



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

Plastic additives for the electrical  
and electronics industry

 **BASF**  
We create chemistry





**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**

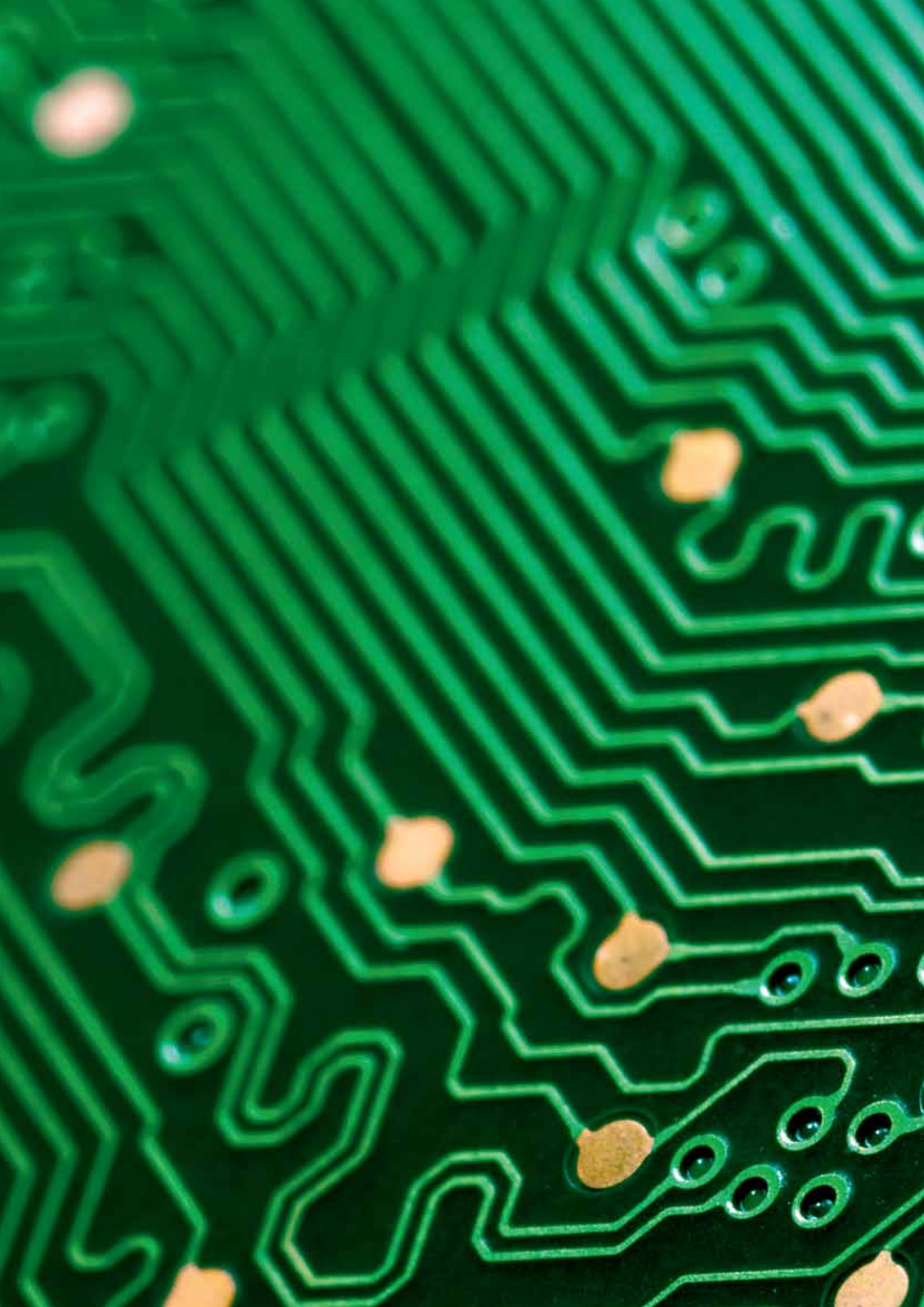
We in the Plastic Additives business have been working in close partnership with our customers for many decades: developing new ideas, responding to changing needs, and creating new solutions. So you can rest assured that we will be here to support your business by delivering the sustainable, innovative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

The electrical and electronic (E&E) industry affects almost every aspect of our daily lives. Products developed in this important industry facilitate our activities and in some cases actually make them possible. E&E appliances help to save energy by increasing the efficiency of resources and also by playing an important role in emerging energy sources such as solar radiation, wind and energy storage.

