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EN ISO 3834-5

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English Version

Quality requirements for fusion welding of metallic materials - Part 5: 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 (ISO 3834-5:2015)

Exigences de qualité en soudage par fusion des matériaux métalliques - Partie 5: Documents auxquels il est nécessaire de se conformer pour déclarer la conformité aux exigences de qualité de l'ISO 3834-2, l'ISO 3834-3 ou l'ISO 3834-4 (ISO 3834-5:2015)

Qualitätsanforderungen für das Schmelzschweißen von metallischen Werkstoffen - Teil 5: Dokumente, deren Anforderungen erfüllt werden müssen, um die Übereinstimmung mit den Anforderungen nach ISO 3834-2, ISO 3834-3 oder ISO 3834-4 nachzuweisen (ISO 3834-5:2015)

This European Standard was approved by CEN on 16 April 2015.

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European foreword

This document (EN ISO 3834-5:2015) has been prepared by Technical Committee ISO/TC 44 “Welding and allied processes” in collaboration with Technical Committee CEN/TC 121 “Welding and allied processes” the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by December 2015, and conflicting national standards shall be withdrawn at the latest by December 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 3834-5:2005.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 3834-5:2015 has been approved by CEN as EN ISO 3834-5:2015 without any modification.

Contents

Page

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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 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: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 44, *Welding and allied processes*, SC 10, *Unification of requirements in the field of metal welding*.

This second edition cancels and replaces the first edition (ISO 3834-5:2005), which has been technically revised. It also incorporates the Corrigendum ISO 3834-5:2005/Cor 1:2007.

ISO 3834 consists of the following parts, under the general title *Quality requirements for fusion welding of metallic materials*:

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

— *Part 2: Comprehensive quality requirements*

— *Part 3: Standard quality requirements*

— *Part 4: Elementary quality requirements*

— *Part 5: 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

— *Part 6: Guidelines on implementing* ISO 3834 [Technical Report]

Requests for official interpretations of any aspect of this part of ISO 3834 should be directed to the Secretariat of ISO/TC 44/SC 10 via your national standards body. A complete listing of which can be found at http://www.iso.org.

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Quality requirements for fusion welding of metallic materials —

Part 5: 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

1 Scope

This part of ISO 3834 specifies the International Standards 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. It can only be used in conjunction with ISO 3834-2, ISO 3834-3, or ISO 3834-4.

2 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

2.1 General

Conformity to the quality requirements of ISO 3834-2, ISO 3834-3, or ISO 3834-4 shall be claimed by a manufacturer in accordance with one or more of the following options:

a) adopting the ISO documents listed in 2.2;

b) adopting other documents that provide technically equivalent conditions to the ISO documents listed in 2.2; it is the responsibility of the manufacturer to demonstrate that the alternative standards selected have technically equivalent conditions to those in the corresponding International Standards when documents specified in 2.2 are replaced;

c) adopting different supporting standards to those listed in 2.2, where these are required in application standards used by the manufacturers.

2.2 ISO documents

The following ISO documents are indispensable for the application of ISO 3834-2, ISO 3834-3, or ISO 3834-4, as specified in 2.1. The latest edition of the referenced document (including any amendments) applies.

ISO 9606-1, *Qualification testing of welders — Fusion welding — Part 1: Steels*

ISO 9606-2, *Qualification test of welders — Fusion welding — Part 2: Aluminium and aluminium alloys*

ISO 9606-3, *Approval testing of welders — Fusion welding — Part 3: Copper and copper alloys*

ISO 9606-4, *Approval testing of welders — Fusion welding — Part 4: Nickel and nickel alloys*

ISO 9606-5, *Approval testing of welders — Fusion welding — Part 5: Titanium and titanium alloys, zirconium and zirconium alloys*

ISO 9712, *Non-destructive testing — Qualification and certification of NDT personnel*

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ISO 10863, *Non-destructive testing of welds — Ultrasonic testing — Use of time-of-flight diffraction technique (TOFD)*

ISO 13588, *Non-destructive testing of welds — Ultrasonic testing — Use of automated phased array technology*

ISO 13916, *Welding — Guidance on the measurement of preheating temperature, interpass temperature and preheat maintenance temperature*

ISO 14555, *Welding — Arc stud welding of metallic materials*

ISO 14731, *Welding coordination — Tasks and responsibilities*

ISO 14732, *Welding personnel — Qualification testing of welding operators and weld setters for mechanized and automatic welding of metallic materials*

ISO 15607, *Specification and qualification of welding procedures for metallic materials — General rules*

ISO 15609-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 1: Arc welding*

ISO 15609-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 2: Gas welding*

ISO 15609-3, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 3: Electron beam welding*

