



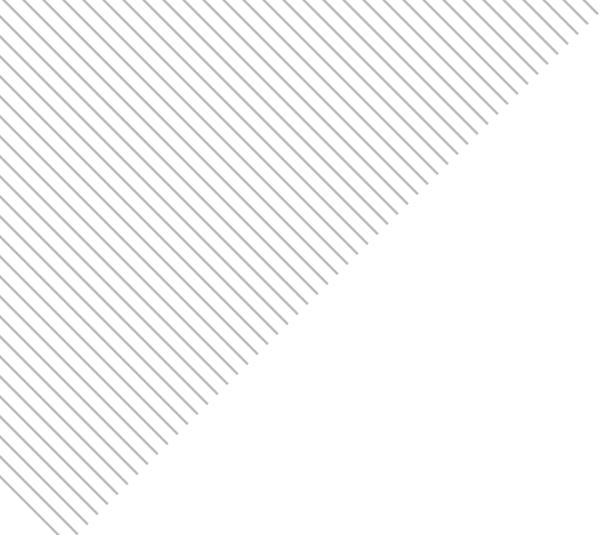
# Graphenano

SMART MATERIALS

[graphenanosmartmaterials.com](http://graphenanosmartmaterials.com)

**Build different.**





## Build different.

**Graphenano Smart Materials** is the world's first manufacturer of **additives with graphene technology for concrete**. In Graphenano we create state-of-the-art solutions with the aim of significantly improving the mechanical performance, quality and efficiency of raw materials for the construction sector.

 **Made in  
Spain**



**graphenano**   
SMART MATERIALS



# GRAPHENANO GROUP



**Graphenano** is the leading group in the production of graphene on an industrial scale. Its manufacturing system allows it to be supplied in different forms such as nanofibers, nanospheres and graphene oxide.

The Graphenano group was born in 2012 after years of research and in close collaboration with different Spanish universities. Since its creation, it has explored the possibilities and applications of graphene (I + A) with the aim of responding to all the business opportunities that arise based on the revolutionary properties of this new material.

**Graphenano Smart Materials** is dedicated to the development and application of graphene additives for advanced building materials that greatly improve mechanical performance, durability and resistance against external attacks, as well as the performance of the necessary raw materials.



**Higher resistance**



**Lightweight**



**Higher strength**



**Higher conductivity**



**Higher elasticity**



**Longer durability**

Graphenano Smart Materials products, graphene it acts as a molecular mesh that gives structural support to buildings.

# GRAPHENANO SMART MATERIALS

# WHAT IS THE GRAPHENE?

## It's nanomaterial

Smaller size than or equal to one millionth of a millimeter.

## It's bidimensional

It only presents two dimensions because it is only one- atom-wide ( $10^{-9}$  mm).

## It's pure carbon

As *graphite*\* and diamonds. Carbon atoms are tightly hold together on an even surface, as it were a honeycomb.

\* *Graphite* is composed of many graphene sheets, stacked up one over the other.

## Principal graphene properties



### Resistant

200 times stronger than steel



### Flexible

Up to 20% without damage



### Biocompatible

Medical field applied



### Conductive

Electrical & thermal conductivity



### Bidimensional

100.000 times thinner than human hair



### Environmentally friendly

Sustainable & biodegradable



### Transparent

98% transparency similar to glass

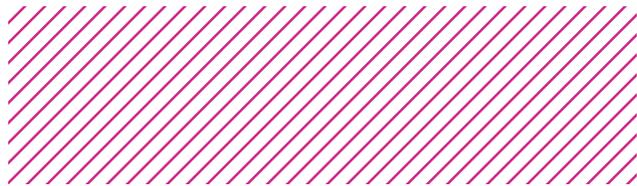


### Lightweight

1 m<sup>2</sup> weight less than 1g



**Graphene is a next-generation carbon nanomaterial that combines a large number of properties that cannot be found together in any other compound. Its incorporation to Graphenano Smart Materials additives allows to improve exponentially the technical characteristics and the performance of the concretes, in comparison with the rest of existing products in the market.**



### **Strenght & Resistance**

Its high resistance to traction and wear make graphene the perfect aggregate for concrete.

### **Bacteriostaic effect**

Graphene prevents the growth of bacteria on its surface, making it ideal for the manufacture of sanitary ware or any other application exposed to moisture.

### **Increase in the useful life of concretes**

Graphenano Smart Materials products improve all the characteristics that affect the durability of concretes and ensure their good behavior over time, making them practically invulnerable against possible attacks from agents.



