



# G-CHECK n-CHECK

Nuclear measurement



# NUCLEAR MEASUREMENT

KEP Technologies is a full solution provider. With **SETS SAFE** we offer standard and customized nuclear measurement solutions. We manage entire projects from the feasibility study up until installation, training and maintenance, as required.

We are confident that with KEP Technologies you will find measurement solutions with the performance needed to characterize and efficiently manage your nuclear materials. This being the case no matter which of our below market segments you may work in.

## WASTE & DISMANTLING

Characterization of nuclear waste or materials, for safety or for the selection of the storage mode, legacy waste, materials transportation – radiological inspection before dismantling.

## DEFENSE

Safeguard, accounting, inventories – Control of Special Nuclear Materials content.

## INDUSTRY

Safeguard, accounting, inventories – Waste characterization.

## RESEARCH

Characterization of waste from the dismantling of research reactors or facilities.



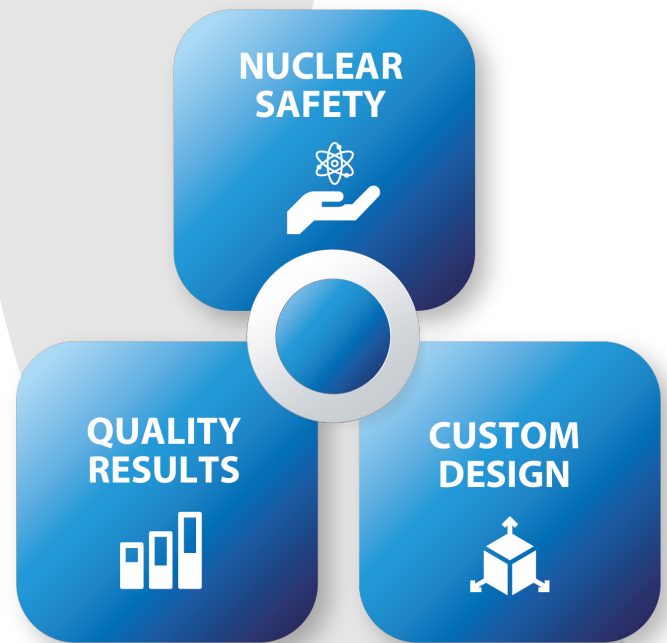
# THE KEP TECHNOLOGIES ADVANTAGE

Despite operating in demanding contexts, each **G-CHECK** or **n-CHECK** solution incorporates three essential elements to ensure the best nuclear measurement:

**QUALITY RESULTS** thanks to the application of our proprietary technologies or the integration of the most reliable technologies on the market

**NUCLEAR SAFETY**, taking into consideration your constraints: radiological environment (integration in glovebox or hot cell), data protection, seismic resistance

**CUSTOM DESIGN**, with solutions tailored to your specific needs in terms of measurement, automated or manual handling etc.



We know that solutions providing these benefits deliver the highest value to our customers.

## OUR SOLUTIONS

**G-CHECK** and **n-CHECK** are full solutions for the **non-destructive characterization of radioactive materials or waste**.

They serve various needs and can be designed to count products entering a facility, to measure the presence or the absence of specific isotopes in a container, or to determine the mass of radioactive materials and their isotopic distribution.

They integrate well-proven technologies like gamma spectrometry and neutron counting into **turnkey solutions**.

- Classical elements (detectors, proportional counters, electronics, shielding, attenuators, etc) as required by these techniques are chosen among the available technologies on the market to best suit your needs.
- Mechanical systems that assemble these elements into a measurement station, software and human-machine interfaces are designed to be functional and technically accessible, whether the user is an expert or not.

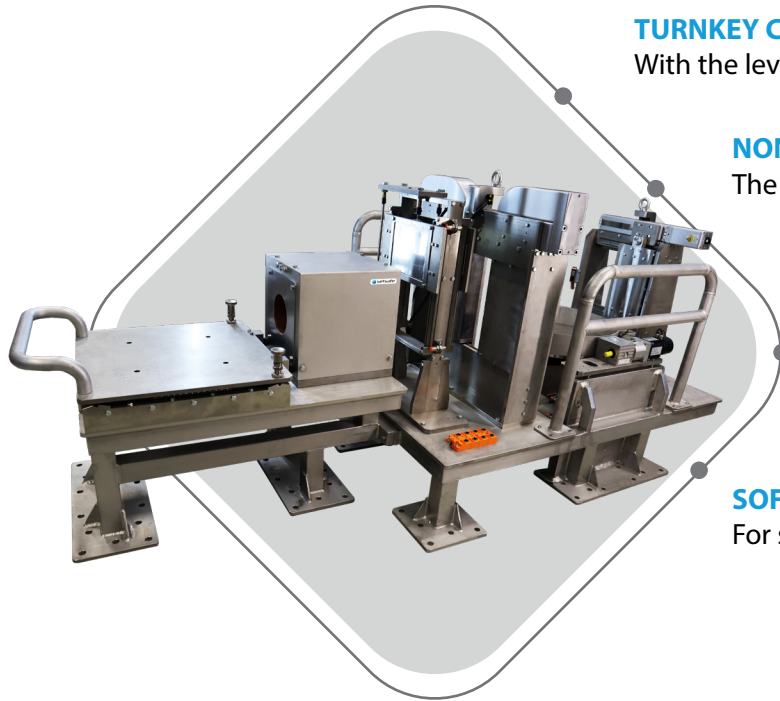
They can be combined with **HEAT-CHECK** line calorimeters, into a full characterization line.





