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CONCRETE ADDITIVES FOR THE DRY MORTAR INDUSTRY

Sika® ViscoCrete® and Retardan®

BUILDING TRUST

SIKA DRY MORTAR – ADDITIVES FOR TODAY AND TOMORROW

SIKA IS A COMPETENT PARTNER for the dry mortar industry with more than 40-years of experience. Since 2008 Sika has provided its superplasticizer Sika® ViscoCrete® and gypsum retarders Retardan® in powder form and thus provides dry mortar manufacturers with new opportunities. With a network of over 400 production sites in more than 102 countries, Sika is positioned not only globally, but also locally, enabling global and local customer support.

SIKA QUALITY PROMISE CONTAINS ...

INDIVIDUAL SERVICE

+

INNOVATION

+

COMPETENCE

+

SUSTAINABILITY

OUR SERVICE – YOUR BENEFIT



ENVIRONMENTALLY COMPATIBLE PRODUCTS

By using sustainable resources and low emissions.

COST-EFFECTIVE SOLUTIONS

Ensured by competent and individual product recommendation.

MAXIMUM SECURITY

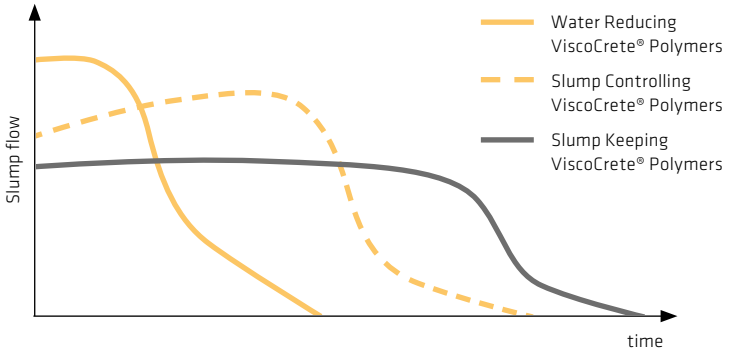
With individually developed dry-mix formulation.



SUPERPLASTICIZERS

Sika® ViscoCrete® – BASED on PCE (polycarboxylate) technology, was introduced in the early 2000s and has been continually developed. Today, Sika is a leading producer of PCE-based plasticizers, with 20 ViscoCrete® production sites worldwide and international experience in countless applications. The production, which conforms to demanding industrial standards, ensures a continuously high product quality.

Examples for consistency curves of various PCEs



Benefits
- Up to 10-times lower dosage compared to traditional superplasticizers
- Short mixing times
- Allows significant water reduction
- Long consistency preservation/workability
- Less shrinkage (up to 30 %)
- Good price/performance ratio
- Good compatibility and synergy with other additives
- No release of ammonia (vs. casein)
- No release of formaldehyde (vs. melamine and naphthalene)
- Sustainable and available worldwide

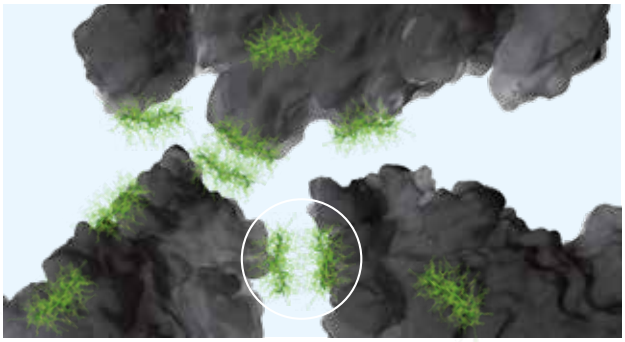
Characteristic of ViscoCrete®-510 P + 520 P
- Even faster adsorption
- Ideal for mechanical mixing and pump technology
- ViscoCrete®-510 P has a very broad spectrum of applications
- ViscoCrete®-520 P especially for ternary systems

Sika® ViscoCrete PowerPack
- Optimized blend of Sika® ViscoCrete® types
- Very easy to dose and therefore robust
- Economical replacement of e.g. melamine
- Useful in a wide application field

Sika® ViscoCrete® superplasticizers have a double-action dispersion effect:
- by saturation of electrostatic charges on the particle surface
- by steric repulsion of the PCE molecules.

