Stiftung Zentrale Stelle VERPACKUNGSREGISTER

Please note: This English version is a convenience translation – the German version shall prevail

Minimum standard for determining the recyclability of packaging subject to system participation pursuant to section 21 (3) VerpackG (Verpackungsgesetz – Packaging Act)

In agreement with the German Environment Agency (Umweltbundesamt)

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1. Introduction

An essential goal of extended producer responsibility regulations is to provide producers with incentives to take the environmental impact of their products throughout the entire product lifecycle and in particular their eventual disposal into account as early as in the process of designing and producing their products.[1] For this reason, the legislative body has broadened extended producer responsibility provisions under the Verpackungsgesetz (German Packaging Act – VerpackG) to include an obligation for systems (system operators according to section 18 VerpackG) to set monetary incentives within the framework of system participation fees.

Section 21 VerpackG requires taking general recyclability into account when calculating participation fees. In this context, legal requirements in the form of specific increases or reductions in participation fees have not been enacted since, on the one hand, with the current state of knowledge they could not be quantified in a generally binding manner and, on the other hand, it would be a significant encroachment on the freedom of the systems to set prices as protected under German antitrust law.[2] Specifically, section 21 (1) VerpackG stipulates that:

> *"(1) Systems are obliged to calculate their participation fees in such a way that incentives are included with a view to the production of packaging subject to system participation*
>
> *1. to promote the use of materials and material combinations that allow for the highest possible percentage to be recycled, taking into account the practice of sorting and recovery [...]"*

In order to provide the systems with a uniform framework for the determination of recyclability as defined in section 21 (1) no. 1, section 21 (3) provides for the annual publication of minimum standards by the Zentrale Stelle Verpackungsregister (Central Agency Packaging Register – ZSVR), in agreement with the German Environment Agency (Umweltbundesamt).[3]

The Verpackungsgesetz requires the first publication of a minimum standard, in agreement with the German Environment Agency, no later than 1 September 2019.

The affected parties were initially involved in the preparation through an expert committee. The minimum standard was drafted largely on the basis of the recommendations of the ZSVR's Expert Committee III; following that, results from a consultation procedure on the draft guidelines were included as well. The minimum standard was finalised following completion of the consultation procedure with the German Environment Agency.

2. Minimum criteria

When determining recyclability, the available recyclable content of a packaging should be taken as the minimum starting point for further considerations. In determining the available recyclable content, at least the following three requirements must be taken into account:

1) The existence **of a sorting and recycling infrastructure** that allows for high-quality mechanical recycling for this packaging,

[1] Bundestag-Drucksache 18/11274, explanatory statement for section 21, p. 107
[2] ibid
[3] ibid

2) the **sortability** of the packaging as well as, where applicable, the **separability** of its components,
3) **incompatibilities** of packaging components or substances contained therein that might render a successful recycling impossible with currently used technology.

3. Object of determination

The determination of recyclability refers to the unfilled packaging as a whole, including all related packaging components such as labels, sealing films, lids and closures, etc. (packaging as a whole). Determination of recyclability must not be based on individual packaging components that could only be achieved by a merely theoretical dismantling of the packaging.

The recyclability of components of combination packaging that typically come apart during use or consumption may be determined separately.

The determination of packaging in groups is permissible if the individual packagings in such a group possess the same material structure and only differ in terms of contents and/or filling capacity, but not in terms of relevant process-specific criteria (see **criteria in 4 and the respective appendices).** An example of where classification of packaging as a group is not possible, are plastic articles which are identical in their material structure but which are only partially sortable due to their different colouring.

4. Details of the requirements set forth in 2

4.1 Availability of sorting and recycling infrastructure

If a packaging matches the 'good material description' in **Appendix 1, column 3 (good materials in the recycling process)** (taking into account any disqualifications in column 4), it can be assumed that an infrastructure for sorting and high-quality recycling is available on the market. If a packaging material cannot be assigned to one of the (listed) material groups, the packaging material is considered to be not recyclable according to current practice.[4] In the determination, the recyclable materials named in **Appendix 1, column 5,** are included proportionally.

