EWF Guideline for EUROPEAN ADHESIVE ENGINEER AND SPECIALIST

Minimum Requirements for the Education, Examination and Qualification

EWF-662r0-19/SV-01

MINIMUM REQUIREMENTS FOR
QUALIFICATION AND EXAMINATION

EUROPEAN ADHESIVE ENGINEER (EAE)

former : Doc. EWF-517-01

EUROPEAN ADHESIVE SPECIALIST (EAS)

former : Doc. EWF-516r1-10

Guideline - General information for the public and organizations that implement these qualifications EAE and EAS

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

For more information regarding the Qualifications System, the EWF Management Team or the ANB should be contacted
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Section I: Minimum Requirements for the Education of European Adhesive Engineer and Specialist

The use of this guideline is restricted to organizations approved by the Authorized Nominated Body (ANB). The section II of this guideline covers the examination and qualification of European Adhesive Engineers and Specialists.

1. Introduction

This guideline for the European Education and Training of Adhesive Engineers and Specialists has been prepared, evaluated and formulated by Members of the Committee for Education and Training of the EWF. It is designed to provide the basic core education in adhesive technology required for a number of adhesive personnel being active in job functions such as foreman, instruction, technical decision makers etc. It is possible that additional training and/or experience may be required by the adhesive personnel beyond the basic core education to lead to qualification in the applicable job functions.

The European Adhesive Engineer has advanced knowledge and critical understanding of adhesive technology application.

He/she shall have advanced skills at a level that is required in the field of bonding technology which demonstrate:

- technology mastery and required innovation
- being able to solve high-level complex and unpredictable problems
- being able to choose the proper technical and economical solutions in complex and unpredictable conditions
- the ability to manage highly complex technical and professional activities or projects related to adhesive bonding applications
- taking responsibility for decision making in unpredictable work or study contexts
- taking responsibility for process planning and verification
- taking responsibility for process documentation (generation of work instructions, bonding protocols etc.)
- taking responsibility for managing the professional development of individuals and groups of workers

The European Adhesive Specialist has specialized and factual knowledge in the field of adhesive bonding technology.

He / she shall have skills at a level that is required in the field of bonding technology, which demonstrate:

- being able to develop solutions on common/regular problems

- being able to choose appropriate methods when applying bonding technology in common /regular problems
- being able to manage and supervise common or standard adhesive applications and related professional activities
- taking responsibility for decision making in common or standard work
- being able to write work instructions
- taking responsibility to supervise the tasks of adhesive and related personnel.

The guideline covers the minimum requirements for education and training, agreed upon by all nominated bodies of welding and joining in each country 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 affect the "state of the art". Students having successfully completed this course of education will be expected being capable of applying adhesive technology as covered by this guideline. The subsequent section II of this document covers the examination and qualification.

	Theoretical Education	Teaching hours EAE	EAS
1.	Fundamentals of Adhesion and Adhesives	58	14
2.	Surface Treatment	40	14
3.	The Main Families of Adhesives and Sealants	40	8
4.	Construction and Design	28	12,5
5.	Quality Control	33	12,5
6.	Durability of Adhesively Bonded Joints	30	14
7.	Benefits and Limitation of Adhesives	8	4
8.	Health and Safety	24	3
9.	Manufacturing Case Studies	24	8
	Practical Education		
	Practical Skills Training	40	22
	Examination	9	8
	Total	334	120

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.

In this syllabus, the workload (WL) is an estimation of the time learners typically need to achieve the defined learning outcomes. WL covers theoretical training and self-study, as well as the time devoted to practical training and examination.

ECVET credit points are allocated to the Competence Unit and Qualification, where 1 credit equals to 25 hours of workload.

It is to be noted that the overall structure of the syllabus for all levels (EAE, EAS and EAB) is similar, but some items are not considered appropriate in the Education of EAS and EAB. 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 course consists of theoretical training and practical training. Applicants must pass theoretical and practical exam (practical exam is optional for EAE).

The theoretical education given to the EAE students aims at an advanced knowledge of a field of work or study, involving a critical understanding of principles and applicability of the appropriate bonding technology, and the materials behaviour including standards and safety regulations.

The theoretical education given to the EAS students aims at a specialised, factual and theoretical knowledge of principles and applicability of bonding technology.

The themes and keywords are given as 'scope' in the Competence Unit descriptions, together with the 'Objective' and the 'Learning Outcomes' defined in terms of ‘Knowledge application’, ‘Practical application’ and ‘Competences’.

