

LyondellBasell

RECYCLASS TECHNOLOGY APPROVAL

Brussels, 22 September 2021

DISCLAIMER

RecyClass recognition applies only to LyondellBasell 'Toppyl PB 8640M' 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 'Toppyl PB 8640M' by LyondellBasell to verify its impact on the quality of recycled PE flexible packaging.

The technology is used in a three layers LDPE film with improved peeling properties conferred by the addition of Polybutene-1. The Polybutene-1 (Toppyl PB 8640M) is incorporated in the external LDPE layer and represents 7,5% of the total weight of the film. The film has been tested unprinted.

According to the results that were obtained from the laboratory test by Proplast, carried out as per the Recyclability Evaluation Protocol for PE films, the 'Toppyl PB 8640M' technology is considered to be **fully compatible with PE flexibles recycling.**

Based on these results, RecyClass certifies that LyondellBasell 'Toppyl PB 8640M' technology will have no 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 Polybutene-1 (Toppyl PB 8640M) represents 7,5% of the total weight of the film, or less;
- c) Peelable film structures using Toppyl PB 8640M are PE-based, with a prevalence of LDPE;
- d) 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 LyondellBasell 'Toppyl PB 8640M' technology as per current market conditions and knowledge, is fully 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%¹.

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

AMMENDEMENT I:

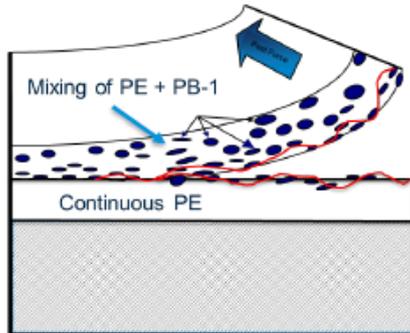
Next to the RecyClass technology approval of the grade ‘*Toppyl* PB 8640M’, LyondellBasell developed an equivalent grade ‘*Toppyl* PB 8340M’, with the only distinction being the melt flow index (MFI). Packaging applications (*cf.* Annex I), concentrations, and usage in PE-based resins of both grades are the same. The only difference lies in the extrusion technologies, that explain the variation of the MFI. ‘*Toppyl* PB 8640M’ is mainly used in blown-film technology, while ‘*Toppyl* PB 8340M’ is destined to cast-film and thermoforming technologies.

Based on the information provided by LyondellBasell, the RecyClass PO films Technical Committee extends the present technology approval to the equivalent grade ‘*Toppyl* PB 8340M’.

Compounding blends “Ready-to-use solutions” using ‘*Toppyl* PB 8640M’ or ‘*Toppyl* PB 8340M’ grade under the conditions listed above in the present letter are covered as well by the RecyClass approval as fully compatible with the PE flexible recycling stream.

Annex I

Film sealed to different substrate



Film sealed to 'itself'

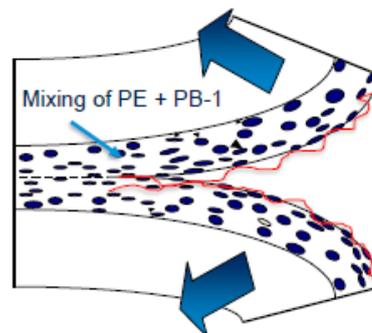


Figure 1 Topyl PB 8640M technology by LyondellBasell used in peelable film structures