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## Quality requirements for fusion welding of metallic materials —

### Part 6: Guidelines on implementing the ISO 3834 series

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# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>Introduction</b> .....	<b>v</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Abbreviated terms</b> .....	<b>1</b>
<b>5 Using the ISO 3834 series</b> .....	<b>1</b>
5.1 General.....	1
5.2 Product standards.....	2
5.3 Purchasers and users.....	2
5.4 Quality management systems in accordance with ISO 9001.....	2
5.5 Quality management systems other than ISO 9001.....	2
5.6 Manufacturers.....	2
<b>6 Incorporating the ISO 3834 series in product standards</b> .....	<b>2</b>
<b>7 Using other documents with the ISO 3834 series</b> .....	<b>2</b>
<b>8 Documentation and quality systems</b> .....	<b>3</b>
8.1 Documentation.....	3
8.2 Quality management system.....	3
<b>9 Selecting the level of quality requirements</b> .....	<b>4</b>
<b>10 Implementation in fabrication</b> .....	<b>6</b>
10.1 General guidelines for implementation.....	6
10.1.1 Basic principles.....	6
10.1.2 Implementation.....	6
10.1.3 Control of welding.....	8
10.1.4 Production procedures.....	8
10.2 Organization.....	10
<b>11 Interpretation of particular clauses in the ISO 3834 series</b> .....	<b>10</b>
11.1 Requirements review and technical review.....	10
11.2 Subcontracting.....	10
11.3 Welding coordination.....	11
11.3.1 General.....	11
11.3.2 Welding coordinator.....	11
11.3.3 Welding inspection personnel.....	12
11.3.4 NDT personnel.....	12
11.3.5 Correlation between ISO 14731 and ISO 3834 series quality levels.....	12
11.4 Equipment.....	13
11.5 Welding activities.....	13
11.6 Storage of parent metal.....	13
11.7 Calibration and validation.....	14
11.8 Identification and traceability.....	14
<b>12 Assessment and certification</b> .....	<b>15</b>
<b>Annex A (informative) Examples of documents for the control of welding-related activities</b> .....	<b>16</b>
<b>Bibliography</b> .....	<b>19</b>

## 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 document 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](http://www.iso.org/directives)).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at [www.iso.org/patents](http://www.iso.org/patents). ISO shall not be held responsible for identifying any or all such patent rights.

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](http://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 document cancels and replaces ISO/TR 3834-6:2007, which has been technically revised.

The main changes are as follows:

- document changed from a Technical Report to an International Standard;
- references to IIW and IAB removed;
- [Clause 11](#) updated to address visual inspection of welds;
- text aligned with ISO 14731.

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](http://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

Welding is a special process in that it is not always possible to verify the final result by testing. The quality of the weld is manufactured into the product, not inspected. This means that welding normally requires continuous control or that specific procedures be followed, or both. The ISO 3834 series deals with quality requirements in welding and has been prepared in order to identify those controls and procedures.

The ISO 3834 series is not a quality system standard intended to take the place of ISO 9001, but a useful, additional tool for use when ISO 9001 is applied by manufacturers, in which case the meeting of its requirements needs to be recorded in certificates or documentation. However, the ISO 3834 series can be used independently of ISO 9001.

The ISO 3834 series is intended for the fusion welding of metallic materials, and its application is independent of the products manufactured. However, its principles and many of its detailed requirements are also relevant for other welding and welding-related processes.

One of the aims of the ISO 3834 series is to specify requirements in the field of welding so that contracting parties or regulators do not have to do this themselves. A reference to a particular part of the ISO 3834 series should be sufficient to demonstrate the capabilities of the manufacturer to control welding activities for the type of work being done. This concept also applies to committees responsible for drafting product standards.

The ISO 3834 series does not in itself require external assessment or certification. However, assessments by customers and certification by independent bodies are growing trends in commercial relations and the series can serve as a basis for these purposes, as well as for the demonstration of performance by those manufacturers implementing it.

Other International Standards covering resistance welding and thermal spraying include the ISO 14554 series and ISO 14922, respectively.

