

## 1 SUBFLOOR PREPARATION

The finished appearance of any resilient flooring installation will be determined in part by the subfloor over which it is installed. This is emphasized when the flooring products are directly glued to the subfloor. Rough, uneven subfloors, of substandard construction, with non-recommended materials, can reduce the life and impair the appearance of the floor covering. Therefore, proper construction and preparation utilizing recommended materials are important for a durable, good quality flooring installation.

### 1.1 BASIC GUIDELINES

Satisfactory results depend highly on proper subfloor preparation.

The following conditions must be met:

1. New concrete subfloors, on or below grade, must have a permanent effective moisture barrier membrane installed under the slab in accordance with ASTM E1745 and ASTM E1643. Renovation projects where it is uncertain whether such a membrane was installed or in circumstances where it cannot be determined if such a membrane was installed, it is recommended to install a topical moisture reduction barrier system to protect against potential moisture vapors and alkali migration that can lead to catastrophic failures.
2. Moisture vapor emissions must not exceed the maximum allowable tolerance of the adhesive being used when tested in accordance with ASTM F1869 (anhydrous calcium chloride test). Please note that this test method stipulates the placement of three (3) tests for the first 1,000 ft<sup>2</sup> and one (1) test for every additional 1,000 ft<sup>2</sup> or fraction thereof.
3. The subfloor surface must be free of any wax, oil, grease, sealer, curing compound, paint, varnish, old adhesive or any other contaminants that may inhibit bond strength. All contaminants must be removed from the subfloor via mechanical abatement. **Never use chemical abatement methods** as residual chemicals on or penetrating the surface of the slab can lead to failures.
4. Subfloors must be smooth and level within a tolerance of 1/8" (3 mm) in a 10' (3.05 m) radius. Mondo does not recognize the "F" numbers: FF = floor flatness, FL = floor levelness. Minor surface cracks or grooves must be filled with a good quality **Portland** cement based patching or leveling compound such as Mapei or Ardex. High spots, bumps and peaks must be repaired prior to installation.
5. **All subfloors must be properly prepared to provide a satisfactory bonding surface for the adhesive being used.**

Mondo flooring can be installed over surfaces that are firm, structurally sound, dry, clean, smooth and level, however, it is not recommended that Mondo flooring be installed over the following: VCT/VAT, LINOLEUM, STONE AND Poured URETHANE SURFACES. When installing over ceramic tiles, you must communicate with the Technical Department for proper instructions.

### 1.2 CONCRETE SUBFLOORS

**NOTE: Regardless of the type of concrete used as a base for resilient flooring, the responsibility for subfloor warranties or performance guaranties rests with the concrete manufacturer and/or the general contractor. In the event of an underlayment/subfloor**

failure, Mondo will not be held liable. The engineer, architect or designated authority must be notified in writing by the flooring contractor of any underlayment defects or installation conditions that could result in unsatisfactory performance. Product installation must not begin until all necessary corrections have been made. Installation of Mondo flooring shall constitute acceptance of the installation conditions and product by the flooring contractor.

