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WHITE PAPER

Sustainable packaging, Biodegradable adhesives and PPWR

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PPWR & Sustainable Packaging

The EU Packaging and Packaging Waste Regulation, entered into force in February 2025 imposes strict requirements on the recyclability and compostability of packaging materials entering the EU market. This includes any components whether they can be separated or not, covering boxes, inserts, labels, adhesives and adhesive residue. This regulation will be enforced in stages and requires business to comply to retain access to the EU market, with all non-compliant packaging being banned from 2030. By changing packaging materials now business can get ahead, not only complying with PPWR to keep EU access but also expanding their sustainability efforts to improve brand reputation and consumer trust.

Key Terms:

PPWR - Packaging and Packaging Waste Regulation
Bio-based Materials – Materials made from natural or renewable sources like starches or plant oils, which will replenish overtime unlike fossil fuels. These materials are not always biodegradable.
Packaging - Packaging in PPWR consists of any item intended for containment, protection, handling, delivery, or presentation of a product irrespective of the materials it's made from or whether it is empty. This includes tea bags, labels, stickers, point of sale packaging, inserts, and bags.
Biodegradable - Materials which will break down naturally overtime, primarily due to microorganisms breaking down the polymers making up the material.
Recycling Performance Grades (RPGs) – Different classes to indicate how efficiently packaging can be recycled, from A – C.
Recyclable at Scale - Materials need be 'collected, sorted, and processed in real-world established recycling systems' at high enough quantities.
Industrial Compostable - Materials that will break down in industrially controlled conditions with defined conditions, period, and high temperatures.
Substances of Concern (SoC) - substances that negatively impact recycling or the safety of materials.
Polylactide Acid (PLA) - a plastic produced using renewable feedstocks such as corn, unlike fossil fuel derived plastics, PLA is 100% based on renewable sources
PFASs (per- and polyfluoroalkyl substances) – considered forever chemicals which are persistent in the environment and resistant to biodegradation, used across manufacturing.

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Related Certifications Explained:

EN 13432 – The European standard that tests compostability in industrial composting conditions. For adhesives, this certification ensures it will not compromise the overall packaging's compostability.
INGEDE Method 12 – The only standard for determining the recyclability of paper products containing adhesives, like labels and tapes and provides a method of assessment of their removability in the paper recycling process.

ASTM (American Society for Testing and Materials)
ASTM D6400 – The US standard specification for labelling plastics confirming their performance in industrial composting.
ASTM D6954 – testing plastics for biodegradability, showing that under natural conditions, the polymers break down to be consumed by microorganisms.

REACH - EU regulation for Registration, Evaluation, Authorisation, and Restriction of Chemicals'
FSC Certification – a chain of customer (CoC) certification verifying that materials (paper, wood) are responsibly and sustainably sourced to different degrees.

What is PPWR?

The packaging and packaging waste regulation (PPWR) replaces the packaging and waste directive (PPWD) adopted in 1994. PPWD was considered to have poor enforcement and is considered out of date requiring an updated regulation to 'ensure a harmonised and well-functioning internal EU market'.

Currently, a lot of materials used within packaging cannot be recycled or make the recycling process harder and costly. For example, plastic or foil lined paper cannot be recycled, and laminated, wax, and carbon paper harm the recycling process. Additionally, packaging contributes to half of marine litter and 40% of plastics used in the EU are in packaging.

PPWR aims to reduce packaging waste by ensuring all packaging entering the EU market is recyclable or compostable in existing industrial systems. This regulation covers all stages of the life cycle, from production to waste management and applies to all packaging, packaging materials, and packaging waste regardless of material or origin. Under PPWR, all packaging must be designed for reuse, compostability, or recycling with substantial documentation for all components. For some categories, compostability will become mandatory, this includes packaging which directly contacts food or is intended to be disposed of along with the contents, i.e. tea bags, coffee pods, and sticky labels on fruit.

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These rules apply to all packaging within the EU market no matter the product within, even empty packaging must comply, meaning anyone shipping to/within the EU is affected.

PPWR also imposes stricter requirements across:

- Clear labelling with material contents and disposal instructions will be uniform
- Packaging weight and size, reducing unnecessary or oversized packaging
- Reducing single use plastics like individual sauce packets
- Requirements for take-away businesses to allow customers to bring their own containers
- The use of recycled plastics within packaging materials
- Minimising substances of concern with restrictions on PFASs in food contact packaging
- Reduction of the use of virgin plastics
- Reuse and refill options at no extra charge
- Charging businesses for clean-up of non-recyclable or environmentally harmful materials.

Timeline

- **January 2025**
  - Publication of the final text in the EU Official Journal
- **February 2025**
  - Entry into force replacing older legislation
- **August 2026**
  - Start of Application
  - Required to declare conformity for products available on the EU market
  - Food contact packaging banned if containing PFAs equal to or above given limits
- **February 2028**
  - Several packaging formats will have to be compostable to be on the EU market
  - Tea bags, fruit stickers, and lightweight carrier bags must be compostable in industrial composting facilities.
  - Standardised labelling of material composition
- **From 2030**
  - All packaging must be designed for recycling and non-compliant packaging will be banned from EU market
  - Packaging shall be designed at minimum possible weight and volume.
- **From 2035**
  - Packaging must be recyclable at scale.

