

# CONCERA® SA Concrete Admixtures

## Frequently Asked Questions Technical Bulletin

### Rheology Modifying High Range Water Reducer

#### What is CONCERA SA control flow concrete?

CONCERA® SA concrete admixtures is a patented rheology modifying high range water reducer that enables the production of control flow concrete with minimal or no segregation using unmodified conventional mix designs. When CONCERA® SA technology is used in these mix designs, minimal or no mechanical consolidation, including vibration, is required. CONCERA® SA technology is a component of GCP's control flow concrete System which is a new concrete category that GCP is promoting to the industry with slump flows that reside between conventional and self-consolidating concrete. It does not need to be used with other mid or high range water reducers. CONCERA® SA concrete admixture is formulated primarily for use in site mix and ready-mix concrete applications where increased flowability, excellent rheology and segregation resistance properties are desired. Base of this super plasticizer is polycarboxylate.

#### What are the advantages and benefits of CONCERA® SA concrete admixtures?

CONCERA® SA concrete admixtures imparts many desirable properties to control flow concrete including segregation resistance, stability, improved passing and filling ability, excellent tolerance to moisture variation and extended slump life. CONCERA® SA technology also produces concrete with very consistent, predictable slump flow and air control properties. CONCERA® SA admixtures have minimal impact on other concrete properties including early and later age compressive strength and drying shrinkage.

#### What are the differences between self-consolidating concrete (SCC) and control flow concrete?

Self-consolidating concrete (SCC) is highly flowable non-segregating concrete that can be spread into place, fill formwork and encapsulate formwork without using mechanical consolidation. SCC slump flows are typically in the 18-32" (457 mm to 813 mm) range and are specified by application requirements. Control flow concrete is similar to SCC, but with slump flow values in the 16-25" (400 mm to 625 mm) range that will require minimal external energy to properly consolidate. (**Note:** 9" (229 mm) slump standard concrete typically has a slump flow of approximately 16" (406 mm)). A primary difference between SCC and control flow concrete is SCC typically requires specifically

designed high cement factor, high fine to coarse aggregate ratios using smaller nominal size coarse aggregate mix designs, while control flow concrete often uses conventional mix designs.

#### Can slight mix design adjustments improve the rheology, stability and segregation resistance properties of CONCERA® SA concrete admixtures?

In most cases, adding CONCERA® SA admixtures to unmodified conventional mix designs will increase slump flows to 16-25" (406 mm to 635 mm) range while providing excellent rheology, stability and segregation resistant properties. However, specific characteristics of the conventional mix design will affect the overall properties of CONCERA® SA control flow concrete. These characteristics include, but are not limited to, total cementitious, water, coarse aggregate, fine aggregate and plastic air contents along with coarse aggregate nominal size, angularity and gradation. If some segregation or instability is observed with CONCERA® SA control flow concrete, slight mix design modifications can be made to improve these properties. Potential modifications include slightly increasing the FA/CA ratio, reducing the W/C ratio while increasing CONCERA® SA admixtures dosage rate and decreasing nominal coarse aggregate size. Technical Bulletin 1701 discusses these modifications in detail.

#### How does using CONCERA® SA concrete admixtures compare to using a HRWR and viscosity modifying agent (VMA) combination?

CONCERA® SA technology or a HRWR and VMA (such as V-MAR3) combination can be used to produce control flow concrete, with the primary difference being CONCERA® SA technology is formulated to be a "one admixture does it all." CONCERA® SA admixtures are formulated as a stand alone admixture with best in class viscosity modifying agents to enable stable, segregation resistant concrete coupled with PC based dispersant technology to produce consistent and superior water reduction and slump flow retention properties. In addition, if a HRWR mix segregates and a VMA is added to provide cohesiveness and reduce segregation, this can potentially cause the mix to have a higher viscosity and sticky feel.

#### How do I transport and pump CONCERA® SA control flow concrete?

CONCERA® SA control flow concrete can be transported using conventional methods, but some precautions should be considered due to the high fluidity of the mix. When CONCERA® SA control

flow concrete is transported to a jobsite in a ready-mix truck, the concrete volume should not exceed 80% of the maximum drum capacity per ASTM C94. This will ensure no spillage on sloped grades during transit. There are no restrictions related to pumping CONCERA® SA control flow concrete and pump pressure reductions will typically make it easier to pump CONCERA® SA control flow concrete compared to conventional concrete. It is recommended that pump pressures be gradually increased since very high initial pump pressures can cause segregation with control flow concretes.

### **How do I place CONCERA® SA control flow concrete in formed concrete applications?**

With CONCERA® SA control flow concrete formed concrete applications, it is important that formwork be watertight and grout-tight (non leaking) to prevent honeycombing and other surface defects. Form pressures will also be higher, compared to conventional concrete, due to the highly flowable characteristics and often faster than usual casting rates. Maximum lateral pressure and its rate of drop over time is impacted by the mix design consistency, rheology, thixotropy, casting rate and ambient and concrete temperature. Therefore, with current available information, a conservative approach should be to design formwork for full liquid head, in accordance with ACI 347. It is recommended control flow concrete mix designs be field tested prior to job start up (mock-up), preferably through plant production equipment and with actual casting into simulated formwork.

### **How do I place and finish CONCERA® SA control flow concrete in slab on grade applications?**

Placing and finishing CONCERA® SA control flow concrete in slab on grade applications is typically both easier and somewhat different, compared to conventional concrete. In general, ACI 302.1 - Guide to Concrete Floor and Slab Construction guidelines should be followed when placing a slab using CONCERA® SA control flow concrete. ACI 302.1 Section 8.4 Table 8.4.1 recommendations will require modification to allow > 5" (>125 mm) maximum slumps. Control flow concrete should be discharged continuously from one location and allowed to fully flow before moving to the next pour location. The intent should be to allow control flow concrete to fill forms and self-level as much as possible on its own, followed by minimal mechanical consolidation such as raking and vibration. Control flow concrete can be poured against concrete that has slightly gelled, but should be vibrated to avoid pour lines. If needed, screeds, vibratory screeds and bull floats used on conventional concrete can be used to level control flow concrete. Control flow concrete will accept any type of final finish, including magnesium float swirl, steel

trowel or broom.

### **What is the recommended batch sequencing for CONCERA® SA control flow concrete?**

In most cases, it is recommended that CONCERA® SA admixtures be added to the concrete mix near the end of the batch sequence for optimal performance. Different sequencing may be used if testing shows better performance. CONCERA® SA admixtures should not come in direct contact with any other admixture during batching.

### **When and where is CONCERA® SA concrete admixtures available?**

CONCERA® SA technology is commercially available in India. CONCERA® SA samples are available for testing through GCP INDIA Technical Services team. Tel: +91 124 4885900.

### **What is the pricing of CONCERA® SA concrete admixtures?**

Contact your local area sales manager or Product Manager for pricing in your territory.

### **What is CONCERA® SA admixtures status with ASTM testing and certification?**

IS 9103, ASTM C494 Type A, Type F & G admixtures, and EN 934-2.

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GCP Applied Technologies Inc., 62 Whittemore Avenue, Cambridge, MA 02140 USA.

In India GCP Applied Technologies India Private Limited Plot No.90, Sector-8, IMT Manesar, Gurgaon, Haryana-122050.

GCP0083 CONC-003-0517

