



**Surface
Renovation
Mortars**

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.

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

Where to Use EMACO® R310 CI

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

Important: Read This First

ChemRex® does not warrant the performance of this product unless the instructions of this document and other related ChemRex® documents are adhered to in all respects.

How to Apply EMACO® R310 CI

Surface Preparation

Perform surface preparation in compliance with ICRI Technical Guideline No. 03730 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays."

- 1 Square cut or undercut the perimeter of the area to be patched to a minimum depth of 1/4 inch (6 mm) to prevent feathered edges. Do not cut reinforcement.
- 2 Chip unsound or delaminated concrete within the area to be repaired to a depth of 1/4 inch (6 mm) or to whatever additional depth is necessary to reach sound concrete.
- 3 Remove areas that have been saturated with oil or grease.
- 4 Remove 3/4 inches (19 mm) of concrete behind the corroded reinforcing steel to provide adequate space for preparation and material placement.

5 After concrete removal, thoroughly abrade the roughened surface and exposed reinforcement to remove all bond-inhibiting materials such as rust, dirt, loose chips, and dust.

6 **Corroded Reinforcing Steel** should be sandblasted or shotblasted after chipping to remove oxidation and scale in compliance with ICRI Technical Guideline No. 03730 "Guide for Surface Preparation for 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 and/or install EMACO® Corr-Stops® CI galvanic anodes.

7 Form as required on vertical surfaces.

8 Saturate the repair area thoroughly with water for several hours prior to placing EMACO® R310 CI.

9 Immediately prior to mixing, blow off or remove all excess water from repair area. Surface should be saturated, surface dry (SSD) condition during placement.

Mixing

Add 0.75 to 0.90 gallons (2.8 to 3.4 L) of potable water per 55 lb. (25 kg) bag of EMACO® R310 CI repair mortar. Mechanical mixing is recommended with use of a slow-speed drill (400 to 600 rpm) and a Jiffy-type paddle, or in an appropriate size mortar mixer. 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. **Do not** mix longer than 5 minutes.

Application

Apply a bond coat of the mortar to a properly prepared saturated surface dry (SSD) substrate by scrubbing a thin layer of EMACO® R310 CI into the surface with a stiff bristle broom or brush. Do not apply more of the bond coat than can be covered with EMACO® R310 CI before the bond coat starts to set. Do not retemper the bond coat. A long open-time bonding agent such as CONCRETSIVE® LIQUID LPL bonding adhesive may be used in lieu of a bond coat.

Minimum application thickness is 1/4 in. (6 mm), maximum application thickness is 1 in. (25 mm). For applications greater than 1 in. (25 mm) thickness, an extension of 25 lb. (45%) rounded pea gravel 3/8 in. per 55 lb. bag (10 mm per 25 kg) of EMACO® R310 CI is required. EMACO® R310 CI should be finished by hand only. Level as needed to match to the original concrete elevation. Where rapid surface evaporation may occur (e.g., hot, dry, or windy conditions), use CONFILM® evaporation reducer. Finish the final surface as required.

Formed Applications

- 1 Apply form release agent.
- 2 Erect forms for EMACO® R310 CI.
- 3 Apply caulk or tape to make form edges watertight.
- 4 Check formed sections for watertightness before installing EMACO® R310 CI.
- 5 Remove forms on the following day.

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 CONCREX® 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, or moist cure for a minimum of 3 days. Do not use solvent-based curing compounds.

For Best Performance

- 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 in sulfate-exposed environments.
- Do not use solvent-based curing compounds.
- Do not mix longer than 5 minutes.
- Do not use in applications of prolonged water immersion.
- Make certain the most current version of this data guide is being used; call Customer Service (1-800-433-9517) to verify the most current version.
- Proper application is the responsibility of the user. Field visits by ChemRex® personnel are for the purpose of making technical recommendations only and are not for supervising or providing quality control on the jobsite.

Technical Data

Results were obtained when material was mixed with 0.8 gallon (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 ³ (2,160 kg/m ³)
Working time	30 minutes
Set times (h:min)	Initial set 1:30
(ASTM C 266)	Final set 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 ¹)	980 (6.8)	1,750 (12.1)	2,100 (15.2)
Drying shrinkage at 28 days (ASTM C 157, Modified ²)			0.09%
Modulus of elasticity at 28 days (ASTM C 469)	2.9 x 10 ⁶ 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)	
Splitting tensile strength (ASTM C 496)	375 (2.6)	450 (3.1)	600 (4.1)
Flexural strength (ASTM C 348)	800 (5.5)	1,000 (6.9)	1,500 (10.3)

	6 Hours psi (MPa)	1 Day psi (MPa)	7 Day psi (MPa)	28 Day psi (MPa)
Compressive Strength (ASTM C 109)	350 (2.4)	2,500 (17.2)	5,500 (37.9)	7,500 (51.7)

¹No epoxy-bonding agent used, air cured per ASTM C 1042.

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

Order Information

Packaging

EMACO® R310 CI

- 55 lb. (25 kg) moisture-resistant bags

Application Thickness

Horizontal

- Without aggregate extension 1/4 to 1 in. (6 to 25 mm)
- With aggregate extension greater than 1" (25 mm)

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). The expiration date is printed on each bag.

Coverage

- Yield is approximately 0.45 ft.³ (0.013 m³) of mortar. This will cover approximately 5.4 ft.² (0.50 m²) 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.³ (0.018 m³).

Caution

EMACO® R310 CI

Risks

Eye irritant. Skin irritant. Causes burns. Lung irritant. May cause delayed lung injury.

Precautions

KEEP OUT OF THE REACH OF CHILDREN. Avoid contact with eyes. Wear suitable protective eyewear. Avoid prolonged or repeated contact with skin. Wear suitable gloves. Wear suitable protective clothing. Do not breathe dust. In case of insufficient ventilation, wear suitable respiratory equipment. Wash soiled clothing before reuse.

First Aid

Wash exposed skin with soap and water. Flush eyes with large quantities of water. If breathing is difficult, move person to fresh air.

Waste Disposal Method

This product when discarded or disposed of is not listed as a hazardous waste in federal regulations. Dispose of in a landfill in accordance with local regulations.

For additional information on personal protective equipment, first aid, and emergency procedures, refer to the product Material Safety Data Sheet (MSDS) on the job site or contact the company at the address or phone numbers given below.

Proposition 65

This product contains materials listed by the state of California as known to cause cancer, birth defects, or reproductive harm.

VOC Content

This product contains 0 g/L or 0 lbs./gallon.

For medical emergencies only, call ChemTrec (1/800/424-9300).

Limited Warranty Notice

Every reasonable effort is made to apply ChemRex® exacting standards both in the manufacture of our products and in the information which we issue concerning these products and their use. We warrant our products to be of good quality and will replace or, at our election, refund the purchase price of any products proved defective. Satisfactory results depend not only upon quality products, but also upon many factors beyond our control. Therefore, except for such replacement or refund, CHEMREX® MAKES NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING WARRANTIES OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY, RESPECTING ITS PRODUCTS, and CHEMREX® shall have no other liability with respect thereto. Any claim regarding product defect must be received in writing within one (1) year from the date of shipment. No claim will be considered without such written notice or after the specified time interval. User shall determine the suitability of the products for the intended use and assume all risks and liability in connection therewith. Any authorized change in the printed recommendations concerning the use of our products must bear the signature of the ChemRex® Technical Manager.



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