The comb polymer structure of Sika® ViscoCrete® was designed to achieve application-specific properties. Polymer-specific properties such as backbone chemistry, backbone length, number and length of side chains and charge density have a direct impact on the performance in the respective application field, such as water reduction, workability time, rheology, strength development, air content and adsorption time.

By understanding the effects of different polymer designs, Sika is able to offer tailor-made solutions for many applications with different binders!

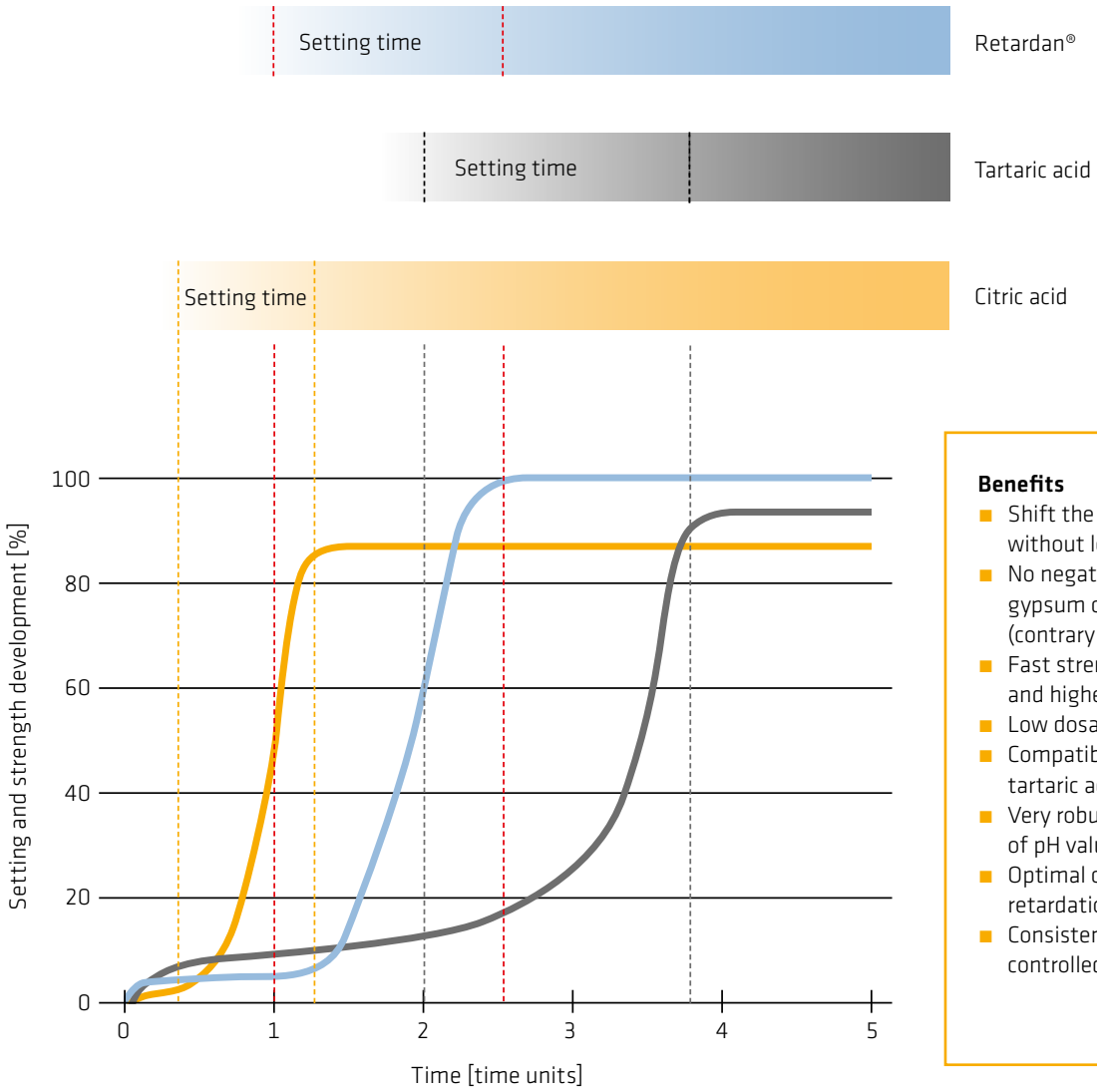


Improved workability by steric repulsion

RETARDERS FOR GYPSUM-BASED DRY MORTARS

Retardan® ADDITIVES ARE very effective retarders in liquid or powder form that have been used for decades in the gypsum industry. They exhibit excellent performance in the adjustment of the setting and workability time in a variety of calcium sulphate binders, also in combination with other additives such as rheological additives, foaming agents and accelerators. They are characterized by a very low dosage and a high retarding effect in different gypsum binder systems. Retardan® is noted for its well-defined retardation.

Comparison of the retardation curve



Benefits

- Shift the start of hydration without loss of intensity
- No negative effect on the gypsum crystal growth (contrary to fruit acids)
- Fast strength development and higher final strengths
- Low dosage
- Compatible with citric and tartaric acid
- Very robust against changes of pH value
- Optimal control of the retardation curve
- Consistent quality due to controlled production

Test conditions:
Constant retarder dosage, alkaline environment

APPLICATION EXAMPLE
Sika® ViscoCrete®
ANHYDRIT LEVELLING FLOOR SCREED

THE MARKET SHARE of flowable screeds will increase in the future. Very simple installation due to the almost self-compacting properties and even surfaces are the main advantages. Sika® ViscoCrete® exhibits excellent liquefaction performance in levelling screeds even at a very low dosage and is compatible with other additives such as the retarder Retardan®.

