



UL 263

Underwriters Laboratories Inc. Standard for Safety

Fire Tests of Building Construction and Materials



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UL Standard for Safety for Fire Tests of Building Construction and Materials, UL 263

Fourteenth Edition, Dated June 21, 2011

Summary of Topics

This new edition of ANSI/UL 263 is being issued to reflect the latest ANSI approval and to include the following revisions that were proposed on October 22, 2010 and February 4, 2011:

- ***Added requirements for testing unrestrained loaded beam specimens.***

The new requirements are substantially in accordance with Proposal(s) on this subject dated October 22, 2010 and February 4, 2011.

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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that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

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JUNE 21, 2011



HISTORICAL NOTE

ANSI/UL 263-2011

These requirements are an outgrowth of proposals of the British Fire Prevention Committee and were adopted in 1903 at an International Fire Congress in London. They were modified for American practice as the result of experience of Underwriters Laboratories Inc. (UL), dating from about the same time, and of study by the Committee on Fire Resistive Construction of the National Fire Prevention Association (NFPA) and the Committee on Fire Proofing of the American Society for Testing Materials (ASTM).

Conferences called jointly by the two committees in 1916-17, which were attended by representatives of the National Board of Fire Underwriters (NFBU), currently the American Insurance Association (AIA), UL, Associated Factory Mutual Fire Insurance Companies, currently the Factory Mutual Research Corporation (FMRC), National Bureau of Standards (NBS), currently the National Institute of Standards and Technology, and other interested national societies, resulted in drafting fire-test requirements which were adopted in 1918 by NFPA and ASTM. They were approved as a tentative American Standard by the American Engineering Standards Committee in 1919.

The Standard Time-Temperature Curve is a composite of a considerable number of performance and calculated curves studied by the above conference. Its principal difference from other curves lies in the rapid rate of rise during the first 10 minutes of the test, a feature embodying the experience and practice of UL.

Fire-test requirements were promulgated by UL as appendices to its reports to clients for many years prior to the adoption of the above requirements. The first UL publication of the fire test requirements, as a separate Standard, appeared in 1926 and was followed by the First Edition of the present Standard in May, 1929.

The Standard has been revised and approved on several occasions as an American National Standard, ANSI A2.1, by the American National Standards Institute (ANSI) under joint sponsorship of ASTM (Serial designation E119), NBS, and ANSI Fire Protection Group, consisting of NFPA, AIA, FMRC, and UL.

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UL 263

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Fourteenth Edition

June 21, 2011

This ANSI/UL Standard for Safety consists of the Fourteenth Edition.

The most recent designation of ANSI/UL 263 as an American National Standard (ANSI) occurred on June 21, 2011. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

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

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APPENDIX A

Standard Time-Temperature Curve for Control of Fire Tests

APPENDIX B

Requirements for Thermocouple Pads

APPENDIX C

Nonmandatory Guide for Determining Conditions of Restraint for Floor and Roof Assemblies and for Individual Beams

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INTRODUCTION

1 Scope

1.1 These fire tests are applicable to assemblies of masonry units and to composite assemblies of structural materials for buildings, including bearing and other walls and partitions, columns, girders, beams, slabs, and composite slab and beam assemblies for floors and roofs. They are also applicable to other assemblies and structural units that constitute permanent integral parts of a finished building.

1.2 The classifications for building construction and materials are intended to register performance during the period of fire exposure and are not intended to be interpreted as having determined their acceptability for use after fire exposure.

1.3 These requirements are intended to evaluate the length of time that the types of assemblies specified in 1.1 will contain a fire or retain their structural integrity, or both, dependent upon the type of assembly involved, during a predetermined test exposure. The test evaluates the assembly's resistance to heat, and in some instances to a hose stream, while carrying an applied load, if the assembly is load bearing.

