



# CONCRETE

## Sika<sup>®</sup> ViscoCrete<sup>®</sup> & Sika<sup>®</sup> ViscoFlow<sup>®</sup>

SOLUTIONS FOR CONCRETE WORKABILITY

BUILDING TRUST





# SIKA CONCRETE SOLUTIONS FOR CONCRETE WORKABILITY

Admixtures from the Sika® ViscoCrete® series consists of polycarboxylate ether (PCE) based superplasticizers which provide different levels of water reduction and slump retention in concrete. The Sika® ViscoFlow® series consists of PCE based admixtures to maintain the workability of concrete for longer periods without significant delays in set time.

Additionally, admixtures from this series provide solutions for producers, contractors, and specifiers for their most basic concrete mix design needs. They can also be suitably combined to meet the most challenging requirements of concrete workability.

# INTRODUCTION

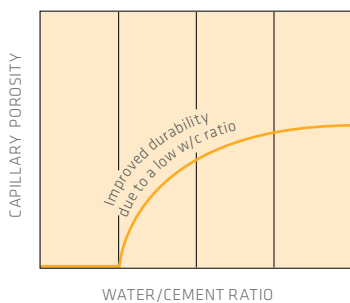
## THE ENGINEERING OF CONCRETE STRUCTURES IS A CONTINUOUS DEVELOPMENTAL PROCESS. INVENTION AND DEVELOPMENT OF NEW CONSTRUCTION METHODS PLACE HIGHER DEMANDS ON BUILDING MATERIALS.

Concrete producers face this technological challenge daily alongside other factors such as the economy, ecology, and raw material and energy costs as well as increased logistical complexity. In the duration of the whole construction process, time itself also becomes an increasingly important factor.

Admixtures from the Sika® ViscoCrete® and Sika® ViscoFlow® series bring several innovative options to design concrete mixes for the ready-mix and precast industry.

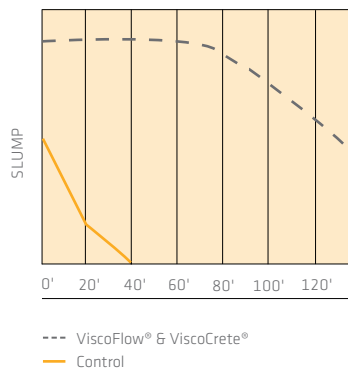


### IMPROVED DURABILITY WITH LOW W/CM AND LOW CAPILLARY POROSITY



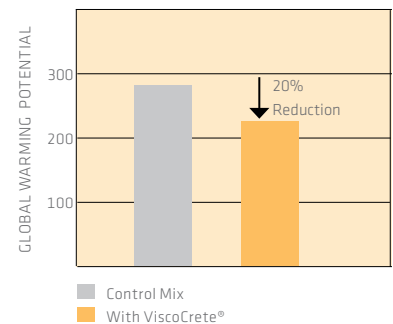
The use of Sika® ViscoCrete® allows for reducing the W/Cm ratio; this increases the strength and reduces concrete permeability.

### EASY PLACEMENT, IMPROVED QUALITY, INCREASED FLUIDITY AND NO RE-TEMPERING



The use of Sika® ViscoCrete® allows for producing high slump or flowable concrete for easy placement. The use of Sika® ViscoFlow® allows for maintaining slump for longer periods without adding water at job-site.

### SUSTAINABLE CONSTRUCTION BY CEMENT REDUCTION



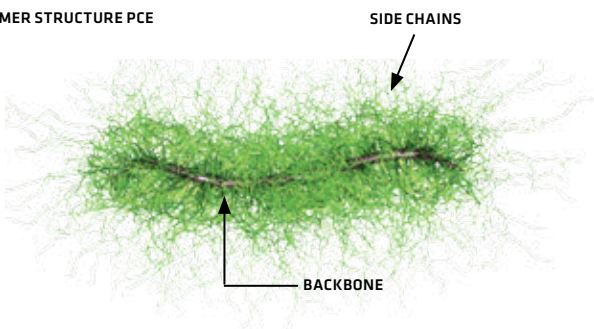
The use of Sika® ViscoCrete® allows for reducing the cement content and allowing the use of more SCMs; this reduces the CO<sub>2</sub> contribution and makes the mix more sustainable and economical.

