

## **Quality control devices for intraoperative gamma probes: physical, technical and radiation protection aspects**

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### **Abstract**

Now a day, radioguided surgery –a novelty in Nuclear Medicine- is increasingly used. The clinical efficiency of these procedures requires the existence of well-trained professionals and implementation of quality assurance programs. It is essential for achieving the main objective, which is an effective and safe surgical procedure, a reliable performance of the detection device. Probes' parameters must remain within the acceptance limits, so they should be checked periodically. NEMA Standards Publication NU 3-2004 "Performance Measurement and Quality Control Guidelines for Non-Imaging Intraoperative Gamma Probes" recommends 13 tests; although only 3 of them -sensitivity in air, visual inspection and power source check- are considered as steadiness tests. Space resolution in a scatter medium is also a test that needs to be carried out. These tests are considerably complex since open radioactive sources are used into a liquid medium in most of the procedures. The immersion of the probe and of the radioactive sources in each case represents both risks of radioactive contamination, and of damages to the equipment. On the other hand, tests in air demand a good reproducibility. Since they are recommended be carried out before any surgery procedure, they also should be easy and quick.

This paper presents 3 devices with its accessories for acceptance and quality control tests of intraoperative gamma probes. They were designed and built taking into consideration important aspects of radiological protection to handle the calibration sources and probes, both in air and into a scatter medium. These devices are designed to fit any kind of probe. Regulatory bodies as part of their instrument audits can also use them.

**KEYWORDS:** *radioguided surgery, intraoperative probe, quality control, nuclear medicine*

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**Performance measurement and quality control tests vs phantoms designing for non imaging intraoperative gammaprobes.**



For Sensitivity in Air, Sensitivity through Side Shielding in Air, Short Term Sensitivity Stability, Energy Resolution and Side and Back Shielding



For: Volume Sensitivity to Distributed Activity in a Scatter Medium



For: Sensitivity in a Scatter medium, Sensitivity to Scatter, Spatial Resolution in a Scatter Medium, Count Rate Capability in a Scatter Medium and Angular Resolution in Scatter Medium