# G-CHECK

YOUR CUSTOM-DESIGNED SOLUTION INTEGRATING GAMMA SPECTROMETRY



## TURNKEY CHARACTERIZATION STATION

With the level of sophistication to suit your needs

## NON-DESTRUCTIVE MEASUREMENTS

The most simple, versatile and accessible

## IDENTIFICATION AND QUANTIFICATION

Of radioelements

## SOFTWARE AND AUTOMATION OPTIONS

For simple and safe use

### DETECTORS & PERFORMANCE\*

<b>Types</b>	Nal(Tl), Csl(Tl), LaBr3, Ge(HP), CdTe, others on request
<b>Modes of operation</b>	<b>Detection</b> To search for the presence or the absence of selected isotopes
	<b>Control</b> To count product entering a facility
	<b>Expertise</b> For the mass or the isotope distribution of a container
<b>Measurement time**</b>	600s counting time for a 10 mg detection limit

### GENERAL\*

<b>Container volume</b>	From 20 to 200 L, others on request
<b>Dimensions (L x P x H) and weight***</b>	From 800 x 1450 x 1000 mm, 600kg 600 x 3000 x 900, 840kg

\* These specifications are indicative of measurement stations already made. They can be tailored to your needs.

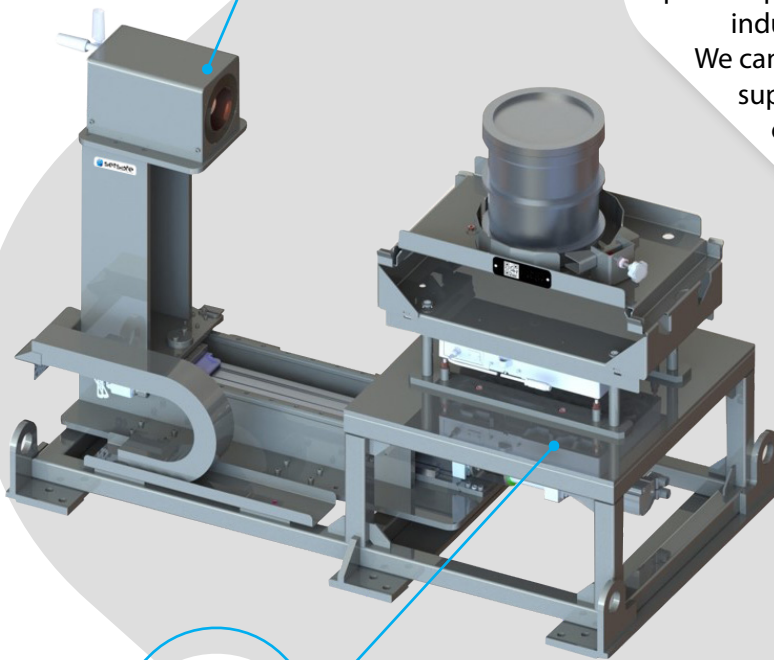
\*\* The measurement time concept depends strongly on the assembly, the measurement method, and the required accuracy.

\*\*\* Dimensions vary with the characterization station, the containers' volume, the necessary container-detector distance, etc.

# BASE ELEMENTS OF G-CHECK

The detector and its electronics are chosen for their detection efficiency and for the suitability of their energy resolution with your characterization challenges. It is protected by shielding (for instance lead with a copper sleeve).

Our solutions use **software** for instrument control, calibration, data acquisition and processing. They can integrate third party software, specific applications, and can interface with industrial supervision systems. We can offer our coupling module to supplement calorimetry or to optimize quantification.

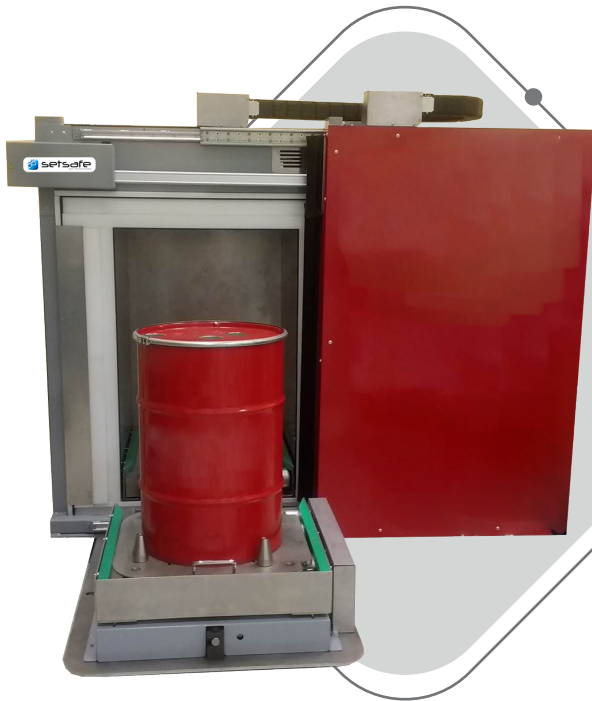


**A mechanical assembly** based on a structure, and as the case may be a weighing system, a rotating plate to measure all around the container circumference, an elevator to measure along the container's height. It can also integrate a collimator to control the measurement's solid angle, shielding for attenuation and filtering of perturbing radiations, a reference source for transmission measurements.

