

EWF Guideline EUROPEAN ALUMINOTHERMIC WELDER



**Minimum Requirements for the Education, Training,
Examination, Qualification and Certification**



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MINIMUM REQUIREMENTS FOR THE EDUCATION, TRAINING, EXAMINATION, QUALIFICATION AND CERTIFICATION OF A EUROPEAN ALUMINOTHERMIC WELDER (EAW)

Interim Guideline of the European Welding Federation
Prepared by RAILSAFE



RAILSAFE is a LEONARDO DA VINCI
Community Vocational Training Action Programme Project

MINIMUM REQUIREMENTS FOR THE EDUCATION, TRAINING, EXAMINATION, AND QUALIFICATION AND CERTIFICATION OF PERSONNEL

“EUROPEAN ALUMINOTHERMIC WELDER (EAW)”

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

**For more information regarding the EWF Qualification System,
the EWF-IAB/IIW Combined Secretariat or the National ANB
should be contacted**

(see in the EWF and/or IIW sites for the ANB contacts)

GUIDELINE OF THE EUROPEAN FEDERATION FOR WELDING, CUTTING AND JOINING - EWF

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Preface

This document has been prepared by the partners in the RAILS SAFE project.

The aim of the RAILS SAFE project is the "Development of a Harmonised System for Education, Qualification and Certification of Railway Track Welders"

The project is financially supported by the European Union *LEONARDO DA VINCI* Community Vocational Training Action Programme.

The project has started on 1 October 2004 and has a duration of 3 years.

Partners in the project are:

- Schweißtechnische Lehr- und Versuchsanstalt Hannover, Germany
- Istituto Italiano della Saldatura, Italy
- Ir. J.B. van den Brug Raadgevend Ingenieur, the Netherlands, Project coordinator
- VolkerRail, the Netherlands
- European Federation for Welding, Joining and Cutting Secretariat, Portugal
- Instituto de Soldadura e Qualidade, Portugal
- Swedish Welding Commission, Sweden
- First Welding Company, Slovakia
- TWI (TWI Ltd), UK, Project promoter

The document is based on the input of in total 50 railway welding experts from seven different European countries by discussions in workshops in Copenhagen, Cambridge, Genoa, Hannover and Bratislava in 2005.

European Welding Federation

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References

- EN 14730 Railway applications – Track – Aluminothermic welding of rails
- EN 13674 -1 Railway applications – Track – Rail – Part 1: Vignole railway rails 46 kg/m and above
- Development of a Harmonised System for Education, Qualification and Certification of Railway Track Welders; Report made after discussions with 50 railway track welding experts from seven different European countries, RAILS SAFE/GUIDE/CO/RI/ JB/060113/4, 25 July 2006

Terms and definitions

European Rail Welding Organisation (ERWO)

Organisation which operates the education, training, qualification and certification system in Europe (organisation to be assigned or established by the European rail welding community; the nature of this organisation and its feasibility are still subject of discussion).

Rail Welding Specialist Group

Group responsible for the maintenance of the harmonised education, training, qualification and certification system in Europe on behalf of the European Rail Welding Organisation. Members of the Group are railway authorities, contractors, process suppliers, training bodies and Authorised National Bodies.

RAILSAFE Authorised National Body (RANB)

Organisation authorised by the European Rail Welding Organisation (ERWO), which operates the education, training, qualification and certification system in its country.

National Rail Welding Specialist Committee

Committee responsible for the implementation of the education, training, qualification and certification system on behalf of the Governing Board of the RANB.

Members of the Committee are national railway authorities, contractors, process suppliers and training bodies.

Approved Training Body (ATB)

Aluminothermic welder training organisation approved by the RAILS SAFE Authorised National Body (RANB).

European Aluminothermic Welder Instructor

Instructor teaching theoretical knowledge and practical skills for courses leading to EAW qualifications.

Authorised Examiner (AE)

Person authorised by the RAILS SAFE Authorised National Body to examine knowledge and/or skills of a welder for a Diploma and/or a Certificate.

Process supplier

Company which supplies aluminothermic welding processes.

Employer

Company which employs aluminothermic welders.

Contractor

Company which builds and/or repairs railways.

Railway Authority

Owner of a railway infrastructure.

Aluminothermic welder

Person who is a certified or qualified or is being trained for the joining of rails by aluminothermic welding process.

Diploma

Lifelong valid document issued to a person having successfully passed an examination after his/her education and training for knowledge and skills.

Certificate

Document with limited validity issued to a Diploma holder showing current knowledge and skills.

