# UL 127

## STANDARD FOR SAFETY

Factory-Built Fireplaces

UL Standard for Safety for Factory-Built Fireplaces, UL 127

Tenth Edition, Dated November 21, 2024

***Summary of Topics***

***This new Tenth Edition of ANSI/UL 127 dated November 21, 2024 incorporates editorial changes including renumbering and reformatting to align with current style.***

The revised requirements are substantially in accordance with Proposal(s) on this subject dated August 23, 2024.

No Text on This Page

NOVEMBER 21, 2024

ANSI/UL 127-2024



# UL 127

## Standard for Factory-Built Fireplaces

First Edition – October, 1958
Second Edition – January, 1960
Third Edition – July, 1970
Fourth Edition – September, 1971
Fifth Edition – November, 1981
Sixth Edition – September, 1988
Seventh Edition – May, 1996
Eighth Edition – July, 2008
Ninth Edition – April, 2011

**Tenth Edition**

**November 21, 2024**

This ANSI/UL Standard for Safety consists of the Tenth Edition.

The most recent designation of ANSI/UL 127 as an American National Standard (ANSI) occurred on November 21, 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 the Collaborative Standards Development System (CSDS) at https://csds.ul.com.

Our Standards for Safety are copyrighted by ULSE Inc. Neither a printed nor electronic copy of a Standard should be altered in any way. All of our Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of ULSE Inc.

No Text on This Page

## CONTENTS

### INTRODUCTION



### CONSTRUCTION



### PERFORMANCE

**OUTDOOR FIREPLACES**



**FIREPLACES FOR USE IN MANUFACTURED HOMES**



**BLOWER ASSEMBLY**

**GENERAL**



**CONSTRUCTION**

**PERFORMANCE**



**MANUFACTURING AND PRODUCTION TESTS**



**MARKING**



**MARKING PERMANENCY**



**INSTALLATION INSTRUCTIONS**

## INTRODUCTION

### 1 Scope

1.1 These requirements cover factory-built fireplaces, including the fire chamber, chimney, roof assembly, and other related parts that are entirely factory-made and that are intended for unit assembly in the field.

1.2 These requirements cover factory-built fireplaces having a fire chamber intended to be operated either open to a room or, when equipped with doors, operated with the doors either open or closed.

1.3 These requirements cover factory-built fireplaces intended for use with either solid wood or coal fuels.

1.4 The factory-built fireplaces covered by these requirements are intended for installation in accordance with the National Fire Protection Association Standard for Chimneys, Fireplaces, Vents and Solid-Fuel Burning Appliances, NFPA 211, the International Mechanical Code, and the Uniform Mechanical Code.

1.5 As covered by these requirements, an air duct system portion of a circulating warm air type fireplace is intended for installation in accordance with the National Fire Protection Association Standard for Warm Air Heating and Air Conditioning Systems, NFPA 90B.

1.6 These requirements also cover fixed blowers, and other electrical accessories for factory-built fireplaces, rated at 600 volts or less, and intended to be employed in specified locations in accordance with the National Electrical Code, NFPA 70.

1.7 The chimneys for factory-built fireplaces covered by these requirements comply with either a 1700 °F (927 °C) flue-gas temperature test or a 2100 °F (1149 °C) flue-gas temperature test, at the manufacturer's option.

1.8 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this Standard, and that involves a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements to determine that the level of safety as originally anticipated by the intent of this Standard is maintained. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this Standard shall not be judged to comply with this Standard. Where appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this Standard.

### 2 Glossary

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

2.2 CIRCULATING WARM AIR-DUCTED TYPE FIREPLACE – A fireplace having a convection type air duct system attached to the fire chamber so that heated air is directed to areas or locations other than directly in front of or above the fire chamber opening.

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

2.4 CONVECTION SYSTEM – An air heating system through which air is circulated by convection. It relies upon an integral fan or blower.

2.5 HEARTH – The floor area within the fire chamber of a fireplace upon which the fire is built.

2.6 HEARTH EXTENSION – The noncombustible surfacing applied to the exposed combustible floor area external to the hearth, as specified in the installation instructions.

## 3 Components

### 3.1 General

3.1.1 A component of a product covered by this standard shall:

a) Comply with the requirements for that component as indicated in 3.2 – 3.12;

b) Be used in accordance with its rating(s) established for the intended conditions of use;

c) Be used within its established use limitations or conditions of acceptability;

d) Additionally comply with the applicable requirements of this end product standard; and

e) Not contain mercury.

Note: 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.

