

# FIV-II

## Formation isolation valve

### APPLICATIONS

- Bidirectional barrier for well control
- Fluid loss control
- Well suspension and temporary abandonment operations
- Completion fluid placement
- Multizone and intelligent completions
- Openhole and cased hole sand control operations
- Underbalanced perforating

### BENEFITS

- Enhances well productivity by preventing formation damage and minimizing fluid loss
- Saves rig time and costs by reducing interventions
- Increases safety by providing a downhole barrier against pressure reversals

### FEATURES

- Ability to function in differential pressure conditions
- Bidirectional-pressure-sealing ball
- One-time opening with tubing pressure cycles
- Ability to open and close multiple times mechanically before Trip Saver\* one-time remote-opening mechanism is activated
- Optional lockout feature
- API 19V/ISO 28781 V3 and Q1, C barrier valve qualified; API 19V monogram available<sup>†</sup>

The FIV-II\* formation isolation valve is a bidirectional barrier valve that isolates reservoir fluids in the lower completion. Based on award-winning technology for offshore safety innovation, this versatile valve enables operators to have a high level of confidence in formation isolation.

The sealing ball design is a larger version of the field-proven Schlumberger HPHT drillstem test ball valve. The FIV-II valve has a higher differential pressure rating than a flapper-type fluid loss prevention device.

Enhanced features provide added flexibility and increased debris tolerance and reliability compared with previous designs. The valve meets and exceeds API 19V/ISO 28781 V3 standards.

### Wide range of applications

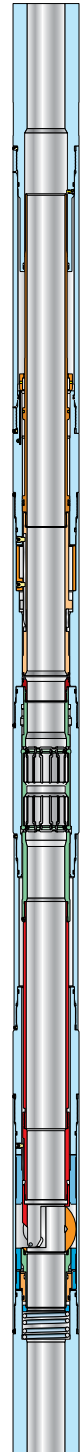
The bidirectional barrier enables operators to transition seamlessly—without intervention—from the lower completion to the upper completion. The FIV-II valve works with all isolation requirements and applications: intelligent, multizone, gravel-pack, frac-pack, and stand-alone screen completions; and suspension and temporary abandonment of a well.

The valve is suitable for deepwater and other harsh environments, such as those created by underbalanced perforating and openhole and cased hole sand control operations.

### Opening and closing mechanisms

The patented Trip Saver one-time remote-opening mechanism eliminates the need for an intervention to open the valve one time. Cycles of tubing pressure are applied against the closed valve in a number predetermined by an integral indexing mechanism. When the opening cycle is reached, the Trip Saver mechanism provides the actuation energy to open the valve. The mechanism allows the operator to pressure test the tubing, set and test the packer, and test the tubing hanger before reestablishing communication with the reservoir. The FIV-II valve is available with either a 10- or a 15-cycle Trip Saver mechanism, the 15-cycle version enabling greater flexibility in completion operations.

Before the Trip Saver mechanism is actuated, the FIV-II valve can be opened and closed mechanically multiple times using a shifting tool run at the end of washpipe, a perforating string, or coiled tubing. When the shifting tool passes through the valve, it engages the shifting profile and the ball closes or opens the valve. Subsequently the shifting tool unlatches from the latch collet of the valve and is retrieved together with the washpipe. Two tools are available. The STC-6 shifting tool has an optimized ID for maximum flow rate through the tool, while the STR-6 tool has a smaller OD to enable it to pass through restrictions in the completion string. An emergency release is also available.



FIV-II formation isolation valve.

In addition, the ReSOLVE\* instrumented wireline intervention service features shifting tools that can be used to open and close the FIV-II valve. The service provides real-time monitoring, dynamic tool control, and verified downhole actuation.

## Qualification

The FIV-II valve benefits from a qualification procedure that exceeds the API 19V/ISO 28781 V3 requirements. For example, it is qualified with gas to a zero-bubble leak rate across the ball sealing mechanism from below

under specified conditions. This tight acceptance criterion surpasses the requirements that must be satisfied to use the valve as a barrier for well intervention operations and for well suspension.

## Optional features

The FIV-II valve is available with a permanent lockout feature, which is activated after the Trip Saver mechanism is activated. It permanently locks the mechanical section of the valve in the open position, preventing inadvertent valve closure. The valve can be designed with extension lengths ranging from 3 ft to 9 ft, the standard being 6 ft.

