RecyClass

RECYCLASS PACKAGING RECYCLABILITY METHODOLOGY

VERSION 3.1

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INTRODUCTION

Chapter 01

RecyClass

INTRODUCTION

Traditionally, packaging has been designed with a focus on functionality and marketing appeal, often overlooking its end-of-life management. However, with the increasing push towards a circular economy, design for recycling has become a key strategy to ensure packaging have a circular lifecycle. This approach not only supports the diversion of packaging from landfills and incineration but also contributes to meeting higher recycling targets, conserving natural resources, and improving the quality of recycled materials.

The Packaging and Packaging Waste Regulation (PPWR)[1] emphasizes the importance of recycling-friendly design to improve the overall recyclability of packaging. By enhancing the quality of packaging waste through better design, we increase the quality of recycled material, driving a more sustainable recycling system. RecyClass main objective is to support high-quality recycling of packaging in line with these goals.

RecyClass is a non-profit European initiative focused on building a community within the plastic packaging value chain to identify the best methods for assessing and designing plastic packaging for recyclability. Its goal is to enhance recyclability and promote the use of recycled content in new products, including those beyond packaging.

RecyClass aims at filling the existing gap between different industry actors and works towards combining the technical knowledge of polymer suppliers, converters, brand owners, waste managers and recyclers. RecyClass gathers members across the whole plastics value chain with recyclability in the core of their strategy to work on the development of sorting and recyclability testing Protocols[2], being testing an essential step to develop robust European standard Design for Recycling Guidelines[3].

To create a level playing field around recyclability claims, RecyClass developed two certification to evaluate the recyclability of products. These certifications are associated to the recyclability self-assessment available for free by means of the RecyClass Online Tool[4], which allows a pre-assessment of the technical recyclability of a packaging on the EU market.

▶ DESIGN-FOR-RECYCLING CERTIFICATION

It is a technical recyclability assessment based on the state of the art of recycling processes and technologies for packaging waste in Europe. The packaging is designed to be recyclable, following the RecyClass Design for Recycling Guidelines. This Certification evaluates and ranks the recyclability of a packaging, determining to which extent it is suitable for a specific recycling stream based on the most commonly used sorting and recycling technologies available in Europe. This certification does not consider collection, sorting and recycling specificities in a given country.

▶ RECYCLABILITY CERTIFICATION

The packaging is designed to be recycled, following the RecyClass Design for Recycling Guidelines, and is effectively recycled in the specific geographical area for which the certification is conducted. In this certification, the existence of selective collection schemes, as well as the existence of sorting and recycling infrastructures are being checked.

Both Certifications are the basis for the RecyClass Certification scheme which third-party evaluates the recyclability of packaging via a technical assessment at European level (Design-for-Recycling Certification, Letter of Compability); and locally (Recyclability Certification). The methodology behind these certification processes is laid down in this document.

1. Packaging and Packaging Waste Regulation available here
2. RecyClass Recyclability Evaluation Protocols here
3. Design for Recycling Guidelines are available here
4. RecyClass Online Tool is available here

RECYCLABILITY DEFINITION AND EVALUATION

Chapter

02

RECYCLABILITY DEFINITION AND EVALUATION

To lay the foundations of the methodology, RecyClass defined first the meaning of "recyclability" and "recyclable packaging", illustrated by a class ranking from "A" to "C", as laid down in the PPWR. Recyclability classes A, B and C are granted to packaging generating high quality recycled materials, meaning incorporable back in its original application or usable for other circular applications, and therefore these packaging can claim their recyclability. On the other hand, packaging design classified as non-recyclable cannot match the requirements of circularity (established on scientific evidence by RecyClass) and will lower the quality of the recycling stream.

Section 2.2. defines each recyclability class and the concept of circularity.

The RecyClass Online Tool is a user-friendly online self-assessment which provides an analysis of the technical recyclability of a packaging according to the state of the art sorting and recycling technologies available in Europe.

The recyclability evaluation results in a class ranking from A to C (and non-recyclable). The results are detailed in a report, which provides specific indications on how the packaging design affects its compatibility with sorting and recycling in Europe.

The results achieved with the RecyClass Online Tool give an indication to the user on the Recyclability of the packaging according to RecyClass packaging recyclability methodology and cannot be considered as an official RecyClass Certification. However, the self-assessment by mean of the RecyClass Online Tool provides a preliminary indication about packaging eligibility for RecyClass recyclability certification or potential tests needed prior to the certification in case of lack of data.

Furthermore, it provides as well a general indications for Certification Bodies before the certification to issue a Certificate for Recyclability (e.g. indications on polymer stream of the audited packaging).

More information on the use of claims may be found in the document "Use of Claims"[5] available on the website.

2.1 RECYCLABILITY DEFINITION

A global definition of "recyclability" of packaging is an integral step to harmonise the worldwide recycling industry. RecyClass endorses the definition developed by The Association of Plastics Recyclers (APR) and Plastics Recyclers Europe (PRE) in 2018.

Four conditions should be fulfilled to consider a packaging as recyclable:

1. The packaging must be made with a material that is collected for recycling, has market value and/or is supported by a legislatively mandated program.
2. The packaging must be sorted and aggregated into defined streams for recycling processes.
3. The packaging can be processed and reclaimed/recycled with commercial recycling processes.
4. The recycled material becomes a raw material that is used in the production of new products.

This definition does not intend to restrict innovation. For innovative materials to be recyclable, it shall be demonstrated that they are collected and sorted in sufficient quantities and are compatible with the state of the art of industrial recycling processes or have sufficient material quantities to justify operating new recycling processes.

Nonetheless, fulfilling these four categories is a prerequisite to evaluate the packaging recyclability and does not automatically designate a packaging recyclable. Recycled material is available in many different quality grades which depend among others on the quality of the input packaging waste to the process. Recyclability will however depend on the specific design of each packaging that will have to be evaluated by the RecyClass Online Tool and certified via Recyclability Certification Schemes.

2.2 RECYCLABILITY CLASSES

The recyclability class ranking ranges from "A" to "C", where an "A" implies that a package is designed to be fully recyclable[6], while a "C" indicates that a package can present some minor issues that do not harm its overall recyclability. Packaging not satisfying those requisites are assessed as non-recyclable.

The recyclability classes are described as follows:

CLASS A

The packaging does not pose any recyclability issues and the recycled material can potentially feed a closed-loop scheme to be used in the same quality application.

CLASS B

The packaging has some minor recyclability issues that slightly affect the quality of the recycled material generated. However, majority of recycled content from this packaging can still potentially feed a closed loop.

CLASS C

The packaging presents some recyclability issues that affect the quality of the recycled material or lead to material losses during recycling. In the first case the recycled material could be used in a cascade open-loop scheme, whereas in the latter case the material could potentially feed a closed loop scheme.

NOT RECYCLABLE

The packaging has either significant design issues that highly affect its recyclability or imply large material losses or is lacking specific infrastructures for collection, sorting and recycling in EU27+3.

5. Recyclability & Recycled Content Use of Claims Guidance is available here

6. Types of packaging considered recyclable in Europe have to fit with the definition of recyclability available here

The class grading indicates a decrease of recyclability which can be caused by many different factors of a packaging design. As defined above, packaging with class “A” can be recycled in closed-loop systems, for instance “beverage bottle to beverage bottle” or “food to non-food packaging”. This class however would not apply to packaging destined for open loop recycling. High-quality applications are significantly reinforced by the principles outlined in the Circular Plastic Economy, the Circular Economy Act[7], the Plastics Strategy, and the PPWR[8], as they:

- Minimize the loss of materials,
- Minimize plastic material degradation, allowing for more recycling cycles,
- Preserve the plastic material economic value.

