**SECTION 090561.13**

**MOISTURE VAPOR EMISSION CONTROL**

**[NOTE: Water based, non-epoxy TEC Liquidam EZ; 1 part]**

# PART 1 GENERAL

* 1. **SECTION INCLUDES**
		1. TEC® LiquiDam EZ™ Moisture Vapor Barrier; 1-part, highly-engineered, **non-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 ONLY** (**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 01810 Facility Performance Requirements for additional requirements:
			1. Submit certificate of CRI Green Label Plus for flooring adhesive.
			2. 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 01650 and section 01660.
		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 Mitigation Vapor Barrier](https://www.tecspecialty.com/product-support/downloads/): Product shall be free from manufacturing defects and will not break down or deteriorate under normal use for 10 years.
		2. [25 Year Moisture Control System Limited Warranty](https://www.tecspecialty.com/product-support/downloads/) 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. [15 Year Moisture Control and Surface Prep ONLY System Limited Warranty](https://www.tecspecialty.com/product-support/downloads/) 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)

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* + 1. Substitutions: Not permitted.
		2. Requests for substitutions will be considered in accordance with provisions of Section 01600.
	1. **MATERIALS**
		1. [**TEC® LiquiDam EZ™**](https://www.tecspecialty.com/products/surface-preparation/liquidam-ez/)**: 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. One-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. Polymeric emulsion moisture mitigation formula
			6. VOC: 1 g/L

#  EXECUTION

* 1. **EXAMINATION**

#  Test moisture content of substrates:

#  Before applying LiquiDam EZ™, 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 EZ™ 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. Open the pail and hand stir to a smooth creamy consistency with a paint stick or margin trowel. Be sure to re-blend in any liquid that may have separated to the top of the container. Do not use an electric drill and mixing paddle. High-speed drills and paddles can entrain air into the formula. Air entrainment may increase work time to roll out the bubbles. Substrate and all materials must be maintained at 50°F-90°F (10°C-32°C) for 24 hours before, during and after installation.
	3. **EXISTING CRACKS**
		1. For Static Cracks, Cuts or Joints less than 1 mm wide: remove dirt, debris or existing sealant from all cracks and joints, then treat static (non-moving) joints, cuts and cracks with LiquiDam EZ™ by directly applying LiquiDam EZ™ into the cracks or joints with a paintbrush, to completely coat the walls of each cavity.
		2. For Static Cracks / Control Joints 1 mm-3 mm wide: remove dirt, debris or existing sealant from cracks and joints, then use a concrete crack filler, such as [TEC® Feather Edge Skim Coat](https://www.tecspecialty.com/products/surface-preparation/feather-edge-skim-coat/) or [TEC® PerfectFinish™ Skim Coat](https://www.tecspecialty.com/products/surface-preparation/perfectfinish-skim-coat/) and allow to dry 15 to 60 minutes.
		3. For Fast-Track Saw Cut / Static Cracks Fill: Remove any dirt, debris, or existing sealant. Use [TEC Joint/Crack Filler](https://www.tecspecialty.com/products/surface-preparation/jointcrack-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 TEC Joint/Crack Filler.
		4. For Expansion Joints / Dynamic (moving) Cracks: remove any dirt, debris or existing sealant from cracks and joints. Treat all dynamic (movement) joints with LiquiDam EZ™ by applying a layer into the joint edges with a paintbrush to completely coat the walls of the cavity. Once dried, fill the dynamic joint with backer rod, leaving a minimum of 1⁄2" (12 mm) open at the top for proper treatments with a sealant.
	4. **APPLICATION**
		1. LiquiDam EZ is applied in two coats. The first coat is applied at 150 ft² (13.94 m²) per gallon and must be trowel-applied and backrolled. The second coat is applied at a 300 ft² (27.87 m²) per gallon and can be trowel-applied and backrolled or simply roller-applied.

1) Lay out the substrate area into one 150 ft² (13.94 m²) grid (example: 6 ft. x 25 ft / 1.83 m x 7.62 m) to validate the first coat spread rate.

2) After stirring (as noted above), spread one gallon of the LiquiDam EZ, across the grid area with a 1⁄16" (1.6 mm) square-notched trowel. NOTE: Do not exceed 150 ft² (13.94 m²) per applied gallon. **Product must be troweled as the first step and followed up in unison with the 1⁄4" nap roller.**

3) Immediately saturate the roller in the initial application of trowel applied LiquiDam EZ, then backroll the area, to optimize disbursement of the material over the entire substrate. Periodically evaluate the surface to ensure a smooth continuous film. Wet film thickness of the first coat should be 18-20 mils.

4) Allow the first coat to dry 90-120 minutes. LiquiDam EZ is dry when it turns dark blue.

5) Apply the second coat with a 1/32" (0.8 mm) U-notched trowel and backroll with the 1⁄4" nap roller or simply roller-apply the second coat. Wet film thickness for the second coat should be 9-10 mils. The second coat must fill any remaining white pinholes from the first coat. Care should be taken to not gouge or otherwise disturb or damage the dried membrane. Inspect the dried film to make sure there are no pinholes, voids, bubbles or breaks in the membrane. Apply additional LiquiDam EZ to f ill all voids and allow to dry. **Do not over-work.**

6) Once dry, the second coat will appear darker than the first. The second coat MUST dry a minimum of 90-120 minutes before moving to the next installation step. Protect the application area from traffic and other trades until installation of the flooring.

After a job is complete, any unused, uncontaminated LiquiDam EZ Moisture Vapor Barrier can be simply resealed securely with the container lid, and then can be used for up to 6 months (see storage guidelines).

**3.6** **DRYING AND SURFACE PREPARATION**

A. Most impervious floor coverings require the application of a TEC® cementitious underlayment over LiquiDam EZ™\* for the adhesives to bond properly to the floor coverings. Combined coats of LiquiDam EZ™ dry in as little as 3-4 hours, depending on surface porosity and ambient humidity. Apply appropriate TEC® cementitious underlayment directly to the dried LiquiDam EZ™ at a minimum thickness of 1⁄8" (3 mm) (no primer is required). For further information contact your TEC® Sales Associate.

 \*TEC Wood Endure™, TEC Wood Assure™, TEC Wood Go™, TEC Releasable Pressure Sensitive Adhesive or TEC Clear Thin Spread Adhesive may be applied directly to LiquiDam EZ Moisture Vapor Barrier if concrete surface is sufficiently smooth and level to accept flooring. If the substrate is not smooth and level, please treat with appropriate TEC surface preparation products, for the proposed floor coverings, as noted above.

**END OF SECTION**

