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Underwriters Laboratories Inc. (UL)
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Northbrook, IL 60062-2096

UL Standard for Safety
for
Factory-Made Air Ducts and Connectors, UL 181

Ninth Edition, Dated April 4, 1996

Revisions: This Standard contains revisions through and including October 4, 1996.

A change is indicated by a note following the affected item. The note is preceded and followed by an asterisk.

The revised effective date is substantially in accordance with UL's Bulletins on this subject dated July 26, 1996 and August 16, 1996. These bulletins are now obsolete and may be discarded.

As indicated on the title page (page 1), this UL Standard for Safety has been adopted by the Department of Defense.

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The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the note following the affected item. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

A change in an effective date is indicated by a note following the affected item, and giving both the previous effective date and the new date the requirement becomes effective.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this Standard including those requirements with a specified future effective date, unless the applicant specifically requests that the product be judged under the current requirements. However, if the applicant elects this option, it should be noted that compliance with all the requirements in this Standard will be required as a condition of continued Listing, Recognition, and Follow-Up Services after the effective date, and understanding of this should be signified in writing.

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This Standard consists of pages dated as shown in the following checklist:

Page	Date
tr1, tr2	October 4, 1996
1	April 4, 1996
2 – 5	April 4, 1996
6	October 4, 1996
7 – 31	April 4, 1996
32	October 4, 1996

INTRODUCTION

1 Scope

1.1 These requirements apply to materials for the fabrication of air duct and air connector systems for use in accordance with the Standards of the National Fire Protection Association for the Installation of Air-Conditioning and Ventilating Systems, NFPA No. 90A, and the Installation of Warm Air Heating and Air-Conditioning Systems, NFPA No. 90B.

1.2 The air ducts and air connectors covered by these requirements include preformed lengths of flexible or rigid ducts, materials in the form of boards for field fabrication of lengths of rigid ducts, and preformed flexible air connectors.

1.3 For the purpose of these requirements, air ducts and air connectors are classified as follows:

Class 0 – Air ducts and air connectors having surface burning characteristics of zero.

Class 1 – Air ducts and air connectors having a flame-spread index of not over 25 without evidence of continued progressive combustion and a smoke-developed index of not over 50.

1.4 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 General

2.1 Components

2.1.1 A component of a product covered by this standard shall comply with the requirements for that component and shall be used in accordance with its identified rating and other limitations of use. A component need not 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.

2.1.2 Except as indicated in 2.1.1, a component of a product covered by this standard shall comply with the requirements for that component.

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

2.1.4 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.

2.2 Units of measurement

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

3 Construction

3.1 Materials

3.1.1 Materials for air ducts and air connectors shall be basically metal or mineral. Unbonded asbestos fiber materials shall not be used.

3.1.2 It is not the intent of 3.1.1 to exclude nonmetallic or organic materials used as binders, adhesives, sealants, or finishes when the product otherwise complies with these requirements.

3.2 Corrosion resistance

3.2.1 Metals used in the assembly of air ducts and air connectors shall be resistant to atmospheric corrosion and shall not be used in combinations that results in galvanic action which deteriorates any part of the system formed from such material.

3.2.2 To comply with 3.2.1 with respect to resistance to atmospheric corrosion, metals which are not inherently corrosion resistant, such as sheet steel, or steel wire, are to have a corrosion-resistant coating.

3.2.3 The corrosion-resistant coating shall provide protection against atmospheric corrosion as determined by 10.1.1 at least equivalent to steel having a uniform coating of zinc of not less than 0.3 ounce per square foot (1 g/mm^2) of surface area.

3.2.4 Materials which have their protective coating damaged or the effectiveness reduced by the manufacturing process are to be tested after being subjected to such process.

PERFORMANCE

4 General

4.1 Table 4.1 indicates the tests applicable to the specific forms of air ducts, air connectors, and joining materials. Additionally, joining materials intended for factory installation are to be evaluated in conjunction with the air duct and air connector tests when specified in the individual sections of this Standard.

Exception: Joining materials which comply with the requirements in the Standard for Closure Systems for Use With Rigid Air Ducts and Air Connectors, UL 181A or the Standard for Closure Systems for Use With Flexible Air Ducts and Air Connectors, UL 181B are not required to be evaluated.

Effective date for 4.1 changed from September 16, 1996 to December 31, 1996

MANUFACTURING AND PRODUCTION TESTS

22 General

22.1 To verify compliance with these requirements in production, the manufacturer shall provide the required production control, inspection, and tests. The program shall include at least the following:

- a) Physical and dimensional determinations on materials, facings, laminates, and the finished product.
- b) Quality control of adhesives.
- c) Periodic check tests to include determination of the percentage of combustibles and materials, and small-scale fire tests on finished product and components.

MARKING

23 Content

23.1 Each piece of air duct or air connector shall be marked with:

- a) The manufacturer's or vendor's identification;
- b) The rated air velocity;
- c) The rated negative and positive pressure; and
- d) Specific information relative to fabricating and joining material and methods.

