

INTRODUCTION

The aim of this document is to offer guidelines to help correctly prepare substrates for the successful subsequent application of ceramic and stone floor coverings.

Fundamentally, an installed system is only as strong as the strength of the weakest bond between two successive layers. The correct preparation of the substrate is the first major step in achieving successful adhesion.

The correct method of preparing the substrate will differ depending on the substrate material, characteristics, and site conditions. As such, specific recommendations may vary from the information contained in this document. However, the recommendations listed are appropriate in their defined applications.

Consult MAPEI's technical representatives for installation recommendations regarding substrates and conditions not listed in this guide.

ENVIRONMENTAL REQUIREMENTS

- Maintain adequate environmental conditions and protect work during and after installation. Where necessary, build temporary shelter and/or use indirect auxiliary heaters to maintain suitable temperature levels in the working environment.
- Maintain substrate and ambient temperatures in tiled areas at between 5°C and 35°C during installation and for at least 7 days after completion, unless otherwise indicated in the product instructions. Both temperature and humidity have an effect on how products cure and develop strength.
- Turn off all forced ventilation and protect the work against drafts during installation and for at least 72 hours after completion.
- Comply with trade and industry standards, construction work health and safety, and any manufacturer's printed recommendations throughout the works.
- Consider the surrounding environment by disposing of any harsh chemicals, materials, and products in the appropriate manner.

JOBSITE EXAMINATION

Before work commences, examine the areas which are to receive tiling and report any deficiencies or adverse conditions in writing to the general contractor, owner, developer or architect. Do not proceed with work until surfaces and conditions comply with the requirements indicated in the manufacturer's instructions, applicable industry standard, federal, state, local regulations and good work practices. The commencement of work indicates that the applicator/user acknowledges the substrate and conditions as acceptable for installation.

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, standing water, laitance, old paint, curing compounds, concrete sealers, loosely bonded toppings, release agents, old adhesive residues (unless otherwise recommended by MAPEI) and any other deleterious substance or contaminate that may prevent or reduce adhesion. If the substrate contains these substances, they must be removed via mechanical means.

1.1.1 **Warning:** Do not install over vinyl asbestos tile (VAT) or any flooring, substrate or substance that may contain asbestos. For removal instructions, refer to the Resilient Floor Covering Institute's Recommended Work Practices and follow all local, state and federal regulations and industry standards when mechanical removal is required.

1.1.2 **Warning:** Certain paints may contain lead. Exposure to excessive amounts of lead dust presents a health hazard. Refer to applicable federal, state and local laws regarding the appropriate methods for identifying and removing lead-based paint.

1.2 Examples of mechanical preparation include diamond grinders, scarifiers, water-jet blasting, sanding, and shot blasters. When installations are to be performed on timber floors use floor sanders. The final process in mechanical preparation is vacuum cleaning and the use of a damp cloth/sponge/mop to remove loose particles.

1.2.1 Acid etching or the use of harsh chemicals to prepare surfaces is not recommended. These can potentially leave a deleterious residue on the substrate.

1.3 Imperfections and irregularities that may interfere with the installation (holes, voids, bumps, cracks, depressions, etc.) must be corrected before the application of subsequent products. MAPEI has a complete range that can be selected from our website at www.mapei.com.au.

1.4 The maximum variation in plane limits (AS 3958.1-2007):

- Thin-bed adhesive: 5 mm over 3 m
- Thick-bed adhesive: 10 mm over 3 m
- Screed: 20 mm over 3 m
- Walls: 4 mm in 2 m



- 1.5 Substrate deflection must not be excessive. If in doubt, refer to an engineer or substrate manufacturer. Under live, dead, or impact actions including concentrated loads, deflection must not exceed $L/360$.
- 1.6 Any joints in the substrate must be appropriately treated or carried through into the tiling works as a movement joint.
- 1.7 Suitability and compatibility of any proprietary substrate to receive tiling products should be recommended by the manufacturer and tested in an inconspicuous location before the full installation.
- 1.8 If tiling in a wet area, the area may require waterproofing. Refer to AS 3740-2010, AS 4654.2-2012, and the National Construction Code (NCC) for more information. MAPEI have a complete range of waterproofing products that can be selected from our website at www.mapei.com.au.

2. Concrete

- 2.1 Concrete substrates must be structurally sound, dry, solid and stable and the surface prepared to the requirements of AS 3958.1-2007.
- 2.2 New Concrete
 - 2.2.1 Drying and shrinkage cracks occur as the concrete cures. Installing products over “green” concrete may result in cracks telegraphing through the tiling works as they develop in the concrete. To avoid this, wait at least 4-6 weeks as per AS 3958.1-2007, and repair cracks as per section 2.4.
 - 2.2.2 Concrete shall be sufficiently dry. External areas may experience water infiltration or be exposed to rain which can re-saturate the concrete, increasing drying times. High moisture may increase a products curing time and the possibility of efflorescence.
 - 2.2.3 Concrete slabs should be installed over an acceptable and effective vapour barrier as per Australian Standards.
 - 2.2.4 It is recommended to waterproof concrete swimming pools with **Mapelastic Smart** to increase the durability of the system.
- 2.3 Cracked, Damaged, or Spalling Concrete
 - 2.3.1 All unsuitable surfaces must be removed down to a solid and clean substrate. Use a hammer to sound out weak, hollow and unsound material. Where cracks are located in the concrete substrate, they should be opened via mechanical means (grinder), then cleaned and vacuumed. These cracks must then be filled using MAPEI **Eporip** or **Epojet**, in accordance with the relevant TDS, and the surface

broadcast with sand to aid the bonding of subsequent products.