*Exception No. 1: A component of a product covered by this standard is not required to comply with a specific component requirement that:*

*a) Involves a feature or characteristic not required in the application of the component in the product,*

*b) Is superseded by a requirement in this standard, or*

*c) Is separately investigated when forming part of another component, provided the component is used within its established ratings and limitations.*

*Exception No. 2: A component complying with a UL component standard other than those cited in 3.2 – 3.12 is acceptable if:*

*a) The component also complies with the applicable component standard of 3.2 – 3.12; or*

*b) The component standard:*

*1) Is compatible with the ampacity and overcurrent protection requirements NFPA 70, where appropriate;*

*2) Considers long-term thermal properties of polymeric insulating materials in accordance with UL 746B, and*

*3) Any use limitations of the other component standard is identified and appropriately accommodated in the end use application. For example, a component used in a household application, but intended for industrial use and complying with the relevant component standard may assume user expertise not common in household applications.*

3.1.2 A component that is also intended to perform other functions, such as over current protection, ground-fault circuit-interruption, surge suppression, any other similar functions, or any combination

thereof, shall comply additionally with the requirements of the applicable UL standard(s) that cover devices that provide those functions.

*Exception: Where these other functions are not required for the application and not identified as part of markings, instructions, or packaging for the appliance, the additional component standard(s) need not be applied.*

3.1.3 A component not anticipated by the requirements of this standard, not specifically covered by the component standards of 3.2 – 3.12, and that involves a potential risk of electric shock, fire, or personal injury, shall be additionally investigated in accordance with the applicable UL standard, and shall comply with 3.1.1 (b) – (d).

3.1.4 With regard to a component being additionally investigated, reference to construction and performance requirements in another UL end product standard is appropriate where that standard anticipates normal and abnormal use conditions consistent with the application of this Standard.

### 3.2 Attachment plugs, receptacles, connectors, and terminals

3.2.1 Attachment plugs, receptacles, appliance couplers, appliance inlets (motor attachment plugs) shall comply with UL 498.

*Exception No. 1: Attachment plugs and appliance couplers integral to cord sets or power supply cords are covered under the requirements of UL 817 and need not comply with UL 498.*

*Exception No. 2: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

3.2.2 Quick-connect terminals, both connectors and tabs, for use with one or two 22 – 10 AWG copper conductors, having nominal widths of 2.8, 3.2, 4.8, 5.2, and 6.3 mm (0.110, 0.125, 0.187, 0.205, and 0.250 inch), intended for internal wiring connections in appliances shall comply with UL 310.

*Exception No. 1: Other sizes of quick-connect terminals shall be investigated with respect to crimp pull out, insertion-withdrawal, temperature rise, and all tests shall be conducted in accordance with UL 310.*

*Exception No. 2: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

3.2.3 Wire connectors shall comply with UL 486A-486B.

*Exception: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

3.2.4 Splicing wire connectors shall comply with UL 486C.

*Exception: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

3.2.5 Equipment wiring terminals for use with all alloys of copper, aluminum, or copper-clad aluminum conductors, shall comply with UL 486E.

*Exception: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

3.2.6 Terminal blocks shall comply with UL 1059, and, if applicable, be suitably rated for field wiring.

*Exception No. 1: A fabricated parts performing the function of a terminal block need not comply with UL 1059 if the part complies with the requirements of Section 36, Field Supply Connections; Section 40, Internal Wiring; and Section 44, Insulating Materials.*

*Exception No. 2: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

3.2.7 Female devices (such as receptacles, appliance couplers, and connectors) that are intended, or that may be used, to interrupt current in the end product, shall be suitably rated for current interruption of the specific type of load, when evaluated with its mating plug or connector. For example, an appliance coupler that can be used to interrupt the current of a motor load shall have a suitable horsepower rating when tested with its mating plug.

*Exception: Plugs, receptacles, connectors, and terminals for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

### 3.3 Boxes and raceways

3.3.1 Electrical boxes and the associated bushings and fittings, and raceways, of the types specified in Chapter 3 of NFPA 70 and that comply with the relevant UL standard (such as UL 514A, UL 514C, UL 514D) and 3.1 are considered to fulfill the requirements of this Standard.

*Exception: Enclosures complying with Section 35, Enclosure, of this end product standard is considered to meet the intent of this requirement.*

### 3.4 Capacitors and filters

3.4.1 The component requirements for a capacitor are not specified. A capacitor complying with UL 810, is considered to fulfill the requirements of 18.1.

3.4.2 Electromagnetic interference filters with integral enclosures that comply with UL 1283, are considered to fulfill the requirements of 18.1.

