

NuCoMo-100

Contamination monitor for high background radiations



Locations with a high background radiation – such as certain areas of nuclear power plants or sites of nuclear incidents – prohibit the use of most contamination measurement devices, while at the same time the risk of having contaminated surfaces is increased. This challenging task is where the newly developed NuCoMo-100 excels. With the NuCoMo-100, β -contamination can be detected in a gamma background of up to 40 $\mu\text{Sv/h}$ when all the other standard contamination monitors are saturated with gamma counts. Most of all the user-friendly, handheld device allows to monitor significant contamination early-on and considerably mitigate the risk of dispersing radioactivity over the site.

Benefits

- Use in high-background environments
- Usable in 50-75% of the controlled areas in nuclear power plants
- Clear optical display via LED band
- User-friendly, handheld device
- Control of the surface distance
- Several accessories

Key Figures

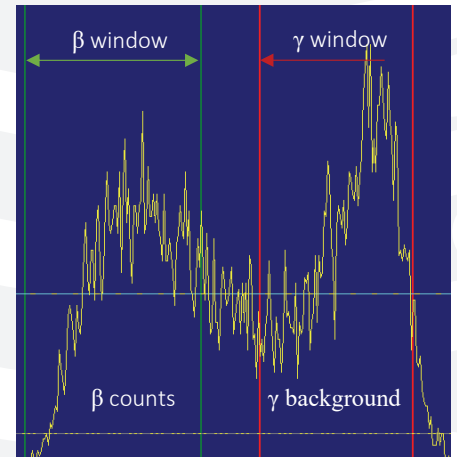
1 Bq/cm² Co-60
 ↳ MDA in a Co-60 background of 1 $\mu\text{Sv/h}$

4 Bq/cm² Co-60
 ↳ MDA in a Co-60 background of 40 $\mu\text{Sv/h}$

13%
 ↳ Efficiency for Co-60 β emitter

The NuCoMo-100 has been developed as part of the collaborative R&D efforts with the CEA LIST. It uses a phoswich detector together with an innovative algorithm. Each scintillator of the phoswich has a different decay time constant allowing to perform Pulse Shape Discrimination (PSD) between the beta and gamma pulses. Hence this state-of-the-art detector enables to discriminate the γ -background and measure only the β -contamination on the surface by comparing signals from two different detector layers. The user can choose between displaying the measurement results in cps, Bq, and Bq/cm². The possibility for expert users to additionally display either a histogram of the last 100s or a bar diagram of the current value in percent of the alarm threshold increases the usability further. Two separate alarm thresholds can be set. The LED-ring flashes in yellow or red accordingly. Alarm thresholds can be adjusted for every nuclide and measurement mode specifically. The three measurement modes are the direct contamination measurement with only the NuCoMo-100 and the measurement of wipe tests and screening/aerosol filters via the additional accessories. When plugged in, the soft-ware automatically recognizes the accessories and switches the menu accordingly.

The whole menu, measurement and calibration process is user guided. This allows to set numerous parameters, (de-)activate functionalities and use the integrated calibration menu by using only five function keys.



Application areas

The NuCoMo-100 excels when surface contamination must be detected in a high background environment. This allows to extend the area where the instrument can be used in a nuclear power plant. Most devices will be saturated by the gamma background in most of the controlled area whereas the NuCoMo-100 will be able to perform contamination measurement in 50% to 75% of the controlled area.

