



CARBOREP

CAR BODY REPAIR

IO2 – European Car Body Repair Technician Curriculum Report

CARBOREP

European Harmonised Training for Personnel working with Car Body Repair Technology

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

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



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Preface

The present document is the European Car Body Repair Technician Guideline.

This guideline for the European education, training, examination and qualification of personnel has been prepared, evaluated and formulated by the EWF Technical Committee under the competence area of “Education, Training and Qualification”, containing general information for the public and organizations that implement these qualifications.

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Copies of this document are available from the EWF Management Team or their designated distributor and can be downloaded from the EWF web site: www.ewf.be.



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

1 Introduction

This guideline covers the minimum requirements for education and training, which have been agreed upon by all EWF Authorized Nominated Bodies (ANBs), in terms of Learning Outcomes (Knowledge and Skills) and the contact (teaching) hours to be devoted to achieving them. It will be revised periodically by EWF Technical Committees to take into account changes to reflect the "state of the art".

Students successfully completing examinations will be expected to be capable of applying the achieved learning outcomes at a level consistent with the qualification diploma.

The modular course contents are given in the following structure (overview):

COMPETENCE UNITS	Recommended Contact Hours*
	ECBRT
CU 1: Steel Structure Body Construction – Welding Repair	28
CU 2: Steel/Aluminium/MultiMaterial Structural Body Construction – Adhesive Bonding and Mechanical Fastener Repairs	28
CONTACT HOURS*	56
WORKLOAD**	84

* Contact Hours are the minimum teaching hours for the Standard Routes. A contact hour shall contain at least 50 minutes of direct teaching time.

** Workload is calculated in hours, corresponds to an estimation of the time students typically need to complete all learning activities required to achieve the defined learning outcomes in formal learning environments, plus the necessary time to perform the examinations and all the individual study.

Within EWF's qualifications, there are two types of Competence Units:

Cross-cutting Competence Unit - A competence unit whose learning outcomes are not directly linked with one job function since the knowledge and skills achieved will be mobilized in several job functions and activities.

Functional Competence Unit - A competence unit whose learning outcomes are directly linked with at least one job function and in which the knowledge and skills achieved will be mobilized in specific job functions and related activities.

The expected learning outcomes are described in two ways: generic outcome descriptors organized in knowledge, skills, autonomy and responsibility; and in detail for each competence unit, organized in job functions and related activities, knowledge and skills corresponding.



On each Competence unit, objectives and scope are defined for a specific depth of knowledge and skills.

Recommended contact hours are distributed between theoretical (A), assigned projects/exercises (B), practical workshop training(C), etc, as showed in the following example:

<i>Qualification: Example 1</i>	
RECOMMENDED CONTACT HOURS	X= (SUM A:C)
Subject Contents	A + B + C

1.1 Professional Profile

The European Car Body Repair Technician (ECBRT) is able to use joining processes to perform repairs in the damaged body of an automobile. Repairs can range from small damage on non-structural components, up to heavily damaged bodywork structural panels, requiring complex and detailed joining on major structural elements of the vehicle. He/she applies joining processes to perform the repair (arc and resistance spot welding, adhesive bonding and blind riveting).

The ECBRT is able to interpret and work according to previously defined repair procedures (e.g. Welding/Bonding Procedure Specifications).

The ECBRT performs the repair on car body parts manufactured in metals (i.e. steel and aluminium alloys).

The ECBRT raises requests to a higher authority for guidance on tasks beyond the scope of this Qualification.



2 Routes to Qualification

Two distinct routes to gaining the qualifications described in this document have been agreed:

1. The Standard Route;
2. The Alternative Route.

2.1 The Standard Route

The Standard Route requires successful completion of EWF approved courses which are designed to meet all the requirements in this Guideline. This is the route (Path 1 in Diagram 1) recommended by EWF as offering the fastest, most comprehensive manner in which the syllabus may be covered.

