



## How does IIW/EWF educations match with (EN) ISO 14731:2019



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Best Practice to the use of (EN) ISO 14731:2019

### 1 Scope

ISO 14731 is the basis for the description and evaluation of tasks and responsibilities for welding coordination personnel.

In the new edition of this standard (ISO 14731:2019), the old Annex A (although it was “informative”) has been deleted. The reason was that references to training schemes created by other associations (such as IIW) are not in-line with CEN-CENELEC-Guide 31 (Competition law for participants in CEN/CENELEC Activities; Edition 1, 2015-12, available on the internet).

The ISO 14731 is referenced in subsequent/supporting standards of e.g. Regulation No. 305/2011 (Construction Products Regulation, or CPR) and the Pressure Equipment Directive (PED) (2014/68/EU), and in the EN 15085-series for rail applications. Therefore ISO 14731 is an important standard for maintaining weld quality in production.

The purpose of this document is to present guidance to the use ISO 14731:2019 the most effective way, ensuring the required level of qualification and experience of welding coordinators and the correct references to the existing educational structure of EWF/IIW.

### 2 References

The following documents are referred to in the text in such a way that some or all of them constitute requirements of this document. For dated references, only the output referred to applies. For undated references, the last edition of the referenced document (including any changes) applies.

EA-6/02 EA Guidelines on the Use of EN 45 011 and ISO/IEC 17021 for Certification to EN ISO 3834.

EN 1090-series, Execution of steel structures and aluminium structures.

EN 12732 – Gas Supply Systems – Welding steel pipework – Functional Requirements.

EN 12953-4 – Shell Boilers – Part 4 – Workmanship and construction of pressure parts of the boiler.

EN 13445-series, Unfired pressure vessels.

EN 13480-4 – Metallic industrial piping – Part 4 – Fabrication and installation.

EN 15085-series, Railway applications.

EWF-637 Guidance for the Implementation of EN ISO 3834 oriented to welded product standards.

EWF-652 Dedicated knowledge for personnel with the responsibility for welding coordination to comply with EN 1090-2.

IAB-001/EWF-416 Rules for the implementation of IIW/EWF guidelines for the education, examination, qualification, and certification of welding personnel.

IAB-252 Personnel with qualification for welding coordination.

IAB-338 Guidance for the Implementation of ISO 3834 Oriented to Welded Product Standards.

ISO 3834-series, Quality requirements for fusion welding of metallic materials.

ISO 12847 – Petroleum and natural gas industries – Pipeline transportation systems – Welding of pipelines.

ISO 14731:2019, Welding coordination - Tasks and responsibilities.

*In this document, standards are referred to as “ISO”, but the European version “EN ISO” is considered to be identical.*

### 3 ISO 3834 series

To have a harmonized system for controlling weld quality all over the world, EWF and IIW developed a manufacturer certification system (MCS) that complies with the requirements of ISO 3834 series and with the requirements of the European co-operation for Accreditation as given in EA-6/02. This system, as described in EWF-637 and IAB-338, contains requirements for MCS certification to ensure that manufacturers are competent and exercise adequate control of the special process of welding,

so that customers and others can have confidence that the welded products they produce will comply with the regulatory and/or contractual requirements as related to Quality, Environment, Health and safety. In this process, the proper application of ISO 14731 plays a crucial role for maintenance of the quality.

#### 4 Competence

Instead of the previous editions, the new ISO 14731 now refers to three “levels of competence” (previously called “knowledge levels”) as there are:

- comprehensive level;
- specific level;
- basic level.

The meaning of the levels is however better defined as “competence” in this new issue of the standard.

An organization shall be aware that competence will include much more than only the knowledge of welding or professional competence.

According to the definition of the new ISO 14731 competence is “the proven ability to use knowledge, skills and personal, social and/ or methodological abilities, in work situations in terms of responsibility and autonomy” (See Figure 1).