*Exception: A capacitor that complies with Section 43, Capacitors, of this end product standard is considered to meet the intent of this requirement.*

### 3.5 Controls

#### 3.5.1 General

3.5.1.1 Auxiliary controls shall be evaluated using the applicable requirements of this end product standard.

3.5.1.2 Operating (regulating) controls shall be evaluated using the applicable component standard requirements specified in 3.5.2 – 3.5.5, and if applicable unless otherwise specified in this end product

standard. Operating controls that rely upon software for the normal operation of the end product where deviation or drift of the control may result in a hazard, such as a speed control unexpectedly changing its output, shall comply with the:

a) UL 991; and UL 1998; or

b) UL 60730-1.

3.5.1.3 Protective (limiting) controls shall be evaluated using the applicable component standard requirements specified in 3.5.2.2.

### 3.5.2 Electromechanical and electronic controls

3.5.2.1 An operating (regulating) control, other than as specified in 3.5.3 – 3.5.5, shall comply with the:

a) UL 244A;

b) UL 873; or

c) UL 60730-1.

3.5.2.2 Protective (limiting) controls shall comply with UL 353.

### 3.5.3 Motor and speed controls

3.5.3.1 A control used to start, stop, regulate or control the speed of a motor shall comply with the:

a) UL 244A;

b) UL 873;

c) UL 508;

d) UL 61800-5-1; or

e) UL 60730-1.

### 3.5.4 Temperature controls

3.5.4.1 A temperature control shall comply with the:

a) UL 244A;

b) UL 873;

c) UL 508; or

d) UL 60730-1 and UL 60730-2-9.

3.5.4.2 A temperature sensing positive temperature coefficient (PTC) or negative temperature coefficient (NTC) thermistor, that performs the same function as an operating or protective control shall comply with UL 1434.

3.5.4.3 A thermal cutoff shall comply with UL 60691.

### 3.5.5 Timer controls

3.5.5.1 A timer control shall comply with the:

a) UL 244A; or

b) UL 60730-1 and UL 60730-2-7.

## 3.6 Cords, cables, and internal wiring

3.6.1 A cord set or power supply cord shall comply with UL 817.

3.6.2 Flexible cords and cables shall comply with UL 62. Flexible cord and cables are considered to fulfill this requirement when preassembled in a cord set or power supply cord complying with UL 817.

3.6.3 Internal wiring composed of insulated conductors shall comply with UL 758.

*Exception No. 1: Insulated conductors need not comply with UL 758 if they comply with one of the following:*

*a) UL 44;*

*b) UL 83;*

*c) UL 66; or*

*d) The appropriate UL standard(s) for other insulated conductor types specified in Chapter 3, Wiring Methods and Materials, of NFPA 70.*

*Exception No. 2: Insulated conductors for specialty applications (e.g. data processing or communications) and located in a low-voltage circuit, complying with Section 41, Separation of Circuits, and not involving the risk of fire or personal injury need not comply with UL 758.*

## 3.7 Overcurrent protection

3.7.1 Fuses shall comply with UL 248-1; and the applicable UL 248 Part 2 (e.g. UL 248-5). Defined use fuses that comply with UL 248-1 and another appropriate UL standard for the fuse are considered to fulfill this requirement.

3.7.2 Fuseholders shall comply with UL 4248-1, and the applicable Part 2 (e.g. UL 4248-9).

3.7.3 Circuit breakers shall comply with UL 489.

*Exception: Circuit breakers used in telecommunications circuitry that comply with UL 489A, need not comply with UL 489.*

3.7.4 Circuit breakers having integral ground fault circuit interrupter capability for protection against electrical shock shall additionally comply with the UL 943.

3.7.5 Supplementary protectors shall comply with UL 1077.

3.7.6 Fusing resistors shall comply UL 1412.

### 3.8 Polymeric materials and enclosures

3.8.1 Unless otherwise specified in this end product standard, polymeric electrical insulating materials and enclosures shall comply with the applicable requirements of UL 746C.

3.8.2 Metallized or painted polymeric parts or enclosures shall comply with the applicable requirements of UL 746C. This requirement is not applicable to exterior surfaces of polymeric enclosure materials or parts provided that the metallized coating or paint does not offer a continuous path for an internal flame to propagate externally.

### 3.9 Power supplies

3.9.1 A Class 2 power supply shall comply with one of the following:

a) UL 1310; or

b) UL 60950-1, with an output marked "Class 2", or that complies with the limited power source (LPS) requirements and is marked "LPS"; or

c) UL 62368-1, marked “Class 2” or the equivalent.

3.9.2 A non-Class 2 power supply shall comply with one of the following:

a) UL 1012; or

b) UL 60950-1; or

c) UL 62368-1.