Welding process

One of a range of aluminothermic welding processes provided by a process supplier

This is not the full version of this document, this version has only the aim to supply general information

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European Aluminothermic Welder

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Minimum requirements for the Education, Training, Examination, Qualification and Certification of a European Aluminothermic Welder (EAW)

1. Introduction

The specific requirements for the theoretical education, practical training, examination, qualification and certification of aluminothermic welders are described in this guideline. The guideline applies to welding of tracks and describes the know-how and skills which the welder requires to produce welded joints independently on rails according to EN 13674-1.

Welding joints on other rails, in other combinations and applying other processes will be subject of special training course modules which are based upon the know-how and skills described in this document.

2. Overall structure

Qualification, resulting in the issue of the Aluminothermic Welder Diploma, requires theoretical education, practical training and theoretical and practical, 'out-of-track', examination.

Certification requires qualification as above plus track welding experience and an 'in-track' assessment. Figure 1 shows the overall structure.

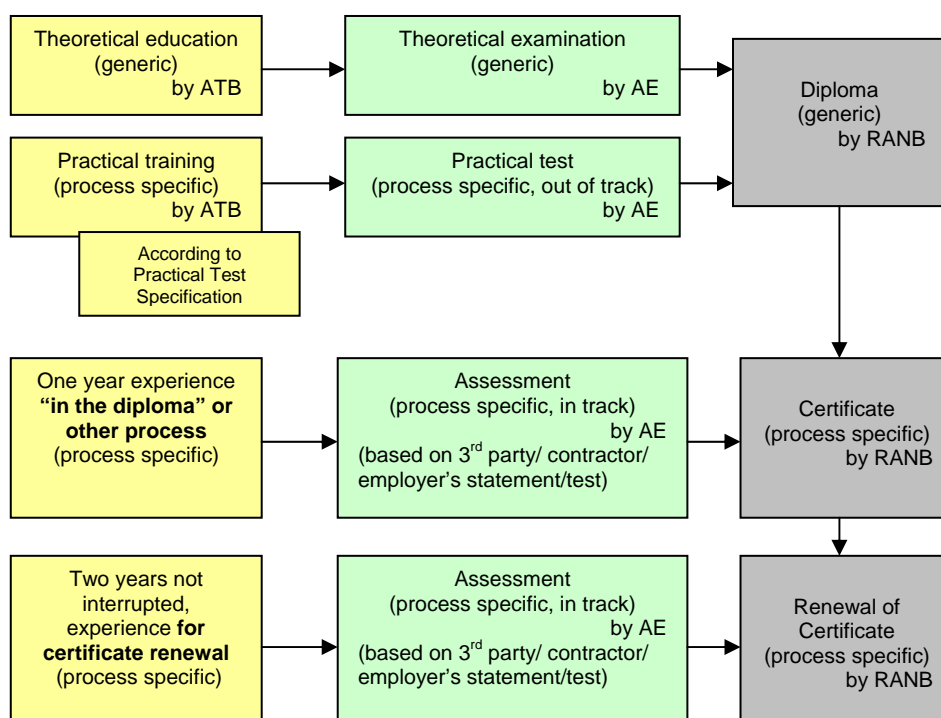


Figure 1 Overall structure of education, training, qualification and certification

Legend: RANB = RAILS SAFE Authorised National Body
 ATB = Approved Training Body
 AE = Authorised Examiner

See separate document for organisational structure

The theoretical education and examination for a Diploma is generic and the practical training and examination for a Diploma is process specific according the Practical Test Specification (Appendix 1), which is specific for each aluminothermic process/ process supplier. After passing the examinations the welder will receive a generic Diploma valid his/her whole life.

Diploma holders are required to demonstrate a period of supervised, documented and satisfactory experience to receive a process specific Certificate covering the process in which the welder has been trained for the Diploma. If the Diploma holder is successful in passing the experience assessment, the Certificate is awarded; if not, the Diploma holder must undergo an 'in-track' practical test. To get a Certificate in another process, the welder must also undergo practical training and an 'in-track' practical test in that process.

Certificates are valid for two years. In order to renew a Certificate for another two-year period, holders are required to demonstrate supervised, documented and satisfactory experience in the process for which the certificate was awarded during the period of validity of the Certificate. If the Certificate holder is successful in passing the experience assessment, the Certificate is renewed; if not the Certificate holder must undergo an 'in-track' practical test.

All theoretical and practical tests shall be in accordance with EN 14730-2 or equivalent.

Diplomas and Certificates issued under the authority of one RANB shall be recognised by all other RANBs.