Plastic is the material of choice for a wide variety of products, thanks to numerous favourable properties, including light weight, insulating characteristics and design flexibility. With its exceptional versatility, plastic allows manufacturers to achieve the right size, design and performance for the respective application.

Highly suitable both for protecting appliances and for fulfilling esthetic requirements, plastics are now used in almost all E&E applications from microchip encapsulation to wind farm rotor blades. Today, about 20 % of all materials used in E&E are made of plastic, accounting for about 7 % of total plastics production. Growth of plastics in E&E is rapid, particularly in Asia where most consumer electronics are produced.



## Powerful challenges

Innovative advances in E&E impact global megatrends and, in turn, are affected by them.



### Energy consumption

As fossil fuels grow scarcer, efficient use of energy is becoming a top priority. The need for lighter weight materials has driven replacement of metal and glass with plastic. Plastic foam insulation is used to reduce heat loss. Smart electronics are being developed to cut energy consumption in, for example, motor controls for the automotive industry. New industries have been developed during the last decade for the commercialization of renewable energy sources such as solar and wind.



### Efficiency optimization

E&E appliances help to increase productivity, reduce costs and improve performance. Electronics, for example, play a crucial role in reducing the weight of vehicles, thereby cutting fuel consumption while maintaining or even increasing the vehicle's power.



### Safety

An important aspect in all sectors, safety is crucial in E&E as applications often use high voltage current and create hot surfaces. Advances in flame retardant technology help reduce the risk of fire in E&E. In addition, E&E innovations have allowed the development of systems such as anti-lock braking, improving control of vehicles in certain hazardous driving conditions.



### Regulatory challenges

Recyclable materials have become a must in E&E, as in other sectors, and many countries have now passed legislation related to recycling. With today's regulatory challenges, many manufacturers and brands aim to meet the standards required for eco-labels to differentiate their products in the market and project a responsible image.



### Fashion and function

In some consumer electronics sectors, such as mobile phones, trends are driven by image, appeal and fashion as well as by function and convenience. Demand for a wider choice of features and functions, the trend toward miniaturization and the need for affordable prices are important drivers in E&E markets.



### Miniaturization

Miniaturization and function integration are becoming increasingly important in the E&E world. Smartphones and tablet computers, for example, need to fit more features into a smaller space while keeping prices affordable. Plastics enable producers to smoothly integrate design, size and performance.

# Advantage through originality

BASF develops, produces and markets innovative additives that enable plastics to meet the requirements of the E&E industry.



## Electrical components

Electrical components are designed to connect and manage all types of electric currents, from power source to end product. Market regulations and increasingly stringent requirements make high performance demands on plastics in electrical components. Regulatory concerns, flame retardancy, heat stability and operational safety have all become top priorities. In addition, fulfilling the need for faster processing and thin wall design has become more challenging.

BASF provides additives such as light, processing and thermal stabilizers and flame retardants that enable plastics to reliably cope with the industry's challenges over the whole lifetime of the final product.

### Recommended BASF additives for electrical components:

Substrates* and typical applications	PS & LTTS*	Light stabilizers	Specialties
<b>Polyamides for connectors</b>	Irganox® 1098 Irganox® B 1171	Chimassorb® 2020 Tinuvin® 234 Tinuvin® 312 Uvinul® 4050	Irgastat® P Melapur® MC Melapur® 200 Tinopal® OB
<b>PET/PBT for connectors, solar panels, frames</b>	Irgafos® 126 Irgafos® 168 Irganox® 245 Irganox® 1010 Irganox® B 561	Tinuvin® 234 Tinuvin® 622 Tinuvin® 1577	Irgastat® P Melapur® 200 Tinopal® OB
<b>PC for housings and frames</b>	Irgafos® 168 Irganox® B 900	Tinuvin® 234 Tinuvin® 329 Tinuvin® 360 Tinuvin® 1577 Uvinul® 3030	Irgastat® P
<b>POM for a variety of parts</b>	Irganox® 245 Irganox® 259 Irganox® 1010	Tinuvin® 234 Tinuvin® 622 Tinuvin® 770	Irgastat® P Tinopal® OB

\* Abbreviations, please refer to the appendix





## Wire & cable

This industry handles the transmission and distribution of electric power. Thermoplastic compounds and resins are primarily used in insulation and jacketing. Polymer selection depends on voltage classification.

BASF thermal and light stabilization packages and metal deactivator systems make these polymers highly durable and enable them to resist heat stress and degradation on exposure to light and in permanent contact with conducting materials.