### 3.10 Printed wiring boards

3.10.1 Printed wiring boards, including the coatings, shall comply with UL 796.

*Exception: A printed-wiring board in a Class 2 nonsafety circuit is not required to comply with the bonding requirements in UL 796 if the board is separated from parts of other circuits such that loosening of the bond between the foil conductor and the base material will not result in the foil conductors or components coming in contact with parts of other circuits of the control or of the end-use product.*

### 3.11 Switches

3.11.1 Switches shall comply with one of the following, as applicable:

a) UL 61058-1;

b) UL 20; or

c) UL 773A.

*Exception: Switching devices that comply with the appropriate UL standard for specialty applications (e.g. transfer switch equipment), industrial use (e.g. contactors, relays, auxiliary devices), or are integral to another component (e.g. switched lampholder) need not comply.*

3.11.2 A clock-operated switch, in which the switching contacts are actuated by a clock-work, by a gear-train, by electrically-wound spring motors, by electric clock-type motors, or by equivalent arrangements shall comply with one of the following:

a) UL 917; or

b) UL 60730-1 and UL 60730-2-7.

3.11.3 A timer or time switch, incorporating electronic timing circuits or switching circuits, with or without separable contacts, shall comply with the requirements for an operating control with Type 1 action for 6000 cycles of operation, or as a manual control for 5000 cycles of operation, in accordance with the following:

a) UL 244A;

b) UL 60730-1 and UL 60730-2-7.

3.11.4 A timer or time switch, incorporating electronic timing circuits or switching circuits, with or without separable contacts, that functions as a protective control, shall comply with the requirements for a protective control; see 3.5.1.3.

### 3.12 Transformers

3.12.1 General-purpose transformers shall comply with UL 5085-1; and UL 5085-2.

*Exception: A transformer that is completely enclosed within the end product enclosure, and that meets the applicable construction and performance requirements of this end product standard when tested in conjunction with the end product, meets the intent of this requirement.*

3.12.2 Class 2 and Class 3 transformers shall comply with UL 5085-1; and UL 5085-3.

*Exception: Transformers located in a low voltage circuit, and that do not involve a risk of fire or personal injury, need not comply with this requirement.*

## 4 Units of Measurement

4.1 If a value for measurement is followed by a value in other units in parentheses, the first stated value is the requirement.

## 5 Referenced Publications

5.1 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.

5.2 The following publications are referenced in this Standard:

ASTM E230/E230M, *Standard Specification for Temperature-Electromotive Force (emf) Tables for Standardized Thermocouples*

ASTM A90, *Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles*

ASTM A463, *Aluminum Coated Type 1 Cold Rolled Steel Sheet*

ASTM A653, *Hot-Dip Process*

ASTM D2860, *Adhesion of Pressure-Sensitive Tape to Fiberboard at 90 Degree Angle and Constant Stress*

CSA/AM ANSI Z21.11.2, *Gas-fired room heaters, volume II, unvented room heaters*

Department of Housing and Urban Development (HUD) "Manufactured Home Construction and Safety Standards

International Mechanical Code

IAS/AGA Z21.11.2, *Unvented Room Heaters*

NFPA 70, *National Electric Code*

NFPA 90B, *Standard for Installation of Warm Air Heating and Air Conditioning Systems*

NFPA 211, *Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances*

UL 20, *General-Use Snap Switches*

UL 44, *Thermoset-Insulated Wires and Cables*

UL 66, *Fixture Wire*

UL 73, *Motor-Operated Appliances*

UL 83, *Thermoplastic-Insulated Wires and Cables*

UL 103, *Factory-Built Chimneys for Residential Type and Building Heating Appliance*

UL 181, *Factory-Made Air Ducts and Air Connectors*

UL 244A, *Solid-State Controls for Appliances*

UL 248-1, *Low-Voltage Fuses – Part 1: General Requirements*

UL 248-5, *Low-Voltage Fuses – Part 2: Class C Fuses*

UL 310, *Electrical Quick-Connect Terminals*

UL 353, *Limit Controls*

UL 486A-486B, *Wire Connectors*

UL 486C, *Splicing Wire Connectors*

UL 486E, *Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors*

UL 489, *Molded-Case Circuit Breakers, Molded-Case Switches and Circuit-Breaker Enclosures*