4.2 Sortability and separability

For the determination of recyclability, **sortability by means of sensor-based sorting** must be taken into account for the following materials: glass, plastics (excluding films group), liquid packaging board, and PPC (paper, paperboard, cardboard). Empirical testing is only required if one of the exclusion criteria listed in

[4] If, in individual cases, the existence of the infrastructure required for high-quality recycling as well as its use can be proven, an exception may apply. Proof must be provided for each individual case, and comprise of the following:
1) Evidence that the result of the recycling process is of high quality in terms of the minimum standard and
2) Weighing notes evidence that an adequate quantity of material is being recovered through this recycling path

Appendix 2 ('Packaging characteristics requiring the testing of identifiability in sensor-based sorting by measurement') applies.[5]

For determining the recyclability of **metal packaging** as well as **metal-containing composite packaging** only the packaging's metal components may be taken into account (this does not apply to metallisations).[6] This excludes liquid packaging board with a metal share; here, recyclability shall be limited to the fibrous material content.

When determining the recyclability of **plastic packaging,** it must be ensured that the **density** of the shredded material (usually <1 cm^2) allows for it to be assigned to the correct flow of recyclables. For example, packaging or packaging components made of polyolefins, which have a density of more than 0.995 g/cm^3 due to of additives, fillers or multilayering, must be regarded as non-recyclable.

For **fibre-based packaging** that does not contain any metal, the determination of recyclability must be limited to the fibrous material content; their recyclability must be determined according to their fibrous material content.[7] Where wet-strength agents, impregnating agents, waxes, etc. are used, and in the case of paper or cartons (excluding liquid packaging board) coated or metallised on both sides, the determination of recyclability needs to be done according to the relevant testing methodology.

4.3 Recycling incompatibilities

The declaration of the recyclability of a packaging requires that no combinations of materials or substances are used that can impede a successful recycling. **Appendix 3 ('Overview of packaging groups/sorts and material-specific recycling incompatibilities')** provides the basis for determining incompatibilities. For any deviating determination in the sense that incompatible substances do not negatively affect recyclability, individual proof must be provided.

4.4 Available recyclable content

The content available for recycling (based on the packaging as a whole, see 6.10 below) determines the recyclability according to this minimum standard. Recyclability must then be ranked on a metric or ordinal scale (the latter with more than three scale degrees).[8] The scale value and, if not self-explanatory, the scale units are required for the documentation of the determination result by the systems.

In addition, the classification according to 4.1 must be specified.

5. Determination procedure

A flowchart of the determination procedure is contained in **Appendix 4.**

[5] This means that, as a rule, no empirical test is required. If an empirical test is necessary in exceptional cases, it must be carried out with a standard operating detection unit, not with a hand-held scanner. In such a case, the result of this empirical test is included in the determination.
[6] Otherwise, an individual statement including supportive evidence must be provided.
[7] Otherwise, an individual statement including supportive evidence must be provided.
[8] Once the system reports submitted in 2019 and 2020 have been evaluated, a decision will be made on further requirements for the representation of recyclability in the minimum standard (2020).

6. Definitions

In this document, the following definitions apply:

6.1 Recyclability

In contrast to the recycling concept as defined in the Kreislaufwirtschaftsgesetz (Circular Economy Act – KrWG), 'recyclability' in this document always refers to high-quality and mechanical recycling (mechanical recycling is defined in section 3 (19) VerpackG). This concept of recyclability encompasses the fundamental and gradual suitability of any given packaging to substitute virgin material in applications typical for that material after undergoing recovery processes available on an industrial scale.

6.2 Foreign materials

Foreign material is material that cannot be classified as recyclable content of any given packaging.

6.3 Combination packaging

Combination packaging are multi-part retail packaging that consist of an outer packaging and one or more inner packaging, made of different materials that usually come apart during use or consumption (e.g. cream jar in a folding box or the typical multi-part packaging for electrical and electronic equipment made of cardboard and plastics).

6.4 Packaging as a whole

The packaging as a whole is the entire unfilled packaging, including all related packaging components such as labels, sealing films, lids and closures, etc. Determining the recyclability based on the individual packaging components as a result of a theoretical decomposition of the packaging is not permitted (exception: combination packaging).

6.5 Metallisation

Metallised films are produced by coating a carrier film, e.g. made of plastic, with a very thin film of (ultrapure) aluminium. This gives the film a metallic sheen; also, metallised film offers protection against light and oxygen.

6.6 Metric scaling

A characteristic that consists of a number and has a dimension as well as a zero point.

6.7 Ordinal scaling

A qualitative characteristic with a natural order (e.g. school grading system or 'very good', 'good', 'bad', etc.).

6.8 Recyclates[9]

A product (substance or mixture) obtained from waste which is suitable to substitute virgin material in applications typical for that material.

