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# SECTION 09XXXX

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## WATER VAPOR EMISSION CONTROL SYSTEM FOR CONCRETE SLABS

### PART 1 GENERAL

#### 1.1 SECTION INCLUDES

- A. Testing and application of systems for the reduction of moisture vapor transmission and alkalinity control for interior concrete slabs scheduled for floor finish of VCT, vinyl flooring, rubber flooring, wood, carpet, and/or epoxy flooring systems.

#### 1.2 RELATED SECTIONS

- A. Section 03 06 30 - Cast-In Place Concrete: Installation and curing requirements according to ACI 302.
- B. Section 09 62 00 - Specialty Flooring: Installation requirement.
- C. Section 09 64 00 - Wood Flooring: Installation requirement.
- D. Section 09 65 00 - Resilient Flooring: Rubber sheet and vinyl tile installation requirements.
- E. Section 09 65 36 - Static Control Flooring: Installation requirements.
- F. Section 09 67 00 - Fluid Applied Flooring: Installation requirements.
- G. Section 09 68 00 - Carpet: Installation requirements.

#### 1.3 REFERENCES

- A. American Society of Testing and Materials (ASTM):
  - 1. C 109 - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in. or [50-mm] Cube Specimens).
  - 2. C 348 - Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars.
  - 3. D 1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes.
  - 4. E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
  - 5. F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Floor Using Anhydrous Calcium Chloride.
  - 6. F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
- B. International Concrete Repair Institute (ICRI) Guideline No. 03732 - Selecting and Specifying Concrete; Surface Preparation for Sealers, Coatings and Polymer Overlays.

## 1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Manufacturer's specification.
  - 2. Installation instructions.
  - 3. Independent test data.
  - 4. Certification requirements.
  - 5. Warranty information.
- C. Pre-Construction Testing: Submit water vapor transmission or slab relative humidity test results. Testing shall be performed according to ASTM F 1869 or ASTM F 2170 by the Owner to determine the level of water vapor transmission or relative humidity in the slab and the application rate of the moisture vapor reduction system required.. Test shall be performed by the Owner and submitted to the Architect, Contractor, and manufacture's site representative.

## 1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications:
  - 1. Manufacturer shall have no less than five years experience in manufacturing moisture vapor reduction systems. The water vapor reduction system shall be specifically formulated and marketed for water vapor reduction and alkalinity control. System design shall provide protection from vapor emission rates less than or equal to 20 pounds per 1000 square feet per 24 hours and/or 98% relative humidity.
- B. Installer Qualifications:
  - 1. Applicator shall have no less than five years experience in surface preparation and application moisture vapor reduction systems and shall be subject to inspection and control by the manufacturer.
- C. Product Performance History:
  - 1. Manufacturer shall provide independent lab test reports documenting performance per the following:
    - a. ASTM E 96, Water Vapor Transmission (wet methods) Performance shall be documented by an independent testing laboratory indicating a minimum of 0.50 PERMs.
    - b. ASTM D 1308; Insensitivity to alkaline environment up to pH 14.
- D. Mock-up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.
  - 1. Install in area designated by Architect.
  - 2. Do not proceed with remaining work until workmanship is approved by Architect.

## 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to the job site in their original unopened containers, clearly labeled with the manufacturer's name and brand designation.
- B. Store products in an approved ventilated dry area; protect from dampness, freezing, and direct sun light. Product should not be stored in areas with temperatures in excess of 90 degrees F (32 degrees C) or below 50 degrees F (10 degrees C).
- C. Handle product in a manner that will prevent breakage of containers and damage products.

## 1.7 PROJECT CONDITIONS

- A. The Owner shall select a floor covering system scheduled for the treated concrete substrate having the ability to withstand water vapor transmission levels up to 3 lb per 1000 sf (1.5 kg/100 sq. m) /24 hours.
- B. Maintain environmental conditions (temperature, humidity and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
  - 1. Do not apply moisture vapor reduction system to unprotected surfaces or when water is accumulated on the surface of the concrete.
  - 2. Do not apply water vapor reduction system when temperature is lower than 50 degrees F (10 degrees C) or expected to fall below this temperature within 24 hours from time of application.
  - 3. Allow continuous ventilation and indirect air movement at all times during application and curing process of the water vapor reduction system.
  - 4. Protection: Protect water vapor reduction system to prevent damage from active rain or surface water for a minimum of 24 hours from time of application.

## 1.8 SCHEDULING

- A. Before installation of VCT, sheet vinyl, rubber flooring, wood, carpet and/or epoxy flooring systems over the interior concrete slabs, anhydrous calcium chloride or slab humidity testing shall be performed per ASTM F 1869 or ASTM F 2170 by the Owner to determine the level of water vapor transmission or relative humidity in the slab and the application rate of the moisture vapor reduction system required.
- B. The Owner will coordinate the scheduling of the water vapor reduction system testing, allowing adequate time to test, review results and determine the water vapor reduction system application rate before installation of floor finish is required.
- C. The Owner will allow a reasonable period of time (Minimum of 3 days) for the concrete slab to cure and dry before performing anhydrous calcium chloride tests. All mastics, glues, curing compounds and contaminants shall be removed to provide a clean, sound, concrete substrate prior to performing anhydrous calcium chloride tests.

