CGO-Smart™ LNC
(RTM662-300)

Large Items Free Release Monitor

The CGO-Smart™ LNC is a universal contamination monitor for clearance and free release measurements in a single device.

FEATURES

- **Low detection safety margins:** excellent measurement-stability, extensive device characterization, efficient algorithms, and detailed investigation of measurement-uncertainties allows reduction of unnecessary conservativeness's for a most accurate free release recommendation
- **Sensitivity:** large volume plastic detectors in a 4π configuration with more than 82% surface coverage resulting in outstanding radiological measurement performance
- **Intelligence:** automatic weight correction of the LNC factors, compensation of NORM and background contributions, automatic handling of lightweight objects
- **Speed:** Mirion Technologies' most advanced decision algorithms allow for a shortest possible measurement time
- **Versatility**: Clearance and Free Release using the same monitor-real time mode switching
- **Availability:** dynamic background radiation compensation using spectral analysis. Integrated battery to compensate power outages and fluctuations
- **Reliability and Stability:** proven plastic scintillator technology combined with individual, automatic gain stabilization of all detection channels allow improved long-term measurement stability and reliability

DESCRIPTION

This highly sensitive monitor has been designed for contamination measurements of average sized items like tool boxes, bags and waste drums. This new monitor is based on the industry proven Smart™ detection technology: spectrometry using plastic scintillation detectors and energy analysis.

Moreover, the CGO-Smart™ LNC features Mirion Technologies' well proven leading nuclide correlation (LNC) technology, which is particularly effective for handling of complex nuclide vectors and reporting of nuclide specific activity as needed for free release applications.

The spectrometric approach ensures excellent long-term stability, short measurement times and particularly low detection limits. Moreover, it allows an automatic validation of the nuclide vector.

The comprehensive and intuitive monitor software comes with nuclide tables and an object library containing common tool-boxes, bags or waste drums. Adding new objects is a straight-forward task providing reliable auto-absorption and background reduction data.

The integrated automatic background learning tool provides efficient management of situations with challenging anisotropic background conditions.

Validated MCNP simulations are available as a complementary service to extend the functionality of the CGO-Smart™ LNC to application-specific objects or assessment of specific environmental conditions or nuclide vectors.

CGO-SMART LNC | LARGE ITEMS FREE RELEASE MONITOR

- **Safety:** designed for safe installation and transportation, including forklift pockets and modular shielding which can be installed on-site
- **Ergonomics:** user-friendly and intuitive graphical user interface
- **Traceability:** all measurement results incl. spectrums and pictures from integrated camera are stored in a local database with LAN access.
- **Compliance:** fulfils the requirements of ISO11929(2019), DIN 25457, EURATOM Directive (2013/59) and its national implementation StrlSchV 2019

RADIOLOGICAL CHARACTERISTICS

Detection

- 6 large-volume plastic scintillation detectors – total active volume: 113,4 litres
- Energy threshold: 50 keV (LNC mode 80 keV)
- Dynamic range: 10 Bq to 1 000 000 Bq.
- Detection homogeneity: ± 15% , No shadow zone.
- Efficiency Co-60 0.65 cps/Bq; Cs-137 0.33 cps/Bq
- 8 spectrometry channels, 256 channels each

Background processing

- Advanced background processing including automatic background reduction and detection of background variations during the measurement
- Filtering of short background variations, accelerated adaptation to lasting changes.

Algorithm

- Compliance to ISO11929(2019) for calculation and decision making
- Activity calculation per nuclide, surface and weight, compensation of NORM contributions and correction for auto-absorption
- Table of nuclides and user configurable nuclide vectors

Other Features

- Automatic gain stabilization using spectral analysis
- Residual chamber contamination check after every measurement
- Graphic illustration of activity distribution**
- Trace mode: Co-60 detection, MDA 0.1 Bq/g in any realistic NORM material (5 to 20 kg, 1 minute)

SPECIAL MEASUREMENT MODE

- **Trace Co-60 Mode**: detection of Co-60 contamination traces in NORM bulk materials using coincidence (MDA 0.1 Bq/g of Co-60, widely independent of the NORM activity)

Alarm threshold versus Background Doserate Co-60, average measurement time: 10 s or less		
Shielding	Background Doserate Co-60	Min. Alarm threshold
10 mm	120 nSv/h	150 Bq
	500 nSv/h	530 Bq
25 mm	300 nSv/h	150 Bq
	1000 nSv/h	530 Bq