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# Quality requirements for fusion welding of metallic materials —

## Part 6: Guidelines on implementing the ISO 3834 series

### 1 Scope

This document gives guidelines for the implementation of requirements given in the other parts of the ISO 3834 series. It is intended to help users select the appropriate part of the ISO 3834 series. It is expected that users will already be familiar with the ISO 3834 series as a whole.

This document does not provide additional requirements to those in ISO 3834-1 to ISO 3834-5.

### 2 Normative references

There are no normative references in this document.

### 3 Terms and definitions

No terms and definitions are listed in this document.

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/>

### 4 Abbreviated terms

For the purposes of this document, the following abbreviated terms apply.

NDT	non-destructive testing
PWHT	post-weld heat treatment
pWPS	preliminary welding procedure specification
WI	work instruction
WPQR	welding procedure qualification record
WPS	welding procedure specification

### 5 Using the ISO 3834 series

#### 5.1 General

ISO 3834-1 provides criteria for the selection and use of the ISO 3834 series. The following subclauses identify different ways that the manufacturer can select or be required to adopt a part of ISO 3834.

## 5.2 Product standards

Where product standards require control of fusion welding, the ISO 3834 series should be used to organize those welding activities.

## 5.3 Purchasers and users

Purchasers and users of welded products can specify in contract documents that manufacturers demonstrate their competence by conformity with a part of ISO 3834.

## 5.4 Quality management systems in accordance with ISO 9001

Since ISO 9001 does not include specific requirements for welding activities, ISO 3834-2, ISO 3834-3 and ISO 3834-4 can be used.

## 5.5 Quality management systems other than ISO 9001

For welding activities in quality management systems other than ISO 9001 that do not include specific requirements for welding activities, ISO 3834-2, ISO 3834-3 and ISO 3834-4 can be used.

## 5.6 Manufacturers

Whenever manufacturers wish to give evidence of their competence in fusion welding activities, the appropriate part of ISO 3834 can be used.

## 6 Incorporating the ISO 3834 series in product standards

An important group of users of the ISO 3834 series is committees that draft product standards at international, regional or national level. ISO 3834-2, ISO 3834-3 and ISO 3834-4 provide a range of quality requirements for welding. Committees drafting product standards are encouraged to select a part, or parts, of ISO 3834 that provide the appropriate quality requirements for the products to be manufactured. This should take into account the selection criteria given in ISO 3834-1. Each part of ISO 3834 is designed to provide a complete set of quality requirements. Additional requirements should not need to be specified unless compelling reasons exist. In case of doubt, or where additional requirements are being considered, consultation with ISO/TC 44/SC 10 is recommended.

Where welding is involved in the manufacture of a product, the standards committee may specify the documents to be applied or else take them from the ISO documents specified in ISO 3834-5. The committee should also select the appropriate quality requirement standard or standards to be applied. Where a series of levels exist in the ISO documents in ISO 3834-5, for example for welding procedure qualification, it is satisfactory for the standardization committee to select only those that are acceptable. The development of tables linking parts of ISO 3834 (with or without other quality-related standards, such as ISO 9001) to requirements other than those given in ISO 3834 is strongly discouraged.

## 7 Using other documents with the ISO 3834 series

Full conformity with ISO 3834-2, ISO 3834-3 and ISO 3834-4 can be achieved either by adopting the ISO documents in accordance with ISO 3834-5 or applying other standards that provide equivalent technical conditions.

Standards that do not provide equivalent conditions may be adopted if they are referenced in product standards that are used by the manufacturer.

Product standards that have been used satisfactorily in service may be considered by a manufacturer as being recognized for application with the ISO 3834 series. Where a manufacturer bases its demonstration of conformity to a part of ISO 3834 on product standards, it is the responsibility of the manufacturer to apply the corresponding standards – whether separately specified or incorporated



in the product standard – in their totality. It is the responsibility of the manufacturer to demonstrate technically equivalent conditions when standards other than the ISO documents in accordance with ISO 3834-5 are applied. Certificates issued following assessment by independent certification bodies or claims of conformity by a manufacturer with any part of ISO 3834 should clearly identify the documents used by the manufacturer and provide or reference evidence of technical equivalence as applicable.

