

# PLUSS<sup>®</sup>



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<sup>®</sup> brand of grafted polymers for the first time in India in 1996.

OPTIM<sup>®</sup> coupling agents and compatibilisers allow plastics manufacturers of world class quality products to *OPTIMise* their compound properties. The ADNYL<sup>®</sup> 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.

## Chemically Modified Polyolefines

## TECHNICAL DATA SHEET

Product : **OPTIM<sup>®</sup> E-156**  
 Series : 300  
 Description : Grafted Polyethylene with anhydride and acid functionality.  
 Appearance: Off white to light yellow free flowing granules / pellets.  
 Properties :

|                      |               |
|----------------------|---------------|
| Density              | : 0.954 gm/ml |
| MFI (190°C, 2.16 Kg) | : 4.5         |
| MAH Content          | : High        |
| High                 | : 0.9-1.5%    |

**Applications**

This **OPTIM<sup>®</sup>** grade is used as compatibilizing agents for fillers and reinforcement with HDPE compounds. It also acts as wetting and dispersing aids for colours and pigments. **OPTIM<sup>®</sup> E-156** is based on homopolymer HDPE.

**As Coupling Agent for Fillers and Reinforcements**

**OPTIM<sup>®</sup>** grafted polyethylene act by improving interfacial adhesion between the filler and polymer matrix. Thus, the polar functional groups in **OPTIM<sup>®</sup>**, bond with the surface of fillers like calcium carbonate, talc, mica and glass fibres, while the PE backbone mixes well with the matrix polymer. This results in better dispersion of the filler and enhancement of mechanical properties of the compound.

Higher filler loadings are also made possible. In this, **OPTIM<sup>®</sup>** replaces the part of conventionally used low molecular weight additives and waxes which have a tendency to plate out and form undesirable die deposits during processing. Level of addition of **OPTIM<sup>®</sup> E-156** for glass filled PE varies between 1-5% depending upon the mixing efficiency of the compounding equipment used and properties required.

**As Wetting and Dispersing Aid for Colours / Pigments**

**OPTIM<sup>®</sup>** acts in this application the same way as it does in the filled PE compounds. The acid and anhydride functionality, together with the high MFI causes good wetting and consequently improves dispersion of the pigment. The pigment agglomerates break down more effectively, leading to an increase in the 'strength' of the colourant for a given pigment loading. Recommended usage level varies between 1 to 3% of total mix.

**As Coupling Agent for Agricultural Waste and Plastics Composites.**

**OPTIM<sup>®</sup>** grafted polyethylene is used in wood fiber/rice husk/ jute and other cellulosic agricultural waste coupling to the base HDPE polymer matrix. Filler loadings of as high as 60% agricultural waste have been achieved using **OPTIM<sup>®</sup>** grafted polyethylene as well as polypropylene. Level of addition of **OPTIM<sup>®</sup> E-156** varies between 1-5% depending upon the mixing efficiency of the compounding equipment used, filler loading and properties required.

**Processing Conditions**

The coupling reaction provided by series 100 resins are slow at 200°C and estimated to be over in less than 2 min. at 240°C. Thus, for any application, the normal resin residence time in an extruder system or a compounding equipment is adequate for the said reaction and the resultant coupling to occur.

Maximum processing temperature should not exceed 280°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

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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. This datasheet is subject to change without notice.