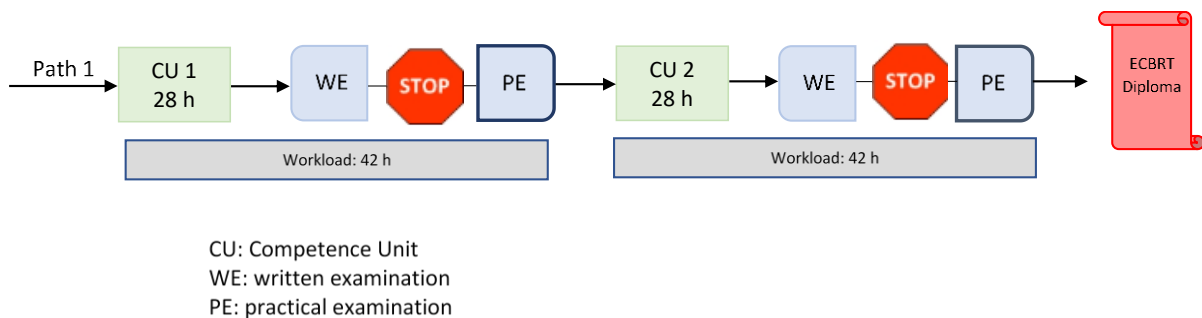
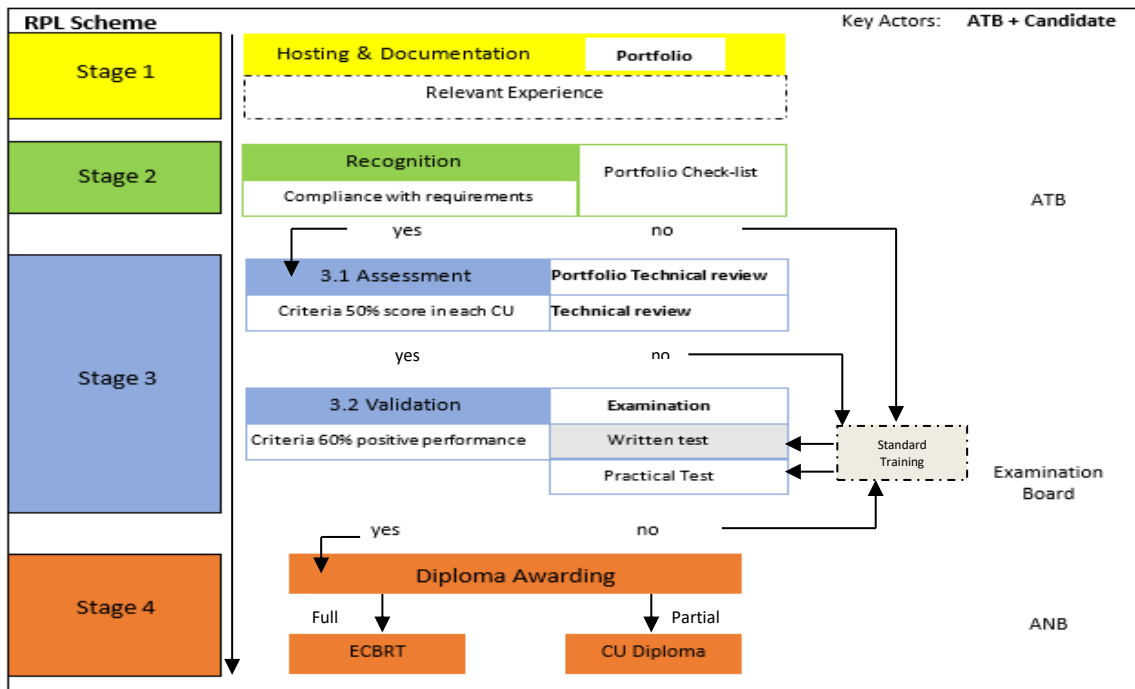


Figure 2.1 – Standard Route

2.2 The Alternative Route

The Alternative Route is aimed at individuals who may already have experience of the job functions at a particular level without holding the appropriate qualification diploma. These individuals will have already gained full or partial knowledge of the syllabus defined in this guideline and can demonstrate their capability to proceed to examination either directly, without compulsory attendance of an ANB approved training course, or by attending only part of such a course by a process of Recognition of Prior Learning (RPL), briefly explained in the Diagram below.



