



# Monitoring the quality of MATERIALS

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Quality Observatory Report – 2023

**CITEO**

Donnons ensemble une  
nouvelle vie à nos produits.

# Editorial



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Head of Recycling at Citeo

Whereas 2022 witnessed record highs in demand for materials and in buy-up prices, 2023 marked a turning point, with demand falling across the board for recycled materials (except for glass). The unfavourable economic climate (inflation) combined with the outbreak of international crises (China's PET dumping policy, tensions in the Red Sea, the Israeli-Palestinian conflict) contributed to jittery markets and a wait-and-see policy.

Against this backdrop, and to guarantee long-term material circularity, we need to ensure that end recyclers have access to a supply of sorted materials that consistently meets the level of quality set out in material standards.

Of the progress made in 2023, it is worth highlighting that citizens throughout metropolitan France now have the option of sorting all their packaging waste. With the modernisation of sorting centres across France and the development of recycling streams, all kinds of previously incompatible packaging waste can now be placed in the yellow lid sorting bin (pots, trays and flexible plastics).

This is great news for collection performance levels; however, it has created new challenges in terms of handling flows when they reach sorting centres. To measure the extent to which the quality of sorted materials meets material standards, Citeo carries out an annual material characterisation campaign throughout France. The resulting report provides an overview of the quality and characteristics of all the streams, as well as insights into the operational situation prior to recycling.

# Contents

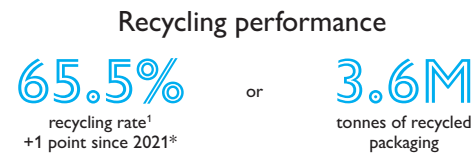
<b>Recycling: a new calculation method and sorting made simpler</b>	<b>4</b>
<b>Citeo Quality Observatory Report</b>	<b>8</b>
<b>Material profiles</b>	<b>11</b>
<b>Appendices</b>	<b>39</b>
<b>Glossary</b>	<b>46</b>

# 1 Recycling: a new calculation method and sorting made simpler

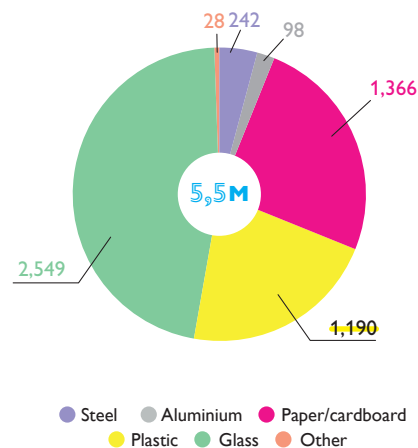
The recycling rate fell from 2021 to 2022, due to a new method for calculating recycling rates introduced by the European Union to harmonise declarations across all member states. The calculation is now based on the quantities actually recycled rather than those accepted by recyclers at process input, as was previously the case. The result has been an automatic reduction in recycling rates.

## Key figures for 2022

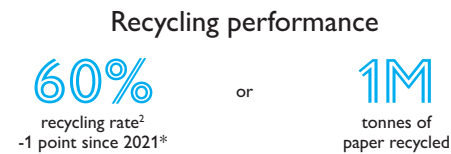
### HOUSEHOLD PACKAGING



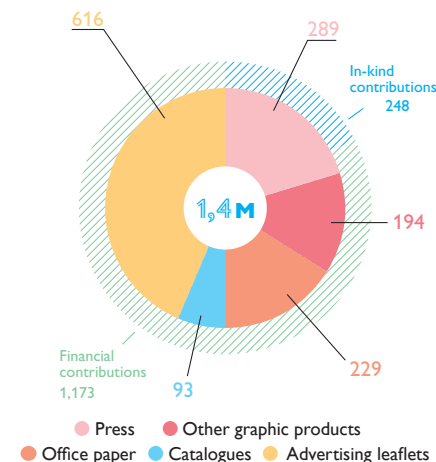
Household packaging tonnage that contributes to financing the sector  
(in thousands of tonnes – rounded figures)



### GRAPHIC PAPER



Graphic paper tonnage that contributes to financing the sector  
(in thousands of tonnes – rounded figures)



To find out more about our impact, visit our website:  
[https://notre-impact.citeo.com/240209\\_FicheA5\\_Chiffres\\_cles\\_2022\\_WEB.pdf](https://notre-impact.citeo.com/240209_FicheA5_Chiffres_cles_2022_WEB.pdf)

1. Figures obtained using the harmonised method for calculating recycling rates, which was introduced by the European Union in 2022. This calculation is based on the quantities actually recycled rather than those accepted by recyclers at process input, as was previously the case. The result has been an automatic reduction in recycling rates.  
2. Rate calculated according to the tonnage of paper placed on the market and collected by the public waste management service (1.7M tonnes).  
\* By applying the new calculation method to the 2021 recycling rate.

## Freshly implemented yet already decisive

It is the ONE thing that clarified sorting for the French. Rolled out mainly between 2016 and 2023, with awareness campaigns reaching almost the entire population, the sorting made simpler initiative\* swept away most doubts about which packaging (especially pots, trays and plastic films) should be disposed of in the sorting bin.

⇒ The outcome: a 2.5-point increase in recycling rates over the last ten years, with a big impact on plastics and a knock-on effect on other materials. This momentum has been witnessed throughout France. The plastic recycling

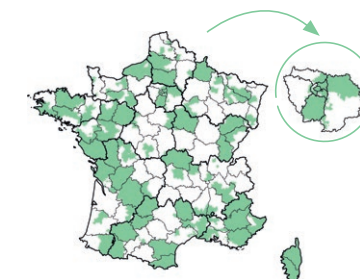
performance level attained by local authorities implementing the sorting made simpler initiative was 6.4 kg/inhabitant/year. For other types of packaging, performance levels rose sharply at the outset. These same local authorities witnessed a reduction of 7 kg/inhabitant/year in the amount of packaging and papers found in residual household waste (RHW).

On the 1 of January 2023, the initiative had been rolled out to over 98% of France. The rolled out will end in 2026.

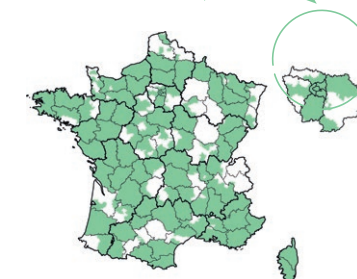
## Step-by-step rollout of the “sorting made simpler” initiative

Information available on 1 January 2023: 98% of the population in mainland France.

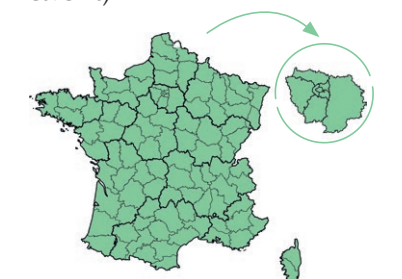
**Extended sorting instructions rolled out to cover 50% of the population**  
Situation in January 2020



**Extended sorting instructions rolled out to cover 75% of the population**  
Situation in October 2022

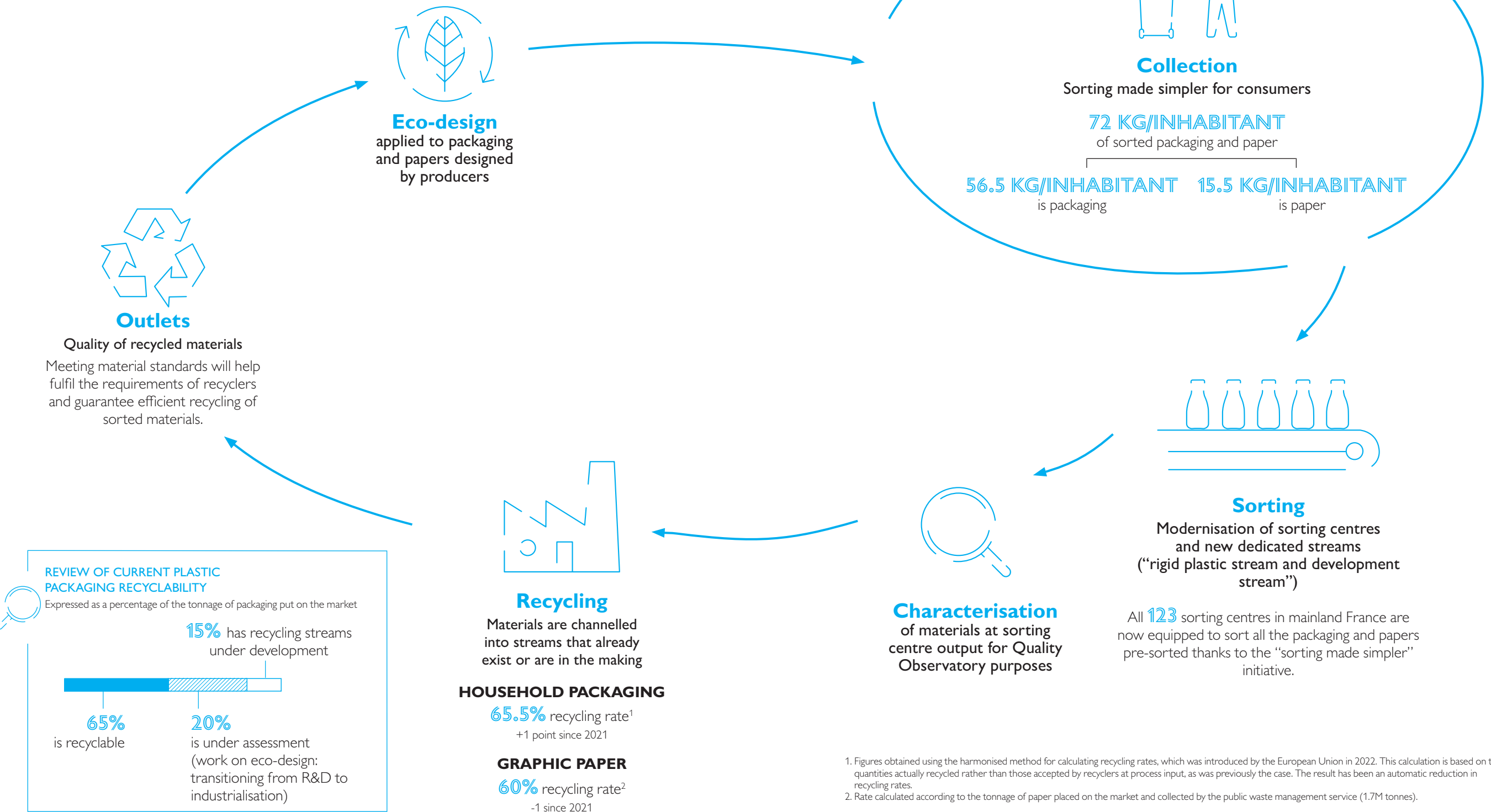


**Extended sorting instructions rolled out to cover 98% of the population**  
Situation in January 2023 (regulatory deadline)



● Area covered by extended sorting instructions

# The main recycling stages in France



1. Figures obtained using the harmonised method for calculating recycling rates, which was introduced by the European Union in 2022. This calculation is based on the quantities actually recycled rather than those accepted by recyclers at process input, as was previously the case. The result has been an automatic reduction in recycling rates.  
2. Rate calculated according to the tonnage of paper placed on the market and collected by the public waste management service (1.7M tonnes).

