



# PR4 QUALITY ASSURANCE RECOMMENDATION GUIDELINE

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KNOWBOND

Boosting Knowledge of Adhesive Bonding Personnel

**Project No. 2021-1-PT01-KA220-VET-000033229**



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## 1. Introduction

KNOWBOND is an Erasmus Plus project that defines a new qualification in the European scene - The Specific European Adhesive Bonder Training (SEABT). The project aims to promote Vocational Education and Training (VET) excellence in the Adhesive Bonding sector by updating the existing European Adhesive Bonder (EAB) qualification and thus enabling the certification of individual skills related to specific professional activities.

The established EAB is a comprehensive qualification for the performing personnel, where professionals are qualified to carry out their tasks in a consistent manner according to work instructions, regardless of the adhesive, the application area, the joining part materials, the surface treatment or the application technique used.

Within the EAB current qualification there is no possibility for individuals that carry out very limited spectrum of bonding work (e.g., operational staff, machine operators, surface treatment workers, direct glazing in vehicles, etc.) to develop and certify the knowledge and skills related with specific professional activities as they are being required within their workplace. To enable the alignment with the industrial needs and specific adhesive bonding application, a market analysis was conducted to support the identification of possible occupational groups and the mapping of their adhesive bonding activities.

The SEABT qualification proposal has been designed following a modular approach in accordance with the harmonized existing EWF Qualification System for adhesive bonding. This approach allows the progression between qualifications, which is possible since there are common Competence Units (CUs) and common topics addressed by some CUs among the SEABT qualification and the EAB Qualification. The KNOWBOND project, in addition to creating this new qualification, in line with the European qualifications and recognition systems, has developed new digital learning and assessment tools.

This guide is directed to policy makers, VET providers, Higher Education Institutions or other bodies that claim to implement the SEABT courses complying with quality assurance principles. The guide sets Recommendations to promote the recognition and benchmark to the SEABT to other countries and qualification systems underpinned by EQAVET and quality assurance principles.

The following subjects are covered by this Guideline:

- Adhesive Bonding Technology
- SEABT course features
- Conditions for the implementation of the training courses
- Alignment with EQAVET Principles
- Recommended actions to enhance the use of European adhesive bonding qualifications at national level in countries not addressed in the project.



## 2. Background

### 2.1 Introduction to Adhesive Bonding

Thanks to its adaptability and ability to reliably join a wide range of materials, adhesive bonding is increasingly being used in industrial applications in many industries, such as automotive, railway, aeronautics, marine, energy (wind power), packaging and electronics. The increasing acceptance of adhesive bonding technology is related to the great benefits associated with its usage, especially when compared to traditional joining technologies<sup>1</sup>. One of the main driving forces behind this change is the European Union's climate and energy policy, which has set a target to increase energy efficiency by 20% by 2020.

To achieve these milestones, multiple industrial sectors are actively seeking lightweight, rust-resistant, durable, and environmentally friendly multi-material structures, which can practically only be achieved through adhesive bonding. As the adoption of this technique increases, there is a greater need for skilled professionals, including a larger pool of qualified personnel of different skill levels, ranging from technicians to engineers, to exploit of this joining technology<sup>2</sup>. Adhesive bonding is a truly interdisciplinary field, requiring mastery of fundamental principles from various scientific disciplines, such as physics, chemistry, and mechanics.

Adhesive bonding is a vital component of contemporary manufacturing methods that is propelling industries towards cutting-edge practices in the 21st century. Its swift expansion is conspicuous on a global scale, benefiting companies and sectors equipped with the requisite expertise, abilities, and methods to harness its advantages. This is especially pertinent in light of the escalating call for European Union enterprises to bolster their competitiveness through initiatives focused on upskilling and modernization<sup>3</sup>.

In countries where adhesive bonding processes are well established in industrial applications, numerous institutions offer certifications in adhesive technology. The European Welding, Joining and Cutting Federation (EWF) has developed a standardised qualification framework comprising three progressive levels: European Adhesive Bonder (EAB), Specialist (EAS) and Engineer (EAE). These levels were outlined as part of the harmonised qualification system initiated by the EWF in 1992 [European Welding Federation 2010a, c, b, 2019]<sup>4</sup>. The introduction of this training programme responds to the urgent demand for training in adhesive joining technology, given its highly specialised nature [Quintino et al. 2013, Wacker et al. 2004]<sup>5</sup>.



