BYK
Additives & Instruments

Product Guide CO-G 1

Additives for the Construction Industry

A member of ALTANA

Products for the Construction Industry

Products for the Construction Industry
A world without construction chemical products would be unimaginable since they are such an integral part of our daily routines and environment. They are evident in the private sphere, in our own apartments or houses, as well as in public infrastructure, such as bridges and streets, and even in the workplace. Building materials have a long history. In the early days, natural materials such as wood, stone or clay were utilized. Brick is the first known man-made building material, and it has been in use for about 6000 years. Modern day demands on the construction industry for cutting-edge and sustainable solutions lead to the development of new materials and technologies. By utilizing our decades of experience in the additive sector, BYK is able to provide efficient solutions for this particular industry.

Contents

Concrete and Cement Products

Additives for Concrete and Cement Products

Defoamers	**Liquid**	**BYK-012** **BYK-1610** **BYK-1640**
	Powder	**BYK-1690 SD** **BYK-1691 SD**
Wetting and Dispersing Additives		**BYK-154** **DISPERBYK-199** DISPERBYK-190
Rheology		**OPTIBENT-MF** 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

Additives for Polymer Concrete

Coupling Agent to Increase Mechanical Properties	BYK-C 8000
Wetting- and Dispersing Additive	BYK-W 909

figure 2

Increase of Flexural Strength in Polymer Concrete

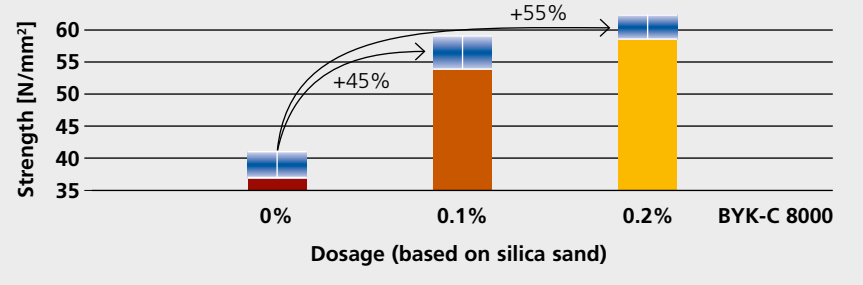
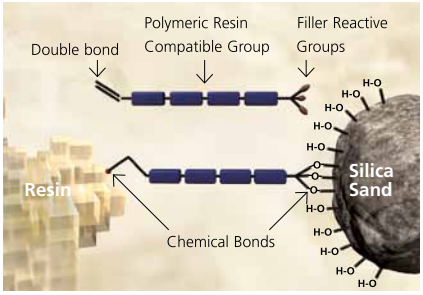


figure 3

Mode of Action



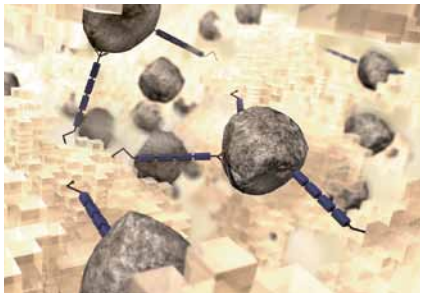


figure 4

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

ATH-filled Acrylic Systems

Aluminum trihydroxide (ATH) is an important filler which is especially valued for its flame retardant and smoke suppressant properties. ATH is used in combination with acrylics for the manufacturing of sinks and bathtubs, for example. For these systems, BYK has developed a polymeric coupling agent, BYK-C 8002, which improves mechanical properties such as the flexural, tensile, compressive and impact strengths of ATH-filled acrylic resins. BYK-C 8002 strengthens the interface between filler and resin by forming strong chemical bonds. These bonds in turn facilitate a noticeable increase in mechanical resilience. The additive also has a positive effect on the settling properties of ATH in acrylic resin (PMMA in MMA).

Benefits

- Improves mechanical properties by up to 30 %
- Anti-settling properties
- Handling is simple – add the additive shortly before curing!

