

OUR COMPOSITES PORTFOLIO
**TOP SOLUTIONS FOR TOP
PERFORMANCE THERMOSETS**



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Welcome to our thermosets business

Fiber-reinforced composites are an integral part of many industries and of our daily life. At BYK, we have been providing the composites industry for many years with tailored additives and customer-orientated services in our labs. In this brochure we provide you with an overview of our portfolio, our service, and the business philosophy behind them.

As a globally leading additives manufacturer it is our main concern to create added value for our customers, regardless of their location. Our overriding aim is to understand their processes and deliver solutions which suit these demands in every respect. Based on our long-standing expertise in the composites industry, we are able to develop

innovative answers to new market trends. This is particularly challenging at a time when the demand for energy efficiency and sustainability draws new attention to composite materials. As lightweight construction captures the mass market for vehicles, the additives business develops accordingly. With our fully equipped lab for advanced composites, we see ourselves well positioned to participate in this fascinating business sector.

But see for yourself. We invite you to take a closer look at how our additive portfolio for thermosets and its related service benefit customers around the world. Maybe, we can support your business as well.

Note

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Our three composites brands



BYK

This is our long-standing main brand. It offers classic solutions for wetting & dispersing, air release, rheology & viscosity. Additionally, it comprises dedicated product groups including coupling agents (BYK-C), air release agents (BYK-A), wetting and dispersing additives (BYK-W), processing additives (BYK-P) as well as styrene emission suppressants (BYK-S).

DISPERBYK

DISPERBYK comprises of wetting and dispersing additives based on the multifunctional deflocculating technology.

RHEOBYK

These organic rheology additives modify the flow behaviour and optimize the rheological properties of thermosets.

Customer value at all levels

BYK is the global leader in the additives market for thermosets. Our products for fiber-reinforced composites are highly regarded within the industry. Besides their mechanic and esthetic advantages, they are known for their excellent processing qualities and ease of application.

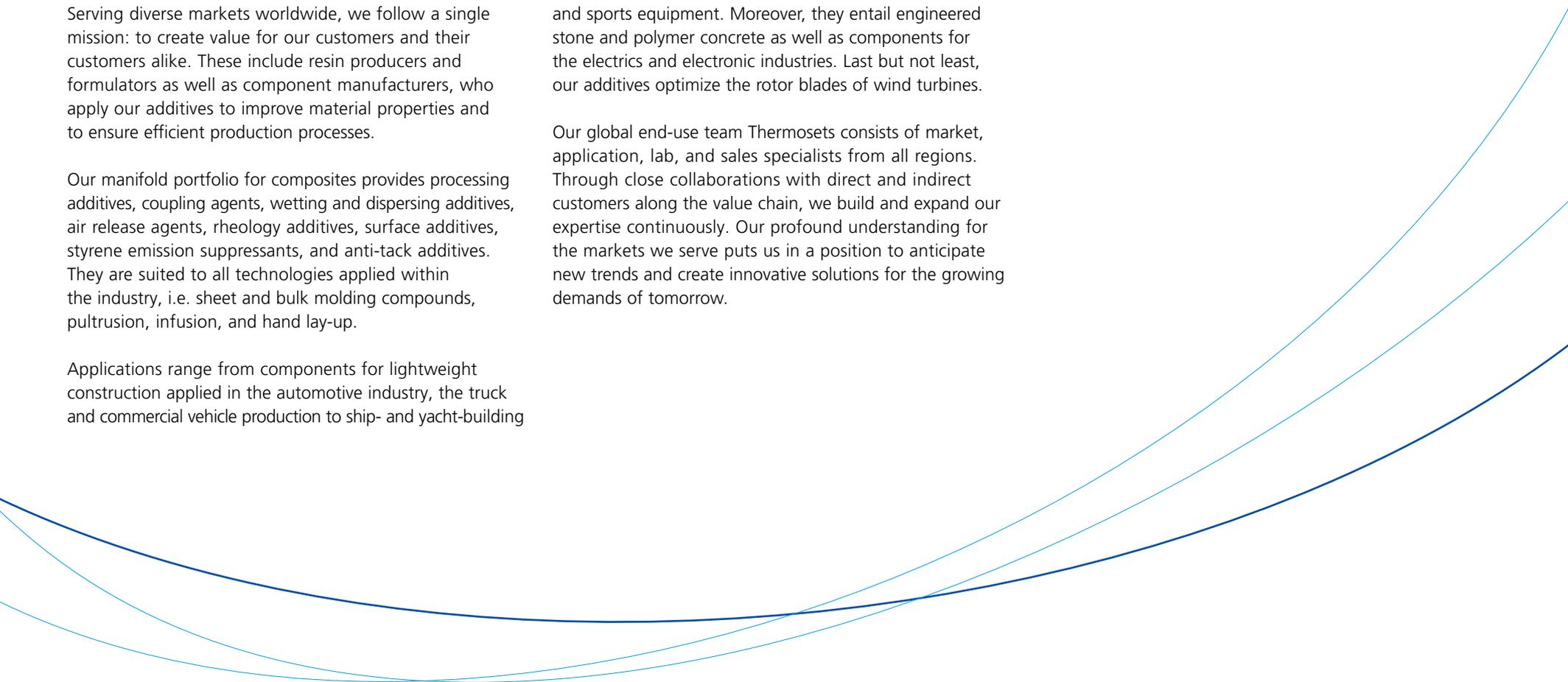
Serving diverse markets worldwide, we follow a single mission: to create value for our customers and their customers alike. These include resin producers and formulators as well as component manufacturers, who apply our additives to improve material properties and to ensure efficient production processes.