UL 489A, *Circuit Breakers For Use in Communications Equipment*

UL 498, *Attachment Plugs and Receptacles*

UL 508, *Industrial Control Equipment*

UL 508C, *Industrial Control Equipment*

UL 514A, *Metallic Outlet Boxes*

UL 514C, *Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers*

UL 514D, *Cover Plates for Flush-Mounted Wiring Devices*

UL 746B, *Polymeric Materials – Long Term Property Evaluations*

UL 746C, *Polymeric Materials – Use in Electrical Equipment Evaluations*

UL 758, *Appliance Wiring Material*

UL 773A, *Nonindustrial Photoelectric Switches for Lighting Control*

UL 796, *Printed Wiring Boards*

UL 810, *Capacitors*

UL 817, *Cord Sets and Power-Supply Cords*

UL 873, *Temperature-Indicating and -Regulating Equipment*

UL 917, *Clock-Operated Switches*

UL 943, *Ground-Fault Circuit-Interrupters*

UL 991, *Tests for Safety-Related Controls Employing Solid-State Devices*

UL 1004-1, *Rotating Electrical Machines – General Requirements*

UL 1004-2, *Impedance Protected Motors*

UL 1004-3, *Thermally Protected Motors*

UL 1004-7, *Electronically Protected Motors*

UL 1012, *Power Units Other Than Class 2*

UL 1059, *Terminal Blocks*

UL 1077, *Supplementary Protectors for Use in Electrical Equipment*

UL 1283, *Electromagnetic Interference Filters*

UL 1310, *Class 2 Power Units*

UL 1412, *Fusing Resistors and Temperature-Limited Resistors for Radio- and Television-Type Appliances*

UL 1434, *Thermistor-Type Devices*

UL 1998, *Software in Programmable Components*

UL 4248-1, *Fuseholders – Part 1: General Requirements*

UL 4248-9, *Fuseholders – Part 9: Class K*

UL 5085-1, *Low Voltage Transformers – Part 1: General Requirements*

UL 5085-2, *Low Voltage Transformers – Part 2: General Purpose Transformers*

UL 5085-3, *Low Voltage Transformers – Part 3: Class 2 and Class 3 Transformers*

UL 60691, *Thermal-Links – Requirements and Application Guide*

UL 60730-1, *Automatic Electrical Controls – Part 1: General Requirements*

UL 60730-2-2, Automatic Electrical Controls for Household and Similar Use; Part 2 Particular Requirements for Thermal Motor Protectors

UL 60730-2-7, *Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Timers and Time Switches*

UL 60730-2-9, *Automatic Electrical Controls for Household and Similar Use; Part 2: Particular Requirements for Temperature Sensing Controls*

UL 60950-1, *Information Technology Equipment – Safety – Part 1: General Requirements*

UL 61058-1, *Switches for Appliances – Part 1: General Requirements*

UL 61800-5-1, *Adjustable Speed Electrical Power Drive Systems – Part 5-1: Safety Requirements – Electrical, Thermal and Energy*

UL 62368-1, *Audio/Video, Information and Communication Technology Equipment – Part 1: Safety Requirements*

Uniform Mechanical Code

## 6 Terms

6.1 As used in these requirements, the term "fireplace" refers to all factory-built fireplaces or any part thereof covered by these requirements, unless specifically noted otherwise.

## CONSTRUCTION

## 7 Materials

### 7.1 General

7.1.1 A fire chamber or chimney part shall be made of noncombustible corrosion-resistant materials. Metals shall not be used in combinations that may cause galvanic action at any location within the assembly.

7.1.2 The minimum thickness of sheet metal, including any coatings, shall comply with Table 7.1 unless otherwise specified in these requirements.

*Exception: Decorative metal parts are not required to comply with Table 7.1.*

**Table 7.1**
**Minimum Metal Thickness**

| | Inch | (mm) |
|---|---|---|
| Aluminum alloys | 0.016 | (0.41) |
| Steel (uncoated or painted) | 0.042 | (1.07) |
| Galvanized steel (G-90 coating class) | 0.018 | (0.46) |
| Galvanized steel (G-60 coating class) | 0.025 | (0.64) |
| Aluminum-coated steel Type T1-40 (regular) [0.40 ounce per square foot (0.12 kg/$m^2$)] | 0.018 | (0.46) |
| Stainless steel | 0.012 | (0.30) |

7.1.3 Aluminum alloys containing more than 1.0 % magnesium shall not be used when the reflectivity of the material is employed to reduce the risk of fire.

7.1.4 A flue-gas-conveying conduit of a chimney shall be of a material equivalent to that of a material specified in Table 7.2. Cast refractory, clay tile, and porcelain-coated steel shall comply with the requirements of the applicable tests described in Sections 22 – 26.

