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## Adhesives and Sealants as Advanced Materials

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FEICA is the Association of the European Adhesive & Sealant Industry. Adhesives and sealants (A&S) play a crucial role in many of the EU's strategic sectors and are essential enablers of countless everyday products. A&S enhance products' performance, durability and circularity. With the support of its members and national associations, FEICA voices the interests of the industry in Europe, where 85% of adhesive and sealant companies are SMEs. The association provides regulatory guidance, helps members navigate compliance requirements, and promotes sustainable practices. FEICA fosters collaboration with industry stakeholders to address shared challenges and to create a mutually beneficial economic and legislative environment.

## Contents

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Introduction: Advanced Materials .....	1
Adhesives and Sealants as Advanced Materials .....	1
Customisation and Innovation .....	2
Examples of Functional Integration Across Strategic Sectors .....	2
Enabling Circularity and Sustainability .....	3
FEICA Recommendation for a Stronger European Advanced Materials Industry .....	3
References .....	4
Contact .....	5

### Introduction: Advanced Materials

According to the European Commission, advanced materials are intentionally designed and engineered to exhibit enhanced or novel properties—mechanical, thermal, chemical, electrical or functional—that enable innovation across strategic sectors. They are central to the EU's goals for industrial leadership, strategic autonomy, and the twin green and digital transitions.

Advanced materials support the substitution of critical raw materials, improve sustainability and enable high-performance applications in sectors such as mobility, energy, healthcare, defence, aerospace and electronics.

### Adhesives and Sealants as Advanced Materials

Adhesives and sealants are **engineered to deliver** reliable **performance**, an **application-specific functionality that enables innovation** across strategic sectors.

They meet the core criteria defined for advanced materials:

- Improving **sustainability** as they enable the implementation of the R-strategies for the transformation towards a circular economy, a key pillar of the EU Green Deal
- Enabling applications in **strategic** sectors such as e-mobility, non-fossil energy generation, healthcare, defence, and electronics for data management and the Internet of Things. These sectors were identified as mission-critical for the EU in the framework of the Clean Industrial Deal

The **intellectual property** in the field of adhesives and sealants that is generated in the EU year over year demonstrates the strength of this industry with its footprint in Europe and underlines its **competitiveness** in a dynamic, global market environment. Adhesives and Sealants are “**hidden champions**”. In the majority of cases their application is not even noticed. Without them, however, certain products of the modern era could simply not exist. The realisation of smartphones, batteries and fuel cells, data centers, solar cells, fast trains, airplanes and millions of other products would be impossible. Adhesives and sealants are literally everywhere and needed where other fixation technology cannot be applied. Their ability to **join different materials safely and with long-term stability while maintaining the properties of the joined materials, withstand thermal and mechanical stresses, and supporting circular design** principles makes them indispensable to the EU's green and digital transitions.

### Customisation and Innovation

Our sector draws on a multitude of chemistries and technologies<sup>1</sup> that are often **highly engineered and application-specific**, developed through close collaboration with downstream users to meet their industries' trends with evolving technical, environmental and regulatory requirements.

Adhesive and sealant manufacturers innovate in different sectors to design bonding solutions that improve the customers' products' performance regarding safety and longevity, enable new functionalities and contribute to everyone's sustainability goals.

### Examples of Functional Integration Across Strategic Sectors

- **Electronics:** Used for waterproofing, thermal management, and structural bonding in devices from smartphones to medical implants. Sealants, for example, protect printed circuit boards from water damage and mechanical stress
- **Defence and Aerospace:** Provide lightweight, high-strength bonding solutions that withstand extreme conditions. A&S are critical for safety and performance in aircraft, satellites and protective equipment
- **Energy:** Essential in the assembly and long-term performance of solar panels, wind turbines and battery systems. Without advanced adhesives the EU's clean energy transition would not be possible
- **Medical:** Used in wound care, wearable sensors, and implantable devices. Their biocompatibility, sterilisability, and precision bonding capabilities are essential for next-generation healthcare technologies
- **Transport:** Enable bonding of both virgin and recycled materials without compromising safety. Adhesives support lightweight construction, crash resistance and modular design for easier

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<sup>1</sup> • Adhesive chemistry refers to the molecular formulation of the adhesive—such as epoxies, polyurethanes, silicones or acrylics—each offering different strengths, flexibility, curing profiles, and resistance to heat, moisture or chemicals. For example, epoxy adhesives are known for their high strength and thermal resistance, making them ideal for structural bonding in aerospace.

