



QL40-IP

The tool is a combination of a quadruple spacing normal resistivity and dual spacing induced polarisation probe measuring the electrical resistivity, self potential and chargeability of rocks. A high chargeability response is an indication of the presence of metallic sulphides and oxides or cation-rich clays.

Equipped with an injection electrode and 4 sense electrodes with spacings of 8", 16", 32" and 64" users can log resistivity profiles with different depth of investigation and gain information about permeability, porosity, water quality and geological formation properties.

Simultaneous measurement of Spontaneous Potential (SP), Single Point Resistance (SPR), 8"- 16"- 32"- 64" Normal Resistivity and Induced Polarisation (IP)!

Real time recording and display of entire current injection and decay cycles (full waveform digitization of electrode voltage and injection current with downhole real time digital processing)!

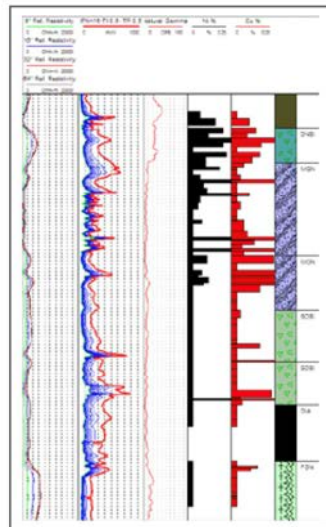
User defined cycle timing (custom 'On' and 'Off' times for IP measurements)!

Full measurement range and accuracy is achieved without the need of manual range switching!

Innovative Quick Link technology allows combination with other measurements (e.g. GR, Verticality, Caliper)!

Application

Determination of water quality, indication of permeable zones and porosity;
 Bed boundary positions and facies changes;
 Indication of mineralisation;



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Principle of measurement

A low frequency alternating square wave current with an 'Off' time between positive and negative parts of the waveform is transmitted from the injection electrode into the formation and returned through the cable armour above the isolation bridle.

The ratio of the secondary voltage measured during the current 'Off' time and the primary voltage measured during 'On' time is related to the electrical polarisation of the rock. This chargeability is measured in time domain at the 16" and 64" sense electrodes. Measurements are taken in ten separate time windows during the decay period.

Potential measurements at selected times in the waveform at the sense electrodes are made with reference to a surface electrode ('fish'). The measurements are converted into apparent formation resistivity within the probe and digitally transmitted to the surface unit. SP voltage and SP Resistance are measured between injection electrode and reference at the surface.

Measurements / Features

Chargeability in [mv/V]
 8", 16", 32" and 64" Normal Resistivity in [Ohm-m]
 SP in [mV]
 SPR in [Ohm]

Operating Conditions

Open Borehole,
 Water filled,
 Centralization not necessary,
 Runs on multi conductor wireline as well as on mono conductor wireline (with isolation bridle).

Technical Specifications

Diameter: 43 mm (1.7")
 Length: 1.9 m (35")
 Weight: 9 kg (19.8 lbs)
 Max. temperature: 70°C (158°F)
 Max. pressure: 200 bar (2900 psi)

IP

Dual Spacing (16" and 64")
 Chargeability measured over 10 time windows per spacing
 Resolution: 1.2 μ V
 Input Impedance: 1.4 MOhm
 User defined cycle timing from 100ms - 4000ms (@ 1ms resolution)

Normal Resistivity & SPR

Range: 0.1 to 100,000 Ohm-m
 Accuracy: depends on measurement range e.g. below 1% of measured value from 1 to 5000 Ohm-m, below 5% of measured value from 5000 to 50000 Ohm-m
 Resolution: below 0.04% of measured value

SP

Range: \pm 18V
 Accuracy: \pm 2.5mV
 Resolution: 0.5mV

