

RECYCLED PLASTICS IN PRODUCTS

Identification, Requirements, Traceability and Labelling

MANUAL



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I. INTRODUCTION

Europe on the way to a circular economy

The use of recycled materials in plastic products makes an important contribution to the circular economy, reduces dependence on fossil raw materials and CO₂ emissions during their production. Under the conditions of climate neutrality, which the EU is aiming for in 2050, high-quality recycled materials can make a significant contribution to securing the supply of raw materials for the plastics industry. This change must be promoted now. The EU Commission and the Circular Plastics Alliance have set themselves the goal of using 10 million tonnes of recyclates in plastic products by 2025. This corresponds to about 20 per cent of plastics processing in Europe.

Stable sales markets have been established for mechanical plastics recycling, which has developed in Germany over the past 30 years. In total, 1.65 million tonnes of recyclates were used by the plastics converting industry in Germany in 2021. In addition, around 0.64 million tonnes are reused as by-products. This corresponds to nearly 12 percent of the raw material demand. Significant quantities of recyclate are used in particular in construction, packaging and agricultural applications. The plastic recyclates meet the market requirements of these applications and are competitive with virgin plastics in terms of price-performance ratio.¹

The use of recyclates is continuously increasing in all sectors. While the amount of virgin plastics processed in 2021 in Germany has decreased compared to 2019, the amount of recycled material has significantly increased in the same period.

Almost 80 percent of the recyclate comes from plastic waste after use (post-consumer waste), the rest from production and processing waste (post-industrial waste).²

Aim of this manual

This handout helps to determine when a material is to be classified as a plastic recyclate and what role the distinction between *post-consumer* and *post-industrial* materials plays in this context. It also explains the conditions under which a material is not a waste but a “by-product”. Examples are used to illustrate what kind of materials are involved. The manual also provides information on traceability and product labelling. The aim is to ensure the correct use of the terms in the market and to promote transparency in the communication of the use of recycled materials.³

1 Conversio, Material flow analysis plastics in Germany 2021.

2 Ibid

3 See for Circular Plastics Alliance, Guidance on Waste Definitions ([link](#)) 2021.

II. WHAT ARE RECYCLED PLASTICS?

For quick readers: Plastic recyclates or recycled plastics are raw materials that are produced when plastic waste is recycled. The following applies: No waste, no recycle! Plastic waste is, for example, plastic packaging that is disposed of after use (so-called post-consumer waste). However, plastic waste can also be generated during the industrial manufacturing process (so-called post-industrial waste). Here, sometimes difficult distinctions are necessary, for example if the material is used directly in another process (so-called by-product).

1. Waste becomes raw materials for new products

Even though efforts to reduce the amount of waste are a top priority, the generation of waste, both in private households and in public institutions, industry and commerce, is not completely avoidable. In order to preserve valuable materials that have become waste as far as possible and to protect the environment, a so-called “waste hierarchy” has been in force in Europe for a long time (Article 4 EU Waste Framework Directive 2008/98/EC, hereinafter WFD): According to this, waste should not merely be disposed of, for example by landfilling, but should be recovered as far as possible, either materially or energetically. In Germany, landfilling of municipal waste has been prohibited since 2005, so that almost 100 percent of plastic waste is recovered. According to the waste hierarchy, material recovery, i. e. recycling, is generally to be preferred to energy recovery.

2. What are recyclates?

In European law, the term recycle is not defined. Even the EU Single-Use Plastics Directive⁴, hereinafter SUPD, only speaks of a mandatory minimum content of “recycled plastic” in single-use plastic beverage bottles without defining the term. Therefore, the German legislator itself defined the term “recyclates” in 2020 as “*secondary raw materials which have been obtained by the recovery of waste or which arise during the disposal of waste and are suitable for the manufacture of products.*” (see § 3 (7b)) of the German Kreislaufwirtschaftsgesetz (Circular Economy Act, hereafter KrWG). For plastic products, the first variant of waste recovery is relevant.

According to this, recyclates are the **result of a recovery or recycling process**⁵, in which a waste material is processed, provided that the result of the process is suitable for the manufacture of products.⁶ No waste, no recycle.

⁴ Directive (EU) 2019/904 of 5.6.2019 on reducing the impact of certain plastic products on the environment.

⁵ The term recycling process is in turn defined in European law as “‘recycling’ means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations;” (see Article 3 No. 17 Waste Framework Directive (WFD), identical wording § 3 (25) KrWG). The ISO 15270:2008 standard defines recycle accordingly as “plastic material resulting from the recycling of plastic waste”.

⁶ It has not been clearly clarified whether the term recycle according to § 3 (7b) KrWG should only apply to those materials that have already lost the end of waste status as a result of treatment or whether such materials can also be considered recyclates which are legally still waste.

In summary, a material must fulfil the following properties to be considered a plastic recyclate:

1. It must be **plastic** (polymers and additives).
2. The material must have been **waste**.
3. It must have been sent to a **recycling process** or another recovery process.
4. It must meet all technical and legal requirements for its intended use.

These four criteria are explained in more detail in the following sections. Practical examples will then be given to help with the often-difficult day-to-day distinction.

a) Plastic

The German Packaging Act (VerpackG) defines plastic in § 3 (21) as a material consisting of a polymer according to Article 3 No. 5 of REACH Regulation No. 1907/2006, to which additives or other substances may have been added and which may act as the main structural component of end products; materials made of natural polymers that have not been chemically modified are excluded.⁷

b) Waste

(1) Definition

The law defines waste as “*any substance or object which the possessor **disposes, intends to dispose or is obliged to dispose***”.⁸ It therefore depends on whether the owner of the substance or object (actually) disposes it, (subjectively) wants to dispose it or (objectively) must dispose it. These three alternatives are defined in more detail in German law:

- **Actual disposal:** § 3 (2) KrWG defines legal (rebuttable) presumptions, the existence of which leads to the assumption of actual disposal and thus of waste. According to this, “*a disposal [...] is to be assumed if the holder **transfers substances or objects to a recovery [...] or relinquishes actual control over them with the cessation of any further purpose***”.
- **Subjective will to dispose:** § 3 (3) KrWG defines two processes which indicate that the owner has a will to dispose: “*The will to dispose [...] is to be assumed with regard to such substances or objects,*
 1. *which arise in the course of energy conversion, **production, treatment or use of substances or products or in the course of services, without the purpose of the respective action being directed to this end, or***

In the practice of plastics recycling, this question can be of importance for the correct classification of plastic waste that has only been subjected to pre-treatment steps prior to final treatment or final recycling, and for which the question arises whether the output of the pre-treatment process can already be classified as recyclate. At least in standardisation (cf. e. g. DIN EN ISO 14021), the term “recycled material” is only used if a material has not only been recovered but also processed into a final product or a component of a final product (ibid. para. 7.8.8.1 b) and c)). Only the amount of material recycled in this sense should also be relevant when determining the recycled content of a plastic product or packaging (ibid. para. 7.8.8.1 a) ISO 14021:2016).

⁷ The definition of plastics in the German Packaging Act thus adopts the legal definition for plastics according to the SUPD almost word for word. Reference is made to the corresponding standards ISO 472:2013 and EN 17228.

⁸ See Article 3 No. 1 WFD, identical wording in § 3 (1) KrWG.

2. *their original purpose ceases to exist or is abandoned without a new purpose taking its place directly*⁹. The assessment of the intended purpose shall be based on the opinion of the producer or owner, taking into account the perception of the market.”

- **Objective compulsory disposal:** § 3 (4) KrWG defines three prerequisites for “compulsory waste”, which must be present at the same time, but are generally not relevant for plastic waste.

(2) Distinction between *post-consumer-* and *post-industrial-waste*

According to the origin of different waste streams, a distinction is made in practice and in standardisation between recycled material from so-called post-consumer waste and from so-called post-industrial waste (cf. e. g. DIN EN ISO 14021). Neither European nor German law makes such a distinction with regard to recycles. Even if the distinction is not relevant for the assessment under waste legislation, it plays a major role in practice, e. g. in labelling and marketing

a) *Post-consumer waste*

So-called *post-consumer* waste or “waste after use” refers to material from households, commercial and industrial facilities or institutes (which are the end users of the product) that is no longer suitable for the intended purpose.