• Adhesive technology refers to the way the adhesive is delivered and applied—such as hot melts, pressure-sensitive adhesives (PSAs), UV-curable systems or two-component systems. For example, UV-curable adhesives are used in electronics and medical devices where fast curing and precision are critical.

disassembly and repair. The functionality, repairability and recycling of batteries can be realised only with adhesives and sealants

- **Construction:** Contribute to airtightness, fire protection, thermal insulation, design freedom and free choice of materials (wood, glass plastics, etc.), and structural integrity. Their use in prefabricated and modular construction enhances energy efficiency and reduces embodied carbon

### Enabling Circularity and Sustainability

Adhesives and sealants play a vital role in **advancing sustainability and circularity across industries**. By enabling durability, lightweighting, repairability and material efficiency, they contribute directly to the environmental performance of products and systems throughout their life cycle. This is fully in line with the EU's circular economy action plan and the respective R-strategies.

- **Durability and longevity:** In sectors such as transportation and construction, adhesives enhance product lifespan, hence lowering the CO<sub>2</sub> footprint in the use phase, by providing strong, fatigue-resistant bonds that withstand mechanical stress, vibration, moisture, and temperature fluctuations

- **Lightweighting:** Adhesives enable the safe use of lightweight material combinations in vehicles and aircraft, reducing weight and improving fuel efficiency whilst maintaining performance

- **Airtightness and energy efficiency:** In buildings, sealants are essential for achieving airtight envelopes, significantly reducing energy loss and improving indoor climate control

- **Circular design:**

- Debondable adhesives allow for disassembly and recycling of multi-material products
- Releasable and reversible formulations respond to chemical and/or physical triggers such as heat or light, enabling on-demand separation
- Adhesives compatible with the recycling process allow the target material to be recycled without disturbing the specific recycling process
- Compatibility with recycled content allows adhesives to be reformulated to bond effectively with secondary raw materials
- Alternative, non-fossil raw materials such as bio-based materials or recyclates (or even CO<sub>2</sub>-based materials) can be used in the production of adhesives and thus make an important contribution to achieving climate targets of the EU

### FEICA Recommendation for a Stronger European Advanced Materials Industry

**Adhesives and sealants meet the criteria for advanced materials** as defined by the European Commission. They are engineered and customisable; they address key economic and ecological requirements and enable strategic collaborations between partners across multiple value chains. Recognising them as such would reflect their true **contribution to Europe's industrial resilience, sustainability goals and technological leadership**.

A predictable regulatory environment is essential to attract industry investment in innovation and the production of advanced materials in Europe. Regulations should include clear, science-based sustainability criteria and remain technology- and material-neutral to avoid lock-ins and allow flexibility for innovation. Simplification should focus on what is strictly necessary, while future rules must strengthen the single market and enhance innovation and competitiveness. This includes reducing administrative burdens, eliminating unnecessary reporting and accelerating lengthy permitting and validation procedures.

Furthermore, as the production of innovative, advanced materials typically faces higher raw material costs, substantial investments and process adaptations, policy measures can increase the availability and the speed of market uptake of such products, ultimately reducing market entry barriers. This includes an incentive-driven regulatory framework (1) compensating potential price premiums of advanced, more sustainable materials, (2) streamlining administrative processes, and (3) shortening approval timelines for innovation funding and industrial investments. Strengthening the advanced materials ecosystems by developing clear industry-wide roadmaps for advanced materials and clean technologies, supported by long-term political and financial commitment, would provide planning security.

### **Safeguarding the competitiveness of the European supply chain**

The resilience of existing production capacity in adhesives in Europe should be safeguarded and protected. The adhesives industry faces increasing challenges due to global market distortions and the rise of protectionist policies in key regions. To safeguard Europe's industrial base, a more **strategic approach to trade and industrial policy is essential**.

We support trade policies that prevent unfair market distortions while maintaining the EU's openness to investment and competition under fair regulatory conditions. At the same time, we recognise the importance of reducing geographic dependencies and strengthening strategic sourcing of advanced materials. Targeted state-aid and industrial strategies should aim to secure Europe's value-added in the adhesives supply chain, ensuring that public and private investment supports European industry while fostering reciprocity with like-minded trade partners.

FEICA, therefore, advocates recognising adhesives and sealants as advanced materials and as a key part of the supply chain for strategic industries using advanced materials. Rather than identifying individual critical materials, we believe it is vital to strengthen entire supply chains through harmonised, science-based, and technology- and material-neutral regulation that attracts investment and reinforces Europe's industrial resilience for advanced materials.

FEICA supports Incentives for private sector to use European advanced materials. This is a positive step towards strengthening the EU's industrial base and supply chain resilience.

FEICA finds it very important to act against anti-dumping practices that prevent investments in production capacities in Europe.

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