RecyClass
FOR BEGINNERS

RecyClass Recyclability Evaluation Protocols & Testing Methods

26 April 2023

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RecyClass
FOR BEGINNERS

WHAT ARE THE TESTING PROTOCOLS?

GET IN TOUCH WITH US!
info@recyclass.eu
www.recyclass.eu

RecyClass | WHAT ARE THE TESTING PROTOCOLS?

Testing protocols

- Standardized procedures to assess the sorting and recyclability of plastic packaging.
- Testing protocols based on state-of-the-art technologies used by European recyclers.
- Built with the inputs of recyclers, laboratories and RecyClass members.
- One protocol per each polymer stream.
- **Recyclability Evaluation Protocols**, Sorting Protocol and Quick Test Procedures.

See all the protocols online

Sorting Evaluation Protocol

- Sorting Protocol for plastic packaging

Recyclability Evaluation Protocols

- Recyclability Protocol for PE films
- Recyclability Protocol for PP films
- Recyclability Protocol for HDPE containers
- Recyclability Protocol for PP containers
- Recyclability Protocol for PS containers
- Recyclability Protocol for PET bottles (EPBP)
- Recyclability Protocol for PET trays (Petcore Europe/EPTP)

Quick Test Procedures

- Washing QT Procedures for labels and adhesives
- Floatation QT Procedures
- Bleeding Inks QT Procedures

RecyClass | SORTING EVALUATION PROTOCOL

HOUSEHOLD COLLECTION → COMPACTION → BAG OPENER → SIEVE DRUM → WIND SIFTER → MAGNETIC SEPARATION → EDDY CURRENT SEPARATION → BALLISTIC SEPARATION

NIR PET → NIR PP → NIR PE → NIR PS → NIR MIXED PLASTICS → RESIDUE

RecyClass | RECYCLABILITY EVALUATION PROTOCOLS

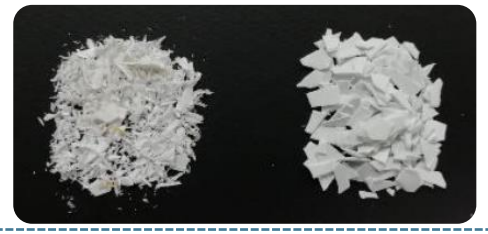
INPUT MATERIAL

GRINDING

WASHING

SEPARATION BY DENSITY

WIND SIFTING (RIGIDS)

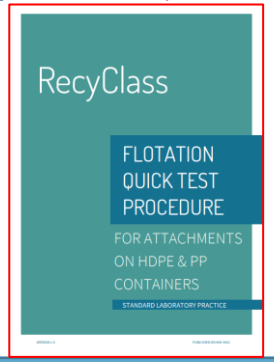


FLAKES

EXTRUSION

PLASTIC GRANULATES

CONVERSION



PROTOCOLS SIMULATE AT LABORATORY SCALE THE PROCEDURES PERFORMED AT RECYCLING FACILITIES IN EUROPE

RecyClass | DEVELOPMENT & UPDATE

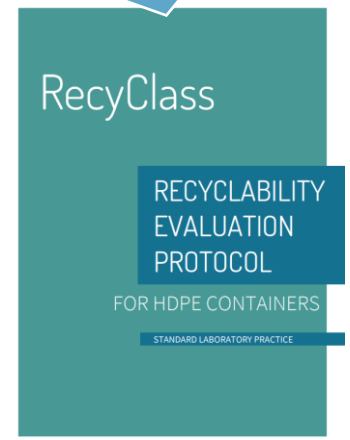
Mapping of state of the art technologies used by recyclers throughout Europe

Discussions in RecyClass Technical Committes (TCs): Inputs of the whole value chain

Academic peer-review process

First trials at laboratory scale: Feedback from testing facilities

Final deliberation in the TCs: submission to RecyClass Steering Board for final approval



Publication of the Protocol: Open access

On annual basis

Inputs from RecyClass network. Update of the state of the art technologies used by recyclers.

Discussions in the Technical Committees

Publication of the new version of the protocol

RecyClass | VALUE CHAIN COLLABORATION

BRANDS & RETAILERS

P&G, Danone, Unilever, ISDIN, Schwarz (Lidl, Kaufland, Schwarz Produktion, preZero), Avon, L'Oréal, Lavazza, Mondelēz International, Aldi, Nestlé, PepsiCo, essity, Kao, Henkel, Ferrero, Orkla, Colgate-Palmolive, Edgewell Personal Care, Reckitt, Haleon, Mars

CONVERTERS

Constantia Flexibles, Berry, Sealed Air, amcor, Hueck Folien, Neopac The Tube, Milliken, Taghleef Industries, Aptargroup, Lumson Cosmetic Packaging Industries, Albéa packaging and more, Huhtamaki, Silgan Dispensing, AFA Dispensing Re-inventing Liquid Dispensing, Fuji Seal, Di Mauro flexible packaging, 深圳市通产丽星科技集团有限公司 Shenzhen Beauty Star Co., Ltd, epl Leading the Pack, Gualapack, Plastipak, Zotefoams, IPV Pack, APG, Guala dispensing a Guala Group company, ATE ΠΛΑΣΤ, greiner packaging, BEWI for a better everyday, SACMI Endless Innovation Since 1919, Trioworld

