



UL 103

STANDARD FOR SAFETY

Factory-Built Chimneys for Residential
Type and Building Heating Appliances

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UL Standard for Safety for Factory-Built Chimneys for Residential Type and Building Heating Appliances, UL 103

Eleventh Edition, Dated October 15, 2010

Summary of Topics

This revision of ANSI/UL 103 dated September 24, 2021 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 UL'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 July 9, 2021.

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The Department of Defense (DoD) has adopted UL 103 on September 16, 1991. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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 <https://csds.ul.com>.

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CONTENTS

INTRODUCTION

1 Scope5
 2 Components5
 3 Units of Measurement5
 4 Undated References5
 5 Glossary6

CONSTRUCTION

6 Materials6
 7 Assembly8
 8 Chimney Caps9
 9 Firestop-Spacers9
 10 Joints10
 11 Radiation Shields11
 12 Roof Assemblies11
 13 Roof Jacks12
 14 Support Assembly13
 15 Openings in Chimney Walls13

PERFORMANCE

16 General13
 17 Test Installations14
 17.1 General14
 17.2 Enclosed chimney installations (residential type and building heating appliance chimney)15
 17.3 Unenclosed chimney installations (building heating appliance type chimney only)29
 18 Temperature Measurement33
 19 Thermal Shock Test39
 20 Temperature Test – 1000°F (538°C) Flue Gases40
 21 Temperature Test – 1400°F (760°C) Flue Gases41
 22 Temperature Test – 1700°F (927°C) Flue Gases41
 23 Temperature Test – 2100°F (1149°C) Flue Gases41
 24 Positive Pressure Applications Test42
 25 Draft Test43
 26 Vertical Support Test43
 27 Strength Test43
 27.1 General43
 27.2 Impact test44
 27.3 Longitudinal force test46
 27.4 Load test for chimney elbows46
 27.5 Chimney joint load test47
 27.6 Chimney joint torsion test48
 28 Wind Load Test48
 28.1 General48
 28.2 Roof assemblies48
 28.3 Lateral supports49
 29 Attic Insulation Shield Ventilation Opening Test51
 30 Rain Test51
 31 Crushing Test of Nonmetallic Flue-Gas Conduit54
 32 Resistance to Action of Acids Test of Nonmetallic Flue-Gas Conduit54

33 Freezing and Thawing Test of Water-Absorptive Nonmetallic Materials..... 55
34 Cemented Joint Test of Flue-Gas Conduit 55
35 Sulfuric Acid Extraction Test for Porcelain-Coated Steel Used for Flue-Gas Conduit 56

MARKINGS

36 Marking 57

INSTRUCTIONS

37 Installation and Maintenance Instructions 58

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INTRODUCTION

1 Scope

1.1 These requirements cover factory-built chimneys intended for venting gas, liquid, and solid-fuel fired residential-type appliances and building heating appliances in which the maximum continuous flue-gas outlet temperatures do not exceed 1000°F (538°C). Factory-built chimneys 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, the International Residential Code, and the Uniform Mechanical Code. They are intended for installation inside or outside of buildings or both, in a manner that provides a vertical (30 degree maximum offset) conduit or passageway to transport flue gases to the outside.

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

1.3 These requirements cover dual purpose residential type and building heating appliance type chimneys, and single purpose building heating appliance type chimneys. Dual purpose residential type and building heating appliance type chimneys are tested enclosed and intended to be installed unenclosed or enclosed with combustible construction. Single purpose building heating appliance type chimneys are tested unenclosed and intended to be installed unenclosed or enclosed in a noncombustible chase.

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.

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 COMBUSTIBLE MATERIAL, NONCOMBUSTIBLE MATERIAL – As used in these requirements, these terms are defined in the Standard for Chimneys, Fireplaces, Vents, and Solid Fuel-Burning Appliances, NFPA 211.

CONSTRUCTION

6 Materials

6.1 A chimney part shall be made of noncombustible corrosion-resistant materials. Metals shall not be used in combinations at any location within the assembly that causes galvanic action.

