

**We create
chemistry
that makes
partners
love plastics.**

Plastic additives for
packaging applications

 **BASF**
We create chemistry

Pushing back the boundaries of plastics

Success in plastics depends on having the right plastic additives. That is why it's important to choose a partner who not only has all the products you need, but can work with you to develop innovative new solutions.

BASF lets you create entirely new additives applications. We are a partner you can rely on to work with you, far into the future. We pioneered the plastics industry in its earliest days and are dedicated to helping our customers achieve sustainable worldwide success in the future. Creating better products. Pioneering new possibilities. And with the vision to shape the future of plastics.

BASF supplies the global plastics industry with an extensive range of additives. Our long experience in stabilization and protection, comprehensive technical support and innovation empower plastics producers to come up with the right solutions throughout the value chain.



We create chemistry that makes enablers love plastics.

Smart solutions to the challenges of the future

However the plastic processing industry develops in the coming years, you can rely on BASF to deliver the plastic additive solutions you need. Working with our customers to enable new plastics applications and support innovative solutions has been part of our DNA for many decades. No one is better positioned to enable you to successfully achieve your goals.



We create chemistry that makes pioneers love plastics.

Innovating the future together

Our pioneering spirit combined with your need for ever-more innovative solutions will drive the development of next-generation plastic additives for tomorrow's world. Together we can explore new possibilities and seek out more sustainable, high-performance solutions for the future.



We create chemistry that makes originals love plastics.

All the knowledge you need for your future success

Since the birth of the modern plastics industry back in the 1950s, BASF has been leading the way in plastic additives. Many of our innovations have gone on to become industry standards and benchmarks. Today, our long experience, expertise and unceasing passion for discovery mean you can rely on us to deliver the solutions you will need tomorrow.



We create chemistry that makes global challenges love plastics.

Your partner, across the globe

As globalization increases, new opportunities are certain to follow. But wherever your plastics business takes you and whatever additive solutions you need, you'll find BASF is already there. Waiting to support you with local knowledge and solutions customized to meet the needs of your new market.



We create chemistry that makes builders love plastics.

The power of curiosity, ambition and expertise

Tomorrow's plastics processing industry will need people with all of these qualities, builders who can deliver the cutting edge solutions that the future demands. With our global reach, innovation leadership, wide product portfolio and uncompromising commitment to product quality, BASF can help you make it happen.



We create chemistry that makes partners love plastics.

Together, we can achieve tomorrow's solutions

We in the Plastic Additives business have been working in close partnership with our customers for many decades: developing new ideas, responding to changing needs, and creating new solutions. So you can rest assured that we will be here to support your business by delivering the sustainable, innovative solutions you need to grow in the future.



We create chemistry that makes visionaries love plastics.

Working together to maximize sustainability

The future of plastics will rely on our shared vision to make the industry truly sustainable with plastic additives. Together, we can shape a bright future for plastics by continuously anticipating new market trends in the emerging economies and achieving best-in-class standards in resource conservation, production efficiency and environmental responsibility.



A bundle of benefits: the market

Without the use of plastics, it has been estimated that the tonnage of packaging materials would increase fourfold, greenhouse gas emissions would double, costs would rise by a factor of 1.9, energy consumption by 1.5 and waste by 1.6. And since plastics are expected to be used on an ever-increasing scale in packaging, these figures will continue to increase.

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Protection

Plastic packaging protects contents from physical impact; barrier properties inhibit chemical degradation and increase shelf life.

Economy

Plastic packaging can help to provide the required cost/effectiveness ratio as well as make businesses more profitable and improve market share.

Light weight

New designs, materials, processes and technologies are enabling the weight of plastics to be continuously reduced: today, an item packaged in plastic is 30% lighter than 10 years ago. Plastics help to reduce fuel consumption during transportation.

Durability

Some packaging for outdoor use (crates/pallets) is exposed for long periods to extreme weather conditions. Correctly formulated plastics will provide the required resistance, while offering significant weight and resource savings.

Recyclability

Thanks to plastic packaging, the demands of brand owners, consumers and authorities for better re-utilization of resources can be met.

Security and hygiene

Plastic offers hygiene and security. Transparency is often used to underline cleanliness and trustworthiness.

Printability

Plastic packaging allows the display of information and instructions for use.

Tonnage of packaging materials would increase

4x

without the use of plastics.



