UL 1618

STANDARD FOR SAFETY

Wall Protectors, Floor Protectors, and Hearth Extensions

UL Standard for Safety for Wall Protectors, Floor Protectors, and Hearth Extensions, UL 1618

Second Edition, Dated October 23, 2015

Summary of Topics

This revision of ANSI/UL 1618 dated April 1, 2024 is being issued to update the title page to reflect the most recent designation as a Reaffirmed American National Standard (ANS). No technical changes have been made.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The requirements are substantially in accordance with Proposal(s) on this subject dated February 9, 2024.

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UL 1618

Standard for Wall Protectors, Floor Protectors, and Hearth Extensions

First Edition – May, 2009

Second Edition

October 23, 2015

This ANSI/UL Standard for Safety consists of the Second Edition including revisions through April 1, 2024.

The most recent designation of ANSI/UL 1618 as a Reaffirmed American National Standard (ANS) occurred on April 1, 2024. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, and Title Page.

Comments or proposals for revisions on any part of the Standard may be submitted to ULSE at any time. Proposals should be submitted via a Proposal Request in ULSE's Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements cover wall protectors, floor protectors, and hearth extensions that are intended for use with heat producing devices, such as fireplaces, fireplace stoves, fireplace inserts, and solid-fuel type room heaters.

1.2 Wall protectors, floor protectors, and hearth extensions are intended for installation in accordance with the Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel Burning Appliances, NFPA 211.

1.3 The factory-built fireplaces with which these products are used are intended to comply with the Standard for Factory-Built Fireplaces, UL 127.

1.4 The fireplace stoves with which these products are used are intended to comply with the Standard for Fireplace Stoves, UL 737.

1.5 The solid-fuel type room heaters with which these products are used are intended to comply with the Standard for Room Heaters, Solid-Fuel Type, UL 1482.

1.6 The pellet-fuel type room heaters with which these products are used are intended to comply with the Standard for Room Heaters, Pellet Fuel-Burning Type, ASTM E1509.

1.7 Floor protectors are not evaluated in regard to floor protection with substantial amounts of fuel burning directly on the floor protector surface.

2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this standard shall comply with the requirements for that component. See Appendix A for a list of standards covering components generally used in the products covered by this standard.

2.2 A component is not required to comply with a specific requirement that:

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

2.3 A component shall be used in accordance with its rating established for the intended conditions of use.

2.4 Specific components are incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions.

3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this standard shall be interpreted as referring to the latest edition of that code or standard.

5 Glossary

5.1 For the purpose of this standard, the following definitions apply.

5.2 FLOOR PROTECTOR – Noncombustible surfacing applied to the floor area underneath and extending in front, to the sides and to the rear of a heat producing appliance.

a) TYPE 1 – EMBER PROTECTOR – for appliances not requiring thermal protection of the combustible floor during normal operation.

b) TYPE 2 – THERMAL FLOOR PROTECTOR – for appliances requiring thermal protection of the combustible floor during normal operation. To qualify as a Thermal Floor Protector, the floor protector must have a minimum R-Value of 1.0 when tested using the method prescribed in Section 11 of this standard.

5.3 HEARTH EXTENSION – Noncombustible surfacing applied to the floor area extending in front of and at the sides of the hearth opening of a fireplace or fireplace insert. Hearth extensions are subject to the same classifications, testing and requirements as Ember Protectors and Thermal Floor Protectors defined in 5.2.

5.4 NONCOMBUSTIBLE MATERIAL – A material that, in the form in which it is used and under the conditions anticipated, will not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat as specified in the Radiant Panel Test, Section 12, and in the Burning Brand Test for Floor Protectors, Section 13. Materials reported as noncombustible, when tested in accordance with the Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, ASTM E136, are considered noncombustible materials.

5.5 PRODUCT – All wall protectors, floor protectors, and hearth extensions or any part thereof covered by these requirements unless specifically noted otherwise.

5.6 R-VALUE – The measure of a material's ability to resist heat flow – Thermal Resistance, units = ft^2 x °F x hour/Btu.