This also includes recycled material from the supply chain (see DIN EN ISO 14021, para. 7.8.1.1 a) 2) as well as practical examples under III. 2c.).

The best-known source of post-consumer waste in Germany is the yellow bag or the yellow bin. All packaging that is subject to Extended Producer Responsibility (EPR) fees is collected and sorted in this bin by the dual systems. In addition, there is a separate collection of single-use and reusable plastic bottles in Germany within the framework of the deposit system. Also, there are separate collections, especially in the commercial sector (e. g. for agricultural film or pesticide canisters).

If the waste is produced in the industrial and commercial sector it is also counted as post-consumer waste provided that the industry has used the product as an end customer. The English “consumer” must not be confused with the German “Konsument”.

b) *Post-industrial waste*

Avoiding production and processing residues has long been a priority for the manufacturing industry. Processes are constantly being improved to keep waste as low as possible. However, production residues are unavoidable to a certain extent in the moulding processes for plastic products. Production waste is usually sorted by type and are collected separately.

⁹ Whether a necessary intermediate treatment of the material always excludes “direct use” has not been clarified by the courts. At least in cases where the necessary intermediate treatment “is not initiated immediately or at least within a foreseeable period of time”, immediacy is said to be lacking, according to OVG Lüneburg, decision of 9 September 2002 – 7 LA 36/02, marginal no. 5. According to a recent decision, it is said to be relevant whether “there is a uniform, never interrupted will on the part of the owner as to how the substance or object is to be dealt with. Therefore, even temporary storage is only harmless if a new intended use is already externally recognisable at the beginning. If necessary, this can also be an alternative use”, according to VG Kassel, decision of 9 July 2021 - 4 L 940/21.KS, marginal no. 68. In contrast, the majority of the literature assumes that the “immediacy” of the new purpose is always lacking in the case of a necessary intermediate treatment.

The composition of the material is known and can therefore be processed very well. Accordingly, the qualities of the recycle are very good and the fluctuations are rather small. The quantities of post

industrial-waste¹⁰ have been on a constant level for years. Post-industrial waste must be distinguished from so-called by-products (see below (3)).

HOW TO DIFFERENTIATE BETWEEN PCR, PIR AND BY-PRODUCTS?

It depends on where the waste comes from:

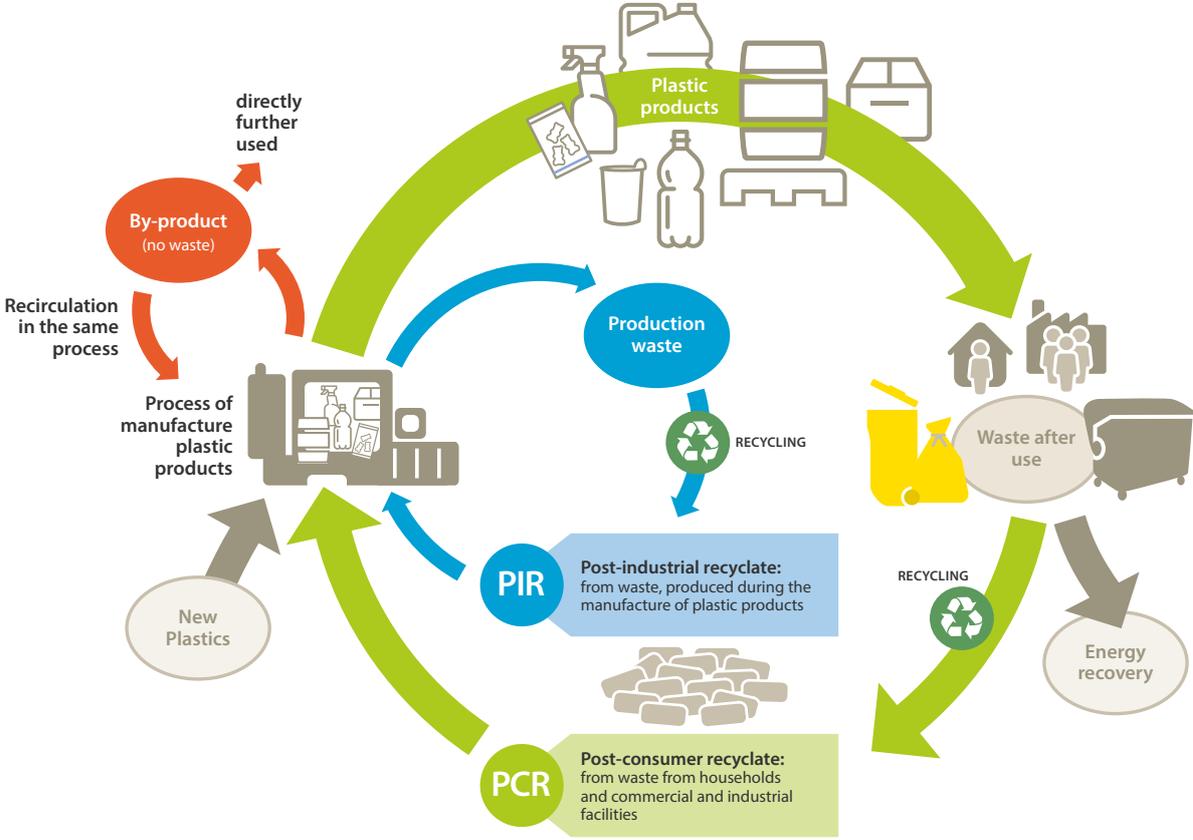


Figure 1: Difference between post-consumer recycle and post-industrial recycle and by-product

10 In standardisation, only the term pre-consumer material or waste before use is defined according to DIN ISO 14021 as “material that is separated from the waste stream during the manufacturing process. It does not include the reuse of materials from reworking, regrinding or scrap that arise in the course of a technical process and can be reused in the same process.” (see para. 7.8.1.1 a) 1). According to ISO 472, the term post-industrial material can be used as a synonym for these materials.

(3) Distinction between waste and by-product

Under certain conditions, production and processing residues are considered a so-called “by-product” and not waste.¹¹ The distinction between waste and (by-) product is one of the most important and difficult questions in waste law.¹² In many cases, the term by-product is used synonymously with the terms “co-, sub-, pre-, intermediate and co-product”.

By way of exception, a production residue is not considered waste, but a by-product, if the following – EU-wide harmonised – prerequisites are met cumulatively:

Requirements for a by-product

(§ 4 (1) KrWG / Article 5 (1) WFD)¹³:

“Where a substance or object is produced in a manufacturing process the **primary aim of which is not the production of that substance or object**, it shall be regarded as a by-product and not as waste if

“1. it is ensured that the substance or object will continue to be used,

2. further pre-treatment beyond a normal industrial process is not deemed necessary,

3. the substance or article is produced as an integral part of a manufacturing process, and

4. the further use is lawful; ...”

(a) Not aimed at

The question of a by-product only arises for those materials which a production process is **not aimed at** (not its “primary aim” (§ 4 KrWG, Article 5 (1) WFD), e. g. for materials which, in view of the respective plant process, are not considered a main product of the same plant.¹⁴

(b) Certainty of continued use

The recognition of such a substance or object as a by-product requires that its further use is already ensured at the time of its creation. It is irrelevant whether the material is used to manufacture the same product or another product. If, on the other hand, there is a possibility that the material is actually unusable or that there is no demand for the material, it is waste. This is primarily a question of proof. The intention to use is typically proven by concrete purchase agreements for the (secondary) product, e. g. framework or cooperation agreements lasting several years. Can the manufacturer sell the material at a positive market price, there is an indication that it is not waste. The same applies if it can be shown that there interested buyers.¹⁵

11 See Article 5 (1) WFD and § 4 KrWG, which is a special case for disposal under § 3 (3) Nr. 1 KrWG (see 2(b)(1) above).

12 See in this respect Commission, Interpretative Communication on Waste and By-products (hereinafter “Communication”), COM(2007) 59 final with a number of example cases.