Compared to melamine, usually less than 25% of the original dosage is required.
As a new solution, Sika® PowerPack can be used as a 1:1 replacement, e.g. for melamine.

Task: Reformulation to a very low-emission recipe by replacing melamine with PCE.
Material: Binder mixture of natural and synthetic anhydrite.


Higher installation rates feasible


Convenient installation


Easy finishing

	REFERENCE	ViscoCrete®-225 P	ViscoCrete®-510 P	ViscoCrete®-510 P
Screed dry mortar without superplasticizer [g]	1997.00	1999.62	1999.62	1999.62
Dosage of superplasticizer [g]	3.00	0.38	0.38	0.60
Water [ml]	320.00	320.00	320.00	300.00
Initial flow Hägermann 2 min [cm]	22.00	22.50	21.40	23.40
Initial flow Hägermann 30 min [cm]	19.80	19.80	20.20	22.90
Strength 7 d (F/C) [N/mm²]	3.4 / 15.4	3.8 / 18.4	3.7 / 17.2	3.9 / 19.4
Strength 28 d (F/C) [N/mm²]	3.9 / 20.2	4.3 / 20.8	4.2 / 20.5	4.5 / 22.6

Solution: To achieve similar fresh and hardened mortar properties compared to the reference, only about 13 % of the original melamine dosage is needed. With 20 % of the original dosage, a water reduction associated with about 10 % higher strengths could be achieved.

APPLICATION EXAMPLE
Sika® ViscoCrete®
GROUTING MORTAR

GROUTS ARE USED during installation in new buildings and in refurbishment, in building construction, civil engineering and engineering. They are mainly used in safety-related areas. Grouting of rails or mounting plates, connection of prefabricated, reinforced concrete and backfilling of sleeve foundations are just some of the possible applications.

Very demanding requirements had been put forward by the wind power industry for highly dynamically stressed grout in offshore and onshore areas.

Due to these different applications continuously new and improved developments are also required up to the high strength range. Different qualities of cement and special additives are the major challenges for the mortar formulation. Fast adsorption to a high initial flow associated with long slump-keeping without additional liquefaction, as well an extraordinary strength performance is required.

