

UL 737

Fireplace Stoves





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Summary of Topics

This new edition of ANSI/UL 737 is being published to reflect its approval as an American National Standard. It also includes revisions addressing: corrections to code references, undated references, and a reference to UL 61058-1.

The requirements are substantially in accordance with UL's Proposal(s) on this subject dated August 31, 2007.

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

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INTRODUCTION

1 Scope

1.1 These requirements cover fireplace stoves that are freestanding assemblies having fire chambers intended to be operated open to the room or, when equipped with doors, to be operated with the doors either open or closed.

1.2 Fireplace stoves covered by these requirements are intended for attachment to a residential chimney capable of being used for use with low heat appliances and intended for use with solid wood or coal fuels.

1.3 Fireplace stoves are intended for installation in accordance with the Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances, NFPA 211, and in accordance with codes such as the International Mechanical Code, International Residential Code, and the Uniform Mechanical Code.

1.4 Fireplace stoves intended for use in mobile homes are to be installed in accordance with the Mobile Home Construction and Safety Standards published by the Department of Housing and Urban Development (HUD).

1.5 The product shall include:

- a) A field-installed cord-connected or permanently-connected blower assembly; and
- b) Other field-installed electrical accessories, rated at 250 volts or less, and intended to be employed in locations in accordance with the National Electrical Code, NFPA 70.

2 Glossary

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

2.2 ALUMINUM-COATED STEEL – An aluminum-coated steel in which the bond between the steel and the aluminum is an iron-aluminum alloy.

2.3 CHIMNEY CONNECTOR – The flue pipe that connects a fuel-burning appliance to a chimney.

2.4 COMBUSTIBLE MATERIAL AND NONCOMBUSTIBLE MATERIAL – As used in this standard, these terms are defined in the Standard Glossary of Terms Relating to Chimneys, Vents, and Heat-Producing Appliances, NFPA 97.

2.5 DAMPER – A valve or plate that regulates draft or flow of flue gases or inlet combustion air. Shall be either manually or automatically operated.

2.6 GRATE – A frame for supporting the fuel within a fireplace stove.

2.7 HEARTH – The floor area within the fire chamber of a fireplace stove.

2.8 FLOOR PROTECTOR (HEARTH EXTENSION) – The noncombustible material applied to the combustible floor area located beneath the product and extending beyond the front and sides and to the rear of the product. The area is to be of the dimensions specified in the installation instructions.

3 Components

3.1 Except as indicated in 3.2, 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.

3.2 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.

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

3.4 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.

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 General

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

5.2 The term "product" as used in these requirements refers to all fireplace stoves or any part thereof covered by these requirements unless specifically noted otherwise.

6 Materials

6.1 A fireplace stove and a chimney connector, when provided, shall be made of noncombustible corrosion-resistant materials. Metals shall not be used in combinations that cause galvanic action at any location within the assembly.

6.2 The minimum thickness of metal, including any coatings, shall comply with Table 6.1.

Exception: Decorative metal parts are not required to comply with Table 6.1.

Table 6.1
Minimum metal thickness

	Inch	(mm)
Aluminum-coated steel Type T1-40 [regular 0.40 oz. per square foot (0.12 kg/m ²)]	0.018	0.46
Aluminum alloys	0.016	0.41
Cast iron	0.125	3.17
Galvanized steel (G60 coating class)	0.018	0.45
Porcelain-enameled steel	0.032	0.81
Stainless steel	0.012	0.30
Steel (uncoated or painted)	0.042	0.41

6.3 Aluminum alloys containing more than 1 percent magnesium shall not be used when the reflectivity of the material is employed to reduce the risk of fire.

6.4 The fire chamber of the fireplace stove, and other parts in contact with flue gases that are visible after installation, shall be of material having the durability and resistance to fire and heat equivalent to fireclay tile, Series 300 or 400 stainless steel, aluminum-coated steel, cast iron, or 0.042 inch (1.07 mm) thick unprotected or painted steel.

6.5 Cast iron and unprotected and painted sheet steel complying with the requirements of footnotes (k) and (l) of Table 11.1 comply with the requirements of 6.4.

6.6 Parts that are in contact with flue gases and that are not visible after installation shall be of a material having the durability and resistance to corrosion, fire, and heat equivalent to fireclay tile or Series 300 or 400 stainless steel.

6.7 Thermal insulation material shall be of metal or of a mineral base.

6.8 Thermal insulation shall comply with the following conditions when the fireplace stove is tested in accordance with these requirements:

- a) The products resulting from the combustion or volatilization of any combustible binder shall be discharged to the chimney.
- b) Insulating material shall remain in the intended position.
- c) Thermal conductivity of the insulation shall not increase.
- d) The insulation shall not show evidence of softening, melting, or deterioration.

6.9 Thermal insulation shall be protected against contact with the products of combustion.

6.10 Thermal insulation that is not self-supporting shall be applied to solid surfaces so that the insulation does not sag. An adhesive or cement used to attach such material shall retain its adhesive qualities at any temperature the adhesive attains when tested in accordance with these requirements and at 0°F (minus 17.8°C).

6.11 A water-absorbing insulating material shall be protected against wetting by condensation or rain when installed as intended.

6.12 The combustion air duct system (when applicable) shall be made of sheet metal not less than 0.016 inch (0.41 mm) thick. See 7.10.1 and 7.10.2.

Exception: Thinner materials classified as Class 0 or Class 1 air ducts, as defined in the Standard for the Installation of Warm Air Heating and Air Conditioning Systems, NFPA 90B, and in the Standard for Factory-Made Air Ducts and Air Connectors, UL 181, shall be used when:

- a) They comply with the requirements of NFPA 90B and UL 181; and*
- b) They have been investigated for the intended application.*

6.13 Asbestos material shall not be used.

7 Assembly

7.1 General

7.1.1 A fireplace stove and related parts shall be constructed and assembled to have the strength, rigidity, and durability to withstand damage during tests in accordance with these requirements and during handling and installation.

