INTERNATIONAL STANDARD

ISO 17639

Second edition
2022-01

Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds

Essais destructifs des soudures sur matériaux métalliques — Examens macroscopique et microscopique des assemblages soudés

Reference number
ISO 17639:2022(E)

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 ..... **iv**
1 Scope **1**
2 Normative references **1**
3 Terms and definitions **1**
4 Symbols and abbreviated terms **1**
5 Principle **2**
6 Purpose of the test **2**
7 Removal of test specimens **2**
8 Test procedure **3**
8.1 General 3
8.2 Test specimen preparation 3
8.3 Surface finish 3
8.4 Etching methods 4
8.5 Etchants 4
8.6 Safety measures 4
9 Examination **4**
10 Designation **4**
11 Test report **7**
Annex A (informative) **Example of a test report** **8**
Bibliography **9**

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 17639:2003), which has been technically revised.

The main changes are as follows:

— Clause 2 has been updated;

— the designations according to ISO/TR 15608 have been updated in Clause 10.

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.

Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds

1 Scope

This document gives recommendations for specimen preparation, test procedures and their main objectives for macroscopic and microscopic examination.

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 6520-1, *Welding and allied processes — Classification of geometric imperfections in metallic materials — Part 1: Fusion welding*

3 Terms and definitions

For the purposes of this document, the following terms and definitions 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
macroscopic examination
examination of a test specimen by the naked eye, or under low magnification (generally less than ×50), with or without etching

3.2
microscopic examination
examination of a test specimen by microscope with a magnification of generally ×50 to ×500, with or without etching

3.3
examiner
person who performs the *macroscopic examination* (3.1) and/or *microscopic examination* (3.2)

4 Symbols and abbreviated terms

For the purposes of this document, the following abbreviations apply.

A macroscopic examination

I microscopic examination

E etched

U unetched

Symbols for parent metals are given as material grouping system in ISO/TR 15608.