

Surface Preparation Requirements for Moisture Barriers/Membranes

This guide is specifically for MAPEI's epoxy-based moisture barriers, polyurethane-based moisture barriers and moisture-controlling membranes.

Jobsite Examination

Before work commences, examine the areas to be repaired and/or covered and report any deficiency or adverse condition in writing to the general contractor, owner, owner representative, developer, architect, engineer or designer. Do not proceed with the work until surfaces and conditions comply with the requirements indicated in the flooring manufacturer's written instructions, applicable industry standards, federal, state/provincial and local regulations as well as good work practices. By beginning work, the applicator/user acknowledges that the conditions are acceptable for installation.

Inspect jobsite conditions around the exterior of the building. Consider whether foundation plantings, mulch beds, sprinkler systems or gutters may cause seasonal moisture problems or sporadic elevated moisture conditions inside the building. Also, if needed, grade landscaping and topography to create a slope that moves water away from the building.

Jobsite Conditions

MAPEI moisture barriers and moisture-controlling membranes are for interior use only. Refer to the flooring manufacturer for specific requirements and reference applicable industry standards such as ASTM F3010 (Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings), ASTM F710 (Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring), ASTM D4259 (Standard Practice for Abrading Concrete) and ASTM F3191 (Standard Practice for Field Determination of Substrate Water Absorption/Porosity for Substrates). Also refer to ACI 302.2R (Guide for Concrete Slabs That Receive Moisture-Sensitive Flooring Materials).

Surface Preparation

General requirements

- All substrates must be structurally sound, dry, solid and stable. The substrate should be clean and free of dust, dirt, oil, grease, wax, soap, paint, concrete color stains, curing compounds, concrete sealers, clear coats and other types of coatings, existing moisture barriers or moisture-controlling membranes, loosely bonded toppings, old adhesive residues (unless otherwise recommended by MAPEI), and any other substance that may prevent/reduce adhesion or affect product performance. Mechanically

abrade and clean the substrate to completely remove any bond-inhibiting contaminants or conditions.

Note: Chemical removal methods are not recommended. If concrete has already been chemically abated, refer to the section "Chemically treated concrete" in this guide.

- **Warnings:**
 - ▶ Do not sand or remove any cutback adhesive that contains asbestos fibers. For removal instructions, refer to the Resilient Floor Covering Institute's Recommended Work Practices. Follow all local, state/provincial and federal regulations as well as industry standards when mechanical removal is required.
 - ▶ Do not install MAPEI products over vinyl asbestos tile (VAT) or any flooring, adhesive, substrate or substance that may contain asbestos. For removal instructions, refer to the Resilient Floor Covering Institute's Recommended Work Practices. Follow all local, state/provincial and federal regulations as well as industry standards when mechanical removal is required.
 - ▶ Certain paints may contain lead. Exposure to excessive amounts of lead presents a health hazard. For additional information on requirements for handling lead based paints, refer to <http://www2.epa.gov/lead/lead-regulations> for the United States or http://www.hc-sc.gc.ca/ewh-semt/contaminants/lead-plomb/asked_questions-questions_posees-eng.php for Canada.
 - ▶ Mixing and/or sanding of cement-based materials may expose the worker to crystalline silica. Long-term exposure to excessive amounts of crystalline silica presents a health hazard. For additional information on requirements for handling silica dust, refer to <https://www.osha.gov/silica/index.html> for the United States or http://www.ccohs.ca/oshanswers/chemicals/lungs_dust.html in Canada.
- All substrates must be flat in order to prevent puddling and/or voids in the application of the MAPEI moisture barrier or moisture-controlling membrane. Use only exterior-rated or moisture-resistant concrete repair products to repair imperfections and irregularities (such as holes, voids,

bumps and depressions). For options, refer to the sections “Patching products” and “Self-leveling underlayments” in this guide. Consult MAPEI’s Technical Services Department or current Technical Data Sheets for product recommendations.

- Refer to MAPEI’s current Technical Data Sheets for the recommended application temperature range for all MAPEI products used in the installation. Maintain these environmental conditions throughout the installation process. Control floor-heating systems so that the substrate temperature falls within the application temperature range of the MAPEI moisture barrier or moisture-controlling membrane being used. Note: The use of floor-heating systems may reduce working time of moisture barriers and moisture-controlling membranes. Floor-heating systems must be fully encapsulated in concrete or an exterior-rated or moisture-resistant self-leveling underlayment in order to receive MAPEI membranes.
- Do not install MAPEI moisture barriers or moisture-controlling membranes over gypsum-based concrete, poured gypsum underlayments or any other type of gypsum-based substrates.
- Consult MAPEI’s Technical Services Department for installation recommendations regarding substrates and conditions not listed in this guide.

