

PRODUCTS FOR WOOD FLOORING

Surface-preparation requirements: Wood adhesives

This guide is specifically for MAPEI's wood-flooring adhesives and moisture-controlling wood-flooring adhesives as well as related products and accessories.

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 and 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 inspect landscaping and topography which should be graded to create a slope that moves water away from the building.

Jobsite Conditions

Refer to the National Wood Flooring Association's (NWFA) Wood Flooring Installation Guidelines and Methods, NWFA's Jobsite Checklist, ACI 302.2R – Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials, 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 wood-flooring manufacturer's guidelines regarding site conditions, surface-preparation requirements, acceptable underlayments, proper conditioning of wood flooring, and moisture content. In addition, refer to the correlating industry standard(s) such as NWFA's Wood Flooring Installation Guidelines and Methods, and ACI 302.2R – Guide for Concrete Slabs that Receive Moisture-Sensitive Flooring Materials. Note that exotic species of solid wood flooring may require longer acclimation periods. Refer to the written instructions of the wood-flooring manufacturer and/or the NWFA.
- 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 and other types of coatings, existing moisture treatment products, 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. 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. 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 level and flat to a tolerance in plane of 3/16" (4,5 mm) in 10 feet (3,05 m) or 1/8" (3 mm) in 6 feet (1,83 m) radius. Refer to the flooring manufacturer's guidelines. Imperfections and irregularities (such as holes, voids, bumps and depressions) must be corrected with the appropriate material, and surfaces must be even before the application of MAPEI wood adhesives. Refer to the sections "Patches" and "Self-Leveling Underlayments" in this guide for options. Consult MAPEI's Technical Services Department for specific product recommendations.
- All buildings must be fully enclosed (doors, walls, windows, roof, etc.). HVAC systems must be fully functional and operating continuously within design parameters. Do not install glue-down wood flooring in buildings that are not climate-controlled. Backup generators are highly recommended, as power outages can cause rapid temperature and humidity changes that can result in wood-flooring failures. Follow the wood-flooring manufacturer's guidelines for climate control settings (temperature and humidity). Maintain these environmental conditions throughout the installation process. Building owners should be advised of the wood-flooring manufacturer's guidelines for climate control settings (temperature and humidity). These conditions must be maintained and kept constant in order to ensure the overall performance and long-term success of the installation.
- Refer to MAPEI's current Technical Data Sheets for the recommended substrate and ambient (air) temperature requirements 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 wood adhesives and surface-preparation products. Radiant-heat flooring systems must be fully functional and in operation for 2 weeks before wood-flooring installations. Floor-heating systems must be fully encapsulated with a cement-based or gypsum-based self-leveling underlayment in order to receive MAPEI wood adhesives and related products. When MAPEI moisture-controlling wood adhesives are used over heated floors, moisture-barrier properties do not apply. Use a traditional wood-flooring trowel. Refer to the radiant-heat manufacturer's written instructions for approved installation methods.
- Do not install wood flooring in areas or with conditions not recommended by the flooring manufacturer or not recommended by MAPEI. Check with the wood-flooring manufacturer for approval in below-grade areas.
- Wood is a natural product and therefore has the potential to become a food source for mold and/or mildew growth when moisture is present. For this reason, it is important to thoroughly inspect the installation area for any signs of existing mold or mildew. If mold or mildew is discovered, a local mold-remediation professional should be immediately contacted. Do not proceed with the installation of wood flooring until all contaminated material has been completely cleaned and/or removed by a mold-remediation professional.

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 wood adhesive.
- When MAPEI wood adhesives without built-in moisture control are installed, concrete substrates must be at least 28 days old.
- When MAPEI moisture-controlling wood adhesives are installed, concrete substrates must be at least 14 days old.
- For installations of all MAPEI wood adhesives, including moisture-controlling wood adhesives, 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.
- Concrete surfaces must be porous and have a light broom finish. Do not install over extremely smooth, nonporous or glass-like concrete surfaces. If the substrate is glass-like or nonporous, it must be mechanically profiled and prepared by shotblasting, sandblasting, water jetting, scarifying or other engineer-approved methods to an International Concrete Repair Institute (ICRI) concrete surface profile (CSP) #2 to #3 standard.
- Following mechanical abrasion/profiled, use appropriate MAPEI surface-preparation products to prepare the surface to receive the flooring and installation material. Refer to the sections "Patches" and "Self-Leveling Underlayments" in this guide for options.

