The GDM 10 is a complete scintillation spectrometry system with a thick lead shield and all electronics for connection to any PC, via the serial port. The gamma detector can be exchanged (takes 5 seconds) for a solid state detector for measuring alpha and beta radiation as an option.

The software for data acquisition and analysis has a lot of professional functions and students learn in a minute how to operate the program. There is an extensive documentation on the software as well as on basic nuclear physics theory. There is also a large number of laboratory experiments in nuclear and atomic physics with detailed instructions for both students and teachers.

The GDM 10 has rapidly become the leading college-level radiation spectrometer in Europe and has been sold to more than 300 student laboratories, all over the world.

The system is a complete tool for determining the specific activity in a sample. The sensitivity is very high, 1Bq in a 60 ml sample with a measurement time of 1 hour (67% confidence level) for Cs-137. The Windows software allows you to operate the hardware and calculate the required result from the data. The software handles single spectra, series of spectra and MCS spectra. Each type of spectrum can be recorded manually or with a preset measurement time or a preset number of counts.

**Sensitivity**

The uncertainty at a confidence level of 67% as a function of the measurement time (Marinelli 1 litre).

**The Alpha and Beta detector (option)**

Connects directly to the GDM spectrometer. It thereby adds the possibility of analyzing alpha and beta radiation to the GDM gamma spectroscopy system. Using the GDM type of beta source (Cs-137) it is possible to observe conversion electrons from the 0.662 MeV level in Ba-137. The observed resolution for an electron peak is < 10 keV FWHM.
SPECTROMETER SYSTEM FOR NUCLEAR RADIATION

GDM 10

TECHNICAL SPECIFICATION

**Detector unit**
- NaI detector (2” x 2”) with PM-tube.
- Energy resolution < 7.0% full width half maximum at 661 keV.
- Cylindrical lead shielding (1 inch thick).
- Filling: removable lead pellets,
- Sample container: 60 ml.
- High-voltage supply: 0-1400 V.
- Continuously adjustable by a 10-turn potentiometer.
- Dimensions: Height: 40 cm (16”)
  Diameter: 12 cm (5”)
  Weight: 2 kg + 18 kg lead (4.4 lbs + 40 lbs)

**Electronic unit**
- Amplifier time constant: 2 µs.
- Discriminator adjustable up to 100% of full range by 10-turn potentiometer.
- Analog/Digital Converter: 1024 channels, 50 MHz clock frequency.
- Integral non-linearity: ± 0.2% over 98% of full range.
- Differential non-linearity: ± 2% deviation from average channel width over 98% of full range.
- Power supply:
  - Input: 200 VAC, 50/60 Hz, 73 mA
  - Output: ± 15 V, 200 mA, supports detector unit.

**Computer interface**
- Connects to PC, RS-232 interface.

**Sensitivity**
- For cesium samples according to the diagram on the previous page.

**Software**
- WinDAS – Data Acquisition System for Windows
  - Win95/NT/98/ME/XP, including routines for automatic recording and calculation of Cs-137 + Cs-134 and radon gas activity.
  - Modes – PHA, MCS and MSP can be run in parallel or separately.
  - Compensation – rate calculation is automatically dead-time compensated.
  - Correction – automatic time correction when subtracting files.
  - Smoothing – adjustable smoothing function.
- File – Load/save binary or ASCII files.
- Calibrations – Energy calibration with automatic scaling, automatic recording and calculation of specific activity.

**Miscellaneous**
- Instruction manual for GDM 10, Teacher’s handbook, Student instructions, WinDAS software manual, calibration sources and sample containers are provided.

**Options**
- **GDM 12**
  - 17 painted lead bricks including special steel frame.
  - 0.5 l Marinelli beakers.
- **GDM 15**
  - 21 painted lead bricks including special steel frame and 3” x 3” NaI detector.
  - 1.3 l Marinelli beakers.
- **GDM 20 upgrade**
  - Special container with 10 cm thick walls containing 315 kg lead pellets. 3” x 3” NaI detector.
  - 1.3 l Marinelli beakers.

**The Alpha and Beta detector**
- Connects directly to the GDM spectrometer. It thereby adds the possibility of analyzing alpha and beta radiation to the GDM gamma spectroscopy system.