

FLOOR COVERING INSTALLATION SYSTEMS

Surface-Preparation Requirements: Resilient/Carpet Adhesives

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

For carpet installations, refer to The Carpet and Rug Institute's (CRI) Carpet Installation Standard. For resilient flooring installations, refer to ASTM F710 and ACI 302.2R standards. For installations of homogeneous sheet vinyl (solid vinyl sheet), refer to RFCI IP #1, "Recommended Installation Practice for Homogeneous Sheet Flooring Fully Adhered." For installations of vinyl composition tile (VCT), refer to the Resilient Floor Covering Institute's (RFCI) IP #2, "Recommended Installation Practice for Vinyl Composition Tile (VCT)." Also refer to ASTM D4259 (Standard Practice for Abrading Concrete) and ASTM F3191 (Standard Practice for Field Determination of Substrate Water Absorption/Porosity for Substrates).

Surface Preparation

General requirements

- Always refer to the flooring manufacturer's guidelines regarding site conditions, surface-preparation requirements, acceptable underlayments and proper conditioning of flooring material.
- All recommendations and guarantees regarding any material used as a substrate for flooring are the sole responsibility of the manufacturer of said underlayment material. Suitability of any substrate to receive adhesive and flooring products should always be tested in an inconspicuous location before proceeding with the installation.
- 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, 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 removing asbestos-based materials.
 - ▶ 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 RFCI's Recommended Work Practices. Follow all local, state/provincial and federal regulations as well as industry standards when removing asbestos-based materials.
 - ▶ Certain paints may contain lead. Exposure to excessive amounts of lead presents a health hazard. For more 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 more 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 plumb and flat to a tolerance in plane of 1/8" (3 mm) in 10 feet (3,05 m) for floors and 1/8" (3 mm) in 8 feet (2,44 m) for walls. Refer to the flooring manufacturer's guidelines. Imperfections and irregularities (such as holes, voids, bumps, cracks and depressions) must be corrected with the appropriate material, and surfaces must be smooth and even before the application of MAPEI resilient/carpet adhesives. Refer to the sections "Patching and skimcoating products" and "Self-leveling underlayments" in this guide for options. Consult MAPEI's Technical Services Department for specific 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 is within the application temperature range. Note: The use of floor-heating systems may reduce working time of certain MAPEI resilient/carpet adhesives and surface-preparation products. Radiant-heat flooring systems must be fully functional and in operation for 2 weeks before floor-covering installations. Floor-heating systems must be fully encapsulated with a cement-based or gypsum-based self-leveling underlayment in order to receive MAPEI's resilient/carpet adhesives.
- Do not install flooring in areas or with conditions not recommended by the flooring manufacturer or by MAPEI.

Concrete conditions

- 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 resilient/carpet adhesive.
- 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.
- When mechanical abrasion/profiling is required to prepare concrete surfaces, allow the concrete to remain uncovered and untreated for about 24 hours.
- Following mechanical abrasion/profiling, use appropriate MAPEI surface-preparation products to prepare the surface to receive the flooring and installation materials. Refer to the sections "Patching and skimcoating products" and "Self-leveling underlayments" in this guide for options.
- For vertical installations, concrete walls and cement-block masonry walls must be above grade, fully cured and free of moisture issues.

Concrete moisture testing

- All concrete, regardless of age or grade level, has certain degrees of moisture and pH that should be analyzed and taken into account before the installation.
- Perform two pH alkalinity tests for every calcium chloride test. Concrete substrates should exhibit surface pH conditions between 9 and 11, inclusively. Any pH levels higher than 11 may indicate serious moisture vapor transmission issues that need to be remediated before floor-covering installation. Any pH levels below 9 may indicate the presence of a surface coating or residue resulting from an acid rinse; 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.
- Concrete moisture testing must be performed before the application of MAPEI resilient/carpet adhesives. Refer to current Technical Data Sheets at www.mapei.com for specific limits. If test results are above the limits, install a MAPEI moisture barrier/membrane. Concrete substrates should have moisture conditions less than the desired stated limits for the installation material.
- 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.
 - ▶ 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 measures more than 15 lbs. per 1,000 sq. ft. (6,80 kg per 92,9 m²) per 24 hours, MAPEI also recommends the RH Moisture Probe Test Method; 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 using the RH Moisture Probe Test Method, if the concrete slab measures more than 95% RH, MAPEI also recommends the 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

- Concrete slabs that contain 20% or more of fly ash should be assessed and evaluated before the application of 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. Refer to ASTM F3191.
- 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. Refer to ASTM F3191.
- For compatibility information about a silicate-based admixture, consult the admixture manufacturer's Technical Services department.
- The moisture protection claims made by the admixture's manufacturer are the sole responsibility and domain of the admixture's manufacturer.
- The bond performance warranty of the adhesive to the concrete is also 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. Refer to ASTM F3191.