7.1.2 A joint in a metal surface of a fire chamber or flue gas passageway shall be made tight by being welded, lock-seamed, riveted, or bolted. A joint shall not depend primarily on cement for tightness.

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

Exception: An assembly or component part intended to be cut to length or to be fitted by the installer shall be provided when 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 shall not occur unless:

- a) The drilling operation does not weaken the assembly or drill into the fire chamber; 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, or descriptions.*

7.1.4 Insulating materials shall be an integral part of the assembly when required to protect combustible parts of the building when the fireplace stove is installed in accordance with the manufacturer's instructions.

Exception: Fire chamber materials shall be packaged and shipped with the fireplace stove when:

- a) The installation instructions provide for a description of method of placement of this material; and*
- b) The fireplace stove is marked with an adhesive-backed warning marking indicating the material is to be installed before firing.*

7.1.5 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 requiring alteration or alignment and only in the correct relationship with each other; or
- b) Assembled and shipped from the factory as one element.

7.1.6 Parts of a fireplace stove, such as support legs, chimney, or chimney connector parts that are necessary to limit temperatures on adjacent construction shall be factory-attached, or shall comply with all of the following:

- a) The parts shall be:
 - 1) Shipped with the fireplace stove; or
 - 2) Marked with the name or trademark of the private labeler, with a catalog number or equivalent designation, and with the type of equipment with which it is intended to be used. The associated fireplace stove shall be marked to indicate the catalog number or equivalent designation of such a part, and the name of the private labeler of that part.
- b) Assembly of the parts shall comply with the requirements of 7.1.3.
- c) The installation instructions shall define and illustrate the intended assembly of the parts.

7.1.7 The fireplace stove shall have no edges, corners, or projections presenting a risk of a cut or puncture-type injury to persons.

7.2 Flue damper

7.2.1 A flue gas outlet damper operated through a linkage or other mechanism shall be constructed so that breakage of a part does not result in the damper to partially or completely close.

7.3 Fire screen

7.3.1 A fire screen shall be furnished by the manufacturer as part of the fireplace stove.

7.4 Flue collar

7.4.1 A flue collar shall be made of material not thinner than that required for the fire chamber. A collar shall provide for attachment and fastening of the chimney connector by at least two screws or other equivalent mechanical methods.

7.4.2 A flue collar shall be of a nominal whole-inch (mm) size diameter of 6 inches (152 mm) or greater or the fireplace stove shall be provided with an increasing adaptor to fit to the next larger whole-inch size diameter of 6 inches or greater.

7.5 Radiation shield and baffle

7.5.1 A radiation shield or a baffle shall be constructed, formed, and supported to provide the intended positioning and to prevent distortion or sagging when tested in accordance with these requirements.

7.6 Thermostatic control

7.6.1 A thermostatically controlled air inlet damper shall be constructed so that breakage or malfunction of a part causes the combustion air inlet to close.

7.6.2 When the mechanism of the thermostat control is accessible (see 11.11), the requirements of 11.10 shall also be applied.

7.6.3 When the mechanism of the thermostat control is not accessible, and the thermostatic control is relied upon to limit maximum temperatures, the thermostatic control shall comply with the requirements in the Standard for Limit Controls, UL 353.

7.7 Grate

7.7.1 A fireplace stove that is intended to burn coal only or both coal and wood shall have an integral grate constructed for burning coal.

Exception: A detachable grate constructed for burning coal shall not be provided and shipped separately unless the assembly complies with the requirements in 7.1.6.

7.8 Separable handle

7.8.1 A separable handle, when provided, shall not remain in position when the user's hand is withdrawn following use.

7.8.2 Storage means shall be provided on the device for separable handles so that when the handle is stored as intended, during the Radiant Fire Test, Section 12 and Brand Fire Test, Section 13, the temperatures on the separable handle do not exceed the temperature limits shown in Table 11.1.

7.9 Barometric draft regulator

7.9.1 A barometric draft regulator used in conjunction with the flue of a fireplace stove shall comply with the requirements in the Standard for Draft Equipment, UL 378. It shall be adjusted and set at the fireplace stove manufacturer's factory to the maximum draft specified on the fireplace stove and shall be shipped with the product.

7.10 Combustion air duct system

7.10.1 The air inlet shall permit zero clearance to combustible construction.

7.10.2 The air inlet shall prevent material from dropping into the inlet or into the area beneath the mobile home, and also prevent rodents from entering from the outside [a wire mesh having openings not larger than 1/4 by 1/4 inch (6.4 by 6.4 mm) is capable of being used for the purpose].

PERFORMANCE

8 General

8.1 When a fireplace stove is tested in accordance with these requirements, temperatures on combustible construction adjoining the fireplace stove, chimney connector, and floor area shall be maintained within the limits specified.

8.2 The draft created by the product during its intended operation shall not result in the spillage of the products of combustion from the product into the area served by the device.

8.3 After being tested in accordance with the Radiant Fire Test, Section 12; Brand Fire Test, Section 13; and Flash Fire Test, Section 14, the product shall be capable of further intended use. After completion of these tests, the fireplace stove is to be allowed to cool to room temperature and then subjected to the Strength Tests, Section 16 and Stability Test, Section 17.

8.4 Results that verify compliance with the requirements of 8.3 include the following:

- a) No part has become damaged or permanently distorted to an extent that it does not continue to function as intended.
- b) Other than paint or porcelain enamel not intended to be a protective coating, the effectiveness of any required protective coating or finish on metal parts has not been impaired.
- c) A ceramic or refractory material does not show evidence of cracking, disintegration, or spalling to an extent that impairs the serviceability of the part or the assembly.
- d) Cracks are not observable in porcelain enamel used as required protective coating, see 7.1.4, when the surface is examined under a microscope of 60 magnification.

e) The reflectivity of a surface has not been impaired when the reflectivity of such surface is employed to reduce the risk of fire.

