

# Surface-Preparation Requirements for Self-Leveling Underlayments

## Floor Covering Installation Systems



## Reference Guide RGF0214

This guide is specifically for MAPEI self-leveling underlayments. For questions regarding surface-preparation requirements for MAPEI self-leveling toppings, such as *Ultratop*<sup>®</sup>, please contact MAPEI's Technical Services Department.

### 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, 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.

### JOBSITE CONDITIONS

Self-leveling underlayments are for interior use only. In areas where the finished flooring will be ceramic tile and/or stone, install MAPEI self-leveling underlayments in areas meeting Tile Council of North America (TCNA) Res1, Res2, Com1 and Com2 classifications. In areas where the finished flooring will be resilient flooring, refer to ASTM F710 and ACI 302.2R standards.

For product recommendations concerning leveling in wet areas or exterior areas, contact MAPEI's Technical Services Department.

### SURFACE PREPARATION

#### 1. General

- 1.1 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.
- 1.2 **Warning:** 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.  
**Note:** Chemical removal methods are not recommended. If concrete has already been chemically abated, refer to Section 4 in this guide.
- 1.3 Maintain environmental conditions throughout the installation process. Refer to MAPEI's Technical Data Sheets (TDSs) for the recommended application temperature range. Exhaust any temporary heaters to the building's exterior to prevent damage to the installation from carbon dioxide emanations.
  - 1.3.1 Turn off all forced ventilation (turbo fans and floor fans) and floor-heating systems before installation. If the floor-heating system is the only form of heat in the building, use space heaters as needed to achieve the minimum temperature requirements.

- 1.4 All MAPEI self-leveling underlayments require the use of one of the MAPEI primers. Consult Reference Guide RGC0609 for primer selection. Also refer to current TDSs for details.

#### 2. Concrete (General)

- 2.1 The use of an appropriate MAPEI primer is required. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 2.2 The specific composition of the concrete should be in accordance with the guidelines and practices of American Concrete Institute (ACI) standards. The concrete should have a density of at least 100 lbs. per 1 cu. ft. (45,4 kg per 0,028 m<sup>3</sup>).
- 2.3 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.) This barrier must be resistant to deterioration as well as to puncturing during construction, and must remain intact and continuous.
- 2.4 Perform several alkalinity tests; pH levels between 5 and 11 are acceptable. Consult MAPEI's Technical Services Department for product recommendations for correcting pH levels outside this range, and correct any areas that are below or above this range. Refer to TDSs for details.
- 2.5 Bonding issues may exist with concrete floors containing a supplementary cementitious material such as – but not limited to – fly ash with a content of 20% or higher, with concrete containing admixtures and with concrete that has a hard-troweled finish. For these reasons, a bond test should always be performed to confirm an adequate bond. If an adequate bond cannot be achieved, the concrete surface should be abraded by mechanical or chemical means (such as MAPEI's *Planiprep*<sup>™</sup> SA). Additional bond tests should be conducted; if an adequate bond cannot be achieved, contact MAPEI's Technical Services Department. Depending on the final surface profile, various floor coverings may be installed directly (using the appropriate bonding materials) or the surface can be made suitable by any number of MAPEI surface-preparation products. Consult the specific TDSs of these products for the most current and complete information.
- 2.6 When applying MAPEI self-leveling underlayments over concrete, honor all expansion and movement joints. Provide additional expansion joints where specified, including – but not limited to – the perimeter of the room, columns, supports and equipment pedestals. Use self-adhesive foam weatherstripping or sill plate foam to form the perimeter expansion joints. Do not bridge expansion or moving joints. Ensure that such joints are honored completely through the primer and leveling system. In areas where the finished flooring will be ceramic tile and/or stone, refer to TCNA Detail EJ171 for guidelines on movement joints or Terrazzo, Tile & Marble Association of Canada (TTMAC) Specification Guide 09 30 00, Detail 301MJ. In areas where the finished flooring will be resilient flooring, refer to ASTM F710 and ACI 302.2R standards.
- 2.7 When applying MAPEI self-leveling underlayments over existing non-moving control joints, mark the control joints on nearby columns and

walls. When the self-leveling underlayment is dry enough to be walked upon, use a grinder to restore saw-cut joints into the self-leveling underlayment. Reference the markings for proper placement.

