



**O2BLOCK**

Oxygen Scavenging Additives

**Maximum Shelf Life | Easy Processing**

**O2BLOCK**  
BY nanobiomatters

# Product description

## O2Block® Oxygen Scavenging Additive

O2Block® by NanoBioMatters is an oxygen scavenging additive for polymer-based materials.

The proprietary and patent-pending O2Block® technology is based on surface-modified phyllosilicate clay that is functionalized with active iron to create a naturally sourced and highly efficient oxygen scavenging product.

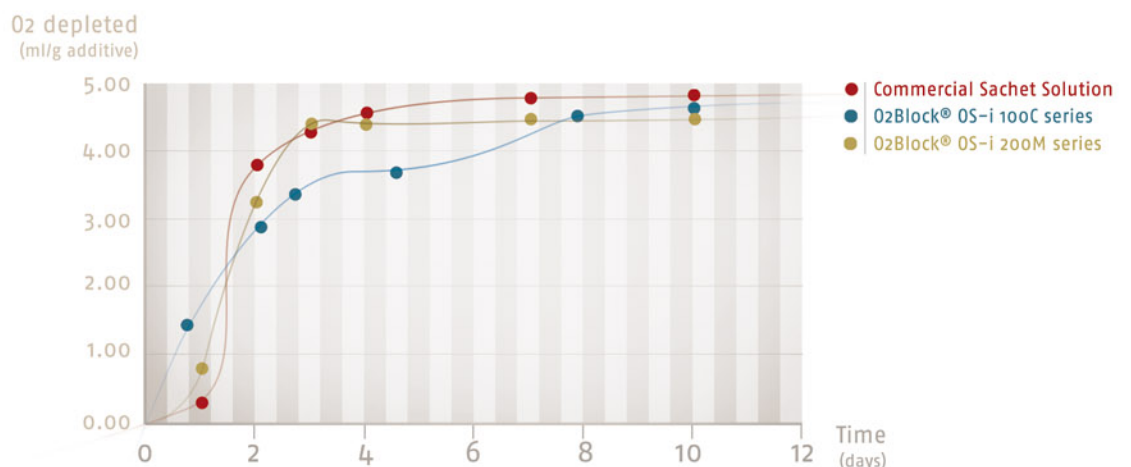
The additive is primarily designed for plastic packaging applications, where either oxygen permeation or oxygen present in the head space can cause degradation of the packaged goods. This solution is often needed in food, pharmaceutical and other industries where fatty or other oxidation-sensitive products are used.

The O2Block® additive protects the packaged goods by reacting with any oxygen present and thereby dramatically limiting the possibility of oxidation reactions that degrade the product in terms of color, functionality and organoleptic properties.

The functional ingredient in O2Block® is active iron, a naturally occurring element with well-documented oxygen scavenging properties. The O2Block® technology allows the active iron to be dispersed directly in the packaging polymer during the production process, without the need for any changes to the existing value chain.

### Additive performance without risk

The performance of the O2Block® additive is comparable to commercial sachet or packet based solutions, but without the inconvenience of having to add a foreign element to the package. This means reduced cost because no additional processing equipment is needed and reduced risk by eliminating the danger of consumers confusing the sachet with a consumable or edible product.



## Engineered Clay + Active Iron Synergies

The most innovative aspect of the O2Block® additive is that purified and modified layered clay is used as a performance-enhancing carrier of the oxygen-scavenging iron. This creates strong synergies between the two materials, especially in terms of **versatility and efficiency**.

### O2block® Versatility Your system. Your needs



The foundation of the O2Block® technology comes from our original expertise with surface modification and dispersion engineered clay additives in a wide range of polymer systems.

The unique chemical and physical treatment of the engineered O2Block® range allows us to design an additive that can be dispersed directly in almost any polymer system. The material is active immediately after being added to the packaging system. These characteristics present significant advantages over systems where sachet solutions or additional activation equipment is required.

