

# Eastman G™ polymers

Superior coupling agents for polyolefin composites

## Introduction

Eastman offers Eastman G™ polymers, a broad range of functionalized polyolefins that are medium molecular weight polypropylene (PP) and polyethylene polymers. They are available with different degrees of functionalization to meet specific application requirements.

Eastman G polymers can be used as coupling agents, processing and dispersing aids, compatibilizing aids, and adhesion promoters.

## Product portfolio

Eastman G-3003 and G-3015 are maleic anhydride grafted polypropylenes recommended as coupling agents for polypropylene composites.

Because of the polarity and anhydride functionality, these functionalized polyolefins are useful for laminating and as compatibilizers for PP blends with nylon or EVOH. These materials are also used to enhance the strength of composites that utilize reinforcements/fillers such as fiberglass, natural fibers, minerals, and metals.



Reinforced plastic composites in automotive applications

## Applications

### Coupling agents

Eastman G™ polymers provide optimum functionality and molecular weight to minimize phase separation between polar reinforcements/fillers and nonpolar polymers in filled composites. The functional groups present on the polymer backbone act as the chemical links between the base polymer and the functional groups present on the surface of various polar reinforcements and fillers. As functionalized polyolefins chemically link to the surface of the reinforcement/filler, they also cocrystallize with the base polymer. This creates a composite with increased thermal and physical properties. The functionalized polyolefins enhance the properties of composites containing various reinforcements/fillers such as fiberglass, wollastonite, talc, mica, calcium carbonate, aluminum trihydrate, magnesium hydroxide, and natural fibers such as wood, flax, and jute.

### Adhesion promoters

Eastman G™ functionalized polyolefins can be used as additives to olefinic plastics and rubber to increase the polarity and surface energy of the material. This enhances the adhesion of a rubber or plastic compound to any polar surface such as metal, nylon, or natural fiber which may be useful in many applications such as extrusion coating or injection molding.

### Processing and dispersion aids for plastics and rubber compounds

The addition of small amounts of Eastman G™ polymers can substantially improve the processability and/or dispersion characteristics of fillers and pigments in polyolefin plastics and rubber compounds. Improved wet out of the filler or pigment reduces the viscosity of the compound, which permits incorporation of higher levels of fillers or better dispersion of pigments and fillers.

### Compatibilizing additives for rubber and plastic modification

Functionalized polyolefins perform as compatibilizers and coupling agents in polymer alloys, permitting the mixing of otherwise incompatible polymers such as polypropylene and nylon. Eastman G™ polymers are particularly effective when one polymer is polar and the other polymer is nonpolar. This allows the formulator to produce compounds with the desirable characteristics of engineering plastics while improving processability and cost by incorporating polyolefin materials. Eastman G polymers are also useful as compatibilizers for polyolefins and EVOH.

### Natural/wood fiber composites

Eastman G™ polymers strengthen wood plastic composites and natural fiber reinforced polyolefins. Their maleic functionality wets out and bonds natural fibers into the base polymer to increase tensile strength and other physical properties substantially. These functionalized polyolefins are especially useful for strengthening highly filled composites with 50%–60% wood fiber loadings.



Natural/wood composite decking and railing

## Typical physical properties of Eastman G™ polymers

### Functionalized polyolefins

| Products       | Polymer type | Acid number<br>(mg KOH/g) | Melting point, <sup>a</sup><br>°C (°F) | Viscosity, Brookfield | Molecular weight <sup>b</sup> |
|----------------|--------------|---------------------------|--|-----------------------|-------------------------------|
|                |              |                           |  | @ 190°C (374°F)       | Mw                            |
| Eastman G-3003 | Ma-PP        | 9                         | 158 (316)                              | 60,000 cP             | 52,000                        |
| Eastman G-3015 | Ma-PP        | 15                        | 156 (313)                              | 18,000 cP             | 47,000                        |

<sup>a</sup>DSC TM

<sup>b</sup>Molecular weight measured via Gel Permeation Chromatography (GPC) using polystyrene standards

## Packaging

Both Eastman G polymers are supplied as free-flowing pellets packaged in 22.7-kg (50-lb) bags. Bulk bag or bulk box packaging can be made available on a made-to-order basis.

Eastman G polymers are products of Eastman Chemical Company and are produced under one or more of the following U.S. patents: 5,955,547 and 6,046,279 and their foreign equivalents.



Plastic composites in appliances

Call Eastman today to discover key manufacturing benefits of Eastman G™ polymers in your polyolefin composite, polyolefin alloy, or other applications.



**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.**

Building C, No. 399 Shengxia Road,  
Pudong New District  
201210, Shanghai, P.R. China

Telephone: (86) 21 6120-8700  
Fax: (86) 21 5027-9229

**Eastman Chemical Japan Ltd.**

MetLife 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.**

9 North Buona Vista Drive  
#05-01 The Metropolis Tower 1  
Singapore 138588

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

[www.eastman.com](http://www.eastman.com)

Although the information and recommendations set forth herein are presented in good faith, Eastman Chemical Company makes no representations or warranties as to the completeness or accuracy thereof. You must make your own determination of their suitability and completeness for your own use, for the protection of the environment, and for the health and safety of your employees and purchasers of your products. Nothing contained herein is to be construed as a recommendation to use any product, process, equipment, or formulation in conflict with any patent, and we make no representations or warranties, express or implied, that the use thereof will not infringe any patent. NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, OR OF ANY OTHER NATURE ARE MADE HEREUNDER WITH RESPECT TO INFORMATION OR THE PRODUCT TO WHICH INFORMATION REFERS AND NOTHING HEREIN WAIVES ANY OF THE SELLER'S CONDITIONS OF SALE.

Safety Data Sheets providing safety precautions that should be observed when handling and storing our products are available online or by request. You should obtain and review available material safety information before handling our products. If any materials mentioned are not our products, appropriate industrial hygiene and other safety precautions recommended by their manufacturers should be observed.

© 2014 Eastman Chemical Company. Eastman, Eastman G, and The results of insight are trademarks of Eastman Chemical Company.