PLASTIC PACKAGING

RECYCLABILITY OF PLASTIC PACKAGING

ECO-DESIGN FOR IMPROVED RECYCLING

Cotrep
Comité Technique pour le Recyclage des Emballages Plastiques

CITEO
Together, let's bring new life to our packaging

valorplast
Plastics can be seen everywhere in daily life and have revolutionised the way we live, offering us simple, effective and practical solutions. Every year, some 1.2 million tons of plastic are used in France to pack the products we use every day. Once used by consumers, these packaging become waste. We are therefore faced with the significant challenges of recycling increasing volumes of this material while taking action from the early stages of the process through the eco-design of packaging.

In 2001, Elipsa, Citeo and Valorplast set up COTREP (Technical Committee for the Recycling of Plastic Packaging) to support companies and help packaging designers develop recyclable solutions without hampering innovation.

In support of its expertise, COTREP has published 130 plastic packaging recyclability notices based on tests conducted in laboratories and under industrial conditions at recycling plants in accordance with industry-approved protocols. These notices provide a universally recognised and accessible framework of knowledge.

This guide is an easy-to-use summary of studies conducted by COTREP and its members. It outlines the main principles of recyclability and also includes more technical material profiles to foster innovation without compromising on packaging recyclability.

The aim is to think innovatively while also optimising packaging end-of-life!
COTREP embodies a commitment among all stakeholders in the household plastic packaging chain to improve recyclability. It includes resin manufacturers, plastic packaging manufacturers and packers who are represented by Elipso, Citeo and Valorplast. Its goal, governed by a Charter, is to promote the inclusion of new packaging items in recycling streams with a view to adding economic and ecological value in accordance with legislation, while also enabling innovation.

Citeo is a not-for-profit company founded from the merger of Eco-Emballages and Ecofolia with a view to reduce the environmental impact of packaging and paper. 250 committed, passionate Citeo employees work to help companies find solutions to their recycling problems, advising them on environmental responsibility, optimizing low-cost sorting and recycling procedures and motivating the public to adopt user-friendly effective sorting.

www.citeo.com

Valorplast is one of the main operators working with specialist recycling streams. The company’s remit is to:
• Provide guaranteed take-back to local authorities that have chosen the guaranteed take-back option for plastic packaging
• Encourage eco-design
• Promote and ensure the development of recycling and outlets with its industrial partners
• Help local authorities with initiatives promoting selective sorting

Elipso is a professional organization that promotes the plastic and flexible packaging industry. Every day, Elipso:
• Helps companies to adapt to changes in regulations
• Helps public authorities and decision-makers to identify future priorities
• Acts as a recognised intermediary between the press, partners in the sector and its customers
• Represents the industry and promotes its image.

BEFORE GETTING STARTED

SORTING & RECYCLING

HOW DOES IT WORK?
SORTING INSTRUCTIONS
EXTENSION IN FULL SWING

NOW
Not all plastic packaging is covered by the French national sorting instructions due to the wide variety of materials and shapes encountered. In fact, the instructions only apply to bottles, which were included in their coverage in 1993.

IN FUTURE, SORTING INSTRUCTIONS WILL BE EXTENDED TO ALL PLASTIC PACKAGING
In 2011, Citeo and its partners started work on extending sorting instructions to all plastic packaging.

This project will affect the entire recycling chain since although it will make sorting easier for consumers, it will also require significant work in terms of adapting collection systems and sorting centres. Since 2016, 23% of the French population is covered and roll-out to the entire population is required to take place by 2022 under the energy transition act.

The aim of extending the sorting instructions to all plastic packaging is to double the recycling rate for these items. This will be achieved by sorting pots, trays and film, and through a ripple effect from plastic packaging already covered by the sorting instructions (bottles). It is likely that this project will also have an impact on recycling of other packaging materials. Indeed in mid-2016, it was apparent that the ripple effect reported after the initial trial had been consolidated with an additional 11% lightweight materials recycled on average (steel, aluminium, cardboard, food and beverage cartons and plastic bottles).

Since 2016, 3.7 million inhabitants reached 100% of inhabitants in mainland France and a target of 6kg more recycled household waste packaging per year per resident has been set, representing over 130,000 extra tons of packaging waste per year by 2018 including 20,000 tons of plastic packaging.

TARGET TO DOUBLE THE PLASTIC PACKAGING RECYCLING RATE

NOW
FUTURE

23%
50%

OVER
RECYCLED

ARE YOU UNSURE OF ANYTHING IN THE SORTING INSTRUCTIONS?
The “Guide du Tri” (sorting guide) app provides details of where to dispose of various packaging items, telling you which colour bin to use and giving you information on how to sort your waste properly. It also explains the benefits of sorting by region.

Check it out at www.consignesdetri.fr

The website

The Sorting Guide app

www.consignesdetri.fr

SORTING STAGES: POTENTIAL IMPACT

EXAMPLE PACKAGING ITEMS

- Packaging that is too small in terms of size or capacity
  - Pods and bottles < 20 mL
  - Film < A5

- Mixed plastic/aluminium packaging
  - PET pots with steel hinge
  - Mixed aluminium/plastic cans

- Items made of a material that is different to the primary resin
  - Surface sleeves > 70% for bottles > 500 mL and > 50% for bottles < 500 mL
  - Composite PET-based trays

- Packaging or packaging components that are not visible or detectable by optical sorting
  - Dark packaging with carbon black
  - Metal springs/balls in pump dispenser bottles

- Other resins than those in the main streams
  - Plastic packaging except PET, PE, PP, PS (PVC, PLA, PC, etc.)
  - PETG bottles

REJECTS

Packaging sent to the wrong stream
- Pods and bottles < 20 mL
- Film < A5
- Mixed aluminium/plastic cans
- PETG bottles

N.B. The technical risks incurred by these types of packaging include economic risks.

SORTED STREAMS

STREAMS TO BE DEFINED
- PS/XPS/EPS : stream used abroad, under investigation in France
- Opague PET : identification of outlets – COTREP study in progress

ADDITIONAL RECOVERY
- PP composites and flexible packaging
- Dark packaging with carbon black
- Packaging with no majority material

FIND OUT MORE
Due to its low tonnage, there are no plans to develop a dedicated sorting and recycling stream for PVC. Moreover, this resin is not currently approved for additional recovery (e.g. Solid Recovered Fuel – see page 12) as it contains chlorine compounds.

