

## BOREHOLE-GEOMETRY PROBE

The borehole-geometry probe consists of a four-arm caliper in combination with a verticality measurement. The verticality section is also capable of stand-alone operation. The probe can replace the standard three-arm caliper with advantage where the borehole cross-section departs from circular and where directional information is required for well-completion studies and formation stress analysis.

### PRINCIPLE OF MEASUREMENT:

The four-arm caliper provides continuous measurements of borehole diameter in two orthogonal directions. The probe includes two independent pairs of linked arms which can be opened or closed from the surface. Once opened, the arms are maintained in contact with the borehole walls by spring pressure. A simple field calibration allows both calipers to be presented as logs in linear metric or imperial units.

The verticality section includes a triaxial magnetometer and three accelerometers. Data from these are combined by a downhole microprocessor to provide real-time, continuous logs of probe orientation and borehole inclination and direction. The probe can operate in any orientation. The operation of the probe is limited in steel casing or in the presence of magnetic minerals which affect the magnetometer. Under such conditions, only borehole inclination (without directional information) and caliper can be logged.

### FEATURES

- Sensitive X-Y caliper
- Continuous orientation log works for all borehole inclinations
- Optional natural-gamma measurement

### MEASUREMENTS

- X Caliper
- Y Caliper
- Borehole azimuth
- Borehole deviation
- Borehole volume
- Borehole drift
- True vertical depth (TVD)
- Natural gamma (optional)

### APPLICATIONS

- Water/ minerals/ engineering**
- Borehole diameter in two axes
- Borehole break-out for stress analysis
- Borehole verticality
- Borehole volume calculation
- Cracks, fissures and casing defects
- Distinguishing hard and soft formations
- Correction of other logs for hole size effects

### OPERATING CONDITIONS

- Borehole type:** open/cased, water/air-filled
- Centralisation:** recommended, non-magnetic centralisers required

### SPECIFICATIONS

<b>Diameter:</b>	60mm
<b>Length:</b>	3.5m (in two sections)
<b>Weight:</b>	40kg
<b>Max. temperature:</b>	70°C (extended ranges available)
<b>Max. pressure:</b>	20MPa (extended ranges available)
<b>Caliper:</b>	
<b>Range:</b>	75mm to 700mm
<b>Accuracy:</b>	+/- 1% at max. extension
<b>Inclination:</b>	
<b>Range:</b>	0 to 180°
<b>Accuracy:</b>	+/- 0.5°
<b>Azimuth:</b>	
<b>Range:</b>	0 to 360°
<b>Accuracy:</b>	+/- 1.5° (Higher accuracy available to special order)
<b>Natural-gamma detector:</b>	50mm x 25mm NaI (TI scintillation crystal (larger sizes available))

### SALES INFORMATION

<b>Probe:</b>	
25 035 000	Borehole-geometry probe with caliper calibrator
25 036 000	- includes natural gamma
<b>Accessories:</b>	
21 025 000	Centraliser 90 - 180mm (non-magnetic)
21 026 000	Centraliser 180 - 260mm (non-magnetic)
21 027 000	Centraliser 260 - 342mm (non-magnetic)
21 028 000	Centraliser 342 - 472mm (non-magnetic)
20 070 000	Natural-gamma API calibrator without source
30 010 000	3.7MBq <sup>137</sup> Cs source for natural-gamma calibrator

