

# EMACO® R310 CI

One-component, polymer-modified, shrinkage-compensated, flowable repair mortar with integral corrosion inhibitor



## DESCRIPTION:

EMACO® R310 CI repair mortar is a one-component, fast setting, polymer-modified, shrinkage-compensated, cement-based mortar with an integral corrosion inhibitor. It is ideally suited for patching and/or resurfacing distressed horizontal concrete surfaces. EMACO R310 CI repair mortar is designed for both interior and exterior use.

### Application Thickness

#### Horizontal

Without aggregate extension	1/4 to 1 in.	(6 to 25 mm)
With aggregate extension	1 to 3 in.	(25 to 75 mm)

## RECOMMENDED FOR:

- Horizontal and formed vertical repair of concrete
- Bridges and parking garages
- Walkways, sidewalks and steps
- Resurface rough floors and work areas
- Balconies

## FEATURES/BENEFITS:

- Corrosion resistant - contains an integral corrosion inhibitor
- One-component - easy mixing and handling
- Low permeability - resists moisture and chloride intrusion
- Low modulus of elasticity - improved compatibility for surface renovation
- Early strength gain - ready for pedestrian traffic in four hours, vehicular traffic in one day
- Abrasion resistant - excellent protection from vehicular traffic

## PACKAGING/ESTIMATING:

EMACO R310 CI repair mortar is packaged in 55 lb (25 kg) moisture resistant bags which yield approximately 0.45 ft<sup>3</sup> (0.013 m<sup>3</sup>). This will cover approximately 5.4 ft<sup>2</sup> (0.50 m<sup>2</sup>) at a 1 in. (25 mm) depth before waste.

An extension of 45% of SSD 3/8 in. pea gravel [25 lb (11 kg) per 55 lb (25 kg) bag] will yield approximately 0.63 ft<sup>3</sup> (0.018 m<sup>3</sup>).

## PERFORMANCE DATA:

Results were obtained when material was mixed with 0.8 gal (3.0 L) of water per bag and cured at 70 °F (21 °C). Reasonable variations can be expected depending upon application methods, test methods and curing conditions.

### PLASTIC PROPERTIES:

Unit Weight	135 lb/ft <sup>3</sup> (2,160 kg/m <sup>3</sup> )	
Working Time	30 minutes	
Set Times (h:min)	Initial Set	Final Set
(ASTM C 266)	1:30	2:00

### HARDENED PROPERTIES:

	1 Day psi (MPa)	7 Day psi (MPa)	28 Day psi (MPa)
Direct Tensile Bond Strength (ACI 503R, Appendix A)	150 (1.0)	175 (1.2)	200 (1.4)
Direct Shear Bond Strength (Michigan DOT)	150 (1.0)	250 (1.7)	300 (2.1)
Slant Shear Bond Strength (ASTM C 882, Modified <sup>1</sup> )	980 (6.8)	1750 (12.1)	2100 (15.2)
Drying Shrinkage at 28 Days (ASTM C 157, Modified <sup>2</sup> )	0.09%		
Modulus of Elasticity at 28 Days (ASTM C 469)	2.9 x 10 <sup>6</sup> psi (20.0 GPa)		
Rapid Chloride Permeability at 28 Days (ASTM C 1202/AASHTO T 277)	850 coulombs		
Freeze-Thaw Resistance at 300 Cycles (ASTM C 666, Procedure A)	92.0% RDM		
Salt Scaling Resistance, 50 Cycles (ASTM C 672)	None		
Abrasion Resistance (ASTM C 779A)	Duration	Depth of Wear	
	30 minutes	0.008 in. (0.21 mm)	
	60 minutes	0.033 in. (0.84 mm)	

	1 Day psi (MPa)	7 Day psi (MPa)	28 Day psi (MPa)
<b>Splitting Tensile Strength</b> (ASTM C 496)	375 (2.6)	450 (3.1)	600 (4.1)
<b>Flexural Strength</b> (ASTM C 348)	800 (5.5)	1000 (6.9)	1500 (10.3)

  

	4 Hours psi (MPa)	1 Day psi (MPa)	7 Day psi (MPa)	28 Day psi (MPa)
<b>Compressive Strength</b> (ASTM C 109)	350 (2.4)	2500 (17.2)	5500 (37.9)	7500 (51.7)

<sup>1</sup> No epoxy-bonding agent used, air cured per ASTM C 1042.

