



Product Guide CO-G 1

# Additives for the Construction Industry

# Additives for the Construction Industry

Whether in your personal domain at home, in the infrastructure of bridges and roads, or at work – construction chemical products are everywhere and indispensable in today’s world. Construction materials have a long history. Today’s demands on the construction industry for increasingly modern and longer lasting solutions are producing more and more new materials and technologies.

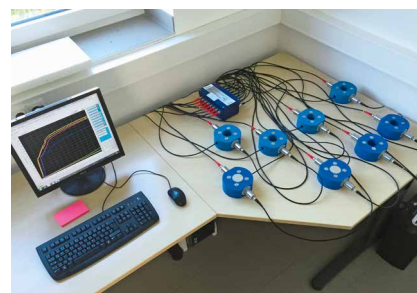
BYK is your competent technology partner for additives for construction materials and supports its customers and partners in the development and optimization of high-quality construction materials and industry products. Additives make it possible to specifically optimize the processing properties and the functionality of construction formulations and make these easier for processors to use.

By using rheology additives, processors can specifically adjust the thixotropic or pseudoplastic properties of the relevant construction material formulation. Wetting and dispersing agents help to disperse fillers and pigments, to reduce viscosity to achieve a higher degree of filling, and to prevent sedimentation.



The group of defoamers helps to reduce foam or the level of air voids in the binder systems, thereby contributing towards optimizing the leveling or surface properties.

BYK, with its construction material lab equipped with state-of-the-art measurement technology and air conditioning, offers the possibility of devising customized application solutions for and with its customers and raw material suppliers. Moreover, it offers the possibility of developing new and innovative products.



**BYK develops more than just additives for construction formulations – we develop customer solutions. Find out more on the following pages.**

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## Concrete and Cement Products

### Additives for Concrete and Cement Products

<b>Defoamers</b>	<b>Liquid</b>	<b>BYK-012</b> <b>BYK-1610</b> <b>BYK-1640</b>
	<b>Powder</b>	<b>BYK-1690 SD</b> <b>BYK-1691 SD</b>
<b>Wetting and Dispersing Additives</b>		<b>BYK-154</b> <b>DISPERBYK-199</b> DISPERBYK-190
<b>Rheology</b>		<b>OPTIBENT-MF</b> OPTIBENT-987

**First recommendation**    Second recommendation

figure 1

Cement and concrete are mineral binders and building materials, respectively, that are primarily used in building shells, in road infrastructure or large-scale projects such as bridges. The respective additives are likewise utilized in the OEM and DIY sector but also in ad-mix.



# Polymer Concrete

Filled, radical curing systems like polymer concrete must be able to withstand tremendous loads. Primary fields of application are tubes, channels, machine beds, basins, etc. Thus their mechanical properties – such as flexural strength, compressive strength, tensile strength and impact resistance – affect their quality directly. BYK-C 8000 improves these key characteristics by up to 50%. This impressive figure is achieved by means of a totally new mode of action. Normally, the filler is only mechanically embedded in between the resin. BYK-C 8000, however, creates genuine chemical bonds between resin and filler. The mechanical strength achieved in this manner can even allow the thickness of components to be reduced without any loss of quality, thereby saving considerable costs. At the same time, BYK-C 8000 improves the processing properties of the filled resin by reducing the viscosity.

### Benefits

- Improvement of mechanical properties
- Low dosage
- Handling is simple – add the additive shortly before curing

### Additives for Polymer Concrete

<b>Coupling Agent to Increase Mechanical Properties</b>	BYK-C 8000
<b>Wetting and Dispersing Additives for Viscosity Reduction</b>	BYK-W 909

