

International standards for the performance of radiation detection instruments used in the global nuclear security framework

The physical protection of nuclear material is fundamental to nuclear security. Interdicting the illegal movement and transfer of nuclear material is part of the nuclear material physical protection. The instruments for monitoring the illegal movement of nuclear and radioactive material need to have performance characteristics and reliability that will assure that they will do the task of preventing the illegal movement and contraband of nuclear material. The minimum performance requirements that each type of radiation detection instrument must meet are specified in a set of standards. The international standards for radiation detection instruments are developed by the International Electrotechnical Commission (IEC) Sub-Committee 45B "Radiation Protection Instrumentation". The IEC is the oldest standards organization with more than 200 Technical Committees and Sub-Committees and over 20000 experts from all over the world. The IEC standards specify the minimum performance requirements for such instruments.

The international standards for detecting and monitoring the illegal trafficking of nuclear and radioactive material cover the following types of instruments:

1. Hand-held and portable instruments
 - Hand-held radionuclide identification devices
 - Hand-held highly sensitive photon devices
 - Hand-held highly sensitive neutron devices
2. Instruments worn on the body
 - Alarming personal radiation devices (PRD);
 - Spectroscopy-based alarming personal radiation devices (SPRD);
 - Backpack based radiation detector (BRD)
3. Instruments on Portals
 - Portal Monitors (RPM);
 - Spectroscopy-Based Portal Monitors (SPRM)
4. Instrumentation mounted on vehicles and used for drive-by monitoring
 - Vehicle-mounted mobile systems

The international standards specify requirements for the design and the general and radiation characteristics, the test procedures that show compliance with the standard requirements, as well as the electromagnetic, mechanical, climatic and safety requirements.

The criteria and compliance test methods in these standards are the result of consensus among the participating experts from many countries. The international standards reflect the positions of the national regulatory agencies, scientific and technological progress of the industry, testing laboratories capabilities, end user needs, testing cost and the way the instruments are used in the field.

The IEC/SC 45B standards for evaluation of the illicit trafficking of radioactive material control instrumentation are used in many countries. They have been transposed by the CENELEC/TC 45B as European EN standards which allows to be referenced and used in different projects and conformity assessment programs as the ITRAP (Illicit Trafficking Radiation Assessment Program). The US ANSI (American National Standard Institute) standards of the N42 group "Homeland Security Instrumentation" and the IEC/SC 45B standards are constantly being harmonized with each other.

The presentation provides overview of the IEC international standards for radiation instrumentation used for detection of illicit trafficking of radioactive and nuclear material.

Gender

Male

State

Other

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Track Classification: MORC: Preventing illicit trafficking of nuclear and radioactive material