**SECTION 090561.13**

**MOISTURE VAPOR EMISSION CONTROL**

**[NOTE: 100% Solids Epoxy; TEC Liquidam; 2 part]**

# PART 1 GENERAL

* 1. **SECTION INCLUDES**
		1. TEC® LiquiDam Moisture Vapor Barrier; 2-part, 100% solids epoxy moisture mitigation
	2. **RELATED SECTIONS**
		1. Section 093000 – Finishes
		2. Section 035400 – Cast Underlayment
		3. Section 096500 – Resilient Flooring
		4. Section 096813 – Tile Carpeting
	3. **REFERENCES**
		1. ASTM F 1869 Standard Test for measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride
		2. ASTM F 2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes.
		3. ASTM D7234 Tensile Bond Strength
		4. ASTM E96 Standard Test Methods for Water Vapor Transmission of Materials

#  SYSTEM DESCRIPTION:

* + 1. Provide a system of **moisture mitigation, surface preparation products, and adhesives** from a single source manufacturer necessary to achieve proper installation of specified flooring material that will provide the Owner with a moisture control system limited warranty for a period of no less than **25 years**.
		2. Provide a system of **moisture mitigation and surface preparation products** (**not adhesives**) from a single source manufacturer necessary to achieve proper installation of specified flooring material that will provide the Owner with a moisture control system limited warranty for a period of no less than **15 years**.
	1. **SUBMITTALS**

#  Submit under provisions of Section 01 30 00 - Administrative Requirements.

#  Product Data:

* + - 1. Manufacturer's data sheets on each product to be used.
			2. Preparation instructions and recommendations.
			3. Storage and handling requirements and recommendations.
			4. Typical installation methods.
			5. System Warranty including moisture vapor barrier, skim coats, self-leveling underlayments and flooring adhesive from a single manufacturer.
		1. Sustainability Submittals: Refer to Division 018100 Facility Performance Requirements for additional requirements:
			1. Submit certificate of CRI Green Label Plus for flooring adhesive.
			2. Submit CDPH 01350 testing certificate from MAS Certified Green for moisture mitigation coating.
			3. Submit contractor certification of compliance with installation requirements of products to maintain sustainability performance levels.
		2. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.
		3. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
	1. **QUALITY ASSURANCE**
		1. Manufacturer Qualifications: Company specializing in manufacturing Products specified in this section.
		2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
		3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
		4. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
			1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
			2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
			3. Retain mock-up during construction as a standard for comparison with completed work.
			4. Do not alter or remove mock-up until work is completed or removal is authorized.
	2. **PRE-INSTALLATION CONFERENCE**
		1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
		2. Discuss contract document requirements, moisture tests, manufacturer recommendations, installer's recommendations, scheduling, and protection of work from damage by other trades.
		3. Attendance required by: Contractor, Floor Installer, Manufacturer's Representative, Independent testing agency, Concrete Subcontractor, Ready Mix supplier.
		4. Objective of conference is:
			1. Review methods and procedures.
			2. Tour job site representative areas to inspect and discuss condition of substrate.
			3. Review concrete finishing requirements.
			4. Review and finalize construction schedule.
			5. Review required inspections, testing, certifications, material usage procedures.
			6. Review environmental restrictions and forecasts
			7. Record content of conference including attendance and topics.
		5. Furnish record of pre-installation conference to all parties who are affected by MVE control systems work.
	3. **DELIVERY, STORAGE, AND HANDLING**
		1. Comply with requirements of section 016000.
		2. Store products in manufacturer's unopened containers until ready for installation.
		3. Store products in a cool dry place out of direct sunlight.
		4. Maximum shelf life is 1 year from date of manufacture in unopened containers. Uncontaminated, resealed partial pails of product can be stored, until depleted, for up to 6 months.
	4. **PROJECT CONDITIONS**
		1. For interior application only.
		2. Do not bridge existing expansion joints.
		3. Do not install in temperatures below 50 degrees F.
		4. Not for use in conditions of hydrostatic pressure or excessive moisture: >100 percent Relative Humidity per ASTM F 2170, or 25 lbs./1000 sq. ft. / 24 hours per ASTM F 1869.
		5. 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 recommended limits.
	5. **WARRANTY**

\*\* NOTE TO SPECIFIER \*\* First warranty if product warranty for TEC Liquidam; second warranty is System Warranty when using Liquidam, TEC surface prep product and TEC flooring adhesives; third warranty is same as second but without using TEC adhesives. Delete one of the following three warranties; coordinate with requirements of Division 1 section.

