

Check-Valve ICDs Save 20 Hours of Rig Time and Approximately USD 1 Million, Offshore Canada

ResFlow CV ICDs ensure completion string hydraulic integrity, eliminating washpipe run and enabling setting of two openhole hydraulic packers for zonal isolation

CHALLENGE

Maximize operational efficiency when setting openhole hydraulic packers for zonal isolation in a stand-alone screen completion.

SOLUTION

Deploy screens equipped with ResFlow CV* check-valve ICDs, which can hold up to 34-MPa [5,000-psi] tubing pressure.

RESULTS

Eliminated washpipe run and enabled packer setting, saving 20 hours of rig time and about USD 1 million.



Openhole hydraulic packer setting complicates screen completion

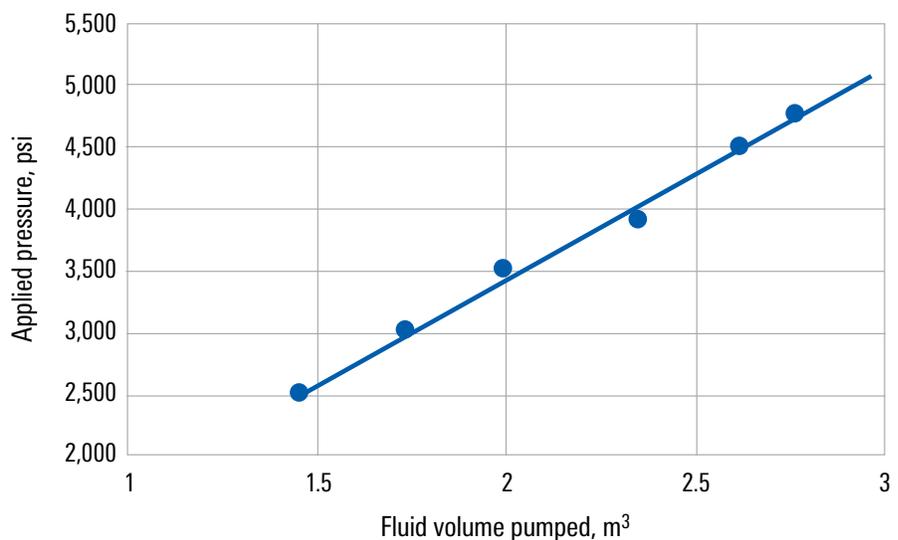
An operator offshore Canada had planned to complete an openhole interval of 1,260 m [4,134 ft] with LineSlot* premium direct-wire-wrapped screens equipped with inflow control devices (ICDs). Two openhole hydraulic packers would provide critical zonal isolation.

In preparation for setting the packers, polished bore receptacles (PBRs) had to be installed above and below each packer. Subsequently, isolating and setting the packers required a dedicated run with molded seal assemblies and washpipe before applying pressure from surface.

Check-valve ICDs minimize rig time, cost, and risk

Schlumberger proposed replacing the ICDs with ResFlow CV check-valve ICDs, which eliminate the need to deploy washpipe for circulation or well cleanup and enable setting of openhole hydraulically set packers. The check-valve assembly—comprising a ceramic nozzle, ceramic ball, and aluminum plate—can be dropped in to replace the standard ICD nozzle assembly within the ICD housing without any design changes to the screens.

During procedures such as fluid circulation to the toe of the well or application of pressure in the string to set hydraulic packers, the check valve helps ensure completion string hydraulic integrity. The ceramic ball closes the valve, preventing outward flow from the screen basepipe into the annulus through the nozzle.



The linear relationship between pressure applied at surface and volume of fluid pumped to set the openhole hydraulic packers confirms that the ResFlow CV ICDs successfully held the pressure with no leaks during packer installation.

