

UHPC MORTAR

Rapid-Hardening, Ultra-High Performance Mortar



PRODUCT DATASHEET

DESCRIPTION: Rapid Set® UHPC MORTAR is an ultra-high performance, rapid-hardening mortar with excellent abrasion-resistance. Durable in wet environments, UHPC MORTAR is a blend of Rapid Set calcium sulfoaluminate cement, high-performance additives, and high-density aggregate. Mix UHPC MORTAR with water to produce a workable, pourable mortar where fast strength gain, superior durability, and high abrasion resistance are desired. Add fibers on site to convert UHPC MORTAR into an ultra-high performance cementitious composite (UHPC).

USES: Use UHPC MORTAR for concrete repair, roadway rut remediation, pre-cast bridge connections, airport pavement repairs, industrial floors, heavy equipment repair areas, solid waste transfer stations, and other applications where long-term durability, quick return to service, and high abrasion resistance are necessary.

ENVIRONMENTAL ADVANTAGES: Use UHPC MORTAR to reduce your carbon footprint and lower your environmental impact. Production of Rapid Set cement emits far less CO₂ than portland cement. Contact your CTS representative for EPD, LEED values and other sustainability information.

APPLICATION: Apply UHPC MORTAR in thicknesses from 1/4" to 4" (0.6 cm to 10.2 cm). For thicker applications up to 24" (61 cm), extend each 60-lb (27.2-kg) bag of UHPC MORTAR with up to 30 lbs (13.6 kg) of coarse aggregate. Use only clean, dry, 1/4" to 3/8" (0.6 cm to 1 cm) coarse aggregate conforming to ASTM C33. To maintain the abrasion resistance of UHPC MORTAR, use only high-performance aggregate such as trap rock, emery, or carborundum with an abrasion value of 15% or less per ASTM C131. Aggregate may be broadcast or integrally mixed with UHPC MORTAR. For steel fiber reinforcement, use only fiber conforming to ASTM A820.

SURFACE PREPARATION: Surface must be clean, sound concrete, free of oil, asphalt, curing compound, acid, dirt, loose debris and other bond breakers. Surface must be ICRI CSP 3 to 5. Mechanical methods of surface preparation such as shot blasting are preferred. Apply UHPC MORTAR to a thoroughly saturated surface with no standing water.

MIXING: Use a power-driven mechanical mixer, such as a mortar mixer, grout mixer, pan mixer or a drill-mounted mixer. Organize work so that all personnel and equipment are in place before mixing. **Use clean potable water. UHPC MORTAR may be mixed using 3.0 to 3.6 quarts (2.8 L to 3.4 L) of water per 60-lb (27.2-kg) bag. Use up to 4.0 quarts (3.8 L) when extending with dry coarse aggregate. Use less water to achieve higher strengths.** Place the desired quantity of mix water into the mixing container. While the mixer is running, add UHPC MORTAR. Mix for at least 5 minutes to achieve a lump-free, uniform consistency. Add fibers or aggregate, if required, and mix until uniform. Do not retemper.

PLACEMENT: UHPC MORTAR may be placed using traditional construction methods. Place, consolidate, and screed quickly to allow for maximum finishing time. Use a method of consolidation that eliminates air voids. On flat work, do not install in layers; install full depth sections and progress horizontally. Do not wait for bleed water. Apply final finish as soon as possible. UHPC MORTAR may be troweled, floated, or broom finished. Once structural strength is achieved, UHPC MORTAR can be ground to be level with the surrounding concrete. The working time for UHPC MORTAR is 10 to 25 minutes at 70°F (21°C). To extend working time, use Rapid Set® SET Control retarding admixture or use cold mix water. Surface and ambient temperatures must be between 45°F and 90°F (7°C and 32°C). Do not install on frozen surfaces.

OVERVIEW

Highlights:

- Ultra-high strength: Over 17,000 psi in 28 days
- Fast: Ready for traffic and loading in 2 hours
- Ideal for UHPC, rut repairs and industrial floors
- Excellent bond strength
- High abrasion resistance
- Freeze-thaw resistant
- Extendable with trap rock or specialized aggregate
- Very low permeability

Tested in accordance with:

ASTM C1856

MasterFormat® 2020

- 03 01 30 Maintenance of Cast-in-Place Concrete
- 03 01 40 Maintenance of Precast Concrete
- 03 01 50 Maintenance of Cast Decks and Underlayment
- 03 01 70 Maintenance of Mass Concrete
- 03 31 24 Ultra-High Performance Structural Concrete
- 03 41 00 Precast Structural Concrete
- 03 53 19 Concrete Overlayment
- 03 54 16 Hydraulic Cement Underlayment
- 03 61 00 Cementitious Grouting

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CURING: Water cure all UHPC MORTAR installations by keeping exposed surfaces wet for a minimum of 1 hour. Begin curing after the material starts to harden and before the surface starts to lose its moist sheen. The objective of water curing is to maintain the moist sheen on the entire surface until the product has achieved sufficient strength. When experiencing extended setting time due to cold temperature or the use of retarder, longer curing times may be required. A curing compound conforming to ASTM C309 Type 2, Class B may be used. For best results, protect from direct sunlight, wind, and other conditions that may cause rapid drying of material.