3 General Access Conditions

The defined access conditions approved by EWF Technical Working Groups Area of competence “Implementation and Authorisation” are given in detail for all countries taking part in the EWF system. Applicants who do not fulfil the access conditions may follow the course as guests, but entry to the related examination is not permitted.

The following general conditions shall be applied to the ECBRT Competence Units:

- For Competence Unit 1, applicants shall:
 - a. Be at least 18 years old and possess a minimum one year of experience in arc welding applied to car body repair, OR
 - b. Be at least 18 years old and possess a minimum of two years of welding experience in arc welding processes, OR
 - c. Be at least 18 years old and possess a valid welder qualification certificate ISO 9606.
- For Competence Unit 2, applicants shall:
 - a. Having completed the Competence Unit 1,
 - b. Be at least 18 years old and possess a minimum one year of experience in car body repair, OR
 - c. Be at least 18 years old and possess a valid European Adhesive Bonder Diploma



The implementation of the access conditions is the responsibility of the ANB.

4 Special Requirements

4.1 Standard Route

Applicants (excluding guests) shall satisfy the ANB access conditions. If the ANB decides that the access conditions are adequately met, the applicants are then required to attend a training course conducted by an Approved Training Body (ATB) providing, as a minimum, the number of hours of instruction detailed in this Guideline as contact hours. There will be written examination for the award of the applicable EWF Diploma.

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

The objectives of the education, training and examinations in terms of learning outcomes are described in two ways: generically for each level; and more specifically and in more detail in each Competence Unit.

The rules for the ANB to conduct the final examination are prescribed under Examination and Qualification in each Competence Unit guideline.

To award the Qualification diploma, the Competence Unit 2 must be awarded in a maximum of 3 years after the completion of the Competence Unit 1.

4.2 Alternative Route

This Alternative Route is defined by a process of Recognition of Prior Learning (RPL), which is structured by the following stages (described in detail in Appendix I):

a) Hosting and Documentation

This stage of Hosting and Documentation is very important for the candidates to make an informed decision about their participation in the process and to feel accompanied from the beginning. The information to be made available at this stage should include, among other elements:

- Information on the EWF Qualification System,
- Information on the EWF routes for ECBRT Qualification,
- The requirements for applying to the EWF RPL Process,
- The rights and duties of the candidate,
- The steps that make up the process,
- The associated cost,
- The advantages of the process.



The candidate is also asked to gather all documentation s/he possesses that can prove his/her professional experience in the sector (e.g. previously acquired diplomas, statements from employers, recommendation letters, job detailed description, etc.) and present them in a Portfolio (see Appendix I)

b) Recognition

The documentation gathered in the Portfolio must be validated so that the candidate may start the RPL Process. In this stage, the candidate has to present evidence that he/she fulfils the requirements mentioned in the hosting and documentation phase so that they can start the RPL Process.

c) Assessment and Validation

The validation of professional competences focuses on the analysis and assessment of the Portfolio according to the learning outcomes, plus the technical interview and the examination. Based on this assessment, the competences to be validated and the competences still to be evidenced and/or developed are identified. More specifically, the following should be considered: the units of competence, the gathering of additional evidence of the competence, the comparison of the evidence with the corresponding learning outcomes standards and the formulation of a judgment based on the evidenced competence.

d) Diploma Awarding

The final stage of the RPL process consists in the awarding of the Diploma by the ANB to the candidate that has successfully passed the theoretical and practical examination, thus fulfilling the intentionally established patterns, which reflect the demands of professional and individual performance.

Based on the candidate's performance and the final decision of the Examination Board, a diploma can be issued, both intended to be valid for life:

- Full Diploma, whenever the candidate has successfully completed all the exams required to obtain a qualification.
- Partial Certificate, whenever the candidate has successfully completed only Competence Unit 1.



Section I: Theoretical and Practical Education – Qualification Descriptors and Learning Outcomes

1 Qualification Outcome Descriptors

QUALIFICATION	EQF/ EWF LEVEL	KNOWLEDGE	SKILLS	AUTONOMY AND RESPONSIBILITY
European Car Body Repair Technician	4 Independent	Fundamental factual and theoretical knowledge of the theory, principles and applicability of joining processes to car body repair.	Fundamental range of cognitive and practical skills required to identify/choose solutions, when applying joining processes to car body repair, in basic and specific problems.	Self-manage, within the scope of a work instruction, the application of joining processes to car body repair, in a predictable context, but subject to change. Take responsibility, without autonomy for decision making, in basic work and supervise basic joining processes tasks of car body repair personnel.



