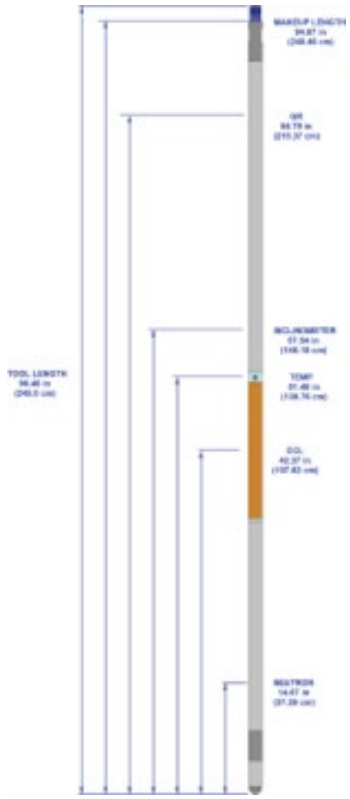
Gamma Ray – Casing Collar Locator – Neutron – Inclinometer – Temperature Tool

Provides correlation and formation evaluation information



Applications

- Through casing porosity
- Gas identification
- Wellbore directional survey

Features and Benefits

- Slim profile for maximum wellbore access
- Compact array of sensors for evaluation of wellbore and reservoir uncertainty

Tool Description

The Weatherford gamma ray – casing collar locator (CCL) – neutron – inclinometer – temperature tool is a compact tool for through-casing evaluation of certain reservoir parameters that can be accurately correlated and understood together with the well geometry.

Specifications

Ratings and dimensions

Maximum temperature	350°F (177°C) for 4 hours
Maximum pressure	20,000 psi (138 MPa)
Outer diameter	1.69 in. (42.93 mm)
Length	96.46 in. (2450.084 mm) | (M/U length 94.67 in. (2404.62 mm)
Weight	35.0 lb (15.9 kg)
Minimum casing/tubing OD	2.38 in. (60.45 mm)
Maximum casing/tubing OD	7.0 in. (178.0 mm)
Tensile strength*	**Tension**: 65,000 lb **Compression**: 130,000 lb **Torque**:150 ft-lb
Measure points	**GR**: 84.79 in. (2,153.67 mm) **CCL**: 42.37 in. (1,076.2 mm) **NEU**: 14.67 in. (372.62 mm) **INC**: 57.54 in. (1,461.52 cm) **TEMP**: 51.48 in. (1,461.52 cm)

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

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Specifications, continued

Borehole conditions

Borehole Fluids	Salt, fresh and oil
Logging Speed	**Recommended**: 60 ft/min (18.2 m/min) **Maximum**: 100 ft/min (30.5 m/min) at 0.08 ft (.02 m) sample rate

Electrical specifications

Operating V / Current	130V DC at 45 mA

Hardware characteristics

	Gamma Ray	Casing Collar Locator	Neutron	Inclinometer
Sensor Type	Thallium activated sodium iodide crystal	Dual magnet, center coil	Helium-3 filled neutron detector	3-axis accelerometer
Transmission Type	Digital telemetry	Line wobble or telemetry	Digital telemetry	Digital telemetry
Data Rate	20 frames / sec at 20 kHz			
Combinability	RADII and CBT (bottom only)			
Connections	GO top, Source sub bottom (no feedthrough)			
Temp Specs	**Sensor**: RTD (1000) | **Trans Type**: Digital telemetry | **Prim Curve**: Temp (°F/C) | **Calibration**: 2pt linear			

Measurements

Principle	Natural Gamma Radiation	Magnetic Flux Lines	Thermal Neutron Detector	Gravity Vector
Range	0 to 10,000 cps	2.38 to 7.0 in. (60.452 to 178.0 mm)	200 to 2,000 cps	± 2 g
Vert resolution	6.0 in. (152.5 mm)	NA	NA	NA
Accuracy (1SD)	± 5%	NA	± 0.07%	± 0.5 degrees
Sensitivity	~0.998 cps/API unit	NA	15 cps/nv	900 lsb/g
Primary curves	GR (API)	CCL (mV)	NEU (API)	Inclination
Secondary	Head voltage, Internal temperature (telemetry only)			

Temperature measurements

Accuracy (+/-)	0.898°F (0.5°C)
Response time	0.5 seconds
Resolution	0.0018°F (0.001°C)

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