Increase of Flexural Strength with BYK-C 8002

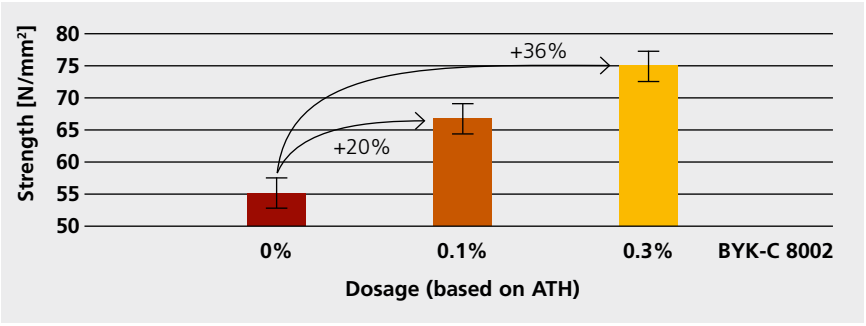


figure 5

BYK-C 8002 Improves the Anti-settling Properties

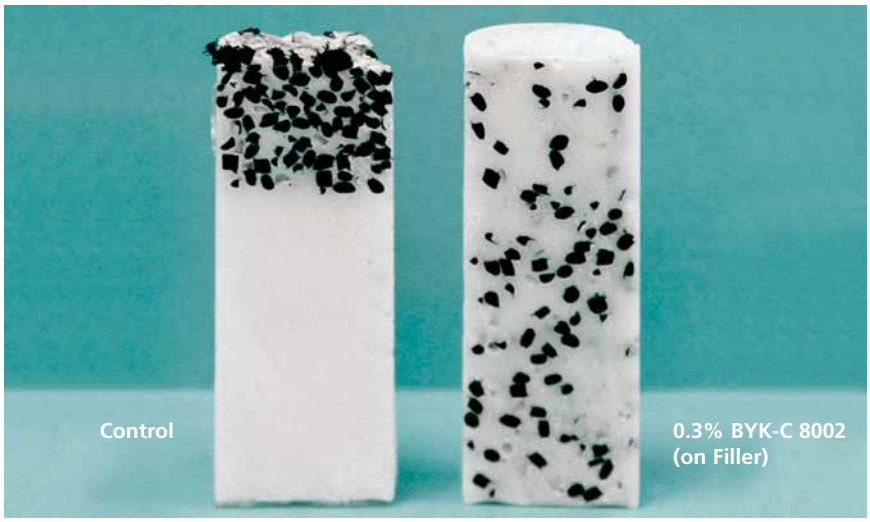


figure 6

Additives for Adhesives and Sealants

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.

	Defoamers	Substrate Wetting	Rheology Control		Wetting & Dispersing			Electrical & Thermal Conductivity
			Anti-settling	Pseudoplasticity	Viscosity Reduction	Viscosity Reduction & Anti-settling	Anti-settling	
Solvent-borne/Solvent-free Systems								
Polyurethane	Silicone: **BYK-067 A** BYK-088 Silicone-free: **BYK-1794*** **BYK-A 535***	Silicone: **BYK-333*** **BYK-378*** BYK-307*	**BYK-7410 ET** GARAMITE-1958 With fumed silica: **BYK-R 606*** BYK-R 605	**BYK-430** GARAMITE-7303	**BYK-W 969** **BYK-W 985** BYK-9076* DISPERBYK-118 DISPERBYK-2152*	**BYK-W 980** BYK-W 966	**BYK-W 961** BYK-P 105*	
Epoxy	Silicone: **BYK-A 525** BYK-A 530 Silicone-free: **BYK-A 550** BYK-A 535*	Silicone: **BYK-333*** **BYK-378*** BYK-307* BYK-310	**BYK-7410 ET** GARAMITE-1958 With fumed silica: **BYK-R 607** BYK-R 606*	**BYK-430** BYK-431 GARAMITE-7303 GARAMITE-7305	**BYK-W 985** BYK-W 969 BYK-W 996 BYK-W 9010* DISPERBYK-118 DISPERBYK-2152*	**BYK-W 980** BYK-W 966	**BYK-W 940**	
Acrylic	Silicone: **BYK-067 A** Silicone-free: **BYK-A 515**	Silicone: **BYK-333*** **BYK-378*** BYK-307*	**BYK-7410 ET** GARAMITE-1958 With fumed silica: **BYK-R 606*** BYK-R 605	**BYK-430** BYK-431 GARAMITE-7303 GARAMITE-7305	**BYK-W 969**	**BYK-W 980** BYK-W 966	**BYK-P 105*** BYK-W 940	
Aqueous Systems								
	Silicone: **BYK-093*** **BYK-094*** BYK-022* BYK-028* Silicone-free: **BYK-1640** **BYK-014*** BYK-012* BYK-016* Mineral oil: **BYK-037** BYK-039	Silicone: **BYK-349*** **BYK-3455*** BYK-348* Silicone-free: **BYK-3410** BYK-DYNWET 800	**BYK-7420 ES** **LAPONITE-SL 25** OPTIGEL-WX High shear thickener: **OPTIFLO-T 1000**	**BYK-425** **LAPONITE-SL 25** OPTIGEL-WA High shear thickener: **OPTIFLO-T 1000**	Inorganic fillers & pigments: **ANTI-TERRA-250** **BYK-154** **DISPERBYK-199** DISPERBYK-2015 Organic pigments & carbon black: **DISPERBYK-191*** DISPERBYK-2015			**CARBOBYK-9810**
Radiation Curing Systems								
	Silicone: **BYK-067 A** **BYK-088** Silicone-free: **BYK-1790*** **BYK-1791** BYK-A 535*	Silicone: **BYK-377*** **BYK-UV 3500***	**BYK-7410 ET** **BYK-7411 ES**	**BYK-430** **BYK-431**	Inorganic fillers & pigments: **BYK-W 9010*** Organic pigments & carbon black: **DISPERBYK-168** BYK-9077* DISPERBYK-2008*			