13 In Germany, Article 5 (1) WFD is implemented by § 4 (1) KrWG.

14 The DIN ISO 14021 standard specifies that a “reuse of materials from reworking, regrinding or scrap that arise in the course of a technical process and can be reused in the same process” is not to be considered as a “post-industrial material” (see clause 7.8.1.1 a) 1). “In the same process” here means the repetition of a manufacturing process or the production of the same type of product that has already been carried out. Manufacturing processes can be e. g. extrusion, injection moulding, blow moulding or thermoforming. Types of products can be e. g. packaging film, shrink film, tubes or profiles. It is important to note that the standard cannot be used to differentiate waste or by-product. The legal requirements for a by-product, on the other hand, also allow external processing steps (see below).

15 Commission, Guidance on the interpretation of the key provisions of Directive 2008/98/EC on waste, 2012, hereafter guidelines (link), p. 16f.

According to case law, interim storage - even for a longer period - prior to further use does not exclude by-product status, provided that the subsequent further use is already sufficiently certain at the beginning of storage. If, on the other hand, the material is stored for an indefinite period of time prior to a possible or conceivable later use, this speaks in favour of a waste status according to court cases.¹⁶

(c) No further pre-treatment beyond a “normal industrial process”.

A by-product further requires that its direct use is possible, i. e. **further pre-treatment beyond a “normal industrial process” must not be necessary for further use.**

This is clear for cases in which the further use of a production residue can take place directly by means of an **internal plant cycle** in the same production process in which it was produced.¹⁷ The output of production residue can therefore be used “as it was produced” directly as input for the main manufacturing process.

In plastics converting, however, a treatment step in the form of **crushing or grinding is usually** required so that production residues can be fed back into the production process. Therefore, the question must be answered as to which pre-treatment processes can be considered a **“normal industrial process”**. The law leaves open which process steps are covered and which are excluded. This means that a decision must be made on a case-by-case basis.

Processes that are also common in the processing of primary raw materials and products, so-called “product-typical” reprocessing processes, indisputably fall under the term “normal industrial process”.¹⁸ On the other hand, processes that require “waste-specific” reprocessing in order for the materials to be reused fall under cannot be included in the definition.

- If a material has to undergo a **“complete recycling process”** (i. e. all recycling steps from sorting, washing and shredding as well as drying, if necessary up to re-granulation) in order to be reused, a waste-specific processing is to be assumed.¹⁹ Classification as a by-product is ruled out here.
- Cleaning processes for the removal of impurities and/or pollutants (**decontamination**) are also usually waste-specific processing steps, as decontamination is not usually necessary for primary raw materials.²⁰ Here, classification as a by-product is usually out of the question.

¹⁶ See e. g. ECJ, judgment of 3.10.2013, Case C113/12 (Brady); ECJ, judgment of 18.4.2002, Case C9/00 (Palin Granit).

¹⁷ See § 3 No. 20 KrWG, which mentions intra-plant circles.

¹⁸ See e. g. explanatory memorandum to the introduction of § 4 KrWG ([link](#)), p. 76; KoppAssenmacher, KrWG § 4 marginal no. 17 with further references; in its guidelines (fn. 15). The Commission describes normal industrial practice as follows: “Normal industrial practice can include all steps which a producer would take for a product, such as the material being filtered, washed, or dried; or adding materials necessary for further use; or carrying out quality control. However, treatments usually considered as a recovery operation cannot, in principle, be considered as normal industrial practice in this sense.” (p. 18).

¹⁹ See Commission Communication, (fn. 12), p. 14.

²⁰ Ibid; cf. ECJ, Order of 15.01.2004 - Case C235/02 (Saetti and FredianiPetrokokos), para. 39.

- Processes for mere **grinding and shredding**, on the other hand, are not waste-specific treatment processes, but can be considered normal industrial processes.²¹ The material can therefore be a by-product, provided that the other requirements are met.
- Processes for **washing and drying** the production residues are also considered normal industrial processes (as long as the washing does not serve to remove pollutants, see above).²²
- **Sorting and separation processes** are normal industrial processes if such processes are also common for comparable primary raw materials.²³ If, on the other hand, a separation between recyclable and non-recyclable fractions is necessary (and not only reasonable), this leads to a classification as waste with regard to the total quantity, because a secure further use cannot be assumed for the total quantity prior to the separation.
- The **addition** of other substances that are indispensable for the end use can also be included in normal industrial treatment.²⁴ Processes that serve the product manufacture itself (**extrusion, injection moulding etc.**) are no longer pre-treatment but, in the case of the use of by-products, already their use. Extrusion therefore plays no role in distinguishing between waste and by-product.

Whether the process steps are carried out by the **manufacturer himself, by intermediary companies** or by the **next user** is not relevant for the classification as a by-product, as long as they continue to be assessed “as an integral part of the manufacturing process”.

(d) Produced as an integral part of the manufacturing process

A substance or object can further be qualified as a by-product only if it is produced as an **integral part of a manufacturing process**.

This requirement is **unproblematic** in cases where the further use of a production residue – including any pre-treatment that may have been necessary beforehand – is to take place in the same plant in which the residue was produced.

In other cases, the distinction is very difficult, especially since there have been **no court decisions** to date on the question of whether or under what circumstances this requirement is met if the further use of a production residue is only possible after pre-treatment, but this is carried out in another plant or by another company. The assessments in the German legal literature on the importance

21 This is explicitly stated in the Commission’s guidelines (fn. 15), p. 17. In the Communication (fn. 12), the Commission already points out that processes for shredding cutting residues resulting from the cutting of wood for further use, e. g. in chipboard, are considered a normal industrial process and thus do not prevent these cutting residues from being classified as a by-product. In this context, the Commission explicitly mentions “plastic scrap” as a possible by-product, provided that the other conditions are met (p. 12).

22 See e. g. Commission Communication (fn. 12), p. 9; Moser-Marzi/Frühwirth, Die Abgrenzung von Nebenprodukt und Abfall in der Industrie, 2015 ([link](#)) with further references.

23 See Commission Communication (fn. 12), p. 9.

24 Ibid.

of this prerequisite are inconsistent.²⁵ In this respect, a certain degree of legal uncertainty remains in the handling of the prerequisite in the practice.

Notwithstanding this, however, both the explanatory memorandum to the German KrWG and the European Commission²⁶ assume that the requirement of an industry-typical **pre-treatment process** (e. g. grinding and shredding) does not prevent a production as an “integral part of the manufacturing process”, even if it takes place **outside the facility** where the main product is produced.²⁷ This will also apply if the pre-treatment is carried out at a downstream company or the **subsequent user**. The treatment can therefore be distributed over several value-adding stages and can also take place across borders. An indication for the existence of the requirement shall be if the material is needed within the scope of the main activity of the manufacturer.²⁸

(e) Further use lawful

The further use of the by-product must be lawful, i. e. it must **fulfil the same requirements of product, environmental and health protection law as a comparable main product**.

25 Some even argue that the criterion in No. 3 has no independent meaning at all, see Jacobj, in: Versteyl/Mann/Schomerus, Kreislaufwirtschaftsgesetz, 2019, § 4 marginal no. 23. The problem stems from the fact that No. 3 does not seem to make sense when viewed in isolation, based on the wording, because a residue that has arisen in a manufacturing process is also always “integrally” produced in this process. Therefore, other authors want to interpret the term “broadly” and with regard to Nos. 2 and 3: According to this, the term “generated” is to be extended not only to the “accrual” of the material, but also to the permissible pre-treatment processes: “The generation of the by-product, together with the necessary treatment processes, must be an integral part of the manufacturing process”, according to Petersen, in: Jarass/Petersen, KrWG, 2014, § 4 marginal no. 36. In this respect, a “proximity” of some kind is thus postulated between the treatment and accrual situation.

