

Method for

Determination of the maximum symmetrical radiation field from a rotating anode X-ray tube for medical diagnosis —

(Implementation of CENELEC
HD 513 S1)

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Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Health Care Standards Committee (HCC/-) to Technical Committee HCC/71, upon which the following bodies were represented:

- Association of X-Ray Equipment Manufacturers (BEAMA Ltd.)
- British Institute of Radiology
- College of Radiographers
- Department of Health and Social Security
- Hospital Physicists' Association
- Royal College of Radiologists

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National foreword

This British Standard has been prepared under the direction of the Health Care Standards Committee and is identical with IEC Publication 806:1984 “*Determination of the maximum symmetrical radiation field from a rotating anode X-ray tube for medical diagnosis*”, published by the International Electrotechnical Commission (IEC). This British Standard is also in agreement with Harmonization Document HD 513 S1, published by the European Committee Electrotechnical Standardization (CENELEC).

Terminology and conventions. The text of the International Standard has been approved as suitable for publication as a British Standard without deviation. Some terminology and certain conventions are not identical with those used in British Standards; attention is drawn especially to the following.

Cross-references

International Standards	Corresponding British Standards
IEC 788:1984	BS 6641:1985 <i>Medical radiology terminology</i> (Identical)
	BS 1384 <i>Photographic density measurements</i>
ISO 5-1:1984	Part 1:1985 <i>Guide for terms, symbols and notations</i> (Identical)
ISO 5-3:1984	Part 3:1985 <i>Specification for spectral conditions</i> (Identical)
ISO 5-4:1983	Part 4:1985 <i>Specification for geometric conditions for reflection density</i> (Identical)

ISO 5-2 and the corresponding Part 2 of BS 1384 are both in preparation.
A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8, an inside back cover and a back cover.
This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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 2.

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.