IEC 60806

Edition 2.0 2022-11

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Determination of the maximum symmetrical radiation field of X-ray tube assemblies and X-ray source assemblies for medical diagnosis

Détermination du champ de rayonnement maximal symétrique des gaines équipées et des ensembles radiogènes utilisés en diagnostic médical

IEC 60806:2022-11(en-fr)

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

DETERMINATION OF THE MAXIMUM SYMMETRICAL RADIATION FIELD OF X-RAY TUBE ASSEMBLIES AND X-RAY SOURCE ASSEMBLIES FOR MEDICAL DIAGNOSIS

FOREWORD

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IEC 60806 has been prepared by subcommittee 62B: Diagnostic imaging equipment, of IEC technical committee 62: Electrical equipment in medical practice. It is an International Standard.

This second edition cancels and replaces the first edition published in 1984. This edition constitutes a technical revision.

This edition includes the following significant technical change with respect to the previous edition:

a) addition of solid state detectors as they have become more common since the first edition of 1984.

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

Draft	Report on voting
62B/1298/FDIS	62B/1305/RVD

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

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

In this document, the following print types are used:

– requirements and definitions: roman type;
– *test specifications: italic type;*
– informative material appearing outside of tables, such as notes, examples and references: in smaller type. Normative text of tables is also in a smaller type;
– TERMS DEFINED IN CLAUSE 3: SMALL CAPITALS.

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DETERMINATION OF THE MAXIMUM SYMMETRICAL RADIATION FIELD OF X-RAY TUBE ASSEMBLIES AND X-RAY SOURCE ASSEMBLIES FOR MEDICAL DIAGNOSIS

1 Scope

This document is applicable to X-RAY SOURCE ASSEMBLIES and X-RAY TUBE ASSEMBLIES.

NOTE 1 If, for certain MEDICAL ELECTRICAL SYSTEMS, special radiation fields are required such that the scope of IEC 60806 does not apply (e. g., using CT collimators with bow-tie filters), the appropriate system particular standard applies.

This document specifies a method for the determination of the greatest geometrically symmetrical RADIATION FIELD at a specified distance from the FOCAL SPOT for which the percentage AIR KERMA RATE along the major axes of the RADIATION FIELD does not fall below a permitted value.

NOTE 2 In practical use AIR KERMA or AIR KERMA RATE are the most practical physical measures to quantify X-RAY PATTERNS.

In case multiple FOCAL SPOTS are not super-imposed, each FOCAL SPOT has its own REFERENCE AXIS. Then the maximum RADIATION FIELD can be given for each FOCAL SPOT separately.

NOTE 3 The maximum symmetrical RADIATION FIELD can change from its initial value as the X-RAY TUBE ages through use.

2 Normative references

The following documents are referred to in the text in such a way that some or all their content constitutes requirements 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 60336:2020, *Medical electrical equipment – X-ray tube assemblies for medical diagnosis – Focal spot dimensions and related characteristics*

IEC 60601-1:2005, *Medical electrical equipment – Part 1: General requirements for basic safety and essential performance*
IEC 60601-1:2005/AMD1:2012
IEC 60601-1:2005/AMD2:2020

IEC 60601-1-3:2008, *Medical electrical equipment – Part 1-3: General requirements for basic safety and essential performance – Collateral Standard: Radiation protection in diagnostic X-ray equipment*
IEC 60601-1-3:2008/AMD1:2013
IEC 60601-1-3:2008/AMD2:2021

IEC 60613:2010, *Electrical and loading characteristics of X-ray tube assemblies for medical diagnosis*

IEC TR 60788:2004, *Medical electrical equipment – Glossary of defined terms*

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3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60336:2020, IEC 60601-1:2005, IEC 60601-1:2005/AMD1:2012, IEC 60601-1:2005/AMD2:2020, IEC 60601-1-3:2008, IEC 60601-1-3:2008/AMD1:2013, IEC 60601-1-3:2008/AMD2:2021, IEC 60613:2010, and IEC TR 60788:2004 apply.

NOTE 1 An Index of defined terms is to be found at the end of the document.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- IEC Electropedia: available at https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

4 Maximum symmetrical RADIATION FIELD

4.1 Orientation of the maximum symmetrical RADIATION FIELD

For the determination of the maximum symmetrical RADIATION FIELD the distribution of AIR KERMA RATE shall be measured along two major axes in the measuring plane; see Figure 1.

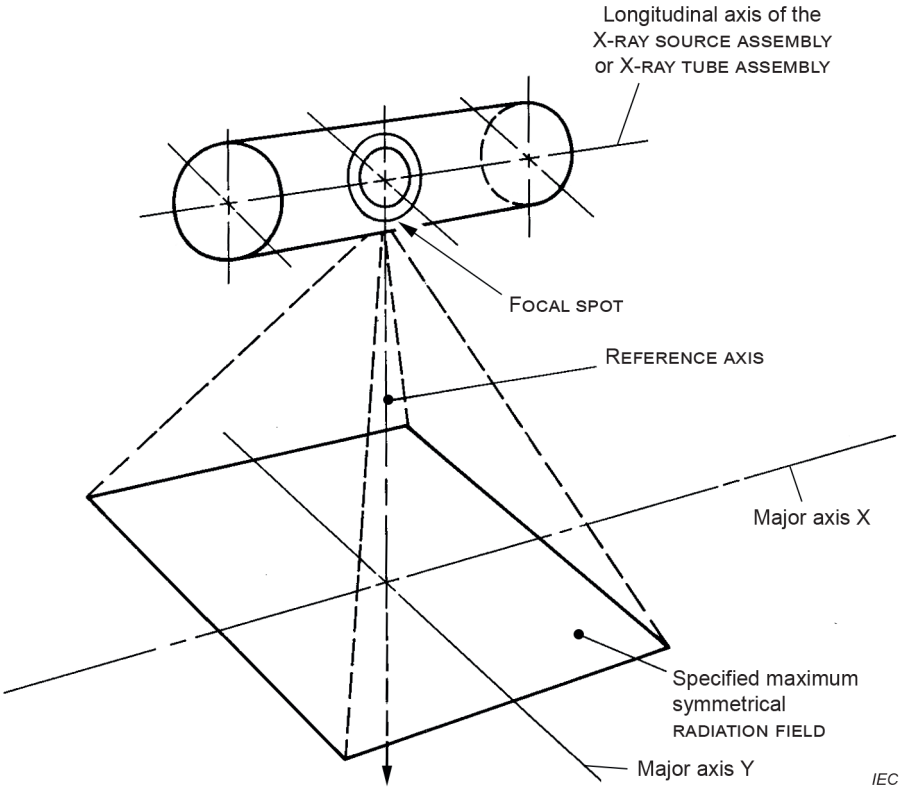

Figure 1 – Orientation of the maximum symmetrical RADIATION FIELD

The major axis *X* is the projection in REFERENCE DIRECTION of the longitudinal axis of the X-RAY TUBE ASSEMBLY or the X-RAY SOURCE ASSEMBLY onto the measuring plane. The major axis *Y* is normal to the axis *X*. Both major axes intersect on the REFERENCE AXIS.

NOTE 1 Usually, both major axes are normal to the REFERENCE AXIS (see also 5.2).

The orientation of the maximum symmetrical RADIATION FIELD is shown in Figure 1. The typical distribution in the direction of the *X* axis is given in Figure 2.

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