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Quality requirements for welding — Resistance welding of metallic materials —

Part 1: Comprehensive quality requirements

Exigences de qualité en soudage — Soudage par résistance des matériaux métalliques —
Partie 1: Exigences de qualité complète

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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. 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. www.iso.org/patents

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: http://www.iso.org/iso/home/standards_development/resources-for-technical-work/foreword.htm

The committee responsible for this document is ISO/TC 44, *Welding and allied processes*, Subcommittee SC 6, *Resistance welding and allied mechanical joining*.

This second edition cancels and replaces the first edition (ISO 14551-1:2000), of which it constitutes a minor revision.

ISO 14554 consists of the following parts, under the general title *Quality requirements for welding — Resistance welding of metallic materials*:

— *Part 1: Comprehensive quality requirements*

— *Part 2: Elementary quality requirements*

Requests for official interpretations of any aspect of this part of ISO 14554 should be directed to the Secretariat of ISO/TC 44/SC 6 via your national standards body. A complete listing of these bodies can be found at www.iso.org.

Quality requirements for welding — Resistance welding of metallic materials —

Part 1: Comprehensive quality requirements

1 Scope

This part of ISO 14554 specifies requirements for the demonstration of the capability of a manufacturer or a sub-contractor to produce welded constructions, fulfilling specified quality requirements, in one or more of the following:

— a contract between involved parties;

— an application standard;

— a regulatory requirement.

The requirements contained within this part of ISO 14554 can be adopted in full or can be selectively deleted by the manufacturer if not applicable to the construction concerned. They provide a flexible framework for the control of welding by providing specific requirements for:

— Case 1 — resistance welding in contracts which require the manufacturer or sub-contractor to have a quality system in accordance with ISO 9001;[4]

— Case 2 — resistance welding in contracts which require the manufacturer or sub-contractor to have a quality system other than ISO 9001;[4]

— Case 3 — resistance welding as guidance to a manufacturer or sub-contractor developing a quality system;

— Case 4 — references in application standards which use resistance welding as part of their requirements or in a contract between relevant parties, although it is more appropriate for ISO 14554-2 to be used in such cases.

This part of ISO 14554:

— is independent of the type of welded construction to be manufactured;

— defines quality requirements for welding both in production plants and on site;

— provides guidance for describing the capability of a manufacturer to produce welded constructions to meet specified requirements;

— can also be used as a basis for assessing the manufacturer in respect to his welding capability.

For general guidelines for selection and use, see ISO 3834-1, while being aware that only comprehensive and elementary quality requirements are specified for resistance welding. Annex A gives a summary comparison of specific quality requirements for resistance welding in this part of ISO 14554 and ISO 14554-2.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3834-1, *Quality requirements for fusion welding of metallic materials — Part 1: Criteria for the selection of the appropriate level of quality requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 3834-1 apply.

4 Contract and design review

4.1 General

The manufacturer shall review the contractual requirements and the design data provided by the purchaser or in-house data for construction designed by the manufacturer. This is to ensure that all information necessary to carry out the fabrication operations is available prior to the commencement of the work. The manufacturer shall affirm his capability to meet all welding contract requirements and ensure adequate planning of all quality-related activities.

Contract review is performed by the manufacturer to verify that: the contract is within his capability to carry out; sufficient resources are available to achieve delivery schedules; and documentation is clear and unambiguous. The manufacturer should ensure any variations between the contract and previous tender documentation are identified and the purchaser notified of any programme, cost or engineering changes that may result.

The items in 4.2 are typically considered at or before the time of the contract review. The items in 4.3 usually form part of the design review and should be taken into account during the contract review if the design is not carried out by the manufacturer. It shall be ensured that all relevant information has been supplied by the purchaser.

When a contract does not exist, e.g. items made for stock, the manufacturer is required to take into consideration the requirements of 4.2 while carrying out its design review (see 4.3).

4.2 Application — Contract review

Contractual requirements to be considered should include:

a) the application standard to be used, together with any supplementary requirements;

b) inspection and testing;

c) the specification of welding procedures, destructive and non-destructive examination procedures and heat treatment procedures;

d) the approach to be used for welding procedure approval;

e) the approval of personnel;

f) heat treatment (for details, see Clause 12);

g) selection, identification and/or traceability, e.g. for materials, welding equipment, welders and welds (see Clause 16);

h) quality control arrangements, including any involvement of an independent inspection body;

i) other welding requirements, e.g. surface condition of the sheets, coatings, fit up of the parts;

j) environmental conditions, e.g. main voltage conditions, very high/low ambient temperatures, high humidity (see ISO 669[1]);

k) sub-contracting;

l) handling of non-conformances.

4.3 Application — Design review

Design requirements to be considered should include:

a) welding process or welding process variable;

b) welding equipment and welding electrodes;

c) use of special methods, e.g. welding with backing electrode, welding with shielding gas or shielding fluids, welding with intermediate electrode;

d) location, accessibility, and sequence of all welds;

e) surface finish and the geometry of the welded joint, e.g. excessive electrode indentation or in the case of mash welding excessive thickness of the weld;

f) parent metal(s) specification and welded joint properties;

g) welds which are to be made in production plants or on site;

h) initial and final dimensions of the welded component, any special surface or edge preparation;

i) quality and acceptance requirements;

j) other special requirements, e.g. surface finishing, heat treatment, interweld adhesives, sealants, primer.

5 Sub-contracting

When a manufacturer intends to use sub-contracted services (e.g. welding, inspection, heat treatment), all relevant specifications and requirements shall be supplied by the manufacturer to the sub-contractor. The sub-contractor shall provide such records and documentation of his work as may be specified by the manufacturer.

Any sub-contractor shall work as instructed by, and be responsible to, the manufacturer and shall fully comply with all relevant requirements of this part of ISO 14554. The manufacturer shall ensure that the sub-contractor can comply with the quality requirements of the contract.

The information to be provided by the manufacturer to the sub-contractor shall include all relevant data from the contract review (see 4.2) and the design review (see 4.3). Additional requirements may need to be specified if the design of a structure is to be sub-contracted.

6 Welding personnel

6.1 General

The manufacturer shall have at his disposal sufficient and competent personnel for the planning, performance, and supervision of the welding production according to specified requirements.

6.2 Operators

All operators of resistance welding equipment shall be given introduction courses and task-oriented training.

6.3 Resistance weld setter

The resistance weld setter is the person who is competent for setting up resistance welding equipment according to specified welding procedures. This person has the required knowledge and skill for carrying out the work for quality assurance in the field of resistance welding.