A pack of prerequisites: the challenges

BASF plastic additives help customers meet the most stringent demands of today's packaging requirements, from technical and aesthetic, right through to disposal and recycling.



Efficacy

Plastic packaging is a sector in which the efficient use of materials and processes is of particular importance. Demand for responsible products and processes is increasing in, for instance, waste reduction and recyclable materials. In Europe, the recovery rate of post-consumer end-of-life plastics is now greater than 50 % and the recycling rate for post-consumer plastics has increased to more than 20 %. Good manufacturing practices are a must. Economy is also crucial: from the highest performance needs to 'fit for purpose', manufacturers expect the best possible effect / cost ratio to help them achieve sustainable business.



Formulation expertise

It is essential that plastic packaging fits the purpose it is designed for. Interactions between additives and other ingredients, such as pigments, can lead to undesired effects including color shifts, unpleasant tastes and odors, and even mechanical failures. Expertise in additives and their interaction with the rest of formulation enables the development of robust and cost efficient packaging solutions based on specific end applications requirements.



Product stewardship

Keeping up with the numerous regulations and standards is another challenge. Purity levels, as well as migration properties, must be strictly controlled. Traceability is indispensable to help ensure that all components of a product are compliant.



Aesthetics and design

Numerous consumer behavior studies have shown that most buying decisions are made within seven seconds. Packaging is therefore a crucial tool that can contribute to the commercial success of a product. Attractive designs, transparency, gloss, whiteness and other effects create appeal and influence prospective buyers.



Value chain coordination

Increasingly complex interactions within the value chain, from polymer producers via master-batchers and converters all the way to OEMs/brand owners, make more detailed coordination along the value chain necessary. BASF strives to facilitate these interactions and supports its customers in developing the right solutions.

Your partner in plastics development

BASF offers the plastic packaging industry a broad range of additives, including process, thermal and light stabilizers, as well as polymer modifiers, such as nucleators, clarifiers, optical brighteners, antistatic additives together with extensive know-how in application and product stewardship.



PO and PET bottles

A plastic bottle requires specific features, including heat, light and processing resistance. It often also needs various content-protection properties, depending on the application. In addition to these attributes, a striking appearance is advantageous, as this enhances appeal and ensures differentiation at the point of sale.

With its wide selection of additives for plastic bottles and formulation expertise, BASF helps meet the requirements of the particular application and maximizes performance versus cost. Besides having the widest range of stabilizers, BASF's portfolio includes specialty polymer modifiers, and in particular Irgaclear® XT 386, a high performance clarifier for PP. Used in very low amounts, this clarifier has extremely high process resistance (no haze or yellowing, even after multiple extrusion steps) and an excellent organoleptic profile. It also helps to provide an attractive appearance and allows contents to be seen.



Tinuvin® 234

In packaging, UV absorbers are also used to protect the goods. In PET bottles for instance, to protect content from UV light degradation, Tinuvin® 234 is a product of choice. Foremost, it is easily incorporated into PET and is very stable at processing temperature, as well as being low in volatility. For the protection against UV light degradation, Tinuvin® 234 exhibits a broad band absorption in the UV area with a cut-off short before 400 nm. This latter feature allows for very low yellowing of the final article.

Recommended BASF additives for bottles:

	Processing & thermal stabilizers	Light stabilizers (UV absorbers)	Clarifiers
Bottles PO	Irganox® B 215, B 225, B 561, 1010 Irgafos® 168	Tinuvin® 326	Irgaclear® XT386
Bottles PET	Irganox® B 561 Irgafos® 126, 168	Tinuvin® 234	



Caps

This market is fast growing and technically demanding, as plastics increasingly replace cork and metal. Plastic caps and closures allow practical design and facilitate use. They need to be distinguishable, compliant with regulations, and have good heat and some light resistance. Caps also need to have good organoleptic properties.



Recommended BASF additives for caps:

	Processing & thermal stabilizers	Light stabilizers (UV absorbers)	Nucleators & clarifiers
Caps	Irganox® B 215, B 561, 1010 Irgafos® 168	Tinuvin® 326	Irgastab® NA 287 Irgaclear® XT 386



PO film and thin wall applications

Today's industry focuses on weight reduction, films and thin wall applications, which are expected to remain very important markets. BASF offers a wide range of additives to help in developing the right formulation for use in exclusive niche applications, food contact films that meet the economic and functional requirements of certain applications without jeopardizing the extrusion process.

