

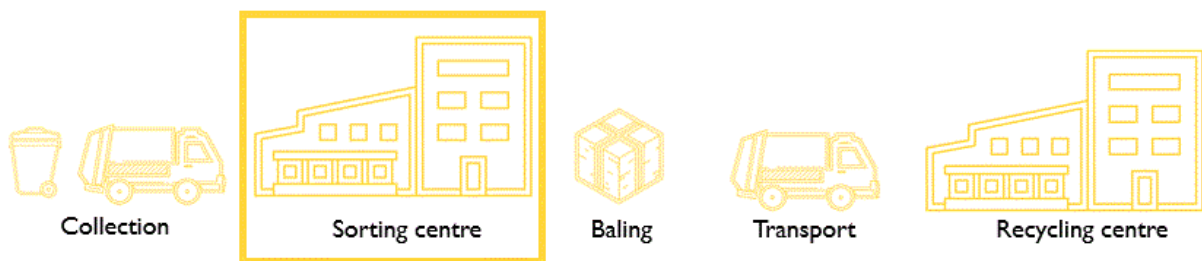


# GENERAL NOTICE 10

## Impact of dark colours on the sorting of paper/cardboard packaging

### SUMMARY

This general notice aims to assess the behaviour in sorting centres of dark paper/cardboard packaging.



— Study scope

In sorting centres, paper/cardboard packaging (consisting of more than 50% paper/cardboard) is intended to be directed to different recycling stream for non-laminated paper/cardboard or for laminated paper/cardboard.

The dark colours of paper/cardboard packaging may disrupt its ejection to its target recycling stream. COCET checked the impact of dark colours on the detection and ejection of the infrared signal emitted and received by the optical sorting machine.

#### The ejection of paper/cardboard packaging by optical sorting is:

- **Acceptable if the packaging surface area covered by dark parts is  $\leq 50\%$  of the surface of the packaging**
- **Unacceptable if the packaging surface area covered by dark parts is  $> 50\%$  of the surface of the packaging**

To ensure that dark paper/cardboard packaging is directed to the target stream, COCET recommends not exceeding a coverage rate of 50% for the dark parts.

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.

## I Context

This notice seeks to assess the impact on sorting of dark colours on paper/cardboard household packaging. This notice applies to packaging that is fully or partially dark in colour, with the colouration achieved by printing or mass-colouration.

"Dark packaging" refers to dark-coloured packaging (black, dark grey, dark blue, dark green, etc.) which may or may not contain carbon black.

This feature needs an aesthetic requirement (market code).

Sectors concerned with this type of packaging include food, detergents, cosmetics & personal care products, etc.

COCET carried out optical sorting tests to assess the impact of dark colours on the sorting of paper/cardboard packaging.

## 2 Scope of the notice

This notice aims to assess the ejection of dark paper/cardboard packaging in sorting centres. It does not assess its suitability for recycling in the target paper/cardboard stream.

The identified risk of disruption for dark packaging is material separation (by optical sorting machine). The study of the behaviour of this packaging in sorting centres therefore focused on this stage.



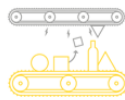
**TROMMEL**  
Separation by size



**BALISTIC**  
Separation by shape



**EDDY CURRENT MACHINE**  
Separation of non-magnetic metals



**OVERBAND**  
Separation of magnetic metals



**OPTICAL SORTING**  
Separation by material and colour (infrared)



**QUALITY CONTROL**  
Manual sorting by material, shape and colour



**BALING**  
Compaction and baling for shipping

Stage studied in this notice

### 3 Tests performed

Sorting tests were performed to understand how the presence of dark colours on paper/cardboard packaging would affect its ejection during the sorting process.

#### Optical sorting

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

The static tests revealed that the detectability of dark parts varied: depending on the samples, they were either detected by optical sorting or not detected..

- For the samples where the dark parts were not detected, we observed that the infrared beam was incapable of returning a strong enough signal to identify the material of these parts: the **colorant** was **undetectable**.
- For the sample where the dark parts were detected, the signal returned by the infrared beam was strong enough to identify the material: the **colorant** was **detectable**.

Dynamic tests were not performed on these 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 dark paper/cardboard packaging:

- The sorting of packaging with dark parts covering up to 50% of the surface is acceptable.
- Packaging with dark areas covering 50% or more is not acceptable for sorting.





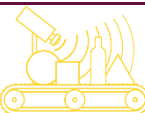


If the dark colour of paper/cardboard packaging is obtained using a detectable colorant and the packaging contains no other sorting disruptors, its sorting will be acceptable.

If the dark colour of paper/cardboard packaging is obtained using an undetectable colorant and the dark parts cover less than 50% of the packaging surface, its ejection to its target recycling stream is also acceptable. However, if the dark parts cover over 50% of the packaging surface, its ejection is unacceptable.

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

Parameter studied	Ejection rate during OS	COCET's assessment
Coverage rate of dark parts $\leq 50\%$	Over 80%	Acceptable
Coverage rate of dark parts $>50\%$	Lower than 80%	Unacceptable

### Impact during sorting stages

Sorting stage	Impact	Description
 TROMMEL	∅	
 BASLISTIC	∅	
 EDDY CURRENT	∅	
 OVERBAND	∅	
 OPTICAL SORTING	⚠	Optical sorting is disrupted if the colorant is undetectable and the dark parts cover more than 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, the dark colour of paper/cardboard packaging may disrupt the sorting process.

- If the dark colorant is detectable, the sorting of this packaging is **acceptable**.
- If the dark colorant is undetectable and the dark part covers up to 50% of the packaging surface, sorting remains **acceptable**.
- Otherwise, the sorting of the packaging is **unacceptable**.

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