**Table 7.2**
**Minimum Thickness of Flue-Gas Conduit Material**

| Equivalent nominal inside diameter of chimney | | Cast refractory or clay tile | | Porcelain-coated steel-base metal | | Series 300 and types 430 and 446 stainless steel | |
|---|---|---|---|---|---|---|---|
| Inches | (mm) | Inch | (mm) | Inch | (mm) | Inch | mm |
| 12 or less | (305 or less) | 0.40 | (10.2) | 0.026 | (0.66) | 0.012[a] | (0.30) |
| Over 12 – 24 | (Over 305 – 610) | 0.65 | (16.5) | 0.032 | (0.81) | 0.016 | (0.41) |

[a] 0.015 inch (0.33 mm) for chimneys evaluated to 2100 °F

7.1.5 The combustion zone of the fireplace, and other parts in contact with flue gases, shall be of a material equivalent to that of a material specified in Table 7.3.

**Table 7.3**
**Minimum Thickness of Combustion Zone Material**

| Cast refractory or clay tile | | Porcelain-coated steel-base metal | | Series 300 and types 430 and 446 stainless steel | | Type I aluminum coated steel | | Cast iron[a] | | Low carbon steel[a] | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Inch | (mm) | Inch | (mm) | Inch | (mm) | Inch | (mm) | Inch | (mm) | Inch | (mm) |
| 0.400 | (10.16) | 0.026 | (0.66) | 0.012 | (0.30) | 0.018 | (0.46) | 1/8 | (3.2) | 0.093 | (2.36) |

[a] See notes k and 1 of Table 11.1.

7.1.6 A firestop assembly, spacers or standoffs, a nonstructural part, such as the decorative front surround of a fire chamber, or other nonstructural parts not subjected to the effects of external atmospheric

conditions, shall be of zinc coated (galvanized) steel not less than 0.018 inch (0.46 mm) thick. The zinc coating shall comply with the coating designation G60 in the Weight (Mass) of Coating Requirements table in ASTM A653, with not less than 40 % of the zinc on any side as determined by the minimum single spot test requirements of ASTM A653.

7.1.7 Other parts of a chimney subject to contact by flue gases or flue-gas air mixtures or subject to condensation, at locations beyond the terminus of the flue-gas-conveying conduit, shall be of aluminum-coated steel. The aluminum coating shall be designation Type T1-40 (regular) in Table 1 of ASTM A463, with not less than 0.40 ounce of aluminum coating per square foot (0.12 kg/$m^2$) of steel or equivalent.

*Exception: Galvanized steel with a zinc coating complying with the coating designation G90 is not prohibited from being used for parts of a chimney subjected to contact by flue gas or condensation, when evaluated during the Performance Testing of Section 9 and when the temperature limitations of this material shown in Table 11.1 are not exceeded.*

7.1.8 An outer casing or other structural part (exclusive of the flue-gas-conveying conduit):

a) Whose malfunction or deterioration results in the fire chamber or chimney to collapse or otherwise increase the risk of injury to users; or

b) That adjoins firestopping material;

shall be of galvanized steel. The galvanized steel shall have a zinc coating complying with the coating designation G90 (former coating Class 1.25 Commercial) in the Weight (Mass) of Coating Requirements table in ASTM A653, with not less than 40 % of the zinc on any side, based on the minimum single spot test requirement in this ASTM designation. The weight of zinc coating shall be established in accordance with ASTM A90.

7.1.9 An unreinforced outer casing of a fire chamber or chimney shall be of material equivalent to one of those specified in Table 7.4. An outer casing reinforced by a solid refractory not less than 2 inches (50.8 mm) thick shall be:

a) Galvanized steel or aluminum-coated steel not less than 0.018 inch (0.46 mm) thick; or

b) Type 430 stainless steel not less than 0.012 inch (0.30 mm) thick.

**Table 7.4**
**Minimum Thickness of Outer Casing Material**

| Nominal inside diameter of flue gas conduit | | Galvanized steel | | | | Type T1 – 40 (regular) aluminum coated steel | | Series 300 and type 430 436 and 446 stainless steel | |
|---|---|---|---|---|---|---|---|---|---|
| | | G-60 coating | | G-90 coating | | | | | |
| Inches | (mm) | Inch | (mm) | Inch | (mm) | Inch | (mm) | Inch | (mm) |
| 12 or less | (305 or less) | 0.025 | (0.64) | 0.018 | (0.46) | 0.018 | (0.46) | 0.012 | (0.30) |
| Over 12 – 24 | (Over 305 – 610) | 0.030 | (0.76) | 0.023 | (0.58) | 0.023 | (0.58) | 0.016 | (0.41) |

7.1.10 Steel with a proprietary coating shall not be used unless it is determined to be equivalent to the coated steel as specified in 7.1.4 – 7.1.9.

