

# SIAM 2000

## Mobile laboratory for the measurement of $\alpha$ , $\beta$ and gaseous iodine concentration

- SIAM 2000 is a mobile laboratory for the measurement of  $\alpha$ ,  $\beta$  aerosols in air and gaseous iodine activity concentrations. The «filter» mode corresponds to normal operation : continuous measurement of aerosol activities deposited on filters and  $\gamma$  spectrometry. Mode « filter + cartridge » corresponds to the detection of abnormal nuclear activity : simultaneous air sampling on filter and cartridge,  $\alpha/\beta/\gamma$  measurement,  $\gamma$  spectrometry on filter, calculation of the « gaseous iodine/total iodine » ratio (10 min. multiple cycle).

- **Networking**
- **Measurement of  $\alpha$ ,  $\beta$  and radon aerosols in air activity concentration**
- **Measurement of  $\gamma$  activity concentration of gaseous iodine**
- **1024-channels analyser for  $\alpha$  and  $\beta$  measurements,**
- **8192 channels for  $\gamma$  spectrometry**
- **Collection of aerosols on filters and activated charcoal cartridge telemanipulated by a 3-axis robot**
- **Barcode numbering of filters and cartridges for measurement filling**

### Technical characteristics

#### $\alpha$ , $\beta$ aerosol measurement:

- Large silicon diode (600 mm<sup>2</sup>)
- Measurement range : 0,1 Bq/m<sup>3</sup> to 1 MBq/m<sup>3</sup>
- Detection limits with 10 Bq/m<sup>3</sup> radon and 200 nGy/h  $\gamma$  background
  - Alpha: 0,1 Bq/m<sup>3</sup> in 1 hour.  
2 Bq/m<sup>3</sup> in 10 min.
  - Beta: 0,5 Bq/m<sup>3</sup> 1 hour after equilibrium of radon solid daughters  
10 Bq/m<sup>3</sup> 10 min after equilibrium of radon solid daughters

#### Gamma spectrometry detection:

- Hyper pure Germanium detector, cooled with liquid nitrogen 8192-channel analyser
- Energy range : 30 keV - 2 MeV
- Relative efficiency : > 18% at 1,33 MeV  $\gamma$  detection limits on filters or cartridges after 10 min. sampling :
  - <sup>137</sup>Cs : 10 Bq/m<sup>3</sup>
  - <sup>60</sup>Co : 1 Bq/m<sup>3</sup>



**Dimensions (bench):** 189 x 123,5 x 189 cm<sup>3</sup>  
(arm in rear position)

**Dimensions (rack):** 125 x 60 x 60 cm<sup>3</sup>

**Total weight:** 350 kg + 50 kg

**Operating temperature :** 0°C to +33°C

Relative humidity : 85%

**Power supply:** 230 V, 50 Hz

**Power consumption:** 2000 Watts (2500 Watts with optional electric cryostat)

**Pump sampling rate:** 7,5 m<sup>3</sup>/h

**Maximum robot arm speed (on 3 axes):** 10 cm/s

**Cryostat with 30 l dewar (option: electric cryostat)**

**Maximum autonomous operation:**

- filters about 100 days in normal mode
- cartridges : about 8 hours with a 10 min. cycle

