

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)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 32543-2:2026 sisaldab Euroopa standardi EN ISO 32543-2:2026 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 21.01.2026.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 32543-2:2026 consists of the English text of the European standard EN ISO 32543-2:2026.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 21.01.2026.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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Supersedes EN 12543-4:1999

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)

This European Standard was approved by CEN on 25 December 2025.

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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 CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

## 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.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 12543-4:1999.

Any feedback and questions on this document should be directed to the users' national standards body/national committee. A complete listing of these bodies can be found on the CEN website.

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## Endorsement notice

The text of ISO 32543-2:2026 has been approved by CEN as EN ISO 32543-2:2026 without any modification.



**International  
Standard**

**ISO 32543-2**

**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 —*

*Partie 2: Méthode par effet de bord avec dispositifs d'essai de type  
à trous ou à disques*

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CP 401 • Ch. de Blandonnet 8  
CH-1214 Vernier, Geneva  
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Email: [copyright@iso.org](mailto:copyright@iso.org)  
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## Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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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).

A list of all parts in the ISO 32543 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at [www.iso.org/members.html](http://www.iso.org/members.html).

## 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  $\geq 100 \mu\text{m}$ .

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  $5 \mu\text{m}$  to  $300 \mu\text{m}$ .

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

- ISO 32543-4<sup>1)</sup> line pair test objects for measuring the effective focal spot size of micro- and nanofocus X-ray tubes with focal spot sizes ranging from  $0,2 \mu\text{m}$  to  $100 \mu\text{m}$ . This method is intended for use by manufacturers and users.
- ISO 32543-5<sup>2)</sup> reconstruction of the spot shape from hole test object measurements. The results are equivalent to the pin hole method down to  $0,2 \mu\text{m}$ , 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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1) Under preparation. Stage at the time of publication: ISO/AWI 32543-4.

2) Under preparation. Stage at the time of publication: ISO/AWI 32543-5.

# 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  $> 0,2 \mu\text{m}$  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  $\pm 10 \%$ .

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*

### 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

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