



The cycle of plastic

Innovations for
Sustainable Manufacturing





For over three decades, Tosaf has been developing and manufacturing high quality additives, compounds and color masterbatches for the plastics industry, offering breakthrough ideas and pioneering solutions. In a global economy that is demanding more sustainable practices from manufacturers, Tosaf has placed a priority on developing solutions that will aid our partners to operate and develop products that are more sustainable and healthier to both consumers and the planet. Tosaf offers a variety of innovative products and solutions that enable plastics to be recycled, enable manufacturers to use more recycled raw materials and enable plastic products to biodegrade.

Recyclable Plastics

Additives Enabling Successful
Integration and Processing of
Recycled & Recyclable Materials

The Environmental Alternative to MATTE Coatings

Matte Material - MT7636PE

This new Matte material delivers a Matte finish which is recyclable and does not require additional converting processes. Minimal MATTE is the environmental conscious alternative to MATTE coatings, enabling a premium chic look and feel with excellent brightness in light transition, without transparencies. Suitable for PE films, this newly-developed matte compound

is also suitable for thin (5-7 microns) skin layers and provides superb haze (~80%) at a very low gloss (<10). It is a terrific printing substratum that enables print clear lacquer for complete transparency. Select areas with matte effect can be made transparent by applying a lacquer coating or by gluing a clear stamp on top of the matte layer.

Recyclable Barriers Compatible With PE

Barriers BR7503PE and BR7562PE

Tosaf had developed two new compounds that provide a high barrier to oxygen and fumigants. BR7503PE and BR7562PE are PE based masterbatches that enable the production of barrier silage and mulch films using a three-layer extrusion line. BR7503PE is intended for blown film where bubble stability is crucial, while BR7562PE is for cast film or used when sealing is needed. Agricultural barrier films most frequently use EVOH in the barrier layer, which

is incompatible with polyethylene, requiring an additional tie layer. The accepted method for producing these films involves a five-layer extruder, which most film producers do not have, blocking their accessibility to the barrier film market. Tosaf's innovative MB products are compatible with PE, enabling film producers to recycle their barrier films and produce a greener product, subsequently removing the obstacles to this untapped market share.

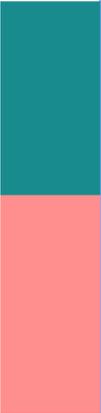
Additives Compatible with HBCD-FREE FR MB

In response to market demand for more sustainable products, and for additives that can be used with recycled materials, Tosaf has developed an HBCD-free FR masterbatch for extruded foamed polystyrene (XPS). The masterbatch can be polymer based, non-polymeric based or a combination of the two, depending on the quantity of recycled polymer in the final product and the customer's need

for thermal stability. This masterbatch is highly recommended for greener, low bromine boards.

A Halogen free flame retardant and UV Recycled Raw Materials Enabler for Processing

Fire and UV resistant additives ideal for outdoor applications. Our new Halogen free flame retardant and UV stabilized concentrate (FR8906PE EU) has self-extinguishing properties for PO fibers and film applications. It's especially recommended for PO films, tapes, synthetic grasses (or artificial turf), as well as woven and nonwoven films and fibers for outdoor applications. This fully transparent product is highly efficient and has minimal impact on production process. R-impervious provides outstanding UV Stability and is completely recyclable. It meets FR8906PE EU, DIN 4102 B1, B2, FMVSS302 classifications.



Recyclable Enablers

Additives Enabling Successful
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Identifiable Black Pigments for Recycling Processes

Near_IR (NIR) - DETECTABLE Black MB

The stylish bold aesthetic of black packaging helps products stand out, especially in the highly competitive food market. While highly desirable for its trendiness, black pigment can be challenging for packagers, especially those who are environmentally conscious and here's why. Carbon black is the pigment that is traditionally used. Its downside is that it completely absorbs

the majority if not all of the NIR radiation used by optical sorting systems typically used in recycling plants, rendering materials undetectable during sorting. As a result, black plastics used in applications like ready-meal boxes are sent to landfills instead of being recycled. Black food packaging plastics that do get recycled either require labor and energy intensive manual sorting processes, or end up as low-quality, low-value materials. Tosaf's IR-detectable black MB offers a strong, jet-black coloration, without compromising detectability by NIR sorting equipment. Products using our pigment are recyclable and renewable, without additional processing costs or depreciation in value.