6.9 Recyclable materials / recyclables

Recyclable materials / recyclables are those materials of a packaging that are to be recovered as recyclates through the respective material-specific recycling process (e.g. steel, metallic aluminium, PE, (cellulose) fibre, PET, etc.).

6.10 Available recyclable content

The available recyclable content is the proportion of recyclable materials of the packaging as a whole that is available for recycling, taking into account the provisions of this minimum standard (see 2 to 5 above).

6.11 Good materials

Within the meaning of this document, good materials are the components of any given packaging designated as desirable in a waste specification/sorts definition. Examples of good material – in particular in contrast to 'recyclable materials/recyclables' – include: tinplate packaging, aluminium packaging, PE bottles, liquid packaging board, PET bottles, each including ancillary components such as labels and closures.

6.12 Fibrous material

For determining the recyclable content 'fibrous material' can be defined as the sum of fibre, filling material, starch, coating colour including binder as well as additives typically used in the paper industry such as wet strength agents, glue and bound water.

6.13 Composites and differentiation from single-component materials

Composite packaging is packaging made from various material types that cannot be separated by hand; no single material type exceeds 95 mass% (section 3 (5) VerpackG).

As a consequence, single-component materials are materials that account for more than 95% of packaging mass (e.g. hence, metallised plastic films are to be classified as plastics).

6.14 Plastics

To the determination of recyclable content for plastic-based packaging the following applies: The recyclable content (PE, PP, PO, etc.) for 'plastic-based packaging' is equal to the eponymous

[9] This definition of recyclates is applicable only to the minimum standard in relation to section 21 (1) no. 1 VerpackG (German Packaging Act).

main part of polymer (plus additives, fine-disperse filling and strengthening agents, as well as pigments included in the polymer matrix composite).

7. Abbreviations

In this document, the following relevant abbreviations are used:

Al	Aluminium
BT	*Bundestag* (German parliament)
EPS	Expanded polystyrene
EVOH	Ethylene vinyl alcohol copolymer
FKN	Liquid packaging board
HDPE	High-density polyethylene
KrWG	*Kreislaufwirtschaftsgesetz* (German Circular Economy Act)
KS	Plastic
LDPE or PE-LD	Low-density polyethylene
LVP	Lightweight packaging
MHD	Minimum shelf life
MPO	Mixed polyolefin
PE	Polyethylene
PE-X	Cross-linked polyethylene
PET	Polyethylene terephthalate
PET-A	(Amorphous) PET
PET-G	Glycol-modified polyethylene terephthalate
PO	Polyolefin
POM	Polyoxymethylene
PP	Polypropylene
PPC	Paper/paperboard/cardboard
PPC from lightweight packaging	Paper/paperboard/cardboard from the lightweight packaging collection group
PS	Polystyrene
PVDC	Polyvinylidene chloride
VerpackG	Verpackungsgesetz (German Packaging Act)

II. Appendices

1. Appendix 1: Material types, material groups and recycling paths

The appendix is based on the following product specifications:

- Duales System Deutschland GmbH, DSD: Downloads – specifications, as per 2014. Available online at https://www.gruener-punkt.de/en/downloads;
- Duales System Deutschland GmbH, DSD: Downloads – specifications, as per 2017. Available online at https://www.gruener-punkt.de/en/downloads;
- EcoPaperLoop: Enhancing Paper Recycling in Europe – Optimising Paper Products, Packaging and Collection Systems, as per 2014. Available online at http://www.ecopaperloop.eu/outcome/EcoPaperLoop-Complete.pdf;
- BDE, BV Glas, bvse: T 120 guideline on 'Quality requirements for glass fragments, to be used in the container glass industry';
- List of grades of paper: DIN EN 643: paper, cardboard and paperboard – European List of Standard Grades of Paper and Board for Recycling, as per 2014.

Packaging that offers a general recyclability from a technical point of view and/or that is recycled, but which is currently sorted from yellow bags/bins only in individual cases (e.g. EPS), is not covered. In such cases, deviating individual evidence is admissible.[10]

How to use the table in this appendix:

1. Check conformity of the packaging whose recyclability is to be determined (e.g. PP yoghurt pot with PP/EVOH sealing film) with the descriptions in column 3 (result for this example: conformity with material group no. 324)

2. Check whether the packaging explicitly falls under a potential disqualification in column 4, when assigning to a material group in column 1 (result for this example: no match) → it can be assumed that a recycling infrastructure is in place if none of the criteria listed in column 4 apply

3. Identify the recyclable materials from column 5 (result for this example: PP)

[10] See footnote 4.