The practical training advised in this guideline will bring the students to the comprehensive skills, required for practical work in industry, meaning for the Engineer the appreciation of the bonding processes and for the Engineer and Specialist the supervision of tasks she or he will be asking others to perform.

2. Routes to Qualification

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

1. The Standard Route;
2. Distance Learning Route.

The Standard Route

The Standard Route requires successful completion of EWF approved courses that are designed to meet all the requirements in this Guideline. This is the route (Path 1 in diagrams 1 and 2) recommended by EWF as offering the fastest, most comprehensive manner in which the syllabus may be covered.

Blended Learning Route

Blended Learning Route requires successful completion of EWF approved courses that are designed to meet all the requirements in this Guideline and specific requirements on the Blended Learning Guideline that shall be followed.

The teaching hours (Classroom, laboratory, practical training and demonstration) are the MINIMUM hours for the course, if a blended learning route is applicable.

EWF Qualification	Minimum Hours classroom (*)	Applies to
EAE	30%	Excluding manufacturing case studies and practical skills training.
EAS	40%	

(*) Expressed as percentage over the total

3. General Access Conditions

In a separate document (EWF-658 latest edition), the defined access conditions approved by EWF Technical Committee are given in detail for all countries participating in the EWF system. Applicants not fulfilling the access conditions may follow the course as guests, but entry to the related examination is not permitted.

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

In following parts of chapter 3, diagrams are used for schematic illustration of the text. It should be noted that it is the text which is binding.

3.1. EAE

It is agreed that entry to the program should be on a postgraduate level. Participants should have a primary degree in an engineering discipline or equivalent in natural sciences recognised by the national government and assessed by the ANB. Therefore, it would be expected that participants should have at least a Bachelor degree at university level with a minimum study of 3 years, e.g.

- a relevant qualification from an accredited program in accordance with the Washington Accord for professional qualification of engineers, or
- a First Cycle Bologna Framework engineering qualification, or
- an engineering qualification at EQF Level 6,
- or equivalent in natural sciences

In case of co-operation arrangements, e.g. with universities, parts of the course EAE are given under careful control of the ANB according to the EAE syllabus with scope, objectives, and learning outcomes can be given under careful control of the ANB. The participant is allowed to enter the EAE course through the Path 2 (see topics 1 and 2 as well as the diagram 1 below).

The following additional conditions shall be observed for the different routes through the EAE course:

1. Students who have authenticated evidence that they have passed the examinations in all subjects of their Bachelor engineering degree studies but still have to complete a thesis are allowed to attend the EAE course and the corresponding written parts of the final examination;

2. Students shall present their degree diploma to the Board of Examiners before being allowed to take the final oral examination for EAE.

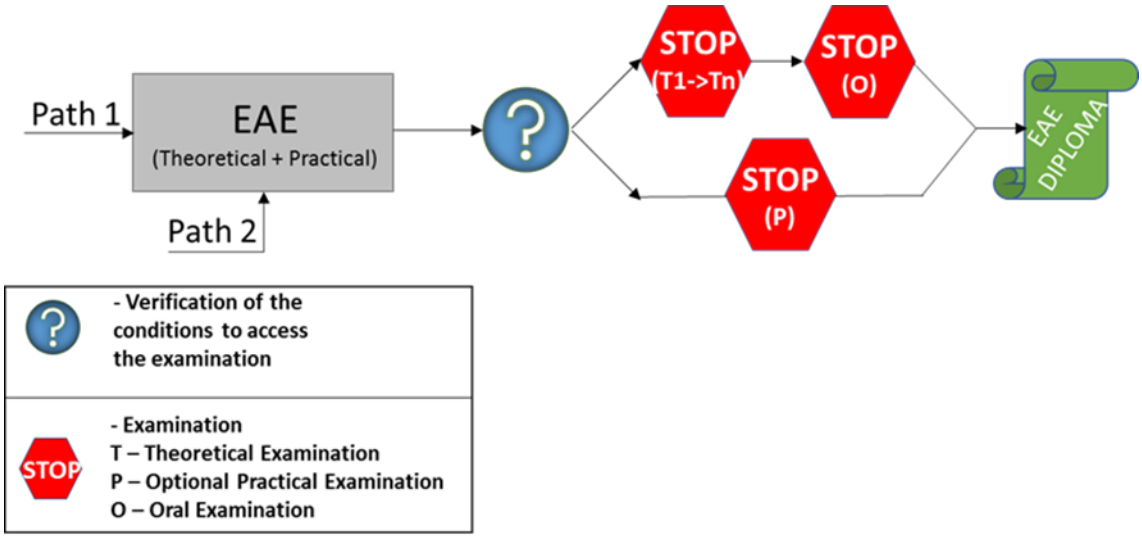

Diagram 1: EAE-route

3.2 EAS

For entry to the EAS training programme 3 paths are available at European level:

