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INTERNATIONAL STANDARD

NORME INTERNATIONALE

Nuclear instrumentation – Nomenclature (identification) of scintillators and scintillation detectors and standard dimensions of scintillators

Instrumentation nucléaire – Nomenclature (identification) des scintillateurs et des détecteurs à scintillation et dimensions normalisées des scintillateurs

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

NUCLEAR INSTRUMENTATION – NOMENCLATURE (IDENTIFICATION) OF SCINTILLATORS AND SCINTILLATION DETECTORS AND STANDARD DIMENSIONS OF SCINTILLATORS

FOREWORD

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International Standard IEC 60412 has been prepared by IEC technical committee 45: Nuclear instrumentation.

This third edition cancels and replaces the second edition published in 2007. It constitutes a technical revision.

The main technical changes with regard to the previous edition are as follows:

- Nomenclature of scintillation detectors was expanded by phoswich detector and single-line multi-channel detector.
- Some missing positions in the nomenclature of the previous edition were filled out.

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The text of this standard is based on the following documents:

FDIS	Report on voting
45/777/FDIS	45/780/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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INTRODUCTION

Recently each manufacturer of scintillation detectors has been offering its own nomenclature presenting in it, in the first place, their trademarks and introducing their own abbreviations (identification). The nomenclature of scintillators and scintillation detectors is quite complicated and usually includes type of detector, scintillator's material, geometry and dimensions of scintillator, materials of housing and window, type and dimensions of photomultiplier tube or photodiode, presence of additional electronic devices and some other characteristics. Different manufacturers offer different content and different order of characteristic designations in the identifiers of their products. This makes perception by a customer of the meaning of symbols in these identifiers difficult. The situation can be improved through introducing a uniform system of nomenclature (identification) of scintillators and scintillation detectors. For this purpose it is advisable to use designations of separate parameters in a strict order, guided by a principle: from the main parameters to secondary ones. This approach will introduce uniformity into the system of nomenclature (identification) of scintillators and scintillation detectors, as well as facilitate the perception of this system and correct selection of products by the customer.

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NUCLEAR INSTRUMENTATION – NOMENCLATURE (IDENTIFICATION) OF SCINTILLATORS AND SCINTILLATION DETECTORS AND STANDARD DIMENSIONS OF SCINTILLATORS

1 Scope

This International Standard gives guidelines for scintillation detectors and scintillators nomenclature (identification) and standard dimensions of scintillators.

This International Standard is applicable to all types of solid organic and inorganic scintillators used in detectors for scintillation counting and spectrometry.

The object of this standard is to define a standardized nomenclature for scintillation detectors in which most of the properties can be found.

The object of this standard is to standardize the dimensions of bare scintillators in order to facilitate interchangeability of non-encapsulated scintillators and to facilitate intercomparisons of measurements with encapsulated scintillators.

Liquid scintillators are not addressed by this standard.

NOTE The identification labels laid down in Clause 2 of the present standard include certain dimensions which may be expressed in millimetres or inches. The SI system recommends the use of millimetres rather than inches.

2 Nomenclature of scintillation detectors and scintillators

2.1 General

The identification of a scintillation detector is specified by a predefined sequence of specification items described below. Each specification item refers to a specific property of the detector material and/or construction.

The general structure of an identification label includes symbols, described in 2.2 to 2.13, and given in the same order in which these subclauses are provided.

2.2 Configuration

This definition is producer-specific, for example:

C – crystal without photomultiplier (see example 1 at the end of this clause);

HC – housed crystal (see example 2);

HCW – housed crystal with a well;

HCH – housed crystal with a hole;

IMP – housed crystal with integrally mounted photomultiplier (see examples 3 to 5);

PhX – phoswich, where X is the number of scintillators (see example 6);

X CH Y – single-line X-channels detector (see example 7), where X is the number of channels in line; Y is pitch.

2.3 Geometry of the scintillator

V – cubic;

R – rectangular;

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S – spherical;

H – hexagonal;

C – cylindrical.

2.4 Dimensions of the scintillator cross-section in mm

Specification in inches shall be marked as such, e.g. 2’’.

In the case of rectangular scintillator dimensions, the two measures are separated by the letter "x" (see example 2 below). The most frequently found (standard) dimensions of scintillator diameters are listed in Table A.1.

2.5 Height of the scintillator in mm

Specification in inches shall be marked as such, e.g. 4".

The most frequently found (standard) dimensions of scintillator heights are listed in Table A.2.

2.6 Scintillator material

Doping elements are written in parentheses.

N – NaI(Tl);

CT – CsI(Tl);

CN – CsI(Na);

LiI – LiI(Eu);

CaF – CaF_2(Eu);

BGO – $Bi_4Ge_3O_{12}$;

CWO – $CdWO_4$;

PWO – $PbWO_4$;

LC – $LaCl_3$(Ce);

LB – $LaBr_3$(Ce);

P – Plastic;

LSO – Lu_2SiO_5;

LYSO – $Lu_{1,8}Y_{0,8}SiO_5$;

GSO – Gd_2SiO_5;

ZS – ZnSe;

ZST – ZnSe(Te);

ZWO – $ZnWO_4$;

YC – YAG(Ce);

BF – BaF_2;

CI – CsI;

CaWO – $CaWO_4$;

CLYC – Cs_2LiYCl_6(Ce);

SI – SrI_2(Eu);

PMMA – polymethylmetacrylate;

PS – polystyrene;

PVT – polyvinyltoluene.

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