



By CTS Cement Manufacturing Corp.

CSI SECTION 03 01 00 – MAINTENANCE OF CONCRETE

Repair with Rapid Set V/O Repair Mix

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. Cleaning of existing concrete surface.
- B. Supply and installation of non-metallic, high strength, cementitious repair and resurfacing materials for concrete substrates in structural and non-structural applications.
- C. Scope of Work as indicated on drawings, including:
 - [1. Repair of deteriorated concrete.
 - [2. Repair of internal concrete reinforcement.
 - [3. Resurfacing of damaged or spalled concrete surfaces.

1.2 RELATED SECTIONS

- [A. Section 03 30 00 - Cast-in-Place Concrete
- [B. Section 03 01 40 – Maintenance of Precast Concrete
- [C. Section 03 31 00 – Structural Concrete
- [D. Section 03 40 00 - Precast Concrete
- [E. Section 04 01 00 - Maintenance of Masonry
- [F. Section 32 16 00 - Curbs, Gutters, Sidewalks, and Driveways
- [G. Section 32 32 00 - Retaining Walls

EDITOR NOTE: Modify References as needed for the project. Include appropriate standards related to concrete reinforcement repair or replacement.

1.3 REFERENCES

- A. ASTM C109 Standard Test Method for Compressive Strength of Hydraulic Cement Mortars
- B. ASTM C157 Standard Test Method for Length Change of Harden Hydraulic-Cement Mortar and Concrete
- C. ASTM C348 Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars
- D. ASTM C469 Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
- E. ASTM C496 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens
- F. ASTM C672 Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals
- G. ASTM C882 Standard Test Method for Bond Strength of Epoxy-Resin Systems Used with



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Concrete by Slant Shear

- H. ASTM C928 Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs
- I. ACI 301 Specification for Structural Concrete
- J. ACI 318 Building Code Requirements for Structural Concrete

1.4 SUBMITTALS

- A. General: Submit samples and manufacturer's product data sheets, installation instructions, 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. Project Record Documents: Submit accurate records of locations of structural reinforcement repairs indicating type of repair and material(s) used.

1.5 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Manufacturer:
 - a. Must have marketed rapid hardening, 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. Repair and resurfacing materials and complementary admixture or bonding agents 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.

1.6 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).
- 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. Store bulk sand in a well-drained area on a clean, solid surface. Cover sand to prevent contamination.
- C. Handling: Handle products in accordance with manufacturer's published recommendations.

1.7 SITE / ENVIRONMENTAL CONDITIONS

- A. Temperature: Maintain ambient and surface temperatures between 45°F (7°C) to 90°F (32°C). Do not apply materials if ambient temperature falls below 45°F (7°C) within 24 hours of application. Protect from uneven and excessive evaporation during dry weather, windy conditions and strong blasts of dry air.
- B. Inclement Weather: Do not apply repair or resurfacing materials during inclement weather unless appropriate protection is employed.
- C. Sunlight Exposure: Avoid, whenever possible, installation of repair or resurfacing materials in direct sunlight which could adversely affect aesthetics.
- D. Substrate: Prior to installation, the substrates must be properly cleaned and prepared to receive repair or resurfacing materials, then inspected for proper preparation and any surface contamination or other conditions that may adversely affect the performance of the materials. Substrate must be free of residual moisture.



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1.8 COORDINATION AND SCHEDULING

- A. Coordinate installation of repair or resurfacing 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 Street, Garden Grove, CA 92841 (800-929-3030, www.CTScement.com).
- B. Components: Obtain repair or resurfacing materials, complementary admixtures and bonding agents 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, Cementitious Repair Materials – General
 - 1. Rapid Set® V/O REPAIR MIX is a high performance, polymer-modified blend of Rapid Set® Cement with additives and specially graded fine aggregate. V/O REPAIR MIX has been specially formulated to match the color of typical portland cement concrete. Cutting-edge Self-Curing Technology (SCT) means wet curing is not required in most applications. V/O REPAIR MIX is non-metallic and no chlorides are added. Combine V/O REPAIR MIX with water to produce a high quality repair material that is ideal where rapid strength gain, high durability, and low shrinkage are desired. Integral corrosion inhibitor is already added to increase protection of embedded reinforcement. V/O REPAIR MIX has a working time of 25 minutes and achieves 2000 psi in 2 hours.
 - 2. Additives and admixture materials must be approved for use by CTS Cement Manufacturing Corp. prior to use. (800-929-3030, www.CTScement.com)
- B. Water: Clean, potable water free of deleterious amounts of silt and dissolved salts.

