



UL 10A

Underwriters Laboratories Inc. Standard for Safety

Tin-Clad Fire Doors



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UL Standard for Safety for Tin-Clad Fire Doors, UL 10A

Twenty First Edition, Dated January 30, 2009

Summary of Topics

The twenty-first edition of the Standard for Tin-Clad Fire Doors, UL 10A, has been issued to reflect the latest ANSI approval date, and to incorporate the proposals dated August 22, 2008 and December 5, 2008. These proposals include the following:

- ***The updating of code references.***
- ***The updating of standard references.***
- ***The deletion of the year from document references.***
- ***The deletion of a reference to a withdrawn standard and removal of redundant text.***
- ***The deletion of old Scope paragraph 1.7.***

The revised requirements are substantially in accordance with UL's Proposal(s) on this subject dated August 22, 2008, and December 5, 2008.

As indicated on the title page (page 1), 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 this ANSI/UL Standard.

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

The UL Foreword is no longer located within the UL Standard. For information concerning the use and application of the requirements contained in this Standard, the current version of the UL Foreword is located on ULStandardsInfoNet at: <http://ulstandardsinfo.net/ulforeword.html>

The master for this Standard at UL's Northbrook Office is the official document insofar as it relates to a UL service and the compliance of a product with respect to the requirements for that product and service, or if there are questions regarding the accuracy of this Standard.

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that have been revised and that have a future effective date are located after the Standard, and are preceded by a "SUPERSEDED REQUIREMENTS" notice.

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 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
1-42	January 30, 2009
A1-A4	January 30, 2009



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HISTORICAL NOTE

ANSI/UL 10A-2009

The title "Tin-Clad Fire Doors" is historically related to two- or three-ply wooden core construction covered with sheet steel as thin as 0.01 in (0.25 mm) coated with "roofing grade" terne "plate" having a composition of 20 percent tin and 80 percent lead. More recently the title has been retained as also applying to identical construction except for the substitution of zinc coating for terne coating with the provision that zinc coated metal should be painted with a good grade of corrosion resisting paint prior to shipment.

The maximum metal section (plate) size of 14 by 20 in (356 by 508 mm) is dictated by the original concept that the extremely thin base metal was to be secured only by nails having their heads covered by fold-over laps and the need for the resultant seams to be spaced sufficiently close as to prevent bulging or surface distortions.

The original title has been retained to relate to the basic concept for this class of construction in trade usage, as is so referenced in several national and other building codes, as well as in the current edition of the Standard for Fire Doors and Other Opening Protectives, NFPA No. 80.

This edition has been edited to delete use of the word "plate" as the present trade usage of this term relates to hot-rolled steel having a thickness of at least 0.230 in (5.8 mm).

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UL 10A

Standard for Tin-Clad Fire Doors

Previous numbered and unnumbered editions of standards covering this material have been published since 1903.

Tenth Edition – August, 1935
Eleventh Edition – July, 1937
Twelfth Edition – December, 1941
Thirteenth Edition – March, 1949
Fourteenth Edition – July, 1951
Fifteenth Edition – January, 1956
Sixteenth Edition – December, 1968
Seventeenth Edition – December, 1973
Eighteenth Edition – February, 1980
Nineteenth Edition – February, 1993
Twentieth Edition – February, 1998

Twenty-First Edition

January 30, 2009

The most recent designation of ANSI/UL 10A as an American National Standard (ANSI) occurred on January 30, 2009. The ANSI approval for this standard does not include the Cover Page, Transmittal Pages, or Title Page.

This ANSI/UL Standard for Safety, which consists of the Twenty-First Edition, is under continuous maintenance, whereby each revision is ANSI approved upon publication.

The Department of Defense (DoD) has adopted UL 10A on October 21, 1984. 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 set of revised requirements. 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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INTRODUCTION

1 Scope

1.1 These requirements cover the design and construction details of tin-clad fire doors which when so fabricated have demonstrated in fire tests conducted in accordance with the Standard for Fire Tests of Door Assemblies, UL 10B, fire performance properties which warrant their use as fire doors having a rating of 3, 1-1/2, or 3/4 hour.

