

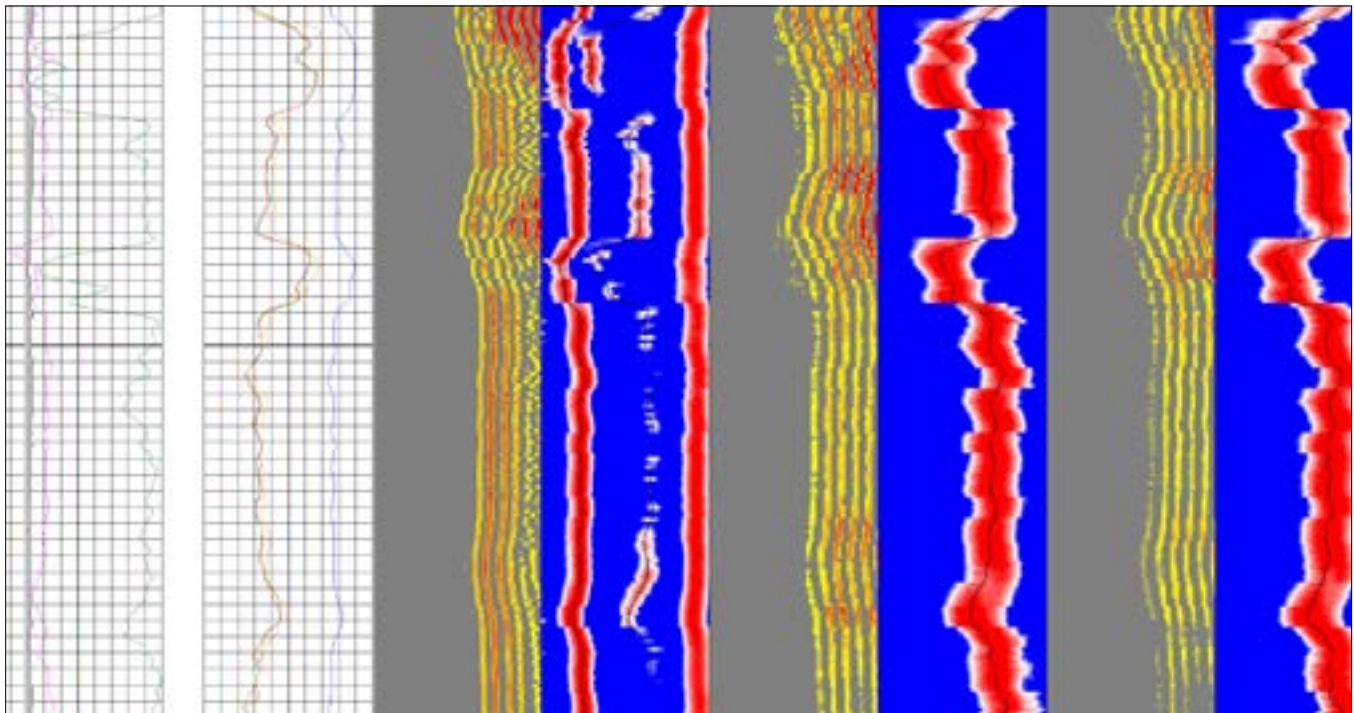
The Cross Dipole Sonic (CDS) tool measures the formation compressional and shear slowness in both fast and slow formations and records full waveform data from which shear anisotropy, geomechanical and geophysical properties, permeability and fractures can be detected and quantified.

The CDS is a multi-mode acoustic logging tool with four user-selectable modes that can be run together on a single pass: high frequency monopole (for compressional and fast shear determination), low frequency monopole (for Stoneley analysis), X-Y dipole (for shear determination in both fast and slow formations) with in-line and off-line receivers (for shear anisotropy analysis). The dipoles can be run at one of three frequencies in order to optimise data quality in different slowness ranges.

- Formation and reservoir characterization - determine location, orientation and intensity of natural fractures
- Evaluate hydraulic fractures - provide the direction, vertical extent and degree of induced fracture anisotropy

**Features:**

- Dipole waveforms for shear and anisotropy evaluation
- Monopole Compressional, Shear and Stoneley waveforms
- Four user-selectable modes (as described above)
- Eight receivers spaced 6" (152.4mm) apart, each with four azimuthal segments separated by 90deg
- Co-located X and Y dipole transmitters.
- A unique isolator design minimizes any signals travelling up the tool from transmitter to receiver.
- Selectable Waveform gain, sample rate and waveform length
- Fully compatible with Sondex Ultrawire\* tools for Open-Hole and Cased-Hole applications



Processed CDS data showing the monopole, XX, and YY waveforms and semblance



Specifications	
Maximum OD	4.0 in (101.6 mm)
Makeup length	29.72 ft (9.06 m)
Weight	670.2 lb (304 kg)
Maximum temperature	302° F (150° C)
Maximum pressure	20,000 psi (137.9 Mpa)
Minimum hole	6.0 in (152 mm)
Receivers	32 – (8 receivers spaced 6" apart, each with 4 azimuthal segments)
Transmitters	Low frequency Monopole (1-2 kHz) High frequency Monopole (6-15 kHz) X-Y dipole (1.2 kHz, 1.5 kHz, 2.3 kHz)
Borehole Conditions	
Borehole Fluids	Fresh, Salt, oil
Maximum logging speed	30 ft/min (9 m/min)
Tool position	Centralized
Measurements	
Accuracy	+/- 2usec/ft or 2%
Vertical resolution	6 in (standard processing)
Sample rate	10, 20, 40 usec (selectable)
Range	Compressional slowness: 40-250 usec/ft Shear slowness: 75-700 usec/ft Stoneley slowness: 160-700 usec/ft
Primary curves	Compressional, Shear and Stoneley slowness
Secondary curves	Monopole & Dipole waveforms
Hardware & Power Requirements	
Tool Bus	Ultrawire*
Power	18VDC (200 mA)

Specifications courtesy of GE Oil & Gas



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