SORTING CENTRE
STANDARD WORKFLOW

BALLISTIC SEPARATION
SORTING BY SIZE

METAL SORTING
EDDY CURRENT/OVERBAND INDUCTION/MAGNETIC SORTING

OPTICAL SORTING
MATERIAL AND COLOUR SORTING (INFRARED)

IN ADDITION TO OPTICAL SORTING:
MANUAL SORTING
MATERIAL, SHAPE AND COLOUR SORTING

PACKAGING SEPARATED BY MATERIAL

BAILING
MATERIAL COMPRESSION

SORTED STREAMS

PACKAGING OF ANY MATERIAL (EXCEPT GLASS)

SORTING INSTRUCTIONS FOR BOTTLES

MECHANICAL RECYCLING

CLEAR PET
- Transparent, colourless and very light, azure blue
- Bottles: Still water, some fruit juices and soft drinks

DARK PET
- Colours other than colourless and azure
- Bottles: Sparkling water and beverages, some HPC bottles

Mixed HDPE and PP
- Bottles and boxes of dry products
- Shampoo, milk, drinking chocolate

WASTE-TO-ENERGY (65%) LANDFILL (35%)

PACKAGING NOT COVERED BY SORTING INSTRUCTIONS:
- Processing with residual household waste (RHW)

SORTING REJECTS

FIND OUT MORE
The extension of plastic sorting instructions provides an opportunity to identify new outlets. The types of new recycling streams developed will depend on innovations in industrial technology.

Citeo and its partners are taking steps to identify and develop these outlets within the scope of R&D projects conducted through calls for proposals.

**MECHANICAL RECYCLING – A SECOND LIFE!**

**NOW**

Recycled PET, PE and PP are used for various purposes depending on their mechanical properties, colour or available quantities.

Over 50% of PET is recycled as fibre. A decontamination stage performed during the recycling process also enables it to be recycled as other packaging items suitable for contact with food. In France, PET is the only plastic material for which this is possible.

Mixed HDPE and PP packaging is recycled regardless of its colour – the resulting dark grey recycled material is used to make items that are not subject to colour restrictions or openly displayed. 61% of outlets are tubes or mandrels. The outlets of these two resins may be different – for example, PP is reused in automotive products, profiles and other technical components.

**FUTURE OUTLETS**

The extension of plastic sorting instructions provides an opportunity to identify new outlets. The types of new recycling streams developed will depend on innovations in industrial technology.

Citeo and its partners are taking steps to identify and develop these outlets within the scope of R&D projects conducted through calls for proposals.

---

**STAGES OF MECHANICAL RECYCLING: POTENTIAL IMPACT**

**RECYCLING STANDARD WORKFLOW**

**DISJOINING OF BALES**

**OPTICAL SORTING AND METAL SORTING**

**MATERIAL AND COLOUR SORTING**

**PAGE 8**

**INSEPARABLE LAYERS OR PACKAGING COMPONENTS**

- Composite PET-based trays
- Inseparable barrier layers
- Glass and metal balls in PET bottles

**DIFFICULT TO ELIMINATE PARTICLES AND RESIDUES**

- Metallic ink pigment
- Non-water soluble glues

**CONTAMINATED WASH WATER**

- High-bled inks

**IMPOSSIBLE TO SEPARATE MATERIALS**

- Components of d > 1 in PET packaging
- Glass balls in PET packaging
- Components of d < 1 in PE/PP packaging

**UNWANTED MATERIALS NOT ELIMINATED**

- Flakes of other materials (metal, other plastics, paper, etc.)
- PVC present in PET

**MECHANICAL RECYCLING, A SECOND LIFE**

**TECHNICAL RISKS:**

- Recyclable material wastage
- Quality defects (outside specifications)
- Technical impact (equipment, machines, water)
- Economic risks

N.B. The technical risks incurred by these types of packaging include economic risks.

* This stage is optional for some recycling lines.

---

**FIBRE**

- PET 55%
- OTHER 3%
- SHEETS 10%
- OTHER 19%
- BOTTLES 32%

**PET**

- 32% fibre
- 19% bottles
- 13% sheets
- 7% other

**HDPE/PP**

- 61% fibre
- 19% bottles
- 13% sheets
- 7% other

**FUTURE OUTLETS**

The types of new recycling streams developed will depend on innovations in industrial technology.

Citeo and its partners are taking steps to identify and develop these outlets within the scope of R&D projects conducted through calls for proposals.
## ADDITIONAL RECOVERY

### ENERGY RECOVERY

**REFUSE-DERIVED FUEL (RDF)**

<table>
<thead>
<tr>
<th>Potential Users</th>
<th>Industrial Conditions</th>
<th>Packaging Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuels produced from ground household waste and non-hazardous industrial waste (NHIW)</td>
<td>Cement works – only outlet in France; potentially industrial boilers and lime kilns</td>
<td>Currently all non-material-recyclable plastic packaging except PVC</td>
</tr>
</tbody>
</table>

**HIGH-YIELD ENERGY RECOVERY**

<table>
<thead>
<tr>
<th>Potential Users</th>
<th>Industrial Conditions</th>
<th>Packaging Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat, electricity and energy producers (substitute for natural gas)</td>
<td>Controlled physicochemical properties: LHV &gt; 18 MJ/kg; limited moisture and ash content (&lt; 15%); low chlorine levels (&lt;0.5%); density</td>
<td>All non-material-recyclable plastic packaging</td>
</tr>
</tbody>
</table>

**PLASTIC-TO-FUEL – UNDER INVESTIGATION**

<table>
<thead>
<tr>
<th>Potential Users</th>
<th>Industrial Conditions</th>
<th>Packaging Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users of liquid fuel (kerosene, fuel oil)</td>
<td>Industrial process not developed in France. Awaiting technical and economic process optimisation</td>
<td>All non-material-recyclable plastic packaging except PVC and plastic/metal multi-layer</td>
</tr>
</tbody>
</table>

**OTHER TYPES OF RECOVERY**

### CHEMICAL RECYCLING

<table>
<thead>
<tr>
<th>Potential Users</th>
<th>Industrial Conditions</th>
<th>Packaging Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemists specialising in polymers and resin manufacturers</td>
<td>Industrial process not developed, awaiting more cost-effective solutions</td>
<td>In theory, all plastic packaging</td>
</tr>
</tbody>
</table>

### COMPOSTING

<table>
<thead>
<tr>
<th>Potential Users</th>
<th>Industrial Conditions</th>
<th>Packaging Involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers, local authorities, households</td>
<td>Industrial stream not developed</td>
<td>Standard EN 13432 or NF T51-800</td>
</tr>
</tbody>
</table>

### DID YOU KNOW?

‘Oxo-degradable’ and ‘bio-fragmentable’ plastics contain oxidising additives that enable them to break down as residues that are invisible to the naked eye. Although these plastics may break down in certain conditions (heat, light, etc.) they are not biodegradable in accordance with current standards. Consequently, the production and use of oxo-degradable packaging was banned in France in August 2015 (Law 2015-992, Article 754).
USING A MATERIAL THAT WILL BE SORTED AND DIRECTED TOWARDS A RECYCLING STREAM

Before being sent to plastic recycling units, used packaging items pass through sorting centres. This is a crucial step in determining packaging recyclability.