### O2block® Efficiency Dispersion and uniform protection

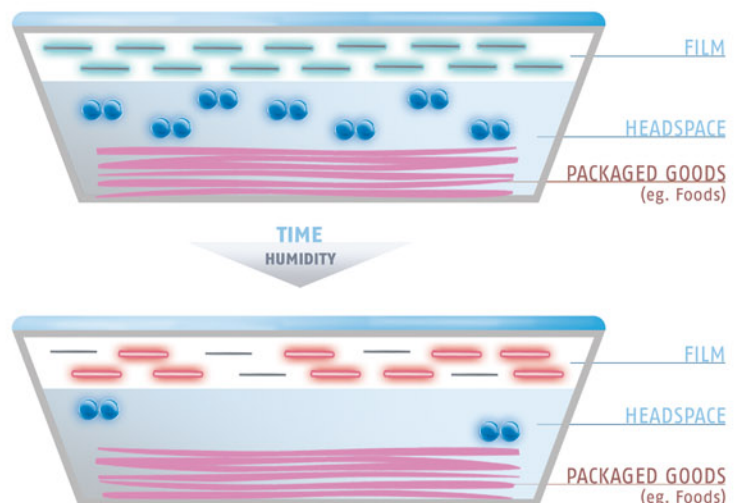


During the proprietary production process, active iron is linked to the clay surface, obtaining a uniform distribution of the active element within the additive. In addition, the iron deposited on the clay prevents platelet agglomeration, which combined with unique surface modification ensures global additive dispersion.

Compared to other commercial systems, the effective dispersion maximizes the access to the active iron, which ensures minimum reaction time and a uniform protection of the packaged goods


### Oxygen depletion directly via the polymer packaging

Highly mobile oxygen molecules are depleted from the package, by migrating through the packaging material and reacting with the dispersed active iron from the O2Block® additive. This reaction is swift and simply produces iron oxide which is linked inside the packaging.



 MOBILE OXYGEN MOLECULE

 O2BLOCK® CLAY PLATELET

 REACTED O2BLOCK® PLATELET

# O2Block® Safety and Applications

Most O2Block® applications are found in food and pharmaceutical industries where product shelf life often is directly linked to oxidation processes.

The O2Block® range is especially suited for these industries, because all of the components in the additives range are considered by the FDA to be GRAS (Generally-Recognised-As-Safe). Food contact notices for all markets including the European Union and the United States are currently being processed. This information will be available shortly.

The need to eliminate oxygen to maintain product quality can be found in many other sectors outside food and pharma industries and we will be happy to design a solution that fits your specific application.

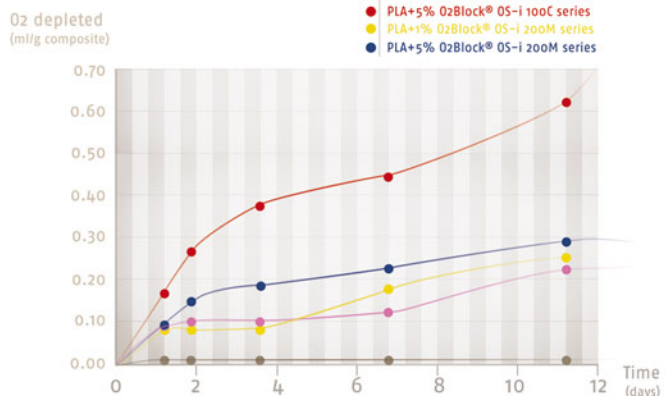
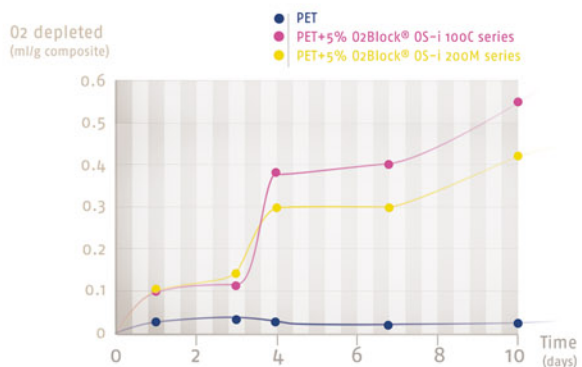
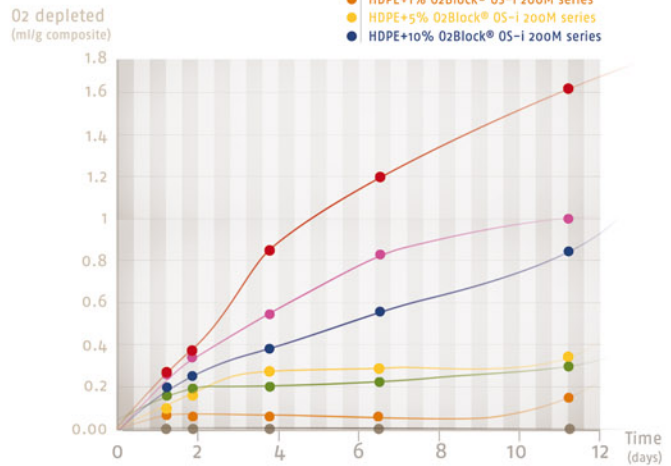
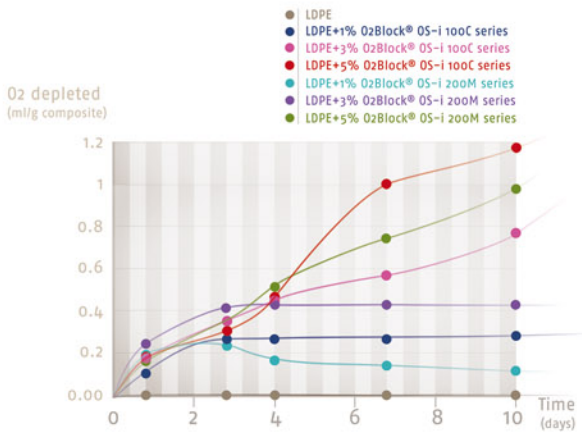


