SECTION 09 05 61 - MOISTURE VAPOR EMISSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Provide the work of this Section in accordance with requirements of the Contract Documents.

B. This Section includes, but is not limited to:

1. Fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete to prepare it for floor covering installation, if the moisture content at time of flooring installation exceeds requirements specified.

C. Related Work:

1. Division 03, Section 03 30 00 “Cast in Place Concrete”.
2. Division 03, Section 03 54 16 “Hydraulic-Cement Underlayment”.
3. Refer to Division 09 for Interior floor finishes.

1.2 DEFINITIONS

A. MVE: Moisture vapor emission.

B. MVER: Moisture vapor emission rate.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include manufacturer's technical data, application instructions, and recommendations for each moisture vapor emission control system component required

B. Sustainable Design Submittals.

C. Shop Drawings: Show locations and extent of moisture mitigation system. Show floor finish plans with the following information:

1. Moisture vapor emission rate initial test results.
2. Alkalinity initial test results.
3. Manufacturer's moisture mitigation system recommendations.

1.4 INFORMATIONAL SUBMITTALS

A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

B. Product Test Reports: For each MVE-control system, for tests performed by manufacturer and witnessed by a qualified testing agency. Provide reports on the following:

1. Moisture Vapor Emission Rate: ASTM F1869.
2. Water Vapor Permeance: ASTM E96.
3. Water Vapor Transmission Reduction: ASTM E96.
4. Bond Strength: ASTM D7234.

C. Compatibility and Adhesion Test Reports: From moisture mitigation system manufacturer, indicating the following:

1. Materials that will contact or affect moisture mitigation system have been tested for compatibility and adhesion with moisture mitigation system.

D. Material Certificates: For each moisture vapor emission control system component, signed by manufacturer.

1. Submit manufacturer's certification that moisture vapor control products meet requirements of current version of ASTM F3010.

E. Field Inspection Reports: Manufacturer's technical representative's inspection reports.

F. Field Quality-Control Reports: For moisture vapor emission rate testing and alkalinity testing.

G. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Not less than ten (10) year experience in manufacturing moisture vapor emission control systems, and that employs factory-trained personnel who are available for consultation and Project-site inspection.

B. Installer Qualifications: Engage an experienced installer (applicator) who has at least five year experience in applying moisture mitigation system similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance, and who is an authorized representative, trained and approved by manufacturer.

C. Preconstruction Compatibility and Adhesion Testing: Submit to moisture mitigation system manufacturers, for testing indicated below, samples of materials that will contact or affect moisture mitigation system.

1. Use manufacturer's standard test method to determine whether materials, including flooring substrates, primers, adhesives, and floor finishes, are compatible with and will obtain rapid optimum adhesion to substrates treated with moisture mitigation system.

D. Adhesives for Floor Finishes: Adhesives for floor finishes shall be approved by moisture mitigation system manufacturer and floor finishes manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components. Each container shall be marked with batch or lot code traceable to manufacturing information.

B. Store materials to prevent deterioration from moisture, heat, cold, direct sunlight, or other detrimental effects.

1. Storage areas shall be dry, well ventilated, and have a minimum temperature of 50 degrees F and a maximum temperature of 90 degrees F.

C. Handle products using methods that prevent breakage or damage of containers and prevent contamination of products.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.

1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F (18 deg C and not more than 85 deg F (29.4 deg C) at least 48 hours before use.
2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F (18 deg C) or more than 85 deg F (29.4 deg C) and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F (3 deg C) higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

B. Do not proceed with the application of materials to surfaces that may be exposed to uncontrolled weather conditions such as precipitation, wind, direct sunlight. Do not apply when moisture is accumulated on the surface of the concrete or if precipitation is anticipated before the moisture control coting has cured. Do not apply in rainy conditions or if heavy rain is anticipated within 8 hours after application. Materials shall not be applied to damp substrates. The surface shall be sufficiently dry to observe the application pattern during application.

C. Close spaces to traffic during water vapor emission control systems application and for not less than 24 hours after application, unless manufacturer recommends a longer period.

1.8 WARRANTY

A. Total System Warranty: Written warranty signed by manufacturer in which the manufacturer agrees to repair or replace components of treatment system, hydraulic cementitious underlayment, floor covering materials, including primer and adhesives, and installation labor for same period resulting from moisture vapor emission related failure that fail in materials or workmanship within specified warranty period.

1. Moisture Vapor Emissions Reduction Rate: Warranty shall warrant the reduction of moisture vapor emissions from a maximum of 25 pounds per 1000 sq. ft./24 hours to no more than 3 pounds per 1000 sq. ft./24 hours determined by the Calcium Chloride Test Method ASTM F1869 and 100% RH using the Relative Humidity Method ASTM F2170.

a. System will not fail due to a manufacturing defect and shall prevent flooring damage and bond failure caused by vapor emissions from concrete substrate.

2. Total System Warranty includes the use of a manufacturer's products listed as a total system.
3. Warranty Period: 20 years from date of Substantial Completion

B. Special Installer's Warranty: Written warranty signed by installer in which installer agrees to repair or replace MVE installation that fail in workmanship within specified warranty period.