3. Access to the course

For entry to the course, appropriate health, physical and mental capability is assumed. The participants are required to have knowledge and skills on health and safety, track construction, cutting and grinding as specified by the RANB

The minimum age is 18 years. Participants must have a spoken and written command of the language in which the course is offered.

4. Instruction programme

The EAW course consists of a theoretical education module and practical training module, as shown in Table 1. Both modules are divided into sub modules, each with a recommended number of teaching hours.

Module	Sub Module	Recommended teaching hours
1. Theoretical education	1. Health, safety and environment	7
	2. Track fabrication	1
	3. Materials and their behaviour during welding	8
	4. Application of Aluminothermic welding to rails	23
	Theoretical examination	1
	Total Module 1	40
2. Practical training	1. Pre-welding activities	77
	2. Aluminothermic welding	
	3. Post-welding activities	
	4. Variants of welds	
	Practical test	3
	Total Module 2	80
	Total Course	120

Table 1 - Parts composing the training course including examinations

Although the theoretical part of the course covers the different proprietary aluminothermic welding process variants, it is intended that the bulk of the training will be on one process variant, to be selected by the student or employer.

The recommended periods of time in the practical part represent the average time required to attain the expected level of knowledge. The time needed may vary individually according to the capability of the student.

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.

The theoretical education given to the students aims at a basic understanding of the process and the materials behaviour including standards and safety regulations. The themes and keywords are given as “scope” in the module descriptions, together with the “objective” and the “expected result”.

The practical training advised in this guideline will bring the students to the skill, required for practical work in industry.

The duration of the training course is derived from the training course content (section 5 and 6). The order of theoretical education and practical training is at the discretion of the training establishment.

Training courses are conducted by Authorised Training Bodies (ATBs). The courses are normally conducted in the training school, but parts of the course may be conducted at the track site, at the discretion of the ATB.

Participants will only be admitted to the examination if they have participated in all aspects of the training course.

ATBs must include in the training programme any applicable national requirements defined by the Railway Authority.

5. Module 1 Theoretical education

In the following paragraphs the minimum requirements for education and training courses are given, with the indication of teaching hours, making particular reference to the ‘expected results’ (welder performance objectives).

	<u>teaching hours recommended</u>
1. Theoretical education	40
1.1. Health, safety and environment	7
1.2. Track fabrication	1
1.3. Materials and their behaviour during welding	8
1.3.1. <u>Basics of metallurgy</u>	2
1.3.2. <u>Welding metallurgy and structure of welded joints</u>	1
1.3.3. <u>Rails</u>	5
1.4. Application of aluminothermic welding to rails	23
1.4.1. <u>Principles of Aluminothermic welding</u>	2
1.4.2. <u>Cutting processes for rails</u>	7
1.4.3. <u>Aluminothermic welding application per process supplier (to be repeated for each additional supplier, as required)</u>	11

	<u>teaching hours recommended</u>
1.4.4. <u>Grinding of completed welds</u>	2
1.4.5. <u>Welding imperfections and defects</u>	1
1.4.6. <u>Arc welding application for repair and building up of rail</u>	0
1.4.7. <u>Other joining processes</u>	0
Theoretical examination	1

6. Module 2 Practical Training

This Guideline applies to rail steels, see table 1 of EN 13674-1.

In paragraphs 2.1, 2.2, 2.3 and 2.4 below the items to be covered in the practical training are given. The typical training time is reported, assumed as average teaching hours to be spent on every item, however subject to evaluation by the trainers, taking into consideration students' skill and experience.

The practical training is designed to give the student know-how and skill to produce welded joints. The practical training as described below is intended to cover a range of process variants, but limited to one process supplier. If skill is required in relation to further process suppliers the practical part would need to be repeated for each supplier.

	<u>teaching hours recommended</u>
2. Practical training	77
2.1. Pre-welding activities	
2.2. Aluminothermic welding	
2.3. Post-welding activities	
2.4. Variants of welds	
Practical test (for one process variant and one process supplier)	3

7. European Aluminothermic Welder Instructors

Instructors teaching theoretical knowledge and practical skills for courses leading to EAW qualifications must possess, specific knowledge and skills (on the complete guideline the requirements are defined):

The Approved Training Body (ATB) must install a system for ensuring that instructors keep up to date and maintain their competence.

8. Examinations and Tests

8.1. Authorised Examiner (AE)

The RANB shall administer the European Aluminothermic Welder examinations and tests through the appointment of competent persons, to be known as RANB Authorised Examiners, who shall be responsible for the functions listed below and for complying with the rules concerning re-examination.

