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STN	**Zlievarenstvo Rádiografické skúšanie Časť 2: Metódy s digitálnymi detektormi**	**STN EN 12681-2 42 9742**

Founding - Radiographic testing - Part 2: Techniques with digital detectors

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 04/18

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EUROPEAN STANDARD
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EN 12681-2

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English Version

Founding - Radiographic testing - Part 2: Techniques with digital detectors

Fonderie - Contrôle par radiographie - Partie 2 : Techniques à l'aide de détecteurs numériques

Gießereiwesen - Durchstrahlungsprüfung - Teil 2: Technik mit digitalen Detektoren

This European Standard was approved by CEN on 16 July 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 12681-2:2017) has been prepared by Technical Committee CEN/TC 190 “Foundry Technology”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by May 2018, and conflicting national standards shall be withdrawn at the latest by May 2018.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.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 10 “Testing for inner discontinuities”:

— to revise EN 12681:2003 into EN 12681-1, *Founding — Radiographic testing — Part 1: Film techniques*;

— and the preparation of a further standard EN 12681-2, *Founding — Radiographic testing — Part 2: Techniques with digital detectors*.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Radiography can be used to detect internal discontinuities in a casting. The discontinuities can be gas holes, non-metallic inclusions, shrinkage, cracks, inserts or chills or inclusions that have lower or higher densities than the parent metal. This European Standard gives acceptance criteria through severity levels.

1 Scope

This European Standard gives specific procedures for industrial X-ray and gamma radiography for discontinuity detection purposes, using NDT (non-destructive testing) digital X-ray image detectors. This part of EN 12681 specifies the requirements for digital radiographic testing by either computed radiography (CR) or radiography with digital detector arrays (DDA) of castings.

Digital detectors provide a digital grey value image which can be viewed and evaluated using a computer.

NOTE This part of EN 12681 complies with EN 14784–2 for CR. Some clauses and annexes are taken from EN ISO 17636-2.

This part of EN 12681 specifies the recommended procedure for detector selection and radiographic practice. Selection of computer, software, monitor, printer and viewing conditions are important but are not the main focus of this standard. The procedure specified in this standard provides the minimum requirements for radiographic practice which permit exposure and acquisition of digital images with equivalent sensitivity for detection of imperfections as film radiography, as specified in Part 1 of this standard.

This standard does not consider radiographic or radioscopic fitness for purpose testing as applied for specific castings based on manufacturer's internal requirements and procedures.

The requirements on image quality in class A and B testing of Annex A consider the good workmanship quality for general casting applications as also required in Part 1 of this standard for film radiography.

The classes A_A and B_A reflect the quality requirements of current automated and semi-automated radiographic testing systems with DDAs and computer or operator based image evaluation, and mini or micro focus tubes (spot size ≤ 1 mm) with reduced requirements to the unsharpness, but unchanged requirements to contrast sensitivity as also required in Part 1 of this standard for film radiography.

The specified procedures are applicable to castings produced by any casting process, especially for steels, cast irons, aluminium, cobalt, copper, magnesium, nickel, titanium, zinc and any alloys of them.

This part of this European Standard does not apply to:

— the testing of welded joints (see EN ISO 17636-2);

— film radiography (see EN 12681-1:2017);

— real time testing with radioscopy (see EN 13068-1; radioscopy with image intensifiers).

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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*

EN 14784-1, *Non-destructive testing - Industrial computed radiography with storage phosphor imaging plates - Part 1: Classification of systems*

EN ISO 9712, *Non-destructive testing - Qualification and certification of NDT personnel (ISO 9712:2012)*

EN ISO 17636-2:2013, *Non-destructive testing of welds - Radiographic testing - Part 2: X- and gamma-ray techniques with digital detectors (ISO 17636-2:2013)*

EN 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 19232-1:2013)*

EN 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 19232-2:2013)*

EN ISO 19232-4, *Non-destructive testing - Image quality of radiographs - Part 4: Experimental evaluation of image quality values and image quality tables (ISO 19232-4:2013)*

EN ISO 19232-5, *Non-destructive testing - Image quality of radiographs - Part 5: Determination of the image unsharpness value using duplex wire-type image quality indicators (ISO 19232-5:2013)*

ISO 5576, *Non-destructive testing — Industrial X-ray and gamma-ray radiology — Vocabulary*

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