

**EFW Guideline
EUROPEAN WELDING PRACTITIONER
FOR RESISTANCE WELDING – Short Version**



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



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MINIMUM REQUIREMENTS FOR THE EDUCATION,
TRAINING, EXAMINATION AND QUALIFICATION

**European Welding Practitioner for Resistance Welding
EWP-RW**

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 on the EWF site – www.ewf.be the ANB contacts)**

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Minimum Requirements for the Education, Training, Examination and Qualification of European Welding Practitioner For Resistance Welding

The use of this guideline is restricted to organizations approved by the Authorized National Body (ANB).

Introduction

This guideline for the European education and training of Welding Practitioners for resistance welding has been prepared, evaluated and formulated by members of the Technical Committee of EWF.

It is designed to provide the basic core education in resistance welding as required by resistance welding personnel who is active in job functions in accordance to EN ISO 14 554 - 1 (chapter 6.3), technical sales etc.

The education and training covers the elementary knowledge that is needed in a wide range of the job functions in resistance welding e.g. weld setter, instructor, inspector, supervisor, foreman, constructor and technical sales personnel.

European Resistance Welding Practitioner may also be a relevant qualification for people whose job is to assist responsible Resistance Welding Coordinators in accordance to EN ISO 14554-1 (chapter 6.4) in manufacturing companies.

Additional training and/or experience relevant to the specific job function may be required beyond the ERWP education. Additional training programmes will be established as required to meet this need.

The guideline covers the minimum requirements for education and training which is related to resistance welding within EWF, in terms of themes, keywords and recommended times devoted to them.

It will be revised periodically by the Technical Committee of the EWF taking into account any changes that may effect the “state of the art”.

A subsequent section II covers examination and qualification.

The contents are given in the following structure:

Theoretical Education (Part I and Part III) teaching hours

1. Resistance welding processes and equipment	10,5
2. Materials and their behaviour during resistance welding	4,0
3. Construction and design	0,0
4. Fabrication, applications engineering	4,0
	<u>18,5</u>

Practical Part II	16,5
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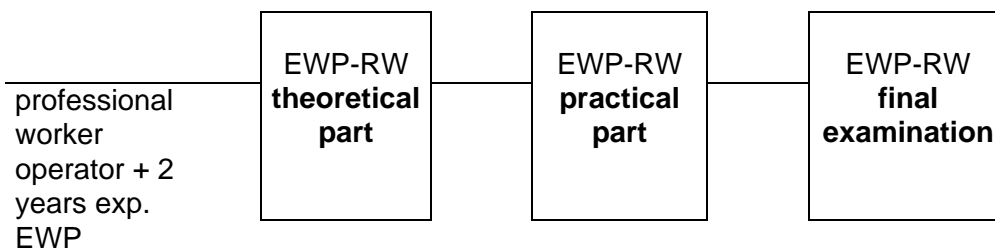
Examination (oral, written and practical)	4
<u>total: 40</u>	

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. It exists the choice in arrangement of the syllabus by the authorised training body (ATB).

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

Route to Qualification



Access Conditions

The minimum requirements for a candidate are at least:

Minimum age of 18 years and a qualified as

- ◆ Professional worker (with certificate after examination) in metal working profession
- or
- ◆ Operator with an experience of 2 years in resistance welding (to be affirmed by his company)
- or
- ◆ Foreman
- or
- ◆ EWP

Section I: Theoretical and Practical Education EWP-RW I and EWP-RW II

I.1 Theoretical Education EWP-RW I

<u>1. Resistance Welding processes and equipment</u>	teaching hours
1.1 General introduction to resistance welding technology	1
1.2 Electrotechnics, a review	1
1.3 Electrotechnics of resistance welding processes	1
1.4 Characteristics of resistance welding machines	1
1.5 Weld controllers for resistance welding machines	1
1.6 Resistance welding electrodes	1,5
1.7 Spot welding	2
1.8 Projection welding	1
1.9 Roller Seam Welding	1
1.10 Fully mechanized resistance welding processes with robotics and other equipment	0
<u>Total hours (1): 10,5</u>	
<u>2. Materials and their behaviour during resistance welding</u>	teaching hours
2.1 Materials	1
2.2 Weldability of steel	1
2.3 Weldability of coated Steel	1
2.4 Weldability of aluminium and aluminium alloys	1
<u>Total hours (2): 4</u>	
<u>3. Construction and design</u>	0
<u>Total hours (3): 0</u>	

<u>4. Fabrication, application engineering</u>	teaching hours
4.1 Introduction to quality assurance in resistance welded constructions	0
4.2 Quality control during manufacture	2
4.3 Machines, resistance welding jigs and fixtures	1
4.4 Health and safety	1
4.5 Economics	0
4.6 Installation of resistance welding machines	0

Total hours (4): 4

Total hours Theoretical part I: 18,5

I.2 Practical Part II

teaching hours

1.	Spot welding	3
2.	Projection welding	2
3.	Roller Seam welding	1
4.	Measurement, control and recording in resistance welding	1
5.	Resistance welding electrodes	2
6.	Resistance welding of surface refined sheet metal panels	2
7.	Resistance welding of aluminium and aluminium alloys	2
8.	Weld controller	1,5
9.	Devices and fixtures, mechanization and robotics	0
10.	Quality control	2
11.	Demonstration of other processes	1

Total hours practical part II: 18

Appendix A:

1. Resistance Welding Equipment

Equipment for the following processes must be available for practical exercises in sufficient number

- ◆ Spot welding
- ◆ Projection welding
- ◆ Roller Seam welding

The maximum size of study group shall not exceed 4 persons per welding machine.

Further processes covered by the syllabus may be shown by means of demonstrations or video presentations.

2. Other equipment

Mechanical testing must, metallurgical examination and NDT equipment should be available for both demonstration and laboratory work purposes.

3. Specimens

A reference collection of well documented weld specimens, polished and etched, should reflect the processes covered by the Guideline and, as a minimum, one specimen per process is required. Preferably the specimens should cover a number of materials and thicknesses.

Appendix B: Practical Examination

No.:	Process	Examination subjects	Approval standard
1	Resistance spot welding	<p>Straight line spot welding according to specifications in a manufacturing drawing</p> <p>selection of electrodes, set-up of the welding machine and welding parameters based on</p> <p>a) test experience b) tables of standard values</p> <p>including optimization of welding parameters, measurement of welding parameters, checking and evaluation of the weld quality (strength and surface)</p>	EN 1418
2	Resistance projection welding	<p>Welding of a multiprojection joint according to specifications in a manufacturing drawing</p> <p>Alignment of the electrodes, set-up of the welding machine and the welding parameters based on</p> <p>a) test experience b) tables of standard values</p> <p>including optimization of welding parameters, measurement of welding parameters, checking and evaluation of the weld quality (strength and surface)</p>	EN 1418
3	Resistance seam welding	<p>Welding of a seam joint according to specifications in a manufacturing drawing</p> <p>Determination of the electrode geometry, set-up of the welding machine based on</p> <p>a) test experience b) tables of standard values</p> <p>including optimization of welding parameters, measurement of welding parameters, checking and evaluation of the weld quality (strength and surface)</p>	EN 1418