First recommendation Second recommendation

figure 7

* High solid additives

Additives for Adhesives and Sealants

Hot Melts

	Defoamers	Anti-blocking
Hot Melts	**BYK-1790*** **BYK-A 535***	**HORDAMER PE 02** AQUACER 531

First recommendation Second recommendation figure 8

* High solid additives

Tile Adhesives

Rheology, Dispersion Adhesives	**OPTIGEL-WA** **OPTIGEL-WM** OPTIBENT-987
Rheology, Cement-based tile Adhesives	**OPTIBENT-602** **OPTIBENT-1056** **OPTIBENT-6042**

First recommendation Second recommendation figure 9

Putty Compounds

Rheology	**OPTIBENT-987** OPTIGEL-WM

First recommendation Second recommendation figure 10

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)

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

First recommendation Second recommendation figure 11

Rheology Additives for Dry Mortars

Plaster/anhydrite-based Systems

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

First recommendation Second recommendation figure 12

Lime-cement-based Systems

Lime-cement Renders	**OPTIBENT-602** OPTIBENT-987 OPTIBENT-1008 OPTIBENT-NT 10
Light-weight Lime-cement Renders	**OPTIBENT-602** **OPTIBENT-1008** OPTIBENT-987 OPTIBENT-NT 10

First recommendation Second recommendation figure 13

Mortar and Modifications

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

Cement-based Systems

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

First recommendation Second recommendation figure 14

Bitumen

Additives for Bitumen/Bituminous Emulsions

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

First recommendation Second recommendation figure 15

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

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

First recommendation Second recommendation figure 16

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.

Products for Wood Plastic Composites (WPC)

Wood plastic composites are generally composed of a wood component and a polymer matrix (polypropylene or polyethylene). These raw materials are used in construction, for example in formwork materials, decking, fencing, and façades. BYK produces coupling agents for this application which improve the properties of the material.

The use of coupling agents in wood plastic composites (WPC) generally leads to the following improvements:
- Increased mechanical strength
- Higher impact strength
- Higher heat distortion temperature
- Lower moisture sensitivity
- Improved surface

Coupling Agents for WPC

PP Basis	SCONA TPPP 8112 FA/GA
PE Basis	SCONA TSPE 1112 GALL SCONA TSPE 2102 GAHD

figure 17

Mechanism

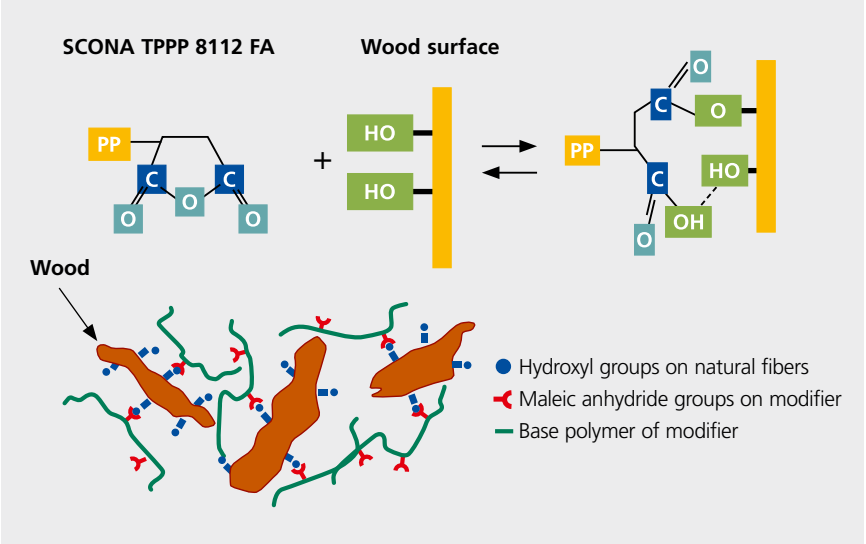
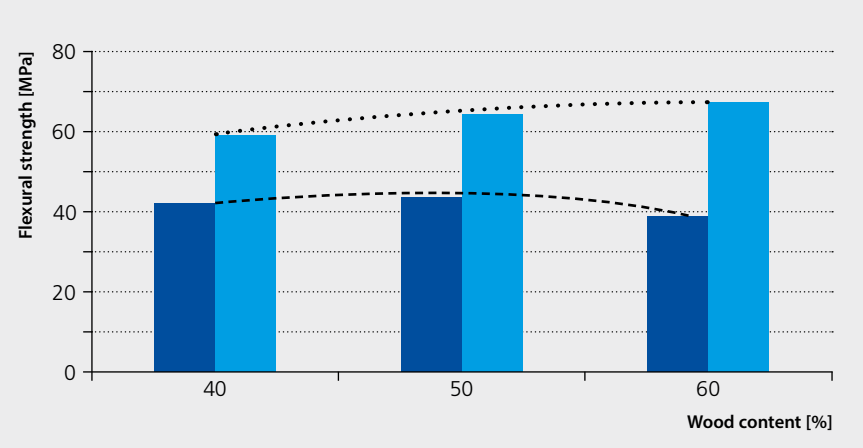


