



LINEAR LOW-DENSITY POLYETHYLENE MASTERBATCH WITH GRAPHENE (MB-LLDPE/GO)



DATA SHEET

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Description

The MB-LLDPE/GO is a granular material obtained by the extrusion process from graphene oxide (Graphenemex®) and Linear Low-Density Polyethylene (LLDPE), a copolymer with butene that offers excellent processability. This masterbatch is part of a new nanotechnological additive that is highly effective in improving mechanical, thermal and UV resistance properties.

Features

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

The incorporation of low percentages of MB-LLDPE/GO during LLDPE processing achieved improvements in the properties of the final product. Among benefits it offers are the following:

- Increase in elastic modulus,
- Increased tensile strength,
- Increased resistance to tearing,
- Increased thermal stability,
- Increased resistance to UV rays.

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

Use

As an additive and/or multifunctional reinforcement, which allows the development of materials with high mechanical strength and improved gas barrier and thermal properties. MB-LLDPE/GO has good blending ability with high- and low-density polyethylene. It is an easy material to incorporate in film extrusion or coextrusion systems.



DATA SHEET

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Components and properties

Components	CAS. No.	EC. No.	%
Ethylene	74-85-1	-	91.0
Butene	106-98-9	-	7.8
Graphene oxide (GO)	7782-42-5	947-768-1	0.1 - 5.0
Properties			
Physical state: Solid	Moisture absorption (~23 °C, 50% RH): < 0.015%		
Color: Dark gray	Alkali resistance: Good		
Odor: Odorless	Solubility: Not soluble in water		
Density: 0.9234 g/cm ³	Oxidising properties: Not considered an oxidizing agent		
Melt Flow Rate (MFR): 1.8 g/10 min	Molecular weight: Not available		
Kinematic viscosity: Does not apply	pH: Not available		
Extrusion speed: Not available	Vapor pressure: Does not apply		
Extruder L/D Ratio: Not available	Partition coefficient n-octanol/water: Does not apply		
Melting temperature: 150°C	Tensile strength (DM): Not available		
Flashpoint: Not available	Tensile strength at yield point: Not available		
Decomposition temperature: Not available	Breaking strength (DM): Not available		
Autoignition temperature: >350 °C	Elongation at breaking point (%): Not available		
Flammability (solid): 1	Flexural modulus (1% secant): Not available		
Plate Properties*			
Tensile strength (yield): > 10 MPa	1% Secant Modulus: 230 MPa		
Tensile strength (rupture): > 16 MPa	Elongation at breaking point: >750 %		
Film Properties (25µm)			
1% Secant Modulus: 195/220 (1)	Elongation at breaking point: 450/600 (1) %		
Tensile strength (rupture): 31/23 (1) MPa	Dart Impact Resistance: 85 g		
Tensile strength (yield): 10/10 (1) MPa	Tear resistance: 31/123 (1) KN/m		

(* Tests performed on molded plates according to ASTM-D-1928 procedure C. (1) MD/TD.

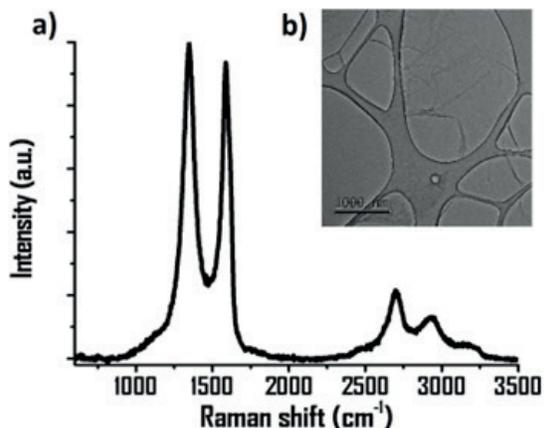
The typical values reported are obtained in the laboratory under the test methods described, are a guide and do not constitute an implicit or explicit guarantee for the application of this product.



DATA SHEET

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Characterization



Characterization of GO present in MB-LLDPE/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-LLDPE/GO, like linear polyethylene (LLDPE), has a low moisture absorption coefficient, so it is sufficient to expose the material together with the rest of the material in a hot air dryer and then submit it to extrusion processing.

Dosage: The recommended dose is between 2 and 3% by weight with respect to the pristine or recycled LLDPE-based polymeric matrix, depending on the needs of each product.

DATA SHEET

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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-LLDPE/GO may slightly dye the final product to a smoky hue; it is advisable to carry out tests during and after the transformation process to determine the appropriate dose before full application according to the conditions and characteristics of the final product. If the MB-LLDPE/GO is stored in places with high moisture, it is advisable to dry the product at 60°C during 4 h, prior its processing.

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.



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PROTECTIVE SUIT



USE GLOVES



WEAR
GLASSES

Storage

The MB-LLDPE/GO should be stored in a dry place at room temperature. Like most polymers, MB-LLDPE/GO 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. If large amounts of material are to be stored, good housekeeping of the area must be adhered to including no dust, 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.

DATA SHEET

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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.

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

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