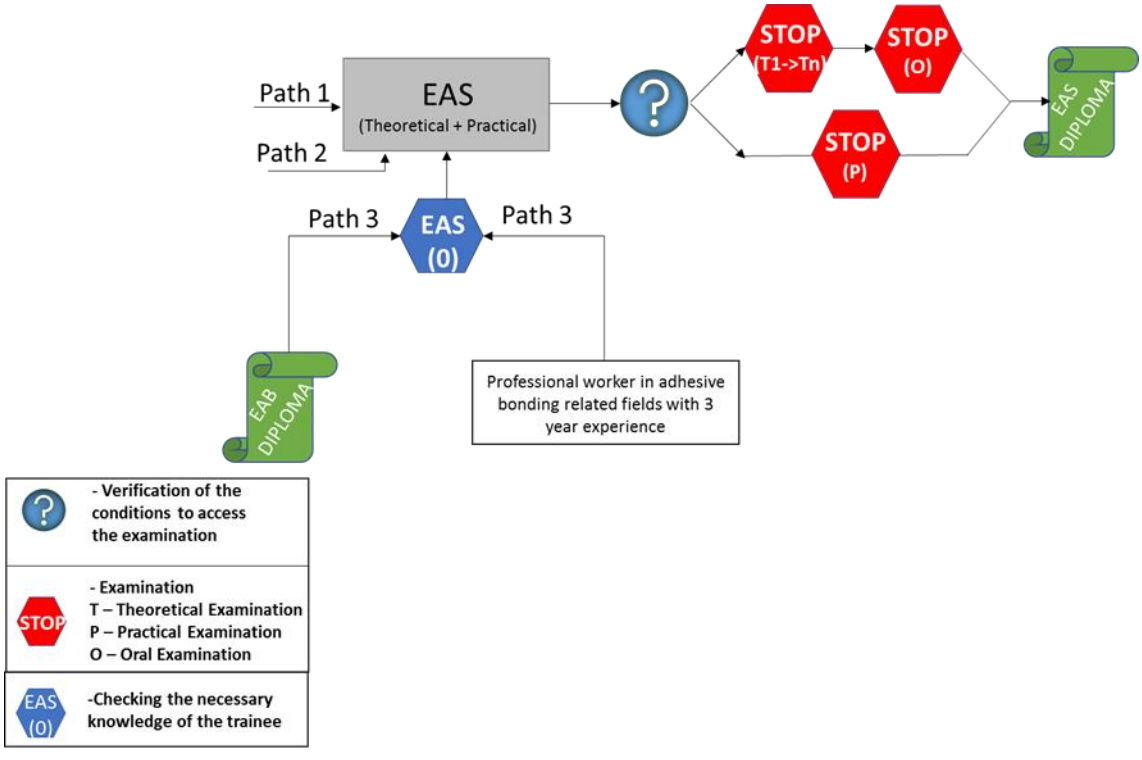

Diagram 2: EAS-route

Path 1 and 2:

For the access to the EAS, the minimum requirements are:

- Specific technical qualification equivalent to EQF level 4, thus according to the national definitions given in another documents, or
- the Diploma as European Adhesive Bonder, EAB, where at the discretion of the ANB in discussion with the ATB, a partial exemption from the course may be granted.
- In either case, all EAS tests need to be completed successfully;
- a minimum age of 18 years.

For Path 2, In case of cooperation arrangements e.g. with technical colleges, according to which basic parts of the course EAS are given under careful control of the ANB, before the participant complies with the access conditions, the access may be according to the path 2 indicated in the graph.

Path 3

For access to the EAS competence unit part 0, the minimum requirements are a professional worker (with a certificate after examination) in material processing profession and a minimum of three years' experience in adhesive related activities.

People who enter from the Bonder or professional worker (Path 3) must pass an entry test. Those who feel they lack the necessary basic technical education may take the preparatory EAS part 0 course before the test. If a student fails in the entry test, he/she must take the full EAS part 0 course before the next test.

Applicants not fulfilling the access conditions may follow the course as guests, but entry to EAS examination is not permitted.

A minimum age of 18 years is required.

