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Non-destructive testing - Characteristics of focal spots in industrial X-ray systems - Part 2: Edge method with hole or disk type test objects (ISO 32543-2:2026)

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This standard includes the English version of the European Standard.

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English Version

Non-destructive testing - Characteristics of focal spots in industrial X-ray systems - Part 2: Edge method with hole or disk type test objects (ISO 32543-2:2026)

Essais non destructifs - Caractéristiques des foyers émissifs des tubes radiogènes industriels - Partie 2: Méthode par effet de bord avec dispositifs d'essai de type à trous ou à disques (ISO 32543-2:2026)

Zerstörungsfreie Prüfung - Charakterisierung von Brennflecken in Industrie-Röntgenanlagen - Teil 2: Kantenmethode mit Lochtestkörpern (ISO 32543-2:2026)

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Ref. No. EN ISO 32543-2:2026 E

Contents

Page

European foreword..... 3

European foreword

This document (EN ISO 32543-2:2026) has been prepared by Technical Committee ISO/TC 135 "Non-destructive testing" in collaboration with Technical Committee CEN/TC 138 “Non-destructive testing” the secretariat of which is held by AFNOR.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by July 2026, and conflicting national standards shall be withdrawn at the latest by July 2026.

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International Standard

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Non-destructive testing — Characteristics of focal spots in industrial X-ray systems —

Part 2: Edge method with hole or disk type test objects

Essais non destructifs — Caractéristiques des foyers émissifs des tubes radiogènes industriels —

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Contents

Page

Foreword ... **iv**

Introduction ... **v**

1 Scope ... **1**

2 Normative references ... **1**

3 Terms and definitions ... **1**

4 Symbols and abbreviated terms ... **3**

5 Principle and detectors ... **4**
5.1 Principle ... 4
5.2 Detectors ... 4
5.2.1 General ... 4
5.2.2 Imaging plates for computed radiography ... 4
5.2.3 Digital detector arrays (DDA) ... 5
5.2.4 Exposure conditions and image processing ... 5

6 Test equipment ... **5**
6.1 General ... 5
6.2 Essential characteristics of test object or Image Quality Indicator (IQI) ... 5
6.2.1 Nanofocus tubes and microfocus tubes (spot size < 100 µm). ... 5
6.2.2 Minifocus, mesofocus and macrofocus tubes (spot size ≥ 100 µm) ... 7
6.2.3 Alignment and position of the test object in the beam ... 8

7 Loading factors ... **10**

8 Measurement procedure and determination of the focal spot size ... **10**
8.1 Measurement procedure ... 10
8.2 Evaluation using a line profile ... 11
8.3 Automated evaluation using a validated software ... 14

9 Classification and result of focal spot size evaluation ... **15**

10 Test report ... **15**

Annex A (Informative) **Values for the classification of X-ray tube focal spot sizes** ... **16**

Bibliography ... **19**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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This document was prepared by ISO Technical Committee TC 135, *Non-destructive testing*, Subcommittee SC 5, *Radiographic testing*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 138, *Non-destructive testing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

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Introduction

To cover the large range of effective focal spot sizes, different methods are specified in ISO 32543 series.

In this document, the edge method is intended as a user method for measurement of the effective focal spot sizes of nano-, micro-, mini- and macro- (standard) focus tubes. The edge method uses hole type test objects and is intended for field and lab applications where users need to observe the effective focal spot on a regular basis and other methods are non-practical.

In ISO 32543-1, the pin hole method permits the measurement of focal spot shape and focal spot sizes ≥ 100 µm.

This document (ISO 32543-2) uses the edge method with hole or disk type test objects.

ISO 32543-3 covers the measurement of the effective focal spot size of mini- and microfocus X-ray tubes from 5 µm to 300 µm.

Two further methods are in preparation as a part of the ISO 32543 series, concerning:

— ISO 32543-4[1)] line pair test objects for measuring the effective focal spot size of micro- and nanofocus X-ray tubes with focal spot sizes ranging from 0,2 µm to 100 µm. This method is intended for use by manufacturers and users.

— ISO 32543-5[2)] reconstruction of the spot shape from hole test object measurements. The results are equivalent to the pin hole method down to 0,2 µm, if no phase contrast is observed.

In the overlapping ranges, the different methods give similar values based on the edge response measurement, which allow using the dedicated method also in a limited way outside the above specified ranges.

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International Standard **ISO 32543-2:2026(en)**

Non-destructive testing — Characteristics of focal spots in industrial X-ray systems —

Part 2:
Edge method with hole or disk type test objects

1 Scope

This document specifies a method for the measurement of effective focal spot dimensions > 0,2 µm of X-ray systems by means of the edge method applied to digital images taken from hole type or disk type test objects if no phase contrast is observed. The imaging quality and the resolution of X-ray images depends highly on the characteristics of the effective focal spot, in particular its size and two-dimensional intensity distribution as seen from the detector plane.

This document specifies procedures for determining the effective size (dimensions) of standard, mini and micro focal spots of industrial X-ray tubes for users in applications where the pin hole method according to ISO 32543-1 is not applicable. The method specified in this document is applicable for measurement and long-term monitoring of focal spot sizes without a pin hole camera.

This document can be used by manufacturers, if special hole test objects manufactured with lower tolerances according to 6.2.1 are applied (see Figure 1). For measurements of the effective focal spot size, the accuracy of the method in this document is lower than the methods specified in ISO 32543-1 (pin hole method) and ISO 32543-3 (microfocus tubes) if using ASTM hole plate IQIs (see ASTM E1025, ASTM E1742), due to its manufacturing tolerance of ±10 %.

NOTE For characterization of commercial X-ray tube types (i.e. for advertising or trade), the nominal values of Annex A are preferred.

2 Normative references

The following documents are referred to in the text in such a way that some or all of 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.

ISO 16371-1, *Non-destructive testing — Industrial computed radiography with storage phosphor imaging plates — Part 1: Classification of systems*

ISO 19232-5, *Non-destructive testing — Image quality of radiographs — Part 5: Determination of the image unsharpness and basic spatial resolution value using duplex wire-type image quality indicators*

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