## 8 Documentation and quality systems

### 8.1 Documentation

In any control system there is a need for documentation, a term which embraces a range of different types of documents, such as procedures, records, instructions and certificates (see [Table 1](#)).

ISO 3834-2, ISO 3834-3 and ISO 3834-4 require certain documents to be produced. [Annex A](#) gives examples of the types of documents which may be used by manufacturers.

**Table 1 — Examples of different types of welding-related documents**

Type of document	Description <sup>a</sup>	Examples of welding coordinator
Procedure	Description of welding-related activity	Description of the role (tasks, responsibilities and authority) of welding coordinator Description of the handling of welding consumables and parent metals Description of how welding procedure tests are carried out Description of how welder's qualification is carried out
Record	Report of welding-related activity	Record from a procedure test (WPQR) Record from a welder qualification test Welding record
Instruction	Description of welding-related operation	Welding procedure specification (WPS) Work instructions
Certificate	Verification of welding-related operation	Welder's qualification test certificate Material test report
<sup>a</sup> Not to be confused with a definition of the terms.		

### 8.2 Quality management system

The ISO 3834 series does not specifically require a quality management system. However, ISO 3834-1 identifies those elements that could be considered as complementing the ISO 3834 series if a quality management system were to be adopted. Of these, one of the most important is document control, and manufacturers are expected to implement a document control procedure ensuring that:

- a) documents are kept up to date;
- b) those in receipt of documents are identified;
- c) the latest issues of the documents are available at locations where they are used;
- d) obsolete documents are withdrawn;
- e) records are archived to avoid deterioration and to enable retrieval;
- f) records are not destroyed without authorization.

Some records generated as part of this system can require updating at periodic intervals. These include calibration or validation records and welder qualification records.

Manufacturers who operate a quality management system conforming to ISO 9001 are expected to have a documented system in place covering those elements identified in ISO 3834-1.

The effectiveness of the welding control system will depend to a large extent on the management input and their role in monitoring performance and implementing action when weaknesses are detected. Applying management review and internal audit ensures senior management involvement in the welding control system and enables the monitoring of performance and introduction of measures to overcome identified deficiencies. [Figure 1](#) provides a summary of critical measures in the welding control system to assist management review of the performance of the welding control system.

## 9 Selecting the level of quality requirements

The ISO 3834 series incorporates three levels of quality requirements that may be included in product standards, regulations and contracts or selected by a manufacturer. The level selected will depend on the nature of the product being manufactured, the conditions under which it is to be used and the range of products manufactured. In ISO 3834-1, it is stated that the standard can be applied in a variety of industrial situations. The following criteria are identified as being those applying in the selection of the most suitable level:

- a) the extent and significance of safety-critical products;
- b) the complexity of manufacture;
- c) the range of products manufactured;
- d) the range of different materials used;
- e) the extent to which metallurgical problems can occur;
- f) the extent to which fabrication imperfections (e.g. misalignment, distortion, weld imperfections) affect product performance.

Product standards that require conformity with a part of ISO 3834 emphasize two critical areas in the choice of the level of quality requirements: the safety-critical nature of the products and the significance of dynamic loading in the product service environment.

In general, the standard level of quality requirements should be suitable for a broad range of products having a normal safety-critical component and that could experience dynamic loading. Such products are manufactured from conventional materials where the weldability is known and the precautions to be taken to ensure mechanical performance and defect-avoidance are well documented. Products having a very limited safety component and that are subjected to only moderate static loads with minor dynamic components would normally only require the elementary level of quality requirements.

Where there are significant safety factors with high static and dynamic loadings and the materials are designed for high-performance applications, the comprehensive level of quality requirements is appropriate. However, there can be situations where, because of the innovative nature of the design or the use of novel production processes, the comprehensive level of quality requirements is selected in place of the standard level.

It is not possible in this document to allocate specific parts of ISO 3834 to particular types of product. This is because there can be different levels of complexity in the design, materials and fabrication processes in any product group. Selection of these levels is the responsibility of product standards committees or of those purchasing or manufacturing particular constructions or groups of constructions.