Committee for Studying the Behaviour of Packaging in Sorting Centres

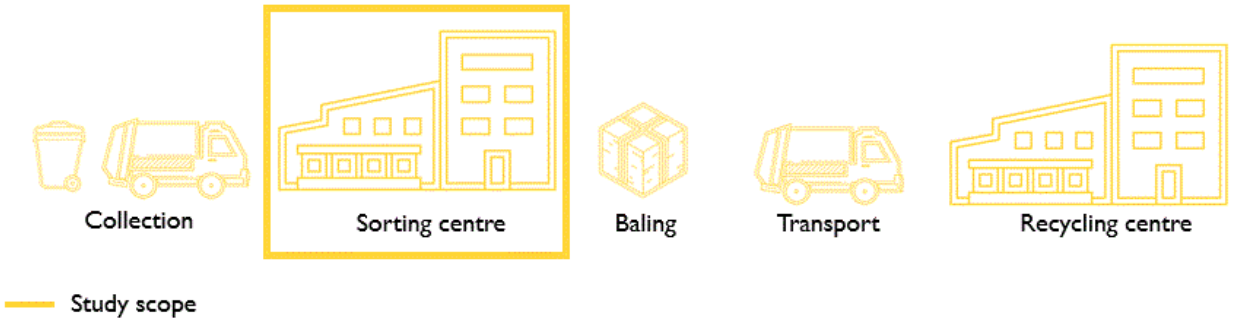
Material: Paper/ cardboard

GENERAL NOTICE 3

Impact of metallised decorations obtained using metallic inks on the sorting of paper/cardboard packaging

SUMMARY

This general notice aims to assess the behaviour in sorting centres of paper/cardboard packaging featuring a metallised decoration obtained using metallic inks.



In sorting centres, paper/cardboard packaging (consisting of more than 50% paper/cardboard) is intended to be directed to the recycling stream for non-laminated paper/cardboard or for laminated paper/cardboard. The presence of a metallised decoration obtained using metallic inks on this packaging may disrupt its discharging 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

Paper/cardboard packaging with a metallised decoration obtained using metallic inks is not captured by the Eddy current machine during the separation of non-magnetic metals.

Furthermore, the discharge of this packaging by optical sorting:

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

Note: To improve the sorting of packaging with an average coverage of 50%, use patterns that limit coverage to a maximum of 50% on the main surface when the packaging is flattened, regardless of how it is flattened.

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

To ensure that paper/cardboard packaging with a metallised decoration obtained using metallic inks is directed to the target stream, COCET recommends not exceeding a coverage rate of 25% 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 target stream.

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1 Context

This notice seeks to assess the impact on sorting of a metallised decoration on paper/cardboard household packaging. It concerns packaging featuring a decoration obtained using colorants containing metallic pigments, hereinafter referred to as "metallic inks".

This technique addresses an aesthetic requirement and creates 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 paper/cardboard packaging.

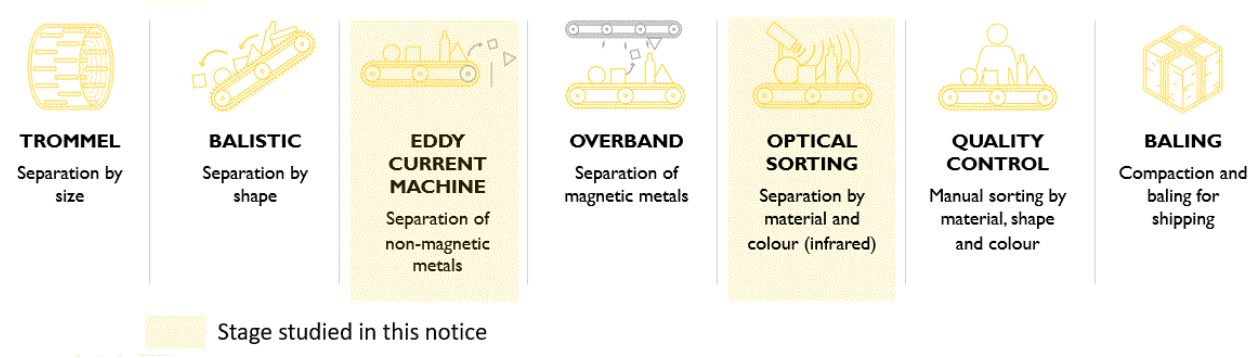
This notice does not concern:

