Applus RESCOLL

Applus laboratories

Bonding Training Catalog

2026

Learn today, innovate tomorrow

Welcome

Who are we?

For over 20 years, Applus+ Rescoll has been supporting manufacturers with innovative technical solutions in bonding, composites, resins, and paints. Our expertise covers demanding sectors such as aerospace, medical, space, rail, and industry.

Training courses to boost your skills

Our training courses draw on recognized expertise and high-performance tools to meet industrial challenges. We offer certified and accredited programs designed to strengthen your knowledge and expertise.

Since 2009, **Applus+ Rescoll** has been the only French-speaking center accredited by the **AFS** to offer diploma courses for European Adhesive Bonding Technicians (EAB) and European Adhesive **Bonding Specialists** (EAS).

Your satisfaction is our priority

Each training course is designed to offer an optimal experience. Our clients give us a **satisfaction rating of over 98%** and a **success rate** of **94%.**

Guaranteed accessibility

We are committed to making our training courses accessible to all, with personalized support for people with disabilities.

Want to find out more?

Contact us to discover our solutions and training courses tailored to your needs.

CERTIFICATE PROGRAMS

- COL-001: Bonding Operator - EWF 515
- COL-002: Welder Specialist - EWF 662
- COL-003: EWF Recycling/Refresh for certified personnel – EAB, EAS, and EAE

(normative references: NF EN 17 460 / ISO 21368 / DIN 6701 / DIN 2304 / TL A-0023)

☑ COL-001 : Bonding Operator - EWF 515

Training in accordance with EWF 515 European Bonder (EAB) guidelines

TARGET AUDIENCE

- Personnel performing bonding operations in industry

TEACHING RESOURCES

- Presentation materials, practical exercises, and case studies

OBJECTIVES

- Understand and apply specific gluing ranges and methods.
- Perform an operation according to best practices.
- Apply a required process.
- Ensure the quality of assemblies produced.
- Apply fundamental health and safety rules

PREREQUISITES

- Basic reading, writing, and arithmetic skills
- Basic knowledge of collage (or prior training)
- Fluency in French
- Minimum age of 16

EVALUATION AND SANCTIONS

- Assessments in the form of written exams (oral and practical)
- Candidates will obtain the European Joiner Diploma if they achieve at least 60% of the maximum points in each exam.
- Failure in at least one module will result in a new exam in the failed module(s).
- The validity of the modules (or subjects) acquired is 3 years from the start of the training.
- Attendance at classes must exceed 90% of the duration of the training

IPRACTICAL INFORMATION

Duration: 5 days

Location: Applus+ Rescoll Pessac or on site

Cost:

- €2,200 excl. tax/person
- €500 excl. tax for exam and diploma fees (€300 per re-examination)

Sessions: 3 per year

- March 9–13, 2026
- September 7–11, 2026
- November 30–December 4, 2026

☑ COL-001 : Bonding Operator - EWF 515

Program: Training in accordance with EWF 515 European Bonder (EAB) guidelines

1. THE FUNDAMENTAL PRINCIPLES OF ADHESIVE BONDING

- Adhesive bonding: a special process
- The advantages and disadvantages of adhesive bonding
- Vocabulary concepts
- The workstation
- Design concepts

2. DIFFERENT SURFACE TREATMENTS

- The importance of different surface preparations
- Different types of surface treatments depending on the type of material
- Tools for checking treatments

3. DIFFERENT FAMILIES OF ADHESIVES

- Definition of how adhesives work
- Presentation of different families of adhesives (two-component, chemically or physically activated adhesives)
- Description of critical application parameters

4. INSPECTION OF ADHESIVES AND BONDED ASSEMBLIES

- Adhesive inspection methods
- Measurement of surface energies
- Destructive mechanical testing
- Concepts of non-destructive testing

5. HEALTH AND SAFETY

- Identification of risk phrases (safety data sheet)
- Identification of hazard pictograms
- Individual and collective protective equipment

7. DURABILITY OF BONDED ASSEMBLIES

- Influence of temperature, humidity, and mechanical stress on bonded assemblies

8. PRACTICAL WORK

- Surface treatments/Different types of adhesives/Bonding inspection

☑ COL-002 : Bonding Operator - EWF 662

Training that meets EWF 662 guidelines

TARGET AUDIENCE

- Industrial bonding personnel
- Technicians or engineers in design, methods, production, and control offices