Concrete conditions

- Refer to current Technical Data Sheets at www.mapei.com for specific requirements on concrete age.
- When installing MAPEI moisture-controlling membranes, concrete must be installed over an acceptable and effective vapor barrier per industry standards. This recommendation refers to on-grade and below-grade concrete slabs. The vapor barrier must be resistant to deterioration as well as to puncturing during construction, and must remain intact and continuous. When installing over concrete that does not have a functioning vapor barrier, apply a MAPEI epoxy-based or polyurethane-based moisture barrier.
- The specific composition of the concrete should be in accordance with the guidelines and practices of American Concrete Institute (ACI) standards. All concrete substrates should be free of efflorescence, laitance, spalling and any other signs of surface weakness. If concrete shows any signs of surface weakness, consult a licensed engineer and make appropriate repairs before applying a MAPEI moisture barrier or moisture-controlling membrane.
- When MAPEI moisture barriers are used over concrete, the concrete surface profile (CSP) must be #2 (via grinding) to #3 (via shotblasting). If concrete already has a CSP of #2 to #3, no mechanical profiling is required; however, the surface must be absorptive, clean and free of contaminants. Do not use chemicals (through acid-etching or stripping methods) to prepare the concrete. In order to minimize pinholes due to outgassing of the concrete surface, allow the concrete to remain open for about 24 hours after mechanical abrasion/profiling.

- When MAPEI moisture-controlling membranes are used over concrete, the CSP must be #1 (acid-etching) to #2 (grinding). If concrete already has a CSP of #1 to #2, has some porosity, and is clean and free of contaminants, no mechanical preparation is required. When using acid-etching methods to prepare concrete surfaces, the concrete must be rinsed with water until no acid residues remain. See the section “Concrete Moisture Testing” for pH testing guidelines in this guide. In order to minimize pinholes due to outgassing of the concrete surface, allow the concrete to remain open for about 24 hours after mechanical abrasion/profiling.
- Voids that are left exposed after mechanical abrasion should be filled with an exterior-rated or moisture-resistant concrete repair product. For options, refer to the sections “Patching products” and “Self-leveling underlayments” in this guide.
- Refer to current Technical Data Sheets for substrate and ambient (air) temperature requirements. Avoid applying a MAPEI moisture barrier when conditions are present that would cause condensation.

Concrete moisture testing

- All concrete, regardless of age or grade level, has a certain degree of moisture and pH that should be analyzed and taken into account before the installation.
- When using MAPEI moisture-controlling membranes, perform two pH alkalinity tests for every calcium chloride test. Concrete substrates should exhibit surface pH conditions between 9 and 11. Any pH levels higher than 11 may indicate serious moisture vapor transmission issues. Any pH levels below 9 may indicate the presence of a surface coating or acid-rinsing residues; in this case, the coating/residue must be completely removed by mechanical abrasion, or the surface must be rinsed again with fresh clean water and allowed to dry. Note that pH tests are not required for MAPEI epoxy-based and polyurethane-based moisture barriers.
- Concrete moisture testing must be performed before the application of MAPEI moisture-controlling membranes. Refer to current Technical Data Sheets at www.mapei.com for specific limits. If test results are above the limits, use a MAPEI epoxy-based or polyurethane-based moisture barrier.
- Two industry-accepted methods are used to evaluate the presence of moisture in concrete slabs: the Calcium Chloride Test Method and the Relative Humidity (RH) Moisture Probe Test Method. Note that moisture testing is not required for MAPEI epoxy-based or polyurethane-based moisture barriers.
 - ▶ Calcium Chloride Test Method (ASTM F1869): This is the standard test method for measuring the moisture vapor emission rate (MVER) of concrete subfloors using anhydrous calcium chloride. When using the Calcium Chloride Test Method, if the concrete slab’s MVER measures more than 15 lbs. per 1,000 sq. ft. (6,80 kg per 92,9 m²) per 24 hours, MAPEI also recommends an RH Moisture Probe Test; follow the most current instructions set forth by ASTM F2170.
 - ▶ RH Moisture Probe Test Method (ASTM F2170): This is the standard test method for determining relative humidity in concrete floor slabs

using in situ probes. When the RH Moisture Probe Test Method is used, if the concrete slab's RH measures more than 95%, MAPEI also recommends a Calcium Chloride Test Method; follow the most current instructions as set forth by ASTM F1869.