### Recommended BASF additives for wire & cable:

Substrates* and typical applications	PS & LTTS*	Light stabilizers	Specialties
<b>HDPE for power cable jackets</b>	Irganox® B-blends Irgastab® Cable KV 10	Chimassorb® 2020	Irganox® MD 1024
<b>LDPE for power cable insulation</b>	Irganox® B-blends Irgastab® Cable KV 10	Chimassorb® 2020	Irganox® MD 1024
<b>Elastomers for jackets</b>	Irganox® 565 Irganox® 1098 Irgastab® Cable KV 10	Chimassorb® 2020 Tinuvin® 234 Tinuvin® 622 Tinuvin® 770 Uvinul® 3035	
<b>TPU for jackets</b>	Irganox® 1010 Irganox® 1098 Irganox® 245 Irgafos® 168	Chimassorb® 81 Tinuvin® 326 Tinuvin® 571 Tinuvin® 622	Tinopal® OB
<b>PVC for jackets</b>	Irganox® 1010 Irganox® 1076	Chimassorb® 81 Tinuvin® XT 835	
<b>PP, LDPE for low-voltage cable insulation and jackets</b>	Irganox® B-blends	Chimassorb® 2020 Tinuvin® 622 Uvinul® 4050	Irganox® MD 1024



## Photovoltaics

Despite increasing public awareness of the growing scarcity of fossil fuels, global energy consumption is still on the rise in many countries. With the current focus on energy conservation and the development of renewable energy resources, the already booming photovoltaics industry is forecast to become a significant source of energy in the near future.

Photovoltaic panels must maintain their high performance for at least 25 years. BASF additives enable plastics used in photovoltaics to withstand exposure to heat and sunlight and help meet this demand.

### Recommended BASF additives for plastics in PV applications:

Substrates* and typical applications	PS & LTTS*	Light stabilizers	Specialties
<b>EVA in encapsulants</b>	Irganox® 1010 Irganox® 1076 Irgastab® FS301	Chimassorb® 81 Tinuvin® 770 Tinuvin® 622	
<b>PA/PBT in electrical components</b>	Irganox® 245 Irganox® 1098 Irganox® B 1171 Irgafos® 126	Chimassorb® 2020 Tinuvin® 234 Tinuvin® 770 Uvinul® 4050	Melapur® 200 Melapur® MC
<b>PET in backsheet films</b>	Irganox® 1010 Irganox® B 561 Irgafos® 168 Irgafos® 126	Tinuvin® 1577 Tinuvin® 1600	
<b>PET/PBT/PA in frames</b>	Irganox® B 1171 Irganox® B 215 Irgafos® 126 Irgafos® 168	Tinuvin® 234 Tinuvin® 622 Tinuvin® 770 Tinuvin® 1577 Uvinul® 4050	Melapur® 200 Melapur® MC

\* Abbreviations, please refer to the appendix



## Housings

E&E appliances used outdoors need to be shielded from environmental impacts. E&E equipment used indoors must protect users against the hazards associated with electric currents. Plastics have become increasingly popular for housings, thanks to their versatility in design and esthetics, their effectiveness in processing and use, their light weight and their broad range of performance features.

BASF offers a wide variety of heat and light stabilizers for almost all plastic materials used in housings. These additives enable plastics to maintain outstanding performance throughout the life of an electrical appliance. All additives fulfill stringent regulations such as WEEE and RoHS.

### Recommended BASF additives for housings:

Substrates* and typical applications	PS & LTTS*	Light stabilizers	Specialties
<b>ABS in consumer electronics</b>	Irganox® 1076 Irganox® 245 Irganox® B900 Irganox® PS800	Tinuvin® 234 Tinuvin® 770 Tinuvin® P Uvinul® 4050	Irgastat® P Tinopal® OB
<b>PC /ABS in consumer electronics</b>	Irgafos® 168 Irganox® 245 Irganox® 1076	Tinuvin® 234	Irgastat® P Tinopal® OB
<b>PS, HIPS in appliances, white goods</b>	Irganox® 245 Irganox® 1076 Irganox® B900	Tinuvin® 234 Tinuvin® P Uvinul® 4050	Irgastat® P Tinopal® OB
<b>PC in components</b>	Irgafos® 168 Irganox® B900	Tinuvin® 234 Tinuvin® 329	Tinopal® OB
<b>PA in power tools</b>	Irganox® 245 Irganox® 1098 Irganox® B1171	Tinuvin® 234 Tinuvin® 770 Uvinul® 4050	Melapur® 200 Melapur® MC
<b>PP in small appliances</b>	Irganox® B215 Irganox® B225 Irganox® PS802	Chimassorb® 2020 Tinuvin® 326 Tinuvin® 783 Tinuvin® 791	Irgaclear® XT Irgastab® NA Irgastat® P Tinopal® OB
<b>PBT/PET in components</b>	Irgafos® 126 Irgafos® 168 Irganox® 245 Irganox® 1010	Tinuvin® 234 Tinuvin® 622 Tinuvin® 1577	Melapur® 200