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

PREREQUISITES

- CAP, BEP, Baccalaureate, BP, AFPA, CQT or equivalent
- EWF qualification or certification

OBJECTIVES

- Understand bonding issues (understanding and drafting specifications)
- Draft and enforce specific bonding methods
- Apply a mandatory process
- Raise operator awareness of the fundamental rules of bonding technology
- Apply fundamental H&S (health and safety) rules
- Participate in the implementation of an industrial range and a quality policy for bonding operations
- Understand and raise staff awareness of H&S concepts specific to the use of adhesives

EVALUATION AND SANCTIONS

- Assessments in the form of written exams (oral and practical)
- Achievement of 60% of the maximum points in each module
- Failure in one module will result in a re-examination of the failed modules. The validity of the modules (or subjects) acquired is three years from the start of the training course
- Attendance at classes must exceed 90% of the duration of the training course

PRACTICAL INFORMATION

Duration: 3x5 days

Location: Applus+ Rescoll Pessac or on site

Cost: €6,370 excl. tax/person + €500 excl. tax exam fee (€300 per re-examination)

Sessions: 2 per year (S1 & S2)

- S1: March 16-20, 2026 | April 13-17, 2026 | May 18-22, 2026
- S2: September 21-25, 2026 | October 19-23, 2026 | November 16-20, 2026

☑ COL-002 : Adhesive Specialist - EWF 662

Program: Training in accordance with EWF 662 European Specialist (EAS) guidelines

1. THE FUNDAMENTAL PRINCIPLES OF ADHESIVE BONDING

- Adhesive bonding: a special process
- The advantages and disadvantages of adhesive bonding
- Vocabulary concepts
- The workstation

2. DIFFERENT SURFACE TREATMENTS

- Surface properties of materials
- Surface thermodynamics
- Different types of surface treatments depending on the type of material
- Process selection criteria
- Treatment control tools

3. DIFFERENT FAMILIES OF ADHESIVES

- Polymers and polymer chemistry
- Definition of the operating principles of adhesives
- Presentation of the different families of adhesives (two-component, chemically or physically activated adhesives) and their properties
- Description of critical application parameters
- Criteria for selecting adhesives

4. TESTING ADHESIVES AND BONDED ASSEMBLIES

- Testing standards
- Methods for characterizing the physical, chemical, and thermomechanical properties of adhesives
- Measuring surface energies
- Destructive mechanical testing with fracture mode analysis
- Non-destructive testing concepts

5. ADHESIVE APPLICATION/INDUSTRIAL PROCESSES

- General information on material strength
- Examples of different industrial processes
- Mixing and dosing methods
- Adhesive application methods
- Pressurization processes
- Automation and robotization

☑ COL-002 : Adhesive Specialist - EWF 662

Program: Training in accordance with EWF 662 European Specialist (EAS) guidelines

6. HEALTH AND SAFETY

- Definition and identification of chemical risks
- Prevention and protection measures
- Regulatory aspects of hazard classifications
- Case studies: solvents and adhesives

7. DURABILITY OF BONDED JOINTS

- Influence of temperature, humidity, mechanical stress
- Electrochemical effects and chemical agents
- Mechanical fatigue, creep, aging

8. DESIGN AND DIMENSIONING OF ASSEMBLIES

- Strength of materials
- Main geometries of assemblies
- Factors influencing dimensioning
- Calculation methods and stress distribution

9. QUALITY MANAGEMENT / SPECIAL PROCESS

- Quality and control tools
- Special process and imposed rules
- Repeatability and traceability

10. PRACTICAL WORK

- Surface treatments (mechanical, chemical bath, plasma, etc.)
- Different types of adhesives (two-component, glass bonding, hot melt, solvents)
- Bonding control (physicochemical characterization, destructive testing)

☑ COL-003: Recycling/Refresh EWF For EAB, EAS, and EAE certified personnel

"Adhesive bonding operators must undergo regular, verifiable training at least every two years.
ABC coordinators must demonstrate that they maintain and update their skills by undergoing additional external training at least every two years."