1.2 The doors covered by these requirements are intended to be mounted with fire door hardware of the following types:

- a) Sliding hardware and
- b) Swinging hardware.

1.3 A tin-clad fire door employing materials and/or having forms of construction differing from those detailed herein are to be examined according to the intent of these requirements and shall be tested for fire performance in accordance with the Standard for Fire Tests of Door Assemblies, UL 10B. If when so tested, it is determined that the fire door complies with the Conditions of Acceptance of this test method it is to be classified as a tin-clad fire door having the applicable fire performance rating of 3, 1-1/2, or 3/4 hour.

1.4 Doors complying with these requirements are classified as to temperature rise on the unexposed side to 250°F (139°C) maximum at the end of the first 30 minutes of exposure to fire; or have no classification referencing temperature rise. See Table 2.1.

1.5 A door conforming to these specifications consists of a core made up of layers of boards nailed to each other, encased in terne or zinc coated steel in the form of sections jointed together at their edges and nailed through the seams to the core.

1.6 Requirements for the location and time rating are contained in codes, such as the International Building Code published by the International Code Council and the Building Construction and Safety Code, NFPA 5000. The method of installation required for fire doors is not included in these codes. Requirements for the details for the installation of tin-clad fire doors, including the requirements for vent holes and glazing are included in the Standard for Fire Doors and Other Opening Protectives, NFPA 80.

1.7 These requirements do not cover electrical, mechanical, or other features which relate to the risk of fire or accident beyond the scope of these requirements.

2 General

2.1 Sizes and ratings

2.1.1 The sizes and ratings for three-ply and two-ply doors are given in Table 2.1.

2.1.2 Table 2.1 pertains only to the maximum size of the opening. Doors limited in size by this table fall into two categories:

- a) Swinging doors intended to be installed within an opening and
- b) All sliding doors and those swinging doors intended for surface mounting outside of the opening.

Swinging doors in (a) are limited in size to the maximum dimensions specified for the opening. Doors in (b) must be larger than the maximum opening dimensions to provide the minimum 4 in (102 mm) lap at each side and the top of the door as required by the Standard for Fire Doors and Other Opening Protectives, ANSI/NFPA 80. Doors exceeding these two basic dimension considerations are termed "Oversize," the design and construction of which are not necessarily fully covered in these requirements.

2.2 Units of measurement

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

2.2.2 The tolerance for all dimensions shall be as specified with the dimension. Where no tolerance is shown, the tolerances specified in Appendix A shall apply. See Appendix A for specifications.

2.3 Undated references

2.3.1 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.

Table 2.1
Sizes and ratings

Type, method of operation and maximum size of opening	Rating and class of opening	Maximum exposed glass area
Three-ply	3 hr. ^a	None
Swinging single		
6'0" x 12'0" (1.83 x 3.66 m)		
Swinging in pairs		
10'0" x 12'0" (3.05 x 3.66 m)		
Sliding single and	1-1/2 hr. ^a	100 sq. in. per door (0.065 m ²)
Center-parting	3/4 hr. ^a	1296 sq. in. per light (0.84 m ²)
120 sq. ft. (11.15 m ²) with maximum dimension 12'0" (3.66 m)		
Vertically sliding		
80 sq. ft. (7.43 m ²) with maximum dimension 10'0" (3.05 m)		

Table 2.1 Continued

Type, method of operation and maximum size of opening	Rating and class of opening	Maximum exposed glass area
Two-ply	1-1/2 hr. ^a	100 sq. in. per door (0.065 m ²)
Swinging single		
6'0" x 10'0" (1.83 x 3.05 m)		
Swinging in pairs	3/4 hr. ^b	1296 sq. in. per light (0.84 m ²)
10'0" x 10'0" (3.05 x 3.05 m)		
Sliding single		
80 sq. ft. (7.43 m ²) with maximum dimension 10'0" (3.05 m)		
^a 3-hour and 1-1/2 hour doors have a maximum temperature rise limitation of 250°F (139°C) maximum at 30 minutes. ^b 3/4-hour doors with large glass lights are not classified as to temperature rise as they are subject to temperature rises in excess of 650°F (361°C) on the unexposed side.		