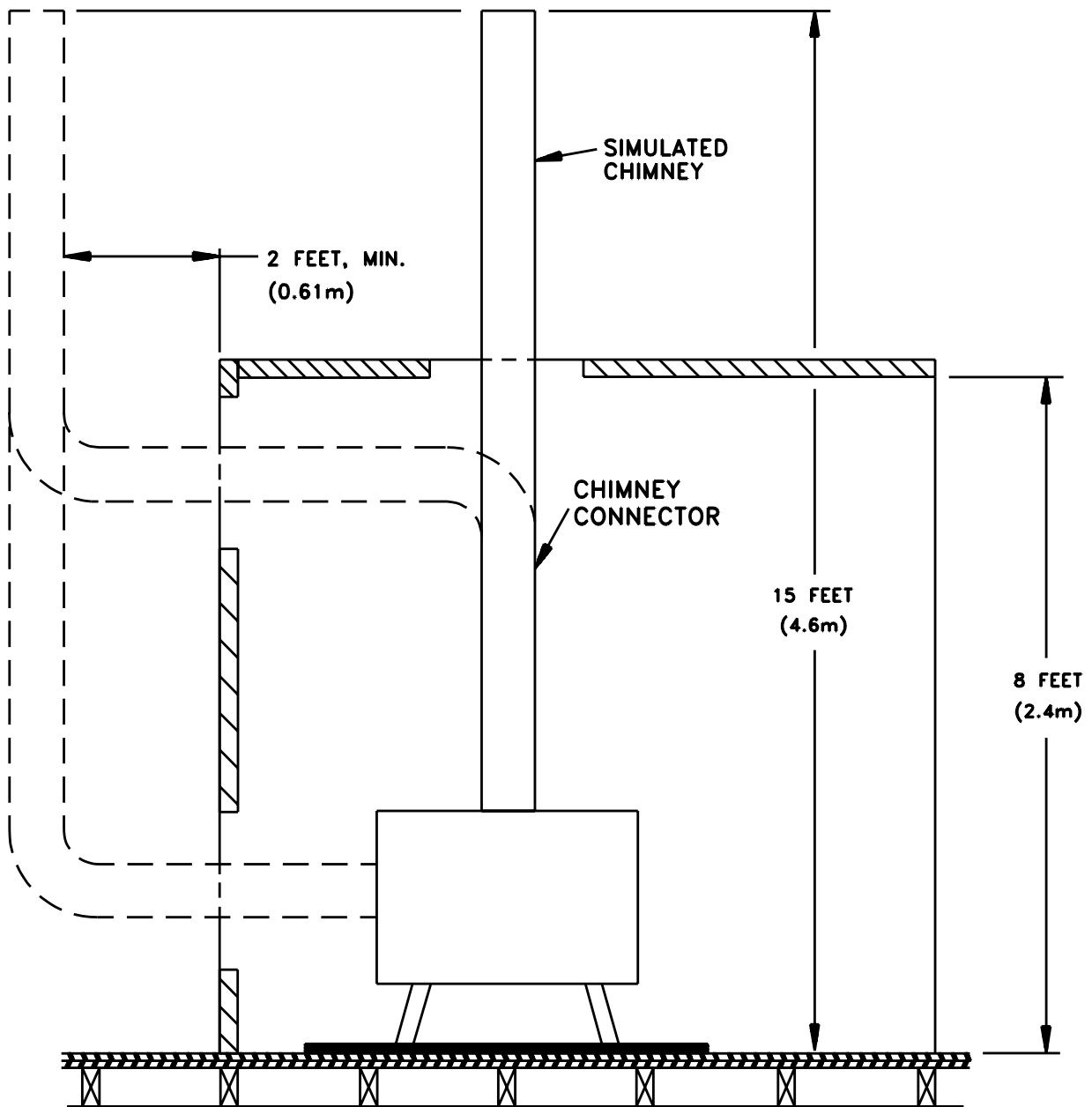
f) The effectiveness of insulating material has not been reduced.

9 Test Installation

9.1 Tests are to be conducted as described in 9.2 – 9.16 on each type of fireplace stove. When the fireplace stove is manufactured in more than one size, tests are to be conducted on as many sizes as to determine compliance with the requirements in 9.2 – 9.16.

9.2 The fireplace stove to be tested is to be installed in a structure similar to that illustrated by Figure 9.1, constructed to accommodate the product as it is to be tested.

Figure 9.1
General form of test structure



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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 throughout the period of any test. The room is to be free of drafts and the chimney is to exhaust into the same space, or into a space freely communicating with the space, from which the combustion air is taken. 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.

9.4 The temperature of the room and entire test structure within the room shall be between 60 and 90°F (15.6 and 32.2°C) at the beginning of the Radiant and Brand Fire Tests, Sections 12 and 13.

9.5 Ventilating, combustion, or cooling air openings into the fireplace stove are to be sealed unless:

- a) The openings are more than 1-1/2 inches (40 mm) above the floor and are otherwise arranged to reduce unintentional closure.
- b) The openings are not blocked by the user to overcome a nuisance, such as downdrafts, a cold room, or an overheated room; and
- c) The air is drawn from the room in which the fireplace stove is installed and is discharged into the same room or into the flue-gas passageway below the damper, or the air is drawn into the fireplace stove through the chimney at the cap which is an integral part of the fireplace stove assembly and discharged into the flue-gas passageway below the damper or separate discharge passageway of the chimney.

9.6 That part of the test structure representing the living-space area in which the fireplace stove is to be installed is to consist of a back wall, one side wall, a ceiling, and a floor. See Figure 9.1.

9.7 The combustible floor below the fireplace stove 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 by 3-1/2 inch (38- by 89-mm)] floor supports placed on 16 inch (405 mm) centers.