# 2 Citeo's Quality Observatory

Citeo's Quality Observatory provides an annual update on the quality of materials sorted by household packaging waste sorting centres in France. In preparation, Citeo performs **characterisation\*** analyses all year round throughout France. The analyses make sure that **material standards\*** are met, as the latter are used as a basis for the quality criteria drawn up for the various materials exiting the sorting centre. They ensure that the materials channelled towards recycling are suitable for the recycling process.

## Citeo's Quality Observatory Report: a key reference document

To carry out the analyses, Citeo calls on specialised external consultancy firms, selected every two years through a tendering process. For the 2023 campaign, the successful applicants were V2R, Austral, Atlance, and Terra.

Sorting centres and recyclers are selected to ensure results are representative of national production, based on geographic area, whether the facilities have been modernised, and tonnages produced per sorting centre.

The data gathered by the Quality Observatory are presented to all the stakeholders through consultation committees. They are the only reference data available covering all of France.

Complying with standards is crucial for ensuring that the recycling system operates smoothly from a technical, financial and environmental perspective, as it guarantees:

### 1 The efficiency of the industrial packaging and paper recycling system.

The quality of secondary raw materials needs to be compatible with the separation methods and technology available at sorting facilities, as well as the input capacity of end recycler processes. A lack of compatibility could result in a "sub-standard" material, leading to additional management costs for recyclers, or inversely, an "above standard" material, generating much higher sorting costs.

### 2 The system is economically viable.

The rate of contribution paid to Citeo by its clients is calculated precisely, according to the needs and costs to be covered.

### 3 The fairness of the system on a national scale.

Complying with standards means that the funds reserved for local authorities are fairly allocated to prevent the forwarding of materials that do not meet the quality requirements of recyclers.

## OUTCOME OF THE 2023 CAMPAIGN



### ALL MATERIALS

The quality is stable or slightly lower, depending on the material.



### METALS

Steel: approximately 10% of the analyses showed full compliance with the standard and 30% almost full compliance.



Aluminium: almost all the analyses showed compliance with the standard.



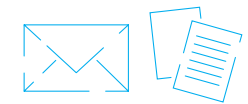
### PAPER/CARDBOARD

The quality is lower (-1.5 pts) except for laminated paper/cardboard (+1.5 pts).



### GRAPHIC PAPER

The average quality is lower (-2 pts).



### PLASTICS

The quality is stable and close to the required standards overall.



### GLASS

According to glass processors, the proportion of "poor" quality glass in streams is relatively low and stable (2%).



\* See glossary.





# Material profiles

Steel	12
Rigid aluminium	14
Small aluminium items and aluminium foil	16
Graphic papers requiring de-inking	18
Sorted mixed paper and cardboard	20
Non-laminated paper and cardboard	22
Laminated paper and cardboard	28
Clear PET (mixed and rigid plastic stream)	28
Dark PET	30
PE/PP/PS	31
PE/PP films – PE films	32
Development stream	34
Rigid plastic stream	35
Glass	36

In light of the low number of analyses performed against certain standards (mixed paper and cardboard to be sorted, plastic sorted by resin), the findings were not representative enough and therefore not robust enough to be shared.

# STEEL

Steel packaging is sorted magnetically using an **overband magnet\***. The overband magnet is installed above a conveyor belt transporting waste materials. Thanks to a magnetic field, it attracts ferrous metals (mainly steel) and sends them towards a collection bin.



## What the standard says

- A steel packaging content of at least **95%** for bundles\*, i.e. a minimum magnetic metal content of **88%**
- A maximum moisture content of **5%**



The ferrous incineration clinker recovery improvement project (AMFI) launched through a call for proposals in 2023 seeks to improve the recovery of fine fractions of less than 10 mm for steel recycling.

The goal of the project is to:

- Increase recycling rates
- Produce additional tonnes of recycled metals to reduce the extraction of primary raw materials
- Help lower steel production carbon emissions by incorporating more recycled material

## What is the recycled material used for?

Building materials, automotive parts, household appliances, packaging, etc.



\* See glossary.

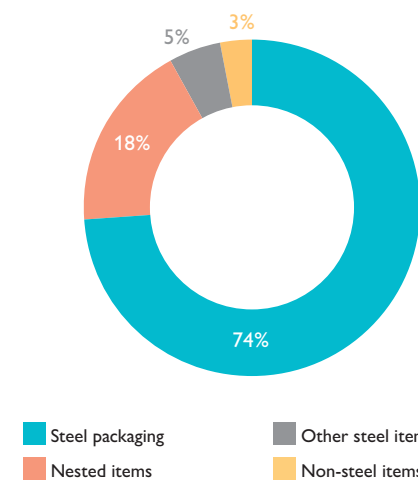
Average steel packaging content<sup>1</sup> of:

**87.9%**

**-2.5%** since 2022

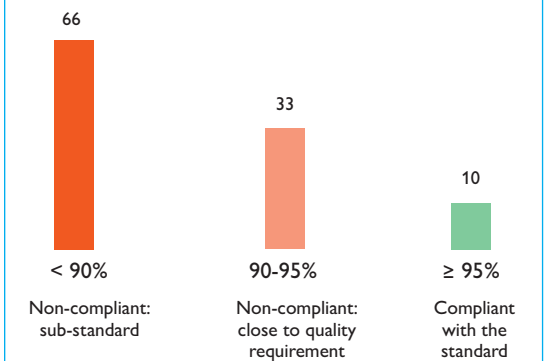
Content specified in the standard: **95%**

## Overall composition

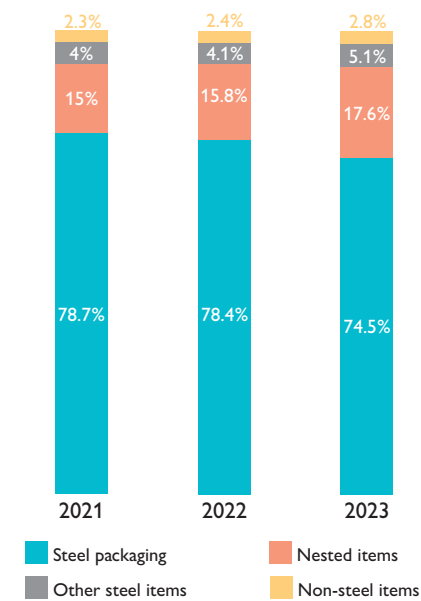


## Compliance findings

(in number of analyses)



## Changes since 2021



<sup>1</sup> As a general rule: the steel packaging content for nested items is 76%

Data generated based on 109 analyses performed against the steel standard in 2023.



# RIGID ALUMINIUM

All the sorting centres in France are equipped with machines for separating ferrous metals (steel mainly). Depending on how advanced sorting centres are, non-ferrous metals such as aluminium are then separated in one of two ways:

- **Manually\*** by a sorting operator
- **Mechanically\*** by an **eddy current separator\*** (ECS), enabling aluminium packaging to be automatically sorted. The ECS propels aluminium and other non-ferrous metals forward into a specific bin thanks to an electromagnetic field.



## What the standard says

- An aluminium packaging content of at least **65%** for bales\*, i.e. a minimum aluminium content of **45%** and a maximum polymer content of **5%**
- Maximum moisture content of **10%**

## What is the recycled material used for?

Bike frames, window frames, engine housings, etc.



\* See glossary.

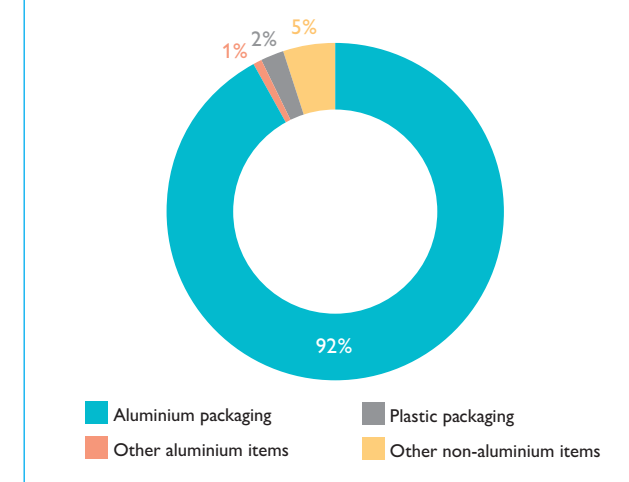
Average aluminium packaging content of:

**91.6%**

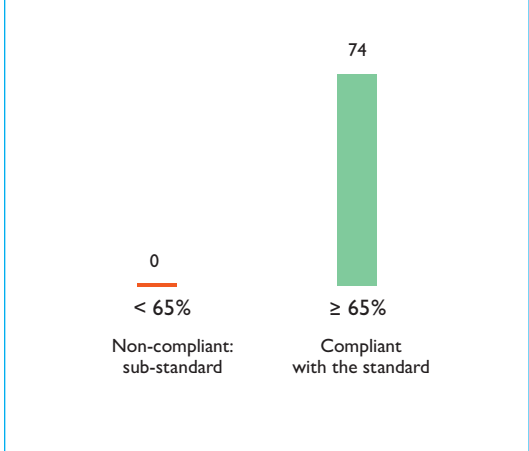
+1% since 2022

Content specified in the standard: **65%**

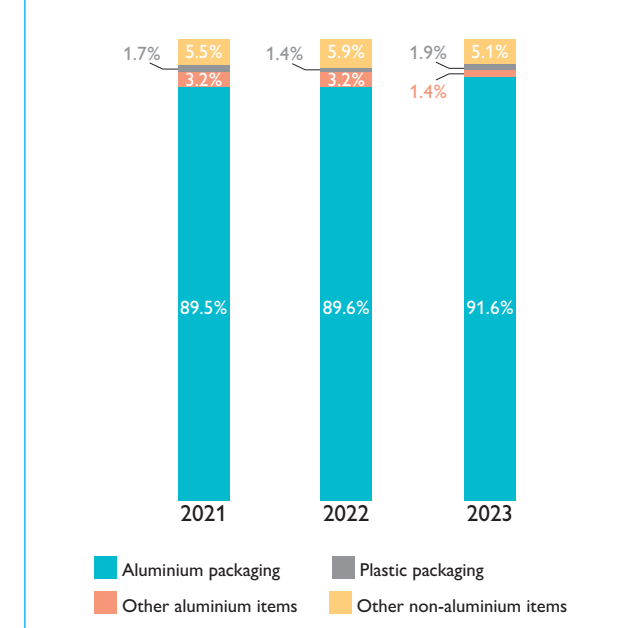
## Overall composition



## Compliance findings (in number of analyses)



## Changes since 2021



Data generated based on 74 analyses performed against the rigid aluminium standard in 2023.