Recycled Raw Materials Enabler for Processing

Flow-Enhancer (CRPP) MB

Manufacturers around the world are increasingly using recycled plastics. Recycled raw materials propose many challenges for different industrial processes, to which Tosaf has developed a

series of solutions. Tosaf's polypropylene flow enhancer MB range modifies melt viscosity and improves the flow characteristics of recycled and prime PP. Its application extends the range of potential uses for low-cost recycled materials, improving processability and contributing to faster mold-fill rates and shorter overall cycle times. These benefits can be achieved without compromising mechanical properties or costs. Tosaf's flow-enhancer MBs are safe to handle, transport and store, and do not require any special safety measures. They comply with food contact regulations and are REACH registered.

Eliminating Bad Odors from Recycled & New Materials

Odor Scavenger OD7904LL EU

Most recycled plastic develops a bad odor throughout storage and processing. Tosaf's Odor Scavenger masterbatch absorbs and reduces rancid odors of recycled material enabling plastic convertors to successfully use low-cost, environmentally friendly raw materials

to create an abundance of consumer products. OD7904LL EU absorbs and eliminates malodors throughout production processes and in final products. These malodors may stem from pungent components of both new and recycled raw materials, including oxidized and degraded polymers, pigments and additives. This is particularly helpful in the production of food packaging such as beverage bottles, caps and closures. Specifically, blue materials have strict and challenging organoleptic demands. As well as absorbing the odor, OD7904LL EU stabilizes the virgin or recycled material against further thermal degradation. OD7904LL is suitable for use with any polyolefin. Equivalent grades for specific carriers and/or applications are also available.

Barrier Film Recycling Enabler

CP8487PE Recycling MB

When producing barrier films the main problem producers face is how to recycle accumulated

scrap materials. Barrier films are produced with 5-layer extruders that glue two incompatible polymers (EVOH/PE, EVOH/PP, etc.) with a tie layer. When this film is later granulated the incompatible polymers are grinded together. If re-used or recycled, these granules form unstable bubble and/or holes that form due to delamination between incompatible polymers. Tosaf's CP8487PE, is a novel masterbatch that glues incompatible components together to produce continuous films, allowing for the recycling of barrier films.



Biodegradable plastics

Additives Enabling Successful
Integration and Processing of
Recycled & Recyclable Materials

