



By CTS Cement Manufacturing Corp.

## CSI SECTION 03 01 30 – MAINTENANCE OF CAST-IN-PLACE CONCRETE

*Fast-Setting, High Strength, Cementitious, Non-Shrink, Polymer-Modified Mortar*

*EDITOR NOTE: The following guideline specification has been prepared to assist architects and design professionals in the preparation of project master specifications. It is intended for use by qualified design professionals and is not intended to be used verbatim. Appropriate modifications to meet specific project requirements are required. Make appropriate [selections] where options are provided and delete items that are not applicable to the project. Contact CTS Cement Technical Service for additional information or project specification assistance.*

### PART 1 - GENERAL

#### 1.1 SECTION INCLUDES

- A. Supply and installation of a fast-setting, high strength, cementitious, non-shrink, polymer-modified mortar for interior and exterior flooring installations.

#### 1.2 RELATED SECTIONS

- [A. Section 03 01 00 - Maintenance of Concrete
- [B. Section 03 01 40 - Maintenance of Precast Concrete
- [C. Section 03 30 00 - Cast-in-Place Concrete
- [D. Section 03 40 00 - Precast Concrete
- [E. Section 07 91 29 - Joint Fillers
- [F. Section 09 61 00 - Flooring Treatments

#### 1.3 REFERENCES

- A. ASTM C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
- B. ASTM C348 Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
- C. ASTM C 779 Standard Test Method for Abrasion Resistance of Horizontal Concrete Surfaces
- D. ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
- E. ASTM F1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- F. ASTM F2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
- G. ACI 302.1R-04 Guide for Concrete Floor and Slab Construction

#### 1.4 SUBMITTALS

- A. General: Submit samples and manufacturer's product data sheets, installation instructions, maintenance procedures, project references, etc. in accordance with Division 01 General Requirements Submittal Section.
- B. Test Data: Submit qualified testing data that confirms compliance with specified performance requirements.
- C. Maintenance Data: For inclusion in maintenance manual required by Division 01.
  - a. Include manufacturer's instructions for maintenance of installed work, including methods and frequency recommended for maintaining optimum condition under intended use.
  - b. Include precautions against cleaning products and methods which may be detrimental to finishes and performance.



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## 1.5 QUALITY ASSURANCE

- A. Qualifications:
  - 1. Manufacturer:
    - a. Must have marketed fast-setting, high strength, cementitious materials in the United States for at least five years and must have completed projects of the same general scope and complexity.
    - b. Complementary materials must be manufactured by or approved for use by CTS Cement Manufacturing Corp. (800-929-3030, www.CTScement.com) and distributed by the same or an authorized CTS Cement dealer.
  - 2. Applicator:
    - a. Must be experienced and competent in installation of fast-setting, high strength, cementitious materials and provide evidence of a minimum of five years experience in work similar in size and scope to that required by this section.
    - b. Must retain sufficient production capability, facilities, and personnel to produce specified work.
- B. Samples:
  - 1. Submit samples for approval. Samples must be of materials specified and of suitable size as required to accurately represent each color and texture used on project. Prepare each sample using the same tools and techniques for actual project application.
  - 2. Maintain and make approved samples available at the job site throughout the construction process and until final acceptance.
  - 3. Mock-Up: Provide a mock-up of the complete system, sized to [enter sample mock-up dimensions], using workmen, equipment, and techniques proposed for use on the project.
    - a. Mock-up must be reviewed for uniformity of depth and thickness, finish color and texture, and overall quality of construction.
    - b. The approved panel will become the standard of comparison for finished work for the project.
    - c. The approved panel must remain on site throughout the construction process and until final acceptance.
    - d. Approved mock-up may become part of the completed work if undisturbed at time of substantial completion.
    - e. Upon project completion and final acceptance, dispose of the sample in accordance with local construction waste guidelines.
- C. Walkway Auditor:
  - 1. Certified by CPAA or NFSI to test concrete floors for dynamic and static coefficient of friction according to ANSI B101.1 and B101.3.
- D. Coefficient of Friction:
  - 1. Achieve following coefficient of friction by field quality control testing in accordance to the following standards:
    - a) ANSI B101.1 Static Coefficient of Friction - Achieve a minimum of [.5] for level floor surfaces.
    - b) ANSI B101.3 Dynamic Coefficient of Friction - Achieve a minimum of [.35] for level floor surfaces.

