UL 2518

STANDARD FOR SAFETY

Air Dispersion Systems

UL Standard for Safety for Air Dispersion Systems, UL 2518

First Edition, Dated July 12, 2016

Summary of Topics

This revision of ANSI/UL 2518 dated April 6, 2023 is being issued to expand the scope and testing criteria to cover products under negative pressure conditions; 1.3, Section 10A and 11.1.

Text that has been changed in any manner or impacted by ULSE's electronic publishing system is marked with a vertical line in the margin.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated December 2, 2022 and March 3, 2023.

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ANSI/UL 2518-2023

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Standard for Air Dispersion Systems

First Edition

July 12, 2016

This ANSI/UL Standard for Safety consists of the First Edition including revisions through April 6, 2023.

The most recent designation of ANSI/UL 2518 as an American National Standard (ANSI) occurred on April 6, 2023. 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 ULSE's Collaborative Standards Development System (CSDS) at https://csds.ul.com.

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INTRODUCTION

1 Scope

1.1 These requirements apply to air dispersion system materials for use in accordance with the following Installation Codes:

a) Standard of the National Fire Protection Association for the Installation of Air-Conditioning and Ventilating Systems, NFPA No. 90A;

b) Standard of the National Fire Protection Association for the Installation of Warm Air Heating and Air-Conditioning Systems, NFPA No. 90B;

c) The International Mechanical Code® (IMC); and

d) The Uniform Mechanical Code™ (UMC).

1.2 The air dispersion system materials covered by these requirements include preformed lengths of fabric or non-fabric products intended to convey and distribute air.

1.3 These air dispersion system materials are intended to be limited for use in air handling systems in exposed locations operating under positive pressure.

Exception: Air dispersion systems that have been tested to Section 10A (Collapse Test) and labeled with the rated negative pressure are not limited to operating under positive pressure.

1.4 These requirements do not intend to address the joints between sections of air dispersion system materials or end connections.

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 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.

2.3 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.

PERFORMANCE

5 Tests for Weight and Air Permeability

5.1 Representative samples of fabric air dispersion system materials shall be evaluated for weight in accordance with the Standard Test Method for Mass Per Unit Area (Weight) of Fabric, ASTM D 3776, on a minimum of five specimens. Weight in units of ounces per square yard (g/m^2) shall be determined and included with the Installation Instructions for the product in accordance with 12.2.

5.2 Representative samples of fabric air dispersion system materials shall be evaluated for Air Permeability in accordance with the Standard Test Method for Air Permeability of Textile Fabrics, ASTM D 737, on a minimum of ten specimens. Air permeability in units of $ft^3/min/ft^2$ ($cm^3/s/cm^2$) shall be determined and included with the Installation Instructions for the product in accordance with 12.3.

6 Test for Surface Burning Characteristics

6.1 Representative samples of air dispersion system materials shall be evaluated for surface burning characteristics according to the requirements in 6.2 and 6.6.

6.2 Tests for surface burning characteristics are to be conducted as specified in the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723. For the purpose of establishing the flame spread and smoke developed indices, typically a minimum of three tests are to be conducted.

6.3 Samples are to be positioned in the 25 foot (7.62 m) long fire test chamber specified in the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723. When required, 1/4 inch (6.4 mm) diameter steel rods shall be used to support the materials. When supporting rods are used, they are to be spaced between 2 feet and 4 feet (0.6 m and 1.2 m) apart as required for support of the samples.

6.4 When the inside and outside surfaces of an air dispersion system material are of different composition, tests for surface burning characteristics are to be conducted by exposing first one side and then the other to the test conditions, using different samples for each exposure. A third test is then to be conducted on the worse case condition using a different sample for the exposure.

6.5 Fabrics, tapes, or other joining materials forming part of an air dispersion product or other parts identified as a component of the product are to be in place during the tests for surface burning characteristics. When, however, the application of the fabric, tape, or other joining material to the sample is likely to affect the various surface burning characteristic indices, samples are to be tested with and without longitudinal seams or joints, and the higher indices taken.

