SLOVENSKI STANDARD
SIST EN ISO 16371-2:2018

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Nadomešča:
SIST EN 14784-2:2005

Neporušitveno preskušanje - Industrijska računalniška radiografija s hranjenjem na fosfornih ploščah - 2. del: Splošna načela za preskušanje kovinskih materialov z uporabo rentgenskih žarkov in žarkov gama (ISO 16371-2:2017, popravljena verzija 2018-05)

Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 2: General principles for testing of metallic materials using X-rays and gamma rays (ISO 16371-2:2017, Corrected version 2018-05)

Zerstörungsfreie Prüfung - Industrielle Computer-Radiographie mit Phosphor-Speicherfolien - Teil 2: Grundlagen für die Prüfung metallischer Werkstoffe mit Röntgen- und Gammastrahlen (ISO 16371-2:2017)

Essais non destructifs - Radiographie industrielle numérisée avec plaques-images au phosphore - Partie 2: Principes généraux de l'essai radiographique des matériaux métalliques au moyen de rayons X et gamma (ISO 16371-2:2017)

Ta slovenski standard je istoveten z: **EN ISO 16371-2:2017**

ICS:

19.100	Neporušitveno preskušanje	Non-destructive testing

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EUROPEAN STANDARD

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EN ISO 16371-2

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English Version

Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 2: General principles for testing of metallic materials using X-rays and gamma rays (ISO 16371-2:2017, Corrected version 2018-05)

Essais non destructifs - Radiographie industrielle numérisée avec écrans photostimulables à mémoire - Partie 2: Principes généraux de l'essai radiographique des matériaux métalliques au moyen de rayons X et gamma (ISO 16371-2:2017)

Zerstörungsfreie Prüfung - Industrielle Computer-Radiographie mit Phosphor-Speicherfolien - Teil 2: Grundlagen für die Prüfung von metallischen Werkstoffen mit Röntgen- und Gammastrahlen (ISO 16371-2:2017)

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN ISO 16371-2:2017) has been prepared by Technical Committee CEN/TC 138 “Non-destructive testing” the secretariat of which is held by AFNOR, in collaboration with Technical Committee ISO/TC 135 “Non-destructive testing”.

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 May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.

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.

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Endorsement notice

The text of ISO 16371-2:2017, Corrected version 2018-05 has been approved by CEN as EN ISO 16371-2:2017 without any modification.

INTERNATIONAL STANDARD

ISO 16371-2

First edition
2017-09

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2018-05

Non-destructive testing — Industrial computed radiography with storage phosphor imaging plates —

Part 2: General principles for testing of metallic materials using X-rays and gamma rays

Essais non destructifs — Radiographie industrielle numérisée avec écrans photostimulables à mémoire —

Partie 2: Principes généraux de l'essai radiographique des matériaux métalliques au moyen de rayons X et gamma

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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 documents 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).

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For an explanation on 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 the following URL: www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 16371 series can be found on the ISO website.

This corrected version of ISO 16371-2:2017 incorporates the following correction:

— Figure A.1 b) has been corrected.

Non-destructive testing — Industrial computed radiography with storage phosphor imaging plates —

Part 2: General principles for testing of metallic materials using X-rays and gamma rays

1 Scope

This document specifies fundamental techniques of computed radiography with the aim of enabling satisfactory and repeatable results to be obtained economically. The techniques are based on the fundamental theory of the subject and tests measurements. This document specifies the general rules for industrial computed X-rays and gamma radiography for flaw detection purposes, using storage phosphor imaging plates (IP). It is based on the general principles for radiographic examination of metallic materials on the basis of films, as specified in ISO 5579. The basic set-up of radiation source, detector and the corresponding geometry are intended to be applied in accordance with ISO 5579 and corresponding product standards such as ISO 17636 for welding and EN 12681 for foundry.

This document does not lay down acceptance criteria of the imperfections. Computed radiography (CR) systems provide a digital grey value image which can be viewed and evaluated on basis of a computer only. This practice describes the recommended procedure for detector selection and radiographic practice. Selection of computer, software, monitor, printer and viewing conditions are important but not the main focus of this document.

The procedure it specifies provides the minimum requirements and practice to permit the exposure and acquisition of digital radiographs with a sensitivity of imperfection detection equivalent to film radiography and as specified in ISO 5579. Some application standards, e.g. EN 16407, can require different and less stringent practice conditions.