### FIV-II Valve Specifications

Size (OD × ID), in [mm]†	Differential pressure rating (body), psi [kPa]	Differential pressure rating (ball), psi [kPa]	Max. temperature, degF [degC]
5.500 × 2.940 [139.7 × 74.68]	9,000 [62,053]	6,000/9,000 [41,369/62,053]	300 [148.9]
5.785 × 3.110 [146.9 × 78.99]	8,000/6,000 [55,158/41,369]	7,500/6,000 [51,711/41,369]	300 [148.9]
7.630 × 3.700 [193.8 × 93.98]	8,000 [55,158]	5,000 [34,474]	300 [148.9]
7.750 × 4.060 [196.9 × 103.12]	5,000 [34,474]	5,000 [34,474]	200/211 [93.3/99.4]
7.850 × 4.060 [199.4 × 103.12]	7,500 [51,711]	7,500 [51,711]	250 [121.1]
8.188 × 4.060 [208.0 × 103.12]	5,000 [34,474]	5,000 [34,474]	200/211 [93.3/99.4]
8.000 × 4.560 [203.2 × 115.82]	6,000/5,000 [41,369/34,474]	6,000/5,000 [41,369/34,474]	300/311 [148.9/155.0]
8.270 × 4.560 [210.1 × 115.82]	7,500 [51,711]	5,000 [34,474]	300 [148.9]
9.000 × 5.300 [228.6 × 134.62]	5,000 [34,474]	5,000 [34,474]	325 [162.8]

†Other sizes and temperature and pressure ratings available on request. Contact your local Schlumberger representative.

### STC-6 Isolation Valve Shifting Tool Specifications

Size, in [mm]†	Max. (Collet) OD, in [mm]	Completion Drift ID, in [mm]	ID, in [mm]
2.650 × 1.219 [67.3 × 30.96]	2.946 [74.8]	2.645 [67.2]	1.219 [30.96]
2.940 × 1.270 [74.7 × 32.26]	3.293 [83.6]	2.920 [74.2], 2.935 [74.6]	1.270 [32.26]
3.110 × 1.421 [79.0 × 36.09]	3.404 [86.5]	3.095 [78.6]	1.421 [36.09]
3.700 × 2.250 [94.0 × 57.15]	3.994 [101.5]	3.695 [93.9]	2.250 [57.15]
4.060 × 2.545 [103.1 × 64.64]	4.324 [109.8]	4.053 [103.0]	2.545 [64.64]
4.250 × 2.406 [108.0 × 61.11]	4.864 [123.6]	4.243 [107.8]	2.406 [61.11]
4.560 × 2.465 [115.8 × 62.61]	4.934 [125.3]	4.560 [115.8]	2.465 [62.61]
5.300 × 3.500 [134.6 × 88.90]	5.564 [141.3]	5.295 [134.5]	3.500 [88.90]

†Other sizes and temperature and pressure ratings available on request. Contact your local Schlumberger representative.

### STR-6 Isolation Valve Shifting Tool Specifications

Size, in [mm]†	Max. (Collet) OD, in [mm]	Completion Drift ID, in [mm]	ID, in [mm]
2.650 × 0.500 [67.3 × 12.70]	2.949 [74.9]	2.310 [58.7]	0.500 [12.70]
2.940 × 0.500 [74.7 × 12.70]	3.244 [82.4]	2.640 [67.1]	0.500 [12.70]
3.110 × 0.500 [79.0 × 12.70]	3.404 [86.5]	2.870 [72.9]	0.500 [12.70]
3.700 × 1.000 [94.0 × 25.40]	3.994 [101.5]	3.095 [78.6]	1.000 [25.40]
4.060 × 0.750 [103.1 × 19.05]	4.324 [109.8]	3.695 [93.9]	0.750 [19.05]
4.250 × 0.750 [108.0 × 19.05]	4.864 [123.6]	3.818 [97.0]	0.750 [19.05]
4.560 × 1.125 [115.8 × 28.57]	4.934 [125.3]	3.993 [101.4]	1.125 [28.57]
5.300 × 2.000 [134.6 × 50.80]	5.594 [142.1]	4.818 [122.4]	2.000 [50.80]

†Other sizes and temperature and pressure ratings available on request. Contact your local Schlumberger representative.