26 In the Guidelines (fn. 15), p. 18 f., the Commission provides the following interpretation aid: “*The following points can be considered by competent authorities in determining in a particular case if a substance or object is produced as an integral part of a production process*”:

- *What is the nature and extent of the tasks needed to prepare the material for direct further use? How integrated are these tasks in the main production process?*
- *Are the tasks that are undertaken as part of, normal industrial practice’ also, an integral part of a production process? The relevant Reference document - BREF might be taken into consideration”.*

27 The explanatory memorandum to § 4 KrWG already points out that reprocessing in “external production processes” does not exclude the application of the criterion “integral component”; cf. also Kopp-Assenmacher, § 4 KrWG, marginal no. 19 with further references.

28 See Commission Communication (fn. 12), p. 9.

DIFFERENTIATION BETWEEN BY-PRODUCT AND WASTE

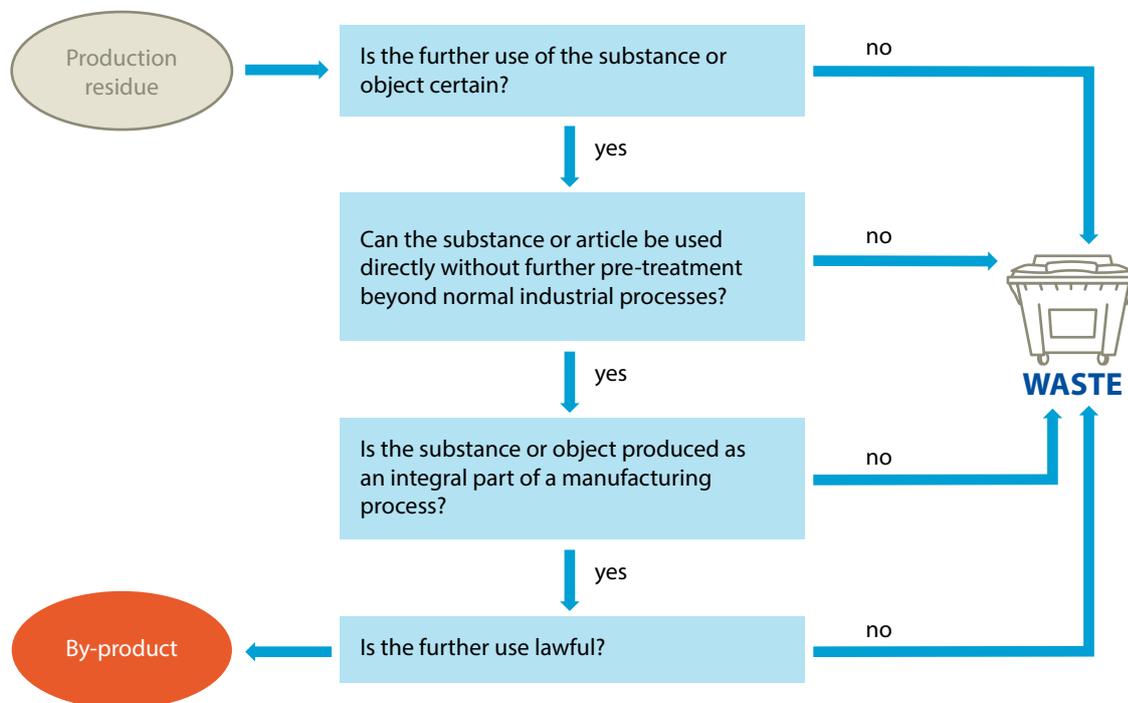


Figure 2: Decision tree for the distinction between by-product and waste

(f) Burden of proof and presentation

According to general rules, the burden of proof for the existence of these conditions lies with the person who wants to invoke them. In practice, this will usually be the manufacturer of the product whose production results in a residue for which the by-product status is to apply. If, for example, the manufacturer applies for a so-called “Product Recognition Notice” or a “negative test”, the applicant alone bears the burden of presentation and proof respectively the burden of establishing that the requirements of the by-product are fulfilled. The situation is different when, for example, an

authority assumes the continued existence of the waste property: Then the authority bears the burden of proof.²⁹

c) Recycling process

Recycling processes are recovery processes by which waste is reprocessed into products, materials or substances either for the original purpose or for other purposes. This includes both mechanical and feedstock or chemical recycling. Excluded from this is energy recovery and reprocessing into materials intended for use as fuel or for backfilling.

²⁹ See BayVGH, decision of 17 February 2020 – 12 CS 19.2505, headnote 5 and para 43.

(1) Material or physical recycling

In material recycling processes, such as mechanical and solvent-based recycling, only the aggregate state (solid/liquid) changes, but not the basic chemical structure (polymer composition) of the plastics. The plastic waste is separated by various physical process steps, e. g. by type, shredded, cleaned and, if necessary, melted down. Especially in the case of mechanical recyclates, the quality depends very much on these different processes. One speaks of high-quality recycling when the recyclates obtained can subsequently replace virgin material in the manufacture of plastic products.

(2) Raw material or chemical recovery

Raw material recovery refers to processes for the recovery of plastic waste in which the plastic polymers are broken down into basic chemical building blocks. These can then be reused for the production of new plastics, but are also suitable as starting materials for the synthesis of other chemical substances. The different technological approaches of chemical recovery can be differentiated as follows

- a) polymer-specific depolymerisation processes, for which only single variety plastic waste can be considered, and
- b) thermo-chemical processes such as pyrolysis and gasification, for which mixed and soiled plastic waste can also be considered.

PLASTIC RECYCLING PROCESS

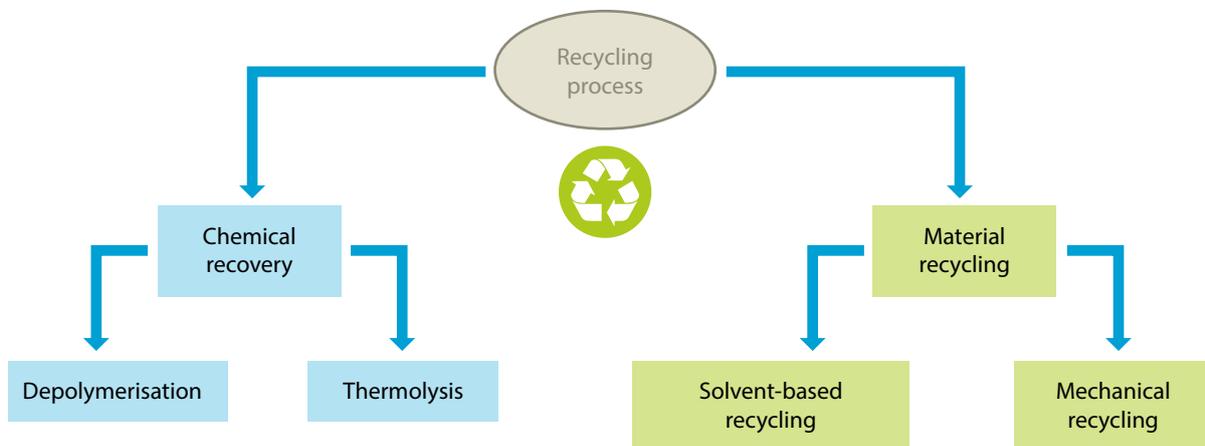


Figure 3: Overview of plastics recycling processes

(d) Requirements for the output of the recycling process

The law provides for certain requirements regarding the output of the recycling process:³⁰ According to this, waste that has undergone a recycling process or another recovery process is no longer to be considered waste if the following conditions are cumulatively met:

Requirements for the result of the recycling process according to § 5 (1) KrWG / Article 6

(1) WFD:

- “a) The substance or object is to be used for **specific purposes**;*
- b) **a market or demand** exists for such a substance or object;*
- c) the substance or object fulfils the **technical requirements** for the specific purposes and meets the existing legislation and standards applicable to products; and*
- d) the use of the substance or object will not **lead to overall adverse environmental or human health impact**”.*

In order to lose the status of waste, the substances or objects must first have undergone a recycling or other recovery process, although this does not mean

that already a final product has been produced but, if applicable, a preliminary or intermediate product can reach the “end-of-waste” status.