4. Syllabus

4a. Theoretical Training

QUALIFICATION	KNOWLEDGE	SKILLS	COMPETENCES	EQF LEVEL (EQF L)	WORKLOAD (WL)	TEACHING HOURS	ECVET POINTS
EUROPEAN ADHESIVE ENGINEER	Advanced knowledge and critical understanding of the principles and applicability of bonding technology.	Advanced problem-solving skills, including evaluation, which allow the choice of suitable technical and economic solutions, when applying bonding technology, in complex and unpredictable conditions.	Manage bonding technology application in a high complex context. Act autonomously as the responsible person for decision-making and definition of Adhesive bonding related personnel's tasks.	6	664	332	22
EUROPEAN ADHESIVE SPECIALIST	Specialised, factual and theoretical knowledge of the principles and applicability of bonding technology.	Specialised range of cognitive and practical skills, which enable the development of solutions or choice of appropriate methods, when applying bonding technology, in common/regular problems.	Manage and supervise common or standard bonding technology applications in an unpredictable context. Take responsibility with limited autonomy for decision making in common or standard work and supervise the Adhesive bonding related personnel's tasks.	5	240	120	10

	COMPETENCE UNIT 1 – ADHESION AND ADHESIVES [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 1]		
QUALIFICATION	ACTIONS /ACHIEVEMENTS	PERFORMANCE CRITERIA	EQF LEVEL
EUROPEAN ADHESIVE ENGINEER	A1 – Explain the developments in adhesives and sealants technology	Demonstrating advanced knowledge and skills in explaining principles of adhesion, its benefits and limitations.	6
		Demonstrating advanced knowledge and skills in identifying adhesives and sealants types and classifications.	
		Demonstrating advanced knowledge and skills in	ECVET POINTS

		selecting requirements for bonded assembly and criteria.	**4,6**
		Demonstrating advanced knowledge and skills in discussing typical applications for adhesives and sealants technologies.	
EUROPEAN ADHESIVE SPECIALIST	**A1- Summarise the developments in adhesives and sealants technology**	**Demonstrating specialised knowledge and skills in recognising principles of adhesion, its benefits and limitations.**	**EQF LEVEL**
		Demonstrating specialised knowledge and skills in naming adhesives and sealants types and classifications.	**5**
		Demonstrating specialised knowledge and skills in selecting adhesives and sealants technologies according to the standards and selection criteria.	**ECVET POINTS**
		Demonstrating specialised knowledge and skills in identifying the common applications for adhesives and sealants technologies.	**1,1**

COMPETENCE UNIT 1 – ADHESION AND ADHESIVES

Subjects Title	Teaching Hours	
	EAE	EAS
1.1 General introduction to adhesive technology	8	4
1.2 Adhesives & Sealants	50	10

UNIT 1	EAE	EAS
	MT	MT
Teaching Hours	58	14
Student estimated workload (hours)	116	28

	COMPETENCE UNIT 2 – MATERIALS AS ADHERENDS [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 2]		
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 – Explain important structures and properties (bulk ad surface) of different materials**	**Demonstrating advanced knowledge and skills in discussing important properties (bulk and surface) of different materials**	**6**
	A2 –Differentiate surface treatment methods	**Demonstrating advanced knowledge and skills in explaining the purpose of surface treatment**	**ECVET POINTS**
		Demonstrating advanced knowledge and skills in selecting different surface treatment methods	**3,2**
EUROPEAN ADHESIVE SPECIALIST	**A1 – Summarise important structures and properties (bulk and surface) of different materials**	**Demonstrating specialised knowledge and skills in describing important properties (bulk and surface) of different materials**	**EQF LEVEL**
		Demonstrating specialised knowledge and skills in naming the purpose of surface treatment	**5**
	A2 – Summarise different surface treatment methods	**Demonstrating specialised knowledge and skills in describing different surface treatment methods**	**ECVET POINTS**
			1,12

COMPETENCE UNIT 2 – MATERIALS AS ADHERENDS

Subjects Title	Teaching Hours	
	EAE	EAS
2.1 Important Adherend Properties	16	6
2.2 Surface Pre -treatment	24	8

UNIT 2	EAE	EAS
	MT	MT
Teaching Hours	40	14
Student estimated workload (hours)	80	28

