

SECTION 03725
SET® 45
CHEMICAL-ACTION CONCRETE

NOTE TO SPECIFIERS

The purpose of this suggested specification is to assist the specifier while developing a specification for the use of Master Builders *SET® 45*. This specification has been prepared to be part of a complete project specification. It has not been prepared to be a “stand alone” item. This document is not intended to be copied directly into project specifications.

PART 1 - GENERAL

1.01 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.

1.02 Summary

- A. This Section specifies a one-component magnesium ammonium phosphate rapid strength concrete repair and anchoring material.
- B. This Product is designed for repairing horizontal and vertical formed concrete surfaces where minimal downtime is required.

1.03 References

ASTM C 33-90	Specification for Concrete Aggregates.
ASTM C 109-90	Test Method for Compressive Strength of Hydraulic Cement Mortars - (Modified).
ASTM C 157-89	Standard Test Method for Length Change of Hardened Hydraulic Cement Mortar and Concrete - (Modified).
ASTM C 266-89	Test Method For Time of Setting of Hydraulic Cement Paste by Gilmore Needles.
ASTM C 348-91	Test Method for Flexural Strength of Hydraulic Cement Mortars - (Modified).
ASTM C 666-91	Test Method for Resistance of Concrete to Rapid Freezing and Thawing -(Modified).
ASTM C 672-84	Standard Test Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.
ASTM C 882-87	Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete -(Modified).
ASTM C 1012-89	Test Method for Length of Change of Hydraulic Mortars Exposed to Sulfate Solutions.

Note: Principle modification of above test methods is for air curing rather than moist curing.

1.04 System Performance Requirements

A. Provide repair mortar that when air-cured produces the following minimum properties:

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| 1. Compressive Strength (ASTM C 109-Modified): | 1 hour*, 2000 psi (13.8 MPa); 1-day, 6000 psi (41.4 MPa); 28-days, 8500 psi (58.6 MPa). |
| 2. Flexural Strength (ASTM C 348 Modified): | 1-day 550, psi (3.8 MPa); 28-days 1125 psi (7.8 MPa). |
| 3. Slant Shear Bond (ASTM C 882-Modified): | 2500 psi (17.2 MPa) at 14 days. |
| 4. Freeze-Thaw Resistance (ASTM C 666-300 cycles): | RDF 80%. |
| 5. Initial Set Time (ASTM C 266): | 15 minutes @ 72 °F (22 °C) minimum. |
| 6. Scaling Resistance (ASTM C 672-25 cycles): | No scaling (rating of "0"). |
| 7. Shrinkage (ASTM C 596): | 0.03 % maximum at 28 days.
(Initial reading at 2 hours after final set)
(1 in. x 1 in. specimens.) |
| 8. Sulfate Resistance (ASTM C 1012): | 0.1% maximum expansion after 52 weeks of immersion. |

*1 hour strength rate does not apply to hot weather versions of rapid repair mortars at room temperatures.

PART 2 - PRODUCTS

2.01 Materials

- A. Rapid Strength Repair Mortar: "SET® 45" or "SET® 45 Hot Weather" by Master Builders, Inc., a fast-setting, single-component concrete repair and anchoring material.
- B. Aggregate (ASTM C 33): Size No. 8 1/2 in. maximum size aggregate [100% passing 1/2 in. (13 mm)], non-reactive, non-calcareous.
- C. Water: Drinkable.

PART 3 - EXECUTION

3.01 Surface Preparation

- A. Mechanically remove unsound concrete to the limits indicated on the drawings.
- B. Remove existing concrete facing as required to expose sound aggregate. Check adequacy of preparation with phenolphthalein or 10% H₂SO₄ indicator to assure removal of carbonated substrate.
- C. Saw-cut perimeter of the area to be repaired to a minimum depth of 1/2 in. (13 mm). Do not cut existing steel reinforcement.

3.01 Surface Preparation (continued)

- D. Where reinforcing steel with active corrosion is encountered, comply with the following:
1. Abrasive blast reinforcing steel to remove rust and contaminants to achieve a white metal finish.
 2. If half of the diameter of the reinforcing steel is exposed, chip out behind the reinforcing to a 1/2 in. (13 mm) minimum depth.
 3. Splice new reinforcing steel to existing where corrosion has depleted the cross-section area by 25%, as directed by the Architect/Engineer.
- E. Thoroughly clean the roughened surface and exposed reinforcement of rust, dirt, loose chips, and dust using high pressure. Remove dust of fracture by flushing substrate or any other means. Retest surface with carbonation indicator outlined in Section 3.01 B. Allow substrate to attain a surface-dry condition prior to application of rapid strength mortar, if dust of fracture is removed by flushing with water.

3.02 Aggregate Extension

- A. Use neat rapid strength repair mortar for patches less than 1 in. (25 mm) in depth or width.
- B. For patches deeper than 1 in. (25 mm), extend repair mortar by adding up to 25 to 30 lbs (12.5 kg to 15 kg) of clean, sound, non-reactive, ASTM C-33 Size No. 8 (1/2 in. maximum) rounded, non-calcareous aggregate to each 50 lb (25 kg) of SET 45.
- C. For deep patches where hydration temperatures will exceed 155 °F (68 °C) for prolonged periods, only use aggregate extended Hot Weather SET 45 formulation.

3.03 Mixing

- A. Comply with rapid strength repair mortar manufacturer's recommendations for water quantity and mixing procedures.
- B. Mix product for 2 minutes to achieve a flowable mortar meeting the requirements of this specification.
Do Not Over Mix. Do Not Add Additional Water Over Bag Instructions.

3.04 Application

- A. Apply rapid strength repair mortar in patches of 1/2 in. (13 mm) or greater in depth. Place repair mortar into prepared areas from one side to the other. Work material firmly into the bottom and sides of the patch to assure good bond.
- B. Do not apply to carbonated concrete. Apply an indicator to the prepared surface to determine if carbonation is present.

3.05 Finishing

- A. Level surface of repair mortar using a wooden float, screed or other suitable device.

3.06 Curing

- A. Materials complying with this specification will require only air curing. Liquid membrane curing compounds or plastic sheeting may be used to give the surface early protection from precipitation, but **never** wet cure "SET 45".
- B. Protect surfaces from exposure to rain, snow and windy conditions with plastic sheeting or apply coating of curing compound if such exposure is probable within two hours of placement.

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