



## DETECTORS

# SIGMA™

*Compact CsI Scintillation Spectrometer*

The profile of the SIGMA detectors makes them ideal for many portable spectroscopy applications.



SIGMA integrated scintillator detector

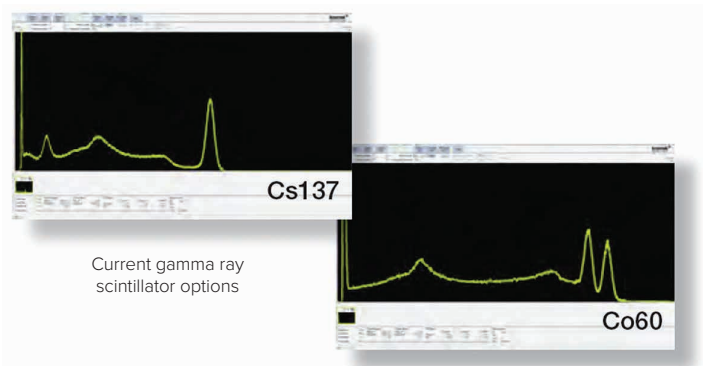
## FEATURES

- All-in-one detector, electronics, and MCA
- Includes CsI scintillator detector with SiPM (No photomultiplier tube)
- Resolution better than 7.2% (at 662 keV)
- Small overall size, but big performance
  - SIGMA25: 35 x 35 x 105 mm; 200 g
  - SIGMA50: 35 x 35 x 130 mm; 300 g
- USB connection to PC
- USB powered, 250 mW max
- Interface to Genie™ 2000 software spectral analysis

## DESCRIPTION

The SIGMA family is based on a CsI scintillator crystal coupled to a “state-of-the-art” SiPM (Silicon Photomultiplier) detector, high voltage, electronics and integrated MCA. All communication and power are provided over the mini-USB connector.

The SIGMA family comes in two scintillator sizes. The SIGMA25 has a 1 in<sup>3</sup> CsI detector and the SIGMA50 has a 2 in<sup>3</sup> CsI detector. All other aspects of the two devices are identical. Both units have a FWHM resolution specification of 7.2% at 662 keV, which is comparable to many NaI based solutions.



# SIGMA | COMPACT CsI SCINTILLATION SPECTROMETER

Model	Case Size (mm)	Crystal Size (mm)	Volume cm <sup>3</sup>	Resolution (%@Cs137)	Weight (g)
SIGMA50	35 x 35 x 130	25.4 x 25.4 x 51	32.8	<7.2	300
SIGMA25	35 x 35 x 105	25.4 x 25.4 x 25.4	16.4	<7.2	200
USB powered 250 mW					

The profile of the SIGMA detectors makes them ideal for many portable spectroscopy applications where size, weight and power constraints are very important. The embedded MCA has a fixed number of channels, fixed high voltage and gain that provides a simple interface that is easy to setup and operate with essentially no configuration. There are three software options available for use with the SIGMA detector series, two of which are offered as free downloads from the Mirion website. All three packages are described below.

## ISOCS™ /LabSOCS™ SUPPORT

Quantitative measurements can be performed without the use of calibration sources using the Mirion ISOCS/LabSOCS mathematical efficiency calibration software. The SIGMA and GR1™ family supports ISOCS efficiency calibrations. This characterization permits the user to calculate mathematical efficiencies using either ISOCS or LabSOCS software (sold separately). A unique characterization can be purchased for each specific detector for optimum accuracy or a generic characterization is available with slightly degraded accuracy specification.

## SOFTWARE OPTIONS

There are three software options available to communicate with the SIGMA family of sensors.