CONSTRUCTION

6 Materials

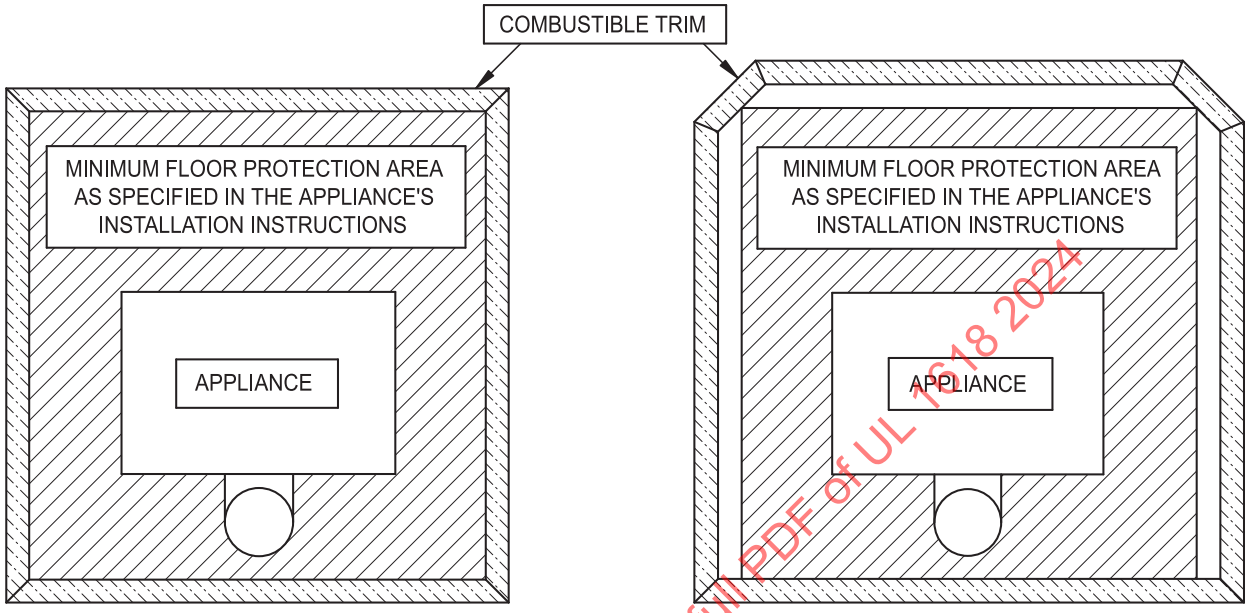
6.1 Floor protectors as specified in 5.2 shall consist of a covering of non-combustible material on the side of the floor protector facing the stove. Material shall form a continuous covering without gaps. All materials shall maintain their structural and thermal integrity throughout the required testing.

Exception: Combustible trim shall not be considered part of the floor protection area if the combustible trim is completely outside the minimum floor protection dimensions specified in the appliance's installation instructions, see 18.2(a). See Figure 6.1 for an example.

Figure 6.1

Allowable combustible trim locations for floor protectors

NOTE: Appliance specific



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6.2 For an ember protector as specified in 5.2(a), combustible materials may be used underneath the noncombustible covering described in 6.1.

6.3 A thermal floor protector as specified in 5.2(b) shall be tested as if any combustible materials used in the construction of the floor protector were the combustible floor. The thermocouples shall be attached to the top surface of the upper-most layer of any combustible material within the floor protector structure. The test limits are to be applied as if the combustible materials were the floor. The R-value given for a thermal floor protector containing combustible materials shall be the thermal resistance from the top surface of the floor protector to the top surface of the upper-most layer of combustible material within the floor protector.

6.4 Asbestos material shall not be used.

7 Assembly

7.1 General

7.1.1 Each part or assembly shall be constructed for attachment of one to the other without requiring alteration, cutting, threading, drilling, welding, or similar tasks by the installer.