Irganox®, Irgafos® and Irgastab®

Film and thin wall applications are demanding for polymers. With its comprehensive range of Irganox®, Irgafos® and Irgastab® antioxidants and process stabilisers, BASF offers various solutions to protect polymer from degradation or gelling during processing as well as maintenance of aesthetics (low discoloration) and organoleptic properties. Solutions with regulatory compliance are an essential part of our offering.



Recommended BASF additives for film and thin wall applications:

	Processing & thermal stabilizers	Light stabilizers	Nucleators & clarifiers	Antistatic agent
PP and PE	Irganox® B 215, B 900, 1010, 1076, E 201	Chimassorb® 2020	Irgaclear® XT386	Irgastat® P
	Irgafos® 168	Tinuvin® 326	Irgastab® NA 287	
	Irgastab® 301			



Returnable crates

Resistance to light, temperature fluctuations, weathering and warping are crucial for crates which have to conform to stringent production processes and regulations as well as specific customer requirements. BASF offers a range of heat, light and processing stabilizers as well as nucleators and antistatic agents that may fulfill certain needs and enable end requirements and regulations to be met, making crates highly durable.

Chimassorb® 2020

Chimassorb® 2020 is a “must use” additive when it comes to protecting plastic packaging from light exposure and weather degradation. It has a track record of durability prolongation and enables reuse cycles for returnable items. In addition, Chimassorb® 2020 provides excellent durability even at high temperature in polyolefins. This is also an easy to process additive that well suits many kinds of polymer resins and formulations.



Recommended BASF additives for returnable crates:

	Processing & thermal stabilizers	Light stabilizers	Nucleators	Antistatic agent
PP and HDPE	Irganox® B 215, B 225, B 561,1010 Irgafos® 168	Chimassorb® 2020 Tinuvin® 326 Uvinul® 4050 (PP-food) Tinuvin® 783	Irgastab® NA 287	Irgastat® P



Heavy Duty Packaging

Industrial packaging represents a very important segment of the packaging market. Often described as “heavy duty”, it implies the need for light-weight packaging with high mechanical resistance and long durability, compared to fast moving consumer goods. This type of packaging needs to fulfill the highest standards of industrial compliance since failure can cause severe damages during handling.

Within the Heavy Duty category, one can find Intermediate Bulk Containers (IBC), Flexible Intermediate Bulk Containers (FIBC) and large bags, drums and Filled and Sealed (FFS) bags.

A variety of goods can be packed, ranging from chemicals, construction materials, medical intermediates and food grade additives as well as food in bulk.

Chimassorb® 2020

Chimassorb® 2020, with outstanding processing stability, is a state-of-the-art HALS-solution to protect Industrial Packaging from UV light degradation during service life.



Recommended BASF additives for heavy duty packaging applications:

	Processing & thermal stabilizers	Light stabilizers	Antistatic agent
FIBC - PP	Irganox® B 215, Irganox® B 225	Tinuvin® 791, Tinuvin® XT 55, Chimassorb® 2020, Uvinul® 4050	Irgastat® P
IBC - HDPE	Irganox® B 561, Irganox® B 215	Tinuvin® 783, Chimassorb® 2020, Tinuvin® 326	Irgastat® P
FFS - (L)LDPE	Irganox® B 215, Irganox® B 900	Tinuvin® 783, Chimassorb® 2020, Tinuvin® 326	Irgastat® P



BASF competencies

Additive	Brand	Benefit
Light stabilizers	Chimassorb®	Extend the lifetime of UV-sensitive packaging applications. Maintain appearance and application properties.
	Tinuvin®	
	Uvinul®	
Thermal and processing stabilizers	Irganox®	Thermal protection and long-term durability.
	Irgafos®	Maintain integrity of polymer properties during processing.
	Irgastab®	
Clarifiers	Irgaclear®	Clarity and low haze values in thin wall applications.
Nucleators	Irgastab® NA	Improve mechanical properties and increase crystallization temperature.
Antistatic Agents	Irgastat® P	Reduces risk of electrostatic discharge damaging packed goods. Minimizes risk of explosion caused by electrostatic discharge.

Terminology:

HDPE: High-Density Polyethylene

PET: Polyethylene Terephthalate

PO: Polyolefin

PP: Polypropylene

PVC: Polyvinyl Chloride

For more information on BASF plastic additives for plastic packaging applications, please contact your account manager or visit www.plasticadditives.basf.com.



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