2 Mandatory Competence Units Learning Outcomes

Competence Unit 1: Steel Structural Body Construction – Welding Repair

QUALIFICATION	EQF/ EWF LEVEL	JOB FUNCTIONS– Steel Structural Body Construction – Welding Repair	JOB REQUIRED ACTIVITIES	CONTACT HOURS	WORKLOAD
ECBRT	3 Basic	To apply Metal Active Gas (MAG) welding (EN ISO 4063 process 135) to repair the damaged body of an automobile	Interpreting and working according to previously defined procedures (referring to repair work instruction and Health, Safety & Environment)	28h	42h Teaching Hrs: Theory:7h; Practical: 21h Exam: T and P: 7h Self-Study Hrs: 7h (prior to course attendance)
			Preparing the welding joint (gap, surface preparation, jiggling and fixturing)		
			Handling and employing the consumables applicable to the process		
			Setting up the equipment and joint parameters		
			Executing the weld (tack welding, weld position, direction and sequence, thermal distortion management)		
			Performing visual inspection of the weld (and other Quality Control methods)		
	3 Basic	To apply Gas Metal Arc Weld Brazing (EN ISO 4063 process 973) to repair the damaged body of an automobile	Interpreting and working according to previously defined procedures (for repair work instruction and Health, Safety & Environment issues).		
			Preparing the joint (gap, surface preparation, jiggling and fixturing).		
			Handling and employing the consumables applicable to the process		
			Setting up the brazing equipment and joint parameters.		
			Executing the braze joint (brazing direction and sequence, thermal distortion management and thermal management in relation to the corrosion protection zinc coatings)		
	Performing visual inspection of the joint (and other Quality Control methods)				
	4 Independent	To apply Resistance Spot Welding (EN ISO 4063 process 21) to repair the damaged body of an automobile	Interpreting and working according to previously defined procedures (repair work instruction and Health, Safety & Environment)		
			Preparing the welding joint (surface preparation, alignment jiggling and fixturing)		
			Employing and handling Resistance Spot Welding consumables		
Setting up the Resistance Spot Welding equipment parameters by performing					



			Quality Control by means of a peel test on spot weld samples.		
			Executing the spot weld (sequence, thermal distortion management)		
			Performing intermediate quality checks of the spot weld by means of a peel test and adjusting equipment parameters accordingly to meet quality requirements.		
			Performing visual inspection of the spot weld (and other Quality Control methods)		

LEARNING OUTCOMES – CU 1: Steel Structural Body Construction – Welding Repair	
Qualification	ECBRT
KNOWLEDGE	<p>Fundamental factual and theoretical knowledge in:</p> <ul style="list-style-type: none"> - Automotive steel grades and their applications; - MAG welding; - Gas Metal Arc Weld Brazing; - Resistance Spot Welding;
SKILLS	<p>Fundamental range of cognitive and practical skills in basic and specific problems related to MAG welding to repair the damaged body of an automobile</p> <p>Fundamental range of cognitive and practical skills in basic and specific problems related to Gas Metal Arc Weld Brazing to repair the damaged body of an automobile</p> <p>Fundamental range of cognitive and practical skills in basic and specific problems related to Resistance Spot Welding to repair the damaged body of an automobile</p>
AUTONOMY AND RESPONSIBILITY	<p>Self-manage, within the scope of a repair work instruction or Welding Procedure Specification (WPS), the application of MAG welding in a predictable context, but subject to change</p> <p>Take responsibility for the execution of MAG welding to repair the damaged body of an automobile, without autonomy for decision making</p> <p>Raise a request, to the supervisor or OEM, for technical review of MAG welding requirements outside the scope of the work instruction or extent of the Car Body Repair Technician competences</p> <p>Self-manage, within the guidelines of a repair work instruction or Brazing Procedure Specification (BPS), the application of Gas Metal Arc Weld Brazing in a predictable context, but subject to change</p> <p>Take responsibility for the execution of Gas Metal Arc Weld Brazing to repair the damaged body of an automobile, without autonomy for decision-making</p> <p>Raise a request, to the supervisor or OEM, for technical review of Gas Metal Arc Weld Brazing requirements outside the scope of the work instruction or extent of the Car Body Repair Technician competences</p> <p>The application of the Resistance Spot Weld in a predictable context, but subject to change</p> <p>Take responsibility for the execution of the Resistance Spot Weld to repair the damaged body of an automobile, without autonomy for decision-making</p> <p>Raise a request, to supervisor or OEM, for technical review of Spot Weld requirements outside the scope of the work instruction or extent of the Car Body Repair Technician competences</p>