MY TO DO LIST

NEED A HAND?

- Use a material that has a recycling stream
- Use a material that is compatible with an existing recycling stream
- In terms of renewable materials, choose recyclable resins

ALREADY BEEN DONE?

- Not all materials can be sorted and recycled, for instance if their tonnage is too low or it is technically impossible to recycle them. The resins currently recycled are PET, PE and PP for rigid packaging and PE for flexible packaging. See page 9
- Polymers from an associated tonnage and with a similar chemical structure can sometimes be integrated in limited concentrations in an existing stream. Request a recyclability test from COTREP
- Surlyn® developed by DuPont – a PE-derived resin that can be incorporated into the HDPE recycling stream in small concentrations (see ATPEHD-14.01)
- Bio-PE and bio-PET are the only types of bio-based packaging that can be recycled in the standard PET and PE recycling streams (since they share the same chemical structure). Biodegradable packaging is not mechanically recycled. See COTREP notice A447

If in doubt, ask COTREP for advice.

MY TO DO LIST

NEED A HAND?

- Introduce a preservative barrier that is compatible with recycling the primary material
- Limit combinations of materials required for packaging and logistics
- Use a screw cap that is compatible with recycling the packaging body material

ALREADY BEEN DONE?

- Aluminium present in plastic disturbs recycling. Alternatives are recommended by COTREP See COTREP material profiles and notices FT36, FT37, AG52 and AG53
- If a barrier is essential for preserving products, nylon is compatible with the PET stream provided that it does not exceed a certain level in the material. See COTREP material profiles and notices EE01-001, EE 09-06, EE02-004
- It is not always technically necessary to combine several types of plastic. Single-material packaging can sometimes offer the same properties. Contact COTREP
- Aluminium present in plastic hinders recycling. Plastic screw caps are a good alternative. See notices AT-ELIPSO-11-02 and AS-PEHD-12-04
- There are PE/EVOH seals that are not affected by PET recycling. Plastic screw caps are a good alternative. See notices ASPEHD-12-04

If in doubt, ask COTREP for advice.

THE RECYCLABILITY CHECKLIST

PACKAGING DESIGN

Packaging is designed to exhibit the necessary features for packing, transporting, preserving and using the products it contains. While it is not always possible to produce single-material packaging, recyclability should be considered in design choices wherever possible.

PE and PE/EVOH seals can be recycled. Elastomer seals/valves (TPR, silicones) must be of an appropriate density to enable separation from the primary material. See notices A03-001 and 04-011

If in doubt, ask COTREP for advice.

COCOA-COLA'S PLANTBOTTLE™ – A BIOBASED PET BOTTLE

Surlyn® developed by DuPont – a PE-derived resin that can be incorporated into the HDPE recycling stream in small concentrations (see ATPEHD-14.01)

Coca-Cola’s PlantBottle™ – A bio-based PET bottle

Surlyn® developed by DuPont – a PE-derived resin that can be incorporated into the HDPE recycling stream in small concentrations (see ATPEHD-14.01)

The Badoit intensely sparkling bottle – an EVA seal that does not affect PET recycling

The Bericap SK 42/24 system – a screw cap combined with a 100% PE tamper-proof band connected to the PE bottle

The Badoit intensely sparkling bottle – an EVA seal that does not affect PET recycling

If in doubt, ask COTREP for advice.
Some features are linked to specific mechanical properties (resistance to impact, temperature, etc.) gained by modifying the material or using specific additives or processes. In these instances, technologies that do not compromise sorting or recycling of the packaging should be used. Below are a number of specific examples:

### MY TO DO LIST

**NEED A HAND?**
- Incorporate additive loads to strengthen the material without compromising recyclability
  - If mineral additive loads are used, the density of packaging may be altered, resulting in it being last during recycling. The quantity of these loads must therefore be adjusted to ensure the density of the material stays the same. See notices AG41 and AG51

**ALREADY BEEN DONE?**
- Additives may be incompatible with recycling materials – COTREP can perform studies on a case-by-case basis. Contact COTREP to test the possible incorporation of an additive into the recycling process
- Clarifying agents under development – a transparency-enhancing additive whose impact on recycling packaging remains to be tested by COTREP

**INTEGRATION OF ADDITIVES**
- Additives to the recycling process
  - Contact COTREP for a flotation test in real-life conditions

**USE A HEAT-RESISTANT MATERIAL**
- Currently, it is only possible to use heat-resistant products packaged in PP (microwaveable products), xPET and CPET (products for microwaves and conventional ovens).
  - Contact COTREP for latest information on heat-resistant packages

**LIGHTEN PACKAGING**
- If material-expanding gas is used, PET density may be reduced below 1 leading to wastage during flotation. Contact COTREP for a flotation test in real-life conditions

### COMBINING MARKETING, COMMUNICATION AND RECYCLABILITY

While meeting regulatory requirements on marking and labelling, packaging can be used to promote brands and products. By adding a sorting guideline to your packaging (see page 26) you can make sorting easier for residents. Moreover, marketing and recyclability are not necessarily mutually exclusive.

**MY TO DO LIST**

**NEED A HAND?**
- Refrain from opacifying packaging if a barrier is not required
  - When present, mineral additives in PET limit outlets for recycling. See dark PET profile and COTREP notes 1 and 2 on opaque PET

**ALREADY BEEN DONE?**
- Use a black or dark colorant that is free of carbon black and detectable by optical sorting machines (NIR)
  - Dark colorants composed of carbon black are not detectable by NIR. See the ‘Opaque PET’ profile
- Prioritise light and translucent colours when colouring packaging
  - Some PET colours can eliminate outlets and limit recycling. See general notices FT19, FT20 and FT33
- Print straight onto the packaging body using processes that do not contaminate the recycling stream
  - Direct printing can adversely affect recycling either in terms of recycled output quality if non-washable inks are used or contaminate wash water if washable ink is used.
- Use a printed and/or glued label or seal that does not risk transfer to the recycled material
  - Only non-bleed inks and glues that are washable in standard washing conditions (80-90°C, pH = 12 to 14) should be used. If inks are used, overlacquers may be applied. See Notice FT03
- Minimise the aluminium content of printing inks
  - When mixed with recycled PET, metallic pigments reduce its quality. When present, they may also cause packaging to be lost (IR SORTING). COTREP works in progress; see AGPET13-01 and clear PET material profile

**ALREADY BEEN DONE?**
- Black pigments that are visible using infrared – an R&D project by Fleurys-Michon aimed at designing and developing dark PP trays
- Ligpack project: delicatessen trays changed from black to colours that do not affect recycling
- Digital printing of PET bottles with low migration inks – new solutions that may benefit recycling – to be checked by COTREP
- New tubs for Somaprico sauce base – a 100% PP tub with IML, that is glue-free and therefore does not affect recycling

**IF IN DOUBT**
- Ask COTREP for advice.

**26 Call for Proposals ‘Improving recyclability of plastic packaging’ – Citeo, in progress.**
RECYCLABILITY IS A KEY FACTOR IN EXTENDING THE SORTING INSTRUCTIONS

As part of their work on extending the sorting instructions to all plastic packaging, Citeo and its partners consistently target the start of the chain by encouraging companies to improve the recyclability of their plastic packaging other than bottles and thus facilitate its incorporation in existing recycling streams. Since 2012, calls for proposals have been issued in two phases for this R&D work, which relates to three main themes.

