# IEC 63148

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# INTERNATIONAL STANDARD

# NORME INTERNATIONALE

## Tracking systems for radioactive materials – Requirements

## Systèmes de suivi des matières radioactives – Exigences

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International Standard IEC 63148 has been prepared by IEC technical committee 45: Nuclear instrumentation.

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

| FDIS | Report on voting |
|---|---|
| 45/924/FDIS | 45/926/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.

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# INTRODUCTION

Radioactive materials are widely used for industrial non-destructive testing, medical diagnosis and therapy, and nuclear facilities, etc., so the safe use of radioactive materials is very important to protect workers and to protect public health.

The tracking system includes two functions, namely the detection of radioactive materials and wireless communication.

Today all manner of products that we take for granted are dependent on the safe, secure and reliable transport of radioactive materials from manufacturer to the end user, or mobile use, for the purpose of non-destructive tests (NDT). As a result of the increased use of radioactive materials in, for example, industry, medicine and agriculture, shipments have become more frequent and larger in volume. In addition, transportation safety and security are vital during all stages of the nuclear fuel cycle – to and from nuclear power plants: at the front end, to transport uranium concentrates and new fuel assemblies; and at the back end, to transport radioactive waste and spent nuclear fuel for storage or disposal.

This document may also be useful for other dangerous materials and valuable goods to be transported and tracked.

# TRACKING SYSTEMS FOR RADIOACTIVE MATERIALS – REQUIREMENTS

## 1 Scope

This document specifies the requirements of tracking systems for radioactive materials. Such systems identify and locate the position of the radioactive materials transported using global navigation satellite systems (GNSS) and radio frequency identification (RFID).

The system provides a set of safety controls of the radioactive material, by which the transporter can improve safety during transportation. This document may also be used as supplementary guidance to the regulatory body.

The tracking system consists of a measurement unit and a wireless communication unit. The measurement unit includes a radiation detector which measures radiation dose rate and may include a detector to measure the energy spectrum of photons emitted from radioactive materials transported, plus temperature and pressure sensors. The wireless communication unit includes mobile devices, base transceiver systems and mobile service providers.

Radioactive materials to be tracked include all radioactive materials, radioactive sources, radioactive waste and nuclear material, including nuclear fuel and spent fuel, transported using a Type B(U), Type B(M) or Type C package. Other criteria might be considered when the transport index is greater than 1.

This document does not apply to ambient or personal dose equivalent meters, which are covered in IEC 60846-1 or IEC 61526, respectively.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050-395:2014, *International Electrotechnical Vocabulary (IEV) – Part 395: Nuclear instrumentation – Physical phenomena, basic concepts, instruments, systems, equipment and detectors*

IEC 60721-3-2:2018, *Classification of environmental conditions – Part 3-2: Classification of groups of environmental parameters and their severities – Transportation and Handling*

ISO/IEC 27000, *Information technology – Security techniques – Information security management systems – Overview and vocabulary*

ISO/IEC 27001, *Information technology – Security techniques – Information security management systems – Requirements*

ISO/IEC 27002, *Information technology – Security techniques – Code of practice for information security controls*

ISO/IEC 27005, *Information technology – Security techniques – Information security risk management*