

Admixtures for Self Consolidating Concrete

The Grace Solution



Self Consolidating Concrete Benefits Producers, Contractors, Engineers, Architects and Owners



SCC is used to produce precast tunnel segments without vibration.

► **Precast and Prestressed Concrete Producers**

- Eliminate the need for vibration and manual compaction in hard-to-reach areas with congested reinforcement
- Improve labor safety and reduce noise levels during production
- Improve concrete consolidation throughout highly reinforced, thin-walled units, and reduce repairs
- Produce the highest quality surface finish, with minimal finishing operations and touch-ups required
- Increase flexibility in design and orientation of formwork and improve plant productivity

► **Concrete Contractors**

- Eliminate the need for vibration and manual compaction in hard-to-reach areas with congested reinforcement
- Shorten construction times with faster placement of vertical and horizontal elements
- Reduce labor and workmanship skill level required to place consistent, high quality concrete with excellent surface finish
- Reduce vibration equipment and associated costs

► **Engineers and Architects**

- Allows increased design flexibility by enabling innovative construction techniques

► **Owners**

- Enables more design choice to develop functional and cost-effective structures
- Improves durability and reduces maintenance of concrete surfaces through improved compaction of cover concrete

SCC may be produced by wet or dry batch readymix systems and pumped into place.



SCC flows and compacts around obstacles and reinforcement to give complete consolidation.

Fine edge details and good surface finish in precast and prestressed concrete using SCC.



Self Consolidating Concrete (SCC) is an advanced approach to the production of highly flowable, self-levelling concrete that can be placed without vibration equipment and without segregation.

Self Consolidating Concrete Is Different from Flowing Concrete

Today, flowable concrete with 175 to 225 mm (7 to 9 inch) slumps can easily be produced using conventional mix designs and standard plasticizers.

However, flowable concrete still requires vibration to ensure complete consolidation within the formwork and around embedded reinforcing steel.

Self Consolidating Concrete Has Unique Advantages

Self Placement —The need for vibration can be eliminated because SCC is highly flowable concrete that will change shape under its own weight to self-level and self-consolidate within formwork.

No Segregation — SCC is a flowable yet highly cohesive material with no segregation and significantly reduced bleeding.

No Blocking — SCC can pass freely through narrow openings and congested reinforcement without aggregates “blocking” behind obstructions and stopping the flow of concrete.

Fields of Application

Self Consolidating Concrete is an innovative technology that can be used to enable new construction techniques and solve construction problems in many traditional fields of application:

- Precast and prestressed concrete
- Bridges and civil engineering projects
- Residential and commercial structures
- Pumped concrete



Self Consolidating Concrete in precast production fills formwork without segregation or blocking.



The Grace Product Range

Grace offers a range of products for Self Consolidating Concrete.

ADVA® Series

New generation, high efficiency polycarboxylate superplasticizers designed to produce concrete with excellent workability and high early and ultimate strengths

V-MAR™ Series

High efficiency, concrete rheology modifying agents to increase concrete cohesion and resistance to bleeding and segregation

Mix Designs and Raw Material Selection

SCC can be made with standard available raw materials, however, in order to achieve the unique rheological properties of SCC, special attention must be paid to mix design process.

Cementitious and filler material contents are normally higher in SCC than in conventional concrete.

Water cement ratios are also low, typically under 0.40. Therefore, under practical field conditions, SCC requires a **high performance superplasticizer** to achieve and maintain desired workability.

SCC performance requirements may also dictate additional methods to ensure mix homogeneity and **prevent segregation**. Various techniques are available, including using **viscosity modifying admixtures** which effectively increase mix cohesion.

Coarse aggregate content is typically reduced, and gradations are modified to include more fines.



Slump Flow Test to measure slump diameter

Self Consolidating Concrete Production

SCC is a high performance concrete material and careful attention to all elements is a key element to a successful project.

The increased flow characteristics of SCC may impact batching operations, transportation and placement choices, particularly with regard to formwork.

Grace can offer technical expertise and guidance on all aspects of SCC, including mix design, batching, placement and testing to ensure consistent, predictable performance of all SCC mixes.



Self Consolidating Concrete Test Methods

SCC is designed with very high flowability. Standard concrete rheology test methods are not appropriate to measure flow, stability and “blocking” resistance of very high slump concrete.

The “Slump Flow Test” has been developed for use in SCC to measure slump flow diameter and flow rate over time. SCC slump flow typically reaches a spread diameter of between 600 and 800 mm (24 to 32 inch) on a specially marked board.

Additional test methods such as the “L box”, “U box”, “J-ring” and “V-funnel” tests are also available.

For more information and assistance, please contact your local Grace representative.



L Box Test to measure flow and blocking resistance of mix

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SELF CONSOLIDATING
CONCRETE

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