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RADIOGRAAFILINE KATSETAMINE. OSA 1: RÖNTGEN-  
JA GAMMAKIIRGUSTEHNİKAD FILMI KASUTAMISEGA

Non-destructive testing of welds - Radiographic testing  
- Part 1: X- and gamma-ray techniques with film (ISO  
17636-1:2022)

## EESTI STANDARDI EESSÕNA

## NATIONAL FOREWORD

<p>See Eesti standard EVS-EN ISO 17636-1:2022 sisaldab Euroopa standardi EN ISO 17636-1:2022 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 03.08.2022.</p> <p>Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN ISO 17636-1:2022 consists of the English text of the European standard EN ISO 17636-1:2022.</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 03.08.2022.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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ICS 25.160.40

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EUROPEAN STANDARD

**EN ISO 17636-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2022

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Supersedes EN ISO 17636-1:2013

English Version

**Non-destructive testing of welds - Radiographic testing -  
Part 1: X- and gamma-ray techniques with film (ISO  
17636-1:2022)**

Essais non destructifs des assemblages soudés -  
Contrôle par radiographie - Partie 1: Techniques par  
rayons X ou gamma à l'aide de film (ISO 17636-1:2022)

Zerstörungsfreie Prüfung von Schweißverbindungen -  
Durchstrahlungsprüfung - Teil 1: Röntgen- und  
Gammastrahlungstechniken mit Filmen (ISO 17636-  
1:2022)

This European Standard was approved by CEN on 25 June 2022.

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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 17636-1:2022) has been prepared by Technical Committee ISO/TC 44 "Welding and allied processes" in collaboration with Technical Committee CEN/TC 121 "Welding and allied processes" 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 February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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 ISO 17636-1:2013.

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.

According to the CEN-CENELEC Internal Regulations, the national standards organizations 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, Türkiye and the United Kingdom.

## Endorsement notice

The text of ISO 17636-1:2022 has been approved by CEN as EN ISO 17636-1:2022 without any modification.

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**Non-destructive testing of welds —  
Radiographic testing —**

**Part 1:  
X- and gamma-ray techniques with  
film**

*Essais non destructifs des assemblages soudés — Contrôle par  
radiographie —*

*Partie 1: Techniques par rayons X ou gamma à l'aide de film*



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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](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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 Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 5, *Testing and inspection of welds*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 121, *Welding and allied processes*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This second edition cancels and replaces the first edition (ISO 17636-1:2013), which has been technically revised.

The main changes are as follows:

- the normative references have been updated;
- the Figures have been updated;
- references to [Figures 1](#) to [19](#) have been updated throughout the document;
- in [6.7](#) the use of ASTM wires and other image quality indicators (IQIs) by agreement of contracting parties has been added;
- in [6.7](#) a) the acceptance of a shorter wire visibility than 10 mm for pipes with an external diameter < 50 mm has been added;
- in [6.7](#), [6.8](#) and [6.9](#) a clarification for the IQI usage for the double-wall double-image (DWDI) technique has been added;
- in [6.9](#) and [7.2.2](#) the lower thickness limit for Se 75 applications has been deleted;
- measurement of optical density in the root of the weld has been clarified;
- IQI use for the DWDI technique has been clarified.

A list of all parts in the ISO 17636 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). Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

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# Non-destructive testing of welds — Radiographic testing —

## Part 1: X- and gamma-ray techniques with film

### 1 Scope

This document specifies techniques of radiographic testing of fusion-welded joints in metallic materials using industrial radiographic film techniques with the object of enabling satisfactory and repeatable results. The techniques are based on generally recognized practice and fundamental theory of the subject.

It applies to the joints of plates and pipes in metallic materials. Besides its conventional meaning, “pipe” as used in this document covers other cylindrical bodies, such as tubes, penstocks, boiler drums and pressure vessels.

This document does not specify acceptance levels for any of the indications found on the radiographs. The ISO 10675 series provides information on acceptance levels for weld evaluation.

If contracting parties apply lower test criteria, it is possible that the quality achieved will be significantly lower than when this document is strictly applied.

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

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

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

ISO 11699-2, *Non-destructive testing — Industrial radiographic films — Part 2: Control of film processing by means of reference values*

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 19232-4, *Non-destructive testing — Image quality of radiographs — Part 4: Experimental evaluation of image quality values and image quality tables*

ASTM E 747, *Standard Practice for Design, Manufacture and Material Grouping Classification of Wire Image Quality Indicators (IQI) Used for Radiology*

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 — Radiographic testing — Determination of the size of industrial radiographic gamma sources*

JIS Z2306, *Radiographic image quality indicators for non-destructive testing*

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5576 and the following 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/>

#### 3.1 nominal thickness

$t$

thickness of the parent material only where manufacturing tolerances do not have to be considered

#### 3.2 penetration thickness change

$\Delta t$

change of *penetrated thickness* (3.3) relative to the *nominal thickness* (3.1) due to beam angle

#### 3.3 penetrated thickness

$w$

thickness of material in the direction of the radiation beam calculated on the basis of the *nominal thicknesses* (3.1) of all penetrated walls

#### 3.4 object-to-film distance

$b$

distance between the radiation side of the radiographed part of the test object and the film surface, measured along the central axis of the radiation beam

Note 1 to entry: The abbreviated term OFD can also be used.

#### 3.5 source size

$d$

size of the radiation source or focal spot size

Note 1 to entry: See the EN 12543 series or EN 12679.

#### 3.6 source-to-film distance

SFD

distance between the source of radiation and the film, measured in the direction of the beam

Note 1 to entry:  $SFD = f + b$

where

$f$  is *source-to-object distance* (3.7);

$b$  is *object-to-film distance* (3.4).