INTERNATIONAL STANDARD

ISO 17663

Second edition
2023-04

Welding — Quality requirements for heat treatment in connection with welding and allied processes

Soudage — Exigences de qualité relatives au traitement thermique associé au soudage et aux techniques connexes

Reference number
ISO 17663:2023(E)

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Published in Switzerland

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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).

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).

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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 10, *Quality management in the field of welding*, 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 17663:2009), which has been technically revised.

The main changes are as follows:

— normative references updated;

— arc stud welding added in 9.5;

— Figure A.1 revised.

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.

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Welding — Quality requirements for heat treatment in connection with welding and allied processes

1 Scope

This document provides quality requirements for heat treatment in air or controlled atmospheres carried out in workshops and on site in connection with welding and forming. It applies mainly to ferritic steels but can be used for other materials as appropriate.

This document provides guidance for manufacturers that perform heat treatment or produce heat-treated products or components. This document can also be used as a basis for assessing the manufacturer in respect to its heat treatment capability.

The fulfilment of a requirement can be waived where justification can be provided that a specific requirement is not applicable to a specific process. This document is intended to be a flexible framework to provide:

— specific requirements for heat treatment by manufacturers in order to have a quality system in accordance with ISO 9001;

— specific requirements for heat treatment in specifications which require the manufacturer to have a quality system other than ISO 9001;

— specific guidance for a manufacturer developing a quality control system for heat treatment;

— specific guidance for post-weld heat treatment for manufacturers adopting ISO 3834-2 or ISO 3834-3;

— detailed requirements for specifications, regulations or product standards that require control of heat treatment activities.

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 4885, *Ferrous materials — Heat treatments — Vocabulary*

ISO 13916, *Welding — Measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

IEC 60584-1, *Thermocouples — Part 1: EMF specifications and tolerances*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 4885 and ISO 13916 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/

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3.1
manufacturer
person or organization responsible for heat treatment of products or components

3.2
loading temperature
temperature of the furnace at the stage when the product or component is put into the furnace

3.3
holding temperature
temperature at which the product or component is kept in order to achieve the specified properties

Note 1 to entry: The holding temperature depends on the type of heat treatment, type of material and material thickness.

Note 2 to entry: Normally, the holding temperature is expressed as a temperature range.

3.4
holding time
time the product or component is kept at the holding temperature

Note 1 to entry: The holding time starts when the temperature at all measuring points has reached the minimum value of the range of the holding temperature and stops when one of the measuring points falls below that temperature.

Note 2 to entry: The holding time depends on the type of heat treatment, material and material thickness.

3.5
unloading temperature
temperature of the product or component when it is taken out of a furnace or when the heat source is removed or switched off in any other heat treatment, e.g. local heat treatment

3.6
section temperature range
temperature range with a specified linear distance that can vary between two adjacent measuring points

4 Review of requirements and technical review

4.1 General

The manufacturer shall review the contractual requirements and any other requirements together with any technical data. This is to ensure that all information necessary to carry out the heat treatment operations is available prior to the commencement of the work. The manufacturer shall affirm its capability to meet all requirements and ensure adequate planning of all quality-related activities.

The review of requirements is carried out by the manufacturer to verify that the work content is within its capability to perform, that sufficient resources are available to achieve delivery schedules and that documentation is clear and unambiguous. The manufacturer shall ensure that variations between the contract and previous quotation are identified.

4.2 Review of requirements

Aspects for consideration shall include the following:

a) product standard used, together with any supplementary requirements;

b) statutory and regulatory requirements;

c) any additional requirement determined by the manufacturer;

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