Exception: An assembly or component part intended to be cut to length or to be fitted by the installer may be provided if means are furnished for joining any altered part to a companion part or assembly. All fasteners required to complete the assembly shall be provided with the product by the manufacturer. Drilling is acceptable if:

a) The drilling operation does not weaken the assembly; and

b) The size of the required drill bit is specified and instructions clearly describe the locations to be drilled, such as by the use of templates, drawings, descriptions, or the like.

7.1.2 Two or more parts or subassemblies that must bear a definite relationship to each other shall be:

a) Arranged and constructed to permit them to be incorporated into the complete assembly without need for alteration or alignment and only in the correct relationship with each other; or

b) Assembled and shipped from the factory as one element.

7.2 Joints

7.2.1 Parts shall be jointed and secured so that they do not disengage when tested in accordance with these requirements.

7.2.2 Any joints between sections of floor protectors to be assembled in the field shall provide continuous protection for the combustible material beneath the joint such as that provided by a "lap" or "tongue and groove" joint with a minimum of 1/2 inch overlap, grouting surface tiles, a strip of sheet metal under the floor protector spanning the joint or equivalent.

7.3 Grounding

7.3.1 When a floor protector is constructed with a metal face, an electrical grounding kit shall be available from the manufacturer for those installations where the appliance installed on the floor protector includes electrical components.

7.3.2 The kit shall include the following construction or its equivalent: a 12 inch (305 mm) long copper wire conductor, 14 AWG (2.1 mm^2) or larger, finished with a continuous green jacket having a paint-cutting type eyelet at each end with a 1/4 inch (6.4 mm) long metal screw, size No. 6-32 (3.5 mm diameter) provided to secure one end of the wire to the floor protector. When the other end of the grounding wire is to be secured to the heating appliance by means of drilling and securing the grounding wire by means of a nut and bolt, the specific drill, bolt, and nut size shall be specified in the kit's installation instructions.

7.4 Spacing

7.4.1 A wall protector spacing kit, when provided, shall be constructed of noncombustible materials and shall establish and maintain the minimum required clearance between the wall shield and the combustible wall surface.

PERFORMANCE

8 General

8.1 When a product is tested in accordance with these requirements, temperatures on combustible construction shall be maintained within the limits specified. No part shall attain a temperature that will damage required corrosion protection or cause creeping, distortion, sagging, or similar damage.

8.2 Thermal insulation, as employed, shall comply with the following requirements during and following tests on the product:

a) The insulating material shall remain in its intended position; and

b) The thermal insulation shall not show evidence of softening, melting, or other evidence of malfunction or deterioration.

8.3 The product, as installed, shall comply with the requirements for the Standard for Tests for Sharpness of Edges on Equipment, UL 1439.