## 2.2 Specific European Adhesive Bonding Training: The Qualification

The new training courses (Specific European Adhesive Bonding Training – SEABT) have been built on the basis of the current comprehensive EAB qualification, using a modular structure consisting of Competence Units. These Competence Units (CU) are structured into units for learning outcomes to describe the expected knowledge and skills acquired by trainees after the successful completion of the training courses. Within the system, a single syllabus is defined, supported by a harmonised system for assessment and quality assurance, resulting in the same qualification being awarded independently from the country.

The design of this qualification provides a clear definition of the professional profile as well as access conditions:

<p><b>Professional Profile</b></p>	<ul style="list-style-type: none"> <li>• Operators in adhesive bonding in the industry are responsible for carrying out all the necessary work steps in the proper sequence to produce high-quality adhesive joints.</li> <li>• This includes preparation of the workshop, substrates, and adhesives.</li> <li>• The person will apply surface treatment methods according to the substrate material used, he or she will apply the adhesive, perform the joining, fixing and curing of the joint.</li> </ul>
<p><b>Access Conditions</b></p>	<ul style="list-style-type: none"> <li>• The SEABT participant must be proficient in the respective language in which the training program is carried out to the extent that he/she can follow the lessons competently, carry out the practical exercises according to oral and written work instructions and take the examination.</li> <li>• A minimum age of 16 is required and basic skills in material processing are recommended.</li> </ul>

The SEABT qualification is comprised off a compulsory competence unit (CU1), which is a mandatory part of every SEABT qualification and provides a basic understanding of adhesive bonding principles and topics.

The competence units CU2 and CU3 are subdivided in specific subjects which are selectable according to need and client requirement or specific target applications.

Whilst competence unit 2 contains knowledge about specific surface treatment methods, competence unit 3 about different adhesives and sealants.

In case a company/industrial application requires knowledge, which is not part of the EAB curriculum an optional competence unit 4 was created.

The following table describes the training competence units of the SEABT.



Competence unit		Subjects
<b>CU1</b> <b>Introduction to Adhesive Bonding</b>	Observation: All subtopics compulsory	<ul style="list-style-type: none"> <li>- Fundamentals of adhesion and adhesives</li> <li>- Surface treatment (basics)</li> <li>- The main families of adhesives and sealants (basics)</li> <li>- Design and construction of adhesive joints</li> <li>- Quality assurance /Quality management</li> <li>- Durability of adhesively bonded joints</li> <li>- Benefits and limitation of adhesive bonding technology</li> <li>- Health and safety</li> </ul>
<b>CU2</b> <b>Specific surface treatment methods</b>	Observation: Number and kind of subtopics can be selected according to the customer needs	<ul style="list-style-type: none"> <li>- Specific cleaning methods</li> <li>- Mechanical treatment</li> <li>- Physical treatment</li> <li>- Chemical treatment</li> <li>- Primer</li> </ul>
<b>CU3</b> <b>Specific adhesives and sealants</b>	Observation: Number and kind of subtopics can be selected according to the customer needs	<ul style="list-style-type: none"> <li>- 1K Epoxies</li> <li>- 2K Epoxies</li> <li>- 1K Polyurethanes</li> <li>- 2K Polyurethanes</li> <li>- 1K Silicones</li> <li>- 1K Silane Modified Polymer adhesives (SMP)</li> <li>- Cyanoacrylates</li> <li>- Anaerobically curing adhesives</li> <li>- MMA/2K Acrylics</li> <li>- Radiation curing adhesives</li> <li>- Hotmelts</li> <li>- Solvent based adhesives</li> <li>- Water based adhesives</li> <li>- Pressure sensitive adhesives (PSA)</li> </ul>
<b>CU4</b> <b>Specific adhesive bonding topics</b>	Observation: Optional	<i>Topics to be defined in agreement with the customer</i>

The total duration of each training program (compulsory and selectable competence units) is recommended to be of at least 24 hours.

