BASF
The Chemical Company

PRODUCT DATA

3 03 01 00 **Maintenance of Concrete**

EMACO® R310 CI

One-component flowable repair mortar with integral corrosion inhibitor

Description

Emaco® R310 CI repair mortar is a polymer-modified cement-based mortar with an integral corrosion inhibitor. It is used for patching or resurfacing distressed horizontal concrete surfaces. Emaco® R310 CI repair mortar is designed for both interior and exterior use.

Yield

Approximately 0.45 ft^3 (0.013 m^3) of mortar, which will cover approximately 5.4 ft^2 (0.50 m^2) at a 1" (25 mm) depth without waste.

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

Packaging

55 lb (25 kg) multi-wall bags

Shelf Life

9 months when properly stored

Storage

Store in unopened containers in clean, dry conditions between 45 and 90° F (7 and 32° C).

Features	Benefits
• Low permeability	Resists moisture and chloride intrusion
• One component	Easy mixing and handling; components not damaged by freezing
• Low modulus of elasticity	Improved compatibility for surface renovation
• Contains an integral corrosion inhibitor	Prevents corrosion from a wide range of sources and environments
• Abrasion resistant	Excellent protection from vehicular traffic
• Early strength gain	Ready for pedestrian traffic in 4 hours, vehicular traffic in 1 day
• Shrinkage compensated	Reduces stress at the bondline
• Polymer modified	Improved bond to surrounding concrete

Where to Use

APPLICATION

- Horizontal concrete surfaces
- Resurfacing rough floors and work areas
- Parking garages
- Walkways, sidewalks, and steps
- Balconies

How to Apply

Surface Preparation

CONCRETE

1. Perform surface preparation in compliance with ICRI Technical Guideline No. 03732 "Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays."

2. Square cut or undercut the perimeter of the area being patched to a minimum depth of 1/4" (6 mm) to prevent featheredges. Do not cut reinforcement.

3. Chip unsound or delaminated concrete within the patch area to a depth of 1/4" (6 mm) or to whatever additional depth is necessary to reach sound concrete.

4. Remove concrete that has been saturated with oil or grease.

5. After concrete removal, thoroughly abrade the roughened surface and exposed reinforcement to remove all bond-inhibiting materials, such as rust, dirt, loose chips, dust, oil, and grease. Do not use a method of surface preparation that will fracture the concrete. Verify the absence of microcracking or bruising as suggested in with ICRI Guideline No. 03732.

6. If using the scrub coat method for bonding, saturate the repair area thoroughly with water for several hours before placing Emaco® R310 CI. If using the epoxy bonding agent method, the surface should be dry. Follow the bonding agent manufacturer's recommendations for mixing and placing.

7. If using the scrub coat method, immediately before mixing, blow off or remove all excess water from repair area. Substrate should be saturated surface-dry (SSD) during placement.

Protection and Repair

Technical Data

Composition

Emaco® R310 CI is a blend of cement, graded aggregates, dry polymer, and set-control additives with an integral corrosion inhibitor.

Typical Properties

PROPERTY	VALUE
Unit weight, lb/ft³ (kg/m³)	135 (2,160)
Working time, min	30
Set times, hr:min (ASTM C 266)	
Initial set	1:30
Final set	2:00

Test Data

PROPERTY	RESULTS			
	6 Hours psi (MPa)	**1 Day psi (MPa)**	**7 Days psi (MPa)**	**28 Days psi (MPa)**
Compressive Strength (ASTM C 109)	350 (2.4)	2,500 (17.2)	5,500 (37.9)	7,500 (51.7)
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)
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)
Drying shrinkage, %, at 28 days (ASTM C 157, Modified[2])				0.09
Modulus of elasticity, at 28 days (ASTM C 469), psi (GPa)				2.9 x 10^6 (20.0)
Rapid chloride permeability, coulombs, at 28 days (ASTM C 1202 / AASHTO T 277)				850

PROPERTY	RESULTS	TEST METHODS
Freeze/thaw resistance, % RDM, at 300 cycles	92.0	ASTM C 666, Procedure A
Salt scaling resistance, 50 cycles	None	ASTM C 672
Abrasion resistance, depth of wear, in (mm)		ASTM C 779A
30 min	0.008 (0.21)	
60 min	0.033 (0.84)	

[1]No epoxy-bonding agent used; air cured according to ASTM C 1042.