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's wood adhesives without built-in moisture control, 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 residue remaining 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. Note that pH tests are not required for MAPEI's moisture-controlling wood adhesives.
- Concrete moisture testing must be performed before the application of any MAPEI wood adhesive, unless otherwise stated. Refer to current Technical Data Sheets at www.mapei.com for specific limits on MAPEI's wood adhesives and surface-preparation products. 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 RH Moisture Probe Test Method.
 - ▶ Calcium Chloride Test Method (ASTM F1869) – Standard Test Method for Measuring Moisture Vapor Emission Rate (MVER) of Concrete Subfloor Using Anhydrous Calcium Chloride. When using the Calcium Chloride Test Method, if the concrete slab measures more than 5 lbs. per 1,000 sq. ft. (2,27 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) – 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 relative humidity measures more than 80%, 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.
- 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 supplementary cementitious materials, such as 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

- Completely remove all areas of contaminated concrete by mechanical abrasion. Application of a MAPEI epoxy-based moisture barrier is also recommended. Profile the concrete to a CSP of #2 to #3 when applying a MAPEI epoxy-based moisture barrier.
- As an alternative method, 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 wood adhesives without built-in moisture control may be installed over standard Portland-cement screeds and cement mortar beds when they are sound and durable, securely bonded, stable, clean, dry and fully cured.
- MAPEI's moisture-controlling wood adhesives may be installed over exterior-rated cement-based mortar beds and exterior-rated cement screeds when they are sound and durable, securely bonded, stable, clean, dry and fully cured.

Patches

- When MAPEI's wood adhesives without built-in moisture control are used, utilize cement-based patching compounds to fill holes, voids and minor irregularities in concrete and approved wood underlayments.
- When MAPEI moisture-controlling wood adhesives are used, utilize only exterior-rated or moisture-resistant patching compounds to fill holes, voids and minor irregularities in concrete.
- If surfaces are uneven, use an appropriate self-leveling underlayment. Note that skimcoats are not recommended for installations of bamboo and solid wood flooring.

Self-leveling underlayments

- MAPEI's wood adhesives without built-in moisture control may be applied over all MAPEI cement-based self-leveling underlayments.

- When MAPEI's moisture-controlling adhesives are used, utilize only exterior-rated or moisture-resistant self-leveling underlayments.
- A self-leveling underlayment that is at least 1/4" (6 mm) thick is recommended for stability beneath all installations of bamboo and solid wood flooring.

Concrete crack repair and joint treatment

- MAPEI wood 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 the application of MAPEI's wood 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 wood adhesives may be used over gypsum-based concrete, existing gypsum-based poured underlayments and existing gypsum-based self-leveling underlayments.
- Approved gypsum-based floor substrates must be clean, dry, fully cured, intact, well-bonded and stable.
- 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?"
- When MAPEI moisture-controlling wood adhesives are used over gypsum substrates, moisture-barrier properties do not apply. Use a traditional wood-flooring trowel.

Epoxy substrates

- MAPEI wood adhesives 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's waterproofing membranes may be desired in multi-story buildings in order to help protect living areas below from flood damage. The recommendation of certain MAPEI waterproofing membranes used in conjunction with certain MAPEI wood adhesives is limited to installations of engineered wood flooring only.
- Approved MAPEI waterproofing membranes must be skimcoated with a specifically recommended MAPEI skimcoating product before the application of MAPEI's wood adhesives.
- When MAPEI moisture-controlling wood adhesives are used over layering systems with waterproofing membranes, moisture-barrier properties do not apply. Use a traditional wood-flooring trowel.

Note: In the case of flooding, the only warranty in effect will be the waterproofing system warranty, and all warranties for MAPEI wood adhesives and related accessories (including patching compounds) will be voided due to water exposure. In all cases where a waterproofing membrane is required and MAPEI materials have been installed over the waterproofing membrane, the warranty coverage remains in effect as long as the system remains dry.