The candidate completing the training under this programme shall possess a factual knowledge and understanding of some universally valid basic principles of adhesive bonding technology, as well as required skills and autonomy level to perform specific adhesive bonding field of activities / processes.





### 2.3 Progressing from SEABT to EAB

To progress from a SEABT to EAB course, the trainees of a SEABT qualification must prove that he/she has acquired and verified all subject contents of an EWF EAB qualification (40 h) within two years and within the framework of SEABT further training measures in theory and practical exercises, both conducted by a recognised Authorised Training Body (ATB).

To achieve the EAB Diploma, since the EWF EAB qualification, unlike the SEABT qualification, is holistic, i.e., without restrictions on specific adhesive bonding activities, company/industry specifics and joining part materials, participation in the EWF EAB examination is required.





### 3 Conditions for the implementation of SEABT courses

The KNOWBOND project partners have identified a series of conditions and steps to boost the use of Specific European Adhesive Bonding Training at national level in countries not covered by the project.

As starting point, several points shall be clarified when setting a customer- based and workplace-oriented programme, in order to achieve the best possible outcome among costumers. Key questions to address are:

- What are the typical adhesive bonding applications?
- What does typical adhesive bonding work look like in the company?
- Which adhesively bonded substrate materials are used?
- Which adhesives are used?
- Which surface treatments are used?

Moreover, for vocational education and training (VET) systems and companies to effectively implement the SEABT qualification, the following actions are recommended:

#### 3.1 Dissemination actions promotion

To promote adhesive bonding technology, training courses and qualifications at national level, it is essential to raise companies' awareness of the added value of European adhesive bonding courses. To this end, a strategic dissemination plan can be formulated focusing on initial and continuing vocational education and training (VET), VET providers and companies. Various activities can be carried out in each country, such as face-to-face meetings, workshops and the creation of marketing materials ([see – KNOWBOND Dissemination Materials](#)).

#### 3.2 Replying on innovative training methodologies

The training methodologies implemented in SEABT courses are learner-centered, which means that students take an active role in their learning process and are encouraged to tackle real-world challenges through problem-based learning. Consequently, the curriculum has transitioned towards a learning outcomes approach, specifying the expected outcomes from students at the conclusion of a learning cycle in terms of applying knowledge, practical skills, and competencies. Additionally, the curriculum accounts for the workload, providing an estimate of the time learners typically require attaining the defined learning outcomes. This workload encompasses both theoretical and practical training hours, self-study time, as well as examination preparation time.

In this framework, the trainer assumes the role of a facilitator who provides support to the learners. The learning environment extends beyond traditional classrooms to encompass workshops and laboratories, offering a wide array of educational materials, as well as digital technologies for blended learning.



For the latter, KNOWBOND provides digital tools for self-study to enhance and facilitate the learner to focus on those topics that are unfamiliar to him/her and to make faster progress in those that are already known. Additionally, learners can evaluate themselves their progress throughout their learning journey.

Within adhesive bonding courses, learners actively participate in practical exercises, engage with video presentations, analyse case studies, and are tasked with presenting solutions to problems. While technical skills remain crucial, there is also an emphasis on cultivating cross-cutting skills such as individual performance, problem-solving abilities, creativity, innovation, critical thinking, communication skills, and collaborative teamwork with peers. SEABT resources – <https://knowbondproject.eu/project-results.html>.

### 3.3 Learning / teaching / training material - Toolkit

As part of the KNOWBOND project, specific educational materials have been developed to cover at least the scope and requirements described in the training guidelines. Although their use is not mandatory for the ATB or the VET provider, they are strongly recommended. These educational materials include:

#### a) Interactive e-Learning Modules

These digital resources offer engaging and interactive learning experiences, covering various aspects of adhesive bonding, with slides presentations serving as one of the most valuable tool for both trainers and trainees in the learning process.

Slides presentations are designed to aid trainers in delivering their lessons effectively, but also to serve as a resource for trainees to engage in self-guided learning. In the KNOWBOND project, slides presentations were specifically developed for the SEABT/EAB level, with CU1 and CU2 being entirely covered and almost half of the adhesive families that are part of CU3.



