



**Applications:** Vapor Intrusion Coating for Existing Structures  
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## **SECTION 09 96 56 EPOXY FLOOR COATINGS**

# **Geo-Seal EFC Guide Specification Contaminate Vapor Intrusion Epoxy Floor Coating**

Geo-Seal EFC is a highly chemically resistant, impervious epoxy coating specially formulated to protect existing structures from contaminant vapor intrusion without the need for additional concrete protection. This guide specification has been prepared according to the principles established in the Manual of Practice published by the Construction Specification Institute.

For additional questions, your local EPRO technical representative can be contacted through: EPRO Services, Inc., Wichita KS; 1.800.882.1896; [www.eproinc.com](http://www.eproinc.com).

# GEO-SEAL EFC CONTAMINATE VAPOR INTRUSION EPOXY FLOOR COATING SPECIFICATION

## SECTION 09 96 56 – EPOXY FLOOR COATING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including general and supplementary conditions, and Division 1 specification section, apply to this section.

#### 1.2 SECTION INCLUDES

- A. The Work of this Section includes, but is not limited to, Geo-Seal EFC Contaminate Vapor Intrusion Epoxy Floor Coating.
- B. Related Sections:
  - 1. Section 02 24 00: Environmental Assessment
  - 2. Section 02 32 00: Geotechnical Investigation
  - 3. Section 03 30 00: Cast-in-Place Concrete
  - 4. Section 03 40 00: Precast Concrete
  - 5. Section 07 92 00: Joint Sealants
  - 6. Section 09 00 00: Finishes

#### 1.3 REFERENCE STANDARDS

- A. The following standards and publications are applicable to the extent referenced in the text.
- B. American Standard Testing Methods (ASTM):
  - D 695 Standard Test Method for Compressive Properties of Rigid Plastics
  - D 790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
  - D 638 Standard Test Method for Tensile Properties of Plastics
  - D 1044 Standard Test Method for Resistance of Transparent Plastics to Surface Abrasion by the Taber Abraser
  - D 2240 Standard Test Method for Rubber Property—Durometer Hardness
  - D 2794 Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact)
  - C 666 Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing

- D 4060 Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser
- D 522 Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings
- F 1869 Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
- F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

C. American Concrete Institute (ACI):

- 503 Guide for the Selection of Polymer Adhesives in Concrete

1.4 PERFORMANCE REQUIREMENTS

- A. General: Provide a complete contaminate vapor intrusion epoxy floor coating system for concrete surfaces that meet the requirements for specific use indicated in the contract documents. Include all applicable substrate testing, surface preparation, and detail work.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's printed technical data, tested physical and performance properties, instructions for evaluating, preparing, and treating substrates, and installation instructions.
- B. Shop Drawings: Project specific drawings showing locations and extent of coating, details for substrate joints and cracks, drains, penetrations, transitions, and termination conditions.
- C. Samples: Submit two standard size samples of the following:
  - 1. Individual components of the specified coating system.
- D. Applicator Certification: Submit written confirmation at the time of bid that applicator is currently approved by the coating manufacturer.
- E. Manufacturer's Warranty Requirements: Submit complete documentation of manufacturer's warranty requirements and sample warranty.

1.6 QUALITY ASSURANCE

- A. Applicator Qualifications: Epoxy coating applicator shall be an EPRO Authorized Applicator who is trained and approved for **Geo-Seal EFC** application in accordance with EPRO standards and policies.
- B. Pre-Construction Meeting: A meeting shall be held prior to application of the epoxy floor coating system to assure proper substrate preparation, confirm installation conditions and any additional project specific requirements. Attendees of the meeting shall include, but are not limited to the following:
  - 1. EPRO representative
  - 2. EPRO certified applicator
  - 3. General contractor
  - 4. Owner's representative

5. Project design team
  6. All appropriate related trades
- C. Field Sample: Apply epoxy coating system field sample to 100 ft<sup>2</sup> (9.3 m<sup>2</sup>) of each assembly to demonstrate proper application techniques, standard of workmanship, and to confirm the aesthetic of the coating is acceptable.
1. Notify epoxy coating system manufacturer representative, architect, and other appropriate parties one week in advance of the dates and times when field sample will be prepared.
  2. If architect and manufacturer representative determine that field sample does not meet requirements; reapply epoxy coating system until field sample is approved.
  3. Retain and maintain approved field sample during construction in an undisturbed condition as a standard for judging the completed epoxy coating system. An undamaged field sample may become part of the completed work.
- D. Materials: Epoxy coating system and auxiliary materials shall be single sourced from the epoxy coating manufacturer.

