.9]	3.812 [96.8]	10,000 [68,950]	493,000 [223,575]
	TRC-II-15	7.875 [200.0]	3.562 [90.5]	15,000 [103,425]	667,000 [302,484]
5.500 [139.7]	TRC-II-10	8.418 [213.8]	4.562 [115.9]	10,000 [68,950]	641,147 [290,760]

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

<sup>‡</sup> Tensile ratings are given for specific example valves; higher-strength materials affect this value. Tensile ratings shown are exclusive of end connection (EOEC) and at ambient temperature.

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