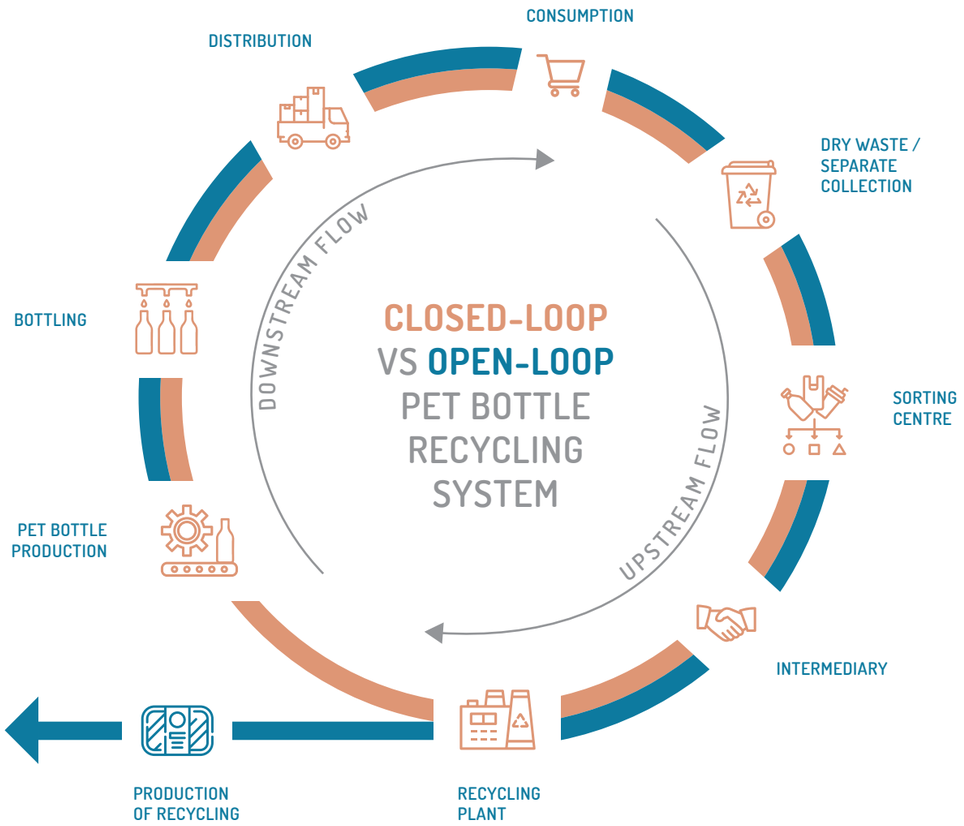


Fig. 1 PET bottles in closed loop and open loop recycling

However, even if not ranked “A”, open-loop recycling also results in a positive environmental impact reduction when compared to the utilization of virgin material feedstock, in particular if several cycles of utilisation are ensured as it is the case with packages obtaining recyclability class “B” or “C”.

There are cases where functionality requirements make certain packaging hard to be designed for closed-loop recycling systems. However, design choices leading to the longer multiple-step cascaded recycling should be favoured as illustrated in figure 2.

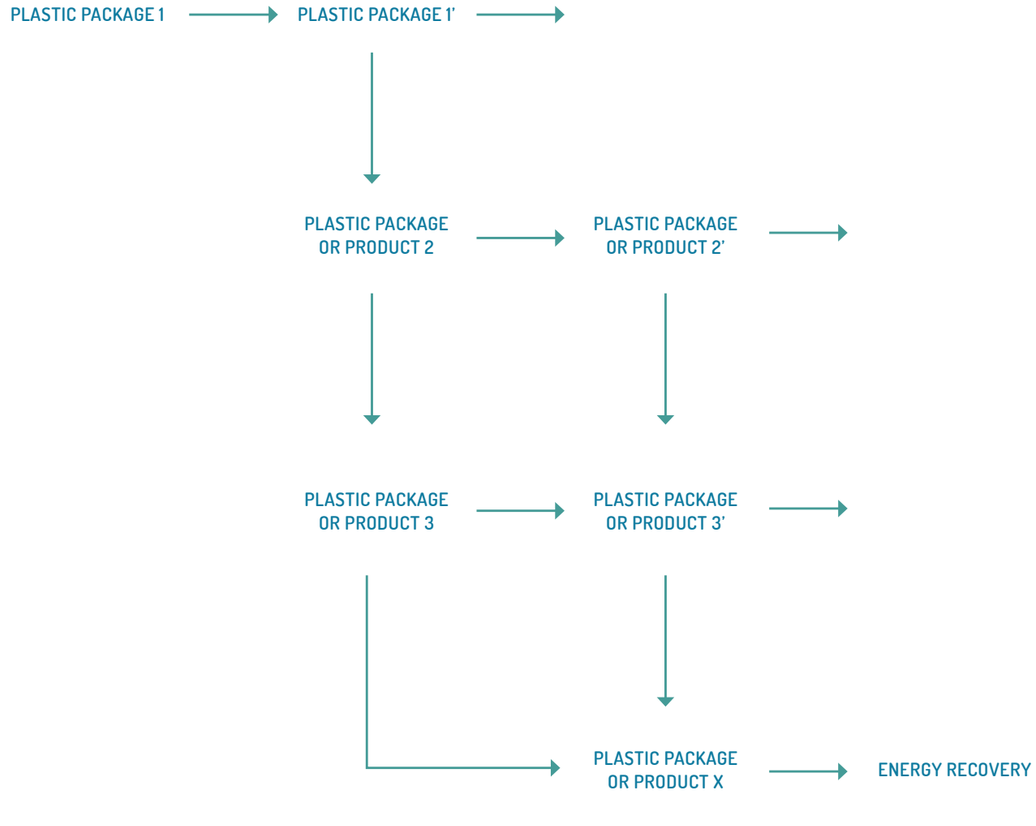


Fig. 2 Cascade open-loop recycling

7. Circular Economy Act available here
8. Plastics Strategy available here

MODUS OPERANDI OF THE RECYCLASS ONLINE TOOL

Chapter

03

MODUS OPERANDI OF THE RECYCLASS ONLINE TOOL

The RecyClass Online Tool is structured in 5 main sections that allows to self-assess plastic packaging recyclability following the present methodology:

1. **Introduction for the users and packaging description**

2. **Suitability analysis,** to define whether the packaging falls into the definition of plastics packaging or whether the packaging has generic design issues that render the packaging non-recyclable per definition, being the entry condition for using RecyClass methodology.

3. **Selection of the packaging's type & sorting behaviour**

4. **Design for Recycling**
   - Part 1: General Questions on the packaging design (recyclable plastic content)
   - Part 2: Questions related to the compatibility of materials used in the packaging
   - Part 3: Calculation of the residual content in the packaging via the "Easy-to-Empty" or "Easy-to-Acces" index

5. **Final results**

Sections 2, 3 and 4 are detailed on the following page.

3.1 SUITABILITY ANALYSIS

The second section of the RecyClass Online Tool aims at identifying whether the packaging is suitable for the analysis by asking whether it contains a minimum of 70 % of its main material; whether it is intended to package non-hazardous goods, and if accepted in the household collection.

The result of this section will not give an indication of recyclability but will only determine whether the analysis may continue.

