

Structuring and preparation of a lesson: **EAS module 1 (Adhesion and adhesives)**

time	Theme, core information, statements or questions	Learning objectives ¹	Methods (e.g. presentation/ discussion/group work)	Media/ training material
4 h	<p>Historical Background</p> <ul style="list-style-type: none"> • use of adhesives (in their broadest sense) before 1900. • Industrial adoption and Expanding opportunities for adhesives (and sealants) <p>Benefits and Limitations of Adhesive Bonding</p> <ul style="list-style-type: none"> • The benefits and opportunities from the adoption of adhesive bonding • The downside of adhesive bonding: <ul style="list-style-type: none"> - Health and safety specific requirements - Cost implications - Lack of credibility <p>Principles of Adhesion</p> <ul style="list-style-type: none"> • A general overview of the theories of adhesion. • The importance of surface energy and how it influences the ability to produce a good quality adhesive bond. • How pretreatment affects surface energy and hence the degree of adhesion • Environmental effects on adhesive performance. <p>Glossary of Terms</p> <ul style="list-style-type: none"> • Terminologies used within the adhesive technology <ul style="list-style-type: none"> - Systematic examination of 	<p>Gain basic knowledge in terms of adhesive technology</p> <p>Know and understand the fundamentals of adhesive bonding within the context of other joining technologies, including its benefits, limitations, principles and related terminologies.</p>	<p>Presentation of content by - presentation</p> <p>Specimens with different types of adhesives</p> <p>Teaching text</p> <p>Practical demonstration</p> <p>Questions about the identification of the adhesive</p>	<p>Explanatory videos showing the difference between joints made with different adhesives.</p> <p>Beamer/ printed – presentation</p>

¹ (1) Know and understand, (2) transfer and practically apply, (3) analyze and assess; (0) no learning objective; additional information

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	terms used and their meanings (e.g. as defined in EN 923)			
10 h	<p>Classification</p> <ul style="list-style-type: none"> • By chemical family (epoxy, silicone...) • By hardening mechanism (chemical curing, solvent evaporation, melting/cooling...) • By origin (natural, synthetic, mineral, organic...) • By end-use (wood adhesives...) • By functional types (structural, hot-melt, pressure-sensitive...) • By physical form (one or multiple components, films, tapes, pastes, liquids...). <p>Constitution of Adhesives and Sealants</p> <ul style="list-style-type: none"> • Different types of polymers and their basic properties • Adhesive modifiers function • Primers • Solvents <p>Types of Adhesives and Seleants</p> <ul style="list-style-type: none"> • Resin chemistry and Cure chemistry • Functional types • Markets and applications • Properties: <ul style="list-style-type: none"> - Handling and storage - Physical (prior to cure) - Process (metering, mixing, dispensing, application) - Mechanical, chemical, thermal, electrical (after cure) - Health and safety • Chemical families: <ul style="list-style-type: none"> - Epoxies - Phenolics - Polyurethanes 	<p>Gain basic knowledge in classify the adhesives according to their chemical characteristics</p> <p>Gain basic knowledge in classify the adhesives according to their physics characteristics</p> <p>Gain basic knowledge in the behavior of different types of adhesives</p>	<p>Presentation of content by - presentation</p> <p>Specimens with different types of adhesives</p> <p>Teaching text</p> <p>Practical demonstration</p> <p>Questions about the identification of the adhesive</p>	<p>Explanatory videos showing the difference between joints made with different adhesives.</p> <p>Beamer/ printed - presentation</p>

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	<ul style="list-style-type: none">- Anaerobics- Acrylics- Cyanoacrylates- Silicones- Polysulphides.- Polyimides-polyphenylquinoxalines-polybenzimidazoles- Inorganic adhesives- Sealants <p>Selection Criteria</p> <ul style="list-style-type: none">• Compatibility with the substrates• Process (number of components, physical form, pot-life, curing, viscosity/rheology, gap-filling)• Mechanical and thermal properties• Durability			
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