1.4 Under these requirements a specimen is subjected to a standard fire exposure controlled to achieve specified temperatures throughout a specified time period. In some instances, the fire exposure may be followed by the application of a specified standard fire hose stream. This exposure by itself may not be representative of all fire conditions; conditions may vary with changes in the amount, nature, and distribution of fire loading, ventilation, compartment size and configuration, and heat sink characteristics of the compartment. These requirements provide a relative measure of fire performance of comparable assemblies under these specified fire exposure conditions. Any variation from the construction or conditions that are tested such as size, method of assembly, and materials, may substantially change the performance characteristics of the assembly.

1.5 These requirements cover the following measurements and determinations during the test exposure:

- a) Measurement of the transmission through the assembly of heat, and of gases sufficiently hot to ignite cotton waste in walls, partitions, floors, and roofs.
- b) Measurement of the load carrying ability of load bearing elements in wall, partition, floor, and roof assemblies.
- c) Measurement of the load carrying ability of individual load bearing assemblies, such as beams and columns, with consideration for the end support conditions, either restrained or not restrained.

1.6 These requirements do not cover:

- a) Accumulation of data as to performance of assemblies constructed with components or lengths other than those tested.
- b) Evaluation of the contribution of the assembly to generation of smoke, toxic gases, or other products of combustion.
- c) Measurement of the degree of control or limitation of the passage of smoke or products of combustion through the assembly.
- d) Simulation of the fire behavior of joints between building elements, such as floor-wall or wall-wall, and like connections.

- e) Measurement of flame spread over the surface of the tested element.
- f) The effect on fire endurance of conventional openings in the assembly, such as openings for electrical receptacle outlets, plumbing pipe, or the like, unless specifically provided for in the construction tested.

1.7 Tests for burning characteristics of building materials, based on the rate of flame spread, can be found in the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723.

1.8 The tests described herein may be cited as the "Standard Fire Tests," and the performance of exposure expressed as "2-hour," "6-hour," "1/2-hour," or the like.

1.9 The results of these tests represent one factor in assessing fire performance of building construction and assemblies. These requirements prescribe a standard fire exposure for comparing the performance of building construction assemblies. Application of these test results to predict the performance of actual building construction requires careful evaluation of test conditions.

1.10 If a factor of safety exceeding that inherent in the test conditions is desired, a proportional increase should be made in the specified time classification period.

2 General

2.1 Units of measurement

2.1.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

2.2 Undated references

2.2.1 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.

3 Control of Fire Tests

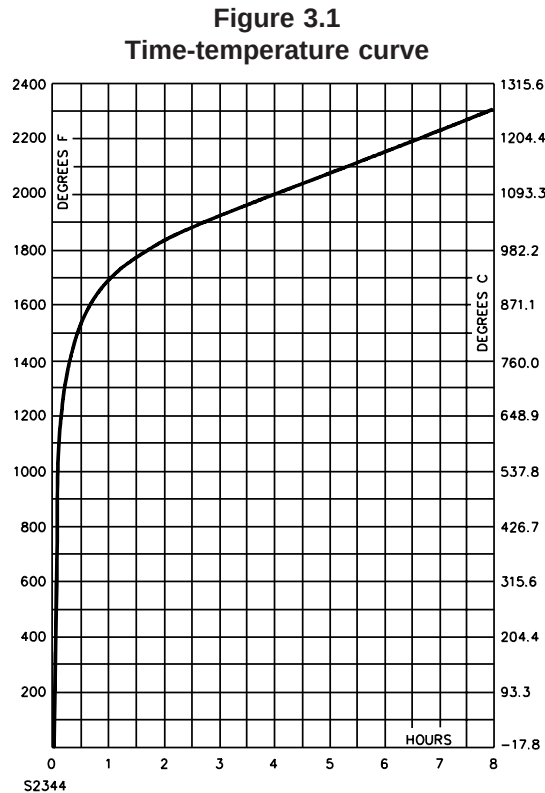
3.1 Time-temperature curve

3.1.1 The conduct of fire tests of materials and construction is to be controlled by the standard time-temperature curve shown in Figure 3.1. The points on the curve that determine its character are:

- a) 1000°F (538°C) at 5 min;
- b) 1300°F (704°C) at 10 min;
- c) 1550°F (843°C) at 30 min;
- d) 1700°F (927°C) at 1 h;
- e) 1850°F (1010°C) at 2 h;
- f) 2000°F (1093°C) at 4 h;

g) 2300°F (1260°C) at 8 h or over.