Competence Unit 2: Steel/Aluminium/MultiMaterial Structural Body Construction – Adhesive Bonding and Mechanical Fastener Repairs

QUALIFICATION	EQF/ EWF LEVEL	JOB FUNCTIONS– Steel/Aluminium/Multi Material Structural Body Construction – Adhesive Bonding and Mechanical Fastener Repair	JOB REQUIRED ACTIVITIES	CONTACT HOURS	WORKLOAD	
ECBRT	4 Independent	To apply Adhesive Bonding to repair the damaged body of an automobile	Interpreting and working according to previously defined procedures (repair work instruction and Health Safety & Environment)	28h	42h Teaching Hrs: T:7h; P:21h Exam: T and P: 7h Self-Study Hrs: 7h (prior to course attendance)	
			Observing and taking measures to achieve environmental and object working conditions.			
			Preparing the bonding joint (substrate preparation, jiggling and fixturing)			
			Employing adhesive material, handling and tools			
			Executing the joint according to the type of adhesive used.			
			Assuring the correct curing of the adhesive			
			Performing visual inspection of the joint (and other Quality Control methods)			
	4 Independent	To apply Mechanical Fasteners to repair the damaged body of an automobile	Interpreting and working according to previously defined procedures (repair work instruction and Health, Safety & Environment)	28h		
			Preparing the joining substrates (hole forming, substrate preparation, jiggling and fixturing)			
			Employing the mechanical fastener element, handling and tools, in the scope of the:			
			- Break Stem Rivet, BSR-Bulb head - Break Stem Rivet, BSR-Countersunk head - Clinch - Self-Piercing Rivet, SPR-Hollow Rivet - Self-Piercing Rivet, SPR-Solid Rivet - Flow Form Rivet - FFR - Flow Drill Screw – FDS			
	Executing the joint according to the type of mechanical fastener element used					
	Performing visual inspection of the joint (and other Quality Control methods)					
	4 Independent	To apply the Hybrid joining technology to repair the damaged body of an automobile, as a combination of: 4 and 3 or 4 and 5				Interpreting and working according to previously defined procedures (repair work instruction and Health, Safety & Environment)
						Preparing the bonding joint (hole forming, surface preparation, jiggling and fixturing)
						Employing the adhesive bonding, handling and tools



			Employing and handling the mechanical fastener joining technology (mechanical fastener element, sheet thickness, hole size)		
			Executing the joint according to the type of adhesive and mechanical fastener element used		
			Assuring the correct curing of the adhesive		
			Performing visual inspection of the joint (and other Quality Control methods)		

LEARNING OUTCOMES – CU 2: Steel/Aluminium/MultiMaterial Structural Body Construction – Adhesive Bonding and Mechanical Fastener Repairs