### 1.2.1 GENERAL

- 1.2.1.1 Concrete subfloors must be dry, sufficiently porous, clean and free of paint, wax, dust, oil, sealers, grease, curing agents, surface hardeners, solvents, asphalt, old adhesives and any other contaminants that could inhibit bond strength. Prior to beginning any installation of Mondo products it is recommended that the entire room be vacuumed to remove dust, loose dirt and debris. **Do not use sweeping compounds.**
- 1.2.1.2 If a curing agent or concrete sealer has been applied on the subfloor it must be removed by means of mechanical abatement. **Never use chemical abatement methods** as residual chemical on or penetrating the surface of the slab can lead to failures.
- 1.2.1.3 Concrete subfloors that are loose, sandy, and scaly or have a white powdery surface are not acceptable. These subfloors must be scarified or shot-blasted to remove affected material and patched and/or leveled to tolerance using a good quality **Portland** cement based patching or leveling compound such as Mapei or Ardex.
- 1.2.1.4 The concrete subfloor must be smooth and level within a tolerance of 1/8" (3 mm) in a 10' (3.05 m), with no abrupt irregularities. Mondo does not recognize the "F" numbers: FF = floor flatness, FL = floor levelness. Please note that while a smooth surface is desired, a shinny, slick, non-porous or overporous slab is not acceptable and will require additional preparation prior to installing Mondo flooring products.
- 1.2.1.5 A problem with proper adhesion to old concrete subfloors usually arises from moisture, dusty, chalky or flaky concrete surfaces or from previous treatments with products containing oil, silicone or other bond reducers. Moisture vapor emissions must be measured and reported in writing to the general contractor (see description in [Section 1.2.6.1](#)). Concrete surface problems should be inspected thoroughly and any problems should be reported and repaired. Specialists from manufacturers such as Ardex or Mapei can aid in the resolution of any related subfloor issues.
- 1.2.1.6 Mechanical abatement methods such as sanding (depending on the product), wet grinding, scarifying or shot-blasting can remove sealers, curing compounds, paint, varnish, releasing agents or wax. In cases where oil and/or grease have penetrated deeply into the concrete and cannot be removed by mechanical abatement, replacement of the soiled area must be carried out. Mondo recommends a light to medium shot-blasting (ICRI CSP #3 to #5 profile). A bond test should be made prior to any installation. Special attention should be paid to areas where paint, varnish, wax and other agents were removed.

#### **Performing a Bond Test**

- a) Once the subfloor preparation has been completed and is believed to be ready to receive the Mondo rubber floor covering, select a small (3' x 3' to 6' x 6') area to perform the bond test.
- b) Install a small (3' x 3' to 6' x 6') sample of the Mondo floor covering using the specified surface preparation system and the recommended adhesive while following the installation instructions for same contained herein.

- c) After a period of a least 24 hours, attempt to remove the flooring by pulling up one of the corners of the sample.
- d) Determine if the bond is adequate. If it is, then proceed with the installation. If it is not, then contact the Mondo Technical Department for recommendations.

## 1.2.2 UNDERLAYMENT

**Mondo will not take any responsibility in regards to the strength, adhesion or general performance of underlayments/subfloors. Patching, leveling and other industry standard subfloor preparation measures are the responsibility of the flooring installer/contractor.**

1.2.2.1 Cracks, saw-cut joints, expansion joints, holes/pitting, rough and uneven areas must be made smooth and level with a good quality **Portland** cement based leveling or patching compound, such as Ardex or Mapei. **Gypsum based patching and leveling compounds are strictly prohibited.** The following are notes on how to recognize and properly deal with various subfloor circumstances:

- a) **Shrinkage cracks** are generally flush with the slab surface but slightly split open. These can be patched using a good quality **Portland** cement based patching or leveling compound, such as Ardex or Mapei, or with Mondo PU 100 adhesive (when PU 100 is the specified adhesive for the installation).
- b) **Structural cracks** generally have a slight lip (are not flush) and will always telegraph (effects from movement can be observed through the floor covering) to the surface of the installed floor. These can be patched using a good quality **Portland** cement based patching or leveling compound, such as Ardex or Mapei, or with Mondo PU 100 adhesive (when PU 100 is the specified adhesive for the installation).
- c) **Saw-cut joints** are flush and level with even width but sometimes varying depth. These must be cleaned (scraped and vacuumed) and then patched using a good quality **Portland** cement based patching or leveling compound, such as Ardex or Mapei, or with Mondo PU 100 adhesive (when PU 100 is the specified adhesive for the installation).

**NOTE - Saw-cut and/or control joints are always moving and are by definition unstable. This means that, once the flooring is installed, they may telegraph through to the surface of the material.**

- d) **Expansion joints** can appear uneven since they are not cut and are of varying widths and depths. The best treatment for these joints is to cut the flooring on either side of the expansion joint and use a proper transition strip molding. However, they can also be stone ground (if necessary) to make them level and then patched using a good quality **Portland** cement based patching or leveling compound, such as Ardex or Mapei, or with Mondo PU 100 adhesive (when PU 100 is the specified adhesive for the installation). A mesh system may need to be adopted if these joints are very large. These are intended to accommodate movement, thus a flexible elastomer sealant should be used to keep foreign materials out of the joint.
- e) **Surface degradation** classifies holes, pitting, scaling, rough and uneven areas, etc. The surface has to be mechanically prepared to correct these issues and then patched using a good quality **Portland** cement based patching or leveling compound, such as Ardex or Mapei, or with Mondo PU 100 adhesive (when PU 100 is the specified adhesive for the installation).