## 1.6 PRE-INSTALLATION MEETINGS

- A. Pre-installation Conference: Conduct conference at the Project Site located at [enter site address] at least two (2) weeks prior to initial overlay placement.



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B. Organize meeting to review specification requirements and finished aesthetics. Require representatives of each entity directly concerned to attend, including the following:

- [1. Owner.
- [2. Architect.
- [3. Contractor's Superintendent/Supervisor.
- [4. All Subcontractor(s), including Finishers and Supervisor.
- [5. Complementary Hardeners, Sealers, Colorants Manufacturer(s).
- [6. Overlay Manufacturer's Representative.

### 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver products in original, unopened, undamaged packaging with manufacturer's identification (i.e., brand logo, product name, weight of packaged unit, lot number). Maintain records of manufacturer's product lot numbers.
- B. Storage: Store products in a dry location, covered, out of direct sunlight, off the ground, and protected from moisture. Maintain storage temperature required by the manufacturer. Keep materials dry until used. Protect materials from temperature extremes.
- C. Handling: Handle products in accordance with manufacturer's published recommendations.

### 1.8 SITE / ENVIRONMENTAL CONDITIONS

- A. Temperature: Maintain ambient and surface temperatures between 50°F (10°C) to 90°F (32°C). Do not apply materials if ambient temperature falls below 50°F (10°C) within 24 hours of application. Protect materials from uneven and excessive evaporation during dry weather, windy conditions and strong blasts of dry air.
- B. Inclement Weather: Do not apply materials during inclement weather unless appropriate protection is employed.
- C. Sunlight Exposure: Avoid, whenever possible, installation of materials in direct sunlight which could adversely affect aesthetics.
- D. Substrate: Prior to installation, the substrates must be inspected for surface contamination or other conditions that may adversely affect the performance of the materials and be free of residual moisture.
- E. Comply with manufacturer's written instructions for substrate temperature and moisture content, ambient temperature and humidity, ventilation and other conditions affecting product performance.
- F. Damage and Stain Prevention: Take precautions to prevent damage and staining of substrates before and after installation.
  1. Protect exposed areas at all times to prevent oils, dirt, metal, excessive water and other potentially damaging materials from affecting the finished surface.
  2. Prohibit use of markers, spray paint, and soapstone.
  3. Prevent staining by hydraulic-powered equipment fluids.
  4. Protect from petroleum, oil, hydraulic fluid, or other liquid dripping from equipment working over surfaces.
  5. Installed topping area must be closed to traffic during and after application for the length of time recommended by the manufacturer.



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**1.9 COORDINATION AND SCHEDULING**

- A. Coordinate installation of materials with all other trades to avoid impeding other construction.
- B. Sufficient manpower must be provided to ensure continuous application and timely finishing.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Basis of Design: CTS Cement Manufacturing Corp., 12442 Knott Avenue, Garden Grove, CA 92841 (800-929-3030, www.CTScement.com).
- B. Components: Obtain overlay and complementary materials manufactured by CTS Cement from authorized distributors. No substitutions or additions of other materials are permitted without prior written permission from the manufacturer for this project.

**2.2 MATERIALS**

- A. Fast Setting, High Strength, Non-Shrink, Polymer-Modified Mortar
  - [1. Rapid Set® Concrete Resurfacer: a pre-packaged, high-performance, fast-setting, polymer-modified, cementitious mortar mixed with water on site. Suitable for use interior and exterior, in wet and dry conditions, to resurface worn, old, or spalled concrete, giving a new concrete look. Ideal for fast-track projects Ready for foot traffic in 2 to 3 hours.
- B. Rapid Set Concrete Pharmacy: Add pre-measured packets per manufacturer's recommendations to change the properties as shown.