RANB Authorised Examiners shall be competent to perform the duties they are requested to undertake and may be specific appointees of the RANB or an RANB approved appointee of another organisation, for example the Approved Training Body (ATB) or a rail welding contractor.

Authorised Examiners must be able to demonstrate impartiality in reaching decisions about the results of the examinations they are supervising.

All examinations shall be conducted under the general supervision of an Authorised Examiner. It is the responsibility of the RANB Authorised Examiner to verify compliance with EN 14730-2 or equivalent.

8.2. Examinations leading to the EAW Diploma

The examination/test centre for the final theoretical examinations and qualification tests may be a part of the training body or a separate organisation. In either case it shall be independent of the training activities and subject to RANB approval. The operation of the centre shall be controlled by a quality manual.

8.2.1. Theoretical examination

After the theoretical training modules, there is a final theoretical examination of the multi-choice type covering the whole syllabus: examination papers shall comprise questions selected by the Authorised Examiner from a bank of questions approved by the RAILS SAFE Authorised National Body.

8.2.2. Practical test

After the practical training modules, there is a final practical test in a specific aluminothermic welding process selected by the candidate and/or his/her employer according to the Practical Test Specification, which is specific for each aluminothermic process/ process supplier (Appendix 1). The test shall be in accordance with EN 14730-2 or equivalent. It shall be administered by the Authorised Examiner and shall take place at a location approved by the AE.

The candidate is allowed assistance during the practical test.

There are no special rules concerning re-examination in the event of failure in the practical test. However, more than one failure is an indication that further training is required.

8.2.3. Award of EAW Diploma

After successfully completing the theoretical examination and the practical test, the candidate is awarded the EAW Diploma. The specific process used for the practical test is indicated on the Diploma. An example of a diploma is shown in Appendix 4.

Diplomas are the property of the holder and are valid for the life of the holder.

8.3. Certification as an EAW

Certificates as described in the current document are not 'Permits to Weld' as described in EN 14730-2, but railway authorities may use such certificates as a basis for issuing 'Permits to Weld'.

8.3.1. Initial certification

For a Certificate in any process the Diploma holder is required to demonstrate a period of supervised, documented and satisfactory experience in that process with a minimum of 50 welds per year. RANBs are permitted to accept a lower number of welds per year as dictated by the circumstances. Justification for doing so must be documented.

If the process to be used for certification is not the same as the process indicated on the diploma, the candidate must also provide evidence of at least 8 hours of training in the process to be used for certification.

Evaluation of the supervised, documented and satisfactory experience and training, if applicable, is carried out by the RANB Authorised Examiner, based on a 3rd party/contractor/employer's statement specifying process and inspection reports on completed (including rejected) welds.

The Authorised Examiner conducts an 'in-track' practical test of the welder in the process indicated on the Diploma, if the welder is not successful in passing the experience assessment.

In case of a process which is different from the process indicated on the Diploma the "in-track" practical test is obligatory.

After successful assessment a Certificate is awarded to the candidate by the RAILS SAFE Authorised National Body.

The Certificate shall be issued in at least one of the official CEN languages (English, French or German).

There are no special rules regarding re-examination in the event of failure in the practical test for certification (or re-certification). However, more than one failure is an indication that further training is required.

The validity of the certificate begins from the date when all necessary tests have been passed.

A certificate shall remain valid for a period of two years providing specific conditions are fulfilled

8.3.2. Renewal of certification

For prolongation of their Certificate after it has been expired, Certificate holders are required to demonstrate a 2 year period of supervised, documented and satisfactory experience with a minimum of 50 welds per year and with no interruption of work longer than a period of 6 months. RANBs are permitted to accept a lower number of welds per year and a longer period of un-interruption of work as dictated by the circumstances. Justification for doing so must be documented.

If the welder is not successful in passing the experience assessment, the renewal candidate is then required to repeat the 'in-track' practical test in the process concerned.

Success in the practical assessment leads to the issue of a new Certificate, in accordance with section 8.3.1 above.

In order to ensure continuity of certification it is recommended that the RANB is advised well before the expiry date of the certificate. A successful renewal test taken within three months before the expiry date of the existing certificate shall result in a new certificate being issued from the date of expiry of the existing certificate.

9. Entry in database (optional)

There is an option to upload the all the details of the welder's Diplomas and Certificates to the aluminothermic welders database on the RAILS SAFE website. Details are to be found in Document RAILS SAFE/Guide/PR/EWF/IF/070109.