The slides presentations are accessible in all partner languages, including English, German, Portuguese, Spanish, and Slovenian, and cover the following subjects:

Competence unit	Subjects
<b>CU1</b> <b>Introduction to Adhesive Bonding</b>	<ul style="list-style-type: none"><li>- Fundamentals of adhesion and adhesives</li><li>- Surface treatment (basics)</li><li>- The main families of adhesives and sealants (basics)</li><li>- Design and construction of adhesive joints</li><li>- Quality assurance /Quality management</li><li>- Durability of adhesively bonded joints</li><li>- Benefits and limitation of adhesive bonding technology</li><li>- Health and safety</li></ul>
<b>CU2</b> <b>Specific surface treatment methods</b>	<ul style="list-style-type: none"><li>- Specific cleaning methods</li><li>- Mechanical treatment</li><li>- Physical treatment</li><li>- Chemical treatment</li><li>- Primer</li></ul>
<b>CU3</b> <b>Specific adhesives and sealants</b>	<ul style="list-style-type: none"><li>- 2K Epoxies</li><li>- 1K Polyurethanes</li><li>- 2K Polyurethanes</li><li>- 1K Silane Modified Polymer adhesives (SMP)</li><li>- Radiation curing adhesives</li><li>- Pressure sensitive adhesives (PSA)</li></ul>

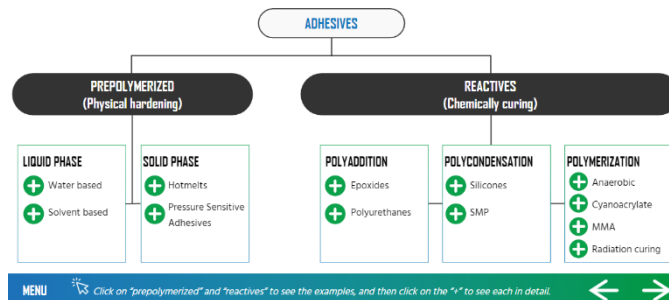
This slide presentations follow a structured format, which includes a summary, detailed contents and some questions and exercises for self-assessment so the trainee can thoroughly test the knowledge

acquired. All presentations are interactive and have an attractive design for the learner, aiming to motivate and stimulate learning.



01 - Classification of adhesives according to the solidification process

Below are some examples of each type of adhesive.



01 - Classification of adhesives according to the solidification process

Knowledge check

Let's review what we have learnt so far. Drag each adhesive to the correct hardening/curing mechanism.

Prepolymerized  
(Physical hardening)

Reactives  
(Chemical curing)

MMA
Radiation curing
Hotmelt
Epoxide
PSA
Polyurethane
Silicone
SMP
Cyanoacrylate
Anaerobic
Solvent based
Water based

Conclusion



Let's recap some of the ideas we explored:

- Adhesives are commonly classified according to their curing/hardening process: they can be prepolymerized or reactive adhesives;
- When storing adhesives, it's essential to follow the information provided in the product Technical Data Sheets and Safety Data Sheets;
- When preparing to apply the adhesive, visually inspect the package, look for the labels and pay attention to the presence of skin, viscosity, and other factors when opening the package;
- When handling adhesives, beware of the pot life and the skin time.
- Mixing should be done according to the TDS. Don't forget to discard the first shot of adhesive;
- When applying, only use the adequate amount of adhesive;
- We covered two techniques that can be used for joining – wet assembly (offers a good control of the adhesive disposal and distribution) and dry assembly (recommended for irregular geometries and short open times);
- Processing adhesives usually requires fixing while curing and developing its strength;
- The curing process depends on the curing mechanism, time and conditions;
- There are three environmental factors that affect the processing of adhesives: temperature, relative humidity and dust and/or pollution

## b) Case Studies and Problem-Solving Exercises

These resources present real-world scenarios and challenges related to adhesive bonding, allowing trainees to apply their knowledge in practical situations.

The KNOWBOND project's outcomes encompass five case studies, each of which covers all three Competence Units.