#### 1.7 MATERIAL DELIVERY, STORAGE AND DISPOSAL

- A. Delivery: Deliver materials to site labeled with manufacturer's name, product brand name, material type, and batch number. Upon the arrival of materials to the jobsite, inspect materials to confirm material has not been damaged during transit.
- B. Storage: Proper storage of onsite materials is the responsibility of the certified applicator. Consult product data sheets to confirm storage requirements. Storage area shall be clean, dry, and protected from the elements. Protect stored materials from direct sunlight.
- C. Disposal: Remove and replace any material that cannot be properly applied in accordance with local regulations and specification section 01 74 19.

#### 1.8 PROJECT CONDITIONS

- A. Substrate Review: Substrates shall be reviewed by the certified applicator and accepted by the certified inspector prior to application.

#### 1.9 WARRANTY

- A. General Warranty: The special warranty specified in this section shall not deprive the owner of other rights the owner may have under other provisions of the contract documents, and shall be in addition to, and run concurrent with, other warranties made by the contractor under requirements of the contract documents.
- B. Special Warranty: Submit a written warranty signed by waterproofing manufacturer agreeing to replace system materials that do not conform with manufacturer's published specifications or are deemed to be defective. Warranty does not include failure of the epoxy coating due to failure of concrete substrate prepared or formation of new joints and cracks.
  1. Warranty Period: 1 year after date of application.
  2. Coverage: Manufacturer will guarantee that the material provided is free of defect for the warranty period.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Manufacturer: EPRO Services, Inc. (EPRO), P.O. Box 347; Derby, KS 67037; Tel: (800) 882-1896; Email: [info@eproinc.com](mailto:info@eproinc.com); Web: [www.euproinc.com](http://www.euproinc.com)

### 2.2 MATERIALS

- A. Contaminate vapor intrusion epoxy coating: **Geo-Seal EFC** is a highly chemically resistant, impervious epoxy coating specially formulated to protect existing structures from contaminant vapor intrusion without the need for additional concrete protection. Provide system with the following physical properties:

PROPERTIES	VALUE	TEST METHOD
Compressive Strength	14,500 PSI (16,500 PSI with aggregate)	ASTM D 695
Flexular Strength	19,200	ASTM D 790
Tensile Elongation	1.0%	ASTM D638
Abrasion Resistance	20-25 mg.	ASTM D 1044
Bond Strength	>350 psi 100% concrete failure	ACI 503
Hardness (Shore D)	89-93	ASTM D 2240
Impact Resistance	160 in. / lbs.	ASTM D 2794
Freeze Thaw Resistance	300 cycles (pass)	ASTM C 666

#### Primer

1. **Geo-Seal EFC Primer** is a plural component, low VOC, water based, low viscosity, concrete penetrating epoxy primer with the following physical properties:

PROPERTIES	VALUE	TEST METHOD
Hardness (Shore D)	78-80	ASTM D 2240
Bond Strength	>350	ACI 503
Impact Resistance	160 in./lbs.	ASTM D 2794
Abrasion Resistance	45-50 mg.	ASTM D 1044
Compressive Strength	7800 PSI	ASTM D 695
Flexular Strength	10,360 PSI	ASTM D 790
Tensile Elongation	6.5%	ASTM D 638
Tensile Strength	6790	ASTM D 638
Freeze Thaw Resistance	300 Cycles (Pass)	ASTM C 666

#### Optional Top Coat

1. **Geo-Seal EFC Clear Coat** is a plural component, low VOC polyaspartic topcoat designed to increase the longevity of the system and has the following physical properties:

PROPERTIES	TEST METHOD	VALUE
Hardness (Shore D)	65-70	ASTM D 2240
Abrasion Resistance	90-95 mg	ASTM D 4060
Flexibility	1/8" (Pass)	ASTM D 522
Freeze Thaw Resistance	300 Cycles (Pass)	ASTM C 666

## 2.3 AUXILIARY MATERIALS

- A. General: All auxiliary materials shall be provided by the specified coating manufacturer. Auxiliary materials used in lieu of, or in addition to, the manufacturer's materials must be approved in writing by EPRO prior to installation.
1. Detailing Material: **PM Sealant** an STPE moisture cure detailing sealant.
  2. Substrate Patching Material: **Geo-Seal EFC Gel** is a plural component, thixotropic, 100% solids, semi-rigid epoxy.
  3. Backer Rod: Closed cell polyethylene foam