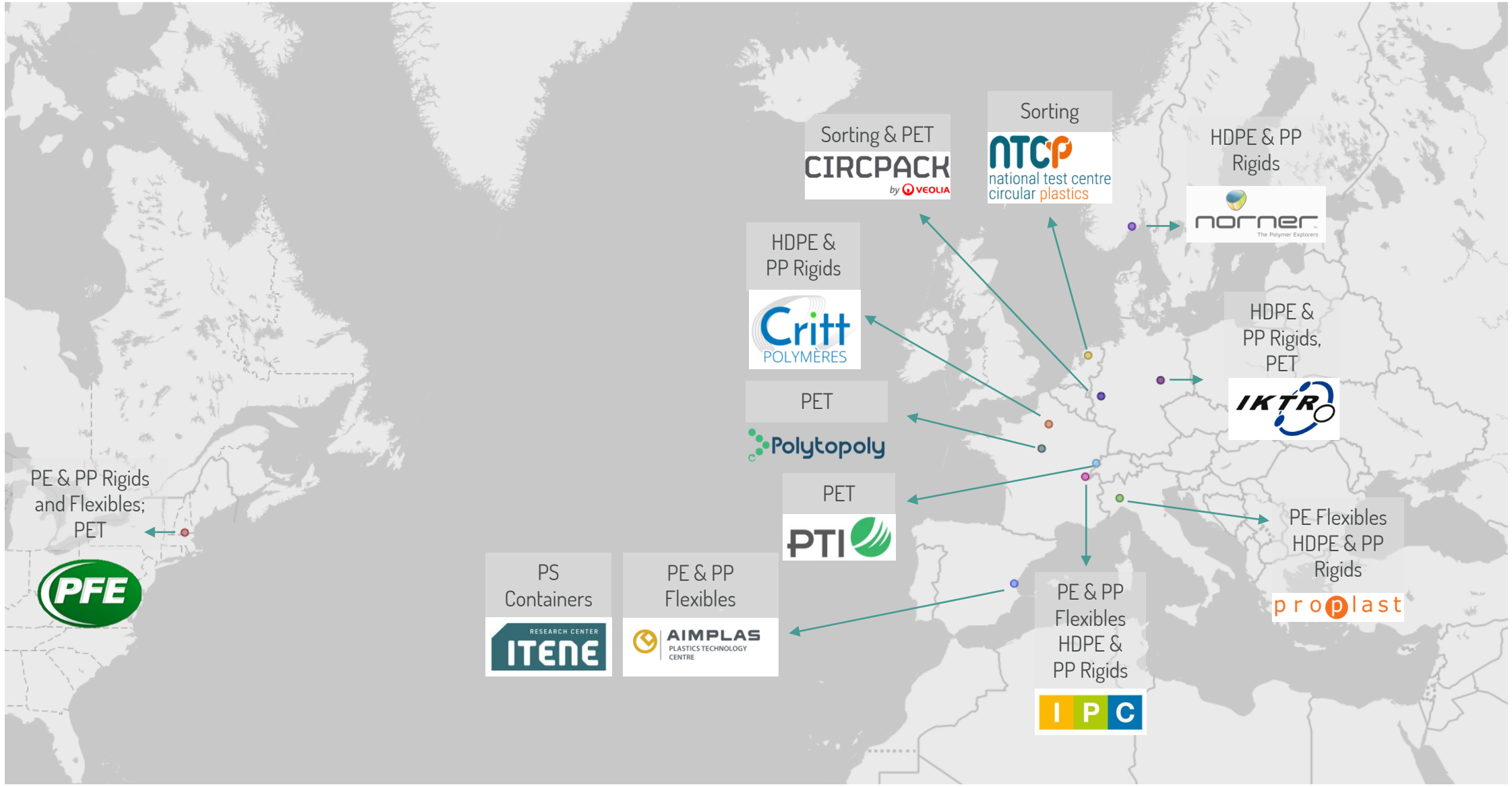
RAW MATERIAL PRODUCERS

H.B. Fuller Connecting what matters., Avery Dennison, UPM Raflatac, UPM, coim, SunChemical a member of the DIC group, Sleever Emotional Science, Bostik smart adhesives, Kurz, ExxonMobil, polyart Solutions Powered by Substrates, Avient, aquapak, DuPont, Borealis Keep Discovering, Siegwerk, Topas Advanced Polymers, kuraray, All4Labels Global Packaging Group, MCC Multi-Color Premium Label Solutions, UBE, Dow, CCL, Fedrigoni Self-Adhesives, Trinseo, Morchem Your Innovation Partner, Mitsubishi Chemical, heubach, saes coated films Advanced coatings for sustainable solutions, Kraton, BASF We create chemistry, YUPO

SUPPORTERS

epro European Association Of Plastics Recycling & Recovery Organisations, petcore Europe Pioneering PET circularity since 1993, FEICA, Polski Pakt Plastikowy, eumeps, Styrenics Circular Solutions, Fostplus, APR The Association of Plastic Recyclers, Stina, TMR, EuPIA, Svensk Plaståtervinning, Grønt Punkt Norge, ANAKPLA, Linpra, FINAT, fti Förpackningsinsamlingen, AGMPM, NTCP national test centre circular plastics, natureef, Searious Business, HPRC Healthcare Plastics Recycling Council

RecyClass | RECOGNISED TESTING FACILITIES



RecyClass

FOR BEGINNERS

HOW TO USE THE PROTOCOLS & WHAT ARE THE BENEFITS?

GET IN TOUCH WITH US!

