Designation: F1482 – 21

Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring[1]

This standard is issued under the fixed designation F1482; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice includes recommendations for the installation of panel type underlayments including wood based, fiber reinforced gypsum and fiber-cement panel underlayment/subfloor assemblies upon which resilient flooring may be installed.

1.2 The structural integrity of subfloor assemblies is governed by local building codes.

1.3 This practice does not supersede in any manner the resilient flooring, underlayment or adhesive manufacturer's written instructions. Consult the individual resilient flooring, underlayment or adhesive manufacturer for specific recommendations. Manufacturer's instructions supercede the recommendations included in this practice.

1.4 See Supplementary Requirements for "Select Warnings" that have been provided.

1.5 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.

1.6 *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.*

1.7 *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:*[2]

C1278/C1278M Specification for Fiber-Reinforced Gypsum Panel

C1288 Specification for Fiber-Cement Interior Substrate Sheets

F141 Terminology Relating to Resilient Floor Coverings

2.2 *ANSI Standards:*[3]

ANSI/A208.1 Particleboard

ANSI/AHA A135.4 Basic Hardboard

2.3 *NIST Standards:*[4]

Voluntary Product Standard PS 1 for Structural Plywood

Voluntary Product Standard PS 2 for Performance Standard Wood-Based Structural-Use Panels

2.4 *Other Documents:*

APA Engineered Wood Construction Guide, Form E30[5]

APA Data File: Selection, Installation and Preparation of Plywood Underlayment Form L335[5]

Resilient Floor Covering Institute (RFCI) Recommended Work Practices for Removal of Resilient Floor Coverings (January 1998)[6]

Lead-Based Paint: Interim Guidelines for Hazard Identification and Abatement in Public and Indian housing (1991 revised)[7]

3. Terminology

3.1 Definitions used in this standard shall be in accordance with Terminology F141.

3.2 *Definitions of Terms Specific to This Standard:*

[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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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

[4] Available from National Institute of Standards and Technology (NIST), 100 Bureau Dr., Stop 1070, Gaithersburg, MD 20899-1070, http://www.nist.gov.

[5] Available from APA—The Engineered Wood Association, 7011 S. 19th St., Tacoma, WA 98466–5399, www.apawood.org.

[6] Resilient Floor Covering Institute, 115 Broad St, Suite 201 LaGrange, GA 30240, www.rfci.com.

[7] U.S. Department of Housing & Urban Development, Washington, DC, www.hud.gov.

3.2.1 *fully adhered flooring*—resilient flooring which has adhesive under the entire product, bonding it to the underlayment surface.

3.2.2 *non fully adhered flooring*—resilient flooring that may be loose laid, in which no adhesive is utilized, or partially bonded to the surface of the underlayment, typically at seams or the surrounding perimeter, or both, of the product.

4. Significance and Use

4.1 This practice provides minimum recommendations for the installation and preparation of wood-based, fiber-reinforced gypsum and fiber-cement panel underlayments suitable to receive resilient floor coverings. Actual requirements for materials to be used, mixtures, and other details are generally included as part of project plans or specification detail and may vary from the minimum recommendations set forth in this practice.

5. Underlayments

5.1 There are several types of panel underlayment available over which selective resilient flooring products may be installed.

5.2 *Plywood,* underlayment grade plywood, complying with PS 1, is composed of veneer plies and layers that are glued together with adhesive. The grain orientation of the face veneers has grain running in the long direction of the panel. The inner veneers often alternate in grain direction, but may be oriented in the same direction as adjacent inner veneers. Other sanded plywood grades are suitable for underlayment applications. APA Form E30 and Form L335 provide additional information.

5.3 *Oriented Strand Board (OSB),* complying with PS 2, is made of thin narrow strands of hardwoods and softwoods that are longer than they are wide. The strands are dried, screened, blended with adhesive and formed into a multi-layered mat. In the surface layer, the long axes of the strands are oriented so that they are in general parallel with the long direction of the panel. The strands in the inner layers may not be oriented in any particular direction or may be generally oriented perpendicular to the long direction of the panel. OSB is not generally recommended as underlayment for fully adhered resilient floor systems but is permitted for some underlayment applications. APA form E30 provides additional information.

