



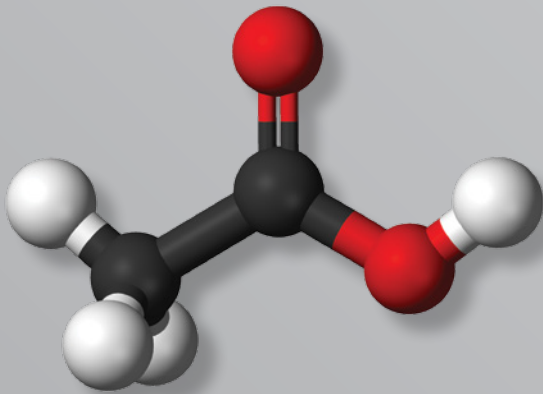
GEOPOLYMER SOLUTIONS, LLC

**ACETIC ACID RESISTANT**

# A400

## COLD FUSION CONCRETE™

**A400 COLD FUSION CONCRETE** is a 3/8-inch nominal (or other aggregate size) (quartzite) concrete material designed for resistance to acetic acid. A400 is resistant to degradation in various concentrations of acetic acid ranging from 0.1-percent to 98-percent with little to no mass loss.



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#### **WHAT IS COLD FUSION CONCRETE?**

Geopolymer Solutions, LLC (GPS) has developed Cold Fusion Concrete (CFC)™. CFC™ is a normal weight and lightweight, single dry material concrete, for water mixing.

CFC is resistant to most natural and man made reagents including chlorides, sulfates, and various concentrations of acids including hydrofluoric (.01 to 50%), sulfuric\* (.01 to 98%), hydrochloric (.01 to 50%), phosphoric (.01 to 75%), acetic (.01 to 80%), and nitric (.01 to 50%). CFC complies with the ASTM C1157 Standard Performance Specification for Hydraulic Cement.

A400 is used in most any pneumatic or conventionally placed concrete application where the completed feature will be subject to acetic acid in very hot or very cold climates. A400 can be utilized in low or high slump applications for construction of secondary containment, various feature construction such as drain systems, foundations, walls, flatwork, and as masonry mortar, etc. The technical data published here should be used as an overview of what our materials can do. We blend custom mixes and provide all the necessary documentation to ensure you are getting the right product for the right job.

A400 is available in many custom mixes - some of the most common being;



**A420 - Sand Formula Low Slump Topical** – Size #8 sieve maximum aggregate and 1 to 4-inch slump. Commonly used for vertical and horizontal repairs, topping, masonry mortar and liners. Our Topical formulas achieve unconfined compressive strengths from about 5,000 to 9,000 psi.

**A430 - Sand Formula High Slump Self-Leveling** - 6 to 10-inch slump. Commonly used for horizontal repairs, topping, and liners, achieving compressive strengths from 5,000 to 8,000 psi.

**A440 - 3/8-inch Aggregate Medium Slump** - is produced at an approximate 4 to 6-inch slump and is suitable for secondary containment and structural concrete; it is commonly provided in ready mixed concrete transportation vehicles, but also available in 55lb. bags and Super Sacks. Our structural formulas achieve unconfined compressive strengths from 5,000 to 10,000 psi.

**A450 - 3/8-inch Aggregate High Slump** - is produced at an approximate 7 to 10-inch slump and is suitable for secondary containment and structural concrete; it is commonly provided in ready mixed concrete transportation vehicles, but also available in 55lb. bags and Super Sacks. Our structural formulas are expected to achieve unconfined compressive strengths from 5,000 to 10,000 psi.

\* adjusting the pH of sulfuric acid when contacted with A400 may cause damage.



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### **EXPECTED CHARACTERISTICS**

#### **A400 CFC®**

- 6,000 psi typical 28-day compressive strength at a water to cement ratio of 0.32, and a slump of 8 inches.
- 8,000 psi typical 28-day compressive strength at a water to cement ratio of 0.27, and a slump of 5 inches.
- 140 lbs/ft<sup>3</sup> wet density.
- 6,000 psi typical compressive strength in from 4 to 8 hours when subjected to cure temperatures greater than 120 degrees Fahrenheit.
- Heat resistance up to a sustained 1,000 degrees Fahrenheit, or brief higher temperature exposure.
- Application temperature range is from 30 to 120 degrees Fahrenheit.
- A400 finishes just as traditional Portland concrete and uses water for ease of clean up.

### **PHYSICAL PROPERTIES**

- Resistant to acetic acid exposure at static concentrations ranging from 5% to 98%.
- Moderately resistant to other acids except hydrofluoric.
- Resistant to hydrocarbon, chloride, and sulfate exposure degradation.
- Resistant to solvent exposure.
- **Green Technology.**
- Can be colored.
- Utilized at slumps ranging from 1 to 10 inches.
- Fiber reinforced (micro).
- Interior and exterior applications.
- Resistant to freeze and thaw cycles.
- Can be used in hot or cold climates.
- Improves corrosion protection when placed on metal features.

### **A400 SPECIFICATIONS**

Results were provided by a licensed engineering test laboratory and represent the typical results derived from production similar materials. Even though actual results presented below exceed stringent internal quality control standards, (available upon request). Of course, all samples were air cured.