1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Verify flooring products comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:

1. MVER: Maximum 15 lb of water/1000 sq. ft. (6.80 kg of water/92.9 sq. m, in order to reduce it to under 2 lbs./1000 sq. ft., when tested according to ASTM F1869
2. Relative Humidity: Maximum 90 percent when tested according to ASTM F2170 using in situ probes.

C. Water-Vapor Transmission: Through MVE-control system, maximum 0.10 perm (5.75 ng/Pa x s x sq. m) when tested according to ASTM E96/ E96M.

D. Tensile Bond Strength: For MVE-control system, greater than 200 psi (1.38 MPa) with failure in the concrete according to ASTM D7234.

E. Source Limitations: Obtain primary water vapor emission control systems materials, including primers, resins, and hardening agents, through one source from a single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

2.2 MVE-CONTROL SYSTEM

A. Products: Subject to compliance with requirements, provide one of the following:

1. Aquafin; Vaportight Coat-SG3or Vaportight Coat- SG4.
2. KOSTER American Corporation; VAP/2000 Zero VOC
3. MAPEI Corporation; Planiseal Easy or Planiseal VS Fast.
4. Laticrete "SUPERCAP Moisture Vapor Control".
5. Ardex "MC Rapid".
6. Custom Building Products "TechMVC Moisture Vapor and Alkalinity Barrier".
7. CMP "Lockdown".

B. MVE-Control System: ASTM F3010 "Standard Practice for Two-Component Resin Based Membrane Forming Moisture Mitigation Systems for Use Under Resilient Flooring"-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.

1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.
2. VOC Content: Provide coating with VOC content of 100 g/L or less.
3. Low-Emitting Materials: Verify coating complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 ACCESSORIES

A. Crack-Filling Material: Resin-based material recommended in writing by MVE-control system manufacturer for sealing concrete substrate crack repair.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Preinstallation Testing:

1. Testing Agency: Owner will engage a qualified testing agency to perform tests.
2. Alkalinity Testing: Perform pH testing according to ASTM F710. Install MVE-control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5.
3. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft. (304.8 sq. m), and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.

    a. Anhydrous Calcium Chloride Test: ASTM F1869. Install MVE-control system in locations where concrete substrate MVER exceeds 3 lb. of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
    b. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.

4. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. (9.29-sq. m) area of MVE-control system to prepared concrete substrate and test according to ASTM D7234.

    a. Proceed with installation only where tensile bond strength is greater than psi (1.38 MPa) with failure in the concrete.

B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.

1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
2. Remove existing floor finishes including floor coverings, coatings, paints, and adhesives in accordance with RFCI "Recommended Work Practices for the removal of resilient Floor Coverings".
3. Provide concrete surface profile complying with ICRI 310.2R CSP 3 requirements by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
4. After shot blasting, repair damaged and deteriorated concrete according to MVE-control system manufacturer's written instructions.
5. Remove dirt, dust rust stains, mortar droppings, temporary construction markings, chalk lines, and other contaminates that will interfere with the proper and effective application of the sealer system and that will affect overall appearance of the completed work.
6. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
7. Repair damaged and deteriorated concrete according to water vapor emission control systems manufacturer's written recommendations.
8. Fill surface depressions and irregularities with patching and leveling material.
9. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
10. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
11. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.

C. Protect adjoining work from spillage of moisture vapor emission control compounds including walls, floor openings, electrical openings, door frames, aluminum and glass and other finished surfaces, and obstructions during installation.

3.3 INSTALLATION

A. Start installation of moisture prevention floor coating work only in the presence and with the advice of the manufacture's technical representative.

B. Install MVE-control system according to ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.

1. Install primers as required to comply with manufacturer's written instructions.
2. Coordinate application of components to provide optimum adhesion of water vapor emission control systems system to substrate, optimum intercoat adhesion, and optimum adhesion to flooring substrates, primers, and adhesives approved by flooring manufacturer.

C. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.

D. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.

E. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.

F. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.

G. At substrate expansion and isolation joints, provide joint in water vapor emission control systems to comply with water vapor emission control systems manufacturer's written recommendations.

1. Apply joint sealant to comply with manufacturer's written recommendations.

H. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty and in thickness required to maintain the warranty in accordance with Division 03, Section 03 54 16 “Hydraulic Cement Underlayment”.

3.4 FIELD QUALITY CONTROL

A. Manufacturer's Technical Representatives Inspection: The Contractor shall arrange and pay for the moisture mitigation system manufacturer's technical representatives to inspect completed application and provide a written report that application complies with manufacturer's written instructions.

B. Testing Agency: Owner will engage a qualified testing agency to perform installation inspections.

C. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.

1. Verify that surface preparation meets requirements.
2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.

a. Test adhesion of moisture control coating to the concrete substrate as required in ASTM F3010 and test method ASTM D7234. Tensile bond strength of the coating shall be at least 200 psi without failure in concrete.

3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.

D. MVE-control system will be considered defective if it does not pass inspections.

3.5 CLEANING AND PROTECTION

A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.

B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

C. Upon completion of moisture prevention floor coating, or at such other times as directed by the Architect remove surplus and waste materials, debris, rubbish, equipment, and implements from the site, and leave the work in a clean, neat and in an acceptable condition, as approved by the Architect.

END OF SECTION