



WORLD  
MINERALS®

Engineered Minerals for High Performance

# POLYMERS AND ELASTOMERS



a member of  
**IMERYS**

Engineered Minerals for High Performance

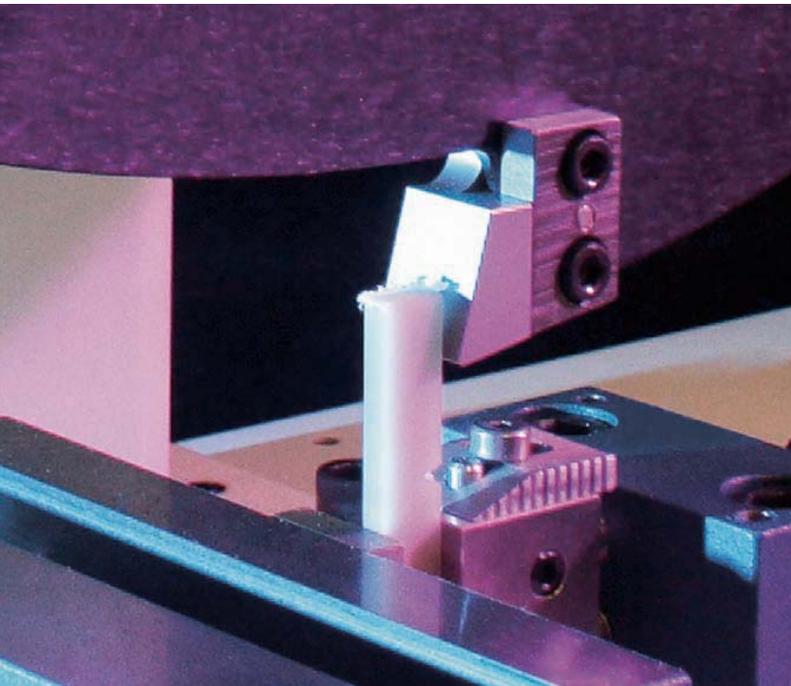
# **POLYMERS AND ELASTOMERS**



**WORLD MINERALS** is a global mining and minerals company and a world leader in the manufacturing of high quality filter aids and functional mineral additives.

Our capability involves far more than owning vast deposits of raw material. During more than 100 years in business, we have developed systems that maximize the performance of polymers in terms of cost efficiency, quality and versatility.

Our staff excels at solving problems at every step of the manufacturing process in diverse industries. Working closely with customers, we engineer solutions that enhance both your processes and your products.



## FUNCTIONAL ADDITIVES: HIGH PERFORMANCE & VERSATILITY

The versatility of our products allows for use in diverse applications in rubbers and plastics such as chemical, food, agricultural, paper and other applications. Our products act as functional fillers as an absorbent, inert carrier, a conditioner, an anti-caking agent, a diluent for reinforcement, a processing aid, for rheological control, for surface modification and many other functions. They can serve single or multiple functions in a single application.

## HOW WE ARE DIFFERENT

### QUALITY ORE RESERVES

World Minerals owns extensive reserves of high-quality freshwater and marine diatomite ore and a wide range of perlite ore.

### PRECISION PROCESSING

At state-of-the-art plants, crude ore is engineered to carefully controlled specifications such as particle size, specific surface area, color and pH. This enables us to supply you with a tailor made additive. The unique nature of our deposits and processes can give precise functional properties when selected for specific applications.