# Sika® ViscoCrete® POLYMER TECHNOLOGY

Traditional water reducers work by giving cement grains like charges such that they repel each other (electrostatic repulsion) and release the entrapped water. These admixtures have limited water reduction ability. PCE based admixtures work on the principle of electrostatic repulsion and steric hindrance (polymer molecules physically repelling the cement particles). PCE based admixtures can provide significant water reduction compared to traditional water reducers.

The major characteristic of PCE based technology is their targeted polymer design to achieve specific concrete properties.

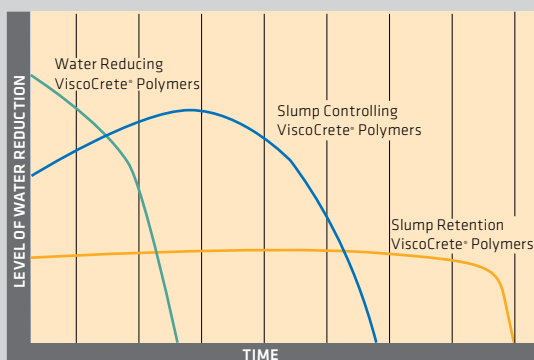
## POLYMER STRUCTURE PCE



The polymers consist of backbones with carboxyl groups, which are responsible for water reduction/initial slump and mixing time, and side chains, which are responsible for slump retention.

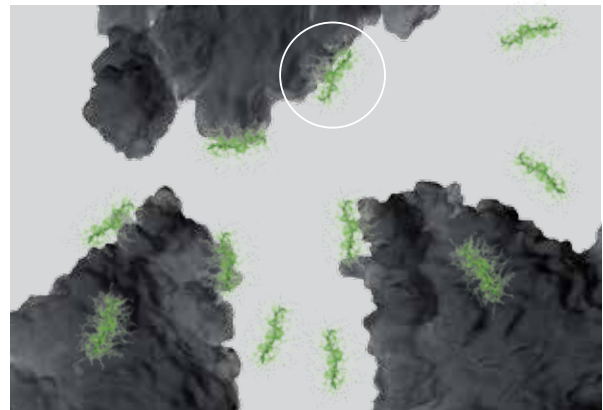
It is possible to design different kinds of polymers by combining the backbones with carboxyl groups and side chains in different ways. For example, it is possible to design a PCE with a large number of carboxyl groups and consequently a low number of side chains, leading to short mixing time with high water reduction and shorter slump life. These polymers are suitable for admixtures used for precast concrete applications.

## SIKA'S PCE TYPES

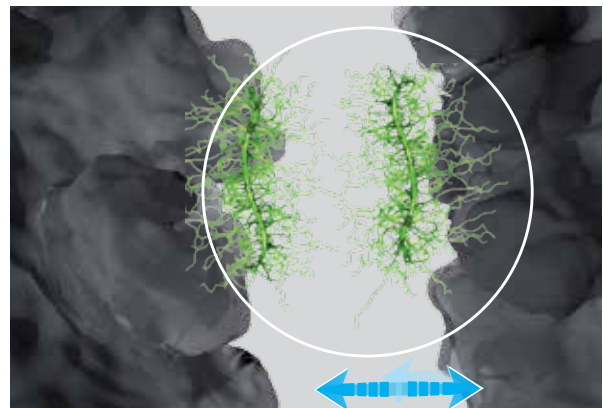


Another possibility is to have a balanced ratio between carboxyl groups and side chains with an average/medium length. The result is a medium water reduction with subsequent adsorption resulting in a delayed dispersion effect. Admixtures based on these polymers are suitable for ready mix concrete applications, and in some situations, precast applications.

The third variation could be to have a large number of side chains resulting in a lower water reduction and longer slump life. The adsorption of these polymers is slow on the cement grain and the polymers change their structure over time resulting in extended slump retention. These polymers can be utilized to produce workability retaining admixtures.