**NOTE: The above notes describe the most common and simplest of scenarios for each. When more severe conditions exist, and/or there is uncertainty about what or how to properly prepare a structural underlayment, please contact the Mondo Technical Department for recommendations.**

**NOTE: When PU 100 is used to fill cracks/joints its surface must be sanding prior to adhesion of material. Otherwise, the dried adhesive will be much too smooth for a proper bond.**

**DISCLAIMER: Although these suggestions have been known to accommodate these conditions through many years of experience, Mondo cannot predict or be held liable for any unexpected or extraordinary conditions. Therefore the user assumes all responsibility.**

1.2.2.2 New concrete subfloors must be allowed to cure and dry before installing any Mondo flooring. Typical curing time for normal concrete is 28 days. However, drying time is typically 4 weeks for every 1" thickness of slab (i.e. a 6" slab will take approximately 24 weeks to adequately dry).

### **1.2.3 ON AND BELOW GRADE CONCRETE**

**NOTE: Mondo will be held harmless from any moisture problems when a membrane has not been installed or has been compromised.**

1.2.3.1 A concrete slab on or below grade will continually absorb moisture from the earth in the absence of a moisture barrier membrane. If no moisture barrier membrane is installed then proper measures are to be taken in order to topically seal the slab and protect the flooring from excess moisture vapors and alkali migration.

1.2.3.2 The appearance of a concrete slab can be deceiving when there is question about its dryness. It is never safe to assume that a concrete floor that looks dry is sufficiently dry. Rapid evaporation at the surface will make it look dry but below the surface the concrete may hold considerable moisture that will contribute to high moisture vapor emissions. Moisture vapor testing by means of an anhydrous calcium chloride test, performed in accordance with ASTM F1869, is the only way acceptable to Mondo for determining the slab's moisture vapor emissions.

### **1.2.4 MOISTURE VAPOR EMISSIONS AND ALKALIS**

**NOTE: Anhydrous calcium chloride tests, in accordance with ASTM F1869, will confirm whether the slab is dry enough to proceed with the installation. It does not mean the slab will always remain dry. Never attempt a moisture test until the HVAC unit has been operational for at least 7 days and the temperature conditions are constant in the building and reflective of in service conditions.**

**MONDO WILL NOT GUARANTEE THE ADHESION OF A MONDO PRODUCT TO A SUBFLOOR WITH MOISTURE VAPOR EMISSIONS EXCEEDING THE TOLERANCE OF THE SPECIFIED ADHESIVE, WHEN TESTED IN ACCORDANCE TO ASTM F1869.**

1.2.4.1 It is essential to dry a slab sufficiently to reduce moisture vapor emissions to an acceptable level within the tolerance range of the adhesive being used. Testing for moisture vapor emissions should be done using the anhydrous calcium chloride test, performed in accordance with ASTM F1869.

- 1.2.4.2 In accordance with ASTM F1869, Mondo requires three (3) tests for the first 1,000 sf<sup>2</sup> and one (1) additional test for each 1,000 sf<sup>2</sup> or fraction thereof. For example, a 5,500 sf<sup>2</sup> installation will require a minimum of 8 tests.
- 1.2.4.3 Many factors affect a slab's ability to dry. If the rate of moisture vapor emissions remains high, the following are factors to consider and suggestions on how to accelerate the drying process:
- a) **Atmospheric and environmental conditions.** If the facility does not have an HVAC unit in operation, the slab is subject to changes in temperature and humidity as governed by outside conditions. This is an important factor that greatly affects the drying time of a slab. Moisture tests performed before an HVAC unit is operational will indicate false results and therefore are a waste of time and money. The HVAC has to run for at least 7 days and the temperature conditions should be constant in the building and reflective of in service conditions.
  - b) **Curing compounds and sealers.** If curing compounds and/or sealers have been used to treat the slab, they will block a significant quantity of the slab's capillary pores thus reducing its ability to expel moisture vapor and adversely affect bond performance. These compounds must be mechanically removed (scarifying, shot-blasting, etc.) in order to allow the slab to dry much more effectively. Allow for the slab to dry out for a period of 24 hours.
  - c) **Surface contaminants.** Dirt, dust, debris and other surface contaminants common to construction sites also inhibit a slab's ability to expel moisture vapors. Through regular sweeping, vacuuming and keeping a clean surface you will assist the slab in drying as efficiently as possible.

