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Non-destructive testing - Characteristics of focal spots in industrial X-ray systems - Part 3: Measurement of the effective focal spot size of mini and micro focus X-ray tubes (ISO 32543-3:2026)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 32543-3:2026 sisaldab Euroopa standardi EN ISO 32543-3:2026 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 32543-3:2026 consists of the English text of the European standard EN ISO 32543-3:2026.</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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EUROPEAN STANDARD

EN ISO 32543-3

NORME EUROPÉENNE

EUROPÄISCHE NORM

January 2026

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Supersedes EN 12543-5:1999

English Version

**Non-destructive testing - Characteristics of focal spots in industrial X-ray systems - Part 3: Measurement of the effective focal spot size of mini and micro focus X-ray tubes (ISO 32543-3:2026)**

Essais non destructifs - Caractéristiques des foyers émissifs des tubes radiogènes industriels - Partie 3: Mesurage de la taille des foyers émissifs effectifs de tubes radiogènes à minifoyer ou à microfoyer (ISO 32543-3:2026)

Zerstörungsfreie Prüfung - Charakterisierung von Brennflecken in Industrie-Röntgenanlagen - Teil 3: Messung der effektiven Brennfleckgröße von Mini- und Mikrofokus-Röntgenröhren (ISO 32543-3:2026)

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 32543-3:2026) 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 12543-5:1999.

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 32543-3:2026 has been approved by CEN as EN ISO 32543-3:2026 without any modification.



**International  
Standard**

**ISO 32543-3**

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

**Part 3:  
Measurement of the effective focal  
spot size of mini and micro focus  
X-ray tubes**

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

*Partie 3: Mesurage de la taille des foyers émissifs effectifs de tubes radiogènes à minifoyer ou à microfoyer*

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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.

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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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

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 ISO 32543-1, the pin hole method permits the measurement of focal spot shape and focal spot sizes  $\geq 100 \mu\text{m}$ .

The edge measurement method of ISO 32543-2 is intended as a user method for measurement of effective focal spot sizes of nano-, micro-, mini- and macro- (standard) focus tubes.

This document (ISO 32543-3) covers the measurement of the effective focal spot sizes between  $5 \mu\text{m}$  and  $300 \mu\text{m}$  of microfocus X-ray tubes.

Two further methods are in preparation as future parts in 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 or disk 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 3: Measurement of the effective focal spot size of mini and micro focus X-ray tubes

### 1 Scope

This document specifies a method for the measurement of focal spot sizes within the range of 5  $\mu\text{m}$  to 300  $\mu\text{m}$  of X-ray systems up to and including 225 kV tube voltage. This determination is based on the evaluation of an image with a dedicated focal spot that has been radiographically recorded using an edge and evaluated with a digital method.

The imaging quality and the resolution of X-ray images depend highly on the characteristics of the effective focal spot, in particular its size and the two-dimensional intensity distribution as seen from the detector plane.

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

NOTE The same procedure can be used at higher kilovoltages by agreement but the accuracy of the measurement can be poorer.

### 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 11699-1, *Non-destructive testing — Industrial radiographic film — Part 1: Classification of film systems for industrial radiography*

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/>