TARGET AUDIENCE

- Engineers, technicians, and operators who meet the requirements of EN 17460 / ISO 21368 (DIN 2304 / DIN 6701)

TEACHING RESOURCES

- Presentation materials, practical exercises, and case studies

PREREQUISITES

- EAE, EAS, or EAB diploma according to EWF standards

OBJECTIVES

- Updating knowledge on adhesive bonding (every two years)

ASSESSMENT

- Multiple-choice assessment questionnaire
- Minimum score of 60% required to pass the training course
- Training course qualification: Certificate of completion

☑ COL-003: Recycling/Refresh EWF For EAB, EAS, and EAE certified personnel

PROGRAM

1. THEORY

- New developments in adhesives
- How to deal with obsolescence?
- Understanding the impact of different components in the formulation
- The removability of bonded assemblies

2. PRACTICAL

- Key concepts in formulation (impact of various components on viscosity, reactivity, final properties, etc.)
- Case study on obsolescence

PRACTICAL INFORMATION

Duration: 2 days
Location: Applus+ Rescoll Pessac
Cost: €1,550 excl. tax/person
Sessions: 3 per year

- February 25-26, 2026
- June 9-10, 2026
- September 30-October 1, 2026

TRAINING COURSES COLLAGE NON-DEGREE

- **COL-004:** The basics of bonding: adhesives, surfaces, and implementation
- **COL-005:** How to define, select, and validate an automated bonding process
- **COL-006:** High-temperature industrial bonding – Adhesive selection and characterization
- **COL-007:** Preventing adhesive obsolescence: causes, impacts, and control strategies
- **COL-008:** Analysis and optimization of bonding practices

☑ COL-004: The basics of bonding Adhesives, surfaces, and application

TARGET AUDIENCE

- Engineers or technicians in design offices, methods, production, control, and quality

TEACHING RESOURCES

- Presentation materials for lectures and case studies

OBJECTIVES

- Learn about the different types of adhesives.
- Understand the adhesive properties of different materials.
- Understand the different types of surface treatments depending on the materials.
- Select an adhesive and surface treatment based on specifications
- Master the implementation of bonding based on bonded assemblies
- Learn the different implementation methods
- Understand the techniques for characterizing assemblies and adhesives

PREREQUISITES

- Basic technical knowledge of the bonding assembly process

EVALUATION AND SANCTIONS

- Assessment methods: Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

PRACTICAL INFORMATION

Duration: 3 days
Location: Applus+ Rescoll Pessac
Cost: €2,450 excl. tax/person
Sessions: 3 per year

- March 3–5, 2026
- June 2–4, 2026
- October 6–8, 2026

☑ COL-004: The basics of bonding Adhesives, surfaces, and application

PROGRAM

1. BONDING : A SPECIAL PROCESS

- Advantages and disadvantages
- Theories of adherence
- Study of technical documents

2. DIFFERENT TYPES OF ADHESIVES

- Classification of adhesives by family
- Functioning, application, and properties (mechanical, thermal, and durability)
- Selection of adhesives based on specifications

3. SURFACE TREATMENT

- The different surface treatments depending on the substrates (metals, glass, composites, plastics)
- How to select and validate a surface treatment?

4. THE IMPLEMENTATION OF INDUSTRIAL BONDING

- How can a bonding process be classified?
- Application methods

5. CHARACTERIZATION OF ADHESIVES AND BONDED ASSEMBLIES

- Non-destructive testing (advantages and limitations)
- Destructive testing (physical chemistry)
- What tests should be performed during qualification and production?

6. CASE STUDY: FROM SPECIFICATIONS TO PRODUCTION

- Different types of materials and adhesives & practical application based on specifications for: adhesive selection, surface treatment, industrialization, control techniques, and characterization

☑ COL-005: Define, select, and validate an automated bonding process

TARGET AUDIENCE

- Personnel supervising bonding operations in industry
- Technicians or engineers in processes, design offices, methods, industrialization

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

OBJECTIVES

- Develop specifications for an automated adhesive bonding process.
- Master the application of adhesives and primers according to the specifications.
- Understand the influence of material and machine parameters on application.
- Be familiar with the different methods (dosing, dispensing, spraying) of application using adhesive technologies

PREREQUISITES

- Basic technical knowledge of the bonding assembly process

EVALUATION AND SANCTIONS

- Assessment methods: Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

PRACTICAL INFORMATION

Duration: 3 days (8 hours/day)
Location: Applus+ Rescoll Pessac
Cost: €2,450 excl. tax/person
Sessions: 2 per year

- April 21-23, 2026
- October 27-29, 2026

☑ COL-005: Define, select, and validate an automated bonding process

PROGRAM

1. BONDING: A SPECIAL MULTI-STEP PROCESS

- Specific concepts related to adhesives
- Bonding range: Development of specifications and implementation of an automated process
- Qualification of the different stages of a special process
- Production environment and best practices for the use of adhesives