For a more precise definition of the time-temperature curve, see Standard Time-Temperature Curve for Control of Fire Tests, Appendix A.



3.2 Furnace temperatures

3.2.1 The measured temperature to be compared with the standard time-temperature curve is to be the average temperature obtained from the readings of not fewer than nine thermocouples for a floor, roof, wall or partition and not fewer than eight thermocouples for a structural beam or column, symmetrically disposed and distributed to indicate the temperature near all parts of the specimen.

3.2.2 The thermocouples are to be enclosed in sealed porcelain tubes, 3/4 inch (19.1 mm) in outside diameter and 1/8 inch (3.2 mm) in wall thickness or, as an alternative in the case of base metal thermocouples, enclosed in sealed, standard-weight 1/2-in [0.84-in (21.3 mm) outside diameter] black wrought steel or black wrought iron pipe. See the Standard for Welded and Seamless Wrought Steel Pipe, ASME B36.10M. The exposed length of the pyrometer tube and thermocouple in the furnace chamber is to be not less than 12 in (305 mm). Other types of protecting tubes or pyrometers may be used that, under test conditions, give the same indications as those specified within the limit of accuracy that applies for furnace temperature measurements.

3.2.3 For floors, roofs, beams and columns, the junction of each thermocouple is to be placed 12 in (305 mm) away from the exposed face of the specimen at the beginning of the test and is not to touch the specimen during the test, as a result of specimen deflection.

3.2.4 For walls and partitions, the thermocouples are to be placed 6 in (152 mm) away from the exposed face of the specimen at the beginning of the test and are not to touch the specimen during the test as a result of specimen deflection.

3.2.5 The temperatures are to be read at intervals not exceeding 5 min during the first 2 h; the intervals thereafter may be increased to not more than 10 min.

3.2.6 The temperature of the furnace is to be controlled so that the area under the measured time-temperature curve, obtained by averaging the results from the pyrometer readings, is within:

- a) 10% of the corresponding area under the standard time-temperature curve shown in Figure 3.1 for fire tests of 1 h or less duration,
- b) 7.5% for tests longer than 1 h but not longer than 2 h, and
- c) 5% for tests exceeding 2 h in duration.

3.3 Temperatures of unexposed surfaces of floors, roofs, walls, and partitions

3.3.1 Temperatures at unexposed surfaces are to be measured with thermocouples or thermometers (under certain condition it may be impracticable to use thermometers), placed under flexible, dry, felted pads. The properties of these pads shall comply with the requirements specified in Requirements for Thermocouple Pads, Appendix B.

3.3.2 The wire leads of the thermocouple or the stem of the thermometer are to have an immersion under the pad and be in contact with the unexposed surface for not less than 3-1/2 ins (88.9 mm). The hot junction of the thermocouple or the bulb of the thermometer is to be placed approximately under the center of the pad. The outside diameter of protecting or insulating tubes and of thermometer stems is to be not more than 5/16 in (7.9 mm). The pad is to be held firmly against the surface and is to fit closely about the thermocouples or the thermometer stems. Thermometers are to be of the partial immersion type with a 3-in (76.2-mm) length of stem measured between the end of the bulb and the immersion mark. The wires for the thermocouple in the length covered by the pad are not to be heavier than No. 18 B&S gage [0.04 in (1.02 mm)] and are to be electrically insulated with heat- and moisture-resistant coatings.

3.3.3 For the purpose of testing roof assemblies, the "unexposed surface" is defined as the surface exposed to ambient air.

3.3.4 Temperature readings are to be taken at not less than nine points on the surface. Five of these are to be symmetrically disposed, one at approximately the center of the specimen and four at approximately the center of its quarter sections. The other four are to be located at the discretion of the testing body to obtain representative information on the performance of the construction under test. No thermocouple is to be located nearer to the edges of the test specimen than one and one-half times the thickness of the construction, or 12 in (305 mm), unless necessary to include an element of the construction not otherwise represented in the remainder of the test specimen.