- Paper/cardboard packaging with a metallised decoration obtained using other technologies (metallised lamination, addition of an aluminium layer, foil stamping, transfer, etc.)
- Paper/cardboard packaging featuring a metallised barrier sandwiched between a layer of paper/cardboard and another layer (paper/cardboard or plastic), such as cartons or multilayer flexible packaging.

2 Scope of the notice

This notice concerns the discharge of paper/cardboard packaging with a metallised surface decoration in sorting centres. It does not assess its suitability for recycling in the non-laminated or laminated paper/cardboard streams.

The identified risks of disruption for packaging with this type of metallised decoration are the separation of non-magnetic metals by Eddy current machine (ECM) 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 using metallic inks on plastic/cardboard packaging would affect its discharge during the sorting process.

A decoration obtained by metallic inks requires the application of a small amount of metal contained in the pigments. This technique allows the application of partial decorations on paper/cardboard surfaces.

3.1 Separation of non-magnetic metals

This packaging has not been tested in sorting centres. However, given the low metal content and the negative results obtained on paper/cardboard packaging with metallised decorations obtained using other technologies with apply a larger amount of metal (particularly aluminised plastic lamination – see AG 1), it is possible to extrapolate these results and conclude that such packaging would not be detected by the Eddy current machine, which is used to separate non-magnetic metals. This conclusion is supported by feedback from sorting centres.

A metallised decoration obtained using metallic inks does not result in the packaging being routed to the aluminium recycling stream.

3.2 Optical sorting

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

The surface covered by metallic inks disrupts optical reading: the decoration acts as a barrier by preventing the infrared beam from reaching the underlying paper/cardboard layer.

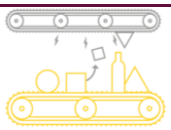
Dynamic tests were not performed on this packaging. However, since the disruption observed in static conditions is similar to that identified for paper/cardboard packaging with decorations obtained by foil stamping or transfer (see AG 2), the results of the dynamic tests from that previous study were extrapolated to the case of paper/cardboard packaging with a metallised decoration obtained using metallic inks:

- The sorting of packaging with a metallised decoration obtained by foil stamping **covering 25%** on average is acceptable.
- The sorting of packaging with a metallised decoration obtained by foil stamping **covering 50%** on average varies depending on the packaging format (shape, size) and the design of the metallised decoration (text, large solid areas, etc.). Greater losses are observed when metallisaedcovers a large surface (e.g., a full panel). Overall, sorting remains acceptable for these packages, but to optimize it, it is recommended to:
    - Favor small decorative elements (text, borders, small shapes) distributed across the entire packaging.
    - Avoid large solid metallic areas that would cover more than 50% of the surface of the "flattened face."
- The sorting of packaging with a metallised decoration obtained by foil stamping **covering more than 50%** on average is unacceptable.

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

Parameter studied	Discharge rate during OS	COCET's assessment
Coverage rate by metallic inks ≤ 25%	Over 80%	**Acceptable**
Coverage rate by metallic inks between 25% and 50%	Globally over 80% *Prefer small designs located on all sides of the packaging*	**Acceptable**
Coverage rate by metallic inks >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 using metallic inks may disrupt the sorting process. If the decoration covers up to 50% of the packaging surface, sorting remains **acceptable**. For packaging with 50% covering of metallised decoration on average, prefer small designs located on all sides of the packaging.

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

[1] Eddy current machine