2. APPLICATION OF ADHESIVES

- **Composition d'un système de mise en œuvre d'adhésifs :**
  - Understanding the role of each component
  - Adhesive dosing and application technologies
  - Influence of adhesive properties on equipment selection and application strategy
  - Operations and consumables related to the process
- **Practical work :**
  - Understanding the advantages of automated glue application compared to manual processes
  - Understanding the technological differences between pneumatic and volumetric dosing

3. SPRAY APPLICATION

- Advantages and limitations of different spraying technologies
- Influence of product properties on equipment design and selection
- **Practical work:**
  - Handling different spraying technologies
  - Understanding the influence of the product on implementation

☑ COL-005: Define, select, and validate an automated bonding process

4. PROCESS AUTOMATION

- Advantages and limitations of automating a special process
- Specific features of robotizing fluid dispensing
- Monitoring devices and methods for process control and tracking
- Example of specifications: presentation of a case study on the implementation of a robotized workstation
- **Practical work:**

Understanding the influence of robotic programming on product dispensing (handling 3- and 6-axis robots)

5. PRACTICAL CASES: FROM SPECIFICATIONS TO PRODUCTION

- Simulation based on specifications for :
  - Selection of adhesives
  - Selection of equipment
  - Industrialization: Development of methods
  - Qualification process

COL-006: High-temperature industrial bonding (200°C - 2000°C) Selection and characterization of adhesives

TARGET AUDIENCE

- Engineers or technicians in design offices, methods, production, control, and quality

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

PREREQUISITES

- Basic technical knowledge of the bonding assembly process

EVALUATION AND SANCTIONS

- Assessment methods: Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

PRACTICAL INFORMATION

Duration: 2 days (8 hours/day)
Location: Applus+ Rescoll Pessac
Cost: €2,450 excl. tax/person
Sessions: 2 per year

- May 27-28, 2026
- October 13-14, 2026

OBJECTIVES

- Understand the causes and consequences of adhesive obsolescence (regulations, raw materials, market developments, packaging, etc.), and know how to identify at-risk adhesive families and their alternatives.
- Deploy a monitoring and anticipation methodology to detect and prevent the obsolescence of the materials used.
- Integrate and apply good industrial practices in order to effectively manage obsolescence in a production environment.

COL-006: High-temperature industrial bonding Selection and characterization of adhesives

PROGRAM

1. HIGH-TEMPERATURE ORGANIC ADHESIVES

- Presentation of high-temperature organic adhesive families: areas of application, implementation, curing mechanism, and associated performance (BMI, cyanate esters, polyimides, etc.)
- Thermal stability: chain breakage, hydrolysis, cross-linking, glassy carbon residue

2. INORGANIC ADHESIVES

- Presentation of inorganic adhesive families: areas of application, implementation, curing mechanism, and associated performance (ceramics, graphite, etc.)
- Case study: characterization of an assembly bonded with high-temperature ceramic adhesives
- Preparation of mass test specimens and characterization at different temperatures

3. CHARACTERIZATION OF HIGH-TEMPERATURE ADHESIVES: ORGANIC VS. INORGANIC

- Preparation of bonded assemblies (implementation, choice of substrates, geometry, etc.)
- Exposure time before characterization: flash (a few seconds/minutes) vs. long duration (several minutes)
- Monitoring during characterization tests

COL-007: Preventing adhesive obsolescence: causes, impacts, and control strategies

TARGET AUDIENCE

People who want to anticipate and manage risks related to adhesive obsolescence.

- Engineers and technicians in R&D, methods, production, or industrialization.
- Quality, purchasing, and supply chain managers.

TEACHING RESOURCES

- Presentation materials and case studies

PREREQUISITES

- Basic knowledge of materials, bonding processes, and assemblies
- General understanding of industrial constraints: product selection, qualification, etc.

