



# POLYMERIC MACROFIBERS WITH GRAPHENE OXIDE

SECONDARY THREE-DIMENSIONAL REINFORCEMENT FOR CONCRETE



# DATA SHEET

## POLYMERIC MACROFIBERS WITH GRAPHENE OXIDE

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### Description

Polypropylene macrofibers with Graphene Oxide (Graphenemex®) are used as secondary three-dimensional non structural reinforcement of concrete. Its nanotechnological formula provides high resistance macrofilaments and superior performance within the concrete than common fibers. Additionally, the macrofibers have been designed with mechanical retentions to maximize their anchorage and to increase their interfacial bond with the concrete to improve flexural strength.

### Features

- Increases flexural strength in concrete,
- Improves the toughness, energy absorption and impact resistance of concrete,
- Reduces shrinkage cracking in fresh concrete,
- Reduces temperature cracks,
- Reduces segregation,
- Increases the mechanical strength and durability of concrete,
- Reduces the permeability of concrete,
- Does not corrode,
- Greater anti-spalling resistance in case of fire,
- High resistance to chemical attacks and alkalis,
- Reduces the cost per electrowelded mesh,
- Provides lint-free surfaces.
- Complies with ASTM C-1116 (Fiber Reinforced Concrete Specification) and ASTM C-1399 (Test to determine the average residual stress of fiber-reinforced

### Use

As reinforcement of concrete subject to light, medium or heavy traffic; parking areas; canals and dams; elements cast with sliding formwork; wet or dry shotcrete, either permanent or temporary; precast elements.

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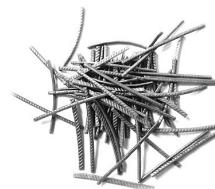
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### Components and properties

Components	CAS No.	EC No.	%
Polypropylene	9003-07-0	618-352-4	> 95
Graphene oxide	7782-42-5	947-768-1	0.1 - 5.0
Properties			
Physical state: Solid	Flammability (solid): 1		
Color: Gray	Moisture: 0%		
Odour: Odorless	Alkali resistance: Excellent		
Density: Not available	Solubility: Not soluble in water		
Specific gravity: 0.9	Oxidising properties: Not considered an oxidizing agent		
Dimensions: 2 x 44mm			
Denier: 8 DPF	Molecular Weight: Not available		
Shape (Design): crimped monofilament	pH: Not available		
Melting temperature: 160-165 °C	Partition coefficient n-octanol/water: Not available		
Flash point: > 329 °C	Vapor pressure: Not available		
Decomposition temperature: Not available	Tensile strength: 5,824 kg/cm <sup>2</sup>		
Electrical Conductivity: Low	Elasticity: 38,050 kg/cm <sup>2</sup>		

### Presentation

Box with 7 water-soluble paper bags with 4.8lb (2.2 kg) of product.



### Material handling

The macrofibers are contained in water-soluble paper bags, so they can be applied directly in the mixer inside its packaging, hence, when bags get in contact with water and during mixing those will disintegrate, and the product will be released.

#### Dosage and performance:

A 4.8 lb (2.2 kg) bag has a yield for 1.3 yd<sup>3</sup> of concrete. Equipment such as conveyor belts and dosing systems can be used to add the macrofibers to the mixing hopper and/or mixer truck. Once incorporated, it is important to mix during 3 to 5 minutes at maximum speed, to get an homogeneous mixture and uniform distribution in concrete.

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### Recommendations

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

The dosage of the macrofibers depends on the requirements of each project.

It is responsibility of the user to carry out previous tests of the reinforced concrete before executing a large load to find the adequate dosage according to the tests and conditions of the specific work.

It is not recommended to increase the water content for the dispersion of the macrofibers, this would increase the contractions due to drying and there is a risk that cracks will appear, and the resistance of the concrete will decrease.

For concentrations above 5.06 lb/yd<sup>3</sup> (3 kg/m<sup>3</sup>) in structural elements designed with ½" or larger rebar, fluidizing agents are recommended to ensure concrete flows through the reinforcement structures. This is because fibers in concrete can reduce fluidity and slump.

### Safety precautions

The product in its current presentation is not classified as dangerous.

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

The use of gloves, boots, and safety glasses is recommended for handling macrofibers, especially when it is shotcrete.

Do not ingest.

Keep out of the reach of children.



USE GLOVES



WEAD GLASSES

### Storage

The product should be stored in a dry place at room temperature, away from strong oxidizers and from sources of ignition. Avoid moisture environments; prevent the product and its packaging get wet. The standards and regulations in force in the place of application in terms of Hygiene, Safety and Environment must be complied.

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## POLYMERIC MACROFIBERS WITH GRAPHENE OXIDE

### 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](mailto:contact@graphenemex.com).

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