5.4 *Fiber-Cement Underlayment,* complying with Specification C1288, is a discrete non-asbestos fiber-reinforced cement flat sheet consisting essentially of an inorganic hydraulic binder formed by the chemical reaction of a siliceous material and a calcareous material reinforced by organic fibers, non-asbestos inorganic fibers, or both.

5.5 *Gypsum Fiber Panel,* underlayment, complying with Specification C1278/C1278M.

5.6 *Particleboard,* complying with ANSI/A208.1, is manufactured from lignocellulosic materials (usually wood) primarily in the form of discrete pieces or particles, combined with a synthetic resin or other suitable binder and bonded together under heat and pressure in a hot press.

5.7 *Hardboard,* complying with ANSI/AHA A135.4, is a panel manufactured primarily from inter-felted lignocellulosic fibers, which are consolidated under heat and pressure in a heated press. Hardboards are not generally recommended as an underlayment for resilient floors.

6. Selection of Panel Underlayment

6.1 *General Consideration:*

6.2 Lifestyle, cost constraints, desired pattern aesthetics, and so forth, can affect which resilient product and panel underlayment should be selected. The resilient manufacturer's product information and installation recommendations should be reviewed prior to purchase. Some resilient manufacturer's literature offers specific recommendations or prohibitions as to types of underlayments for use under their flooring products.

6.3 There are two major categories of resilient flooring installation techniques:

6.3.1 Fully adhered, and

6.3.2 Non fully adhered (perimeter, loose-laid or locked together, etc.).

6.4 Fully adhered floors, constituting the majority of resilient floors installed, generally have more limitations or restrictions regarding underlayment suitability of use, than perimeter or loose laid floors.

6.5 Non fully adhered floors are ones that because of their product construction are designed to be floating or loose laid over the underlayment or partially bonded; that is, at the seam or perimeter areas, or both. Non fully adhered resilient flooring products may permit a wider selection of underlayments to be utilized.

6.6 The panel underlayment shall be smooth enough so that the texture of the graining or particle placement in the panel will not show through the finished resilient flooring. The underlayment panels shall not contain any foreign substance or markings that may stain the resilient flooring after installation. Protective coatings that may be used on underlayment panels shall be non-staining and be compatible with adhesives used for installing the finished flooring. Panels should not contain preservatives (pressure treated).

6.7 Responsibility for appearance or performance related issues that arise from use of panel underlayment outside the resilient manufacturer's recommendations, typically fall back to the underlayment panel manufacturer or whoever selected or specified the panel underlayment to be used. Following the resilient flooring manufacturer's published guidelines is recommended.

6.8 Responsibility for appearance or performance related issues that arise from patching, leveling or adhesive compounds outside the resilient manufacturer's recommendations, typically fall back to the supplier of those materials or whoever selected or specified those materials. Following the resilient manufacturer's published guidelines is recommended.

7. Material Acceptance

7.1 *Delivery*—All materials shall be delivered in packages, containers, or bundles with the identification and markings intact.

7.2 *Inspection*—Inspection of the materials shall be agreed upon between the purchaser and the supplier as part of the purchase agreement.

7.3 *Rejection*—Materials that are damaged, wet, frozen or in any way defective shall not be used. Rejection of materials shall be promptly reported verbally to the producer and immediately reported in writing. The notice of rejection shall contain a statement documenting the basis for material rejection.

7.4 *Certification*—When specified in the contract documents, the panel underlayment producer shall furnish a report certifying that the materials are in conformance with product and material standards and contract documents. The panel underlayment shall be marked as complying with the applicable product specification.

8. Material Storage and Conditioning

8.1 All materials shall be kept dry by storage under cover and protected from the weather. Outside storage is not recommended.

8.2 All other underlayment components shall be stacked off the ground, flat and with care taken to avoid damage to edges, ends or surface. It should be supported on a level platform and protected from direct sunlight, weather, surface contamination or physical damage in accordance with the producer's written instructions.

8.3 Materials shall be protected from exposure to temperatures less than 40°F (4°C) unless otherwise specified by the producer.