### **Ecological and VOC-free**

Graphene additives reduce the cement demand necessary for the same use and characteristic resistance by up to 30%. This translates into an optimization of natural resources and a reduction of CO2 emissions into the atmosphere from the extraction, handling, production and transport of raw materials.

### **Elasticity & flexibility**

The presence of cracks and fissures during the useful life of concrete reduces the mechanical capacities of the structures. The great flexibility of graphene makes Graphenano Smart Materials additives a structural reinforcing element.

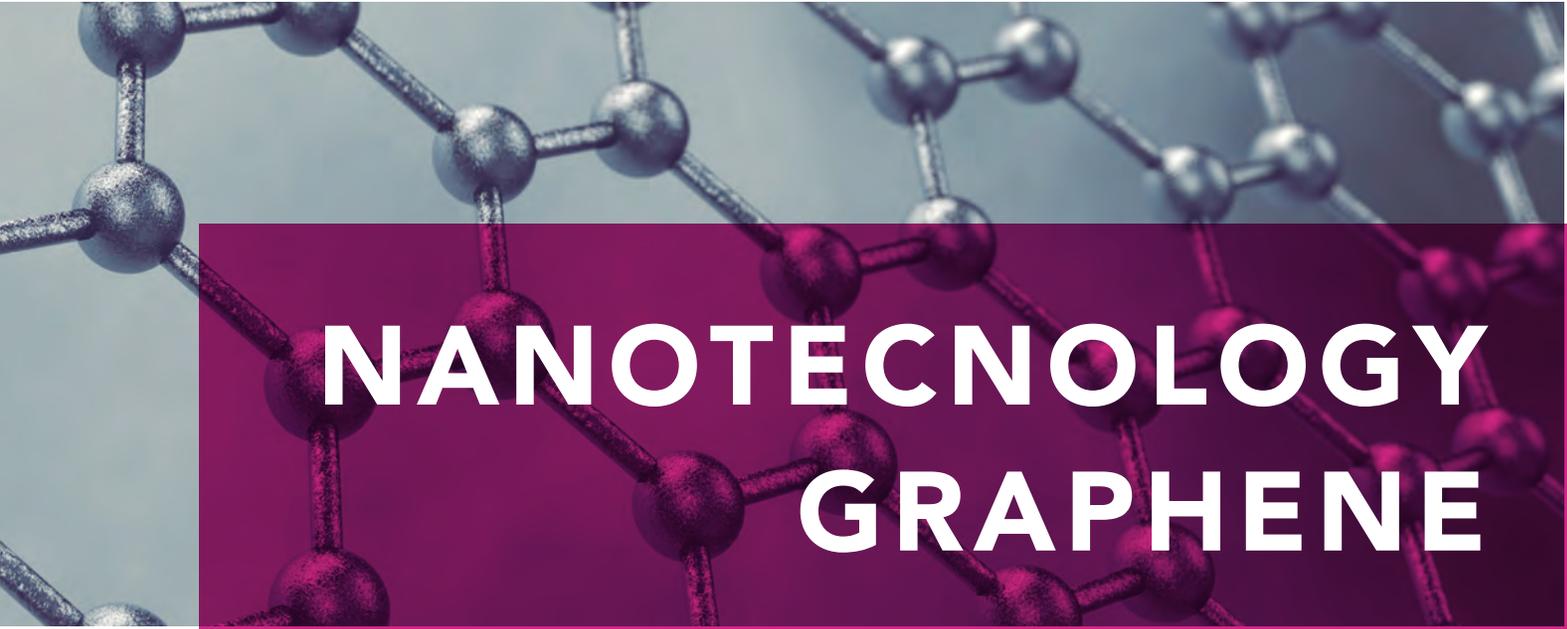
### **Lower maintenance for infrastructure**

With graphene additives, conventional concrete becomes a high-performance and quality concrete. Increasing its useful life and improving its resistance to external aggressions means a drastic reduction in maintenance costs and repairs for pathologies.

### **Increased thermal conductivity**

Increases the conductive property of concrete and mortar.

**Graphene improves concrete properties**



**NANOTECHNOLOGY  
GRAPHENE**

# Smart**ADDITIVES**

GRAPHENE CONCRETE





+ **Ecological and efficient: reduction of CO<sub>2</sub> emissions**

+ **50% more protection against chlorides and sulfates**

+ **60% improvement against carbonation**

+ **Up to 60% improvement in protection of submerged hydraulic concretes**



## Solid MECHANIC



The image shown does not belong to the final package.