9.8 The floor under the fireplace stove is to extend at least 4 feet (1.2 m) in front of the fireplace stove opening. The enclosure side wall is to be placed perpendicular to the back wall. The floor and back wall are to join the side wall. The floor and walls are to extend at least 4 feet (1.2 m) beyond the fireplace stove.

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

9.10 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 fireplace stove. The chimney connector is to connect to the simulated chimney at the ceiling or wall. Where the chimney pierces the ceiling or wall, an opening having a diameter 8 inches (205 mm) larger than the diameter of the chimney is to be cut and the chimney centered in the opening. The ring thus formed is to be sealed with gypsum wallboard or equivalent mineral board material at least 3/8 inch (9.5 mm) thick, placed on the exterior surface of the ceiling. The joint between the chimney connector and the ring shall not have a through opening (total eccentricity) greater than 1/8 inch (3.2 mm) wide. Temperatures on the surfaces surrounding the chimney connector are to be determined at points located 2 inches (50 mm) from the outer edge of the ring.

9.11 The fireplace stove and chimney connector are to be installed in the test structure at the minimum clearances specified by the installation instructions. Legs or other support members are to be adjusted to position the fireplace stove at the minimum allowable distance above the floor.

9.12 The area to be covered by the floor protector is to be as specified in the installation instructions.

Exception: The unit shall be tested without a floor protector at the manufacturer's request, and the installation instructions shall describe the floor protector to be used in the final installation.

9.13 The fireplace stove is to be connected to a simulated chimney by a black or blued-steel chimney connector pipe of the same nominal diameter as the collar or adaptor provided on the fireplace stove or by the chimney connector provided as part of the fireplace stove. The thickness shall be 0.023 – 0.028 inch (0.58 – 0.71 mm). The chimney connector is to be run vertically or horizontally, or both, to the chimney at the clearances specified by the installation instructions.

9.14 The simulated chimney is to consist of black or blued-steel pipe of the same size as the chimney connector, and shall have a thickness of 0.023 – 0.028 inch (0.58 – 0.71 mm). The chimney is to originate at the point where the chimney connector exits the test structure and is to terminate 15 feet (4.6 m) above the floor of the test structure.

Exception: In lieu of the simulated chimney, and at the option of the manufacturer, the fireplace stove is to be tested with a factory-built chimney and ceiling support specified by the manufacturer, when:

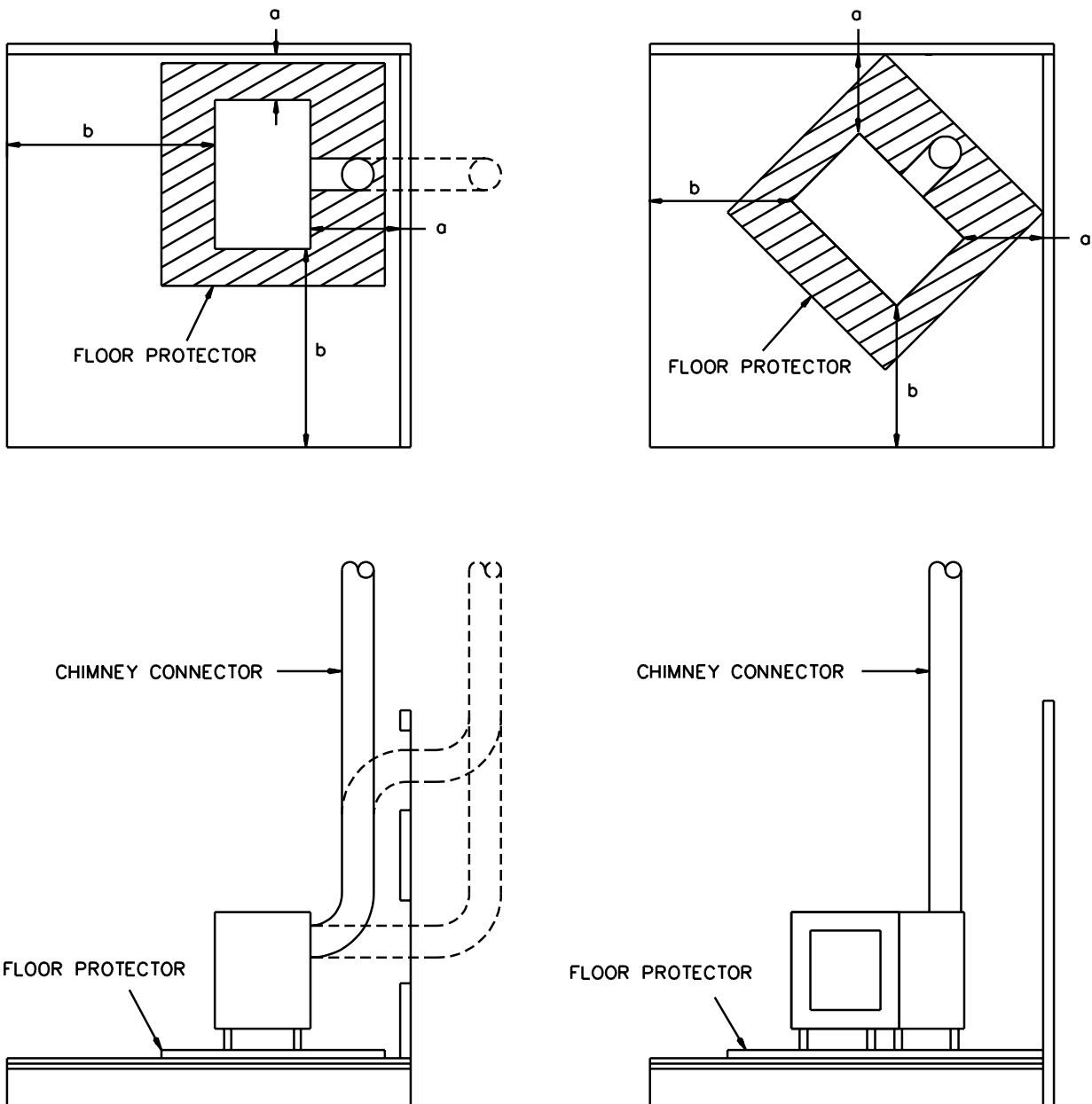
a) The chimney complies with the Standard for Factory-Built Chimneys for Residential Type and Building Heating Appliances, UL 103; and

b) Both the installation instructions and marking on the product specify the chimney with which the fireplace stove is to be used.

