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Welding coordination — Tasks and responsibilities

Coordination en soudage — Tâches et responsabilités

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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 11, *Qualification requirements for welding and allied processes personnel.*

Any feedback, question or request for official interpretation related to any aspect of this document should be directed to the Secretariat of ISO/TC 44/SC 11 via your national standards body. A complete listing of these bodies can be found at www.iso.org/members.html. Official interpretations, where they exist, are available from this page: https://committee.iso.org/sites/tc44/home/interpretation.html.

This third edition cancels and replaces the second edition (ISO 14731:2006), which has been technically revised.

The main changes compared to the previous edition are as follows:

— informative reference to IIW has been removed due to anticompetition rules;

— Annex A now addresses the assessment of welding coordination personnel;

— the term responsible welding coordinator, RWC, has been deleted;

— the concept of competence and levels (see Clause 6) has been introduced;

— new subclause B.20 has been added to address Health and Safety and Environment.

Introduction

Validation and verification of welding requires competent personnel to perform welding coordination to establish confidence in weld quality and to ensure reliable performance in service.

The tasks and responsibilities of welding coordination personnel involved in welding-related activities (e.g. planning, executing, supervising and inspection) need to be clearly defined.

Welding coordination — Tasks and responsibilities

1 Scope

This document identifies the essential welding quality related tasks and responsibilities included in welding coordination.

The principle of an assessment according to this document is that welding coordination personnel need to be competent in the welding-related tasks allocated to them.

It is presumed that welding coordination personnel have the necessary education, qualifications and experience and are appointed by the manufacturer.

Regulatory documents, application standards and contracts can give specific requirements for welding coordination personnel. Otherwise, it is the responsibility of the manufacturer to determine the requirements to be in compliance with this document.

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 3834 (all parts), *Quality requirements for fusion welding of metallic materials*

ISO/TR 25901-1, *Welding and allied processes — Vocabulary — Part 1: General terms*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO/TR 25901-1 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
manufacturer
entity carrying out welding and related activities under the same technical and quality management

Note 1 to entry: Welding and related activities may be carried out in a workshop or onsite or both, but the manufacturer remains responsible for the welding production.

3.2
welding coordination
coordination of manufacturing operations for all welding and welding-related activities

Note 1 to entry: Welding coordination can be assigned to an individual or a team.

3.3
welding coordination personnel
welding coordinator
person or group of people performing defined welding coordination tasks

Note 1 to entry: Different personnel may be appointed by the *manufacturer* (3.1) for different welding and related tasks.

Note 2 to entry: A qualification and/or practical experience may be required.

3.4
welding inspection
conformity evaluation of welding variables by observation and judgment accompanied as appropriate by measurement or testing

Note 1 to entry: Welding inspection is a part of welding coordination.

3.5
skill
ability to apply knowledge and experience to complete tasks and solve problems

Note 1 to entry: Skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments).

[Adapted from European Council Recommendation 2017/C 189/03, Annex I, (g)][1]

3.6
knowledge
outcome of the assimilation of information, the body of facts, principles, theories and practices that is related to a field of work, through learning (theoretical and/or factual)

[Adapted from European Council Recommendation 2017/C 189/03, Annex I, (f)][1]

3.7
qualification
<personnel> formal outcome of an assessment and validation process to determine that an individual has achieved learning outcomes to a given program

[Adapted from European Council Recommendation 2017/C 189/03, Annex I, (a)][1]

3.8
competence
proven ability to use effectively knowledge, skills and personal, social and/or methodological abilities, in a wide variety of work situations in terms of responsibility and autonomy

[Adapted from European Council Recommendation 2017/C 189/03, Annex I, (i)][1]

3.9
responsibility
accountability, duties, obligations and associated rights assigned by the *manufacturer* (3.1) as a result of competence in the job

4 Tasks and responsibilities

4.1 Welding quality related tasks

Annex B shall be used by the manufacturer as a guide to allocate welding quality related tasks and responsibilities to welding coordination personnel. It may be supplemented for special applications. Not all the items are required for all manufacturers or quality system requirements, and selection shall be made as appropriate. For example, where there is no destructive testing or post-weld heat treatment, B.14 c) and B.15 do not apply.