- 2.4 Curing Compounds, Release Agents, Silicates Densifiers
 - 2.4.1 These act as bond breakers, inhibiting the ability of products to bond and also affect curing times. All curing compounds, release agents, and silicate densifiers, irrespective of their type, (including dissipating curing compounds) must be mechanically removed. Conduct a water-drop test to test porosity and the presence of a topical product.
 - 2.5 Contaminated Surfaces
 - 2.5.1 Concrete substrates that are covered/coated in dirt, oil, grease, paint, laitance, old adhesive residue and any other substance that may prevent or reduce adhesion must be removed. Materials used to remove oils and grease may also prevent adhesion, therefore, it is recommended to complete mechanical removal down to solid, sound, and uncontaminated concrete.
 - 2.6 Surface Profile
 - 2.6.1 For an excellent bond to concrete, it's important for the surface to have an adequate concrete surface profile (CSP) to promote bonding. The concrete should be finished with a screed, wood float, broom, or power float type finish. This equates to a CSP of #1 to #3 for tile adhesives. Steel-trowelled slabs are more difficult to adhere to and it is recommended to mechanically prepare.
 - 2.7 Surface Planarity
 - 2.7.1 Should the concrete be out of level or not sufficiently flat on internal substrates, the substrate can be primed with **Eco Prim T Plus** and levelled with **UC Leveller**. For external substrates, **Adesilex P4 + Latex Plus** can be used. If the height is permissible, installing a screed is an option. A levelled surface is especially important using large format tiles.
- ## 3. Screeds / Mortar Beds
- 3.1 Sand-cement screeds should generally incorporate a latex additive (such as **Planicrete SP**) and should be installed as per the guidelines in Appendix A of AS 3958.1-2007.
 - 3.2 AS 3958.1-2007 states that sand-cement screeds should be “cured for at least 7 days and be subjected to continuous air-drying after curing for at least 2 weeks before tiling”. Screed subfloors shall be sufficiently dry with a moisture content of less than 5.5% as per AS 3958.2-1992.



3.3 Alternatively, engineered screed products such as **Topcem Pronto** and **Mapecem Pronto** can be used to facilitate a controlled and rapid installation. Refer to the products TDS for installation and curing times.

3.4 If the full depth of a concrete substrate is contaminated (e.g. oil) or if it is particularly prone to cracking or movement, an unbonded screed is preferred. Use a layer of 200 µm polythene sheet or similar material to separate the substrate.

3.5 For large areas, control joints should be incorporated to match the specified movement joints in the tiling works.

3.6 In external or internal wet areas, incorporate falls in the screed as required by the Australian Standards and Building Code of Australia.

4. Blockwork and Rendered Wall Substrates

4.1 Brush and wash any loose dirt or render with a hard bristle broom. Ensure the joints are also raked of any loose material. If the surface is painted, scratch the surface to remove any loose paint, flakes or dust.

4.2 Blockwork substrates should be rendered with **Planitop Fast 330** to fill in any mortar joints and to provide a suitably rendered finish prior to tiling. Maximum variation in plane of 4 mm in 2 metres.

4.3 On external walls, waterproofing with **Mapelastc Smart** may be applied to aid in minimising efflorescence and to assist with the durability of the system.

4.4 For external façade tiling, ensure the render and substrate achieve a minimum tensile strength of at least 1 MPa.

5. Autoclaved Aerated Concrete (AAC) and Lightweight Concrete Blocks

5.1 These substrates generally have low mechanical strengths and are susceptible to high point loads. They should generally only be used in internal residential environments. Follow the recommendations from the manufacturer.

5.2 Due to their porous nature, prime with **Eco Prim T Plus** or **Primer 3296** diluted with 1-2 parts water. Use two coats of primer if necessary. Ensure no puddling occurs.

5.3 AAC is not an acceptable substrate for direct tiling on external facades. A solution is to render (minimum 10 mm thick) and incorporate reinforced galvanized mesh fastened mechanically to the structure.

6. PVC Proprietary Wall Systems

6.1 Prior to tiling, these systems must be mechanically scratched using a diamond disk on a low speed grinder to create a keyed finish. Ensure the grinder does not burnish the substrate due to high speeds.

6.2 Ensure substrate is clean.

6.3 PVC can be a difficult substrate to bond to, as such, resin-based adhesives (**Keralastic T**) or a waterproofing membrane with **Mapelastc Smart** should be applied.