*EDITOR NOTE: list only the products desired for use on the project.*

- 1. Set Control – Increases pot life
- 2. Light – Lightens the color of material
- 3. Dark – Darkens the color of material
- C. Additives and admixture materials must be approved for use by CTS Cement Manufacturing Corp. prior to use. (800-929-3030, www.CTScement.com)
- D. Water: Clean, potable water free of deleterious amounts of silt and dissolved salts.

**2.3 MATERIAL PERFORMANCE**

- A. Fast Setting, High Strength, Non-Shrink Polymer-Modified Mortar
  - 1. Minimum performance requirements:

<b>Compressive Strength (ASTM C109 Modified)</b>	24 hours 28 days	2,000 psi 4,000 psi
<b>Set Time (ASTM C266)</b>	Initial Set	110 minutes

- 2. Must not re-emulsify when wet
- 3. Must be non-metallic with no added chlorides and must be pre-blended requiring only addition of water



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## 2.4 RELATED MATERIALS

**EDITOR NOTE:** *Modify to suit project scope and requirements.*

- A. Repair Materials: Products designed to repair cracks and surface imperfections prior to application of overlay material.
1. Rapid Set LevelFlor®: a quick setting, hydraulic cement-based, self-leveling floor underlayment suitable for use both indoors and outdoors to produce a flat, strong surface. Applied at 0.25 to 2.0" depth neat, up to 5" extended.
  2. Rapid Set Cement All®: a pre-packaged, high-performance, fast-setting, multi-purpose, non-metallic, cementitious, non-shrink grout and concrete repair material mixed with water on site. Suitable for use in wet environments and any application where high durability and rapid strength gain are desired. Structural strength is achieved in one (1) hour. Suitable for structural and non-structural applications. Applied at 0 to 4" depth.
  3. Rapid Set® Mortar Mix: a pre-packaged, trowel grade, high-performance, fast-setting, multi-purpose, non-metallic, cementitious repair material [with integral air entrainment] mixed with water on site. Suitable for indoor and outdoor use, use in wet environments, and for any application where high durability, rapid strength gain and low shrinkage are desired. Structural strength is achieved in one (1) hour. Suitable for structural and non-structural applications from 1/2 in. to 6 in. depths. Applied at 0.5 to 6" depth.
  4. Rapid Set® Concrete Mix: a pre-packaged, trowel grade, high-performance, fast-setting, multi-purpose, non-metallic, cementitious repair material [with integral air entrainment] mixed with water on site. Suitable for indoor and outdoor use, use in wet environments, and for any application where high durability, rapid strength gain and low shrinkage are desired. Structural strength is achieved in one (1) hour. Suitable for structural and non-structural applications from 2 in. to 24 in. depths. Applied at 2 to 24" depth.
- B. Admixtures: Must conform to ASTM C494. All additives and admixture materials must be approved for use by CTS Cement Manufacturing Corp. prior to use. (800-929-3030, www.CTScement.com)

## 2.5 SEALERS/GUARDS

**EDITOR NOTE:** *Modify below to suit project scope and requirements.*

- [A. Sealer - Semi Impregnating Stain Protection: A film forming material which will penetrate into the mortar leaving a protective surface film of less than .05 mils which meets the OSHA requirements for slip resistance as tested by ASTM D 2047 and stain resistance of ASTM D 1308. [Color: \_\_\_\_\_]]
- [A. Sealer - Impregnating Stain Protection: Non film forming stain and food resistant penetrating sealer designed to be applied to mortar which meets the requirements of OSHA for slip resistance as tested by ASTM D 2047 and stain resistance of ASTM D 1308. [Color: \_\_\_\_\_]]



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## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Compliance: Comply with manufacturer's instructions for installation of materials. Existing concrete must have a minimum compressive strength of 3000 psi and a minimum density of 100 pcf (pounds per cubic foot).
- B. Coordinate installation with adjacent work to ensure proper sequencing of construction.
- C. Close off areas receiving overlay during installation from all traffic and stop excessive air movement across the top of the surface until overlay has reached final set.
- D. Advise contractor of discrepancies preventing proper installation of materials. Do not proceed with the work until unsatisfactory conditions are corrected.