As a result of the following initiatives, some packaging composed of several materials is moving towards a single recyclable material, while it should be possible to sort and therefore recycle others – they are ready for the extended sorting instructions!

### Themes

#### Transition from multi-layer to single material packaging

- **Semi-rigid trays:** Transition from a semi-rigid composite PET/EVOH/PE tray to a recyclable PET solution with a PET seal containing washable inks
- **PET film:** PET seal applied to a PET tray without using glue

#### Transition from multi-material to single material packaging

- **Flexible pouches (PE/aluminium):** Although it is technically possible to replace aluminium with a thin layer of SiOx, this development raises financial difficulties
- **Tubs for pre-prepared food ingredients (plastic/aluminium/paper and cardboard):** Non-plastic materials eliminated and single-resin packaging developed

#### Development of dark, infrared-detectable colorants

- **Black PP and PET trays:** Black, infrared-identifiable trays developed or replaced by a different colour

### Why?

**Benefits of the process**
CONSUMER ACTION – A SIGNIFICANT TREND

SORTING – A MEANINGFUL GOOD DEED FOR THE ENVIRONMENT

With 87% of French people stating that they sort their waste regularly, sorting has become a part of people’s everyday lives, encouraging them to adopt environmentally responsible habits. 86% of French people currently view packaging waste as a genuine resource for manufacturing other products while 92% are confident that sorting their waste is necessary for protecting the environment.

Which of these factors do you consider most important when purchasing consumer products?

CONSUMERS APPRECIATE ECO-DESIGNED AND PARTICULARLY RECYCLABLE PACKAGING

After inherent product characteristics, consumers give recyclability as their top environmental criterion. Indeed, 77% of French people appreciate companies’ efforts to improve the recyclability of their packaging. This is a tangible notion as it is linked to their sorting practices. Brands can prove that they are taking action by actually enabling well-sorted packaging to be recycled.

CONSUMER BUY-IN AND RETENTION

The values of respect for the environment and sustainable packaging shared by companies and consumers inspire loyalty to specific products. This also enables a special relationship to be forged with consumers [proximity, transparency, etc.] whose trust in products is enhanced.

In contrast, brands that do not adopt responsible practices may suffer damage to their image, since 30% of consumers refuse to purchase the products of brands whose record on the environment meets with their disapproval. This is accentuated by the fact that eco-design has become common practice in many sectors, whether in terms of recyclability or reduction at source.

DISRUPTIVE PACKAGING

The Citeo fee is increased by 50% for packaging that significantly affects sorting and recycling processes. This includes PET-based packaging combined with aluminium, PVC or silicone of density > 1.

Packaging with no stream

The Citeo fee is increased by 100% for packaging that is covered by the sorting instructions but has no recycling stream. This includes bottles with a body made of a material other than PET, HDPE or PP (PVC, PLA, PC, etc.).

A CROSS-DISCIPLINARY APPROACH WITH BENEFITS

CITEO FEE

The Citeo fee is calculated to provide a financial incentive for initiatives aimed at improving recyclability and reducing waste at source. Initiatives taken by companies to help recycle their packaging are rewarded with a bonus while penalties are applied to packaging that is difficult or impossible to recycle.

‘RECYCLABILITY IMPROVEMENT’ BONUS

• Eliminate a minority component of a packaging unit with different materials
• Replace composite plastic trays with single-resin trays
• Eliminate carbon black colorant from plastic packaging
• Add a perforated line on the plastic sleeve

CONSUMER BUY-IN AND RETENTION

The values of respect for the environment and sustainable packaging shared by companies and consumers inspire loyalty to specific products. This also enables a special relationship to be forged with consumers [proximity, transparency, etc.] whose trust in products is enhanced.

In contrast, brands that do not adopt responsible practices may suffer damage to their image, since 30% of consumers refuse to purchase the products of brands whose record on the environment meets with their disapproval. This is accentuated by the fact that eco-design has become common practice in many sectors, whether in terms of recyclability or reduction at source.

CONSUMER ACTION – A SIGNIFICANT TREND

SORTING – A MEANINGFUL GOOD DEED FOR THE ENVIRONMENT

With 87% of French people stating that they sort their waste regularly, sorting has become a part of people’s everyday lives, encouraging them to adopt environmentally responsible habits. 86% of French people currently view packaging waste as a genuine resource for manufacturing other products while 92% are confident that sorting their waste is necessary for protecting the environment.

Which of these factors do you consider most important when purchasing consumer products?

CONSUMERS APPRECIATE ECO-DESIGNED AND PARTICULARLY RECYCLABLE PACKAGING

After inherent product characteristics, consumers give recyclability as their top environmental criterion. Indeed, 77% of French people appreciate companies’ efforts to improve the recyclability of their packaging. This is a tangible notion as it is linked to their sorting practices. Brands can prove that they are taking action by actually enabling well-sorted packaging to be recycled.

CONSUMER BUY-IN AND RETENTION

The values of respect for the environment and sustainable packaging shared by companies and consumers inspire loyalty to specific products. This also enables a special relationship to be forged with consumers [proximity, transparency, etc.] whose trust in products is enhanced.

In contrast, brands that do not adopt responsible practices may suffer damage to their image, since 30% of consumers refuse to purchase the products of brands whose record on the environment meets with their disapproval. This is accentuated by the fact that eco-design has become common practice in many sectors, whether in terms of recyclability or reduction at source.

DISRUPTIVE PACKAGING

The Citeo fee is increased by 50% for packaging that significantly affects sorting and recycling processes. This includes PET-based packaging combined with aluminium, PVC or silicone of density > 1.

Packaging with no stream

The Citeo fee is increased by 100% for packaging that is covered by the sorting instructions but has no recycling stream. This includes bottles with a body made of a material other than PET, HDPE or PP (PVC, PLA, PC, etc.).