6.6 All materials shall have a flame-spread index of not over 25 without evidence of continued progressive combustion and a smoke-developed index of not over 50.

7 Mold Growth and Humidity Test

7.1 Materials for air dispersion system products, including any nozzles, tapes, fabrics, cements, or other materials shall be resistant to the effects of high humidity under standard atmospheric temperature conditions. The mold shall not spread beyond the inoculated area, and no significant growth of mold is to

be observed. Materials shall not become deformed or delaminated; tapes, casings, and lining shall remain securely in place; and joints shall not open or show evidence of separation.

7.2 Three samples representing typical wall areas of the assembled air dispersion system materials are to be prepared. Each sample is to be 4 by 4 inches (102 by 102 mm) square and is to include any joining materials.

7.3 Mold mycelia and spores using Chaetomium Globosium are to be applied to the samples. The samples are to be placed in a closed vessel in which an atmosphere saturated with water vapor is maintained at room temperature and under dark conditions. The samples are to remain in this atmosphere until the extent of growth has been demonstrated or until the mold and spores have disintegrated, and not less than 60 days.

7.4 The samples then are to be examined visually for extent of mold growth and for indications of deterioration in wall structure, exterior casing, inner lining, tapes, and fabrics.

8 Temperature Test

8.1 General

8.1.1 Materials for air dispersion system products, including any nozzles, tapes, fabrics, cements, or other materials shall be resistant to the effects of the temperatures to which they are exposed in the following tests.

8.2 Low temperature

8.2.1 Material shall not become deformed or show delamination; tapes, casings, and lining shall remain securely in place; and joints shall not open or show evidence of separation when a sample is subjected to the test described in 8.2.2 – 8.2.4.

8.2.2 Three samples representing typical wall areas of the assembled product are to be prepared. Each sample is to be 8 by 8 inches (203 by 203 mm) square.

8.2.3 The samples are to be placed in a closed vessel in which an atmosphere saturated with water vapor is maintained at room temperature for a period of 48 hours. The samples then are to be removed and immediately placed in a refrigerated compartment and maintained at a temperature of minus 17.8°C (0°F) for a period of 24 hours.

8.2.4 The samples shall then be removed from the refrigerated compartment and allowed to be conditioned at 23 ±2°C (73 ±4°F) and 50 ±5 percent relative humidity for at least 24 hours. The samples then are to be examined visually for indications of deterioration in wall structure, nozzles, exterior casing or interior linings, tapes, fabrics, and cements.

8.3 High temperature

8.3.1 To comply with the requirements of 8.1.1, the exterior and interior surfaces of samples of air dispersion system sections are to be simultaneously exposed to air maintained at not less than 51.7°C (125°F) on the exterior and not less than 129.4°C (265°F) on the interior. Any arrangement using samples of air dispersion system sections shall be employed. The test arrangement is to provide means for maintaining air at the specified test temperatures in moving contact with the two surfaces of the test samples. As a result of the test described in 8.3.2 – 8.3.4, structural material shall not become deformed or show delamination; tapes, casings, and lining shall remain securely in place; and joints shall not open or show evidence of separation.

8.3.2 At least two representative samples are to be specified and prepared for this test. When the product is of uniform grade, thickness, and cross section the samples are to be chosen from the smaller sizes. Sections, varying in grade and thickness with size, may also require samples in other size ranges.

8.3.3 Each sample is to be 3 feet (0.91 m) long. At least one end of each sample is to be attached to a metal collar in accordance with the manufacturer's instructions.

8.3.4 The conditions of test are to be maintained for a period of 60 days. The samples shall then be removed and conditioned at 23 ±2°C (73 ±4°F) and 50 ±5 percent relative humidity for at least 24 hours. The samples then are to be examined visually for indications of deterioration in wall structure, nozzles, exterior casings or interior linings, tapes, fabrics, and cements.