**Adsorption of the polymer (backbone) on the cement grain.**



**Detail of improved workability due to steric hindrance.**

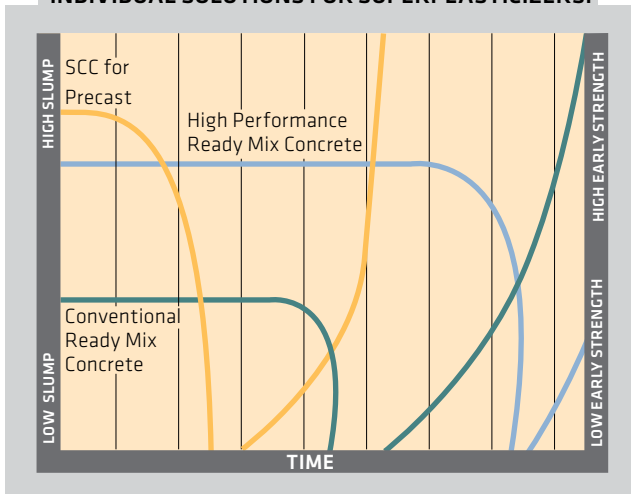
# Sika® ViscoCrete® PRODUCT TECHNOLOGY

POLYMERS FROM Sika® ViscoCrete® TECHNOLOGY CAN BE SUITABLY COMBINED TO MAKE TAILOR MADE ADMIXTURES TO MEET THE SPECIFIC REQUIREMENTS OF CONCRETE.

All of Sika's PCE based admixtures are made from using either stand alone polymers or blending different polymers from the Sika® ViscoCrete® polymer technology in order to meet the specific requirements of water reduction, slump retention and set time for various concrete applications.

Cement composition plays a very important role in the performance of PCE based admixtures. Sika ensures that all of its admixtures are robust and perform with a wide variety of cements. This provides more flexibility to the concrete producer and enables Sika to cover a wider variety of cements with lesser products.

## INDIVIDUAL SOLUTIONS FOR SUPERPLASTICIZERS:



## Sika® ViscoCrete® TECHNOLOGY FOR READY MIX CONCRETE APPLICATIONS

Sika offers several PCE based admixtures targeted for ready mix concrete producers. The admixtures provide different levels of water reduction, and moderate to high slump retention to provide the concrete producer a choice to select the best admixtures for their mix designs and materials. Sika also provides mid-range water reducing admixtures based on PCE or a blend of PCE with other technologies to provide a cost effective solution to concrete producers.



## Sika® ViscoCrete® TECHNOLOGY FOR PRECAST CONCRETE APPLICATIONS

Sika's offering for precast producers consists of high range water reduction with a shorter or medium slump retention. In some situations when producers use very low W/Cm ratio, need longer placing time or produce high temperature concrete, superplasticizers with high slump retention are utilized.



# Sika® ViscoFlow® PRODUCT TECHNOLOGY



Admixtures in the Sika® ViscoFlow® series are also produced using polymers from the Sika® ViscoCrete® polymer technology. Admixtures from the Sika® ViscoFlow® series enable little to no water reduction and moderate to extreme slump retention. Since Sika® ViscoFlow® admixtures are PCE based they do not chemically react with the cement and retard its set time. The polymers used in the Sika® ViscoFlow® series consist of polymers that adsorb

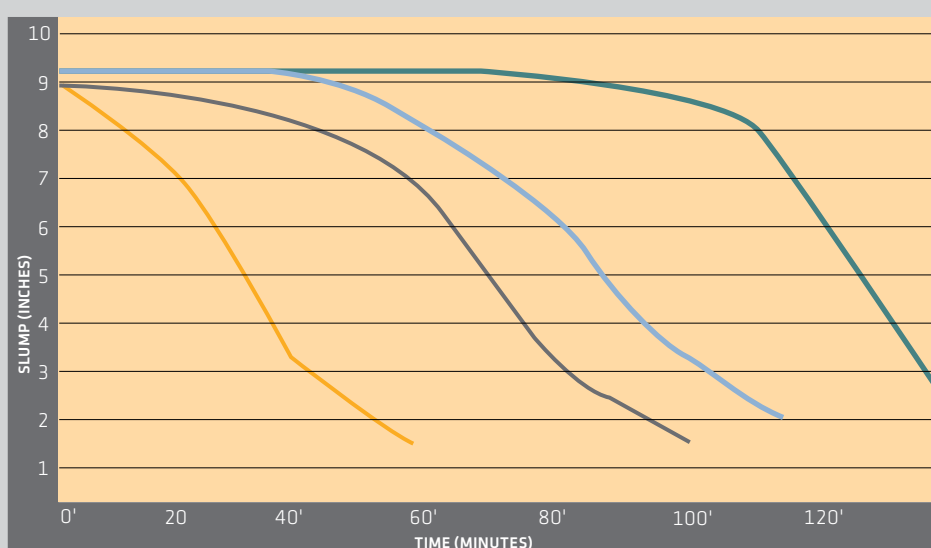
slow on the cement grain and change their structure over time resulting in extended slump retention.