9.15 The fireplace stove is to be installed and tested with the fire chamber opening parallel to the rear wall of the test enclosure or in a corner when such installation produces higher temperatures on the test structure. See Figure 9.2.

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

Figure 9.2
Typical fire test installations



S2074

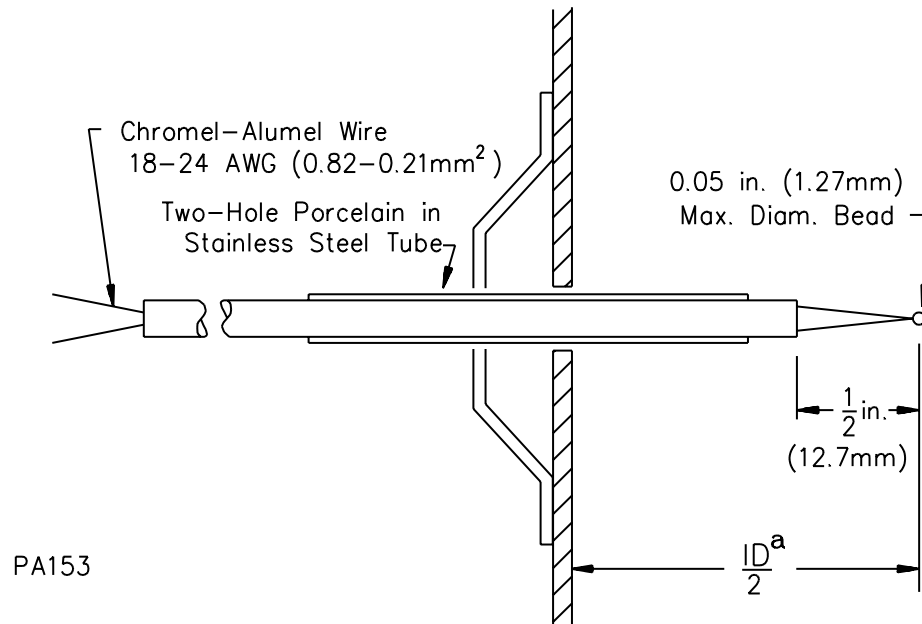
a = Minimum clearances to combustible walls, as specified in installation instructions.

b = 4 feet (1.22 m), minimum

10 Temperature Measurement

10.1 During all tests the inlet flue-gas temperature to the simulated chimney section is to be determined by a thermocouple, such as illustrated by Figure 10.1. The thermocouple is to be a Type K (chromel-alumel) of 24 AWG (0.21 mm^2) to 18 AWG (0.82 mm^2) wire, and have an untwisted welded bare lead junction of not more than 0.050 inch (1.27 mm) in diameter. The thermocouple is to be positioned in the center line of the chimney connector, 6 inches (152 mm) from the simulated chimney.

Figure 10.1
Flue-gas thermocouple and support bracket



^a ID = Internal Diameter of Flue Pipe

10.2 Temperatures of other than flue gases and metal surfaces are to be measured using either Type K (chromel-alumel) or Type J (iron-constantan) thermocouples of wire not larger than 24 AWG (0.21 mm^2).

10.3 Temperatures of metal surfaces other than handles and electrical components are to be measured using Type J (iron-constantan) or Type K (chromel-alumel) thermocouples of 18 AWG (0.82 mm^2) to 24 AWG (0.21 mm^2) wire.

10.4 The thermocouple wire insulation is to have a temperature use rating higher than the temperatures to which it shall be subjected during these tests.

10.5 The ambient temperature is to be determined by using a thermocouple that is shielded by being located centrally within a vertically oriented 6 inch (152 mm) length of aluminum-painted 2 inch (51 mm) steel pipe complying with the Standard for Welded and Seamless Wrought Steel Pipe, ANSI/ASME B36.10, open at both ends.

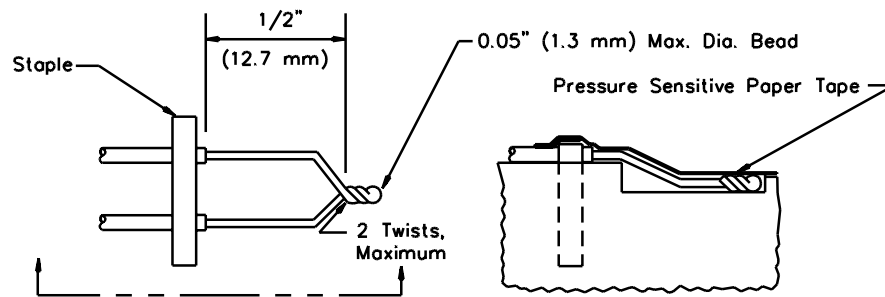
10.6 The shielded thermocouple described in 10.5 is to be located 6 inches (152 mm) away from the side wall, 4 feet (1.2 m) above the floor, and a distance in front of the unit that is equal to at least the minimum clearance of the unit from the back wall (as specified by the manufacturer) and not less than 7 feet (2.1 m) from the back wall.

10.7 When a fireplace stove assembly is intended to take combustion or cooling air from the outside of a building, the ambient temperature of the space outside of the test structure, and within the test room, is to be measured by means of a shielded thermocouple located on the same horizontal plane as the opening provided for the admission of outside combustion or cooling air and 3 feet (0.9 m) from the opening. This temperature is to be maintained between 60 and 90°F (16 and 32.2°C) during all temperature tests.