## HIGH MECHANICAL PERFORMANCE

### Product Description:

**Solid MECHANIC** is a range of additives designed with breakthrough graphene technology for use in concretes in plants or ready-mixed concrete. It is indicated for high performance concretes improving quality, strength and surface finish.

### Presentation:

**Mechanic Graphene PLASTICIZER** y **FLUID** sold in bulk, in 1050 kg containers and 210 kg drums.

### ¿How does graphene additives improve concrete??

- + **Increased resistance**
- + **Great water-reducer power**
- + **Decreased porosity**
- + **Optimization of raw materials**

**Mechanic Graphene**  
**FLUID ULTRA**

**Mechanic Graphene**  
**FLUID BASIC**

**Mechanic Graphene**  
**FLUID PREMIUM**

**Mechanic Graphene**  
**SUPERPLASTICIZER**

**Mechanic Graphene**  
**FLUID PLUS**

**Mechanic Graphene**  
**PLASTICIZER**

# CONDUCTIVITY POWER

## Product Description:

New superplasticizer additive family generation based on graphene and PCE nanoparticles combination chain, for self-leveling mortars with better conductive properties and high durability performance.

## Presentation:

The Solid CONDUCTIVITY family sold in bulk, 1000 kg containers and 200 kg drums.

## ¿How does graphene additives improve concrete?

- + **Increased thermal conductivity**
- + **Increased resistance**
- + **Great water reducing power**
- + **Improved durability**
- + **Optimization of raw materials**



## Solid CONDUCTIVITY



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**Graphene Fluid  
CONDUCTIVITY G500**

**Graphene Fluid  
CONDUCTIVITY G400**

**Graphene Fluid  
CONDUCTIVITY G200**

**Graphene Plasticizer  
CONDUCTIVITY G20**

**Graphene Plasticizer  
CONDUCTIVITY G10**

**Graphene Plasticizer  
CONDUCTIVITY G5**



Solid  
**PRECAST**



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### **Precast Graphene *FLUID***

Hyperplasticising/water-reducing additive.

### **Precast Graphene *FINISH***

Demoulding agent.

## **HIGH STRENGTH & WORKABILITY**

### **Product Description:**

**Solid PRECAST** is a line of additives designed with the innovative graphene technology for the prefabricated world. These additives improve the quality and the productive process, reducing the costs and increasing to the maximum the efficiency of the concretes..

### **Presentation:**

**Precast Graphene *FLUID*** is sold in bulk, in 1050 kg containers and 210 kg drums..

**Precast Graphene *FINISH*** is sold in bulk, 1000 kg containers and 200 kg drums.

### **¿How does graphene additives improve concrete?**

- + **Increases initial and final resistances**
- + **Great hyperplastic water-reducing power**
- + **Reduced porosity**
- + **Increased impermeability**
- + **High workability**

# EXTREME SHIELD

## Product Description:

**Solid HARD** is a line of additives designed with the innovative graphene technology for concretes exposed to extreme aggressions. Indicated for highly durable concretes with reduced permeability..

## Presentation:

**Hard Graphene DURABILITY & RETRACTION** sold in bulk, 1000 kg containers and 200 kg drums.

**Hard Graphene INHIBITOR** is sold in bulk, in 1100 kg containers and in 220 kg drums.

## ¿How does graphene additives improve concrete?

- + **Enhanced waterproofing**
- + **Increased protection against chlorides**
- + **Improved protection against carbonation**
- + **Reduced porosity**



Solid  
**HARD**



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**Hard Graphene DURABILITY**  
High activity multifunctional additive.

**Hard Graphene RETRACTION**  
Drying shrink reducing additive.

**Hard Graphene INHIBITOR**  
Corrosion Inhibitor Additive.



## Solid SUPPORT



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### **Support Graphene AIR IN** Air Inclusion Agent.

**Support Graphene SET**  
Chloride-free antifreeze agent.

**Support Graphene SET-R**  
Retardant agent that regulates the setting of the concrete..

**Support Graphene COMPACT**  
Viscosity modulating agent for self-compacting concrete.

## ADVANCED COMPLEMENTARY AGENTS

### **Product Description:**

**Solid SUPPORT** is a range of complementary products for the adjustment and modification of the lines of **Smart Additives**.

