LF–03

UNDERLAYMENT

NORTH AMERICAN LAMINATE FLOORING ASSOCIATION

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An American National Standard (ANSI)

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www.nalfa.com | 413-264-5352
1350 Main St. Suite 1100 | Springfield, MA, 01103

Foreword

The North American Laminate Flooring Association has prepared this Standards Publication for use by manufacturers, suppliers, distributors, dealers, and consumers of laminate flooring. The performance values and test methods presented have been related as closely as possible to end-use applications, and consumer needs have been considered throughout.

The purpose of this Standards Publication is to provide a minimum performance set of requirements for a laminate floor underlayment using standard test methods. The requirements of this standard apply to a laminate floor underlayment not attached to laminate flooring.

The procedures and criteria within this standard provide evaluation guidance regarding laminate floor underlayment products to meet various performance requirements. As testing capability improves, it is recognized that equivalent test methods may be considered.

The Technical Committee works closely with trade organizations, consumers, manufacturers, and appropriate government agencies in the periodic review and revision of these standards.

In this revision to the 2019 publication for laminate floor underlayment, effort has been made to relate this standard closely to the expected performance in the application. During laminate floor underlayment and laminate flooring installation, the fabrication method and technique employed will have a definite bearing on product performance and service. Consult individual laminate flooring manufacturers for specific installation criteria.

Metric values for the test procedures and performance standards are regarded as the standard.

This standard is periodically reviewed by the Technical Committee for any revisions necessary to keep them up to date with advancing technology. Proposed or recommended revisions should be submitted to:

Technical Director
North American Laminate Flooring Association
Webster, Chamberlain, & Bean
1747 Pennsylvania Avenue, NW Suite 1000
Washington, DC 20006
(202) 785-9500

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1. SECTION #1: GENERAL

1.1. Scope

This standard is intended to establish the minimum requirements that a non-attached laminate floor underlayment must meet to achieve the NALFA Seal of Approval.

1.1. Referenced Test Methods

- ASTM D3575: Standard Test Methods for Flexible Cellular Materials Made From Olefin Polymers.
- ASTM E492: Standard Test Method for Laboratory Measurement of Impact Sound. Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine.
- ASTM E989: Standard Classification for Determination of Impact Insulation Class (IIC).
- ASTM E90: Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.
- ASTM E413: Classification for Rating Sound Insulation.
- ASTM D3273: Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- ASTM C518: Standard Test Method for Steady-State Thermal Transmission Properties
- ASTM D5116: Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions From Indoor Materials/Products
- ASTM E96: Standard Test Methods for Water Vapor Transmission of Materials.
- ASTM F1249: Standard Test Method for Water Vapor Transmission Rate through Plastic Film and Sheeting Using a Modulated Infrared Sensor.

1.3. Conditioning

Materials to be evaluated shall follow the conditioning requirements of each ASTM Test Standard, unless noted in this document. If noted, this document supersedes the ASTM conditioning requirements.

1.4. Definitions

- Laminate Floor Underlayment: A product used over the sub-floor or underlayment surface and under the laminate flooring material for the purpose of improving properties such as smoothing out minor sub-floor imperfections; improving acoustic and thermal insulation properties; reducing walking fatigue; etc.
- Laminate Flooring: A rigid floor covering with a surface layer consisting of one or more thin sheets of a fibrous material (usually paper), impregnated with amino plastic thermosetting resins(usually melamine), pressed or bonded on a substrate, normally finished with a backer.

2. SECTION #2: PERFORMANCE PROPERTY CHART

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TEST METHOD	**PROPERTY**	**Method**		
3.1	Thickness	ASTM D 3575	≥ 1 mm (≥ .040")	≥ 1 mm (≥ .040")
3.2	Compression Resistance	ASTM D 3575 Suffix D	≥ 2.5 psi	≥ 2.5 psi
3.3	Impact Insulation Class (IIC)	ASTM E492 / ASTM E989	≥ 50	≥ 50
3.4	Sound Transmission Class (STC)	ASTM E90 / ASTM E413	≥ 50	≥ 50
3.5	Thermal Resistance (R-Value)	ASTM C518	State Value	State Value
3.6	Indoor Air Quality (CA01350)	ASTM D5116	Pass / Fail	Pass / Fail
3.7	Water Vapor Transmission Rate	ASTM E96 / ASTM F1249	N/A	≤ 3 lbs/1000 ft^2 day
3.8	Mold Growth	ASTM D3273	N/A	≥ 9

3. SECTION #3: Testing Method and Additional Information

3.1. THICKNESS - ASTM D 3575

3.1.1. Scope: This test measures the thickness of a laminate floor underlayment.

3.1.2. Test Apparatus: A dial gauge or other suitable measuring device capable of providing accurate and reliable readings within a range of ± 0.025 mm (0.001in.). The minimum foot area shall be 650 mm^2 (1 $in.^2$). Pressure on the foot shall be 190 ± 50 Pa (0.028 ± 0.007 psi).

3.1.3. Specimens: Randomly selected representative samples of laminate floor underlayment shall be used.

3.1.4. Procedure: Measure the center and four equally spaced locations around the center of the laminate floor underlayment.

