

Standard for Safety

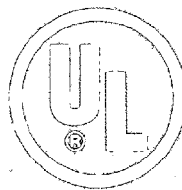
UL 641

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Type L Low-Temperature Venting Systems



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Standard



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December 7, 1995

Standard for

Type L Low-Temperature Venting Systems

UL 641, Seventh Edition

Accompanying this transmittal notice is a copy of the Seventh edition of UL 641.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT.

As indicated on the title page, this UL Standard for Safety is an American National Standard. Attention is directed to the note on the title page of this standard outlining the procedures to be followed to retain the approved text of ANSI/UL 641-1995.

Revised and/or additional pages may be issued from time to time.

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An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

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Revisions of this standard will be made by issuing revised or additional pages bearing their date of issue. A UL Standard is current only if it incorporates the most recently adopted revisions, all of which are itemized on the transmittal notice that accompanies the latest published set of revision pages.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover factory-built vent piping and fittings constructed to provide venting systems for use with gas and liquid fuel-burning appliances that exhaust low-temperature flue gases and that are approved for use with Type L venting systems.

1.2 Requirements for the installation and use of Type L low-temperature venting systems are included in the Standard for Chimneys, Fireplaces, Vents, and Solid-Fuel Burning Appliances, NFPA 211, and codes such as the BOCA Basic/National Mechanical Code, the Standard 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 involve a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as required 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 is not judged to comply with this Standard. Where appropriate, revision of requirements are proposed and adopted in conformance with the methods employed for development, revision, and implementation of this Standard.

2 Units of Measurement

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

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.

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 recognized rating established for the intended conditions of use.

3.4 Specific components are recognized as being 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 for which they have been recognized.

4 Glossary

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

4.2 COMBUSTIBLE MATERIAL – Material made of or surfaced with wood, compressed paper, plant fibers, or other material that ignites and burns, as applied to materials adjacent to or in contact with heat-producing appliances, chimney connectors and vent connectors, steam and hot water pipes, and warm air ducts. Such material shall be identified as combustible even though flameproofed, fire-retardant treated, or plastered.

4.3 NONCOMBUSTIBLE MATERIAL – A material that, in the form in which it is used and under the conditions anticipated, does not ignite, burn, support combustion, or release flammable vapors when subjected to fire or heat.

4.4 TYPE L VENTING SYSTEM – A passageway, vertical or nearly so, used for conveying flue gases from oil and gas appliances or their vent connectors to the outside atmosphere.

CONSTRUCTION

5 Materials

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

5.2 The minimum thickness of sheet metal, including any coatings, shall be as specified in Table 5.1.

Table 5.1
Minimum metal thickness

Metal	Inch	mm
Aluminum alloys (1100, 3003)	0.016	0.41
Steel (uncoated or painted)	0.042	1.07
Galvanized steel (G-90 coating class)	0.018	0.46
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

5.3 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.

5.4 A flue-gas conveying conduit shall be of cast refractory or clay tile [minimum thickness 0.400 inch (10.2 mm)], porcelain-coated steel-base metal [minimum thickness 0.026 inch (0.66 mm)], or Series 300 or Types 430 and 446 stainless steels [minimum thickness 0.012 inch (0.30 mm)]. Cast refractory, clay tile, and porcelain-coated steel shall comply with the requirements specified in Section 26, Crushing Test of Nonmetallic Flue-Gas Conduit; Section 27, Resistance to Action of Acids Test of Nonmetallic Flue-Gas Conduit; Section 28, Freezing and Thawing Test of Water-Absorptive Nonmetallic Materials; and Section 29, Cemented Joint Test of Flue-Gas Conduit. Flue-gas conveying conduit of porcelain-coated steel shall also comply with the requirements specified in Section 30, Sulfuric Acid Extraction Test for Porcelain-Coated Steel Used for Flue-Gas Conduit.

5.5 Other parts 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 stainless steel Series 300 or Types 430 and 446 or the equivalent.

5.6 An outer casing or other structural part:

- a) Whose deterioration or corrosion causes the venting system to collapse or otherwise increase the risk of injury to persons;
- b) That adjoins firestopping material; or
- c) Is subject to condensation;

shall be of stainless steel, galvanized steel, or aluminum-coated steel. Galvanized steel or aluminum-coated steel shall comply with the requirements of 5.7. Stainless steel shall comply with 5.2.

Exception No. 1: This requirement does not apply to the flue-gas conveying conduit. See 5.4.

Exception No. 2: This requirement does not apply to parts subject to contact by flue-gases or flue-gas air mixtures at or beyond the terminus of the flue-gas conveying conduit. See 5.5.

5.7 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 Table 1 of the Standard Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, ASTM A525-79, 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 Methods for Weight of Coating on Zinc-Coated (Galvanized) Iron or Steel Articles, ANSI/ASTM A90-69(R1978). Aluminum-coated steel shall be of Type T1-40 (regular) [0.40 ounce per square foot (0.12 kg/m²)].