- 2.8 Concrete slabs have the tendency to expand, contract, shift and move due to curing, temperature changes, seasonal changes, ground settlement, heavy loads, vibration and the Earth's natural forces. When dealing with existing cracks, consult with an experienced engineer to determine appropriate crack-repair procedures. MAPEI does not warrant against concrete slab movement or against moisture coming up through cracks.

### 3. Concrete Moisture Testing

- 3.1 Concrete moisture testing must be performed before the application of MAPEI self-leveling underlayments and primers.
- 3.2 All concrete substrates must be fully cured and free of any hydrostatic pressure.
- 3.3 Inspect jobsite conditions around the exterior of the building. Consider whether foundation plantings, mulch beds, sprinkler systems, gutters and drainage issues may cause seasonal moisture problems or sporadic elevated moisture conditions inside the building.
- 3.4 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.
- 3.5 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:** Pin meters commonly used to measure the moisture content of wood flooring are not acceptable tools for qualifying a concrete slab to receive a self-leveling underlayment.

- 3.5.1 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 m<sup>2</sup>) per 24 hours, MAPEI also recommends an RH Moisture Probe Test. Follow the most current instructions set forth by ASTM F2170.
- 3.5.2 RH Moisture Probe Test Method (ASTM F2170) – 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 80% RH, MAPEI also recommends a Calcium Chloride Test Method. Follow the most current instructions as set forth by ASTM F1869.
- 3.6 All components in the flooring system (primers, levelers, membranes, setting materials, adhesives and the flooring itself) should be considered regarding the maximum allowable MVER and/or RH.
  - 3.6.1 Consult individual TDSs regarding the maximum allowable MVER and RH for all MAPEI products.
  - 3.6.2 Refer to the flooring manufacturer's written instructions for the moisture limits of the flooring material.
  - 3.6.3 Work should not begin if the maximum allowable MVER and/or RH exceeds MAPEI's or the flooring manufacturer's moisture limits. For such a case, refer to Step 3.7.
- 3.7 Use a MAPEI epoxy moisture barrier to treat concrete slabs with elevated moisture conditions. Consult MAPEI's Technical Services Department for product recommendations. Refer to current TDSs for details.

### 4. Chemically Treated Concrete

- 4.1 Chemical residue may reside in concrete slabs that have been chemically treated to aid in the removal of floor coverings and adhesives during asbestos abatement procedures. There are two options when dealing with chemically abated concrete: Remove the contaminated area, or clean it and encapsulate it.
  - 4.1.1 Remove all areas of contaminated concrete by mechanical abrasion. This should be achievable by ensuring the removal of at least 1/8" (3 mm) of the thickness of the concrete's top layer.
  - 4.1.2 As an alternative method, MAPEI offers a two-step system to clean and encapsulate the concrete. Consult MAPEI's Technical Services Department for product recommendations.

### 5. Concrete Tilt-Up Construction

- 5.1 The use of bond-breaking coatings is common in tilt-up construction. These coatings are designed to create a non-stick surface in order to facilitate the placement of concrete panels. When these bond breakers are exposed to rain and water, a slick, water-resistant, nonporous residue will often remain, preventing the proper adhesion of MAPEI primers. For this reason, all bond-breaking coatings must be thoroughly removed. Follow the coating manufacturer's written instructions for proper cleaning and removal procedures.
- 5.2 Perform a bond test to ensure the total elimination of the bond breaker before proceeding with the installation.

### 6. Existing Cement Mortar Beds and Cement Screeds

- 6.1 The use of an appropriate MAPEI primer is required. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 6.2 Do not install MAPEI self-leveling underlayments over any patching compounds or skimcoating products.
- 6.3 MAPEI self-leveling underlayments may be installed over cement screeds and cement mortar beds when they are sound and durable, securely bonded, stable, clean, dry and fully cured.

### 7. Gypsum-Based Concrete, Existing Gypsum-Based Poured Underlayments and Existing Gypsum-Based Self-Leveling Underlayments

- 7.1 The surface of the gypsum-based substrate must be thoroughly and completely primed. Refer to MAPEI Technical Bulletin #010313-TB, "Gypsum-Based Floors and Walls: Which MAPEI Products Can Be Applied?" and Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection.
- 7.2 Approved gypsum-based substrates must be clean, dry, fully cured, intact, well-bonded, stable and free of existing cracks. Refer to MAPEI Technical Bulletin #010313-TB for details.
- 7.3 Do not install MAPEI self-leveling underlayments over any gypsum-based patching compounds.

