SIKA GYPSUM ADDITIVES
EFFICIENT AND SUSTAINABLE SOLUTIONS FOR THE GYPSUM INDUSTRY

BUILDING TRUST

SUSTAINABLE INCREASE OF PRODUCTION EFFICIENCY

PLASTER BOARDS ARE PRODUCED in a highly automated continuous process. Quick setting and hardening are of critical importance to keep production running at high speed for optimal capacity utilization. Additive technologies for hydraulic binders is one of Sika's core competencies. For many years Sika develops customer-specific solutions for the gypsum and dry mortar industry. Sika offers professional support, tailored to the individual needs and requirements of its customers.

ViscoCrete® Superplasticizer

+

Retardan® Retarder

+

CUSTOMIZED SOLUTIONS

=

SUSTAINABLE PRODUCTION EFFICIENCY

Sika solutions

INDIVIDUAL – EFFICIENT – SUSTAINABLE

SUSTAINABLE INCREASE OF PRODUCTION EFFICIENCY
through individual process optimization

WATER AND ENERGY SAVING
through powerful superplasticizers and retarders

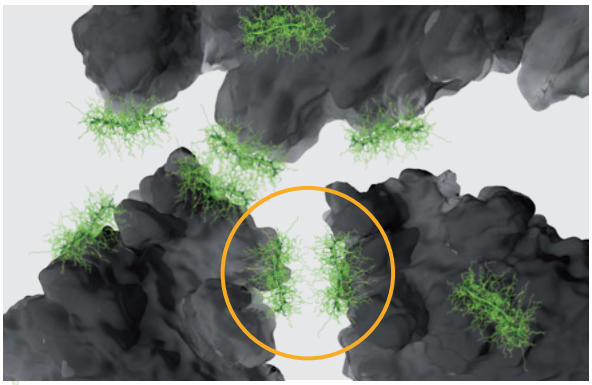
CO_2 FOOTPRINT REDUCTION
through sustainable solutions

CAPACITY UTILIZATION INCREASE
through performance improvement

HIGH PERFORMANCE SUPERPLASTICIZER
Sika® ViscoCrete®

Sika® ViscoCrete® – high performance superplasticizers are based on PCE (polycarboxylate ether) technology. Their dispersing effect is based on two mechanisms:

1. WORK MECHANISM



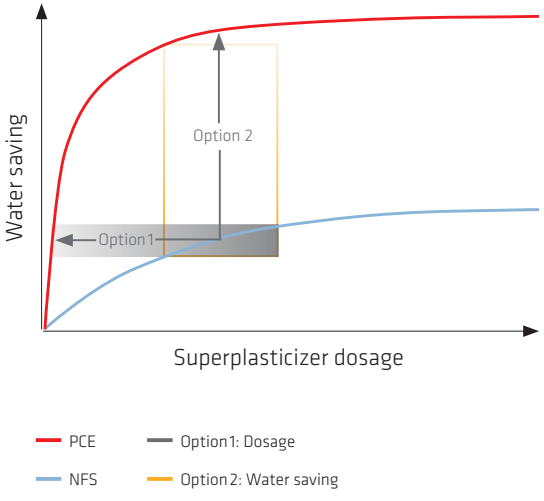
The comb polymer structure of Sika® ViscoCrete® made it possible, by changing the polymer design, to adjust targeted specific application-related properties, in particular the water-reducing capacity, the processing time, rheology, strength development, air entrainment and adsorption rate.

USE OF HIGH-PERFORMANCE SUPERPLASTICIZERS

Sika® ViscoCrete® can be used for the improvement of the flow properties. But also – while maintaining the flow properties, – there are two advantages for the user:

1. Reduction of the previously used superplasticizer dosage
2. Reduction of the added water

In the context of increasing energy costs and CO_2 taxes the water reduction provides the greatest benefit in terms of cost savings and sustainability. In addition, fluctuations in the water demand of the gypsum binder, which can be caused by variations in raw materials, calcining and grinding process, are balanced out by the superplasticizer. This has a positive effect on the process stability and board quality, reduces claims and waste. The smaller amount of excess water to be evaporated in the dryer offers further possibilities for increasing efficiency and capacity utilization.



