



UL 959

STANDARD FOR SAFETY

Medium Heat Appliance Factory-Built Chimneys

UL Standard for Safety for Medium Heat Appliance Factory-Built Chimneys, UL 959

Ninth Edition, Dated December 17, 2010

Summary of Topics

This revision of ANSI/UL 959 dated August 28, 2019 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 June 28, 2019.

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DECEMBER 17, 2010

(Title Page Reprinted: August 28, 2019)



ANSI/UL 959-2006 (R2019)

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UL 959

Standard for Medium Heat Appliance Factory-Built Chimneys

First Edition – May, 1969
Second Edition – January, 1971
Third Edition – June, 1975
Fourth Edition – October, 1976
Fifth Edition – February, 1986
Sixth Edition – October, 1994
Seventh Edition – December, 1995
Eighth Edition – May, 2001

Ninth Edition

December 17, 2010

This ANSI/UL Standard for Safety consists of the Ninth Edition including revisions through August 28, 2019.

The most recent designation of UL 959 as a Reaffirmed American National Standard (ANS) occurred on August 19, 2019. 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 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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INTRODUCTION

1 Scope

1.1 These requirements cover factory-built chimneys intended for venting gas, liquid, and solid-fuel-fired medium-heat type appliances in which the maximum continuous flue-gas temperatures do not exceed 1800°F (980°C).

1.2 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, and the Uniform Mechanical Code.

1.3 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 or of electric shock or injury to persons shall be evaluated using appropriate additional component and end-product requirements to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard does not comply with this standard. Revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

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.

5.3 MEDIUM HEAT APPLIANCE – As used in these requirements, this term is 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 that cause detrimental galvanic action at any location.

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

Table 6.1
Minimum thickness of sheet metal

Metals	Minimum thickness, sheet metal	
	inches	(mm)
Aluminum alloys (1100, 3003)	0.018	(0.46)
Steel	0.122	(3.10)
Galvanized steel (G90 coating class)	0.018	(0.46)
Aluminum-coated steel [0.40 ounce per square foot (0.12 kg/m ²)]	0.018	(0.46)
Stainless steel	0.012	(0.30)

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

6.4 A steel part intended to be field-welded shall have a minimum thickness of 0.122 inch (3.10 mm).

6.5 A flue-gas conveying conduit shall be of refractory materials at least 2 inches (50.8 mm) thick conforming to the test requirements contained herein. Ceramic materials shall conform to the requirements of the applicable tests described for the material.

6.6 Other parts of a chimney subject to contact by flue gases or flue-gas air mixtures at locations beyond the terminus of the flue-gas conveying conduit, or subject to condensation, shall be of material equivalent to Types 309, 309S, 310, 310S, 314, and 446 stainless steel having a minimum thickness of 0.020 inch (0.51 mm).

6.7 An outer casing or other structural part exclusive of the flue-gas-conveying conduit whose deterioration results in the chimney system collapsing or otherwise increasing the risk of injury to persons shall be of galvanized steel having a coating Designation G90 (former coating Class 1.25 Commercial) in 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 requirement in ASTM A653, or the equivalent. See Table 6.2.

Exception No. 1: The outer casing or structural part is not required to be of galvanized steel when it is made of steel 0.104 inch (2.64 mm) thicker than required to be in accordance with the other requirements contained in this standard.

Exception No. 2: This requirement does not apply to the flue-gas conveying conduit or other parts in contact with flue-gases. See 6.5 and 6.6.

Table 6.2
Minimum thickness of outer casing material

Equivalent inside nominal diameter of chimney		Galvanized steel or aluminum-coated steel		Series 300 or 400 stainless steel	
inches	(mm)	inch	(mm)	inch	(mm)
12 or less	(305 or less)	0.018	(0.46)	0.012	(0.30)
Over 12 – 24	(Over 305 – 610)	0.023	(0.58)	0.016	(0.41)
Over 24 – 36	(Over 610 – 914)	0.034	(0.86)	0.026	(0.66)
Over 36	(Over 914)	0.045	(1.14)	0.032	(0.81)

6.8 The weight of zinc coating shall be permitted to be determined by any acceptable method; however, in case of question, the weight of 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 Thermal insulation shall comply with the following conditions when the chimney is tested in accordance with these requirements:

- The products resulting from the combustion or volatilization of any combustible binder shall be discharged to the chimney terminus outside of the building.
- The insulating material shall remain in the intended position.
- The thermal conductivity of the insulation shall not increase.
- The insulation shall not show evidence of softening, melting, or deterioration.

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

6.11 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).

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

7 Assembly

7.1 A chimney shall consist of all the essential parts required for the intended installation of a complete 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 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 for 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, support element, or 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. 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 or private labeler's instructions, a chimney shall be positioned securely and resistant to wind damage. See Vertical Support Test, Section 19; Strength Test, Section 20; and Wind Load Test, Section 21.

8 Chimney Caps

8.1 A cap shall be provided.

Exception: A chimney that does not incorporate unprotected ventilation openings terminating exterior to the building does not require 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 22.

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 obstructs the flue-gas or cooling-air passages.

9 Joints

9.1 Parts of a chimney shall be joined and secured in a manner so that they do not disengage when tested in accordance with these requirements.

9.2 When screws are employed to join assemblies during installation, the assemblies to be joined shall provide for use of screws without being punched or drilled, except as referenced in 7.1. When cement is employed for this purpose, it shall be a quick-setting type. Cement, screws, and instructions shall be furnished. A screw shall not extend into a flue gas passage.

9.3 A joint shall not retain condensation or permit condensation to flow from the interior to the exterior of the flue-gas conveying conduit.

10 Radiation Shields

10.1 A radiation shield provided to comply with the maximum temperature limits of these requirements shall:

- a) Be an integral part of a roof jack; and
- b) Provide a continuous barrier for a vertical distance, referenced to the roof level, of not less than 12 inches (305 mm).

10.2 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.

11 Roof Jacks

11.1 When installed in accordance with the manufacturer's instructions, a roof jack shall protect against the entrance of water and debris into the building where the chimney passes through the roof. See Rain Test, Section 22. The height of a roof jack shall be such that the flue-gas exit is located at least 10 feet (3 m) above the roof flashing.

12 Support Assembly

12.1 A support assembly shall be constructed to be installed on the noncombustible floor of a building or on a field-constructed noncombustible base.

12.2 A support assembly shall sustain, without damage or giving way, a load equivalent to four times the weight imposed upon it by all chimney parts it is intended to support. See Vertical Support Test, Section 19.

PERFORMANCE

13 General

13.1 When a chimney is tested in accordance with these requirements, specified temperatures on combustible construction shall be maintained.

13.2 After being subjected to the tests for Thermal Shock, Water Shock, and Temperature as specified in Sections 16 – 18, as applicable, a chimney shall be capable of being further used.

13.3 Test results indicating compliance with the requirement of 13.2 include the following:

- a) No part of the chimney has become damaged or permanently distorted to an extent that it or the chimney assembly does not continue to function as intended.
- b) The effectiveness of any required protective coating or finish on metal parts has not been reduced.
- c) A ceramic material shows no evidence of cracking, disintegration, or spalling to the extent that serviceability of any part of an assembly has been impaired.
- d) Cracks are not observable in porcelain enamel used as a required protective coating when the surface is examined under a microscope of 60 magnification.
- e) The reflectivity of a surface has not been impaired when the reflectivity is utilized to reduce the risk of fire.
- f) Burning or scaling of metal parts is not evident upon visual observation.
- g) The effectiveness of insulating material has not been reduced.