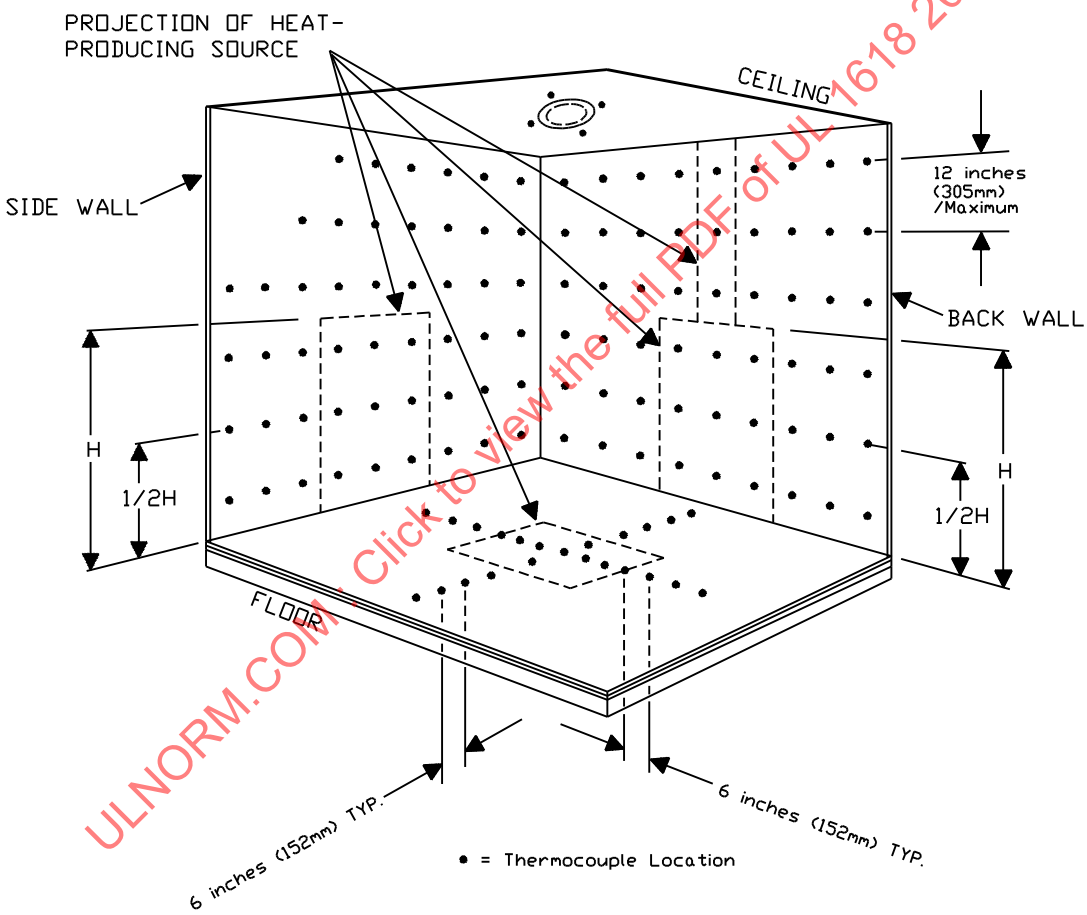
9 Test Installation

9.1 Tests shall be conducted as described herein on each type of product and on as many sizes as necessary to determine compliance with these requirements.

9.2 A wall protector is to be installed in a structure similar to that illustrated by Figure 9.1.

Figure 9.1

Typical thermocouple locations, walls and floor test structure



9.3 The test structure is to be erected within a room having ventilation capable of maintaining the buildup of carbon monoxide to less than 50 parts per million[a] throughout the period of any test. The room is to be free of drafts. During any one test the room temperature shall not increase more than 20°F (11°C) above the value recorded at the beginning of the test.

[a] Threshold limit value as recommended by the American Conference of Governmental Industrial Hygienists.

9.4 That part of the test structure representing the living-space area in which the heat producing source is installed is to consist of a back wall, one side wall, a combustible floor, and a typical ceiling and floor construction. See Figure 9.1.

9.5 The combustible floor below the heat producing source is to consist of two layers of 3/4-inch (19-mm) thick plywood over trade size 2 by 4 inch (nominal 1-1/2 inch by 3-1/2 inch [38 mm by 89 mm]) floor supports placed on 16 inch (405 mm) centers.

9.6 The floor under the heat producing source is to extend at least 4 feet (1.2 m) in front of the heat producing source. The floor and back wall are to join the side wall. The floor and walls are to extend at least 4 feet beyond the projection of the heat producing source.

9.7 The side and back walls are each to consist of one thickness of 3/4-inch (19-mm) thick plywood.

9.8 The test structure is to include a 3/4 inch (19 mm) thick plywood ceiling located 8 feet (2.4 m) above the floor and extending not less than 4 feet (1.2 m) beyond the projection of the heat producing source.

9.9 All wall, floor, and ceiling surfaces of the test structure are to be painted flat black.

10 Accelerated Aging Test

10.1 Noncombustible insulating material used in a product shall demonstrate neither thermal decomposition nor degradation of thermal characteristics as a result of the accelerated aging procedures described in 10.2 – 10.5.

10.2 Two 12 by 12 inch (305 by 305 mm) samples of the product's noncombustible insulating material are to be used for this test. (See 6.3).

10.3 One of the samples is to be placed in an oven at 300°F (149°C) for 30 days.

10.4 Following the accelerated aging period, the aged and unaged samples of the insulating material are to be dried for 24 hours at 140°F (60°C) and then conditioned at a temperature of 73 ±5°F (23 ±3°C) and a relative humidity of 50 ±5 percent for at least 8 hours.