figure 18

Products for Wood Plastic Composites (WPC)

Increase in Flexural Strength of WPC Using Coupling Agents



Without adhesion promoter With adhesion promoter figure 19

Such improvements become even greater as the proportion of wood flour or natural fibers is increased (see fig. 19). For WPC based on PP, SCONA TPPP 8112 is available in flake (FA) or granulate (GA) form. By virtue of a high degree of grafting, superior performance is achieved at low dosage levels when compared with conventional PP products grafted with maleic anhydride.

Similar results are obtained with coupling agents which are recommended for WPC based on PE (mostly HDPE). In this case, the precise recommended use depends on which equipment is available to the customer. Granulate and powder versions are also available.

Wood Impregnation

Untreated wood is not sufficiently protected from decomposition, e.g. from organisms and deterioration, when exposed to the elements. Various methods of impregnation protect the wood by having substances penetrate the pores. There are non-pressurized methods such as brushing or dipping as well as pressurized methods such as vacuum-pressure impregnation.

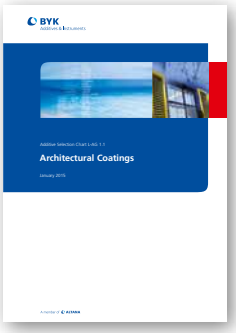
The wood is further protected by an appropriate varnish or coating.

Additives for Wood Impregnation

	Aqueous Systems	Solvent-borne Systems
Defoamers	**BYK-024** **BYK-093** BYK-022	**BYK-066 N** BYK-052 N
Wax Additives	**AQUACER 539**	**CERAFAK 117**
Surface Additives	**BYK-333** **BYK-349** BYK-348	**BYK-333** BYK-307

First recommendation Second recommendation figure 20

Additional information about our additives for coatings and varnishes can be found in our brochure L-AG 1.1 “Architectural Coatings”.



Plastics (Liquid Plastics)

Plastics are used in the construction industry in various ways. Liquid plastics are utilized in coatings for flooring such as industrial flooring, parking decks, and sports flooring. They are also utilized in façade cladding, pipes, polymer plugs and hoses.

Difficulties often arise with polyol mixtures, which must be mixed first with a chain extender and then with a hardener before processing at the construction site. This laborious series of processing steps is required due to the incompatibility between the chain extender and the polyol mixture. Thus, it is not possible to produce stable mixtures at the manufacturing site.

The new additives BYK-P 9908 and BYK-P 9909 are now available to relieve this problem. They are based on an innovative concept, which harnesses the potential of controlled polymerization technology (CPT) to create a new class of compatibilizers/emulsifiers.

In both of these new additives, two amphiphilic, polymeric active ingredients are combined together without disrupting the properties of either one. Both components react with each other like a pair of fraternal twins (which led us to name this type of emulsifier „Twin Amphiphilic Polymeric Emulsifier," or „T.A.P.E." for short). One of the active components demonstrates higher solubility in (meaning higher compatibility with) hydrophobic polyol, while the other component is especially soluble in the hydrophilic chain extender.

Benefits

- Stable mixture of polyol and chain extender over a longer period of time
- Reduction of mixing steps from 3 to 2
- Fewer accident-prone processing steps, leading to fewer customer complaints
- Simpler and faster processing for the end user

Mode of Action of the Additives
Twin Amphiphilic Polymeric Emulsifier (T.A.P.E.)