3.2 TYPE OF PACKAGING

The main material in the packaging has to be selected, as this choice will determine which guidelines[9] to use for that specific kind of packaging. The different types of packaging included in the RecyClass Online Tool are:

- Clear / light blue PET bottles
- Transparent Coloured PET bottles
- White Opaque PET bottles (for food-contact packaging)
- Clear PET thermoforms
- Coloured PET thermoforms
- Natural PE flexible film
- Coloured PE flexible film
- Natural PP flexible film
- Coloured PP flexible film
- Natural & white HDPE containers
- Coloured HDPE containers & tubes
- Natural & white PP containers
- Coloured PP containers & tubes
- Natural & white PS containers
- Coloured PS containers
- HDPE crates & pallets
- PP crates & pallets
- EPS fish boxes
- EPS white goods
- Rigid Aluminum packaging - in collaboration with CIRCPACK by Veolia[10]
- Semi-rigid Aluminum packaging – in collaboration with CIRCPACK by Veolia
- Flexible Aluminum packaging– in collaboration with CIRCPACK by Veolia
- Steel packaging – in collaboration with CIRCPACK by Veolia

The type of packaging is linked to the availability of valuable recycling streams in Europe and recognised by Plastics Recyclers Europe (for plastics only), for which RecyClass (or CIRCPACK by Veolia for non-plastic packaging) developed a corresponding Design for Recycling Guidelines.

For plastics, the same design for recycling recommendations apply to natural and white packaging, to preserve the high-value of these materials and to ensure the availability of both white and natural recycled plastic on the markets. Natural and white plastic packaging should be preferred over coloured packaging and should be sorted into two distinct streams and recycled separately.

3.3 DESIGN FOR RECYCLING

The third section evaluates in detail the packaging design and its compatibility with recycling through 3 sets of questions. Any packaging feature is relevant and should be characterized in order to self-assess the impact of the packaging design on the targeted stream.

12. Design for Recycling Guidelines for plastic packaging are available here
13. CIRCPACK's Design for Recycling Guidelines for non-plastic packaging are available here

QUESTION PART 1 : GENERAL QUESTIONS - RECYCLABLE PLASTIC CONTENT

The first set of questions concerns the overall design of the packaging to assess the proportion of recyclable content in the target stream using a mass balance calculation. Based on the answers provided, the system will give a first provisional indication of the recyclability of the packaging, known as an intermediate result (cf: table 1). The calculation reflects the recoverable proportion of materials in the current recycling streams per type of packaging.

Maximising the proportion of the main and preferably unique material is one of the principal requirements in designing a recyclable packaging and in improving the quality of the recycled material (generated). Therefore, the larger the content of one material in the packaging, the higher its recyclability yield.

Other materials present as layers and/or welded to the main body's structure cannot be separated by the recycling process and will therefore be processed together during recycling thus limiting their possible end applications.

Please note that the recyclable content does not refer to inks, additives, barrier (e.g., PA), adhesive for laminates, etc. These features will be evaluated in the next part: Design for Recycling Incompatibilities.

Table 1. Recyclable Plastic Content Calculation

PE AND PP FLEXIBLE PACKAGING	The recyclable proportion consists of the weight of the main polymer (i.e., polymer of the targeted recycling stream) and possibly weights of any PE or PP additional components (e.g., cap, label, sleeve, others) compared to the overall weight of the packaging. Only the weight of the main polymer is counted in case of multilayer PE/PP in the packaging body. Any other combination of PO with non-PO materials as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ PO\ (except\ multilayers)}{Total\ wt\ of\ the\ packaging}$
HPDE AND PP RIGID PACKAGING	The recyclable proportion consists in the weight of the main polymer (i.e., polymer of the targeted recycling stream) and possibly weights of any PE or PP additional components (e.g., cap, label, sleeve, others) compared to the overall weight of the packaging. Any other combination of PO with non-PO materials as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ PO}{Total\ wt\ of\ the\ packaging}$
PET BOTTLE	The recyclable proportion consists in the weight of PET and possible weights of any PE or PP additional components (e.g., cap, label, sleeve, others) compared to the overall weight of the packaging. Indeed, the floating fraction (PE and PP) is recovered during the PET recycling process and recycled within the mixed polyolefins stream. $Recyclable\ \% = \frac{wt\ of\ PET + wt\ of\ PO}{Total\ wt\ of\ the\ packaging}$
PET THERMOFORMS	The recyclable proportion consists in the weight of PET compared to the overall weight of the packaging. Combination of PET with any other material than PE as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ PET}{Total\ wt\ of\ the\ packaging}$
PS RIGID PACKAGING	The recyclable proportion consists in the weight of PS compared to the overall weight of the packaging. Combination of PS with any other material as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ PS}{Total\ wt\ of\ the\ packaging}$
HDPE AND PP CRATES & PALLETS	The recyclable proportion consists in the weight of the main polymer (i.e., polymer of the targeted recycling stream) compared to the overall weight of the packaging. Any other combination of PO with non-PO materials as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ PO}{Total\ wt\ of\ the\ packaging}$
EPS FISH BOXES	The recyclable proportion consists in the weight of EPS compared to the overall weight of the packaging. Combination of EPS with any other material as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ EPS}{Total\ wt\ of\ the\ packaging}$
EPS WHITE GOODS	The recyclable proportion consists in the weight of EPS compared to the overall weight of the packaging. Combination of EPS with any other material as multilayers is disqualifying. $Recyclable\ \% = \frac{wt\ of\ EPS}{Total\ wt\ of\ the\ packaging}$
ALUMINUM	The recyclable proportion consists in the weight of Aluminum compared to the overall weight of the packaging. $Recyclable\ \% = \frac{wt\ of\ Aluminum}{Total\ wt\ of\ the\ packaging}$
STEEL	The recyclable proportion consists in the weight of Steel compared to the overall weight of the packaging. $Recyclable\ \% = \frac{wt\ of\ Steel}{Total\ wt\ of\ the\ packaging}$

In line with the PPWR, based on the answers provided in this first area of questions, the following interim results are provided by the Online Tool:

A: ≥ 95% B: 80-95% C: 70-80% Non recyclable: <70%

The class resulting from Question Part 1 – recyclable material content – is the maximal and theoretical recyclability class that the packaging can obtain. Indeed, the larger the content of the targeted material in the packaging, the higher its recyclability will be (i.e., the amount of recoverable and valuable material recycled).

QUESTION PART 2: DESIGN FOR RECYCLING INCOMPATIBILITIES

This section focuses on the evaluation of the compatibility of the different packaging components with the recycling of the main material in the packaging, based on the information reported in the Design for Recycling Guidelines[11 12] .

Based on the interim result obtained in the previous sections, the following rules are applied:

- The packaging does not present any features listed in the RecyClass Sorting Protocol[13] and all packaging features are listed as fully compatible with recycling in the guidelines: no penalties are applied.
- The packaging presents one or more features listed as limited compatible with recycling (i.e. slightly negative) in the guidelines: 1 class penalty is applied (the features and the penalties are not cumulative)

The packaging present one or more features listed as no compatible with recycling in the guidelines: the packaging is considered non-recyclable by definition. In case the packaging presents one or more features listed in the RecyClass Sorting Protocol, a sorting test following the protocol procedures is mandatory. Class penalties are applied in case sorting efficiency is lower than the thresholds highlighted in the Sorting Protocol.

If a feature is not mentioned in the guidelines, it should be tested within the technology approval framework before proceeding with certification[14].