MATERIALS

3 Lumber

3.1 The following soft woods shall not be used, unless only one kind of lumber is used in the assembly of a single core:

Cedars— All Classes	Northern White Pine	Sitka Spruce
Cypress — All Classes	Redwood	Yellow Poplar
Douglas Fir	Eastern Spruce	Tupelo Gum
Western White Pine		

3.2 Other kinds of lumber shall not be added to the foregoing list, unless the kind of wood to be used has properties equivalent to the above species with regard to low resin content, light weight, resistance to fungus and decay, and ability to withstand nailing without splitting or splintering.

3.3 Lumber shall have a moisture content of 19 percent or less at the time of manufacturing door cores. Tests for moisture content shall be made using the oven drying or the electrical meter method in accordance with Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials, ASTM D4442.

3.4 Stocks of lumber shall be stored under cover in the premises of the fire-door manufacturer for at least one month before being used in the manufacture of fire-door cores, and while in storage shall be piled in such a manner that the air has free access to all surfaces of each board. Kiln drying is accepted for the 30-day drying period.

3.5 The boards shall be nominal 1-in (19.1 mm) lumber, surfaces on two sides and matched. They shall be without beading, beveling, painting, or other treatment.

- 3.6 The actual thickness of the boards shall be not less than 3/4 in (19.1 mm).
- 3.7 The boards shall not be less than 4 in (89 mm) nor more than 8 in (178 mm) in nominal width.
- 3.8 The nominal width (or stock width) is greater than the actual width over the tongue and groove.
- 3.9 The boards shall be free from wane (bark), decay, knot or other holes, loose knots, unsound knots, or knots exceeding 2-1/2 in (64 mm) in any dimension.
- 3.10 Lumber of a No. 2 Common or Construction grade or better will meet these requirements. However, because some pieces of No. 2 grade are unacceptable, the kind of lumber used and its condition shall be judged from characteristic properties of the wood as commonly known. These characteristics include:

a) DECAY – Destruction of the wood substance due to the action of wood-destroying fungi;

Note: "Dote" and "rot" are synonymous with "decay" and are any form of decay which is evident either as a dark red discoloration, not found in the sound wood, or the presence of white or red rotten spots.

b) ADVANCED (Typical) DECAY – The older stage of decay in which the destruction is readily recognized because the wood has become punky, soft and spongy, stringy, ring shaped, pitted, or crumbly;

c) INCIPIENT DECAY – The early stage of decay which has not proceeded far enough to soften or otherwise perceptibly impair the hardness of the wood;

d) KNOT – That portion of a branch which has become incorporated in the body of a tree;

e) LOOSE KNOT – A knot which is not firmly held in place by growth or position;

f) TIGHT KNOT – A knot so fixed by growth or position that it firmly retains its place in the wood piece;

g) HOLLOW KNOT – A hollow knot is an apparently sound knot except it contains a hole over 1/4 in (6.4 mm) in diameter or a void area behind the knot;

h) CHECK – A separation along the grain, the greater part of which occurs across the rings of annual growth;

i) WANE – The lack of wood from any cause, or bark on the surface of lumber.

3.11 To permit judging of the several characteristics of knots, such are to be measured across their lines of growth for oval and circular knots. For spike knots the measurement is to be parallel to the lines of growth. In all cases the measured distance is to be the visible portion of the knot and is normally darker or lighter than the coloring of board.

3.12 The following characteristics are to be judged as unacceptable:

a) Oval, circular, or spike knots exceeding 2-1/2 in (64 mm) in any direction (D or L), as shown in Figure 3.1.