figure 2

### Increase of Flexural Strength in Polymer Concrete

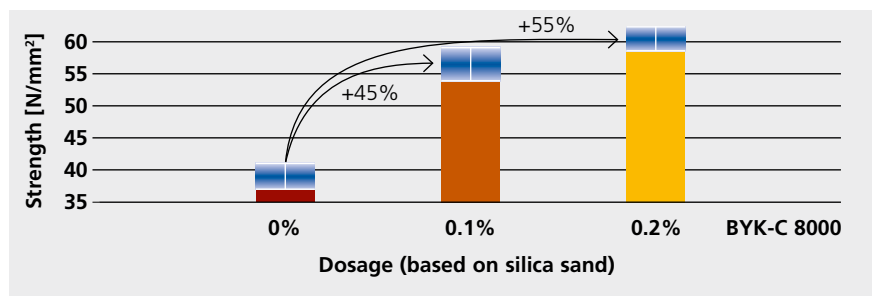


figure 3

### Mode of Action

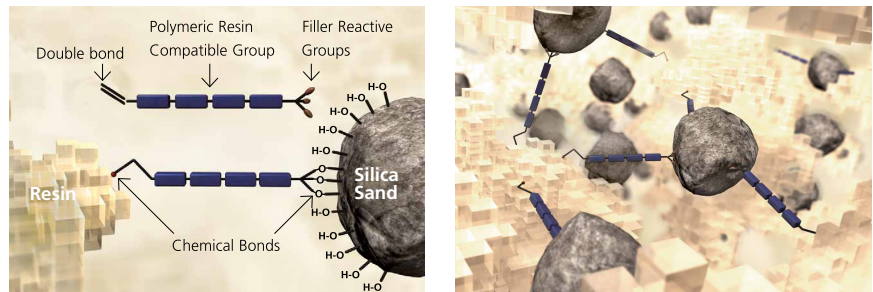


figure 4

Generally speaking, construction adhesives involve all products in which bonding is required, including all types of flooring as well as wall coverings such as wallpaper, tiles, and paneling. BYK is your competent technology partner when it comes to adhesives and improving their properties. BYK understands the language of the

adhesive market. Sealants are used to fill and seal joints of any type. For this reason, they must exhibit good application behavior (e.g. anti-sagging tendency), have good extension properties and no impact on the other adjacent products. A distinction is drawn here between reactive and physical drying systems.

## Additives for Construction Adhesives

	Defoamers	Substrate Wetting	Rheology Control		Wetting & Dispersing			Electrical & Thermal Conductivity
			Anti-settling	Structural Viscosity	Viscosity Reduction	Viscosity Reduction & Anti-settling	Anti-settling	

### Solvent-borne/Solvent-free Systems

<b>Polyurethane</b>	Silicone: <b>BYK-067 A</b> BYK-088  Silicone-free: <b>BYK-1794*</b> <b>BYK-A 535*</b>	Silicone: <b>BYK-333*</b> <b>BYK-378*</b> BYK-307*	<b>BYK-7410 ET</b> GARAMITE-1958  With fumed silica: <b>BYK-R 606*</b> BYK-R 605	<b>BYK-430</b> GARAMITE-7303	<b>BYK-W 969</b> <b>BYK-W 985</b> BYK-9076* DISPERBYK-118 DISPERBYK-2152*	<b>BYK-W 980</b> BYK-W 966	<b>BYK-W 961</b> BYK-P 105*	
<b>Epoxy</b>	Silicone: <b>BYK-A 525</b> BYK-A 530  Silicone-free: <b>BYK-A 550</b> BYK-A 535*	Silicone: <b>BYK-333*</b> <b>BYK-378*</b> BYK-307* BYK-310	<b>BYK-7410 ET</b> GARAMITE-1958  With fumed silica: <b>BYK-R 607</b> BYK-R 606*	<b>BYK-430</b> BYK-431 GARAMITE-7303 GARAMITE-7305	<b>BYK-W 985</b> BYK-W 969 BYK-W 996 BYK-W 9010* DISPERBYK-118 DISPERBYK-2152*	<b>BYK-W 980</b> BYK-W 966	<b>BYK-W 940</b>	
<b>Acrylic</b>	Silicone: <b>BYK-067 A</b>  Silicone-free: <b>BYK-A 515</b>	Silicone: <b>BYK-333*</b> <b>BYK-378*</b> BYK-307*	<b>BYK-7410 ET</b> GARAMITE-1958  With fumed silica: <b>BYK-R 606*</b> BYK-R 605	<b>BYK-430</b> BYK-431 GARAMITE-7303 GARAMITE-7305	<b>BYK-W 969</b>	<b>BYK-W 980</b> BYK-W 966	<b>BYK-P 105*</b> BYK-W 940	

