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**RMWF Project: Implementation of International
Guidelines for Risk Management in Welding
Fabrication**

Guideline (short version)

Final Version

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MINIMUM REQUIREMENTS FOR THE EDUCATION, TRAINING, EXAMINATION AND QUALIFICATION

EWF Guideline for European Welding Fabrication Risk Manager Qualification

- Short Version -

This is a reduced version; it is not the full Guideline

For more information regarding the Qualifications System, the EWF Secretariat or the National ANB should be contacted
(see in the EWF sites the ANB contacts)

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The use of this guideline is restricted to organisations approved by the Authorised Nominated Body (ANB)

1. Introduction

This guideline for the European education and training on Risk Management in Welding Fabrication has been prepared, evaluated and formulated by the Working Group “Quality, Environment, Health and Safety” of the Technical Committee of EWF. It is designed to provide the education and training in Risk Management in the field of welding fabrication activities.

Section 1 of the guideline covers the minimum requirements for education and training, agreed upon by all national welding societies within the EWF in terms of objectives, keywords, expected results and recommended times devoted to them. It will be revised periodically by the Technical Committee to take into account any changes which may affect the "state of the art".

Students having successfully completed this course of education will be expected to have advanced knowledge and critical understanding of risk-based approaches and their practical applications in different fields of life, with special regard to industrial sectors producing welded structures.

He or she shall have advanced skills at the level that is required for:

- demonstrating mastery and innovation, required to solve complex problems in the field of risk-based approach application both in different welding technological processes and economical environments;
- deciding appropriate investments in education, qualification and equipment in order to manage the relevant risk.

In terms of autonomy and responsibility, he or she shall be able to:

- manage complex technical or professional activities or projects in the field of implementation and operation of risk-based procedures in fabrication of welded structures;
- Take responsibility for decision-making in welding related technical problems and for managing professional risk-based approach development applications of individuals and groups.

A subsequent section covers the examination and qualification. The contents are given in the following structure:

Education	Teaching Hours (minimum)
1. Fundamentals of welding technology	53 (acc. to EWF-IAB-252)*
2. Risk management in welding fabrication	72
Total	125

* Correspondent to the Module 1 “Welding processes and equipment” for the IWS qualification.

A teaching hour will contain at least 50 minutes of direct teaching time. It is not obligatory to follow exactly the order of the topics given in this guideline and choice in the arrangements of the syllabus is permitted.

In this syllabus, the workload (WL) is an estimation of the time learners typically need to achieve the defined learning outcomes in formal learning environments. WL covers contact hours and self-study time, meaning practical training and examination are not included. The European Credit System for Vocational Education and Training (ECVET) is applied to the Competence Units, where 1 credit equals to 25 to 30 hours of workload.

The depth to which each topic is dealt with is indicated by the recommended number of hours allocated to it in the guideline. This will be reflected in the scope and depth of the examination.

It is also allowed for students having already participated to IIW/EWF training courses in the field of welding co-ordination activities and/or welding Inspection activities and/or other training courses in the field of quality management to waive a corresponding part of the courses. This waiving shall be based on the guidance provided by part 3 of this document and on the approval of the Authorised Nominated Body (ANB).

2. Access to the education

Participants should have a relevant qualification from an accredited program in accordance with the Sydney Accord for professional qualification of engineering technologists, or a Short Cycle Bologna Framework engineering qualification, or an engineering qualification at EQF level 5 or its equivalent, recognised by the national government and assessed by the ANB. To access the training as defined in this guideline the requirements to access European Welding Technologist apply (in accordance with IAB-252 latest edition).

3. Structure of the qualification

The course is based on 2 Modules, each one covering differing aspects of risk management in welding fabrication.

The chart of diagram 1 shows the education routes.

Waiving of module 1 is possible if an “intermediate examination” is performed and passed (in order to access module 2) covering all the relevant items of module 1. The examination shall be conducted under the control of the ANB

Waiving modules or sub-modules is also possible, subject to ANB evaluations, provided the following conditions are satisfied (see Table1).

