EWF Training & Qualification
EUROPEAN ADHESIVE ENGINEER

Minimum Requirements for the Education, Examination and Qualification

EWF – 517-01

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

EUROPEAN ADHESIVE ENGINEER (EAE)

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 the ANB contacts)

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

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Minimum Requirements for the Education, Examination and Qualification of European Adhesive Engineers

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The use of this guideline is restricted to organisations approved by the Authorised National Body (ANB). The Section II of this guideline covers the examination and qualification of (EAE) of European Adhesive Engineers

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Introduction

This guideline for the European education and training of Adhesive Engineers has been prepared, evaluated and formulated by Members of the Sub-Committee for Adhesive Bonding.

The adhesive engineer is responsible for the integration of adhesive bonding into the design and manufacture of products, including design, evaluation of process parameters, problem solving and failure analysis.

The guideline covers the minimum requirements for education and training, agreed upon by all national welding and joining societies within the EWF, in terms of themes, keywords and times devoted to them. It will be revised periodically by the Committee to take into account any changes which may effect the "state of the art". Students having successfully completed this course of education will be expected of being capable of applying the technology required in adhesive engineering as covered by this guideline. A subsequent document covers the examination and qualification.

The contents are given in the following structure:

Theoretical Education		Teaching Hours
1.	Adhesion and adhesives	48
2.	Materials as adherends	40
3.	Construction and design	40
4.	Durability	24
5.	The Bonding process	35
6.	Testing and analysis	36
7.	Health and safety	8
8.	Qualification Management	29
9.	Manufacturing Case Studies	24
10.	Practical Skills Training	40
11.	Examination	8
	Total	**332**

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 arrangement of the syllabus is permitted. 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.

Theoretical and Practical Education,
(Only the main Syllabus Themes)

Theoretical Education

1. Adhesion and adhesives **48 Hours**

1.1 Introduction

1.2 Adhesives & Sealants

2. Materials as adherends **40 Hours**

2.1 Important Adherend Properties

2.2 Purpose of the Surface Treatment (Key Surface Features)

2.3 Types of Surface Pretreatment

2.4 Selection of Surface Pretreatment and Surface Pretreatment Facilities

2.5 Surface Pretreatment Facilities

3. Construction & Design **40 hours**

3.1 Fundamentals of the Strength of Materials

3.2 Design Principles of Bonded Structures

3.3 Basics of Adhesive Bonding Design

3.4 Joint Design

3.5 Calculation of Stresses in Bonded Joints

3.6 Hybrid Joints

3.7 Design Considerations for Durability of Joints (Long-Term Performance)

3.8 Manufacturing Considerations

4. Durability **24 Hours**

4.1 Introduction

4.2 Thermal Effects on Adhesive Joints

4.3 Moisture Effects on Adhesive Joints

4.4 Electrochemical and Corrosion Effects on Adhesive Joints

4.5 Chemical Effects on Adhesive Joints

4.6 Radiation and Vacuum Effects on Adhesives in Bonded Joints

4.7 Mechanical Stress Effects on Adhesive Joint Durability

4.8 Combined Temperature - Moisture - Mechanical Stress Effects on Adhesive Joints

4.9 Weathering and Ageing Effects on Adhesive Joints

4.10 Durability Assessment and Life Prediction for Adhesive Joints

5. Bonding Process **35 Hours**

5.1 Introduction to the Bonding Process

5.2 Sourcing and Storing Adhesives

5.3 Preparation of the Adhesive

5.4 Adhesive Application

5.5 Assembly

5.6 Bonding Pressure

5.7 Adhesive Curing

5.8 Inspection

5.9 Repair

5.10 Health and Safety

5.11 Automation and Robotics

5.12 Factory Layout (Including Economic Aspects)

5.13 Bonding Co-ordination (Equivalent to PrEN 719)

6. TESTING AND ANALYSIS — 22 Hours

6.1 Standard Test Methods and Others

6.2 Property Determination for Adhesive, Adherend or Joint

6.3 Characterisation of Raw Material

6.4 Characterisation of Cured Adhesive

6.5 Mechanical Properties of the Assembly

6.6 Performance in Service

6.7 Non-Destructive Testing

6.8 Examination of Joint Fracture Surfaces and Adhesive Layer

7. Health & Safety — 8 Hours

7.1 Selection Tables and Performance Specifications

7.2 Checklist with Comments

7.3 Countermeasures

7.4 Data Section

7.5 National Rules and Regulations

8. Quality Management **29 Hours**

8.1 Introduction - The Adhesive Bonding Process

8.2 Raw Materials Control

8.3 Process

8.4 End-product Control

8.5 Available Quality Tools and Techniques

8.6 Employee Training and Certification

8.7 Company Quality Management System and Certification

9. Manufacturing Case Studies **24 Hours**

9.1 Industrial Case Studies

9.2 Group Exercises

10. Practical Skills Training **40 Hours**

10.1 Surface Preparation of Adherends

10.2 Use of Different Adhesives

10.3 Use of Adhesive Application Equipment

10.4 Joint Types

10.5 Manufacture of Bonded Joints with Different Materials

10.6 Examination and Testing of Bonded Joints

10.7 Practical Inspection Techniques

11. Examination **8 Hours**

APPENDIX 1

Access to the Education

It is agreed that entry to such a programme should be on the basis of an engineer having received prior education training to a postgraduate level. Participates should have a primary degree in an engineering or related discipline recognised by the national government and assessed by the ANB. Therefore, it would be expected that participants should have at least a BSc degree. Definitions for each country are given below. Applicants not fulfilling the access conditions may follow the course as guests, but entry to the EWF examination is not permitted.

National definitions for the minimum requirements for access to the Adhesive Engineer's education and training, can be consulted through the ANB.