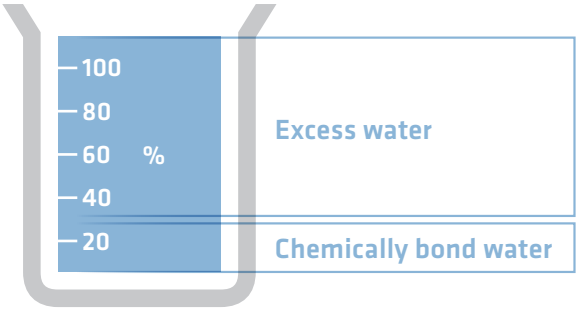
2. APPLICATION BENEFITS

THE MOST IMPORTANT ADVANTAGES AT A GLANCE:

- Strong liquefaction already at very low dosages
- High water reduction possible
- Individual solutions, customized to the application system
- Short mixing times
- Enables formaldehyde-free products
- Good compatibility and synergies with other additives
- Consistent quality
- Worldwide available
- Also available as a powder if there is a risk of frost

WATER DEMAND FOR THE LIQUEFACTION OF PLASTER SLURRY

Between 65% and 75% of the added water must be evaporated from the board after rehydration of the plaster. This requires a lot of energy and thus becomes the main cost driver in the gypsum board production.



REDUCING THE EXCESS WATER **WITH Sika® ViscoCrete®** MEANS **SAVING DRYING ENERGY COSTS**.

EFFICIENT RETARDERS
Sika® Retardan®

Retardan® ADDITIVES are very efficient retarders available in liquid and powder form that have been in use in the gypsum industry for decades. They show excellent performance in adjusting the setting and processing time for a wide range 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 the various gypsum binder systems.

SETTING AND HARDENING CONTROL

Initial and final setting of gypsum can be precisely controlled by the use of additives. Additives that influence the gypsum crystal nucleation – especially retarders and the accelerators based on fine ground gypsum – have a much stronger effect than substances which affect the solubility. During gypsum board production the use of plaster of Paris in combination with highly effective accelerators, especially fine ground gypsum, is state of the art. If no retarder was added, the crystal growth of gypsum starts immediately after the contact of the binder with water.

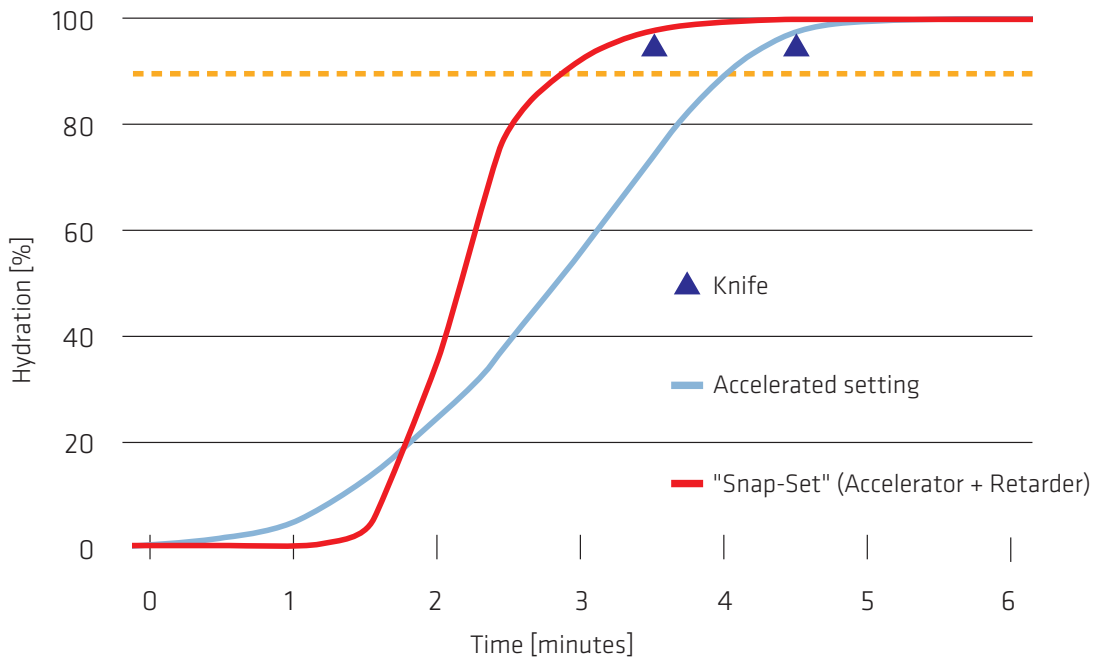
ADDITIVE COMBINATION IS THE KEY

Modern production lines in gypsum board plants require an end of the hardening process in significantly less than 10 minutes. This can only be achieved by high accelerator dosages, often in the range of 0.5%. In many cases, this does not provide the required slurry processing time of a few seconds until it starts stiffening. Negative consequences of premature stiffening occur inside the mixer and on the homogenization table: it worsens the flow behaviour of the plaster slurry, and caking and clumping can occur. This can result in both, disruptions in the manufacturing process for maintenance as well as reduced board quality.