## O2Block® Dosing

O2Block® is delivered as a micronized powder or a masterbatch. Scavenging capacity is directly linked to the amount of active iron available. Dosing is therefore tailored to the individual customer needs by adjusting masterbatch loading and/or or active clay content within the additive to fit the need for depletion of oxygen.

## Compatible Polymer Systems

In terms of polymer compatibility, the O2Block® range is versatile and includes products that are compatible with a wide range of polymers. New solutions are continuously being developed for additional systems. Below are examples of performance in some of the most widely used polymers:





## Maximum shelf life Synergies and Combined Technologies

The O2Block range offers a variation of technologies that can be combined with the oxygen scavengers to target shelf life solutions for even the most demanding applications.

### **O2Block® Barrier technology**

The use of dispersed layered clays in the O2Block® products gives the added benefit of creating up to 50% increase in oxygen barrier properties in several polymer systems. For example, the oxygen scavenging technology can be used in combination with our unique O2Block® solution for EVOH multilayer films.

### **O2Block® Radical Scavengers**

NanoBioMatters is continuously developing game-changing technologies based on engineered clays to ensure maximum shelf life. We are currently developing the O2Block® RS-R series, which is a radical scavenger that use a sustainable plant extract as the active ingredient in this novel and green clay-based additive.



# TOMORROWS TECHNOLOGIES COMBINED TODAY

## About Nanobiomatters

NanoBioMatters is a material science company specialized in engineered clay-based additives.

**Our mission is to create additives that maximize the performance of materials through unique, sustainable and cost effective clay dispersion and functionalization technology.**

NanoBioMatters proprietary technology is based on naturally sourced clays, which are refined, purified and surface modified to ensure uniform dispersion and compatibility with a variety of polymer systems. The modification technology includes the addition of active functionalities and the creation novel and highly efficient products, such as antimicrobial or antioxidant additives.

The major advantage of working with highly dispersed clay additives compared to traditional additives is that it enables the enhancement of specific target properties without compromising the inherently positive properties of the original material.



### MAXIMIZING MATERIAL PERFORMANCE

Through unique, sustainable and cost-effective clay technology

NanoBioMatters production facilities have a 2500 metric ton/year additive capacity and 4000 metric ton/year master batch capacity supported by state-of-the-art laboratories for analysis and development of clay based additives in plastics.



#### **NanoBioMatters North America LLC**

Independence Wharf  
470 Atlantic Avenue - 4th Floor  
Boston - MA 02210 - U.S.A.  
Phone: +1 6172738092

#### **Nanobiomatters Industries S.L. (Head Office)**

Parque Tecnológico,  
Calle Louis Pasteur 11 - Nave 5 & 6  
46980 Paterna - Valencia - Spain  
Phone: +34 96 131 8628