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EU Packaging and Packaging Waste Regulation - Requirements for Packaging Adhesives

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Executive summary

The EU Packaging and Packaging Waste Regulation (PPWR) introduces comprehensive requirements for packaging placed on the EU market, which lead to specific implications for adhesives used in packaging applications ('packaging adhesives'). **This document outlines key PPWR provisions relevant to packaging adhesives and the recommended preparations for adhesive companies.**

Key articles of the PPWR define its **scope** (Article 2), and provide important **terminology** (Article 3), restrictions on **substances in packaging** (Article 5), requirements for packaging to be **recyclable** (Article 6) or **compostable** (Article 9), for **packaging minimisation** (Article 10), and for the **reusability** of certain packaging (Articles 11 and 29). The requirements of the PPWR legal text will be supplemented by secondary legislation (mainly delegated acts), which are currently under development.

Whilst the above requirements are mostly relevant for 'manufacturers' in the meaning of the PPWR, for packaging adhesives, future PPWR compliance (verification) work for packaging adhesives will most likely involve:

- Article 5: monitoring substances restricted, including **heavy metals** and **PFAS**, which shall not exceed defined thresholds in the packaging
- Article 6: providing information as regards the stipulations for adhesives in the **design-for-recycling criteria** and, in certain cases, potentially packaging waste sortability
- Article 9: supporting the **(home) compostability assessment** of packaging in line with a revised EN 13432 standard (and a future EN standard for home compostability)
- Article 11: potentially, fulfilling requirements for **label removability** in reuse applications

The PPWR may exert further influence on the packaging adhesives industry, such as requirements to reduce adhesive amounts, reduction of packaging size, and the discontinuation of certain packaging formats. These effects, which influence volumes of adhesives rather than their compliance, are beyond the scope of this document.

Adhesive companies are **advised** to:

- **Monitor the development of relevant CEN standards** (e.g., the EN 18120 series and additional CEN TS documents out of CEN TC261/SC4) for an indication of future **design-for-recycling** requirements
- **Evaluate their products and new product developments** with a view to fitness for these technical requirements
- Prepare for **issuing information to downstream packaging producers on restricted substances and compatibility with recycling**
- **Engage with users and downstream packaging producers** to ensure sufficient communication and address shared compliance work

Requirements stated in the PPWR relevant for packaging adhesives

The following articles of the PPWR are relevant in the context of both adhesives in packaging applications *and* for the packaging of adhesives themselves:

Article 2 – Scope

The PPWR applies to packaging of all materials and for all uses. As such, packaging adhesives intended for all packaging materials, all packaging formats, and all markets – including special markets, such as medical products and pharmaceuticals – fall under the regime of the PPWR.

Article 3 – Definitions of terms

While the PPWR defines numerous terms, the following are the most relevant for the assessment of packaging adhesive applications. A brief interpretation of the implications of each selected definition is provided below.

'Plastic'

Adhesives are different from 'plastic' and are therefore **not subject to the minimum recycled content requirements** for plastics in packaging as stipulated by the PPWR[1].

> *'plastic' means a material consisting of a polymer within the meaning of Article 3, point (5), of Regulation (EC) No 1907/2006, to which additives or other substances may have been added, and which is capable of functioning as a main structural component of packaging, with the exception of natural polymers that have not been chemically modified;*

[1] Please refer to FEICA's POP "Adhesives are not plastic": https://www.feica.eu/information-center/all-information-centre/preview/1214/pop-ex-o04-010-feica-adhesives-are-not-plastic?id=4c6dc063-0d18-47c1-aaf7-e2c7dce4e4a0&filename=POP-EX-O04-010_FEICA+on+Adhesives+are+not+Plastic.pdf

'Composite packaging'

The PPWR clearly defines that adhesives are not to be considered in the determination of whether a packaging design constitutes composite packaging. Therefore, **no particular requirements are placed on packaging adhesives in this regard**.

> *'composite packaging' means a unit of packaging made of two or more different materials which are part of the weight of the main packaging material and cannot be separated manually and therefore form a single integral unit, unless one of the materials constitutes an insignificant part of the packaging unit and in any event no more than 5 % of the total mass of the packaging unit and excluding labels, varnishes, paints, inks, adhesives and lacquers; this is without prejudice to Directive (EU) 2019/904;*

'Substance of concern'

The PPWR defines[2] 'substances of concern' more broadly than has been the common use of the term in the past, by referring not only to REACH, CLP, and the POP Regulation[3] but also including any substance that negatively affects the reuse and recycling of materials in the product in which it is present. This definition may therefore lead to ambiguities and potential overlap between the regulation of risks posed by hazardous substances and negative effects on recyclability, blurring the line between packaging regulation and chemicals regulation further[4].