OBJECTIVES

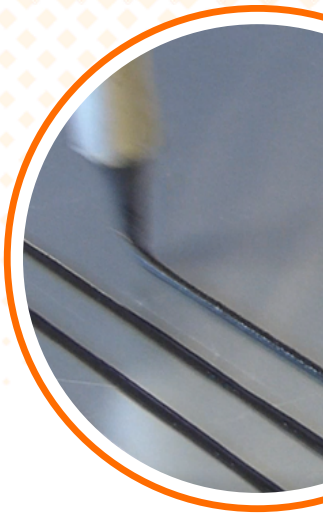
- Understand the causes and consequences of adhesive obsolescence (regulations, raw materials, market developments, packaging, etc.).
- Identify high-risk adhesive families and their alternatives.
- Deploy a monitoring and anticipation methodology to detect and prevent the obsolescence of materials used
- Integrate and apply good industrial practices in order to effectively control obsolescence in a production environment

PRACTICAL INFORMATION

Duration: 3 days (8 hours/day)
Location: Applus+ Rescoll Pessac
Cost: €2,450 excl. tax/person
Sessions: 3 per year

- March 24-26, 2026
- July 7-9, 2026
- November 24-26, 2026

☑ COL-007: Preventing adhesive obsolescence: causes, impacts, and control strategies



PROGRAM

1. INTRODUCTION TO OBSOLESCENCE

- Review of obsolescence issues in the adhesive industry
- Identification of causes: geopolitical factors, discontinuation of raw material production, shelf life, regulatory constraints, packaging
- Impacts: product/process reclassification, quality and compliance risks

2. METHODOLOGY FOR IDENTIFYING COMPOUNDS OF CONCERN

- Formulation basics: fundamental principles and nature of adhesives
- Identification of problematic substances
- Mapping of associated risks: technical, environmental, health
- Innovative and sustainable alternatives: bio-based adhesives, eco-design

3. REGULATORY MONITORING

- Key European regulations and organizations: REACH, CLP
- Anticipation and intent lists: creation, updating, and monitoring
- MSDS analysis: comparison of obsolete vs. recent versions

4. SOLUTIONS AND BEST PRACTICES

- DLU monitoring: characterization and alert system
- Best practices at industrial sites
- Anticipation: dual sourcing, reformulation, monitoring, supplier exchanges

☑ COL-008: Analysis and optimization of bonding practices

TARGET AUDIENCE

- Engineers and technicians in R&D, processes, methods, industrialization
- Production, quality, maintenance, and technical support staff
- Purchasing, supply chain, and procurement departments
- Design offices

TEACHING RESOURCES

- Presentation materials, practical exercises, and case studies

PREREQUISITES

- General knowledge of materials or manufacturing processes, or working in an industrial environment.

ASSESSMENT AND CERTIFICATION

- Assessment methods: Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

PROGRAM

Fully customizable and built according to your needs, materials, and processes.

- Definition of training objectives
- Modules customized to your expectations
- Focus on your materials
- Study of the adhesives you use
- Analysis of existing processes
- Best practices

Advanced training with practical workshops and participatory analysis

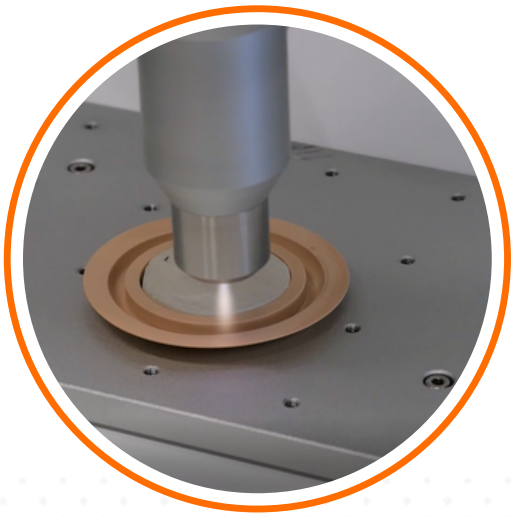
☑ COL-008: Analysis and optimization of bonding practices

ESSENTIAL PACKAGE | 1 DAY

OBJECTIVE

Developing skills in the fundamentals of the job and the process

- Awareness of the job/process
- Understanding technical and organizational requirements
- Practical exercises analyzing bonding situations
- Participants identifying any discrepancies between current practices and best practices



PRACTICAL INFORMATION

Duration: 1 day
Location: On site
Cost: €4,000 excluding tax
Amount excluding travel expenses
Session: on request