Our manifold portfolio for composites provides processing additives, coupling agents, wetting and dispersing additives, air release agents, rheology additives, surface additives, styrene emission suppressants, and anti-tack additives. They are suited to all technologies applied within the industry, i.e. sheet and bulk molding compounds, pultrusion, infusion, and hand lay-up.

Applications range from components for lightweight construction applied in the automotive industry, the truck and commercial vehicle production to ship- and yacht-building

and sports equipment. Moreover, they entail engineered stone and polymer concrete as well as components for the electrics and electronic industries. Last but not least, our additives optimize the rotor blades of wind turbines.

Our global end-use team Thermosets consists of market, application, lab, and sales specialists from all regions. Through close collaborations with direct and indirect customers along the value chain, we build and expand our expertise continuously. Our profound understanding for the markets we serve puts us in a position to anticipate new trends and create innovative solutions for the growing demands of tomorrow.



Reliable processes, flawless materials

Our additives support a wide range of applications from many different industries. Customers benefit in a number of ways. Our processing additives help to establish highly reliable production processes, whereas our functional additives optimize the properties of the end product. The results are composites with flawless surfaces and extraordinary mechanical properties.

Automotive industry

The automotive industry employs components based on thermosets for a multitude of applications, e.g. trims, trunk lids, or headlamp housings. During sheet and bulk mold compounding (SMC/BMC), our products help to optimize production, making these processes highly reliable. Thanks to their excellent release properties after molding, our processing additives, e.g. BYK-P 9065, deliver immaculate component surfaces. Our wetting and dispersing additives, notably BYK-W 9010, improve the resin's flow behavior during production.



Ship- and yacht-building

Materials used in structural components for the hulls of ships or yachts benefit in many ways from our additives. For an optimal flow behavior and processing we recommend RHEOBYK-R 605 in these materials. To ensure the necessary nonporous properties of gelcoats for the boat's outer skin, we recommend the use of our air release agents during production. BYK-A 555 has proven particularly successful in this context. Surface additives like BYK-330 improve the material's substrate wetting.

In open mold processes with hand lay-up or spray-up technologies, our styrene emission suppressants, e.g. BYK-S 750 N, reduce workplace hazards and optimize working conditions.

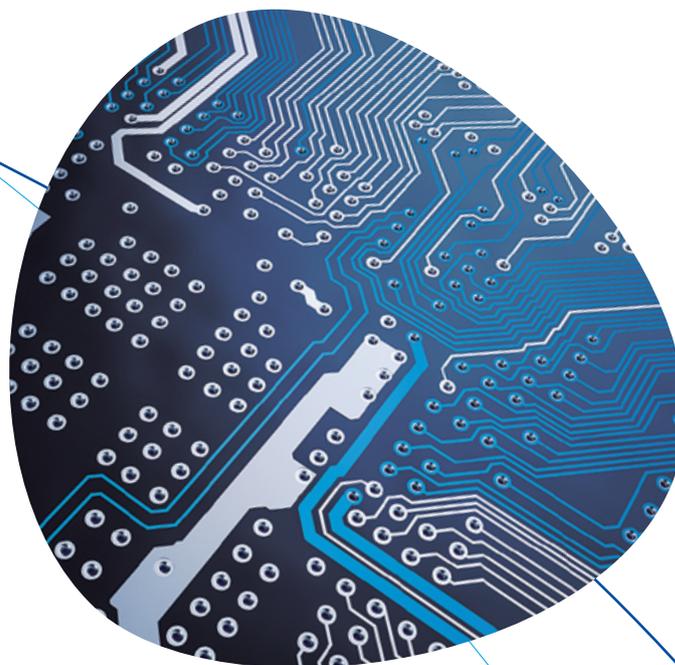


Construction business

Our additives improve a variety of materials used in the construction business. They include polymer concrete for piping, artificial or engineered stone as well solid surface materials used in interiors, e.g. kitchen benches. First and foremost, producers use our coupling agents, e.g. BYK-C 8000, to improve the material's mechanical strength and its load-bearing capacity. Additionally, our wetting and dispersing additives, e.g. BYK-W 908 and BYK-W 909, contribute to the resin's optimal flow behavior during manufacturing.

