

Installed monitors for the control and detection of gamma radiations contained in recyclable or non-recyclable materials transported by vehicles

The European Standard EN 62022:2007 has the status of a
British Standard

ICS 13.280

National foreword

This British Standard is the UK implementation of EN 62022:2007. It was derived by CENELEC from IEC 62022:2004.

The CENELEC common modifications have been implemented at the appropriate places in the text and are indicated by tags **[C]** **[C]**.

The UK participation in its preparation was entrusted to Technical Committee NCE/2, Radiation protection and measurement.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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**Installed monitors for the control and detection of gamma radiations
contained in recyclable or non-recyclable materials
transported by vehicles
(IEC 62022:2004, modified)**

Moniteurs fixes de contrôle et de détection
d'émetteurs de rayonnements gamma
contenus dans des matériaux recyclables
ou non recyclables, transportés
dans des véhicules
(CEI 62022:2004, modifiée)

Fest installierte Monitore
für die Überwachung und den Nachweis
von Gammastrahlen-Emittern
in von Fahrzeugen transportierten,
wiederverwertbaren
oder nicht wiederverwertbaren Materialien
(IEC 62022:2004, modifiziert)

This European Standard was approved by CENELEC on 2007-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

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Foreword

The text of the International Standard IEC 62022:2004, prepared by SC 45B, Radiation protection instrumentation, of IEC TC 45, Nuclear instrumentation, together with the common modifications prepared by CENELEC BTTF 111-3, Nuclear instrumentation and radiation protection instrumentation, was submitted to the formal vote and was approved by CENELEC as EN 62022 on 2007-07-01.

The following dates were fixed:

- latest date by which the EN has to be implemented
at national level by publication of an identical
national standard or by endorsement (dop) 2008-07-01
- latest date by which the national standards conflicting
with the EN have to be withdrawn (dow) 2010-07-01

Clauses, subclauses, notes, tables and figures which are additional to those in IEC 62022:2004 are prefixed “Z”.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62022:2004 was approved by CENELEC as a European Standard with agreed common modifications.

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INSTALLED MONITORS FOR THE CONTROL AND DETECTION OF GAMMA RADIATIONS CONTAINED IN RECYCLABLE OR NON-RECYCLABLE MATERIALS TRANSPORTED BY VEHICLES

1 Scope

This International Standard is applicable to installed monitors for the control and detection of radioactivity of gamma emitters contained in recyclable or non-recyclable material waste to be transported by vehicles.

This standard is designed to provide the purchaser with an indication of the performance of the equipment in detecting radioactive sources left in the material being monitored, and not to measure quantity.

This standard does not apply to hand-held equipment. It is not applicable to the monitoring of materials on conveyors, in grabs or being moved by electromagnets.

This standard is not intended for the monitoring of radioactive waste or detection of fissile materials.

The object of this standard is to define an installed monitor for the control and detection of radioactivity of gamma emitters contained in recyclable or non-recyclable materials transported by vehicle, the conceptual requirements, general characteristics, mechanical characteristics, environmental conditions, minimal requirements, test procedures and documentation.

The selection of the location of the instrumentation on the site needs to be optimised to achieve the best performance of measurement, but this is beyond the scope of this standard.

The gamma radiation detected by these monitors may be emitted by one or several discrete radioactive sources included in the loading, or by the presence of radioactive material in the vehicle being monitored.

These monitors are to be used outdoors. The radiations detected are gamma emissions of energy at least from 50 keV to 1 500 keV.

It is advantageous if the equipment can give the approximate location of a radioactive source but this is not a mandatory requirement of this standard.

Conformance with the requirements of this standard is no guarantee that a radioactive source will always be discovered. The shielding of the high-density materials will mean radioactive substances buried deep in the material could be missed.

2 Normative references

The following referenced documents should be used for the application 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 60038:1983, *IEC standard voltages*
Amendment 1 (1994)
Amendment 2 (1997)

IEC 60050(151):2001, *International Electrotechnical Vocabulary (IEV) – Chapter 151: Electrical and magnetic devices*

IEC 60050(393):1996, *International Electrotechnical Vocabulary (IEV) – Chapter 393: Nuclear instrumentation: Physical phenomena and basic concepts*

IEC 60050(394):1995, *International Electrotechnical Vocabulary (IEV) – Chapter 394: Nuclear instrumentation: Instruments*

IEC 60068-2-27:1987, *Basic environmental testing procedures – Part 2: Tests – Test Ea and guidance: Shock*

IEC 61000-4-3:2006, *Electromagnetic compatibility (EMC) – Part 4-3: Testing and measurement techniques – Radiated, radio-frequency, electromagnetic field immunity test*

IEC 61000-4-4:2004, *Electromagnetic compatibility (EMC) – Part 4-4: Testing and measurement techniques – Electrical fast transient/burst immunity test.*

IEC 61000-4-5:2005, *Electromagnetic compatibility (EMC) – Part 4-5: Testing and measurement techniques – Surge immunity test*

IEC 61000-4-6:2006, *Electromagnetic compatibility (EMC) – Part 4-6: Testing and measurement techniques – Immunity to conducted disturbances, induced by radio-frequency fields*

IEC 61000-4-11:2004, *Electromagnetic compatibility (EMC) – Part 4-11: Testing and measurement techniques – Voltages dips, short interruptions and voltage variation immunity tests*

IEC 61187:1993, *Electrical and electronic measuring equipment – Documentation*

ISO 4037-1:1996, *X and gamma reference radiation for calibration dosimeters and dose rate meters and for determining their response as a function of photon energy – Part 1: Radiation characteristics and production methods*

3 Terms, definitions, quantities and units

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050(393) and IEC 60050(394), as well as the following, apply.

3.1.1

sensitivity

for a given value of the measured quantity, ratio of the variation of the observed variable to the corresponding variation of the measured quantity

[IEV 394-19-07]

NOTE In this standard, sensitivity is the ratio between the net true count rate and the activity of radiation source. This sensitivity depends on the nature of the radiation issuing radionuclide.

3.1.2

background level

gamma radiation field in which the equipment is intended to operate, which includes natural background (including eventually radiation due to radioactive sources adjacent to the equipment), without monitored vehicle.

For a measuring assembly, when the assembly is placed under its normal conditions of operation, value indicated in the absence of the source whose radiation is to be measured

[IEV 394-19-08, modified]

3.1.3

detector efficiency

ratio of the number of detected photons to the number of photons of the same type which are incident on the detector in the same time interval

[IEV 394-18-21, modified]

3.1.4

radiation detection assembly

assembly intended for converting ionizing radiation energy into a normalized signal, carrying information about ionizing radiation physical quantities, and which provides the signal for transmission to the information treatment assembly

[IEV 394-01-15, modified]

3.1.5

information treatment assembly

assembly which treats the count rates issued from the radiation detection assembly over a period of time, performs the necessary corrections for statistical variations, background level and eventually shielding effects, and compares it to alarm threshold

3.1.6

alarm assembly

assembly that provides visual or audio signals or both to call attention to events

[IEV 393-08-03, modified]

3.1.7

reference point of radiation detection assembly

physical mark on the assembly to be used in order to position it at a precise point, to define the geometric conditions of tests