9 Erosion Test

9.1 General

9.1.1 Material for air dispersion systems shall not break away, crack, peel, flake off, or show evidence of delamination or continued erosion when air is passed through typical sections at a velocity of two and one-half times the manufacturer's rated velocity, and not less than 2500 feet per minute (762 m/min). For the purpose of this requirement, continued erosion is identified to be either a constant or increasing rate of erosion.

9.2 Test installation

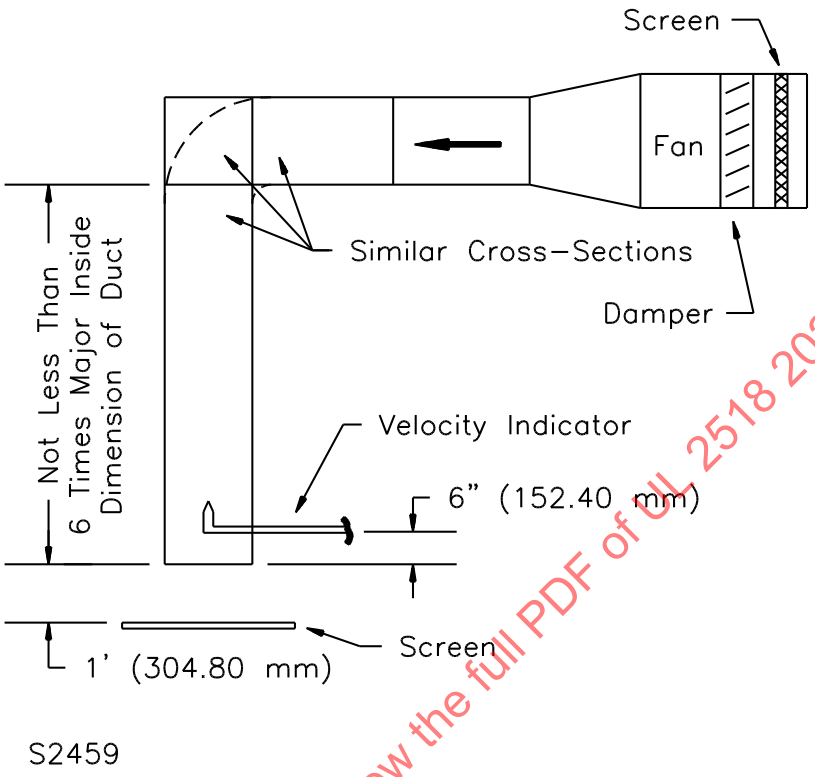
9.2.1 Previously untested representative samples are to be prepared on the basis of grade, thickness, size, and shape. Consideration is to be given to tested samples which are vulnerable to damage under the conditions of test. Such samples may include air dispersion system materials prepared with a representative field splice of a type as specified by the manufacturer. Samples of non-symmetrical cross section are to be evaluated in the orientations identified as being vulnerable under the conditions of test.

9.2.2 In assembling the test samples, all materials are to be extended to their full length. Any adhesives or cements are to be allowed to cure for a period of at least 24 hours. Samples are not to be exposed to relative humidity greater than 70 percent during the 24-hour period prior to test.

9.2.3 The sample or samples are to be arranged in an L-shaped assembly as described in Figure 9.1, having a length of not less than six times the major inside dimension of the air dispersion system section. The assembly is to be bent at a radius equivalent to the inside diameter of the air dispersion system to form the 90-degree bend. The entire assembly is to have similar cross sections.

Figure 9.1

Erosion test



9.2.4 Connection to the outlet of the fan is to be by means of a transformation piece of any intended material to provide for uniform air entry to the test sample. The fan is to have the capacity to provide a maximum velocity of two and one-half times the maximum velocity specified by the manufacturer, but not less than 2500 feet per minute (762 m/min) of air at room temperature.

9.2.5 The air velocity for purposes of the test is to be measured by a pitot tube, or direct-reading velometer, positioned in the center of the outlet end of the sample. Room air handled by the fan and ranging in temperature between 15.6 and 37.8°C (60 and 100°F) shall be employed.

