# Guidance on the assessment of the recyclability of packaging subject to mandatory scheme participation

## Aligned with the German Federal Environment Agency



**Osnabrück, 30.11.2018**

## 1. Introduction

A key objective of product responsibility regulations is to provide manufacturers with incentives to take into account the environmental impacts of products throughout their entire life cycle during the design and manufacture of products and, in particular, during their subsequent disposal.[1] For this reason, the legislator has broadened product responsibility in the Packaging Act (VerpackG) by including a regulation on monetary incentives provided by EPR-schemes within the framework of scheme participation fees.
One objective of the regulation in § 21 VerpackG is, in addition, to take basic recyclability into account when calculating participation fees. In doing so, no legal requirements in the form of concrete surcharges or discounts on participation fees were included, since, on the one hand, these cannot be quantified in a generally binding manner on the basis of the current state of knowledge and, on the other hand, would mean an intensive intervention in the pricing-freedom of the schemes which is protected by competition law.[2] Specifically, section 21, paragraph 1 of the Packaging Act governs:

> *„ (1) Schemes are obliged to create incentives, within the framework of the assessment of participation fees, in order to*
>
> *1. promote the use of materials and material combinations, which can be recycled as high a percentage as possible, taking into account sorting and recovery practices, […]“*

In order to provide the schemes with a uniform framework for the assessment of recyclability within the meaning of paragraph 1(1), paragraph 3 requires an annual publication of minimum standards by the Central Packaging Registry (Zentrale Stelle) in alignment with the Federal Environment Agency.[3] The Packaging Act requires the first publication of a minimum standard aligned with the Federal Environment Agency as per 01.09.2019. As the schemes will have to report to the Central Packaging Registry and the Federal Environment Agency for the first time by 01.06.2019 on their implementation of the requirements of § 21 of the Packaging Act, the Central Packaging Registry and the Federal Environment Agency have decided to provide a guidance in order to provide for a first outline of framework and direction of development. This guidance thus represents the preliminary stage of the actual incentive setting, which is then carried out by the schemes in the next step.

The stakeholders concerned were initially involved in the drafting process in the form of an expert group. Based largely on the recommendation of Expert Group III of the Central Packaging Registry, a draft of the guidance was prepared. A further stakeholder involvement took place within the framework of a consultation procedure on this draft. This guidance was finalised after revision following the consultation procedure.

## 2. Requirements

When calculating the recyclability, at least the proportion of recycling-ready materials in the individual packaging must be taken into account. When determining the recycling-ready material content, at least the following three criteria must be taken into account:



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1 [BT] BT-Drucksache 18/11274, justification for § 21, S. 107.
2 Ibid.
3 Ibid.

1) the existence of sorting and recovery infrastructure for high-quality mechanical recycling of this packaging,
2) the sortability of the packaging and the separability of its possible components,
3) incompatibilities of packaging components or substances contained which, according to recovery practice, may prevent successful recovery.

**3. Object of assessment**

The assessment of recyclability relates to the unfilled packaging as a whole, including all associated packaging components such as labels, sealing films, lids and closures, etc. (complete packaging). Measuring recyclability based on individual packaging components as a result of theoretically dismantling the packaging is not permitted.
The components of combination packaging, which typically separate during use or consumption, can be assessed separately.
The evaluation of packaging in groups is permitted if the individual packaging in such a group have the material structure in common and otherwise only differ in terms of contents and/or volume. Group evaluation is not allowed if parts of the group differ in relevant process-specific criteria (see criteria in section 4 and the respective appendices). For example, classification as a packaging group is not possible for plastic articles whose material structure is identical, but which are only partially accessible for sorting due to their different colouring.

