

INTERNATIONAL STANDARD

ISO
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Quality requirements for welding — Fusion welding of metallic materials —

Part 1:

Guidelines for selection and use

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

Partie 1: Lignes directrices pour la sélection et l'utilisation



Reference number
ISO 3834-1:1994(E)

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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3834-1 was prepared by Technical Committee ISO/TC 44, *Welding and allied processes*, Subcommittee SC 10, *Unification of requirements in the field of metal welding*.

This part of ISO 3834 cancels and replaces International Standards ISO 3834:1978 as well as ISO 6213:1989 which have been technically revised so as to gather all quality requirements for welding in one standard and to be in alignment with the principles for quality systems given in the ISO 9000 series.

ISO 3834, which is equivalent to EN 729, consists of the following parts, under the general title *Quality requirements for welding — Fusion welding of metallic materials*:

- *Part 1: Guidelines for selection and use*
- *Part 2: Comprehensive quality requirements*
- *Part 3: Standards quality requirements*
- *Part 4: Elementary quality requirements*

Annexes A, B and C of this part of ISO 3834 are for information only.

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Introduction

Welding processes are widely used to fabricate many of the constructions of the engineering industry and in some companies they are the key feature of production. Such constructions may range from pressure vessels to domestic and agricultural equipment and includes items such as cranes, bridges and other welded structures. As such, welding exerts a profound influence on the cost of fabrication and quality of the product. It is important, therefore, to ensure that welding is carried out in the most effective way and that appropriate control is exercised over all aspects of the operation.

Within the ISO 9000 series of standards for quality systems, welding is to be treated as a "special process" since welds cannot be fully verified by subsequent inspection and testing of the product to ensure that the required quality standards have been met.

Quality cannot be inspected into a product, it has to be built into it. Even the most extensive and sophisticated non-destructive testing does not improve the quality of welds.

For welded constructions to be effective and free from serious problems in production and in service, it is necessary to provide controls, from the design phase, through material selection, into fabrication and subsequent inspection. For example, poor design for welding may create serious and costly difficulties in the workshop, on site, or in service. Incorrect material selection may result in welding problems, such as cracking. Welding procedures have to be correctly formulated and approved to avoid imperfections. Supervision needs to be implemented to ensure that the specified quality will be achieved.

To ensure an effective welded fabrication, management needs to appreciate the sources of potential trouble and to introduce appropriate quality procedures.

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Quality requirements for welding — Fusion welding of metallic materials —

Part 1: Guidelines for selection and use

1 Scope

The guidelines given in this part of ISO 3834 have been prepared to describe welding quality requirements suitable for application by manufacturers using welding as a means of fabrication. They are structured such that they can be used for fabrication of any type of fusion welded construction. They relate only to those aspects of the quality of the final construction which may be influenced by welding and allied processes.

These guidelines define various approaches to quality requirements for welding fabrication, both in workshops and on sites and provide guidance for describing the capability of a manufacturer to be able to produce welded constructions of the specified quality. They can also be used by any interested party as a basis for assessing a manufacturer's welding quality arrangements.

These guidelines are intended as a guide for the preparation of regulatory or contractual requirements and for a manufacturer's management to define welding requirements for quality systems related to the type of welded construction. The guidelines are not structured to be used in isolation as part of any regulatory, contractual or managerial requirement.

They are intended to be used for the following purposes:

- a) providing interpretation of the requirements in the ISO 9000 series of standards, as a guideline for specification and establishment of the part of the quality system related to control of welding as a "special process";
- b) providing guidelines to establish specifications and welding quality requirements, where a quality system according to ISO 9001 and ISO 9002 is not involved;
- c) assessment of the welding quality requirements mentioned in a) or b) above.

The application of this would typically occur in the following circumstances:

- in contractual situations: specification of welding requirements for quality systems;
- by manufacturers: establishment and maintenance of welding quality requirements;
- by committees preparing structural codes or other application standards: specification of welding quality requirements;
- by interested parties, e.g. third parties, customers or the manufacturer's management: assessment of welding quality requirements.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 3834. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 3834 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO

maintain registers of currently valid International Standards.

ISO 3834-2:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 2: Comprehensive quality requirements*.

ISO 3834-3:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 3: Standards quality requirements*.