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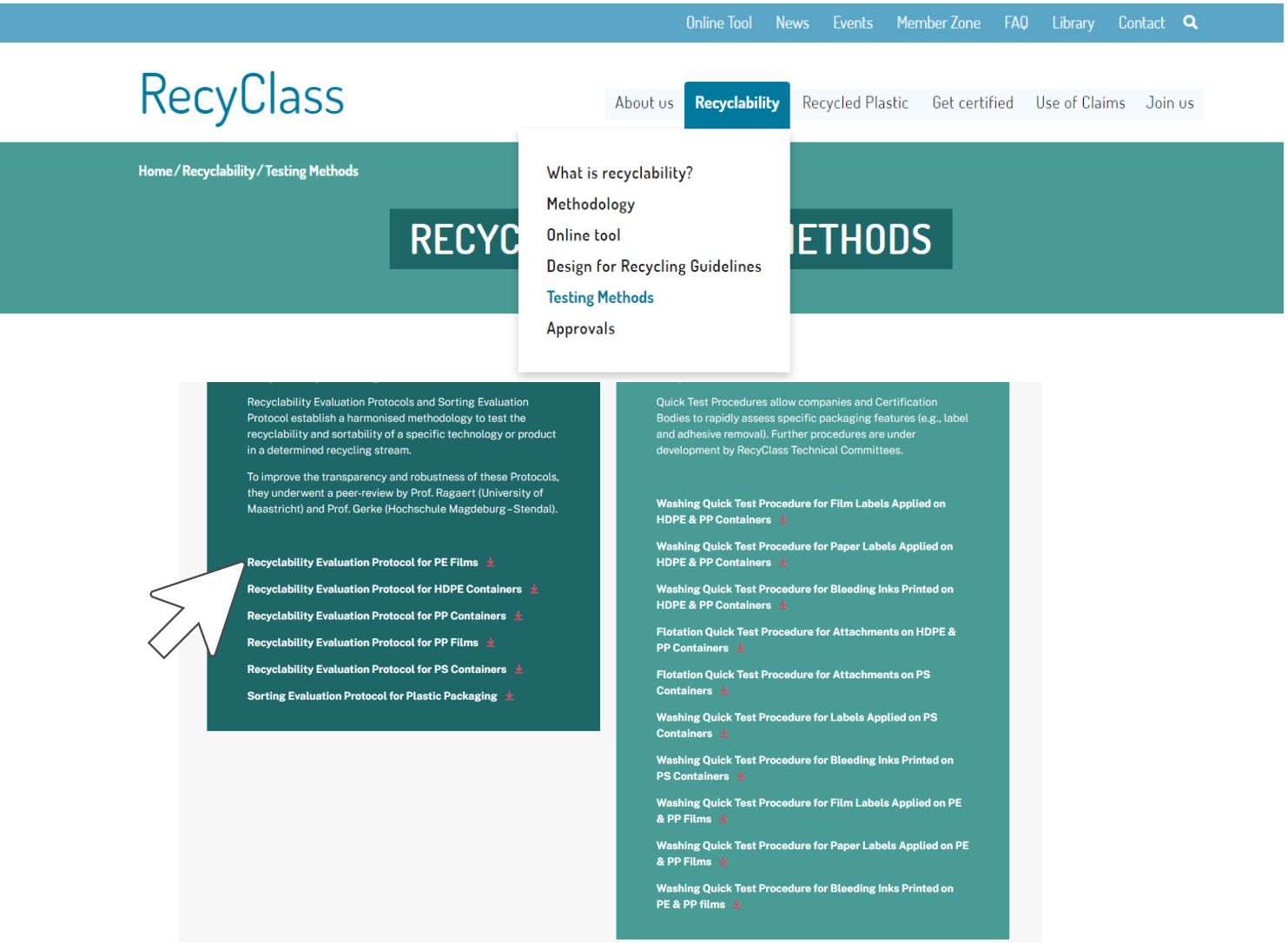
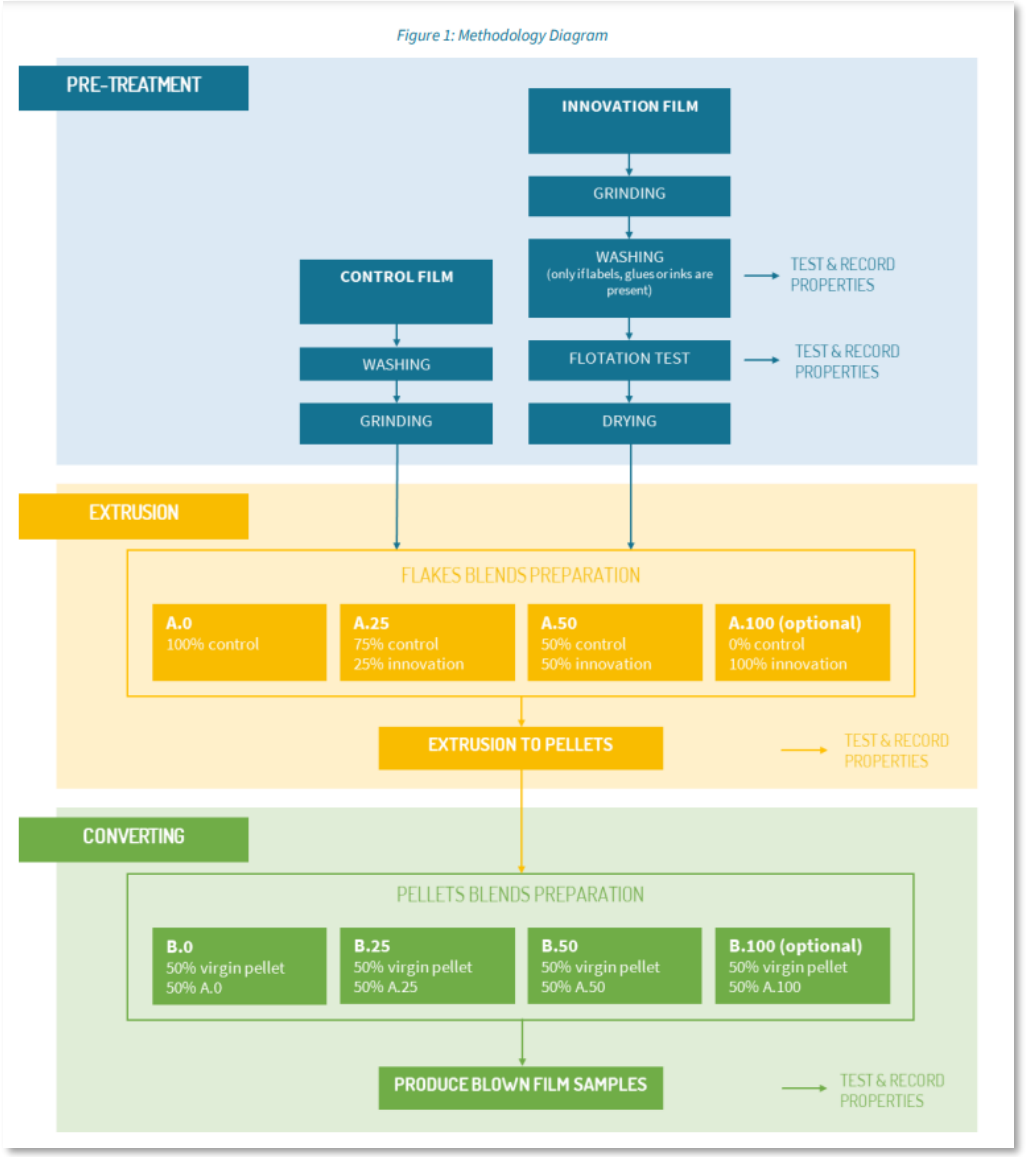
RecyClass | WHERE TO FIND & HOW TO USE PROTOCOLS?