8.4 Gypsum-based or Portland cement patching and leveling compounds, or both, shall be kept dry until ready for use. They shall be kept off the ground, under cover and away from damp wall and surfaces.

8.5 Materials shall not be applied to an underlayment containing frost. Panel underlayment surface temperature shall be not less than 40°F (4°C) unless otherwise specified by the producer. Mixtures for application shall not contain any frozen ingredients.

8.6 Individual wood-based underlayment panels shall be separated and stored on edge for a minimum of 24 h prior to installation, with sufficient space between panels to permit air circulation to aid in acclimatization of the underlayment panels. Check underlayment panel manufacturer's specific recommendations.

8.7 The temperature conditions for installing resilient flooring products and related sundries is typically 65 to 80°F (18 to 27°C) for 48 h before, during and after the installation, then must remain within the range of 55 to 100°F (13 to 38°C) thereafter.

9. Installation of Panel Underlayment

9.1 *General Considerations:*

9.1.1 Underlayments to receive resilient flooring directly or panel underlayment shall be dry, clean, smooth, structurally sound and in compliance with local building codes. They shall be free of dust, solvent, paint, wax, oil, grease, residual adhesive, adhesive removers, and other foreign materials that might prevent adhesive bond or cause staining of resilient flooring.

9.1.2 A common floor joist spacing is 16 in. (405 mm) on center. Other joist spacing such as nominal 20 in. on center (19.2 in. actual) or 24 in. on center are permitted dependent upon joist and panel systems. Joist spacing shall comply with local building codes.

9.1.3 Wood subfloors to receive panel underlayment shall be suspended at least 18 in. (460 mm) above the ground, with adequate cross ventilation. Use of a vapor barrier on the ground surface, using overlapping widths and lengths to reduce high humidity from ground moisture into the crawlspace below the wood subfloor is recommended where appropriate.

9.2 *Preparation of New Wood Floors:*

9.2.1 A combination of the wood subfloor and panel underlayment shall be of double layer construction. Refer to the resilient flooring manufacturer's recommendations and local building codes for references to minimum thickness.

9.2.2 Install panel underlayment just before the installation of the finished resilient flooring and protect it from construction traffic, staining, denting or other potential damage.

9.2.3 Install with long dimension of the underlayment panels perpendicular to the floor joists for maximum rigidity.

9.2.4 Install with underlayment panel edges offset from any subfloor joints or edges by at least 6 in. (150 mm).

9.2.5 Offset panel underlayment joints by at least 16 in. (405 mm), and make sure panel underlayment is staggered such that four-panel corners do not meet.

9.2.6 Use only non-staining fasteners to secure panel underlayment.

9.2.6.1 For ¼ to ½ in. (6.4 to 12.7 mm) thick underlayment panels, use 3d ring-shank nails spaced 3 in. (75 mm) on center along panel edges, ⅜ in. from ends and edges (9.5 mm) and 6 in. (150 mm) on center over panel field. Staples are also widely utilized as fasteners; refer to panel underlayment manufacturer's recommendations as to type, length and crown orientation of staples for the thickness underlayment being fastened. Also, check resilient manufacturer's recommendations. Oil from fastening equipment can stain resilient flooring. It is the panel installer's responsibility to make sure equipment is well maintained (does not leak excess oil) and that non-staining lubricating oils are utilized.

9.2.6.2 For underlayment panels from 19⁄32 to ¾ in. (15.1 to 19 mm) thick, use 4d ring-shank nails spaced 6 in. (150 mm) on center at panel edges and 8 in. (200 mm) on center over panel field.

9.3 *Preparation of Existing Wood Subfloors or Panel Underlayment:*

9.3.1 The resilient flooring manufacturer shall be consulted regarding the removal of old resilient flooring, adhesive residue, or other surface contaminants. If old resilient flooring or adhesive residue is to be removed, follow the RFCI's "Recommended Work Practices for Removal of Resilient Floor Covering."

9.3.2 Stripwood plank or any board type subfloors are not acceptable under-floors for the direct installation of resilient flooring. If stripwood is 3 in. (75 mm) or less in width and is