APPLICATION INFORMATION

ADDITIVES FOR CASTING SYSTEMS LIKE CULTURED MARBLE, ONYX AND POLYMER CONCRETE BASED ON UNSATURATED POLYESTER

Contents

Introduction

Artificial marble (calcium carbonate), onyx (ATH) and polymer concrete (silicate) are some examples of highly filled casting applications based on unsaturated polyester resins, which are differentiated according to the filler used and the final product manufactured.

The most important properties of the end products can be not only an attractive appearance but also a high filler content, low porosity, chemical resistance and good mechanical properties.

This brochure shows you how BYK additives can help optimize these properties in your products.

For additional information on additives and technical topics please contact us:
Thermosets.BYK@altana.com

Note

To ensure the best appearance and full functionality, please open in Adobe Acrobat.

Wetting and dispersing additives

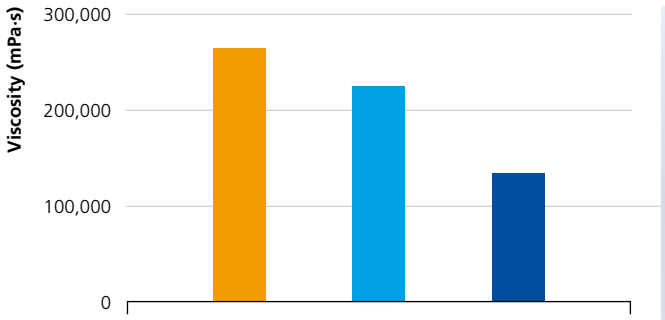
BYK-W 908 and **BYK-W 909** are designed for cast polymer application areas of cultured marble, cultured onyx, cultured granite, solid surface (polyester and acrylic modified polyester) and polymer concrete. BYK-W 908 is the REACH registered version of BYK-W 909.

They exhibit high viscosity reducing effects in most highly-filled compounds containing silica sand, ATH, and calcium carbonate. Highly-filled application areas, such as polymer concrete, show better wetting and therefore improved flow (see G. 02).

By using 1 % BYK-W 908/BYK-W 909 (based on resin) it is possible to reduce the amount of resin in the formulation up to 10 %.

The additives are a water-clear liquid and have no effect on color, either initially or in the final cured part (see G. 03). Also BYK-W 985 is suitable for highly-filled casting systems.

High viscosity reduction of a 75 % filled cultured marble formulation



As measured on Brookfield RVT Viscometer with #4 spindle @ 5 rpm for 1 minute (25 °C). All additive dosages are based on filler weight.

- Control
- 0.5 % BYK-W 908/BYK-W 909
- 1.0 % BYK-W 908/BYK-W 909

G. 01

Lateral spread of polymer concrete compound

Without additive **With 1 % BYK-W 908/BYK-W 909**

G. 02

Physical testing

Thermal shock: Two vanity tops – one control without additive at 26 % resin and another with BYK-W 908/ BYK-W 909 at 22 % resin – were thermal shock tested up to 1500 cycles at a certified lab. The results showed that the use of the additives at lower resin content had no effects on the thermal cycles.

Impact: A certified lab tested the two vanity tops for impact strength. Both, the control sample and the sample with BYK-W 908/BYK-W 909, performed the same. This showed that the use at a lower resin content had no effect on the impact strength.

Reactivity: Tests in BYK laboratories have shown that BYK-W 908 and BYK-W 909 have no effect on reactivity and do not influence gel or cure times.

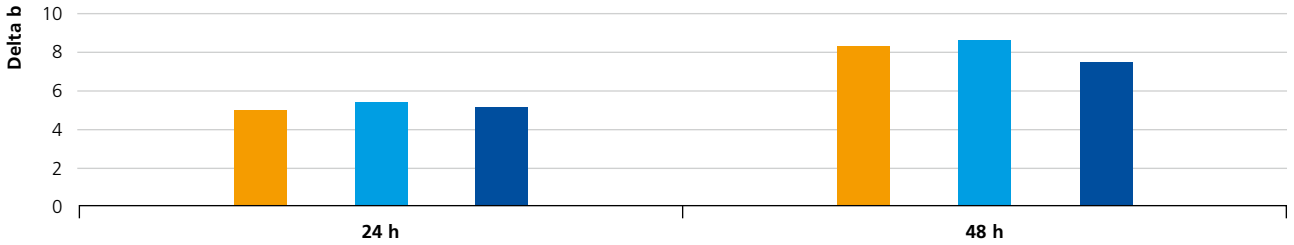
Dosage and incorporation

BYK-W 908/BYK-W 909 when used at higher dosages will maximize the viscosity reduction. This will allow an optimization of resin/filler ratio leading to lower costs. The additives can also be used in lower dosages to improve the filler wet-out, enhance flow and leveling, and help with deaeration. In order to obtain the maximum air release properties in any casting application and obtain a final part with improved appearance and strength, it is recommended that air release additives be used in conjunction with BYK-W 908/BYK-W 909.

- For systems with up to 75 % filler: 0.5 %–1.5 % based on filler.
- For systems with more than 75 % filler: 1.0 %–2.0 % based on resin.

For best performance the additive should be mixed into the resin prior to the addition of filler.

Onyx: no color shift due to BYK-W 908/BYK-W 909



Measured with BYK-Gardner color-guide after 24 h and 48 h exposure to UV light. Additive dosage based on filler weight.