COMPETENCE UNIT 3 – CONSTRUCTION AND DESIGN [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 3]			
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 – Explain the fundamentals of joint design and stresses, strength of materials and the use of hybrid joints**	**Demonstrating advanced knowledge and skills on the fundamental aspects of joint design, explaining the major factors that affect joint strength.**	**6**
		Demonstrating advanced knowledge and skills in describing the different stresses that act upon an adhesive joint and relating them with the loads being applied.	**ECVET POINTS**
		Demonstrating advanced knowledge and skills in explaining the mechanical properties of materials and selecting the correct materials to increase joint performance.	**3,2**
		Demonstrating advanced knowledge and skills in applying the concept of hybrid joint to the design of high performance adhesive joint.	
EUROPEAN ADHESIVE SPECIALIST	**A1 – Summarise the fundamentals of joint design, strength of materials and the use of hybrid joints**	**Demonstrating specialised knowledge and skills on the fundamental aspects of joint design, understanding the major factors that affect joint strength.**	**EQF LEVEL**
		Demonstrating specialised knowledge and skills in describing the most important mechanical properties of materials and selecting the correct materials to increase joint performance.	**5**
		Demonstrating specialised knowledge and skills in applying the concept of hybrid joint this to the design of high performance adhesive joint.	**ECVET POINTS**
			0,64

COMPETENCE UNIT 3 – CONSTRUCTION AND DESIGN

Subjects Title	Teaching Hours	
	EAE	EAS
3.1 Fundamentals of the Strength of Materials	8	2,5
3.2 Joint Design	15	4
3.3 Calculation of Stresses in Bonded Joints	12	0
3.4 Hybrid Joints	5	1,5

UNIT 3	EAE	EAS
	MT	MT
Teaching Hours	40	8
Student estimated workload (hours)	80	16

COMPETENCE UNIT 4– DURABILITY [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 4]			
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 – Explain the fundamentals of different effects on Adhesive joints.**	**Demonstrating advanced knowledge and skills in relating the influences of different effects on Adhesive joints.**	**6**
		Demonstrating advanced knowledge and skills in predicting the durability of different predefined Adhesive joints in different environmental conditions.	**ECVET POINTS**
	A2 - Explain the fundamentals of: thermal, moisture, chemical, mechanical, combined, weathering, ageing effects on durability of Adhesive joints.	**Demonstrating advanced knowledge and skills in deciding the appropriate adhesive technology for a defined environment.**	**2,2**
		Demonstrating advanced knowledge and skills in relating materials - design – environmental effects – durability.	
EUROPEAN ADHESIVE SPECIALIST	**A1 – Summarise the fundamentals of different effects on Adhesive joints.**	**Demonstrating specialised knowledge and skills in describing the influences of different effects on Adhesive joints.**	**EQF LEVEL**
	A2 - Summarise the fundamentals of: thermal, moisture, chemical, mechanical, combined, weathering, ageing effects on durability of Adhesive joints.	**Demonstrating specialised knowledge and skills in analysing the durability of different predefined Adhesive joints in different environmental conditions.**	**5**
		Demonstrating specialised knowledge and skills in selecting the appropriate adhesive technology for a defined environment.	**ECVET POINTS**
			1

COMPETENCE UNIT 4 –DURABILITY

Subjects Title	Teaching Hours	
	EAE	EAS
4.1 Introduction	1	1,5
4.2 Thermal Effects on Adhesive Joints	4	1
4.3 Moisture Effects on Adhesive Joints	4	1
4.4 Electrochemical and Corrosion Effects on Adhesive Joints	2	0
4.5 Chemical Effects on Adhesive Joints	2	1
4.6 Radiation and Vacuum Effects on Adhesives in Bonded Joints	1	0
4.7 Mechanical Stress Effects on Adhesive Joints	6,5	4,5
4.8 Combined Temperature - Moisture - Mechanical Stress Effects on Adhesive Joints	4	2
4.9 Weathering and Ageing Effects on Adhesive Joints	2	1,5
4.10 Durability Assessment and Life Prediction for Adhesive Joints	1,5	1

UNIT 4	EAE	EAS
	MT	MT
Teaching Hours	28	12,5
Student estimated workload (hours)	56	25