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. Refer to ASTM F3191.

Chemically treated concrete

- One method for installing over chemically treated concrete is to completely remove all areas of contaminated concrete by mechanical abrasion. MAPEI also recommends the application of a MAPEI epoxy-based moisture barrier; profile the concrete to a CSP of #2 to #3 when applying a MAPEI epoxy-based moisture barrier.
- As an alternative method for installing over chemically treated concrete, MAPEI offers a two-step system to clean and encapsulate chemically

treated concrete. Consult MAPEI's Technical Services Department for product recommendations.

Cement screeds and mortar beds

- MAPEI's resilient/carpet adhesives may be installed over cement screeds and cement mortar beds when they are sound and durable, securely bonded, stable, clean, dry and fully cured. Use MAPEI skimcoating compounds to smooth out rough-textured surfaces and correct irregularities in cement mortar beds and screeds before application of flooring. Note: When using a MAPEI high-moisture adhesive with no moisture limits, use only exterior-approved cement screeds and exterior-approved mortar beds.

Patching and skimcoating products

- MAPEI resilient/carpet adhesives may be installed over cement-based patching and skimcoating compounds that are hard, durable, well-bonded and fully-cured.
- Use appropriate cement-based patching and skimcoating compounds to fill holes, voids and minor irregularities in concrete and plywood floor substrates.
- Note: When using a MAPEI high-moisture adhesive with no moisture limits, use only exterior-rated or moisture-resistant patching compounds.
- If surfaces are uneven, MAPEI recommends the use of an appropriate self-leveling underlayment.
- Cement-based wall patching compounds should be used to correct minor deviations, imperfections and irregularities on concrete walls and cement-block masonry walls.

Self-leveling underlayments

- MAPEI resilient/carpet adhesives may be applied over self-leveling underlayments. Note: When using a MAPEI high-moisture adhesive with no moisture limits, use only exterior-rated or moisture-resistant self-leveling underlayments.

Concrete crack repair and joint treatment

- MAPEI's resilient/carpet adhesives and surface-preparation products 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's resilient/carpet adhesives.
 - ▶ 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.

Gypsum substrates

- MAPEI resilient/carpet adhesives and surface-preparation products may be used over gypsum-based concrete, existing gypsum-based poured underlayments and existing gypsum-based self-leveling underlayments

when they are listed as acceptable substrates with certain MAPEI resilient/carpet adhesives and surface-preparation products.

- Approved gypsum-based floor substrates must be clean, dry, fully cured, intact, well-bonded and stable.
- Gypsum wallboard must be clean, dry, stable and undamaged with paper intact. Wallpaper, vinyl wall coverings, laminates and similar nonporous surfaces must be removed. Replace gypsum wallboards if they are damaged, if the gypsum core is exposed or if the paint is not water-based.
- Gypsum-based wall patching compounds must be hard, durable, well-bonded and fully cured.
- The surface of all gypsum-based substrates must be thoroughly and completely primed.
- For details, refer to MAPEI's Technical Bulletin "Gypsum-Based Floors and Walls: Which MAPEI Products Can Be Applied?"

Epoxy substrates

- MAPEI resilient/carpet adhesives and surface-preparation products may be used over epoxy poured floors, epoxy terrazzo and epoxy moisture barriers when those substrates are listed as acceptable with those products.
- Epoxy poured floors, epoxy terrazzo and epoxy moisture barriers must be securely bonded, stable, clean and dry.
- Ensure that terrazzo strips are well bonded, stable and in good condition.
- Prepare epoxy poured floors by mechanical abrasion, such as using a sanding screen on a floor buffer. The area must then be vacuumed, mopped and allowed to dry completely. Consult MAPEI's Technical Services Department for product recommendations when sanding is not possible. Do not abrade epoxy moisture barriers.

Waterproofing membranes

- MAPEI waterproofing membranes may be desired in multi-story buildings in order to help protect living areas below from flood damage.
- In interior dry areas, approved MAPEI waterproofing membranes may be skimcoated with a specifically recommended MAPEI skimcoating product followed by an appropriate MAPEI resilient/carpet adhesive.

Note: In the case of flooding, the only warranty in effect will be the waterproofing system warranty and all warranties for MAPEI resilient/carpet adhesives and related accessories (including skimcoating compounds) will be voided due to water exposure.

- In exterior areas, MAPEI exterior-approved resilient/carpet adhesives may be used over certain exterior-approved MAPEI waterproofing membranes only when the membrane is listed as an acceptable substrate for the referenced adhesive.