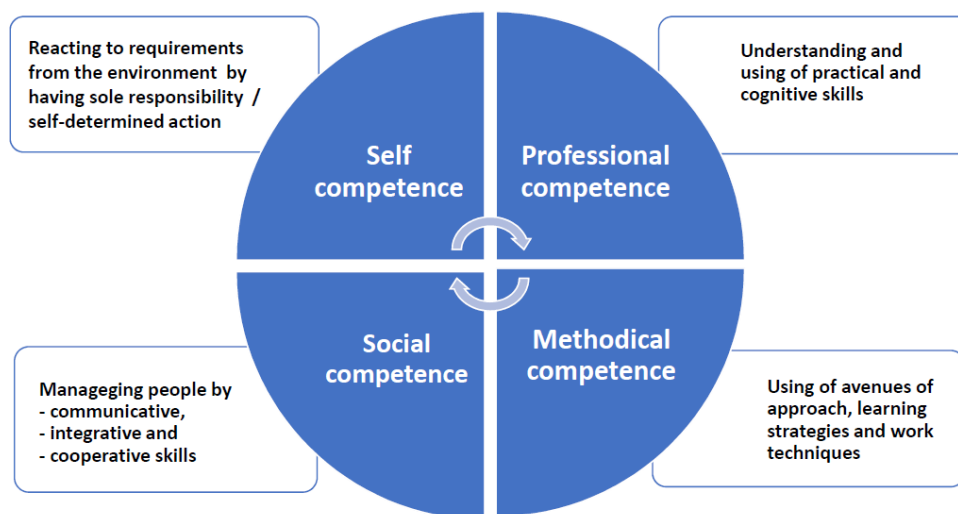


Figure 1 The different parts of competence.

#### 5 Qualification

The informative Annex A in ISO 14731 Edition 2006 doesn't exist anymore in the new edition of ISO 14731:2019. In the 2006 edition as well as in the European predecessor the European standard EN 719, this Annex A provided recommendations for technical knowledge in welding as specified in several IIW (and EWF) documents.

The standard is in principle applicable to all people, even those who don't fulfil the requirements as specified below, but who are thoroughly experienced in manufacturing “their” product! The European Federation for Welding, Joining and Cutting (EWF) and the International Institute for Welding (IIW) however have developed a structure of welding education programs to provide a solid base for carrying out the required tasks of welding coordination.

As shown in Figure 2, a comprehensive qualification will create the base for carrying out the required tasks of welding coordination.

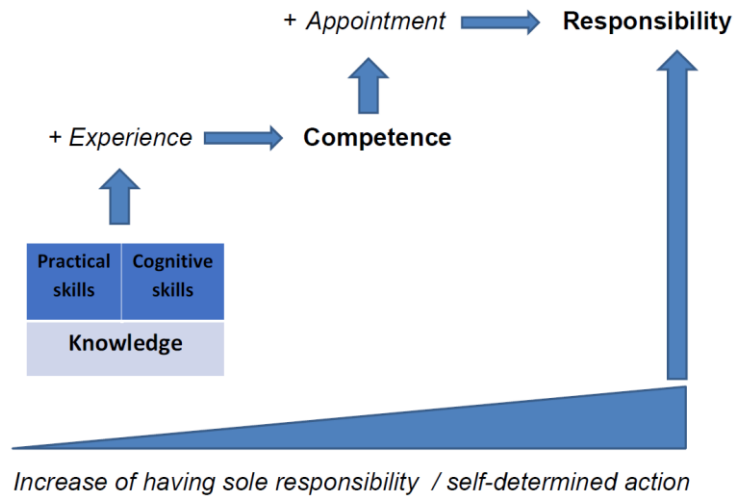


Figure 2 How responsibility is developing.

These educations assure in addition to the experience, a wide basis of welding knowledge, covering more product groups, materials and welding processes.

## 6 The requirements of ISO 14731:2019 – the position of EWF/IIW

### 6.1 General

In this new edition the factor “general technical requirement” was deleted. Without the former informative Annex A there is no information given to a manufacturer, which are the minimum requirements. Table 1 gives an overview of the recommended general educations.