RecyClass | QUICK TEST PROCEDURES

RecyClass Quick Test Procedures

Quick Test Procedures allow companies and Certification Bodies to rapidly assess specific packaging features (e.g., label and adhesive removal). Further procedures are under development by RecyClass Technical Committees.

Washing Quick Test Procedure for Film Labels Applied on HDPE & PP Containers

Washing Quick Test Procedure for Paper Labels Applied on HDPE & PP Containers

Washing Quick Test Procedure for Bleeding Inks Printed on HDPE & PP Containers

Flotation Quick Test Procedure for Attachments on HDPE & PP Containers

Flotation Quick Test Procedure for Attachments on PS Containers

Washing Quick Test Procedure for Labels Applied on PS Containers

Washing Quick Test Procedure for Bleeding Inks Printed on PS Containers

Washing Quick Test Procedure for Film Labels Applied on PE & PP Films

Washing Quick Test Procedure for Paper Labels Applied on PE & PP Films

Washing Quick Test Procedure for Bleeding Inks Printed on PE & PP films

HOW TO USE THEM?

- ❑ **Easy procedures** targeting specific packaging characteristics (floatation, washability, bleeding inks)
- ❑ Procedures **to be used internally** for development & Innovation
- ❑ **No need** to go through a RecyClass assessment (for PE, PP and PS packaging)

WHICH BENEFITS DO I GET?

- ❑ Ensure that your innovation will **pass the requirement of a full protocol**
- ❑ Ensure that your product will **meet the requirement for recyclability certification**

NOTE:

For PET bottles, RecyClass recognises EPBP QT Procedures, but assessments need to be carried out by RecyClass & EPBP

PET Packaging Innovation

European PET Bottle Platform (EPBP) and RecyClass support the PET value chain actors in their efforts to improve the circularity of **PET bottles**. Within this partnership, **RecyClass is responsible for the execution and validation of the standard recyclability evaluation based on EPBP guidelines, protocols & quick test procedures**.

Recyclability Evaluation Protocol for PET Bottles

Quick Test (QT 500): Oven test for regrind PET flakes

Quick Test (QT 502): Sink-float separation test

Quick Test (QT 504): Glue separation test

Quick Test (QT 507): Bleeding label

Quick Test (QT 508): Labels & Adhesives

RecyClass | RECYCLABILITY EVALUATION PROTOCOLS

WHAT ARE THE RECYCLABILITY EVALUATION PROTOCOLS USED FOR?

- ❑ **Evaluating the impact** of an innovation on packaging recyclability
- ❑ **Fill grey areas** of RecyClass Design for Recycling Guidelines
- ❑ Get a **European recognition** for the compatibility of your innovation with recycling

HOW TO USE THEM?

- ❑ Protocols available online → **Can be used by everyone**
- ❑ Recyclability Assessment to be carried out by RecyClass → **Contact RecyClass team**
- ❑ **Only recyclability evaluation** performed by RecyClass Recognised Testing Facilities **will be validated by RecyClass**

WHAT ARE THE BENEFITS?

