Measuring the pulse rate performance of the BG51 sensor

BG51/BG51-OEM specifications

Measuring range	0,1 µSv/h to 100 mSv/h
Dose rate performance	5 ppm (pulse per minute) ±15% for 1 µSv/h
Energy range of the sensor	70 keV to 2 MeV

Measuring conditions

BG51 supply voltage	4.0V
Ambient temperature	22°C – 25°C
Radiation source	Cs137, ≥100 µCi
Measurement setup	Sensor window directed towards the radiation
Distance	Radiation source to sensor ≥50 cm
Number of pulse counts	≥ 1500

Example

Source: Cs137
Activity of the source: 100 µCi (calibrated!)
Distance radiation source to sensor: 50 cm
Dose rate at the sensor window: 1,13 µSv/h

Measurements and calculations:

Number of pulses counted during 5 hours	1994
Number of pulses from background radiation during 5 hours	-314
Number of pulses from Cs137 source during 5 hours	1680

Effective number of pulses after 1 hour	1680 / 5 = 336 pph
Dose rate performance for 1,13 µSv/h	336 pph / 66 = 5,6 ppm
Dose rate performance for 1 µSv/h	5,6 ppm / 1,13 = **4.95 ppm**

Calculation of the dose rate in relation to the source activity

Source Activity	Distance	Dose Rate
100 µCi	50 cm	1,1297 µSv/h
100 µCi	100 cm	0,2818 µSv/h
50 µCi	100 cm	0,1409 µSv/h

The dose rate is inversely proportional to the square of the distance.

P.K. 05.11.2022