Enhanced Capacitance Water Holdup (CWH) tool

Measure the dielectric constant of the surrounding borehole fluid to determine the water holdup

Application

- Identify water entry into hydrocarbon flow
- Locate hydrocarbon/ water interface in shut-in well conditions
- Detect hydrocarbon entry into water
- Find top of water column in a production well
- Discover well fluids in multiphase
- Two phase production profiling
- Water holdup calculations
- Qualitative analysis of high GOR wells

Features

- Improved response compared with earlier generation capacitance sensors
- Simultaneous operation with other Baker Hughes **Ultrawire™ production logging tools**

The enhanced Baker Hughes **Capacitance Water Holdup (CWH) tool** measures the dielectric constant of the surrounding borehole fluid to determine the water holdup with improved response characteristics.

Borehole fluid enters a hollow tube that surrounds an insulated rod at the centre. The tube wall and the insulated rod form the electrodes of a capacitor. As hydrocarbons and water have different dielectric constants, the capacitance is a function of the dielectric constant of the fluid between the rod and wall of the tube. This capacitance is incorporated in the frequency determining circuitry of an oscillator. The frequency of the oscillator is therefore a function of the type of fluid that is present in the borehole.

The dielectric constant of water is 80, oil is around 10 and air has a value of 1. Salinity has minimal effect on tool measurement. The enhanced measurement has improved response characteristics particularly at water holdup values greater than 50%. The improved design also minimises the watering out effect that can, under certain circumstances, result in the tool continuing to read water even though the surrounding fluid has been replaced by hydrocarbons.

Specifications

Temperature rating	350°F (177°C)
Pressure rating	15,000 psi (103 MPa)
Tool diameter	1 11/16 in. (43 mm)
Tool length	26.2 in. (666 mm)
Tool weight	9.5 lb (4.3 kg)
Toolbus	Ultrawire production logging tool
Current consumption	17 mA
Accuracy	1.0% (approx.)
Resolution	0.1%
Acquisition time	1 sec (typ)
Effective range	0 to 40% water holdup
Materials	Corrosion resistant throughout