



PRODUCT SPECIFICATION

Rapid Set® DOT CONCRETE MIX

Date Issued: 08-May-2015

SECTION 03 01 29	RIGID PAVEMENT REPAIR
SECTION 03 01 30	MAINTENANCE OF CAST-IN-PLACE CONCRETE
SECTION 03 01 40	MAINTENANCE OF PRECAST CONCRETE
SECTION 03 01 50	MAINTENANCE OF CAST DECKS AND UNDERLAYMENT
SECTION 03 01 70	MAINTENANCE OF MASS CONCRETE
SECTION 03 01 80	MAINTENANCE OF CONCRETE CUTTING and BORING
SECTION 03 04 00	PRECAST CONCRETE
SECTION 03 30 53	MISCELLANEOUS CAST-IN-PLACE CONCRETE
SECTION 03 31 00	STRUCTURAL CONCRETE
SECTION 03 33 00	ARCHITECTURAL CONCRETE

[Note to specifier: Verify above references are current and applicable.]

PART 1: GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions, apply to this section.

1.2 SUMMARY

A. This section specifies material for general construction and very rapid concrete repairs from 2" to 24" thick.

1.3 SUBMITTALS

A. Substitutions:

[Note to specifier: This paragraph should be included in Section 01 25 13. It is shown here as a convenience for your review.] Requests for substitution must be received by Architect at least 14 days prior to bid opening and shall be accepted only from prime bidders. Request shall include: documentation from an approved independent testing laboratory showing compliance with this specification, record of past performance, list of similar installations, detailed comparison of the qualities of the proposed substitute with the specified product, statement of product costs showing all savings passed to owner if approved, and certification by the contractor that the proposed substitute is in every significant way equal to or better than the specified product.

B. Submit 2 copies of product manufacturer's literature and Material Safety Data (MSDS).

[Note to specifier: Add any other required submissions.]

1.4 QUALITY ASSURANCE

A. Comply with the following unless modified by this specification.

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| 1. ASTM C928 | Standard Specification for Packaged, Dry, Rapid-Hardening Cementitious Materials for Concrete Repairs |
| 2. ASTM C1202 | Standard Test Method for Electrical Indication of Concrete's Ability to Resist Chloride Ion Penetration |
| 3. ASTM C666 | Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing (Procedure A & B) |
| 4. ASTM C884 | Standard Test Method for Thermal Compatibility Between Concrete and an Epoxy-Resin Overlay |



- 5. ASTM C1583 Standard Test Method for Tensile Strength of Concrete Surfaces and the Bond Strength or Tensile Strength of Concrete Repair and Overlay Materials by Direct Tension (Pull-off Method)
- 6. ASTM C469 Standard Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression
- 7. ASTM C496 Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to job site in original, unopened, undamaged containers that clearly show the manufacturer's name, product name, and batch number.
- B. Storage: Store material in a dry area off the ground. Protect from rain, snow, and other sources of moisture.

PART 2: PRODUCTS

2.1 MATERIALS

- A. Rapid Set® DOT CONCRETE MIX
 - Manufacturer:
CTS Cement Manufacturing Corp.
11065 Knott Avenue, Suite A, Cypress, CA, 90630
Phone: 800-929-3030
Email: info@ctscement.com
Website: www.ctscement.com.

B. The material shall meet the following minimum performance requirements:

1. Compressive strength per ASTM C39 (Mod. by ASTM C928):

2 hours	3000 psi
1 day	4500 psi
7 days	6000 psi
28 days	6500 psi

2. Bond strength per ASTM C882 (Mod. by ASTM C928):

1 day	1700 psi
7 days	2400 psi

3. Length change per ASTM C157 (Mod. by ASTM C928):

Air storage at 28 days	-0.035%
Water storage at 28 days	+0.020%

4. Slump of concrete (Mod. by ASTM C928):

5 minutes after addition of mixing liquid	5 inches
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5. Scaling resistance per ASTM C672 (Mod. by ASTM C928):

50 cycles	1 – Visual rating
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6. Chloride permeability per ASTM C1202:

28 days <1000 Coulombs

7. Freeze-thaw resistance per ASTM C666:

Procedure A

Durability factor at 300 cycles 97%

Mass loss at 300 cycles 0.00%

Length change at 300 cycles +0.027%

Procedure B

Durability factor at 300 cycles 96%

Mass loss at 300 cycles 0.00%

Length change at 300 cycles +0.005%

8. Thermal compatibility per ASTM C884:

5 cycles Pass (no delamination)

9. Direct bond strength per ASTM C1583:

28 days 300 psi

10. Static modulus of elasticity:

28 days 3.60×10^6 psi

11. Splitting tensile strength:

28 days 300 psi

C. The material shall be hydraulic cement-based, low-shrinkage concrete repair material that is non-metallic with no added chlorides. Shall be pre-blended requiring only the addition of water.

D. Material shall be applied in thicknesses ranging from 2" to 24".

2.2 WATER: Potable

2.3 ADMIXTURES and ADDITIONS

If modification of the setting time, fluidity, color, or other properties is desired, use Rapid Set® CONCRETE PHARMACY® additives. Add the pre-measured packets per the manufacturer's recommendations.

Do not add other materials unless specified here or approved in writing by CTS Cement Manufacturing Corporation.



PART 3: EXECUTION

3.1 SURFACE PREPARATION

- A. Remove a minimum of 1/16" from the application surface.
- B. Concrete 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. For partial depth repairs, the perimeter of the area to be repaired shall be saw cut or chipped perpendicular to the surface to a minimum depth of 2". Do not cut or damage reinforcing steel.
- D. Reinforcing steel shall be free from rust and other materials that will inhibit bond.
[Note to specifier: Add special requirements concerning replacement of reinforcing that has lost too much cross-sectional area.]
- E. 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.
- F. Concrete surface shall be saturated with potable water. Standing water shall be removed from surface to achieve a Saturated, Surface Dry (SSD) condition.

3.2 MIXING

- A. Organize personnel and equipment before mixing.
- B. Use 3.25 to 3.5 quarts of water per 60-lb bag of Rapid Set® DOT CONCRETE MIX
- C. Follow manufacturer's recommendations for mixing in cold or hot conditions. The mix temperature may be controlled by protecting the bags of repair material from temperature extremes and using hot or cold mix water.
- D. Place the desired quantity of water into the mixing container. While mixing in a power-driven mechanical mixer, such as a mortar mixer or a drill-mounted mixer, add approximately two-thirds of the material and continue mixing for 30 to 60 seconds.
- E. While mixing, add the remaining material. Mix for an additional 1 to 2 minutes to achieve a uniform, lump-free consistency.
- F. Do not re-temper.

3.3 PLACEMENT

- A. Place Rapid Set® DOT CONCRETE MIX immediately after mixing.
- B. Work the mixed Rapid Set® DOT CONCRETE 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.

3.4 CURING

- A. Water cure installations per manufacturer's recommendations.

3.5 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