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What does this mean for Adhesives?

Adhesives designed for packaging applications, whether as tapes, hot melt, labels, or sealants, must also adhere to PPWR if they exceed a certain amount of the packaging weight or cannot be separated completely.

Under EN 13432 any component of packaging which makes up more than 1% of the dry weight must be certified as compostable themselves and the total of all non-compostable packaging components cannot exceed 5%. This includes adhesives, meaning they must meet the same standards as the rest of the packaging.

Additionally, this means that even if the adhesive makes up less than 1% of the total weight, it can still contribute to the total weight of non-compostable elements, (inks, coatings, etc.) and cause the invalidation of recyclability/compostability claims.

Ultimately, the adhesive needs to match the packaging's intended end of life and, under some certifications, must be proven compostable. Using a non-compliant adhesive can compromise the recyclability or compostability of the overall packaging risking fines, contamination to recycling systems, and reputation damage. No matter the percentage of adhesive used, we recommend switching to a recyclable, compostable, or biodegradable packaging adhesive sooner rather than later.

Why act now?

Failing to comply with PPWR and provide testing evidence could result in restricted or blocked access to the EU market, increased scrutiny, brand reputation damage, and fines. While delaying action to the last minute could cause costly redesigns and supply chain disruptions as companies play catchup.

The responsibility of compliance falls on the manufacturer of the packaged product while suppliers need to provide the necessary documentation, meaning whether you are manufacturing packaging, shipping consumer products, or selling into the EU, all businesses will need to act to ensure their packaging complies.

- Start by auditing your materials, what are they made of, how are they used, are any components unnecessary, and do they hold the appropriate certifications. This includes cartons, sealing products, labels and inks.
- Speak to your suppliers and distributors to request the necessary documentation.
- If you need to switch materials, test them, ensure they provide the output you need while being compliant. Doing this as early as possible allows you time to find better materials as needed.

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- Finally ensure all components you use in your packaging align with the intended route i.e. composting, recycling, or mechanical separation.

By getting ahead on PPWR compliance, businesses will avoid making decisions and changes under time pressure, but you can also meet sustainability goals, improve brand reputation, and even lower costs by using lighter and smaller packaging.

Expanding further - Sustainability

Compliance is required but going a step further and becoming a more sustainable business overall builds brand reputation and consumer trust, as well as supply security during geopolitical situations and fossil-based resource limitations.

Even if the amount of tape/adhesive you use for your packaging is below the threshold for required biodegradability or recyclability, taking steps to make your packaging more eco-friendly or eco conscious is beneficial.

However, sustainability in industry comes with challenges:

- New legislations, like PPWR, enforce changes which can be hard to keep up with and avoid penalties.
- Getting full documentation from suppliers and manufacturers can be logistically challenging and without it companies face penalties and greenwashing allegations.
- Cross department collaboration is required to align cost, performance and sustainability goals.
- Customers are more aware of packaging, especially plastic usage.
- Adopting new processes and materials can be expensive in the short term, especially automated systems designed for traditional materials.
- Recycled materials may not be as consistent in quality compromising efficiency and reputation if not tested regularly.
- The conversation is consistently changing and requires regular training to stay up to date.

Why transition to sustainability?

While challenging, it is still important companies start to transition to sustainable practices and materials as soon as financially viable. By making the transition companies can benefit the environment by minimising CO2 emissions throughout the supply chain and leaving no harmful effects when products reach end of life.

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They can also improve brand reputation, value and customer approval by sourcing materials ethically and responsibly and preventing stock issues from fossil-based resource limitations.

Where can you introduce sustainable practices with adhesives?

Sustainable adhesive applications go beyond just packaging; many industries are making the move to sustainable products to minimise environmental impact but also for consumer and worker safety. This change spans automotive, aerospace, and consumer appliances.

Sustainable, and safer, adhesives and tapes include:

- **Bio based products** – these can help to reduce carbon footprint, lower toxicity, and replace fossil products. They are already heavily used in food packaging and consumer goods applications
- **Biodegradable products** – sustainable end of life products, which contribute to a circular economy
- **Products with solvent free production processes**
- **PLA products** – 100% based on renewable sources
- **PFASs free adhesives**
- **Plastic wrap** and pallet stabilisation alternatives to reduce single use plastic
- **Reducing the use of solvents**, VOCs, and harmful aerosols which harm workers.

Product Solutions

Power adhesives

Power Adhesives created the world's first fully certified biodegradable hot melt adhesive with technology that allows them to make almost all their hot melt products biodegradable. The range has since expanded to five biodegradable hot melt adhesives with two bio-based options.

These adhesives will breakdown after use with no harmful effects to the environment or microplastics and are free from solvents and chemicals. The raw materials in Tecbond biodegradable hot melts are also indirect food contact approved. Aimed at being a more sustainable solution to the packaging industry they are also suitable for mattress assembly, sports equipment and related applications.