Standard recyclability assessment report

Approval Letter

Trust

First step to get a certification

Claim compatibility with recycling

RecyClass | RECYCLABILITY ASSESSMENT

Preparation + Acceptance by TC

1 month

Testing

6 to 10 weeks

10 – 15 k€

Discount for RecyClass members

Revision and decision

1 month

RecyClass management fee: 2.5 k€

Approval

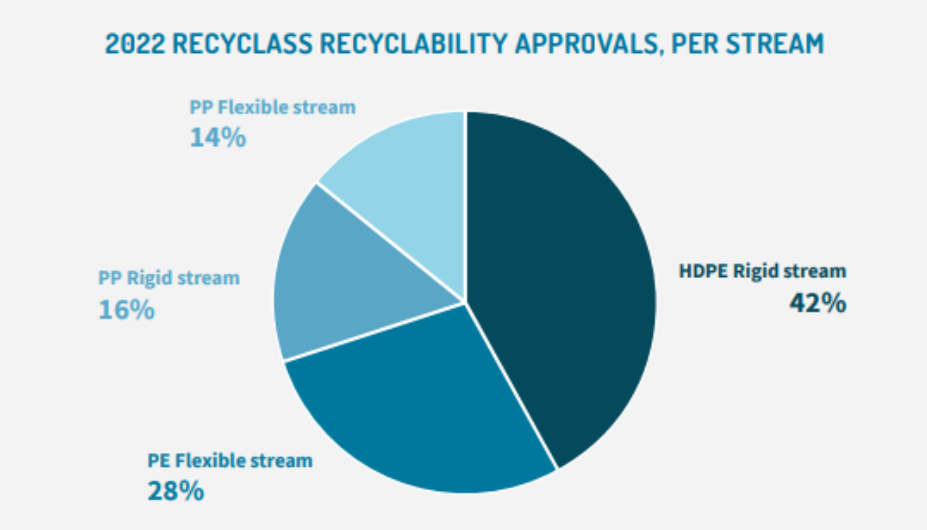
Approval letter + SB decision

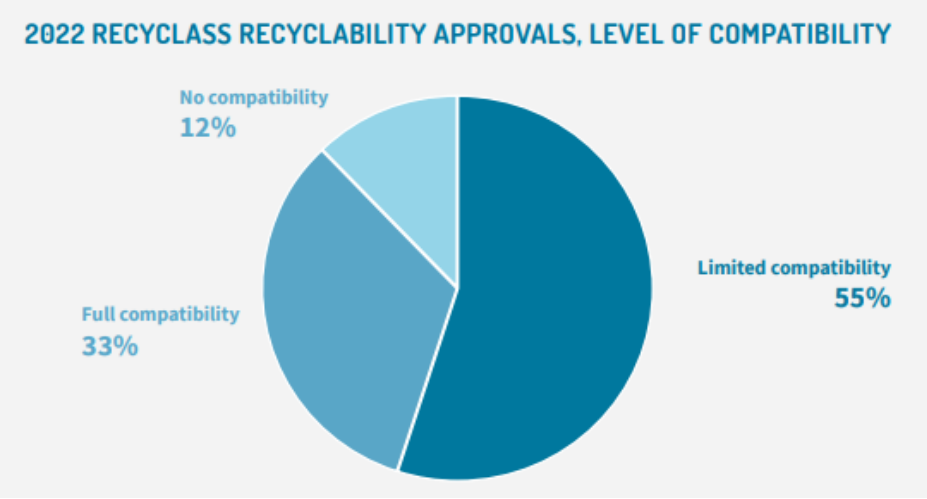
1 month

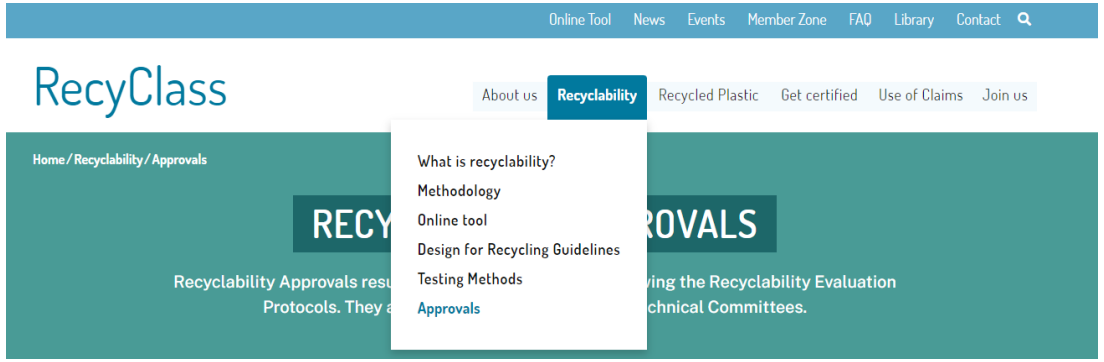
4 to 6 months

RecyClass | RECYCLABILITY APPROVALS

100+ Recyclability Evaluations already performed





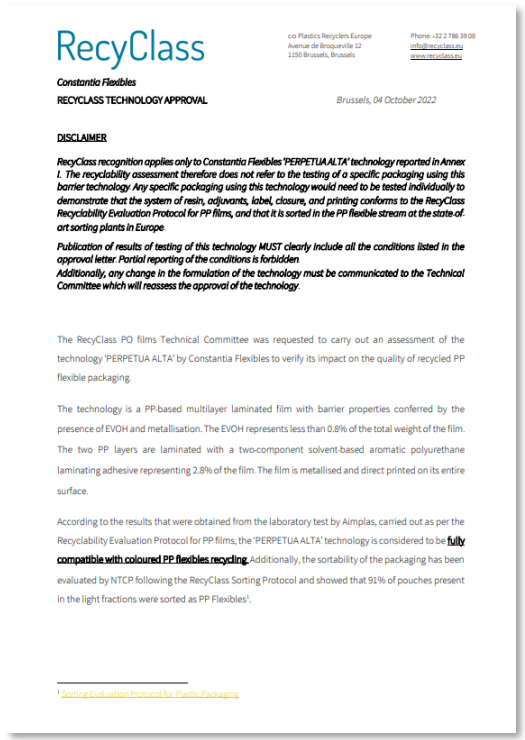


Approval type	Packaging type	Technology type	Company	Study
Make a choice	Make a ch...	Make a ch...	Make a choice	
Technology Approval	HDPE bottle	Adhesive for labels	Avery Dennison	PP CAVITATED TOP WHITE CF3050
Technology Approval	HDPE bottle	Adhesive for labels	Avery Dennison	PE TOP WHITE CF3050
Product Approval	HDPE tube	Barrier	Neopac	Polyfoil® MMB 545/645
Technology Approval	PE flexible	Adhesive for labels	Essity	Single Unit Wrapper for Hanky Tissue Products
Technical R				

Documents **available online** to start a Recyclability Evaluation Application

Recyclability Approvals already obtained are listed online

RecyClass | TECHNOLOGY APPROVAL



RecyClass

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Constantia Flexibles

RECYCLASS TECHNOLOGY APPROVAL

Brussels, 04 October 2022

DISCLAIMER

RecyClass recognition applies only to Constantia Flexibles 'PERPETUA ALTA' technology reported in Annex I. The recyclability assessment therefore does not refer to the testing of a specific packaging using this barrier technology. Any specific packaging using this technology would need to be tested individually to demonstrate that the system of resin, adjuvants, label, closure, and printing conforms to the RecyClass Recyclability Evaluation Protocol for PP films, and that it is sorted in the PP flexible stream at the state-of-art sorting plants in Europe.