- All concrete substrates must be free of any standing water during application and curing time.
- All concrete substrates must be free of hydrostatic pressure.
- Moisture meters (pin meters) can be used to help locate areas with elevated moisture conditions. These meters can be used to quickly survey many test locations and check different concrete placements along joints, near exterior walls for slabs on-ground, near water and drain lines under the slab, and other areas of potentially high moisture in order to guide placement of calcium chloride and/or RH moisture probe tests.
- All MAPEI products used in the flooring system (primers, levelers, membranes, patching compounds and adhesives) should be considered regarding the maximum allowable MVER and/or RH. Refer to MAPEI's current Technical Data Sheets regarding the maximum allowable MVER and RH for every MAPEI product to be used in the installation. Work should not begin if the maximum allowable MVER and/or RH exceeds MAPEI's stated limits.

Concrete with fly ash

- When MAPEI moisture-controlling membranes are used, concrete slabs that contain 20% or more of fly ash should be assessed and evaluated before the application of the membrane.
- Confirm porosity with a water drop test; the water droplet should not only wet the concrete, it should also dissipate onto the surface almost immediately.
- Perform a bond test to determine compatibility.
- If an adequate bond cannot be achieved, mechanically abrade the slab and conduct additional bond tests.

Silicate-based admixtures

- When concrete slabs consist of concrete that has been mixed with a silicate-based admixture, assess and evaluate the slabs before applying MAPEI products. Confirm porosity with a water drop test; the water droplet should not only wet the concrete, it should also dissipate onto the surface almost immediately.
- Concrete must be mechanically profiled to a CSP of #2 (via grinding) or #3 (via shotblasting).
- Voids that are left exposed after mechanical abrasion should be filled with an exterior-rated or moisture-resistant concrete repair product. For options, refer to the sections "Patching products" and "Self-leveling underlayments" in this guide.
- For compatibility information about a silicate-based admixture, consult the admixture manufacturer's Technical Services department.

- The bond performance warranty of the membrane to the concrete is the sole responsibility and domain of the admixture's manufacturer.

Concrete sealers and hardeners

- Concrete slabs with topical sealers or hardeners must be mechanically abraded to completely remove the sealer or hardener. Confirm porosity with a water drop test; the water droplet should not only wet the concrete, it should also dissipate onto the surface almost immediately.

Concrete curing agents and curing compounds

- Concrete slabs with liquid-applied topical curing agents and curing compounds must be mechanically abraded in order to completely remove the curing agent or curing compound. Confirm porosity with a water drop test; the water droplet should not only wet the concrete, it should also dissipate onto the surface almost immediately.

Chemically treated concrete

- Completely remove all areas of contaminated concrete by mechanical abrasion to a CSP of #2 to #3.

Screeds and mortar beds

- MAPEI moisture barriers and moisture-controlling membranes may be installed over exterior-approved cement screeds and exterior-approved cement mortar beds when they are sound and durable, securely bonded, stable, clean, dry and fully cured.

Patching products

- MAPEI moisture barriers may be applied over exterior-rated or moisture-resistant patching compounds to fill holes, voids and minor irregularities in concrete.
- For correcting large areas that are out of level, see the section "Self-leveling underlayments" below.

Self-leveling underlayments

- MAPEI moisture barriers and moisture-controlling membranes may be applied over exterior-rated or moisture-resistant self-leveling underlayments.
- When MAPEI moisture barriers and moisture-controlling membranes are used, it is best to apply the membrane under (not over) self-leveling underlayments whenever possible.

Crack repair and joint treatment

- MAPEI moisture barriers and moisture-controlling membranes are not designed to repair structural cracks.
- Crack repair procedures and joint treatment methods should be detailed in writing by a consultant or engineer to address expansion joints, contraction joints, cold joints and existing cracks. Follow ACI RAP Bulletin 2, "Crack Repair by Gravity Feed with Resin."
- Repair any open cracks before applying MAPEI moisture barriers and moisture-controlling membranes.

- When a MAPEI epoxy-based moisture barrier is used, cracks narrower than 1/8" (3 mm) may typically be filled neat with the MAPEI epoxy-based moisture barrier.
- Cracks wider than 1/8" (3 mm) should be filled with a suitable high-modulus epoxy such as MAPEI's *Planibond® EBA*. Consider adding sand to *Planibond EBA* to create an epoxy mortar, if appropriate.
 - ▶ Note: Regardless of treatment, MAPEI does not warrant against the appearance of cracks, against moisture coming up through cracks and joints, or against debonding that results from subsequent substrate movement of any kind.

