SLOVENSKI STANDARD
SIST EN 61675-2:1998

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Radionuclide imaging devices - Characteristics and test conditions - Part 2: Single photon emission computer tomographs (IEC 61675-2:1998)

Radionuclide imaging devices - Characteristics and test conditions -- Part 2: Single photon emission computer tomographs

Bildgebende Systeme in der Nuklearmedizin - Merkmale und Prüfbedingungen -- Teil 2: Einzelphotonen-Emissions-Tomographie

Dispositifs d'imagerie par radionucléides - Caractéristiques et conditions d'essais -- Partie 2: Systèmes de tomographie d'émission à photon unique

Ta slovenski standard je istoveten z: **EN 61675-2:1998**

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11.040.50	Radiografska oprema	Radiographic equipment

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EUROPEAN STANDARD

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EN 61675-2

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English version

Radionuclide imaging devices - Characteristics and test conditions Part 2: Single photon emission computer tomographs (IEC 61675-2:1998)

Dispositifs d'imagerie par radionucléides
Caractéristiques et conditions d'essais
Partie 2: Systèmes de tomographie
d'émission à photon unique
(CEI 61675-2:1998)

Bildgebende Systeme in der
Nuklearmedizin - Merkmale und
Prüfbedingungen
Teil 2: Einzelphotonen-Emissions-
Tomographie
(IEC 61675-2:1998)

This European Standard was approved by CENELEC on 1998-01-01. 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.

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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.

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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 document 62C/206/FDIS, future edition 1 of IEC 61675-2, prepared by SC 62C, Equipment for radiotherapy, nuclear medicine and radiation dosimetry, of IEC TC 62, Electrical equipment in medical practice, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61675-2 on 1998-01-01.

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) 1998-11-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-11-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annex ZA is normative and annex A is informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61675-2:1998 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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

Publication	Year	Title	EN/HD	Year
IEC 60788	1984	Medical radiology - Terminology	HD 501 S1	1988
IEC 60789	1992	Characteristics and test conditions of radionuclide imaging devices Anger type gamma cameras	EN 60789	1993
IEC 61675-1	1998	Radionuclide imaging devices Characteristics and test conditions Part 1: Positron emission tomographs	EN 61675-1	1998

INTERNATIONAL STANDARD

IEC 61675-2

First edition
1998-01

Radionuclide imaging devices – Characteristics and test conditions –

Part 2: Single photon emission computed tomographs

Dispositifs d'imagerie par radionucléides – Caractéristiques et conditions d'essais –

Partie 2: Systèmes de tomographie d'émission à photon unique

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RADIONUCLIDE IMAGING DEVICES – CHARACTERISTICS AND TEST CONDITIONS –

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FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, the IEC publishes International Standards. Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.

2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61675-2 has been prepared by subcommittee 62C: Equipment for radiotherapy, nuclear medicine and radiation dosimetry, of IEC technical committee 62: Electrical equipment in medical practice.

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

FDIS	Report on voting
62C/206/FDIS	62C/215/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.

In this standard, the following print types are used:

– TERMS DEFINED IN CLAUSE 2 OF THIS STANDARD OR LISTED IN ANNEX A: SMALL CAPITALS.

The requirements are followed by specifications for the relevant tests.

Annex A is for information only.

A bilingual version of this standard may be issued at a later date.

RADIONUCLIDE IMAGING DEVICES – CHARACTERISTICS AND TEST CONDITIONS –

Part 2: Single photon emission computed tomographs

1 General

1.1 Scope and object

This part of IEC 61675 specifies terminology and test methods for describing the characteristics of Anger type rotational GAMMA CAMERA SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHS (SPECT), equipped with parallel hole collimators. As these systems are based on Anger type GAMMA CAMERAS this part of IEC 61675 shall be used in conjunction with IEC 60789. These systems consist of a gantry system, single or multiple DETECTOR HEADS and a computer system together with acquisition, recording, and display devices.

The test methods specified in this part of IEC 61675 have been selected to reflect as much as possible the clinical use of Anger type rotational GAMMA CAMERA SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHS (SPECT). It is intended that the test methods be carried out by manufacturers thereby enabling them to describe the characteristics of SPECT systems on a common basis.

No test has been specified to characterize the uniformity of reconstructed images because all methods known so far will mostly reflect the noise of the image.

1.2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61675. At the time of publication, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this part of IEC 61675 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60788:1984, *Medical radiology – Terminology*

IEC 60789:1992, *Characteristics and test conditions of radionuclide imaging devices – Anger type gamma cameras*

IEC 61675-1, — *Radionuclide imaging devices – Characteristics and test conditions – Part 1: Positron emission tomographs*

2 Terminology and definitions

For the purpose of this part of IEC 61675 the definitions given in IEC 60788, IEC 60789 and IEC 61675-1 (see annex A), and the following definitions apply.

Defined terms are printed in small capital letters.