* + 1. 10 Year Limited Product Warranty for Moisture Vapor Barrier: Product shall be free from manufacturing defects and will not break down or deteriorate under normal use for 10 years.
		2. **[NOTE: If specifying TEC Adhesives as well as TEC moisture vapor barrier and TEC floor flatness products, include “B”]** 25 Year Moisture Control System Limited Warranty is available when using concrete moisture vapor barrier system in conjunction with specific surface preparation products and adhesives as identified on published warranty at the time of issuance. This warranty warrants to the Owner of the premises in which the product is applied, that the products, as indicated on published warranty, when installed as a complete system, will 1) reduce the moisture vapor emissions of treated concrete substrate from a maximum of 25 pounds per 1000 sq. ft./24 hours as determined by the Calcium Chloride Test Method ASTM F1869 (or 100 percent RH using the Relative Humidity Method ASTM F2170-09) to no more than 3 pounds per 1000 sq. ft./24 hours, and 2) if moisture vapor emissions comply with above, and the products are used as a complete System, the System a) will not fail due to a manufacturing defect, b) will prevent flooring damage and bond failure caused by vapor emissions from the concrete substrate.
		3. **[NOTE: If NOT specifying TEC Adhesives, but only TEC moisture vapor barrier and floor flatness products, include only “C”]15 Year Moisture Control and Surface Prep ONLY Limited Warranty** is available when using concrete moisture vapor barrier system in conjunction with specific surface preparation products **(not adhesives)** as identified on published warranty at the time of issuance. This warranty warrants to the Owner of the premises in which the product is applied, that the products, as indicated on published warranty, when installed as a complete system, will 1) reduce the moisture vapor emissions of treated concrete substrate from a maximum of 25 pounds per 1000 sq. ft./24 hours as determined by the Calcium Chloride Test Method ASTM F1869 (or 100 percent RH using the Relative Humidity Method ASTM F2170-09) to no more than 3 pounds per 1000 sq. ft./24 hours, and 2) if moisture vapor emissions comply with above, and the products are used as a complete System, the System a) will not fail due to a manufacturing defect, b) will prevent flooring damage and bond failure caused by vapor emissions from the concrete substrate.

#  PRODUCTS

* 1. **MANUFACTURERS**
		1. Acceptable Brand/Manufacturer: TEC®/H.B. Fuller Construction Products Inc.; 1105 S. Frontenac Street, Aurora, IL 60504.
		Tel: 800-832-9023. Web: [www.tecspecialty.com](http://www.tecspecialty.com)
		2. Substitutions: Not permitted.
		3. Requests for substitutions will be considered in accordance with provisions of Section 01600.
	2. **MATERIALS**
		1. **TEC® LiquiDam™: Technical Data:**
			1. Maximum allowable moisture emission rate of concrete: 25 lbs. per 1,000 ft2 per 24 hours when measured in accordance with ASTM F 1869, or an RH value of 100% or less when measured in accordance with ASTM F 2170.
			2. Two-part formula
			3. Permeance shall be no greater than 0.10 per ASTM E96
			4. Floor covering installation: 4 hours (dependent on substrate conditions, porosity and temperature.)
			5. 100% Solids Epoxy moisture mitigation formula
			6. VOC: 1 g/L

#  EXECUTION

* 1. **EXAMINATION**

#  Test moisture content of substrates:

#  Before applying LiquiDam™, refer to the [TEC® Moisture Mitigation Checklist](https://www.tecspecialty.com/product-support/blog/moisture-mitigation-made-easy-with-our-pre-mitigation-checklist/) and use an approved testing method to determine the relative humidity of the concrete or Moisture Vapor Emission Rate (MVER). Approved methods include the use of ASTM F2170 to determine the relative humidity of the concrete or “Anhydrous Calcium Chloride” testing per ASTM F1869 to determine the MVER.

