



Compact™ Cross-Dipole Sonic (CXD)

Weatherford's *Compact* cross-dipole sonic (CXD) tool combines monopole and cross-dipole sonic technology, providing acoustic data for a wide variety of geophysical, petrophysical, and geomechanical applications. The data obtained by the CXD tool assists in improving reservoir characterization and ultimately maximizes well and reservoir productivity.

The tool incorporates three high-powered transmitters—one monopole and two wideband, low-frequency, dipole transmitters perpendicular to each other. The receiver section has an array of eight receiver stations. Each receiver station consists of four gain-matched, piezoelectric hydrophones that are aligned with the dipole transmitters. Ninety-six, high-fidelity, wideband waveforms are recorded, ensuring excellent quality control.

Patented isolator technology prevents direct flexural wave transmission to the receivers through the tool body and provides a rugged tool for flexible conveyance.

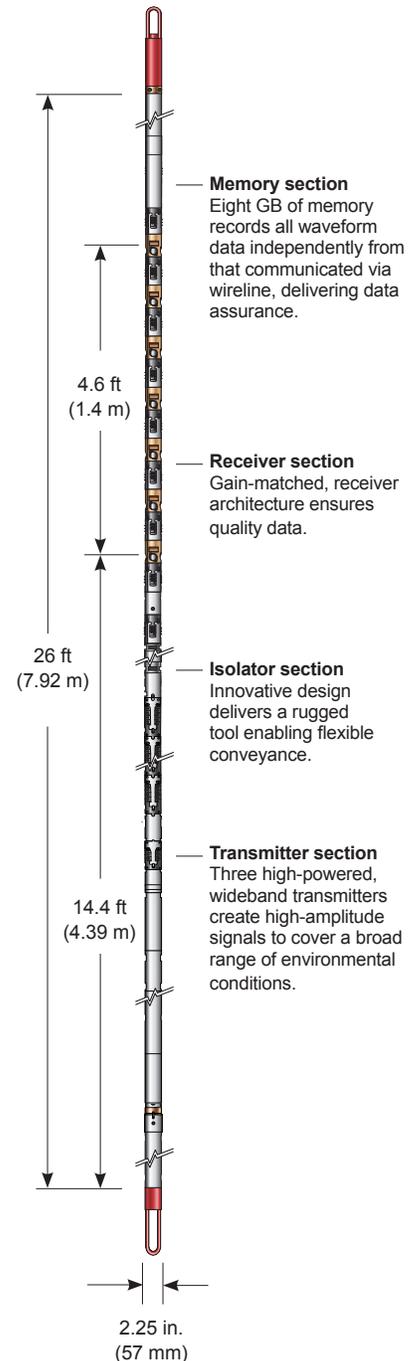
Anisotropic orientation data is produced by combining the CXD with either the *Compact* borehole navigation (MBN) tool or the *Compact* microimager (CMI) tool.

Applications

- Geophysics
 - Velocity calibration, time/depth conversion
 - Amplitude variation with offset (AVO) calibration
- Petrophysical
 - Porosity estimation and lithology
 - Gas identification
- Geomechanical
 - Anisotropic presence, magnitude, and orientation
 - Elastic properties
 - Hydraulic-fracture design
 - Sanding potential

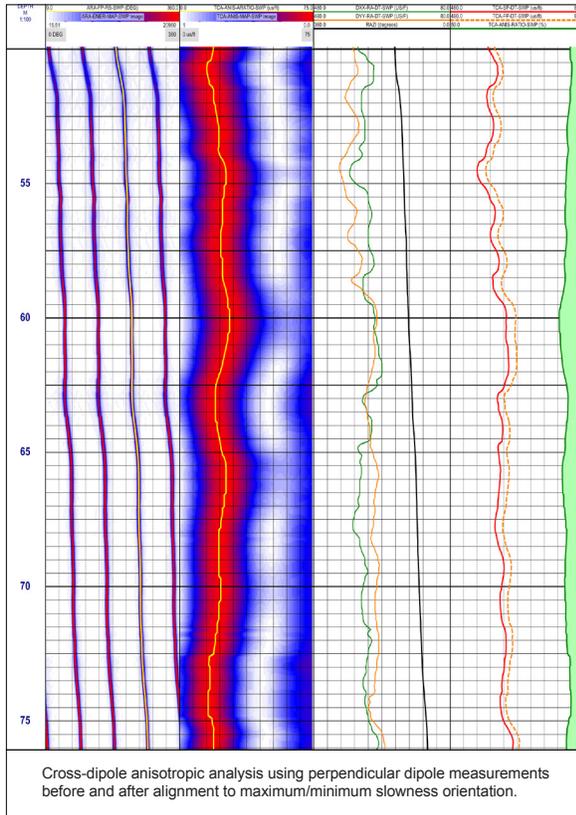
Features, Advantages and Benefits

- Proprietary transmitter and receiver design produces high-data quality over a broad range of environmental conditions.
- The small diameter and length of the tool facilitate flexible deployment, in wireline or memory mode, to mitigate the risk of bridging events and reduce nonproductive time.
- The CXD records all waveform data into flash memory, independently from the data communicated by wireline, for data assurance.



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Log Presentation



Specifications

Measurement specifications

Data	Compressional (P-wave), shear (S-wave) slowness, fast shear azimuth
Logging speed	1,800 ft/hr (9 m/min)
Measurement range compressional slowness	40 to 250 $\mu\text{s}/\text{ft}$ (130 to 820 $\mu\text{s}/\text{m}$)
Measurement range shear slowness	70 to 700 $\mu\text{s}/\text{ft}$ (230 to 2,300 $\mu\text{s}/\text{m}$)
Vertical resolution	4.6 ft (1.4 m) Enhanced = 0.7 ft (0.2 m)
Accuracy	$\pm 2\%$
Depth of investigation	9 in. (229 mm)
Borehole fluids	WBM OBM Salt

Mechanical specifications

Maximum outer diameter	2.25 in. (57 mm)
Length	26 ft (7.9 m)
Weight (in air)	239 lb (108.5 kg)
Maximum temperature	302°F (150°C)
Maximum pressure	15,000 psi (103 MPa)
Minimum borehole diameter	3.5 in. (89 mm)
Maximum borehole diameter	15.7 in. (400 mm)