6.2 The minimum thickness of sheet metal including any coatings and of other materials shall comply with [Table 6.1](#).

6.3 A flue-gas conveying conduit of a chimney shall be of stainless steel, porcelain-coated steel or cast or fired refractory of the minimum thickness specified in [Table 6.1](#). Porcelain-coated steel and cast or fired refractory shall comply with the requirements of the applicable tests described in Sections [31](#) – [35](#).

6.4 An unreinforced outer casing of a chimney shall be of galvanized steel, aluminum-coated steel, Series 300 or 400 stainless steel, or equivalent material. Minimum thickness of these materials shall be as specified in [Table 6.1](#).

6.5 An outer casing reinforced by solid refractory not less than 2 inches (50.8 mm) thick shall be of galvanized steel, aluminum-coated steel, stainless steel or equivalent material. Minimum thickness of these materials shall be as specified in [Table 6.1](#).

6.6 Parts of a chimney subject to contact by flue gases or flue-gas air mixtures at or beyond the terminus of the flue-gas conveying conduit shall be of a material equivalent to the flue-gas conveying conduit. See [6.3](#).

6.7 An outer casing or other structural part shall be of stainless steel, galvanized steel, or aluminum-coated steel when the part:

- a) Is such that deterioration or corrosion of the part causes the chimney system to collapse or otherwise increase the risk of injury to persons;
- b) Adjoins firestopping material; or
- c) Is subject to condensation.

Galvanized steel or aluminum-coated steel shall comply with the requirements of [6.8](#). Stainless steel shall comply with [Table 6.1](#).

Exception No. 1: This requirement does not apply to the flue-gas conveying conduit. See [6.3](#).

Exception No. 2: This requirement does not apply to parts subject to contact by flue-gas or flue-gas air mixtures at or beyond the terminus of the flue-gas conveying conduit. See [6.6](#).

**Table 6.1
Minimum thickness of chimney material**

Type of material	Use of material	Paragraph reference	Equivalent nominal inside diameter of chimney					
			12 or less inches (305 or less mm)		Over 12 to 24 inches (over 305 to 610 mm)		Over 24 to 36 inches (over 610 to 914 mm)	
			Minimum material thickness					
			Inch	(mm)	Inch	(mm)	Inch	(mm)
Stainless steel – Series 300 or 400 or equivalent	Flue-gas conduit of chimneys evaluated to 1700°F; other parts exposed to flue gases or subject to condensation	6.3, 6.6	0.012 ^a	(0.30)	0.016	(0.41)	0.020	(0.51)
Stainless steel – Series 300 or 400 or equivalent	Flue-gas conduit of chimneys evaluated to 2100°F	6.3	0.015	(0.33)	0.016	(0.41)	0.020	(0.51)
Stainless steel – Series 300 or 400 or equivalent	Outer casing, unreinforced	6.4	0.012	(0.30)	0.016	(0.41)	0.026	(0.66)
	Outer casing, reinforced	6.5	0.012	(0.30)	0.012	(0.30)	0.012	(0.30)
	Component or subassembly	6.9	0.012	(0.30)	0.012	(0.30)	0.012	(0.30)
Galvanized steel, G-90 coating designation or aluminum-coated steel – Type T1-40	Outer casing, unreinforced	6.4, 6.7	0.018	(0.46)	0.023	(0.58)	0.034	(0.86)
	Outer casing, reinforced	6.5	0.018	(0.46)	0.018	(0.46)	0.018	(0.46)
	Component or subassembly	6.9	0.018	(0.46)	0.023	(0.58)	0.034	(0.86)
Aluminum alloys or painted steel	Component or subassembly	6.9	0.016	(0.41)	0.016	(0.41)	0.016	(0.41)
Steel, painted	Outer casings or structural part	6.10	0.053	(1.35)	0.053	(1.35)	0.053	(1.35)
Porcelain-coated steel-base metal	Flue-gas conduit of chimneys evaluated to 1700°F	6.3	0.026	(0.66)	0.032	(0.81)	0.032	(0.81)
Cast iron	Outer casing or structural part	6.10	0.125	(3.18)	0.125	(3.18)	0.125	(3.18)
Cast or fired refractory, clay tile	Flue-gas conduit	6.3	0.40	(10.2)	0.65	(16.5)	1.00	(25.4)

^a Flue-gas conduit employed for tee sections shall be of 0.015 inch (0.38 mm) minimum thickness.