7. Fibre Cement Sheet (CTU, CFC, FC Boards) and Plasterboard

7.1 Fibre cement sheeting and plasterboard must comply with the applicable Australian Standards and must be installed as per the manufacturer's recommendations. Ensure the sheeting is suitable for the intended tiling system and application environment.

7.2 Most sheets have a surface layer of dust that must be removed by wiping down with a damp cloth or mop and allowed to dry.

7.3 FC sheets to have a minimum thickness of 6 mm for residential floor & wall applications, and a minimum 9 mm for wall tiling in heavy-duty commercial applications. CFC sheets should be minimum 15 mm thick for floor tiling (AS 3958.1).

7.4 Highly absorbent substrates which have not been sealed should be primed with **Eco Prim T Plus** or **Primer G** so that the adhesive curing isn't adversely affected.

8. Timber, Plywood and Particleboard

8.1 Wood based substrates are generally sensitive to moisture which can lead to issues such as warping and instability. Extra care is need when attempting to tile on these substrates.

8.2 All wood underlayments must be recommended and guaranteed by the wood underlayment manufacturer and the floor-covering manufacturer, and comply with the applicable Australian Codes and Standards.

8.3 Stripwood subfloors, presswood, chipboard, flakeboard and similar types of dimensionally unstable materials are generally not acceptable substrates for the installation of surface preparation products and adhesives.

8.4 Plywood surfaces must be installed with the smooth side facing up and have a minimum thickness of 10 mm.

8.5 Do not install over a subfloor that is in direct contact with the ground. Good ventilation is essential under wood substrates to prevent distortion, decay, and excessive movement. The requirements of the relevant local regulatory authority for underfloor clearance and provision of ventilators shall be followed. In the absence of such requirements, precautions outlined in AS 3958.1-2007 must be followed.

8.6 Under no circumstances should any floor material be laid over wood underlayments or subfloors that are under



conditions that might cause buckling or rotting of the wood. Always replace wood subfloors or underlayments that have been subject to water damage.

9. Gypsum Substrates

9.1 All gypsum substrates must be dry, clean, flat and properly primed with a manufacturer recommended primer such as MAPEI's **Primer G**, **Eco Prim T Plus** or **Eco Prim Grip**. Refer to relevant MAPEI Technical Data Sheets.

9.1.1 Note: Un-primed gypsum substrates may leave a dusty residue on the surface and have a slightly higher porosity factor that could affect the adhesive's open time and weaken the adhesive bond. A complete installation failure may occur if the substrate is not properly primed prior.

9.2 Allow the applied primer to dry completely before installation of adhesives or waterproofing.

10. Metal Substrates

10.1 Metal substrates must be rigid, solidly fixed in place, and free of paint, primer, oil, rust, corrosion or other contaminants. Ensure the metal has been treated with a suitable rust treatment.

10.2 A resin-based adhesive such as **Keralastic T** is recommended over metal substrates.

11. Existing Floor Coverings

11.1 Ceramic tiles, porcelain tiles and cement terrazzo must be firmly bonded, clean, and free of dust, dirt, oil, grease, paint, wax, sealer, soap and any other substance that may prevent or reduce adhesion. The existing tiles can be slightly roughened by mechanical means. Any loose tiles or grout joints should be removed and filled with **Adesilex P4**. The area must then be vacuumed, mopped and allowed to dry prior to the application of **Eco Prim Grip**.

11.2 It is possible to tile over vinyl sheet or tiles (non-cushioned backed) in residential environments providing that they are firmly bonded, clean, and free of contaminants. Sand the vinyl to provide a mechanical key. Use **Keralastic T** or **Keraquick S1 + Latex Plus** to tile over these substrates. Alternatively, **Mapeprim SP** can be used to prime the vinyl. For commercial environments it is recommended to remove the vinyl flooring.

11.3 The following existing floor coverings are generally not acceptable for the installation of surface preparation products and adhesives: self-stick tile, glass tile, linoleum, laminate, fibreglass, poured epoxy floors and other dimensionally unstable and/or non-porous materials. These should be removed back to the structural substrate, or consult a MAPEI technical representative for more information.

11.3.1 **Warning:** Do not sand or remove any existing resilient floors or cutback adhesive that contains asbestos fibres or crystalline silica. Follow all local, state and federal regulations and industry standards when mechanical removal is required.

11.4 Refer to Technical Data Sheets for details on MAPEI product suitability over existing floor covering.

12. Tiling System Selection

12.1 To ensure a successful tiling installation, the correct selection of the system components is essential. Refer to the MAPEI Adhesive and Selection Guide or MAPEI's Work Method Statements (WMS), both which can be found at www.mapei.com.au.

13. Test Area

This guide is to be used as a general reference for preparing substrates to receive MAPEI products. The objective was to present a large variety of substrate conditions, however, it is not possible to define and specify every possible situation that may occur on site.

As such, it is strongly recommended to complete a test area on site in order to ensure suitability of the preparation.