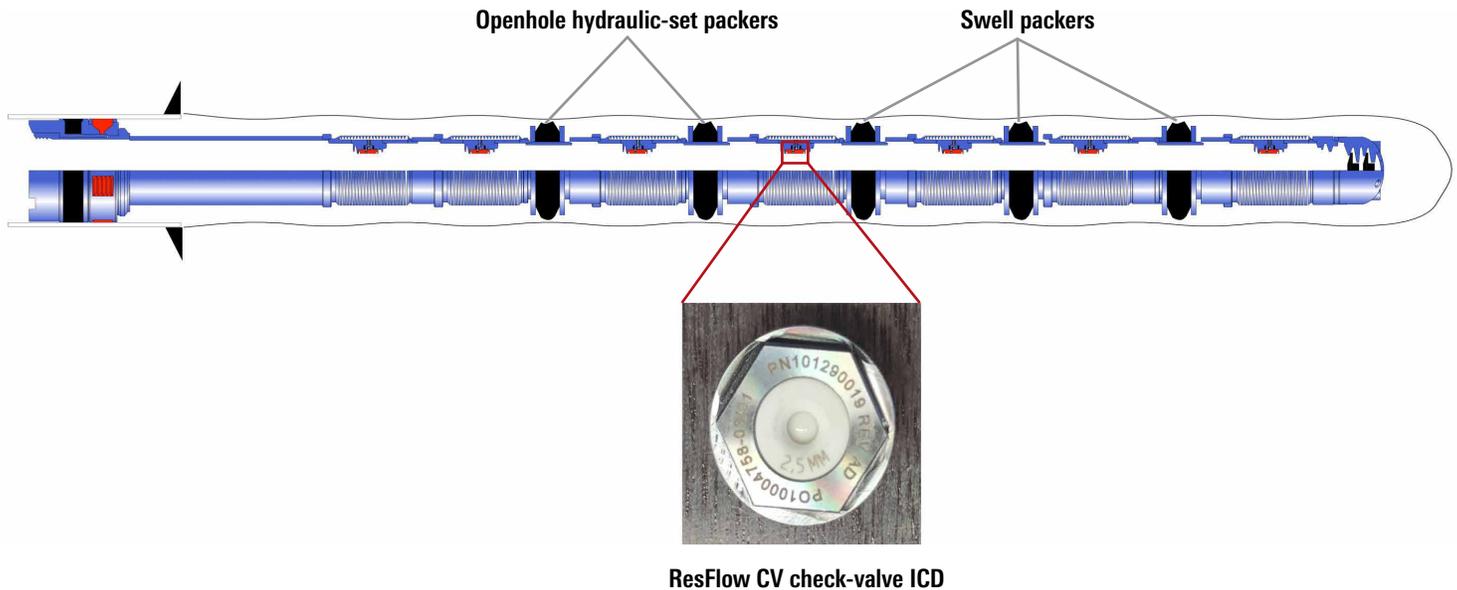
CASE STUDY: ResFlow CV ICDs hold 34-MPa hydraulic pressure and enable openhole packer setting, offshore Canada

Later, when the pressure is released or pumping stops, the ball drops back onto the plate, enabling fluid to flow into the tubing again. Subsequently, the ICD controls the flow of hydrocarbons during production in the same way as a conventional ICD. The ceramic ball flows back to surface once the plate is dissolved by mild acid or eroded by the production fluid. Eliminating washpipe runs reduces costs and improves operational efficiency, safety, and logistics.

Operator achieves zonal isolation and saves about USD 1 million

The lower completion of 1,427 m [4,682 ft] was run in with 31 screen joints, each equipped with four check-valve ICD assemblies. Subsequently, 34-MPa pressure was applied to set the packers; the ResFlow CV ICDs successfully held the pressure.

The streamlined process saved the operator 20 h of rig time and approximately USD 1 million. This was the first application of ResFlow CV ICDs in setting openhole hydraulic packers. The operator has since used this solution in a second well in the same field.



ResFlow CV check-valve ICDs replaced standard ICDs without any design changes to the screens.

slb.com/resflow