7.1.11 A painted part made of steel not less than 0.053 inch (1.35 mm) thick, or of cast iron not less than 0.125 inch (3.18 mm) thick, and for use only in the interior of buildings is identified as having corrosion resistance equivalent to that required in 7.1.8.

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

7.1.13 Thermal insulation shall not come into contact with the products of combustion.

7.1.14 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).

7.1.15 A water-absorbing insulating material shall not be subject to wetting by condensation or rain when installed as intended.

## 7.2 Air duct system

7.2.1 The air duct system portion of:

a) Circulating warm air ducts; and

b) Combustion air inlet ducts

shall be constructed entirely of corrosion-resistant sheet metal having a minimum thickness as shown in Table 7.5. See 8.12.1 and 8.12.2.

*Exception: Lesser thickness materials classified as Class 0 or Class 1 air ducts, as defined in NFPA 90B, and in the requirements in UL 181, is used when:*

*a) They comply with the requirements of NFPA 90B and UL 181; and*

*b) They have been investigated for the intended application.*



**Table 7.5**
**Minimum Thickness of Sheet Metal Ducts**

| Diameter or width | Galvanized steel | | | Aluminum | | Tin plate |
|---|---|---|---|---|---|---|
| | Nominal thickness | Minimum thickness | | Minimum thickness | | Minimum weight per base box |
| inches | inches | inches | (mm) | inches | (mm) | pounds |
| | (a) Round Ducts and Enclosed Rectangular Ducts: | | | | | |
| 14 or less | 0.016 | 0.013 | (0.330) | 0.016 | (0.406) | 135 |
| Over 14 | 0.019 | 0.016 | (0.406) | 0.020 | (0.508) | – |
| | (b) Exposed Rectangular Ducts: | | | | | |
| 14 or less | 0.019 | 0.016 | (0.406) | 0.020 | (0.508) | – |
| Over 14 | 0.022 | 0.019 | (0.483) | 0.023 | (0.584) | – |

7.2.2 Asbestos material shall not be used.

7.2.3 Fibrous insulation materials used in an air handling compartment shall comply with the Erosion Test specified in the requirements in UL 181.

# 8 Assembly

## 8.1 General

8.1.1 A fireplace shall consist of all the essential parts required for the intended installation of a complete fireplace and its chimney. Each part of the assembly shall be constructed for ready attachment of one to the other without requiring alteration by the installer, such as by cutting, threading, drilling, welding, or similar tasks.

*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 penetrate into the fire chamber; and*

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

8.1.2 Two or more parts or subassemblies that bear a definite relationship to each other in the intended application shall:

a) Be arranged and constructed to meet the intent of the requirement to be incorporated into the complete assembly, without requirement of alteration or alignment, and only in the correct relationship with each other; or

b) Be assembled and shipped from the factory as one unit.

8.1.3 To comply with the requirements of 8.1.1 and 8.1.2, a chimney-pipe section comprised of a flue-gas-conveying conduit, formed insulation or other intermediate assembly, and an outer jacket, which are separable, shall be preassembled and packaged as one unit. A firestop-spacer assembly shall be constructed in two halves, and shall be packaged as one unit. In such cases, each separable part is to be completely formed, including the jointing of all seams.

8.1.4 The construction of a fireplace shall not void the firestopping required between spaces of a building when the fireplace and its chimney are installed in accordance with the manufacturer's instructions.

8.1.5 The fireplace shall not incorporate provisions for placing combustible materials, or for supporting a combustible mantel, at distances from the fireplace opening less than those dimensions specified in the installation instructions.

## 8.2 Joints

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

8.2.2 When screws are employed to join assemblies during installation, the assemblies to be joined shall provide for use of screws without having to be punched or drilled, except for parts as referenced in 8.1.1. When cement is employed for this purpose, the cement shall be a quick-setting type. Cement, screws, and instructions shall be furnished. A screw shall not extend into a flue-gas passage.

8.2.3 A joint, fabricated in accordance with the manufacturer's instructions, shall limit the leakage of combustion by-products through the joint. With reference to 7.1.13, there shall be no leakage in areas where thermal insulation is installed. There shall also be no leakage from the exterior of the assembly.

8.2.4 A joint shall not significantly reduce the capacity of the chimney.

8.2.5 A joint shall not retain condensation. Condensation also shall not flow from the interior to the exterior of the fuel-gas-conveying conduit.

### 8.3 Firestop spacers

8.3.1 A chimney intended to pass through a floor or ceiling of a building shall be provided with an assembly constructed to provide firestopping at the framed joist opening and to establish and maintain required minimum clearances between chimney sections and combustible construction in this area. Spacers shall have strength and bearing surface to maintain the required clearance from chimney sections to joists and ceiling and floor material.