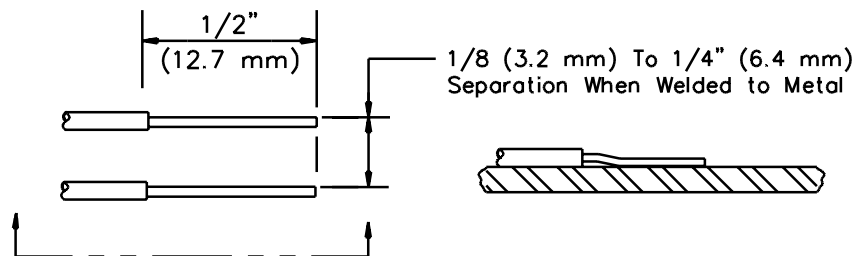
10.8 The measurement of temperature rises on the fireplace stove and chimney connector parts and on the test structure is to be referenced to the recorded ambient temperatures measured as described in 10.6.

10.9 Thermocouples are to be attached to metal surfaces by screws, rivets, or by silver soldering, brazing or welding of the tip to the metal surface as illustrated by Figure 10.2.

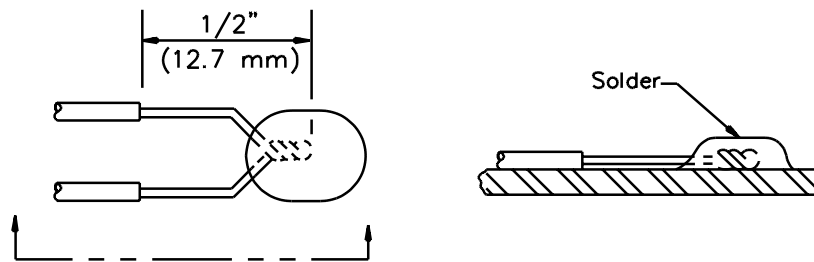
Figure 10.2
Thermocouple installation methods
THERMOCOUPLE INSTALLATION METHODS



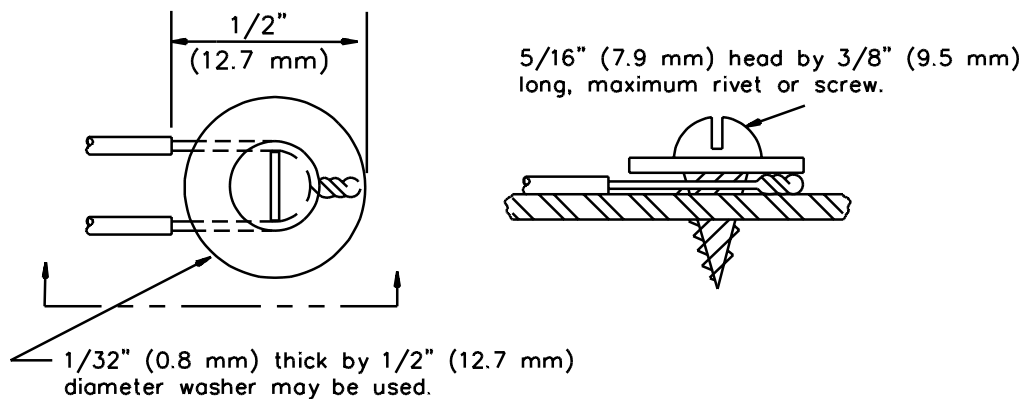
THERMOCOUPLE FOR WOOD SURFACES



THERMOCOUPLE WELDED TO METAL SURFACE



THERMOCOUPLE SOLDERED TO METAL SURFACES



TC-100

THERMOCOUPLE SECURED TO METAL SURFACES

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10.10 Thermocouples are to be secured to wood surfaces by staples placed over the insulated portion of the wires. The thermocouple tip is to be depressed into the wood so as to be flush with the wood surface at the point of measurement and held in thermal contact with the surface at that point by pressure-sensitive paper tape. See Figure 10.2.