# SMALL ALUMINIUM ITEMS AND ALUMINIUM FOIL

As with other aluminium packaging, small-sized aluminium items and aluminium foil are separated from other small waste items using an eddy current separator. Added to the list of standards in 2019, fifty sorting centres are now equipped and the number is growing year on year. The tonnage is also increasing.

## FOCUS Recycling via pyrolysis

The PRE-pyrolyse project launched through a call for proposals in 2023, is exploring the possibility of adding a grinding and separation stage to recycle aluminium packaging items, especially the smallest-sized ones, which are currently processed via pyrolysis. The goal is to reduce the amount of aluminium sent to pyrolysis plants by offering an alternative solution. Pyrolysis, which currently takes place at one of two plants located in France and Germany, actually requires more energy and includes more processing stages than the traditional grinding and separation approach. The benefits of mechanical processing include better material recovery, taking the pressure of pyrolysis plants, and reducing the need to transport the aluminium sorted in France by recycling it in facilities located in France.

### What is the recycled material used for?

Bike frames, garden lamps, window frames, engine housings, new aluminium packaging, etc.

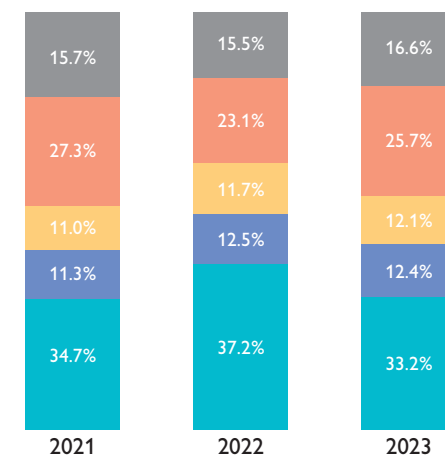


### Aluminium content

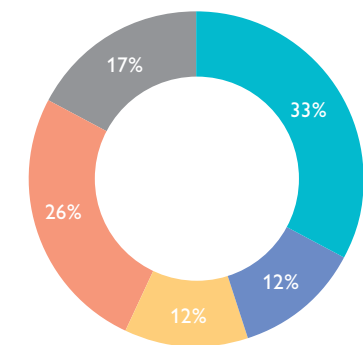
A conversion rule does not yet exist to calculate aluminium content based on a given rate of aluminium foil. Consequently, the findings are presented here for information only and do not allow us to predict the quality of the small-sized aluminium packaging stream. Only end recyclers are able to calculate the aluminium output rate at pyrolysis based on material balance.



### Changes since 2021



### Overall composition



Data generated based on 63 analyses performed against the small-sized aluminium items and aluminium foil standard in 2023.

# GRAPHIC PAPERS REQUIRING DE-INKING

Graphic papers are papers used for press publications and printed papers. They belong to the graphic paper stream, which is different from the household packaging stream and has its own specifications. Graphic papers that require de-inking mainly consist of newspapers and magazines. They can be separated manually or via **optical sorting\*** machines.



## What the standard says

- A graphic paper content of at least **97%** and a maximum content of materials other than graphic papers (non-fibrous materials and unwanted fibres; non de-inkable recyclable fibres) of **3%**, including a non-fibrous material content of **1.5%**
- Maximum moisture content of **10%**



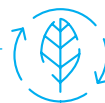
R&D

## Improvement of sorting by type of fibre

The Triscell project, launched in partnership with Pellenc ST and the Pulp and Paper Research & Technical Centre (CTP) in 2021, which ended in 2023 led to a new optical sorting method which improves the efficiency and purity of the paper stream by 10 to 12 percent. The method appears to be viable and robust, and began to be included in industrial processes while the project was ongoing.

## What is the recycled material used for?

Newspapers and magazines, office paper, etc.



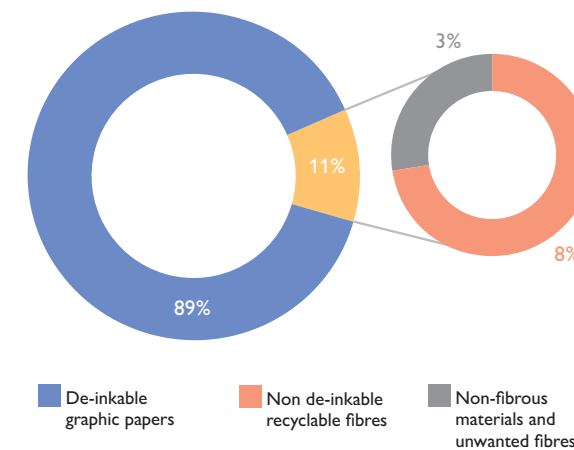
Graphic papers requiring de-inking – average content:

**89.3%**

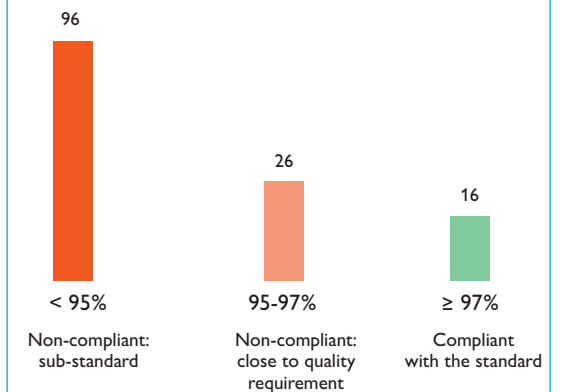
-1.9% since 2022

Content specified in the standard: **97%**

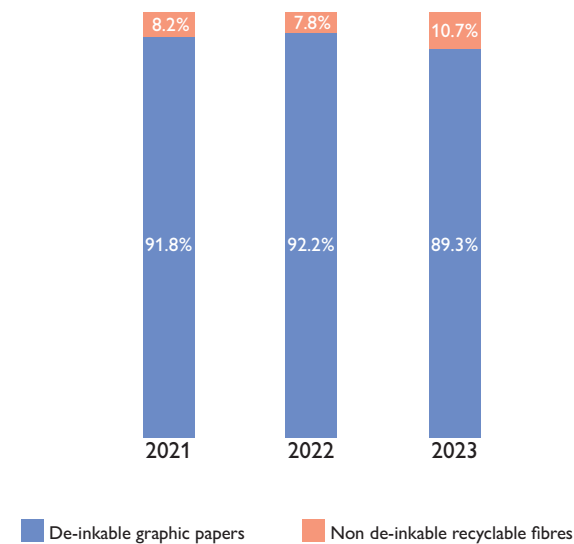
## Overall composition



## Compliance findings (in number of analyses)



## Changes since 2021



Data generated based on 138 analyses performed against the graphic papers requiring de-inking standard in 2023.



# SORTED MIXED PAPER AND CARDBOARD

The standard for sorted mixed paper and cardboard includes a range of different papers and cardboards that are sorted manually or separated thanks to **optical sorting\*** equipment. If a stream sorted to meet the de-inkable standard does not fulfil the required quality criteria, it can be re-classified as sorted mixed paper and cardboard and still benefit from Citeo's support. However, a stream cannot be re-classified if it does not meet the standard for sorted mixed paper and cardboard.

## What the standard says

- Paper/cardboard and graphic paper content of at least **97.5%** and a maximum content of non-fibrous materials and unwanted fibre of **2.5%**
- Maximum moisture content of **10%**

## What is the recycled material used for?

New paper/cardboard packaging.



\* See glossary.

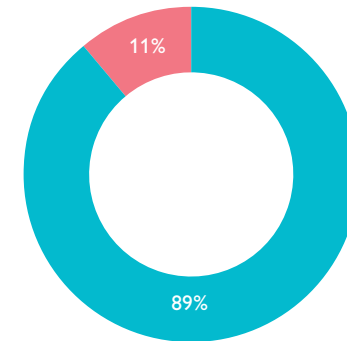
Sorted mixed paper/cardboard content:

**89.1%**

-2.1% since 2022

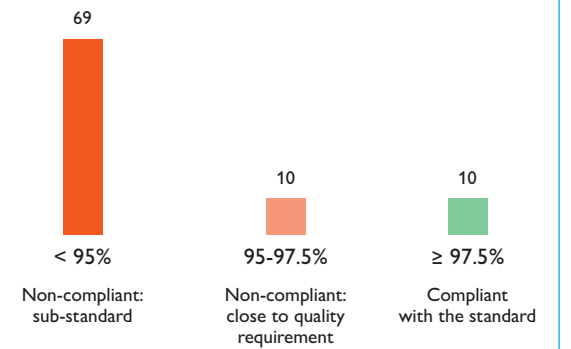
Content specified in the standard: **97.5%**

## Overall composition

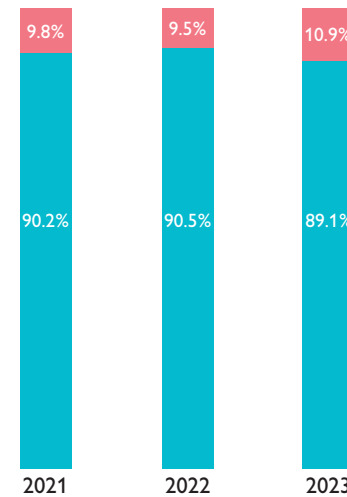


■ Mixed paper/cardboard ■ Non-fibrous materials and unwanted fibres

## Compliance findings (in number of analyses)



## Changes since 2021



■ Mixed paper/cardboard ■ Non-fibrous materials and unwanted fibres



Data generated based on 89 analyses performed against the sorted mixed paper and cardboard standard in 2023.

# NON-LAMINATED PAPER/CARDBOARD

Paper/cardboard packaging is sorted mechanically or manually. An increasing number of sorting centres are equipped with optical sorting machines, which still require considerable manual checks at output.

## The material standard:

- A non-laminated paper/cardboard content of at least **95%** for bales
- In the event of a second stream, a corrugated cardboard content of at least **95%**
- Maximum moisture content of **12%**



**FOCUS**  
A thriving market

To boost the economic and industrial independence of Europe, new industrial plants have been set up in France and other European countries, leading to positive short-term impacts, but also fears that the market may become saturated over time.

## What is the recycled material used for?

Shipping and packing boxes, shoe boxes, etc.