**4. Details of the requirements in accordance with section 2.**

**4.1 Existence of sorting and recovery infrastructure**

If packaging conforms to the "targeted material description" in Appendix 1, column 3 (targeted materials in the recycling process) (taking into account a possible exclusion in column 4), it can be assumed that an infrastructure of sorting and high-quality mechanical recycling is available on the market. If it is not possible to allocate the packaging to one of these material fractions, the packaging is not considered recyclable according to current practice.[4] The recyclable materials specified in Appendix 1, column 5 shall be included proportionately in the assessment.

4.2 **Sortability and separability**

When assessing recyclability, the sortability by means of sensor-supported detection for the following materials has to be considered: Glass, plastics (except film fraction), liquid packaging cartons and paper/carton. Empirical testing is only required if one of the exclusion criteria listed in Appendix 2 (packaging characteristics requiring testing of identifiability in sensor-assisted sorting) applies.[5]

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4 If, in individual cases, the existence and use of the infrastructure necessary for high-quality mechanical recycling can be demonstrated, an exception may apply. Such evidence must include the following for each individual case:
(1) evidence that the result of the recycling process is of high quality within the meaning of the minimum standard; and
2) weighing slip-based verification

5 This means that, as a rule, no empirical testing is required. If an empirical test is nevertheless necessary in exceptional cases, it must be carried out with a standard detection unit, i.e. not with a hand-held scanner. In this case, the result of this empirical test is included in the assessment.

For metal packaging and metal-containing composite packaging, when assessing the recyclability only the metal content may be taken into account (this does not apply to metallizations).[6]

When assessing the recyclability of plastic packaging, it must be taken into account that the density of the shredded material (usually <1 $cm^2$) allows it to be allocated to the correct recyclable material flow. Packaging or packaging components made of polyolefins which have a density of over 0.995 $g/cm^3$ as a result of additives, fillers or in a multilayer are not considered recyclable.

In the case of fiber-based packaging, the assessment of recyclability shall be limited to the fiber content; as a general rule, they shall be assessed as recyclable in accordance with their fiber content. For water-resistant packaging or components, it is necessary to determine recyclability by testing according to the relevant test methodology.

**4.3 Recycling incompatibilities**

Declaring a packaging recyclable presupposes that no material combinations or substances are used which can prevent successful recycling. Appendix 3 (Overview of packaging recyclables and material-specific incompatibilities) provides the testing basis for determining incompatibilities. An individual proof must be provided if one wants to deviate from that basis.

**4.4 Available content of recyclable materials**

The material content available for recycling (in relation to the total packaging, cf. 6.10) determines the recyclability according to this guidance. The recyclability shall be classified on a metric or ordinal (with more than three degrees of scale) dimensional scale.[7] The scale value and, if not self-explanatory, the dimensional scale, the associated classification rules and the classification in accordance with subclause 4.1 are required on the part the schemes when documenting the assessment result.
The assessment which is limited to the recyclable material content, allows to further considerate the intrinsic value and marketability of material components and can thus reflect realistic economical and ecological added value for the post-use phase.

**5. Method**

A model for the approach to the assessment of recyclability is given in appendix 4.

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6 An individual justification must be kept for any findings that deviate from this.
7 More detailed requirements for the presentation of recyclability in a minimum standard 2019 will be decided after evaluation of the scheme reports that will be submitted by 01.06.2019.

## 6. Terminology

The following definitions apply in this document:

### 6.1 Recyclability

In contrast to the recycling concept of the German Circular-Economy Act (KrWG), recyclability in this document always refers to high-quality and material recycling. This recyclability is the basic and gradual suitability of a packaging, after passing through industrially available recovery processes, to substitute virgin material in material-typical applications.

### 6.2 Foreign material

All materials that cannot be classified as recyclable are referred to as foreign materials.

### 6.3 Combination packaging

Combination packaging are multi-part sales packaging consisting of an outer packaging and one or more inner packaging made of different materials, which are usually separated when used or consumed (e.g. the cream can in a folding box or the typically multi-part packaging for electrical appliances made of cardboard and plastics).