### **Presentation:**

**Support Graphene AIR IN & COMPACT** are presented in bulk, in 1000 kg containers and in 200 kg drums.

**Support Graphene SET** are presented in bulk, in 1000 kg containers and in 200 kg drums..

**Support Graphene SET-R** are presented in bulk, in 1100 kg containers and in 220 kg drums.

### **¿How does graphene additives improve concrete?**

- + **Improvement of the matrix**
- + **Consistency maintenance**
- + **Increased curing**
- + **Improved workability**

# SEMI-DRY CONCRETE

## Product Description:

**Solid DRY** is a line of additives designed with the innovative graphene technology for the manufacture of semi-dry concrete..

## Presentation:

**Dry Graphene WATER-REPELLENT** are presented in bulk, in 1000 kg containers and in 1 and 25 kg bottles..

**Dry Graphene PLASTICIZER** are presented in bulk, in 1000 kg containers and in 25 kg bottles

## ¿How does graphene additives improve concrete?

- + **Improved parts durability**
- + **Increased impermeability**
- + **Reduction of absorption**
- + **Improves resistance to freeze-thaw cycles**
- + **Water-repellent properties**



Solid  
**DRY**



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## **Dry Graphene WATER-REPELLENT**

Liquid water-repellent for dry consistency prefabrication.

## **Dry Graphene PLASTICIZER**

Plasticising additive for dry-consistency prefabricated products.



## Solid **GUNITE**



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### **Gunite Graphene EU**

Non alkaline and alkali free liquid accelerant.

### **Gunite Graphene FLUID**

Superplasticising/water-reducing additive.

## **GUNITE CONCRETE**

### **Product Description:**

**Solid GUNITE** is a line of additives designed with the innovative technology of graphene for the manufacture of sprayed concrete.

### **Presentation:**

**Gunite Graphene EU** is presented in bulk, in 1363 kg containers and 250 kg drums

**Gunite Graphene FLUID** is presented in bulk, in 1050 kg containers and 210 kg drums

### **¿How does graphene additives improve concrete?**

- + Increased work rates
- + Improvement of the initial and final resistances
- + Improved durability
- + Increased thickness per layer

# HIGH STRUCTURAL REINFORCEMENT



Solid  
**FIBER**

## Product Description:

**Solid FIBER** is a line of fibers for replacement or reduction of reinforcement in fresh concrete. Compatible with the whole range of **Smart Additives**.

## Presentation:

**Fiber Graphene PVA** is presented in boxes of 15 kg.

**Fiber Graphene MACRO** is presented in bags of 4 and 6 kg, and in bags of 150 kg..

**Fiber Graphene MICRO** is presented in 600 g and 1 kg bags, and in 250 kg bags.



The image shown does not belong to the final package.

## Fiber Graphene PVA

Structural synthetic fibre for the reinforcement of very high resistance concretes.

## Fiber Graphene MACRO

Alkali-resistant monofilament polypropylene fibre for structural reinforcement.

## Fiber Graphene MICRO

Monofilament polypropylene fibre for cracking and fire resistance.



# SmartCOVER $\mu$

GRAPHENE FINISHING

Micro mortar coating with graphene  
technology





## CLASSIC System

**Graphene micromorter** ideal for innovative and sustainable floors, walls and other surfaces. It guarantees maximum resistance and toughness without neglecting the design.

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## ECO System

**Efficient graphene micromorter** for long transports, ready and ready to use. Same characteristics and application as the Classic system but with greater ease of installation.

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## AQUA System

**Graphene micromorter** perfect for walls and floors in bathrooms, kitchens and outdoors. Specially prepared to withstand loads of chlorine and salt.

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## AQUA PLUS System

**Graphene micromorter with high hydrophobic protection**, perfect in humid areas and environments in direct contact with water such as bathtubs, showers, swimming pools, saunas, etc. Specially prepared to withstand abundant loads of chlorine and salt maintained in direct and prolonged contact.

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## HARD System

**Graphene micromorter for high pedestrian traffic**, ideal for floors, walls and other surfaces of shopping centers, bars, restaurants, party venues, cinemas, etc. It guarantees great resistance to wear, abrasion and protection from stains without neglecting the design.

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## INDUSTRIAL System

**Graphene micromorter for industrial floors with high traffic**, ideal for floors in warehouses, ideal for floors in warehouses, warehouses, factories, etc. It guarantees great resistance to wear and abrasion, eliminates dust, facilitates cleaning and removes stains without neglecting the design.