Task: Optimize fresh mortar to a target value of 245 mm ± 5 mm Hägermann consistency drop after 2 hours <10 %. Fast adsorption to a high initial flow associated with long slump-keeping without additional liquefaction.

Material: Cementitious grout

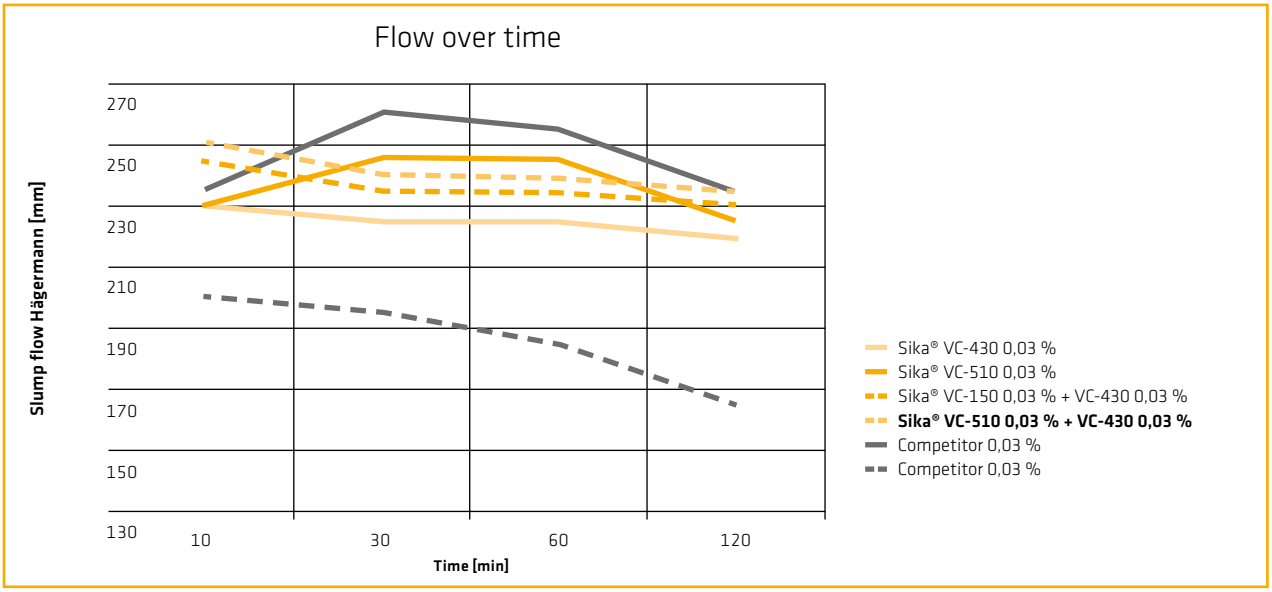
Solution: None of the tested superplasticizers fulfils the requirement stated above alone. The combination of a strong water reducer with a slump keeper gives the optimal solution.



