



**SLOVENSKI STANDARD**  
**SIST EN 62022:2008**  
**01-februar-2008**

---

**Vgrajeni monitorji za nadzor in detekcijo sevanja gama, ki ga oddajajo za recikliranje primerni ali neprimerni materiali, transportirani z vozili (IEC 62022:2004, spremenjen)**

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

Fest installierte Monitore für die Überwachung und den Nachweis von Gammastrahlen-Emittern in von Fahrzeugen transportierten, wiederverwertbaren oder nicht wiederverwertbaren Materialien

Moniteurs fixes de contrôle et de détection d'émetteurs de rayonnements gamma contenus dans des matériaux recyclables ou non recyclables, transportés dans des véhicules

**Ta slovenski standard je istoveten z: EN 62022:2007**

**ICS:**

13.280

17.240

**SIST EN 62022:2008**

**en,fr,de**

# **iTeh STANDARD PREVIEW** **(standards.iteh.ai)**

SIST EN 62022:2008

<https://standards.iteh.ai/catalog/standards/sist/54347f29-916d-4a1b-b499-39e4cdb0e788/sist-en-62022-2008>

**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)

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN 62022:2008  
https://standards.iteh.ai/catalog/standards/sist/5d347120-910f-4a1b-b49f-30e10d1de7b8/cen-en-62022-2008  
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

**Central Secretariat: rue de Stassart 35, B - 1050 Brussels**

## 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.

---

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN 62022:2008

<https://standards.iteh.ai/catalog/standards/sist/54347f29-916d-4a1b-b499-39e4cdb0e788/sist-en-62022-2008>

## Endorsement notice

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

### COMMON MODIFICATIONS

**Replace** “operational setting” with “operating setting” all over the document.

## 2 Normative references

**Replace** the references to IEC 61000-4 series with their latest editions.

## 4 Design requirements

### 4.1 General characteristics

**Add** at the end of the first paragraph: “... threshold. The alarm threshold is not a fixed value, but an expected value depending on the measuring conditions, e.g. the material and energy ranges expected.”

**Replace** the last paragraph with:

In the case of the dynamic mode (the vehicle passing the equipment) alarm occurs when there is a statistically significant increase in the detected fluence rate of gamma photons when the vehicle is passing the detection system. This fluence may however be less than that due to normal background.

**Add** a new paragraph below the current text, reading:

In the case of the static mode (vehicle stationary within the equipment) an alarm occurs when the fluence rate of gamma photons detected is greater than a pre-established level.

### 4.2 Configuration

**Replace** the first paragraph with:

The equipment is composed of one or several radiation detection assemblies adjacent to the vehicle in the static mode and close to the vehicle whilst it passes in the dynamic mode, and an information treatment assembly, linked to an alarm assembly.

**Replace** the fifteenth paragraph with:

Sensors should indicate the approach of the vehicle to inhibit any further storage of background information. Further sensors should indicate the vehicle is in the monitoring position or passing through the monitoring area.

**Replace** the last paragraph with:

Equipment shall be provided with appropriate facilities for indicating faults, for example loss of detector voltage or failure of electronics. The number and type of faults to be indicated shall be by agreement between the manufacturer and purchaser.

### 4.3 Indication facilities

**Begin** the penultimate paragraph with “It should be possible to transfer these data to an additional ...”

## 5 Test procedures

### 5.1 General test conditions

#### 5.1.1 Nature of tests

In the last two bullets, **replace** “reference load” with “reference load (see 5.1.6)”.

#### 5.1.3 Tests performed under standard test conditions

**Replace** the first sentence with “Tests which are performed under standard test conditions are listed in Table 2, the table indicates, for each characteristic under test ...”

#### 5.1.6 Test vehicle

**Replace** the fifth paragraph with:

Recommended vehicles and reference loads are given in Annex A.

In the last paragraph, **replace** “wood” with “wood (wood for non-metal applications only)”.

### 5.2 Radiation characteristics

#### 5.2.2 Reference radioactive sources

In item a), **change** the order of second and third paragraphs.

In item b), **add** a further paragraph, reading:

These reference radioactive sources shall be used when the equipment is tested with a test vehicle.

