RecyClass

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UBE

RECYCLASS TECHNOLOGY APPROVAL

Brussels, 23 March 2021
Reviewed: Brussels, 19 December 2023

DISCLAIMER

RecyClass recognition applies only to UBE 'PERFORMANCE PA SC15' technology reported in Annex I. The recyclability assessment therefore does not refer to the testing of a specific packaging using this barrier film. Any specific packaging using this film would need to be tested individually to demonstrate that the system of resin, adjuvants, label, closure, and printing conforms to the RecyClass Recyclability Evaluation Protocol for PE films, and that it is sorted in the PE flexible stream at the state -of-art sorting plants in Europe.
Publication of results of testing of this technology MUST clearly include all the conditions listed in the approval letter. Partial reporting of the conditions is forbidden.
Additionally, any change in the formulation of the technology must be communicated to the Technical Committee which will reassess the approval of the technology.

The RecyClass PO films Technical Committee was requested to carry out an assessment of the technology 'PERFORMANCE PA SC15' by UBE to verify its impact on the quality of recycled PE flexible packaging.

The technology is a LDPE-based multilayer film with barrier properties conferred by a polyamide inner layer. The PA 6/6.6 copolymer (UBE NYLON 5034B) composing the structure at 15%wt is characterized by a low melting point and a low stiffness. Its compatibility is ensured by 10%wt LLDPE-based tie layers grafted with maleic anhydride (MAH). The film has been tested unprinted.

According to the results that were obtained from the laboratory test performed by Aimplas, carried out as per the Recyclability Evaluation Protocol for PE films, the 'PERFORMANCE PA SC15' technology is considered to be limited compatible with PE flexibles recycling.

Based on these results, RecyClass acknowledges that UBE 'PERFORMANCE PA SC15' technology have limited negative impact on the current European PE flexibles recycling provided that PE flexible films based on this technology are designed only under the following conditions[1]:

a) The density of the PE film is below 0,97 g/cm^3;

[1] **PE films designed under conditions other than those indicated need to be tested to assess their compliance with Recyclass Recyclability Evaluation Protocol for PE films.**

b) The PA used in the film structure is a PA 6/6.6 copolymer having the following properties[2]:
   - a melting point lower than 192°C,
   - a tensile modulus around 500-600 MPa,
   - a tensile elongation at break around 450-470%;

c) The PA layer represents at maximum 15% in weight of the total film structure;

d) The PA layer is compatibilized with LLDPE-based tie layers grafted MAH (with MAH > 0,06%) and representing at minimum 10% in weight of the total film structure;

e) Any components or attachments to the packaging should be preferably made of clear PE;

f) Any additional component or features (inks, adhesives, …) of the packaging must be compliant with the corresponding RecyClass Design for Recycling Guidelines.

RecyClass concludes that UBE 'PERFORMANCE PA SC15' technology as per current market conditions and knowledge, is limited compatible with the existing European industrial recycling processes for PE flexibles. The plastic generated by the recycling process may be used in high quality applications such as PE blown films up to 25%[3].

In regard to RecyClass Recyclability Certification, the present limited compatibility with PE flexibles recycling approval delivered to 'PERFORMANCE PA SC15' technology, means that a package based on PE film containing the 'PERFORMANCE PA SC15' technology, as mentioned in the aforementioned conditions, will be penalised with one Recyclability Class downgrade. Nevertheless, the amount of recyclable PE will impact the final Recyclability Class obtained during Recyclability Certification and should be kept above 95% or 90% in the final packaging to maximise chances to get a Recyclability Certificate with a Class B or C, respectively[4]. Also, it is noteworthy that the presence of additional packaging features, like inks or adhesives, could additionally impact the certification process.

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[2] All tests carried out with a 5 layers airblown line, Die diameter = 90 mm · GAP=1,4 mm
Structure: PE (outer) / PE / PA (medium) / PE / PE (inner), PA layer delaminated for the tests
Layer thickness distribution: PE = 50 µm, PA = 50 µm, PE = 50 µm (Total film thickness = 150 µm)
Cooling conditions: Chiller temp. = 13 °C · Take off rolls = 35 °C
Film orientation: Blow-up ratio = 2,1 · Take-off speed = 6m min-1
Sample conditioning and testing conditions: T = 23°C, RH =50%

[3] Technology tested according to the RecyClass Recyclability Evaluation Protocol for PE films

[4] RecyClass Recyclability Certification

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About RecyClass

RecyClass is a non-profit, cross-industry initiative advancing recyclability, bringing transparency to the origin of plastic waste and establishing a harmonized approach toward recycled plastic calculation & traceability in Europe. RecyClass develops Recyclability Evaluation Protocols and scientific testing methods for innovative plastic packaging materials which serve as the base for the Design for Recycling Guidelines and the RecyClass Online Tool. RecyClass established Recyclability Certifications for plastic packaging, Recycling Process Certification and Recycled Plastics Traceability Certification for plastic products.

RecyClass – Plastic Future is Circular

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Annex I

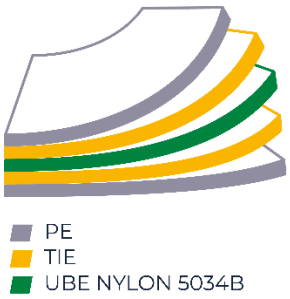

Figure 1 PERFORMANCE PA SC15 *technology by UBE*

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