10.5 Following the conditioning specified in 1.4, the thermal resistance of the aged sample shall be measured with either ASTM C177 (Guarded Hot Plate) or ASTM C518 (Heat Flow Meter). The mean temperature for the measurements should be 110 ±10°F. The measurements shall show less than 10 percent degradation in the thermal resistance of the aged sample when compared to the unaged sample.

11 Thermal Resistivity Test

11.1 For Type 1 Ember Protectors as defined in 5.2(a), no thermal resistivity test is required. A statement that the R-Value = 0 for this product shall be included on the permanent label, in the installation manual and on removable labeling per requirements of Section 16, Markings.

11.2 Type 2 Thermal Floor Protectors as defined in 5.2(b), shall have a minimum R-value of R = 1.0 measured on 12 inch x 12 inch section of the floor protector – constructed and positioned to exhibit the worst-case test situation for thermal conduction with the floor protector as normally installed. The R-value shall be measured with either ASTM C177 (Guarded Hot Plate) or ASTM C518 (Heat Flow Meter). The mean temperature for the measurements should be 110 ±10°F. The actual R-Value as measured in this test shall be included on the permanent label, in the installation manual, and on removable labeling per requirements of Section 16, Markings.

11.3 If the floor protector being tested per 11.2 contains spacers to create an air space under the floor protector, a box may need to be constructed of mineral fiber board to facilitate thermal resistivity testing. The bottom and the walls of box are to be constructed of 0.5 inch mineral fiber board. The seams of the box and the seams between the box and the unit under test should be sealed with silicone. The tops of the sides of the box should be level with the top surface of the unit under test. The thermal resistivity of the mineral fiber board should be measured by itself under the same conditions and with the same equipment. After the thermal resistivity of the combination of the box and unit under test is completed, the thermal resistivity of the mineral fiber board that was used for the bottom of the box can be subtracted in order to calculate the thermal resistivity of the unit under test.

11.4 If the floor protector being tested per 11.2 contains spacers to create an air space under the floor protector and also contains convective air openings that allow that air space to communicate with room air, a test box that allows the air space to naturally convect will need to be constructed. When constructing the test box, block off any air openings that would be less than 1.5 inches from the floor when the floor protector is installed as intended in the home. Follow the remaining requirements as per 11.3.

12 Radiant Panel Test

12.1 A product shall have a flame spread index of 50 or less when tested as specified in the Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source, ASTM E162. A product complying with the Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, ASTM E136, is considered as having a flame spread index of 50 or less.

13 Burning Brand Test for Floor Protectors

13.1 General

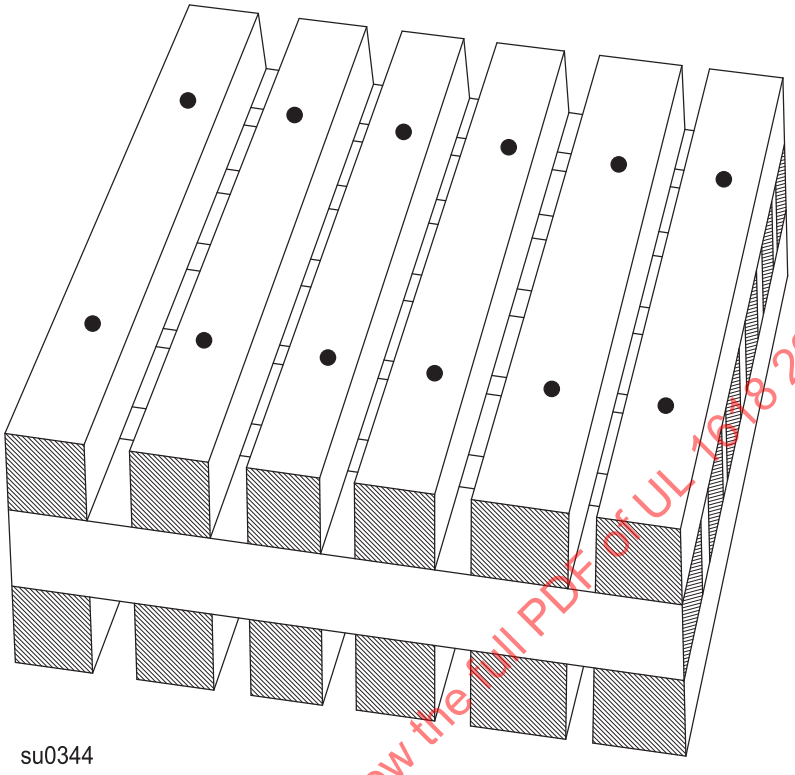
13.1.1 A floor protector shall remain intact and shall not flame on either its topside or underside when exposed to a burning wood brand as described in 1.2 – 13.5. A floor protector in which all component materials comply with the Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750°C, ASTM E136, is considered as complying with these requirements.