Designated level of specialized technical knowledge in welding processes	Recommended general education according to ISCED level <sup>1)</sup> (minimum)	Examples of qualification
<b>Basic</b>	4 <sup>2)</sup>	European/International Welding Practitioner (Professional worker)
	5 <sup>2)</sup>	European/International Welding Specialist (Foreman)
<b>Specific</b>	6 <sup>3)</sup>	European/International Welding Technologist (Technician)
	7 <sup>3)</sup>	European/International Welding Engineer (Engineer)
<b>Comprehensive</b>		
1) ISCED <sup>1)</sup> level or its equivalent recognized by the national government. 2) A qualification in the field of the metal-working industry or handcraft and a minimum of 3 years of experience is additionally required. 3) A qualification in the field of engineering, manufacturing or construction is required.		

Table 1 Recommended general education for welding coordination personnel.

<sup>1</sup> ISCED = International Standard Classification of Education.

## 6.2 The comprehensive level

*In item 6.2.2 of the standard: "Comprehensive level", the requirements for "highly specialized problem-solving skills" are described.*

The answer from the EWF/IIW scheme (described in IAB-252) is as follows:

A candidate completing the European/International Welding Engineer (E/IWE) training under the EWF/IIW program is expected to acquire advanced knowledge and critical understanding of welding technology application.

He / she shall have advanced competence and skills at a level that is required in the field of welding technology which demonstrate:

- technology mastery and required innovation;
- the ability to solve high-level complex and unpredictable problems;
- the ability to manage high complex technical and professional activities or projects related to welding applications;
- the ability to transfer information from drawings to the component;
- the ability to give understandable instructions;
- taking responsibility for decision making in unpredictable work or study context;
- taking responsibility for managing professional development of individuals and groups.

## 6.3 The specific level

*In item 6.2.3 of the standard: "Specific level", the requirements for "advanced problem-solving skills" are described.*

The answer from the EWF/IIW scheme (described in IAB-252) is as follows:

A candidate completing the European/International Welding Technologist (E/IWT) training under the IIW program is expected to acquire an overall knowledge and understanding of welding technology application.

He / she shall have competence and skills at a level that is required in the field of welding technology which demonstrate:

- the ability to solve low-level complex problems;
- the ability to manage in detail the welding applications and related professional activities or projects;
- the ability to transfer information from drawings to the component;
- the ability to give understandable instructions;
- taking responsibility for decision making in low-level complex work or study context;
- taking responsibility to define the tasks of welding or related personnel;
- the ability to manage professional development of individuals and groups.

## 6.4 The basic level

*In item 6.2.4 of the standard: "Basic level", the requirements for fundamental problem-solving skills are described.*

The answer from the EWF/IIW scheme (described in IAB-252) is as follows:

A candidate completing the European/International Welding Specialist (E/IWS) training under the IIW program is expected to acquire a specialized and factual knowledge in the field of welding technology.

He / she shall have competence and skills at a level that is required in the field of welding technology which demonstrate:

- the ability to develop solutions on common/regular problems;
- the ability to manage and supervise common or standard welding applications and related professional activities;

- the ability to transfer information from drawings to the component;
- the ability to give understandable instructions;
- taking responsibility for decision making in common or standard work;
- taking responsibility to supervise the tasks of welding and related personnel.

Additionally, to the “basic level”, candidates that completed the European/International Welding Practitioner (E/IWP) training under the EWF/IIW program are expected to acquire also basic knowledge in the field of welding technology but on a limited scale.

He / she shall have competence and skills at a level that is required in the field of welding technology which demonstrate:

- the ability to develop solutions on basic and specific problems;
- the ability to supervise basic welding applications and related professional activities;
- the ability to transfer information from drawings to the component;
- the ability to give understandable instructions;
- taking responsibility for decision making in basic work;
- taking responsibility to supervise the tasks of welding and related personnel.

The table below (Table 2) originating from the current issue of IAB 252, may clarify the situation even more.

