

IntelliFlow™

ADVANCED ARRAY PRODUCTION LOGGING SERVICES

FEATURES

- » Cross-sectional velocity and phase profiling
- » Sensors co-located on the same arms
- » Phase measurements of optical, capacitance, and resistivity
- » Combinable with other Halliburton diagnostic tools
- » Sensors parallel to flow
- » Arm's opening diameter is adjustable
- » 1.72-in. maximum closed OD
- » Opens to 9 in.
- » Short length

BENEFITS

- » Offers in-depth fluid-phase analysis
- » Provides volumetric flow rate for each phase
- » Identifies gas, oil, and water holdups
- » Determines fluid velocities, distribution, and direction
- » Flow regime and entry point clarity
- » Service past small restrictions
- » Can pass through moderate to aggressive doglegs

OVERVIEW

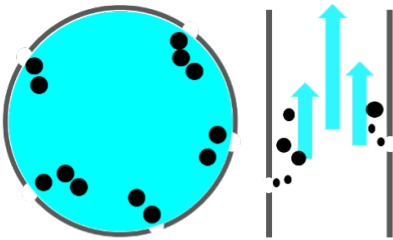
The Halliburton IntelliFlow™ advanced array production logging service tool provides accurate production profile information using co-located sensors placed in the flow stream of the wellbore. This technology measures flow features and captures changes in the production profile immediately where they occur upon input into the wellbore. The novel system uses discreet local fluid velocities and phase information circumferential to the wellbore. With multiple miniature sensors deployed on positioned arms, this array tool provides fluid velocities and direction along with phase information around the wellbore. The co-located sensors measure velocity by means of spinners and phase information using capacitance, resistivity, and optical sensors. This new production array provides clarity to changes in production from flow regimes to entry points. Flow testing verified characterization of tool and sensor response. When used in tandem with other Halliburton tools and analysis programs, this tool's inspection capabilities provide a detailed description of the production flow downhole.

Phase segregation occurs in many deviated and horizontal wells, including those with little deviation from vertical. The lighter phases migrate to the high side of the well and the heavier phases migrate to the low side. The individual phases flow at different velocities and potentially in different directions. Highly efficient miniature spinners are required to obtain the volumetric flow rate of each phase. These spinners use low-friction jeweled bearings and three wings to reduce the mechanical threshold and improve sensitivity to fluid flow. The tool determines the direction and speed of spinner rotation. Halliburton has incorporated a relative-bearing measurement to indicate the high side of the hole along with accelerometer measurements. The volumetric flow rates of phases using co-located sensors are accomplished with a higher degree of certainty to provide dynamic information for reservoir management.

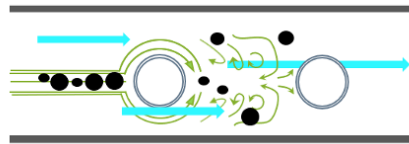


Specifications

Tool Size	1.72 in. (43.7 mm)
Maximum Borehole Diameter	9 in. (228.6 mm)
Pressure Rating	15,000 psi (103 MPa)
Temperature Rating*	350°F (177°C)
Number of Arms	6
Number of Sensors	24
Co-Located Sensors	Within 13.1 in. (0.33 m)



> Sensor placement is crucial to properly measure and capture changes as they occur during production.



> Sensors being placed in unaltered flow, which is important to achieve a stabilized measurement.

Sensor Information

CAPACITANCE (6)	0 to 40% Water Holdup
Accuracy	1%
Resolution	0.1%
RESISTANCE (6)	0 to 100% Water Holdup
Type	Galvanic (salinity)
OPTICAL (6)	Gas Phase (%)
Secondary	Bubble Count
Bubble Size	1-mm droplet
MICROSPINNER (6)	Threshold ≤ 10 ft/min (H ₂ O)
	4,000 ft/min (5-in. casing)

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

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