#  Notify the Architect and General Contractor in writing of any unsatisfactory conditions.

* 1. **PREPARATION**
		1. Clean surfaces thoroughly prior to installation.
		2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
			1. All surfaces shall be structurally sound and free from oil, grease, dust, loose or peeling paint, sealers, floor finishes, curing compounds or any contaminant that would prevent a good bond.
			2. Minimum tensile bond strength of 150 psi (1 MPa) is required, when tested per ASTM D7234 (tensile bond test).
			3. Substrate temperature shall be a minimum of 50 F during application.
			4. Air temperature shall be maintained between 50 – 90 F
		3. A successful application to concrete requires evaluation and preparation to address any conditions that would prevent a good bond. The following guidelines are provided to assist in this process. Additional evaluation, testing and/or preparation may be required to ensure the above Surface Preparation Requirements are met. It is necessary to evaluate all four conditions. Check for Condition 1 on the entire concrete surface. Conditions 2 through 4 should be checked for at least once per every 50 ft2 (4.6 m2 ) on small applications (1000 ft2 [93 m2 ] or less) and once every 100 ft2 (9 m2 ) on large applications (greater than 1000 ft2 [93 m2 ]). Once you have completed the preparation method, always re-check to confirm the method worked.
			1. **CONDITION 1:** Surface coatings and/or contamination such as gypsum plaster, joint compound, paint and adhesive. **Evaluation**: Look at the surface and note the type and location of the surface contamination. **Preparation**: First scrape off any lumps and loose material. Then use an appropriate cleaning method for the type of coating or contamination.
				1. For gypsum plaster and joint compound — Scrub with warm water and detergent to remove any remaining material. Thoroughly rinse off any residue and allow concrete to dry prior to application of any TEC® materials.
				2. For paint — Chemical strippers should not be used. They may leave a residue or be absorbed into the concrete and later migrate into the surface and cause a bond failure. Paint not easily scraped off should be mechanically removed.
				3. For adhesive — Scrape off all the adhesive from the surface first, then remove the layer of adhesive-contaminated concrete by mechanical means.
			2. **CONDITION 2:** Weak top layer (called laitance) or damaged concrete such as spalling, scaling, delaminating or crumbling. **Evaluation**: First scrape the surface with a knife blade. If this produces a fine powder, then laitance is present. Then use a hammer or other heavy object to sound out weak or hollow areas. Note the areas that are weak or damaged. **Preparation**: Weak or damaged concrete must be mechanically removed. Do NOT acid wash or etch concrete because it is difficult to fully remove contaminants and properly neutralize. The acid can penetrate into the porous concrete and chemically undermine it, weakening the concrete. Acid washing will not remove grease or oil.
			3. **CONDITION 3**: Curing Compounds/Sealers
				1. Broom finish or Steel troweled finish (non-glossy) **Evaluation**: Apply water droplets onto the surface. If the droplets are not absorbed within 60 seconds the surface was treated with a curing compound/ sealer or is contaminated. **Preparation**: The sealed or contaminated layer of concrete must be removed by mechanical means.
				2. Burnished finish (glossy surface) Evaluation: Frequently LiquiDam™ can be installed over burnished concrete without mechanical preparation. For glossy burnished concrete surfaces, apply test areas to confirm bond strength of at least 150 psi when tested per ASTM D7234 (tensile bond test). Preparation: Glossy burnished concrete surfaces that do not provide bond strength of at least 150 psi must be removed by mechanical means.
			4. **CONDITION 4**: Final Surface Preparation - removal of dirt and dust. **Evaluation**: Wipe the surface with a clean dark cloth. If powder is visible on the cloth the surface is not clean enough. Note the areas that were not clean enough. **Preparation**: Always use a two-step method to remove surface dirt and dust. First use a dry clean broom and sweep the entire surface. Do not use oil or wax based sweeping compounds. They can leave a film on the concrete surface that will prevent a proper bond. The second step should consist of one of the following:
				1. Vacuuming — use a heavy-duty industrial type vacuum to provide a dust-free surface. It may also be necessary to follow vacuuming with a damp sponge wipe to remove residual surface dust.
				2. Water cleaning — use a stream of potable water with sufficient pressure to remove dust and dirt. When necessary, also scrub with a stiff bristled brush. **Remove all wash water and allow concrete to thoroughly dry**.