Electro and electronics industry

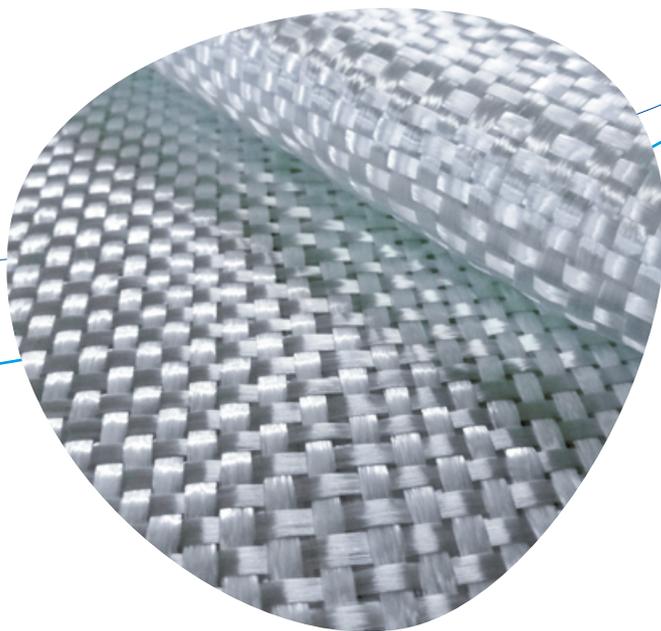
Electro and electronic applications for our additives involve circuit boards, components, electrical insulation, and electrical casting. Here, the challenge is to ensure a perfect flow behavior of the resin during application. Moreover, flawless wetting properties as well as utmost air release are needed to achieve optimal results. To this end, we provide BYK-088 for air release, BYK-W 985 for wetting, and BYK-310 for substrate wetting.



Advanced composites

Lightweight construction based on carbon fibers is in high demand within the transportation industry, since these advanced composites contribute to the production of energy efficient vehicles. Reliable manufacturing processes for these materials hinge on an immaculate wetting of the fibers to ensure the component's mechanical strength. Moreover, perfect wetting is the only way to reduce rejects to a minimum, if not altogether.

Our innovative additive BYK-C 8013 is specifically designed for carbon fibers. Its unique chemical composition allows bonding of those fibers to the resin matrix. As a result, the finished parts are more resilient. In hot curing processes, e.g. sheet or bulk molding, pultrusion, prepreg or RTM, the component's mechanical strength increases by up to 70%. Besides, our processing additive BYK-P 9920 also facilitates optimal fiber wetting.



Sports equipment

Golf clubs or tennis rackets, and fishing rods are mostly made of carbon fiber-reinforced materials. To improve material properties, we recommend this specific wetting and dispersing additive: BYK-9076. It is particularly suited to the pultrusion production process.

Wind turbine construction

We support the production of rotor blades for wind turbines in many ways. Our coupling agent BYK C-8001, a co-polymer with reactive groups, improves the mechanical strength and durability of fiber-reinforced resins used in the blades. Based on our processing additives, our innovative Viscosity Control Technology (VCT) acts in the bonding pastes used to join components. Working in sync, Thixbreaker BYK-P 2710 and Thixbooster BYK-P 2720, help manufacturers to achieve the desired viscosity in each processing step.



Type Approval
Additive for Epoxy Resin
TA-DNVGL-CP-0089-07147

As first specialty chemicals manufacturer worldwide, BYK now has in its portfolio an additive with **Germanischer Lloyd certification**: BYK-C 8001. This means manufacturers of wind turbines can use the polymer coupling agent without further testing in their glass fiber reinforced epoxy resin systems – an important element in resource efficiency on the globally booming market for wind power.



Innovation, expertise, and service – on your doorstep

Being close to our customers is key to our success. With 17 production sites plus 35 laboratory locations over five continents, our global presence is unrivalled in the industry. Our innovation centers in Germany and the USA focus on solutions which help our customers to address new market trends. Often these trends are related to sustainability issues, to energy efficiency, and climate change, but also to changing demographics and digitization. Our technical service, which we offer to customers around the world, is globally unique. In sum, this organization lays the basis for delivering our expertise directly to our customers.

Hands-on support

In our application labs we provide hands-on support. We use state-of-the-art equipment to replicate production conditions at our customers and run tests of our additives in their formulations and applications. This helps to identify the additive best suited.

For sheet molding compounds, we use our own SMC line and a 1,000-ton press to test our additives. To examine formulations for rotor blade components, we employ our infusion line, and for construction applications, e.g. pipes, we have a filament winder. With our static and dynamic testing machine, we are able to verify the mechanical loads that lightweight components refined with our additives can bear. This service often saves R&D efforts on our customers' part.

Innovation plays a major role at BYK.

A fifth of our employees work in jobs related to R&D. We invest eight percent of our annual sales into R&D and new products respectively, which is more than the average in our industry.

Global regulatory service

With our Global Regulatory Service, we help our customers to meet all aspects related to product safety, product stewardship, and the registration of chemical substances. This also applies to rules regarding food contact, toy compatibility as well as other health and safety issues.

Based on our commitment to product stewardship, we provide a BRIEF document (BYK Regulatory Information Extensive Form) for each additive. This data sheet contains all the relevant international regulatory data plus further information on product safety.

BYK-Chemie GmbH
 P.O. Box 10 02 45
 46462 Wesel
 Germany
 Tel +49 281 670-0
 Fax +49 281 65735

info@byk.com
www.byk.com

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This issue replaces all previous versions.