- Participants having already achieved the International/European Welding Engineer and or Technologist Diploma and or Specialist Diploma can waive modules 1¹ and 2.1;
- Participants having already followed a training course in the field of quality management according to ISO 9001), can waive the relevant part of module 2 (item 1.1);
- Participants having already followed a training course in the field of quality management in welding fabrication according to ISO 3834, can waive the relevant part of module 2 (item 1.2);

¹ Module 1 is equivalent to the Module 1 “Welding Processes and Equipment” of the guideline IAB 252 (latest edition) for the education and training of European/International Welding Coordinators at the Specialist level.

- Participants having already followed a training course in the field of environmental management in welding fabrication according to EWF EMS, can waive the relevant part of module 2 (item 1.3);
- Participants having already followed a training course in the field of health and safety management in welding fabrication according to EWF SMS, can waive the relevant part of module 2 (item 1.4).

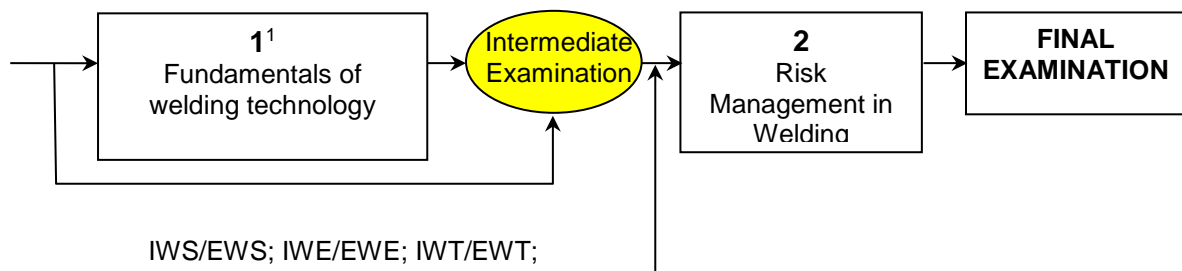


Diagram 1: Routes to access the final examination

¹Module 1 is equivalent to the Module 1 “Welding process and equipment” of in the guideline IAB 252 (latest edition) for the education and training of European/International Welding Coordinators at the Specialist level.

Education or Qualification	Previous attendance of Modules	Waiving in current Guideline
		Sub-Module
IWE/EWE, IWT/EWT and IWS/EWS Diploma	1 (IAB – 252 latest edition)	Complete
	2 (IAB – 252 latest edition)	2.1.1
Introduction to quality assurance in welded fabrication	4 (4.1.E/IWE-E/IWT) (IAB – 252 latest edition) 1 (1.4 E/IWI-C) (IAB – 041 latest edition)	2.1.1
Health and Safety Management in welding fabrication (EWF SMS) *	4 (4.5. E/IWE-E/IWT) (IAB – 252 latest edition) 4 (4.3 E/IWI-C) (IAB – 041 latest edition)	2.1.3
Critical review of selection of NDT methods	2 (2.9 E/IWI-C) (IAB – 041 latest edition)	2.1.6
Economics and productivity	4 (4.9. E/IWE-E/IWT) 2 (2.13 IWI) (IAB – 041 latest edition)	2.1.7

* to be approved by the ANB

Table 1 – Waiving of modules

Maximum possible waiving is 57 hours of teaching.

Section I: Minimum Requirements for the Education

Module 1: Fundamentals of welding technology

The minimum requirements for the education for these modules are those reported in the latest revision of the Guideline EWF-IAB-252 (latest edition) related to Module 1 “Welding processes and equipment”.

