

# MasterEmaco® S 210SP

Silica-fume-enhanced structural wet- or dry-process shotcrete

FORMERLY SHOTPATCH® 21

## PACKAGING

55 lb (25 kg) polyethylene-lined bags  
3,300 lb (1,500 kg) bulk bags

## YIELD

0.46 ft<sup>3</sup> (0.013 m<sup>3</sup>) per 55 lb (25 kg)

## STORAGE

Store in unopened containers in cool, clean, dry conditions

## SHELF LIFE

55 LB BAG: 1 year when properly stored  
3,300 LB BULK BAG: 3 months when properly stored

## VOC CONTENT

0 g/L less water and exempt solvents

## DESCRIPTION

MasterEmaco S 210SP is a one-component repair mortar that contains an integral corrosion inhibitor. It can be applied by either the wet or dry shotcrete process.

## PRODUCT HIGHLIGHTS

- Versatile, can be applied using dry or wet shotcrete process
- Very low chloride permeability and an integral corrosion inhibitor protects reinforcing steel
- Workable and easy to cut and finish when applied using wet process
- Prepackaged quality for bag-to-bag uniformity
- NSF/ANSI Std 61 certified for drinking water systems

## APPLICATIONS

- Interior and exterior
- Horizontal, vertical, and overhead surfaces
- Structural repair and retrofit of
  - Bridges, tunnels, and parking garages
  - Piers, docks, and dams
  - Reservoirs and tanks
  - Water management facilities
  - Canals and aqueducts

## SUBSTRATES

- Concrete

## HOW TO APPLY

### SURFACE PREPARATION

1. Substrate must be structurally sound and fully cured (28 days).
2. Saw cut the perimeter of the area being repaired into a square with a minimum depth of 1/4" (6 mm).
3. The surface to be repaired must be clean, free of laitance and saturated surface-dry (SSD) following ICRI Guideline no. 310.2 to permit proper bond.

### REINFORCING STEEL

1. Remove all oxidation and scale from the exposed reinforcing steel in accordance with ICRI Technical Guideline No. 310.1R.
2. For additional protection from future corrosion, coat the prepared reinforcing steel with MasterProtect P 8100 AP.

### MIXING

#### WET PROCESS

1. Add 0.65–0.8 gallons (2.5–3.3 L) of potable water per 55 lb (25 kg) bag of S 210 SP.
2. Mechanically mix using an appropriately sized forced-action mortar mixer. Pour approximately 90% of the water into the mixing container, then charge the mixer with the material. Add the remaining mix water as required.
3. Mix for 3–5 minutes to reach a homogeneous consistency.

**Technical Data**

**Composition**

MasterEmaco S 210 SP is a one-component silica-fume-enhanced mortar containing an integral corrosion inhibitor.

**Compliances**

- Cement meets ASTM C 150 standards
- Sand gradation meets ASTM C 33 and ACI 506 standards
- NSF/ANSI Std 61 certified for drinking water systems

**Typical Properties**

| PROPERTY   | VALUE       |
|--|-------------|
| <b>Unit weight,</b><br>lb/ft <sup>3</sup> (kg/m <sup>3</sup> ) | 134 (2,147) |
| <b>Set times, hrs:min</b><br>(ASTM C 266)                      |             |
| Initial set  | 1:40        |
| Final set  | 4:25        |

**Test Data**

| PROPERTY   | RESULTS                    |                              |                     | TEST METHOD                       |
|--|----------------------------|------------------------------|---------------------|-----------------------------------|
|  | 1 Day<br>Psi (MPa)         | 7 Day<br>Psi (MPa)           | 28 Day<br>Psi (MPa) |                                   |
| <b>Compressive strength</b>                                  | 2,500<br>(17.2)            | 6,000<br>(41.4)              | 7,000<br>(48.3)     | ASTM C 109                        |
| <b>Splitting tensile strength</b>                            | 240<br>(1.6)               | 400<br>(2.7)                 | 490<br>(3.3)        | ASTM C 496                        |
| <b>Flexural strength</b>                                     | 700<br>(4.8)               | 1,200<br>(8.3)               | 1,800<br>(12.4)     | ASTM C 348                        |
| <b>Direct tensile bond strength</b>                          | 160<br>(1.1)               | 210<br>(1.2)                 | 230<br>(1.5)        | ACI 503R, Appendix A              |
| <b>Slant shear bond strength</b>                             | 1,200<br>(8.3)             | 2,500<br>(17.2)              | 3,000<br>(20.7)     | ASTM C 882, modified <sup>1</sup> |
| <b>Compressive strength</b>                                  |                            |                              |                     | ASTM C 42                         |
|  | <b>3 day<br/>psi (MPa)</b> | <b>28 day<br/>psi (MPa)</b>  |                     |                                   |
| Dry process  | 6,000 (41.4)               | 10,000 (69.0)                |                     |                                   |
| Wet process  | 5,000 (34.5)               | 9,000 (62.0)                 |                     |                                   |
| <b>Drying shrinkage, %</b> , at 28 days                      |                            | 0.10                         |                     | ASTM C 157, modified <sup>2</sup> |
| <b>Modulus of elasticity, psi (GPa)</b> ,<br>at 28 days      |                            | 4.9 × 10 <sup>6</sup> (33.8) |                     | ASTM C 469                        |
| <b>Rapid chloride permeability</b> ,<br>coulombs, at 28 days |                            | 740<br>(very low)            |                     | ASTM C 1202 /<br>AASHTO T-277     |
| <b>Freeze/thaw resistance, % RDM</b> ,<br>at 300 cycles      |                            | 97                           |                     | ASTM C 666,<br>Procedure A        |

<sup>1</sup>No epoxy bonding agent used.

<sup>2</sup>ICRI Guideline #03733, 1 by 1 by 10" (25 by 25 by 250 mm) prism, air cured.

Results were obtained when material was mixed with 0.72 gallons (2.7 L) of water per bag and cured at 73° F (22° C). Expect reasonable variations, depending upon application methods, test methods, and curing conditions.

#### APPLICATION

1. Apply in accordance with ACI 506R.
2. Apply while taking proper consideration for rebound and compaction around reinforcing steel. The successful application depends primarily on the skill of the nozzleman.
3. When applying multiple lifts, scratch the preliminary lift before initial set. Apply the succeeding lift after the preliminary lift has reached final set. If the succeeding lift will not be immediately placed, keep the surface continually moist.
4. Cut off or level the application as required, matching the original concrete elevation.
5. In rapid-drying conditions (e.g., hot, dry, and windy weather) use MasterKure ER 50 evaporation reducer.
6. Finish the final surface as required.

#### CURING

Wet cure for a minimum of seven days or cure with an approved curing compound compliant with ASTM C 309 or preferably ASTM C 1315.

#### CLEAN UP

Clean tools and equipment with clean water immediately after use. Cured material must be removed mechanically.

#### FOR BEST PERFORMANCE

- Precondition these materials to approximately 70° F (21° C) for 24 hours before using.
- Water content should not exceed 0.9 gallons per 55 lb bag during application.
- Minimum application thickness is  $\frac{3}{8}$ " (10 mm).
- Maximum application thickness is 6" (152 mm) per lift.
- Do not mix partial bags.
- Minimum ambient and surface temperatures should be 45° F (7° C) and rising at the time of application.
- For professional use only; not for sale to or use by the general public.
- Make certain the most current versions of product data sheet and SDS are being used; visit [www.master-builders-solutions.com/en-us](http://www.master-builders-solutions.com/en-us) to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by Master Builders Solutions personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

#### HEALTH, SAFETY AND ENVIRONMENTAL

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