[2]ICRI Guideline No. 03733, 1 by 1 by 10" (25 by 25 by 250 mm) prism, air cured

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

STEEL

1. Remove 3/4" (19 mm) of concrete behind corroded reinforcing steel to provide adequate space for preparation and material placement.

2. Sandblast or shotblast corroded reinforcing steel 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® P24 rebar coating.

Mixing

1. Add 0.75 – 0.90 gallons (2.8 – 3.4 L) of potable water per 55 lb (25 kg) bag of Emaco® R310 CI repair mortar.

2. Use a slow-speed drill (400 – 600 rpm) with a Jiffy-type paddle or an appropriately sized mortar mixer. Pour approximately 90% of the mix water into the mixing container, then slowly charge the mixer with the bagged material.

3. For applications greater than 1" (25 mm) in thickness, add up to 25 lbs (11 kg) of SSD 3/8" (10 mm) pea gravel per 55 lb (25 kg) bag of Emaco® R310 CI. Add the remaining mix water as required to obtain desired consistency. Mix for a total of 3 – 5 minutes to achieve a homogeneous consistency. Do not mix longer than 5 minutes.

Application

HORIZONTAL APPLICATIONS

1. A long open-time bonding agent such as Concresive® Liquid LPL or Emaco® P24 bonding adhesive may be used in place of a bond coat.

2. If using the scrub coat method in lieu of an epoxy bonding agent: scrub a thin layer of Emaco® R310 CI into the properly prepared saturated surface-dry (SSD) substrate 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 dilute the bond coat with water. Do not retemper the bond coat.

3. Minimum application thickness is 1/4" (6 mm); maximum application thickness is 1" (25 mm). For applications greater than 1" (25 mm) in thickness, extend with 25 lbs (45%) of rounded 3/8" pea gravel per 55 lb bag (10 mm per 25 kg) of Emaco® R310 CI.

4. Finish Emaco® R310 CI by hand only. Level as needed to match the original concrete elevation.

5. Where rapid surface evaporation may occur (e.g., hot, dry, or windy conditions), use Confilm® evaporation reducer. Refer to the Confilm® product data sheet for more information. Finish the final surface as required.

Curing

1. Proper curing will aid in developing the optimum properties of this product. Follow the recommendations of ACI 308. "Guide to Curing".

2. Apply a water-based curing compound that complies with the moisture-retention requirements of ASTM C 309 or ASTM C 1315 or moist cure for 24 hours, do not exceed 48 hours. Do not use solvent-based curing compounds.

For Best Performance

- Precondition these materials to approximately 70° F (21° C) for 24 hours before using.
- Protect repairs from direct sunlight, wind, and other conditions that could cause rapid drying of material.
- Do not use in applications where product will be in a continuous wet or immersed condition.
- Minimum application thickness is 1/4" (6 mm). For applications greater than 1" (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.
- Make certain the most current versions of product data sheet and MSDS are being used; call Customer Service (1-800-433-9517) to verify the most current versions.
- Proper application is the responsibility of the user. Field visits by BASF personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

Health and Safety

EMACO® R310 CI

WARNING!

Contains crystalline quartz, Portland cement, anhydrite, limestone, gypsum.

Risks

Product is alkaline on contact with water and may cause injury to skin or eyes. Ingestion or inhalation of dust may cause irritation. Contains small amount of free respirable quartz which has been listed as a suspected human carcinogen by NTP and IARC. Repeated or prolonged overexposure to free respirable quartz may cause silicosis or other serious and delayed lung injury.

Precautions

Avoid contact with skin, eyes and clothing. Prevent inhalation of dust. Wash thoroughly after handling. Keep container closed when not in use. DO NOT take internally. Use only with adequate ventilation. Use impervious gloves, eye protection and if the TLV is exceeded or used in a poorly ventilated area, use NIOSH/MSHA approved respiratory protection in accordance with applicable Federal, state and local regulations.

First Aid

In case of eye contact, flush thoroughly with water for at least 15 minutes. In case of skin contact, wash affected areas with soap and water. If irritation persists, SEEK MEDICAL ATTENTION. Remove and wash contaminated clothing. If inhalation causes physical discomfort, remove to fresh air. If discomfort persists or any breathing difficulty occurs or if swallowed, SEEK IMMEDIATE MEDICAL ATTENTION.

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 material listed by the State of California as known to cause cancer, birth defects or other reproductive harm.

VOC Content

0 g/L or 0 lbs/gal less water and exempt solvents.

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

BASF Construction Chemicals, LLC – Building Systems

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