### Aqueous Systems

	Silicone: <b>BYK-093*</b> <b>BYK-094*</b> BYK-022* BYK-028*  Silicone-free: <b>BYK-1640</b> <b>BYK-014*</b> BYK-012* BYK-016*  Mineral oil: <b>BYK-037</b> BYK-039	Silicone: <b>BYK-349*</b> <b>BYK-3455*</b> BYK-348*  Silicone-free: <b>BYK-3410</b> BYK-DYNWET 800	<b>BYK-7420 ES</b> <b>LAPONITE-SL 25</b> OPTIGEL-WX  High shear thickener: <b>OPTIFLO-T 1000</b>	<b>BYK-425</b> <b>LAPONITE-SL 25</b> OPTIGEL-WA  High shear thickener: <b>OPTIFLO-T 1000</b>	Inorganic fillers/pigments: <b>ANTI-TERRA-250</b> <b>BYK-154</b> <b>DISPERBYK-199</b> DISPERBYK-2015  Organic pigments/carbon black: <b>DISPERBYK-191*</b> DISPERBYK-2015	<b>CARBOBYK-9810</b>
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### Radiation Curing Systems

	Silicone: <b>BYK-067 A</b> <b>BYK-088</b>  Silicone-free: <b>BYK-1790*</b> <b>BYK-1791</b> BYK-A 535*	Silicone: <b>BYK-377*</b> <b>BYK-UV 3500*</b>	<b>BYK-7410 ET</b> <b>BYK-7411 ES</b>	<b>BYK-430</b> <b>BYK-431</b>	Inorganic fillers/pigments: <b>BYK-W 9010*</b>  Organic pigments/carbon black: <b>DISPERBYK-168</b> BYK-9077* DISPERBYK-2008*	
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**First recommendation**    Second recommendation

\* High solid additives

figure 5



## > Additives for Construction Adhesives

### Tile Adhesives

<b>Rheology, Dispersion Adhesives</b>	<b>OPTIGEL-WA</b> <b>OPTIGEL-WM</b> OPTIBENT-987
<b>Rheology, Cementitious Tile Adhesives</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1056</b> <b>OPTIBENT-6042</b>

First recommendation    Second recommendation

figure 6

### Putties

<b>Rheology</b>	<b>OPTIBENT-987</b> OPTIGEL-WM
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First recommendation    Second recommendation

figure 7

## Mortar and Modifications

This category includes all products such as screed, tile grout, joint mortar, and any type of engineered mortar and plaster.

### Additives for Mortar and Modifications (Pasty Systems)

<b>Defoamers</b>	<b>BYK-1610</b> <b>BYK-1640</b> BYK-012
<b>Wetting and Dispersing Additives</b>	BYK-154 BYK-155/35 DISPERBYK-199
<b>Rheology</b>	OPTIGEL-WA OPTIGEL-WM OPTIGEL-WX

First recommendation    Second recommendation

figure 8

## Rheology Additives for Dry Mortars

### Plaster/anhydrite-based Systems

<b>Drywall Mounts</b>	<b>OPTIBENT-987</b>
<b>Plasters/Light-weight Plasters</b>	<b>OPTIBENT-602</b>
<b>Thin-set Plaster</b>	<b>OPTIBENT-602</b> OPTIBENT-987
<b>Screeds</b>	<b>OPTIBENT-MF</b> <b>OPTIBENT-940</b> OPTIBENT-987
<b>Spackling Compounds</b>	<b>OPTIBENT-987</b> OPTIBENT-602

First recommendation    Second recommendation    figure 9

### Lime-cement-based Systems

<b>Lime-cement Renders</b>	<b>OPTIBENT-602</b> OPTIBENT-987 OPTIBENT-1008 OPTIBENT-NT 10
<b>Light-weight Lime-cement Renders</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1008</b> OPTIBENT-987 OPTIBENT-NT 10

First recommendation    Second recommendation    figure 10



# Mortar and Modifications

Refer to the B-RI 11 OPTIBENT brochure for more information.