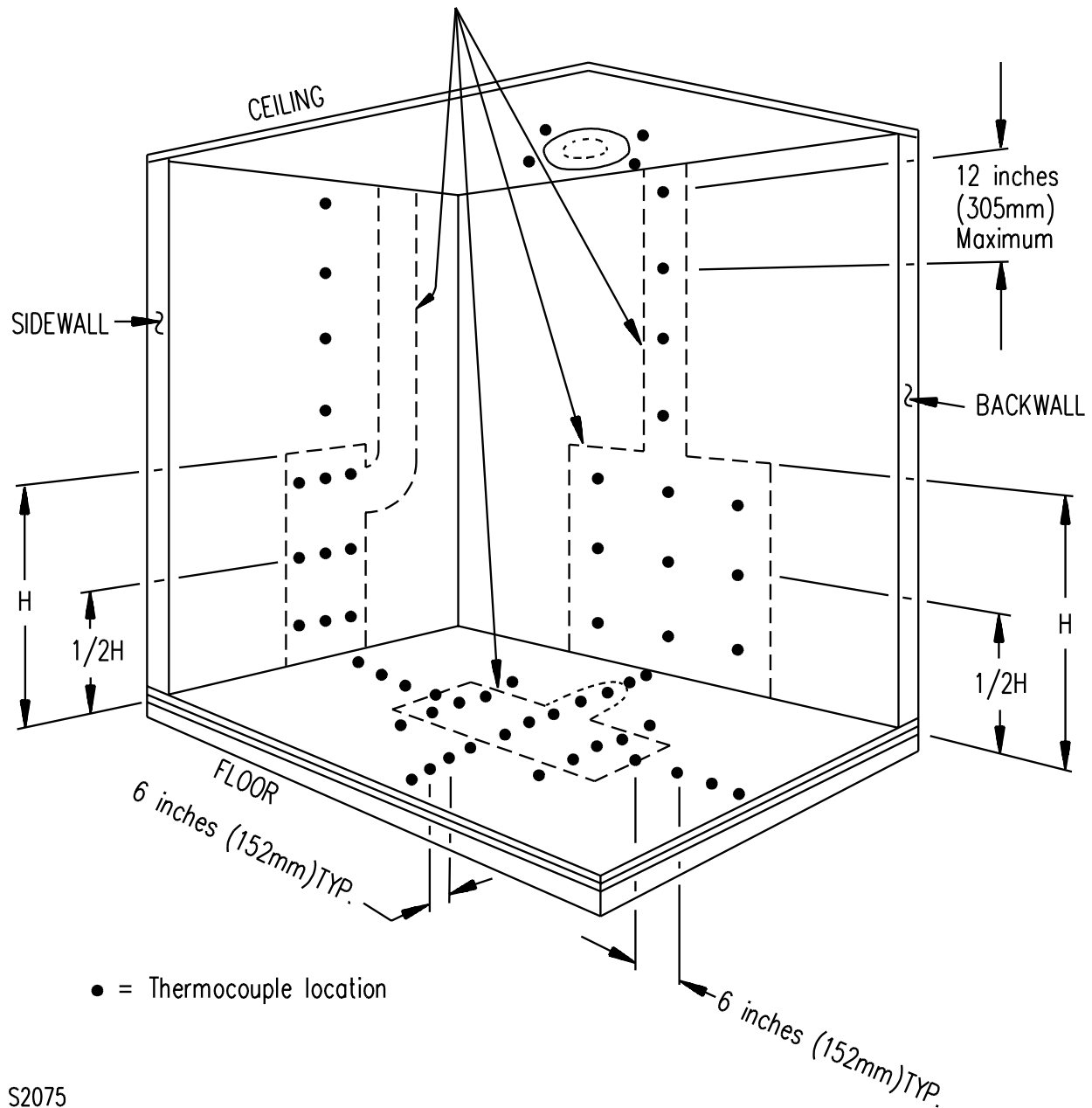
10.11 Thermocouples are to be attached to cement material surfaces by having the 1/2 inch (12.7 mm) tip and at least 1 inch (25.4 mm) of the lead wires embedded into the material so as to be flush with the surface of the material. Furnace cement is to be smoothed over such indentations to maintain thermal contact.

10.12 Thermocouples are to be attached to surfaces and electrical components other than those described in 10.9 – 10.11 by being cemented or taped to the surface in a manner to maintain thermal contact with the surface. Materials and parts whose temperatures are to be measured are included in Table 11.1. Temperatures on electrical conductors are to be measured on the surfaces of the conductor insulation.

10.13 The wiring methods for thermocouple circuitry, including junctions, terminals, switches, plugs, and jacks are to be designed and constructed to provide independent continuous routing of both thermocouple leads to the recording equipment.

10.14 Thermocouples are to be placed on surfaces of the test structure at various locations as required to measure maximum temperatures during tests. A minimum number of typical thermocouple locations are shown in Figure 10.3.

Figure 10.3
Typical thermocouple locations, walls and floor of test structure
PROJECTION OF FIREPLACE STOVE AND CHIMNEY CONNECTOR



S2075

10.15 When test enclosure elements are in contact with the fireplace stove or chimney connector parts, thermocouples are to be placed on the fireplace stove or on chimney part surfaces at representative points of contact.

Exception: When a point or line contact of a spacer with an enclosure is not greater than 1/8 inch (3.2 mm) diameter or width, thermocouples are to be placed on the test enclosure at points 1/2 inch (12.7 mm) from the center of the point or line contact.

10.16 Thermocouples are to be placed between the floor protector and the plywood flooring. Additional thermocouples are to be attached to the plywood flooring beyond the floor protector as shown in Figure 10.3.

10.17 Thermocouples are to be attached to the fireplace stove and chimney connector at various locations as shall be required to measure maximum temperatures during the tests. A minimum number of locations includes the following:

- a) Hearth and refractory material;
- b) Firechamber – Bottom, sides, back, front, and top;
- c) Flue collar;
- d) Feed and ash doors (when provided);
- e) Outer Cabinet – Bottom, sides, back, front and top;
- f) Door and control handles or knobs; and
- g) Legs or support stands.

11 Fire Tests

11.1 When a fireplace stove incorporates an integral grate, the grate is to be used during the Radiant Fire Test, Brand Fire Test, and Flash Fire Test.

11.2 When a fireplace stove does not incorporate a grate, the Radiant Fire Test is to be conducted using a basket grate (see 12.1 – 12.4) and the Brand Fire Test and Flash Fire Test are to be conducted with using andirons (see 13.1).

11.3 When a fireplace stove is intended to be used with wood only, the Brand Fire Test and Flash Fire Test shall be conducted with the brands on the hearth when the unit bears the visible marking, "DO NOT USE GRATE OR ELEVATE FIRE – BUILD WOOD FIRE DIRECTLY ON HEARTH."

11.4 The surface temperature on the largest amount of material employed in a handle or knob for use on a fireplace stove door shall not exceed the temperature specified in Table 11.1 during the Radiant and Brand Fire Tests.

Exception: The temperature limitation does not apply to knobs used for adjusting combustion air inlets or damper handles that do not require adjustment during operation.

11.5 Temperatures of the flue gases are to be recorded at regular intervals not exceeding 1 minute for the duration of the temperature tests.

11.6 When a fireplace stove is provided with an ash drawer, the stove is to be operated during the Radiant, Brand, and Flash Fire Tests with the ash door in any position, including an open position, that develops the maximum temperatures.

Exception No. 1: The ash door shall not be closed during the tests unless the stove is provided with an interlock arrangement that closes the ash removal door when the fuel loading door is closed.

Exception No. 2: The ash door shall not be closed during these tests unless a marking as follows is provided on the ash door: "CAUTION" and the following or equivalent wording: "Risk of Excessive Temperatures. Keep Ash Door Closed During Firing Of The Fireplace Stove."