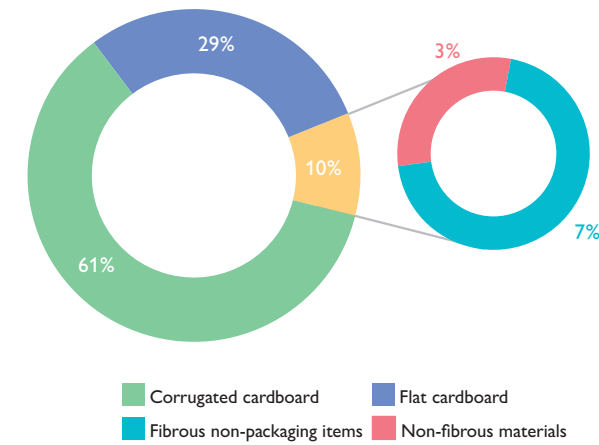
Average non-laminated paper/cardboard content:

**90.7%**

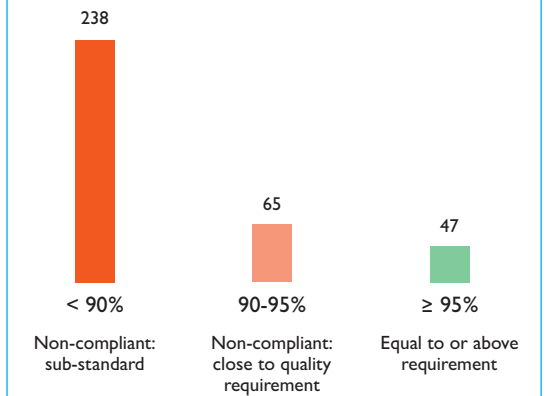
-1.6% since 2022

Content specified in the standard: **95%**

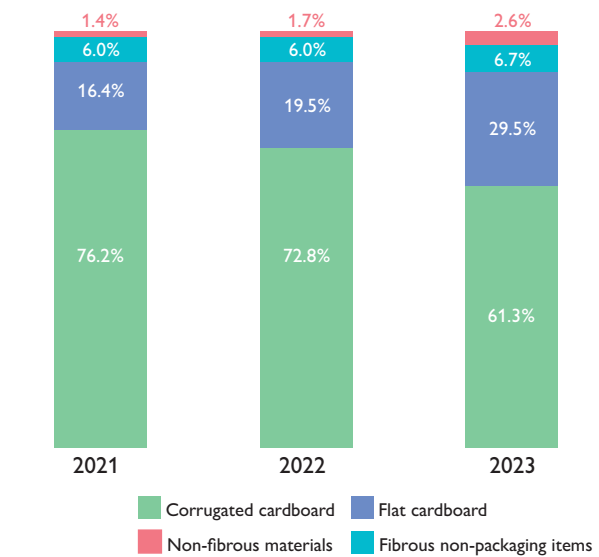
## Overall composition



## Compliance findings (in number of analyses)



## Changes since 2021



Data generated based on 350 analyses performed against the non-laminated paper/cardboard standard in 2023.



# LAMINATED PAPER/CARDBOARD

Laminated paper/cardboard is paper or cardboard which is made up of three layers (polyethylene, paper and aluminium foil) tightly held together by a binder, or for which the total mass of non-fibrous materials exceeds a certain threshold. Mostly made up of liquid packaging board (LPB), but also including other laminated packaging, the laminated paper/cardboard stream is mainly sorted using optical sorting technology, and very rarely by hand.



## The material standard:

- A laminated paper/cardboard content of at least **95%** for bales
- Maximum moisture content of **12%**

## What is the recycled material used for?

Toilet paper, paper towels.



Average laminated paper/cardboard content:

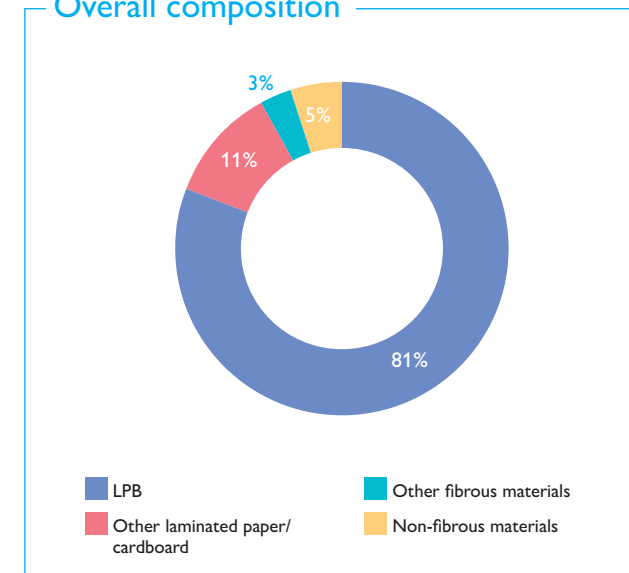
**92%**

+1.5% since 2022

Content specified in the standard: **95%**

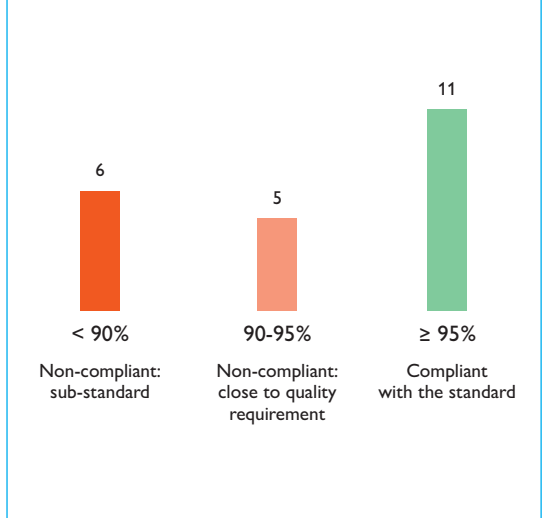


## Overall composition

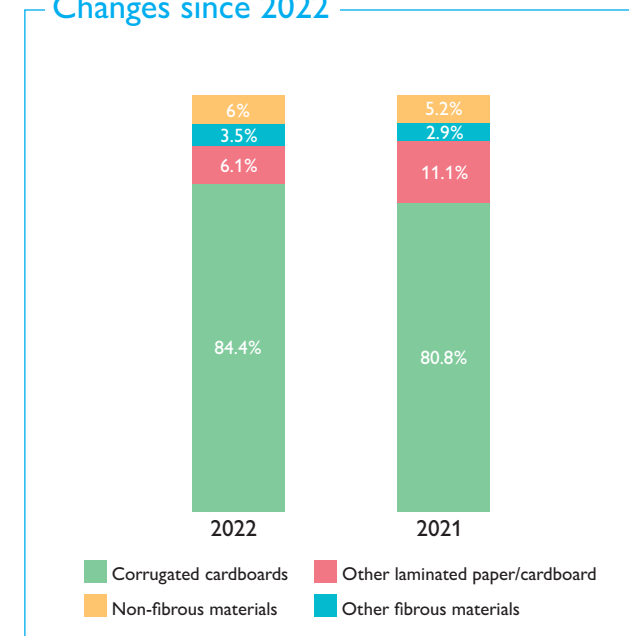


## Compliance findings

(in number of analyses)



## Changes since 2022



Data generated based on 22 analyses performed against the laminated paper/cardboard standard in 2023.

# PLASTIC

## OUTPUTS FROM SORTING CENTRES

In 2023, the final roll-out phase of the sorting made simpler initiative made sorting instructions the same almost everywhere in France. All sorting centres are now geared to sorting the different types of plastic packaging, including pots, trays and films. To make this possible, numerous sorting centres across France have been modernised. They are now equipped to receive and separate all plastic packaging and resins rather than bottles alone.



### Plastic standards

- **Clear PET**  
A clear or colourless PET bottle, pot and tray content of at least **98%**
- **Dark PET**  
A dark or coloured PET bottle, pot and tray content of at least **98%**  
Clear PET is also tolerated
- **PE/PP/PS or PE/PP**  
A rigid PE, PP, or PS household packaging content of at least **98%**, with a **95%** tolerance threshold (at least 95% for the HDPE and PP stream for sorting centres with rigid plastic stream)



### New standards

- **Development stream**  
A minimum content of **90%** for packaging that meets plastic standards where the simplified sorting instruction applies (more details in the corresponding material profile)
- **Rigid plastic stream**  
A minimum content of **95%**, with a **90%** tolerance threshold, for all types of packaging
- **PE films**  
A minimum PE film and bag content of at least **95%**
- **PE/PP films**  
A minimum content of **90%** for films and bags mainly made of polyolefins (PE and PP-based)

### What is the recycled material used for?

**PET:**  
clear plastic bottles, coloured plastic bottles, polyester fibre, etc.



**PE/PP/PS:**  
Bins, watering cans, pipes, flower pots, etc.



## CLEAR PET PLASTIC

Clear PET can be sorted in one of two ways, depending on the sorting centre:

- A stream with a mix of bottles and clear mono-PET trays
- A packaging stream in sorting centres with “rigid plastic stream” (see the stream-in-development profile below) that only contains clear PET bottles

In both cases, the clear PET packaging items are separated via optical sorting, then compacted into bales to be sent to recyclers.