The impact of packaging adhesive applications on recyclability may often not be attributable to individual substances within the adhesive. Although at present there is no indication of what exact interpretation will be applied in relation to this requirement. It can be expected that **the presence of substances that negatively affect reuse and recycling will need to be minimised or avoided in packaging adhesive formulations**. More clarity is expected to emerge in 2026 after ECHA and the Commission have reviewed the topic.

> *'substance of concern' means a substance that: (a) meets the criteria laid down in Article 57 of Regulation (EC) No 1907/2006 and is identified in accordance with Article 59(1) of that Regulation; (b) is classified in Part 3 of Annex VI to Regulation (EC) No 1272/2008 in one of the following hazard classes or hazard categories: (i) carcinogenicity categories 1 and 2; (ii) germ cell mutagenicity categories 1 and 2; (iii) reproductive toxicity categories 1 and 2; (iv) endocrine disruption for human health categories 1 and 2; (v) endocrine disruption for the environment categories 1 and 2; (vi) persistent, mobile and toxic or very persistent, very mobile properties; (vii) persistent, bioaccumulative and toxic or very persistent, very bioaccumulative properties; (viii) respiratory sensitisation category 1; (ix) skin sensitisation category 1; (x) hazardous to the aquatic environment — categories chronic 1 to 4; (xi) hazardous to the ozone layer; (xii) specific target organ toxicity — repeated exposure categories 1 and 2; (xiii) specific target organ toxicity — single exposure categories 1 and 2; (c) is regulated under*

[2] Through adoption of the definition provided in the Ecodesign of Sustainable Products Regulation[1].
[3] Cf. Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH)(https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A02006R1907-20250901), Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures (CLP) (https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:02008R1272-20250901), Regulation (EU) 2019/1021 of the European Parliament and of the Council of 20 June 2019 on persistent organic pollutants (POP) (https://eur-lex.europa.eu/eli/reg/2019/1021/oj/eng)
[4] See FEICA's call on the Commission to align definitions of SoC with the REACH regulation in the new Environmental Omnibus: https://www.feica.eu/information-center/all-information-centre/preview/1214/feica-position-paper-environmental-omnibus?id=94d05b12-a8c1-4557-b925-a7b32d737138&filename=POP-EX-O09-028_FEICA+position+paper_Environmental+Omnibus.pdf

Regulation (EU) 2019/1021; or (d) negatively affects the reuse and recycling of materials in the product in which it is present;

'Compostable packaging'

The PPWR definition of 'compostable packaging' comprises the compatibility both with industrial composting processes and with (industrial) anaerobic digestion processes, whereas existing certification schemes for 'compostable packaging' – typically based on EN 13432 – have allowed certification based solely on compostability.

Depending on the trajectory of the update of EN 13432, as requested in the PPWR, adhesives intended for 'compostable packaging' may need to fulfil additional requirements in the future[5]. **Retesting and/or recertification** according to the updated EN standard may be required.

'compostable packaging' means packaging that biodegrades in industrially controlled conditions or that is capable of undergoing biological decomposition in such conditions, including through anaerobic digestion, but not necessarily in a home-composting environment, combined, if necessary, with physical treatment, resulting ultimately in the conversion of the packaging into carbon dioxide or, in the absence of oxygen, methane, and mineral salts, biomass and water, and that does not hinder or jeopardise the separate collection and the composting and anaerobic digestion process;

Article 5 – Requirements for substances in packaging

The PPWR provides updated limits for certain **heavy metals** in packaging compared to the Packaging and Packaging Waste Directive[2], and introduces a strict limit for per- and polyfluorinated alkyl substances (**PFAS**).

As these **limits apply to the overall packaging**, sources of these materials in packaging adhesives need to be considered. Packaging **adhesives will therefore have to allow the packaging to comply** with heavy metals and PFAS restrictions. These substances are not intentionally added to adhesives. However, **trace amounts may be introduced *unintentionally***, e.g., from processing equipment, piping, or transport and logistics operations, and therefore **need to be monitored**.