TOTAL MODULE (MIN.)² 53 h

Module 2: Risk management in welding fabrication

Theoretical training foreseen in this module has been structured into two Competence Units, as follows:

Competence Units	Duration (Contact hours)
2.1 - Management of Welding Fabrication	22
2.1.1 Quality management in welding fabrication	4
2.1.2 Environmental management of welding fabrication activities	2
2.1.3 Health and safety management of welding fabrication activities	2
2.1.4 Weld cracking management	2
2.1.5 Safety reliability and risk management of welded components	3
2.1.6 Critical review of NDT methods selection. Reliability of NDT	3
2.1.7 Economics and Productivity	2
2.1.8 European norms/directives in welded production fabrication	2
2.1.9 Mathematical statistics in welding	2
2.2 Risk Management	50
2.2.1 Company organisation	4
2.2.2 Management of control	2
2.2.3 Elements of operational risk management	6
2.2.4 Risk management according to ISO 31000	4
2.2.5 Risk management with reference to human reliability assessment	8
2.2.6 Risk assessment according to ISO 31010	8
2.2.7 Case studies	14
2.2.8 “Welding risk” oriented homepages, contents and evaluations	4

² Total amount of hours is indicative; and refers to Module 1 which is equivalent to the Module 1 “Welding Processes and Equipment” of the guideline IAB 252 (latest edition) for the education and training of European/International Welding Coordinators at the Specialist level.

The cross-reference table enables a clear understanding on how the professional job functions and required professional activities relate to the Competence Units of Learning Outcomes.

Job Function	Job function – required activities	Competence Units of Learning Outcomes	
		2.1 Management of welding fabrication	2.2 Risk Management
1. Verify compliance with quality assurance procedures	1.1 Applying quality assurance principles and procedures to the inspection of welded fabrication 1.2 Writing requirements for quality control procedures and audit plans 1.3 Carrying out audits to assess welding related plan, personnel, equipment and products	x	
2. Monitor and assess the environmental impact of welding fabrication activities	2.1 Developing an environmental check-list according to EWF Environmental Management System (MES) 2.2 Analysing the impact of a given manufacturer activity following MES	x	
3. Monitor and assess health and safety procedures	3.1 Analysing health and safety risks related to the welding activity 3.2 Verifying the correct use of PPE equipment for health and safety 3.3 Verifying compliance with health and safety procedures 3.4 Developing a plan for preventing and mitigating risks	x	
4. Monitor and assess the risk of weld cracking	4.1 Analysing the risk of cracking in a welding fabrication 4.2 Verifying if cracking factors were avoided 4.3 Developing a plan for preventing and mitigating weld cracking 4.4 Developing a repair plan for weld cracking	x	
5. Monitor and assess safety reliability and risk of welded components	5.1 Verifying if risk handling procedures were correctly used 5.2 Calculating cost effective solutions for periodical inspection and maintenance of welded components 5.3 Verifying if procedures of Risk-based Inspection and Reliability-based maintenance were followed	x	
6. Review NDT methods for inspection	6.1 Analysing the benefits and limitations of NDT methods regarding welding inspection 6.2 Selecting adequate NDT methods to be applied for a given welding construction	x	
7. Monitor and assess the economy and productivity of welding operations	7.1 Calculating welding costs applied to welded fabrication 7.2 Calculating the Welder duty cycle 7.3 Developing measures for decreasing welding costs 7.4 Developing measures for improving productivity	x	
8. Apply European Standards in Welding production fabrication	8.1 Studying the structure and field of application of European norms/directives for welded fabrication. 8.2 Interpreting European norms/directives regarding welded structures	x	