### 6.4 Complete packaging

This is the unfilled packaging as a whole, including all associated packaging components such as labels, sealing films, lids and closures, etc. It is not permitted to measure the recyclability on the basis of individual packaging components as a result of a theoretical dismantling of the packaging (exception: combination packaging).

### 6.5 Metallization

Metallized films are produced by vaporizing a very thin layer of (ultrapure) aluminum onto a carrier film, e.g. plastic-based. The films are given a metallic sheen, in addition, the metallized version offers protection against light and oxygen.

### 6.6 Metric scaling

Value for a property that consists of a number and has a dimension and a zero point.

### 6.7 Ordinal scaling

Qualitative value for a property with a natural order (e.g. school grades or "very good", "good", "bad", etc.).

**6.8 Recyclate**[8]

Product (substance or mixture) from waste which is suitable for substituting virgin material in material-typical applications.

**6.9 Recyclable materials**

Recyclable materials are the materials in a packaging that are to be recovered as recyclate through the respective material-specific recycling process. (e.g. steel, metallic aluminium, PE, (cellulose) fiber, PET, etc.).

**6.10 Available content of recyclable materials**

The available content of recyclable materials is the proportion of recyclable materials in the total packaging that is available for recovery, taking into account the specifications in this guidance (Sections 2 to 5).

**6.11 Targeted materials**

For the purposes of this document, targeted materials are packaging identified as desired components in a waste specification/type definition. Examples that are differentiated from recyclable materials are: Tinplate packaging, aluminium packaging, PE bottles, liquid cartons, PET bottles each including secondary components such as labels and closures.

**6.12 Composites and differentiation from solid materials**

Composite packaging is packaging made of various types of material that cannot be separated by hand, none of which exceeds 95 percent by mass (§ 3 Para. 5 VerpackG).
Accordingly, solid materials are those materials, of which a mass fraction constitutes more than 95 % (e.g. correspondingly metallized plastic films are to be classified as plastic).

**7. Abbreviations**

The following relevant abbreviations are used in the document:

| | |
|---|---|
| Al resp. Alu | Aluminium |
| BT | Bundestag |
| EPS | Expanded polystyrene |
| EVOH | Ethylene-vinyl alcohol copolymer |
| FKN | Flüssigkeitsverbunde (liquid packaging boards/compounds) |

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8 This definition of recyclates applies exclusively in the sense of the minimum standard in relation to § 21 Paragraph 1 No. 1 VerpackG.

| | |
|---|---|
| HDPE | high density polyethylene |
| KrWG | Kreislaufwirtschaftsgesetz (German Circular-Economy Act) |
| KS | plastic |
| LDPE bzw. PE-LD | low density polyethylene |
| LVP | lightweight packaging |
| MHD | best-before date |
| MPO | mixed polyolefins |
| PE | polyethylene |
| PE-X | cross-linked polyethylene |
| PET | Polyethylenterephtalat |
| PET-A | PET (amorphous) |
| PET-G | PET modified with glycol |
| PO | polyolefins |
| POM | polyoxymethylene |
| PP | polypropylene |
| PPK | paper / cardboard / carton |
| PPK aus LVP | paper / cardboard / carton from the collection fraction lightweight packaging |
| PS | polystyrole |
| PVDC | polyvinylidene chloride |
| VerpackG | Verpackungsgesetz (Packaging Act) |

**8. Bibliography**


[BT] BT-Drucksache 18/11274, Begründung zu § 21, S. 107

[COTREP] Comité Technique pour le Recyclage des Emballages Plastiques, COTREP: Avis général, Stand 2015. Online verfügbar unter http://www.cotrep.fr/?L=1

[CHI] Institut cyclos-HTP: Prüfung und Testierung der Recyclingfähigkeit, Anforderungs- und Bewertungskatalog des Institutes cyclos-HTP zur EU-weiten Zertifizierung, Stand 2017, Aachen. Online verfügbar unter http://cyclos-htp.de/fileadmin/user_upload/Anforderungs-_und_Bewertungskatalog_Version_3.5_Stand_03.08.2017.pdf

