

This is a preview - click here to buy the full publication



IEC TR 61948-1

Edition 2.0 2016-03

# TECHNICAL REPORT

---

**Nuclear medicine instrumentation – Routine tests –  
Part 1: Gamma radiation counting system**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

---

ICS 11.040.50

ISBN 978-2-8322-3240-8

**Warning! Make sure that you obtained this publication from an authorized distributor.**

## CONTENTS

FOREWORD.....	3
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions .....	5
4 Test methods.....	6
4.1 General.....	6
4.2 Background check.....	6
4.3 ENERGY CALIBRATION .....	7
4.4 ENERGY CALIBRATION linearity .....	7
4.5 Constancy of sensitivity .....	7
4.6 Constancy of ENERGY RESOLUTION .....	7
4.7 Counting precision .....	7
5 Frequency of ROUTINE TESTS .....	8
Annex A (informative) Index of defined terms .....	9
Table 1 – Frequency of ROUTINE TESTS .....	8

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

### NUCLEAR MEDICINE INSTRUMENTATION – ROUTINE TESTS –

#### Part 1: Gamma radiation counting system

#### FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

IEC TR 61948-1, which is a technical report, has been prepared by subcommittee 62C: Equipment for radiotherapy, nuclear medicine and radiation dosimetry, of IEC technical committee 62: Electrical equipment in medical practice.

This second edition cancels and replaces the first edition published in 2001. This edition constitutes a technical revision and includes the following significant technical changes with respect to the previous edition:

- a) Geiger-Mueller counters are explicitly excluded from the scope;

- b) the routine test for energy calibration has been split into a test for energy calibration (frequency: daily) and a test for energy calibration linearity (frequency: semi-annual);
- c) the test for window presets has been removed.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
62C/621/DTR	62C/642/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

In this technical report the following print types are used:

- requirements, compliance with which can be tested, and definitions: in roman type;
- notes, explanations, advice, introductions, general statements, exceptions and references: in smaller roman type;
- *test specifications: in italic type;*
- TERMS DEFINED IN CLAUSE 3 OF THIS TECHNICAL REPORT OR LISTED IN ANNEX A: SMALL CAPITALS.

The requirements are followed by specifications for the relevant tests.

A list of all parts in the IEC 61948, published under the general title *Nuclear medicine instrumentation – Routine tests*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

A bilingual version of this publication may be issued at a later date.

## **NUCLEAR MEDICINE INSTRUMENTATION – ROUTINE TESTS –**

### **Part 1: Gamma radiation counting system**

#### **1 Scope**

This part of IEC 61948, which is a technical report, describes test methods of instruments that count and measure the energy of photons emitted by RADIONUCLIDES *in vivo* and *in vitro* without the option of imaging. This includes, for example, well counters and organ probes. Geiger-Mueller counters and dose calibrators are not within the scope of this document.

As part of QUALITY CONTROL this report is defining ROUTINE TESTS to be performed by the user of gamma radiation counting systems to maintain proper operation conditions. The results of these ROUTINE TESTS are compared to the REFERENCE DATA determined during or after the ACCEPTANCE TEST.

#### **2 Normative references**

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC TR 60788:2004, *Medical electrical equipment – Glossary of defined terms*