- Control
- 0.5 % BYK-W 908/BYK-W 909
- 1.0 % BYK-W 908/BYK-W 909

G.03

Air release additives

BYK-081
is a medium active and transparent defoamer and has food contact approval.*

BYK-A 550
shows a high effectiveness with minimal haze and is recommended for use in transparent castings and translucent cultured onyx parts and cultured marble.

BYK-A 555
shows the best air release effect and is recommended for use in highly-filled casting applications such as cultured marble and polymer concrete.

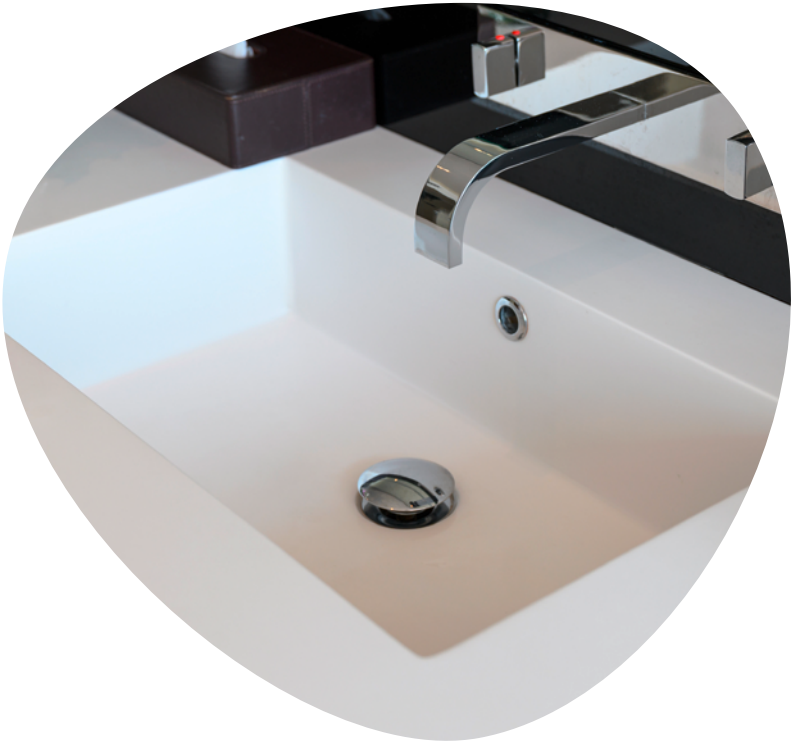
BYK-A 515
offers very good air release and is recommended for use in polyester and acrylic modified polyester solid surface applications.

Additives to improve defoaming

Product	Cultured marble	Polymer concrete	Solid surface polyester	Solid surface polyester w/MMA	Cultured onyx	Transparent castings
BYK-081*	○	○		○	○	○
BYK-A 550	○	○	●	●	●	●
BYK-A 555	●	●	●	○		○
BYK-A 515	●	○	●	●	○	

● First recommendation ○ Second recommendation T. 02

* For details on food contact use, please refer to the food contact sheet available on www.byk.com/en/service/regulatory-affairs/food-contact.



Coupling agents

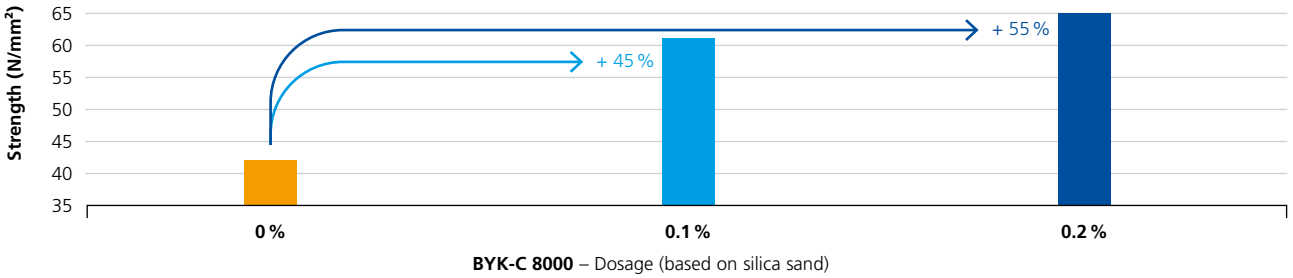
Filler is usually only mechanically embedded in the resin. Under stress, filled parts break at the interface filler/resin.

BYK-C 8000 strengthens the interface between filler and resin by forming strong chemical bonds, resulting in a remarkable improvement of mechanical properties.

BYK-C 8000 is a polymeric coupling agent that enhances mechanical properties such as:
- flexural strength
- tensile strength
- compressive strength
- abrasion resistance
- impact strength

in filled ambient curing resins. As a result, depending on systems and usage, the thickness of the composites can be reduced which is economically favorable.

Increase of flexural strength in polymer concrete

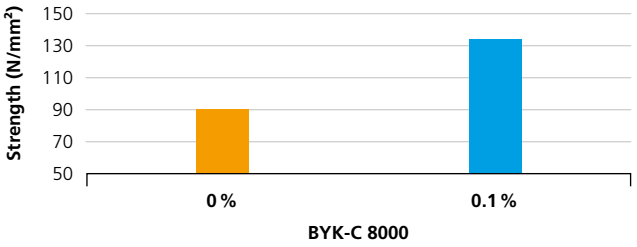


G.04

Your benefits

- Improving mechanical strength up to +50 %
- Improving flow properties by reducing viscosity up to 50 %
- Easy-to-use – just add the additive to the mixture prior to curing!

Increase of compressive strength in polymer concrete



G.05

TS-A 1 01/2022

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