☑ COL-008: Analysis and optimization of bonding practices

COMPLETE PACKAGE | 2 DAYS

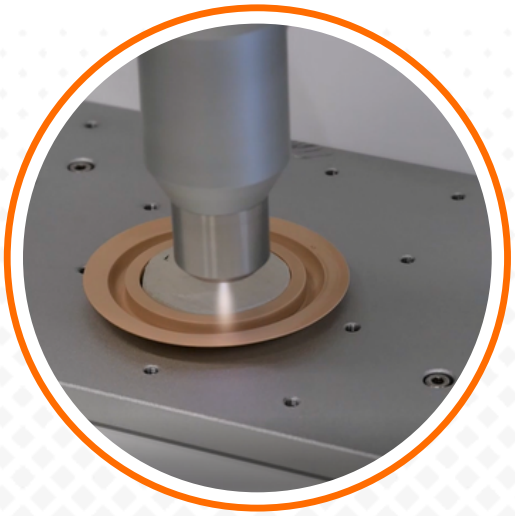
OBJECTIVE

Technical deep dive and development of operational improvements

- Job/process awareness
- Collaborative workshops to analyze internal practices
- Joint development of a process improvement plan
- Guided exercises to verify key points of a gluing job
- Role-playing: identification of risks, critical parameters, and corrective actions
- Group work to formalize best practices tailored to the company

An educational report including:

- Work and analyses carried out by trainees
- Key points covered in training
- Best practices discussed
- Co-developed areas for improvement



PRACTICAL INFORMATION

Duration: 2 days
Location: On site
Cost: €8,000 excluding tax
Amount excluding travel expenses
Session: on request

TRAINING COURSES MATERIALS

- **MAT-001:** Selecting, formulating, and characterizing an epoxy system suited to its application
- **MAT-002:** Viscoelastic characterization of polymer materials using DMA
- **MAT-003:** Understanding and using DSC for polymer characterization
- **MAT-004:** Fire behavior of materials (aeronautical regulations)
- **MAT-005:** Mastering the Sol-Gel process: mechanisms, synthesis, and applications

MAT-001: Selecting, formulating, and characterizing an epoxy system suitable for its application

TARGET AUDIENCE

- Engineers or technicians with a background in organic chemistry who want to understand the chemistry of epoxides

PREREQUISITES

- Present basic technical knowledge in organic chemistry

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

OBJECTIVES

- Understand the different polymerization mechanisms of epoxy systems
- Understand the different applications of epoxy systems
- Understand the implementation and characterization techniques of epoxy systems
- Be able to compose a typical formulation of an epoxy system based on given specifications

EVALUATION

- Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

PRACTICAL INFORMATION

Duration: 2 days
Location: Applus+ Rescoll Pessac
Cost: €2,450 excl. tax/person
Session: on request

☑ MAT-001: Selecting, formulating, and characterizing an epoxy system suitable for its application

PROGRAM

1. THEORY | 1,5 DAY

General information on epoxy systems:

- Main properties
- Overview of standard systems on the market: resins, hardeners, additives, fillers
- Main applications
- Chemistry of epoxy resins (polymerization reaction, exothermic reaction, crosslinking monitoring, etc.)
- Implementation
- Characterization
- Concrete examples of formulation and characterization in different fields of application

2. PRACTICE | 0,5 JOUR

- Practical work and tutorials on the implementation and characterization of epoxy systems: recommendations on mixing, test piece fabrication, etc.

MAT-002: Viscoelastic characterization of polymer materials by DMA

TARGET AUDIENCE

- Engineers and technicians in R&D, materials, polymers, composites, adhesives, quality, or characterization departments

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

PREREQUISITES

- Have a basic understanding of mechanical behavior or polymer science.

EVALUATION

- Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

OBJECTIVES

- Understand the basics of dynamic mechanical analysis (DMA) of polymer materials.
- Choose the right loading mode and analysis conditions for the material being tested.
- Be able to analyze DMA thermograms and understand the structure-property relationship (viscoelasticity, damping, etc.).
- Know the range of characterizations possible with a dynamic mechanical analyzer (creep, relaxation, temperature scanning, frequency, deformation, time/temperature equivalence, etc.)

PRACTICAL INFORMATION

Duration: 1 day
Location: Applus+ Rescoll Pessac
Cost: €1,250 excl. tax/person
Session: on request

MAT-002: Viscoelastic characterization of polymer materials by DMA

PROGRAM

1. INTRODUCTION TO VISCOELASTIC BEHAVIOR

2. THE DMA: PRINCIPLE AND APPLICATIONS

- Test principle
- Influence of different stress modes
- Single variable tests
- Amplitude: determination of the linear range
- Temperature: determination of glass transition temperature, elastic and viscous moduli
- Frequency
- Multi-variable tests (time/temperature equivalence)
- Creep/relaxation

3. CASE STUDIES

- Influence of polymerization conditions
- Influence of formulations: structure-property relationship