Additionally, the project includes ten problem-based exercises designed to enhance the learning experience and practical application of adhesive bonding knowledge and skills. These exercises provide valuable hands-on experience in addressing real-world challenges related to adhesive bonding.

Exercise	CU / subjects covered
Evaluation of surface treatment	Introduction to adhesive bonding ○ Surface treatment - basics
Evaluation of the main families and sealants	Introduction to adhesive bonding ○ The main families of adhesives and sealants - basics
Analysis of defects in adhesive joints	Introduction to adhesive bonding ○ Construction and design
Bond test aim	Introduction to adhesive bonding ○ The main families of adhesives and sealants - basics
Evaluation of benefits and limitations of adhesive bonding	Introduction to adhesive bonding ○ Benefits and limitations of adhesives
Working instructions	Introduction to adhesive bonding ○ Health and safety
Preparation of workplace/Manufacturing of work samples	Introduction to adhesive bonding ○ Surface treatment - basics ○ Quality assurance / Quality management
Bus and Train windshield bonding	Introduction to adhesive bonding ○ Durability of adhesively bonded joints
Car side-mirror bonding	Introduction to adhesive bonding ○ Durability of adhesively bonded joints
Final inspection	Introduction to adhesive bonding ○ Quality assurance / Quality management

### c) Assessment Tools - Bonder quiz

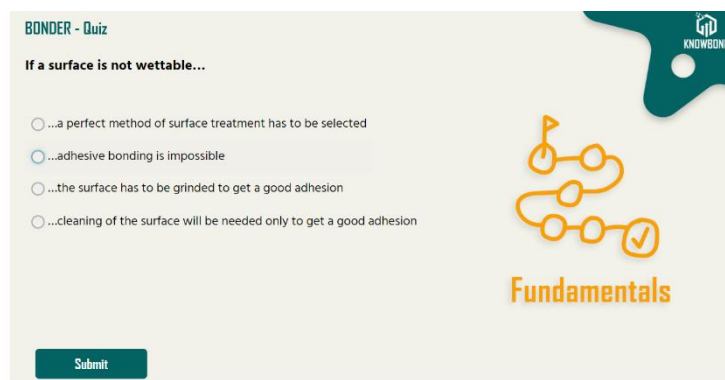
These include an interactive quiz game aimed at assessing trainees' understanding and proficiency in adhesive bonding.



The game starts with the identification and sequencing of the main steps in the production process of adhesive joints.



Once the learner completes the first task, he/she must correctly answer a question related to each of the steps to progress through the board and successfully complete the adhesive bonding process.



The Bonder Quiz is accessible in all partner languages, including English, German, Portuguese, Spanish, and Slovenian.

### 3.4 Integration of the learning content into online platforms

The “User guide for the integration into online platforms” is a dedicate guide for the European Qualification System and European Adhesive Bonding (EAB) training, which aims at enabling the integration

of the Specific European Adhesive Bonding Training (SEABT) course contents, developed resources and Competence Units within a diversity of existing learning platforms.

It has been developed during the KNOWBOND project and consists on a specific guide with operational steps that allows any VET provider to include the digital training materials in their training courses on their own platforms.

### 3.5 Examination procedure

Training program participants who can prove that they have attended 90% of the SEABT lessons are admitted to the examination.

The total examination time is 4.5 hours and is divided into 4 hours of practical examination and 0.5 hours of theoretical written examination. The assessment for each CU can be performed separately.

After passing the examination, a record of achievement is awarded. This record of achievement contains the name, surname, place and birthdate of the participant, place and name of the executing training organization of the SEABT, as well as a detailed list of the competence units that were part of the SEABT in which the person participated.

The examination follows the same requirements of the EAB (EWF 515) guidelines, and must be conducted by the ANB, authorised by EWF for this purpose.