Existing cement terrazzo

- Ensure that terrazzo strips and existing terrazzo are well bonded and in good condition.
- When MAPEI epoxy-based moisture barriers and polyurethane-based moisture barriers are used over existing cement terrazzo flooring, mechanically prepare the terrazzo surface to a CSP of #2 to #3.
- When MAPEI moisture-controlling membranes are used over existing cement terrazzo, prepare the terrazzo by mechanical abrasion (such as sanding) in order to remove any sealers and roughen the surface.

Flooring adhesive residue

- When MAPEI epoxy-based moisture barriers and polyurethane-based moisture barriers are used, all existing flooring adhesives including all traces of remaining flooring adhesive residues must be completely removed by mechanically preparing the concrete surface to a CSP of #2 to #3.
- MAPEI moisture-controlling membranes may be used over carpet adhesive residues and cutback adhesive residues. Prepare existing carpet and cutback adhesives by fully and thoroughly scraping so that only a very thin layer of adhesive remains. The top surface of the concrete should be visible through the adhesive.
- **Warnings:**
 - ▶ All cutback adhesive should be tested for asbestos before removal. Do not sand any cutback adhesive that contains asbestos. For removal instructions, refer to the Resilient Floor Covering Institute's Recommended Work Practices. Follow all local, state/provincial and federal regulations as well as industry standards when removing asbestos-containing materials.

- Note: Chemical removal methods are not recommended. If the concrete has already been chemically abated/treated, refer to the section "Chemically treated concrete" in this guide.
- Do not apply MAPEI moisture-controlling membranes over residues of pressure-sensitive, epoxy-based or urethane-based adhesives.

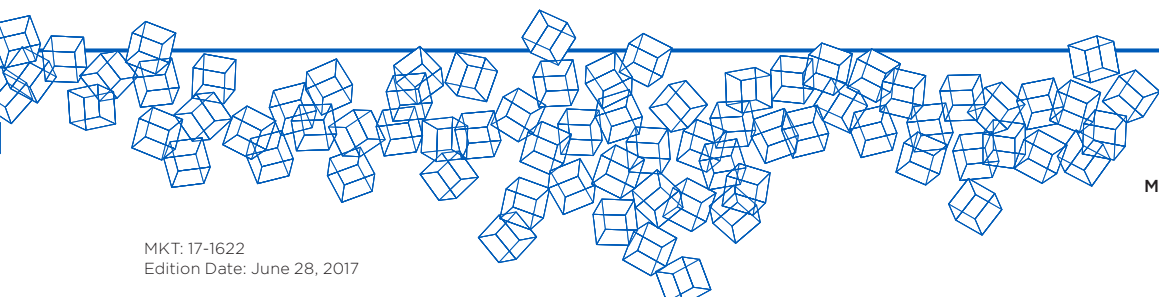
Wood underlayments

- When used as a sealer or a primer, certain MAPEI moisture-controlling membranes may be applied over certain types of plywood underlayments when those underlayments are listed as acceptable substrates. Moisture-controlling properties do not apply.
- Do not install MAPEI epoxy-based moisture barriers or polyurethane-based moisture barriers over any type of wood substrate or wood subfloor.

Completing the installation

- Do not use any MAPEI moisture barrier or moisture-controlling membrane as a final wear surface; it must be covered with a flooring system.
- If a MAPEI epoxy-based moisture barrier is used, it is best to protect the moisture barrier with an application of either a MAPEI skimcoating compound or a MAPEI self-leveling underlayment, utilizing suitable primers beforehand.
- If a MAPEI polyurethane-based moisture barrier is used, it is best to protect the moisture barrier with an application of a MAPEI self-leveling underlayment, installing a second application of the moisture barrier to serve as a bonding agent (primer).
- If a MAPEI moisture-controlling membrane is used, it is best to protect the membrane with an application of a MAPEI skimcoating compound.
- Using a total MAPEI installation system – including recommended MAPEI adhesives in conjunction with recommended MAPEI surface-preparation products and moisture barriers or moisture-controlling membranes – ensures compatibility that will ultimately result in a reliable, long-term, successful installation.
- MAPEI epoxy-based moisture barriers or polyurethane-based moisture barriers or moisture-controlling membranes will not prevent flooring failures due to water or excess moisture coming from above such as floods, leaks, improper cleaning procedures or high ambient (air) humidity levels.

For additional information related to product use and safety, refer to individual Technical Data Sheets and Safety Data Sheets of MAPEI products.



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