A CROSS-DISCIPLINARY APPROACH WITH BENEFITS

CITEO FEE

The Citeo fee is calculated to provide a financial incentive for initiatives aimed at improving recyclability and reducing waste at source. Initiatives taken by companies to help recycle their packaging are rewarded with a bonus while penalties are applied to packaging that is difficult or impossible to recycle.

‘RECYCLABILITY IMPROVEMENT’ BONUS

• Eliminate a minority component of a packaging unit with different materials
• Replace composite plastic trays with single-resin trays
• Eliminate carbon black colorant from plastic packaging
• Add a perforated line on the plastic sleeve

CONSUMER BUY-IN AND RETENTION

The values of respect for the environment and sustainable packaging shared by companies and consumers inspire loyalty to specific products. This also enables a special relationship to be forged with consumers [proximity, transparency, etc.] whose trust in products is enhanced.

In contrast, brands that do not adopt responsible practices may suffer damage to their image, since 30% of consumers refuse to purchase the products of brands whose record on the environment meets with their disapproval. This is accentuated by the fact that eco-design has become common practice in many sectors, whether in terms of recyclability or reduction at source.
45% of companies surveyed increased their revenue by selling eco-designed products while the impact was neutral for 51%\(^\text{11}\). Most respondents stated that the profit margin for eco-designed products was higher or similar to that of conventionally designed products: +12% on average despite increased overheads for R&D and internal training. This is explained by reduced costs (lighter packaging, optimised logistics, etc.) and additional sales due to the responsible stance taken.

Of 119 European and Canadian companies surveyed, 48% reported a more cross-disciplinary approach to research on eco-designed solutions not only internally but also with suppliers and subcontractors (36%). Finally, 32% stated that they were more able to develop new products after adopting an eco-design process\(^\text{11}\).

Although an eco-design process may sometimes meet with barriers to change (time restrictions, pressures of customer demands and deadlines, etc.) it also helps companies to attract talent while motivating and mobilising staff. Thanks to these activities, employees regain a sense of performing meaningful roles, which contributes to a feeling of self-worth\(^\text{12}\).

12 Committee 21 (2011) ‘The sustainable marketing guide. Marketing and sustainable development – everything you need to know to avoid making mistakes.’
GET STARTED

Asking expert advice
Technical Committee for the Recycling of Plastic Packaging
www.cotrep.fr

- On-demand packaging recyclability assessment based on laboratory testing or tests conducted in industrial conditions, which are formalised in technical notices
- Provision of general notices on the impact of packaging on the recycling stream

Finding information
Packaging Recyclability Test
http://tree.citeo.com

- Assessment of packaging recyclability
- Disruptive components and associated penalties identified
- Alternative designs suggested to improve the recyclability of packaging

Getting ideas
Best practice catalogue
http://reduction.ecoemballages.fr

- Catalogue of eco-design best practice – groups from all sectors
- Search by factor, material, market or year

Securing backing for your environmental process
French Environment and Energy Management Agency
www.ademe.fr

- General database on eco-design and sustainable development
- Funding of projects relating to eco-design and packaging waste management

MEASURE

Measuring and validating environmental benefits

BEE – an LCA tool developed by Citeo
http://bee.citeo.com

- Free, confidential and open access
- Calculation of the environmental impact of various packaging solutions and approval of selected eco-design processes
- Rapid identification of concrete recommendations for eco-design

SOME EUROPEAN TOOLS

Europe

- PET bottle recyclability
  The European PET Bottle Platform - EPBP
  www.epbp.org

Portugal

- Recyclability of packaging

Belgium

- Recyclability of packaging
  www.pack4recycling.be
- Eco-design of packaging
  www.pack4ecodesign.org
COMMUNICATE

Simplifying sorting for consumers with “Info-Tri Point Vert” (sorting information)

Harmonised sorting instructions developed specifically for packaging. According to an Opinion Way survey conducted in 2013, Green Dot Sorting Info has prompted almost 9 out of 10 people to sort their waste! In 2015, 40 billion packaging items were issued with sorting instructions.

Communicating about your commitments and actions

‘Responsible Marketing’ training by Citéo

Defining best responsible marketing and communication practice for packaging.

Packaging and corporate social responsibility

5 rules with examples to help you communicate on your commitment in accordance with the applicable CSR reporting standards and regulations. www.ecoemballages.fr/la-docutheque-eco-emballages

Adhering to communication rules

Publication on ‘Environmental claims relating to packaging’ – Conseil National de l’Emballage (CNE)

• Practical paper
• Notices and Recommendations www.conseil-emballage.org
Since recycling of PE film and flexible packaging is still being developed, COTREP is unable to provide detailed recommendations on eco-design. This profile provides a number of preliminary design ideas based on those used for rigid PE packaging (see relevant profile). These will be further developed by COTREP.

### Prerequisites

**Since recycling of PE film and flexible packaging is still being developed, COTREP is unable to provide detailed recommendations on eco-design. This profile provides a number of preliminary design ideas based on those used for rigid PE packaging (see relevant profile). These will be further developed by COTREP.**

### Guidelines

#### Body

- **Colorants**
  - All colours (excluding carbon black)
  - Dark colours with carbon black

- **Barricres**
  - Coating (SiOx, COx, AlOx)
  - EVOH multi-layer
  - Carbon black as an internal layer

- **Additives (Blowing Agents, Opacifiers, Additive Loads, etc.)**
  - Blowing agents, gas and additive loads that result in density < 1 when combined with PE *
  - Additive loads and other agents that result in density > 1 when combined with PE

#### Closure System

- **Labels**
  - PE, PP, OPP, PET and PS (d > 1)
  - N.B. If material other than PE, PP, OPP, coverage (% surf.):
    - Volumes > 500 mL: % surf. < 50%
    - Volumes < 500 mL: % surf. < 70%

- **Ink**
  - Non-washable (whether applied to the body or label)
  - Non-toxic (aqueous, plant-based, etc.)

- **Glue**
  - Washable and residue-free*
  - Non-toxic (aqueous, plant-based, etc.)

- **PVC**
  - Polyvinyl chloride
  - PS (d < 1)
  - PETG

- **Colorants**
  - All colours (excluding carbon black)

- **Barricres**
  - Coating (SiOx, COx, AlOx)
  - EVOH multi-layer

- **Additives (Blowing Agents, Opacifiers, Additive Loads, etc.)**
  - Blowing agents, gas and additive loads that result in density < 1 when combined with PE *

- **Materials**
  - Highly coloured with a high level of bleed
  - Metallic inks and other residual inks
  - Ink coupling agents and overlacquers

- **Non-washable in alkaline solution at 60-80°C**
- **Acrylic**
- **Ultrahard/bond or self-adhesive**

#### Design

- **Labels**
  - PE, PP, OPP, PET and PS (d > 1)
  - N.B. If material other than PE, PP, OPP, coverage (% surf.):
    - Volumes > 500 mL: % surf. < 50%
    - Volumes < 500 mL: % surf. < 70%

- **Ink**
  - Non-washable (whether applied to the body or label)
  - Non-toxic (aqueous, plant-based, etc.)