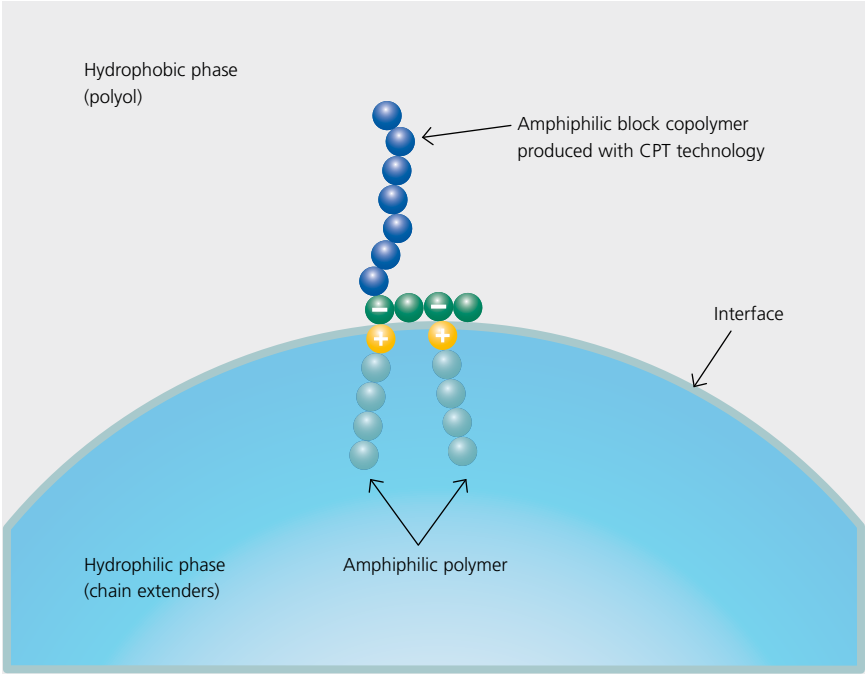
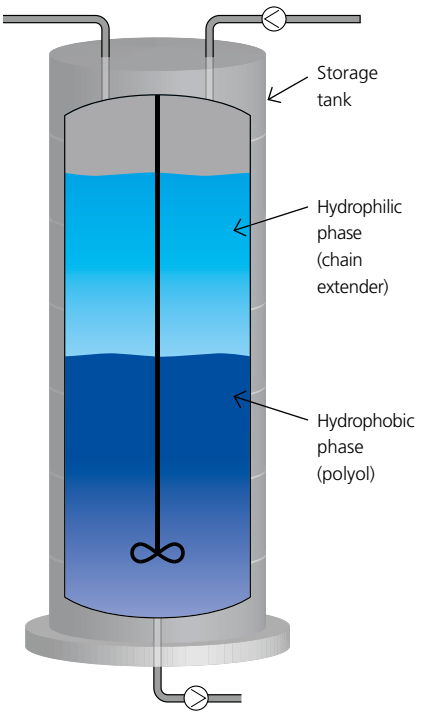


figure 21

Plastics (Liquid Plastics)

Longer Polyol Emulsion Stability and Homogeneity in Storage and Day Tanks

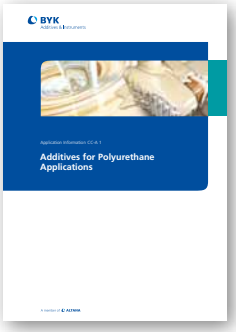


No additional mixing equipment necessary! figure 22

Excellent Stabilization of Butanediol in PTMEG

Storage conditions: 40 °C, 14 days
Mixing ratio: 92 Polyether Polyol : 8 Butanediol
figure 23

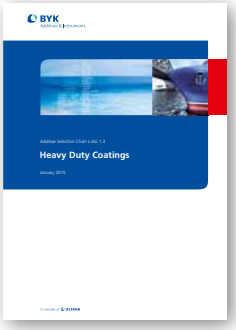
Additional information can be found in the CC-A 1 “Additives for Polyurethane C.A.S.E. Applications” and CC-A 4 “Additives for Epoxy-Systems” brochures.



Metals

Metals are used for example in the construction of bridges. This necessitates a specific protection of the metal components from environmental factors as well as salt water in order to prevent rust formation. Without a protective coating for significant corrosion protection, the metal would deteriorate resulting in respective loss of stability and the aesthetic would be negatively impacted. BYK offers a wide range of additives for corrosion protection coatings.

Additive recommendations can be found in the L-AG 1.3 "Heavy Duty Coatings" brochure.



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), 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.

BYK Additive Guide

Available on the App Store

Google play

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

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