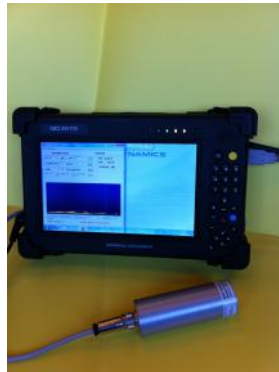


SGP Series – Smart Gamma Probe

Patented
Under licence from the French Atomic Commission (CEA)



The SGP device is a **smart gamma probe** providing information on the radioactive dose rate (Cs equivalent), designed for area monitoring and alarm triggering. SGP Series are composed of Geiger Muller detectors and all electronic modules required for autonomous use.

A Geiger Muller tube is a particle gas detector that fully ionize at each interaction between a particle and the gaz. It is associated to a counting electronic mechanism that gives the number of ionization (i.e. impulsion) occurred in the tube. This number can then be transformed in radiation intensity.

Key Features

- **Fast detection, measurement and historic data registration of Gamma and X-Rays.**
- **Measurement of ambient dose equivalent rate up to 10 Sv/h with very short time response.**
- **Miniature electronics: 3 times lighter & 4 times more compact than average competing smart probes (Length and diameter almost cut in 2).**
- **Unique and patented signal filtering algorithm, insulating measurements from vibrations and allowing detection without false alarm of small variation of nuclear activity within a high intrinsic statistical noise.**
- **Fast data transmission and easy-to-setup thanks to USB interface and internal driver, offering integrated power-supply and mobile applications solution.**
- **Two types of very sensitive energy compensated Geiger Mueller tube can be mounted with almost constant time response on full measurement range: Low Range & High Range (cf. Technical features)**
- **Complete autonomy of the probe provided by smart electronic architecture, including all key components of hardware circuitry (Microprocessor, Amplifier, Analyzer, Converter, HV module, Memory, ...) and the intelligence controlling those components, offering remote sensing and analysis solutions.**
- **Outdoor rugged and electromagnetic shielded probe (aluminum housing) for outdoor operations (compliance: IP67 – IP 68 optional), operations in harsh environment, and easy decontamination.**
- **Probe can provide information in $\mu\text{Sv/h}$ (μSv) or $\mu\text{rem/h}$ (μrem). Transmitted data includes: index, date/time, measurement value, selected unit and counting time.**
- **PC software interface provided for visualization and probe internal parameters setting.**
- **Probe can be supplied by PC via an USB cable or an RS 485 liaison that allow communication, or by external battery.**

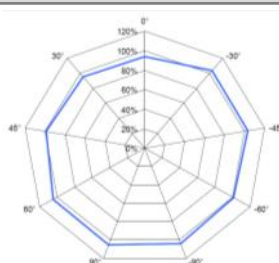


Fig 1. Normalized counting rate with regard to the orientation. The angular response is very uniform with a standard deviation of ca. 5%.



Fig 2. PC interface software, allowing direct visualization of dose rate, management of acquisition data and setting of internal parameters of the tube

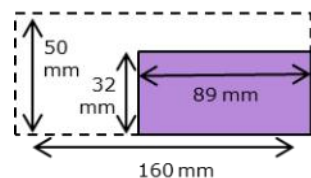


Fig 3. Illustrative comparison of SGP module size (solid line) against average size of competing smart probes (dashed line); Each nominal dimension is almost cut by 2, providing an overall compactness divided by 4, whereas the weight is divided by 3

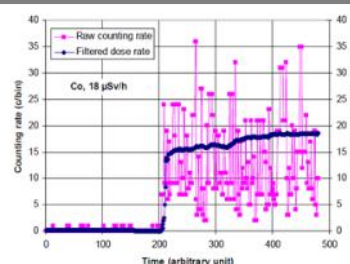


Fig 4. Real time counting rate and filtered dose rate measured with a ^{60}Co irradiator at $18 \mu\text{Sv/h}$. Smoothed signal provide much more reliable information within a high intrinsic statistical noise.

SGP Series - Technical Features

NUCLEAR	
Display units	μSv/h, μSv or μrem, μrem/h depending on internal settings or meter connected; H*(10) ambient gamma dose equivalent rate
Emitter	Gamma and X-Rays
Detector	Energy Compensated Geiger Mueller (guaranty +/- 40% maximal variation on the tube energy range)
Measurement range	Option 1 Low Range: 1 μSv/h to 100 mSv/h Option 2 High Range: 0.1 mSv/h to 10 Sv/h
Energy range	Option 1 Low Range: 20 keV to 1.25 MeV Option 2 High Range: 80 keV to 1.25 MeV
Sensitivity	Option 1 Low Range: 2.6 c/s for μSv/h (¹³⁷ Cs) Option 2 High Range: 37 c/s for mSv/h (¹³⁷ Cs)
Background	Option 1 Low Range: <8 c/min Option 2 High Range: <1 c/min
Display	Provided by host instrument or PC
Alarm setpoint	Saved in probe memory. It can be changed with a PC
Response time	Low dose 2 μSv/h < 10s / 20 μSv/h < 2s / 200 μSv/h < 2s / High dose 2 Sv/h < 2s
Norms	CEM conforms, CE-Meets requirements, IEC-Approval to IEC 60846
ELECTRICAL	
Power	Supplied by PC or external battery (USB, RS 485)
Communication	USB or RS 485
Interface	PC software for visualization and probe internal parameters setting
MECHANICAL	
Housing	Aluminum
Dimensions	89 x 32 mm (3.54 in. x 1.26 In.) (L x D)
Weight	88 g (0.176 lb), without cable
ENVIRONMENTAL	
Temperature	-10 °C to +40 °C (14 °F to +140 °F)
Cleaning	Probe housing easy to decontaminate
Water resistance	IP67: Waterproof 1 m immersion connected (IP 68 optional)

Smart Gamma Probe Applications

- **Mobile area monitoring solution (dose rate acquisition and alarm triggering) composed of several probes and a mobile PC**
- **Integration in existing radiation monitoring and surveillance networks**
- **Hand held instrument for radiological control**
- **Dose rate monitoring functions embedded in vehicles**