## 1.9 WARRANTY

- A. Manufacturer shall provide the Owner with a system warranty including adhesives and surface preparation products for a period of no less than ten years at no additional cost.
- B. Installer of water vapor reduction system shall provide standard installation warranty for workmanship.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Acceptable Manufacturer: BESSERN Building Products: 1400 North Providence Road, Media, PA 19063, email: info@BESSERN.com web: [www.bessern.com](http://www.bessern.com)
- B. Substitutions: Not permitted.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01600.

- D. Provide materials of one manufacturer throughout the project.

## **2.2 SYSTEM**

- A. Single Coat System: 2-component, VOC Compliant, Low viscosity, 100 percent solid epoxy formulated as a vapor barrier against high moisture and alkalinity in concrete substrates. The water vapor reduction system shall, after final cure, reduce vapor emissions from a maximum of 98 percent relative humidity and alkalinity reduction to acceptable pH levels.
  - 1. Product: ENDURIT MVC-2 as manufactured by BESSERN Building Products, Media, PA.
  - 2. A Single Coat System consists of one coat of ENDURIT MVC-2, coating to be applied to a properly prepared concrete surface at an application rate determined by an anhydrous calcium chloride tests and/or RH in situ probes.
  - 3. Mix Component A and B at a ratio per manufacturers strict instructions.

## **PART 3 EXECUTION**

### **3.1 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.2 PREPARATION**

- A. Inspect surfaces with manufacturer's representative to determine its suitability to receive the moisture vapor reduction system. Provide an uncontaminated, sound surface.
- B. Clean surfaces to receive moisture vapor reduction system. Shot blast floors to CSP-3 and clean surfaces to remove residue from the substrate. Remove defective materials, and foreign matter such as dust, adhesives, leveling compounds, paint, dirt, floor hardeners, bond breakers, oil, grease, curing agents, form release agents, efflorescence, laitance, shot blast abrasive residue, etc.
- C. Repair cracks, control Joints, and open surface honeycombs.
  - 1. Use ENDURIT MVC-2 mixed with dry, clean white silica sand 1:1 by volume. Force mixture into cracks and joints with a trowel or putty knife. Comply with requirements listed in manufacturer's technical data information. Alternatively, ENDURIT Quick-Fix 100 may be used. Consult the Quick-Fix 100 technical data sheet for complete installation insructions. No exceptions. Consult with vapor reduction manufacturer.
- D. Verify that surfaces to be treated with moisture vapor reduction system have not previously been treated with materials such as underlayments, screeds, penetrating sealants, etc.
  - 1. Consult with vapor reduction system manufacturer prior to application.
- E. Verify if concrete additives such as chlorides or other soluble compounds that may contaminate surfaces have been used in the concrete mix.
  - 1. Consult with vapor reduction system manufacturer prior to application.
- F. Do not acid etch surface.
- G. Verify that the substrate surface does not deteriorate due to the presence of sulphurous compounds or alkaline aggregate/silica reaction encountered in certain areas.
  - 1. Consult with vapor reduction system manufacturer prior to application.

2. Testing for concrete deficiencies / contamination such as alkaline silica reaction, untreated silicates, organic residue, etc. is the responsibility of the Owner.
- H. The surface substrate shall remain uncontaminated, absorptive, and sound prior to receiving a water vapor reduction system. Comply with all requirements as listed in manufacturer's technical data information. No exceptions.

### 3.3 APPLICATION

- A. Single Coat System Application:
1. The coverage rates for the Single Coat System are dependant on the surface texture and porosity of the substrate.
  2. Required Application Rate Relative to Existing Levels of Moisture Vapor to Achieve 3 lb/1000 sf / 24 hours Moisture Levels:
    - a. **Consult Technical Data Sheet for Application Rates**
  3. Apply one coat of ENDURIT MVC-2 Moisture Vapor Control using a squeegee. Allow 5 minutes for surface to "off gas". Back roll with a 3/8 inch (9.5 mm) nap roller to achieve uniform, continuous application of membrane. Allow the minimum cure time before installing the finish flooring.

### 3.4 TESTING

- A. Initial Tests:
1. Anhydrous calcium chloride or slab humidity testing shall be performed by the installer.
  2. Provide initial anhydrous calcium chloride tests according ASTM F 1869 to the prepared concrete surfaces or slab humidity tests according to ASTM 2170. Tests shall be performed on properly prepared concrete. No exceptions!
  3. Conduct calcium chloride tests at the same temperature and humidity as designed normal occupancy. If this is not possible, test conditions shall be 75 degrees F +/-10 degrees (24 degree C +/- 5 degrees) and 50 percent +/-10 percent relative humidity. Maintain these conditions 48 hours prior to and during tests. Water vapor transmission levels are directly affected by ambient room temperature and readings conducted without a sustained ambient temperature are not acceptable.
  4. Installer shall provide test results with a marked up floor finish plan showing test results. Owner shall provide a written clarification on status of the ambient air temperature and humidity before and during the testing procedures.
  5. Installer shall provide a marked up floor plan showing areas with vapor reduction system recommendations.

### 3.5 CLEANING

- A. Remove all debris resulting from water vapor reduction system installation from project site.

### 3.6 POST APPLICATION

- A. Protect coating during specified cure period from any kind of traffic, topical water and contaminants.

**END OF SECTION**