CAPACITANCE & RESISTIVITY ARRAY TOOL

The Capacitance & Resistivity Array Tool (CAT&RAT) consists of 6 miniature sensors installed around the tool on self-centralized rigid arms facing fluid flow at 45° covering the entire cross-section of the wellbore. Each sensor includes capacitance and resistivity probes (2 in 1). Additionally, the tool is equipped with an accelerometer for sensors positioning and a caliper for arms opening confirmation.

The tool is independently programmable for the duration of logging and fully compatible with other North Side PL tools and modules.

Applications

- 3D fluid phase mapping in highly deviated or horizontal trajectories with segregated flow regimes
- Cross-sectional water hold-up profile determination
- Waterflooding fields
- Water breakthrough determination based on resistivity (salinity) measurements

Advantages

- The circumferential distribution of 6 sensors allows obtaining the data across the 360° of the wellbore
- Advanced rigidity of the tool due to the titanium shaft pulled through the tool and thick arms
- Combined Capacitance & Resistivity in one tool allows shorter string and complex data acquisition
- Build-in accelerometer
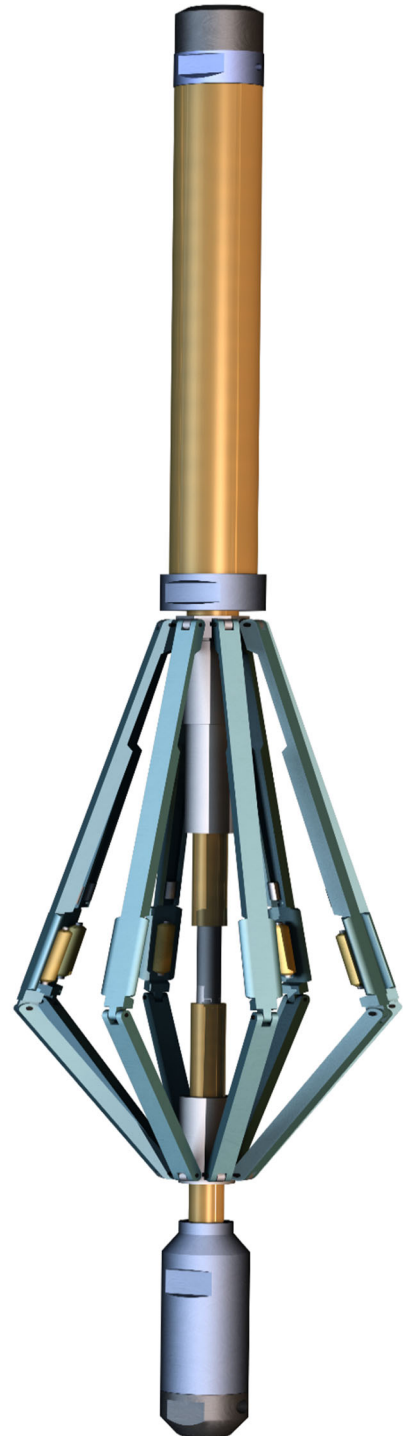
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Capacitance Array Module (6 sensors)	
Water cut	0-100%
Accuracy	±0.1%
Resistivity Array Module (6 sensors)	
Measurement error	Less than 1 ohm-m
Build-in Positioning Module (accelerometer)	
Axial rotation sensor	0-360°
Angle of inclination sensor	0-90°
Build-In Caliper	Yes
General Specifications	
Maximum operating pressure	14,500 PSI (100 MPa)
Maximum operating temperature	150°C (302°F)
Tool OD	1.65 in (42.0 mm)
Tool length	3.8 ft (1.15 m)
Tool weight	17.6 lbs (8.0 kg)
Connections	15/16 SR
Surface read-out / Memory	Fully autonomous (memory mode)
Operational time	Over 100 hours
H_2S resistance	6% standard (25% optional)

The combination of capacitance and resistivity array sensors in one tool allows the differentiation of wellbore fluid phase segregation as well as changes in water mineralization to determine the production from different intervals/reservoirs.