### 3.6 Comprehensive capacity of VET providers to deliver specific adhesive bonding training courses

Sufficient facilities and equipment are essential to provide both theoretical and practical training, in accordance with the minimum requirements established by the SEABT course defined in (PR1) - Update of the European Adhesive Bonding Curricula

- a) The recruitment of learners must adhere to minimum conditions. This implies, firstly, identifying and addressing the appropriate target groups. In addition, learners should meet the general access conditions specified for the profile, as detailed in section “2.2. *Specific European Adhesive Bonding Training: The Qualification*” of this recommendation.
- b) Trainers of European adhesives courses must have practical experience in adhesives training and competence as educators. They must demonstrate extensive knowledge and skills in the adhesive curriculum as well as competence in pedagogical methods and resources.
- c) The number of trainers required to deliver the course should be sufficient to ensure that the team of trainers and visiting lecturers covers and represents the level of industrial knowledge and experience indicated in the syllabus.





- d) Train-the-trainer courses focused on various adhesive bonding applications should encompass the following areas of knowledge and skill development:
- Adhesive bonding curricula
  - Understanding and leveraging learning outcomes for training and assessment
  - Implementing learner-centered approaches and active training methodologies
  - Familiarity with materials for both theoretical and hands-on training (e.g., software, videos, structuring aids, presentations, specimens, machinery, among other resources).
- e) Compliance with EWF rules and guidelines, meaning the ANB will audit and verify if the adhesive bonding training courses are delivered according to the EAB (EWF 515) guidelines, thus ensuring harmonised procedures and quality in training.

### 3.7 National Regulations

In some countries like Germany, there is a regulation mandating the presence of certified workers in companies that utilize adhesive bonding in their processes. This requirement is outlined in DIN 2304, which sets standards for Quality Assurance in the process chain of adhesive bonding.

Another widely recognized standard in the industry is DIN EN ISO 21368, which provides guidelines for manufacturers of adhesively bonded structures and outlines a reporting procedure suitable for risk assessment of such structures.

Additionally, specific legislation pertaining to adhesive bonding in different industrial sectors can be found, such as DIN EN 17460 for the adhesive bonding of railway vehicles and parts, including Part 2 which covers the qualification of manufacturers of adhesive bonded materials.

### 3.8 Sustainability of the qualification

Continuous improvement of course content and methodologies involves a process of ongoing refinement and adjustment to align with the specific needs and context of each national setting. This ensures that the training remains effective and relevant to the evolving requirements of the learners and the industry.

### 3.9 Involvement of stakeholders

The active involvement of stakeholders from both the education/training system and the industrial sector is vital for ensuring the effective implementation of adhesive bonding training and qualifications at both national and European levels.

Each stakeholder's role should be:

- **Adhesive bonding trainers and experts** – to provide adhesive bonding personnel with the necessary skills and knowledge to meet industry standards.
- **Independent VET providers** – Deliver training courses in accordance with established guidelines. This includes providing access to appropriate training materials for practical and theoretical training, as well as ensuring access to appropriate facilities.
- **ATBs (Authorized Training Bodies)** – provide training courses in accordance with established guidelines. This includes providing access to appropriate training materials for practical and theoretical training, as well as ensuring access to appropriate facilities.
- **Awarding bodies/ANBs (Authorized Nominated Bodies)** – Promote adhesives training courses and qualifications in each country; Ensure that training and examinations comply with EWF and industry standards; Issue SEABT diplomas.
- **National qualification authorities** – promote and regulate adhesive training courses and qualifications as they become part of the national Vocational Education and Training (VET) system.
- **Manufacturing companies (SMEs, medium and big) which use adhesive bonding in their products** – foster the demand for highly specialised personnel responsible for adhesive bonding and related tasks; Raise awareness of the importance of adhesive bonding and the need for qualified professionals, as this is a crucial condition for ensuring product quality and safety.



## 4 Alignment with EQAVET indicators

The execution and acknowledgment of adhesive training programs at the European level are founded on EU policies and tools, which, fundamentally, serve as pivotal elements in improving the transparency, comparability, and transferability of individuals' qualifications.

On April 23, 2008, the European Parliament and the Council put forth a Recommendation that established the [European Qualifications Framework \(EQF\) for lifelong learning](#). This framework provides a unified reference system consisting of eight levels of qualifications, articulated as learning outcomes with progressively higher levels of expertise. The EQF functions as a bridge for translating between various qualification systems and their respective levels.