The requirement in a) is intended to prevent substances and objects from falling outside the scope of waste legislation, whose further use is uncertain.³¹

The existence of a “market” in b) can be demonstrated e. g. by means of a demonstrably positive market price; in the absence of an established market for a specific product derived from waste, however, the existence of demand is also sufficient, the proof of which can be provided in practice, for example, by means of binding purchase or supply contracts.

The criterion in c) must be used to check whether special product-related requirements exist and are fulfilled for the material obtained from the recycling process with regard to its concretely intended further use.³² This can include, for example, requirements for the (chemical-physical) suitability of a material for further processing and use, but also requirements from the aspect of environmental and health protection.³³ The latter include, for example, requirements³⁴ that define

30 See Article 6 WFD and (almost identical in wording) § 5 (1) KrWG.

31 European and German law differ slightly here, because for the KrWG it is sufficient if the substance or object is “commonly” used for certain purposes.

32 Legal literature is unanimous that the term “products” (in German “Erzeugnisse”) is to be understood more broadly here than under the REACH Regulation. Thus, according to § 5 No. 3 KrWG, the end-of-waste question must also look at legal provisions and standards for such materials that would not be classified as a product under the REACH Regulation, but as a substance or mixture. Insofar as the fulfilment of “standards” is used as a benchmark, it means technical specifications from recognised standardisation bodies that have been adopted for repeated or continuous use (DIN, DKE, ISO, IEC, CEN). If such standards exist, they should, according to the legal literature, only have “orientation value” within the framework of § 5 KrWG, as long as they are not designed as legally binding (e. g. through the reference of a legal provision that is binding for the user to a specifically designated standard).

33 For the special requirements for the use of recyclates in food contact materials and hazardous packaging, see Chapter IV.

34 Such requirements do not have to be created specifically “for recyclates”, but can also regulate the use of primary materials in products; the material obtained from waste must then at least “essentially” comply with such requirements for primary raw materials in order to be able to reach the end of waste.

which pollutant content³⁵ a recycled plastic or material may have in order to be used for the manufacture of certain products; also regulations that define the permissible source materials or input materials for (further) product manufacture.³⁶

Even if there are no specific requirements under product law or binding technical specifications in the aforementioned sense for the planned use of the recycled plastic, the effects of the further use on human health and the environment must also be examined on the basis of the criterion according to d). According to this criterion, the further use of the recycled plastic “as a whole” must not lead to harmful effects on humans or the environment. This examination requires a prognosis of possible harmful effects of the further use, whereby the law does not further limit the environmental goods to be considered. In essence, it is a matter of demonstrating that even in the case of a release of the respective material from the waste regime, there will be no accumulation of pollutants in environmental media (soil, water, air) contrary to the – then applicable – specialised law (e.g. product, chemical, hazardous substance or immission protection law) and that there is no threat of health hazards for the users of the products produced from the respective recyclates. Conversely, according to a recent decision of the European Court of Justice (ECJ)³⁷, it should also be possible to take into account the benefits for the environment when considering the overall effects on the environment of the use of recycled plastics, in particular with regard to the conservation of natural raw material sources and the goal of creating a circular economy.

35 E.g. the restrictions (concentration limits) for POPs according to EU Regulation 2019/1021.

36 For example, § 3 (2) of the German EWKVerbotsV stipulates that products made of oxo-degradable plastics may not be placed on the market. A corresponding recyclate could therefore not reach the end of waste. The Commission Regulation No. 10/2011 restricts, for example, the use of certain substances in the manufacture of plastic food contact material.

37 In this sense, ECJ, judgment of 14.10.2020, Case C629/19 (Sappi Austria), para. 68.

III. PRACTICAL EXAMPLES

1. Examples of the distinction between *post-industrial waste* and *by-product*

The following examples are intended to illustrate how production residues can be classified either as post-industrial waste or as a by-product.

(a) Material that is generated during production at plastics converters

Example 1: When starting up a production cycle or changing over production, a production backlog (e. g. the so-called “start-up cake”) is created which is fed back into the manufacturing process “as is”.

This is a case of “plant-internal recirculation”. The production residue can be classified as non-waste. If “plant-internal recirculation” of production residues without pre-treatment steps is not possible, as is usually the case in the plastics converting industry, or if the material is first collected, temporarily stored or fed into another process, post-industrial waste is to be assumed as a matter of principle as long as the existence of the prerequisites for by-product status within the meaning of § 4 KrWG cannot be proven.

*Example 2: Direct use of the production residue in one and the same process is not possible. The residue must first be **ground or shredded** (by the company itself or a third party) before it can be used again in the same plant where the main product was produced.*

The grinding or shredding of the material may be considered a “normal industrial process” even if it is done by a third party. Provided also the other requirements of § 4 KrWG are present, it is a by-product.

*Example 3: Like example 2, except that after grinding or shredding, the material is not used in the manufacturing process of the main product, but **by a third party**.*

The reprocessing of the production residues can also take place at an intermediary company or at the subsequent user. In contrast to example 2, there is no specific link between the production plant for the main product and the plant in which the processed production residue is to be used, in particular there is no “return” of the pre-treated material to the production plant for the main product. This raises the question of whether it applies to the production residue - also in view of its external processing and further use - that it has been “produced as an integral part of a production process” within the meaning of § 4 (1) No. 3 KrWG. At least in an interpretation closely guided by the wording of § 4 (1) No. 3 KrWG, there is nothing to be said against the assumption of a by-product in this constellation, provided that the necessary pre-treatment can be assessed as a “normal industrial process”, the further use is certain – across all process stages – and also the other requirements of § 4 KrWG are met.

*Example 4: The production residues, in addition to being ground or shredded, have to be **washed and dried** at a third parties.*

Washing and drying of materials can also be “product-typical”, normal industrial process steps and do not have to prevent classification as a by-product, even if they take place at an intermediate company.

Example 5: The materials are initially stored (as they are or after processing) without any specific intention of use.

Example 7: The material is collected by a commercial waste disposal company, which delivers the material to a plastic recycling company, which regranulates it.

As a rule, this is *post-industrial* waste. Only if the further use of the material is already demonstrably “ensured” at the time of production, a classification as by-product is possible.

Post-industrial recycle. In this case, the material is already collected as waste (= disposed), so that classification as waste is given.

Example 6: The material is not only ground at the plastics recycler, but also sorted, washed and, if necessary, regranulated.

Post-industrial recycle. These waste treatment processes are no longer “industry-typical” pre-treatment processes in the sense of the by-product definition, but are instead waste-typical treatment.



“Start-up cake”



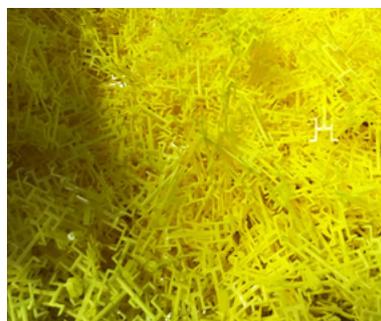
Starting lump



Start-up material



Coarsely shredded chunks and strands



Sprues



Sprue



Production residues of the composite material

b) Material from defective production at the plastics processor

Incorrect settings of the machine or unnoticed changes in the running process result in defective production, i. e. the product has a defect that precludes or impedes its use or marketing.

As a rule, this is post-industrial waste. It is precisely not a by-product that accumulates alongside the actual product, but the product itself, even if it is defective.

Accordingly, one can only speak of non-waste if the production defect is not so serious that further use/marketing as a main product is excluded (e. g. in the case of marketing as so-called B-goods). In this case, it is only a question of whether and, if so, at what point in time the defective product can reach the end-of-waste status through subsequent treatment.



Defective production and sprues



Defective production



Defective production, film scrap / section from production; mixture PA/PE

c) Material from fabrication remnants at the plastics converters plant

In a continuous production process, for example, semi-finished products are manufactured that are made up for the consumer. Due to the production process, there are sections that can no longer be used for finishing. For example, foams are first produced (main product) and then “cut to size” according to customer requirements (finished product).

The cut-off remnants are generally post-industrial waste. Exceptionally, they may be a by-product if the conditions according to § 4 KrWG (see II. 2. B) (4) above) are fulfilled, e. g. if a direct further use, e. g. as a cushioning material, is secured.



