

General Notice

The behaviour of labels and sleeves during the recycling of PET, HDPE and PP bottles

1/ LABELS AND SLEEVES IN USE FOR PLASTIC BOTTLES

Labels and sleeves are essential components of plastic bottles for household use. They enable manufacturers to meet their obligations regarding consumer information, giving details relating to the brand, product composition, use-by date, usage precautions where applicable and the procedure to follow for recycling the packaging after use.

SPECIFIC PROPERTIES OF LABELS AND SLEEVES	
LABELS	SLEEVES
Labels may be made of paper or plastic. Some labels are aluminised.	Sleeves are always made of plastic.
The label is known as "dry" if adhesive has to be applied before it is stuck to the product, or "self-adhesive" if it is supplied pre-coated with adhesive.	There are two types of sleeve: stretch or shrink.
Some labels are fixed to the packaging in the mould and therefore do not require adhesive.	Sleeves have the distinction of not requiring adhesive to attach them to the bottle.

The plastics currently used for labels and sleeves are as follows: OPP, PP, LDPE, PS, PVC, PETG, etc. It should be noted that labels and sleeves vary in size, and may cover a greater or smaller part of the bottle.

In the manufacture of packaging components, there are several factors that influence the choice of decision-makers between labels and sleeves and between the various materials and technologies on offer.

Marketing requirements in terms of communication or product visibility influence the size of the label or sleeve. For example, a full sleeve may be used for promotional actions, being generally favoured for its large surface area, which enables enhanced packaging decoration and message content.

2/ The influence of full labels and sleeves in sorting for recycling

Some labels and sleeves cover the entire body of the bottle and, except in the case of tamper-proof sleeves, remain on the bottle during the household waste sorting stage. The presence of this type of label or sleeve has an impact on the sorting stage:

- In an automatic sorting unit, bottles with this type of label or sleeve can be directed into the PET stream, the HDPE stream or into non-recyclable waste, as appropriate. There are various factors determining the stream into which bottles are sent: material /

- appearance of the label or sleeve, position of the bottle at the time of optical sorting, thickness of the label or sleeve, etc.
- In a manual sorting unit, these labels or sleeves may be the cause of sorting errors (the colour and appearance of the bottle in particular may cause a PET bottle to be sent into the HDPE stream, or vice versa).

This is why COTREP recommends the use of partial labels or sleeves wherever possible, with the aim of facilitating bottle recycling at the end of the life cycle.

3/ Studies carried out on the behaviour of labels and sleeves

General Notices are drawn up to explain the behaviour of each type of label and to advise or advise against their use.

- **FT 08:** behaviour of a PVC label or sleeve on a PET bottle
- **FT 13:** behaviour of an aluminised paper label on a PET bottle
- **AG 14:** behaviour of a PVC label or sleeve on an HDPE bottle
- **AG 15:** behaviour of a PP/OPP label or sleeve on a PET bottle
- **AG 16:** behaviour of a PP/OPP label or sleeve on an HDPE bottle
- **FT 17:** behaviour of an LDPE label or sleeve on a PET bottle
- **FT 18:** behaviour of an LDPE label or sleeve on an HDPE bottle
- **FT 42:** behaviour of a PS label or sleeve on a PET bottle
- **FT 43:** behaviour of a PS label or sleeve on an HDPE bottle
- **FT 44:** behaviour of a PETG label or sleeve on a PET bottle
- **FT 45:** behaviour of an aluminised paper label or sleeve on an HDPE bottle

These Notices are available on the COTREP website: www.cotrep.fr

4/ Summary table of impacts on regeneration

The following tables present a summary of all data contained in these Notices and highlight in particular:

- comments relating to the behaviour of the material during the recycling process;
- the stages that are disrupted and observations made in this regard;
- a general evaluation of bottle recyclability for each type of label and sleeve (abbreviated as L and S respectively in the tables).

a. PET stream

SPECIFICATIONS		BEHAVIOUR DURING RECYCLING		
MATERIAL	L OR S	STAGES DISRUPTED		RECYCLABILITY EVALUATION
PVC	L/S		1 PVC L/S detected = up to 3 bottles without PVC L/S ejected ⇒ Increase in losses and waste to be processed	UNFAVOURABLE
			Undetected PVC flakes cannot be separated from PET flakes by flotation (density of the two materials >1) ⇒ Recycling stream pollution	
			1 PVC flake detected = up to 100 flakes ejected ⇒ Recycling stream pollution and increase in losses	
			Decomposition of PVC into carbon residues at PET conversion temperature: clogging of extruder filters and/or quality problems with the granules ⇒ Increase in machine stoppages, increase in losses, quality problems and increase in waste to be processed	
PS	L/S		Depending on their density, PS flakes are sent into the PET stream ($d > 1$) or polyolefin stream ($d < 1$) ⇒ Pollution of the recycling stream and the polyolefin stream	SUBSTITUTION RECOMMENDED
			With a fusion temperature well below that of PET, deterioration of the PS during shaping ⇒ Creation of impurities and yellowing of pale coloured materials (not visible in dark materials) and quality problems	
Stretch LDPE	L/S	NONE		FAVOURABLE
PETG	S		PEGT flakes not separated from PET flakes (density of the 2 materials >1)	SUBSTITUTION RECOMMENDED
			Tendency of PEGT to stick to the walls of the machines during drying and transfer	
			Yellowing of pale coloured PET streams over a certain concentration	
PP/OPP	L/S	NONE		FAVOURABLE
Aluminised paper	L		Partial defibering of the paper and traces of aluminium stuck to the packaging ⇒ Increase in losses and waste to be processed	UNFAVOURABLE
			For each bottle with aluminised paper label, up to 5 bottles without aluminised paper label are ejected ⇒ Increase in losses and waste to be processed	

b. HDPE/PP stream

SPECIFICATIONS		BEHAVIOUR DURING RECYCLING		
MATERIAL	L OR S	STAGES DISRUPTED		RECYCLABILITY EVALUATION
PVC	L/S	 	<p>Traces of PVC create black stains during recycling</p> <p>⇒ Quality problems</p>	SUBSTITUTION RECOMMENDED
PS	L/S		<p>Depending on their density, flakes are sent into the HDPE/PP stream ($d < 1$) or into post-sorted waste ($d > 1$)</p> <p>⇒ Recycling stream pollution and increase in losses</p>	SUBSTITUTION RECOMMENDED OR USE OF A PS WITH DENSITY OVER 1
		 	<p>Given their conversion temperatures close to those of PS, PP and HDPE, the shaping process is identical</p> <p>PS incompatible with HDPE and PP</p> <p>⇒ Tendency to agglomerate and impair the final properties of the material (creation of areas of weakness, incipient breaks)</p>	
Stretch LDPE	L/S	NONE		FAVOURABLE
PP	L/S	NONE		FAVOURABLE
Aluminised paper	L/S		<p>Partial defibering of the paper and traces of aluminium stuck to the packaging</p> <p>⇒ Increase in losses and waste to be processed</p>	UNFAVOURABLE
				
			<p>For each bottle with aluminised paper label, up to 5 bottles without aluminised paper label are ejected</p> <p>Increase in losses and waste to be processed</p>	