4.2 Specification of tasks and responsibilities

Welding coordination is the sole responsibility of the manufacturer.

The tasks of welding coordination personnel shall be selected from Annex B and/or as specified, for example, in application standards and other documents. The level of competence of welding coordination personnel shall be determined in accordance with the complexity of the welding and related activities, product type(s), criticality of the application and the quality requirements specified in the relevant part of the ISO 3834 series.

Each task in Annex B may be associated with a number of activities, such as:

— specification and preparation;

— control;

— inspection, checking or witnessing.

Where more than one person carries out welding coordination, the tasks and responsibilities shall be clearly allocated, such that responsibility is clearly defined and the persons are competent for each specific welding coordination task.

The manufacturer shall appoint at least one person to be responsible for welding coordination tasks.

If welding coordination is subcontracted, the tasks and responsibilities shall be defined and documented. However, compliance with this document remains the responsibility of the manufacturer.

NOTE Examples of items to be addressed when welding coordination is subcontracted: a) a provision for the subcontracted welding coordinator to visit the premises, routine or otherwise; b) reports of all visits including purpose and activities carried out.

5 Job description

5.1 General

The manufacturer shall prepare job descriptions for all welding coordination personnel which shall include at least their tasks and responsibilities and extent of authorization, see 5.2 and 5.3.

The manufacturer shall determine the level of education, qualification and experience (see Clause 6) required for welding coordination personnel.

Welding coordination personnel shall be able to demonstrate their competence to follow their assigned tasks (see Annex B), for example, by an assessment in accordance with Annex A.

Each manufacturer is responsible for the appointment of their welding coordination personnel. This appointment is not transferable to other manufacturers.

5.2 Tasks

The tasks assigned to welding coordination personnel shall be identified in accordance with 4.2 and Annex B.

5.3 Responsibilities and extent of authorization

The responsibilities and extent of authorization assigned to the welding coordination personnel are identified as follows:

— their position in the manufacturer's organization and their responsibilities;

— the extent of authorization assigned to them to carry out the assigned tasks (see Annex B);

— the extent of authorization assigned to them to accept or validate, by signature, technical administrative documents or contracts, on behalf of the manufacturer, as needed in order to fulfil the assigned tasks, for example, for procedure specification and supervision reports.

6 Technical knowledge and competence

6.1 General

All welding coordination personnel shall be able to demonstrate:

— competence in the welding-related tasks allocated to them;

— technical knowledge in welding and related technologies relevant to the assigned tasks obtained by a combination of education, training and/or experience.

Competence includes application of welding and related standards when relevant to the assigned tasks.

The extent of on the job experience and competence level required for welding coordination depends on the consequences in the case of failure of a welded component.

Guidance for the assessment of welding coordination personnel is given in Annex A.

6.2 Competency levels for welding coordination personnel

6.2.1 General

Welding coordination personnel shall be allocated to one of the following levels, depending on the nature and/or complexity of the production:

6.2.2 Comprehensive level

At the comprehensive level, welding coordination personnel shall have highly specialized problem-solving skills. These skills shall include critical and original evaluation to define or develop the best technical and economical solutions when applying welding and related technologies for highly complex and unpredictable conditions.

They shall be able to manage and adapt welding and related technologies for welded fabrications, including situations of high complexity.

They shall be competent to make decisions and to define and revise welding and related personnel's tasks.

6.2.3 Specific level

At the specific level, welding coordination personnel shall have advanced problem-solving skills. These skills shall include critical evaluation to select the appropriate technical and economical solutions when applying welding and related technologies, for complex and unpredictable conditions.

They shall be able to manage the application of welding and related technologies for welded fabrications, including complex situations.

They shall be competent to make decisions and to define the welding and related personnel's tasks.

6.2.4 Basic level

At the basic level, welding coordination personnel shall have fundamental problem-solving skills. These skills shall include the ability to identify and develop appropriate solutions, when applying welding and related technologies, for common basic and specific problems.