#### **Compressive Strengths - PSI**

3 Hours	Custom
24 Hours	Custom
7 Days	Typical 4,000 psi
28 Days	Custom 5,000 - 9,000 psi

#### **Bond Strength - PSI**

- Variable depending on substrate.
- Greater bond modulus than PCC when attached to PCC.

#### **Flexural Strength - PSI**

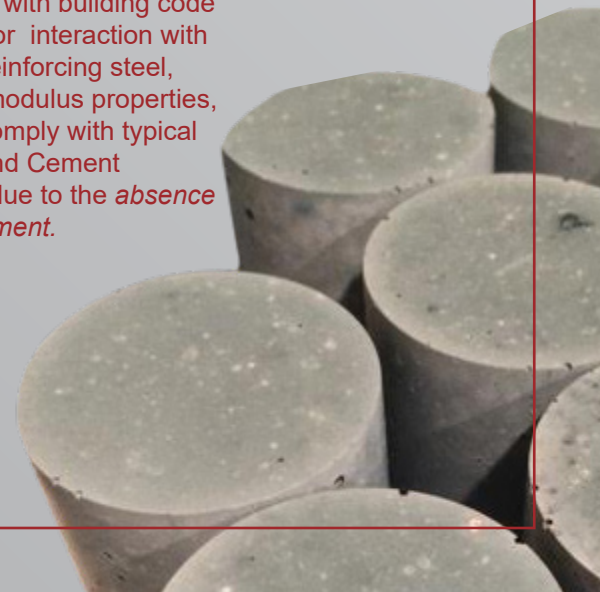
7 Days	Variable - Depends on Mixture 500 - 800 psi typical.
28 Days	Variable - Depends on Mixture 800 - 1,200 psi typical.

#### **Splitting Tensile Strength - PSI**

7 Days	Variable - Depends on Mixture 600 - 800 psi typical.
28 Days	Variable - Depends on Mixture 1,000 - 1,600 typical.

*A400 complies with building code requirements for interaction with conventional reinforcing steel, strength, and modulus properties, but does not comply with typical industry Portland Cement specifications due to the absence of Portland Cement.*

**Cost savings combined with superior long-lasting quality is not just a goal, it's inherent with A400.**





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#### **SITE PREP**

The placement location requirements are no different for CFC® than for typical Portland Cement mixtures. The placement area should be moist, but no free water should be present. The placement area should be clean and free of debris. If bonding to existing CFC® or Portland materials, the exposed area should be thoroughly cleaned, moist but not wet, and roughened if possible (but not required). If bonding to existing CFC® or Portland, the interface should be vibrated to ensure complete and thorough contact with the new material. Ambient surface should not be freezing or above the boiling temperature of water. Elevated temperatures above 90°F will shorten the working time.

#### **A400 MIXING INSTRUCTIONS**

Approximately 80-percent of design water mass should be batched into RMC delivery vehicles with mineral aggregate. Mineral aggregate mass and volume should be corrected based upon the measured moisture content, as compared to the design Saturated Surface Dry (SSD) condition. Cold Fusion Concrete materials are batched to design amounts and mixed at low speed revolutions for 2 to 3 minutes. Final water additions should be made to adjust the slump based upon quality control tests, and the RMC delivery vehicle should then be dispatched to the project.

#### **Caution is advised for water additions!**

Approximately one-half or less of the water typically required to increase the slump on Portland Cement mixtures is required for the same effect on A400. Further, after initial mixing no additional high speed mixing should occur; entrapped air will be developed in the mix with excessive mixing. When the truck departs the plant, either low speed revolutions or stopping the drum should occur. When the truck arrives on site, no high speed revolutions should occur as typical with Portland. A400 is designed to suspend aggregate, even at high slumps.

#### **PRECAUTIONS**

Like Portland batching procedures for CFC® are critical. Employees should be protected from inhaling dry materials and any materials making contact with skin or clothing should be cleaned immediately. A400 has a pH greater than Portland in a dry state. After batching and in a plastic condition, A400 has a similar pH as Portland.

#### **A400 APPLICATION AND FINISHING**

Placement procedures are highly similar to Portland mixtures. No bleed water will develop with A400. Accordingly, finishing can be expedited if elevations and smoothness are achieved. No curing compounds are necessary and A400 can be cured in direct sunlight, the shade, or elevated temperature conditions. Like Portland mixtures, high wind conditions should be avoided and A400 should be protected from freezing for at least 48 hours dependent upon the mean daily temperature. If a glass-like finished surface is desired, placing plastic sheeting or film on the surface immediately after finishing and in-contact with the concrete for approximately 5 hours will achieve this effect. A400 may attain a blueish color, which is often mottled during curing. Some of this color will dissipate during the extended curing process. While finishing aids are not recommended, they can be used sparingly. We have developed a finishing aid under our product name Fusion Finish. Fusion Finish is supplied in 5-gallon buckets, or 270 gallon totes. Over applications of Fusion Finish will reduce the hardness and chemical resistance of the surface of the concrete, but will not affect the hardness or chemical resistance of the underlying mass. No aggregate segregation is expected up to an approximate 10-inch slump. Concrete consolidation with vibrators is highly similar to Portland mixtures. Over vibration should be avoided, particularly using high slump consistencies. Moving concrete with vibrators should be avoided. Concrete strength gain can be accelerated with A400 by applying heat in the form of ambient temperature, sunlight, or, applied heat by flame or other means.

**Packaging 55lb Bags or Super Sacks**