Remnants Pipe Fabrication



PUR flexible foam production residues



Offcut uncrosslinked PE foam



Production residues PVC window profile production

2. Distinction between *post-consumer* and *post-industrial material*

a) Material from fabrication remnants at a company from the wider value chain

The semi-finished products are not assembled by the plastics processor, but by another company in the supply chain. Thereby, off-cuts and scraps are created in the process.

As a rule, post-industrial waste will be present. However, if the fabrication of semi-finished products is an independent manufacturing process, the question may arise for the production-related

off-cuts and scraps of this process – just as for all other production residues – as to whether these can be classified as by-products under the further conditions of § 4 KrWG.

This could be examined, for example, in constellations in which the material is collected separately by the fabricator at the behest of the plastics converter, returned directly to the converter, and there only undergoes a pre-treatment typical for the industry (e.g. grinding and/or washing) before being used in the production of plastics.



Punch scraps



Cutting residues, PE films



Edge sections PMMA sheets

b) Material from installation and processing primarily in the construction sector

Usually this is post-consumer waste. The original purpose of the material (use as a building material, e.g. in the sense of a floor material or insulation material) has ceased to exist when it is cut off. A new purpose is not immediately in sight. In this respect, it must be assumed that the material has

been disposed. In any case, a direct further use, which could possibly stand in the way of a discharge, would have to be very well justified.

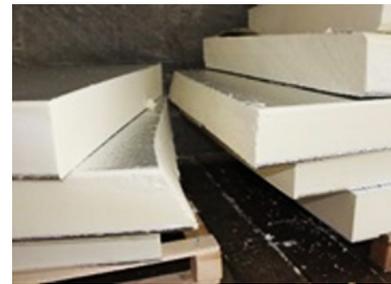
The following pictures show material that occurs during the final processing of the end product for the end consumer.



Sections PVC flooring



EPS insulation sections



Building materials: PUR insulation boards

c) Material from returns in the supply chain

Returns in the supply chain are post-consumer material.³⁸ This includes, for example, stock that is no longer needed due to product changes, returns and rejected material. In the view of the German Federal Environment Agency (UBA), this also includes packaging materials that have been taken back but cannot be reused, including single-use bottles with deposits and reusable bottles if they become waste after several cycles.³⁹ Certificates or labels are not always based on DIN EN ISO 14021:2016-07.

According to case law, whether returned goods, surplus goods or goods subject to complaint that have been returned within the supply chain are legally to be considered as waste or non-waste essentially depends on whether in the respective individual case a **further use of the goods for the same purpose is sufficiently probable**.⁴⁰

In the field of plastics converting, for example, this concerns cases where semi-finished products have been delivered for further processing and are then returned in the supply chain because they have become surplus.

³⁸ See DIN EN ISO 14021. The DIN EN ISO 14021:2016-07 contains the following wording: "This includes returns of material from the distribution chain".

³⁹ Cf. UBA, *Beschaffung von Kunststoffprodukten aus Post-consumer-Rezyklaten*, 2021, p. 11.

⁴⁰ See above II. 2.b) (1) as well as e.g. ECJ, judgment of 4.7.2019 - Case C624/17 (Tronex): Insofar as the goods are returned under the product guarantee and against reimbursement of the purchase price, from the ECJ's point of view there is generally no intention to discard the goods. At this point, the goods are therefore not (yet) waste. In the further course, the ECJ examines whether a further use of the goods is sufficiently probable. This is affirmed if the goods are in their unopened original packaging (no waste). According to the ECJ, if the product has a defect, this in itself is not sufficient evidence for a lack of functionality and thus for classification as waste. If the product - despite a defect - can be sold without being repaired and can be further used for its original purpose and if such further use is sufficiently certain, it is not waste. In this respect, the burden of proof lies with the respective owner. Only in the case of objects in need of repair, for which a functionally adequate use is excluded due to the respective defect of the object, can a discarding and thus the existence of a waste be assumed.



Stocks from the trade



Stocks from the trade

If in such a case it is already clear at the time of return that the semi-finished products will continue to be used after their return in accordance with their original purpose – i. e. precisely in their capacity as a semi-finished product that is to be processed into a final product – this speaks against a disposing by the returning party and thus against the existence of waste. If, on the other hand, surplus products of plastic are returned in order to grind them in a plant and to manufacture new products from the material thus obtained, this generally speaks in favour of the existence of waste.

Against the background of the case law on the criterion of direct use within the framework of § 3 (2) no. 2 KrWG (see above), in such cases it will regularly be assumed to be waste, because the person returning semi-finished plastic products is likely to be regularly “indifferent” to what happens further with his surplus goods. It will be difficult to prove the “uninterrupted will of the owner”, also directed towards a possible new regranulation purpose, required by case law.

d) Material from industrial/commercial origin

Industry or commerce can also be end customers of plastic products that are recycled after use, e. g. by a plastics recycler. As a rule, this is post-consumer waste, because the intended purpose of the

products has ceased or has been abandoned without a new intended purpose directly replacing them and which are also submitted to a disposal procedure, so that discarding is also to be assumed for this reason (see above II. 2. b) (1).



Used plant pots



Used protective elements



PE-LD film from commercial collection



Used drums from the industry

e) Material from households or household-related collections

In Germany, this group is predominantly made up of the collection system of one-way beverage deposit bottles and the yellow bag/yellow bin. This material is *post-consumer* waste.



PET deposit bottles sorted and pressed into bales



Mixed Lightweight packaging plastic sorting



Mixed and used plastics from household goods, sport/play/leisure



Electronic scrap plastics

IV. REGULATIONS FOR THE USE OF RECYCLATES IN PLASTIC PRODUCTS

In general, the same legal regulations apply to the use of recycled plastics as for new plastic goods.

With regard to the information on the recyclates, the new DIN SPEC 91446⁴¹ provides for four different data quality levels for recyclates: It is not prescribed which properties the recyclates must have, but which details (information and/or test results) must be provided for which data quality levels. While only information without test results must be documented for data quality level 1, from data quality level 2 onwards the results of tests are also prescribed, the scope of which increases up to level 4. Consequently, the properties of a recyclate can be better predicted on the basis of the information, the higher the data quality level.

In addition, special regulations apply to certain applications.

1. Use in food contact materials

The EU Commission Regulation No. 2022/1616 (hereinafter referred to as the Regulation or Recycling Regulation) applies to the use of plastic recyclates in food contact materials since 10 October 2022. The Regulation defines so-called “suitable” recycling technologies with which recyclates can be produced for use in food contact materials.

One of the two recycling technologies recognised as “suitable” so far is the mechanical recycling of post-consumer PET waste. The regulation defines the requirements under which recyclates from such processes can be used in food contact materials.⁴² In doing so, the Commission is guided by the previous EFSA assessment. A prerequisite is the individual approval of the recycling processes by the Commission.

The second application described as “suitable recycling technology” concerns recyclates from “closed and controlled product loops”, whereby these are limited to waste streams from (1.) the production of food contact materials, e.g. production waste, (2.) distribution and (3.) catering facilities. Unlike in the previous Commission Regulation No. 282/2008, *post-industrial recyclates* (PIR), which originate e.g. from production offcuts or from residues from the production of plastic films/packaging for food contact, are covered by the scope of the regulations. The regulation contains detailed specifications under which conditions such recyclates can be used in new food contact products. Recyclates originating from waste within the scope of distribution, e.g. returns in the supply chain that become *post-consumer recyclates* (PCR), can also be used in food contact according to the new specifications, provided that the prerequisites are met.

Recyclates used behind functional barriers are covered by the regulation, unlike in the previous regulation. Such processes are considered “novel” recycling technologies and have to be authorised by the Commission in an elaborate and lengthy procedure following an EFSA assessment. In addition, the requirements in Articles 13 and 14 of Commission Regulation No. 10/2011 must be complied with.

In order for a recycling process to be approved, detailed technical documentation must be prepared, which will be centrally evaluated by the European Food Safety Authority (EFSA) with regard to its safety. Based on the EFSA assessments ([link](#)), the European Commission intends to authorise recycling processes.

