



National Standards Authority of Ireland

IRISH STANDARD

**I.S. EN 60405:2007**

ICS 27.120

**NUCLEAR INSTRUMENTATION -  
CONSTRUCTIONAL REQUIREMENTS AND  
CLASSIFICATION OF RADIOMETRIC  
GAUGES (IEC 60405:2003 (MOD))**

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EUROPEAN STANDARD

**EN 60405**

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2007

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ICS 27.120

English version

**Nuclear instrumentation -  
Constructional requirements and classification of radiometric gauges  
(IEC 60405:2003, modified)**

Instrumentation nucléaire -  
Prescriptions de construction  
et classification pour les jauges  
de mesure des rayonnements ionisants  
(CEI 60405:2003, modifiée)

Strahlungsmessgeräte -  
Konstruktionsanforderungen  
und Klassifikation radiometrischer  
Einrichtungen  
(IEC 60405:2003, 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

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

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## Foreword

The text of the International Standard IEC 60405:2003, prepared by IEC TC 45, Nuclear instrumentation, together with 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 60405 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 60405:2003 are prefixed “Z”.

Annexes ZA and ZB have been added by CENELEC.

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## Endorsement notice

The text of the International Standard IEC 60405:2003 was approved by CENELEC as a European Standard with agreed common modifications as given below.

### COMMON MODIFICATIONS

**Delete** the clause INTRODUCTION in total.

**Replace** “radiation protection class” with “shielding class” all over the document.

#### 1 Scope and object

In the last sentence of the last paragraph, **replace** “special attention is attached” with “special attention may be attached”.

#### 2 Normative references

**Add:**

EN 60846:2004, *Radiation protection instrumentation – Ambient and/or directional dose equivalent (rate) meters and/or monitors for beta, X and gamma radiation* (IEC 60846:2002, modified)

EN 61005:2004, *Radiation protection instrumentation – Neutron ambient dose equivalent (rate) meters* (IEC 61005:2003, modified)

**Delete** the indications of IEC 61326:2002 and ISO 7205:1986.

#### 3 Definitions

##### 3.4 source holder

**Replace** “support and contain” with “support and fix”.

**Add** a note below the definition, reading:

NOTE Z1 In the context of this standard the term source holder means the part of the device which fixes or holds the source. This can be e.g. the shutter or a part of the housing.

##### 3.6 source housing

**Add** a note below the definition, reading:

NOTE Z1 If the source housing is not part of a measuring head the term source container shall be used (see definition 3.Z1).

##### 3.9 collimation device

**Delete** “useful”.

**Add** a note below the definition, reading:

NOTE Z1 This term is usually applied to collimators used in combination with detectors.

**Add** an additional definition 3.Z1, reading:

##### 3.Z1

##### source container

device which includes the radioactive source, its holder and primary shielding measure and shutter mechanism, if any

NOTE Z1 The term usually means stand alone source container.

## 4 Classification of radiometric gauge types

Add an additional Subclause 4.Z1 below 4.2, reading:

### 4.Z1 Category C: Source containers for fixed radiometric gauges

Category C comprises stand alone source containers for radiometric gauges equipped with a shielding and properties for collimation of the useful beam.

The source container shall be designed in such a way that the radiation, except for the useful beam, is attenuated in conformity with the requirements of this standard.

NOTE Z1 Such source containers are used in fixed level or density gauging systems in which the source holder and the detector are independent units and the useful beam is not restricted by the detector but by additional radiation protection measures.

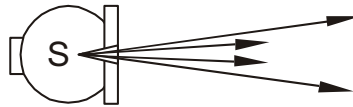


Figure Z1 – Category C stand alone source container for fixed level or density gauges

### 4.3 Radiation protection classes

In Table 1, **replace** all entries for shielding classes 1 and 7 with “Not to be applied”.

In Table 1, **add** for shielding class 6 in the first line of 5 cm distance “> 3,0  $\mu\text{Sv/h}$ ” and in the first line of 100 cm distance “> 1,0  $\mu\text{Sv/h}$ ”.

In Table 1, **add** a new column for class “E” with “ $\leq 3,0 \mu\text{Sv/h}$ ” in the line of 5 cm distance and “ $\leq 1,0 \mu\text{Sv/h}$ ” in the line of 100 cm distance.

**Add** the following notes below Table 1:

NOTE Z1 The values given in Table 1 are NOT related to limits required in European or national regulations for radiation protection. Those limits may require additional measures on site and have to be verified in the specific application.

NOTE Z2 Referring to 10.1 to each gauge four shielding classes are assigned. Two for “shutter closed” at 5 cm and 100 cm respectively, and two for “shutter open” at 5 cm and 100 cm respectively.

NOTE Z3 The dose equivalent rate can be measured in terms of  $\dot{H}$  (10) and/or  $\dot{H}'(0,07)$ , see 8.4.

### 4.4 Temperature class

**Replace** “Temperature class” with “Temperature classes” in the headline of 4.4.

In Table 2, **replace** all entries for temperature class 1 with “Not to be applied”.

In Table 2, **replace** all entries for temperature class 7 with “Other values”.

**Add** the following paragraph below Table 2:

If the temperature class corresponding to the testing range of an incorporated source (e.g. according to ISO 2919) is lower than that of the source housing the temperature class of the source only shall be used.

## 5 General requirements

### 5.2 Source holder

In a), **replace** “installation” with “installation and de-installation”.

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