

### 2 3/4" Radial Bond Tool

The 2 3/4" RadII™ Cement Bond Tool utilises a single ceramic transmitter, (an eight segment receiver at 3ft. spacing and a single receiver at 5ft. spacing) to accurately measure the quality of the cement job in a cased hole well environment. The segmented receiver provides a good indication of cement channelling behind the casing.

This cement bond tool is of high quality steel construction with oil filled, pressure compensated transmitter and receiver sections. The transmitter and both receivers are ceramic to withstand high temperature well environments. Upon each transmitter firing, data from all the receivers is digitized and stored in internal memory, then sequentially transmitted to the surface computer.

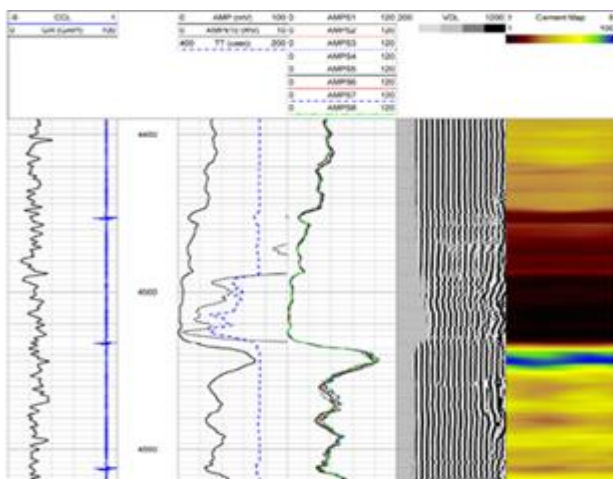
Transmission of the sonic data to the surface is accomplished by an internal controller which transmits 8 signals from the RADII™ receiver, a composite 3ft. signal (sum of all 8 RADII™ signals), a 5ft. receiver signal, and an internally generated calibration signal. Transmission of the remaining signals consist of digitally encoded data transmitted after the acoustic signals.

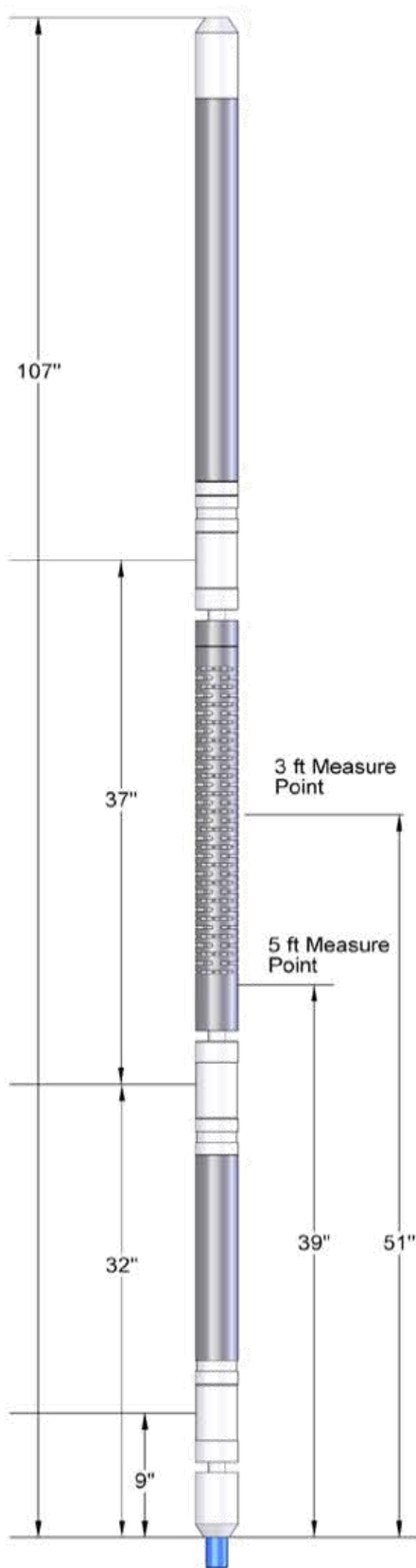
#### Applications

- Evaluation of cement bond quality and integrity
- Location of free-pipe and cement – top
- 360 degree cement map

#### Features and Benefits

- Eight channel segment receiver
- Combinable with Gamma Ray - Cased Collar Locator (GR-CCL) & temperature (external)
- Test tube calibration stored in memory and retrievable
- Surface Read Out (SRO) or Memory mode conveyance
- Allows early detection of poor cement quality, enabling remedial action





### Dimensions and ratings

Max Temp: 350°F (177°C)	Max Press: 20,000 psi (137,895 Kpa)
Max OD: 2.75 in. (6.98 cm)	Min Csg/Tbg ID: 4.5 in (11.5 cm)
Length*: 8.92 ft (2.72 m)	Max Csg/Tbg OD: 10 3/4 in (27.3 cm)
	Weight: 100 lb. (45.5 kg)

\*Length does not include centralizers. A minimum of two inline centralizers (approx. 2.6 ft (0.79 m for each) are required when running the CBT.

### Borehole conditions

Borehole fluids:	salt <input type="checkbox"/> fresh <input type="checkbox"/> oil <input type="checkbox"/> air <input type="checkbox"/>
Recommended logging speed:	60 ft (18.2m) /minute. max. 100ft (30.5m)/minute at 0.08 ft (.02 m)sample rate
Tool positioning:	centralised <input type="checkbox"/> eccentralised <input type="checkbox"/>

### Hardware characteristics

Source type:	One piezoelectric crystal fired at 50 msec interval
Sensor type:	Omni Receiver = One 20 kHz piezoelectric Radial Receiver = One 8 segment 20 kHz piezoelectric
Sensor spacings:	Omni Receivers = 5 ft (1.5 m); 3.00 ft. (.9 m)
Firing rate:	20/sec
Waveform:	Analog; 3ft (.9 m), 5ft (1.5 m), 8 Sectors Digital; Telemetry Data
Recording time:	1300µs for each receiver, 250 µs for each sector
Combinability:	GR/CCL, MAC40, MAC60, EMIT

### Measurement

	E1Peak amplitude	Sonic waveform
Principle	Sonic wavetrain attenuation	
Range	200 to 1500µs	200 to 1500µs
Vertical resolution	3 ft. (.9 m)	5 ft. (1.5 m)
Depth of investigation	na	na
Precision (1 SD)	< 1mV	na
Primary Curves	Amplitude (3 ft) (.9 m) Individual sector amplitudes (3 ft) (.9 m) TT (3ft) (.9 m), VDL(5ft) (1.5 m)	
Secondary Curves	Head voltage, internal temperature	

### Calibration

Primary:	5.5 in.(13.97 cm) – Pressurized Calibration Tank
Wellsite verifier:	Free pipe, stored calibration tank waveforms on demand

### Physical strength

Hardware	Tension	Compression
Tool joints	50,000 lb	35,000 lb
Other	50,000 lb	35,000 lb

\* Strengths apply to new tools at 70°F (21°C) and 0 psi.

### Measure points

Measurement	Measure point (Referenced from bottom of tool)
Amplitude, TT	4.3 ft. (1.3 m)
VDL, signature	3.3 ft. (1.0 m)