DATA SHEET

HALLIBURTON

Formation Evaluation

Xaminer® Array Sonic Tool (XAST™) service

Crossed-dipole sonic tool

FEATURES

- Long-spaced monopole and broadband dipole sources for sonic slowness measurements in near and far fields
- Broadband 8-level, quad-receiver array
- Records all 128 waveforms per transmitter firing at surface
- On-depth, low-frequency bender-bar source
- Drillpipe-conveyed operation capability

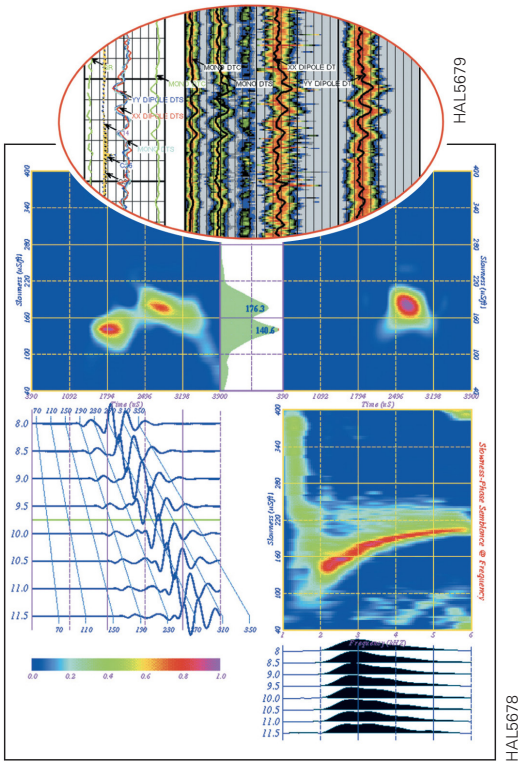
BENEFITS

- Enables accurate slowness measurements across a wide range of formation depths
- Delivers high-quality waveform data for advanced processing
- Captures complete waveform sets for improved subsurface analysis
- Enhances operational flexibility through seamless tool integration
- Provides a clean source signal, eliminating need for dispersion corrections and depth shifting

Overview

The Xaminer® Array Crossed-Dipole Sonic Tool makes it easy to determine fast and slow shear-wave travel times and their orientation in the formation. With the XAST™ service, you can calculate minimum and maximum principal stresses and stress field orientation by combining oriented slowness data with overburden and pore-pressure data. This information is vital for geomechanical analysis, wellbore stability, and production enhancement-treatment design.

Sonic anisotropy and its orientation help identify the direction of natural fractures. Sonic attributes—such as P-wave slowness, fast and slow shear-wave travel times, compressive fluid identification in pore spaces, and anisotropy orientation—improve 3D seismic analysis.

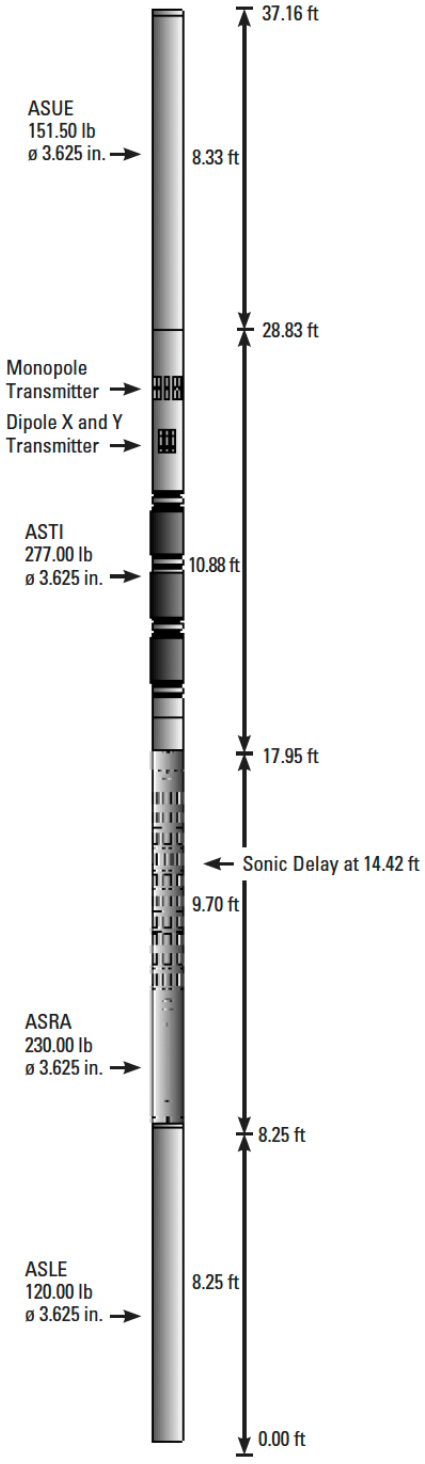


» **IMAGE–** This is an example of a semblance diagnostic plot of the waveform data from the eight waveforms. In the circle is a section of a log showing monopole P-wave slowness and semblance quality, monopole-refracted shear-wave slowness and semblance quality, X-X dipole slowness and semblance quality, and Y-Y dipole slowness and semblance quality.

