QL40-SGR2G-BGO

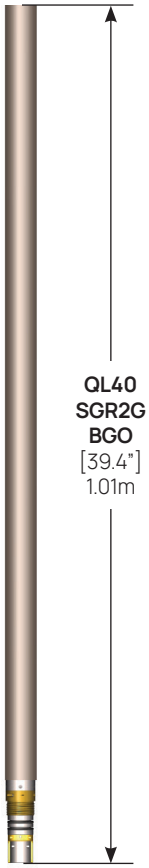
Spectral Gamma Ray

January 2026

The QL40-SGR2G is the new generation of slimhole Spectral Gamma Tool. The new system consists of a completely redesigned and ruggedised mechanical assembly, electronics and gamma module. It implements also the latest ALT telemetry developments to enhance tool performances on long single and multi-conductor wirelines.
The probe measures the total gamma counts in API as well as the full energy spectrum of
the natural gamma radiations emitted naturally from within the formations.
A Full Spectrum Analysis (FSA)1 is performed on the recorded energy spectra. The FSA derives in real time the concentration of the three main radioisotopes 40K, 238U, 212Th and thus provides insight into the mineral composition of the formations2.
The QL40-SGR2G is a modular platform that can be equipped with a scintillation BGO (Bismuth Germanium Oxyde) crystal or with a scintillation CeBr3 (Cerium Bromide) crystal. This brochure refers to the QL40-SGR2G-BGO
The BGO crystal is characterized by a very high scintillation efficiency, good energy resolution, and is mechanically strong. It makes the tool ideal for a wide range of applications listed below.
The QL40-SGR2G is supplied as an inline sub. It can be combined with other logging tools of the QL product line or can be operated as a standalone tool. It is compatible with the ALT/MSI acquisition systems.

Application

- Recognition of radioactive materials
- Contamination studies
- Lithology characterization
- Well to well correlation
- Sedimentology - differentiation of facies and depositional environment



Tool

Diameter : 40mm (1.6")
Length : 1.01 m (39.4")
Weight : 6kg (13 lbs)
Temp : 70 °C (158 °F)
Max. Pressure : 200bar (2900psi)

Sensor

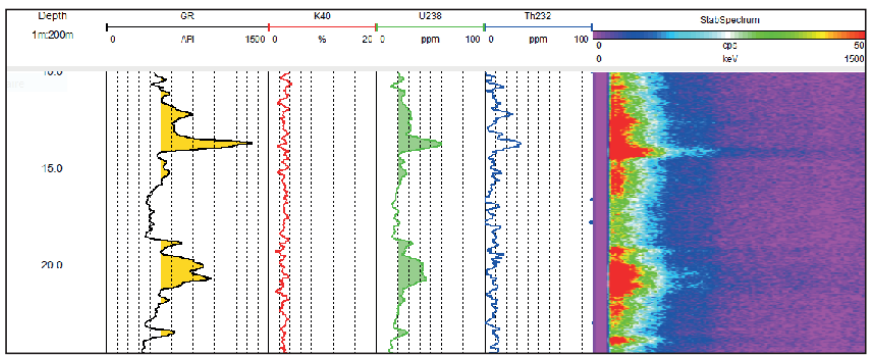
Scintillation crystal : BGO (Bismuth Germanium Oxyde)
Dimensions : 25.4mm x 100.0mm (1.00" x 4.00")
Sensitivity (compared to NaI crystal) : x 3
Spectral Resolution @ Cs (%) : 13.6
Dead Time (µs) : 4.8

Operating conditions

Cable type : Mono, multi-conductor, coax
Compatibility :
Scout Pro / Opal (Scout / Bbox / Matrix)
Digital data transmission Telemetry :
Variable baudrate telemetry according to cable length/type & surface system
Logging speed : 2m/min
Centralisation : Recommended
Borehole conditions :
Dry or fluid-filled borehole
Open or cased borehole

