

FWS 50/68

Full Wave Form Sonic



GENERAL SPECIFICATIONS

Terraplus is providing a full waveform sonic tool which has been specifically designed for the water, mining and geotechnical industries. Its superior specification makes it ideal for cement bond logs, for the measurement of permeability index, and as a specialist tool to carry out deep fracture identification.

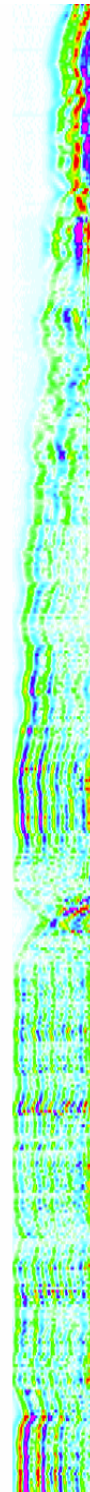
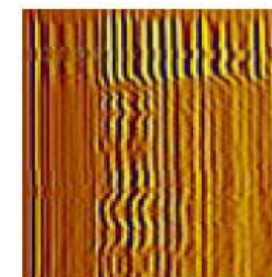
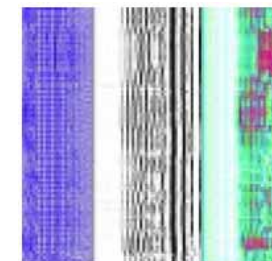
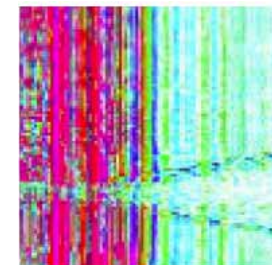
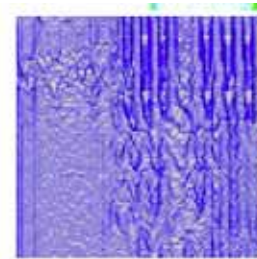
Principle of operation:

During logging a series of high frequency sonic impulses are emitted by the tool. Following their passage through the borehole fluid and formations, these impulses are detected by receivers at various distances from the transmitter. At each receiver the arriving waveform is digitally sampled according to a set of predefined tool configuration parameters (sample rate, sampling period, gain). The digitized waveforms are subsequently transmitted to the surface acquisition and recording system.

Advantages of the tool include:

- High energy of transmission to give a greater depth of penetration or longer spacing.
- Lower frequency of operation for greater penetration, especially for the CBL.
- Ability to record a long wave train for Tube wave train reflection that allows for the measurement of fracture aperture and permeability index.
- The absolute value of the amplitude of the received waveform is measurable thus allowing for the calibration of the amplitude.
- Truly modular construction allowing variation of receiver/transmitter combinations.
- Higher logging speeds when used in conjunction with the Matrix Logger acquisition system due to the superior rate of data communication possible.

Typical tool configuration



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Log parameters

- Full wave form per receiver*
- Formation velocity (slowness-porosity)*
- Shear (S) velocity (we recommend more than 2 receivers in that application)
- Time of first arrival (delta-t)*
- Amplitude of first arrival (CBL)*

*Real time process

Applications

Sonic logs are widely used (in combination with certain other logs) to provide formation porosity and mechanical properties data. Under suitable acquisition conditions shear wave and slower (eg. Stoneleigh) arrivals can be detected. The tool will only function in fluid-filled hole and is normally run centralized. Logging speed depends to some extent on the tool configuration but is generally in the range 4 to 6 meters/minute

- Cased -hole
Location of poor or missing cement behind casing
- Open-hole
Lithology identification
Porosity
Rock strength and elasticity (Poisson's ratio)
Fracture and permeability indication in hard rock

Technical specifications

Diameter:	50mm / 68 mm
Length:	variable depending on configuration Typical : 2.6m
Weight:	variable –typical 18kgs
Max temp:	70°C (158°F)
Max pressure:	200 bar (3000 PSI)
Borehole diameter:	minimum 60mm/78mm
Logging speed:	typically 4 to 6 m/min

Cable

Cable type:	mono, four-conductor, seven-conductor
Digital data transmission:	40 80Kbps per second depending on wire line
Compatibility:	Matrix or MGXII

Sensors

Transducers:	ceramic piezoelectric with 20Khz (50mm) or 15 KHz (68mm) resonant frequency
Number of Transmitters:	1 or 2
Number of receivers:	2 to 8
Spacing:	variable All traces synchronously and simultaneously recorded
Frequency of sonic wave:	20KHz (50 mm) or 15 KHz (68 mm).
Sonic wave sampling rate:	Configurable, min. 2.0 µSec.
Sonic wavelength:	Configurable, up to 1024 samples per trace.
Sonic wave dynamic range:	12 bits plus configurable 4-position gain with AGC mode.

The specifications are not contractual and are subject to modifications without notice.