They shall be able to supervise common or standard welding and related technologies, in situations of a predictable nature, but which can be subject to minor changes.

They shall be competent to make decisions in common or standard work and supervise the basic welding and related personnel's tasks.

Annex A
(informative)

Assessment of welding coordination personnel

Welding coordination personnel have the responsibility of deciding how welds shall be made to meet specified requirements taking account of weldability problems that can occur in relation to the materials used, process(es) and fabrication technique(s). This includes, ensuring that weld quality is obtained and that regulations, standards, specifications and other client requirements are satisfied. The assessment of the competence of welding coordination personnel should include at least the following, in relation to the nature and/or complexity of the production:

— previous experience of welding similar products with the standards used by the manufacturing organization;

— extent of experience fabricating the materials used by the manufacturer;

— previous experience in using the welding supporting standards used by the manufacturing organization, e.g., WPQR, WPS, welder and welding operator qualifications;

— understanding of the ISO 3834 series and this document (i.e. ISO 14731);

— experience of troubleshooting of welding related problems;

— knowledge of relevant essential welding and related tasks as specified in Annex B;

— theoretical knowledge to a level relevant to the manufacturer as specified in Clause 6.

The assessment of the competence of welding coordination personnel should include a review, as a separate professional interview and/or during a shop walk around. Where possible, the review should be conducted by a person with a level of competence equal to or higher than the welding coordination personnel under review.

Annex B
(normative)

Essential welding and related tasks to be considered when appropriate

B.1 Review of requirements

The following elements shall be considered in a review of requirements:

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

b) the capability of the manufacturer to meet the prescribed requirements.

B.2 Technical review

The following elements shall be considered in a technical review:

a) the parent material(s) specification and welded joint properties;

b) the joint location with relation to the design requirements;

c) quality and acceptance requirements for welds;

d) the location, accessibility and sequence of welds, including accessibility for inspection and non-destructive testing;

e) other welding requirements, e.g. batch testing of consumables, ferrite content of weld metal, ageing, hydrogen content, permanent backing, use of peening, surface finish, weld profile;

f) the dimensions and details of joint preparation and completed weld.

B.3 Sub-contracting

With regard to sub-contracting, the suitability of any sub-contractor for welding fabrication and their ability to comply with the relevant clauses of the ISO 3834 series (if contractually required) shall be considered.

B.4 Welding personnel

With regard to welding personnel, the qualification of welders and welding operators shall be considered and in conformance with the relevant contract requirements.

B.5 Equipment

The following elements shall be considered with regard to equipment:

a) the suitability of welding and associated equipment;

b) auxiliaries and equipment supply, identification and handling;

c) personal protective equipment and other safety equipment, directly associated with the applicable manufacturing process;

d) equipment maintenance;

e) equipment verification and validation.

B.6 Production planning

The following elements shall be considered with regard to production planning:

a) reference to the appropriate procedure specifications for welding and related processes;

b) the sequence in which the welds are to be made;

c) environmental conditions (e.g. protection from wind, temperature and rain);

d) the allocation of competent personnel;

e) equipment for preheating and post-heat treatment, including temperature indicators;

f) the arrangement for any production test.

B.7 Qualification of the welding procedures

With regard to the qualification of the welding procedures, the method and range of qualification and all variables shall be considered against the relevant contract requirements.

B.8 Welding procedure specifications

With regard to welding procedure specifications, the range of qualification shall be considered and be in conformance with the relevant contract requirements.

B.9 Work instructions

With regard to work instructions, the issuing and use of work instructions shall be considered.

B.10 Welding consumables

The following elements shall be considered with regard to welding consumables:

a) compatibility;

b) delivery conditions;

c) any supplementary requirements in the welding consumable purchasing specifications, including the type of welding consumable inspection document;

d) the storage and handling of welding consumables;

e) batch testing.

B.11 Materials

The following elements shall be considered with regard to materials:

a) any supplementary requirements in the material purchasing specifications, including the type of inspection document for the material;

b) the weldability of the materials to be used;