13.2 Size and construction of brand

13.2.1 The wood brand is to consist of a grid, 5-3/4 inch by 6 by 2-1/4 inches (146 mm by 150 mm by 57 mm), made of kiln-dried Douglas fir lumber that is free from knots and pitch pockets. The brand is to be made of 18 strips of lumber 3/4 inch by 3/4 inch (19.1 mm by 19.1 mm) square and 6 inches (150 mm) long, placed in three layers of six strips each, with strips spaced 1/4 inch (6.4 mm) apart. The strips are to be placed at right angles to those in adjoining layers and are to be nailed, using 1-1/2 inch (38.1 mm) long, 16 AWG nails, or stapled, using 16 AWG steel wire staples having a 7/32-inch (5.6-mm) crown and 1-1/4 inch (31.8-mm) legs, at each end of each strip on one face, and in an "X" pattern on the other face. Prior to exposing the floor protector to the burning wood brand, the brand is to be conditioned in an oven at 40 to 49°C (105 to 120°F) for at least 24 hours. The dry weight of the finished brand is to be 500 ±50 grams at the time of ignition. See Figure 13.1.

Figure 13.1

Wood brand construction



13.3 Ignition of brand

13.3.1 Before application to the floor protector, the brand is to be ignited so as to burn freely in still air, as described in 13.3.2. The flame of the gas burner used to ignite the brand is to essentially envelop the brand during the process of ignition. The temperature of the igniting flame is to be 888 ±10°C (1630 ±50°F), measured 2-5/16 inches (58.7 mm) above the top of the burner. The burner is to be shielded from drafts.

13.3.2 The brand is to be exposed to the flame for 4 minutes, during which time it is to be rotated to present each surface to the flame as follows:

a) Each 6 inch by 5-3/4 inch (152 mm by 146 mm) face for 30 seconds;

b) Each 2-1/4 inch by 6 inch (57.2 mm by 152 mm) face for 30 seconds; and

c) Each 2-1/4 inch by 6 inch (57.2 mm by 152 mm) face for 30 seconds.

13.4 Test conditions

13.4.1 The floor protector is to be mounted such that the underside of the floor protector can be observed. The burning brand is to be placed on the surface of the floor protector at the location considered most vulnerable with respect to ignition of the floor protector.

13.5 Duration of test

13.5.1 The test is to continue until the brand is consumed and until all evidence of flame, glow, and smoke has disappeared from both the exposed surface of the material being tested and the underside of the floor protector, or until unacceptable results occur, but not more than 1-1/2 hours.

14 Impact and Strength Test

14.1 A floor protector, after being subjected to the impacts and loading specified in 14.2 and 14.3, shall show no deformation to the insulating material which would impair insulating characteristics nor shall any covering material be damaged to the extent that insulating material is exposed.

14.2 An air space or air pockets of a product designed with an insulating air space shall not be reduced after being subjected to the impacts and loading specified in 14.3 and 14.4.

14.3 The floor protector is to be subjected to three successive impacts from a 5 inch (127 mm) diameter hardwood log, 18 inches (457 mm) long, weighing 12 pounds-mass (5.4 kg), and dropped from a height of 48 inches (1.22 mm) with its major axis parallel, perpendicular, and at a 45 degree angle to the surface of the floor protector.