[EPBP] European PET Bottle Platform, EPBP: Design Guidelines, Stand 2017. Online verfügbar unter http://www.epbp.org/design-guidelines/products

[INGEDE] INGEDE e.V.: INGEDE-Methode 12 – Bewertung der Rezyklierbarkeit von Druckerzeugnissen – Prüfung des Fragmentierverhaltens von Klebstoffapplikationen, Stand 2003

[Papiersortenliste] DIN EN 643: Papier, Karton und Pappe – Europäische Liste der Altpapier-Standardsorten, Stand 2014

[PRE] Plastics Recyclers Europe, PRE: Guidelines of Packaging, Stand 2014. Online verfügbar unter http://www.plasticsrecyclers.eu/guidelines-packagings

[Produktspezifikationen] Duales Scheme Deutschland GmbH, DSD: Downloads – Spezifikationen, Stand 2014. Online verfügbar unter https://www.gruener-punkt.de/de/download.html
EcoPaperLoop: Enhancing Paper Recycling in Europe - Optimising Paper Products, Packaging and Collection Schemes, Stand 2014. Online verfügbar unter http://www.ecopaperloop.eu/outcome/EcoPaperLoop-Complete.pdf
Duales Scheme Deutschland GmbH, DSD: Downloads – Spezifikationen, Stand 2017. Online verfügbar unter https://www.gruener-punkt.de/de/download.html

[PTS] Rimkus, A.: EU-Ecolabel für Druckerzeugnisse – Kriterien, Antragstellung und Gebühren, RAL gGmbH, Stand 2013. Online verfügbar unter http://docplayer.org/19240631-Eu-ecolabel-fuer-druckerzeugnisse.html

[RECOUP] Recycling Of Used Plastics Limited, RECOUP: Plastic Packaging – Recyclability By Design, Stand 2017, Peterborough. Online verfügbar unter http://www.recoup.org/p/130/recyclability-by-design

**Appendixes**

## Appendix 1: Material types, material fractions and recycling pathways[9]

How to use the table:
1. check the conformity of the packaging to be evaluated (e.g. PP yoghurt cups with PP-EVOH sealing film) with the descriptions in column 3 (result for example: conformity with Fract.-No. 324)
2. check whether the packaging explicitly falls under a possible exclusion in column 4 (result for example: no conformity)→ Recycling infrastructure can be assumed if none of the criteria listed in column 4 applies
3. identify the recyclable material from column 5 (result for example: PP)

| **Material group: plastic packagings** | | | | | |
|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** |
| **Material fractions** | **Fract. no. / Type no.** | **Description of targeted material [10]** | **Disqualification** | **Recyclable material** | **Notes on availability** |
| Foil fraction | 310 | Scheme-compatible articles made of plastic film, surface area > DIN A4, such as bags, carrier bags and shrink films, incl. ancillary components such as labels, etc. | Exclusion of aluminium-coated plastics | LDPE (PO)-share | |
| PP fraction | 324 | Rigid, scheme-compatible plastic articles made of PP, volume ≤ 5l, such as bottles, trays and cups, incl. ancillary components such as closures, labels, etc. | Exclusion of cartridges for sealing compounds | PP (PO)-share | |
| PE fraction | 329 | Rigid, scheme-compatible plastic articles made of PE, volume ≤ 5l, such as bottles and trays, incl. ancillary components such as closures, labels, etc. | Exclusion of cartridges for sealing compounds | HDPE (PO)-share | |