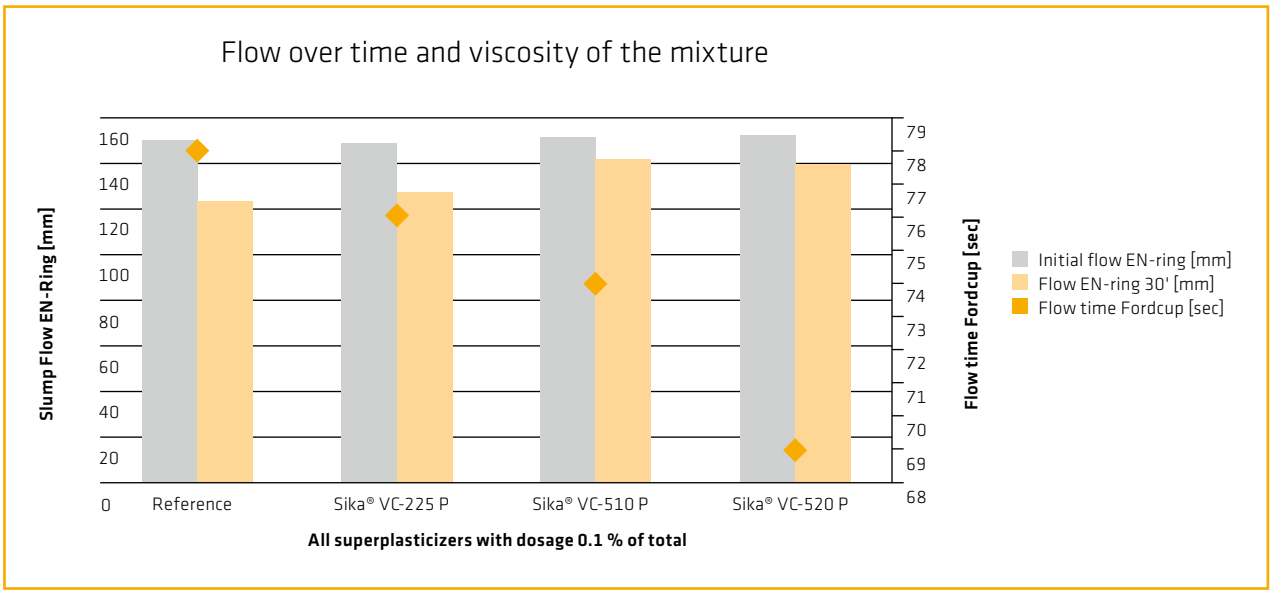
Flow channel for grout



Flow rate with Hägermann



APPLICATION EXAMPLE
Sika® ViscoCrete®
SELF-LEVELLING UNDERLAY





Perfect flow properties



SLU application

With the installation of floor coverings, a flat, evenly absorbent substrate is required. Self-levelling compounds fulfil these tasks. They must be tailored to the particular substrate and floor covering.

Excellent flow properties and rapid drying for are the key arguments for the floor layers. Mortar developers are focusing more and more on the use of special mixing and pumping equipment. Sika® ViscoCrete® Superplasticizer exhibits especially good liquefaction performance here, even at low temperatures.

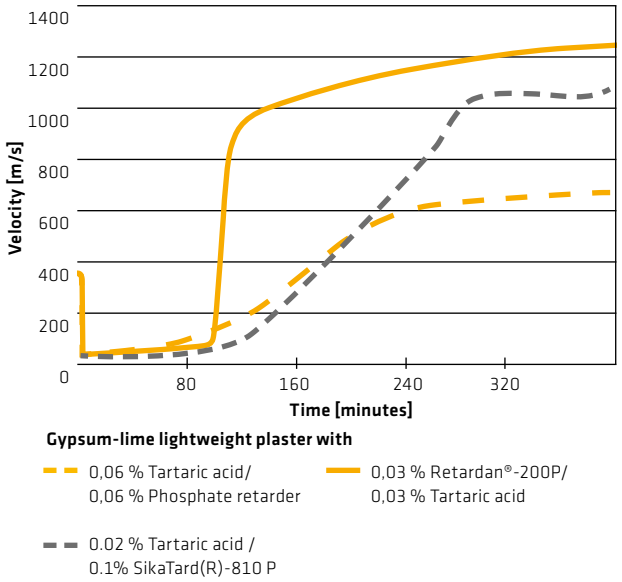
Task: Replacement of an existing PCE with comparable flow properties for mechanical mixing and pumping technology.