COMPETENCE UNIT 5– BONDING PROCESS [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 5]			
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 – Explain the fundamentals of the necessary steps to achieve a bonded joint.**	**Demonstrating advanced knowledge and skills in explaining the necessary steps to achieve a bonded joint and their major influences**	**6**
	A2 - Explain the fundamentals of storing, preparation and application, assembly and pressure, curing, inspection and automation	**Demonstrating advanced knowledge and skills in explaining the fundamental aspects of sourcing, storing adhesives and the main parameters**	
		Demonstrating advanced knowledge and skills in explaining the procedures and equipment used for the preparation and application of adhesives	
		Demonstrating advanced knowledge and skills in explaining assembly, methods of bonding and environmental aspects	
		Demonstrating advanced knowledge and skills in applying bonding pressure	**ECVET POINTS**
		Demonstrating advanced knowledge and skills in explaining possibilities and parameters of adhesive curing	
		Demonstrating advanced knowledge and skills in performing inspection of bonds and fabricated parts	**2,68**
		Demonstrating advanced knowledge and skills in performing surface preparation and applying repair of bonded joints	
		Demonstrating advanced knowledge and skills in explaining the function principle of automated systems and joint design for implementation of automated manufacturing procedures	
EUROPEAN ADHESIVE SPECIALIST	**A1 – Summarise the fundamentals of the necessary steps to achieve a bonded joint.**	**Demonstrating specialised knowledge and skills in describing the necessary steps to achieve a bonded joint and their major influences.**	**EQF LEVEL**
	A2 – Summarise the fundamentals of storing, preparation and application, assembly and pressure, curing, inspection and automation	**Demonstrating advanced knowledge and skills in describing the fundamental aspects of sourcing and storing adhesives and the main parameters**	**5**
		Demonstrating specialised knowledge and skills in describing the used procedures and equipment for preparation and application of adhesives	
		Demonstrating specialised knowledge and skills in describing the assembly, methods of bonding and environmental aspects	
		Demonstrating specialised knowledge and skills in applying bonding pressure	
		Demonstrating specialised knowledge and skills in describing the possibilities and parameters of adhesive curing	**ECVET POINTS**
		Demonstrating specialised knowledge and skills in performing inspection of bonds and fabricated parts	
		Demonstrating specialised knowledge and skills in performing surface preparation and applying repair of bonded joints	**1**

		Demonstrating specialised knowledge and skills explaining the function principle of automated systems and joint design for implementation of automated manufacturing procedures	

COMPETENCE UNIT 5 – BONDING PROCESS

Subjects Title	Teaching Hours	
	EAE	EAS
5.1 Introduction to the Bonding Process	1	0,5
5.2 Sourcing and Storing Adhesives	1	0,5
5.3 Preparation and application of the Adhesives	7,75	2,5
5.4 Assembly	5	2
5.5 Bonding Pressure	0,25	4
5.6 Adhesive Curing	4	1,5
5.7 Inspection	4	0,75
5.8 Repair	1	0
5.9 Automation and Robotics	5	0,5
5.10 Factory Layout	4	1

UNIT 5	EAE	EAS
	MT	MT
Teaching Hours	33	12,5
Student estimated workload (hours)	66	25

	COMPETENCE UNIT 6 – TESTING AND ANALYSIS [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 6]		
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 -Explain the fundamentals aspects of testing materials, including destructive methods, non-destructive methods and failure analyses.**	**Demonstrating advanced knowledge and skills in explaining adhesive and substrate mechanical properties and in selecting the relevant methods to measure them.**	6
		Demonstrating advanced knowledge and skills in explaining raw materials and cured adhesives characteristics and properties and in selecting the relevant methods to measure them.	
		Demonstrating advanced knowledge and skills in explaining destructive testing standards, objectives and limitations and in selecting the relevant methods for test pieces.	**ECVET POINTS**
		Demonstrating advanced knowledge and skills in explaining non-destructive testing standards, objectives and limitations and in selecting the relevant methods for adhesive fabrications.	**2,4**
		Demonstrating advanced knowledge and skills in examining joint fracture surfaces and adhesive layer and in selecting test methods for detecting failure analysis.	
EUROPEAN ADHESIVE SPECIALIST	**A1 – Summarise the fundamentals aspects of testing materials, including destructive methods and non-destructive methods.**	**Demonstrating specialised knowledge and skills in recognising adhesive and substrate mechanical properties and in using methods to measure them.**	**EQF LEVEL (EQF L)**
		Demonstrating specialised knowledge and skills in recognising raw materials characteristics and properties and in using methods to measure them.	**5**
		Demonstrating specialised knowledge and skills in outlining destructive testing standards, objectives and limitations and in using methods for test pieces.	**ECVET POINTS**
		Demonstrating specialised knowledge and skills in outlining non-destructive testing standards, objectives and limitations and in using methods for adhesive fabrications.	**1,12**

COMPETENCE UNIT 6 –TESTING AND ANALYSIS

Subjects Title	Teaching Hours	
	EAE	EAS
6.1 Property Determination for Adhesive, Adherend or Joint	4	2
6.2 Characterisation of Raw Material and Cured Adhesive	8	4
6.3 Destructive Testing	4	3
6.4 Non Destructive Testing	10	5
6.5 Examination of Joint Fracture Surfaces and Adhesive Layer	4	0

