

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Radiation protection instrumentation – Spectroscopy-based alarming personal radiation detectors (SPRD) for the detection of illicit trafficking of radioactive material

Instrumentation pour la radioprotection – Détecteurs individuels spectroscopiques d'alarme aux rayonnements (SPRD) pour la détection du trafic illicite de matières radioactives





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CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope.....	7
2 Normative references	7
3 Terms and definitions, abbreviated terms and symbols, quantities and units.....	8
3.1 Terms and definitions.....	8
3.2 Abbreviated terms and symbols	10
3.3 Quantities and units	10
4 General test procedure	11
4.1 Standard test conditions	11
4.2 Uncertainties.....	11
4.3 Statistical fluctuations	11
4.4 Background radiation during testing	12
4.5 Operating parameters and set up.....	12
4.6 Radiation sources	12
4.7 Special nuclear material (SNM) and depleted uranium (DU) sources.....	12
4.8 Speed of moving sources including scaling	12
4.9 Functionality test and test acceptance range requirements	13
4.10 Neutron measurement requirements	15
5 General requirements	16
5.1 Basic information	16
5.2 Mechanical characteristics	16
5.3 Data output.....	17
5.4 User indications	17
5.5 Markings	17
5.6 Alarms	18
6 Radiation detection requirements	18
6.1 False alarm rate.....	18
6.2 Gamma alarm	18
6.3 Personal protection alarm	19
6.4 Relative intrinsic error.....	19
6.5 Detection of gradually increasing radiation levels.....	20
6.6 Over-range	20
6.7 Detection of neutrons (if provided)	20
6.8 Gamma response of neutron detector (if provided).....	21
6.9 Identification of single radionuclides	22
6.10 Simultaneous radionuclide identification	23
6.11 Low-exposure rate identification.....	23
6.12 Over range characteristics for identification	23
7 Environmental requirements	24
7.1 Ambient temperature.....	24
7.2 Temperature shock	24
7.3 Relative humidity	24
7.4 Dust and moisture protection	25
8 Mechanical requirements.....	25
8.1 Vibration	25

8.2	Microphonics/Impact	26
8.3	Drop	26
9	Electromagnetic requirements	26
9.1	Electrostatic discharge (ESD)	26
9.2	Radio frequency (RF).....	27
9.3	Radiated RF emissions	27
9.4	Magnetic fields.....	27
10	Documentation	28
10.1	Operation and maintenance manual.....	28
10.2	Test certificate	28
10.3	Declaration of conformity	28
	Bibliography.....	29
	Table 1 – Overview of IEC radiation protection instrumentation standards	6
	Table 2 – Standard test conditions	11
	Table 3 – Test results analysis.....	15
	Table 4 – Identification acceptance criteria ¹	22

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**RADIATION PROTECTION INSTRUMENTATION –
SPECTROSCOPY-BASED ALARMING PERSONAL
RADIATION DETECTORS (SPRD) FOR THE DETECTION
OF ILLICIT TRAFFICKING OF RADIOACTIVE MATERIAL**

FOREWORD

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IEC 62618 has been prepared by subcommittee 45B: Radiation protection instrumentation, of IEC technical committee 45: Nuclear instrumentation. It is an International Standard.

This second edition cancels and replaces the first edition published in 2013. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) making the standard consistent with the new standards for detection of illicit trafficking of radioactive material (see the Introduction);
- b) creating unformed functionality test for all environmental, electromagnetic and mechanical tests and a requirement for the coefficient of variation of each nominal mean reading;
- c) reference to IEC 62706 for the environmental, electromagnetic and mechanical test conditions;
- d) adding information regarding climatic exposures.

The text of this International Standard is based on the following documents:

Draft	Report on voting
45B/1011/FDIS	45B/1017/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

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

INTRODUCTION

It is important to detect illicit and inadvertent movement of radioactive materials in the form of radiation sources and contaminated metallurgical scrap. Radioactive sources out of regulatory control, so-called “orphan sources”, have frequently caused serious radiation exposures and widespread contamination. Although illicit trafficking of nuclear and other radioactive materials is not a new problem, concern about a nuclear “black market” has increased particularly in view of its terrorist potential.

In response to the technical policy of the International Atomic Energy Agency (IAEA), the World Customs Organization (WCO), and the International Criminal Police Organization (Interpol) related to the detection and identification of special nuclear materials and security trends, nuclear instrumentation companies have developed and manufactured radiation instrumentation to assist in the detection of illicit movement of radioactive and special nuclear materials. This type of instrumentation is widely used for security purposes at nuclear facilities, border control checkpoints, and international seaports and airports.

To ensure that measurement results made at different locations are consistent, it is imperative that radiation instrumentation be designed to specifications based upon agreed performance requirements. IEC standards have been developed to establish performance requirements for personal radiation detectors, radiation portal monitors, highly sensitive gamma and neutron detection systems, spectrometric personal radiation detectors, and backpack-based radiation detection and identification systems. Table 1 contains a list of those standards.

Table 1 – Overview of IEC radiation protection instrumentation standards

Type of instrumentation	IEC number	Title of the standard
Body-worn	62401	Radiation protection instrumentation – Alarming Personal Radiation Devices (PRDs) for the detection of illicit trafficking of radioactive material
	62618	Radiation protection instrumentation – Spectroscopy-Based Alarming Personal Radiation Detectors (SPRD) for the detection of illicit trafficking of radioactive material
	62694	Radiation protection instrumentation – Backpack-type radiation detector (BRD) for the detection of illicit trafficking of radioactive material
Portable or hand-held	62327	Radiation protection instrumentation – Hand-held instruments for the detection and identification of radionuclides and for the estimation of ambient dose equivalent rate from photon radiation
	62533	Radiation protection instrumentation – Highly sensitive hand-held instruments for photon detection of radioactive material
	62534	Radiation protection instrumentation – Highly sensitive hand-held instruments for neutron detection of radioactive material
Portal	62244	Radiation protection instrumentation – Installed radiation portal monitors (RPMs) for the detection of illicit trafficking of radioactive and nuclear materials
	62484	Radiation protection instrumentation – Spectrometric radiation portal monitors (SRPMs) used for the detection and identification of illicit trafficking of radioactive material
Data format	62755	Radiation protection instrumentation – Data format for radiation instruments used in the detection of illicit trafficking of radioactive materials
Mobile system	63121	Radiation protection instrumentation – Vehicle-mounted mobile systems for the detection of illicit trafficking of radioactive materials