Measurement range

Measurement point : 0.25 m (9.9") from bottom
Measurement range : up to 3 MeV



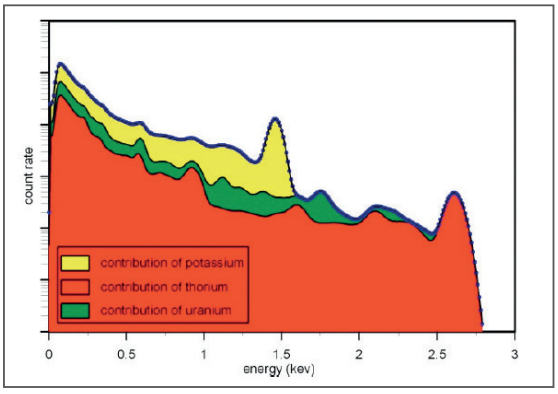
Field record - Radioisotope concentrations and stabilized spectrum

Principle of measurement

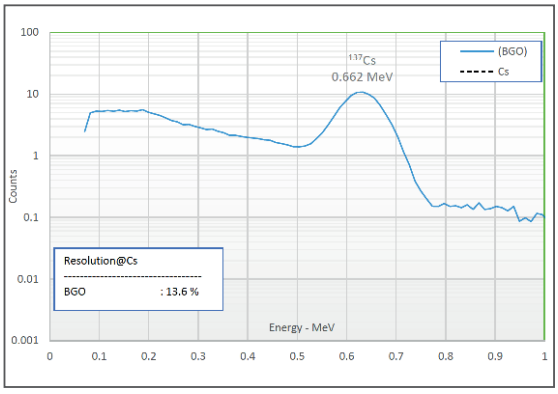
The QL40-SGR2G is equipped with a scintillation crystal. When exposed to gamma rays, the crystal emits light as a function of the gamma ray energies. The pulses of light are amplified by a photomultiplier tube and converted into electrical pulses which are distributed into discrete energy channels. Gamma ray analysis is performed in two steps.
First spectrum stabilization will be performed: each multichannel spectrum in the data set will be converted to a spectrum having all count peaks at the corresponding energy position. This process implies a close comparison with the reference spectra obtained during the calibration process of the spectral gamma tool at the Medusa calibration facility. In a second step the stabilized spectrum will be convoluted into concentrations of naturally occurring radionuclides (^{40}K, ^{238}U, ^{212}Th) or other man-made nuclides like ^{137}Cs or ^{60}Co. Corrections taking borehole diameter, rock density, casing type and thickness, tool position and borehole fluid conditions into account can be applied.

Measurements features

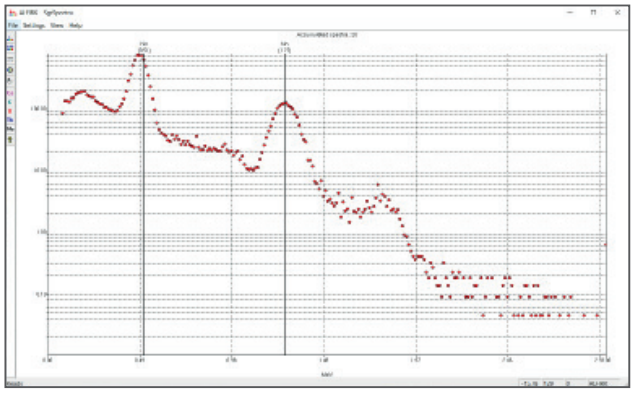
- 256 channels gamma ray energy spectrum
- Full spectrum analysis and stabilized spectrum
- Total gamma counts [API]
- Concentration of radioisotopes [Bq/kg or ppm]
- Concentration error of radioisotopes [Bq/kg or ppm]



Full Spectrum Analysis by Medusa Systems BV



Example of spectrum - ^{137}Cs isotope



LoggerSuite – Real Time Spectrum (^{22}Na isotope)