### **3.2 PREPARATION**

- A. Mechanically roughen surfaces and remove all loose, unsound, contaminated material.
- B. Use appropriate mechanical means and methods to completely remove existing floor coverings, coatings, mastics, paints, adhesives and other floor materials that may inhibit bond.
- C. Bonding surfaces must be clean, sound, and free from any materials that may inhibit bond such as oil, curing compounds, asphalt, sealing compounds, acids, wax and loose dirt, dust and debris.
- D. Prevent damage to substrate during demolition and preparation.
- E. Correct conditions that are found to be out of compliance with the requirements of this section, to include substrate repair, joint and crack treatment as required to achieve the specified finish.
- F. Mechanically prepare the substrate to a minimum ICRI CSP 2.
- G. Pin or otherwise mark all existing joint locations to ensure they can be located and re-saw cut after placement of topping.

### **3.3 MIXING**

- A. Comply with manufacturer's printed instructions.
- B. Use 1.75 – 2.25 quarts of potable water to each 25-lb box.
- C. The ideal temperature of mixed material is 70°F. Warmer material will set faster and cooler material will have slower strength gain. Control temperature by protecting material bags from extreme temperatures and adjust the mix temperature by using hot or cold water.
- D. Add potable water first, then add material while mixing mechanically with a drill and mixing paddle.
- E. Mix 2-3 minutes until smooth, uniform, and lump free
- F. Do not re-temper
- G. Clean mixing bucket and tools between batches.

### **3.4 APPLICATION**

- A. Comply with manufacturer's printed instructions and the following:
  - 1. Verify that all substrates and ambient temperatures are between 50°F (10°C) to 90°F (32°C) and will remain within range until the overlay has reached full cure. Ideal installation conditions are 60°F (15.6°C) to 80°F (26.7°C).



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2. To prevent micro-crazing, eliminate air movement over the surface and do not apply overlay when relative humidity is below 30%.
3. Have all required tools, equipment and materials organized and as close to the placement area as possible.
4. Place quickly to allow for maximum finishing time.
5. Do not wait for bleed water; apply final finish as soon as possible

**EDITOR NOTE:** *Modify selections in brackets below to suit project scope and requirements.*

6. Resurfacer overlay must be [troweled][floated][broom finished]
7. Do not install on frozen surfaces

### **3.5 CURING**

- A. No special requirements needed. Material does not require water curing or curing compounds.
- B. Allow topping to cure for a minimum of four (4) hours prior to saw cutting joints.
- C. Prevent damage to overlay and protect from all traffic for the length of time recommended by the manufacturer.

### **3.6 JOINT CUTTING, PREPARATION AND FILLING**

- A. Honor all existing joints. Locate original joint locations and saw cut through topping into the original joint. Saw blade must penetrate to the depth of the original joint or 2" deep, whichever is smaller. Prefill joints greater than 2" deep.
- B. Ensure saw-cut joint is completely free of dust/debris/laitance.
- C. Apply stain prevention film or other masking agent along surface on both sides of the joint to avoid residual staining.

### **3.7 SEALING**

- A. Apply densifiers, sealers, guards or stain protectors per manufacturers' instructions.
- B. Achieve waterproofing, hardening, dust-proofing, and abrasion resistance of the surface without changing the designed aesthetics of the finish.

### **3.8 PROTECTION**

- A. Prevent damage to overlay and protect from all traffic for the length of time recommended by the manufacturer.
- B. Protect the finished surfaces from damage, soiling and other construction activities.
- C. Provide suitable protective cover without damaging the surface.
- D. Follow maintenance guidelines as provided in Section 1.4 Submittals.

### **3.9 CLEAN-UP**

- A. Remove and legally dispose of debris material from job site.
- B. Clean excess material from surrounding areas and all tools immediately, before material cures. If materials have cured, remove using mechanical methods that will not damage the substrate.



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- C. Clean adjacent surfaces as needed using materials and methods recommended by the manufacturer of the material being cleaned. Remove and replace work that cannot be cleaned to the satisfaction of the Project Designer/Owner.

END OF SECTION

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*This sample guideline specification is intended for use by a qualified design professional. The sample guideline specification is not intended to be used verbatim as an actual specification without appropriate modifications for the specific project requirements.*