ISO 15609-4, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 4: Laser beam welding*

ISO 15609-6, *Specification and qualification of welding procedures for metallic materials — Welding procedure specification — Part 6: Laser-arc hybrid welding*

ISO 15610, *Specification and qualification of welding procedures for metallic materials — Qualification based on tested welding consumables*

ISO 15611, *Specification and qualification of welding procedures for metallic materials — Qualification based on previous welding experience*

ISO 15612, *Specification and qualification of welding procedures for metallic materials — Qualification by adoption of a standard welding procedure*

ISO 15613, *Specification and qualification of welding procedures for metallic materials — Qualification based on pre-production welding test*

ISO 15614-1, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys*

ISO 15614-2, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 2: Arc welding of aluminium and its alloys*

ISO 15614-3, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 3: Fusion welding of non-alloyed and low-alloyed cast irons*

ISO 15614-4, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 4: Finishing welding of aluminium castings*

ISO 15614-5, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 5: Arc welding of titanium, zirconium and their alloys*

ISO 15614-6, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 6: Arc and gas welding of copper and its alloys*

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ISO 15614-7, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 7: Overlay welding*

ISO 15614-8, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 8: Welding of tubes to tube-plate joints*

ISO 15614-10, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 10: Hyperbaric dry welding*

ISO 15614-11, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 11: Electron and laser beam welding*

ISO 15614-14, *Specification and qualification of welding procedures for metallic materials — Welding procedure test — Part 14: Laser-arc hybrid welding of steels, nickel and nickel alloys*

ISO 15618-1, *Qualification testing of welders for underwater welding — Part 1: Diver-welders for hyperbaric wet welding*

ISO 15618-2, *Qualification testing of welders for underwater welding — Part 2: Diver-welders and welding operators for hyperbaric dry welding*

ISO 17635, *Non-destructive testing of welds — General rules for metallic materials*

ISO 17636-1, *Non-destructive testing of welds — Radiographic testing — Part 1: X- and gamma-ray techniques with film*

ISO 17636-2, *Non-destructive testing of welds — Radiographic testing — Part 2: X- and gamma-ray techniques with digital detectors*

ISO 17637, *Non-destructive testing of welds — Visual testing of fusion-welded joints*

ISO 17638, *Non-destructive testing of welds — Magnetic particle testing*

ISO 17639, *Destructive tests on welds in metallic materials — Macroscopic and microscopic examination of welds*

ISO 17640, *Non-destructive testing of welds — Ultrasonic testing — Techniques, testing levels, and assessment*

ISO 17662, *Welding — Calibration, verification and validation of equipment used for welding, including ancillary activities*

ISO 17663, *Welding — Quality requirements for heat treatment in connection with welding and allied processes*

ISO 22825, *Non-destructive testing of welds — Ultrasonic testing — Testing of welds in austenitic steels and nickel-based alloys*

ISO/TR 17671-2, *Welding — Recommendations for welding of metallic materials — Part 2: Arc welding of ferritic steels*

ISO/TR 17844, *Welding — Comparison of standardised methods for the avoidance of cold cracks*

2.3 Applicability

There are two different types of ISO documents for the quality requirements of fusion welding processes:

— Type A: ISO documents for welding processes for which the quality requirements are given in several documents, see Tables 1 to 9;

— Type B: ISO documents for specific welding processes for which the quality requirements are given in a single document, see Table 10.

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NOTE 1 The quality requirements for fusion welding can also be used for friction welding, as appropriate (see ISO 15620[1]).

NOTE 2 For guidelines on the education and qualification of personnel dealing with welding coordination and inspection, see Annex A.

2.4 Certificate

The independent certification organization or the manufacturer claiming compliance with ISO 3834-2, ISO 3834–3, or ISO 3834–4 shall list the supporting standards or documentation in the certificate.

Table 1 — Welders and welding operators

Welding process	**ISO documents**	ISO 3834-2:2005 **subclause**	ISO 3834-3:2005 **subclause**	ISO 3834-4:2005 **subclause**
Arc welding	ISO 9606-1, ISO 9606-2, ISO 9606-3, ISO 9606-4, ISO 9606-5, ISO 14732, ISO 15618-1, ISO 15618-2	7.2	7.2	7.2
Electron beam welding	ISO 14732			
Laser beam welding	ISO 14732			
Gas welding	ISO 9606-1			

Table 2 — Welding coordination personnel

Welding process	**ISO documents**	ISO 3834-2:2005 **subclause**	ISO 3834-3:2005 **subclause**	ISO 3834-4:2005 **subclause**
Arc welding	ISO 14731	7.3	7.3	none
Electron beam welding				
Laser beam welding				
Gas welding				