QUESTION PART 3: EASY-TO-EMPTY & EASY-TO-ACCESS INDEXES

The presence of residual product content in the packaging negatively affects its recyclability. Therefore, a packaging which is designed to be emptied easily is more recyclable than one which still contains significant quantities of the product it contained.

As a prerequisite for industrial and commercial rigid packaging (B2B applications), presence of residual product content is limited to half by weight relative to the weight of the empty packaging. Any packaging with a higher residual content is disqualified, as highly contaminating for the recycling streams. If the packaging meets this first condition, the residual product content must be further calculated to evaluate its impact on the recycling process as explained below.

“Easy-to-empty” index (Etei) is to be assessed for packaging where the product content is not accessible for emptying (i.e., tubes); whereas the “easy-to-access” index (Etai) is to be used for packaging where the content is accessible for emptying (i.e., pots). Both indexes represent the percentage of product that remains in the packaging after its normal emptying.

For a package that contains liquids, creams, gels, or pasty products the easy-to-empty / easy-to-access index should be calculated. The results of the following index will influence the recyclability ranking as follows:

- More than 5 % = -1 class & sorting test mandatory
- More than 10 % = -2 classes & sorting test mandatory

More than 15 %= disqualification. The calculation method is the following:

$$Ete_i / Eta_i = \left(\frac{Pe - W}{Pf} \right) \times 100$$

where,

1. W = weight of a fully empty packaging (without product inside)

2. Pf = declared net weight of content (in case of volume it must be converted in weight)

3. Pe = average weight of empty packaging after normal use, in minimum 10 emptying tests.

EtE = Easy-to-empty (e.g., tubes): a packaging with the declared quantity of product has to be emptied easily without being forced (i.e., for liquids just holding the open package vertically for 1’ with open side downwards; for pasty products just squeezing the tube as in its normal use, for creams taking them out of the jar as per normal use, etc.)

Etai = Easy-to-access (e.g., pots): a packaging with the declared quantity of product has to be emptied simulating a normal use by the end consumer (i.e., with a spoon).

The testing procedure to evaluate the Easy to Empty index can be found on the RecyClass Online Tool[15].

11. Design for Recycling Guidelines for plastic packaging are available here
12. CIRCPACK’s Design for Recycling Guidelines for non-plastic packaging are available here
13. RecyClass Sorting Protocol available here
14. RecyClass Testing methods for the Technology Approvals are available here
15. Details on easy-to-empty / easy-to-access index are available here

INTERIM RESULT AND SELF-ASSESSMENT REPORT

The Online Tool shows the recyclability interim results by compiling the questions of each section. In this way, the users can monitor what affects the recyclability rank and to which extent. Once the analysis is completed, a self-assessment report is generated automatically by the system which may be downloaded as PDF. It includes all the questions and answers provided during the assessment, as well as the interim results for each of the sections and the final result. Highlighted in red are reported design aspects negatively affecting the recyclability of the packaging. Companies may contact RecyClass (for plastics) or CIRCPACK (for other packaging materials) if they would like an expert to review the self-assessment report.

In addition, for plastic packaging, the Online Tool provides country-specific information on where the analysed packaging might be collected, sorted, and recycled in Europe. The mapping is regularly updated based on the evolution of the European waste management systems.

Following the completion of the assessment, companies are welcomed to apply for a Recyclability Certification. The certification is carried out by an independent and recognised auditor (cf: section 4 for more details).

RECYCLABILITY CERTIFICATIONS

Chapter

04

RECYCLABILITY CERTIFICATIONS

The RecyClass Certifications provide a comprehensive evaluation of plastic packaging recyclability following the present methodology and considering the most commonly used technologies of sorting and recycling infrastructures in Europe. RecyClass developed two types of recyclability certifications: Design for Recycling and Recyclability Certification, that both consider the sorting behaviour of the packaging and the design incompatibilities that may impact the recycling process. The results of these evaluations certify whether the packaging is designed to be recycled or effectively recycled, respectively.

RecyClass implemented a Certification Scheme to cover each recyclability evaluation, offering the possibility to the plastic industry to get certified by third-party auditors and communicate externally about their packaging recyclability in a fair and robust way for both Business-to-Business and Business-to-Consumers models. (cf: section 4 for more details).

Certification procedures described in sections 2 and 3 are a basis for a Recyclability Certification, which are respectively called ***Design for Recycling Certification*** and ***Recyclability Certification***. The procedures allow the applicant to communicate externally about the packaging recyclability by using the RecyClass logo to report the class achieved. Details are described in the "Recyclability & Recycled Content Use of Claims Guidance"[16] document.

It is worth noting that the class obtained through the self-assessment with the RecyClass Online Tool is a first indication of the packaging recyclability and does not allow any claim in regard to its recyclability. The packaging may be audited to certify its recyclability, since the self-assessment provides only a preliminary indication of the packaging recyclability.

It must be also highlighted that the results of the certification process may vary from the results of the self-assessment, especially for more complex packaging that needs to undergo sorting and/or recycling tests following the RecyClass Protocols.

4.1 FOCUS & SCOPE

The Certification Scheme aims at recognising the compatibility of plastic packaging with mechanical recycling process. It specifies requirements for companies placing plastic packaging in the European Market who wish to claim their recyclability under a comprehensive Certification Scheme. The scheme focuses on recyclability by considering as main benchmark the ability of the recycled plastic packaging to be re-used in Closed-Loop and Cascade Open-Loop applications.

Recyclability of plastic packaging must be verified throughout the whole steps of the waste management process, which includes collection, sorting, and recycling, in order to make a claim of recyclability in final packaging. Therefore, certification may be granted to all companies commercialising final plastic packaging, mainly brand owners and retailers but not exclusively.

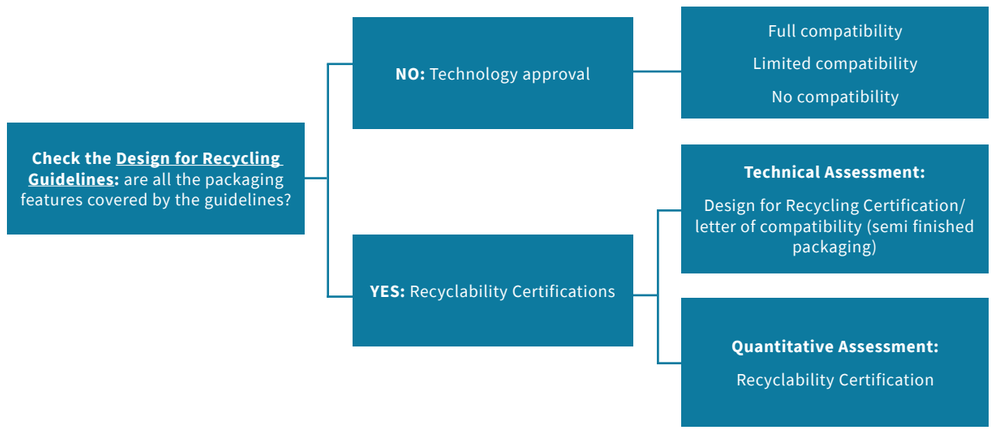
The Schemes are developed according to the RecyClass Recyclability Methodology and EN 13430 - Requirements for packaging recoverable by material recycling.

4.2 ELIGIBILITY REQUIREMENTS

Packaging which has already been introduced to the European market is eligible for Recyclability Certifications, as well as packaging which has not yet been introduced to the market but where no further alterations are to be made to its design (i.e., only final packaging are eligible for the certification). Semi-finished packaging cannot be assessed with the Recyclability Certification scheme. However, they can be evaluated and receive a Letter of Compatibility (cf: section INFOBOX – Letter of Compatibility).