Operations such as detector positioning, container's rotation, collimators and shielding set-up can be **manual, automated, or even remote controlled.**

# n-CHECK

YOUR CUSTOM-DESIGNED SOLUTION INTEGRATING NEUTRON COUNTING



## TURNKEY CHARACTERIZATION STATION

With the level of sophistication to suit your needs

## QUANTITATIVE AND NON-DESTRUCTIVE MEASUREMENTS

Ideal when gamma emissions are hidden by more intense emitters

## RESULTS BARELY IMPACTED BY SURROUNDING MATERIALS

Especially by metallic and non-hydrogenated matrices

## SOFTWARE AND AUTOMATION OPTIONS

For simple and safe use

### DETECTORS & PERFORMANCE\*

<b>Types</b>	25,4 x 1 000 mm He-3 proportional counters at 4 atm
<b>Arrangement</b>	36 tubes in 4 groups of 7 tubes and 2 groups of 4 tubes
<b>Mode of operation</b>	Coincidence or multiplicity counting
<b>Measurement efficiency</b>	10%
<b>Measurement time (typical)</b>	20 – 50 minutes

### GENERAL\*

<b>Container volume</b>	From 20 to 200 L, others on request
<b>Dimensions (L x P x H)</b>	2 370 x 2 450 x 2 500 mm

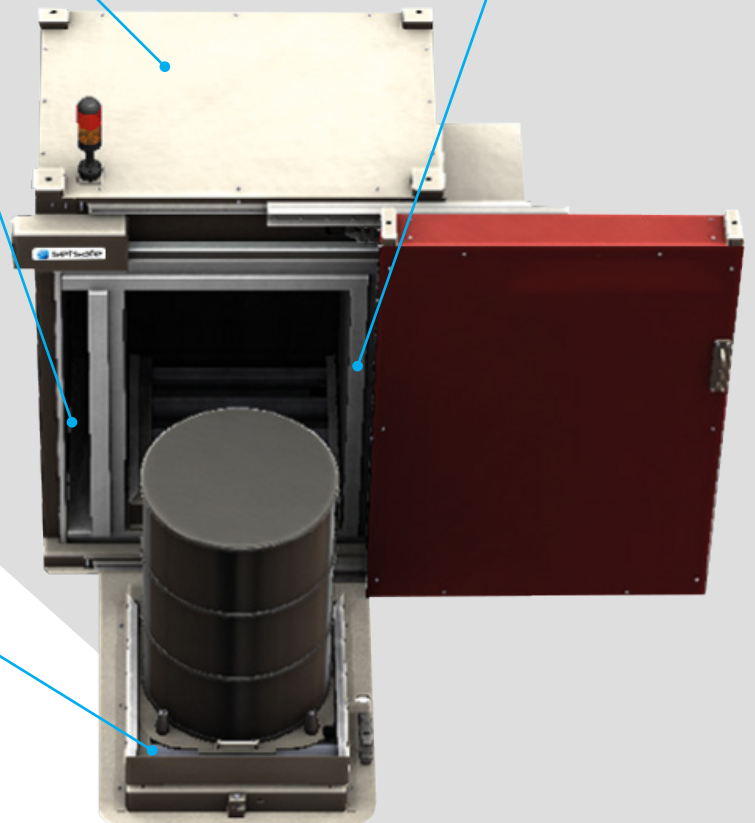
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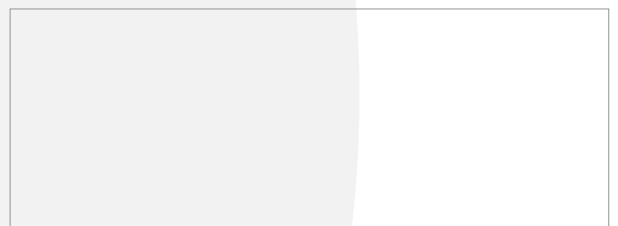
# BASE ELEMENTS OF n-CHECK

The detection system is composed of He-3 tubes distributed over the 6 faces of the measurement cavity. Their number and position are optimized to obtain the required detection efficiency.

The measurement cavity is composed of neutron moderator blocks made of PEHD. Their thickness can be optimized. Detachable neutron absorbing shields, made of cadmium or borated materials, can be added to reduce the background noise.

Container handling is made easy thanks to various automation options. Here, a motorized and mobile conveyor can transfer the container inside the measurement cavity.





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