2.3 MATERIAL PROPERTIES

- A. Fast Setting, Cementitious Repair Materials – General
 - 1. Rapid Set® V/O REPAIR MIX:
 - a. Compliance with: ASTM C928, ASTM C387
 - b. Minimum performance requirements:

Compressive Strength (ASTM C109)	2 Hours	2000 psi
	24 Hours	4000 psi
	28 Days	6500 psi

2.4 RELATED MATERIALS

- A. Admixtures: Do not add additional dry materials such as cement, sand, additives or admixtures. Mix only with water. All additives and admixture materials must be approved for use by CTS Cement Manufacturing Corp. prior to use. (800-929-3030, www.CTScement.com)
- B. Curing: Prevent rapid water loss from materials as directed in the manufacturer’s product data by use of:



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1. Water Curing
2. Wet Burlap Method
3. Curing Compound compliant with ASTM C309.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify project site conditions under provisions of Section 01 00 00.
- B. Compliance: Comply with manufacturer's instructions for installation of repair and resurfacing materials.
- C. Coordinate installation with adjacent work to ensure proper sequencing of construction.
- D. Protect adjacent and surrounding surfaces not specified to receive materials with necessary means to ensure protection against overspray, water or other harmful debris.
- E. Advise Contractor of discrepancies preventing proper installation of materials. Do not proceed with the work until unsatisfactory conditions are corrected.

3.2 CLEANING

- A. Protect surrounding area by providing enclosures, barricades and other temporary construction as required to protect adjacent work from damage.
- B. Clean concrete surfaces, cracks and voids of dirt or other contamination using the most appropriate method for proper preparation. Ensure methods are in compliance with material manufacturer's recommendations.
- C. Do not use any of the following cleaning methods unless approved by the [Architect,] [Engineer,] and the repair and resurfacing materials manufacturer:
 1. Brushes with wire bristles, grinding with abrasives, solvents, hydrochloric or muriatic acid, sodium hydroxide, caustic soda, or lye.
 2. Soap or detergent that is not non-ionic.
 3. Water washing pressure over 100 psi.
 4. Steam-cleaning or steam-generated hot-water washing.
 5. Alkaline cleaning agents.
 6. Acidic cleaning agents.
 7. Abrasive blasting.

3.3 PREPARATION

- A. Remove spalled and unsound concrete from application surface.
- B. Concrete substrate must be free of materials such as paint, oil, curing compound, bond breaker or any material that will inhibit bonding. Mechanically remove loose, unsound, contaminated concrete.
- C. If rusty reinforcing steel is present, it must be abrasively blasted to remove rust. Do not cut or damage reinforcing steel.

[Note to specifier: Add special requirements concerning replacement of reinforcing that has lost too much cross-sectional area.]

- D. Thoroughly clean extraneous material such as dirt, loose chips, and dust from concrete surface. If compressed air is used, it shall be free of oil.
- E. Concrete surface shall be saturated with potable water. Standing water shall be removed from surface to achieve a Saturated, Surface Dry (SSD) condition.
- F. Minimum substrate temperature must be 45°F (7°C) and maximum substrate temperature 90°F (32°C).



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3.4 MIXING

- A. Organize installation personnel and equipment before mixing begins.
- B. Comply with manufacturer's printed instructions.
- C. Adjust water to achieve the desired consistency. Do not exceed manufacturer's recommendations.
- D. Extend with aggregate as indicated on manufacturer's printed instructions.
- E. All additives and admixture materials must be approved for use by CTS Cement Manufacturing Corp. prior to use. (800-929-3030, www.CTScement.com)
- F. Do not re-temper, add water, or remix after material stiffens. Material that stiffens before use must be discarded.

3.5 APPLICATION

- A. Place Rapid Set® VO Repair Mix immediately after mixing.
- B. Work the mixed Rapid Set® VO Repair Mix firmly into all application surfaces to achieve good bond. Consolidate to remove air voids.
- C. Do not wait for bleed water. Apply final finish as soon as material condition allows.
- D. VO Repair Mix may be troweled, floated, shaved, or broom-finished.
- E. On flat work, do not install in layers. Install full depth sections and progress horizontally.
- F. Do not install on frozen surfaces. VO Repair Mix may be applied in temperatures ranging from 45°F to 90°F.

3.6 CURING

- A. VO Repair Mix does not require water curing or curing compound under normal conditions at 70°F.
- B. If used in excessively dry, windy, or hot conditions apply a fine water mist to VO Repair Mix installations. Begin curing as soon as surface starts to lose its moist sheen. Keep exposed surfaces wet for a minimum of 1 hour if water curing is necessary

3.7 CLEAN-UP

- A. Maintain a clean, orderly work area.
- B. Clean excess material from surrounding areas immediately.
- C. Protect adjacent surfaces that may be damaged, with drop cloths, waterproof paper or other means to maintain surfaces free of material splashes, water and debris.

END OF SECTION

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