

Plastolyn™ R1140

Hydrogenated hydrocarbon resins for improved film properties in flexible packaging



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Plastolyn™ R1140 is a high-softening point (140°C) amorphous hydrocarbon resin developed to modify polypropylene (PP) films. It is produced by polymerization and hydrogenation of a specific C9 hydrocarbon feed stream. Plastolyn™ R1140 provides excellent compatibility with PP and, because it increases the glass transition temperature of the amorphous phase, it offers improved film stiffness (modulus), a critical property in film applications. Since a thinner film with equal stiffness is possible with Plastolyn™ R1140, it is a cost effective choice for twist-wrap and film packaging. Additionally, Plastolyn™ R1140 has been approved for food contact by the European Food Safety Authority (EFSA).

The amount of resin added has a direct relationship to the stiffness and optical properties of the film and the optimization of the shrinkability process parameters.

Properties

Typically, the addition of 5% Plastolyn™ R1140 provides an increase in stiffness of up to 30%, as well as an increase in the tensile strength. At addition levels of 8%–10%, Plastolyn™ R1140 offers the added benefit of dead-fold and twistability properties in oriented and non-oriented films.

Testing has confirmed that, at an addition level of only 5%, Plastolyn™ R1140 improves film appearance with enhanced gloss and clarity up to 40%. Furthermore, it has demonstrated that it is one of the most efficient agents for this purpose on the market.

APPLICATION EXAMPLE

Twist-wrap film (both BOPP & cPP)

In order to generate the dead-fold properties required for this grade, 12% Plastolyn™ R1140 was added to the core layer of a cPP film on a commercial line. The appearance of the film improved and the high stiffness contributed to good dead-fold properties, hand feel, and product bulk. Additionally, it was reported that the cPP film was metalized without issues and had good metal receptivity.



Process

A shrink film enables a product to be packed tightly and esthetically and is perceived as an integral part of the package. It protects not only the contents of the box, but also the print on the package. On a typical BOPP production line, the degree of shrinkage in a heat-set film is a maximum of 3% but with the addition of Plastolyn™ R1140, shrinkage can be increased as high as 15%. Generally, for optimal packaging, only 10%–12% would be required.

The use of Plastolyn™ R1140 broadens the operating window at lower energy consumption (lower T). For example, the temperatures typically can be reduced by 5°C in extrusion and 10°C in stretching. This allows for the selection of low melt flow index (MFI) PP materials while retaining good processability. The Plastolyn™ R1140 material does not adversely change the PP rheology and has little effect on throughput.

APPLICATION EXAMPLE

Shrink over wrap film for solid carton boxes

A production run performed on a commercial BOPP line evaluated Plastolyn™ R1140 in a down gauged high stiffness film against a competitive product. The film,

successfully produced with the addition of 5% Plastolyn™ R1140 as the active component, provided a shrink value of 8% and met the high gloss and clarity specifications for this grade. Plastolyn™ R1140 was more efficient than the competing product, resulting in 20% lower addition levels.

Regulatory

Plastolyn™ R1140 hydrocarbon resin meets the specifications for petroleum hydrocarbon resins (hydrogenated) as listed in Directive 2008/39/EC (the 5th Amendment to the Plastics Directive 2002/72/EC; reference PM/REF number 72081/10).

This substance is listed as a lipophilic substance for which a “fat reduction factor” applies (reference Annex IV of Directive 2007/19/EC).

Plastic articles containing this resin will be subject to the overall migration limit of 10 mg/dm² or 60 mg/kg of food.

Regarding the dual use additives provision in Directive 2004/19/EC as amended, this product does not contain any additives subject to restrictions on concentrations in food as a direct food additive.

- Provides improved film stiffness
- Enables dead-fold and twist-wrap ability
- Enhances gloss and clarity
- Offers a variable degree of shrinkage
- Improves processability
- Complies with the European Food Safety Authority (EFSA) directives for food contact

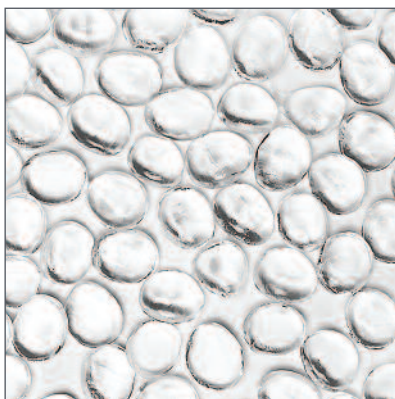


Plastolyn™ R1140 improves the rigidity and appearance of the film when used with biaxially oriented polypropylene (BOPP), mono-axially oriented polypropylene (MOPP), cast unoriented (cPP) and single or double bubble-blown polypropylene. It also allows the production of shrink films and widens the operational envelope on oriented film lines. Most notably, these benefits are achieved without any hardware modification of existing lines.



In the shrink film market where both film appearance and film stiffness are important, Plastolyn™ R1140 provides these advantages along with offering broader possibilities in processing the film.

Plastolyn™ R1140 added to PP produces crystal-clear pellets.



EASTMAN

Eastman Chemical Company Corporate Headquarters

P.O. Box 431
Kingsport, TN 37662-5280 U.S.A.

Telephone:
U.S.A. and Canada, 800-EASTMAN
(800-327-8626)
Other Locations, (1) 423-229-2000
Fax: (1) 423-229-1193

Eastman Chemical Latin America

9155 South Dadeland Blvd.
Suite 1116
Miami, FL 33156 U.S.A.

Telephone: (1) 305-671-2800
Fax: (1) 305-671-2805

Eastman Chemical B.V.

Fascinatio Boulevard 602-614
2909 VA Capelle aan den IJssel
The Netherlands

Telephone: (31) 10 2402 111
Fax: (31) 10 2402 100

Eastman (Shanghai) Chemical Commercial Company, Ltd. Jingan Branch

1206, CITIC Square
No. 1168 Nanjing Road (W)
Shanghai 200041, P.R. China

Telephone: (86) 21 6120-8700
Fax: (86) 21 5213-5255

Eastman Chemical Japan, Ltd.

AIG Aoyama Building 5F
2-11-16 Minami Aoyama
Minato-ku, Tokyo 107-0062 Japan

Telephone: (81) 3-3475-9510
Fax: (81) 3-3475-9515

Eastman Chemical Asia Pacific Pte. Ltd.

#05-04 Winsland House
3 Killiney Road
Singapore 239519

Telephone: (65) 6831-3100
Fax: (65) 6732-4930

www.eastman.com



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