Biodegradable Compounds, Masterbatches & Solutions

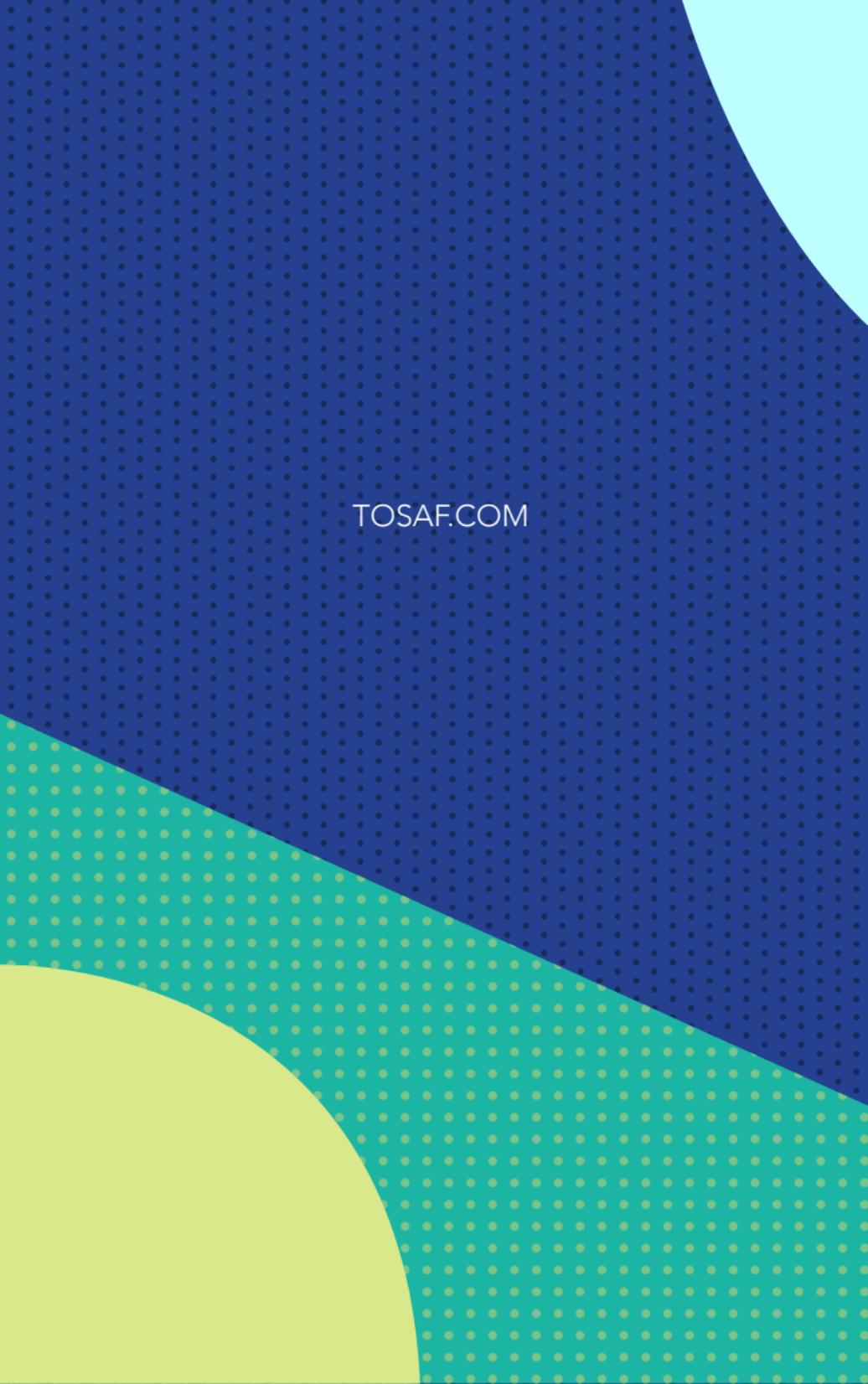
Bio-degradable MB7783DP

The utilization of biodegradable and compostable polymers is a growing regulatory and market demand and a rising concern of the modern consumer on a global scale. Tosaf offers standard, custom-made color masterbatches and compounds compatible with all biodegradable carriers such as PLA, PHA/PHB, PBS, PBAT etc. These solutions have the added value of

enhancing the performance, properties, processability and stability of such resins. Tosaf's solutions support a wide spectrum of applications, flexible and rigid, durable and disposable, transparent and opaque, etc. Our biodegradable masterbatches and all its components, pigments, and additives are certified according to current regulatory requirements (e.g. EN 13432, ASTM D6400). Our biodegradable solutions are certified to meet all global regulations (e.g. FC, REACH, Toys, RoHS, etc.).

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The Tosaf Group has established two entities that are dedicated to advancing a positive environmental impact. Shachaf, a dedicated company to the recycling of plastics was established in 1997. The plant recycles and upgrades plastic raw materials that would otherwise go to waste and landfill. The company operates nationwide, exports recycled raw materials and develops products which are based on recycled materials. Topgreen is a company that offers sustainable polymer solutions and a wide range of environmentally friendly products, such as wood compounds bio-polymers, PLA compounds, and compounds based on renewable resources.

The background is composed of several overlapping regions. The top and right portions are a dark blue field with a fine, repeating pattern of small white dots. A curved white shape is visible in the top right corner. The bottom portion is a teal field with a repeating pattern of small yellow dots. A large, solid yellow curved shape is in the bottom left corner.

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