

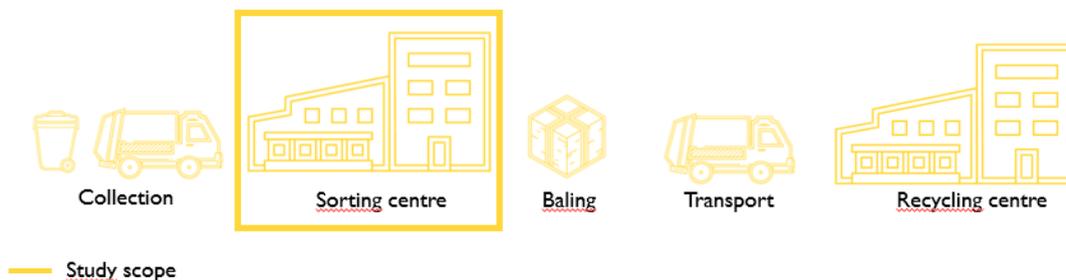


GENERAL NOTICE 4

Impact of metallised decorations obtained by foil stamping or transfer on the sorting of rigid plastic packaging

SUMMARY

This general notice aims to assess the behaviour in sorting centres of rigid plastic packaging featuring a metallised decoration obtained by foil stamping or transfer.



In sorting centres, rigid plastic packaging (consisting of more than 50% rigid plastic) is intended to be directed to different recycling streams depending on its resin. Recycling streams are available for the following resins: clear, coloured and opaque PET bottles and dispenser bottles as well as other rigid PP and PE packaging. Recycling streams are under development for clear and coloured PET trays and rigid PS packaging.

The presence of a metallised decoration obtained by foil stamping or transfer on this packaging may disrupt its routing to these recycling streams. COCET checked the impact of these metallised decorations on:

- metal sorting, particularly during capture by an Eddy current machine
- the reading of the infrared signal emitted and received by the optical sorting machine

Rigid plastic packaging with a metallised decoration obtained by foil stamping or transfer is not captured by the Eddy current machine during the separation of non-magnetic metals.

Furthermore, the routing of this packaging by optical sorting:

- **Is acceptable if the decoration covers up to 50% of the packaging surface**
- **Is unacceptable if the decoration covers over 50% of the packaging surface**

To ensure that rigid plastic packaging with a metallised decoration obtained by foil stamping or transfer is directed to the appropriate stream, COCET recommends not exceeding a coverage rate of 50% for this type of decoration.

This notice pertains solely to the behaviour of the packaging in sorting centres and provides no indication of the impact of the issue studied during the recycling of this packaging in its respective stream.

I Context

This notice seeks to assess the impact on sorting of a metallised decoration on rigid plastic household packaging. It concerns the following techniques:

- **Hot/cold foil stamping**, which involves locally applying a thin metallic layer comprising just a few microns of metal, most often aluminium, of the required shape and size onto a substrate. In both cases, the metal's supporting structure, generally a polyester film of variable thickness, is not attached to the metal during application and does not remain on the packaging.
- **Hot/cold transfer**, which involves locally applying a metallic layer in the desired shape using adhesive. This is a two-stage process: first, the adhesive is applied in the desired shape, then the film is applied. The adhesive application stage determines the final shape of the design: it enables the film to adhere solely to the required area.

This decoration can be applied to the surface of the rigid plastic packaging, either directly or via a label, and includes all metallic-effect colours (gold, silver, etc.).

These techniques address an aesthetic requirement and create a surface decoration featuring a "metallic effect".

Sectors concerned with this type of metallised packaging include cosmetics, luxury, chocolate, deli products, etc.

COCET carried out optical sorting tests to assess the impact of the presence of this metallised decoration on the surface of rigid plastic packaging.