MAT-003: Understanding and using DSC for polymer characterization

TARGET AUDIENCE

- Engineers and technicians in R&D, materials, polymers, composites, adhesives, quality, or characterization departments

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

PREREQUISITES

- Possess fundamental knowledge of polymer materials science or thermal characterization

EVALUATION

- Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

OBJECTIVES

- Learn the basics of differential scanning calorimetry (DSC) for polymer materials
- Select the right analysis conditions for the material being tested
- Analyze DSC thermograms of different polymer materials: thermosets, thermoplastics, or elastomers (glass transition temperature, melting point, crystallization temperature, reaction progress, etc.)

PRACTICAL INFORMATION

Duration: 1 day
Location: Applus+ Rescoll Pessac
Cost: €1,250 excl. tax/person
Session: on request

MAT-003: Understanding and using DSC for polymer characterization

PROGRAM

1. DIFFERENTIAL SCANNING CALORIMETRY (DSC)

- Principle
- Equipment
- Best practices

2. CHARACTERIZATION OF THERMOPLASTIC MATERIALS

- Crystallization
- Melting
- Glass transition

3. CHARACTERIZATION OF THERMOSETTING MATERIALS

- Polymerization kinetics
- Conversion rate
- Impact of baking conditions: evolution of the glass transition

4. ADDITIONAL MEASURES IN DSC | ENTHALPY RELAXATION

- Specific heat capacity (Cp)
- Oxidation temperature and time (OOT & OIT)

MAT-004: Fire behavior of materials (aviation regulations)

TARGET AUDIENCE

- Engineers or technicians working in design, methods, production, control, and quality departments

TEACHING RESOURCES

- Presentation materials for lectures and case studies

PREREQUISITES

- Possess basic technical knowledge of materials science or thermal behavior

EVALUATION

- Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

OBJECTIVES

- Understand the regulations and spirit of standards (e.g., FAR, CS, and/or ABD0031)
- Identify the measurement principles of different equipment
- Interpret analyses and identify a product's weak points

PRACTICAL INFORMATION

Duration: 1 day
Location: Applus+ Rescoll Pessac
Cost: €1,250 excl. tax/person
Session: on request

☑ MAT-004: Fire behavior of materials (aviation regulations)

PROGRAM

1. REGULATIONS AND STANDARDS

- International authorities EASA FAA
- Key regulatory documents relating to fire

2. FAR/CS 25 853 APPENDIX F

- Types of equipment enabling the qualification/certification of an in-cabin product

3. TOUR OF THE APPLUS+ RESCOLL FIRE TESTING LABORATORIES AND PRESENTATION AND/OR PERFORMANCE OF TESTS

- Cabin interior: flammability, smoke/toxicity, heat release (tests can be performed on samples provided by the intern)
- Tests on seat cushions and cargo panels

MAT-005: Mastering the Sol-Gel Process: Mechanisms, Synthesis, and Applications

TARGET AUDIENCE

- Engineers, technicians, and researchers in materials, chemistry, R&D, formulation, surface treatments, or processes

TEACHING RESOURCES

- Presentation materials for lectures and case studies

PREREQUISITES

- Have a basic understanding of general chemistry, mineral chemistry, or materials chemistry.

EVALUATION

- Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

OBJECTIVES

- Understand the fundamental principles of the sol-gel process and its areas of application.
- Identify the key synthesis parameters (precursors, pH, solvents, temperature, hydrolysis rate, etc.).
- Describe the reaction mechanisms involved in the hydrolysis, condensation, gelation, and drying stages
- Adapt synthesis conditions according to the desired final properties
- Analyze and interpret variations in properties based on formulation and operating conditions

PRACTICAL INFORMATION

Duration: 1 day
Location: Applus+ Rescoll Pessac
Cost: €1,500 excl. tax/person
Session: on request

MAT-005: Mastering the Sol-Gel Process: Mechanisms, Synthesis, and Applications

PROGRAM

1. INTRODUCTION TO THE SOL-GEL PROCESS

- Origin and general principles
- Field of application: glass, coatings, powders, hybrid materials
- Advantages and limitations of the process

2. THE PRECURSORS AND THEIR INFLUENCE

- Types of precursors (alkoxides, metal salts, hybrid precursors)
- Influence of chemical nature on reaction kinetics
- Role of solvents, co-solvents, and complexing agents

3. REACTION MECHANISMS

- Hydrolysis
- Condensation
- Network formation
- Parameters influencing polymerization (pH, temperature, concentration, catalysts, etc.)