## Cement-based Systems

<b>Self-leveling Compounds</b>	<b>OPTIBENT-MF</b> OPTIBENT-987 OPTIBENT-NT 10
<b>Reinforcement Mortars</b>	<b>OPTIBENT-1008</b> <b>OPTIBENT-1248</b> <b>OPTIBENT-NT 10</b>
<b>Concrete Restoration</b>	<b>OPTIBENT-MF</b> <b>OPTIBENT-602</b> OPTIBENT-1056
<b>Water-proofing Slurries</b>	<b>OPTIBENT-MF</b> <b>OPTIBENT-987</b> <b>OPTIBENT-NT 10</b>
<b>Screeds</b>	<b>OPTIBENT-MF</b> OPTIBENT-987
<b>Grout/Joint Compounds</b>	<b>OPTIBENT-987</b> <b>OPTIBENT-NT 10</b>
<b>Stucco</b>	<b>OPTIBENT-1248</b> OPTIBENT-987 OPTIBENT-1008 OPTIBENT-NT 10
<b>Light-weight Renders</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1008</b> OPTIBENT-987 OPTIBENT-NT 10
<b>Masonry Mortars/ Light-weight Masonry M.</b>	<b>OPTIBENT-1008</b> OPTIBENT-987
<b>Adhesives for Concrete Precision Blocks</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1056</b>
<b>Repair Mortars</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1056</b> OPTIBENT-987
<b>Restoration Renders</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1008</b>
<b>Base Coats</b>	<b>OPTIBENT-602</b> <b>OPTIBENT-1008</b> OPTIBENT-987
<b>Block Fillers</b>	<b>OPTIBENT-987</b>
<b>EIFS/Adhesives/Reinforcement Mortars</b>	<b>OPTIBENT-1008</b> <b>OPTIBENT-1248</b> <b>OPTIBENT-6042</b> OPTIBENT-1056

First recommendation    Second recommendation

figure 11



## Bitumen

### Additives for Bitumen/Bituminous Emulsions

<b>Defoamers</b>		<b>BYK-1640</b> <b>BYK-1730</b> BYK-022
<b>Wetting and Dispersing Additives</b>		<b>BYK-154</b>
<b>Rheology</b>	<b>Aqueous</b>	<b>OPTIGEL-CG</b> <b>OPTIGEL-CK</b> OPTIGEL-WM LAPONITE-RD
	<b>Solvent-borne</b>	<b>TIXOGEL-EZ 100</b> <b>TIXOGEL-VP</b>

First recommendation    Second recommendation

figure 12

Bitumen is primarily comprised of long-chain hydrocarbons. It is a natural product, but it is also obtained during the fractionated distillation of crude oil. Bitumen is a thermoplastic material that liquefies and becomes processable at temperatures ranging from 150 to 200 °C. It is utilized primarily in the construction of roads and as a sealant/insulator for buildings and roofs.

## Concrete Protection

### Additives for Protective Cement Coatings

	<b>Water-borne Systems</b>	<b>Solvent-borne Systems</b>
<b>Defoamers</b>	<b>BYK-1640</b> BYK-1710	<b>BYK-066 N</b> BYK-052 N
<b>Rheology Additives</b>	<b>BYK-7420 ES</b>	<b>BYK-431</b>
<b>Wetting and Dispersing Additives</b>	<b>ANTI-TERRA-250</b> <b>DISPERBYK-199</b> DISPERBYK-2015	<b>DISPERBYK-145</b> DISPERBYK-108

First recommendation    Second recommendation

figure 13

Concrete can be damaged by weather, air pollutants or acid rain. In addition to optical appeal, a specific objective is to protect the concrete from these external effects. This prevents damage to the concrete and the rebar inside.



# Defoamers for Three-pack Self-leveling PU Systems

Key quality criteria for self-leveling coatings include properties such as good leveling, a consistent appearance, and a surface without pinholes and other defects. Defoamers contribute significantly towards these properties. They ensure that air incorporated during mixing and application is removed from the material.

As a result of the relatively short pot life of approx. 15–20 minutes, highly effective and therefore incompatible defoamers are required in 3-pack PU systems to ensure a rapid defoaming of the system. This incompatibility, however, can cause problems like phase separation or surface defects such as cratering.

The liquid products BYK-066 N and BYK-1794 and the solid product BYK-1690 SD provide three defoamers that are ideally suited to use in 3-pack PU systems. They are characterized by their high efficiency whilst still being easy to incorporate. Supplied as a solid product, BYK-1690 SD can be added to the dry mix, which also enables existing formulations to be easily improved.

