SLOVENSKI STANDARD
SIST EN 2002-21:2020

01-februar-2020

Aeronavtika - Kovinski materiali - Preskusne metode - 21. del: Radiografsko preskušanje ulitkov

Aerospace series - Metallic materials - Test methods - Part 21: Radiographic testing of castings

Luft- und Raumfahrt - Metallische Werkstoffe - Prüfverfahren - Teil 21: Röntgenographische Prüfung von Gußstücken

Série aérospatiale - Matériaux métalliques - Méthodes d'essai - Partie 21 : Examen radiographique des pièces moulées

Ta slovenski standard je istoveten z: **EN 2002-21:2019**

ICS:

49.025.05	Železove zlitine na splošno	Ferrous alloys in general
49.025.15	Neželezove zlitine na splošno	Non-ferrous alloys in general
77.140.80	Železni in jekleni ulitki	Iron and steel castings

SIST EN 2002-21:2020 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 2002-21

November 2019

ICS 49.025.05; 49.025.15

English Version

Aerospace series - Metallic materials - Test methods - Part 21: Radiographic testing of castings

Série aérospatiale - Matériaux métalliques - Méthodes d'essais - Partie 21 : Examen radiographique des pièces moulées

Luft- und Raumfahrt - Metallische Werkstoffe - Prüfverfahren - Teil 21: Durchstrahlungsprüfung von Gußstücken

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

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

Ref. No. EN 2002-21:2019 E

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European foreword

This document (EN 2002-21:2019) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This document shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2020, and conflicting national standards shall be withdrawn at the latest by May 2020.

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.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This document specifies the requirements for the radiographic testing of castings for aerospace applications.

It shall be applied when referred to in the EN technical specification or material standard unless otherwise specified on the drawing, order or testing schedule.

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.

EN 1330-1, *Aerospace series — Non-destructive testing — Terminology — Part 1: List of general terms*

EN 1330-2, *Aerospace series — Non-destructive testing — Terminology — Part 2: Terms common to the non-destructive testing methods*

EN 1330-3, *Aerospace series — Non-destructive testing — Terminology — Part 3: Terms used in industrial radiographic testing*

EN 4179, *Aerospace series — Aerospace series — Qualification and approval of personnel for non-destructive testing*

EN 4258, *Aerospace series — Metallic materials — General organization of standardization — Links between types of EN standards and their use*

EN 4259, *Aerospace series — Metallic materials — Definitions of general terms*[1)]

EN 25580, *Aerospace series — Non-destructive testing — Industrial radiographic illuminators — Minimum requirements*

EN ISO 5579, *Non-destructive testing — Radiographic testing of metallic materials using film and X- or gamma rays — Basic rules*[2)]

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*[2)]

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*[2)]

EN ISO 19232-3, *Non-destructive testing — Image quality of radiographs — Part 3: Image quality classes*[2)]

EN ISO 11699-1, *Non-destructive testing — Industrial radiographic film — Classification of film systems for industrial radiography*[2)]

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1) Published as ASD-STAN Standard at the date of publication of this standard by AeroSpace and Defence industries Association of Europe Standardization (ASD-STAN), http://www.asd-stan.org/

2) Published by: International Organization for Standardization, http://www.iso.ch/

ASTM E155-95, *Standard Reference Radiographs for Inspection of Aluminium and Magnesium Castings* 3)

ASTM E192-95, *Standard References Radiographs for Investment Steel Castings of Aerospace Applications* 3)

ASTM E24215, *Standard Reference Radiographs for Appearances of Radiographic Images as Certain Parameters are Changed*3)

ASTM E446-93, *Standard Reference Radiographs for Steel Castings up to 2 in (51 mm) in Thickness* 3)

ASTM E132015, *Standard Reference Radiographs for Titanium Castings* 3)

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 4259 apply.

For the other terms, see EN 1330-1, EN 1330-2 and EN 1330-6.

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/

4 Health and safety

Resources, test pieces, test samples, test materials, test equipment and test procedures shall comply with the current health and safety regulations/laws of the countries where the test is carried out.

Where equipment, materials and/or reagents which may be hazardous to health are specified, appropriate precautions in conformity with local regulations/laws shall be taken.

Particular attention shall be paid to the health and safety requirements applicable to ionising radiation (γ and X–ray).

5 Principle

The method requires the use of X- or gamma-radiography for the detection of discontinuities, using film or real-time techniques, applicable to the testing of metallic materials.

See EN ISO 5579.

6 Testing requirements

6.1 Resources

The resources shall be appropriate for fixed installation or portable system used on-site.

3) Published by: American Society for Testing and Materials (ASTM), http://www.astm.org/

6.1.1 Equipment/plant

The following equipment is needed:

a) X-ray source(s) and Gamma-ray source(s) with performance parameters appropriate to the material thickness and geometry of the objects to be tested;

b) image quality indicators according to EN ISO 19232-1 or EN ISO 19232-2;

c) a film processing system;

d) a film density measuring according to EN 444;

e) a suitable viewing room with appropriate control of illumination;

f) a viewing screen with luminance according to EN 25580 and capable of masking the area of interest;

g) radiation monitors calibrated in accordance with national standards;

h) a radiation hazard warning system;

i) a Gamma-ray source storage facility;

j) a building or room with suitable radiation shielding.

For real-time radiographic systems:

k) a means of remote manipulation;

l) electronic viewing/recording means;

m) software;

n) image enhancement and assessment tools.

6.1.2 Materials/reagents

The following material is required:

a) industrial radiographic films according to EN ISO 11699-1;

b) film processing chemicals;

c) electronic recording means.

6.1.3 Qualification of personnel

Testing to the requirements of this document shall only be performed and/or supervised by NDT personnel, qualified and approved in accordance with the requirements of EN 4179.

6.2 Test samples

The test sample shall be the casting; or group of castings as specified by the test procedure.