
**Quality requirements for fusion
welding of metallic materials —**

**Part 1:
Criteria for the selection of the
appropriate level of quality
requirements**

*Exigences de qualité en soudage par fusion des matériaux
métalliques —*

*Partie 1: Critères pour la sélection du niveau approprié d'exigences de
qualité*



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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).

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 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 third edition cancels and replaces the second edition (ISO 3834-1:2005), which has been technically revised. The main changes compared with the previous edition are as follows:

- this document has been editorially revised;
- references to subclauses in ISO 9001 have been updated.

A list of all parts in the ISO 3834 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.

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

Introduction

Processes such as fusion welding are widely used to manufacture many products. In some companies, they are the key feature of production. Products can range from simple to complex. Examples include pressure vessels, domestic and agricultural equipment, cranes, bridges, transport vehicles and other items.

These processes exert a profound influence on the cost of manufacture and quality of the product. Therefore, it is important to ensure that these processes are carried out in the most effective way and that appropriate control is exercised over all aspects of the operation.

It is emphasized that the ISO 3834 series is not a quality management system (QMS) standard replacing ISO 9001:2015. However, it can be a useful tool when ISO 9001:2015 is applied by manufacturers.

Specification of quality requirements for welding processes is important because the quality of these processes cannot be readily or economically validated. Therefore, they are considered to be special processes as noted by ISO 9000:2015.

Quality cannot be inspected into a product: quality needs to be built in. Even the most extensive and sophisticated non-destructive testing does not improve the quality of the product.

For products to be free from serious problems in production and in service, it is necessary to provide controls, from the design phase, through material selection, into manufacture and subsequent inspection. For example, poor design can create serious and costly difficulties in the workshop, on site or in service. Incorrect material selection can result in problems, such as cracking in welded joints.

To ensure sound and effective manufacturing, management needs to understand and appreciate the sources of potential trouble and to implement appropriate procedures for their control.

The ISO 3834 series identifies measures that are applicable for different situations. Typically, they can be applied in the following circumstances:

- in contractual situations: specification of welding quality requirements;
- by manufacturers: establishment and maintenance of welding quality requirements;
- by committees drafting manufacturing codes or application standards: specification of welding quality requirements;
- by organizations assessing welding quality performance, e.g. third parties, customers or manufacturers.

The ISO 3834 series can be used by internal and external organizations, including certification bodies, to assess the manufacturer's ability to meet customer, regulatory or the manufacturer's own requirements.

NOTE 1 ISO 3834-2, ISO 3834-3 and ISO 3834-4 provide complete sets of quality requirements for process control related to all fusion welding processes (for each process separately or in combination as specified). ISO 3834-5 specifies the documents with which it is necessary to conform to claim conformity to the quality requirements of ISO 3834-2, ISO 3834-3 or ISO 3834-4.

NOTE 2 ISO 3834-2, ISO 3834-3 and ISO 3834-4 can be used on their own by a manufacturer or in conjunction with ISO 9001:2015.

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Quality requirements for fusion welding of metallic materials —

Part 1:

Criteria for the selection of the appropriate level of quality requirements

1 Scope

This document specifies a general outline of the ISO 3834 series and criteria to be taken into account for the selection of the appropriate level of quality requirements for fusion welding of metallic materials, among the three levels specified in ISO 3834-2, ISO 3834-3 and ISO 3834-4.

It is applicable to manufacturing, both in workshops and at field installation sites.

This document does not specify requirements for a total quality management system (QMS). However, [Clause 6](#) identifies QMS elements where their inclusion complements the ISO 3834 series.

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 9000:2015, *Quality management systems — Fundamentals and vocabulary*

ISO/TR 25901 (all parts), *Welding and allied processes — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 9000:2015, the ISO/TR 25901 series 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

construction

product, structure or any other welded item

3.2

manufacturer

person or organization responsible for the welding production

3.3

sub-contractor

supplier of products, services and/or activities to the manufacturer in a contractual situation

4 General outline of the ISO 3834 series

The ISO 3834 series specifies quality requirements suitable for fusion welding processes of metallic materials. The requirements contained within this document can be adopted for other welding processes. These requirements relate only to those aspects of the quality of the products, which can be influenced by fusion welding, without being assigned to any specific product group.

Therefore, the ISO 3834 series provides a method to demonstrate the capability of a manufacturer to produce products of the specified quality.

It was prepared such that:

- a) it is independent of the type of construction manufactured;
- b) it defines quality requirements for welding in workshops and/or on site;
- c) it provides guidance for describing a manufacturer's capability to produce constructions to meet specified requirements;
- d) it provides a basis for assessing a manufacturer's welding capability.

The ISO 3834 series is appropriate when demonstration of a manufacturer's ability to produce welded constructions fulfilling specified quality requirements, is specified in one or more of the following:

- a specification;
- a product standard;
- a regulatory requirement.

The requirements contained within this document may be adopted in full or may be selectively deleted by the manufacturer if not applicable to the construction concerned. They provide a flexible framework for the control of welding in the following applications.