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

## **SURFACE PREPARATION:**

### **Concrete**

Perform surface preparation in compliance with ICRI Technical Guideline No. 03730, "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion". Remove all unsound or delaminated concrete providing a minimum 1/4 in. (6 mm) substrate profile and 3/4 in. (20 mm) clearance behind corroded reinforcing steel. The perimeter of the area to be patched should be sawcut to a minimum depth of 1/4 in. (6 mm) to prevent featheredges. After concrete removal and prior to placement, mechanically abrade the concrete surface to remove all bond-inhibiting materials from the concrete substrate and to provide additional mechanical bond. Unless a bonding agent is used, presoak the prepared concrete surface to provide a saturated, surface dry (SSD) condition.

### **Corroded Reinforcing Steel**

Remove all oxidation and scale from the exposed reinforcing steel in accordance with ICRI Technical Guideline No. 03730 "Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion". For additional protection from future corrosion, coat the prepared reinforcing steel with EMACO P22 or EMACO P24 rebar coatings.

## **MIXING:**

Add 0.75 to 0.90 gallons (2.8 to 3.4 liters) of potable water per 55 lb (25 kg) bag of EMACO R310 CI repair mortar. Mechanically mix using a mortar mixer of an appropriate size. Pour approximately 90% of the mix water into the mixing container then slowly charge the mixer with the bagged material. For applications greater than 1 in. (25 mm) in thickness, add up to 25 lb (11 kg) of SSD 3/8 in. (10 mm) pea gravel per 55 lb (25 kg) bag of EMACO R310 CI mortar. Add the remaining mix water as required to obtain desired consistency. Mix for a total of 3 to 5 minutes until a homogeneous consistency is achieved.

## **APPLICATION:**

Scrub a bond coat of EMACO R310 CI repair mortar into the prepared saturated surface with a stiff bristle broom or brush. A long open-time bonding agent such as CONCRESE<sup>®</sup> LIQUID LPL bonding adhesive may be used in lieu of a bond coat. EMACO R310 CI mortar must be placed before the bond coat or bonding agent dries. Level as needed to match to the original concrete elevation. Where rapid drying conditions exist (such as hot, dry or windy conditions) use CONFILM<sup>®</sup> evaporation reducer. Finish the final surface as required.

## **Formed Applications**

Immediately prior to placement, drain presoaking water from the form leaving a saturated substrate with no excess water remaining. Scrub a bond coat of EMACO R310 CI repair mortar into the prepared saturated surface with stiff bristle broom or brush. Air relief vents should be placed at the highest point in the repair area to prevent voids from entrapped air. Apply with sufficient pressure to ensure intimate contact with the substrate surface. A long open time bonding agent such as CONCRESE<sup>®</sup> LIQUID LPL bonding adhesive may be used in lieu of a saturated substrate. In this case, place the EMACO R310 CI repair mortar before the bonding agent becomes tack-free. Remove forms when sufficient strength has developed. For further information, consult ACI 347R "Guide to Formwork for Concrete".

## **CURING:**

Proper curing is extremely important and should be conducted in accordance with ACI 308 "Standard Practice for Curing Concrete". Apply a water-based curing compound that complies with the moisture retention requirements of ASTM C 309 such as MASTERKURE<sup>®</sup> 100W or 200W curing compounds; or moist cure for a minimum of 2 days.

## **LIMITATIONS:**

Minimum application thickness is 1/4 in. (6 mm). For applications greater than 1 in. (25 mm) in thickness, the product must be extended with aggregate. Do not mix partial bags. Minimum ambient and surface temperatures should be 45 °F ( 7 °C) and rising at the time of application. Do not use solvent-based curing compounds. Do not mix longer than 5 minutes.

## **STORAGE AND SHELF LIFE:**

Unopened bags have a shelf life of 18 months when stored under cover in dry conditions between 45 and 90 °F (7 and 32 °C).

## **RELATED BULLETINS:**

Material Safety Data Sheet — EMACO R310 CI  
Installation Bulletin (7I56) #112674 — EMACO R310 CI  
Specification Bulletin (7S56) #112644 — EMACO R310 CI

For additional information, contact your local Master Builders representative.

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