Article 6 – Recyclable packaging

The PPWR requires most **packaging placed on the market to be recyclable from 2030** onwards, with exemptions provided only for specific sensitive packaging applications such as medical devices and medicinal products, infant formula, and dangerous goods according to Directive 2008/68/EC as well as certain packaging material such as wood, cork, rubber, ceramic, porcelain and wax. The **exact requirements and the verification process for recyclability are to be provided in the form of secondary legislation (delegated acts)** and need to consider the parameters set out in Table 4 of Annex II of the PPWR as well as substances of concern.

As Table 4 of Annex II explicitly refers to adhesives, the **effects of packaging adhesive applications on the recyclability** of packaging will **need to be considered**.

[5] While EN 13432:2000 does describe anaerobic digestion, the pass/fail limits it provides are based on industrial composting only (NOTE 2 of clause 8 states that it is sufficient to determine biodegradability under aerobic conditions).

The requirement in Article 6 is expected to represent the **central new requirement of the PPWR from a packaging adhesive perspective and is likely to become the main driver of compliance and product development work**.

Article 9 – Compostable packaging

The PPWR requires certain types of packaging, including self-adhesive **labels for fruits and vegetables,** to be industrially compostable from the 12th of February 2028 onwards. It allows member states to additionally require home compostability at the national level. The verification is to be performed based on a revised version of standard EN 13432 and a potential new EN standard on home compostable packaging. In its current form, the EN 13432 standard requires the consideration of all constituents and components of packaging that individually represent more than 1 wt% in the biodegradability assessment. There is no strong indication that this will change. As such, the **biodegradability of packaging adhesives**, as well as their potential impacts on **ecotoxicity,** will most likely need to be considered as part of the verification of the compostability of packaging, as per updated standard EN 13432 (see also the definition of 'compostable packaging' above).

Article 10 – Packaging minimisation

The PPWR requires a minimisation of packaging weight and volume as a measure of waste prevention. While this measure can be expected to be focused on the weight and volume of the main packaging material(s)[6], the implementation of the verification will be determined in a CEN standard. Existing standard EN 13428:2004, created in the context of the Packaging and Packaging Waste Directive, may form a basis for the development of the harmonised standard.

It may be **expected that this requirement will remain at an overall packaging design level**, rather than create specific requirements on packaging adhesives.

Article 11 – Reuseable packaging

The PPWR describes the verification of the property of a packaging being considered 'reusable' and relates to the required use of 'reusable' packaging in certain applications (see Article 29). The description of the process to determine the 'reusable' nature explicitly mentions the attachment of labels (see Article 11), and the removal of 'non-reusable components of packaging' (see Annex VI, part B). As such, the **ability of labelling adhesives to release the label** may become part of the assessment of reusable packaging.
As **no specific guidance or requirements are provided in the PPWR** text and no secondary legislation or standardisation is foreseen in the text, it appears likely that any requirement related to releasability or solubility of labelling adhesives (either water or alkali) will be negotiated in the form of normal business practice along the value chain, and no specific compliance work will be required by adhesive producers or users.

Future verification of PPWR requirements and compliance work

Based on the above description of which provisions of the PPWR relate to packaging adhesives, this section provides an illustration of how compliance work related to packaging adhesives is likely to be performed when Articles 5, 6, and 9 begin to apply.

Packaging adhesive companies can – and should – already begin preparing for compliance with PPWR requirements. The following section also presents suggestions for such preparations.

[6] The PPWR legal text hints at the consideration of weight and volume limits, as well as wall thickness and empty space, as factors in this assessment (see Annex IV of the PPWR for more details).

The suggestions are based on the PPWR legal text and, to some extent, on an estimation of the content of the upcoming secondary legislation under the PPWR. **The reader should always consult the current state of secondary legislation and any guidance issued by the EU Commission on the PPWR.**

Assessment of packaging according to Article 5 of the PPWR (substances requirement)

Article 5 of the PPWR stipulates the application of the conformity assessment procedure provided in Annex VII. This annex describes the process to be followed for the assessment of packaging and mentions test reports, but does not address the communication or the sharing of compliance work along the value chain.

Consequently, while it would be possible for packaging manufacturers to verify compliance with Article 5 based on practical testing of the finished packaging, **it appears likely that adhesive suppliers will be asked to provide information about the presence of substances restricted by Article 5** to the users of adhesives.

