

EquiFlow[®] Density-Based Autonomous Inflow Control Device

PREFERENTIALLY PRODUCE OIL AND RESTRICT UNWANTED FLUIDS BASED ON DENSITY CONTRAST

OVERVIEW

Autonomous inflow control device (AICD) applications in oil producer wells have effectively managed unwanted fluids production and improved oil recovery since their deployment in the industry. During initial production, AICDs regulate the inflow along the wellbore. Upon breakthrough of unwanted fluids, the AICDs autonomously restrict the inflow of unwanted fluids from effective zones while stimulating oil production from the other well sections. Commercially available AICDs primarily operate by differentiating the viscosity contrast between oil and gas or water. In very-light-oil reservoirs, however, the viscosity contrast is not significant enough for conventional AICDs.

Halliburton developed the EquiFlow[®] Density-AICD (D-AICD), a novel class of AICDs that balances production flow and restricts unwanted production fluids, even with minimal viscosity difference between the produced fluids.

The innovative D-AICD differentiates the density contrast between produced fluids by buoyancy forces that are magnified with artificial gravity. This feature eliminates the need for downhole orientation in the completion. The D-AICD's centrifugal selector operates a valve to open or restrict production flow based on the density of downhole fluids.

The D-AICD performance has been demonstrated in computational numerical simulations and measured in testing. The flow loop test performance demonstrated substantial restriction of unwanted fluids based exclusively on density contrast.



HCT12140-004

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FEATURES

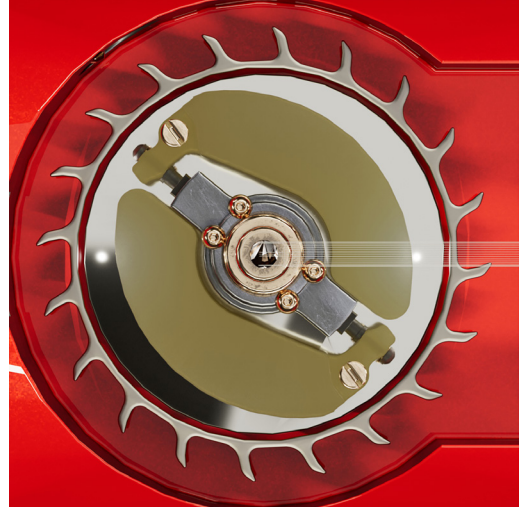
- » Independent of tubing orientation
- » High-flow-rate capacity at low-pressure differentials
- » Each device functions independently for precise response to the reservoir

OPTIONAL FEATURES

- » Sliding sleeve and a washpipe-free feature (pressure activated)
- » Cable bypass

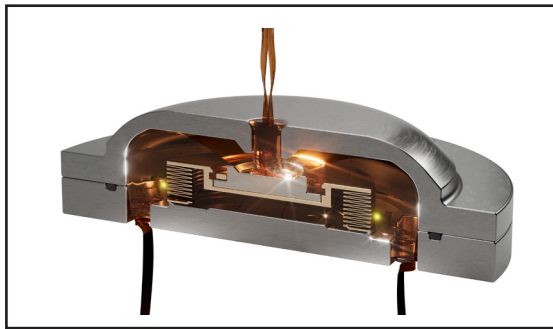
BENEFITS

- » Differentiates solely on density contrast
- » Maximizes ultimate recovery
- » Autonomously switches from oil to water and back to oil, as required



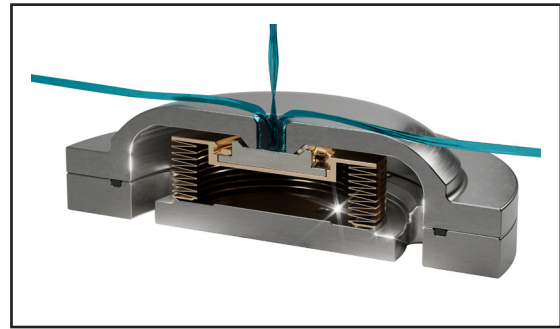
HCT2140-008A

Density AICD - Floats in Valve Closed



HCT2024-003

Density AICD Float Open



HCT2024-004

Density AICD Float Closed

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