### R&D Development of new PET sleeves

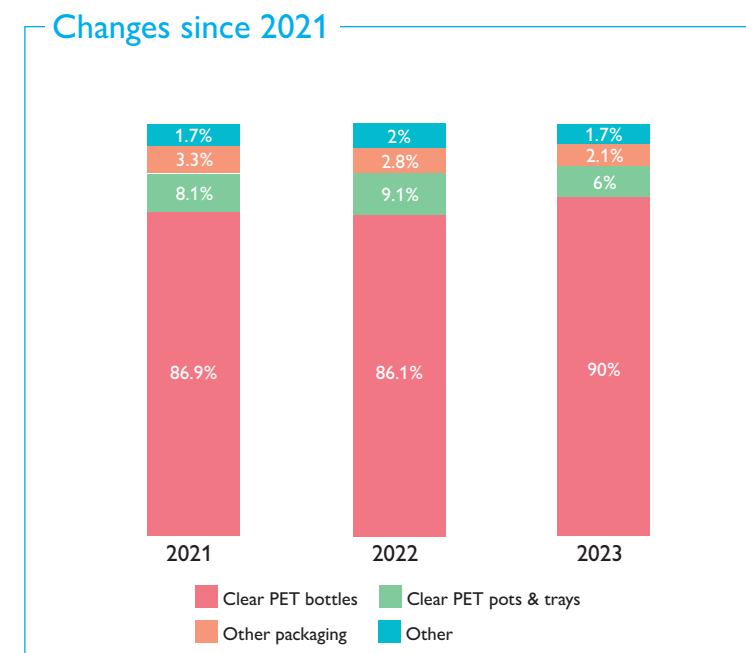
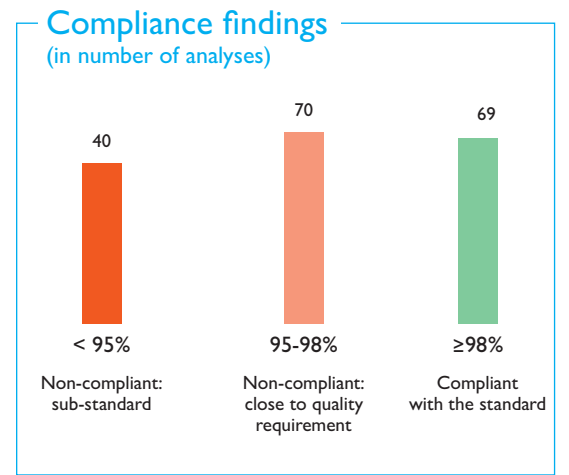
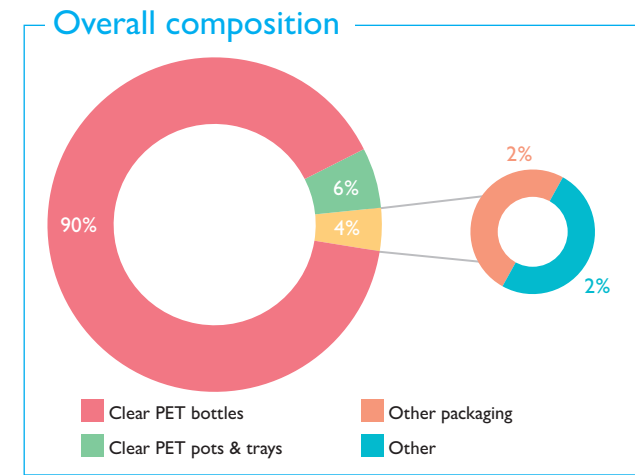
Full sleeves used on PET bottles currently cause several issues in terms of sorting and recycling such bottles. Some types of sleeves can disrupt the process of directing this packaging to the appropriate recycling streams. Moreover, some sleeves can adversely affect the quality of recycled PET produced. Two projects supported by Citeo in 2018 and 2022 tested the effectiveness of perforated sleeves and identified the criteria for their easy removal (size and spacing of perforations, position of the perforated lines, etc.). For now, the use of perforated lines to remove sleeves still falls slightly short of the mark, however, if well-designed, perforation certainly helps with sleeve removal and makes bottle recycling easier.

Average clear PET packaging content:

96%

+0.8% since 2022

Content specified in the standard: 98%



Data generated based on 179 analyses performed in 2023 against the standard applicable to the emerging clear PET stream.

## DARK PET PLASTIC

Average dark PET packaging content:

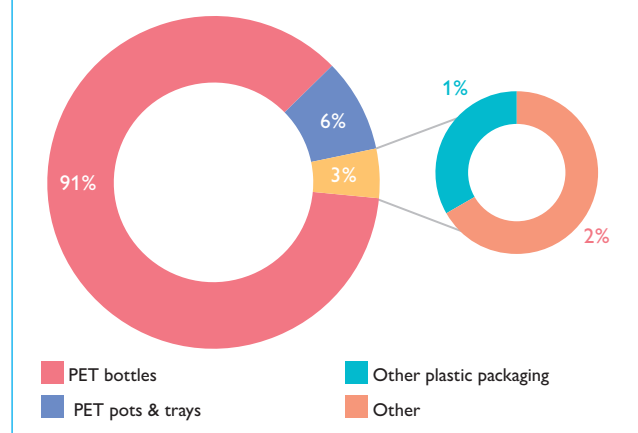
**96.9%**

-0.2% since 2022

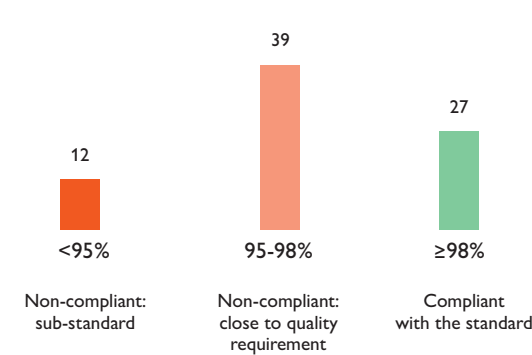
Content specified in the standard: **98%**



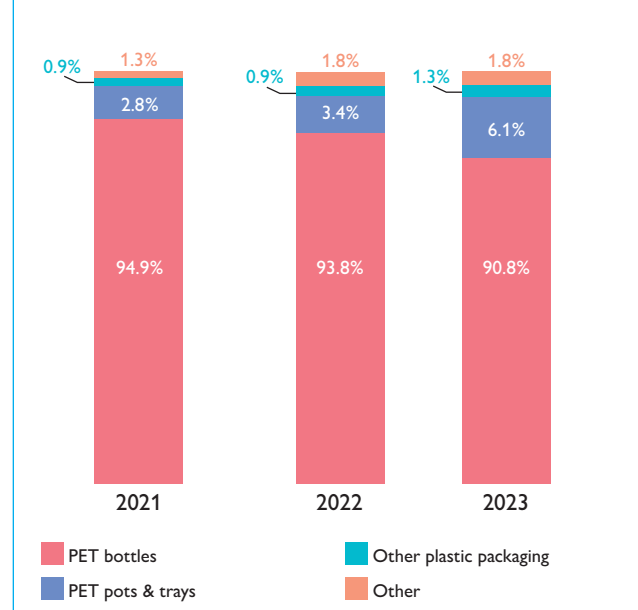
### Overall composition



### Compliance findings (in number of analyses)



### Changes since 2021



### FOCUS Recycled to food contact grade

In 2022, a call for proposals was issued to encourage the development of new recycling streams, including a stream for recycling coloured PET bottles to food contact grade by adding a decontamination stage to the mechanical recycling process. Three winners were selected based on specific technical and financial criteria: Paprec, Nord Pal Plast (Dentis Group) with Valorplast, and Suez.

Data generated based on 78 analyses performed against the dark PET standard in 2023.

## PE/PP/PS PLASTICS

Average PE/PP/PS packaging content:

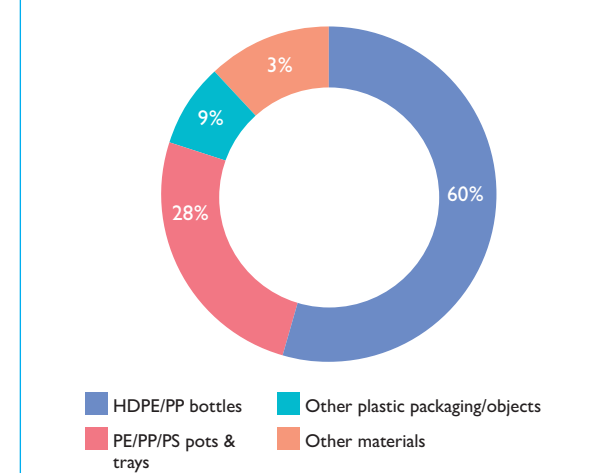
**88.1%**

-0.1% since 2022

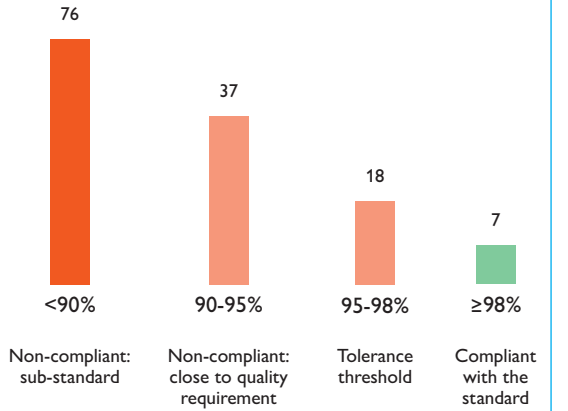
Content specified in the standard: **98%**



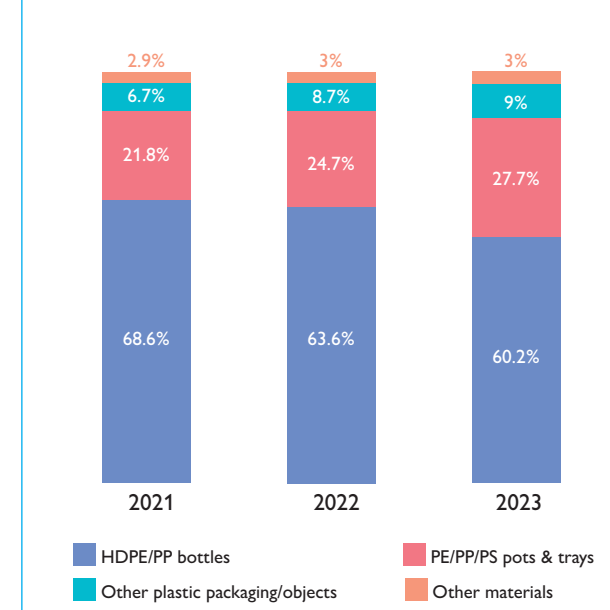
### Overall composition



### Compliance findings (in number of analyses)



### Changes since 2021



### FOCUS HDPE bottle recycling

Carried by a consortium of stakeholders operating across the value chain (Valorplast, Environnement Massif Central, Institut Professionnel du Lait de Consommation and TotalEnergies), the Circulait-PE project was launched following a call for projects, issued by Citeo in 2023, on improving recycling streams. This project is studying whether HDPE milk bottles (with PP tops) from selective collection and with secondary sorting can be recycled to food contact grade (100% of milk bottles). The goals are to compare two washing/decontamination and bottle/bottle top separation technologies, and work on the melt flow rate of post-consumer recycled resin (PCR) so that it is as similar to the virgin material as possible (achieve a content that includes at least 30% PCR). The idea is to recover as much material as possible and limit the environmental impact of producing virgin materials.

Data generated based on 138 analyses performed against the PE/PP/PS standard in 2023.