Asphalt pavement

- In exterior areas, MAPEI exterior-approved resilient/carpet adhesives may be used over asphalt paving only when it is listed as an acceptable substrate and when approved by the flooring manufacturer.

- Asphalt paving must be fully cured, in good condition, clean and free of oil, dirt and coatings.

Wood underlayments

- All wood underlayments must be recommended and guaranteed by either the wood underlayment manufacturer or the flooring manufacturer. Such underlayments include Group 1 exterior-grade plywood, CC-plugged or better, conforming to APA classification and U.S. Product Standard PS 1-95 or a "SELECT" or (SEL-TF) CANPLY classified exterior-grade plywood conforming to CSA-0121 for exterior fir.
- Plywood surfaces must be installed with the smooth side facing up.
- The adjacent edges of the plywood sheets should not be more than 1/32" (1 mm) out of plane.
- Plywood subfloors should be double-layered.
- The base layer should be plywood at least 5/8" (16 mm) thick over joist and 16" (41 cm) on center. Follow the plywood manufacturer's recommendations regarding proper application. A second layer – a wood underlayment at least 1/4" (6 mm) thick – is required for all resilient sheet vinyl flooring; thicker boards may be required for commercial applications.
- Do not install MAPEI's resilient/carpet adhesives over bamboo flooring, glue-down engineered wood flooring, glue-down solid wood flooring or similar types of dimensionally unstable materials. Plank-board subfloors, stripwood subfloors and nailed-down solid wood flooring must be covered over with at least one layer of plywood (with a minimum thickness of 1/4" [6 mm]) that must be properly fastened according to industry standards.
- Do not install resilient/carpet adhesives over fire-treated plywood.
- Certain MAPEI resilient/carpet adhesives and surface-preparation products may be installed over underlayment-grade particleboard, underlayment-grade Lauan plywood, marine plywood, pressure-treated plywood and Exposure 1 oriented strand board (OSB) under specific conditions – when recommended by MAPEI and when approved by the flooring manufacturer. Follow the flooring manufacturer's recommendations regarding acceptable wood underlayments.
- Plywood subfloors must have at least 18" (46 cm) of cross-ventilated air space between the underside of the subfloor and the ground. Cover the ground surface of crawl spaces with a suitable vapor barrier.
- Under no circumstances should any floor material be laid over wood subfloors that have experienced conditions that might cause buckling or rotting of the wood.
- Always replace wood subfloors or underlayments that have been subjected to water damage.

Fiberglass

- Certain MAPEI resilient/carpet adhesives may be used over fiberglass when it is listed as an acceptable substrate and when approved by the flooring manufacturer. The fiberglass must be in good condition, clean and free of oil, dirt, paint and coatings.

Metal

- Certain MAPEI resilient/carpet adhesives may be used over steel and aluminum when they are listed as acceptable substrates for those products and when recommended as suitable substrates by the flooring manufacturer.
- Steel and aluminum substrates must be rigid, solidly fixed in place, and free of paint, primer, oil and corrosion.
- Prepare steel and aluminum surfaces with a light sandblast and then wipe the surface clean with a residue-free solvent such as acetone.

Flooring adhesive residues

Cutback adhesive residue

- MAPEI's resilient/carpet adhesives and surface-preparation products may be used over cutback adhesive residue when it is listed as an acceptable substrate for those products. Cutback adhesive residue by definition is the black/brown stain remaining in the concrete/plywood after all areas have been completely scraped.
- **Warning:** 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 RFCI's Recommended Work Practices. Follow all local, state/provincial and federal regulations as well as industry standards when removing asbestos-based materials.
- Cutback adhesive that does not contain asbestos must be fully and thoroughly scraped so that only a very thin layer of residue remains. The top surface of the concrete or plywood should be visible through the adhesive.
- Note that chemical removal methods are not recommended. If the concrete has already been chemically abated, refer to the section "Chemically treated concrete" in this guide.

Carpet adhesive residue

- Certain MAPEI primers and skimcoating compounds may be used over carpet adhesive residue when it is listed as an acceptable substrate for them.
- Carpet adhesive must be fully and thoroughly scraped so that only a very thin layer of residue remains. The top surface of the concrete or plywood should be visible through the adhesive.
- Note: If acrylic-based adhesives will be used to bond vinyl-backed flooring or rubber-backed flooring over carpet adhesive residue, that residue should be isolated with a thin layer of cement-based patching compound to protect the installation from plasticizer migration and potential floor failure.

Urethane adhesive residue

- Urethane adhesive must be well scraped so that only a very thin layer of residue remains. Certain MAPEI primers may be used over urethane adhesive residue when it is listed as an acceptable substrate for them. The primer must be followed with a compatible skimcoating compound or self-leveling underlayment.