Material group: Plastic packagings					
1	2	3	4	5	6
Material group	**Group no. / sort no.**	**Good material description[11]**	**Disqualification**	**Recyclable material**	**Notes on availability**
Film	310	System-compatible articles made from plastic film, surface area > A4 in size, like bags, carrier bags and shrinkwrap, including ancillary components such as labels, etc.	Aluminised plastics are disqualified	LDPE (PO) share	
PP	324	Rigid, system-compatible plastic articles made from PP, ≤ 5l in volume, like bottles, trays and cups, including ancillary components such as closures, labels, etc.	Sealant cartridges are disqualified	PP (PO) share	
PE	329	Rigid, system-compatible plastic articles made from PE, ≤ 5l in volume, like bottles and trays, including ancillary components such as closures, labels, etc.	Sealant cartridges are disqualified	HDPE (PO) share	

[11] For many groups, the product specification for good material (cf. appendix introduction) includes the addition that packaging must be 'used, emptied'. Within the meaning of this minimum standard, this passage would be ambiguous; it was thus not added to this appendix.

Material group: Plastic packagings					
1	2	3	4	5	6
Material group	**Group no. / sort no.**	**Good material description**	**Disqualification**	**Recyclable material**	**Notes on availability**
Plastic hollow bodies	322	Rigid, system-compatible plastic articles, like bottles > 5l in volume and buckets, canisters and bulk packs ≤ 200l in volume, including ancillary components such as closures, labels, etc.	Sealant cartridges are disqualified	PO share	
MPO	323	System-compatible plastic articles made from polypropylene (PP) and polyethylene (PE), like bottles, cups, trays, films, as well as household and plastic articles composed of the same material, including ancillary components such as labels, etc.	Sealant cartridges are disqualified	PO share	Limited availability of recycling option
PS share	331	Rigid, system-compatible plastic articles made from PS, ≤ 1l in volume, like cups and trays, including ancillary components such as closures, labels, etc.	Foamed plastics, including EPS articles, are disqualified	PS share	
PET bottles, transparent	325	Rigid, system-compatible articles made from PET, ≤ 5l in volume. Includes ancillary components such as closures, labels, etc. Examples include bottles containing beverages, detergent and household cleaning agents.	Opaque PET bottles and other PET articles are disqualified	PET-A share, transparent; PO from closures	
Rigid plastics	351	Rigid, system-compatible articles made from polypropylene, polyethylene or polystyrene, like cups, bottles and trays, including ancillary components such as closures, labels, etc.	Foamed plastics, including EPS articles, are disqualified	PO share, PS share	Limited availability of recycling option redundancy compared with group no. 324, 329, 331

Material group: Fibre-based packaging (PPC, PPC composites, liquid carton FKN)					
1	2	3	4	5	6
Material group	**Group no. / sort no.**	**Good material description**	**Disqualification**	**Recyclable material**	**Notes on availability**
FKN	510	System-compatible retail packaging made from cardboard composite materials, consisting of cardboard/PE or cardboard/aluminium/PE, for liquid and paste product filling, including ancillary components such as closures, etc.	Other articles from paper, paper board, cardboard are disqualified	Fibrous material share	
PPC from lightweight packaging	550	System-compatible PPC articles as well as PPC-based composites, including ancillary components.	Liquids packaging board, waxed, paraffin, bitumen and oil paper are disqualified	Fibrous material share	Limited availability of recycling option
PPC from separate collections	05.01.00	System-compatible PPC articles as well as PPC-based composites, including ancillary components.	Liquid packaging board, waxed, paraffin, bitumen and oil paper are disqualified	Fibrous material share	

Material group: Ferrous metals packaging					
1	2	3	4	5	6
Material group	**Group no. / sort no.**	**Good material description**	**Disqualification**	**Recyclable material**	**Notes on availability**
Tinplate	410/412	System-compatible articles made from tinplate, like beverage or food cans and buckets, including ancillary components such as labels, etc.		Steel share	

Material group: Aluminium packaging, and packaging containing aluminium					
1	2	3	4	5	6
Material group	**Group no. / sort no.**	**Good material description**	**Disqualification**	**Recyclable material**	**Notes on availability**
Aluminium	420	System-compatible articles made from aluminium or containing aluminium foil, like trays and wrapping film, including ancillary components such as closures, labels, etc.		Al share	