23.2 In addition, each piece of material for the field-fabrication of air ducts or air connectors shall be marked with information covering the maximum and minimum dimensions of air ducts or air connectors for which the material is intended, and each piece of rigid air duct or air connector shall be marked with the manufacturer's specified support spacings.

23.3 Detailed information relative to the fabricating and joining materials and methods to be employed for an air duct or air connector shall not be included in instructions packaged with each carton of material, unless the marking on the air duct or air connector shall identify the joint treatment to be employed. In addition, the marking on the instructions is to be referenced to that treatment.

23.4 Each material furnished separately for use in fabrication of an air duct or air connector system, such as tape, cement, and adhesive, shall be marked with identification (such as name and catalog designation of product) to associate it with the marking on the air duct or air connector and the manufacturer's or vendor's installation instructions.

23.5 All required markings shall be grouped and appropriately located on each piece at intervals of 10 feet (3.0 m) or fractions thereof. Markings shall be permanent, by means such as printing or stenciling with waterproof ink or paint on the surface of the material or on labels not affected by water, and shall be attached to the material by means of water-insoluble adhesive capable of being used.

23.6 When a manufacturer produces material at more than one factory, each individual piece or assembly shall have a distinctive marking to identify it as the product of a particular factory.

24 Instructions

24.1 Installation instructions shall be provided with air ducts and air connectors. Instructions shall be illustrated and shall include directions and information for attaining intended installation of the product. Instructions for making joints shall be included on the air ducts and air connectors or with each package of materials. Instructions for the fabrication of air ducts and air connectors furnished in the form of boards shall be included with each package of board material. (See 23.3.)

24.2 These instructions are to be used as a guide in the examination and test of the product. For this purpose, a printed edition is not required.

24.3 When the installation instructions specify the field usage of pressure-sensitive tapes with flexible air ducts and air connectors, the tapes shall comply with the requirements in the Standard for Closure Systems for Use With Flexible Air Ducts and Air Connectors, UL 181B.

Effective date for 24.3 changed from September 16, 1996 to December 31, 1996

24.4 When the installation instructions specify the field usage of mastic products with rigid air ducts and air connectors, the mastic products shall comply with the requirements in the Standard for Closure Systems for Use With Rigid Air Ducts and Air Connectors, UL 181A.

Effective date for 24.4 changed from September 16, 1996 to December 31, 1996

24.5 When the installation instructions specify the field usage of mastic products with flexible air ducts and air connectors, the mastic products shall comply with the requirements in the Standard for Closure Systems for Use With Flexible Air Ducts and Air Connectors, UL 181B.

Effective date for 24.5 changed from September 16, 1996 to December 31, 1996

UL 181

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Factory-Made Air Ducts and Air Connectors





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UL Standards for Safety are developed under a procedure which provides for participation and comment from the affected public as well as industry. The procedure takes into consideration a survey of known existing standards and the needs and opinions of a wide variety of interests concerned with the subject matter of the standard. Thus manufacturers, consumers, individuals associated with consumer-oriented organizations, academicians, government officials, industrial and commercial users, inspection authorities, insurance interests and others provide input to UL in the formulating of UL Standards for Safety, to keep them consonant with social and technological advances.

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April 4, 1996

Standard for

Factory-Made Air Ducts and Connectors

UL 181, Ninth Edition

Accompanying this transmittal notice is a copy of the Ninth edition of UL 181.

A CHANGE IS INDICATED BY A SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEM.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT EXCEPT FOR PARAGRAPHS 4.1, 24.3, 24.4, AND 24.5, WHICH BECOME EFFECTIVE SEPTEMBER 16, 1996 AS INDICATED IN THE SMALL PRINT NOTE FOLLOWING THE AFFECTED ITEMS.

New product submittals made prior to a specified future effective date will be judged under all of the requirements in this standard unless the applicant specifically requests that the product be judged under the current requirements. However, should the applicant elect this option, it should be noted that compliance with all the requirements in this standard will be required as a condition of continued Listing and Follow-Up Services after the effective date and understanding of this should be signified in writing.

Attention is directed to the note on the title page of this standard identifying that the Department of Defense has adopted the text of UL 181.

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

APRIL 4, 1996

1

UL 181

Standard for

Factory-Made Air Ducts and Air Connectors

The first through the fourth editions were titled "Air Ducts."

The fifth edition was titled "Factory-Made Air Duct Materials and Air Duct Connectors."

The sixth edition was titled "Factory-Made Air Ducts and Connectors."

First Edition – November, 1961

Second Edition – March, 1967

Third Edition – April, 1970

Fourth Edition – May, 1972

Fifth Edition – April, 1974

Sixth Edition – August, 1981

Seventh Edition – April, 1990

Eighth Edition – November, 1994

Ninth Edition

April 4, 1996

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

The Department of Defense (DoD) has adopted UL 181 on July 20, 1994. The publication of revised pages or a new edition of this Standard will not invalidate the DoD adoption.

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

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