## PLASTIC PE/PP FILMS

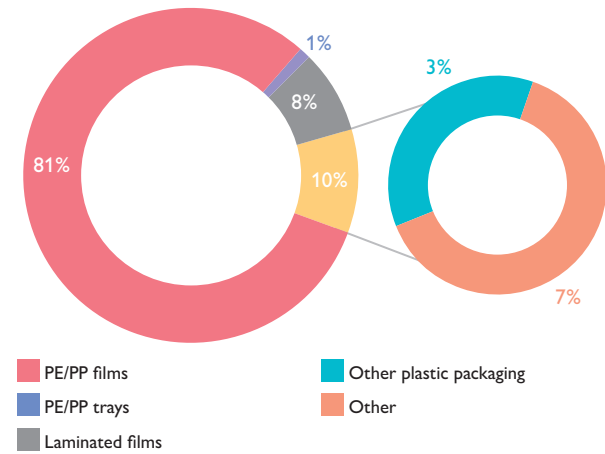
Average PE/PP film packaging content:

90.1%

Content specified in the standard: 90%

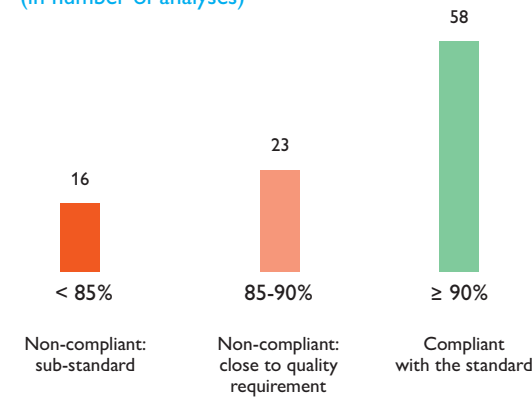


### Overall composition



### Compliance findings

(in number of analyses)



### FOCUS Recycling of PE/PP films

In 2024 and 2025, pyrolysis will be launched on an industrial scale to recycle PP films and some PE and laminated films. Pyrolysis consists of thermally breaking down plastic materials to obtain an oil that is used to produce new plastics of similar quality to fossil-based virgin plastics. This approach broadens the choice of outlets and means that recycled material can be used in packaging for food or sensitive products. In the case of laminated films containing PE and PP, a study is underway to better understand the factors influencing how they are sorted during optical sorting and, ultimately, which streams they will need to comply with in terms of eco-design.



Data generated based on 97 analyses performed against the PE/PP/PS standard in 2023.

## PLASTIC PE FILMS

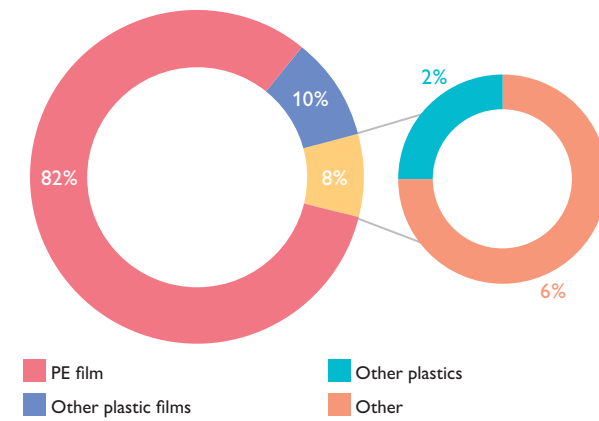
Average PE film packaging content:

82%

Content specified in the standard: 95%

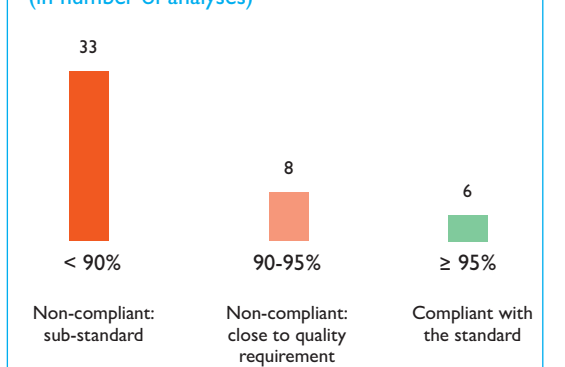


### Overall composition



### Compliance findings

(in number of analyses)



### What is the recycled material used for?

Plastic bags, bin bags, and construction pipes



### FOCUS Recycling of PE films

Mechanical recycling is the most popular/prevalent recovery process for PE films. It is essential to follow Cotrep guidelines to be compatible with this recycling process.

Data generated based on 47 analyses performed against the development stream standard in 2023.

## PLASTICS - DEVELOPMENT STREAM

Average rigid plastic stream packaging content:

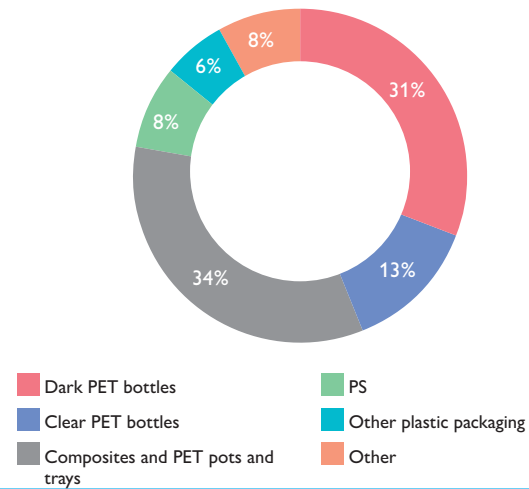
**92%**

+5.3% since 2022

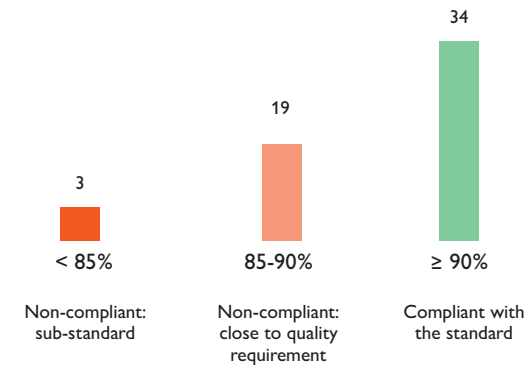
Content specified in the standard: **90%**



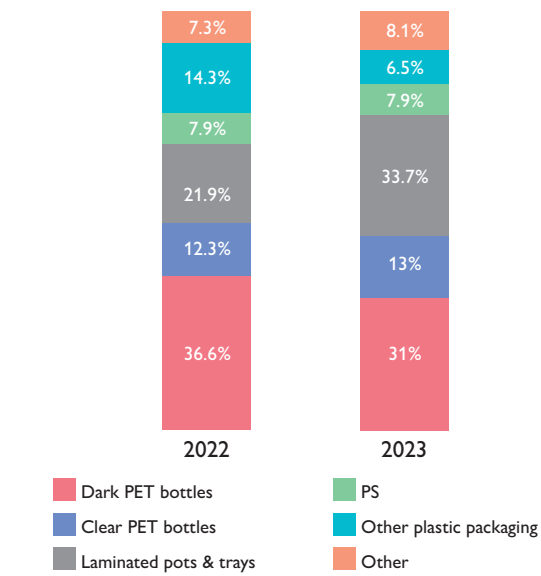
### Overall composition



### Compliance findings (in number of analyses)



### Changes since 2022



### FOCUS PS recycling

To develop and set up a durable PS recycling process and meet the recycling targets set by the Anti-Waste Law for a Circular Economy (AGEC Law) and the European Union, Citeo launched a call for proposals in 2022. Two winners were selected based on specific technical and financial criteria: Indaver, which will recycle PS to food contact grade thanks to pyrolysis, and Eslava, which will continue to develop existing outlets thanks to mechanical recycling processes.



Data generated based on 56 analyses performed against the development stream standard in 2023.

## RIGID PLASTIC STREAM

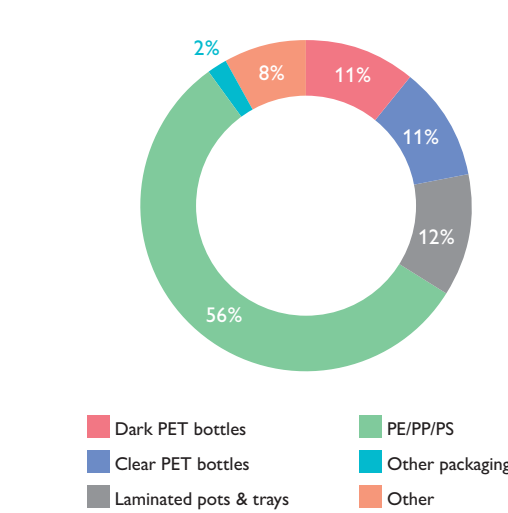
Average mixed plastic stream packaging content:

**92%**

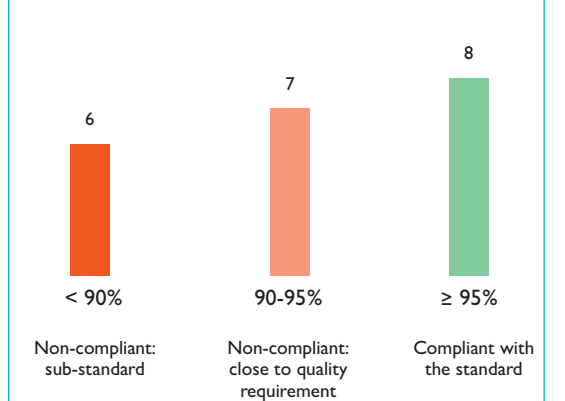
Content specified in the standard: **95%**



### Overall composition



### Compliance findings (in number of analyses)



### FOCUS Secondary sorting centre

Following the call for expressions of interest (CFI) launched in 2021 for projects on developing secondary sorting processes specific to the mixed plastics stream, three secondary sorting centres have now been approved. Two centres (Suez Épinal and Bourgogne Recyclage) were opened in 2023 providing a combined secondary sorting capacity of 52,000 tonnes per year. A third centre will be opened in 2024 (EMC 48) with a capacity of 15,000 tonnes per year. These secondary sorting capacities will not be enough process all the bought-up feedstock from the stream. A new CFI will therefore be launched in 2024 to boost capacities and improve the network of centres across the country.

Data generated based on 21 analyses performed against the rigid plastic stream standard in 2023.

# GLASS

Glass household packaging is collected separately and has a recycling process of its own. Most of the glass collected is taken to consolidation platforms, and then on to “treatment plants” which sort and prepare the glass. The process gets rid of most of the contaminants and grades the pieces of glass to produce **cullet\*** that is equivalent in quality to the raw material used in glass furnaces for manufacturing new glass packaging.



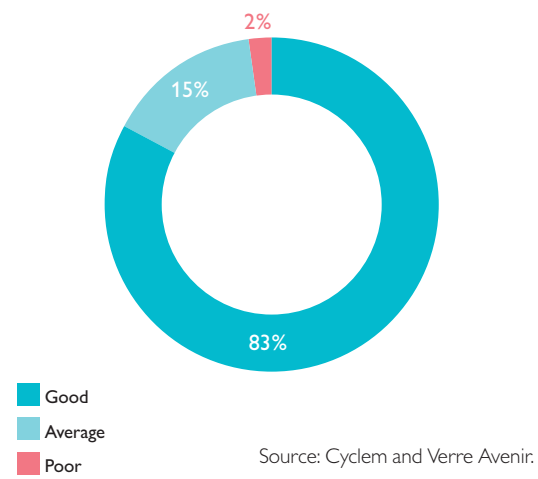
## What the standard says

A glass household packaging content of at least **98%**



In 2023, French glass manufacturers O-I and Veralia signed a partnership with Citeo to launch the production of the first reusable packaging units for the fast-moving consumer goods sector. It was the first step towards achieving the reused packaging target of 10% set for 2027 and boosting the circular economy for household packaging. The challenge is to set up a nationwide system and successfully scale up operations. The key factor is to produce standardised packaging that can be collected, washed and reused whatever the location across the country.