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# Colours

The SmartCOVER pigmentation system allows it to be purchased in a wide variety of solid and homogeneous colors, as well as matte, gloss



White



Pale white 1



Pale white 2



Ivory



Grey pearl



Tin grey



Slate



Anthracite



Stone



Sand



Grey pearl



Silver



Wine



Clay



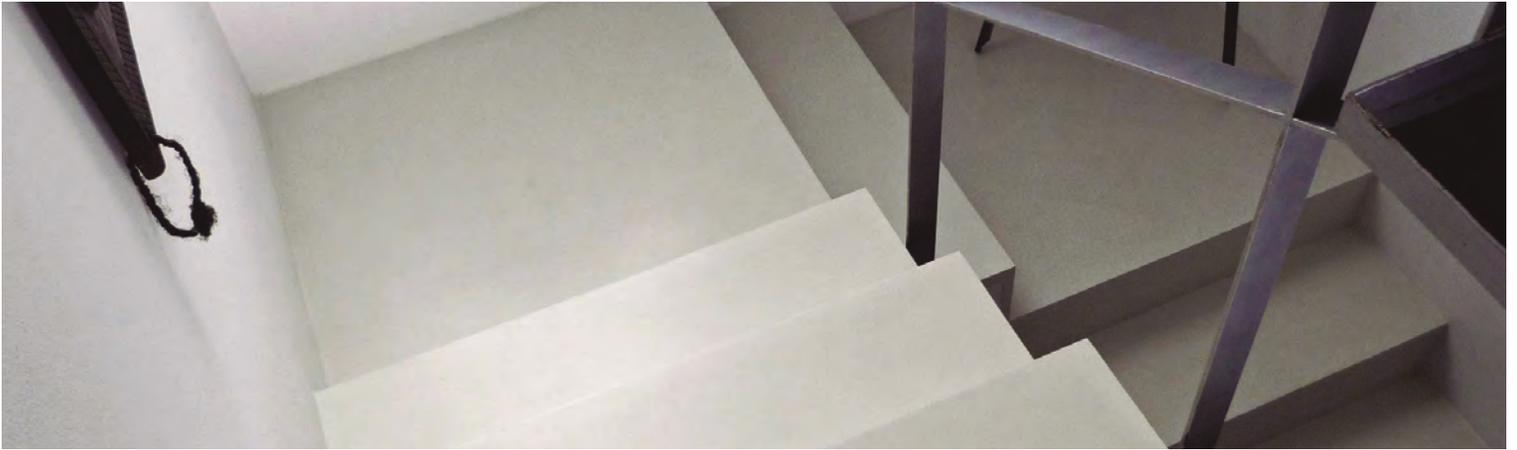
Argila



Chocolate

# Textures

SmartCOVER can present textures that mimic natural stone, space stone, slate, etc., that are waterproof and that are applied to facades and exterior walls with the intention of giving them a rustic appearance. Likewise, it can present smooth and uniform textures, equally waterproof and hygienic, ideal for interiors in which it is intended to achieve a clean and elegant style.



# Smart**CONCRETE**

GRAPHENE ADDITIVE





## Lightened concretes with structural resistance

*Lightweight standard concrete.*

Only with water, cement, graphene additives and light aggregates, eg. perlite, pumis, etc. Fine aggregates such as sand and gravel are not required.

### Density

1400-1600 kg / m<sup>3</sup>

### Relation a / c

0,46

### K Value

> 0,33 W / mK

### Resistance to compression

25 a 45 N / mm<sup>2</sup>

### Consistency

> 93 cm

### Noise Protection

> 53 dB



## Concrete with high performance desert sand

*Designed concrete with dessert sand.*

Only with water, cement, additives with graphene and desert sand. Fine aggregates such as sand and gravel are not required

### Standard Concrete

#### Density

2400 - 2500 kg / m<sup>3</sup>

#### Strenght compression

35 a 40 N / mm<sup>2</sup>

#### Cement %

270 - 280 kg / m<sup>3</sup>

### High Performance Concrete

#### Density

2400 - 2500 kg / m<sup>3</sup>

#### Strenght compression

+ 90 N / mm<sup>2</sup>

#### Cement %

360 - 380 kg / m<sup>3</sup>

# Smart **MASTER BASE**

GRAPHENE ADDITIVE





## Graphene additives for solutions in construction products

Water-based graphene nanodispersions for integration in manufacturing processes of additives for concrete and construction products.

These solutions are specially designed for manufacturers of products in the construction sector, and can in any case be configured and adapted to the manufacturing processes and requirements of each manufacturer.

This technology provides improvements in mechanical performance, durable performance and maximum efficiency.

- + **Improvement in mechanical performance.**
- + **Durable performance improvement.**
- + **Maximum efficiency of polymers and technologies in which it is used.**

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