**NOTE: Drying of the slab in the first few weeks after pour should be slow. Fast drying will, in many cases, dry the slab on the surface while it remains wet at the bottom. This situation will make the slab curl at the edges and joints, and can also lead to surface cracking.**

**NOTE: A high rate of moisture vapor emissions will bring the alkaline salts within the concrete slab up to the surface. These alkalis will attack and eventually break the bond of the adhesive. The end result will be a failure of the installation.**

- 1.2.4.4 Moisture vapor testing by means of an anhydrous calcium chloride test, performed in accordance with ASTM F1869, is the only way acceptable to Mondo for determining the slab's moisture vapor emissions.

## **1.2.5 MOISTURE VAPOR REDUCTION BARRIERS (MRB)**

**NOTE: Failure to adequately protect against high moisture vapor emissions or alkali migration will compromise the flooring system. Mondo accepts no responsibility for failures associated to moisture.**

- 1.2.5.1 When moisture vapor emissions are above tolerance for the specified adhesive, a moisture vapor reduction barrier can be used on concrete subfloors on or below grade. Properly installed, they will effectively reduce the moisture vapor emissions and alkali migration coming from the concrete slab.

## **1.2.6 TESTING FOR MOISTURE VAPOR EMISSIONS**

- 1.2.6.1 It is never safe to presume that a concrete floor that looks dry is sufficiently dry. **Never** install Mondo flooring on a concrete slab that has not been tested for moisture vapor

emissions, or that does not meet the requirements as set forth in this manual. It is the responsibility of the **general contractor to deliver a leveled and dry subfloor** for the installation of the resilient flooring. Therefore, it is his responsibility to conduct moisture vapor emission tests until the subfloor meets the necessary requirements. The results of these tests must be communicated to the flooring contractor. We suggest keeping a copy of the test results for a minimum three-year period or for the duration of the floor covering warranty.

- 1.2.6.2 Moisture vapor testing by means of an anhydrous calcium chloride test, performed in accordance with ASTM F1869, is the only way acceptable to Mondo for determining the slab's moisture vapor emissions.

### **1.2.7 SUSPENDED CONCRETE SLABS**

- 1.2.7.1 While suspended concrete slabs are protected from direct hydrostatic moisture sources, the subfloor should be permitted to dry thoroughly with good ventilation.
- 1.2.7.2 When poured on steel pans, a longer drying time will be necessary prior to the first moisture vapor emission test.
- 1.2.7.3 Moisture vapor emissions must not exceed adhesive tolerance, in accordance with ASTM F1869.

### **1.2.8 LIGHTWEIGHT, GYPSUM AND CELLULAR CONCRETES**

**The direct installation of any Mondo flooring over cellular or gypsum concrete is NOT acceptable. A second topping should be considered and must be validated by concrete experts such as Ardex or Mapei.**

- 1.2.8.1 Special attention should be paid to lightweight concrete subfloors to determine if they are suitable for the installation of Mondo products.
- 1.2.8.2 Some lightweight concretes have densities too low for installing resilient flooring. Density must be at least 100 lbs/ft<sup>3</sup> (1,600 kg/m<sup>3</sup>), if not it should be topped with 2" (5 cm) of standard, normal density concrete. In all cases, such subfloors should not be subjected to heavy loads (static or dynamic) or subjected to repeated impacts.
- 1.2.8.3 Moisture vapor emission must not exceed adhesive tolerance, in accordance with ASTM F1869.