3.1.5. Calculations: 1 - Average the five locations.

3.1.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.2. COMPRESSION RESISTANCE - ASTM D 3575 Suffix D

3.2.1. Scope: This test method covers the measurement of the force necessary to compress a laminate floor underlayment to 0.5 mm (0.020 in.) of deflection.

3.2.2. Test Apparatus: An apparatus shall be provided having a flat compression foot, larger than the specimen to be tested, connected to force-measuring device and mounted in a manner such that the laminate floor underlayment can be compressed at a speed of 12.5 mm/min (0.5 in./ min). The apparatus shall be arranged to support the laminate floor underlayment on a level horizontal plate.

3.2.3. Specimens: The laminate floor underlayment shall be a right cylinder with parallel top and bottom surfaces. The thickness shall be no greater than 75% of the minimum top dimension. Laminate floor underlayment shall be a minimum of 2500 mm^2 (4 $in.^2$) in area and shall be the same nominal thickness as supplied to the marketplace. The laminate floor underlayment may not be plied up. Three samples for each product shall be tested.

3.2.4. Procedure: Place the laminate floor underlayment centered in the line of the axial load of the supporting plate of the apparatus. Bring the compression foot into contact with the laminate floor underlayment, applying a total pretest pressure of 758 ± 69 Pa (0.11 ± 0.01 psi) for cellular products and 1551 ± 172 Pa (0.225 ± 0.025 psi) for non-cellular products. Compress the laminate floor underlayment a distance of 0.5 mm (0.020in.). Record the load at this point.

3.2.5. Calculations: Calculate the deflection force at 0.5mm (0.020 in.) of deflection, per unit area of the laminate floor underlayment, expressed as kilopascals (or pounds-force per square inch) as follows.

CD = F/A

Where:

CD = compression deflection force at 0.5 mm (0.020 in.) of Deflection in kPa (psi).

F = force required to compress the laminate floor underlayment to 0.5 mm (0.020in.).

A = test area on the laminate floor underlayment, m^2 ($in.^2$).

3.2.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.3. IMPACT INSULATION CLASS (IIC) - ASTM E492 / ASTM E989

3.3.1. Scope: This test method covers the laboratory measurement of impact sound transmission of floor (laminate floor with laminate floor underlayment)-ceiling assemblies using a standardized tapping machine. A laminate floor that is a nominal 8 mm thick shall be used.

3.3.2. Test Apparatus: Reference ASTM followed during testing.

3.3.3. Specimens: The laminate floor underlayment is to be tested at nominal thickness and area that is appropriate for the testing room.

3.3.4. Procedures: The client shall request that the testing be performed with a 152 mm (6") thick reinforced concrete slab. In addition a 12.5 to 15.9 mm (0.5 to 0.625") thick gypsum board suspended ceiling with 89 to 100 mm (3.5 to 4") of lay in fiberglass insulation or sound attenuation batts shall be used.

3.3.5. Calculations: Reference ASTM followed during testing.

3.3.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.4. SOUND TRANSMISSION CLASS (STC) - ASTM E90 / ASTM E413

3.4.1. Scope: This test method covers the laboratory measurement of airborne sound transmission loss of building partitions such as walls of all kinds, operable partitions, floor (laminate floor with laminate floor underlayment)-ceiling assemblies, doors, windows, roofs, panels, and other space-dividing elements. A laminate floor that is a nominal 8 mm thick shall be used.

3.4.2. Test Apparatus: Test Apparatus: Reference ASTM followed during testing.

3.4.3. Specimens: The laminate floor underlayment is to be tested at nominal thickness and area that is appropriate for the testing room.

3.4.4. Procedure:

3.4.4.1. The client shall request that the testing be performed with a 152 mm (6") thick reinforced concrete slab. In addition a 12.5 to 15.9 mm (0.5 to 0.625") thick gypsum board suspended ceiling with 89 to 100 mm (3.5 to 4") of lay in fiberglass insulation or sound attenuation batts shall be used.

3.4.4.2. An alternative to the floor/ceiling assembly described in 3.4.4.1, a joist floor/ceiling system as described below may be used. A 37.5 mm (1.5") lightweight concrete topping over a 15.9 mm (0.625") tongue and groove plywood subfloor, nailed floor joists 24" on center. The ceiling shall consist of 15.9 mm (0.625") gypsum board. The channels shall be filled with 139.7 mm (5.5") of cellulose insulation.

3.4.5. Calculations: Reference ASTM followed during testing.

3.4.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.5. THERMAL RESISTANCE (R-Value) - ASTM C518

3.5.1. Scope: This test measures the resistance to heat transfer in insulation.

3.5.2. Test Apparatus: Reference ASTM followed during testing.

3.5.3. Specimens: Reference ASTM followed during testing. The laminate floor underlayment is to be tested at nominal thickness.

3.5.4. Procedures: Reference ASTM followed during testing.

3.5.5. Calculations: Reference ASTM followed during testing.

3.5.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.6. INDOOR AIR QUALITY (CA01350) - ASTM D5116

3.6.1. Scope: This test measures volatile organic chemical emissions from indoor air sources using environmental chambers.

