



Designation: F3311 – 19

Standard Practice for Mat Bond Evaluation of Performance and Compatibility for Resilient Flooring System Components Prior to Installation¹

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1. Scope

1.1 This practice is designed to provide a short-term qualitative evaluation of the effectiveness and compatibility of the composite layers for flexible and fully adhered resilient flooring installation(s). Aspects of the resilient flooring assembly to be evaluated may include concrete surface profile (CSP), surface preparation, a topical moisture mitigation system, underlayment product(s), primer(s), application and the installation of the resilient flooring material itself. Aspects such as surface profile, surface cleanliness, surface porosity, the application method(s), and the open, curing, and drying times of each layer of the flooring system can be assessed using this practice prior to the actual full-scale installation taking place.

1.1.1 This practice is not intended for use with liquid applied, loose laid or perimeter fixed, or rigid resilient flooring products.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety, health, and environmental practices and determine the applicability of regulatory limitations prior to use.* See Section 6 for specific Hazards statements.

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

2. Referenced Documents

2.1 ASTM Standards:

F141 Terminology Relating to Resilient Floor Coverings

¹ This practice is under the jurisdiction of ASTM Committee F06 on Resilient Floor Coverings and is the direct responsibility of Subcommittee F06.40 on Practices.

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F710 Practice for Preparing Concrete Floors to Receive Resilient Flooring

F1482 Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring

F1869 Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride

F2170 Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes

F2419 Practice for Installation of Thick Poured Gypsum Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring

F2471 Practice for Installation of Thick Poured Lightweight Cellular Concrete Underlayments and Preparation of the Surface to Receive Resilient Flooring

F2659 Guide for Preliminary Evaluation of Comparative Moisture Condition of Concrete, Gypsum Cement and Other Floor Slabs and Screeds Using a Non-Destructive Electronic Moisture Meter

F2678 Practice for Preparing Panel Underlayments, Thick Poured Gypsum Concrete Underlayments, Thick Poured Lightweight Cellular Concrete Underlayments, and Concrete Subfloors with Underlayment Patching Compounds to Receive Resilient Flooring

F2873 Practice for the Installation of Self-Leveling Underlayment and the Preparation of Surface to Receive Resilient Flooring

F3010 Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings

F3191 Practice for Field Determination of Substrate Water Absorption (Porosity) for Substrates to Receive Resilient Flooring

3. Terminology

3.1 Definitions:

3.1.1 See Terminology F141 for definitions of the terms: mat, bond, subfloor, substrate, resilient, pull, and peel.

4. Summary of Practice

4.1 This practice comprises a procedure whereby a number of mat bond evaluation area(s) are selected, prepared, and

installed in exact accordance with the associated manufacturer(s) written instructions.

4.2 The preparation of the mat bond evaluation area(s) may include a partial or extensive combination of subfloor material, preparation and application/installation method(s) of the products being considered, which may include moisture mitigation systems, leveling or patching compounds or various adhesives. The perimeter of each flooring sample is to be sealed to the substrate using a 2-in. (51-mm) wide duct tape (or similar), and if required, left to cure prior to its evaluation.

4.3 After any specified curing time has elapsed, the flooring sample is removed following one of the methods (type A or B, see 8.10 or 8.11), and the results are assessed and recorded.

5. Significance and Use

5.1 Any individual performing a mat bond evaluation should either be a qualified installer or a trained and experienced evaluator of resilient flooring and adhesive bond strength.

5.2 This practice should not be considered mandatory, except when required or specified by the end user, general contractor and architect, flooring contractor, adhesive manufacturer(s), underlayment manufacturer(s) or flooring manufacturer(s).

5.2.1 Typically, this practice is only recommended or required if products from a different manufacturer(s) are being used in combinations not experienced before or if the substrate preparation or application method is in question.

5.3 The number of mat bond evaluation(s) should be selected that is appropriate for the project and be representative of each type of substrate, including trenches, grade, type of flooring, and ambient conditions. The number may also be determined by the responsible party or specified by the end user, general contractor and architect, flooring contractor, adhesive manufacturer(s), underlayment manufacturer(s) or flooring manufacturer(s).

5.4 All mat bond evaluation(s) conducted shall have the results recorded within report, including photographs (see A1.11).

5.5 There are many factors that may influence the outcome of mat bond evaluation(s). Therefore, it is required to follow each manufacturer(s) installation/application instructions for every product used including open, curing, drying time, and the length of time required prior to evaluation(s).

5.6 Each step of the process must be conducted only at a time when the subfloor and ambient conditions comply with the requirements defined by all of the relevant manufacturer(s) written installation instructions or Practices F710, F1482, F2419, F2471, F2678, F2873, F3010, or combinations thereof.

6. Hazards

6.1 *Silica and Asbestos Warning*—Do not sand, dry sweep, dry scrape, drill, saw, bead blast, mechanically chip or pulverize existing resilient flooring, backing, lining felt, paint, asphaltic cutback adhesives, or other adhesives. These products may contain asbestos fibers or crystalline silica. Avoid creating

dust: Inhalation of such dust is a cancer and respiratory tract hazard. Smoking by individuals exposed to asbestos fibers greatly increases the risk of serious bodily harm. Unless positively certain that the product is a non-asbestos containing material, presume that it contains asbestos. Regulations may require that the material be tested to determine asbestos content. The Resilient Floor Covering Institute's (RFCI) recommended work practices for removal of existing resilient floor coverings should be consulted for a defined set of instructions specific to the task of removing all resilient floor covering structures.

6.2 *Lead 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 and guidelines for hazard identification and abatement of lead-based paint published by the U.S. Department of Housing and Urban Development regarding appropriate methods for identifying lead-based paint and removing such paint, and any licensing, certification, and training requirements for persons performing lead abatement work.