\* Abbreviations, please refer to the appendix





# BASF competencies



Additives	Brand	Benefit
<b>Durability &amp; visual appeal</b>		
Light stabilization	Chimassorb® Tinuvin® Uvinul®	Maintain appearance and properties of plastic components during the product's lifetime. Extend the lifetime of UV-sensitive applications.
Thermal stabilization	Irganox®	Thermal protection and long-term durability.
Antidust	Irgastat® P	Reduces dust build-up; keeps surfaces clean; prevent cross contamination.
<b>Regulatory / Safety</b>		
Flame retardant	Melapur®	Non-halogenated systems for connectors, parts and components of E&E devices.
Antistatic	Irgastat® P	Reduces risk of electrostatic discharge damaging processors, microchips and charge-sensitive parts. Minimizes risk of explosion caused by electrostatic discharge.
<b>Manufacturing</b>		
Processing stabilization	Irgafos® Irgastab®	Maintains integrity of polymer properties during processing.

## Terminology:

**LS:** light stabilizer  
**LTTS:** long-term thermal stabilizer  
**PS:** process stabilizer  
**UVA:** UV absorber

**ABS:** acrylonitrile-butadiene-styrene  
**EVA:** ethylene-vinyl-acetate  
**HDPE:** high-density polyethylene  
**HIPS:** high-impact polystyrene  
**LDPE:** low-density polyethylene  
**LLDPE:** linear low-density polyethylene  
**PA:** polyamide  
**PBT:** polybutylene terephthalate  
**PC:** polycarbonate  
**PET:** polyethylene terephthalate  
**POM:** polyoxymethylene  
**PP:** polypropylene  
**PS:** polystyrene  
**PVC:** polyvinylchloride  
**TPU:** thermoplastic polyurethane

For more information on BASF plastic additives for electrical and electronic applications, please contact your account manager or visit [www.plasticadditives.basf.com](http://www.plasticadditives.basf.com).



### Asia

#### **BASF East Asia**

Regional Headquarters Limited  
Plastic Additives  
45th Floor, Jardine House  
No.1 Connaught Place  
Hong Kong  
Phone: +852 2731-0111

### Europe

#### **BASF Lampertheim GmbH**

Plastic Additives  
Chemie Strasse 22  
68623 Lampertheim  
Germany  
Phone: +49 621 60-0

### Middle East

#### **BASF Plastic Additives**

Middle East S.P.C., Bahrain  
International Investment  
Park (BIIP)  
Road 1518, Al Hidd,  
Kingdom of Bahrain  
Phone: +973 17 585-232  
+973 17 585-235

### North America

#### **BASF Corporation**

Plastic Additives  
100 Park Avenue  
Florham Park, NJ 07932  
USA  
Phone: +1 973 245-6000

### South America

#### **BASF S.A.**

Plastic Additives  
Sede Administrativa  
Av. das Nações Unidas,  
14.171, Morumbi  
04794-000 São Paulo, SP  
Brasil  
Phone: +55 11 2039-2797



[www.plasticadditives.basf.com](http://www.plasticadditives.basf.com)

#### Note

The descriptions, designs, data and information contained herein are presented in good faith, and are based on BASF's current knowledge and experience. They are provided for guidance only, and do not constitute the agreed contractual quality of the product or a part of BASF's terms and conditions of sale. Because many factors may affect processing or application/use of the product, BASF recommends that the reader carry out its own investigations and tests to determine the suitability of a product for its particular purpose prior to use. It is the responsibility of the recipient of product to ensure that any proprietary rights and existing laws and legislation are observed. No warranties of any kind, either expressed or implied, including, but not limited to, warranties of merchantability or fitness for a particular purpose, are made regarding products described or designs, data or information set forth herein, or that the products, descriptions, designs, data or information may be used without infringing the intellectual property rights of others. Any descriptions, designs, data and information given in this publication may change without prior information. The descriptions, designs, data and information furnished by BASF hereunder are given gratis and BASF assumes no obligation or liability for the descriptions, designs, data or information given or results obtained, all such being given and accepted at the reader's risk. (08/2016)

© = registered trademark of BASF SE  
Tinuvin® = registered trademark of BASF in many countries

 **BASF**  
We create chemistry