Packaging adhesives suppliers' preparation for the restrictions on substances (Article 5)

- Monitor the **maximum content of lead, cadmium, mercury, and hexavalent chromium** in packaging adhesives so that its application will not lead to the concentration of these metals in the overall packaging to exceed 100 mg/kg of packaging
- Monitor the **maximum concentration of per- and polyfluorinated alkyl substances (PFAS)** in packaging adhesives so that its application will not lead to the concentration(s) of these substances in the overall packaging to exceed 25 ppb for PFAS measured with targeted analyses, 250 ppb for the sum of PFAS measured with targeted analyses, and 50 ppm for PFAS overall.[7] It must be noted that so far, **no standardised analytical protocols for PFAS** testing exist
- Seek to **minimise**, **as much as possible, the presence of 'substances of concern'**, as per the definition (cf. the PPWR and ESPR definition), in adhesive formulations[8].

Assessment of packaging subject to Article 6 of the PPWR (recyclability requirement)

Packaging for which recyclability is required will need to be assessed following procedures still to be developed in the form of a delegated act under the PPWR. While presently, no detailed information is available, certain assumptions can already be made based on the PPWR legal text, the development of European standardisation deliverables requested by the European Commission, and pre-existing systems for the evaluation of recyclability, such as those in place in the German Mindeststandard or the design-for-recycling requirements used in conjunction with EPR systems (e.g., COTREP guidelines).

Based on these sources, it may be expected that the **packaging manufacturers' verification process to assess the recyclability of packaging will broadly follow the steps below** (terms used by the PPWR are in italics):

1. Identify the *main body of the packaging unit* (e.g., a bottle, cup, tray, or flexible pouch)
2. Identify *separate components* (e.g., clip-on caps, loose paper banderoles), if any
3. Assess the *main body of the packaging* unit and each *separate component* separately as follows:
    a. Determine the *predominant material* by weight

[7] See Article 5(5) of the PPWR for details on the measurement method.
[8] More clarity on the criteria for 'substances of concern' is expected to by provided by ECHA in 2026, as part of a study commissioned by the EU Commission.

b. Identify the PPWR *packaging category* that corresponds to the *predominant material* and, as applicable, the form (flexible vs. rigid, bottle vs. other formats)
c. Consult the applicable design-for-recycling guideline table in the delegated act under the PPWR: establish for each *integrated component* and for each *constituent* whether it can be found in the green (or 'fully compatible'), yellow (or 'limited compatibility'), or red ('not compatible') column of the guideline or whether it is not listed
d. If the design guideline table states that a sorting test is required for an *integrated component* or a *constituent*, perform the required testing to obtain a test result that determines whether that integrated component or constituent is fully compatible, of limited compatibility, or not compatible
e. If an *integrated component* or a *constituent* is not listed, perform recyclability testing according to the procedures provided in the delegated act. This testing may include sortability testing. Depending on the exact content of the delegated act, it may also be possible that the entire finished packaging is to be tested rather than individual components and constituents that are missing from design-for-recycling guidelines
f. Apply the to-be-defined scoring method to calculate the individual *recyclability performance score*

4. Combine the *recyclability performance scores* of the *main body of the packaging unit* and all *separate components*, as the sum of the individual scores multiplied by their weight share in the overall packaging unit
5. Assign a *recyclability performance grade* based on the *recyclability performance score*, according to PPWR Annex II, Table 3

Adhesives are used as a minor element in packaging (i.e., comprise a low weight share of the packaging), and it is therefore not expected that they would form the predominant material. Adhesive applications are expected to be considered a constituent. The **impact of packaging adhesive applications on the recyclability assessment can therefore be expected to be limited to step 3.c-e.**[9,10]

In consequence, **two principal routes are expected to confirm the compatibility of a given adhesive application[11] with recycling** and therefore to allow packaging containing that adhesive application to receive a positive assessment under Article 6 of the PPWR:

1. Adhesives applications **already listed in the respective design-for-recycling guidelines, *or***
2. **Practical testing** of the compatibility of the adhesive application with recycling

Entire groups of adhesives rather than individual products are expected to be listed in the delegated acts defining the design-for-recycling criteria. Such group listings will avoid substantial product-specific testing.

[9] In principle, adhesives could impact sortability of packaging waste via near-infrared (NIR) sorting devices – particularly if the surface coverage is large, as is mainly the case with laminating adhesives, labelling adhesives, and heat seal coatings. However, extensive tests[3] suggest that due to the low layer thickness of such adhesive applications, they do not influence the NIR spectrum and therefore do not influence the NIR sorting process at all.