7. Conditioning

7.1 Confirm the required ambient conditions (temperature, relative humidity, and dew point) and substrate surface temperature and verify at each evaluation area that they are within the manufacturer(s) specified requirement. The dew point shall not be within 10 °F (~ 5 °C) of the recorded substrate surface temperature.

7.2 If required by a manufacturer(s), the surface of the substrate shall be tested for pH using a detailed test method defined by that manufacturer(s). The exact methodology shall be recorded, including any dwell time (pooling) for the water and the amount and type of abrasion performed.

7.3 If a porous/absorptive substrate is required, then test and record the results in accordance with Practice F3191.

7.4 If required, by any of the manufacturer(s) including the resilient flooring and adhesive manufacturer(s), then moisture testing shall be performed with all results recorded. This may be in accordance with Test Methods F2170, F1869, or Practice F2659, or combinations thereof. The moisture readings shall meet the specified requirements of all manufacturer(s) prior to installation of any samples or consider allowing the subfloor to dry sufficiently or use a recommended and warrantied surface moisture mitigation system.

7.5 If required, prepare the subfloor or substrate following the written instructions of the manufacturer(s).

8. Procedure

8.1 Verify and record the ambient temperature and humidity, date and time, applicator and any witnesses of each test and type of application along with a detailed method of application, substrate preparation, adhesive and flooring used within the mat bond evaluation(s), with photographs/videos.

8.2 Select either the amount of mat bond evaluation(s) required or enough that represent every substrate, flooring type, and ambient condition found within the project (including

trenches, and grade) or that are being considered. The selected mat bond evaluation area(s) should typically be away from doorways, walkways, and windows.

8.3 Each flooring sample should measure at least 24-in. (600-mm) by 24-in. (600-mm). However, it is recommended to use a size that best accommodates the flooring material size(s), as an example; for 6- by 36-in. planks, use a 24- by 36-in. area.

8.4 Each subsequent product layer applied below the adhesive layer should extend beyond the one above it (~ 1-in.), so that each subsequent layer will be visible. However, the adhesive shall be the same size (± 0.25 -in. / 6-mm) as the flooring sample.

8.5 All products utilized for each mat bond evaluation shall be installed in exact accordance with the written installation/application instructions of the manufacturer(s), including mechanical preparation, application, open time, drying time, curing time, and ambient conditions.

8.5.1 Typical surface preparations may include removing all bond inhibiting substances, the application of a moisture mitigation system, leveling compound or patching compound. Prior to installing each successive layer, substrate surface preparations or cleaning procedures may be required, such as mechanical abatement, profiling, vacuuming, sweeping, or damp mopping with clean water.

8.6 After the complete subfloor system is installed and prepared, apply the required adhesive following the written instructions of the flooring manufacturer.

8.6.1 For trowel applications, ensure the appropriate trowel notch size and shape is used. The adhesive shall be applied to the required area with the correct trowel at an angle approximately 45 degrees from horizontal (or as required by the manufacturer). The adhesive must be applied without voids or puddles. Do not make any sharp turns with the trowel to avoid an uneven application of the adhesive.

8.6.1.1 Only if required, back-roll the adhesive, using a non-shedding paint roller that is the recommended type, width, and nap length, pre-wetted with the adhesive.

8.6.1.2 Spray adhesive shall be applied in accordance with the adhesive or flooring manufacturer(s) specified pattern, coverage preparation, and application requirements.

8.7 Observe and follow all open times. When the adhesive is ready, correctly place the resilient flooring into the adhesive and follow any rolling and re-rolling instructions.

8.8 The entire perimeter of each resilient flooring sample shall be covered with 2-in. (51-mm) wide duct tape (or similar).

8.9 All samples shall be left to cure or dry for as long as required, according to the manufacturer(s) written instructions. In the absence of any specified cure time, use a minimum of 72 h.

8.9.1 Protect the test area from traffic for the duration of the test.

8.10 *Evaluation Method A*—(typically, not for two-part reaction adhesives)

8.10.1 Remove the tape from the perimeter of the test sample. Beginning at a corner of the installed resilient flooring, use a putty knife or scraper and separate roughly 1 in. (25 mm) of the resilient flooring from the substrate/adhesive.

8.10.2 Grasp the loosened flap (using pliers may be helpful) and pull the flap slowly, evenly and vertically (approximately 90 degrees), away from the subfloor.

8.11 *Evaluation Method B*—(typically, two-part reaction adhesives)

8.11.1 Remove the tape from the perimeter of the sample and using a knife and straight edge cut a 2-in. (51-mm) wide strip of the flooring, near the center of the sample (more may be required), cutting completely through the resilient flooring.

8.11.2 At one end of the 2-in. (51-mm) wide strip, use a putty knife or scraper and separate roughly 1 in. of the resilient flooring from the substrate/adhesive.

8.11.3 Grasp the loosened flap (using pliers may be helpful) and pull the flap slowly, evenly and vertically (approximately 90 degrees), away from the subfloor.

9. Assessment

9.1 The person(s) evaluating the bond strength should determine if the results are acceptable for each location. Assess and record with photographs/video the level of difficulty for removing each sample. Assessment conclusions would be: easy (typically unacceptable), medium (typically acceptable), or difficult (acceptable). Include the type and point of failure (for example, cohesive failure within adhesive or adhesive failure between substrate and adhesive).

9.1.1 If deemed unacceptable, then further investigation may be necessary. Begin with contacting the manufacturer(s) for guidance as some products do not require a strong peel strength. Please refer to [Appendix X1](#) for the Evaluation Guide.