### 8. Heated Floors

- 8.1 Install electric and hydronic radiant-heat systems in strict accordance with the written instructions of the radiant-heat system manufacturer.
- 8.2 Turn off radiant-heat systems at least 48 hours before installation of MAPEI primers and self-leveling underlayments, and keep them off during installation. Wait at least 48 hours after the installation before turning the systems on.
- 8.3 When using MAPEI self-leveling underlayments over radiant-heat systems, it is important to measure and calculate the thickness that will be needed to achieve the proper encapsulation. Ensure that the requirement will not exceed the maximum thickness limit of the self-leveling underlayment. Consult MAPEI's Technical Services Department for product recommendations. Refer to current TDSs for details.
- 8.4 Some hairline cracks may develop near or immediately above heating elements (cable or flexible piping); this is to be expected during the initial drying.
- 8.5 To help avoid reflective cracking to tile or stone flooring, use a MAPEI crack-isolation membrane after the initial curing is achieved.

### 9. Membranes for Waterproofing, Sound Control, Crack Isolation and Moisture Reduction

- 9.1 MAPEI self-leveling underlayments may be used over 100%-solids, epoxy-based moisture barriers in conjunction with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 9.2 Do not install MAPEI self-leveling underlayments over waterproofing membranes, uncoupling membranes, crack-isolation membranes or sound-control membranes/underlayments.
- 9.3 Waterproofing, uncoupling, crack-isolation and sound-control membranes should only be applied over (and not under) MAPEI self-leveling underlayments.

### 10. Wood Underlayments

- 10.1 The use of an appropriate MAPEI primer is required. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.

- 10.2 Do not install MAPEI self-leveling underlayments over particleboard, Lauan plywood, presswood, bamboo flooring, glue-down engineered wood flooring, glue-down solid wood flooring or similar types of dimensionally unstable materials.
- 10.3 Wood underlayments must be Group 1 exterior-grade plywood, CC-plugged or better, conforming to APA classification and U.S. Product Standard PS 1-95 or COFI-classified "SELECT" or (SEL-TF) CANPLY-classified exterior-grade plywood conforming to CSA-0121 standard for Douglas fir.
- 10.4 MAPEI self-leveling underlayments may be used over oriented strand board (OSB) when it is listed as an acceptable substrate with certain specific MAPEI primers and self-leveling underlayments.
- 10.5 Plywood subfloors must consist of two layers of exterior-grade plywood (a minimum thickness of 5/8" [16 mm] per layer to equal a total thickness of at least 1-1/4" [3.2 cm]).
- 10.6 When applying MAPEI underlayments to plywood flooring, installation requirements (finished flooring, load, use and/or deflection) may require the utilization of *Mapelath™* or diamond mesh (meeting the requirements of ASTM C847) on top of the primed surface before the underlayment application. In all cases, one can anticipate better performance when utilizing lath, particularly over OSB.
- 10.7 Plywood surfaces must be installed with the smooth side facing up.
- 10.8 The adjacent edges of the plywood sheets should not be more than 1/32" (1 mm) out of plane.
- 10.9 Fill plywood joints using a caulking compound. Consult MAPEI's Technical Services Department for product recommendations. Refer to current TDSs for details.
- 10.10 Do not install over a subfloor that is in direct contact with the ground. The plywood 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.
- 10.11 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.
- 10.12 Always replace wood subfloors or underlayments that have been subjected to water damage.
- 10.13 Plank-board subfloors, stripwood subfloors and nailed-down solid wood flooring must be covered over with at least one layer of exterior-grade plywood (a minimum thickness of 5/8" [16 mm]) that must be properly fastened according to industry standards.

### 11. Cement Backer Units (CBUs) and Fiber Cement Boards

- 11.1 The use of an appropriate MAPEI primer is required. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 11.2 CBUs and fiber cement boards must be installed in strict accordance with the written instructions of the board manufacturer.

