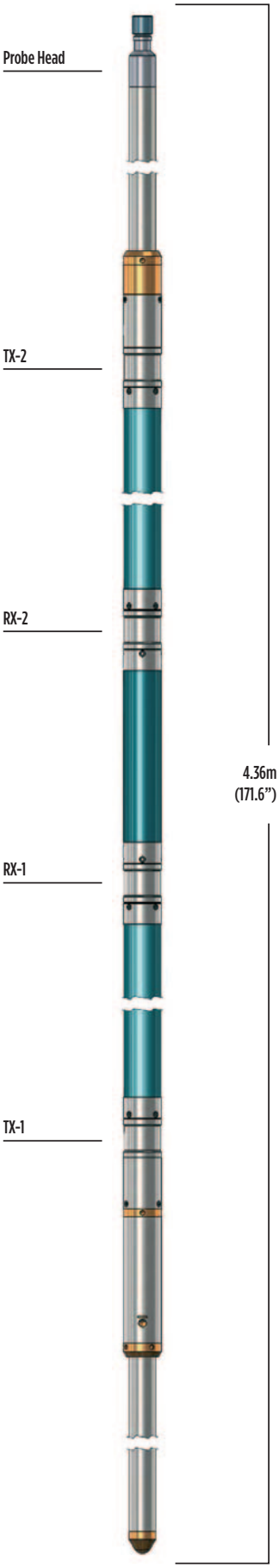
PROBES

FULL WAVEFORM SONIC



Full Waveform Sonic Probe

The Full Waveform Sonic probe uses a dual-transmitter dual-receiver array to provide high quality formation acoustic-velocity data.

Options are available for display of full-waveform data and cement-bond data (CBL) in cased boreholes.

Principle of Measurement:

A piezoelectric transmitter stimulated by a high-voltage pulse radiates a high-frequency acoustic wavelet. This is coupled via the borehole fluid and formation to each receiver. An accurate quartz clock measures the first arrival transit time. The first arrival in open hole corresponds to the p-wave path in the formation.

Full Waveform Sonic mode: Two pairs of transmitters and receivers are used to allow cancellation of the borehole fluid path and determination of formation velocity (slowness). The full sonic waveform from both receivers is displayed as a variable-density log (VDL) or waveform ('wiggle') trace.

Cement Bond Log (CBL) mode: The probe records the amplitude and arrival time of the first casing arrival at the near receiver and full sonic waveforms from both receivers.

GeoCAD® Sonic Module: This optional package allows shear wave slowness processing from the full waveform data. These can be combined with additional density data to determine elastic moduli. First arrivals and waveform amplitudes can also be determined by the CBL function to provide cement bond quality reports.

SPECIFICATION:

Features

- Down-hole digitisation of waveform data
- Compensation for poor centralisation or caving
- Variable density log (VDL) or wavelet ('wiggle') display

Measurements

- Formation velocity (slowness)
- Shear (S) velocity (where shear wave exists)
- Full waveform Time of first arrival (delta-t)
- Amplitude of first arrival (CBL)
- Integrated transit time
- Natural Gamma optional

Applications

Water / Minerals / Engineering

- Porosity
- Rock strength and elasticity (with density log)
- Correction of seismic velocity
- Fracture and permeability indication in hard rock
- Location of poor or missing cement behind casing

Operating Conditions

Borehole type:

Sonic:	open-hole, water-filled
CBL:	cased-hole, water-filled
Centralisation:	required
Recommended Logging Speed:	4m/min

Specifications

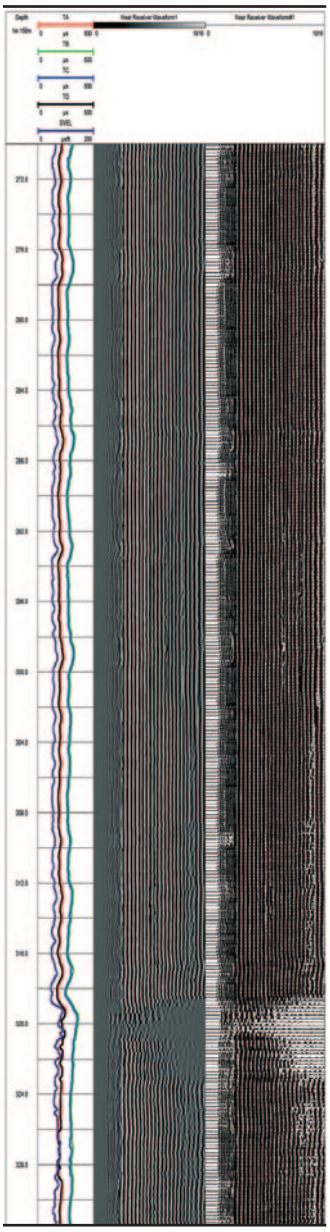
Diameter:	60mm
Length:	4.36m (4.78m with gamma)
Weight:	30kg (33kg with gamma)
Temperature:	0-70°C (extended ranges available)
Max. pressure:	20MPa

Part Numbers

I002128	Full Waveform Sonic probe with CBL

GeoCAD® Sonic Module

I020983	GeoCAD® Sonic Module



Example of logging data

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