### **1.2.9 RADIANT HEATING SYSTEMS**

- 1.2.9.1 Mondo products can be installed over substrates with radiant heating systems. The system has to be turned off 48 hours before the installation, during the installation and 48 hours after the installation.
- 1.2.9.2 The radiant heating temperature must not to exceed 86°F (30°C).
- 1.2.9.3 Mondo sport flooring products will have insulation "R" values between 0.9 and 1.1 depending on the material thickness. Commercial products will have negligible insulation properties.

### **1.2.10 CURING & HARDENING COMPOUNDS (CONCRETE POROSITY)**

- 1.2.10.1 Concrete subfloors that have been treated with curing compounds or hardening compounds will inhibit bond and are not suitable for covering with Mondo flooring under any circumstances.
- 1.2.10.2 These compounds must be mechanically removed (scarifying, shot-blasting, etc.). The method of removal selected must ensure the complete removal of the compound. The degree of aggressivity required will vary with the type and depth of penetration of the compound on the surface.
- 1.2.10.3 Before starting an installation, you must perform bond tests in various areas of the installation to ensure proper adhesion (refer to [Section 1.2.1.6](#)).
- 1.2.10.4 Concrete subfloors that are excessively porous and absorbent should be coated with a good quality **Portland** cement based patching or leveling compound, such as Ardex or Mapei. Always contact the manufacturer for proper application procedure.
- 1.2.10.5 **Installation using a Mondo acrylic adhesive must only be performed over a porous surface.** Acrylic adhesives dry by dissipating moisture into the concrete therefore if a slab is non-porous the adhesive will not be capable of achieving full bond strength. If the slab cannot absorb 3 to 4 ounces of water poured onto its surface within a 5 to 10-minute period, then the surface will require additional preparation before commencing with an installation using an acrylic adhesive. **Please contact Mondo's Technical Department for recommendations on how to proceed in these circumstances.**

**NOTE: Regardless of the type of concrete used as a base for resilient flooring, the responsibility for substrate warranties or performance guaranties rests with the concrete manufacturer and/or the general contractor. In the event of an underlayment/subfloor failure, Mondo will not be held liable. The engineer, architect or designated authority must be notified in writing by the flooring contractor of any underlayment defects or installation conditions that could result in unsatisfactory performance. Product installation must not begin until all necessary corrections have been made. Installation of Mondo flooring shall constitute acceptance of the installation conditions and product by the flooring contractor.**

### 1.3 WOOD SUBFLOORS

**NOTE: Wood subfloors will experience movement over time due to expansion and contraction. Telegraphing of plywood seams must be expected. The severity of the telegraphing will depend on the amount of movement the subfloor experiences.**

#### 1.3.1 GENERAL

- 1.3.1.1 The underfloor construction must be solid and have a well ventilated air space below the wood subfloor to avoid deterioration from dry rot.
- 1.3.1.2 Do not install Mondo flooring on sleeper-constructed or other wood subfloors directly on or below grade. When there is not enough ventilation, moisture from the concrete will build up and lead to possible installation failures, deterioration, warping and rotting of the wood subfloor.
- 1.3.1.3 Wood subfloors must be clean, dry, smooth and free of paint, varnish, oil, wax, grease and other foreign materials. Oil-treated plywood floors are not acceptable subfloors.

- 1.3.1.4 Plywood spacing should not exceed 1/16" anywhere to minimize telegraphing of these seams.

### **1.3.2 STRIPWOOD SUBFLOORS**

- 1.3.2.1 Mondo does not recommend the installation of its products over stripwood subfloors.
- 1.3.2.2 If an installation on a stripwood subfloors must take place, then we recommend that the stripwood be covered with 5/8" (1.59 cm) in thickness or heavier (refer to section 1.3.3 for plywood recommendations).

### **1.3.3 UNDERLAYMENT**

- 1.3.3.1 Underlayment is the most common type of wood subfloor in use today. Although many different products are being called floor underlayment, Mondo only recommends APA (Engineered Wood Association) Exterior grade plywood or CANPLY Exterior Certified plywood (Group 1, CC type).
- 1.3.3.2 Products such as hardboard, particleboard, chipboard or flakeboard are not to be used.