

## DENSITY GAMMA PROBE (TRISONDE)

The trisonde is a convenient alternative to the standard RG sidewall density probe whenever borehole diameter is restricted and qualitative density measurements are sufficient. One common application is logging through drill pipe when unstable borehole conditions prevent use of unprotected nuclear probes. The probe is unfocussed and indicates the average density of material surrounding the borehole.

### PRINCIPLE OF MEASUREMENT:

The probe contains a gamma source and two high-sensitivity scintillation gamma detectors. Gamma radiation from the source is backscattered by the formation (Compton effect) and reaches the two detectors where the relative count-rates provide a measure of formation bulk density.

### FEATURES

- Long-spacing detector (LSD) for deep penetration and immunity from borehole effects
- High-resolution detector (HRD) for accurate bed-boundary detection
- Optional temperature and borehole-inclination measurement

### MEASUREMENTS

- Long-spacing density LSD
- High-resolution density HRD
- Natural gamma
- Temperature
- Borehole inclination

### APPLICATIONS

#### Minerals

- Lithology
- Bulk density variations
- Correlation with other logs
- Bed thickness and boundary location
- Borehole inclination and true vertical depth

#### Engineering

- Detection of weathered or fractured zones
- Ground compaction studies

#### Water

- Location of aquifer and aquitard
- Detection of cavities and missing cement around casing

### OPERATING CONDITIONS

**Borehole type:** all

### SPECIFICATIONS

<b>Diameter:</b>	38mm
<b>Length:</b>	2.31m
<b>Weight:</b>	7.6kg
<b>Max. temperature:</b>	70°C (extended range available)
<b>Max. pressure:</b>	20MPa (extended range available)
<b>Density detectors type:</b>	Nal(Tl) scintillation crystal
<b>Density detector spacings:</b>	48cm (LSD) 24cm (HRD) 14 cm (BRD)
<b>Natural-gamma detector:</b>	50mm x 25mm Nal (Tl) scintillation crystal (larger sizes available)
<b>Inclination range:</b>	0 to 30°
<b>Inclination accuracy:</b>	+ / - 0.5°

### SALES INFORMATION

<b>Probe:</b>	
25 004 000	Density-gamma probe with source holder and source transport container
25 005 000	- includes temperature
25 006 000	- includes inclination
<b>Accessories:</b>	
30 003 000	370MBq <sup>137</sup> Cs gamma source
20 070 000	Natural-gamma API calibrator without source
30 010 000	3.7MBq <sup>137</sup> Cs source for natural-gamma calibrator