ISO 3834-4:1994, *Quality requirements for welding — Fusion welding of metallic materials — Part 4: Elementary quality requirements*.

ISO 8402:1994, *Quality management and quality assurance — Vocabulary*.

3 Definitions

For the purposes of this part of ISO 3834, the definitions given in ISO 8402 and the following definitions apply.

3.1 contract

(1) Agreed requirements for constructions ordered by a customer.

(2) Manufacturer's basic specification for constructions manufactured in series for several customers, unknown to the manufacturer at the time of design and production.

NOTES

1 The contract is, in both cases, assumed to include reference to all relevant regulatory requirements.

2 The role of an independent body is considered to be a matter which is determined by the contracting parties and/or the application standard.

3.2 special process: Process, the results of which cannot be fully verified by subsequent inspection and testing of the product and where, for example, processing deficiencies may become apparent only after the product is in use. Accordingly, continuous monitoring and/or compliance with documented procedures is required to ensure that the specified requirements are met [adapted from ISO 9001:1994, subclause 4.9 and ISO 9002:1994, subclause 4.9].

3.3 manufacturing organization: Welding workshops and/or sites under the same technical and quality management.

3.4 qualified person: Person whose competence and knowledge has been obtained by education, training and/or relevant practical experience.

3.5 construction: Product, structure or any other welding item.

4 Selection of welding quality requirements

Welding quality requirements may be selected to suit the type of welded construction concerned in accordance with table 1. Annex A and annex B also give further information on the selection and content of ISO 3834-2, ISO 3834-3 and ISO 3834-4.

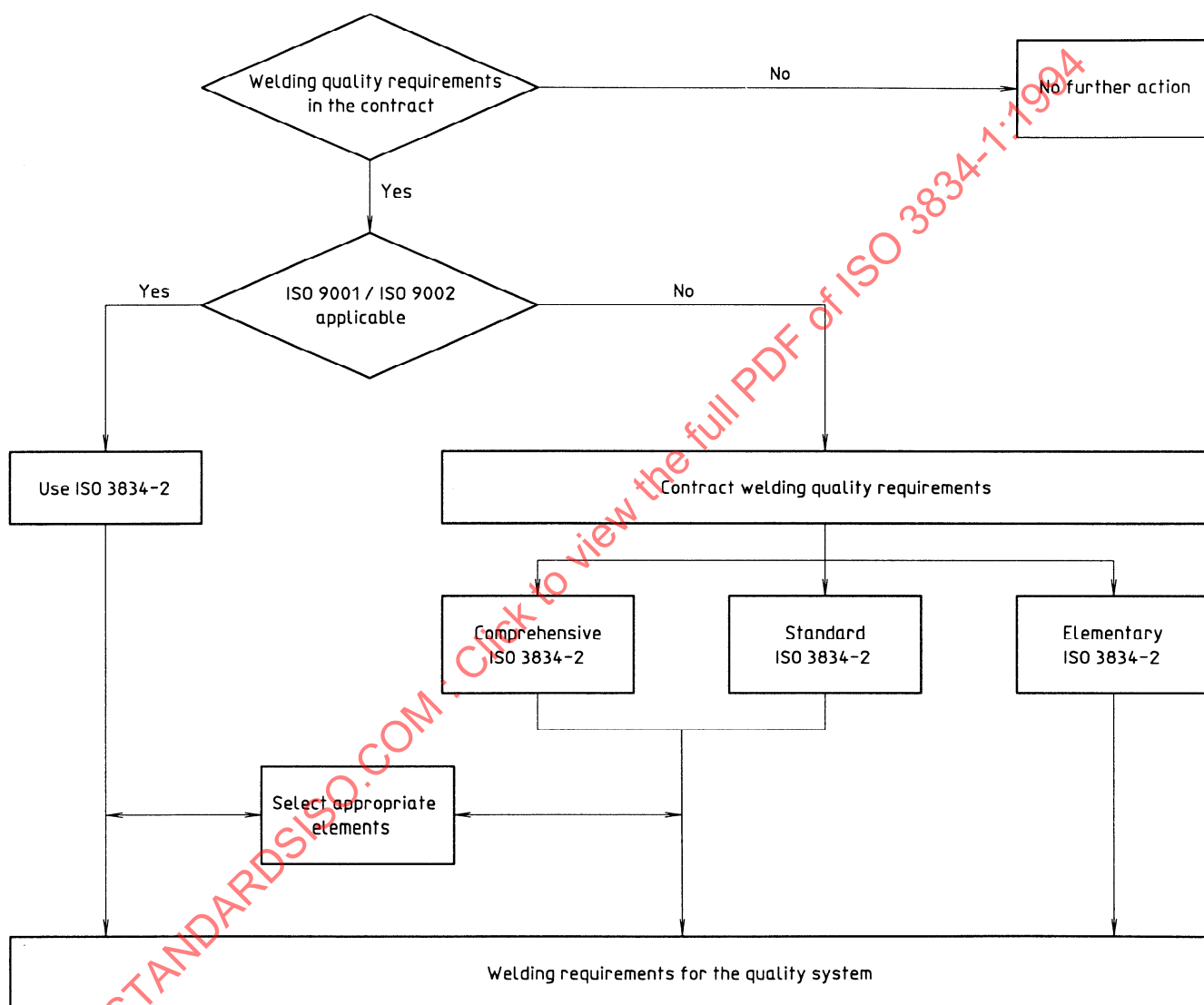
Table 1 — Selection of welding quality requirements