41 DIN SPEC 91446:2021-12: “Classification of plastic recyclates by data quality levels for use and (internet-based) trade”, available free of charge at: <https://www.beuth.de/en/technical-rule/din-spec-91446/346496956>

42 See in detail: GKV-BDE-bvse Guidance document „New rules for recycled plastics in contact with food“ (2022).

In contrast to the previous regulation, recyclates from chemical processes are also generally covered by the regulation. However, an exception applies to those processes in which a complete depolymerisation to monomers takes place, which are regulated in the Plastics Regulation No. 10/2011 (see Art. 1 para. 3 of Regulation No. 2022/1616). This means that, for example, recyclates from the glycolysis process are covered by the regulation (“novel technology”), but recyclates from pyrolysis or methanolysis processes are not.

For all types of recyclates, the requirements of **Commission Regulation No. 10/2011**, EU-Regulation 1935/2004 as well as Commission Regulation No. 2023/2006 also apply, which ultimately leads to a quality assurance system.

2. Use in dangerous goods packaging

The use of recyclates in plastic dangerous goods packagings and IBCs is regulated in the UN Model Regulations. These are updated every two years and serve, among other things, as the basis for the revision of the European Agreement concerning the International Carriage of Dangerous Goods by Road (*Accord européen relatif au transport international des marchandises Dangereuses par Route*, *ADR for short*). The national implementation of the ADR in Germany is carried out by the **Ordinance on the National and International Carriage of Dangerous Goods by Road, Rail and Inland Waterways (GGVSEB)**.

In addition to the legal requirements, which are rather generally formulated, DIN EN ISO 16103: “Packaging - Packaging for the transport of dangerous goods - Recycled plastics” specifies more concrete requirements for the use of recycled materials. Consequently, this standard is also used by the competent authorities in the dangerous goods sector as a criterion for the granting of dangerous goods approvals.

The use of recyclates in plastic dangerous goods packagings and IBCs is possible under certain conditions. These are described in the UN Model Regulations and DIN EN ISO 16103, among others:

1. Only **used industrial packaging**, e.g. drums, canisters, IBCs and large packaging that meet the following criteria may be collected:
 - a) Proof of previous contents (dangerous goods labelling)
 - b) Marking of the material code
 - c) Marking of the date of manufacture

2. only packagings or IBCs from the same **manufacturing process** may be used (in one batch) (e. g. extrusion blow moulding, rotational moulding, injection moulding).

3. The following packagings and IBCs are, however, **excluded**:

- a) those that have contained products that have attacked the plastic material (e. g. certain strongly oxidising substances), making it unsuitable for reprocessing
- b) those which have contained certain specific substances hazardous to health and safety and/or the environment, listed in classes
 - 6.1 Toxic substances,
 - 6.2 Contagious substances
 - and 7 Radioactive substancesof the UN Model Regulations, as well as all substances with toxic secondary risks.
- c) those that are older than 10 years
- d) those that show signs of ageing, e. g. due to the effect of UV radiation
- e) those made of a material that cannot be recycled (e. g. cross-linked polyethylene).
- f) those marked with the “REC” symbol

4. The criteria mentioned for the collection are to be checked during an **incoming inspection**

5. the following **pre-treatments** must be carried out before recycling:

- a) Clean all packaging and IBCs so that all residues are removed from the inside and outside.
- b) remove all caps and seals
- c) completely remove all labels that are made of materials other than the packaging/ IBC

6. during the final **quality control** of the recyclates, it shall be verified that each batch (25 t) of recycled plastic has the specified melt flow rate (MFR), density and tensile strength corresponding to the recyclate, which is was used for the type approval

7. the packagings or IBCs made from the recyclate must also be tested **batchwise (25 t) to a design type test**.

All the above steps must be described and documented in a **quality assurance programme** recognised by the competent authority.

In addition to the extra effort required to ensure compliance with collection, sorting and recycling requirements, batch testing of packaging or IBCs leads to 10-15 times higher testing frequencies for packaging/IBCs containing recyclates compared to those made from virgin material. These hurdles currently stand in the way of a wider use of recyclates in the area dangerous goods packaging. For this reason, IK has been working for years to adapt the requirements to the state of the art and to reduce the tests, since the experience of the past decades in the use of recyclates has clearly proven that the properties of packaging made of recyclates correspond to those of virgin material, provided that the properties of the recyclate are verified and all the process steps carried out beforehand are complied with in accordance with the recognised quality assurance programme.

V. NOTES ON TRACEABILITY

Traceability plays a very important role in the case of recyclates, as there is currently no measuring procedure with which the recyclate content in a plastic product can be determined or checked. Thus, the only way to prove the recyclate content is to provide complete data from the collected waste to the recyclate. Such a proof on the basis of the mass balance is also provided for in § 30a (2) VerpackG for the minimum recyclate content in single-use beverage bottles.

The traceability of recyclates is regulated according to EN 15343. This describes which data the supplier must provide for the respective process steps for the production of the recyclate. All procedures for determining and recording the data must be adequately described and documented. The individual process steps and the associated requirements are explained in more detail below:

1. Control of the incoming material

The supplier should provide as much information as possible. For the control of input materials there are specifications according to EN 15347, which are subdivided as follows:

- a. Required characteristics necessary for the characterisation of the waste batches, such as batch size, colour, shape and the polymer contained as the main component.
- b. Optional characteristics are information that could add value to the waste batch, such as mechanical properties, additives and moisture content. For these properties, it shall also be indicated where they come from. Are they those of the original source material (e.g. the packaging) or were they measured on representative samples from the waste batch?

The companies collecting the waste as well as those sorting it must identify the input material in batches and keep records of the incoming or sorted products in accordance to Table 1 (see below).

2. Control of the recycling process

In this step, the process variables are to be recorded in order to ensure a proper procedure in terms of good manufacturing practice (GMP). For this purpose, the quality of the products supplied by the process must be checked batch by batch. Challenge tests may be required for specific applications to demonstrate that the process is capable of delivering recyclates that meet the requirements of the application, e. g. food applications or automotive.

3. Characterisation of plastic recyclates

In order for the purchaser of the recyclate to be able to assess the quality of the product, the supplier must test and document the properties on a batch-by-batch basis in accordance with the standards for recyclates (e. g. EN 15342, EN 15344, EN 15345, EN 15346 or EN 15348).

Traceability should be achieved by assigning a unique identifier to each batch produced by the sorting and/or recycling companies, which ensures identification throughout the recycling process. As soon as the recyclate is delivered to the processor for the manufacture of the end products, the processor shall document and archive all data provided on the recycling process as part of its regular order process.

Based on this available data, the purchaser must ensure that the scope of traceability is sufficient for the intended application in each case!

The following table gives a non-exhaustive overview of the necessary information to be documented as a minimum for traceability according to EN 15343.

Table 1 – Information to be recorded according to the end-use application

Origin	Material type/shape
	Product type
	Type of waste e. g. pre- or post-consumer
	Where it comes from (provider identification)
	Date
	Waste history (e. g. possible contact with hazardous substances)
Logistics	Collection (transporter/transport mode)
	Sorting
	Lot size, identification and labelling
	Pre-treatment (e. g. washing, crushing)
	Storage (e. g. outdoors)
Tests carried out before processing	EN 15347 Plastics recyclate characterisation of waste plastics
	or, if applicable, others that are suitable for the end application
Process parameters	Details of the procedure used
	EN 15342 (PS)
Tests carried out after processing	EN 15344 (PE)
	EN 15345 (PP)
	EN 15346 (PVC)
	EN 15348 (PET)
	Or any other standard suitable for the end application
Intended [appropriate] application	Details of suitable or unsuitable applications

The list is not exhaustive, therefore further information may need to be provided, which between buyer and seller are to be agreed.

VI. NOTES ON THE LABELLING OF THE RECYCLATE USE

There is no legal obligation to indicate the use of recycled material or the recycled content in plastic products besides food contact materials (see above). Terms such as “recycled material”, “recycled content” or “PCR plastics” are – as seen – not legally defined. However, if companies use these or similar terms in the labelling of their products or in business practice, the rules of fair competition apply, in particular the prohibition of **misleading commercial conduct** (§ 5 UWG).