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 5579, *Non-destructive testing — Radiographic testing of metallic materials using film and X- or gamma rays — Basic rules*

ISO 5580, *Non-destructive testing — Industrial radiographic illuminators — Minimum requirements*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

ISO 16371-1:2011, *Non-destructive testing — Industrial computed radiography with storage phosphor imaging plates — Part 1: Classification of systems*

ISO 19232-1, *Non-destructive testing — Image quality of radiographs — Part 1: Determination of the image quality value using wire-type image quality indicators*

ISO 19232-2, *Non-destructive testing — Image quality of radiographs — Part 2: Determination of the image quality value using step/hole-type image quality indicators*

ISO 19232-3:2013, *Non-destructive testing — Image quality of radiographs — Part 3: Image quality classes*

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

EN 12543 (all parts), *Non-destructive testing — Characteristics of focal spots in industrial X-ray systems for use in non-destructive testing*

EN 12679, *Non-destructive testing — Determination of the size of industrial radiographic sources — Radiographic method*

3 Terms and definitions

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

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

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
computed radiography system
CR system
complete system comprising a *storage phosphor imaging plate* (3.2) and a corresponding read-out unit (scanner or reader) and system software, which converts the information from the IP into a digital image

3.2
storage phosphor imaging plate
imaging plate
IP
photostimulable luminescent material capable of storing a latent radiographic image of a material being examined and upon stimulation by a source of red light of appropriate wavelength, generates luminescence proportional to radiation absorbed

Note 1 to entry: When performing *computed radiography* (3.1), an IP is used in lieu of a film. When establishing techniques related to source size or focal geometries, the IP is referred to as a detector, i.e. source-to-detector distance (SDD).

3.3
structure noise of imaging plate
structure noise of IP
fixed pattern noise measured due to IP structure which is inherent from inhomogeneities in the sensitive layer (graininess) and surface of a *storage phosphor imaging plate* (3.2)

Note 1 to entry: After scanning of the exposed imaging plate, the inhomogeneities appear as overlaid fixed pattern noise in the digital image.

Note 2 to entry: This noise limits the maximum achievable image quality of digital CR images and can be compared with the graininess in film images.

3.4
grey value
GV
numeric value of a pixel in a digital image

Note 1 to entry: This is equivalent to the term pixel value as defined in ASTM E 2033, E 2445, E 2446 and E 2007.

3.5
linearized grey value
GV_{lin}
numeric value of a pixel which is directly proportional to the detector exposure dose, having a value of zero if the detector was not exposed

Note 1 to entry: This is equivalent to the term linearized pixel value as defined in ASTM E 2033, E 2445, E 2446 and E 2007.

3.6
basic spatial resolution of CR system
$SR_b^{detector}$
corresponds to half of the measured detector unsharpness in a digital image and corresponds to the effective pixel size and indicates the smallest geometrical detail, which can be resolved with a CR system at magnification equal to one

Note 1 to entry: For this measurement, the duplex wire IQI is placed directly on the CR imaging plate.

Note 2 to entry: The measurement of unsharpness is described in ISO 19232-5; see also ASTM E 2002.

3.7
basic spatial resolution of a digital image
SR_b^{image}
corresponds to half of the measured image unsharpness in a digital image and corresponds to the effective pixel size in the image and indicates the smallest geometrical detail, which can be resolved in a digital image

Note 1 to entry: For this measurement, the duplex wire IQI is placed directly on the object (source side).

Note 2 to entry: The measurement of unsharpness is described in ISO 19232-5; see also ASTM E 2002.

Note 3 to entry: The effective pixel size of the image (basic spatial resolution of the digital image) depends on pixel pitch, geometrical unsharpness, detector unsharpness and magnification.

3.8
signal-to-noise ratio
SNR
quotient of mean value of the *linearized grey values* (3.5), which is the signal intensity to the standard deviation of the linearized grey values (noise) in a given region of interest in a digital image

Note 1 to entry: The SNR depends on the radiation dose and the CR system properties.

3.9
normalized signal-to-noise ratio
SNR_N
signal-to-noise ratio (3.8), normalized by the basic spatial resolution, SR_b, which may be SR_b^{image} or $SR_b^{detector}$, as measured directly in the digital image and/or calculated from the measured SNR, $SNR_{measured}$, by

$$SNR_N = SNR_{measured} \cdot \frac{88{,}6\,\mu m}{SR_b}$$