9. Apply mathematical statistics in welding products fabrication, including probability methods to different fields of welding	9.1 Using probability and reliability theories applied to welding testing methods 9.2 Analysing statistic examination results 9.3 Taking management decisions, based on the previous statistic results	x	
10. Develop and implement a risk management system for organisations	10.1 Analysing the organisational context, conditions and needs 10.2 Developing and implementing operational procedures for the use of Risk Management strategies and tools in a given organisation		x
11. Apply control procedures and techniques for management	11.1 Studying control procedures and techniques for management 11.2 Using adequate control tools and techniques for cost management 11.3 Analysing the cost production results to monitor and improve overall management		x
12. Develop and implement risk management according to ISO 31000	12.1 Assessing the elements and types of operational risks 12.2 Interpreting risk databases information, including its origin and consequences 12.3 Applying tools and techniques for operational risk management 12.4 Creating an operational plan for handling operational risk		x
13. Perform risk management referenced to human reliability assessment	13.1 Apply principles and methods for human reliability assessment 13.2 Selecting the required methods for human reliability assessment		x
14. Develop and implement risk management assessment according to ISO 31010	14.1 Analysing types of risk and management procedures for cost effectiveness 14.2 Interpreting risk databases information, including its origin and consequences 14.3 Applying techniques for risk assessment 14.4 Creating an operational plan for handling risk, focused on the required treatment steps		x
15. Perform risk analyses in different welding fabrication scenarios	15.1 Analysing risk and the need for different management behaviours 15.2 Assessing risk in different welding fields and context of application Selecting adequate methods for risk management, based on the benefits/limitations in different fabrication scenarios		x
16. Create "welding risk" digital contents	16.1 Comparing different "welding risk" contents and homepages 16.2 Deciding about reliable contents to be included in welding webpages 16.3 Developing relevant digital "Welding Risk" contents		x

Both Competence Units, Management of Welding Fabrication and Risk Management, are described for the EQF level 6, using the correspondent descriptors (Council Recommendation for the EQF, 2017) in terms of knowledge, skills, autonomy and responsibility.

COMPETENCE UNIT 1 - Management of Welding Fabrication					
KNOWLEDGE	SKILLS	AUTONOMY AND RESPONSIBILITY	EQF LEVEL	WORKLOAD (Hours)	ECVET Points
Advanced knowledge and critical understanding of the principles and methods applied to Welding Fabrication management activities.	Advanced problem-solving skills including critical evaluation, allowing to choose the proper technical and economical solutions for the Management of Welding Fabrication, in complex and unpredictable conditions.	Manage the applications concerning the quality control of welded products in a highly complex context. Take responsibility for decision making regarding the management of Welding Fabrication.	6	44	1,8

COMPETENCE UNIT 2 – Risk Management					
KNOWLEDGE	SKILLS	AUTONOMY AND RESPONSIBILITY	EQF LEVEL	WORKLOAD (Hours)	ECVET Points
Advanced knowledge and critical understanding of the principles and methods applied to risk management.	Advanced problem-solving skills including critical evaluation, allowing to choose the proper technical and economical solutions for risk management, in complex and unpredictable conditions.	Manage the applications concerning the quality control of welded products in a highly complex context. Take responsibility for decision making regarding the risk management.	6	100	4

Learning tools and activities

Learning and training in the field of Risk Management are recommended to be supported in trainers' presentations, case studies, problem solving and fundamental literature in the applied field of expertise, including the appropriate European standards and directives.

Section II: Examination and qualification

1. Introduction

This guideline seeks to achieve European harmonisation and common standards in the education, training, and qualification of personnel in the field of risk management in welding fabrication.

The national welding organisations, being members of EWF, mutually acknowledge the Diploma awarded in any Member State to people who have successfully followed this guideline. Education must have followed Section 1 of the EWF guideline for “European Welding Risk Manager Qualification. The intermediate examination is under the responsibility of the Approved Training Body or under the control of the Authorised Nominated Body, while the final examination must have been conducted by the nominated body authorised by EWF for this purpose.

2. Approval of training courses

Any training course leading to the examination must be approved by the ANB. The number of teachers required to give the course shall be sufficient to ensure, that the expert knowledge and industrial experience to cover the syllabus, is adequately represented in the team of teachers and visiting lecturers.

ATB shall have the necessary equipment to carry out practices according to this guideline. In addition, ATB shall comply with national safety laws.

3. Requirements for Training and Examination centres

Requirements for teachers and instructors, examiners, training establishments, courses and examination / test centres are documented in EWF 416 (latest version).

4. Appeals procedure

Candidates who feel they have been unfairly treated during the examination procedure have the right to appeal to the Authorised Nominated Body.

5. European Welding Fabrication Risk Manager Diploma

After successful examination the Authorised Nominated Body awards a Diploma to the candidate.