

# TB-1704 — CONCERA<sup>®</sup> CP1124 Frequently Asked Questions Technical Bulletin

Rheology Modifying Water Reducer

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## What is CONCERA<sup>®</sup> CP1124?

CONCERA<sup>®</sup>CP1124 is a patent pending rheology modifying polycarboxylate based water reducer that enables the production of Control Flow Concrete with minimal or no segregation using unmodified conventional mix designs. When CONCERA<sup>®</sup>CP1124 is used in these mix designs, minimal or no mechanical consolidation, including vibration, is required. CONCERA<sup>®</sup>CP1124 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. CONCERA<sup>®</sup>CP1124 is formulated primarily for use in ready-mix concrete applications where increased flowability, excellent rheology and segregation resistance properties are desired.

## What are the advantages and benefits of CONCERA<sup>®</sup> CP1124?

CONCERA<sup>®</sup>CP1124 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<sup>®</sup>CP1124 also readily enables jobsite concrete to be re-tempered with water to restore slump lost during transit. CONCERA<sup>®</sup>CP1124 has minimal impact on other concrete properties including early and later age compressive strength and drying shrinkage while initial time of set and total bleed may slightly increase depending on specific conditions.

## 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 such as vibration. 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" (406 mm to 635 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.

## What is the difference between CONCERA® CP1124 and CONCERA® SA8080?

CONCERA®CP1124 and CONCERA®SA8080 are both used to produce Control Flow Concrete. CONCERA®CP1124 is an ASTM C494 Type A water reducer (> 5% water reduction) that is typically used in combination with a polycarboxylate based mid or high range water reducer to produce Control Flow Concrete. Prior to CONCERA®CP1124 addition, slumps are typically in the 5-8" (127 to 203 mm) range. CONCERA®CP1124 is formulated with latest generation patent pending best in class rheology modifying agents that are field proven to provide consistent robust performance with a wide range of materials, mix designs and conditions. CONCERA®CP1124 is formulated for use in non air entrained concrete and air entrained concrete.

CONCERA®SA8080 is primarily a ASTM C494 Type F high range water reducer (>12% water reduction) that is typically used as a stand-alone product to produce Control Flow Concrete. Typical CONCERA®SA8080 dosage rates range from 8 to 20 oz/cwt (533 to 1304 mL/100 kg) and slumps prior to CONCERA®SA8080 addition are typically less than 4" (102 mm). CONCERA®SA8080 is formulated for use in non air entrained and air entrained concrete.

## Can slight mix design adjustments improve the rheology, stability and segregation resistance properties of CONCERA® CP1124 concrete?

In most cases, adding CONCERA®CP1124 to a conventional mid range or high range water reducer mix design will increase slump flows to 16-25" (406 mm to 635 mm) and provide excellent rheology, stability and segregation properties. However, specific characteristics of the conventional mix design can affect the overall properties of CONCERA®CP1124 Control Flow Concrete. These characteristics include 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®CP1124 Control Flow Concrete, slight mix design modifications can be made to improve overall rheology. First, most conventional MRWR/HRWR mix designs are produced in the 5-8" (127-203 mm) slump range and CONCERA®CP1124 has built in water reducer capability to increase 5+ inch (127 mm) slump concretes up to the highly flowable 16-25" (406 mm to 635 mm) range. Therefore, since most CONCERA®CP1124 mix designs already contain a PC based MRWR or HRWR, rheology improvements can be realized by slightly reducing the PC based MRWR/HRWR dosage rate and increasing the CONCERA®CP1124 dosage rate. This adjustment will increase the total amount of rheology modifier in the concrete. Other potential modifications include slightly increasing the FA/CA ratio, reducing the W/C ratio and decreasing nominal coarse aggregate size. Technical Bulletin 1703 discusses these modifications in detail.

## How does using CONCERA® CP1124 compare to using a viscosity modifying agent (VMA) with a mid or high range water reducers?

CONCERA®CP1124 is formulated with best in class VMA technology and ASTM C494 Type A water reducing capability while most VMA's (such as V-MAR3) are ASTM C494 Type S viscosity modifying agent (no water reducing capability). Therefore, since CONCERA®CP1124 has built in water reduction capability, a lower dose of the base mid or high range water reducer will be required. CONCERA®CP1124 will also provide superior rheology, segregation resistance, tolerance to water fluctuation, slump retention over time and allows for jobsite concrete to be retempered with water to restore slump lost during transit.

## How do I transport and pump CONCERA® CP1124 Control Flow Concrete?

CONCERA® CP1124 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® CP1124 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® CP1124 Control Flow Concrete and pump pressure reductions will typically make it easier to pump CONCERA® CP1124 Control Flow Concrete compared to conventional concrete. It is recommended pump pressures be gradually increased since very high initial pump pressures can cause segregation with Control Flow Concretes.

## How do I place CONCERA® CP1124 Control Flow Concrete in formed concrete applications?

With CONCERA® CP1124 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® CP1124 Control Flow Concrete in slab on grade applications?

Placing and finishing CONCERA® CP1124 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® CP1124 Control Flow Concrete. ACI 302.1 Section 8.4 Table 8.4.1 recommendations will require modification to allow > 5" (>127 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.

## Is CONCERA® CP1124 compatible with all GCP and competitive admixtures?

CONCERA® CP1124 is fully compatible with all GCP commercially available admixtures except naphthalene based admixtures including DARACEM®19 and DARACEM®100. It is also expected CONCERA® CP1124 will be compatible with most standard competitive admixtures. However, it is recommended pre-job testing with specific concrete mix designs be conducted to verify cement, supplemental cementitious materials (SCM's), aggregate and admixture compatibility and performance.

## What is the recommended batch sequencing for CONCERA® CP1124?

In most cases, it is recommended that CONCERA® CP1124 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® CP1124 should not come in direct contact with any other admixture during batching.

## When and where is CONCERA® CP1124 available?

CONCERA® CP1124 is commercially available in the U.S. and Canada. CONCERA® CP1124 samples are available for testing through GCP NA customer service (phone: 877-423-6491, email: [central.admixturecustomerservice@gcpat.com](mailto:central.admixturecustomerservice@gcpat.com)).

## What is the pricing of CONCERA® CP1124?

Contact your Product or District Manager for CONCERA® CP1124 pricing in your territory.

## What is CONCERA® CP1124 status with ASTM testing and certification?

Final one year ASTM C494 Type A report is available.

## What is CONCERA® CP1124 status with DOT submittals and approvals?

DOT submittals and approvals are ongoing.

[gcpat.com](http://gcpat.com) | North America Customer Service: 1 877-4AD-MIX1 (1 877-423-6491)

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