Further situations where contamination detection in high background environments are vital are:

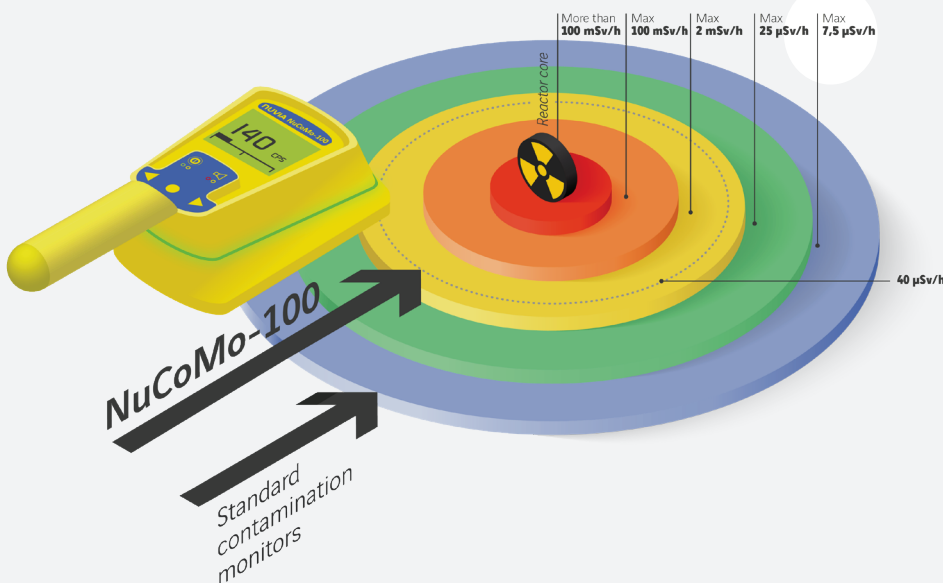
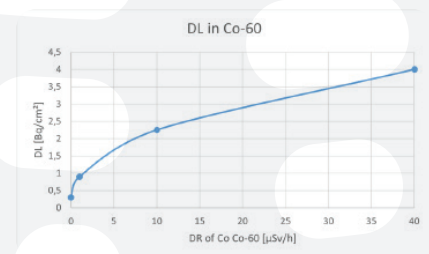
- emergency response situations after either nuclear accidents or
- after the explosion of a nuclear dispersion device ("dirty bomb")

Technical data

- Operation via Li-Ion-battery approx. 10 hours
- Temperature range: 10-35°C
- Lightweight: 970 g
- Freely programmable nuclide library
- Store up to 620 datasets
- Acoustic alarm: approx. 80 dB in 30cm
- Optical alarm: LED ring (green, yellow, red) and LEDs in front panel
- Vibration alarm in handle
- 2 adjustable alarm thresholds per unit
- USB interface
- 128x64 px backlit LC-Display

MDA

In a Co-60 background dose rate (DR) the minimal detectable activity of a Co-60 contamination is given by the detection limit (DL) which can be approximated by the graph below:



Accessories

Wipe-test station

Measuring smear samples on-side in the presence of a high background radiation is extremely difficult. Heavily shielded wipe-test counters are normally stationary. Combining the NuCoMo-100 with the Wipe-test station offers a lightweight, user-friendly and cost-efficient alternative. Smears can be checked on-side for β -contamination, allowing a fast decision making and thus increasing the safety of the personnel.



Chiffonette station

Likewise to the wipe-test station, the chiffonette station allows on-side measurements of screening samples of up to 100x100 mm². The chiffonette station also automatically measures the background continuously when no probe is inserted and can load the battery of the NuCoMo-100 as well.



Wall station / NuCoMo-100 stand

A NuCoMo-100 can serve as a stationary contamination control at entrance or exit points of laboratories or workspaces where open radioactive material could occur. Light barriers automatically start and control the measurement. The wall station is a highly practical accessory to extend the usability of an existing device. As an alternative to the fixed wall station, a moveable stand is available.



Additional display unit (LED and OLED)

For checking confined spaces and areas which are difficult to access, the additional display device can be used. It allows to use the NuCoMo in one and get a clear optical display of the alarm level on the additional display that can be held in the other hand. Two versions are available. The LED unit gives a clear light signal (green, yellow, red) of the status. The OLED unit displays the measured value of the contamination. The colour of the displayed value changes according to the contamination level.



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