5.8 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 to have corrosion resistance equivalent to that required by 5.6. Paint coatings shall remain intact at the maximum temperatures obtained on the part during the tests specified in these requirements.

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

5.10 Thermal insulation as employed shall be in accordance with the following conditions when the system 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 terminus outside of the building;
- b) The insulating material shall remain in its intended position;
- c) The thermal conductivity of the insulating material shall not be increased; or
- d) The thermal insulation shall not show evidence of softening, melting, or other evidence of malfunction or deterioration.

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

5.12 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).

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

6 Assembly

6.1 A venting system shall consist of all the essential parts required for the intended installation of a complete system for venting. 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 not be provided unless 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.*

6.2 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.

6.3 Each part, such as a vent-pipe section or length, elbow, coupling, or tee, shall be completely assembled by the manufacturer at the factory.

6.4 The venting system shall be capable of attachment to chimney connectors having diameters of integral inches.

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

6.6 The annulus between any two walls of a multiple-wall vent-pipe section or vent-pipe fitting shall be not less than 1/4 inch (6.4 mm) in width.

6.7 A venting system shall be of uniform cross-sectional shape.

7 Caps

7.1 A cap shall be provided to resist the entrance of debris and rain into the flue-gas conveying conduit and into any cooling-air passage terminating exterior to the building.

7.2 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.

8 Firestop-Spacers

8.1 A venting system 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 vent sections and combustible construction. Spacers shall have the strength and bearing surface to maintain the required clearance from vent sections to joists and ceiling and floor material.

8.2 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 with construction for a height of not less than 1 inch (25.4 mm).

8.3 A joint between factory-made parts that provide for firestopping shall have a through opening (total eccentricity) not larger than 1/8 inch (3.2 mm) wide.

9 Fittings

9.1 The nominal cross-sectional area of the flue-gas passage of a vent-pipe fitting shall be equivalent to that of the vent-piping with which it is intended to be used.

10 Joints

10.1 Parts of a venting system shall be joined and secured so that they do not disengage when tested in accordance with these requirements.

10.2 When screws are employed to field-join assemblies, the assemblies to be joined shall provide for use of screws without being field-punched or drilled, except as referenced in 6.1. 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.

10.3 A joint shall not retain condensation or rain water, nor permit rain water to flow from the exterior to the interior of the flue-gas conveying conduit, nor permit condensation to flow from the interior to the exterior of the flue-gas conveying conduit.

11 Radiation Shields

11.1 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).

11.2 The assembly specified in 11.1 shall fit into a framed joist area not larger than the sum of:

- a) 1/2 inch (12.7 mm) greater on each side than the outside diameter of the vent pipe; and
- b) Twice the dimension specified in the installation instructions for clearance between vent pipe sections and combustible enclosures.

11.3 Parts of a firestop-spacer or support assembly that provide incidental shielding from radiation to combustible construction are not determined to be radiation shields.

11.4 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.

12 Roof Assemblies

12.1 A roof assembly installed in accordance with the installation instructions shall resist the entrance of excess water and debris into the building where the chimney passes through the roof. See Rain Test, Section 25.

12.2 A roof assembly shall resist the accumulation of soot and debris therein when such accumulation obstructs flue-gas or cooling-air passages. See Sections 18 – 20.

13 Roof Jacks

13.1 A roof jack constructed for placement in contact with combustible roof, rafter, insulation, and ceiling material shall provide a continuous surface or barrier for a vertical distance, measured from the roof line, of at least 6 inches (150 mm).

13.2 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 vent passes through the roof. See Rain Test, Section 25.

13.3 A roof jack shall be constructed so that soot or debris is not capable of accumulating therein when such accumulation obstructs flue-gas or cooling-air passages.

14 Sizes

14.1 A vent-pipe section or vent-pipe fitting shall have an internal cross-sectional area of not less than 7.1 square inches (45.2 cm²) for 3-inch (76-mm) diameter pipe and not more than 28.3 square inches (181 cm²) for 6-inch (150-mm) diameter pipe.

14.2 The internal minor axis of a vent pipe or fitting section shall be not less than 3 inches (76 mm).

15 Support Assembly

15.1 A support assembly (such as a ceiling or floor support), when furnished, shall establish and maintain the minimum required clearance between a vent pipe and combustible construction. A support for installation in a joist area shall constitute a complete firestop when tested in accordance with these requirements.

15.2 A support assembly shall sustain a load equivalent to four times the weight imposed upon it by all vent parts it is intended to support. See Vertical Support Test, Section 22.

15.3 A support assembly intended to be secured by nails or screws shall be arranged so that the load on such holding means is a shear load.