Existing flooring

- MAPEI resilient/carpet adhesives and surface-preparation products may be used over certain types of existing flooring only when that existing flooring is listed as an acceptable substrate for them and when recommended by the flooring manufacturer. Do not install MAPEI resilient/carpet adhesives and surface-preparation products over linoleum, foam-backed/cushion-backed vinyl, self-stick tile, rubber flooring, laminate flooring, glass tile, bamboo flooring, glue-down engineered wood flooring, glue-down solid wood flooring or other dimensionally unstable and/or nonporous materials.
- Note that in cases where the existing floor covering lacks asbestos but has any type of texture (such as raised patterned residential sheet vinyl and tile/grout lines in ceramic) and a secondary layer of resilient flooring is to be installed, all embossed areas must be completely leveled with an appropriate embossing leveler or primer/skimcoating compound.
- Vinyl composition tile (VCT), noncushioned sheet vinyl, ceramic tile, porcelain tile, quarry tile, natural stone tile and cement terrazzo must be securely bonded, stable, clean and dry.
- **Warning:** 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 RFCI's Recommended Work Practices. Follow all local, state/provincial and federal regulations as well as industry standards when removal is required.

Vinyl composition tile (VCT)

- VCT must be limited to one layer only. A commercial-grade wax stripper must be used to remove any dirt, oil, grease, wax or sealer. The area must be rinsed well with clean water and allowed to dry completely. A light sanding of the VCT may be required before the application of some MAPEI products. The area must then be vacuumed, mopped and allowed to dry completely. Consult MAPEI's Technical Services Department for product recommendations when sanding is not possible.

Noncushioned sheet vinyl

- Noncushioned sheet vinyl with a vinyl or urethane wear layer must be fully adhered (not perimeter-glued) and limited to one layer only. New vinyl and vinyl with a urethane wear layer must be slightly roughened to dull the finish (60-grit sandpaper is recommended). The wear layer must remain intact, and the underlying sheet-vinyl paper should not become exposed. The area must then be vacuumed, mopped and allowed to dry completely.

Ceramic, porcelain, quarry and natural-stone tile

- Well-bonded, ceramic tile, porcelain tile, quarry tile and natural stone may require a light sanding before the application of some MAPEI products. The area must then be vacuumed, mopped and allowed to dry completely. The grout lines must receive a thorough brush cleaning. Consult MAPEI's Technical Services Department for product recommendations when sanding is not possible.

Existing cement terrazzo

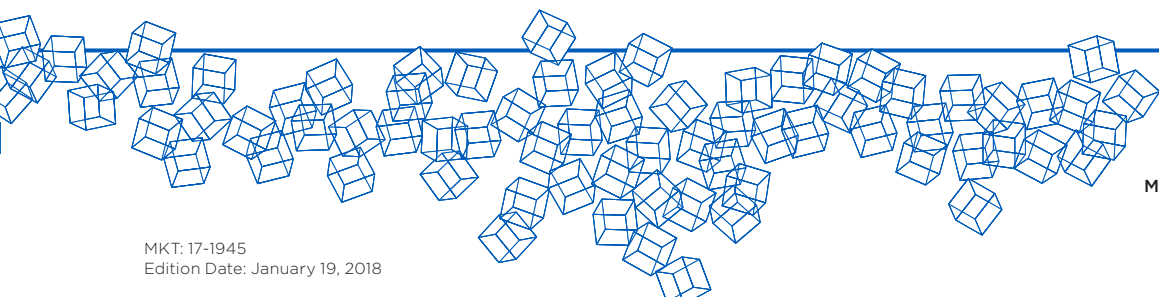
- Ensure that the existing cement terrazzo and metal divider strips are well bonded and in good condition.

- Prepare cement terrazzo floors by mechanical abrasion (such as sanding) in order to remove any sealers and roughen the surface. The area must then be vacuumed, mopped and allowed to dry completely. Consult MAPEI's Technical Services Department for product recommendations when sanding is not possible.
- Before any patching takes place, prime the metal divider strips on the existing terrazzo installation.

Completing the Installation

- Using a total MAPEI installation system – including recommended MAPEI resilient/carpet adhesives in conjunction with recommended MAPEI surface-preparation products and MAPEI moisture barriers/membranes – ensures compatibility that will likely result in a reliable, long-term, successful installation.

Consult MAPEI's Technical Services Department for product recommendations, installation considerations and approvals regarding substrates and conditions not listed in this guide. For details related to product use and safety, refer to current individual Safety Data Sheets of MAPEI products.



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