Measurement time for an alarm threshold of 150 Bq Co-60					
Shielding thickness (mm Pb)		10	25	25	25
Background level (nSv/h)		100	100	300	1000
Measurement Time Co-60 (s)	Max	27	11	19	30
	Average	7	4	5	8

MECHANICAL CHARACTERISTICS

- External dimensions: 84.0 x 89.2 x 155.0 cm^3 (HxWxD)
- Dimensions of measurement chamber:
- 60.8 x 60.1 x 84 cm^3 (HxWxD) or 307 litres
- Total weight with shielding :
- Shielding (mm)10   25   50
- Mass (kg)   1200   1600   2300
- Maximum object weight: 150 kg,
- 2 LCD colour 10" touchscreens.

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FUNCTIONAL CHARACTERISTICS

- Double / single doors operation
- Preselection of disposal paths
- Preconfigurable items like drums, bags, clothes, toolboxes handling background- and self-absorption compensation
- Hierarchical password protected access for user settings, diagnosis or configuration
- Assisted monitor diagnosis and calibration
- Item detection by camera or scale
- Visual and audible alarm
- Internal database including spectra from all background and monitoring results
- Detailed report including results, picture and spectrum - Interface for user specific report generation
- Data export on USB or network - Interface to waste-management system prepared.

ELECTRICAL CHARACTERISTICS

- Operating voltage: 110-230 V, 50-60 Hz
- Standby current 32 mA
- Operating current 380 mA
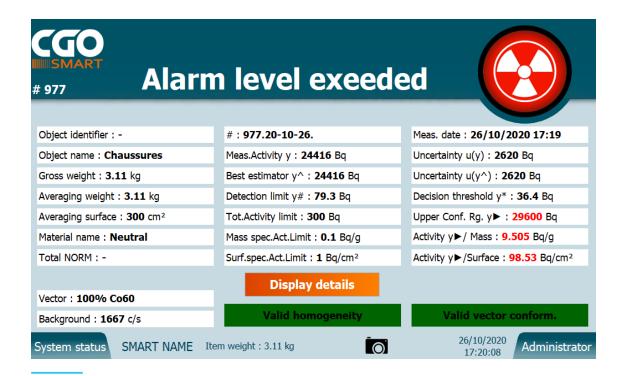- Battery charging 470 mA
- Surge current: 2.5 A for 500 ms
- Backup autonomy: 10 min
- 2 external USB connectors, 1 LAN connection
- 2 information reports by isolated relay
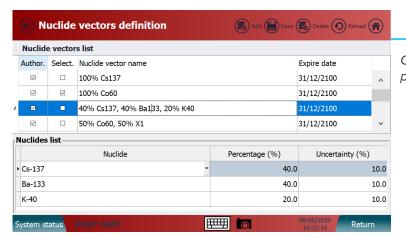
SAFETY CHARACTERISTICS

- EMC Susceptibility EN 6100-6-2
- EMC Emission: EN 55022 class A
- Electrical safety IEC 60439

ENVIRONMENTAL CHARACTERISTICS

- Operating temperature range +5°C to +40°C
- Storage temperature range -25°C to +60°C
- Relative humidity (non-condensing) 40% to 100%
- Atmospheric pressure 840 hPa to 1160 hPa

Detailed display of measurement conditions and results for a case where the alarm level is exceeded. In this case the upper limit of the confidence interval for activity (in Bq), mass-specific activity (in Bq/g) and surface-specific activity (in Bq/cm²) is exceeding the corresponding limits.
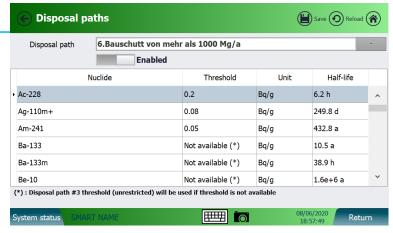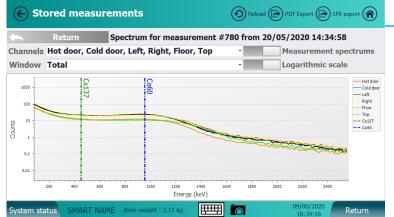
MIRION TECHNOLOGIES

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Configuration screen to set-up and parameterize nuclide vectors

Configuration screen for nuclide-specific clearance limits. The software allows to configure different disposal paths with specific clearance limits

Display of spectrum from the measurement's database for a Co-60 contamination

Graphical display of background count-rates and their evaluation by the smart background processing algorithms

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