[10] Adhesives may also influence whether a component of a packaging unit is considered an integrated or a separate component. The determination of this property is expected to be described in EN 18120-3. While this may influence the overall recyclability outcome of a packaging unit (e.g., a separate paper component is not likely to impact the recyclability performance grade of a plastic packaging, but an integrated paper component is), the compliance work related to the adhesives' compatibility with recycling will still be performed in the same steps described here. In cases where a separate component is made from a different material than the main body of the packaging unit, this may imply the verification of the adhesive's compatibility with one or both design-for-recycling guidelines or the respective test methods.

[11] As well as other constituents and components of packaging.

Packaging adhesives suppliers' preparation to meet recycling compatibility requirements (Article 6)[12]

- **Prepare to issue information on the adhesive as regards the stipulations found in the design-for-recycling guideline tables** of the upcoming PPWR secondary legislation (i.e., confirming that a given adhesive, by its composition and/or chemical nature, matches one of the stipulations found in the design-for-recycling guideline)
- In cases **where the stipulations** in the design for recycling **tables do not apply, individual testing may be used** to demonstrate recycling compatibility of adhesive applications that are not included or do not have a favourable rating in the group listings

For most cases, no impact of adhesives on the **sortability of packaging** (waste) is expected[3]. In case of doubt, a near-Infrared (NIR) sortability test can provide reassurance that NIR-based sorting of packaging waste will indeed not be affected. This testing can be performed by all-over coating a substrate samplewith the adhesive at the nominal application weight and conducting a classification test on a commercial NIR sorting device.[13]

The following constitute easy-to-implement suggestions to minimise the risk of impacts on **sortability**:

- Avoid the incorporation of **carbon black** – a material that strongly absorbs NIR light – in adhesives applied with large or full packaging surface coverage, in order to prevent affecting NIR-based sorting operations
- Avoid the incorporation of **ferromagnetic materials** in adhesives, in order to prevent affecting magnetic sorting operations
- Avoid the incorporation of **conductive materials** in adhesives, in order to prevent affecting eddy current and metal-detector-based sorting operations
- Prepare to potentially issue **statements of absence** of ferromagnetic materials, conductive materials, and carbon black

Assessment of packaging subject to Article 9 of the PPWR (compostability requirement)

Packaging for which compostability is required will need to be assessed according to a harmonised European standard for composting in industrially controlled conditions in bio-waste treatment facilities, as well as potentially ancillary standards relating to home compostability, if home compostability is required in a member state.

Based on the current testing and certification approaches related to compostable packaging, it may **be expected that the verification of the compostability of packaging** will broadly follow the following **process**:

1. Establish the **compliance with compostability requirements based on EU harmonised standard(s)**
2. If the packaging is subject to EU member state requirements for home compostability, establish the **compliance with home compostability requirements based on EU harmonised standard(s)**

Packaging adhesives suppliers' preparation to meet compostability requirements (Article 9)[14]

[12] Readers are warned that the suggestions in this section apply to packaging adhesive used in packaging subject to Article 6 of the PPWR. Certain packaging applications are exempt from these requirements.
[13] A procedure for performing full testing of packaging sortability is described in EN 18120-3. The PPWR secondary legislation may provide a definitive method.
[14] Readers are warned that the suggestions in this section apply to adhesives intended for packaging subject to Article 9 of the PPWR. Only specific packaging applications are subject to these requirements.

- **Verify the biodegradability and ecotoxicity properties** of packaging adhesives intended for (home) compostable applications through the corresponding test procedures
- **Prepare to issue information** related to biodegradability, ecotoxicity and (home) compostability or obtain a certification of (home) compostability once updated standards are available[15]

References

[1] "REGULATION (EU) 2024/1781 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 13 June 2024 establishing a framework for the setting of ecodesign requirements for sustainable products, amending Directive (EU) 2020/1828 and Regulation (EU) 2023/1542 and repealing Directive 2009/125/EC." European Union, 2024.
[2] "European Parliament and Council Directive 94/62/EC of 20 December 1994 on packaging and packaging waste." 1994.
[3] "Near-infrared classification and sorting test programme - Summary of key outcomes." CEFLEX, 2023.
[4] CEN TC261/SC4/WG3 (Material recovery)
[5] CEN TC261/SC4/WG10 (Design for recycling for plastic packaging products)
[6] CEN TC261/SC4/WG2 (Degradability and organic recovery of packaging and packaging materials)

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[15] Certifying products according to current standards, such as EN 13432:2000, should not be considered final assurance, as the requirements are expected to be tightened and potentially supplemented by additional requirements in the updated standard.

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