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. When MAPEI moisture-controlling wood adhesives are used over wood underlayments, moisture-barrier properties do not apply. Use a traditional wood-flooring trowel.
- 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; thicker boards may be required for commercial applications.
- Plank-board subfloors, stripwood subfloors and nailed-down solid wood flooring must be covered over with at least one layer of plywood (at least 3/8" [10 mm] thick) that must be properly fastened according to industry standards.
- Do not install MAPEI's wood adhesives or related products or accessories over bamboo flooring, glue-down engineered wood flooring, glue-down solid wood flooring, particleboard, Luan plywood, fire-treated plywood or similar types of dimensionally unstable materials.
- Certain MAPEI wood adhesives and surface-preparation products may be installed over oriented strand board (OSB) rated as Exposure 1 under

specific conditions – when recommended by MAPEI as a substrate for particular adhesives, and when approved by the flooring manufacturer.

- Do not install over a subfloor that is in direct contact with the ground. The plywood must have at least 18" (46 cm) of air space between the underside of the subfloor and the ground. Also, the ground surface must be covered with a suitable vapor barrier, and all crawl spaces must be sealed and fully climate-controlled.
- In any floor-covering installation, the plywood subfloor should be dry. The moisture content of the plywood must be within the recommended range of the moisture content of the wood flooring to be installed. Refer to the written installation instructions of the wood-flooring manufacturer regarding moisture content. Follow NWFA's Wood Flooring Installation Guidelines and Methods.
- 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.

Flooring adhesive residues

- Remove all existing flooring adhesives by scraping, followed by mechanical abrasion such as grinding, shotblasting or bead blasting. All traces of the adhesive must be completely removed.
- **Warning:** All cutback adhesive should be tested for asbestos before removal. Do not sand any cutback adhesive that contains asbestos. Follow all local, state/provincial and federal regulations as well as industry standards when removing asbestos-containing materials.
- Note that chemical removal methods are not recommended. If the concrete has already been chemically treated, refer to the section "Chemically treated concrete" in this guide.

Existing flooring

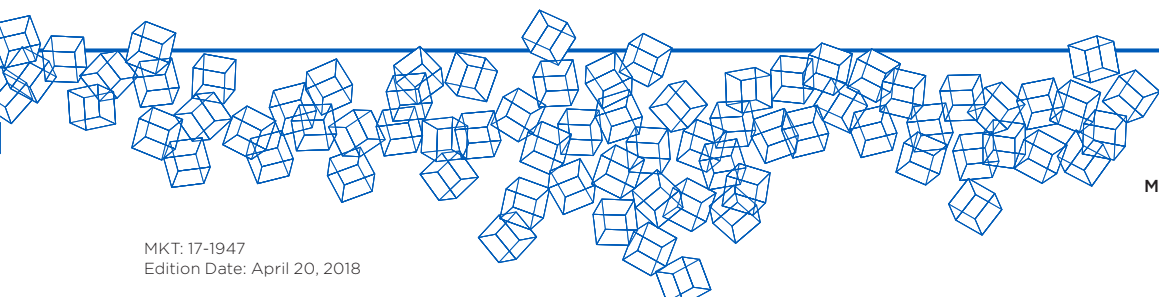
- MAPEI's wood adhesives may be used over certain types of existing flooring only when the existing flooring is listed as an acceptable substrate for certain MAPEI wood adhesives and when recommended by the flooring manufacturer.
- **Warning:** Do not install MAPEI products over vinyl asbestos tile (VAT) or any flooring, adhesive, substrate or substance that may contain asbestos. Follow all local, state/provincial and federal regulations as well as industry standards when removing asbestos-based materials.

- Do not install MAPEI's wood adhesives over linoleum, sheet vinyl, vinyl tile, self-stick tile, vinyl composition tile (VCT), 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.
- Ceramic tile, porcelain tile, quarry tile, natural-stone tile, cement terrazzo and terrazzo divider strips must be securely bonded and in good condition.
- Prepare all surfaces 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.
- Tile grout lines must receive a thorough brush cleaning.

Completing the Installation

- Using a total MAPEI installation system – including recommended MAPEI wood adhesives in conjunction with recommended MAPEI surface-preparation products – ensures compatibility that will likely result in a reliable, long-term, successful installation.
- MAPEI's wood adhesives – including moisture-controlling wood-flooring adhesives – will not prevent flooring failures due to water or excess moisture coming from sources above, such as floods, leaks, improper cleaning procedures or high ambient (air) humidity levels.

Consult MAPEI's Technical Services Department for installation recommendations 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. Also refer to other MAPEI Reference Guides as appropriate to the installation.



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MAPEI Headquarters of North America
1144 East Newport Center Drive
Deerfield Beach, Florida 33442
1-888-US-MAPEI (1-888-876-2734) /
(954) 246-8888