

LIQUID EFFLUENT MONITORING SYSTEM

LEM

MAIN FEATURES

- **Simple and reliable effluent monitoring system**
- **Fully customizable sampling cycle on the customer PLC**
- **I/O contacts for status and commands**
- Measurement geometry: 1 liter Marinelli beaker
- Detector type: 2"x2" NaI(Tl) scintillator
- Lead shielding well, 5 cm thickness
- Panel PC and relay contacts for I/O signals
- Efficiency calibration function for reference radionuclide
- Energy range: 30 keV – 2 MeV
- Measurement range: 3.7×10^3 – 3.7×10^8 Bq/l



DESCRIPTION

The **LEM** system allows to sample the liquid effluents and to perform a gross gamma measurement of the specific activity in Marinelli geometry.

LEM system is composed of the following main parts:

- Stainless steel support structure
- Electrical and command board with panel PC integrated in the stand
- Measurement system: NaI(Tl) detector, electronics for HV and signal processing, 1 l Marinelli, 5 cm lead shielding well
- Self-priming pump
- Software for system management, data acquisition and processing

The system is equipped with a touch-screen operator panel, where the ELSE NUCLEAR software is installed. The software displays in real time the measurement, controls the system status, and allows to set the operative parameters (including the alarm thresholds), to manage the measurement steps. The system provides also I/O contacts through dedicated connectors:

- Good functioning status
- Alarm status
- Pump activation input from customer PLC (*)
- Spare available I/O contacts (to be defined when necessary)

The system displays the specific and the total activity, or the count rate and integrated counts.

The software is equipped with a calibration routine, to be used with a Marinelli calibration source (available as accessory).

The system provides also a test program, separate from the main application, to be used for maintenance or periodical quality controls.

()*: only if the pump is included, i.e. when it is not available in the sampling/hydraulic equipment which LEM shall be connected to.

TECHNICAL SPECIFICATIONS

Weight and dimensions

- Stainless steel stand
 - WxDxH = 80 x 70 x 150 cm
 - max weight = 500 kg
- Lead well
 - Ø x H = 32 x 30 cm (ext); 22 x 20 cm (int)
 - max weight = 300 kg

Main specifications

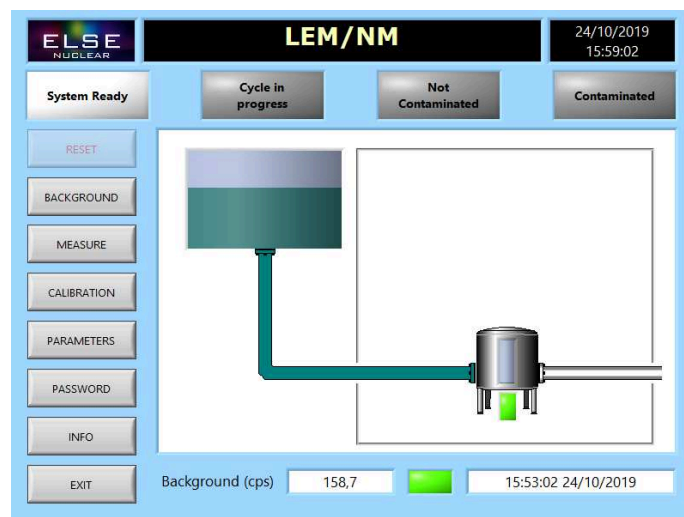
- Detector type: 2"x2" NaI(Tl) scintillator
- Cylindrical lead well, 5 cm thickness, composed by several rings for easy assembling and installation
- Plexiglass Marinelli beaker, 1 liter, connections included, can be completely disassembled for cleaning and decontamination activities
- Electronics for HV and signal processing
- Electric safety, isolation and waterproofing
- Protection grade: IP67 (underwater parts), IP44 (non-underwater parts)

Measurement specifications

- Measurement unit: specific activity (Bq/l) or count rate (cps or cpm)
- Gross gamma measurement of the specific activity
- Efficiency in measurement geometry: >1.5% (Cs-137)
- Response in measurement geometry: >12 cps/kBq (Cs-137)
- Energy range: 30 keV – 2 MeV
- Measurement range: 3.7×10^3 – 3.7×10^8 Bq/l
- "Fail safe": alarm and interlock activation in case of power supply interruption
- Detector can easily be disassembled for maintenance activities

Sampling circuit (*)

- Flow sensor for malfunctioning detection
- Working pressure of sampling system: 10 bar
- Self-priming pump



Software main panel

OPTIONS

- 3 liters Marinelli
- 10 cm thick lead well

ACCESSORIES AVAILABLE UPON REQUEST

1. Calibration source (isotopes and activity to be defined) composed of a gel matrix inserted in an additional Marinelli beaker
2. Cs-137 point source, activity < 10 kBq, for periodical quality controls
3. Warranty extension from 12 months to 24 months