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How do Tecbond biodegradable adhesives break down?

- Exposure to UV light, oxygen and heat begin the process, breaking down long chain polymers. This process is irreversible.
- After exposure only oxygen is needed to continue the breakdown.
- Once the long chain polymers have broken down they can be consumed by microorganisms like natural waste

Tecbond	214B	110B-PR	902B-PL	351BPR	355B-PR
Form	Shaped & Bulk	Bulk	Bulk (Pillows)	Bulk	Bulk
Open time	10 seconds	10 seconds	permanent	10 seconds	10 seconds
Substrates	Carton and board	Carton and board	Paper, board, wood, plastics, fabric	Carton and board	Paper, board, coated board
USP	45% Bio Based	High speed packaging adhesive	51% Bio Based pressure sensitive adhesive, very high tack	Clean running, reduced filter and nozzle blockages	Low temperature performance, suitable for freezer applications
ASTM D6400	✓	✓	✓	✓	✓
EN13432	✓	✓	✓	✓	✓
ASTM D6954	✓	✓	✓	✓	✓

tesa

Tesa tapes offer a wide range of adhesive tapes with sustainability certifications and benefits designed to minimise environmental impact aimed at the packaging industry. They offer additional benefits such as shock absorption and printability to allow you to find the right option for your application.

They consider products to be a more sustainable option if they adhere to one of these criteria:

- Contain at least 50% bio-based material in one component and 30% in total
- have at least one component that is made of at least 50% recycled material, and the total share must be at least 30%
- be certified as recycling-friendly according to certifications like INGEDE Method 12
- have at least one component that has more than 50% content of a (bio) mass balance material and minimum 30% share in total

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The below products each adhere to at least one of these criteria and are considered advanced sustainable solutions for packaging applications, they all also feature a solvent free production process.

Product	4513	4713	60408	60412	60418
Base	Paper based	Paper based	Paper based	Filmic	Filmic
Max Weight	15kg	10kg	20kg	30kg	25kg
Adhesive	Synthetic rubber	Natural rubber	Natural rubber	Waterborne acrylic	Synthetic rubber
Backing Material	FSC Certified paper	FSC Certified paper	FSC Certified paper	PCR PET (70%)	PCR PET (85%)
USP	Good adhesion on difficult carton quality	Suitable for use at low temps	Very good shock resistance	Very good printability	Low unwinding force
Sustainability	Recycling friendly according to INGEDGE method 12 (100/100)	Recycling friendly according to INGEDGE method 12 (100/100)	92% bio-based carbon content in total product Recycling friendly according to INGEDGE method 12 (78/100) Official certification from DIN CERTCO	70% Post-Consumer Recycled (PCR) PET content in backing Recycling friendly according to INGEDE Method 12 (100/100)	85% Post-Consumer Recycled (PCR) PET content in backing

3M

3M have developed their first industrial, paper backed, box sealing tape: Scotch Performance Paper Box Sealing Tape 570. This tape offers the perfect balance between performance and sustainability, being an eco-friendly alternative to traditional plastic tapes.

3M 570 is comprised of a solvent free hot melt adhesive and a strong backing made from FSC certified paper. This adhesive tape is fully automatable and helps reduce the use of single use plastic packing on pallet and lightweight parcel shipments designed to help end users meet sustainability goals, this tape is recycling friendly according to INGEDE 12 and can adhere to packaging cartons made from high levels of recycled content.

Additionally, many 3M tapes are produced using a solvent free adhesive coating process. Instead of using solvents, 100% solid raw materials are used as well as less energy for a lower carbon footprint process with no solvent emission.

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Disclaimer

This whitepaper has been researched and produced by TECHSiL for informational purposes. Nothing contained in this document constitutes legal, regulatory, or compliance advice. All businesses and individuals are strongly encouraged to seek independent legal and regulatory counsel before making decisions based on the information presented here.

Resources

https://www.3m.co.uk/3M/en_GB/packaging-solutions-uk/applications/sustainable-packaging-solutions/

https://environment.ec.europa.eu/topics/waste-and-recycling/packaging-waste/facts-about-new-eu-rules-packaging-and-packaging-waste_en

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https://www.ppwr-guidebook.eu/about-the-ppwr/

https://www.ppwr-guidebook.eu/glossary/

https://afera.com/uploads/Afera%20position%20on%20packaging%20tapes%20under%20PPWR.pdf

https://www.3m.co.uk/3M/en_GB/p/d/b5005550001/

https://www.futuremarketinsights.com/reports/sustainable-packaging-market

https://www.poweradhesives.com/2026/01/28/ppwr-biodegradable-adhesives-a-comprehensive-qa/

https://www.poweradhesives.com/2025/11/13/will-your-packaging-meet-the-compostability-mandates-in-2027/

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https://www.tesa.com/en-gb/about-tesa/insights/stories/packaging-and-packaging-waste-regulation.html

https://www.poweradhesives.com/2024/10/23/bio-based-biodegradable-what-exactly-do-they-mean/

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