As a second eligibility requirement, the packaging should be entirely covered by the Design for Recycling Guidelines, meaning that all its features are already known and classified according to their recycling compatibility. Any innovative technology should be tested first following the RecyClass testing protocols[17] in order to assess its compatibility. Tested and approved packaging containing innovative technologies can be certified based on the approval letter granted by the RecyClass Technical Committees. Figure 5 summarizes the existing routes of recyclability certifications.

Detailed information about the material composition of a given packaging must be provided to the auditor to ensure sound scientific recyclability analysis. As packaging often consists of multiple components with specific functionalities, to certify its recyclability the behaviour of each component (e.g., bottle, label/sleeve, closure system, seal, adhesive, ink, printing, other attachments, etc.) in sorting and recycling processes must be considered by the auditor.



16. *Recyclability & Recycled Content Use of Claims Guidance available here*

17. *RecyClass Testing Protocols available here*

4.3 CONFORMITY ASSESSMENT

The Certification Scheme assesses the level of compatibility of a plastic packaging with recycling with a system of class ranking scale from A to C (and non-recyclable). Packaging evaluated with class A, B or C is stated conform and recyclability can be claimed. Non-conformity means that the packaging is not suitable according to RecyClass Recyclability Methodology (cf: suitability analysis section 2.3.1) and therefore cannot be ranked and rated by this certification scheme.

4.4 CERTIFICATION DETAILS

As input requirements, the Certification Body will require the applicant:

- To specify whether the evaluation concerns a Design for Recycling or Recyclability Certification and, in the case of the latter, for which geographical area (all Europe or specific countries),
- To share the self-assessment report from the RecyClass Online Tool,
- To fill in a standard template[18] with details on the different components of the packaging and on the packaging design,
- To provide a number of samples of the packaging that varies from 10 units to a few dozen if an additional test is required (sorting test for example)

Based on the information provided by the applicant, the Certification will conduct the recyclability audit as per the steps defined in Section 3 and as per Table 2: “Recyclability rating requirements”.

Additionally, similar packaging (e.g., with only modification of the artwork or the sizes) of audited packaging may be submitted by the applicant. In this case, input requirements for all similar packaging must be provided to the auditor to ensure equivalence with the audited packaging. Similar packaging is considered equivalent as long as the components’ proportion remains the same and the results of the audit are not affected.

As an outcome of the audit, the applicant will receive:

- An audit report, including the recyclability class and the recyclable plastic content of Audited Packaging – following the criteria cited above – and reporting its composition. The audit report is identified with a unique certification code.
- The Recyclability Certificate, in case of a positive evaluation, identifying the recyclability class achieved by Audited Packaging and the recyclable plastic content. As for the audit report, the certificate is identified with the same certification code as the audit report. The auditor shall include an Annex to the certificate if equivalent packaging has been assessed, listing them with unique identifications.
- The RecyClass logo including the recyclability class,
- Tests results, if any performed by the auditor.

The certificate is valid for 3 years and guarantees that the packaging is designed to be recycled in Europe. Any change in the packaging design must be communicated to RecyClass in order to revise its recyclability.

Retailers, brands, converters and any other companies involved in manufacturing or designing of the packaging can apply for the Certification. Detailed information on how to apply for the Recyclability Certification and on the procedures may be found in the document “Recyclability Certification Quality Management & Procedures” available on the RecyClass website[19].

18. Product Data Specifications Sheet
19. The “Recyclability Certification Quality Management & Procedures” is available here

INFOBOX

LETTER OF COMPATIBILITY

The Letter of Compatibility allows the evaluation by a recognised auditor of a semi-finished plastic packaging. This evaluation is based on the certification scheme of the Design for Recycling Certification described in the previous sections.

Upon the completion of the evaluation, the Applicant will receive a Draft Evaluation Report issued by the Certification Body outlining the results and a corresponding Letter of Compatibility in case of a positive evaluation. RecyClass strongly encourages the applicant to certify the final package, as changes in design, print, used materials and/or the effect of product-content or residue, might change the outcome of the certification of a final packaging.

RecyClass endorsement and usage of the logo are permitted only for certified final packaging. RecyClass however developed a communication package (including banners) for companies producing semi-finished packaging that received a Letter of Compatibility.

The Letter of Compatibility is valid for 3 years and guarantees that the semi-finished packaging is at this stage designed to be compatible with recycling in Europe. Any change in the packaging design must be communicated to RecyClass in order to revise its compatibility.

4.5 DESIGN FOR RECYCLING CERTIFICATION

The Design for Recycling is evaluated from the point of view of the technical feasibility of packaging being properly sorted and recycled in Europe. The Certification considers the most commonly used technologies of the European waste management infrastructures, without taking into consideration local or country specificities.

Following the same methodology as the Online-Tool described in section 2, the packaging design is ranked from class A to C, considering the sorting behaviour, the recyclable plastic amount extracted from the packaging and the compatibility of the design features with recycling. If the packaging is not fitting with those classes, the packaging is defined as non-recyclable

The evaluation considers:

- If the packaging fit with an existing European packaging waste stream recognised by Plastics Recyclers Europe,
- If the packaging design is compatible with sorting (size sorting excluded) and recycling processes,
- If and to which extent the recycled plastic obtained or generated by the packaging can be used to replace virgin in plastic products.

4.6 RECYCLABILITY CERTIFICATION

In the Recyclability Certification, design aspects of the packaging that will result in material losses in the sorting and recycling processes, or that will result in a downgrading of the recycled plastic quality, will impact the final recyclability class.

Meanwhile, the Design for Recycling Certification is evaluated considering the most commonly used technologies of sorting and recycling infrastructures in Europe, the Recyclability Certification is assessed considering the collection schemes, as well as the effective availability of sorting and recycling infrastructures in the audited area.

The formula to evaluate recyclability considers:

- Packaging collection (locally or at a European level)
- Availability of sorting and recycling infrastructures (locally or at a European level),
- Packaging compatibility with sorting (in line with the Sorting Evaluation Protocol);
- Packaging compatibility with recycling (with the same methodology used for achieving the Design for Recycling Certification),
- Quality of recycled plastic generated by the packaging

4.7 SORTABILITY

Sorting is a key step in the recyclability evaluation of plastic packaging and can be compromised by certain design aspects. The sorting process is a well-developed process based on the following steps:

1. **CONSUMER BEHAVIOR:**
   RecyClass does not consider consumer behaviour unless consumer's action is needed to access the product.

2. **COMPACTION:** it occurs during the collection and transportation of packaging waste. This can have an impact on the detectability of the packaging during the sorting steps. Compaction conditions are defined in the RecyClass *"Sorting Evaluation Protocol"*[20].

3. **SMALL PIECES REMOVAL,** with any of the dimensions lower than 50 mm, to purify the stream.