Publication of results of testing of this technology MUST clearly include all the conditions listed in the approval letter. Partial reporting of the conditions is forbidden.
Additionally, any change in the formulation of the technology must be communicated to the Technical Committee which will reassess the approval of the technology.

The RecyClass PO films Technical Committee was requested to carry out an assessment of the technology 'PERPETUA ALTA' by Constantia Flexibles to verify its impact on the quality of recycled PP flexible packaging.

The technology is a PP-based multilayer laminated film with barrier properties conferred by the presence of EVOH and metallisation. The EVOH represents less than 0.8% of the total weight of the film. The two PP layers are laminated with a two-component solvent-based aromatic polyurethane laminating adhesive representing 2.8% of the film. The film is metallised and direct printed on its entire surface.

According to the results that were obtained from the laboratory test by Aimplas, carried out as per the Recyclability Evaluation Protocol for PP films, the 'PERPETUA ALTA' technology is considered to be **fully compatible with coloured PP flexibles recycling**. Additionally, the sortability of the packaging has been evaluated by NTCP following the RecyClass Sorting Protocol and showed that 91% of pouches present in the light fractions were sorted as PP Flexibles[1].

[1] Sorting Evaluation Protocol for Plastic Packaging

Case study: 'Perpetua Alta' by Constantia Flexibles

WHAT WAS TESTED?

- ❑ Presence of **EVOH**
- ❑ Presence of **laminating adhesives**
- ❑ Film is **metallised** and **slightly decorated**

HOW WAS IT TESTED?

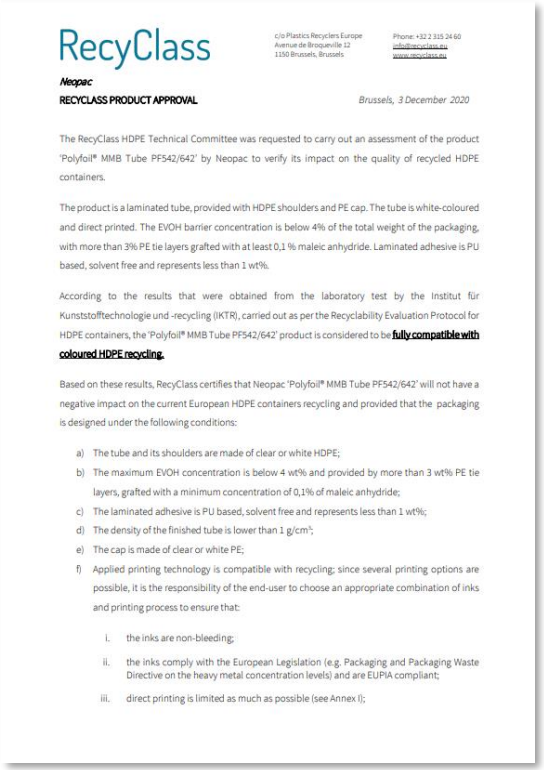
- ❑ According to the Recyclability Evaluation **for PP Flexibles**
- ❑ Tested in one of RecyClass **Recognised Testing Facility** for PP Flexibles (Aimplas)

OUTCOME?