## Overall composition<sup>1</sup>



New glass packaging



1. See the glass recycling process in the appendix.



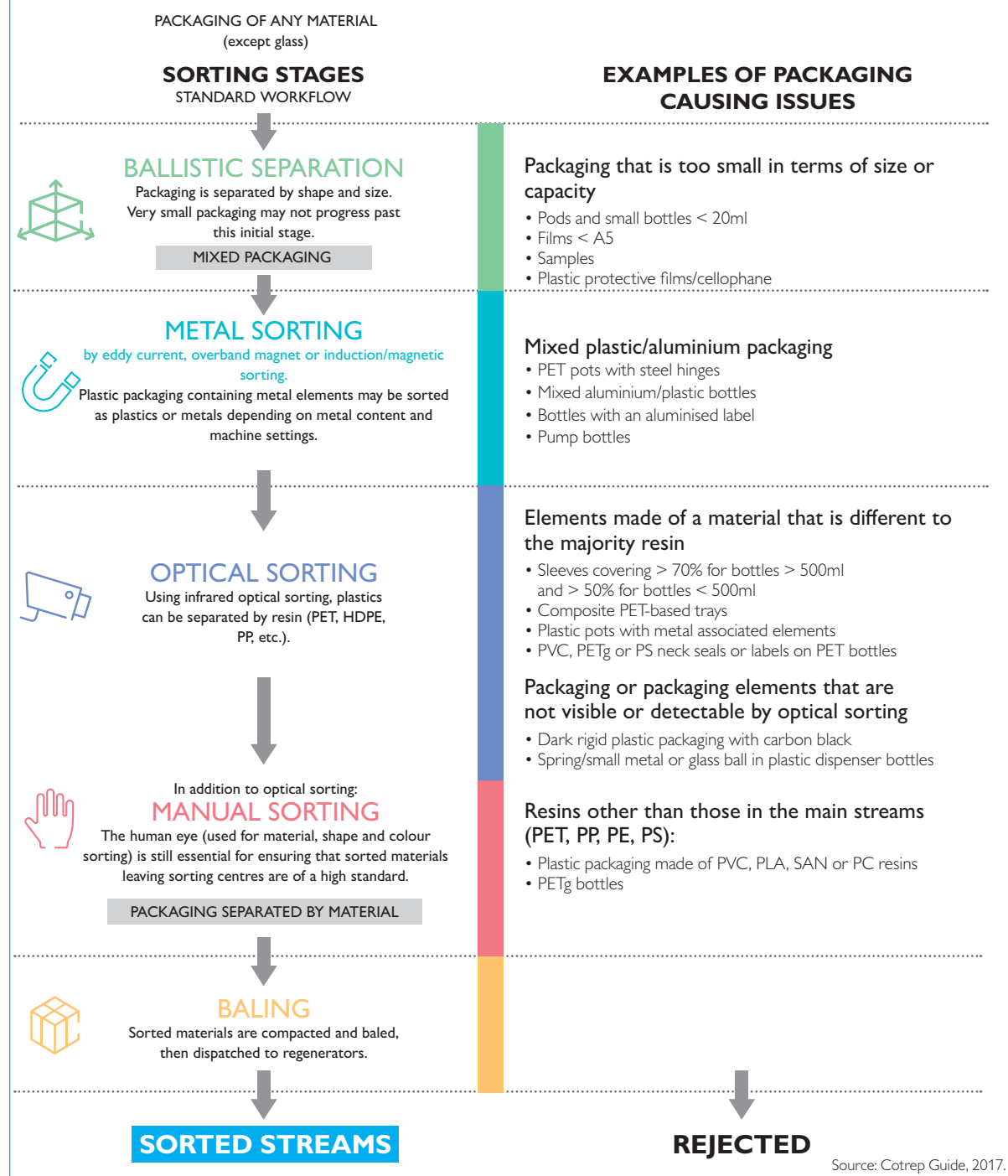


# Appendices

The sorting process for household packaging	40
Plastic packaging outputs at sorting centres	41
The main stages of the glass recycling process	42
The characterisation process	43
Changes to sorting schemes for plastic standards in France	44
Glossary	46



## THE SORTING PROCESS FOR HOUSEHOLD PACKAGING



### What is the recycled material used for?

The recycling process involves over 300 industrial plants specialising in different materials. Most of the recycling plants are based in France, and the others in Europe. Every tonne that is recycled is registered using a recycling certificate submitted to Citeo, which ensures traceability is monitored and controlled for each material.

Find information on the main outlets for each type of material in the material profiles.

## PLASTIC PACKAGING EXITING SORTING CENTRES

### SORTING INSTRUCTIONS WITHOUT APPLICATION OF THE SIMPLIFIED SORTING INSTRUCTION – 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

All colours

##### Bottles and boxes of dry products

Shampoo, milk, drinking chocolate

**Find out more:** Up to 10% PP can be recycled as a blend with PE

### PACKAGING NOT COVERED BY SORTING INSTRUCTIONS:

Processing with residual household waste (RHW)

#### SORTING REJECTS

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

The European directive of 2008 supporting the move to a "recycling society", introduces Member States to a hierarchical five-tier waste treatment model: **prevention, reuse, recycling, energy recovery and disposal**.

The French general tax on polluting activities (TGAP) and the financial support received from Citeo per recycled tonne are key to encouraging local authorities to recycle.

### FIND OUT MORE

Due to its low tonnage, there are no current 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) as it contains chlorine compounds.

