

Part 1, General (HP Cement)

1.01 Work Included

- A. Furnish all materials, labor, tools, and equipment to patch or overlay interior and/or exterior horizontal surfaces as designated by the owner.

1.02 Related Work

- A. Joint fillers
- B. Crack repair
- C. Pavement markings

1.03 Quality Assurance

- A. Provide a notarized certificate stating that the Portland cement concrete meets the specified requirements and have the manufacturer's current printed literature on the specified product.
- B. Portland Cement concrete shall be tested by a certified testing laboratory, on a batch basis, to assure the product has been manufactured as specified on manufacturer's printed literature.
- C. Complete laboratory test reports, from an independently qualified testing laboratory, shall be made available for the specified product.

1.04 Delivery, Storage, and Handling

- A. Deliver the specified product in original, unopened containers with the manufacturer's name, labels, product identification, and batch numbers.
- B. Store and condition the specified product as recommended by the manufacturer.

1.05 Job Conditions

- A. Environmental Conditions: Do not apply material in rainfall or if the ambient temperature will fall below 32 degrees F. within 24 hours of application.
- B. Protection: Precautions should be taken to avoid damage to any surface near the work zone due to mixing and handling of the Portland cement concrete.

Part 2, Products

2.01 Acceptable Products

- A. H P Cement (extended with coarse and fine aggregates) By U.S. Concrete Products, Timonium, Maryland.

- B. Substitutions: The use of other than the specified product will be considered providing the contractor requests its use in writing to the Engineer. A certificate of compliance shall accompany this request from an approved independent testing laboratory that the proposed substitute product meets or exceeds the specified performance criteria, tested in accordance with the specified test standards.

2.02 Performance Criteria

- A. Properties of the mixed Portland cement concrete:
 - 1. Working Time: 18 minutes
 - 2. Finishing Time: 20 minutes
 - 3. Color: concrete gray
 - 4. Flow: 100-200% (ASTM C109)

- B. Properties of the cured portland cement concrete:
 - 1. Compressive Strength (ASTM C-39 Modified)
 - a. 1 hour 2800 psi
 - b. 1 day 4300 psi
 - c. 7 days 6800 psi
 - d. 28 Days 7800 psi
 - 2. Splitting Tensile Strength (ASTM C-496) at 28 days: 750 psi min.
 - 3. Flexural Strength (Modulus of Rupture)(ASTM C-78) at 28 days: 1200 psi min.
 - 4. Bond Strength (ASTM C-882 Modified) at 28 days: 2000 psi min.
 - 5. Freeze thaw resistance (ASTM C-666): 102% RDM, <.8% loss @ 300 cycles
 - 6. Length Change (ASTM C 157): <-.03% @ 56 days
 - 7. Set time: Initial - 25 min. Final - 30 min.

2.03 Materials

- A. Portland cement concrete:
 - 1. HP Cement™ shall be a blend of selected Portland cements, specially graded aggregates, admixtures for controlling setting time, water reducers for workability.
 - 2. The ratio of water to H PCement™ shall be 33% by weight.
 - 3. The material shall not contain asbestos, chlorides, nitrates, added gypsum, added lime, or high aluminum cements.
 - 4. The material shall be non-combustible, either before or after cure.
 - 5. The Portland cement concrete shall be supplied in a factory proportioned unit.
 - 6. The Portland cement concrete must be able to be finished with a power trowel.
 - 7. The Portland cement concrete must be place able from 1 inch up to full depth.

Part 3, Execution

3.01 Surface Preparation

- A. The surface must be mechanically prepared. Areas to be patched or overlaid must be clean and sound. All loose and deteriorated concrete shall be removed by mechanical means approved by the Engineer. Chip concrete substrate and prepare the substrate surface in accordance with ICRI Guideline 03731. Sandblast reinforcing steel to remove all contaminants and rust. For substrate preparation where corroded reinforcing steel caused deteriorated concrete follow ICRI Guideline 03730.
- B. Cracks in the substrate in the area of the patching or overlay work must be treated as directed by the Engineer.
- C. Extend all existing control and expansion joints through any patch or overlay. Install new joints as directed by the Engineer. Fill all joints as directed by the Engineer.

3.02 Application

- A. Mixing the Portland cement concrete: Mix manually or mechanically. Manually mix in a wheelbarrow or mortar box. Mechanically mix in appropriate sized mixer. Pour approximately 6 qts. water (per 50lb bag of cement) into the mixing container. Add 100lbs each of coarse and fine aggregates meeting ASTM C 33 while continuing to mix add 50lbs of HP Cement. Mix to a uniform consistency for a maximum of three minutes. If manual mixing takes more than three minutes, mix small quantities. Should smaller quantities be needed, be sure that the HP Cement, sand and gravel is uniformly proportioned.
- B. Placement Procedure: At the time of application, the substrate should be saturated surface dry with no standing water. Mortar and/or concrete must be scrubbed into substrate filling all pores and voids. While the scrub coat is still plastic, force material against edge of repair, working toward center. After filling, consolidate, then screed. Allow mortar to set to desired stiffness. Then finish with trowel, manual or power for smooth surface. Broom or burlap drag for rough surface. Areas where the depth of the repair area to sound concrete is less than 1 in. shall be repaired with Portland cement mortar
- C. Curing is not required under most conditions. However, if ambient condition might cause premature surface drying-high winds, high temperatures, direct sunlight, low humidity, etc., use a fine mist of water, wet burlap, or non-solvent, water based curing compound, which has been pre-approved by the Engineer.
- D. Adhere to all limitations and cautions for the Portland cement concrete in the manufacturers current printed literature.

3.03 Cleaning

- A. The uncured Portland cement concrete can be cleaned from tools with water. The cured Portland cement concrete can only be removed mechanically.
- B. Leave finished work and work area in a neat, clean condition without evidence of spillovers onto adjacent areas.