## Phase Separation in Binder

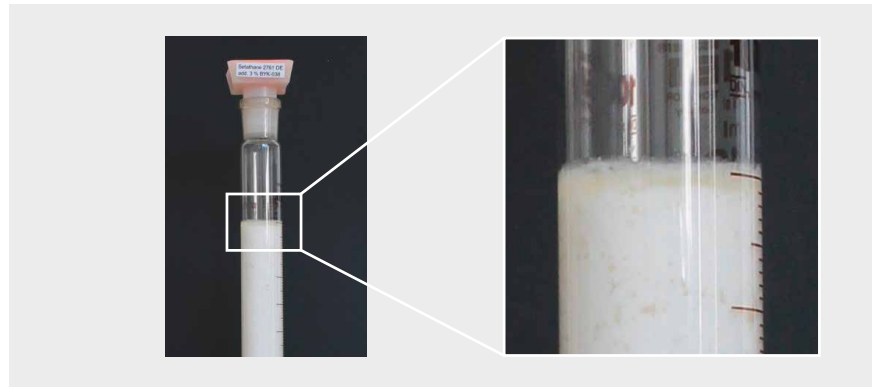
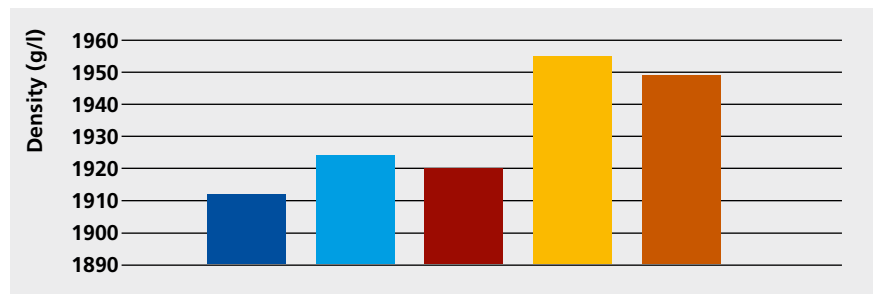


figure 14

## Density of a Three-pack PU System One Minute After Application



■ Without Additive   ■ BYK-066 N   ■ BYK-1794  
 ■ BYK-066 N + BYK-1690 SD   ■ BYK-1794 + BYK-1690 SD

figure 15

## Flow Diameter and Surface Appearance

Additive	(%) on total Formulation	Flow Diameter (mm)	Surface Appearance
Without additive	0.6	122	Crater/pinholes
<b>BYK-066 N</b> in binder	<b>0.5</b>	128	Less craters/micro pores
<b>BYK-1794</b> in binder	<b>0.5</b>	124	Minimal craters/micro pores
<b>BYK-1690 SD</b> in dry mix	<b>0.5</b>	125	Less craters/micro pores
<b>BYK-066 N</b> in binder <b>BYK-1690 SD</b> in dry mix	<b>0.5</b> <b>0.5</b>	135	No craters/homogeneous/ smooth surface
<b>BYK-1794</b> in binder <b>BYK-1690 SD</b> in dry mix	<b>0.5</b> <b>0.5</b>	130	No craters/homogeneous/ smooth surface

figure 16



## Plastics (Liquid Plastics)



Additional information can be found in the CC-A 1 “Additives for Polyurethane C.A.S.E. Applications” and CC-A 4 “Additives for Epoxy-Systems” brochures.

## Additional Information

### BYK Additive Guide App

Higher speed, easier operation and offline availability – these were the main challenges that had to be mastered to implement the BYK app. Similar to the Additive Guide on the BYK website ([www.byk.com](http://www.byk.com)), the new 2.0 version of the new BYK Additive Guide app offers

- an additive search function
- an option for finding suitable additives by selecting your application areas.

An intuitive user interface and a clear design enhance the app’s user friendliness and overall appearance.

Navigation is possible in English, Chinese or German.

Technical data sheets and further information on the additives, e.g. their food regulatory status, are available in up to 10 languages. It is possible to bookmark additives and to e-mail documents.

A check for updates is initialized every time the app is launched online. Since the user can opt to download these updates or not, the app is also available offline.

Check out the new BYK app that enables you to use all the information on BYK additives quickly and easily.



**Additive Guide**



For more information about our additives and instruments, as well as our additive sample orders please visit:

**www.byk.com**

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