9.2.6 The inlet of the air fan used for the test is to be covered with a double layer of cheesecloth (14 to 15 square yards per pound (0.026 to 0.028 m^2/g) and known to the trade as "count of 32 by 28").

9.2.7 A damper, when employed for regulating velocity in the system, is to be located between the screen and the fan or between the fan and the inlet of the test sample.

9.2.8 A collecting screen consisting of a double layer of cheesecloth, as specified in 9.2.6, stretched taut on a frame sized to provide for an area not less than five times the inside cross-sectional area of the test sample, is to be located 1 foot (0.30 m) from the outlet end of the test sample.

9.3 Test method

9.3.1 Air is to be passed through the sample at test velocity with the collecting screen removed for a period of at least 1 hour and not more than 24 hours. The collection screen then is to be placed in position.

9.3.2 The test then is to proceed at test velocity and continued for a period of 4 hours. The collecting screen is to be examined for macroscopic particles at the end of each hour during the test period by taping the screen with the adhesive side of transparent tape, or tapes, in order to remove and record any eroded particles.

10 Pressure Test

10.1 Air dispersion system materials shall withstand without rupture an internal air pressure of 2-1/2 times the manufacturer's rated positive pressure, and not less than 1-1/4 inch water column (311 Pa). The sample is not to rupture, as evidenced by breaks, tears, rips, or other openings greater than 1/8 inch (3.2 mm) in length; any joining material is to remain intact to the extent that materials such as tapes do not become displaced more than a total for both edges of 1/8 inch (3.2 mm) from their initial position, disregarding movement due to slack or stretch which does not produce a separation of materials; and there is to be no evidence of other damage which results in the samples becoming unusable.

10.2 Air dispersion system sections of samples previously untested are to be used for the test. Samples, 8 feet (2.43 m) long, are to be used in accordance with 9.2.1. Air ducts and air connector sections are to be prepared in accordance with 9.2.2. Each end of the sample is to be sealed airtight by any means consistent with the use of the material under test. To permit the dispersion system to be fully extended to its maximum length, the air dispersion system is permitted to be pressurized to 0.25 inch water column (62.2 Pa). Each end of the sample is to be attached to a stationary fixture.

10.3 A pressure tap consisting of pipe or tubing is to be sealed into one end of the test sample and connected to a water manometer which shall be read directly to 0.05 inch water column (12.4 Pa). The manometer is to be checked for zero reading at the beginning and at the end of each test.

10.4 An air supply tap consisting of pipe or tubing is to be sealed into the same or the other end of the sample and connected to a source of air pressure capable of maintaining the specified air pressure in the sample. The manufacturer's rated pressure is to be gradually attained in not less than 45 seconds nor more than 60 seconds from the initial application of the test pressure. This pressure is to be held for 1 minute. The pressure then is to be increased to 2-1/2 times the manufacturer's rated pressure in not less than 45 seconds nor more than 60 seconds.

10.5 To achieve the intended pressurization of the sample, a flexible thin-wall bladder is permitted to be used inside the air dispersion system. The bladder, if used, shall not restrict expansion of the sample when subjected to the test pressure.

10.6 The air pressure in the test sample is to be maintained at the designated test pressure for a period of 1 hour.

10A Collapse Test

10A.1 The collapse test is required when an air dispersion system is labeled for installation in a negative pressure application and marked accordingly.

10A.2 Air dispersion system materials and the joints between sections, assembled in accordance with the manufacturer's instructions, shall resist collapse, damage, and excessive deformation (greater than 20 percent of stated design size area) when subjected to negative pressure of 2-1/2 times the manufacturer's rated negative pressure, and not less than a negative pressure of 3/8-inch water column (93 Pa).

10A.3 The sample shall not collapse, any joining material shall remain intact to the extent that materials such as tapes or sewn seams do not become displaced more than a total for both edges of 1/8 inch (3.2 mm) from their initial position, disregarding movement due to slack or stretch which does not produce a separation of materials; and there shall be no evidence of other damage which results in it to be not