Qualification	ECBRT
KNOWLEDGE	<p>Fundamental factual and theoretical knowledge in:</p> <ul style="list-style-type: none"> - The materials used in automotive body construction and their application areas; - Adhesive Bonding; - Mechanical Fasteners; - Hybrid Joining Technology; <p style="text-align: center;">4 Adhesive Bonding in combination with e.g. 3 Resistance Spot Welding or 5 Mechanical fastener</p>
SKILLS	<p>Fundamental range of cognitive and practical skills in basic and specific problems related to Adhesive Bonding to repair the damaged body of an automobile</p> <p>Fundamental range of cognitive and practical skills in basic and specific problems related to Mechanical fastener joining to repair the damaged body of an automobile</p> <p>Fundamental range of cognitive and practical skills in basic and specific problems related to the Hybrid joining technology to repair the damaged body of an automobile</p>
AUTONOMY AND RESPONSIBILITY	<p>Self-manage, within the guidelines of a repair work instruction, the application of Adhesive Bonding in a predictable context, but subject to change</p> <p>Take responsibility for the use of Adhesive Bonding to repair the damaged body of an automobile, without autonomy for decision making.</p> <p>Raise a request, to supervisor or OEM, for technical review of the Adhesive Bonding requirements outside the scope of the work instruction or extent of the Car Body Repair Technician competences.</p> <p>Self-manage, within the guidelines of a repair work instruction, the application of Mechanical fastening joining in a predictable context, but subject to change.</p> <p>Take responsibility for the use of Mechanical fastener joining to repair the damaged body of an automobile, without autonomy for decision-making.</p> <p>Raise a request, to supervisor or OEM, for technical review of the Mechanical fastener joining requirements outside the scope of the work instruction or extent of the Car Body Repair Technician competences.</p> <p>Self-manage, within the guidelines of a work instruction, the application of the Hybrid joining technology in a predictable context, but subject to change.</p> <p>Take responsibility for the use of the Hybrid joining technology to repair the damaged body of an automobile, without autonomy for decision-making.</p> <p>Raise a request, to the supervisor or OEM, for technical review of the Hybrid joining technology requirements outside the scope of the work instruction or extent of the Car Body Repair Technician competences.</p>



Appendix I: Tools and actors of the RPL Process

The RPL Process is structured by 4 stages which need to define tools and actors capable to make the recognition of candidates' knowledge and skills. The tools and actors required for each stage of the RPL process are the following:

a) Hosting and Documentation

Tools:

The Portfolio is the preferred tool at this stage. It should include the information gathered using the following forms::

- Welding Professional and Training Registration form;
- Welding Professional and Personal Motivations form;
- Welding Interview guide;
- Self-assessment grid.

With these "forms" the candidate will be able to provide evidence of his/her professional achievements, including employer details, duration, roles and responsibilities, as well as the relevant qualifications education and training paths.

Actors:

The actors involved in this phase are the ATB – EWF Authorised Training Body – and the candidate. The ATB will receive the candidate's application and provide detailed information about EWF qualifications.

b) Recognition

Tools:

- Portfolio Check-list. Will be used by the candidate and ATB in order to verify the compliance with the requirements and the presentation of the mandatory and other relevant documents to the process.

Actors:

The main actor involved in this stage is the ATB that has the following tasks:

- Verify if the candidate complies with the requirements;
- Verify if the candidate has valid evidences or pieces of evidences;
- Fill in the header table of the portfolio check-list in accordance with its decision.



c) Assessment and Validation

Tools:

- Portfolio Technical Review document,
- A Technical Interview guide,
- Examination.

Actors:

The actor involved in this phase is the ATB which is responsible for conducting the portfolio technical review and the technical interview guide. The results obtained by the candidate have then to be reported to the ANB – EWF Authorised Nominated Body- before the examination.

Whenever the candidate has to demonstrate welding skills, an authorised examiner approved by the ANB, which can be a welding trainer, must be designated to evaluate the candidate. Impartiality of the trainer has to be guaranteed according to the International Welder specific requirements addressed in the IAB 089 Guideline (latest edition).

The development and implementation of the examination system is a responsibility of the Examination board, under the supervision of the ANB.

d) Diploma Awarding

Actors:

At this “stage” there is only one actor involved which is the ANB. The ANB is responsible for awarding the candidate’s Certificate as the result of successfully completing the RPL Process for Competence of Unit 1.



Appendix II: List of Referenced Standards

Standard (-series)	Title
EN ISO 9606	Qualification testing of welders. Fusion welding. Steels
ISO 4063 (process 135)	Welding and allied processes. Nomenclature of processes and reference numbers
ISO 4063 (process 973)	Welding and allied processes. Nomenclature of processes and reference numbers
ISO 4063 (process 21)	Welding and allied processes. Nomenclature of processes and reference numbers