2.1
SYSTEM AXIS
Axis of symmetry characterized by geometrical and physical properties of the arrangement of the system

NOTE – The SYSTEM AXIS of a GAMMA CAMERA with rotating detectors is the axis of rotation.

2.1.1
COORDINATE SYSTEMS

2.1.2
FIXED COORDINATE SYSTEM
Cartesian system with axes X, Y, and Z, Z being the SYSTEM AXIS. The origin of the FIXED COORDINATE SYSTEM is defined by the centre of the TOMOGRAPHIC VOLUME (see figure 1). The SYSTEM AXIS is orthogonal to all TRANSVERSE SLICES.

2.1.3
COORDINATE SYSTEM OF PROJECTION
Cartesian system of the IMAGE MATRIX of each two-dimensional projection with axes X_p and Y_p (defined by the axes of the IMAGE MATRIX). The Y_p axis and the projection of the system axis onto the detector front face have to be in parallel. The origin of the COORDINATE SYSTEM OF PROJECTION is the centre of the IMAGE MATRIX (see figure 1).

2.1.4
CENTRE OF ROTATION (COR)
Origin of that COORDINATE SYSTEM, which describes the PROJECTIONS of a TRANSVERSE SLICE with respect to their orientation in space

NOTE – The CENTRE OF ROTATION of a TRANSVERSE SLICE is given by the intersection of the SYSTEM AXIS with the mid-plane of the corresponding OBJECT SLICE.

2.1.5
OFFSET
Deviation of the position of the PROJECTION of the COR (X'_p) from $X_p = 0$. (See figure 1)

2.2
TOMOGRAPHY (see annex A)

2.2.1
TRANSVERSE TOMOGRAPHY
In TRANSVERSE TOMOGRAPHY the three-dimensional object is sliced by physical methods, e.g. collimation, into a stack of OBJECT SLICES, which are considered as being two-dimensional and independent from each other. The transverse image planes are perpendicular to the SYSTEM AXIS.

2.2.2
EMISSION COMPUTED TOMOGRAPHY (ECT)
Imaging method for the representation of the spatial distribution of incorporated RADIONUCLIDES in selected two-dimensional SLICES through the object

2.2.2.1
PROJECTION
Transformation of a three-dimensional object into its two-dimensional image or of a two-dimensional object into its one-dimensional image, by integrating the physical property which determines the image along the direction of the PROJECTION BEAM

NOTE – This process is mathematically described by line integrals in the direction of projection and called the Radon-transform.

2.2.2.2

PROJECTION BEAM

Determines the smallest possible volume in which the physical property which determines the image is integrated during the measurement process. Its shape is limited by the SPATIAL RESOLUTION in all three dimensions.

NOTE – In SPECT the PROJECTION BEAM usually has the shape of a long thin diverging cone.

2.2.2.3

PROJECTION ANGLE

Angle at which the PROJECTION is measured or acquired

NOTE – For illustration see figure 1.

2.2.2.4

SINOGRAM

Two-dimensional display of all one-dimensional PROJECTIONS of an object slice, as a function of the PROJECTION ANGLE

The PROJECTION ANGLE is displayed on the ordinate. The linear PROJECTION coordinate is displayed on the abscissa.

2.2.2.5

OBJECT SLICE

A slice in the object. The physical property of this slice that determines the measured information is displayed in the tomographic image.

2.2.2.6

IMAGE PLANE

A plane assigned to a plane in the OBJECT SLICE

NOTE – Usually the IMAGE PLANE is the mid-plane of the corresponding OBJECT SLICE.

2.2.2.7

TOMOGRAPHIC VOLUME

Ensemble of all volume elements which contribute to the measured PROJECTIONS for all PROJECTION ANGLES

NOTE – For a rotating GAMMA CAMERA with a circular field of view the TOMOGRAPHIC VOLUME is a sphere provided that the radius of rotation is larger than the radius of the field of view. For a rectangular field of view, the TOMOGRAPHIC VOLUME is a cylinder.

2.2.2.7.1

TRANSVERSE FIELD OF VIEW

Dimensions of a slice through the TOMOGRAPHIC VOLUME, perpendicular to the SYSTEM AXIS. For a circular TRANSVERSE FIELD OF VIEW it is described by its diameter.

NOTE – For non-cylindrical TOMOGRAPHIC VOLUMES the TRANSVERSE FIELD OF VIEW may depend on the axial position of the slice.

2.2.2.7.2

AXIAL FIELD OF VIEW

Dimensions of a slice through the TOMOGRAPHIC VOLUME parallel to and including the SYSTEM AXIS. In practice it is specified only by its axial dimension given by the distance between the centres of the outermost defined IMAGE PLANES plus the average of the measured AXIAL SLICE WIDTH measured as EQUIVALENT WIDTH (EW).

2.2.2.7.3

TOTAL FIELD OF VIEW

Dimensions (three-dimensional) of the TOMOGRAPHIC VOLUME