				3. Detergent water cleaning — using a stiff bristled brush or broom, scrub the entire concrete surface with a cleaning product intended for concrete or a solution of at least 4 ounces (113 g) of trisodium phosphate per gallon (3.78 L) of warm water. Before the surface dries, thoroughly flush the concrete with clean potable water to remove all wash water and residue. **Allow concrete to thoroughly dry prior to application of any TEC® materials.**
	2. **MIXING**
		1. Mix materials in accordance with manufacturer's instructions.
			1. Part A Epoxy Resin is designed exclusively for use with Part B Curing Agent. Substrate and all materials must be maintained at 50-90°F (10-32°C) for 24 hours before, during and after installation. Completely pour two .33 gallon (1262 mL) jugs of Part A into the empty 2 gallon (7.57 L) pail provided. Completely pour .33 gallon (1262 mL) of Part B Curing Agent into the 2 gallon (7.57 L) pail containing .67 gallons (2.5 L) Part A and mix thoroughly for 3 minutes using a low speed (≤150 rpm) mixer. Do not over mix and avoid using high speed mixing to prevent entraining air.
	3. **Joint/Crack Pre-Treatment**
		1. **For Static Cracks/Control Joints less than 1mm (with no movement):** Remove any dirt, debris or existing sealant from cracks and joints. Mix LiquiDam™ per instructions. Treat all static joints with LiquiDam™ by applying material into the joint with a paintbrush to completely coat the walls of the cavity.
		2. **For Static Cracks/Control Joints greater than 1mm (with no movement):** Remove any dirt, debris or existing sealant from cracks and joints. Mix LiquiDam™ per instructions. Blend at a 1:1 ratio with fine silica sand. Immediately pour into control joints and cracks, level with concrete surface.
		3. **For Fast-Track Saw Cut/Static Crack Fill:** Remove any dirt, debris, or existing sealant. Use TEC Joint/Crack Filler per product data sheet instructions. Overfill the joint/crack and shave after the material loses tack (typically 45-55 minutes). To optimize coverage, use of backer rod is acceptable for deep joints/cracks but you must maintain minimum depth of 1/2" with Joint/Crack Filler.
		4. **For Expansion Joints/Dynamic Cracks (with movement):** Remove any dirt, debris or existing sealant from cracks and joints. Treat all dynamic joints with LiquiDam™ by applying a layer into the joint with a paintbrush to completely coat the walls of the cavity. Once cured, fill the joint with sand or backer rod while leaving the top of joint open for proper treatment with sealant. NOTE: There is a major difference between the proper application of flooring over static vs. dynamic joints, as well as, variations based upon the type of flooring being installed. Please follow appropriate industry standards, as well as flooring manufacturer’s recommendation for treatment of joints.
		5. **APPLICATION**
		6. Layout the substrate area into 150 ft2 (13.9 m2) “grids” for each 1 gallon (3.78 L) blended kit. Immediately after mixing, pour the blended gallon container of LiquiDam™, across the grid area while spreading with a squeegee or 1⁄16" (1.6 mm) square notched trowel allowing the LiquiDam™ to saturate the surface. **Do not move too fast.** (Unused LiquiDam™ should not be left in container. Immediately pour excess material onto a disposable surface (such as cardboard) or into disposable containers, at a thickness no greater than 1⁄4" (6 mm). Once cured (after approximately 4 hours) the coated surfaces or containers may be disposed of in normal job site trash.) Back roll surface with a 3⁄16" (4.8 mm) nap foam roller to evenly distribute the product. First saturate the roller and then work at a smooth even pace. Periodically evaluate the surface to ensure a smooth continuous film. It may be necessary to wait up to 5 minutes before back rolling to minimize surface bubbles. Do not over-work. Higher temperatures will shorten the work time. Do not exceed 180 ft2/gallon (4.4 m2/L). LiquiDam™ performs equally well on porous or dense concrete. On porous concrete it penetrates into the surface. On dense concrete it forms a continuous, topical film. While the porosity of the substrate affects the application appearance, it does not affect the performance.**3.6**
		7. **Curing and Surface Preparation**

A. Most floor coverings and adhesives require the application of a TEC® cementitious underlayment over LiquiDam™\*. LiquiDam™ cures to a tacky film with no transfer to the touch in as little as 4-5 hours. LiquiDam™ surface must be primed with undiluted TEC® Multipurpose Primer prior to installation of cementitious underlayment. To maximize installation efficiency primer can be applied in as little as 4-5 hours after installation of LiquiDam™. Allow primer to dry and apply appropriate TEC® cementitious underlayment at a minimum thickness of 1⁄8" (3 mm). For further information contact your TEC® Sales Associate.

 \*TEC® Releasable Pressure Sensitive Adhesive or TEC® Clear Thin Spread Adhesive may be applied directly to LiquiDam™ Moisture Vapor Barrier if concrete surface is sufficiently smooth and level. If the substrate is not smooth and level, please treat with appropriate TEC® surface preparation products as noted above.

**END OF SECTION**

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