- **Glue**
  - Washable and residue-free*
  - Non-toxic (aqueous, plant-based, etc.)

- **PVC**
  - Polyvinyl chloride
  - PS (d < 1)
  - PETG

- **Colorants**
  - All colours (excluding carbon black)

- **Barricres**
  - Coating (SiOx, COx, AlOx)
  - EVOH multi-layer

- **Additives (Blowing Agents, Opacifiers, Additive Loads, etc.)**
  - Blowing agents, gas and additive loads that result in density < 1 when combined with PE *

- **Materials**
  - Highly coloured with a high level of bleed
  - Metallic inks and other residual inks
  - Ink coupling agents and overlacquers

- **Non-washable in alkaline solution at 60-80°C**
- **Acrylic**
- **Ultrahard/bond or self-adhesive**

#### Forthcoming Studies...

- **Maximum levels of EVOH in the PE film stream**

#### Recyclability Profile

**They’ve Done It**

1. Using a material that will be sorted and directed towards a recycling stream
2. Combining features and recyclability
3. Providing the material with certain mechanical properties while ensuring it can be sorted and recycled
4. Combining marketing, communication and recyclability

---

**BONDED, GLUE-FREE SLEEVES ENSURING TOTAL PACKAGING CLOSURE**

Nowadays, various technologies are available for bonding two PE films. Using either ultrasound or pulse sealing, they produce solid seams, thus providing a packaging closure solution that avoids using glue, an important development in terms of recyclability and securing the quality of process water.

**FLEXIBLE PE POUCHES FOR CREAM WITH NO ALUMINIUM BARRIER**

As part of an initial EcoEmballeages call for proposals, Elvir worked on improving the recyclability of its doypacks for cream by replacing the aluminium layer with a SiOx barrier that does not affect recyclability.

Although this development is technically feasible, it is still relatively expensive. Additional work is required.

Read the summary of the Elvir project on ‘Improving the recyclability of plastic packaging’

**A LIGHTER, HARD-WEARING, RECYCLABLE PE BAG**

Several manufacturers currently offer polyethylene film that includes a gas-expanded PE microcellular middle layer compatible with recycling.

The quantity of material used is sometimes reduced to 30% resulting in packaging that is lighter yet just as hard-wearing. This solution therefore combines weight-reduction, resilience and recyclability.

---

A ‘They’ve done it!’ feature is provided for recommendations with a * symbol

- No special restrictions
- Restricted recycling – check with COTREP

---

28 29
**RECYCLABILITY PROFILE**

**HDPE**

**GUIDELINES**

**COLORANTS**
- All colours (excluding carbon black)
- Dark colours with carbon black

**BARRIERS**
- Coating (SiOx, CoOx, AlOx)
- EVOH multi-layer
- Carbon black as an internal layer

**ADDITIVES (BLOWING AGENTS, OPACIFIERS, ADDITIVE LOADS, ETC.)**
- Gas, blowing agents and loads that result in density < 1 when combined with PE
- Additive loads and other agents that result in density > 1 when combined with PE

**GUIDELINES**

**LABELS**
- PE, PP, OPP, PET and PS (d > 1)
- Non-washable (whether applied to the body, label or IMI)
- Non-toxic (aqueous, plant-based, etc.)

**INK**
- Non-washable (including some heatmelts, adhesive) in alkaline solution at 60-80°C
- Acrylic
- Ultra-adhesive or self-adhesive

**GLUE**
- Washable and residue-free*
- Non-toxic (aqueous, plant-based, etc.)

**CLOSURE SYSTEM**

**CAPS**
- PE or PP-based (single or multiple materials of d < 1)
- Stretch LDPE, PP, OPP, PS of d > 1*

**SEALS**
- PE, PP, PS of d > 1

**OTHER COMPONENTS (VALVES, PUMPS, ETC.)**
- Metal
- Glass, paper and cardboard components
- PS density < 1

**FORTHCOMING STUDIES...**
- Impact of LDPE on the HDPE stream

** Если ваша система закрытия включает PP компоненты, она может быть включена в комбинацию с HDPE из тела упаковки, так как PP часто используется для бутылок. Вместо того, чтобы выбрасывать эти материалы, их можно утилизировать в существующих потоках. Био-ПЕ производится из сахарной свеклы и является рекуперацией, которая не влияет на климат, а также обеспечивает аналогичные технические свойства ПЕ. Для получения дополнительной информации обращайтесь в КОТРЕП AG 47.**

**Design**

**LABELS**
- PE, PP, OPP, PET and PS (d > 1)
- PVC
- PS (d < 1)
- PETG

**INK**
- Highly coloured with a high level of bleed
- Metallic inks and other reactive inks
- Ink bonding agents and overprinters

**GLUE**
- Washable and residue-free*
- Non-toxic (aqueous, plant-based, etc.)

**Colors**
- All colors (excluding carbon black)
- Dark colors with carbon black

**Barriers**
- Coating (SiOx, CoOx, AlOx)
- EVOH multilayer
- Carbon black as an internal layer

**Additives (Blowing Agents, Opacifiers, Additive Loads, etc.)**
- Gas, blowing agents and loads that result in density < 1 when combined with PE
- Additive loads and other agents that result in density > 1 when combined with PE

**Label Guidelines**
- PE, PP, OPP, PET and PS (d > 1)
- Non-washable (whether applied to the body, label or IMI)
- Non-toxic (aqueous, plant-based, etc.)