3.6.2. Test Apparatus: Reference ASTM followed during testing.

3.6.3. Specimens: Reference ASTM followed during testing. The laminate floor underlayment is to be tested at nominal thickness.

3.6.4. Procedures: Reference ASTM followed during testing.

3.6.5. Calculations: Reference ASTM followed during testing.

3.6.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.7. WATER VAPOR TRANSMISSION RATE - ASTM E96 / ASTM F1249

3.7.1. This test method covers the determination of water vapor transmission (WVT) of a laminate floor underlayment. The test method is limited to specimens not over 32mm (1.25 in) thick. There are two methods within ASTM E96, the Water Method shall be used as it provides for the measurement of permeance, and two variations include service conditions with one side wetted and service conditions with low humidity on one side and high humidity on the other.

3.7.2. A second test method may be chosen ASTM F1249. This method is applicable to sheets and films up to 3 mm (0.118 in.) in thickness, consisting of single or multilayer synthetic or natural polymers and foils, including coated materials. It provides for the determination of (1) water vapor transmission rate (WVTR), (2) the permeance of the film to water vapor, and (3) for homogeneous materials, water vapor permeability coefficient. Note 1: Values for water vapor permeance and water vapor permeability must be used with caution. The inverse relationship of WVTR to thickness and the direct relationship of WVTR to the partial pressure differential of water vapor may not always apply.

3.7.3. Test Apparatus: Reference ASTM followed during testing.

3.7.4. Specimens: Reference ASTM followed during testing.

3.7.5. Procedures: Reference ASTM followed during testing.

3.7.6. Calculations: Reference ASTM followed during testing.

3.7.7. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations.

3.8. MOLD GROWTH - ASTM D3273

3.8.1. Scope: This test measures the fungal resistance of plastics and polymeric materials.

3.8.2. Test Apparatus: Reference ASTM followed during testing.

3.8.3. Specimens: Reference ASTM followed during testing. The laminate floor underlayment is to be tested at nominal thickness.

3.8.4. Procedures: Reference ASTM followed during testing.

3.8.5. Calculations: Reference ASTM followed during testing.

3.8.6. Report: Reference to this Standard, Description of Sample, Results, Date, and Testing deviations

4. SECTION #4: THIRD PARTY TESTING

4.1. COMPLIANCE: When reference is made to this standard in statements of compliance, the laminate floor underlayment product shall meet all of the requirements in their entirety.

4.2. CERTIFICATION: All Certification and testing shall be performed by an independent testing lab. A party seeking certification shall submit its results, as well as identifying information for the test lab, to NALFA for review and verification. All laminate floor underlayment must undergo third party testing at least every five years or whenever a product is substantially changed.

4.3. EFFECTIVE DATE: The certification requirements shall become effective with the publication date of this standard.

5. SECTION #5: GLOSSARY APPENDIX

This appendix is not part of the NALFA requirements for laminate floor underlayment products, but is included for informational purposes only.

1. Acclimation: Adaptation of the laminate floor to its installation environment.
2. Acoustical Properties: Absorbance, reflection or transmission of sound waves.
3. Adhesion: A chemical process by which two materials can be joined together.
4. Chemical Resistance: The degree to which a material resists visual or physical degradation from exposure to various household and/or industrial chemicals.
5. Compressive Strength: the ability of a material to withstand loads.
6. Deflection: The degree to which a structural element is displaced under a load.
7. Delaminating: Separation of layers.
8. Density: Unit weight per volume of a panel expressed in lb/ft^3 or kg/m^3.
9. Dimensional Stability: The ability of a material to resist changes in measured dimensions caused by environmental factors (e.g., moisture or temperature).
10. Embossing: A process by which a surface is given a texture.
11. Equilibrium Moisture Content: The moisture content at which the material neither gains nor loses moisture at a given relative humidity.
12. Expansion Gap: A space necessary between fixed objects (i.e. walls of a room, pipes, and cabinets) and between the material itself to allow for the movement of the material.
13. Flame Spread: Measurement of the flame propagation along the surface of a material.
14. Floating Floor: Installation method by which the flooring panels are connected together and not attached to the subfloor.
15. Impact Resistance: Ability to resist fracture or damage from a falling object.
16. Laminate: A product made by bonding together two or more layers of material.
17. Laminate Flooring: A rigid floor covering with a surface layer consisting of one or more thin sheets of a fibrous material (usually paper), impregnated with amino-plastic thermosetting resins (usually melamine). These sheets are either pressed as such (HPL, CPL, Compact), and in the case of HPL or CPL bonded on a substrate, or in the case of DPL directly pressed on a substrate. The product is normally finished with a backing primarily used as a balancing material. Its performance values are set by the NALFA/ANSI Standard.
18. Moisture Content: The amount of water in the material, usually expressed as a percentage of the dry weight.
19. Moisture Meter: A tool used to measure moisture content.
20. Sub-floor: A pre-existing supporting surface in a structure.