Thermo Scientific
Neutron Gate Monitor FHT 1388 S

Sensitive Detection of Industrial Americium Sources

The new Thermo Scientific Neutron Gate Monitor FHT 1388 S provides a high level of protection against the inadvertent melting of Americium sources.

Key Features

- Modular monitor design for up to 8 dual neutron detectors*
- Flat panel large area neutron detector elements embedded in thoroughly designed moderator and reflector housing for maximum sensitivity
- Optimized timing algorithm for best signal recognition and false alarm free operation
- Excellent source detection capabilities for industrial neutron and Am-241 sources (shielded and embedded in steel scrap) as low as
  - 1 – 5 mCi for AmBe (neutron gauge sources)
  - 200 – 1000 mCi for Am (gamma/X-ray gauges)
- Preferred location of monitor at stationary weighing bridge
- Stand-alone operation or integration into gamma portal monitor FHT 1388 S
- Easy installation - only 25 kg per detector module

** Neutron monitoring capabilities are recommended in the IAEA Safety Guide SSG-17 (2012) "Control of Orphan Sources and other Radioactive Material in the Metal Recycling and Production Industries"*

In recent years several incidents have been reported, where orphan Am-241 sources, inadvertently included in scrap metal, were molten in the furnaces of a steel plant. Despite the fact that the steel remains largely uncontaminated in such melts (due to its physical properties most of the Am-241 activity ends up in the slag and dust), the cost of clean-up and disposal are significant. As well the inhalation risk to the work force is significant, since the radio toxicity of Am-241 is comparable to Plutonium.

Unlike other industrial sources (Co-60, Cs-137, Ir-192, Eu-152) and naturally occurring radioactive materials (NORM), Am-241 predominantly emits low energy gamma radiation below 100 keV (mainly 59 keV). The emission rate of penetrating higher energy gamma radiation is very low (in the order of E-5), so that even high activity sources can remain undetected by conventional systems based on gamma detectors.

In order to address this gap in the detection capabilities of conventional industrial gate monitors, Thermo Fisher Scientific Messtechnik GmbH, Erlangen, Germany has developed a highly sensitive neutron detector system which can be integrated into existing Thermo Scientific gate monitors or can be operated as stand-alone installation. The design of the system was led by the fact that any Am-241 source emits as well a certain amount of neutron radiation. These high energy neutrons are produced in the AmOxide source matrix by nuclear alpha,n reaction.

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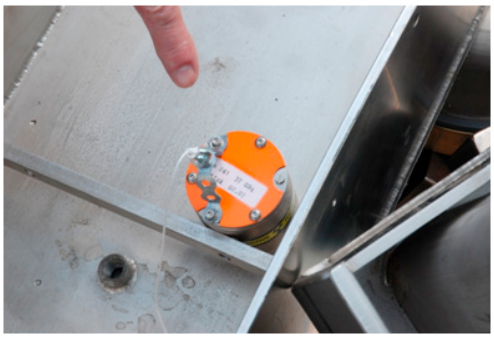
Compared to gamma radiation, these neutron particles are highly penetrating and therefore much less attenuated by the shielding of the source and the surrounding scrap material. In addition to the surprisingly good detection capability for high activity Am-241 sources, these systems obviously provide excellent protection against neutron sources (AmBe, Cf-252, Pu-238, Pu-240, Cm isotopes) which are in common use in industry, including low activity portable devices which may be deeply buried in dense scrap material and remain undetected by conventional gate monitors.



1 Ci Am-241 source in Tungsten shielding container

50 mCi AmBe industrial source found in steel scrap

Mobile High Sensitivity Gamma Neutron Screening with light weight backpack instrument

High sensitivity routine surveys of extended areas (scrapyard, steel mill) can be accomplished by the FHT 1377 GN-2 PackEye. This extremely simple to use instrument contains the same high sensitivity neutron flat panel detectors as built into the stationary gate monitor. Additionally a 1 litre gamma detector with NBR (Natural Background Rejection) is integrated, so that a “second line of defense” can be established for cases where an orphan source had not been detected by any entrance gate monitor.

For further detailed information please ask for the FHT 1377 GN-2 data sheet.

Usage as backpack monitor

Usage in on-site security vehicle

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