The Advantage is Clear
The wide range of high clarity packaging film MINBLOC® imparts essential antiblocking functionality without diminishing critical optical, mechanical or structural properties. Compounders and resin producers will find MINBLOC provides an opportunity to rationalize their matrix of resins, additives and processes with a single, efficient optical-grade antiblock. For producers in highly competitive market segments MINBLOC can facilitate a cost effective entry into premium higher value applications.

A uniquely occurring combination of refractive index and particle morphology, MINBLOC properties are further refined to deliver the industry’s lowest haze values with excellent clarity and gloss performance. With a refractive index that is nearly identical to that of clarity grade polyolefin resins, MINBLOC operates transparently within the polymer matrix. This unique optical property has allowed MINBLOC to become a standard for high clarity LDPE film and make it advantageous in a broad range of polyolefins, including butene, hexene and octene LLDPE resins, high clarity metallocene catalyzed products, and a variety of co-polymer and blended resins.

**Haze, ASTM D1003**

LDPE, 1.8 M.I. g/10 min, 0.921 Density, g/cm³ 32 micron film thickness, 1000 ppm Erucamide, 2500 ppm Antiblock.

The MINBLOC particle is a low surface area and non-porous structure ideal for efficient particle wetting and particle to polymer bonding. Absent are the micro-surface porosities or irregular particle shapes that can agglomerate, cause incomplete wetting and produce air inclusions. These abnormalities are a source of light refraction and distortion that causes increased internal haze and corresponding loss of transparency. When subjected to the high shear forces of compounding and extrusion, MINBLOC maintains its physical integrity and will not break down into a different sub-performing particle size distribution.
MINBLOC® is proven compatible with the entire range of polyolefin resins, including LDPE, LLDPE, PP, EVA copolymers and blends, and is efficiently incorporated in polymers made by all processes and catalyst systems. An inert and nonreactive material, MINBLOC is compounded with minimal chemical or physical interaction with other components of the additives package. With controlled surface area and fewer interactive sites, MINBLOC virtually eliminates modifier and stabilizer inefficiencies due to absorption, surface adhesion or chemical reaction. MINBLOC’s natural affinity for polymer wetting also improves dispersion without the need for additional surface treatments or coatings.

**Oil Absorption and Surface Area of Antblocking Minerals**

While the addition of any additive or filler will have some impact on film integrity, MINBLOC is engineered to operate in a minimally invasive way. Its advantageous surface chemistry is fully exploited when precisely classified to produce antiblocking and thermal additives with the lowest possible surface area. Precise control over the particle size distribution eliminates oversize and ultrafine particles to maintain critical tensile strength, tear resistance and impact properties of polyolefin films. MINBLOC additives also offer the collateral advantage of acting as an inorganic nucleating agent to increase the degree and rate of polymer crystallinity in polypropylene systems.

MINBLOC additions have no adverse effect on high-speed conversion equipment and heat-sealing processes. Similarly, MINBLOC will not impact film treatment and ink adhesion in high definition flexographic packaging film printing. A free flowing powder, MINBLOC is easily metered through conventional gravity feeders without agglomerating to facilitate highly loaded thermal film production.

This combination of absorptive properties, surface area and micro-porosity correlates directly with additive efficiency. Non-reactivity with other additive components means improved cost effectiveness and performance of slip additives, antioxidants, stabilizers, colorants and other processing aids.

In some formulations, MINBLOC operates synergistically with erucamide slip additives to optimize both slip and antiblock performance and to enhance film production and handling properties. Compared to more porous mineral additives, MINBLOC will not diminish the performance of costly processing aids, effectively increasing film throughput and reducing the incidence of film surface defects. Low surface area and minimal porosity also helps to reduce interference with UV stabilizers to extend the effectiveness of these important thermal film additives.
A Natural Balance of Performance and Inert Service

When emerging opportunities require additional health and safety certifications and regulatory compliance or new customer requirements necessitate a rationalization of antiblock formulations, MINBLOC® can provide a solution. MINBLOC delivers the ideal combination of performance and non-reactive service in the most demanding food production, food packaging, pharmaceutical and human contact applications.

As a single component additive, MINBLOC greatly simplifies the regulatory approval process. MINBLOC does not contain, nor is it manufactured with, chemical additives, organic solvents or substances of animal origin. Functionality without the need for surface treatments or dispersion aids also means MINBLOC brings no additional chemical interactions into the compounding or production environment.