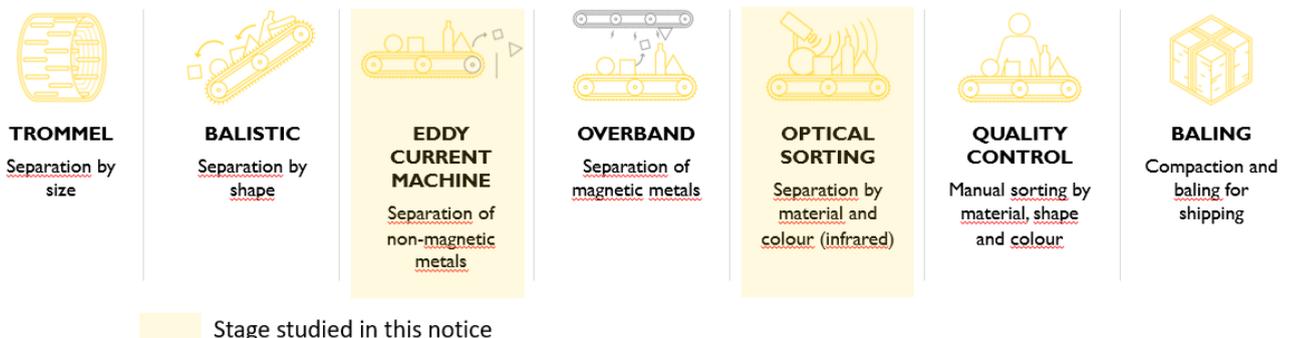
This notice does not concern:

- Rigid plastic packaging with a metallised decoration obtained using other technologies (vacuum sputtering, mass-colouration, etc.)
- Rigid plastic packaging featuring a metallised decoration sandwiched between two layers of plastic (e.g. metallised lamination)
- Flexible plastic packaging

2 Scope of the notice

This notice concerns the routing of rigid plastic packaging with a metallised surface decoration in sorting centres. It does not assess its suitability for recycling in the appropriate rigid plastic stream.

The identified risks of disruption for packaging with this type of metallised decoration are the separation of non-magnetic metals (by Eddy current machine) and material separation (by optical sorting machine). The study of how this packaging behaves in sorting centres therefore focused on these two stages.



3 Tests performed

Sorting tests were performed to understand how the presence of a metallised decoration obtained by foil stamping or transfer on rigid plastic packaging would affect its routing during the sorting process.

A metallised decoration obtained by foil stamping or transfer requires the application of a very thin metallic layer comprising just a few microns of metal. This technique allows the application of partial decorations on rigid plastic surfaces.

3.1 Separation of non-magnetic metals

This packaging has not been tested in sorting centres. However, COCET experts and feedback from sorting centres indicate that the low metal content of this packaging prevents it from being routed to the aluminium recycling stream.

A metallised decoration obtained by foil stamping does not result in the packaging being routed to the aluminium recycling stream.

3.2 Optical sorting

Static and dynamic optical sorting tests were conducted at optical sorting machine manufacturers to assess the impact of these decorations on the detection and routing of the packaging at this stage.

Several hot foil stamping coverage rates were tested on rigid plastic dispenser bottles, ranging from 30% to 70% of the packaging.

- The static tests showed that the areas covered by foil were not detected by optical sorting. The infrared beam was unable to pass through the layer of metal and identify the underlying material.
- During dynamic tests, we observed that the lower the foil coverage rate, the more the packaging is routed towards its target stream:
 - The sorting of packaging with a metallised decoration obtained by foil stamping covering 50% of the surface is acceptable.
 - The sorting of packaging with a metallised decoration obtained by foil stamping covering 70% of the surface is unacceptable.

A metallised decoration obtained by foil stamping covering less than 50% of the packaging surface enables acceptable routing of rigid plastic packaging to its designated recycling stream.

However, if the decoration covers over 50% of the packaging surface, its routing to its recycling stream is unacceptable.

Assessing the behaviour of the packaging tested during optical sorting (OS)

Parameter studied	Routing rate during OS	COCET's assessment
Coverage rate by foil stamping or transfer \leq 50%	Over 80%	Acceptable
Coverage rate by foil stamping or transfer $>$ 50%	Lower than 80%	Unacceptable

Impact during sorting stages

Sorting stage	Impact	Description
 TROMMEL	∅	
 BASLISTIC	∅	
 EDDY CURRENT	✓	No capture by the ECM ¹ .
 OVERBAND	∅	
 OPTICAL SORTING	⚠	Disruption of optical sorting if the metallised decoration covers over 50% of the packaging.
 QUALITY CONTROL	∅	
 BALING	∅	

 No impact
  Caution
  Not tested or not concerned

CONCLUSION

Given the current state of equipment and sorting techniques available in France, a metallised decoration obtained by foil stamping or transfer may disrupt the sorting process of rigid plastic. A decoration covering more than 50% of the packaging prevents proper sorting of this packaging into its appropriate recycling stream. If the decoration covers up to 50% of the packaging surface, sorting remains **acceptable**.

COCET may review this notice in light of developments in sorting technologies, markets or quality requirements for recycled material.

¹ Eddy current machine