

CENTURION Circulating Valve

CCV

Critical drilling operations demand multiple capabilities such as flow splitting, reverse circulation and fluid displacement. The advanced CENTURION Circulating Valve (CCV) WELLBORE PRODUCTIVITY* tool from M-I SWACO* performs many functions, including spotting Lost-Circulation Material (LCM) pills, boosting annular flow velocities, pulling dry pipe and flow-splitting during drilling.*

Features

- Generous port flow-through area
- Multiple open/close cycles (14 balls)
- Available in a range of sizes for various drilling string configurations

Benefits

- High circulation rates do not cause the tool to function prematurely
- Prevents coarse LCM from entering sensitive Bottomhole Assembly (BHA) elements such as LWD/MWD, etc.
- Optional ball or wireline access below the tool is possible, even after it has been activated
- Eliminates risk of dropping wrong size ball
- Reverse circulation possible through tool



The CCV can be used in the drilling or precompletion phases of a well when high circulation rates or an alternative flow path is required.

How It Works

The tool can be run in hole or pulled out of hole with the ports locked open/closed and will remain in the same position until activated by dropping a ball. The same size of activation ball is used to open and close the tool and the only limit on the number of cycles is the capacity of the ball catcher.

When run with the Bypass Ball Catcher (BBC), other ball-drop tools can be run below the CCV. The design of the BBC allows smaller balls to be dropped past the tool and continue down the string to operate the other tools. Wireline access (e.g., to retrieve a radioactive source from a stuck BHA or to run a gyro survey) is also possible (depending on the size and configuration of the tool string) through the CCV/BBC combination.

Advantages

No complicated ball/dart sequence or potentially problematic pump on/off hydraulic sequencing is required to open and close the tool. Use of unique ball-seat technology allows the same-size ball to open and close the tool, eliminating the risk of dropping the wrong size ball. In addition, high circulation rates will not cause the tool to function prematurely. Removal of cuttings beds in high-angle/horizontal wells is possible through boosting of annular velocities.

Operation

When run with the Bypass Ball Catcher, other ball-drop tools can be run below the CCV. The design of this Bypass Ball Catcher allows smaller balls to be dropped past the tool and continue down the string to operate the other tools.

The CCV can be run or pulled out of hole, with the ports locked open or closed and remains in that position until activated by dropping a ball. The same size activation ball is used to open and close the tool, and the only limit on the number of cycles is the capacity of the ball catcher. The CCV is normally positioned above the BHA or small-diameter drillstring.

When spotting coarse LCM, a lower ball seat is installed in the tool whereby the flow to the bit is shut off by dropping a special “shut-off” ball to this seat after opening the tool (Figure 2).

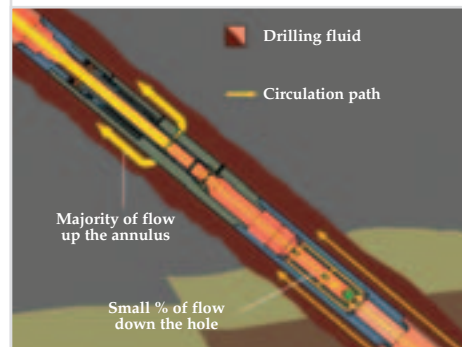


Figure 1.

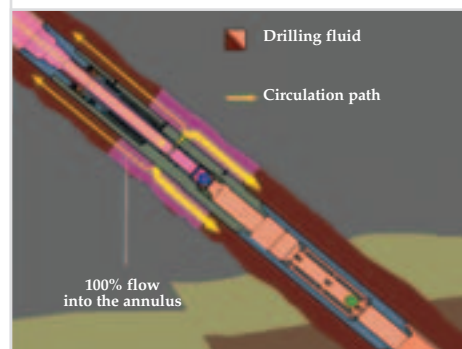


Figure 2.

Operating Parameters

Tool size, OD	Maximum circulating rate or pressure when pumping balls		Maximum circulating rates		Opening and closing pressure psi (bar)
	Rate, gpm (L/min)	Pressure, psi (bar)	Open, gpm (L/min)	Closed gpm (L/min)	
4½	84 (318)	1,500 (103)	840 (3,180)	672 (2,544)	2,500 (172)
6½	126 (477)	1,200 (83)	1,050 (3,975)	840 (3,180)	2,000 (139)
8½	126 (477)	1,000 (69)	1,680 (6,359)†	1,344 (5,088)†	1,800 (124)
9½	126 (477)	1,000 (69)	1,680 (6,359)†	1,344 (5,088)†	1,800 (124)

These are general guidelines only and may be subject to review, if required, for individual circumstances.
 †Maximum circulating rates stated are for 18 lb/gal (2.16 kg/L) mud. Please contact your M-I SWACO representative at the planning stage of the well if the mud weight is heavier than 18 lb/gal (2.16 kg/L).
 The maximum surface circulating pressure must be no greater than the above values at these recommended pump rates.

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