**Ink**
- Non-washable (including some heatmelts, adhesive) in alkaline solution at 60-80°C
- Acrylic
- Ultra-adhesive or self-adhesive

**Guidelines**

**Caps**
- PE or PP-based (single or multiple materials of d < 1)
- Stretch LDPE, PP, OPP, PS of d > 1*

**Seals**
- PE, PP, PS of d > 1

**Other Components (Valves, Pumps, etc.)**
- Metal
- Glass, paper and cardboard components
- PS density < 1

**Forthcoming Studies...**
- Impact of LDPE on the HDPE stream
CLEAR PET GUIDELINES

**BODY**

- **COLORANTS**
  - Colourless
  - Transparent light blue

- **BARRIERS**
  - Coating (G, Ox, Co, A0, A)
  - Three-layer PA (PET/PA/PET) inclusions with PA > 50% mass
  - PTA and PGA barriers
  - Oxygen scavengers

- **ADDITIVES (BLOWING AGENTS, OPACIFIERS, ADDITIVE LOADS, ETC.)**
  - Gas and load blowing agents that result in d > 1 when combined with PET
  - PA multilayer (> 3 layers where PA > 30% mass)
  - Multiple layers of other resins
  - Blended barriers

**CLOSURE SYSTEM**

- **CAPS**
  - PE, PP (single or multiple materials of d ≤ 1)

- **SEALS**
  - PE, PP, CPP (single or multiple materials of d ≤ 1)
  - Non-piercable plastic/aluminium blends that are fully detachable for use

**OTHER COMPONENTS (VALVES, PUMPS, ETC.)**

- PE, PA
- Other materials (silicone, EVA, etc.) of d ≤ 1

**FOURTHCOMING STUDIES...**

- Impact of washable and high bleed ink
- Maximum PE content in PET – impact of composite clear PET/PE trays on recycling of clear PET packaging
- Optical recognition of PETG

**DESIGN**

- **LABELS**
  - PE, PP, OPP, PET (d ≤ 1)
  - H.B. Coverage (% surf.):
    - Volumes > 500 ml. % surf. < 50%
    - Volumes < 500 ml. % surf. < 70%
  - PVC
  - PS
  - PETG

- **INK**
  - Non-washable on separable materials
  - Non-toxic (aqueous, plant-based, etc.)

- **GLUE**
  - Soluble at 60-80°C in alkaline conditions
  - Washable and residue free
  - Non-toxic (aqueous, plant-based, etc.)

- **CAPS SEALS OTHER COMPONENTS**
  - PE, PP, OPP (single or multiple materials blends that are fully detachable for use)
  - Metal •  Metal •  Metal
  - Non-pierceable plastic/aluminium (silicone, TPE of d > 1)

**IF THE BODY OF YOUR PACKAGING INCLUDES...**

- Metallic pigment-based inks will not be recycled. The metal disrupts PET recycling by damaging recycling machines, causing PET wastage and affecting the end quality of recycled PET.

- If metal is present, even in small quantities, this can disrupt PET recycling by causing wastage of recyclable material, clogging extruder filters and affecting the end quality of recycled PET.

**IF THEY’VE DONE IT!**

1. **Using a material that will be sorted and directed towards a recycling stream**

2. **Combining features and recyclability**

3. **Providing the material with certain mechanical properties while ensuring it can be sorted and recycled**

4. **Combining marketing, communication and recyclability**

**A MONO-PET POT COMPATIBLE WITH THE EXISTING STREAM**

These days, many delicatessen products are packed in PET-based dual material pots with snap-on lids. Two types of combinations are generally found:

1. PET/PE bodies with PET lids
2. PET bodies with PE or PP lids

Several manufacturers have taken steps to improve the recyclability of these items either by removing the PE layer or using lids that are also made of PET. This means that the pots can be included in the clear PET stream.

**BARRIERS THAT DO NOT AFFECT RECYCLING**

Oxygen barriers are appropriate for a wide range of products, providing a sufficiently effective gas barrier to prevent product oxidation while also enabling recycling. When 0.1% ColorMatrix HyGuard is added to the PET matrix, it offers benefits in terms of its barrier effect and recyclability. This additive has been tested by the EPBP in the clear PET stream and is compatible with recycling, allowing it to be reused for making bottles.

For more information: EPBP Notice

**LIGHTER SILICONE THAT CAN BE SEPARATED FROM PET**

Sports cap manufacturer Seaquist offers a leak-proof SimpliSqueeze valve with density lower than 1 enabling it to be separated from PET by flotation. Moreover, colour has recently been added to the valves to facilitate optical detection and thus eliminate any risk of them becoming mixed up with colourless or transparent blue PET.

For more information: COTREP AT VLP 07-01

**RECYCLING-COMPATIBLE ALUMINISED INKING**

In 2012, Wattwiller pioneered OPP labels with reduced aluminium pigment levels. Since then, packagers such as Colgate have taken steps to optimise aluminised printing and now the affected packaging is no longer detected by optical sorting, with no metallic residue left in the recycled material.

COTREP is therefore seeking to identify key parameters for improving the recyclability of these labels and defining detailed rules on aluminised label design predating any impact on recycling.

For more information: COTREP FT 13
### Recyclability Profile
#### Dark PET

#### Guidelines

**BODY**
- **COLORANTS**
  - All colours except red (maroon, prada)
  - Dark colourful with carbon black
- **BARRIERS**
  - PE multi-layer, other resins
  - Blends
- **ADDITIVES**
  - Gas, blowing agents and loads that result in $d > 1$ when combined with PET

**Forthcoming Studies**
- **Impact of washable and high bleed inks**
- **Maximum levels of PE in PET**
- **Optical recognition of PETG**

**Design**
- **Labels**
  - PE, PP, PET
  - Not washable on separable materials
  - Non-toxic (aqueous, plant-based, etc.)
  - Highly coloured with a high level of bleed
  - Metallic inks and other residual inks
  - Ink bonding agents and overlacquers

**In order to maximise the recyclability of your packaging body...**
- Some colours should be avoided so that recycling outlets are not limited. For example, colours derived from red should not be used for bottle and strapping applications. Otherwise, only the "fibre" outlet is compatible. See COTREP General Notice no. 33 for further details.

#### Closure System
- **Caps**
  - PE, PP-based (single or multiple materials of $d < 1$)
- **Seals**
  - Non-piercible plastic/aluminium blends that are fully detachable for use *

**Other Components**
- **Valves, Pumps, etc.**
- PE, PE
- Other materials (silicone, EVA, etc.)

**In order to recognise the primary material**
- Opaque PET, which can be found in large volumes in dark PET bottles ($> 10\%$ - see COTREP Notice), can affect equipment and the quality of recycled fibre, which is the main outlet of dark PET. COTREP is currently seeking to develop new recycling outlets for opaque PET with a view to deciding what should be done with end-of-life opaque PET. Consequently, COTREP recommends only using this material for products that require a UV barrier.

#### Recyclability Profile

#### Dark PET

**1. Using a material that will be sorted and directed towards a recycling stream**
- Combining features and recyclability

**2. Providing the material with certain mechanical properties while ensuring it can be sorted and recycled**
- Combining marketing, communication and recyclability

**3. A recyclable dark PET delicatessen tray**
- With a strategy resolutely focused on developing single-material packaging, Faerch Plast has carried out work on developing C-PET, a type of PET that can be recycled in the dark PET stream and which exhibits properties that are comparable to those of non-recyclable material blends.

For more information: COTREP AG 54

**4. An expanded PET suitable for sleeving and recycling of bottles**
- Sleeves covering over 70% of a bottle’s body are generally made of PVC or PETG, two materials that have a negative impact on sorting (PET is difficult to recognise) and recycling (PVC and PETG affect equipment and recycled output quality).