UNIT 6	EAE	EAS
	MT	MT
Teaching Hours	30	14
Student estimated workload (hours)	60	28

COMPETENCE UNIT 7– HEALTH AND SAFETY [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 7]			
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 – Select an adhesive for a specific application**	**Demonstrating advanced knowledge and skills in making use of selection tables and performance specifications to select the adhesive**	6
		Demonstrating advanced knowledge and skills in explaining the risks associated to various types of adhesives, and in relating them to its associated health risks.	
		Demonstrating advanced knowledge and skills in comparing several types of adhesives in terms of their technical performance against the joint performance requirements	
	A2 – Create a checklist to be used by workers in a specific workplace to guarantee risk minimization	**Demonstrating an advanced knowledge and skills in explaining the steps of the adhesive process and on its health risks by including all the steps of the adhesive process with regards to the health effects and adding comments to the checklist**	
		Demonstrating advanced knowledge and skills in creating a countermeasures list describing the associated risks and how they can be reduced	
		Demonstrating advanced knowledge and skills in checking workplaces regarding the use of countermeasures that apply to the specific bond processes	
		Demonstrating advanced knowledge and skills in defining general rules to handle substances safely, considering adhesives' associated risks and general characteristics that can influence risk situation.	**ECVET POINTS**
		Demonstrating advanced knowledge and skills in explaining the risks associated to the constituents of the adhesives and equipment existing at a workplace	**O,64**
	A3 - Select equipment for measuring, mixing and applying adhesive	**Demonstrating advanced knowledge and skills in using aids for preparing, measuring and mixing adhesives**	
EUROPEAN ADHESIVE SPECIALIST	**A1 – Select an adhesive for a specific application**	**Demonstrating specialised knowledge and skills in making use of selection tables and performance specifications to select the adhesive.**	**EQF LEVEL**
		Demonstrating specialised knowledge and skills in describing the risk associated to various types of adhesives, and in relating them to its associated health risks	**5**
		Demonstrating specialised knowledge and skills in associating several types of adhesives in terms of their technical performance against the joint performance requirements	**ECVET POINTS**
		Demonstrating specialised knowledge and skills in defining general rules to handle substances safely, considering adhesives' associated risks and general characteristics that can influence risk situations	**0,32**
	A2 - Select equipment for measuring, mixing and applying adhesives	**Demonstrating specialised knowledge and skills in gathering and interpreting information about the design of bonded joints, pre-treatment, preparation and application of adhesives**	

COMPETENCE UNIT 7 – HEALTH AND SAFETY

Subjects Title	Teaching Hours	
	EAE	EAS
7.1 Selection Tables and Performance Specifications	0,5	0,5
7.2 Checklist with Comments	2	0
7.3 Countermeasures	1	0
7.4 Data Section	3,5	2,5
7.5 National Rules and Regulations	1	1

UNIT 7	EAE	EAS
	MT	MT
Teaching Hours	8	4
Student estimated workload (hours)	16	8

	COMPETENCE UNIT 8– QUALITY MANAGEMENT [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 8]		
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 – Prepare a quality management system for the whole operation from joint design to final assembly**	**Demonstrating advanced knowledge and skills in using proven procedures to reduce the possibility of poor quality joints**	**6**
		Demonstrating advanced knowledge and skills in controlling aspects regarding raw materials such as supplier certification, manufacturing system qualification, incoming specifications and testing, as well as aspects regarding the process, such as procedure specifications, staff training and statistical monitoring methods	
		Demonstrating advanced knowledge and skills in considering the correct and necessary storage of material	**ECVET POINTS**
		Demonstrating advanced knowledge and skills in choosing different types of inspection and test to be used as a mean for inspection, destructive and non-destructive tests, sampling and statistics and its limitations	**1,92**
		Demonstrating advanced knowledge and skills when using the main quality tools and techniques	
EUROPEAN ADHESIVE SPECIALIST	**A1 – Prepare the implementation of a quality management system for the whole operation from joint design to final assembly**	**Demonstrating specialised knowledge and skills in distinguishing the specific procedures for quality management and control throughout the whole operation.**	**EQF LEVEL (EQF L)**
		Demonstrating specialised knowledge and skills in storing all materials in the bonding process, referring to all control parameters which should be considered	**5**
		Demonstrating advanced knowledge and skills in identifying the process' steps that need to be documented	**ECVET POINTS**
		Demonstrating specialised knowledge and skills in checking staff training needs with a view to comply with the company's quality system	**0,24**

