

SECTION 03721

EMACO® S88-CA

SPRAYABLE, SHRINKAGE-COMPENSATED STRUCTURAL REPAIR MORTAR

NOTE TO SPECIFIERS

The purpose of this suggested specification is to assist the specifier while developing a specification for the use of Master Builders *EMACO® S88-CA*. 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, thixotropic, rheoplastic, cement-based, fiber reinforced, shrink-age-compensated, sulfate-resistant structural repair mortar.
- B. This Product is designed for repairing concrete or masonry structures and can be applied by low pressure spraying or hand troweling.

1.03 References

ASTM C 109-90 (Modified)	Test Method for Compressive Strength of Hydraulic Cement Mortars.
ASTM A 185-85	Specification for Steel Welded Wire Fabric, Plain, for Concrete Reinforcement.
ASTM C 348-91	Test Method for Flexural Strength of Hydraulic Cement Mortars.
ASTM C 469-87	Test Method for Static Modulus of Elasticity and Poisson's Ratio of Concrete in Compression.
ASTM C 596 (Modified)	Test Method for Drying Shrinkage of Mortar Containing Portland Cement.
ASTM C 666-91	Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
ASTM C 806-87	Test Method for Restrained Expansion of Expansive Cement Mortar.
ASTM C 882-87 (Modified)	Test Method for Bond Strength of Epoxy Resin Systems Used with Concrete.
ASTM C 1012-89 (Modified)	Test Method for Length of Change of Hydraulic Cement Mortars Exposed to a Sulfate Solution.
ASTM C 1202-91	Electrical Indication of Resistance to Chloride Ion Penetration.

1.04 System Performance Requirements

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

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| 1. Compressive Strength (ASTM C 109): | Minimum, 1-day 4500 psi (31.0 MPa);
28-day 11,000 psi (69 MPa). |
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1.04 System Performance Requirements, continued

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| 2. Flexural Strength (ASTM C 348): | Minimum, 1-day 650 psi (4.5 MPa);
28-day 1300 psi (9.0 MPa). |
| 3. Slant Shear Bond Strength (ASTM C 882-modified): | Minimum, 1-day 1400 psi (9.7 MPa); 28-day
3000 psi (20.7 MPa). |
| 4. Permeability (ASTM C 1202): | 500 Coulombs Maximum. |
| 5. Drying Shrinkage (ASTM C 590-modified): | Maximum 0.1% shrinkage at 28 days. |
| 6. Freeze-Thaw Resistance (ASTM C 666-300 cycles): | Minimum RDF 85%. |
| 7. Sulfate Resistance (ASTM C 1012-15 weeks): | 0.09% expansion (maximum difference
between control bars in water and test bars). |
| 8. Modulus of Elasticity (ASTM C 469): | 3.5 million psi minimum, 4.0 million psi
maximum at 28 days. |

1.05 Project Conditions

- A. Weather Conditions: Apply repair mortar only when ambient and surface temperatures are 50 °F (10 °C) and rising. Do not make the repair if the ambient temperature is expected to fall below 40 °F (5 °C) within 24 hours after placement. Do not apply repair mortar when ambient and surface temperatures are 100 °F (38 °C) and above.
- B. Follow manufacturer's recommendations regarding additional installation information (hot weather or cold weather installation).

PART 2 - PRODUCTS

2.01 Materials

- A. Repair Mortar: "EMACO® S88-CA" by Master Builders, Inc., a blend of portland cement, silica fume, specially graded aggregates, synthetic fibers, and set-control admixtures including shrinkage compensating additives.
- B. Welded Wire Mesh: ASTM A 185, 4 x 4 spacing, gauge 10 - 12, where required.
- C. Water: Drinkable
- D. Curing Compounds: "MASTERKURE®", MASTERKURE® 100W or 200W", by Master Builders, Inc.
- E. "CONFILM®" evaporation reducer and finishing aid, by Master Builders, Inc.

PART 3 - EXECUTION

3.01 Surface Preparation

- A. Mechanically remove unsound concrete to the limits indicated on the drawings.

3.01 Surface Preparation, continued

- B. Remove a minimum of 1/4 in. (6 mm) of existing concrete facing and continue removal as required to expose sound aggregate. Substrate should have a minimum amplitude of 1/4 in. (6 mm). Limit the size of chipping hammers to 15 lbs to reduce micro fractures.
- C. Saw-cut perimeter of the area to be repaired to a minimum depth of 1/4 in. (6 mm). Do not cut existing steel reinforcement.
- D. Where reinforcing steel with active corrosion is encountered, comply with the following:
 - 1. Abrasive blast reinforcing steel to remove rust, scale 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 3/4 in (19 mm) minimum depth.
 - 3. Splice new reinforcing steel to existing steel 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 water. Maintain substrate in a saturated, surface dry condition.
- F. Coat exposed reinforcing steel with EMACO® P22 rebar protection prior to patching.

3.02 Use of Mesh

- A. When applying product in repairs greater than 10 lineal feet (3 m) in the longest direction or in overlays at depths of 1 in. to 1-1/2 in. (25 to 38 mm) or greater ¾ and for overhead applications of the same size ¾ a 4 in. x 4 in. low gauge mesh (10 - 12 gauge) must be firmly tied to the properly prepared substrate.
- B. Locate the mesh no closer than 3/8 in. (10 mm) and no more than 1 in. (25 mm) from the finished surface, using spacers and concrete anchors. A minimum cover of mortar over the mesh should be 3/8 in. (10 mm).
- C. Mesh is not necessary in applications where side restraint exists, such as in square cut patches or where existing reinforcement will provide adequate restraint.

3.03 Mixing

- A. Comply with mortar manufacturer's recommendations for water quantity and mixing procedures.

3.04 Application

- A. Maintain substrate in a saturated, surface-dry condition.
- B. For hand applications, a bond scrub coat is required.
- C. Apply repair mortar by low pressure wet spraying or hand troweling on vertical or overhead surfaces in depths ranging from 3/8 in. (10 mm) to 2 in. (51 mm).
 - 1. Vertical Applications: Repair mortar can be applied on vertical applications up to a 2 in. (51 mm) depth in one lift.
 - 2. Overhead Applications: Do not exceed 1.5 in. (38 mm) thickness per pass. For depths greater than 1.5 in. (38 mm), limit succeeding lifts to 1 in. (25 mm) thickness.

3.04 Application, continued

3. Multiple Passes: Place succeeding lifts after repair mortar has developed initial set. Scarify the surface of the first lift to ensure integral bond between successive layers.

3.05 Finishing

- A. Level surface of repair mortar using a float or screed.
- B. Apply final finish when mortar has begun to stiffen using a wooden, plastic, or synthetic sponge float or trowel.
- C. Spray apply undiluted "CONFILM®" evaporation reducer lightly to aid in finishing, especially in windy, hot conditions.

3.06 Curing

- A. Protect fresh mortar from premature evaporation. Cure finished repair mortar by one of the following methods:
 1. Preferred Method: Keep area continuously moist with water as soon as mortar surface has hardened (thumb print hard), for a minimum of seven days.
 2. Acceptable Method: Apply two coats of curing compound, Master Builders "MASTERKURE®", or MASTERKURE® 100W or 200W". Apply the first coat immediately after completing finishing operations. Apply the second coat about 24 hours later.

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