COLD WEATHER: Environmental and material temperatures below 70°F (21°C) may delay setting time and reduce the rate of strength gain. Lower temperatures will have a more pronounced effect. Thinner sections will be more significantly affected. To compensate for cold temperatures, keep material warm, use heated mix water, and follow ACI 306 Procedures for Cold Weather Concreting.

WARM WEATHER: Environmental and material temperatures above 70°F (21°C) may speed setting time and increase the rate of strength gain. Higher temperatures will have a more pronounced effect. To compensate for warm temperatures, keep material cool, use chilled mix water, and follow ACI 305 Procedures for Hot Weather Concreting. The use of SET Control retarding admixture will help offset the effects of high temperatures.

YIELD & PACKAGING: UHPC MORTAR comes in 60-lb bags and 3,000-lb bulk bags. One 60-lb (27.2 kg) bag of UHPC MORTAR will yield approximately 0.42 ft³ (0.012 m³). The coverage is approximately 20 ft² (1.9 m²) at 1/4" (0.6 cm) deep. One 3,000-lb (1,360- kg) bulk bag of UHPC MORTAR will yield approximately 0.77 yd³ (0.59 m³). The coverage is approximately 111 yd² (92.8 m²) at 1/4" (0.64 cm) deep. Coverage will increase if UHPC MORTAR is extended with aggregate and may vary due to jobsite conditions.

SHELF LIFE: UHPC MORTAR has a shelf life of 12 months when stored properly in a dry location, protected from moisture, out of direct sunlight, and in an undamaged package.

USER RESPONSIBILITY: Before using CTS products, read current technical data sheets, bulletins, product labels and safety data sheets at www.CTScement.com. It is the user's responsibility to review instructions and warnings for any CTS products prior to use.

WARNING: DO NOT BREATHE DUST. AVOID CONTACT WITH SKIN AND EYES. Use material in well-ventilated areas only. Exposure to cement dust may irritate eyes, nose, throat, and the upper respiratory system/lungs. Silica exposure by inhalation may result in the development of lung injuries and pulmonary diseases, including silicosis and lung cancer. Seek medical treatment if you experience difficulty breathing while using this product. The use of a NIOSH/MSHA-approved respirator (P-, N- or R-95) is recommended to minimize inhalation of cement dust. Eat and drink only in dust-free areas to avoid ingesting cement dust. Skin contact with dry material or wet mixtures may result in bodily injury ranging from moderate irritation and thickening/cracking of skin to severe skin damage from chemical burns. If irritation or burning occurs, seek medical treatment. Protect eyes with goggles or safety glasses with side shields. Cover skin with protective clothing. Use chemical resistant gloves and waterproof boots. In case of skin contact with cement dust, immediately wash off dust with soap and water to avoid skin damage. In case of skin contact with wet concrete, wash exposed skin areas with cold running water as soon as possible. In case of eye contact with cement dust, flush immediately and repeatedly with clean water, and consult a physician. If wet concrete splashes into eyes, rinse eyes with clean water for at least 15 minutes and go to the hospital for further treatment.

Please refer to the SDS and www.CTScement.com for additional safety information regarding this material.

LIMITED WARRANTY: CTS CEMENT MANUFACTURING CORP. (CTS) warrants its materials to be of good quality and, at its option, will replace or refund the purchase price of any material proven to be defective within one (1) year from date of purchase. The above remedies shall be the limit of CTS' responsibility. Except for the foregoing, all warranties expressed or implied, including merchantability and fitness for a particular purpose, are excluded. CTS shall not be liable for any consequential, incidental, or special damages arising directly or indirectly from the use of the materials.

⚠ WARNING

CANCER and REPRODUCTIVE HARM - www.P65Warnings.ca.gov

TYPICAL PHYSICAL DATA

Set Time, ASTM C191 Mod.

Initial set 60 minutes

Compressive Strength, ASTM C109 Mod.

2 hours 3,000 psi (20.7 MPa)

4 hours 8,000 psi (55.2 MPa)

24 hours 11,000 psi (75.8 MPa)

7 days 14,000 psi (96.5 MPa)

28 days 17,000 psi (117.2 MPa)

Flexural Strength, ASTM C78

2 hours 500 psi (3.5 MPa)

28 days 1,200 psi (8.3 MPa)

Freeze-Thaw Resistance, ASTM C666* Procedure A

300 cycles, Durability > 96%

All data obtained at 3.6 quarts of water per 60 lbs, neat
* Per ASTM C1856



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