COMPETENCE UNIT 8 – HEALTH AND SAFETY

Subjects Title	Teaching Hours	
	EAE	EAS
8.1 Introduction – The Adhesive Bonding Process	1	0,5
8.2 Raw Materials Control	4	0,5
8.3 Process Control	8	1,5
8.4 End-product Control	3	0,5
8.5 Available Quality Tools and Techniques	4	0
8.6 Employee Training and Certification	2	0
8.7 Company Quality Management System and Certification	2	0

UNIT 8	EAE	EAS
	MT	MT
Teaching Hours	24	3
Student estimated workload (hours)	48	6

COMPETENCE UNIT 9– MANUFACTURING CASE STUDIES [GUIDELINE IAB 516 / 516 R1-10 (2010) MODULE 9]			
QUALIFICATION	**ACTIONS /ACHIEVEMENTS**	**PERFORMANCE CRITERIA**	**EQF LEVEL**
EUROPEAN ADHESIVE ENGINEER	**A1 Explain of adhesively bonded applications in their entirety.**	**Demonstrating advanced knowledge and skills in explaining adhesively bonded applications in their entirety.**	6
			ECVET POINTS
		Demonstrating advanced knowledge and skills evaluating complex interrelation of interdisciplinary topics important for adhesive bonding	**1,92**
EUROPEAN ADHESIVE SPECIALIST	**A1 – Summarise adhesively bonded applications in their entirety.**	**Demonstrating specialized knowledge and skills in describing adhesively bonded applications in their entirety.**	**EQF LEVEL**
		Demonstrating specialized knowledge and skills in analyzing complex interrelation of interdisciplinary topics important for adhesive bonding	**5**
			ECVET POINTS
			0,64

COMPETENCE UNIT 9 – MANUFACTURING CASE STUDIES

Subjects Title	Teaching Hours	
	EAE	EAS
9.1 Industrial Case Studies	12	4
9.2 Group Exercises	12	4

UNIT 9	EAE	EAS
	MT	MT
Teaching Hours	24	8
Student estimated workload (hours)	48	16

4b. Practical Training

PRACTICAL SKILLS TRAINING			EAE	EAS
A	**Surface Pre-treatment of Substrates**	Practical experience of each main surface pre-treatment type on different substrates [as defined in subject 2.2], i.e. cleaning and degreasing, surface roughening, physical treatments including at least one from plasma, corona, flame or UV/ozone, primers including coupling agents,. Measurement and assessment of treated surface, related to key surface features, e.g. wettability by contact angle or surface tension inks. First set of practical exercises (4b1) summarises the basic requirements.	40 hours	22 hours
B	**Health and Safety**	The considerations on health and safety, storage conditions, disposal, workshop environment (temperature, humidity, cleanliness, etc) and safety instructions will be highlighted [in accordance with Competence Unit 7].		
C	**Use of Different Adhesives**	Storage conditions, including safe and efficient handling Opening the pot Metering and mixing (for two part adhesives) Dispensing adhesives, manually or with semi-automatic and automatic equipment such as pneumatic guns and cartridges, in order to appreciate viscosity and cure speed. Realisation of test specimens (single lap-shear, peel specimens with different types of adhesives including the calibration of the bond-line thickness, the curing process). For each type of adhesive used, the influence of not following the correct procedures (metering, mixing, curing) on the quality of the joint will be demonstrated. Second set of practical exercises (4b2) summarises the basic requirements.		
D	Quality Control of Joints/Testing	Practical experience of the different methods described for the quality control of the joint (at the different stages of the process) [as defined in Competence Units 6 and 8]. The bonded joints will be tested destructively. Visual assessment and physical measurement of joint features (e.g. Tg of cured adhesive overflow to detect correct cure cycle). NDT methods including ultrasonic, thermographic, acoustic (eg. coin-tap) or electrical tests. Third set of practical exercises (4b3) summarises the basic requirements.		
E	Joint Type	Lap joints, coaxial joints, lamination of multilayers and skin - core (foam, honeycomb)		
F	Manufacture of Bonded Joints with Different Materials	Metals - mild steel, aluminium; Plastics - thermoplastic (eg. polypropylene), thermoset composite (eg. GRP); Others - rubber, concrete, fabric		

PRACTICAL TRAINING EXERCISES

Practical exercises	EAE	EAS
	Hours	
4b1 - Surface Pre-treatment of Substrates	14	8
4b2 – Use of Different Adhesive Systems	13	7
4b3 - Quality Control of Joints/Testing	13	7
TOTAL	40	22