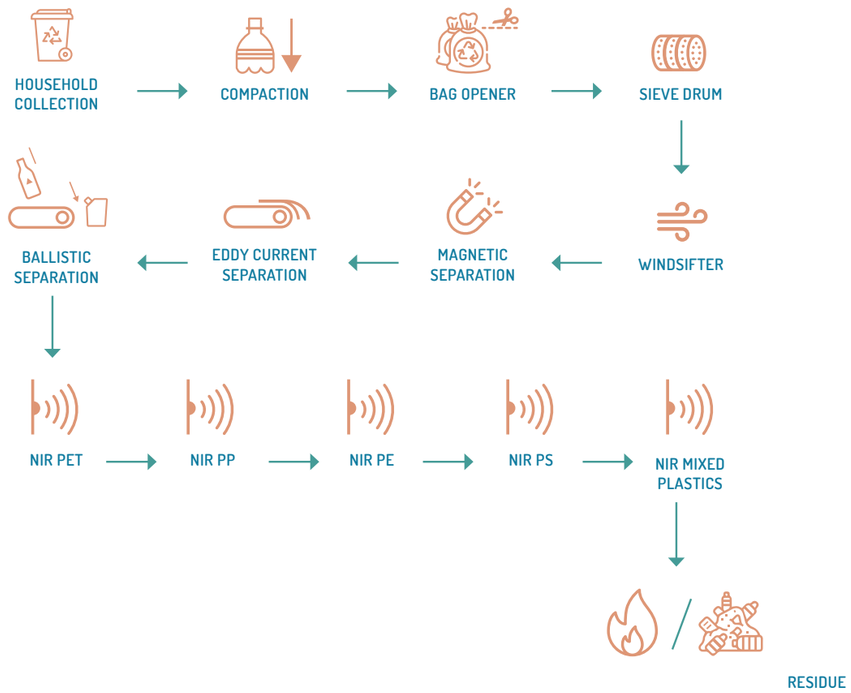
4. **METAL AND ALUMINUM DETECTION AND SEPARATION** by means of magnetic and eddy current separators,

5. **DISCRIMINATION OF POLYMERS IN SEPARATE STREAMS BY A SERIES OF NIR** (near infra-red) detectors. Color sorting is not applied in general to olefin-based packages. However, color sorting is a standard for PET bottles.

On that basis, it is essential for certain types of packaging to be effectively sorted in the appropriate recycling stream. Moreover, the design can affect either partially or fully the packaging sortability, leading to losses of materials.

In particular, the packaging designed with the characteristics mentioned in the RecyClass Sorting Evaluation Protocol (Annex I)[21] shall be tested, in order to determine the sorting efficiency.

FLOWSHEET OF THE SORTING PROCESS



20 & 21 RecyClass Sorting Protocol available here

4.8 DESIGN INCOMPATIBILITIES

Compatibility of the packaging components is checked based on the Design for Recycling Guidelines and when necessary through dedicated tests based on the RecyClass Protocols.

Identified incompatibilities between components of the packaging are classified as:

- **Downgrading** the recycled plastic quality, referring to components that will be correctly separated but not recycled or inseparable substances/materials that will reduce the recycled plastic quality. A penalty will be applied to the evaluation, the value of which will depend on the kind of material/substance present in the packaging.
- **Disqualifying** the recycled plastic quality, referring to substances/materials that completely compromise the packaging recyclability. These features may lead to the disqualification of the packaging.

The design incompatibilities are defined according to the most commonly used technologies of recycling infrastructures in Europe.

On that basis, certain design features can be separated during the process of increasing the purity of the recycling stream (e.g., by density separation and wind sifting). However, not all design features can be separated and can thus affect either partially or fully the packaging recyclability, reducing the quality of the recyclate.

The evaluation requirements of the Recyclability Certifications are described in the Table 2. Recyclability rating requirements.

FLOWSHEET OF THE RECYCLING PROCESS

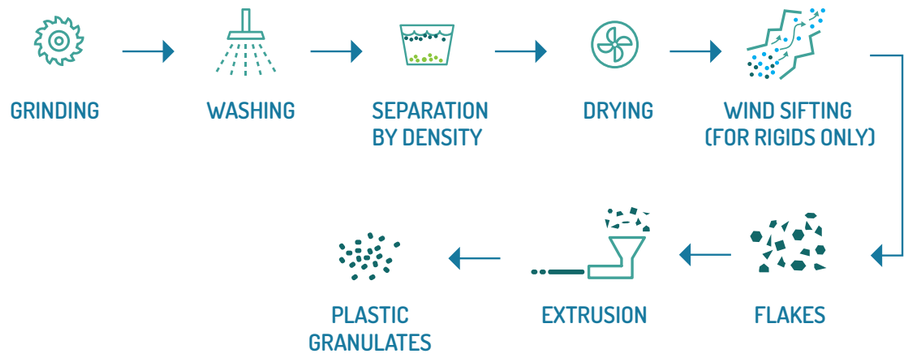


Table 2. Recyclability rating requirements

CRITERION	ASSESSMENT	DOWNGRADING OR DISQUALIFICATION FEATURES	SCORE PENALTY
1. SUITABILITY	Packaging belongs to the plastic recycling stream and will not jeopardize the process.	Disqualification if: • Less than 50% plastic • Less than 50% plastic surface • Hazardous product contained in the packaging, not accepted in the plastic collection • Bio- or oxo-degradable additives • Aluminium layer > 5 µm • Carbon black surface	Disqualification
2. PRE STREAM AVAILABILITY	Package with a PRE recycling stream in place, meaning that collection, sorting, and recycling are established and functioning at least in one European Country. PRE recognized recycling streams are: PET Bottles; PET Thermoforms; PE Films ; PP Films; HDPE Containers ; PP Containers; HDPE and PP Crates & Pallets; PS Containers; EPS fish boxes; EPS white goods	Disqualification if no collection or recycling stream established in Europe and recognized by PRE to recycle the packaging.	Disqualification
2A. LOCAL COLLECTION (ONLY RA)	Packaging collected in the countries of interest, based on the auditor knowledge.	Disqualification if no collection system in place to collect the given packaging in the countries of interest.	Disqualification
2B. LOCAL SORTING AND RECYCLING (ONLY RA)	Packaging sorted and recycled in the countries of interest, based on the auditor knowledge.	Disqualification if no available sorting or recycling infrastructure for the given packaging in the countries of interest.	Disqualification
3. RECYCLABLE PLASTIC CONTENT	Packaging contains a minimal amount of recoverable and valuable plastic for the targeted recycling stream.	Downgrading according to the proportion of any non-recoverable materials. The factor "X" represents (if any) the % of non-plastic material non separable by consumers by the main packaging (e.g., plastic blister coupled with cardboard on one side)	• X > 5%: class B • X > 20%: class C • X > 30%: Disqualification

CRITERION	ASSESSMENT	DOWNGRADING OR DISQUALIFICATION FEATURES	SCORE PENALTY
4. SORTABILITY	Packaging can be sorted into a polymer stream according to the state-of-the-art technology available in Europe. *Reference: Sorting Protocol*	Downgrading based on the sorting efficiency evaluated on the base of big data or on the base of the results of testing with the "Sorting Protocol". The Protocol must be applied in the cases mentioned in section 3.3.	Refer to the Sorting Protocol
5A. DESIGN FOR RECYCLING INCOMPATIBILITIES (REMOVABLE)	Package designed according to the Design for Recycling Guidelines. *Reference: Design for Recycling Guidelines*	Downgrading accounts for all the parts of packaging such as inks, adhesives, labels, sleeves, valves/seals, caps, etc. that will be separated by the recycling process and will not get recycled.	Strongest class penalty to apply for both criteria 5a and 5b.
5B. DESIGN FOR RECYCLIN INCOMPATIBILITIES (NON-REMOVABLE)	Package designed according to the Design for Recycling Guidelines allowing for high quality recycled plastic. *Reference: Design for Recycling Guidelines*	Downgrading of parts of the packaging such as barriers, additives, printing, and all other non-detachable components which will not be separated during the recycling process and will be part of the final recyclate.	
6. EASY-TO-EMPTY / EASY-TO-ACCESS INDEXES	Packaging easily accessible and emptied which minimises the contained residues in the recycling stream.	Downgrading if presence of product residues on the packaging is evaluated by applying the formula reported in section 2.3. Deductions will be applied in case of each 5 more points evaluated with the index, and a sorting test will be required.	• EtEi < 5 %: 0 class • EtEi < 10 %: -1 class • EtEi < 15 %: -2 classes • EtEi >15 %: disqualification