Material group: Glass packaging					
1	2	3	4	5	6
Material group	**Group no. / sort no.**	**Good material description**	**Disqualification**	**Recyclable material**	**Notes on availability**
Container glass	T 120	Container glass from households, commerce and manufacturing, like bottles, glasses, pharmaceutical and cosmetic glass (soda-lime glass).	Lead glass, untreated safety glass, glass-ceramic, illuminants, TV glass, quartz glass, borosilicate glass and any other lead-containing glass are disqualified	Glass share; portion steel and Al from lids and closures	

2. Appendix 2: Packaging characteristics requiring the testing of identifiability in sensor-based sorting by measurement

Plastic packaging

- Large labels (taking up > 50% of the surface) made from foreign material
- Full sleeve label
- Multi-layer structure (excluding PE/PP EVOH)
- Metallisation (excluding on the inside/in the middle layer)
- Dark colours using soot-carbon-based colourants (also when used for internal layers)
- Different types of plastic used on front and back sides

PPC packaging as well as PPC-based composites

- Lacquered surface (excluding clear protective lacquer up to a thickness of <= 5 micrometer) or plastic-coated surface
- Dyed black, using soot-carbon-based colourants

Liquid packaging board

- Design different from standard structure (no wet-strength cardboard, PE ± aluminium)

Glass

- Lack of transparency/translucency

3. Appendix 3: Overview of packaging groups/sorts and material-specific recycling incompatibilities

Group/sort	Incompatibilities
Film and PE-LD	water-insoluble adhesive applications in combination with wet-strength labels, PA barriers, PVDC barriers, non-polymer barriers (excluding SiOx/AlOx/metallisations), non-EVOH barriers
Rigid PE	Silicone components; components of foamed non-thermoplastic elastomers; water-insoluble adhesive applications in combination with wet-strength labels PA barriers; PE-X components, PVDC barriers; non-PO plastics with a density of < 1 g/cm³
Rigid PP	Silicone components; components of foamed non-thermoplastic elastomers; water-insoluble adhesive applications in combination with wet-strength labels; PA barriers; PVDC barriers; non-PO plastics with a density of < 1 g/cm³
Rigid PS	Foreign plastics or multi-layers with a density of 1.0-1.08 g/cm³; water-insoluble adhesive applications in combination with wet-strength labels
Transparent PET bottles	PET-G components; POM components; PVC components; EVOH barriers; silicone components, PA monolayer barriers for transparent PET bottles, colourless and 'light blue'; PVC labels/sleeves, PS labels/sleeves, PET-G labels/sleeves; other blended barriers; PA additives for transparent PET bottles, colourless and 'light blue'; insoluble adhesive applications (in water or alkaline at 80° C); non-magnetic metals; elastomer components with a density of > 1 g/cm³; direct print (excluding production codes and 'best before' dates)
PO	Silicone components; foamed non-thermoplastic elastomers with a density of < 1 g/cm³; foamed non-polyolefin components

Group/sort	Incompatibilities
PPC PPC composites Liquid packaging board	Water-insoluble or re-dispersing adhesive applications where it has not been specifically proven that they can be removed. A testing method suitable for adhesive applications is PTS-RH 021/97, or INGEDE Method 12 adjusted for packaging.[12] The exceptions granted for hotmelt adhesives in the ERPC Scorecard[13] apply (softening temperature of the adhesive (according to R&B): ≥ 68 °C, layer thickness (non-reactive adhesives): ≥ 120 µm, layer thickness (reactive adhesives): ≥ 60 µm, horizontal dimension of the application (in either direction): ≥ 1.6 mm).[14]
Glass	Lead and barium from crystal glass packaging

[12] As INGEDE Method 12 was designed for deinking products (graphic paper), the defibration parameters must be adjusted to packaging paper for recycling: defibration in the case of low consistency, with no chemicals added (e.g. DIN EN ISO 5263). If a method is developed that includes a determination model for packaging paper, a corresponding adjustment of the minimum standard will be decided upon in the following year.

[13] www.paperforrecycling.eu/download/882

[14] These exceptions were defined based on INGEDE Method 12, not adjusted to packaging. They must be reviewed before the minimum standard is revised in 2020, using a methodology adjusted to packaging paper for recycling. Failing this, the exception shall be void.

4. Appendix 4: Flowchart of the determination procedure

The flowchart models the determination procedure according to 2 to 4 above. It should be noted that the packaging being determined (object of determination) always undergoes the whole test, but that only the determined proportion of the relevant recyclable material is included in the final measurement/scaling.