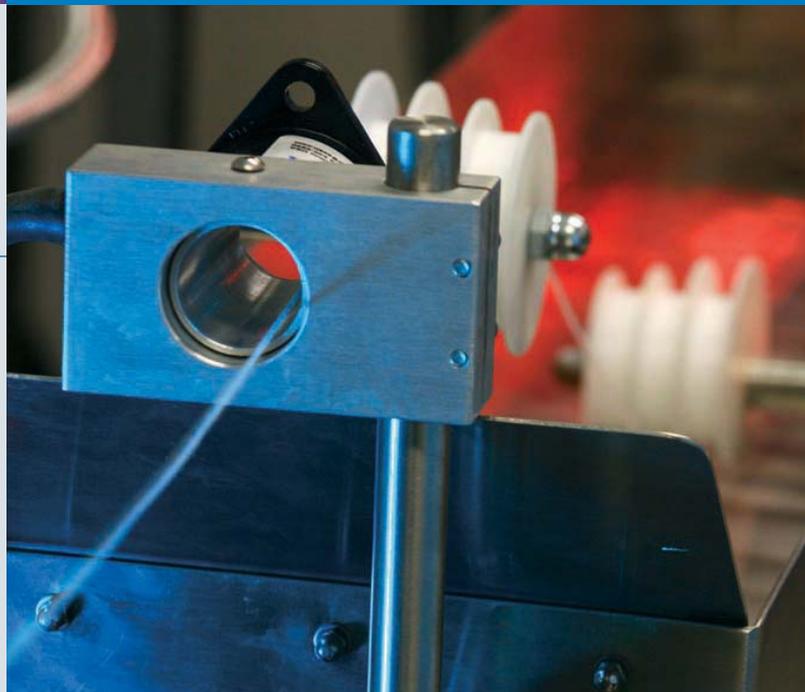
### QUALITY CONTROL COMPATIBILITY

Over the years, we have developed a sophisticated method of analyzing and benchmarking our minerals based upon standard and customized tests. Our quality systems are based on achieving and maintaining the highest possible process control capabilities. We have 15 plants certified in ISO 9001:2000 and will continue to make investments to remain the leader in quality in our industry.

### ADDING VALUE THROUGH RESEARCH

In the field, our experienced scientists and engineers work closely with plant and production managers in a wide range of industries. We offer problem-solving advice for increasing productivity or improving product quality with our existing product lines, through innovation or customized new product development. Backing up their expertise is our Research and Applications laboratory, and our extensive knowledge gained as a member of Imerys. Our primary activities include basic and applied research, product development, process improvement and pilot plant operations.

World Minerals is a member of Imerys, a world leader in adding value to minerals.



# BETTER PERFORMANCE OF POLYMER PRODUCTS



World Minerals products are extensively used in polymer applications.

## SUPERIOR FILM PERFORMANCE

Film production uses the addition of diatomaceous earth grades as an antiblock agent into LDPE, LLDPE, mLLDPE, HDPE, PP, EVA, TPU films among others. The nature of World Minerals products, in terms of surface structure, allows for low addition rates compared to other materials, giving superior antiblock performance as well as excellent effectiveness in block/reblock conditions. The relatively inert nature of the surface reduces interactions, resulting in lower usage of additives and polymer processing aids (PPA) than with other antiblock systems.

## PROCESS IMPROVEMENTS

In polymer processing, relatively small additions of our materials results in the reduction of die build up and plate out in PVC systems and other extrusions, reducing scrap, process down time and improving the surface of the extrusion.

## BENEFICIAL FILLER

In bulk polymer systems the use of our materials as a primary filler enhances mechanical properties, providing improvements such as impact resistance.

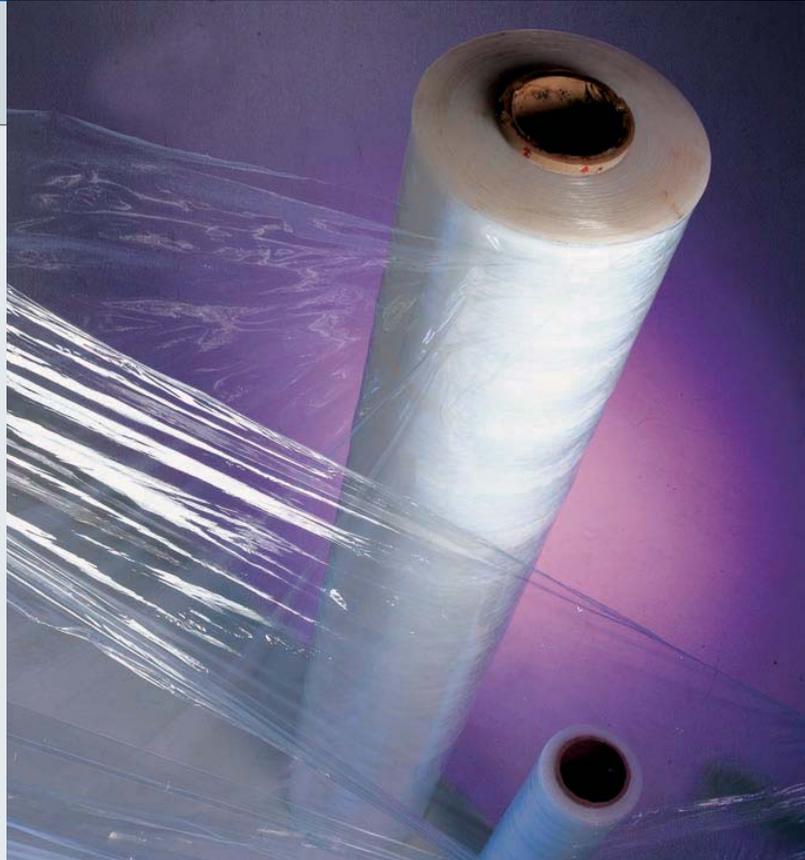
## DIATOMITE

Millions of years ago, the earth's waters were filled with countless single-celled aquatic plants called diatoms. Like the diatoms found in water today, these Jurassic plants have the unique ability to absorb silica, using it to form complex remains frameworks. Over the eons, their fossilized shells settled on the ocean and lake bottoms, forming deep deposits, which are continually replenished by succeeding generations of diatoms.