### SORTING INSTRUCTIONS FOR PLASTIC WITH APPLICATION OF THE SIMPLIFIED SORTING INSTRUCTION

#### MECHANICAL RECYCLING

##### CLEAR PET

Transparent, colourless and very light, azure blue

##### Mono-PET bottles, pots and trays

Water bottles, pastry trays, sauce bottles

##### DARK PET

Colours other than colourless and azure

##### Mono-PET and opaque PET bottles, pots and trays

##### Insulating panels

Sparkling water bottles, deli trays

##### HDPE

All colours

##### Mono-PE and PE/EVOH bottles, pots and trays

Boxes of confectionery, shampoo bottles

##### PE Film

All colours

##### Flexible packaging, films and bags

Bags, sleeves, wrapping films

##### PP

All colours

##### Mono-PP and PP/EVOH bottles, pots and trays

Ice cream boxes, body hygiene product bottles

#### NO RECYCLING STREAM

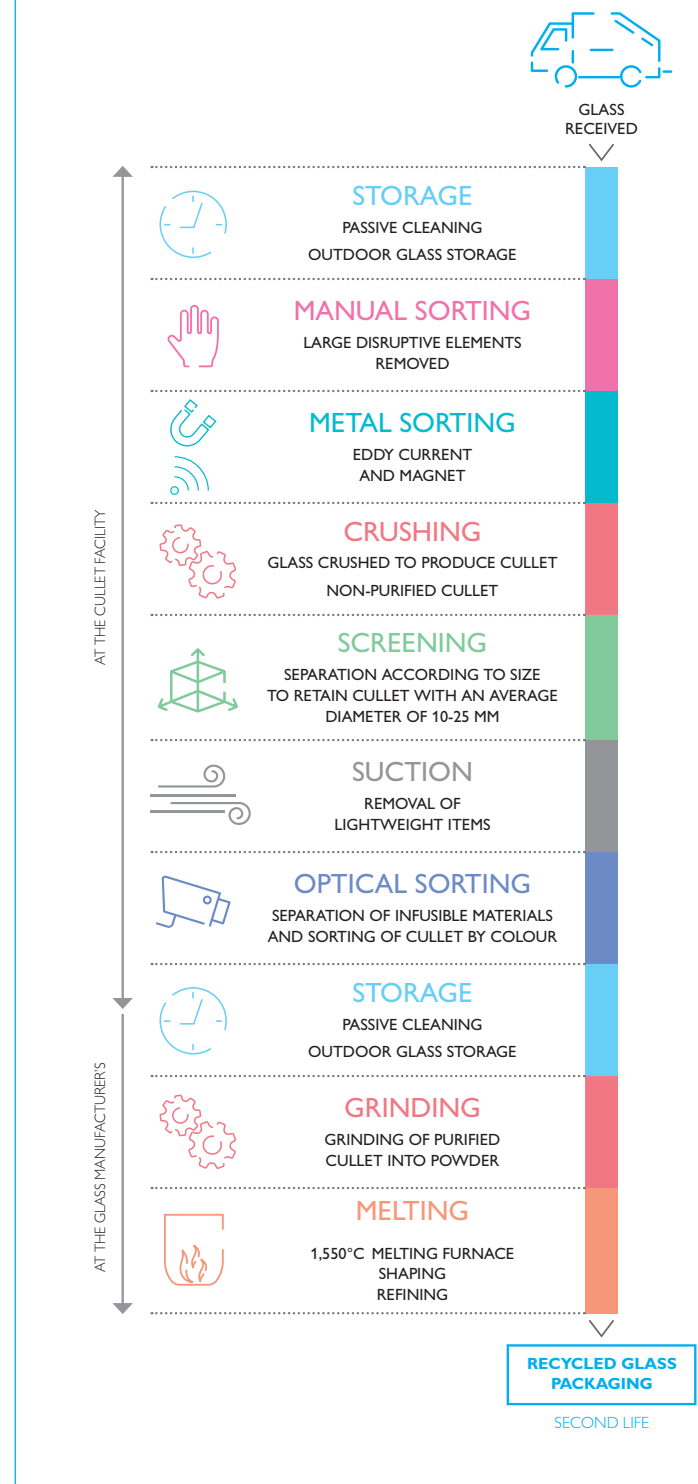
#### ADDITIONAL ENERGY RECOVERY

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

#### RECYCLING STREAMS UNDER DEVELOPMENT

**PS/XPS/EPS:** stream operational abroad, under investigation in France

## MAIN STAGES OF THE GLASS RECYCLING PROCESS



## THE CHARACTERISATION PROCESS

Random selection of a bale\* or bulk pile to be analysed



Sample collection



Sorting of the different constituent materials



Weighing of sorted materials

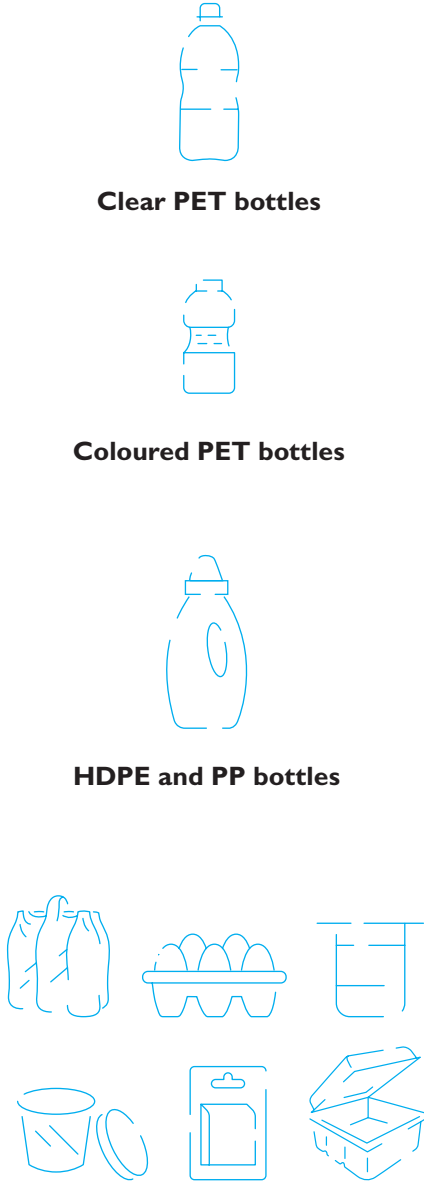


Comparison of the results with the standard



# CHANGES TO SORTING SCHEMES FOR PLASTIC STANDARDS IN FRANCE

**BEFORE EXTENSION (A)**



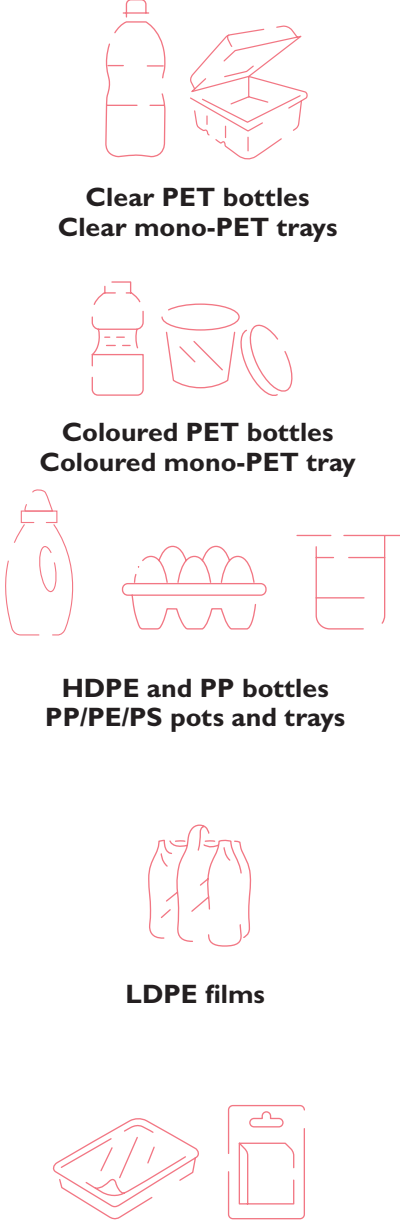
Clear PET bottles

Coloured PET bottles

HDPE and PP bottles

Sorting rejects

**PREVIOUS EXTENSION (B)**



Clear PET bottles  
Clear mono-PET trays

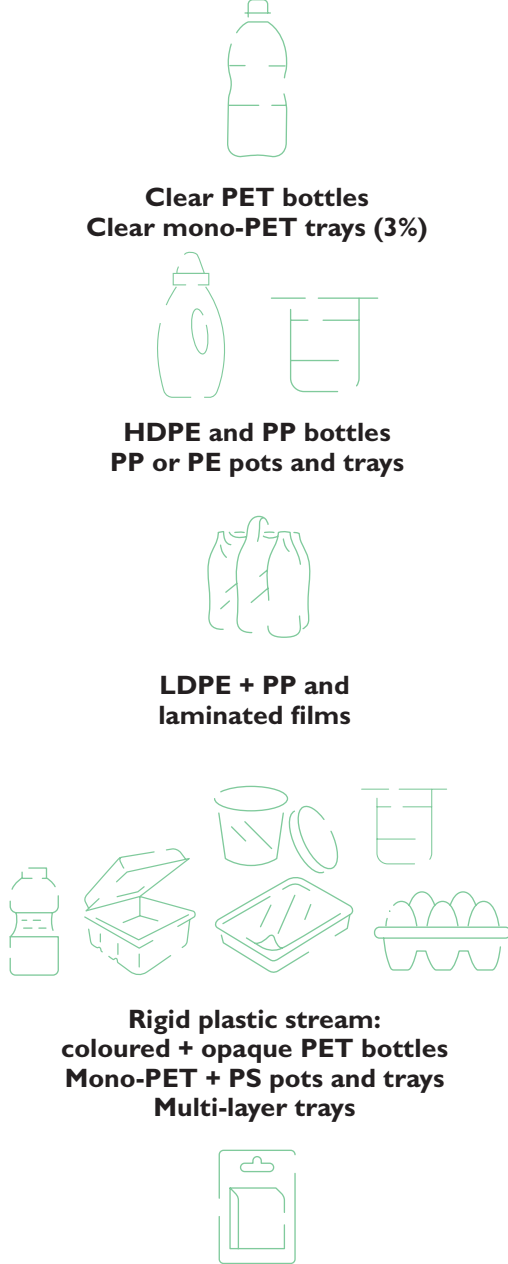
Coloured PET bottles  
Coloured mono-PET tray

HDPE and PP bottles  
PP/PE/PS pots and trays

LDPE films

Sorting rejects  
(multi-layer trays/PVC/small-sized films)

**CURRENT EXTENSION\* (C)  
SCHEME WITH TWO  
PLASTIC STANDARDS  
(DEVELOPMENT STREAM)**



Clear PET bottles  
Clear mono-PET trays (3%)

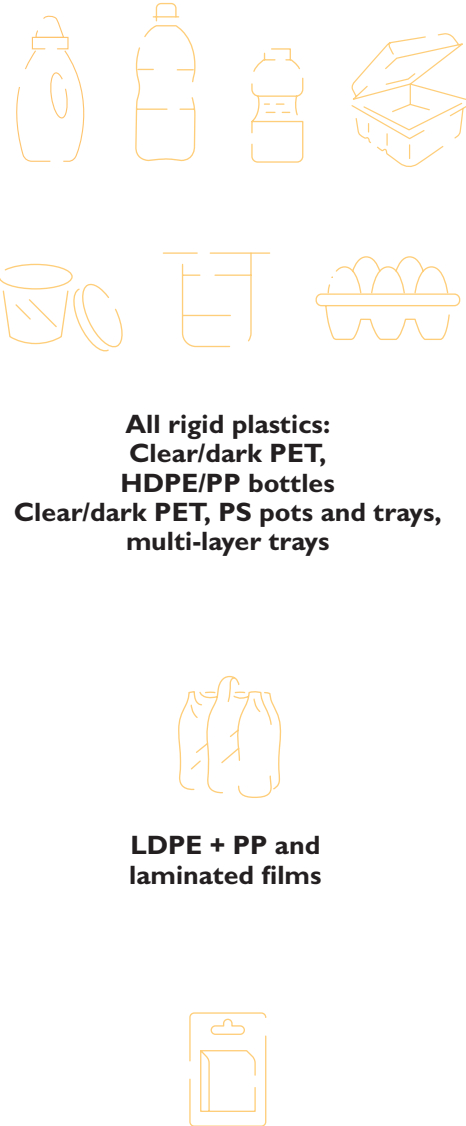
HDPE and PP bottles  
PP or PE pots and trays

LDPE + PP and  
laminated films

Rigid plastic stream:  
coloured + opaque PET bottles  
Mono-PET + PS pots and trays  
Multi-layer trays

Sorting rejects (PVC/small-sized films)

**CURRENT EXTENSION\* (C)  
SIMPLIFIED SORTING SCHEME  
(RIGID PLASTIC STREAM)**



All rigid plastics:  
Clear/dark PET,  
HDPE/PP bottles  
Clear/dark PET, PS pots and trays,  
multi-layer trays

LDPE + PP and  
laminated films

Sorting rejects  
(PVC/non-PE films/small-sized films)

\* Currently being rolled out.

# Glossary

**Bale or Bundle:** the waste is compressed into large cubes, strapped and ejected. In sorting centres, once sorted, waste is compressed by a press into cubes of the same size for each material, called “bales”, or “bundles” when it comes to steel.

**Characterisation:** all the testing carried out on waste to analyse its state, composition, behaviour and alteration.

**Collection:** this refers to the collection of waste to transport it to a waste processing facility. Collection starts when the waste collection service (public or private) picks up the waste.

**Contract Action Performance:** a contract for action and performance drawn up between local authorities and Citeo over the 2018-2020 period, serving to improve performance as regards the packaging EPR scheme.

**Cullet:** glass that has been sorted and cleared of impurities at a treatment plant, and is ready for the glass furnace.

**Elements disrupting recycling or unwanted items:** packaging or paper elements or waste whose inclusion in recyclable packaging waste streams disrupts collection and/or sorting and/or recycling processes.

**Energy recovery facility:** a household waste incineration plant that uses the calorific value of waste by burning it to recover the energy as heat or electricity. Such facilities need to meet the energy performance value of at least 0.6 set by the regulatory standards currently in force.

**Extended Producer Responsibility:** as part of EPR, manufacturers, white label brand owners and importers who place products on the market that generate waste are responsible, especially financially, for the management of such waste.

**Graphic papers:** term used for printed paper and graphic printing paper waste.

**HDPE:** high density polyethylene.

**Manual sorting:** operation enabling materials to be separated by category as they travel along a sorting belt. It is performed by sorting operators at a sorting centre.

**Material standards:** household packaging and graphic paper waste standards describe the general characteristics of such waste, in terms of composition and quality (number of streams, humidity threshold and impurities), and, in some cases, how they are prepared (bulk, bales or bundles) for transport to recycling facilities.

**Mechanical sorting:** automated sorting carried out by machines at a sorting centre.

**Optical sorting:** a process for sorting packaging according to its material content, by using a bright light and recording the reflected light waves.

**Overband magnet:** a magnetic separator positioned above a waste conveyor belt, which, thanks to its permanent magnet, removes ferrous metals present in selectively collected packaging waste.

**Packaging:** any form of container or media used to contain a product for transportation or display purposes.

**PET:** polyethylene terephthalate.

**PP:** polypropylene.

**PS:** polystyrene.

**Recycler-material end user:** anyone who uses household packaging or paper waste to produce an end product.

**Sorting centre for household waste:** facility to which collected recyclable waste is brought to be sorted according to the material. The materials are then put into bales or stored in bulk to be sold to recyclers.

**“Sorting made simpler” initiative:** extension of sorting instructions to include all plastic packaging. The aim is to double the recycling rate for these items. This will be achieved by sorting plastic pots, trays and films, and through a ripple effect from other plastic packaging already covered by the sorting instructions (bottles and dispenser bottles).





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