Reliable sonic data for complex reservoirs

The Halliburton XAST™ service provides simultaneous monopole and crossed-dipole sonic information. It captures P-wave and S-wave slowness in formations ranging from poorly consolidated, high-porosity gas-saturated sandstones to low-porosity carbonates. The flexural wave energy is propagated from two low-frequency, on-depth, crossed-dipole bender-bar sources.

The low-frequency flexural wave travels at the true shear slowness of the formation. The flexural-wave data dispersion analysis provides information about both the near and far fields. The broadband monopole source provides information about fast formations and Stoneley data in slow formations.



Xaminer® Array Sonic Tool (XAST™) specifications

	STANDARD	DEEPSUITE™ LOGGING TOOLS
Maximum temperature	350°F (177°C)	
Maximum OD	3.625 in. (92.1 mm)	4.4 in. (111.8 mm)
Maximum pressure	20,000 psi (138 MPa)	35,000 psi (241 MPa)
Minimum hole	5 in. (127 mm)	6 in. (152.4 mm)
Maximum hole	16.0 in. (406.4 mm)	
Makeup length	37.16 ft (11.33 m)	
Weight	778 lb (352.9 kg)	1317 lb (597.4 kg)
BOREHOLE CONDITIONS		
Borehole fluids	Saltwater, freshwater, oil	
Recommended maximum logging speed	2 spf: 30 ft/min (9 m/min) 4 spf: 15 ft/min (5 m/min)	
Tool positioning	Centralized	
HARDWARE CHARACTERISTICS		
Source type	Piezoelectric (Monopole); Benderbar (Dipole) X and Y Dipole sources at same depth	
Number of receivers	32 (8 rings of 4 receivers)	
Receiver type	Piezoelectric cylinders	
Receiver spacings	0.5 ft (15 cm)	
Firing rate	1/sec	
Digitizing interval	Monopole: 20.32 µs; Dipole: 40.63 µs; Stoneley: 40.63 µs	
Samples per sensor	Monopole: 512, Dipole: 512, Stoneley: 512	
Measurement bandwidth	Monopole: 5 to 20 kHz; Dipole: 0.5 to 10 kHz; Stoneley: 0.5 to 5 kHz	
Combinability	All LOGIQ® tools	

DATA SHEET

	STANDARD	DEEPSUITE™
MEASUREMENT		
Principle	Δt_p, Δt_s, and Δt_{St}	
Range	Δt_p 40 to 250 µs/ft, Δt_s 60 to 600 µs/ft, Δt_{St} 185 to 500 µs/ft	
Vertical resolution	0.5 ft	
Depth of investigation	1 to 3 ft	
Primary curves	Full waveforms (from Monopole, Dipole, and Stoneley firings) Δt_p, Δt_s (X & Y), and Δ_t Stoneley	
Secondary curves	Poisson's ratio, Formation Anisotropy, Integrated Traveltime (ITT)	
CALIBRATION		
Primary	N/A	
Secondary	Internal check	
Wellsite verifier	N/A	

PHYSICAL STRENGTHS**	Tension	Compression	Torque
Receiver Array (ASRA)	30,000 lb (133.44 kN)	5,000 lb** (22.24 kN)	600 ft/lb (813.36 Nm)
Isolator	30,000 lb (133.44 kN)	5,000 lb** (22.24 kN)	600 ft/lb (813.36 Nm)

ELECTRICAL SPECIFICATION	
Tool power	200 VDC
Current	400 ma in Log Mode

MEASURE POINTS	Measurement	Measure point	Referenced from
	Δt_p, Δt_s, Δt_{St}	14.42 ft (Center Array)	Bottom of ASLE

* Strengths apply to new tools at 70°F (21°C) and 0 psi (0 MPa) and are limited by the ASRA.
** 5,000 lb in boreholes > 8 in.; 7,000 lb in boreholes from 6 to 8 in.; 9,000 lb in boreholes < 6 in.

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

halliburton.com

HALLIBURTON