- ❑ Successfully tested following RecyClass Recyclability Evaluation Protocol for PP Flexibles
- ❑ **Approved as fully compatible** with coloured PP Flexibles recycling by RecyClass

RecyClass | PRODUCT APPROVAL

Case study: 'Polyfoil® MMB Tube PF542/642 with cap' by Neopac



RecyClass

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Neopac

RECYCLASS PRODUCT APPROVAL

Brussels, 3 December 2020

The RecyClass HDPE Technical Committee was requested to carry out an assessment of the product 'Polyfoil® MMB Tube PF542/642' by Neopac to verify its impact on the quality of recycled HDPE containers.

The product is a laminated tube, provided with HDPE shoulders and PE cap. The tube is white-coloured and direct printed. The EVOH barrier concentration is below 4% of the total weight of the packaging, with more than 3% PE tie layers grafted with at least 0,1 % maleic anhydride. Laminated adhesive is PU based, solvent free and represents less than 1 wt%.

According to the results that were obtained from the laboratory test by the Institut für Kunststofftechnologie und -recycling (IKTR), carried out as per the Recyclability Evaluation Protocol for HDPE containers, the 'Polyfoil® MMB Tube PF542/642' product is considered to be **fully compatible with coloured HDPE recycling.**

Based on these results, RecyClass certifies that Neopac 'Polyfoil® MMB Tube PF542/642' will not have a negative impact on the current European HDPE containers recycling and provided that the packaging is designed under the following conditions:

a) The tube and its shoulders are made of clear or white HDPE;
b) The maximum EVOH concentration is below 4 wt% and provided by more than 3 wt% PE tie layers, grafted with a minimum concentration of 0,1% of maleic anhydride;
c) The laminated adhesive is PU based, solvent free and represents less than 1 wt%;
d) The density of the finished tube is lower than 1 g/cm³;
e) The cap is made of clear or white PE;
f) Applied printing technology is compatible with recycling; since several printing options are possible, it is the responsibility of the end-user to choose an appropriate combination of inks and printing process to ensure that:
   i. the inks are non-bleeding;
   ii. the inks comply with the European Legislation (e.g. Packaging and Packaging Waste Directive on the heavy metal concentration levels) and are EUPIA compliant;
   iii. direct printing is limited as much as possible (see Annex I);

RecyClass

LETTER OF COMPATIBILITY

DESIGN for RECYCLING

SUEZ.Circpack® assessed the recyclability of the semi-finished-product described underneath. The analysis was done conform the RecyClass guidelines and methodology. Based on the results of our judgement we are confident to grant you this letter of compatibility.

Please be aware that changes in design, print, used materials and/or the effect of product-content or residue, might change the outcome of the assessment of a final packaging. We advise you to have the final/complete product packaging certified.

GRANTED TO:
Neopac
Burgdorfstrasse 22
3672 Oberdiessbach
Switzerland

PACKAGING:
MMB Polyfoil Barrier Tube
MMB 542, 642

Result ***We confirm that the semi-finished product we have assessed, is compatible with readily available sorting & recycling technologies commonly used at industrial scale in the recycling sector in Europe. As an intermediate result, we have established that this semi-finished product is sorted into the HDPE-fraction. The RecyClass recyclability of this semi-finished product is calculated as class A.***

Disclaimer ***At this stage, the use of the RecyClass logo is prohibited. The use of any claims on the recyclability of the semi-finished product are not supported by RecyClass. To use the logo and/or to have RecyClass endorsement, you must submit the final packaging for certification. Indeed, it is the final packaging (including its decorative elements and product-residue) that will enter the recycling system.***

This letter of compatibility is valid until 22/02/2024, three years after the release of the audit report.

This letter is based on
Evaluation Report n° 014-neo+sz

Date : 22/02/2021

V. J. Mooij
Director of SUEZ.circpack®

HOW WAS IT TESTED?

- ❑ According to the Recyclability Evaluation **for HDPE Containers**
- ❑ Tested in one of RecyClass **Recognised Testing Facility** for HDPE (IKTR)

OUTCOME?

- ❑ Successfully tested following RecyClass Recyclability Evaluation Protocol for HDPE rigids
- ❑ **Approved as fully compatible** with coloured HDPE recycling by RecyClass

RecyClass | APPROVAL LETTERS: BENEFITS

Approval based on standardised scientific tests

European company specific approval

Claiming the compatibility with recycling of your innovation

RecyClass

c/o Plastics Recyclers Europe
Avenue de Broqueville 12
1150 Brussels, Brussels

Neopac

RECYCLASS PRODUCT APPROVAL

Brussels, 16 November 2021

DISCLAIMER

RecyClass recognition applies only to Neopac 'Polyfoil® MMB Tube PF528' reported in Annex I. It, therefore, does not concern to a recyclability assessment of specific packaging using this tube. Any specific packaging using this tube would need to be tested individually to demonstrate that the system of resin, adjuvants, label, closure, and printing conforms to the RecyClass Recyclability Evaluation Protocol for PP containers, and that it is sorted in the PP rigid stream at the state-of-art sorting plants in Europe. Publication of results of testing of this technology MUST clearly include all the conditions listed in the approval letter. Partial reporting of the conditions is forbidden. Additionally, any change in the formulation of the technology must be communicated to the Technical Committee which will reassess the approval of the technology.

