COTREP

Comité Technique pour le Recyclage des Emballages Plastiques

Resin

Rigid PP

GENERAL NOTICE 79

Impact of EVA skin film on the regeneration of rigid PP packaging

SUMMARY

The aim of this general notice is to assess the mechanical regeneration potential of rigid PP packaging with a related EVA skin film during regeneration of rigid PP household packaging.

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

Study scope

Skin pack trays are generally used to improve performance in terms of product preservation and aesthetic appeal (limit the release of exudate), particularly in the vacuum-packed meat or fish market. This packaging consists of a PP tray and a top film made mostly of EVA, that closely fits the shape of the product being packaged.

Skin pack technology consists of deforming the top film through heating and applying it to the product. EVA – ethylene-vinyl acetate copolymer – is used as the majority component of these seals to provide the elasticity needed for this particular forming process.

The top film is attached to virtually the entire tray. When the seal is removed by the consumer, the majority of the skin film therefore stays on the tray. This means that a certain amount of EVA skin film will be found in the rigid PP stream. COTREP tested the potential impact of this packaging on regeneration of the rigid PP stream and the quality of the recycled rPP* material for an injection moulding application.

In conclusion, given the current state of regeneration equipment and techniques available in France, rigid PP packaging with EVA skin film offers partial compatibility in the rigid PP stream.

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

**rPP means recycled material from rigid PP packaging.*

1. CONTEXT

Skin trays are used to improve preservation performance and also the aesthetic appeal of products (particularly meat and fish), by limiting the release of exudate.

Skin pack technology consists of deforming the top film through heating and applying it to the product. EVA (ethylene-vinyl acetate copolymer) is used as the majority component of these seals to provide the elasticity needed for this particular forming process.

On a skin tray, the film is attached to the tray except where the product is situated. When the consumer removes the film, the majority of the skin film therefore stays on the tray. As the density of these skin films is lower than 1, they will therefore end up in the rigid PP stream during regeneration.

Rigid PP packaging with a skin film accounts for under 1% of rigid PP packaging placed on the market.

This notice seeks to assess the impact of EVA skin film on mechanical regeneration of the rigid PP stream by injection moulding and on material quality.

The technical characteristics of the recycled material were assessed with a view to reprocessing as plant pots (injection moulding), an application representative of outlets for rPP material.

2. IMPACT ON REGENERATION

2.1. Principle and analytical criteria

In its recyclability study, COTREP assessed the impact of EVA skin film on the regeneration process and quality of rPP produced from rigid PP household packaging.

The regeneration tests were performed on a pilot scale based on the protocol defined by COTREP for recycling rigid PP packaging. This protocol is representative of industrial practices applied by regeneration plants processing streams in France.[1] Use of the regenerated material was tested for injection moulding to manufacture plant pots on the site of one of COTREP's industrial partners.

Various physical-chemical criteria were measured during the test phases and compared to those of a standard sample composed of 100% rPP.

The technical characteristics of the recycled material were assessed with a view to reprocessing as plant pots (injection moulding).

2.2. Test samples

EVA is present in the structure of skin film but may also be used in the film sealing layer. To isolate the issues and test solely the impact of the film, we chose a skin film that contained EVA only in its structure, with a density less than 1. According to market research, skin films generally contain between 60% and 80% of EVA. These parameters were considered in the choice of test samples.

There are two film types: adhesive peelability (i.e. completely detaches from the tray without any sealing agent residue) or cohesive peelability (i.e. the film detaches from the tray leaving a layer of film on the tray). COTREP wished to test samples of cohesive peelability film to consider the worst case scenario for a regeneration plant.

Based on market analysis, samples of PP trays and EVA skin film representative of products that may be placed on the market were selected and procured. The packaging was tested without any food residue or other secondary elements (labels, print, etc.). These items were incorporated into the standard stream to simulate the addition of EVA skin film to the rigid PP stream.

The standard stream used for the study comprises 100% rPP extruded sheets produced exclusively for the study from granulate sourced from French selective collection (rigid PP standard).

COTREP sought to assess the impact of rigid PP packaging with EVA skin film based on rates of 1% and 10% to account for current marketing and to reflect projected volumes marketed with occasional peaks in concentration in rigid PP bales.

[1] For further information, see protocol Rigid PP-1 on the COTREP website: www.cotrep.fr

2.3. Results

IMPACT OF EVA SKIN FILM ON RIGID PP PACKAGING REGENERATION PROCESSES

RECYCLING PROCESSES	IMPACT	*DESCRIPTION*
SHREDDING	✓	*No impact on shredding*
WASHING AND SPINNING	✓	*No impact on washing and spinning*
FLOTATION AND DRYING	✓	*No impact on flotation and drying*
EXTRUSION/ GRANULATION	✓	*No impact on extrusion/granulation*
INJECTION MOULDING	✓	*No impact during plant pot manufacture*

⚠ Caution ✓ No impact

TECHNICAL CONCLUSIONS

Through tests performed by COTREP, it was possible to assess the impact of rigid PP packaging with EVA skin film on mechanical regeneration of rigid PP household packaging.

Results obtained show that the presence of this packaging up to a proportion of 10% does not disrupt the different stages of the regeneration process.

Given the current state of regeneration equipment and techniques available in France, rigid PP packaging with EVA skin film offers partial compatibility in the rigid PP stream.

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