



# HIGH DENSITY POLYETHYLENE MASTERBATCH WITH GRAPHENE OXIDE (MB-HDPE/GO)



# DATA SHEET

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### Description

The MB-HDPE/GO is a granular material of high-density polyethylene with functionalized graphene oxide (Graphenemex®) that is part of a new line of nanotechnological additives designed to improve tensile strength, fatigue, and impact resistance, among other properties.

### Features

The external appearance of the product is of a granulated material for greater ease of dosing and processing; its black coloration is due to the presence of graphene oxide and does not contain additional dyes.

The incorporation of low percentages of MB-HDPE/GO during the processing of pristine or recycled HDPE will provide significant improvements in the properties of the final material. Among the benefits it offers are the following:

- Increase in elastic modulus,
- Greater resistance to tension, deformation, compression, and impact,
- Greater thermal stability,
- Increased resistance to UV rays,
- Compatible with most grades of commercial HDPE.

**Note:** The benefits described are subject to tests carried out by each user and do not depend solely on the use of MB-HDPE/GO, but on its correct handling, as well as the quality of the raw materials additionally used during the transformation process.

### Use

Additive for multifunctional reinforcement in extrusion and blow molding systems. The use of MB-HDPE/GO allows the development of improved polymeric compounds in terms of mechanical, electrical, thermal, and barrier properties, among others.



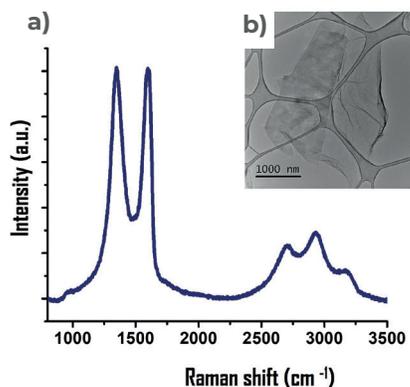
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### Components and properties

Components	CAS. No.	EC. No.	%
Polyethylene copolymer	25087-34-7	607-541-7	≥ 95
Graphene Oxide	7782-42-5	947-768-1	0.1 - 5.0
Properties			
Physical state: Solid	Moisture absorption (~23 °C, 50% RH): Not available		
Color: Dark gray to black	Alkali resistance: Excellent		
Odor: Odorless	Solubility: Not soluble in water		
Density: 0.954 g/cm <sup>3</sup>	Oxidising properties: Not considered an oxidizing agent		
Melt Flow Rate (MFR): 0.35 g/10 min	Molecular weight: Not available		
Dynamic viscosity: Does not apply	pH: Not available		
Extrusion speed: Not available	Partition coefficient n-octanol/water: Not available		
Extruder L/D Ratio: Not available	Vapor pressure: Not available		
Melting temperature: 170- 180 °C	Tensile strength (DM): Not available		
Flashpoint: Not available	Tensile strength at yield point: 31 MPa		
Decomposition temperature: Not available	Breaking strength (DM): Not available		
Autoignition temperature: >300 °C	Elongation at breaking point (%): 640%		
Flammability (solid): 1	Flexural modulus (1% secant): 182,920 psi		

### Characterization



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Characterization of GO present in MB-HDPE/GO. a) Raman spectrum. DXR-Raman-microscope-BR51343 (Energieia Fusion, S.A. de C.V.), b) Image by High Resolution Transmission Electron Microscopy. TEM JEOL JEM-2100. Energy Dispersive Spectroscopy (EDX/EDS), Oxford, Instruments. (U.A.S.L.P.).

### Presentation

25 kg bag.



### Material handling

Dry conditions: The MB-HDPE/GO has a low moisture absorption coefficient, so it is sufficient to expose the material together with the rest of the product in a hot air dryer and then submit it to extrusion processing.

Dosage: The recommended dose is between 2 and 5% by weight with respect to the pristine or recycled HDPE polymer matrix, depending on the needs of each product. Processing recommendations- Extrusion temperature: 180°C - 220°C.

### Recommendations

Prior to use, read the product data sheet and safety data sheet.

The performance of the product may vary depending on the conditions of each project. The MB-HDPE/GO can slightly dye the final product to a smoky hue; it is advisable to carry out tests during and after the transformation process in order to determine the appropriate dose before full application according to the conditions and characteristics of the final product.

If the MB-HDPE/GO is stored in places with high moisture, it is advisable to dry the product at 60°C during 4 h, prior its processing.

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### Safety precautions

The product in its current presentation is not classified as dangerous according to the GHS.

Handle in accordance with conventional safety and hygiene practices at work.

Avoid contact with the molten polymer; the use of personal protective equipment such as safety glasses and gloves are safety requirements for personnel who could come into contact with the material during its melting and processing.

Exposure to process vapors can cause irritation to the eyes and respiratory tract.

Do not ingest.

Keep out of reach of children.



WEAR  
PROTECTIVE SUIT



USE GLOVES



WEAR  
GLASSES

### Storage

The MB-HDPE/GO should be stored in a dry place at room temperature.

Like most polymers, the product burns. They are difficult to ignite but are defined as combustible but not highly flammable. Reasonable precautions should be taken to ensure the absence of strong oxidizers and to avoid sources of ignition in warehouses and storage areas. When store large amounts of material, the warehouse must be free of dust, have clear access routes, sprinkler system, etc. The standards and regulations in force in the place of application in terms of Hygiene, Safety and Environment must be complied.

### Waste management and environmental impact

The generation of waste should be avoided or minimized wherever may be possible.

**Product:** Disposal of this product and any derivative must comply with the requirements of environmental protection and waste disposal legislation and all local authority requirements. The solid product is treated as waste material and can be disposed of as rubble or recycled.

**Totally empty containers/packaging:** Can be treated as normal waste or recycled.

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## HIGH DENSITY POLYETHYLENE MASTERBATCH WITH GRAPHENE OXIDE (MB- HDPE/GO)

### Expiration

Shelf life of 5 years in good storage conditions on its original package, indoors, in a cool and dry place, sunlight protected.

### Legal note

The information contained in this data sheet is provided in good faith and is valid only for the product to which reference is made. The information is not intended to be exhaustive, and it is based on Energeia Fusion, S.A. de C.V., current knowledge and experience, as long as the product is properly stored, handled and applied under normal conditions and in accordance with the recommendations expressed here.

Due to the variability of materials, working conditions and purpose of use, the guarantee is limited solely to the quality of the product supplied. It is advisable to carry out the pertinent tests with the product to determine its suitability before its final application. In case of changes in parameters of application or if it is planned to use for a different application, consult Technical Service. Energeia Fusion, S.A. de C.V., is not responsible for any damage that may be caused by misuse of the product.

For more information contact [contact@graphenemex.com](mailto:contact@graphenemex.com).

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