Therefore, a combination of retarder and accelerator is used in the manufacture of gypsum boards to create an ideal setting curve, which is characterized by a slight extension of the dormant phase, followed by a short and intensive setting period. This so-called "Snap-Set" avoids problems in the mixer and ensures a high degree of hydration (95 - 98%) before the boards are cut and dried. In addition, the strength in the board core is improved, which is particularly desirable in the manufacture of lightweight boards. The use of Sika® Retardan® enables the targeted incorporation of foam into the liquid gypsum mass, keeps the mixer clean and improves the wet bond between the cardboard layers.

Sika® Retardan® products are appreciated for their well-defined retardation.

OPTIMIZATION OF THE REACTION PROCESS



THE MAIN ADVANTAGES

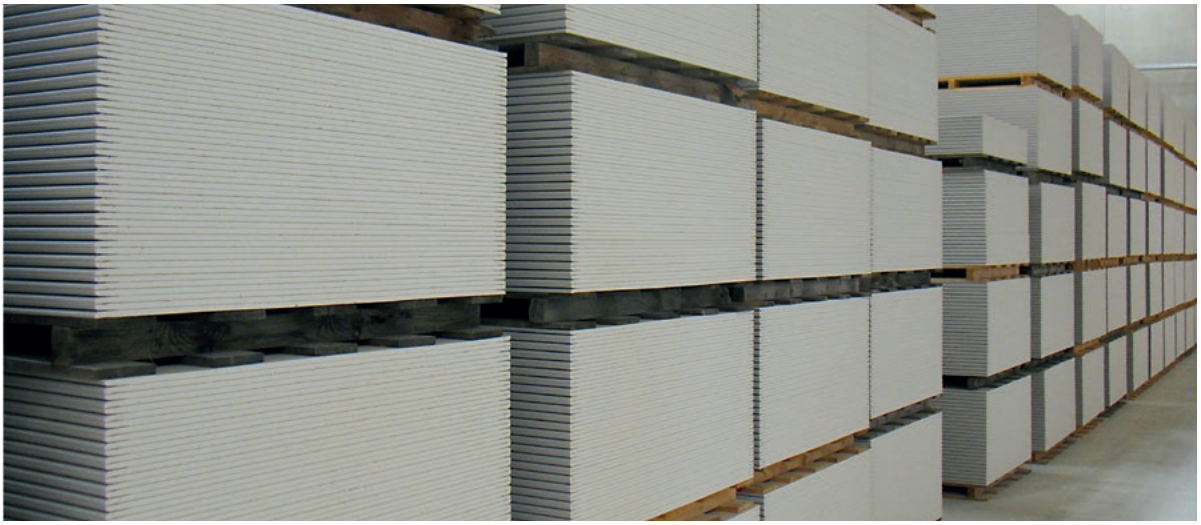
- Shifting the beginning of hydration without loss of intensity
- No inhibition of crystal growth (in contrast to fruit acids)
- Rapid strength development and higher final strength
- Steadily consistent quality and worldwide availability
- Defined production with synthetic raw materials under controlled conditions

