

# WELL DEFENDER multiactivation drilling valve

Delivers specialized lost circulation materials (LCM) and preventative borehole stress treatments

## Where it is used

- Alternative circulation path
- Lost circulation control
- Cementing
- Well construction (borehole stress treatment)
- Performance drilling

## How it improves wells

This low-complexity, high-reliability tool enhances hole cleaning, enables cuttings-bed movement, and reduces drilling NPT.

## How it works

When the activation ball lands on the seat, flow through the drilling assembly stops. The positive force of the rig pump pushes the activation ball against the spring-loaded sliding sleeve to open the exit ports, enabling flow through the tool to the annulus. When pumping has been completed, the rig pump is stopped and the spring-loaded sleeve deenergized to close off the exit ports. To regain flow to the drilling assembly, the deactivation ball is landed and pressure is built up to 1,600 psi [110 bar]. Both the activation and deactivation ball expel from the drilling valve into the side-pocket mandrel ball catcher. Full access through the drilling valve and the bypass ball catcher is available to recover radioactive sources.



### Typical Physical Properties

Drilling hole size range, in	5 $\frac{1}{8}$ –6 $\frac{1}{4}$	8 $\frac{1}{4}$ –10 $\frac{5}{8}$	10 $\frac{1}{2}$ –14 $\frac{1}{4}$	≥12 $\frac{1}{4}$
Model	475	675	825	950
Size, in	4 $\frac{3}{4}$	6 $\frac{3}{4}$	8 $\frac{1}{4}$	9 $\frac{1}{2}$
Circulation ports and size, in [mm]	3 × 1.0 [25.4]	3 × 1.25 [31.75]	3 × 1.4 [35.56]	3 × 1.40 [35.56]
Maximum total flow area (TFA), in <sup>2</sup> [mm <sup>2</sup> ]	2.356 [1,520]	3.681 [2,374]	4.618 [2,979]	4.618 [2,979]
Minimum TFA, in <sup>2</sup> [mm <sup>2</sup> ]	2.23 [1,438]	3.17 [2,045]	4.63 [2,987]	4.63 [2,987]
Activation ball OD, in [mm]	1.75 [44.45]	2.115 [53.72]	2.500 [63.50]	2.500 [63.50]
Deactivation ball OD, in [mm]	1.698 [43.13]	2.063 [52.40]	2.448 [62.18]	2.448 [62.18]
Deactivation ball pressure, psi [bar]	1,500 [103]±25%	1,500 [103]±25%	1,600 [110]±25%	1,600 [110]±25%
Pressure drop at maximum flow rate, psi [bar]	20 [1.37]	76 [5.2]	80 [5.5]	80 [5.5]