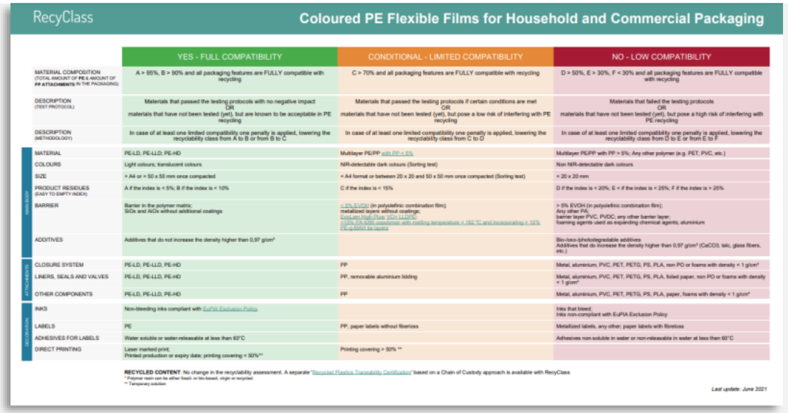
The RecyClass PP Technical Committee was requested to carry out an assessment of the product 'Polyfoil® MMB Tube PF528' by Neopac to verify its impact on the quality of recycled PP containers.

The product is a PP laminated tube, provided with PP shoulders and PP cap. The tube body has metallic appearance with direct printing and is lacquered representing less than 1% of the total weight of the packaging. The EVOH barrier concentration is 2% of the total weight of the packaging, provided with 2% combined PP and PE tie layers grafted with maleic anhydride. The metallization layer has an optical density up to 2.4 (about 0.02 µm in thickness) representing less than 0.02%. Laminated adhesive is PU based, solvent free and counts for less than 1 wt%. The tube structure is completed by a MDO-PE barrier film, where PE represents 3% of the total packaging weight.

According to the results that were obtained from the laboratory tests done by the Institut für Kunststofftechnologie und -recycling (IKTR), carried out as per the Recyclability Evaluation Protocol for PP containers, 'Polyfoil® MMB Tube PF528' is considered to be **limited compatible with coloured PP recycling.**

Based on these results, RecyClass certifies that Neopac 'Polyfoil® MMB Tube PF528' will have a limited impact on the current European PP containers recycling and provided that the full packaging is designed under the following conditions:

a) The tube, the shoulder and the capare made of clear or white PP;
b) EVOH-barrier represents 2 wt%, or less, and is provided with more than 1.4 wt% PP tie layers, grafted with at least 0.1% of maleic anhydride;



Potential impact on the Design for Recycling Guidelines

Possibility to obtain Recyclability Certification

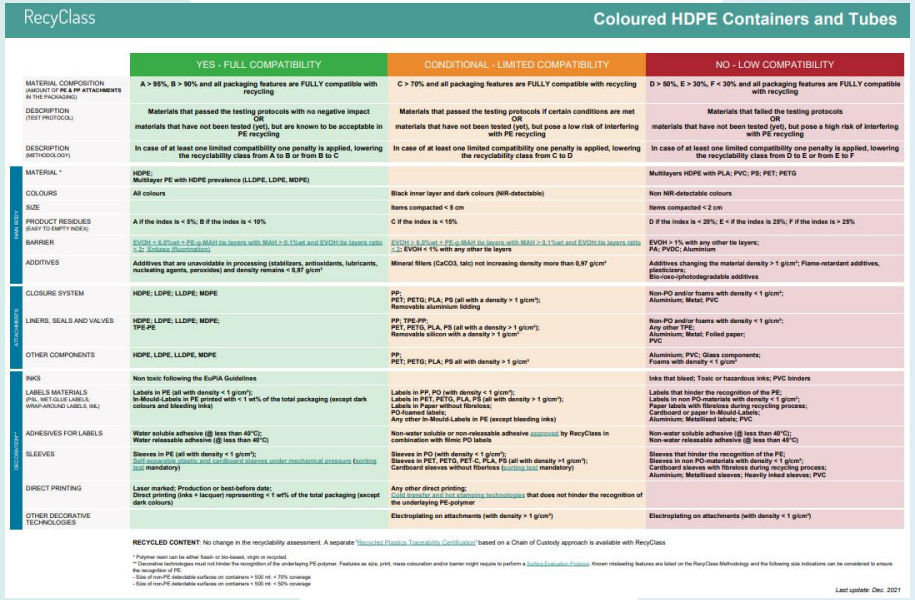
RecyClass | FROM INNOVATION TO CERTIFICATION

Innovative Technology

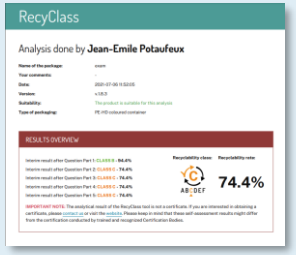
RECYCLABILITY APPROVAL PROCESS

Lab Testing

Approval Letter



Self-Assessment (Online Tool)



CERTIFICATION PROCESS

CB Audit

Certification

RecyClass

KEY TAKEAWAYS

- ✓ **RecyClass Recyclability Evaluation Protocols** assess packaging technologies against recyclability via a scientific approach
- ✓ **Standardized procedures** developed by the plastic value chain and technical experts to replicate recycling processes at laboratory scale
- ✓ **Generate knowledge** on Design for Recycling to be used as recommendations for the entire industry
- ✓ Allows for **claims on compatibility with recycling** of innovative technologies/packaging

RecyClass
FOR BEGINNERS

Questions & Answers

Use the Q&A box at the top-right corner of your screen

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FOR BEGINNERS

Thank you for participating!

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