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**Horia Hulubei National Institute for
R&D in Physics and Nuclear
Engineering**

Portable stand and protocol for calibration of a tritium gas monitor

Patent Number: RO126503/17.11.2010

Abstract

The patent request relates to a portable calibration stand for tritium gas monitors with ionisation chamber that works as a sealed and autonomic system. The calibration protocol consist of controlled contamination of the air recirculated through the ionization chamber using the pump fitted to monitor.

The controlled contamination of air is achieved with saturated tritiated water (HTO) vapour by purging of the air in the sealed system over a hydrogel which containing tritiated water with certified radioactive concentration. As a solidifying agent, polyacrylic acid (PAA) with a high degree of swelling is used. The PAA presence does not affect the concentration of standard radioactive sources, does not affect the saturated vapour pressure values of HTO and saturated vapour pressure ratio of HTO / H₂O. The PAA shows good mechanical and radiolysis stability.

According to the patent request, the contamination of the recycled air is controlled by the radioactive concentration of the HTO, the absolute humidity of the air, the saturated vapour pressure ratio of HTO / H₂O.

Decontamination of air inside of the calibration stand after each calibration step and finally is realized by air recirculating on a dehydration cartridge

Advantages

- Portable calibration stand easy to handle
- The possibility to calibrate monitoring equipment which cannot be removed from the working positions and transported to the the calibration unit;
- Easy calibration protocol. No contamination of environment

MTG = Tritium Gas Monitor with Ionisation Chamber; R1-R6 = Vacuum valves; FE = Interchangeable HTO evaporation vial; C = Vacuum connector DN ISOKF; CD = Desiccation cartridge; TS = Silicon tube for connection

Technology stage

The functional model is realised and tested using as standards HTO solutions certified by Radionuclide Metrology Laboratory (LMR) from IFIN HH. After building of the prototype using technical specifications described in the request patent, the product and associated protocol is ready for licensing.

Applications

Calibration of tritium gas monitor from the tritium units.

Target groups

NPP Cernavoda, Future Cernavoda Tritium Removal Facility, Water Detritiation Systems for ITER and JET

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