

STN	Nedeštruktívne skúšanie zvarov Skúšanie prežarováním Časť 1: Techniky röntgenového žiarenia a žiarenia gama s použitím filmu (ISO 17636-1: 2022)	STN EN ISO 17636-1 05 1150
------------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------	----------------------------------------------

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

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. 10/22

Obsahuje: EN ISO 17636-1:2022, ISO 17636-1:2022

Oznámením tejto normy sa ruší
STN EN ISO 17636-1 (05 1150) z júla 2013

135757

EUROPEAN STANDARD

EN ISO 17636-1

NORME EUROPÉENNE

EUROPÄISCHE NORM

August 2022

ICS 25.160.40

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.

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.

CEN members are the national standards bodies of 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 United Kingdom.



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

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

EN ISO 17636-1:2022 (E)

Contents	Page
European foreword.....	3

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.

INTERNATIONAL STANDARD

ISO 17636-1

Second edition
2022-07

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



Reference number
ISO 17636-1:2022(E)

© ISO 2022

ISO 17636-1:2022(E)**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Symbols and abbreviated terms	3
5 Classification of radiographic techniques	4
6 General preparations and requirements	4
6.1 Protection against ionizing radiation.....	4
6.2 Surface preparation and stage of manufacture.....	4
6.3 Location of the weld in the radiograph.....	5
6.4 Identification of radiographs.....	5
6.5 Marking.....	5
6.6 Overlap of films.....	5
6.7 Types and positions of image quality indicators (IQIs).....	5
6.8 Evaluation of image quality.....	6
6.9 Minimum image quality values.....	6
6.10 Personnel qualification.....	7
7 Recommended techniques	7
7.1 Test arrangements.....	7
7.1.1 General.....	7
7.1.2 Single-wall penetration of plane objects (see Figure 1).....	8
7.1.3 Single-wall penetration of curved objects with the source outside the object (see Figures 2 to 4).....	8
7.1.4 Single-wall penetration of curved objects with the source inside the object for panoramic exposure (see Figures 5 to 7).....	9
7.1.5 Single-wall penetration of curved objects with the source located off-centre and inside the object (see Figures 8 to 10).....	10
7.1.6 Double-wall penetration and double-image evaluation (DWDI) of pipes with the elliptic technique and the source and the film outside the object (see Figure 11).....	11
7.1.7 Double-wall penetration and double-image evaluation (DWDI) with the perpendicular technique and source and film outside the object (see Figure 12).....	11
7.1.8 Double-wall penetration and single-image evaluation (DWSI) of curved objects for evaluation of the wall next to the film (see Figures 13 to 16).....	11
7.1.9 Penetration of objects with different material thicknesses (see Figure 17 to 19).....	13
7.2 Choice of tube voltage and radiation source.....	13
7.2.1 X-ray devices up to 1 000 kV.....	13
7.2.2 Other radiation sources.....	14
7.3 Film systems and metal screens.....	15
7.4 Alignment of beam.....	17
7.5 Reduction of scattered radiation.....	17
7.5.1 Metal filters and collimators.....	17
7.5.2 Interception of backscattered radiation.....	17
7.6 Source-to-object distance.....	18
7.7 Maximum area for a single exposure.....	20
7.8 Optical density of radiograph.....	20
7.9 Processing.....	21
7.10 Film viewing conditions.....	21
8 Test report	21

ISO 17636-1:2022(E)

Annex A (normative) Number of exposures for acceptable testing of a circumferential butt weld	23
Annex B (normative) Minimum image quality values	28
Annex C (informative) Calculation of maximum X-ray tube voltages from Figure 20	35
Bibliography	36

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).

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).

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.

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.

ISO 17636-1:2022(E)

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. Official interpretations of ISO/TC 44 documents, where they exist, are available from this page: <https://committee.iso.org/sites/tc44/home/interpretation.html>.

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*

ISO 17636-1:2022(E)

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

koniec náhľadu – text ďalej pokračuje v platenej verzii STN