6.8 Galvanized steel used for outer casings, structural parts, firestopping or other components or subassemblies 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 of Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, ASTM A653, with not less than 40 percent of the zinc on any side, based on the minimum single spot test in the ASTM designation. The weight of zinc coating shall be established in accordance with the Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings, ASTM A90. Aluminum-coated steel shall be of Type T1-40 (regular) [0.40 ounce per square foot (0.12 kg/m²)].

6.9 Components of a chimney, or subassemblies, which are not required to conform to the requirements for flue-gas conduits or outer casings, shall be of materials and thicknesses as specified in [Table 6.1](#), or the equivalent.

6.10 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 determined as having corrosion resistance equivalent to that required by [6.8](#). Paint coatings shall remain intact at the maximum temperatures obtained on the part during the tests specified in these requirements.

6.11 Except for binder materials, thermal insulation material shall be noncombustible.

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

6.13 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 18°C).

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

6.15 Asbestos material shall not be used.

7 Assembly

7.1 A chimney shall consist of all the essential parts required for the intended installation of a complete chimney assembly. 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 is 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 flue liner; 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.*

7.2 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 permit them to be incorporated into the complete assembly without alteration or alignment and only in the correct relationship with each other; or
- b) Be assembled and shipped from the factory as one unit.

7.3 Each part, such as a chimney-pipe section or length, cap, firestop-spacer, support element, roof assembly, or jack shall be completely assembled by the manufacturer at the factory.

7.4 To comply with the requirements of [7.3](#), 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 constructed in two halves shall

be packaged as one unit. In such cases, each separable part shall be completely formed, including the joining of all seams.

7.5 After being installed in accordance with the manufacturer's instructions, a chimney shall be positioned securely and resistant to wind damage. See Vertical Support Test, Section [26](#); Strength Test, Section [27](#); and Wind Load Test, Section [28](#).

7.6 A chimney shall be capable of attachment to chimney connectors having diameters of integral inches.

7.7 The construction of a chimney shall not void the firestopping required between spaces of a building when the chimney is installed in accordance with the manufacturer's instructions.

7.8 When a chimney assembly incorporates elbows, no part of the chimney shall be at an angle of more than 30 degrees from the vertical at any point in the assembly, and the chimney shall not include more than two offsets (four elbows).

8 Chimney Caps

8.1 A cap shall be provided.

Exception: A chimney designated as a building heating appliance type only and that does not incorporate unprotected ventilation openings terminating exterior to the building is not required to be provided with a cap.

8.2 A cap shall resist the entrance of debris and rain into the flue gas conveying conduit and into any unprotected ventilation openings terminating exterior to the building. Protection devices intended to protect only ventilation air openings terminating exterior to the building shall resist the entrance of debris and rain into such ventilation openings. See Rain Test, Section [28](#).

8.3 A cap shall be constructed so that leaves and debris fallen or blown onto it are not retained so as to obstruct flue-gas or cooling-air passages. A cap shall be constructed to resist the accumulation of soot that will obstruct the flue-gas or cooling-air passages.

8.4 A cap shall be removable and replaceable by the use of simple hand tools (screwdriver, wrench, pliers, or similar tools) to allow for chimney cleaning in accordance with the installation and maintenance instructions without bending or deforming the chimney or parts thereof.

9 Firestop-Spacers

9.1 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 the strength and bearing surface to maintain the required clearance from chimney sections to joists and ceiling and floor material.

9.2 A firestop shall provide complete firestopping when the assembly is installed in a framed joist opening that is 1/2 inch (13 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 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.