Today, the world's leading supplier of diatomite is World Minerals, with extensive worldwide reserves. The diatomite is mined and engineered for many useful applications, including filtration, mineral fillers, coating agents and carriers.

Diatomite is available as natural, calcined or flux calcined products. The key to the wide use of World Minerals diatomite as a functional additive is its unique combination of physical properties, including:

- High porosity
- Thermal and chemical stability
- Unique particle structure/high surface area
- Low specific gravity
- Low interaction with other additives
- Whiteness



## WORLD MINERALS DIATOMITE BRANDS:

Celite® | Celpure® | CelTiX™ | Diactiv® | DiaFil® | Kenite® | Micro-Ken® | Primisil®  
Snow Floss® | Super Floss® | Super-Fine Super Floss® | White Mist®

World Minerals products are widely used in the elastomer industry. The three-dimensional structure, chemical and thermal stability, whiteness and relatively low specific gravity make these minerals useful additions into a number of applications.

#### PRINCIPAL BENEFITS

The unique structure of the World Minerals products and the way they maintain their properties during compounding allows for mechanical improvements to the elastomer while having a minimal effect on compression set. This is particularly useful in engineering applications or in the seals industry.

#### GOOD REINFORCEMENT

Specific grades can provide excellent levels of mechanical reinforcement. As a white filler they can be used in pigmented systems.

#### PROCESSING ADVANTAGES

Small addition rates can result in process improvement in extrusions including elimination of sharkskin melt fracture and increased extrusion rates. In molded components this is seen by improved mold release performance.

#### THERMAL AND CHEMICAL STABILITY

The inert character and thermal and chemical resistance of our products make them ideally suited for demanding applications where performance is critical, resulting in their use in many high performance elastomers such as silicone and fluoroelastomer materials.

#### LOW ELECTRICAL CONDUCTIVITY

The base silica structure of certain grades of our products can give good electrical insulation, allowing for use in high voltage cables.

#### DRY LIQUID CARRIERS

Our range of hydrous synthetic silicates have the ability to carry liquids into elastomer systems without changing the mechanical properties of the formulation. This can result in better dispersion and ultimately in a reduction in the amount of active ingredient required.

## IMPROVED RUBBER PROCESSING



#### PERLITE

Perlite is highly siliceous volcanic glass, containing from 2 to 5 percent combined water. When rapidly heated to the proper temperature, the vaporization of the water and the simultaneous softening of the glass, causes the perlite to suddenly expand, or “pop” into lightweight cellular particles. The control of this expansion and milling technology results in engineered products suitable for specific functions. Although perlite occurs fairly commonly around the world, finding the right combination of accessible deposits of commercially viable quality and size is rare. World Minerals owns vast high quality perlite reserves around the globe.

Perlite is available as ore, expanded unmilled and expanded milled products. Important physical properties include:

- Lightweight
- Unique particle shape and size
- Absorption properties
- Chemical and thermal stability

#### WORLD MINERALS PERLITE BRANDS:

Harborlite® | Europerl® | Perfiltra®



## SYNTHETIC SILICATES

World Minerals manufactures a line of synthetic silicates, produced by the hydrothermal reaction of diatomite, hydrated lime and water. Through careful and deliberate control of the processing conditions, the chemical and physical properties can be altered to meet some of the most exacting demands in industry.

Available in a wide range of grades and compositions, our synthetic silicate products provide exceptional performance and cost benefits as absorbent and inert carriers, conditioners, anti-caking agents, diluents and bulking agents.

Physical properties include:

- Very high surface area
- Low bulk density
- Relatively inert chemistry
- Very high liquid absorption — over 5 times its own weight



### WORLD MINERALS SYNTHETIC SILICATES BRANDS:

Micro-Cel® | Celkate® | Calflo®

## WORLDWIDE EXPERTS IN AN EXPANDING INDUSTRY

World Minerals is recognized worldwide for its functional additive technology. As the polymers industry expands, so do our capabilities. Our trained representatives are a source of expert advice—whether it is troubleshooting a problem or choosing the functional additive most suitable for your specific application. World Minerals has sales offices and manufacturing facilities around the globe.

For further details, please contact your local World Minerals sales office or distributor or go to [www.WorldMinerals.com](http://www.WorldMinerals.com).

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#### Legend:

- = Perlite
- = Diatomite
- = World Minerals Office
- ★ = Corporate Headquarters

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