11.7 During the Radiant, Brand, and Flash Fire Tests, thermostatic controls, adjustable flue-gas dampers, and air inlets are to be adjusted to produce the maximum temperatures.

11.8 During any of the tests, temperatures are to be determined with the fireplace stove screens withdrawn (open).

11.9 When a fireplace stove is equipped with doors, the same maximum temperature limits apply during operation with doors fully open or fully closed.

11.10 When the mechanism of the thermostatic control is accessible, the control is to be bypassed when bypassing produces higher temperatures.

11.11 With reference to the requirements of 11.10, a control is determined accessible when:

- a) Access to the control mechanism shall be gained by the use of simple hand tools, such as flat blade or Phillips head screwdrivers, hand pliers, wrenches, and similar tools; or
- b) The control shall be modified or its purpose defeated by mechanical means such as by connection of a piece of wire to bypass its operating characteristics.

11.12 Throughout the fire tests, there shall be no evidence of spillage of products of combustion or flame from the fireplace stove. Intermittent or sporadic wisps of smoke (smoking not over 15 seconds at a time) is not to be regarded as spillage.

Table 11.1
Maximum temperature rises

Materials and components		Column 1		Column 2	
		Degrees		Degrees	
		C	F	C	F
A. Motors ^{a,b,m}	1. Class A insulation systems on coil windings of alternating-current motors 7 inches (178 mm) or less in diameter (not including universal motors):				
	a. In open motors:				
	Thermocouple or resistance method	75	135	115	207
	b. In totally enclosed motors;				
	Thermocouple or resistance method	80	144	115	207
	2. Class A insulation systems on coil windings of alternating-current motors more than 7 inches (178 mm) in diameter and of direct-current and universal motors:				
	a. In open motors;				
	Thermocouple method	65	117	115	207
	Resistance method	75	135	115	207
	b. In totally enclosed motors;				
	Thermocouple method	70	126	115	207
	Resistance method	80	144	115	207
	3. Class B insulation systems on coil windings of alternating-current motors 7 inches (178 mm) or less in diameter (not including universal motors):				
	a. In open motors;				
B. COMPONENTS ^m	Thermocouple or resistance method	95	171	140	252
	b. In totally enclosed motors;				
	Thermocouple or resistance method	100	180	140	252
	4. Class B insulation systems on coil windings of alternating-current motors more than 7 inches (178 mm) in diameter and of direct-current and universal motors:				
	a. In open motors;				
	Thermocouple method	85	153	140	252
	Resistance method	95	171	140	252
	b. In totally enclosed motors;				
	Thermocouple method	90	162	140	252
	Resistance method	100	180	140	252
	1. Capacitors:				
	a. Electrolytic types ^c	40	72	(Not specified)	
	b. Other types ^d	65	117		
	2. Relay, solenoid, and other coils with:				
	a. Class 105 insulation systems;				
	Thermocouple method	65	117	115	207
	Resistance method	85	153	115	207
	b. Class 130 insulation system;				
	Thermocouple method	85	153	140	252
	Resistance method	105	189	140	252
	3. Transformer enclosure: ^b				
	a. Class 2 transformers	60	108	85	153
	b. Power and ignition transformers	65	117	90	162

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Table 11.1 Continued on Next Page



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Table 11.1 Continued

Materials and components		Column 1		Column 2	
		Degrees		Degrees	
		C	F	C	F
C.	INSULATED CONDUCTORS ^{e,f,m}				
	1. Appliance wiring material				
	75°C rating	50	90	65	117
	80°C rating	55	99	70	126
	90°C rating	65	117	80	144
	105°C rating	80	144	95	171
	200°C rating	175	315	200	360
	250°C rating	225	405	250	450
	2. Flexible cord – Types SO, ST, SJO, SJT, HSJ, HSJO				
	60°C rating	35	63	60	108
	75°C rating	50	90	65	117
	90°C rating	65	117	80	144
	105°C rating	80	144	95	171
	3. Other types of insulated wires	See note e			
D.	ELECTRICAL INSULATION – GENERAL ^{f,m}				
	1. Class C electrical insulation material	Not specified			
	2. Class (180) electrical insulation material	As determined by test			
	3. Fiber used as electrical insulation or cord bushings	65	117	90	162
	4. Phenolic composition used as electrical insulation or as parts where malfunction will result in a risk of fire or electric shock	125	225	150	270
	5. Thermoplastic material	25°C or 77°F less than its temperature rating			
	6. Varnished cloth insulation	60	108	85	153
E.	METALS ^g				
	1. Aluminum alloys –				
	a. 1100 (2S)	183	330	239	430
	b. 3003 (3S)	239	430	294	530
	c. 2014, 2017, 2024, 5052 ^h	294	530	350	630
	2. Aluminum-coated steel, heat-resistant type ⁱ	572	1030	708	1275
	3. Carbon steel – Coated with Type A19 ceramic	572	1030	628	1130
	4. Galvanized steel ^j	267	480	350	630
	5. Low-carbon steel, cast iron ^{k,l}	461	830	517	930
	6. Stainless steel –				
	a. Types 302, 303, 304, 321, 347	686	1235	767	1380
	b. Type 316	667	1200	748	1345
	c. Type 309S	867	1560	950	1705
	d. Types 310, 310B	894	1610	975	1755
	e. Type 430	728	1310	808	1455
	f. Type 446	961	1730	1042	1875
F.	GENERAL				
	1. Operating knobs, handles, and levers ^o				
	a. Metallic	50	122	Not specified	
	b. Glass	78	172		
	c. Plastic ⁿ	85	185		
	d. Wood	150	302		

^a The motor diameter is to be measured in the plane of the laminations of the circle circumscribing the stator frame, excluding lugs, boxes, and the like, used solely for motor cooling, mounting, assembly, or connection.