APPLICATION EXAMPLES

EXAMPLE 1:
REPLACING THE WATER REDUCER DURING GYPSUM BOARD PRODUCTION

FORMULATION AND SAVING POTENTIAL

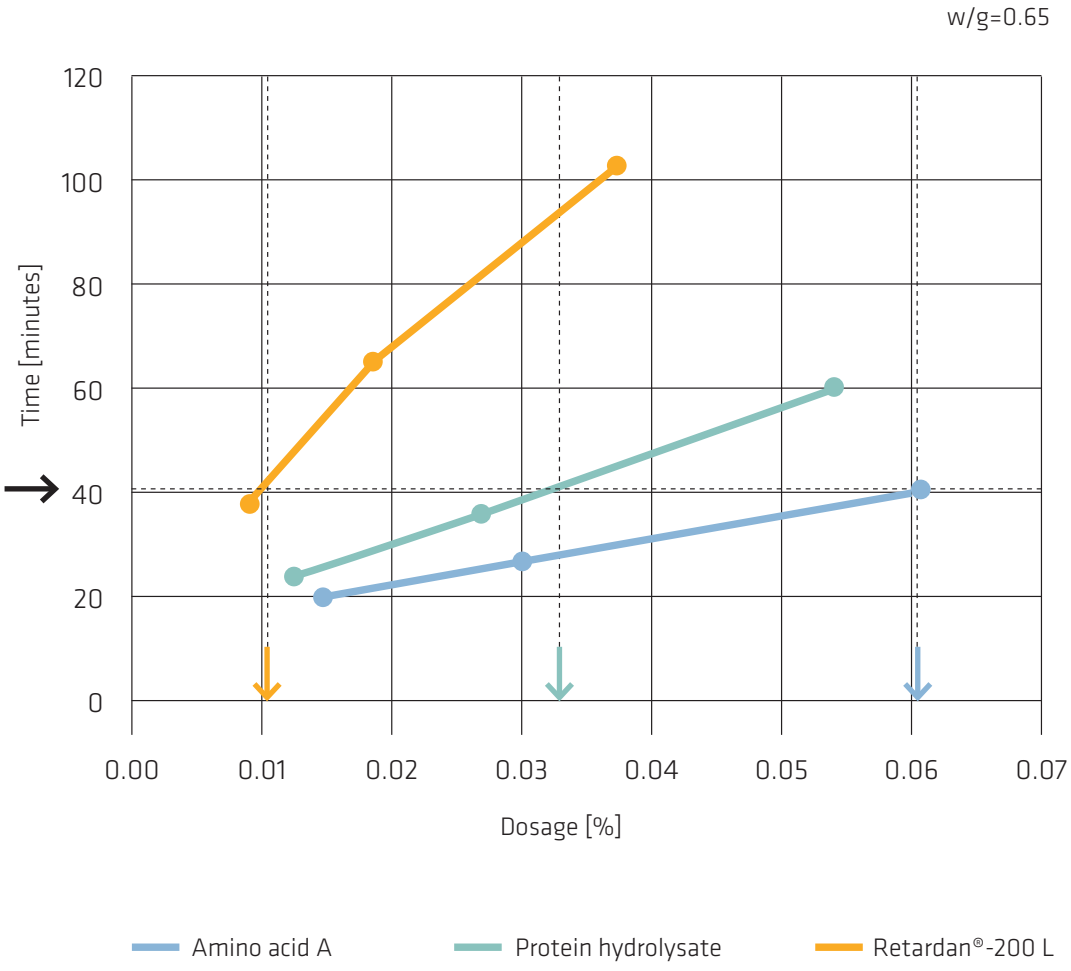
Superplasticizer		PNS	PCE	PCE +8% WR	PCE +15% WR
PNS	g/m²	30	–	–	–
PCE	g/m²	–	10	20	30
Water reduction (WR)	%	–	–	**8**	**15**
Costs Superplasticizer	¢/m²	1.7	1.2	2.4	3.6
Energy costs	¢/m²	20.0	20.0	18.2	16.6
Total costs	¢/m²	21.7	21.2	20.6	20.2
Cost saving	¢/m²	–	0.5	1.1	1.5



The saving potential shown in the sample calculation through the replacement of superplasticizers corresponds to approx. € 150,000 per 10 Mio m^2 gypsum board.
Further savings result from lower water consumption, reduced CO_2 emissions, increased production speed and thus improved capacity utilization as well as increased board quality. As a result of the water reduction, the capillary pore space of the gypsum structure is reduced, which can be compensated by adjusting the amount of foam added.

EXAMPLE 2:
REPLACEMENT OF THE INITIAL RETARDER FOR THE SETTING CONTROL

PERFORMANCE COMPARISON OF DIFFERENT RETARDERS



Sika® Retardan®-200 L is highly concentrated to reduce transportation costs and storage capacity. It is typically diluted directly prior usage to an active substance content of 2 ... 5%. Alternatively, products with a lower active substance content are available (e.g. Retardan®-2010 L).

PRODUCT RANGE OVERVIEW
SOLUTIONS FOR (GYPSUM) BOARDS AND DRY MORTARS

	Product Name	Gypsum Boards
High-performance super-plasticizers & Water reducer	Sika® ViscoCrete® L and P PowerPacks®	■
Gypsum Retarder	Sika® Retardan®	■
Grinding Aids	SikaGrind®	■
Foaming Agent	Sika® Lightcrete	■
Air Entrainer	SikaControl® AER	
Accelerator for Cement	SikaRapid® (Hardening Accelerator) Sigunit® (Setting Accelerator)	
Compaction Aids	SikaPaver®	
Fibers (micro / macro)	SikaFiber®	
Color pigments	SikaColor®	
Microsilica	Sika® Silicoll and SikaFume®	
Mould Release Agent	Sika® Separol®	
Paints / surface protection	SikaGard®	
Bonding / Connecting	Sikadur®	

LEARN MORE!

Scan the code and you will receive further information as well as our current product range.

Gypsum Blocks	Fibreboards	Refractory Mortar	Lightweight mortar and light-weight concrete elements	Dry Mortar
■	■	■	■	■
■	■			■
			■	
		■	■	■
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WORLDWIDE SYSTEM SOLUTIONS FOR CONSTRUCTION AND INDUSTRY

CONCRETE

WATERPROOFING

ROOFING

FLOORING

CORROSION AND FIRE PROTECTION

SEALING AND BONDING

REFURBISHMENT

BUILDING FINISHING

INDUSTRY

As a subsidiary of the globally operative Sika AG, Baar/Switzerland, Sika Deutschland GmbH is one of the leading suppliers of building chemical product systems as well as sealants and adhesives for industrial manufacturing.

CONCRETE/SD/12.2021

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