MINBLOC is Generally Recognized as Safe (GRAS) and complies with all known international regulatory requirements for direct and indirect food contact, including the U.S. Food and Drug Administration, the Commission of the European Communities Directive 2002/72/EC, its predecessors, amendments and specific country enabling regulations. MINBLOC is compliant with Japan’s Hygenic and Styrene Plastics Association regulations, JHOSPA registration number (B) NJ-0694, and is exempt under Japan’s MITI regulations as a nonchemical substance. Chemical purity and general inertness make MINBLOC an excellent candidate for incorporation in medical device films and pharmaceutical packaging applications. MINBLOC also carries the Kosher-Pareve certification.

MINBLOC purity also assures compliance with environmental, recycling and waste disposal regulations. As a naturally occurring mineral additive MINBLOC is exempt from the REACH registration protocol. MINBLOC complies with CONEG and the European Communities Directive 2002/95/EC (ROHS) regarding the restriction and use of certain hazardous substances in electrical and electronic equipment.
Crop and ornamental production under the protection of an engineered horticultural film will benefit from MINBLOC® additions. MINBLOC additives are designed to optimize light transmittance, maximize thermal efficiency, and extend field service life of single component or blended LDPE, LLDPE or EVA systems.

When the objective is improved heat retention in double-layer greenhouses or in high and low tunnel applications, MINBLOC additives perform as infrared reflectors to improve thermal efficiency. With strong infrared reflection properties in the mid range 7-14 µm (1400-700 cm⁻¹) wavelength region, MINBLOC filled polyolefin films retain as much as 88% of captured light energy.

MINBLOC particle size distributions are further optimized according to Mie theory to increase light scattering effects by concentrating particles that display slightly broader infrared bands.

MINBLOC containing films also help accelerate plant growth by transmitting more photosynthetically active radiation (PAR) to accelerate the process of photosynthesis. Because MINBLOC’s refractive index essentially matches the host plastic, visible light transmittance can measure in excess of 90%. This refractive index also allows producers to exceed traditional 10% loading limits without degrading film optical properties, tensile strength or service life. When indirect or diffused light is sought for a more uniform growth without shadowing or burning, loading levels can be increased to produce a controlled haze. Highly filled systems with as much as 60% measured haze still transmit sufficient direct and indirect light for accelerated plant growth. MINBLOC is transparent to UV radiation and as such thermal film formulations should always contain an effective UV stabilization system and antioxidants to slow film photo degradation.

MINBLOC purity also helps extend thermal film lifetime by eliminating the primary catalysts of environmental weathering. The deleterious effects of even trace amounts of iron, copper, nickel, zinc, chromium and titanium in the film oxidation process are well recognized by the industry. Produced from extremely pure mineral feedstock, MINBLOC can reduce these contaminants by as much as 20X. In silage and field storage applications MINBLOC improves UV stability, for reduced storage losses, improved integrity in handling and extended useful life.

**Infrared Transmittance and Thermicity**

Unfilled 100 micron LDPE Film vs. LDPE with 10% MINBLOC

Unfilled LDPE Thermicity = 73% (Heat loss = 73%; heat retained = 27%)

MINBLOC Thermicity = 22% (Heat loss = 22%; heat retained = 78%)

This added thermicity accumulates and holds heat that would otherwise be lost during nighttime, reducing the need for supplemental space heating in cooler climates. In controlled laboratory tests, LPDE thermal films containing MINBLOC retain nearly 70% more heat than unfilled polyethylene.
MINBLOC® plastic film additives offer an exceptional balance of clarity, purity, antiblock performance, and thermal efficiency for a wide range of packaging and horticultural film systems. MINBLOC provides reliable antiblock performance even in the harshest handling and storage environments. For horticultural applications, MINBLOC delivers excellent light transmittance and thermal efficiencies for improved climate management and crop production.

All MINBLOC grades are processed and refined in statistically controlled manufacturing operations dedicated to the production of plastic film additives. Particle size distributions and specific surface areas are precisely tailored for optimized performance. Raw materials, processes and analytical services receive additional certification under ISO.

Complementing this unique product line is a support system of technically proficient sales representatives, research engineers and transportation professionals. Specified worldwide, MINBLOC polyolefin film additives are available through a global network of independent distributors, agents and company operated facilities.

For additional product information, contact our nearest agent, distributor or call us directly.