

UBE

RECYCLASS TECHNOLOGY APPROVAL

Brussels, 23 March 2021

DISCLAIMER

RecyClass recognition applies only to UBE 'PERFORMANCE PA SC15' technology reported in Annex I. It, therefore, does not concern to a recyclability assessment of specific packaging using this 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 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 certifies 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:

- a) The density of the PE film is below 0,97 g/cm³;

- b) The PA used in the film structure is a PA 6/6.6 copolymer having the following properties¹:
- 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) Applied printing technology is compatible with recycling; since several printing options are possible, it is the responsibility of the end-user to choose an appropriate combination of inks and printing process to ensure that:
- i. the inks are non-bleeding;
 - ii. the inks comply with the European Legislation (e.g. Packaging and Packaging Waste Directive on the heavy metal concentration levels) and are EUPIA compliant;
 - iii. direct printing is limited as much as possible;

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%², and providing that full package market penetration is limited to 10% maximum of the whole European LDPE flexible film market.

AboutRecyClass

RecyClass is a comprehensive cross-industry initiative that works to advance plastic packaging recyclability and to establish a harmonized approach towards recycled content calculation and traceability in Europe. Activities within RecyClass include the development of Recyclability Evaluation Protocols and scientific testing of innovative materials which serve as the base for the Design for Recycling guidelines and the free online tool. RecyClass offers Recyclability Certifications and Recycled Content Traceability Certification for plastic packaging.

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¹ 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%

² Technology tested according to the RecyClass [Recyclability Evaluation Protocol for PE films](#)

Annex I



Figure 1 PERFORMANCE PA SC15 technology by UBE