ANNEX

CLEAR PET BOTTLE

COMPOSITION

- PET BOTTLE 88,0%
- PP CAP 9,0%
- PE LABEL 3,0%

ADDITIONAL INFORMATION

- PET BOTTLE WITHOUT BARRIER LAYER
- NO DIRECT PRINTING ON THE BOTTLE
- 0,1% WATER-SOLUBLE ADHESIVE (IN HOT ALKALINE WASH WATER)
- 0,2% PRINTING ON THE LABEL

1. SUITABILITY:
It is made of more than 50 % plastic. More than 50 % of its surface is made of plastic. The bottle is not coupled with other materials.
The packaging is suitable for the analysis.

▷ Interim result = class A

2. PRE RECYCLING STREAM EXISTS:
Clear transparent PET bottles stream

- 2a. Local collection: to be checked in the country(ies) of interest

- 2b. Local sorting and recycling: to be checked in the country(ies) of interest

The packaging is collected, sorted, and recycled in the geographical area of interest.

▷ Interim result = class A

3. RECYCLABLE PLASTIC CONTENT
Weights of non-recoverable non-plastic parts are removed from the recyclable proportion (adhesive and printing inks), representing 0.3 wt%.
X = 0,3 leading to (100 – X) = 99,7%. Recyclable plastic content > 95% leading to no class penalty.

▷ Interim result = class A and 99,7% of recyclable plastic content

4. SORTABILITY
No carbon black surface, No Al layer > 5 microns, no full sleeves, no dark color, no multilayers, no metal components, label covering < 50 % the bottle surface -> No need to perform a sorting test

▷ Interim result = class A

5. DFR INCOMPATIBILITIES
Identify the removable DfR incompatibilities that will get separated by the process, and the DfR incompatibilities that will get recycled within the stream and will therefore affect the recyclate quality.

- 5a. Removable DfR incompatibilities
No disqualifying items. The PP cap will float and will be recovered as by-product, as well as the PE label because the water-soluble adhesive will allow the PE label to detach from the bottle.

▷ Interim result = class A

- 5b. Non-removable DfR incompatibilities
The PET bottle is designed with all separable materials/substances.

▷ Interim result = class A

6. EASY TO EMPTY
The bottle will be completely emptied after use (Index = 0) : no class penalty.

FINAL RESULTS = CLASS A

CLEAR PE POUCH

COMPOSITION

- PE POUCH 95,6%
- PE WHITE CAP 4,4%

ADDITIONAL INFORMATION

- MULTILAYER PE WITH 4% EVOH BARRIER
- TiO2 MASTERBATCH 0.4 %
- DIRECT PRINTING WITH CLEAR COLOUR 3%
- < 50% PRINTING COVERING
- NO LABEL OR OTHER ATTACHMENTS

1. SUITABILITY:
It is made of more than 50 % plastic. More than 50 % of its surface is made of plastic. The pouch is not coupled with other materials.
The packaging is suitable for the analysis.

▷ Interim result = class A

2. PRE RECYCLING STREAM EXISTS:
PE flexibles stream

- 2a. Local collection: to be checked in the country(ies) of interest

- 2b. Local sorting and recycling: to be checked in the country(ies) of interest

The packaging is collected, sorted, and recycled in the geographical area of interest.

▷ Interim result = class A

3. RECYCLABLE PLASTIC CONTENT
Weights of non-recoverable non-plastic parts are removed from the recyclable proportion (EVOH, inks and coloured masterbatch), representing 7.4 wt%.
X = 7.40 leading to (100 – X) = 92.6 %. Recyclable plastic content > 90 % leading to one class penalty.
Interim result = class B and 92.6 % of recyclable plastic content

▷ Interim result = class B and 92,6%

4. SORTABILITY
No carbon black surface, No Al layer > 5 microns, PE Multilayers, Clear colour. However, mix of flexible and rigid parts -> need to perform a sorting test
Sorting test according to the Sorting Protocol to identify where the pouch will end and the sorting efficiency. Tests confirmed it is sorted in the PE flexible stream with a sorting efficiency 80 %.

▷ Interim result = class B

5. DFR INCOMPATIBILITIES
Identify the removable DfR incompatibilities that will get separated by the process, and the DfR incompatibilities that will get recycled within the stream and will therefore affect the recyclate quality.

- 5a. Removable DfR incompatibilities
No disqualifying items. No elements separated by the process.

▷ Interim result = class B

- 5b. Non-removable DfR incompatibilities
EVOH and direct printing will affect the recyclate quality. These features are indeed reported as limited compatible on the DfR guidelines and will therefore penalize the pouch by 1 class.

▷ Interim result = class C

6. EASY TO EMPTY
The pouch will be almost completed emptied after use (Index < 5) : no class penalty

FINAL RESULTS = CLASS C

RecyClass
RECYCLABILITY

CLEAR PET TRAY

COMPOSITION

- PE TRAY 73,0%
- PAPER DISPLAY 25,0%
- PE LIDDING FILM 2,0%

ADDITIONAL INFORMATION

- CLEAR PET TRAY
- PE LIDDING FILM
- 0,1% WATER SOLUBLE ADHESIVE
- NON WELDED/GLUED PAPER DISPLAY

1. SUITABILITY:
The paper display will be removed and completely separated by the consumer to access the product. The paper display will be then discarded in the paper bin and the tray in the plastic bin.
Then, the tray is suitable for the analysis (made of more than 50 % plastic; more than 50 % of its surface is made of plastic, etc.).

▷ Interim result = class A

2. PRE RECYCLING STREAM EXISTS:
clear PET trays stream

- 2a. Local collection: to be checked in the country(ies) of interest

- 2b. Local sorting and recycling: to be checked in the country(ies) of interest

▷ Interim result = class A

3. RECYCLABLE PLASTIC CONTENT
Weights of non-recoverable non-plastic parts are removed from the recyclable proportion (PE lidding film and adhesive), representing 2.8 wt% as the paper proportion is not considered anymore.
X = 2.8 leading to (100 – X) = 97.2 %. Recyclable plastic content > 95 % leading to no class penalty.

▷ Interim result = class A and 97,2% of recyclable plastic content

4. SORTABILITY
No carbon black surface, No Al layer > 5 microns, no full sleeves, no dark color, no multilayers, no metal components -> No need to perform a sorting test

▷ Interim result = class A

5. DFR INCOMPATIBILITIES
Identify the removable DfR incompatibilities that will get separated by the process, and the DfR incompatibilities that will get recycled within the stream and will therefore affect the recyclate quality.

- 5a- Removable DfR incompatibilities
The PE lidding film will float and will be discarded, as the water-soluble adhesive will allow the PE lidding film to be completely detached by the tray. Weights already removed in criterion 3 and no further penalty to applied.

▷ Interim result = class A

- 5b- Non-removable DfR incompatibilities
The PET tray is designed with all separable materials/substances. No direct printing is applied on the tray.

