
Determination of the maximum symmetrical radiation field from a rotating anode X-ray tube for medical diagnosis (IEC 60806:1984)

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DETERMINATION OF THE MAXIMUM SYMMETRICAL RADIATION
FIELD FROM A ROTATING ANODE X-RAY TUBE FOR MEDICAL
DIAGNOSIS

Détermination du champ de
rayonnement maximal symétrique
provenant d'un tube à anode
tournante utilisé en diagnostic
médical

Bestimmung des maximalen
symmetrischen Strahlungsfeldes
von einer
Drehanoden-Röntgenröhre
für medizinische Diagnostik

BODY OF THE HD

The Harmonization Document consists of:

- IEC 806 (1984) ed 1; IEC/SC 628, not appended

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The English and French versions of this Harmonization Document are provided by the text of the IEC publication and the German version is the official translation of the IEC text.

According to the CENELEC Internal Regulations the CENELEC member National Committees are bound:

to announce the existence of this Harmonization Document at national level by or before 1989-07-01

to publish their new harmonized national standard by or before 1990-01-01

to withdraw all conflicting national standards by or before 1990-01-01.

Harmonized national standards are listed on the HD information sheet, which is available from the CENELEC National Committees or from the CENELEC Central Secretariat.

The CENELEC National Committees are the national electrotechnical committees of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxemburg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE
NORME DE LA CEI

INTERNATIONAL ELECTROTECHNICAL COMMISSION
IEC STANDARD

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Détermination du champ de rayonnement maximal symétrique
provenant d'un tube à anode tournante

utilisé en diagnostic médical
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Bureau Central de la Commission Electrotechnique Internationale

3, rue de Varembe
Genève, Suisse

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

**DETERMINATION OF THE MAXIMUM SYMMETRICAL
 RADIATION FIELD
 FROM A ROTATING ANODE X-RAY TUBE
 FOR MEDICAL DIAGNOSIS**

FOREWORD

- 1) The formal decisions or agreements of the IEC on technical matters, prepared by Technical Committees on which all the National Committees having a special interest therein are represented, express, as nearly as possible, an international consensus of opinion on the subjects dealt with.
- 2) They have the form of recommendations for international use and they are accepted by the National Committees in that sense.
- 3) In order to promote international unification, the IEC expresses the wish that all National Committees should adopt the text of the IEC recommendation for their national rules in so far as national conditions will permit. Any divergence between the IEC recommendation and the corresponding national rules should, as far as possible, be clearly indicated in the latter.

PREFACE

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This standard has been prepared by Sub-Committee 62B: X-ray Equipment Operating up to 400 kV and Accessories, of IEC Technical Committee No. 62: Electrical Equipment in Medical Practice.

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

Six Months' Rule	Report on Voting
62B(CO)51	62B(CO)52
62B(CO)53	62B(CO)57

Further details can be found in the relevant Reports on Voting indicated in the above table.

The following IEC publication is quoted in this standard:

Publication No. 788 (1984): Medical Radiology — Terminology.

Other publications quoted:

ISO Standard 5/1: Photography — Density Measurements. Part 1: Terms, Symbols and Notations.

ISO Draft International Standard 5/2: Part 2: Geometric Conditions for Transmission Density.

ISO Standard 5/3: Part 3: Spectral Conditions.

ISO Standard 5/4: Part 4: Geometric Conditions for Reflection Density.

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INTRODUCTION

Owing to the increased ABSORPTION in the ANODE of an X-RAY TUBE in oblique directions, the AIR KERMA RATE decreases towards the edge of the RADIATION FIELD in directions forming small angles with the surface of the ANODE.

In addition, the AIR KERMA RATE over the RADIATION FIELD decreases with distance from the REFERENCE AXIS to the edges of the RADIATION FIELD according to the inverse square law with respect to the distance from the FOCAL SPOT.

ABSORPTION in the material of the TARGET affects RADIATION QUALITY as well as AIR KERMA RATE; therefore the results of measurements of AIR KERMA RATE are affected by the amount of ADDITIONAL FILTRATION in the RADIATION BEAM. For this reason the measuring arrangement required in this standard includes substantial ADDITIONAL FILTRATION of a given value in the RADIATION BEAM.

Furthermore the distribution of AIR KERMA RATE is affected by, for example:

- SCATTERED RADIATION from objects in the RADIATION BEAM;
- the position of any object in the RADIATION BEAM;

Therefore, the measuring arrangement is required to have no objects in the RADIATION BEAM except the ADDED FILTER in its required position.

A typical distribution of AIR KERMA RATE is shown in Figure 1, page 9.

