

PLUSS[®]



Pluss Polymers is an offshoot of Manas, established to develop and market new technologies and products developed inhouse. Pluss Polymers was incorporated in 1993 to commercialise the technology for grafted modified polymers and alloys and blends. Backed by competent technical staff, laboratory facilities, a good library and technical database with a retrievable wealth of information marketed the OPTIM[®] brand of grafted polymers for the first time in India in 1996.

OPTIM[®] coupling agents and compatibilisers allow plastics manufacturers of world class quality products to *OPTIMise* their compound properties. The ADNYL[®] range of nylon alloys provide the user with extra tough nylon for increased strength.

Profiles and other rigid and flexible containers for thermal energy storage have also been introduced in India for the first time by Pluss Polymers.

OPTIM[®] Chemically Modified Polyolefines

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Product : **OPTIM[®] E-142 & E-143**

Series : 100

Description : Grafted LDPE resins with anhydride and acid functionality having additional ester component over OPTIM[®] E-126.

Appearance : White to off white free flowing pellets / granules.

Properties	E-142	E-143
Density g/ml	0.925	0.925
Tm (DSC) °C	103	103
MFI (190°C, 2.16 Kg)	4.0	6.0
MAH content (% min)	0.9 – 1.3	0.5 – 0.8

Applications

OPTIM[®] E series is suitable for making nylon-6 alloys and as coextrudable adhesive between nylon-6 and LDPE and other similar polymers. It may also be used as compatibiliser for glass filled nylon alloys and for a range of polar and non-polar polymer mixtures. **E-142** may be used for in-situ nylon alloying in injection moulding machine. Different MFI and MAH content of the grades allows choosing the material suitable from processing point of views. **E-143** gives nylon alloy viscosity lower than that made with **E-142**. This would be preferred for difficult to fill mouldings or for extrusion applications requiring higher flow (MFI) of the alloy. Due to their limited thermal stability these materials may not be used for nylon 6,6, for which OPTIM[®] **E-126** is recommended.

Nylon Alloys

Series 100 OPTIM[®] resins are based on LDPE, having acid and anhydride groups grafted on the back bone. Although polyethylene on its own will not blend with nylon but the anhydride groups react with the amine end groups in nylon and thus compatibilise polyethylene moiety, as shown in figure.

Such nylon alloys have excellent impact properties even at low temperatures. The additional ester groups facilitate wetting of glass fibres for improved dispersion and impact properties in glass filled nylon alloys.

Properties of Alloyformed are determined by a number of factors. Some of the important ones are:

1. Shear rate
2. Residence time
3. Temperatures
4. Grade of Nylon
5. Composition and
6. Additives package

In-situ Nylon Alloying

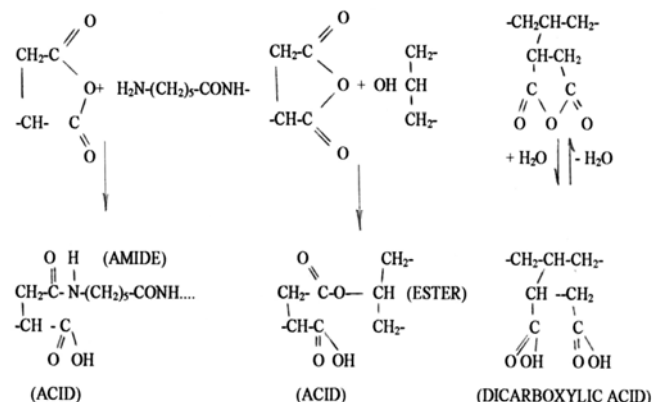
OPTIM[®] E-142 can be hopper blended with nylon and moulded into small or large components using screw type

injection moulding machine providing adequate mixing. At the nylon processing temperatures, an alloy is formed in injection moulding machine itself, having good impact properties. The presence of additional ester groups ensures good blending during shorter residence time in injection moulding machine as compared to a compounding machine.

Cable Wrap

OPTIM[®] E-142 or E-143 are may be used for lamination on aluminium foil and cable wrap and similar applications. It has excellent adhesion to aluminium foil and good heat seal characteristics, which can be used to advantage in processing and application.

Anhydride-Amine/Hydroxyl Reaction



Processing conditions

The coupling reaction is slow at 200°C and estimated to be over in less than 2 min. at 240°C. Thus, for any application, resin residence time in extruder compounding equipment is adequate for the above reaction and coupling to occur. Normal nylon processing temperatures are adequate. Maximum melt temperature should, however, not exceed 260°C.

Stoppages: For short interruptions, the extruder should be kept running at low speed (as low as possible).

Drying: These resins are mildly hygroscopic. Our recommendation is that prior to processing the material should be dried in hopper dryer or oven at 80±5°C for 2-4 hours.

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The information given here is meant as a guide to determining suitability of our products for the stated applications. The products are intended for use in industrial applications. The users should test the materials before use and satisfy themselves with regard to contents and suitability in the desired application. We guarantee that our products will meet our written specifications. Nothing herein shall constitute any other warranty expressed or implied. Recommendation herein may not be construed as freedom to infringe/operate under any third party patents. In the event of a proven claim, our liability is limited only to replacement of our material and in no case shall we be liable for special, incidental or consequential damages arising out of usage of our material.