Material: Ternary, CAC-rich floor levelling compound, pH <11.5

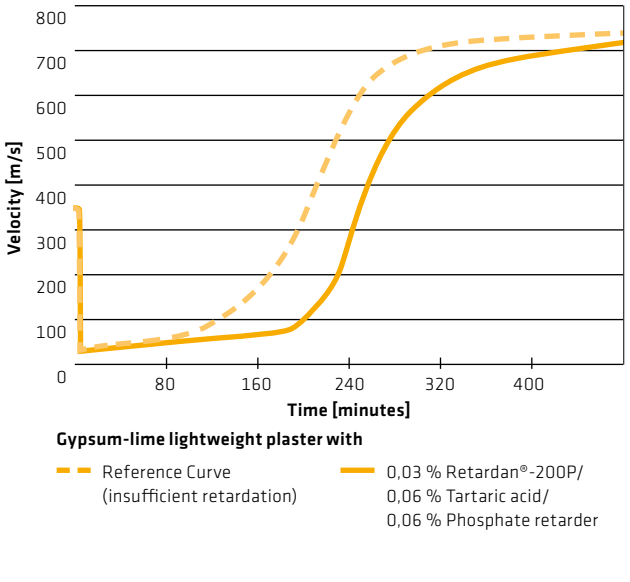
Solution: The new ViscoCrete®-510 and ViscoCrete®-520 exhibit the highest initial flow and the best slump-keeping of all tested ViscoCrete® types. ViscoCrete®-520 P is also characterized by low mortar viscosity and high mortar strengths. 1:1 replacement is possible and even leads to quality improvements.

APPLICATION EXAMPLE
Retardan®-200 P
GYPSUM PLASTER

Setting profile by ultrasound



Combination of 2 retarders: the different retarder combinations exhibit a steep setting curve, except for the combination with the phosphate retarder.



Combination of 3 retarders: with the combination of tartaric acid, Retardan®-200 P and phosphate retarder an ideal setting curve is achieved.

Gypsum plaster or gypsum-lime plaster is at present the most frequently used interior plaster. Easy application and a consistent setting behaviour are critical for the success of the user. Retardan®-200 P is especially suitable as a setting regulator for use in gypsum plaster due to its large pH-value tolerance. It can be optimally combined with other retarders e. g. fruit acids.

Task: Set the processing time with Retardan®-200 P

Material: Gypsum-lime lightweight plaster, pH-value 12.3 (mixed with 10 % water)

The ideal setting curve is reached through a combination of Retardan®, tartaric acid and phosphate retarder or a combination of SikaTard®-810 P and tartaric acid. After spraying, the plaster is levelled with the metal straight edge perpendicularly and flush. Once the stiffening begins after about 90 minutes, ridges and tracks are pulled out with the trowel. After about 3 hours, when the plaster is sufficiently stiffened, the surface can be wetted slightly and felted by using a sponge float. After another 30 to 60 minutes, once the surface is dull, the smoothing can be started. The working practices may vary regionally so that the setting profile of the gypsum plaster can change.

Solution: The combination of 2 or 3 retarders produces the ideal setting curve.





ADDITIONAL ADDITIVES FOR THE DRY MORTAR INDUSTRY

Sika® ViscoCrete® PowerPack RANGE

Targeted solution for low-VOC dry mortar formulations as a replacement for traditional superplasticizers like melamine or naphthaline. Easy to dose and optimized for most of the dry mortar formulations.

ACCELERATORS

Sigunit® as an alkali-free setting accelerator for dry shotcrete allows large layer thicknesses in one working step and rapid strength development. SikaRapid® acts as a hardening accelerator and stimulator for cementitious dry mortars.

RETARDERS

SikaTard® acts as a retarder and setting regulator in cementitious dry mortars without loss of strength and can be combined e.g. with SikaRapid®.

FIBRES

Sika® Fibres improve the stability of the mixture and increase the impact resistance, tensile strength and fire protection.

AIRPORES

SikaAir® Solid are stable, tiny prefabricated air pores with which mortars with high resistance to frost and de-icing agents can be produced.

FOAMING AGENTS

SikaPoro® is a combination of anionic and kathionic surfactants to be applied with a foam generator. With Sika foam unit SG 70 a fine, very stable foam is produced, for example for lightweight mortar.

OTHER ADDITIVES

SikaFume®-300 is amorphous, highly reactive silica, uncompacted. It thus selectively improves the chemical and freeze-thaw resistance of cementitious mortars and injection mortars.



SELECTION GUIDE
Sika® ViscoCrete® POWDER

ALL Sika® ViscoCrete® powders are pure polycarboxylate ether (PCE). They are free of formaldehyde and ammonia and not defoamed.

