We create chemistry that makes enablers love plastics.

Plastic additives for the textile and fiber industry
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.
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.

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.

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.

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.

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.

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.

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.
The changing fabric of the market

Synthetic fibers have come a long way since polyamide was first used as a replacement for silk in parachutes and stockings during World War II. Today, more than half of all fibers consumed are synthetic, with various applications in every field of fiber and textile technology.

Four types of synthetic fiber – polyamide, polyester, acrylic and polyolefin – dominate the market. By volume they account for approximately 98% of synthetic fiber production, with polyester alone making up more than 70%. Globally, more than 80 million metric tons of fibers are produced annually, of which about 50 million tons are synthetic fibers, the rest being natural fibers, mainly cotton.

New technologies are widening the scope for fiber applications even further. Growth continues in most synthetic fiber applications, including the nonwoven, construction, automotive and artificial turf sectors.

Today, more than 50% of fibers consumed are synthetic.
The challenges of dynamic fabric trends

A wide variety of modern trends is affecting developments in the synthetic fiber industry.

Efficient use of scarce materials

A strong focus on sustainability has led to efforts to cut the consumption of precious resources such as water and energy. Demand is growing for additives that help meet challenging regulations and requirements, such as non-halogenated flame retardants, and products and processes that allow the use of scrap and recycled materials.
Using scrap and recycled materials is not only responsible and advantageous, but it also helps increase efficiency, allows the reuse of resources and reduces costs.

As resources become scarcer and increasingly expensive, demand grows for cleaner, smarter, more competitive energy systems. For example, energy-efficient materials include fibers that can replace metals, foams and roof membranes, improving building insulation. Today, manufacturers are combining raw materials, fiber spinning and fabric construction to design textiles that meet challenging requirements. New additives and processes allow design flexibility that optimizes the consumption of precious resources.

**Efficiency improvement**

Fibers used for numerous applications, such as artificial turf, barrier membranes and carpets, have to withstand very harsh climate conditions, including prolonged exposure to UV light and acid rain. Extremely high long-term durability is essential in some applications, such as construction and automotive.

**Durability and performance**

Increasingly stringent safety specifications for applications such as construction, medical equipment and workwear are accelerating demand for additives such as flame retardants.

**Hygiene and safety**
Enabling innovative synthetic fiber solutions

BASF has the technical know-how and product portfolio to meet the toughest plastic additives challenges of the synthetic fiber industry.

Nonwoven

The nonwoven sector covers a very wide variety of applications, including hygiene, air filtration, construction and geotextiles. BASF offers a broad range of versatile products, including process, thermal, and light stabilizers as well as flame retardants and polymer modifiers.

Customers benefit from technical support and expert advice on products, plant operation and process optimization. Equipped with its own laboratory meltblown line, BASF can test customers’ formulations for nonwoven applications prior to production scale-up, helping them to reduce consumption of valuable resources and develop innovative solutions.

Recommended additives for PP nonwoven applications:

<table>
<thead>
<tr>
<th>Applications</th>
<th>Base stabilization</th>
<th>Light stabilizers</th>
<th>Flame retardants</th>
<th>Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Air filtration</td>
<td>Irgastab® FS 533</td>
<td>Chimassorb® 2020</td>
<td>Flamestab® NOR® 116</td>
<td>Irgatec® CR 76 IC</td>
</tr>
<tr>
<td>Construction fabrics</td>
<td>Irgastab® FS 301, FS 410, FS 210</td>
<td>Chimassorb® 2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geotextiles</td>
<td></td>
<td>Chimassorb® 2020</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td></td>
<td>Tinuvin® XT 200</td>
<td></td>
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</tr>
<tr>
<td>Hygiene</td>
<td></td>
<td></td>
<td></td>
<td>Irgatec® CR 76 IC</td>
</tr>
</tbody>
</table>
Artificial turf

BASF is a leading supplier of additives for the artificial turf market with more than 25 years’ experience in artificial turf components. Our comprehensive portfolio includes light stabilizers and UV absorbers for films, tapes and monofilaments of polyethylene, polypropylene and polyamide.

Customers can rely on our full support in creating tailor-made, sustainable and durable solutions for high-performance artificial grass pitches for all applications.

Recommended additives for artificial turf:

<table>
<thead>
<tr>
<th>Applications</th>
<th>Base stabilization</th>
<th>Light stabilizers</th>
<th>Flame retardants</th>
<th>Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td>monofilament/tapes</td>
<td>Irganox® B 225</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Indoor/outdoor PE</td>
<td>Irganox® B 215</td>
<td>Chimassorb® 2020 Tinuvin® 326 Uvinul® 4050 Tinuvin® XT 55</td>
<td>Flamestab® NOR® 116</td>
<td>Irgastat® P</td>
</tr>
<tr>
<td>monofilament/tapes</td>
<td>Irganox® B 225</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sports indoor/outdoor PA</td>
<td>Irganox® B 1171</td>
<td>Chimassorb® 2020 Tinuvin® 234 Uvinul® 4050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>monofilament/tapes</td>
<td></td>
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</tbody>
</table>
The synthetic fibers most commonly encountered in household applications are polyamide, which is used for carpet face yarns; polyester for upholstery and other soft furnishings; and polypropylene for carpet face yarns and soft furnishings.

Functional effects such as stain resistance are in great demand for carpets and upholstery. Additional sought-after specifications include: processability, durability, appearance, comfort and odorless. As safety regulations become more stringent, effects such as flame retardant will also be required in an increasing number of applications.