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Comply with project documents, manufacturer's product information, including product application and installation guidelines, pre-job punch list, as well as, manufacturer's shipping and storage recommendations.
- B. Examine all substrates, areas, and conditions under which the epoxy coating system will be installed, applicator and inspector must be present. Do not proceed with installation until unsatisfactory conditions have been corrected and surface preparation requirements have been met. If conditions exist that are not addressed in this section notify inspector and contact EPRO for additional clarification.
1. That the concrete deck surface is free of ridges and sharp projections, sound and dry.
  2. That the concrete was cured for a minimum of 28 days. (Minimum of 3,500 psi compressive strength). The use of concrete curing agents, if any, shall be of the sodium silicate base only; others require written approval by EPRO.
  3. That damaged areas of the concrete substrate be restored to match adjacent areas. Use Geo-Seal EFC Gel for filling and leveling mixed with recommended amount of aggregate/filler.
  4. Due to hydrostatic, capillary and moisture vapor pressure, the moisture vapor emission of concrete shall not exceed 3 lbs/1,000 sq. ft./24 hrs, when tested by the quantitative calcium chloride test method (ASTM F1869). Relative Humidity is not to exceed 75% when tested by In-situ Probe Test (ASTM F2170). If site conditions exceed these parameters, moisture mitigation primers are available.

### 3.2 SUBSTRATE PREPARATION

- A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, relatively smooth, dust free, and dry substrate for epoxy coating application. The pH of the concrete substrate should be at 9 or above.
- B. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, acid residues, and other penetrating contaminants or film-forming coatings from substrate. Contaminated surfaces must be vigorously scrubbed with a power broom and a strong non-sud detergent. Areas where oil or other contaminants penetrate deep into the concrete may require removal by mechanical methods.

- C. Mechanically prepare surface by shot-blasting or diamond grinding to industry standard surface texture (ICRI's CSP3-4) without causing additional surface defects to substrate. Shot-blasting and diamond grinding does not remove deep penetrating oils, grease, tar or asphalt stains. Follow proper cleaning procedures to ensure proper bonding of the epoxy coating. Note: Contact EPRO Technical Service for alternative surface preparation methods.
- D. Fill all non-moving cracks with Geo-Seal EFC Gel after shotblasting. Fill control and cold joints flush with Geo-Seal EFC Patch at 3/4" depth. Install backer rod if necessary to limit depth to 3/4".
- E. Seal expansion and isolation joints  $\leq$  1" in width PM Sealant. Sealant shall be applied to inside of joint only, not applied to floor surface.

### 3.3 APPLICATION

- A. General: The contaminate vapor intrusion epoxy floor coating shall be applied to the vertical wall or slab under strict accordance with the manufacture's guideline and project specifications. Complete all substrate preparation before applying the coating over the field of the substrate.
- B. Primer Application
  - 1. Mix at lowest RPM to prevent air entrapment in prepared mix and apply Geo-Seal EFC Primer at a minimum rate of 200 square feet per gallon (8 mils WFT) to prepared substrate with a notched squeegee. Back roll with a short napped phenolic roller to assure even coverage.
- C. Base Coat Application
  - 1. Mix at lowest possible RPM to prevent air entrapment in prepared mix and apply 20 mil coat of Geo-Seal EFC at a minimum rate of 80 square feet per gallon (20 mils WFT) to properly primed and prepared substrate with a notched squeegee. Back roll with a short napped phenolic roller to assure even coverage.
- D. Aggregate Application
  - 1. Broadcast blended silica quartz into wet epoxy base coat until refusal at a rate of approximately 50 pounds per 100 square feet. Maintain a one to two foot wet edge without any aggregate to allow for a smooth transition to the next pass of neat epoxy. Allow to cure 8 to 12 hours at 70°F/21°C. Remove excess aggregate and lightly sand with a circular floor sander and #50 grit sandpaper to remove any rough spots.
- E. Top Coat Application
  - 1. Mix at lowest RPM to prevent air entrapment in prepared mix and apply Geo-Seal Clear Coat a minimum rate of 160 square feet per gallon (10 mils WFT) over Geo-Seal EFC base coat with a notched squeegee. Back roll with a short napped phenolic roller to assure even coverage.

### 3.4 QUALITY CONTROL

- A. **Geo-Seal EFC** is 100% solids. When applied 1 gallon will yield 80 square feet. Confirm the amount of material used corresponds the square footage of application.
- B. Use a wet film gauge to spot check the thickness of **Geo-Seal EFC** to make certain the proper mil thickness has been applied. Since the material is 100% solid, the material will not shrink after curing. Due to the thickness of the coating and the uneven substrate professional judgement will need to be utilized because of high or low points in the underlying substrate.

### 3.5 PROTECTION AND CLEANING

- A. Strictly comply with installation guidelines in manufacturer's published literature, including but not limited to, the following:
1. After completion of application, allow system to cure for 24 hours at 75°F/23°C before allowing foot traffic, 48 hours before allowing heavy loading.
  2. Properly dispose of all debris and unused materials.
  3. Clean tools and surfaces before the materials cure.
- B. Proper and routine floor care will extend the life of **Geo-Seal EFC**. Use a damp mop to clean dust and debris from coating, conventional commercial cleaners are acceptable. Never use any abrasive cleaners to clean the coating system.

End of Section