8.3.2 A firestop shall provide complete firestopping when the assembly is installed in a framed joist opening that is 1/2 inch (12.7 mm) greater on each side than the opening for which the assembly is intended. A spacer shall provide for continuous interference around the perimeter of the construction for a height of not less than 1 inch (25.4 mm). The inside diameter of the firestop opening shall not be more than 1/8 inch (3.2 mm) greater than the outside diameter of the chimney pipe, including chimney joints and raised projections.

### 8.4 Support assembly

8.4.1 A support assembly, such as a ceiling or floor jack, when furnished, shall establish and maintain the minimum required clearance between a chimney section and combustible construction. A chimney support assembly shall be provided at changes in chimney direction from diagonal to vertical and at intermediate points on diagonal runs, as specified in the installation instructions.

8.4.2 A support assembly intended to be secured by nails or screws shall be arranged so that such loads on the holding means are shear loads.

### 8.5 Radiation shield

8.5.1 A radiation shield provided to comply with the maximum temperature limits of these requirements for floor or ceiling structures shall:

a) Be an integral part of a firestop-spacer or support assembly; and

b) Provide a continuous barrier for a vertical distance, referenced to the ceiling or floor level, of not less than 10 inches (254 mm).

The assembly shall fit into a framed joist area not larger than the sum of 1/2 inch (12.7 mm) greater on each side than the outside diameter of the chimney and twice the dimension to be specified in the installation instructions for clearance between chimney sections and combustible enclosures.

8.5.2 Parts of a firestop-spacer or support assembly that are not intended to provide shielding from radiation to combustible construction are not identified to be radiation shields.

8.5.3 A radiation shield provided to obtain compliance with the maximum temperature limits of these requirements for roof structures shall not be employed in a roof or other terminating assembly intended to be altered in the field when such alteration requires the shifting or relocation of the shield.

## 8.6 Flue damper

8.6.1 A fireplace flue-gas outlet damper operated by a linkage or other mechanism shall be constructed so that breakage of a part, after fire testing (see Sections 13 – 15), results in the damper to move to its designed open position. When the fireplace is provided with a flue-gas outlet damper that is placed in, and remains in, any position from open to closed, the following considerations apply:

a) During the fire tests, see Sections 13 – 15, spillage of products of combustion (flame or smoke) or temperatures in excess of established requirements shall not occur while the damper is in the fully open position and the doors are open.

b) During the fire tests, spillage of products of combustion or temperatures in excess of established requirements shall not occur while the damper is in the fully open position or at any intermediate position (other than fully closed) and the doors are closed.

c) The unit shall be marked with a permanent marking located at or near the fuel feeding door advising users to open the damper before opening the doors. See 60.11.

d) The damper control knob shall be located external to the fire chamber. The maximum temperature on the damper control knob(s) shall not exceed the value specified in Table 11.1.

e) Doors shall be provided for use with the unit.

*Exception No. 1: (c) and (d) do not apply when other means are utilized to open the damper before the doors are opened.*

*Exception No. 2: (c) and (d) do not apply when the unit does not spill products of combustion when the damper is in any position other than fully closed.*

## 8.7 Chimney caps

8.7.1 A cap shall be provided to resist the entrance of debris and excess rain into the flue-gas-conveying conduit and into any cooling-air passage terminating exterior to the building. See Rain Test, Section 21.

8.7.2 A cap shall be constructed so that leaves and debris falling or blown onto it are not retained so as to obstruct flue-gas or cooling-air passages. A cap shall be constructed to resist accumulation of soot that obstructs flue-gas or cooling-air passages. An opening, other than one for flue gas passage, shall not have an entrance of a 1/2 inch (12.7 mm) diameter rod.

8.7.3 A cap shall be removable and replaceable, without bending or deforming the chimney or parts thereof, by the use of common hand tools, such as flat blade or Phillips head screwdrivers, hand pliers, wrenches, and other tools, to meet the intent of the requirement for chimney cleaning in accordance with the operating instructions.

## 8.8 Roof assemblies

8.8.1 The height of a roof assembly shall be such that the flue-gas exit is not less than 3 feet (0.9 m) above the highest point where the chimney passes through the roof.

8.8.2 A roof assembly installed in accordance with the installation instructions shall resist the entrance of excess water and debris into the building. See Rain Test, Section 21.

8.8.3 A roof assembly shall resist the accumulation of soot and debris therein when such accumulation obstructs flue-gas or cooling-air passages. An opening, other than one for flue gas passage, shall not have an entrance of a 1/2 inch (12.7 mm) diameter rod.