BASF offers a wide range of additives, such as process, thermal, and light stabilizers as well as flame retardants and polymer modifiers for carpets and upholstery made of synthetic fibers.

### Recommended additives for carpet & upholstery applications:

<table>
<thead>
<tr>
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<th>Flame retardants</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene fiber</td>
<td>Irgastab® FS 533 (Irgastab® FS 301/ Irgastab® FS 410)</td>
<td>Chimassorb® 2020 Tinuvin® 234</td>
<td>Flamestab® NOR® 116</td>
<td>Irgastat® P</td>
</tr>
<tr>
<td>Polyamide fiber</td>
<td>Irganox® 1098 Irganox® B 1171</td>
<td>Chimassorb® 2020 Tinuvin® 234 Uvinul® 4050</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polyester fiber</td>
<td>Irganox® B 561 Irgafos® 126 Irganox® 1010</td>
<td>Tinuvin® 1600 Tinuvin® 234 Tinuvin® 1577</td>
<td></td>
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</tbody>
</table>
Automotive fibers

BASF offers high-performance additives that meet the stringent requirements of the automotive industry, including process, thermal and light stabilizer, as well as flame retardants.

Interior trim and other components inside vehicles are subject to some of the harshest climatic conditions on earth, including extreme temperatures and wide fluctuations in humidity.

The main fibers encountered in most interior trim applications are polyester and polypropylene, plus polyamide for carpet pile. These fibers are also used for components such as tires, filters, belts, hoses, airbags and sound insulation materials, which need to remain fully functional throughout the life of the vehicle.

Recommended BASF additives for automotive fibers:

<table>
<thead>
<tr>
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<th>Flame retardants</th>
<th>Specialties</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Polypropylene fiber</strong></td>
<td>Irgastab® FS 533 (Irgastab® FS 301 / Irgafos® 168)</td>
<td>Chimassorb® 2020</td>
<td>Flamestab® NOR® 116</td>
<td>Irgastat® P</td>
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<td><strong>Polyamide fiber</strong></td>
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</tbody>
</table>
Architectural barrier membranes include geotextiles, roof felts used under roof tiles and housewrap surroundings for insulation. Both can be laminated onto microporous films for breathability. Roof scrims are plastic supports for textiles used on roofs.

Geotextiles, roof felts and housewraps are made of both woven and nonwoven polyolefins, polyester and occasionally polyvinylchloride (PVC).

Focusing on the safety aspect of construction materials, BASF supplies flame retardants that meet new regulations for synthetic roofing as well as light-stability for barrier membranes.

**Recommended additives for building & construction applications:**

<table>
<thead>
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<th>Flame retardants</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Polypropylene fiber</td>
<td>Irgastab® FS 533 (Irgastab® FS 301)</td>
<td>Chimassorb® 2020 Tinuvin® 326 Tinuvin® 234</td>
<td>Flamestab® NOR® 116</td>
<td>Irgatec® CR 76 IC</td>
</tr>
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<td>Polyamide fiber</td>
<td>Irganox® 1098 Irganox® B 1171</td>
<td>Chimassorb® 2020 Tinuvin® 234 Uvinul® 4050</td>
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<td>Polyester fiber</td>
<td>Irganox® B 561 Irgafos® 168 Irgafos® 126 Irganox® 1010</td>
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</table>
### BASF competencies

<table>
<thead>
<tr>
<th>Effect</th>
<th>Brand</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Durability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thermal stabilization</td>
<td>Irganox®, Irgastab®</td>
<td>Thermal protection and long term durability</td>
</tr>
</tbody>
</table>
| Light stabilization | Chimassorb®, Uvinul®, Tinuvin® | • Excellent UV-light stability  
|                  |                | • Excellent heat stability  
|                  |                | • High extraction resistance  
|                  |                | • Low volatility  
|                  |                | • Good melt flow during fiber spinning  
|                  |                | • No pigment interaction                                                 |

| Safety & environment | Flame retardants | Flamestab® | Non-corrosive  
|                      |                 |             | Provides UV and thermal stability in addition to flame retardancy  
|                      |                 |             | Active at low concentrations  
|                      |                 |             | No reduction in physical mechanical properties  
|                      |                 |             | Easy processing in fiber-spinning & spunbond nonwoven  
| Permanent antistatics (monofilaments and tapes only) | Irgastat® P | Inherent antistatic network throughout the polymer  
|                      |                 |             | Immediate effect – starting with processing  
|                      |                 |             | Permanent effect during lifetime of polymer  
|                      |                 |             | Good performance at low humidity (< 10 % r. h.)  
|                      |                 |             | Solid form and easy processing  
|                      |                 |             | No migration  

| Fiber processing | Polymer modification | Irgatec® CR | Narrow distribution of finer fibers  
|                  |                      |             | Distinctly better barrier properties  
|                  |                      |             | Better mechanics at less cost  

| Processing stabilization | Irgafos®, Irganox®, Irgastab® | Gas fade resistance  
|                        |                               | Processing stability  
|                        |                               | Short-term thermal stability  
|                        |                               | Light stability  
|                        |                               | Thermal protection  
|                        |                               | Long term durability  

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

**Terminology:**
- **PA:** polyamide  
- **PE:** polyethylene  
- **PES:** polyester  
- **PP:** polypropylene  
- **PVC:** polyvinylchloride
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