APPLICATION SYSTEM	TYPICAL APPLICATIONS	BINDER TYPE	Sika® ViscoCrete®							
			-111 P	-120 P	-125 P	-150 P	-225 P	-430 P	-510 P	-520 P
Cementitious mortars	Self-compacting concrete (SCC), industrial floors, grouts	CEM I, R (rapid)	+	+	+	++	+	+	++	
		CEM I, N (normal)	+	+	+	++	+	+	++	+
		CEM II, S (slag)	+	++	+	++	++	++	++	
		CEM II, LL (limestone)	+	++	+	++	+	++	++	++
Ternary CAC based binder systems CAC = calcium alumina cement	Self-levelling underlays (SLU)	Ternary binder system, pH > 11.5				++	++		++	++
		Ternary binder system, pH < 11,5				++	++	+	++	++
Ternary CSA based binder systems CSA = sulpho alumina cement	Self-levelling screed (SLS) approx. 25 % binder	Binder system without additional anhydrite				+	++	++	++	+
		Binder system with 20 % anhydrite on CSA				+	+	++	++	++
		Binder system with 40 % anhydrite on CSA				+	+	++	+	++
	Self-levelling underlay (SLU) approx. 35 % binder	Binder system without additional anhydrite				++	+	+	++	++
		Binder system with 20 % anhydrite on CSA				++	+	+	++	++
		Binder system with 40 % anhydrite on CSA				++	+	+	++	++
Calcium sulphate / gypsum based mortars	Self-levelling screed (SLS)	Thermal anhydrite (FGD)				+		+	++	+
		Synthetic anhydrite			+	+	+	++	++	+
		Natural anhydrite				+	+	+	++	+
	Self-levelling screeds/ underlays (SLS/SLU), plasters	Alpha-hemihydrate, pH > 11.5				++	++	+	++	++
		Alpha-hemihydrate, pH < 11,5				+	++	+	++	++
		Beta-hemihydrate, FGD				+	++	+	++	+
		Beta-hemihydrate, natural				+	++	+	++	+

++ recommended
+ suitable

Get more information about additives for the dry mortar industry on our website

PERFORMANCE	Sika® ViscoCrete®							
	-111 P	-120 P	-125 P	-150 P	-225 P	-430 P	-510 P	-520 P
High initial flow				■	■	■	■	■
Long flow retention (open time)	■		■	■	■	■	■	
Low sulphate sensitivity		■		■	■	■	■	■
Compatibility with retarders (fruit acids)		■		■	■	■	■	■
Fast dispersing effect (short mixing)			■	■	■	■	■	■
Low setting retardation		■	■	■	■		■	■
High early strength development		■	■			■	■	■
Low early shrinkage	■	■	■				■	■

All Sika® ViscoCrete®-powders are pure polycarboxylate ethers (PCE). They are free of formaldehyde and ammonia and do not include a defoamer. An additive compound may be purposeful for your specific application. Please contact our Technical Service Department for more information and advice. The evaluation gives a rough rating which might change depending on the binder.

	Retardan® and SikaTard® Powder Selection Guide					
	Retardan® -200 P	Retardan® -2025 P	Retardan® -2010 P	SikaTard® -810 P	SikaTard® -900 P	SikaTard® -901 P
Chemical basis	modified amino acid			Organic and inorganic mix	Phosphonate mix	
Dosage in % on dry weight	0.001-0.02	0.004-0.08	0.01-0.15	0.05-0.25	0.015-0.20	0.01-0.15
Application						
Building plaster, stucco, machine and hand plaster	■	■		■		
Plaster and joint filler gypsum based			■			
Model and mould gypsum		■	■			
$CaSO_4$-flowing screed	■	■			■	■
Ternary self-levelling underlay (SLU)				■		■
Concrete and grouts				■		
Cementitious flow screeds						■



As a subsidiary of the globally active Sika AG, Baar/Switzerland, Sika Deutschland CH AG & Co KG is one of the world's leading suppliers of construction chemical product systems and sealants and adhesives for industrial production.

Our current terms and conditions apply. The current local product data sheet must always be consulted before use and processing.

CON/WG/FLY/200/04.2025

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