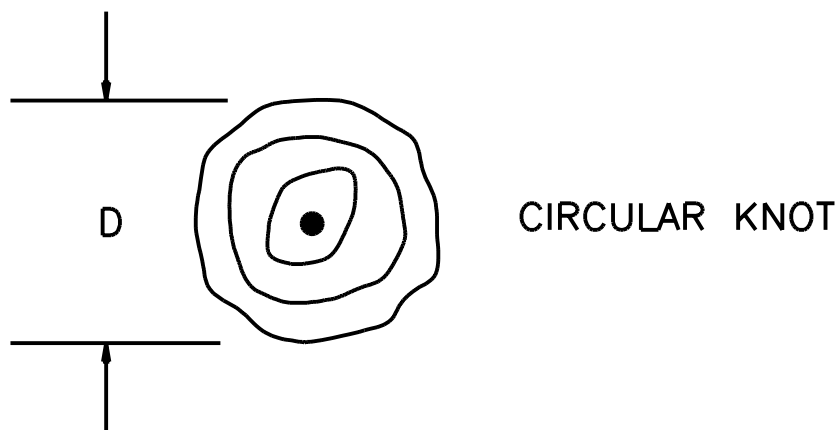
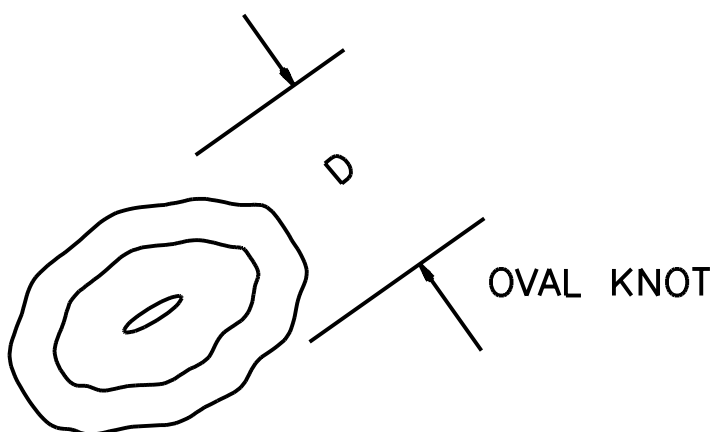
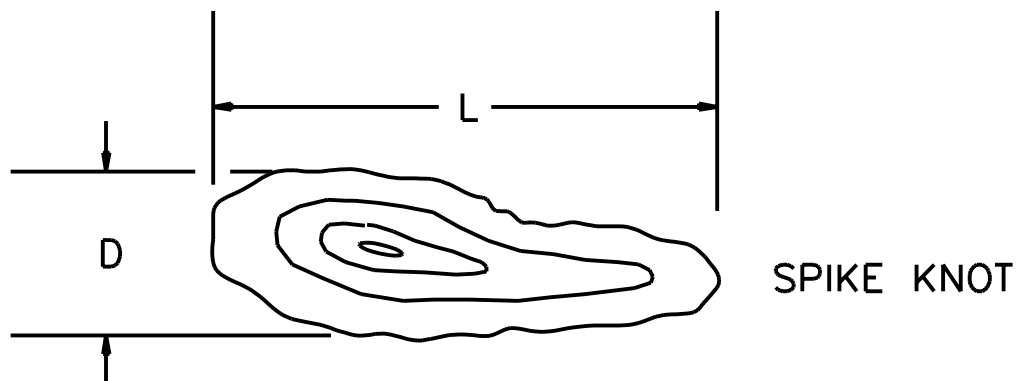
b) Loose knots, open knots, or any knot over 1 in (25.4 mm) in any direction located on the tongue or lip.

- c) Loose knots, open knots, through holes, and surface pits [deeper than 1/16 in (1.6 mm)] in the central portion of the board.
- d) Hollow and decayed knots.
- e) Checks, advanced (typical), and incipient decay.
- f) Warpage, which prevents the boards from being nailed flat, or which affects the flatness of the nailed core.
- g) Cluster knots or knots in groups [less than 5/8 in (15.9 mm) apart].

3.13 Tight knots on the lips or tongue of a board are acceptable if, due to manufacturing, they have been chipped, but only to the extent that:

- a) The dimensions of the damage do not exceed 3/8 in (9.5 mm) in length and 3/16 in (4.8 mm) in diameter and
- b) The lip or tongue with a chip is not easily broken, such as upon exerting direct hand pressure.

Figure 3.1
Types of knots



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