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9 Based on [product specifications]; [T 120]; [paper grade list]. Packaging that is technically recyclable in principle or that is recycled, but which is currently sorted from the yellow bag/bin only in individual cases (e.g. EPS), is not shown. Individual certificates are permissible in such cases, see footnote 4.
10 For many fractions, the targeted material description of the product specifications contains the addition that the packaging must be "used, completely emptied". This passage would be misleading in the sense of this orientation guide and has therefore been deleted throughout this Appendix.

| Material group: Plastic packagings | | | | | |
|---|---|---|---|---|---|
| 1 | 2 | 3 | 4 | 5 | 6 |
| Hollow articles fraction | 322 | Rigid, scheme-compatible plastic articles, e.g. bottles > 5l, buckets, canisters and large containers ≤ 200l incl. ancillary components such as closures, labels, etc. | Exclusion of cartridges for sealing compounds | PO-content | |
| MPO- fraction | 323 | Scheme-compatible plastic articles made of polypropylene (PP) and polyethylene (PE) such as bottles, cups, trays, foils as well as household and plastic articles made of the same material including secondary components such as labels, etc. | Exclusion of cartridges for sealing compounds | PO-content | Limited availability of the recovery option |
| PS- fraction | 331 | Rigid, scheme-compatible plastic articles made of PS, volume ≤ 1l, such as cups and trays, incl. ancillary components such as closures, labels, etc. | Exclusion of foamed plastics incl. EPS articles | PS-content | |
| PET-bottles, transparent | 325 | Rigid, scheme-compatible plastic articles made of PET, volume ≤ 5l, such as beverage, detergent and household cleaner bottles, including ancillary components such as closures, labels, etc. | Exclusion of opaque PET bottles and other PET articles | PET-A-content, transparent;<br>PO from closures | |
| Rigid plastics | 351 | Rigid, scheme-compatible plastic articles made of polypropylene, polyethylene or polystyrene such as cups, bottles, trays, incl. ancillary components such as closures, labels, etc. | | PO-content,<br>PS-content | Limited availability of the recovery option<br>Redundancy to fract.no. 324, 329, 331 |

| Material group: Fibre-based packaging (PPK, PPK composites, FKN) | | | | | |
|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** |
| **Material fractions** | **Fract. no. / Type no.** | **Description of targeted material [10]** | **Disqualification** | **Recyclable material** | **Notes on availability** |
| FKN | 510 | Scheme-compatible sales packaging made of cardboard composite materials consisting of cardboard / PE or cardboard / aluminium / PE for filling liquid and pasty products, including secondary components such as closures, etc. | Exclusion of other articles from paper, cardboard or carton | Fibre content | |
| PPK from LVP | 550 | Scheme-compatible articles made of PPK as well as composites based on PPK incl. ancillary components | Exclusion of liquid packaging board, wax, paraffin, bitumen and oil papers | Fibre content | Limited availability |
| PPK | 1.02 | Mixed waste paper: mixture of different paper, cardboard and paperboard qualities containing max. 40 percent of newspapers and magazines | | Fibre content | |

| Materialgruppe: Fe-Metall-Verpackungen | | | | | |
|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** |
| **Material fractions** | **Fract. no. / Type no.** | **Description of targeted material [10]** | **Disqualification** | **Recyclable material** | **Notes on availability** |
| Tinplate | 410/412 | Scheme-compatible articles made of tinplate, such as beverage cans, food cans and buckets, incl. ancillary components such as labels, etc. | | Steel content | |

| Material group: aluminium packaging and packaging containing aluminium | | | | | |
|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** |
| **Material fractions** | **Fract. no. / Type no.** | **Description of targeted material [10]** | **Disqualification** | **Recyclable material** | **Notes on availability** |
| Aluminium | 420 | Scheme-compatible articles made of aluminium or aluminium foil containing, e.g. trays, wrapping foil, incl. secondary components such as closures, labels etc. | | Al content | |

| Material group: glass packaging | | | | | |
|---|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** | **6** |
| **Material fractions** | **Fract. no. / Type no.** | **Description of targeted material [10]** | **Disqualification** | **Recyclable material** | **Notes on availability** |
| Container glass | T 120 | Container glass from households, industry and production, e.g. bottles, glasses, pharmaceutical and cosmetic glass (soda lime glass) | Exclusion from lead glass. Not prepared safety glass, glass ceramic. Lamps, TV glass, quartz glass, borosilicate glass and other leaded glasses. | Glass content: steel and AL content from lids and closures | |

