BYK
Additives & Instruments

Application Information CC-A 9

Additives for Chemical Anchoring and Fixing Products

A member of ALTANA

Additives for Chemical Anchoring and Fixing Products

In chemical anchoring, generally highly filled, two-component reaction resins are used to permanently bond anchors made of metal or reinforced plastics to mineral materials (e.g., concrete, masonry, and stone). The use of this technique permits stress-free, substance-to-substance bonding of an anchor to the material surrounding the drill hole.

The reaction resins are usually epoxides, unsaturated polyesters, vinyl esters, acrylates, and modifications of these. In practice, the reaction resins are either injected from two-component cartridges (figure 1) or inserted as capsules (figure 2) into the drill hole.

Important properties of the chemical anchors are: high mechanical resilience, excellent adhesion to the substrate, good storage stability before the chemical reaction and easy processability with low raw material costs.

This brochure summarizes our additive recommendations for this application.

Preferred additives
are in bold print.

2-pack Injection Cartridge

figure 1

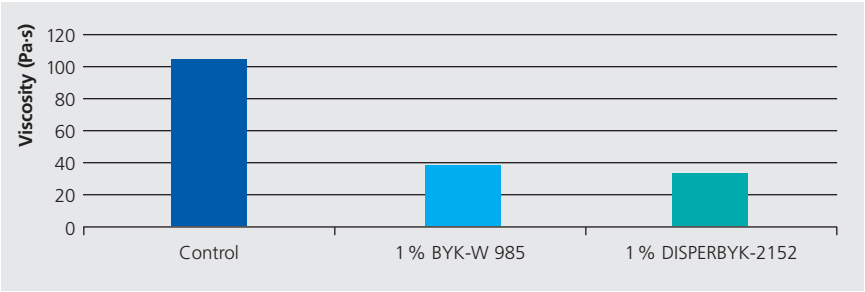
Chemical Resin Capsule

figure 2

Wetting and Dispersing Additives

Fillers are used to improve the mechanical properties of the system and to reduce costs. However, they increase the viscosity of the formulation and in doing so, can make processability more difficult. Suitable wetting and dispersing additives improve the wetting of the solid particles, which significantly reduces viscosity (figure 3). Alternatively, the filler content can be increased while holding the viscosity constant. Moreover, wetting and dispersing additives stabilize the fillers against sedimentation (figure 4).

Viscosity Reduction (Orthophthalic Resin with 70 % Quartz)



Brookfield RVT, #7 spindle, 5 rpm

figure 3

Stabilization Against Sedimentation

figure 4

Additive Recommendations

	Viscosity Reduction	Stabilization Against Sedimentation
Epoxy	BYK-W 980 **BYK-W 985** BYK-W 996 DISPERBYK-2152	**ANTI-TERRA-204** BYK-W 940
Unsaturated polyester/ vinylester (also monomer-free)	BYK-W 909 BYK-W 966 **BYK-W 985** DISPERBYK-2152	**BYK-W 940**
Acrylate	**BYK-W 969** BYK-W 9010	**BYK-P 105**

figure 5

Rheology Additives

The flow behavior of the resin mixture is a critical factor for composite anchors. The system must be simple to prepare and as stable as possible against sedimentation during storage. Good flow properties are required during application so that all space between the anchor and the wall of the drilled hole is filled; on the other hand, the resin should remain in the hole until it has cured and not leak out of the hole. To adjust the thixotropy of chemical fixing systems BYK offers liquid as well as solid thixotropes. The two thixotropy boosters must always be used in combination with a solid thixotrope such as GARAMITE or fumed silica.

Additive Recommendations

	Thixotropy Booster	Liquid Thixotrope	Solid Thixotrope
Epoxy	**BYK-R 605** **BYK-R 607***	**BYK-410**	**GARAMITE-7305**
Unsaturated polyester/ vinylester (also monomer-free)	**BYK-R 605**	**BYK-410****	GARAMITE-1210 **GARAMITE-1958**
Acrylate	**BYK-R 605**	**BYK-410****	GARAMITE-1210 **GARAMITE-1958**

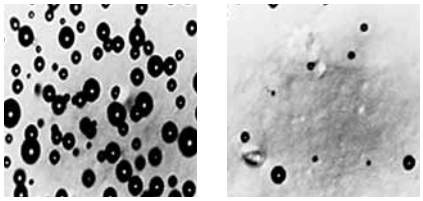
* for the hardener ** only for cobalt-free systems

figure 6

Air Release Agents/Defoamers

Mechanical strength and chemical resistance are extremely important for composite anchors. Air entrapment in the cured system could negatively affect these properties. To achieve optimal deaeration, resin-specific additives are added that spontaneously deaerate the resin during preparation and improve application.

Deaeration of an Unsaturated Polyester



Without additive **With additive**

figure 7

Additive Recommendations

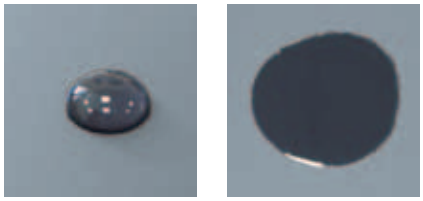
Epoxy	BYK-A 501 **BYK-A 530**
Unsaturated polyester	BYK-A 515 **BYK-A 555**
Vinylester	**BYK-A 515**
Styrene-free polyester/vinylester	**BYK-A 530** BYK-A 555
Acrylate	BYK-070 **BYK-A 515**

figure 8

Surface-active Additives

The often dusty surface of the mineral substrate makes wetting and saturation of the substrate difficult and the consequence is that the resin and substrate are not sufficiently bonded together. The use of surface-active additives, which are generally based on modified polysiloxanes, significantly reduces the surface tension of the resin (figure 9). The penetration of the resin into the substrate occurs more readily since the cohesion to the wall of the drilled hole becomes stronger than the adhesion of the liquid particles to each another.

Reduction of Surface Tension



Without additive **With additive**

figure 9

Additive Recommendations

Epoxy	**BYK-306** BYK-310
Unsaturated polyester/vinylester (also monomer-free)	BYK-306 BYK-310 **BYK-330**
Acrylate	**BYK-306** BYK-378

figure 10

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

www.byk.com

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Additive Guide

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