1. Scope and object

1.1 Scope

This standard is applicable to X-RAY SOURCE ASSEMBLIES and X-RAY TUBE ASSEMBLIES containing ROTATING ANODE X-RAY TUBES, for use in MEDICAL DIAGNOSTIC RADIOLOGY for techniques in which the X-RAY PATTERN will be received simultaneously in all points of the IMAGE RECEPTION AREA.

Unless otherwise specified, this standard is applicable to an X-RAY TUBE ASSEMBLY with a brand-new ROTATING ANODE X-RAY TUBE.

This standard does not apply to X-RAY SOURCE ASSEMBLIES and X-RAY TUBE ASSEMBLIES for special applications, when for example steeper variations of the AIR KERMA RATE or particular distributions are intended.

1.2 Object

This standard describes 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 does not fall below a permitted value.

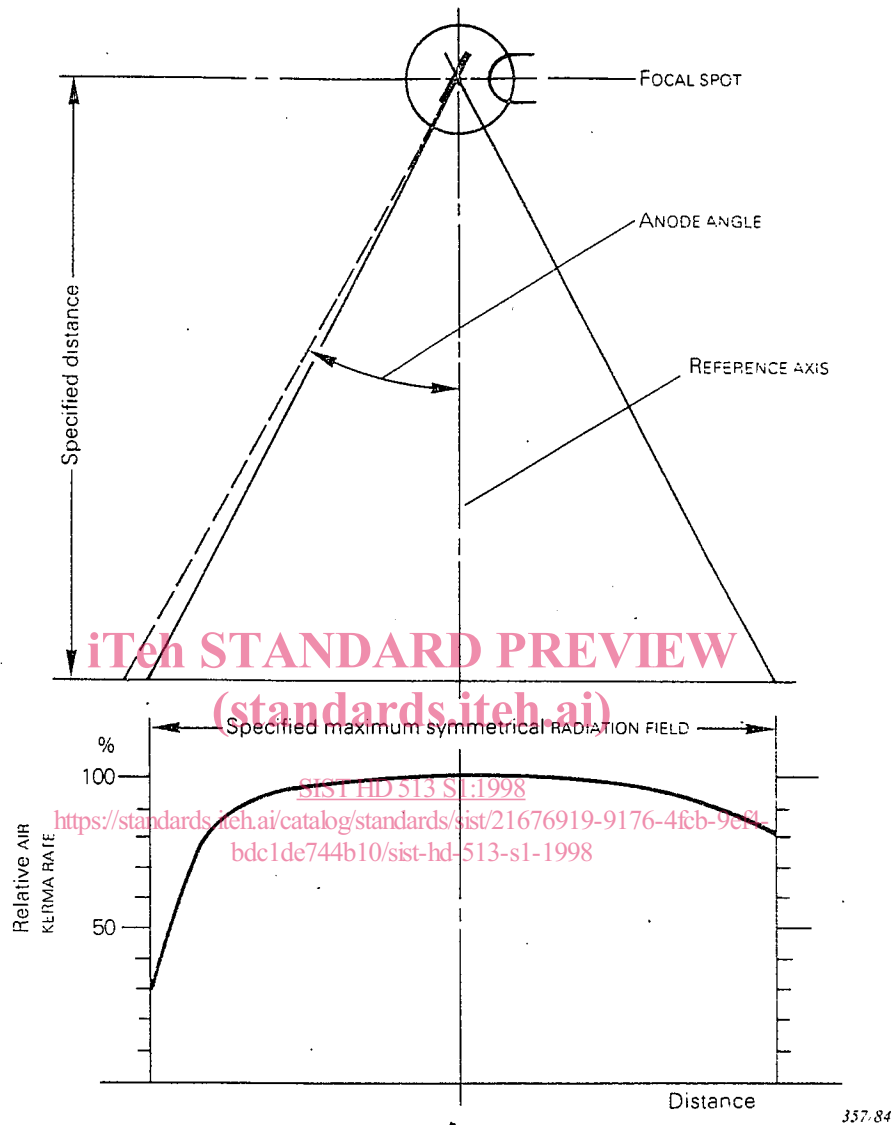


FIG. 1. — Typical distribution of the relative AIR KERMA RATE along the major axis X of a maximum symmetrical RADIATION FIELD.

2. Terminology

2.1 Degree of requirements

In this standard the auxiliary verb

- “shall” implies that compliance with a requirement is mandatory for compliance with the standard;
- “should” implies that compliance with a requirement is strongly recommended but is not mandatory for compliance with the standard;
- “may” implies that compliance with a requirement is permitted to be accomplished in a particular manner, for compliance with the standard.