The [new Council Recommendation on the EQF for lifelong learning](#) (2017) has been approved, building upon the accomplishments of the 2008 Recommendation. This ensures the seamless continuation of processes initiated by individual countries to align their qualifications frameworks and levels with the EQF.

KNOWBOND results are fully aligned with the [New Skills Agenda](#), as the modularization of the EAB level course, the use of digital and more flexible technologies and the development of personalized learning paths facilitate trainees to access to the qualification level and promote the continuous education of adhesive bonding professionals.

In terms of training implementation KNOWBOND project followed European quality assurance best practices underpinned by [EQAVET](#). From the indicators set by the framework, five of them were selected to measure the quality of the training provided within this scope. Therefore, the project used as reference indicators 1, 2, 3, 9 and 10 as follows:

- Indicator 1. Relevance of quality assurance systems for VET providers
- Indicator 2. Investment in training of teachers and trainers
- Indicator 3. Participation rate in VET programmes
- Indicator 9. Mechanisms to identify training needs in the labour market
- Indicator 10. Schemes used to promote better access to VET

## Indicator 1. Relevance of quality assurance systems for VET providers

Quality assurance systems for Vocational Education and Training (VET) providers, such as those implemented by the European Welding Federation (EWF) for Approved Training Bodies (ATB), are essential in maintaining high teaching standards. These systems ensure effective and reliable education, benefiting both students and employers looking for competent professionals.

This approach is particularly important in projects like KNOWBOND, aimed at providing training in the adhesive sector through online education. In a technical field like this, quality assurance is crucial to ensure that the training meets industry standards and provides the necessary skills and knowledge.

Accreditation from recognized entities like the EWF adds value to the certifications obtained, ensuring that the teaching is internationally recognized. This is vital in specialized areas, facilitating the professional mobility of graduates.

Moreover, these systems promote a culture of continuous improvement. For KNOWBOND, this means that the online training program for the adhesive sector must adhere to rigorous standards and constantly update its curriculum to maintain accreditation, enhancing the quality of education and ensuring its relevance in an ever-evolving industry.

In summary, integrating quality assurance systems into projects like KNOWBOND is vital for maintaining high educational standards and ensuring the effectiveness of vocational training in specialized sectors, especially in the context of online education.

## Indicator 2. Investment in training of teachers and trainers

To guarantee the quality of the training, dedicated sessions to capacitate trainers of the partner organizations have been organized, thus helping to clarify and decide the teaching methodologies to be used in this project.

In this way, the ideal methodologies for the purpose of **KNOWBOND** have been defined at the Workshop in Vienna. Two main capacitation sessions were carried out :

- **Vienna (Austria) on the 11<sup>th</sup> May 2022 integrated in the 2nd project meeting – 6 trainers** took part of PR2 (Tools for Flexible Learning) session, which aimed to present the Problem-Based Learning method, in order to accelerate the take-up of this method by the participants
- **Oporto (Portugal), 10<sup>th</sup> to 13<sup>th</sup> January 2023** - trainers gathered in January at INEGI facilities for the learning, teaching and training activity. The activity enabled to capacitate **12 trainers** towards the future implementation of the Specific European Adhesive Bonding Training (SEABT) course. For four days, the developed resources "Tools for flexible learning" were revisited and best practices shared among all participants.

### Indicator 3. Participation rate in VET programmes

In terms of participation rate in the SEABT pilot training. A total of 107 participants enrolled in the redesigned VET programme. In terms of sectoral background, data revealed that most participants were **workers** belonging equally to automotive, railway or several industries. While students were less represented in the overall study, although they were the main profile of participants in Portugal. Despite the majority didn't specify the years of experience, some mentioned having less than two years, while only a few mentioned more than two.

ORGANISATION	PILOT ID	PROFILE OF PARTICIPANTS	NO PARTICIPANTS
IFAM	E1 (DE)	Professionals from automotive industry	23
OFI	E2 (AU)	?	15
IZV	E3 (SL)	Workers from various industries	15
CESOL	E4 (ES)	Repair/maintenance sectors of the railway industry	24
ISQ/ INEGI	E5/E6 (PT)	Workers in various industries and students (VET/HE)	30
<b>Total</b>			<b>107</b>

### Indicator 9. Mechanisms to identify training needs in the labour market

Working group meetings, composed by both education and industry representatives, have been held to identify the current state of the labor market and determine what knowledge is most practical and best valued in the industry. In this way, the training of the project has been focused on improving the preparation of workers. participants in the key points of the adhesives sector.