Table 3 — Non-destructive testing personnel

Welding process	**ISO documents**	ISO 3834-2:2005 **subclause**	ISO 3834-3:2005 **subclause**	ISO 3834-4:2005 **subclause**
Arc welding	ISO 9712	8.2	8.2	8.2
Electron beam welding				
Laser beam welding				
Gas welding				

Table 4 — Welding procedure specifications

Welding process	**ISO documents**	ISO 3834-2:2005 **subclause**	ISO 3834-3:2005 **subclause**	ISO 3834-4:2005 **subclause**
Arc welding	ISO 15609-1	10.2	10.2	none
Electron beam welding	ISO 15609-3			
Laser beam welding	ISO 15609-4, ISO 15609-6			
Gas welding	ISO 15609-2			

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Table 5 — Qualification of the welding procedures

Welding process	ISO documents	ISO 3834-2:2005 subclause	ISO 3834-3:2005 subclause	ISO 3834-4:2005 subclause
Arc welding	ISO 15607, ISO 15610, ISO 15611, ISO 15612, ISO 15613, ISO 15614-1, ISO 15614-2, ISO 15614-3, ISO 15614-4, ISO 15614-5 ISO 15614-6, ISO 15614-7, ISO 15614-8, ISO 15614-10	10.3	10.3	none
Electron beam welding	ISO 15607, ISO 15611, ISO 15612, ISO 15613, ISO 15614-11			
Laser beam welding	ISO 15607, ISO 15611, ISO 15612, ISO 15613, ISO 15614-11, ISO 15614-14			
Gas welding	ISO 15607, ISO 15610, ISO 15611, ISO 15612, ISO 15613, ISO 15614-1			

Table 6 — Post-weld heat treatment

Welding process	ISO documents	ISO 3834-2:2005 Clause	ISO 3834-3:2005 Clause	ISO 3834-4:2005 Clause
Arc welding	ISO 17663	13	13	none
Electron beam welding				
Laser beam welding				
Gas welding				

Table 7 — Inspection and testing during welding

Welding process	ISO documents	ISO 3834-2:2005 subclause	ISO 3834-3:2005 subclause	ISO 3834-4:2005 subclause
Arc welding	ISO 13916, ISO/TR 17671-2, ISO/TR 17844	14.3	14.3	none
Electron beam welding	none			
Laser beam welding	none			
Gas welding	none			

Table 8 — Inspection and testing after welding

Welding process	ISO documents	ISO 3834-2:2005 subclause	ISO 3834-3:2005 subclause	ISO 3834-4:2005 subclause
Arc welding	ISO 10863, ISO 13588, ISO 17635, ISO 17636-1, ISO 17636-2, ISO 17637, ISO 17638, ISO 17639, ISO 17640, ISO 22825	14.4	14.4	none
Electron beam welding				
Laser beam welding				
Gas welding				

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Table 9 — Calibration and validation of measuring, inspection and testing equipment

Welding process	**ISO documents**	ISO 3834-2:2005 **Clause**	ISO 3834-3:2005 **Clause**	ISO 3834-4:2005 **Clause**
Arc welding	ISO 17662	16	16	none
Electron beam welding				
Laser beam welding				
Gas welding				

Table 10 — Other fusion welding processes

Welding process	**ISO documents**	ISO 3834-2:2005 **clause**	ISO 3834-3:2005 **clause**	ISO 3834-4:2005 **clause**
Stud welding	ISO 14555	all, if relevant	all, if relevant	all, if relevant
Aluminothermic welding/ thermite welding	Presently no ISO documents available	—	—	—

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Annex A
(informative)

Guidelines on qualification/education scheme for personnel dealing with welding coordination and inspection

The International Institute of Welding (IIW) has, on a voluntary basis, prepared guidelines for minimum requirements for the education, training, examination, and qualification of personnel dealing with welding coordination and inspection.

The minimum requirements for personnel dealing with welding coordination are stated in the following documents:

Doc. IAB-252-07/SV-00

— International Welding Engineer (IWE)
former: Doc. IAB-002-2000/EWF-409 Rev. 2;

— International Welding Technologist (IWT)
former: Doc. IAB-003-2000/EWF-410 Rev. 2;

— International Welding Specialist (IWS)
former: Doc. IAB-004-2000/EWF-411 Rev. 1.

The minimum requirements for inspection personnel are stated in the following document:

— International Welding Inspection Personnel (IWIP)
Doc. IAB-041-2001/EWF-450.

Personnel dealing with welding coordination and inspection fulfilling the requirements of these documents, or holding acceptable national qualifications, are considered to satisfy relevant requirements.

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Bibliography

[1] ISO 15620, *Welding — Friction welding of metallic materials*

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