▷ Interim result = class A

6. EASY TO EMPTY
The tray will be completely emptied after use (Index = 0): no class penalty.

FINAL RESULTS = CLASS A

RecyClass
RECYCLABILITY

CLEAR HDPE BOTTLE

COMPOSITION:

- HDPE BOTTLE 79,0%
- PE/PP CLOSURE 20,0%
- LABEL 1,0%

ADDITIONAL INFORMATION:

- CLEAR HDPE BOTTLE
- PP < 4 % IN THE CLOSURE
- PP FILM LABEL
- 0.3 % RELEASABLE ADHESIVE
- 0.1 % PRINTING ON THE LABEL

1. SUITABILITY:
It is made of more than 50 % plastic. More than 50 % of its surface is made of plastic. The bottle is not coupled with other materials. There is no aluminium layer, no bio- or oxo-degradable plastics.

▷ Interim result = class A

2. PRE RECYCLING STREAM EXISTS:
Natural HDPE containers stream

- 2a. Local collection: to be checked in the country(ies) of interest

- 2b. Local sorting and recycling: to be checked in the country(ies) of interest

The packaging is collected, sorted, and recycled in the geographical area of interest.

▷ Interim result = class A

3. RECYCLABLE PLASTIC CONTENT
Weights of non-recoverable non-plastic parts are removed from the recyclable proportion (label, adhesive and printing), representing 0.4 wt%.
X = 0.4 leading to (100 – X) = 99.6 %. Recyclable plastic content > 95 % leading to no class penalty.

▷ Interim result = class A and 99.6 % of recyclable plastic content

4. SORTABILITY
No carbon black surface, No Al layer > 5 microns, no full sleeves, no dark color, no multilayers, no metal components. However, PP label covering on both sides more than 50 % -> need to perform a sorting test
Sorting test according to the Sorting Protocol to identify where the bottle will end and the sorting efficiency. Tests confirmed it is sorted in the HDPE rigid stream with a sorting efficiency 80 %.

▷ Interim result = class A

5. DFR INCOMPATIBILITIES
Identify the removable DfR incompatibilities that will get separated by the process, and the DfR incompatibilities that will get recycled within the stream and will therefore affect the recyclate quality.

- 5a. Removable DfR incompatibilities
No disqualifying items. The releasable adhesive will allow the PP label to detach from the bottle. The PP label will therefore float and will be removed via air elutriation (1 class deduction).

▷ Interim result = class B

- 5b. Non-removable DfR incompatibilities
The PP component in the closure will float and cannot be separated by the HDPE stream. The PP components in the closure will thus slightly reduce the r-HDPE quality. The coloured cap will slightly colour the final natural recyclate.
As the PP content is overall lower than 10 wt%, a single class penalty is applied.

▷ Interim result = class B

6. EASY TO EMPTY
The bottle will be almost completely emptied after use (Index <5) : no class penalty.

▷ Interim result = class B

FINAL RESULTS = CLASS B

ANNEX II. DEFINITIONS

APPLICANT: Company applying for a recyclability assessment.

PACKAGING: Packaging shall mean all products made of any materials of any nature to be used for the containment, protection, handling, delivery, and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer [Packaging and Packaging Waste Directive].

AUDITOR: Accredited person to perform the audit to grant the Recyclability Certification.

EQUIVALENT PACKAGING: Equivalent shall designate similar executions of packaging, for which the only differences do not impact the result of the audit.

SEMI-FINISHED PACKAGING: packaging consisting of at least its body or main component, but without all its final attachments (e.g., closure systems, labels, artwork).

EUROPEAN MARKET: The Geographical Area of the Certification is limited to EU 27+3 area, plus the following countries: Serbia, Bosnia and Herzegovina, Albania, North Macedonia, Montenegro, Andorra, Monaco, Liechtenstein, San Marino, Holy See.

RECYCLING: 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 [art 3(17) OJ L 312 22.11.2008, p. 3-30].

MECHANICAL RECYCLING PROCESS: Physical process which converts collected and sorted used packaging and scrap, together in some instances with other material, into secondary raw material or products.

CLOSED-LOOP APPLICATIONS: Utilisation of the recycled plastic packaging back into its original application.

CASCADE OPEN-LOOP APPLICATIONS: Several cycles of utilization of the recycled plastic packaging in new plastic product.

PLASTIC: Material consisting of a polymer as defined in point 5 of Article 3 of Regulation (EC) No 1907/2006, to which additives or other substances may have been added, and which can function as a main structural component of final products, with the exception of natural polymers that have not been chemically modified.

ANNEX III. CONTROL TABLE OF CHANGE

VERSION	DATE	SECTION	UPDATE DESCRIPTION
3.1	August 2025	3.2	New type of packaging (White Opaque PET Bottles)
3.0	January 2025	Entire document	Changes in the recyclability classes, suppression of the rates (recyclability rate certification), renaming of the Recyclability Rate certification to Recyclability Certification, inclusion of the other packaging materials for the Online Tool, removal of the annexes I, II and III.
2.3	February 2024	2.4	Clarification about the self-assessment results and use in the certification procedure Clarification about the audit report's outcome
2.2	February 2023	Introduction, 2.3, 3.3, 4.2, 4.4, Annexes	Wording clarifications and corrections. Revision of Annexes and case studies.
2.1	May 2022	2.3	Wording clarifications and corrections
2.1	May 2022	Annex II, III, IV and V	Revision of Annexes and corrections
2.0	December 2021	2.3.1	Wording clarification
2.0	December 2021	2.3.3	New types of packaging (EPS fish boxes and white goods)
2.0	December 2021	4.1	New section to clarify the focus and scope of the certification scheme
2.0	December 2021	4.2	New section to clarify the eligibility requirements of the certification scheme
2.0	December 2021	4.3	New section to clarify the conformity assessment of the certification scheme
2.0	December 2021	4.3	New section to clarify certification details of the certification scheme
2.0	December 2021	Annex II	EPS disqualifying criteria
2.0	December 2021	Annex III	Update of the light downgrading criteria following the Design-for-Recycling Guidelines & EPS criteria
2.0	December 2021	Annex IV	Update of the strong downgrading criteria following the Design-for-Recycling Guidelines & EPS criteria
2.0	December 2021	Annex VI	New annex on definitions
2.0	September 2021	2.3.3	New type of packaging (PS containers)
2.0	September 2021	2.3.3	New rule for the EtE index (pre-requisite)
1.2	September 2021	1.0	Wording clarification
1.2	September 2021	2.0	Paragraphs reorganisation
1.2	September 2021	2.1	New section to clarify the recyclability definition
1.2	September 2021	2.2	Wording clarification
1.2	September 2021	2.3	Alignment of the tool's modus operandi with the tool's updates
1.2	September 2021	3.0	Section generalized to both recyclability assessments (3.1. DfR and 3.2. Recyclability Rate)
1.2	September 2021	3.3	Wording clarification
1.2	September 2021	3.4	Wording clarification & new graphic
1.2	September 2021	3.4	Revised table of the recyclability rating requirements
1.2	September 2021	4.0	Wording clarification
1.2	September 2021	4.0	Introduction of the Letter of Compatibility
1.2	September 2021	Annex II	Revision of the disqualifying criteria following the Minimum Standards (Zentrale Stelle) & PS criteria
1.2	September 2021	Annex III	PS light downgrading criteria
1.2	September 2021	Annex IV	PS strong downgrading criteria
1.2	September 2021	Annex X	Revision of the case studies
1.1	November 2020	3.1.3 and 3.2	Additions to the "sortability" section.
1.0	June 2020		First publication of the document

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