Companies in the industrial sector have been surveyed to see the attractiveness of these training courses and this information has been collected in the PR1 and PR2 documents.

### Indicator 10. Schemes used to promote better access to VET

To promote access to project information for VETs, an online syllabus prepared in presentations has been generated in which all the training given in the courses is collected. In this way, the syllabus is ready to be transmitted and shared, providing additional training to any existing training in the field of adhesives. The online platform is essential to expand the reach and promote the integration and dissemination of knowledge to various sectors

## 5. Quality assurance recommendations for SEABT implementation in other countries

This chapter consolidates a series of Recommendations drawn from the KNOWBOND project's experience and work. Six recommendations were defined to ensure the implementation of SEABT training in other countries following Quality Assurance Principles, which in an European qualification system are linked with the establishment of Guidelines (for a transnational curricula), Harmonized Assessment, Quality Assurance System for the implementation & EQAVET indicators.

### 5.1 SEABT Curricula expressed into Learning Outcomes

Harmonized Training Guideline, defined in terms of knowledge, skills, autonomy and responsibility used to support the implementation of training at European level; \* The training guidelines also include: requirements for training attendance; requirements for trainers, rules for evaluation.

### 5.2 Accreditation and Compliance with Industrial Standards

Ensure SEABT meets relevant national and international industrial standards, with a clear process for accreditation and maintaining standards

### 5.3. Harmonised and Quality Assesment

Use of common tools and specific procedures concerning the assessment, that are followed by all organizations, to guarantee the depth and scope of assessment is adequate to the defined LOs.

### 5.4. Continuous Improvement/Update of SEABT course

Implement procedures for continuous improvement, which include: review the SEABT curriculum validity every 3 years; review of the learning resources; periodic students & teachers surveys; revision of the questions performance used in the harmonized assessment every year; regular auditing activities to the ANBs and ATBs.

### 5.5 Quality Contole for the organisations conducting training and assesment

Methods and rules for the Approval of ANBs (responsible for approval and supervision of training centres, qualification evaluation, development and implementation and awarding of diplomas) and for ATBs (responsible for delivering training in compliance with Qualification guidelines and specific rules)



## 5.6 Performance Indicators:

Define and monitor key performance indicators (KPIs) in alignment with EQAVET to evaluate, monitor and improve the program's effectiveness and participants satisfaction. Some examples of reference EQAVET indicators are:

- **Relevance for the labour market** : regular auscultation directly addressing the labour market to assure that the qualification is in line with the current skills needs and anticipate future needs [Indicator 9. Mechanisms to identify training needs in the labour market]
- **Teachers Professional Development**: Encourage ongoing training and professional development for teachers involved in SEABT to keep them updated on the latest teaching methodologies and practices. [Indicator 2. Investment in training of teachers and trainers]

\* The applied EQAVET indicators were addressed in more detail in the previous section.

These points can serve as a foundation for developing a robust quality assurance framework for the SEABT programme,

## 6. Conclusion

The integration of European Qualifications into National Qualifications Frameworks/Systems is a challenge, but also a significant opportunity in the KNOWBOND project. Establishing a unified system for recognizing qualifications across European countries can bring benefits to various stakeholders: industry, education policy makers, vocational education and training (VET) providers, and trainees. These advantages align with one of the fundamental principles of the European Union: the mobility of people.

By sharing the experiences of the KNOWBOND partnership throughout the project's development, particularly in terms of the lessons learned from each recommendation, VET providers and local/national authorities in the field of VET can further explore steps towards the integration of European/international qualifications.

In conclusion, this document has fulfilled its purpose: to serve as a starting point and offer guidance in the contemplation process for integrating European Qualifications, which are versatile and connected to the labour market, into national qualification frameworks or systems, regardless of the country or context.



## 7. References

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