- Case 1: To provide specific requirements in specifications which require the manufacturer to have a QMS in accordance with ISO 9001:2015.
- Case 2: To provide specific requirements in specifications which require the manufacturer to have a QMS other than ISO 9001:2015.
- Case 3: To provide specific guidance for a manufacturer developing a QMS for fusion welding.
- Case 4: To provide detailed requirements for specifications, regulations or product standards that require control of fusion welding activities.

5 Selection of the appropriate level of quality requirements

The selection of the appropriate part of the ISO 3834 series, specifying the required level of quality requirements, should be in accordance with the product standard, specification, regulation or contract. Because the ISO 3834 series can be used in a variety of situations and for different applications, definitive rules on the level of quality requirements to be adopted in individual circumstances cannot be given in this clause.

The ISO 3834 series can be applied in a variety of situations. The manufacturer should select one of the three parts specifying different levels of quality requirements, based on the following criteria related to products:

- the extent and significance of safety-critical products;
- the complexity of manufacture;
- the range of products manufactured;

- the range of different materials used;
- the extent to which metallurgical problems can occur;
- the extent to which manufacturing imperfections, e.g. misalignment, distortion or weld imperfection, affect product performance.

A manufacturer that demonstrates compliance to a particular quality level is considered to have established compliance to all lower levels without further demonstration, e.g. a manufacturer compliant to comprehensive quality requirements (i.e. ISO 3834-2) demonstrates compliance with standard quality requirements (i.e. ISO 3834-3) and elementary quality requirements (i.e. ISO 3834-4).

[Annex A](#) lists criteria which assist in the selection of the appropriate part of the ISO 3834 series.

6 Elements to be considered for a quality management system to complement the ISO 3834 series

The ISO 3834 series contains many attributes that contribute to a QMS. This clause identifies those QMS elements that the manufacturer should consider implementing to support the quality requirements of the ISO 3834 series:

- a) control of documents and records (see ISO 9001:2015, 7.5);
- b) management responsibilities (see ISO 9001:2015, 5.3);
- c) provision of resources (see ISO 9001:2015, 7.1);
- d) competence, awareness and training of operational personnel (see ISO 9001:2015, 7.2, 7.3 and Clause 10);
- e) planning of product realization (see ISO 9001:2015, 8.2, 8.3, 8.4 and 8.5, and ISO 10005);
- f) determination of requirements related to the product (see ISO 9001:2015, 8.2.2 and 8.2.4);
- g) review of requirements related to the product (see ISO 9001:2015, 8.2.3);
- h) purchasing (see ISO 9001:2015, 8.4);
- i) validation of processes (see ISO 9001:2015, 8.4 and 8.5.1);
- j) customer property (see ISO 9001:2015, 8.5.3);
- k) internal audit (see ISO 9001:2015, 9.2);
- l) monitoring and measurement of product (see ISO 9001:2015, 9.1.3);
- m) control of externally provided processes, products and services (see ISO 9001:2015, 8.4);
- n) control of production and service provision (see ISO 9001:2015, 8.5.1).

ISO 9004 provides guidance on the development and implementation of a QMS.

Annex A
(informative)

**Criteria which assist in the selection of ISO 3834-2, ISO 3834-3 or
ISO 3834-4**

No.	Element	ISO 3834-2	ISO 3834-3	ISO 3834-4
1	Review of requirements	Review required		
		Record is required	Record can be required	Record is not required
2	Technical review	Review required		
		Record is required	Record can be required	Record is not required
3	Sub-contracting/ sub-contractor	Treat like a manufacturer for the specific subcontracted product, services and/or activities. However, final responsibility for quality remains with the manufacturer.		
4	Welders and welding operators	Qualification is required		
5	Welding coordination personnel	Required		No specific requirement
6	Inspection and testing personnel	Qualification is required		
7	Production and testing equipment	Suitable and available as required for preparation, process execution, testing, transport, lifting in combination with safety equipment and protective clothes.		
8	Equipment maintenance	Required to provide, maintain and achieve product conformity		No specific requirement
		Documented plans and records are required	Records are recommended	
9	Description of equipment	List is required		No specific requirement
10	Production planning	Required		No specific requirement
		Documented plans and records are required	Documented plans and records are recommended	
11	Welding procedure specifications	Required		No specific requirement
12	Qualification of the welding procedures	Required		No specific requirement
13	Batch testing of consumables	If required	No specific requirement	
14	Storage and handling of welding consumables	A procedure is required in accordance with supplier recommendations		In accordance with supplier recommendations
15	Storage of parent material	Protection required from influence by environment. Identification shall be maintained through storage.		No specific requirement

No.	Element	ISO 3834-2	ISO 3834-3	ISO 3834-4
16	Post-weld heat treatment	Confirmation that the requirements according to product standard or specifications are fulfilled		No specific requirement
		Procedure, record and traceability of the record to the product are required	Procedure and record are required	
17	Inspection and testing before, during and after welding	Required		If required
18	Non-conformance and corrective actions	Measures of control are implemented. Procedures for repair and/or rectification are required.		Measures of control are implemented
19	Calibration or validation of measuring, inspection and testing equipment	Required	If required	No specific requirement
20	Identification during process	If required		No specific requirement
21	Traceability	If required		No specific requirement
22	Quality records	If required		

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