1. Prohibition of misleading claims

Pursuant to § 5 (1) first sentence, of the German Unfair Competition Act (UWG), anyone who engages in a misleading commercial act which is capable of inducing the consumer or other market participant to take a commercial decision which he would not otherwise have taken. Pursuant to § 5 (1) sentence

2 UWG, a commercial act is misleading if it contains **untrue statements** or **other information suitable for deception about certain circumstances** (e. g. essential characteristics of the goods such as composition, quality or commercial origin).

In order to assess how the public understands an advertisement, it is necessary to take into account the **reasonably well-informed and reasonably observant and circumspect consumer**. An advertising claim is already misleading if it can be misunderstood even by a small, not entirely inconsiderable part of those addressed. Therefore, it is not the understanding of the advertising entrepreneur that is decisive, but the respective impression that the advertising creates in the audience.

According to case law, statements about the sustainability of a product are highly likely to influence the decision to buy. Accordingly, statements such as “from 100 percent recycled plastic”, is judged according to **strict standards**. According to case law, environmental claims may only be used in advertising if they are clearly substantiated and consumers are not misled. Environmental claims can also be misleading if they are based on inaccurate and general statements about environmental benefits. If the environmental claim can be misunderstood, the company is obliged to provide more detailed information. A further difficulty arises from the fact that even factually correct environmental claims can be misleading if, for example, the environmental benefits claimed do not exist as is suggested to the consumer.

The misleading effect is clear, for example, if the information on the recycled content is simply false. Such and similar cases are listed on a so-called “black list” in the annex to § 3 (3) UWG. This also includes the unauthorised use of quality marks, quality labels or similar.

Furthermore, it has been decided by the courts that the labelling of a plastic bottle as “Ocean bottle” is misleading if the communication as a whole gives the impression that the plastic for the production is collected directly from the sea or has been washed out of the sea onto the beach and collected there, if in fact the plastic is also collected from river courses and canals at some distance from the sea and has not been washed there from the sea or if the plastic collected on the beach is to a substantial extent also plastic that has arrived there from the land.⁴³

43 See OLG Stuttgart, judgement of 25.10.2018 2 U 48/18: “Plastic that has never been in the sea is not plastic from the sea.”

Case law also applies strict standards when examining the reported recycled content. It was decided that the statement “consists of 50 percent plastic waste” is misleading if the packaging “**which the consumer holds in his hand**” contains no recycled plastics at all or at least less than promised.⁴⁴

Strict requirements also apply to statements regarding the origin of the recycled material. For example, it was decided that paper whose production also involved post-industrial waste should not be considered as “100 percent recycled”.⁴⁵ The reason given for this decision was that the consumer **associates the term “recycled” with the idea that the material used to manufacture the product has already been in circulation**, so that its reuse closes a cycle. Another decision reached the same conclusion in relation to plastic baskets for toilet flushers.⁴⁶

A number of standards have been developed to assist in the correct use of environmental claims. The application of such standards is basically voluntary.⁴⁷ However, if the regulations of the standard are complied with, it can be assumed that, at least with regard to the labelling, no misleading advertising is given.

2. Type I environmental labels (DIN EN ISO 14024)

Type I labelling is based on a **catalogue of criteria** according to which the respective product is evaluated. It is used when the specified environmental performance requirements are met within the specific product category. In most cases, these environmental labels are known to private and commercial consumers and have a high level of credibility. **The criteria are developed with the involvement of interested parties and verified by external certification.** Under certain circumstances, the awarding of these labels may even be in the hands of the state, but this is not a mandatory requirement.

The best-known Type I eco-labels include the Blue Angel in Germany, the European Eco-label or the RAL quality mark for recycled plastic from the yellow bag.

44 Ibid., para. 165: “If it is suggested that the bottle is made from a certain raw material, this must be in the actual bottle. A ‘quantity compensation’ in such a way that only that number of bottles is labelled with a reference to plastic from the sea which was actually produced in this way, but the bottle labelled in this way does not actually come from this material, would also be unfair.”

45 See KG Berlin v. 21.05.2010 - 5 U 103/08.

46 Decision of the LG Stuttgart, May 2019, the decision is not published.

See <https://www.sueddeutsche.de/wirtschaft/plastik-verpackungen-oeko-gruen-alternativen-1.4492282>.

47 For plastic food contact materials, e. g. food packaging and beverage bottles, Commission Regulation 2022/1616 and EU-Framework Regulation 1935/2004 (see Article 15) provide for labelling requirements.



Plastic products with the Blue Angel must consist of 80 percent post-consumer material.



Plastic packaging for lubricants, for example, must consist of 25 per cent post-consumer material.



This indicator shows the exact percentage of recycled plastics from household (EPR) collections.

3. Type II environmental labels (DIN EN ISO 14021)

Type 2 labels are a voluntary self-declaration and are therefore the sole responsibility of the respective manufacturer. They usually focus on a single environmental aspect. The use of a symbol for the eco-labels is optional, but they should be easily distinguishable from other well-known eco-labels to avoid confusion among consumers.

DIN EN ISO 14021 also specifies that the recycled content is the percentage by mass of the recycled material in a product or in packaging. The information on the product and the packaging may therefore not be combined. In the case of external enquiries, a company must provide the respective procurement documents or other reports to verify the origin and quantity of the recycle.

An example of a Type II eco-label is the dm sustainability cloverleaf:



It makes sense to use a symbol according to DIN 6120 for Type II environmental labelling. Since the revision of this standard in 2019, it is now possible to indicate the percentage by mass of the recycled material in the product. This is possible for all mono-materials as well as for plastic-plastic composites.



PET (REC25)



LDPE/PET/EVOH

4. Sector-specific quality marks

In addition to the different types of environmental labels in the ISO 14020 series, there are also, for example, sector-specific quality labels. Here, however, the focus is not on the environmentally relevant aspects, but on certain quality criteria. Nevertheless, there are also quality associations in which the use of recycled materials is specified as a component of the quality criteria (e. g. RAL Quality Association Recyclables chain PET-Getränkeverpackungen e. V. – the quality and testing regulations stipulate a minimum recycle content of 25 percent *post-consumer material*).



ANNEX

Image directory/image sources

	Coarsely crushed chunks and strands, MKV
	Start-up cake, RDG
	Sprue, RDG
	Start-up chunks and strands, MKV
	Sprues and faulty production, MKV
	Start-up material, Halbich
	Sprues, MKV
	Production residues of the composite material, BMW
	Faulty production, MKV
	Faulty production, film rejects/cuttings from production; mixture of PA/PE, APK
	Remaining pieces of pipe assembly, Kunz
	Production remnants PVC window profile production, Dako-pr
	PUR flexible foam production residues, Hinzsch Schaumstofftechnik GmbH & Co. KG

	Blend of non-cross-linked PE foam, Hinzsch Schaumstofftechnik GmbH & Co. KG
	Punch remnants, www.ammon-kunststoffe.com
	Cutting residues, PE films, http://www.heger-recycling.de/de_material-kunststoffe.html
	Edge cuttings PMMA sheets, https://www.pekutherm.de/kunststoff-recycling/acrylglas-recycling/
	PVC flooring sections, https://www.aktionpvcrecycling.com/flooring/
	Sections EPS insulation, https://www.hausjournal.net/styroporaufglaskleben
	Building materials: PUR insulation boards, FSK
	Stocks from trade, source: Conversio*
	Stocks from trade, source: Conversio*
	Used plant pots, Pöppelmann
	Used protective elements, Pöppelmann

	Post-consumer PE-LD film from commercial collection, https://puhm.eu/purchase-plastics/
	Used industrial drums from production, source: Conversio*.
	PET deposit bottles sorted and pressed into bales, www.herbold.com
	Mixed LVP plastic sorting, www.eurecycling.com
	Mixed and used plastics from household goods, sport/play/leisure; www.solarify.eu
	Electronic scrap plastics, www.eurecycling.com

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