**Appendix 2: Packaging characteristics requiring verification of identifiability in sensor-based sorting by measurement**

**Plastic packaging**
- large-surface labelling (> 50 % of the surface) with foreign material
- full sleeve labelling
- multilayer construction (except PE-/ PP-EVOH)
- dark colour design using soot-based dyestuffs (also when used in internal layers)
- different types of plastics on front and back sides

**PPK packaging and composites based on PPK**
- lacquered or plastic-coated surface

**Liquid packaging board**
- different design from standard construction (non-wet resistant cardboard, PE ± aluminium)

**Glass**
- lack of transparency or translucency

**Appendix 3: Overview of packaging recyclables and material-specific recycling incompatibilities**

| Wertstoff | Unverträglichkeiten |
|---|---|
| PE-LD | Non-water soluble adhesives in combination with wet strength labels[3];<br>PA barrier coatings, PvDC barrier coatings, non-polymer (except SiOx/AlOx), non-EVOH barrier coatings[1] |
| PE rigid | Silicone components[3];<br>Components of foamed non-thermoplastic elastomers[3];<br>Non-water soluble adhesives in combination with wet strength labels[3];<br>components of foamed non-thermoplastic elastomers[3].<br>PA barriers[1]; PE-X components, PvDC barriers[1,5]<br>Non-PO plastics of density < 1 g/cm³ [1] |
| PP rigid | Silicone components[3];<br>Components of foamed non-thermoplastic elastomers[3];<br>Non-water soluble adhesives in combination with wet strength labels[3];<br>PA barrier layers[1]; PvDC barrier layers[1,5];<br>Non-PO plastics of density < 1 g/cm³ [1] |
| PS rigid | Foreign plastics or multilayers of density class 1.0 - 1.08 g/cm³ [3];<br>Non-water-soluble adhesives in combination with wet-strength labels [5] |
| PET-bottles transparent | PET-G components[1,3,4]; POM components[3]; PVC components[1,3,4,5];<br>EVOH barrier layers[1,3,4,5]; PA monolayer barrier layers[3,4];<br>PVC labels/sleeves[1,3,4,5], PS labels/sleeves[1,3,4,5], PET-G labels/sleeves[1,3,4,5]; other blended-barriers[3];<br>PA additives[3];<br>Insoluble adhesives (in water or alkaline at 80°C)[1,2,3,4,5];<br>non-magnetic metals[3];<br>Elastomer components of density > 1 g/cm³ [3];<br>Direct printing (except production code and MHD)[1,4] |
| PO | Silikonkomponenten3;<br>geschäumte nicht thermoplastische Elastomere mit der Dichte < 1 g/cm³ 3;<br>geschäumte nicht-polyolefinische Komponenten |
| PPK<br>PPK-composites<br>Liquid packaging board | Wet strength agents, unless it can be demonstrated that the fibres have been recovered and recycled. (PTS Method PTS-RH 021/97)[6];<br>Insoluble dispersing adhesives unless it is shown that they can be removed (INGEDE Method 12 or 4)[6,7] |
| Glass | Lead and barium from crystal glass packages |

1 [PRE]
2 [COTREP]
3 [CHI]
4 [EPBP]
5 [RECOUP]
6 [PTS]
7 [INGEDE]

**Appendix 4: procedure model**

In the following, the test in accordance with Sections 2 to 4 is presented as a model. It should be noted, however, that the object of assessment always undergoes the test in full, but that only the respective determined proportion of recyclable material is included in the measurement..