

General Notice

Impact of flexible PE plastic packaging on regeneration lines at regeneration plants handling rigid PE plastic packaging

CONTEXT

Currently, in local authorities where sorting guidelines are extended to all packaging, flexible PE packaging is separated from rigid PE packaging and sent to separate regeneration plants. This notice seeks to answer the question: "Could flexible packaging be recycled with rigid packaging?" and addresses the issue of flexible PE packaging mistakenly entering bales of rigid PE packaging waste.

Summary



Sorting centre
Ability of packaging waste to be channelled to the regeneration plant



Regeneration
Ability of packaging waste to be converted into ready-to-use flakes or granulate



Use of recycled material
Ability of flakes or granulate to be converted into new products

Given the technologies currently used in France and Europe, flexible PE packaging present in bales of rigid PE packaging disrupts rigid PE regeneration and diminishes the quality of regenerated material. Consequently, rigid and flexible PE packaging cannot be recycled together.

Please note: This notice has been drafted based on feedback from French regeneration plants handling rigid PE household packaging waste.

IMPACT DURING REGENERATION OF RIGID PACKAGING

The term "flexible packaging" relates to the following items: bags, pouches, film, wrapping film, multipack film, cling film, sachets, bag-in-box (BIB), stand-up-pouches, doypacks, nets, etc. (non-exhaustive list). Tubes (more akin to rigid packaging in terms of their shape and composition) and seals (which in reality remain on a large majority of pots and trays) are not addressed by this notice.

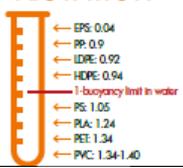
In contrast to rigid packaging, flexible plastic packaging is thin (<300µm), has low resistance to deformation, tends to flatten when empty, and has a different impact during sorting and regeneration¹.

Different equipment is required for regenerating flexible packaging, and regeneration plants dealing with rigid packaging are not equipped to process it.

¹ There is no standardised definition of flexible packaging.

Flexible packaging disrupts the regeneration process due to its low mass and higher volume. The table below provides a step-by-step summary of the impact of flexible packaging on rigid PE packaging regeneration lines.

Details of the impact of flexible packaging during rigid PE regeneration

Recycling stage	Impact	Description
 OPTICAL SORTING (stream sorting and filtering)	∅	<p>The optical sorting machines used are incapable of distinguishing between flexible and rigid packaging. They identify the resin used in packaging. Consequently, flexible PE packaging is mixed with rigid PE packaging.</p> <p>Due to its low mass, this packaging is inappropriate for sorting machine settings specific to rigid packaging. It may disrupt sorting efficiency.</p> <p>→ Accurate separation of rigid and flexible packaging is not possible during this stage. Any flexible packaging present may disrupt sorting efficiency.</p>
TRANSFER (pipes, conveyors, etc.)		<p>When transferring material between two stages, flexible packaging rolls up and obstructs lines, jamming and creating a bridge effect in equipment used to transfer material from one facility to another.</p> <p>→ Line breakdown, diminished productivity and efficiency.</p>
 SHREDDING		<p>Shredders used at regeneration plants handling rigid packaging are not suitable for flexible packaging.</p> <p>→ Flexible packaging may fold and be difficult to shred.</p>
FLOTATION 	∅	<p>At this stage, flakes of flexible polyolefin packaging float with flakes of rigid packaging.</p> <p>→ No separation between rigid and flexible plastic is possible in the washer, reduced flow rate.</p>
 WASHING AND DRYING	∅	<p>During this phase, folded flexible packaging flakes reduce the flow rate and store more moisture than rigid packaging flakes.</p> <p>→ Flexible packaging flakes reduce the flow rate and the material is not optimally dried.</p>
SUCTION (optional)		<p>To limit the impact of flexible packaging and decorative elements (sleeves, labels, etc.) contained in rigid packaging, some regeneration plants possess equipment enabling suction of flakes after washing. This suction eliminates the majority of flexible flakes.</p> <p>→ Loss of material and reduced efficiency.</p>
 EXTRUSION/GRANULATION		<p>Any surplus moisture that has not been eliminated disrupts the degassing phase during extrusion.</p> <p>→ Degassing is not optimal, and water vapour remains trapped in the granulate, affecting the quality of the end material (holes).</p>
RECYCLING 		<p>Differences in grade between flexible and rigid PE packaging and moisture-related quality defects during extrusion may lead to quality defects, downgrading, and even elimination of material.</p> <p>→ Visual defects (e.g. holes) or degraded mechanical characteristics → impossible to sell regenerated material.</p>

 : Caution ∅: No impact

Rigid packaging regeneration lines are not equipped to process flexible packaging. Due to differences in the material's shape and physical properties, special equipment is required: shredders, transfer equipment, silos, hoppers, centrifuges, feed screws, etc. (e.g. regeneration plants handling flexible packaging waste use additional equipment to densify the material ensuring more effective extruder supply, and also to limit moisture prior to extrusion).

CONCLUSION

In conclusion, if flexible PE packaging waste is not eliminated during regeneration processes, its presence in bales of rigid PE packaging waste disrupts the recycling of rigid packaging. It may cause quality issues, processing defects (holes or issues in terms of surface appearance), and changes to the physical-chemical properties of regenerated material, rendering regenerated material incompatible with users' specifications. Consequently, rigid and flexible packaging made of the same resin cannot be recycled together.

At best, and depending on the line involved, flexible packaging can be extracted from the rigid packaging stream, but cannot ultimately be recycled. In this case, it represents reduced efficiency and increased rejects for regeneration plants. These rejects are sent for energy recovery or landfill.