Sika® ViscoFlow® admixtures are normally used in conjunction with Sika ViscoCrete® admixtures to enhance the slump retention. The dosage of the Sika® ViscoFlow® admixture can be adjusted to meet the slump retention requirements.

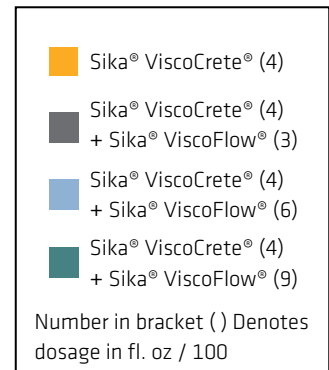
#### KEY BENEFITS:

- Can be easily used in combination with any high range water reducer.
- Improves slump retention without excessive retardation.
- Reduces or eliminates the need to re-temper concrete with water at site.
- Reduces stickiness and improves concrete finishability.

**TIME VS SLUMP CHART**



**TIME VS SLUMP CHART**



# SOLUTIONS FOR PRODUCERS, SPECIFIERS, & CONTRACTORS

ADMIXTURES FROM THE Sika® ViscoCrete® AND Sika® ViscoFlow® SERIES CAN BE USED TO MEET THE VARIOUS REQUIREMENTS OF CONCRETE PRODUCERS, SPECIFIERS AND CONTRACTORS.

SIKA CAN BE THERE EVERY STEP OF THE WAY, FROM DESIGN TO PLACEMENT.



## READY-MIX CONCRETE

### REQUIREMENTS

- Meet target strength.
- Optimized cement content.
- Meet specified slump at job site.
- Easy to use admixtures.

### SIKA ADMIXTURE SOLUTION

- Water reduction for strength, durability and cement optimization.
- Improved workability retention to meet slump requirements.
- Improved mix consistency and reduced standard deviation.
- Flexible dosage range to meet slump requirements.



## PRECAST CONCRETE

### REQUIREMENTS

- Faster production.
- High early and later age strength.
- Faster stripping & rotation of forms.

### SIKA ADMIXTURE SOLUTION

- Faster dispersion, increased fluidity, allow for faster finishing and increased productivity.
- High water reduction enables high early strength.
- Faster setting & high early strength enables faster stripping of forms.



## DESIGNERS/SPECIFIERS

### REQUIREMENTS

- High durability with low maintenance.
- Appearance and aesthetics.
- Environmentally friendly and economical.

### SIKA ADMIXTURE SOLUTION

- Low w/cm ratio, higher SCMs and improved quality control provide high durability.
- Increased fluidity improve surface appearance.
- Optimizing cement & SCM content makes the mix economical and sustainable.



## CONTRACTORS

### REQUIREMENTS

- Sufficient workability for easy placement.
- Easy finishing, time saving, reduced cost.
- Faster turnaround of forms.

### SIKA ADMIXTURE SOLUTION

- Improved slump retention enables easy placement.
- Reduced stickiness of concrete, improved finishability, early strength for faster form stripping.
- Pumpability and SCC reduces time and provides labor savings.



# SIKA FULL RANGE SOLUTIONS FOR CONSTRUCTION:



**WATERPROOFING**



**CONCRETE**



**REFURBISHMENT**



**SEALING AND BONDING**



**FLOORING**



**ROOFING**

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## **LIMITED MATERIAL WARRANTY**

SIKA warrants this product for one year from date of installation to be free from manufacturing defects and to meet the technical properties on the current Product Data Sheet if used as directed within shelf life. User determines suitability of product for intended use and assumes all risks. Buyer's sole remedy shall be limited to the purchase price or replacement of product exclusive of labor or cost of labor.

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