Low-density PET sleeves are developed to ensure that these sleeves are separated from the rest of the PET packaging during the flotation stage without hindering recognition of the primary material.

**Expanding PET suitable for sleeving and recycling of bottles**

**4. Glues and label materials that are more compatible with the recycling process**
- Sorting technologies have been developed ensuring that PE or PP labels that partially cover packaging items do not hinder recognition of the packaging body material, even if this is PET. Moreover, due to their density, recycling operators can easily separate these labels from PET by flotation. When using these conditions, it is also possible to apply controlled quantities of glues that are washable under recycling operators’ normal industrial conditions, which means they are compatible with the recycling process.

For more information: COTREP AG 12

---

**They’ve done it!**

A ‘They’ve done it!’ feature is provided for recommendations with an * symbol.

- **Coating (OxO, CoO, ALOx)**
- **PET and PTA barriers**
- **Oxygen scavengers**
**RECYCLABILITY PROFILE**

**PP**

**GUIDELINES**

**IF YOUR PACKAGING INCLUDES AN EVOH-TYPE BARRIER...**
- It can still be recycled in the PP stream given the volumes currently marketed. However, if volumes of packaging containing EVOH were to increase significantly (EVOH levels > 5% of the PP stream), it would no longer be possible to include these types of packaging in the relevant stream.

**RECYCLABILITY PROFILE**

**PP**

**THEY’VE DONE IT!**

1. **A PP TRAY FORMULATED FOR MODIFIED ATMOSPHERES THAT IS ALSO RECYCLABLE**
   - The Kapseal® formulation was specially developed by Knauf Industries for packaging meat products under a modified atmosphere. Knauf is therefore offering a PP solution that can be recycled in the existing stream while meeting product preservation requirements in this sector.

2. **A NEW INFRARED-DETECTABLE BLACK COLOURING SOLUTION ENSURING TRAY OPACITY**
   - As part of the second ‘Improving Recyclability’ call for proposals backed by Eco-Emballages, Fleury-Michon and manufacturer Europlastiques have joined forces to develop black PP trays that are identifiable in sorting centres by infrared optical equipment.

   One of the project’s aims was to ensure that the finish remained unchanged, especially in terms of opacity. In view of the initial encouraging results, a marketable solution should be available in 2017.

3. **A LABELLING SOLUTION THAT IS GLUE-FREE AND THEREFORE HAS NO IMPACT ON PROCESS WATERS**
   - These days, many manufacturers offer different shaped pots using IML (In Mould Labelling). This process consists of adding labels to a mould prior to injection or thermoforming, and therefore bonding them without using glue or adhesives. Since this solution generally combines a PP label and body, it facilitates recycling of packaging.

**FORTHCOMING STUDIES...**

- Behaviour of dark PP trays that are identifiable using near infrared technology

**DESIGN**

**LABELS**
- PE, PP, OPP, PET and PS (d > 1)
- N.B. If material other than PE, PP, OPP, coverage (% surf.): - Volumes > 500 ml: % surf. < 50% - Volumes < 500 ml: % surf. < 70%
- PVC
- PS (d < 1)
- PETG

A “They’ve done it!” feature is provided for recommendations with a * symbol

**INK**
- Non-washable (whether applied to the body, label or IML)
- Non-toxic (aqueous, plant-based, etc.)

**GLUE**
- Washable and residue-free*
- Non-toxic (aqueous, plant-based, etc.)
- Non-washable in alkaline solution at 60-80°C
- Acrylic
- Urethane/urea or polyurethane

**COLORANTS**
- All colours (excluding carbon black)

**BARRIERS**
- Coating (SiOx, COx, AlOx)
- EVOH multilayer
- Oxygen scavengers
- Carbon black as an internal layer

**ADDITIVES** (BLENDING AGENTS, OPACIFIERS, ADDITIVE LOADS, ETC.)
- Gas, blowing agents and loads that result in d < 1 when combined with PP*

**CLOSURE SYSTEM**

**CAPS**
- PE, PP-based (single or multiple materials of d < 1)

**SEALS**
- PE, PP, OPP-based (single or multiple materials of d > 1)
- Plastic/aluminium blends that are fully detached for use

**OTHER COMPONENTS** (VALVES, PUMPS, ETC.)
- PE, PP, PS of d > 1
- Other materials (silicone, EVA, etc.)

**IF YOUR BOTTLE DISPENSES ITS CONTENTS USING A PUMP...**
- Solutions are now available that use airless pouches rather than internal metal springs. These 100% plastic solutions are fully compatible with PP recycling since the associated materials are generally LDPE, PP, EVOH, POM or EVA and are used in very small quantities.

See COTREP notices ELIPSO-09-03 and ELIPSO-12-05 for further information

**CAPS**
- PE, PP, OPP-based (single or multiple materials of d < 1)

**SEALS**
- PE, PP, PS of d > 1
- Other materials (silicone, EVA, etc.)

**IF YOUR PACKAGING INCLUDES AN EVOH-TYPE BARRIER...**
- It can still be recycled in the PP stream given the volumes currently marketed. However, if volumes of packaging containing EVOH were to increase significantly (EVOH levels > 5% of the PP stream), it would no longer be possible to include these types of packaging in the relevant stream.

See COTREP AG 53 for further details

**LABELS INK GLUE**
- PE, PP, OPP*, PET and PS (d > 1)

N.B. If material other than PE, PP, OPP, coverage (% surf.):
- Volumes > 500 mL: % surf. < 50%
- Volumes < 500 mL: % surf. < 70%

- Non-washable (whether applied to the body, label or IML)
- Non-toxic (aqueous, plant-based, etc.)

- Washable and residue-free*
- Non-toxic (aqueous, plant-based, etc.)

- PVC
- PS (d < 1)
- PETG

- Highly coloured with a high level of bleed
- Metallic inks and other residual inks
- Ink bonding agents and overlacquers

- Non-washable in alkaline solution at 60-80°C
- Acrylic
- Urethane/urea or polyurethane

**CAPS**
- PE, PP-based (single or multiple materials of d < 1)

**SEALS**
- PE, PP, OPP-based (single or multiple materials of d > 1)
- Plastic/aluminium blends that are fully detached for use

- Metal
- Metal

**Metal**
- Glass, paper and cardboard items
- PS of d < 1

**Using a material that will be sorted and directed towards a recycling stream**

**Combining features and recyclability**

**Providing the material with certain mechanical properties while ensuring it can be sorted and recycled**

**Combining marketing, communication and recyclability**

1. Dark colours with carbon black*
2. Aluminium barriers
3. Multiple layers of other resins
4. Additive loads and other agents that result in density > 1 when combined with PP