<b>QUALIFICATION</b>	<b>KNOWLEDGE APPLICATION</b>	<b>SKILLS APPLICATION</b>	<b>COMPETENCES</b>
INTERNATIONAL WELDING ENGINEER	Highly specialised and forefront knowledge including original thinking, research and critical assessment of theory, principles and applicability of welding related technologies.	Highly specialised problem- solving skills including critical and original evaluation, allowing to define or develop the best technical and economical solutions, when applying welding processes and related technologies, in complex and unpredictable conditions.	Manage and transform the welding processes and related technologies in a highly complex context. Act as the full responsible person for the definition and revision of the welding and related personnel’s tasks.
INTERNATIONAL WELDING TECHNOLOGIST	Advanced knowledge and critical understanding of the theory, principles and applicability of welding and related technologies.	Advanced problem-solving skills including critical evaluation, allowing to choose the proper technical and economical solutions, when applying welding and related technologies, in complex and unpredictable conditions.	Manage the applications of welding and related technologies in a highly complex context. Act autonomously as the responsible person for the decision making and the definition of the welding and related personnel’s tasks.



QUALIFICATION	KNOWLEDGE APPLICATION	SKILLS APPLICATION	COMPETENCES
INTERNATIONAL WELDING SPECIALIST	Specialised, factual and theoretical knowledge of the theory, principles and applicability of the welding and related technologies.	Specialised range of cognitive and practical skills, allowing to develop solutions or choose the appropriate methods, when applying welding and related technologies, in common/regular problems.	Manage and supervise common or standard welding applications and related technologies, in an unpredictable context. Take responsibility with limited autonomy for decision making in common or standard work and supervise the welding and related personnel's tasks.
INTERNATIONAL WELDING PRACTITIONER	Factual and theoretical knowledge (basic understanding) of the theory, principles and applicability of the welding and related technologies.	Fundamental range of cognitive and practical skills required to identify proper solutions, when applying welding and related technologies, in basic and specific problems.	Self-manage within the guidelines of work, the applications of welding and related technologies, in a predictable context, but subject to change. Take responsibility without autonomy for decision making in basic work and supervise basic tasks of welding and related personnel.

Table 2 Knowledge, skills and competences of the IIW educations (taken from IAB-252).

### 6.5 Special education according to EWF-652 Guideline.

This guideline is meant to refresh and update the knowledge of personnel that have been working as welding coordination personnel in the field of metal construction as defined in the European Standard EN 1090-2 and required through the application of the European Regulation (EU) No 305/2011 (the previous European Directives 89/106/EEC, 93/68/EEC). These are personnel that have a formal recognition of their essential know-how, best or good practice and solid knowledge to become welding coordinators with limitation on material and thickness and the level "B" or "S" as specified in the application standard EN-1090-2.

## 7 Welding coordination is a job function!

The term "welding coordinator" as used in the standard is a job function, that means that it is the duty of the manufacturer to establish if a certain person has the knowledge, skill and experience to fulfil the requirements of the job and appoint a person as such by a contract.

Just appointing someone based on his/her education is not enough; it is the suitability for the specific job in a specific company. That means the materials, construction details, welding processes, etc. as used by the company concerned are the most relevant items. Don't forget: the standard says, "welding coordination is the sole responsibility of the manufacturer"!

The tasks of welding coordination personnel shall be selected from Annex B of the standard (based on the ISO 3834-series) and/or as specified in application standards (e.g. EN 1090, EN 13445, EN 15085, etc.), contracts or other relevant documents. This is clearly described in clauses 4.2 and 5.1 of the ISO 14731 and it is the task of the manufacturer to specify this.

## 8 Conclusions

There is a lot of freedom given by the ISO 14731, but the proper use of the document, will assure that welding coordination is performed in a good professional and safe way.

It is evident that all training schemes developed by EWF/IIW as referred to in this document, will cover the requirements for professional competence as specified in the ISO 14731.

It is however still essential that careful evaluation shall be done by the management of the manufacturing organisation, as given the Annex B of the ISO 14731.

To demonstrate the competence of welding coordinators to the ISO 14731, it is highly recommended that the organization shall, in combination with Annex A of ISO 14731:

- a) determine the necessary competence of person(s) doing work under its control that affects the performance and effectiveness of welded components;
- b) ensure that these persons are competent on the basis of appropriate qualification and experience;
- c) where applicable, take actions to acquire the necessary competence, and evaluate the effectiveness of the actions taken;
- d) retain appropriate documented information as evidence of competence.

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