Contract welding requirements	Quality requirements	
	When quality system ¹⁾ conforming to ISO 9001 or ISO 9002 is required	When quality system conforming to ISO 9001 or ISO 9002 is not required
	use	use
Comprehensive quality requirements	ISO 3834-2 ¹⁾	ISO 3834-2
Standard quality requirements	ISO 3834-2 ¹⁾	ISO 3834-3
Elementary quality requirements	ISO 3834-2 ¹⁾	ISO 3834-4
1) Within the scope of ISO 9001 and ISO 9002, the requirements of ISO 3834-2 may be minimized to an appropriate level to suit the type of welded construction.		

Annex A

(informative)

Flow diagram for selection of welding quality requirements



Annex B

(informative)

Summary comparison of welding quality requirements with regard to ISO 3834-2, ISO 3834-3 and ISO 3834-4

Table B.1 — Summary comparison

Elements	ISO 3834-2 (comprehensive quality requirements)	ISO 3834-3 (standard quality requirements)	ISO 3834-4 (elementary quality requirements)
Contract review	Full documented review	Less extensive review	Establish that capability and information is available
Design review	Design for welding to be confirmed		
Subcontractor	Treat like a main fabricator		Shall comply with all requirements
Welders, operators	Approved in accordance with ISO 9606		
Welding coordination	Welding coordination personnel with appropriate technical knowledge, e.g. EN 719 (see annex C), or persons with similar knowledge		Not required but personal responsibility of manufacturer
Inspection personnel	Sufficient and competent personnel to be available		Sufficient and competent, access for third parties, as needed
Production equipment	Required to prepare, cut, weld, transport, lift, together with safety equipment and protective clothes		No specific requirements
Equipment maintenance	Shall be carried out, maintenance plan necessary	No specific requirements, shall be adequate	No requirements
Production plan	Necessary	Restricted plan necessary	No requirements
Welding procedure specification (WPS)	Instructions to be available to welder (ISO 9956-2)		No requirements
Welding procedure approval	In accordance with the appropriate part of ISO 9956, approved as application standard or contract demands		No specific requirements
Work instructions	Welding procedure specification (WPS) or dedicated work instructions to be available		No requirements
Documentation	Necessary	Not specified	No requirements
Batch testing of consumables	Only if specified in contract	Not specified	No requirements
Storage and handling of welding consumables	According to supplier's recommended minimum		
Storage of parent materials	Protection required from influence by the environment; identification shall be maintained		No requirements

Elements	ISO 3834-2 (comprehensive quality requirements)	ISO 3834-3 (standard quality requirements)	ISO 3834-4 (elementary quality requirements)
Post-weld heat treatment	Specification and complete record necessary	Confirmation to specification necessary	No requirements
Inspection before, during, after welding	As required for specified operations		Responsibilities as specified in contract
Nonconformances	Procedures shall be available		
Calibration	Procedures shall be available	Not specified	
Identification	Required, when appropriate	Required, when necessary	Not specified
Traceability			Not specified
Quality records	Shall be available to meet the rules for product liability		As required by contract
	Retained for five years minimum		

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