## K-SPECT SOFTWARE

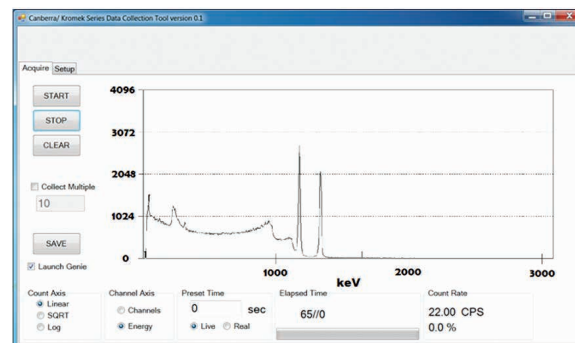
The K-Spect software can be downloaded free of charge from either the Mirion or Kromek websites. It establishes communications with the SIGMA family enabling MCA control functions, spectrum acquisition, display, basic analysis and storage functions. Together, the SIGMA and K-Spect software establish a basic gamma-ray spectroscopy system that is suitable for qualitative spectral inspection and ROI based gamma analysis.



## GENIE 2000 ANALYSIS

(through Kromek Connection Tool)

Although Genie 2000 software cannot directly control the SIGMA family of sensors, Mirion is providing a simple control application that can be used to collect data and save it to a .CNF format file. The file can be analyzed using the full suite of Genie 2000 tools such as S501 Advanced Analysis and the ISOCS/LabSOCS mathematical efficiency packages. The Kromek Connection Tool is available as a free download from the Mirion website and is compatible with all current Genie 2000 analysis versions (Genie 2000 suite sold separately). The SIGMA family, coupled with Genie 2000 analysis is the perfect combination for many portable spectroscopy applications requiring quantitative analysis (activity determination).



## KROMEK SDK

The SIGMA family of sensors is also supported by a Kromek software development kit (SDK). These software tools can be purchased from Mirion to allow end users to develop customized software applications to interact directly with the SIGMA unit. The tools provide complete setup and control of the key MCA functional parameters. The SDK supports both Windows and Linux-based systems. Some programming knowledge is required to implement this product.

## SPECIFICATIONS

### Performance

- Detector:
  - SIGMA25 1" x 1" x 1" CsI(Tl) detector
  - SIGMA50 1" x 1" x 2" CsI(Tl) detector
- Energy range: 50 keV to 1.5 MeV
- Energy resolution: <7.2% FWHM at 662 keV (Standard Models)
- Number of channels: (fixed) 4096
- Maximum throughput (USB): 5000 cps
- Differential non-linearity: <±1%

### Physical

- Size:
  - SIGMA25 – 34.5 x 34.5 x 105 mm
  - SIGMA50 – 34.5 x 34.5 x 130 mm
- Weight:
  - SIGMA25 – 200 g
  - SIGMA50 – 300 g

### Inputs/Outputs

- USB (all models): Signal and Power (Power consumption: 250 mW)

### Environmental

- Operating temperature: 0 to 40 °C (32 to 104 °F)

## ORDERING INFORMATION

SIGMA25	1" x 1" x 1" CsI (TI) Spectrometer with – 7.2% FWHM resolution at 662 keV
SIGMA50	1" x 1" x 2" CsI (TI) Spectrometer with – 7.2% FWHM resolution at 662 keV

## OTHER RELATED PRODUCTS

### GR1™ Device

GR1 Gamma-Ray Spectrometer with

- 2.5% FWHM resolution at 662 keV
- Without MCX I/O ports

### GR1+™ Device

GR1+ Gamma-Ray Spectrometer with

- 2.0% FWHM resolution at 662 keV
- Without MCX I/O ports

### GR1-A™ Device

GR1-A Advanced Gamma-Ray Spectrometer with

- 2.5% FWHM resolution at 662 keV
- With MCX I/O ports (includes 3x MCX to BNC adaptors)

### GR1-A+™ Device

GR1-A+ Advanced Gamma-Ray Spectrometer with

- 2.0% FWHM resolution at 662 keV
- With MCX I/O ports (includes 3x MCX to BNC adaptors)

### ISXCZT-GR1

Generic ISOCS Characterization for the GR1, GR1+, GR1-A or GR1-A+ units

### ISXCSI25

Generic ISOCS Characterization for the SIGMA25

### ISXCSI50

Generic ISOCS Characterization for the SIGMA50

### LAB CPG (10x10x10)

1 cm<sup>3</sup> CZT detector for use with external MCA electronics

### ISXCZT-LAB1000

Generic ISOCS Characterization for the LAB CPG (10 x10x10)

### TN-15™ Detector

USB enabled Thermal Neutron Detector

