EASTMAN

Addition of Plastolyn™ R1140 hydrocarbon resin to biaxially oriented polypropylene (BOPP) for increased shrinkage and improved optics

Overwrap shrinkfilm application

A shrink film enables a product to be packed tightly and aesthetically 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 biaxially oriented polypropylene (BOPP) production line, the degree of shrinkage in a heat-set film is a maximum of 3%, but with the addition of Plastolyn™ R1140 hydrocarbon resin, shrinkage can be increased as high as 15%. Generally, for optimal packaging performance, only 10%–12% shrinkage would be required.

Plastolyn™ R1140 is a hydrogenated hydrocarbon resin which, when added to polypropylene, effectively increases the MFI of the blend; therefore it is highly important to optimize the temperature settings during film production to ensure the most efficient blend ratio is obtained.

Addition of Plastolyn™ R1140 improves the film stability during production, meaning less web breaks and an improved thickness profile, therefore it is possible to reduce temperature during orientation.

It is advisable to add Plastolyn™ R1140 to both the core and skin layers, thus ensuring that both layers can be stretched at the lower temperature, preventing any mismatch between the two.

It is of interest to find the optimal stretching temperature for the most efficient use of Plastolyn™ R1140. Machine type, settings and raw materials differ from line to line, it is therefore of utmost importance to determine the most favorable temperature and stretching speed settings in order to obtain the desired shrinkage level and optimal performance.

Temperatures in extrusion, preheating, machine direction orientation (MDO) stretching, transverse direction orientation (TDO) stretching and annealing must be lowered for optimal production.

Extrusion: A reduction of extrusion temperature by 10–15°C is possible with the addition of 10 wt% Plastolyn™ R1140.

MDO: Both preheating and stretching temperatures can be reduced by 10°C with the addition of 10 wt% Plastolyn™ R1140.

TDO: Both preheating and stretching must be done at a reduced temperature. A reduction of at least 10–15°C is recommended when using an addition level of 10 wt% Plastolyn™ R1140.

Annealing is advised to be done at 5–7°C less than stretching temperature.

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