#### 5.2.4 Sensitivity of the radiation detection assembly for radioactive sources placed in free air

##### 5.2.4.2 Testing method

In the second paragraph, **replace** “1 m” with “2 m”.

### 5.4 Electrical characteristics

#### 5.4.1 Requirements for power supplies

In the last sentence, **replace** “indications of the quantities” with “indicated count rate” and “10 %” with “ $\pm 5$  %”.

#### 5.4.2 Method of test

In the last sentence of the third paragraph and in items a) and b), **replace** “10 %” with “ $\pm 5$  %”.

### 5.5 Mechanical characteristics

#### 5.5.1 Mechanical shocks

**Add** a further paragraph below the current text, reading:

The detection assemblies should be protected by physical barriers.

**5.5.2 Vibration test**

**5.5.2.1 Requirements**

**Replace** “The indication of the equipment” with “The count rate”.

**Add** at the end of the paragraph “... and no alarm shall appear.”

**5.5.2.2 Method of test**

**Replace** in the third paragraph “or other changes” with “and no physical damages”.

**5.7 Electromagnetic compability**

**5.7.1 Radiated electromagnetic fields**

**5.7.1.1 Requirements**

**Replace** “15 %” with “10 %”.

**5.7.1.2 Method of test**

**Replace** in the second paragraph “1 GHz” with “6 GHz”, **replace** “frequencies (27),” with “41 frequencies” and **replace** “and 1 000 MHz” with “1 000, 1 400, 1 500, 1 600, 1 800, 2 000, 2 200, 2 400, 3 000, 5 100, 5 300, 5 500, 5 700 and 5 900 MHz”.

**Replace** the last sentence of the last paragraph with “There shall be no unintended change in the operating settings from before to after the test and no false indications during or after the test.”

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

**5.7.2 Conducted disturbances induced by bursts and radio-frequencies**

**5.7.2.1 Requirements**

[SIST EN 62022:2008](https://standards.iteh.ai/catalog/standards/sist/54347f29-916d-4a1b-b499-39e4cdb0e788/sist-en-62022-2008)

**Replace** “15 %” with “10 %”.

**5.7.2.2 Method of test**

**Replace** “15 %” with “10 %”.

**Replace** the last sentence with “There shall be no unintended change in the operating settings from before to after the test and no false indications during or after the test.”

**5.7.3 Surges**

**5.7.3.1 Requirements**

**Replace** “15 %” with “10 %”.

**5.7.3.2 Method of test**

**Replace** “15 %” with “10 %”.

**Replace** the last sentence with “There shall be no unintended change in the operating settings from before to after the test and no false indications during or after the test.”

## 5.7.4 Voltage dips and short interruptions

### 5.7.4.1 Requirements

Replace “15 %” with “10 %”.

### 5.7.4.2 Method of test

Replace “15 %” with “10 %”.

Replace the last sentence with “There shall be no unintended change in the operating settings from before to after the test and no false indications during or after the test.”

## 6 Documentation

### 6.2 Certificate

Replace “measure” with “detect” in the third bullet.

Add a further bullet below the current ones, reading:

- detailed description of the reference vehicle and reference load used for the testing.

### Table 2 Tests performed with variations of influence quantities

In the second line and third line, replace “10 %” with “5 %”.

In the line “vibration test”, add “and no alarm” behind “20 %”.

In the last four lines, replace “15 %” with “10 %”.

[SIST EN 62022:2008](https://standards.iteh.ai/catalog/standards/sist/54347f29-916d-4a1b-b499-39e4cdb0e788/sist-en-62022-2008)

### Annex A Test vehicle

Replace the headline with “**Recommended test vehicles and reference loads**”

Add a note to Figure A.1, reading:

NOTE Z1 The reference point of the detector is 2 m above ground, see 5.2.4.2.

Replace the title of Figure A.2 with “Container as reference load – alternative to the test vehicle of Figure A.1”.



## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable 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.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60038 (mod)	1983	IEC standard voltages	HD 472 S1 <sup>1)</sup> + corr. February	1989 2002
A1	1994		-	-
A2	1997		-	-
IEC 60050-151	2001	International Electrotechnical Vocabulary (IEV) - Part 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	EN 60068-2-27	1993
IEC 61000-4-3	2006	Electromagnetic compatibility (EMC) - Part 4-3 : Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test	EN 61000-4-3	2006
IEC 61000-4-4	2004	Electromagnetic compatibility (EMC) - Part 4-4: Testing and measurement techniques - Electrical fast transient/burst immunity test	EN 61000-4-4	2004
IEC 61000-4-5	2005	Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test	EN 61000-4-5	2006
IEC 61000-4-6	2003	Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields	EN 61000-4-6	2007

<sup>1)</sup> The title of HD 472 S1 is: Nominal voltages for low voltage public electricity supply systems.

IEC 61000-4-11	2004	Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests	EN 61000-4-11	2004
IEC 61187 (mod)	1993	Electrical and electronic measuring equipment - Documentation	EN 61187 + corr. March	1994 1995
ISO 4037-1	1996	X and gamma reference radiation for calibrating dosimeters and doserate meters and for determining their response as a function of photon energy - Part 1: Radiation characteristics and production methods	-	-

## iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 62022:2008](https://standards.iteh.ai/catalog/standards/sist/54347f29-916d-4a1b-b499-39e4cdb0e788/sist-en-62022-2008)

<https://standards.iteh.ai/catalog/standards/sist/54347f29-916d-4a1b-b499-39e4cdb0e788/sist-en-62022-2008>

NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD

CEI  
IEC

62022

Première édition  
First edition  
2004-07

---

---

**Moniteurs fixes de contrôle et de détection  
d'émetteurs de rayonnements gamma  
contenus dans des matériaux recyclables  
ou non recyclables, transportés dans  
des véhicules**

iTeh STANDARD PREVIEW

(standards.iteh.ai)

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

<https://standards.iteh.ai/catalog/standards/sist/en-62022-2008/39e4cdb0e788/sist-en-62022-2008>

© IEC 2004 Droits de reproduction réservés — Copyright - all rights reserved

Aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'éditeur.

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from the publisher.

International Electrotechnical Commission, 3, rue de Varembe, PO Box 131, CH-1211 Geneva 20, Switzerland  
Telephone: +41 22 919 02 11 Telefax: +41 22 919 03 00 E-mail: inmail@iec.ch Web: www.iec.ch



Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

CODE PRIX  
PRICE CODE

T

Pour prix, voir catalogue en vigueur  
For price, see current catalogue

## CONTENTS

FOREWORD.....	7
1 Scope .....	11
2 Normative references .....	13
3 Terms, definitions, quantities and units .....	13
3.1 Terms and definitions .....	13
3.2 Quantities and units .....	17
4 Design requirements.....	19
4.1 General characteristics .....	19
4.2 Configuration.....	19
4.3 Indication facilities .....	21
4.4 Vehicle speed.....	23
5 Test procedures .....	23
5.1 General test conditions .....	23
5.1.1 Nature of tests .....	23
5.1.2 Reference conditions and standard test conditions.....	25
5.1.3 Tests performed under standard test conditions.....	25
5.1.4 Tests performed with variation of influence quantities.....	25
5.1.5 Statistical fluctuations .....	25
5.1.6 Test vehicle .....	25
5.2 Radiation characteristics.....	27
5.2.1 Reference gamma radiation.....	27
5.2.2 Reference radioactive sources.....	27
5.2.3 Background effect.....	27
5.2.4 Sensitivity of the radiation detection assembly for radioactive sources placed in free air.....	29
5.2.5 Alarm test with test vehicle.....	29
5.2.6 False alarm test with test vehicle.....	31
5.3 Overload test.....	31
5.3.1 Requirements .....	31
5.3.2 Method of test.....	31
5.4 Electrical characteristics .....	31
5.4.1 Requirements for power supplies.....	31
5.4.2 Method of test.....	33
5.5 Mechanical characteristics .....	33
5.5.1 Mechanical shocks.....	33
5.5.2 Vibration test .....	33
5.6 Environmental characteristics .....	35
5.6.1 Ambient temperature.....	35
5.6.2 Relative humidity .....	35
5.6.3 Sealing .....	37
5.6.4 External magnetic fields .....	37
5.6.5 Storage.....	37