



Pioneering Oxo-biodegradable Plastic Technology

DEGRADABLE/BIODEGRADABLE POLYPROPYLENE FILMS AS FINISHED PRODUCTS WITH VARIOUS DIRECT FOOD CONTACT AND NON FOOD CONTACT APPLICATIONS

Types/Codes: SUPERECO 1011 MMB
 SUPERECO 2011 MMB
 SUPERECO NB 2011 MMB

The bi-axially or mono-axially oriented polypropylene film products mentioned above are manufactured by Super Film Ambalaj and incorporate TDPA® additives (Totally Degradable Plastics Additives) supplied by EPI Environmental Products Inc. The PP film has a controlled, limited life (16 – 18 months when stored and handled/used as per recommendations attached) and once discarded in a landfill or accidentally littered will soon start degrading (after approximately 1 – 6 months, depending on the environment and local environmental conditions) and ultimately biodegrade releasing into the environment water, carbon dioxide and a small amount of biomass. The degradation processes, as well as the testing procedures/methodology are described in ASTM D 6954 – 04 standard guide. The complete degradation process might take 18 – 24 months based on local environmental conditions.

The PP film incorporating the TDPA® has the same physical, chemical, mechanical or optical performance characteristics as the regular PP film but has a controlled life. The external factors (triggers) which will initiate the degradation process are the heat (e.g. in a landfill, in soil or composting facilities) and/or UV radiation (e.g. direct sun exposure) and the mechanical stress will always enhance the effect of the other two factors (triggers). As long as the degradation process is not triggered (within the shelf/service life) the PP film can be recycled as any other regular PP film and converted into either degradable or regular finished products with no negative impact on product quality and performance.

The degradation process is a two-stage mechanism. The first step is abiotic and follows the chemical degradation of polyolefins: the oxygen attacks the polymeric chains of carbon and breaks them down into smaller molecules which will now incorporate oxygen as organic functional groups: (aldehydes, ketones, carboxylic acids, hydro-carboxylic acids, alcohols, etc.). The fragments are polar and attract water (are hydrophilic – as opposed to the original PP



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polymer which repels water). The three modifications i.e.: oxygen is now incorporated, the molecular size is greatly reduced and the fragments are hydrophilic - to create the positive conditions for the second microbiological step: the microorganisms (bacteria, fungi, algae) consume these fragments in their trophic process releasing water, carbon dioxide and biomass.

The PP film has a safe chemical composition and complies with plastic materials regulations referring to toxic chemical components. None of the ingredients incorporated is a GM product. No heavy metals, as listed per USA – EPA (Environmental Protection Agency) regulations/specifications are incorporated (antimony, arsenic, barium, cadmium, chromium, copper, lead, mercury, molybdenum, nickel, selenium, silver, zinc). The PP films do not incorporate lead, cadmium, hexavalent chromium or mercury and complies with the specific requirements in the EC – Directive 94/62/EC (20.12.1994), as well as CONEG (The Coalition of North-West Governors – USA) i.e: the total concentration of lead, cadmium, mercury and hexavalent chromium present in the PP films mentioned above is below 100 parts per million by weight. If some of these metals are accidentally tested positive they were not intentionally added (contamination) during the manufacturing process. The PP films comply with the specifications of the EC Directive 2002/16/EC regarding the epoxy derivatives. No such chemical compounds are incorporated or released during the manufacturing or degradation processes.

The PP films incorporating TDPA® additives are safe to be used in direct food contact applications. The PP film components are listed in the FDA GRAS List (Generally Recognized As Safe) for direct addition to food or have passed the mandatory FDA registration and validation testing. The GRAS chemical substances are also safe to be used in food-contact articles – e.g. packaging – as per 21 C.F.R. Paragraphs 174.5 (d) (1) and 184.1. (a). For the components not cleared as GRAS, migration studies along with the associated validation testing were conducted to determine whether and to what extent the substances are expected to migrate from packaging into food. Based on complete lab trials PP film products may be used as intended and their use fully comply with Federal, Food, Drug and Cosmetic Act and all other applicable food additive regulations for plastic packaging in direct contact with foods at temperatures up to and including Condition of Use C (“Hot filled or pasteurized above 150°F” – See 21 C.F.R. Paragraph 176.170(c), Table 2).

The ingredients in the PP films mentioned above are listed in Annex II, Section A of EU Directive 2004/19/EC (the latest revision of the EU Directives 2002/72/EC and 90/128/EC). The films meet the Specific Migration Limit (SML) for their ingredients. The majority of ingredients are listed as permissible chemical compounds to be used with no restrictions. For the ingredients subject to SML, migration studies (aqueous, acidic, alcoholic, dry and fatty foods), along with the associated validation testing were conducted, under the “hot fill”



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conditions: temperatures between 70°C and 100°C as per the EC Directive 97/48/EC. Based on complete lab trials these components may be incorporated as intended and the use comply fully with the requirements of:

- The Plastics Directive 2002/72/EC throughout the EU Member States (and, accordingly to EU Directive 2004/19/EC)
- The Frame Work Directive - Directive 89/109/EC (and, accordingly to EC N 1935/2004).

The statements and claims made in this document are in compliance with:

- EU Council Directive 84/450/EEC as amended by council Directive 97/55/EC
- ISO 14021:1999

and

- Section 5 of the Federal trade Commission Act, 15 U.S.C. § 45.

EPI Environmental Products Inc.

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