### 12. Cutback Adhesive Residue

- 12.1 MAPEI self-leveling underlayments may be used over cutback adhesive residue when it is listed as an acceptable substrate with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- Note:** Cutback adhesive residue by definition is the black/brown stain remaining in the concrete/plywood after all areas have been completely scraped.
- 12.2 **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 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.
- 12.3 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:** Chemical removal methods are not recommended. If the concrete has already been chemically abated, refer to Section 4 in this guide.

### 13. Carpet Adhesive Residues

- 13.1 MAPEI self-leveling underlayments may be used over carpet adhesive residue when it is listed as an acceptable substrate with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 13.2 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.
- 13.3 Carpet adhesive residue may also be completely removed using an approved MAPEI three-step system. Consult MAPEI's Technical Services Department for product recommendations.

### 14. Urethane Adhesive Residues

- 14.1 MAPEI self-leveling underlayments may be used over urethane adhesive residue when it is listed as an acceptable substrate with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 14.2 Urethane adhesive must be well scraped so that only a very thin layer of residue remains.

### 15. Existing Flooring

- 15.1 MAPEI self-leveling underlayments may be used over certain types of existing flooring only when the existing flooring is listed as an acceptable substrate with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 15.2 **Warning:** Do not install MAPEI self-leveling underlayments over vinyl asbestos tile (VAT) or any flooring, adhesive, substrate or substance that may contain asbestos.
- 15.2.1 Existing flooring materials and existing flooring adhesives that were installed before 1981 should be tested for asbestos before removal.
- 15.2.2 Do not sand any flooring or 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 mechanical removal is required.
- 15.3 Existing vinyl composition tile (VCT), ceramic tile, porcelain tile, quarry tile, natural stone tile and cement terrazzo must be securely bonded, stable, clean and dry.
- 15.3.1 A light sanding of the existing flooring may be required before the application of some MAPEI primers. The area must then be vacuumed, mopped and allowed to dry completely. Consult MAPEI's Technical Services Department for primer recommendations when sanding is not possible.
- 15.4 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.
- 15.5 Do not install MAPEI self-leveling underlayments over sheet vinyl, linoleum, luxury vinyl tile (square or plank), 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.

### 16. Epoxy Poured Floors, Epoxy Terrazzo and Epoxy Moisture Barriers

- 16.1 MAPEI self-leveling underlayments may be used over epoxy poured floors, epoxy terrazzo and epoxy moisture barriers when they are listed as acceptable substrates with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials – Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 16.2 Epoxy poured floors, epoxy terrazzo and epoxy moisture barriers must be securely bonded, stable, clean and dry.
- 16.3 Prepare existing epoxy terrazzo and epoxy poured floors by mechanical abrasion, such as using a sanding screen on a floor buffer.

## 17. Metal

- 17.1 MAPEI self-leveling underlayments may be used over metal substrates such as steel, copper and lead with certain specific MAPEI primers. Consult Reference Guide RGC0609, "Primers for Self-Leveling Materials Product Selection Guide," for primer selection. Refer to current TDSs for details.
- 17.2 Metal substrates must be rigid, solidly fixed in place, clean and free of corrosion.
- 17.3 Prepare metal surfaces with a light sand blast. Then, wipe the surface clean with a residue-free solvent.

## 18. Double Layers of MAPEI Self-Leveling Underlayments

- 18.1 MAPEI self-leveling underlayments may be poured in two layers. The total thickness of the two combined layers must not exceed the maximum thickness limit of the self-leveling underlayment. Refer to current TDSs for details.
- 18.2 Allow the first layer to dry for 24 hours and then apply primer. Allow the primer to dry completely before pouring the second layer of self-leveling underlayment.
- 18.3 When thicker pours are needed, use aggregate as an extender for the first layer and then pour the second layer without aggregate. Refer to current TDSs for details or contact MAPEI Technical Services Department for recommendations.

Protect work against drafts during installation and for at least 72 hours after completion in order to prevent damage to substrates, installation products and flooring materials.

Contact MAPEI's Technical Services Department regarding installation of MAPEI self-leveling underlayments over unique/special substrates and/or for any condition not listed above.

Using a total MAPEI installation system – including recommended MAPEI tile-setting materials and/or adhesives in conjunction with recommended MAPEI surface-preparation products – ensures compatibility that will ultimately result in a reliable, long-term, successful installation.

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



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