14.4 The floor protector is to be subjected to a 600 pounds-force (lbf) (272 N) static load applied to a 1 square-inch (6.45 cm^2) area for 30 minutes.

15 Reduced Clearance Test for Wall Protectors

15.1 A radiant heat source consisting of a flat panel at least 36 inches high by 36 inches wide is to be mounted parallel to one of the test chamber walls and 6 inches above the floor. The panel is to be either a gas fired porous radiant panel or electrically heated radiant panel type heater.

15.2 The radiant panel is to be located 36 inches (900 mm) from the wall.

15.3 Without the wall protector installed, the radiant panel is to be heated to produce the highest temperature of the wall of 117°F (65°C) above ambient. The energy input to the radiant heat source is to be recorded.

15.4 The radiant panel is to also be heated to produce the highest temperature of the back wall of 140°F (78°C) above ambient. The energy input to the radiant heat source is to be recorded.

15.5 The wall protector is to be installed according to installation instructions.

15.6 The radiant panel is to be moved to a location representative of the maximum clearance reduction as specified by the manufacturer and operated at the energy input as recorded in 15.3. After equilibrium has been obtained, temperatures on the walls behind the heat shield are to be recorded. Temperatures behind the heat shield shall not exceed 90°F (50°C) above ambient.

15.7 The radiant panel is to then be operated at the inputs as specified for 15.4 for a period of 30 min. The temperatures behind the heat shield are to be recorded. Temperatures behind the heat shield shall not exceed 140°F (78°C) above ambient.

MARKINGS

16 General

16.1 Each product shall be permanently marked with the following:

a) The manufacturer's or private labeler's name or identifying symbol;

b) A distinctive type or model designation; and

c) Label as to the allowed usages as defined in Section 5, Glossary.

16.2 When a manufacturer produces products at more than one factory, each individual assembly shall have a distinctive marking to identify it as the product of a particular factory.

16.3 Permanent markings on a product shall molded; die-stamped; paint-stenciled, stamped, or etched metal that is permanently secured to the product; or indelibly stamped on a pressure-sensitive label. Ordinary usage, handling, and storage of the product are considered in determining the permanence of the marking. Adhesive attached marking and labeling systems shall comply with the requirements in the Standard for Marking and Labeling Systems, UL 969.

16.4 In addition to permanent markings, floor protectors and hearth extensions shall include removable (temporary) marking displayed on the top surface of the product or on the packaging in such manner that it is visible to the consumer when the product is being purchased. Adhesive-backed paper labels or printing directly onto individual product packaging are acceptable for this purpose.

16.5 Floor protectors and hearth extensions shall be labeled as to the tested usages as defined in 5.2 (Type 1 or Type 2)

a) If usage is limited to Type 1, Ember Protection, the permanent and removable markings shall include the following statement:

"R-VALUE = 0. For use with appliances that require only ember protection. This product is not to be used with appliances that specify Type 2 thermal floor protection or a specific R-value requirement."

b) For Type 2 Thermal Floor Protectors, the permanent and removable markings shall include the following statement:

"The R-VALUE of this product is R = *. This R-VALUE must be equal to or greater than that specified in the heat producing appliance's installation instructions and labeling."

*Note: Insert the R-Value of this product as determined in accordance with Section 11, Thermal Resistivity Test.

The following statement may also be included: “This Type 2 Thermal floor protector may be used as a Type 1 Ember Protector”.

16.6 Wall Protectors shall be marked with the allowable percentage reduction in clearance to combustible materials (C_{rp}), such as "This wall protector allows the required clearance between walls and the wood-burning appliance to be reduced by C_{rp} (expressed to the nearest whole percent), except where clearances include provision for access or ventilation." Unless the appliance and wall protector are specifically tested and labeled together for lesser clearance, the clearance after reduction shall be not less than:

a) 12 inches for appliances with labeled clearances to unprotected walls greater than 12 inches; or