4. GEL FORMATION AND ASSOCIATED PHENOMENA

- Gelation process
- Influence of experimental conditions (time, atmosphere, agitation, etc.)
- Drying of gels: physical phenomena and risks (cracking, shrinkage, etc.)
- Types of gels obtained (aerogels, xerogels, monoliths, films, etc.)

MAT-005: Mastering the Sol-Gel Process: Mechanisms, Synthesis, and Applications

5. NATURE AND PROPERTIES OF THE MATERIALS OBTAINED

- Mineral materials (silica, alumina, titanium, etc.)
- Organic–inorganic hybrid materials
- Textures, porosities, internal structures
- Influence of structure on final properties

6. IMPLEMENTATION OF SOL-GEL MATERIALS

- Film deposition (spin coating, dip coating, spray coating, etc.)
- Encapsulation, impregnation, porous matrices
- Heat treatment and densification
- Typical industrial applications

7. CASE STUDIES AND TUTORIALS

- Influence of operating conditions on final properties
- Comparison of sol-gel formulations
- Examples of specific industrial applications
- Analysis of specifications and selection of synthesis parameters

CUSTOMIZED TRAINING COURSES

- **Cutting-edge expertise**: Our training courses are designed by bonding/materials specialists, covering processes, formulation, and sector-specific issues.
- **100% customizable**: Each program is tailored to the customer's needs, incorporating their processes, constraints, and quality objectives.
- **Practical approach**: We offer hands-on exercises and real-life case studies to ensure immediate application in the field.
- **From basics to expertise**: From understanding the different families of adhesives to mastering complex processes, we cover all the fundamentals and critical points.
- **Measurable impact:** Our training courses reinforce understanding of material properties and assemblies to ensure reliable technical choices and lasting quality.

SM-001: CUSTOMIZED TRAINING

TARGET AUDIENCE

- Engineers and technicians in R&D, processes, methods, industrialization
- Production, quality, maintenance, and technical support staff
- Purchasing, supply chain, and procurement departments
- Design offices

TEACHING RESOURCES

- Presentation materials, practical examples, and case studies

PREREQUISITES

- General knowledge of materials or manufacturing processes, or working in an industrial environment

EVALUATION AND SANCTIONS

- Assessment methods: Multiple-choice assessment questionnaire
- Training certification: Certificate of completion

CUSTOMIZED PROGRAM

- **Defining training objectives**: Identifying your needs in order to develop a targeted program.
- **Modules customized to your expectations**: Adapting content to your challenges and constraints.
- **Focus on your materials**: Incorporating the study of specific properties and behaviors.
- **Study of your adhesives, processes, and tests**: Analyzing your practices to optimize their effectiveness.
- **Best practices**: Sharing key recommendations to ensure quality and reliability.

PRACTICAL INFORMATION

Duration: depending on demand
Location: Applus+ Rescoll Pessac or on site
Cost: depending on demand
Session: on request

The program is fully customizable and tailored to your needs, materials, and processes.

SM-001: CUSTOMIZED TRAINING

EXAMPLES

ON-SITE OPERATOR TRAINING: SAFETY, CHEMICAL HAZARDS, AND BEST PRACTICES FOR BONDING

- On-the-job training to teach operators the fundamentals of bonding, safe handling of chemicals, appropriate PPE, waste management, and best practices for ensuring assembly quality.

SPECIALIZED TRAINING IN BONDING FOR SPACE APPLICATIONS

- Highly technical module dedicated to the requirements of the aerospace sector: selection and qualification of adhesives, severe environmental constraints, surface preparation, cleanliness control, control of critical parameters, and compliance with specific aerospace standards.

TRAINING IN METAL-TO-METAL BONDING WITH ANAEROBIC ADHESIVES

- Session focused on understanding and mastering anaerobic adhesives for metal-to-metal assembly: polymerization principles, surface preparation, product selection based on mechanical and thermal constraints, best practices for application, and control methods.

TRAINING ON ADHESIVE FORMULATION (EPOXY, POLYURETHANE, ACRYLIC, ETC.)

- Training focused on understanding and mastering adhesives and assembly processes: polymerization mechanisms, influence of formulations and additives, surface preparation, selection of solutions adapted to mechanical, chemical, and thermal constraints, best practices for implementation, and characterization methods to ensure performance and reliability.

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