

CAN/ULC-S103:2016

**STANDARD SPECIFICATION FOR “TIN-CLAD” FIRE DOORS
MEETING THE PERFORMANCE REQUIRED BY CAN/ULC-S104**

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CORPORATE HEADQUARTERS

Underwriters Laboratories of Canada
7 Underwriters Road
Toronto, Ontario M1R 3A9
Telephone: (416) 757-3611
Fax: (416) 757-9540

REGIONAL OFFICES

PACIFIC OFFICE

13775 Commerce Parkway, Suite 130
Richmond, British Columbia V6V 2V4
Telephone: (604) 214-9555
Fax: (604) 214-9550

EASTERN OFFICE

6505, Rte Transcanadienne, Suite 330
St-Laurent, Québec H4T 1S3
Telephone: (514) 363-5941
Fax: (514) 363-7014

For further information on ULC standards, please contact:

ULC STANDARDS

171 Nepean Street, Suite 400
Ottawa, Ontario K2P 0B4
Telephone: (613) 755-2729
Fax: (613) 231-5977
E-mail: customerservice@ulc.ca
Web site: www.ulc.ca

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CETTE NORME NATIONALE DU CANADA EST DISPONIBLE EN VERSIONS FRANÇAISE ET ANGLAISE

STANDARD SPECIFICATION FOR “TIN-CLAD” FIRE DOORS MEETING
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ULC STANDARDS COMMITTEE ON FIRE TESTS

NAME	AFFILIATION	REGION	CATEGORY
A. Laroche (Chair)	Canadian Codes Centre, National Research Council Canada	Canada	Regulator
C. Andersson	Health Canada	Canada	Regulator
B. Bulley	Canadian Steel Door Manufacturers Association	Canada	Producer
S. Craft	CHM Fire Consultants Ltd.	Ontario	General Interest
T. Crimi	A.C. Consulting Solutions Inc.	Ontario	General Interest
C. Dagenais	FPIInnovations	Canada	User
D. Falconer	Falconer Engineering & Testing	Ontario	General Interest
G. Frater	Canadian Steel Construction Council	Canada	Producer
G. Gardin	Canadian Plastics Industry Association	Canada	Producer
M. Gilfillan	Canadian Fire Safety Association	Canada	General Interest
G. Hadjisophocleous	Carleton University	Ontario	General Interest
L. Hamre	PLC Fire Safety Solutions	New Brunswick	General Interest
J. Humpries	City of Toronto	Ontario	Regulator
G. Loughheed	National Research Council Canada	Canada	User
M. McClure	ThermoFire Systems Inc.	Ontario	General Interest
R. McGrath	Cement Association of Canada	Canada	Producer
G. Morinville	National Defence and the Canadian Armed Forces	Canada	User
L. Nadeau	Ontario Building Officials Association	Ontario	Regulator
E. Randsalu	Office of the Fire Marshal and Emergency Management	Ontario	Regulator
J. Roberts	LRI Engineering Inc.	Canada	User
I. Smith	Exova Canada Inc.	Canada	User
P. Shinkoda	CGC Inc.	Canada	Producer
I. Van Zeeland	Canadian Wood Council	Canada	Producer
N. Benichou (Associate Member)	National Research Council Canada	Canada	Non-Voting
M. Birk (Associate Member)	Queen's University	Ontario	Non-Voting
K. Kooner (Associate Member)	Intertek	Canada	Non-Voting
H. Locke (Associate Member)	Locke & Locke Inc.	British Columbia	Non-Voting
E. Sopeju (Associate Member)	Underwriters Laboratories of Canada	Canada	Non-Voting
J. Su (Associate Member)	National Research Council Canada	Canada	Non-Voting
B. Weckman (Associate Member)	University of Waterloo	Ontario	Non-Voting
K. Wu (Project Manager)	ULC Standards	Canada	Non-Voting

This list represents the membership at the time the Committee balloted on the final text of this edition. Since that time, changes in the membership may have occurred.

ULC STANDARDS TASK GROUP ON FIRE DOORS**MEMBER****REPRESENTING**

B. Bulley (Chair) Canadian Steel Door Manufacturers Association, Canada
S. Craft CHM Fire Consultants Ltd., Ontario
T. Crimi A.C. Consulting Solutions Inc., Ontario
C. Dagenais FPInnovations, Canada
L. Hamre PLC Fire Safety Solutions, New Brunswick
J. Humphries.....City of Toronto, Ontario
H. Locke Locke & Locke Inc., British Columbia
G. Loughheed National Research Council Canada, Canada
J. Roberts.....LRI Engineering Inc., Canada
E. Sopeju Underwriters Laboratories of Canada, Canada
H. Spice.....Underwriters Laboratories of Canada, Canada
I. Van Zeeland Canadian Wood Council, Canada
L. Woods.....Underwriters Laboratories Inc., USA

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STANDARD SPECIFICATION FOR “TIN-CLAD” FIRE DOORS MEETING THE PERFORMANCE REQUIRED BY CAN/ULC-S104

PREFACE

This is the Fourth Edition of the Standard Specification for “Tin-Clad” Fire Doors Meeting the Performance Required by CAN/ULC-S104, CAN/ULC-S103.

This Edition of the Standard was developed by the ULC Standards Task Group on Fire Doors and has been formally approved by the ULC Standards Committee on Fire Tests.

The terminology “Tin Clad” applied to this type of fire door is not intended to imply a requirement for one of the materials from which the door is constructed but rather, refers to a form of construction, which has been employed for many years and by which this type of door is readily identified in the building construction industry.

This Standard has been developed in compliance with the requirements of SCC for accreditation of a Standards Development Organization.

Only metric SI units of measurement are used in this Standard. If a value for measurement is followed by a value in other units in parentheses, the second value may be approximate. The first stated value is the requirement.

In Canada, there are two official languages, English and French. All safety warnings must be in French and English. Attention is drawn to the possibility that some Canadian authorities may require additional markings and/or installation instructions to be in both official languages.

This Fourth Edition National Standard of Canada is based on, and now supersedes, the Third Edition.

Attention is drawn to the possibility that some of the elements of this Canadian standard may be the subject of patent rights. ULC Standards shall not be held responsible for identifying any or all such patent rights.

Requests for interpretation of this Standard should be sent to ULC Standards. The requests should be worded in such a manner as to permit a “yes” or “no” answer based on the literal text of the requirement concerned.

The review and action to revise or reaffirm this Standard will not exceed 5 years from the date of publication, unless the Standard is identified as fitting within a stabilized category, whereby the review will commence within the appropriate time frame set out by ULC Standards.

This Standard is intended to be used for conformity assessment.



1 SCOPE

1.1 These requirements cover the design and construction of "tin-clad" fire doors which have demonstrated in fire tests, fire performance properties sufficient to warrant their use in closure assemblies having a fire-protection rating of up to and including 3 h, when tested in accordance with CAN/ULC-S104, Standard Method for Fire Tests of Door Assemblies.

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

1.3 The sizes and ratings for three-ply and two-ply doors, constructed in accordance with these specifications, are given in Table 1. These ratings are designed to enable regulatory bodies to determine the suitability of the door assemblies described in this Standard for use in locations where a fire resistance of a specified duration is required. Requirements for the details of the installation of "tin-clad" fire doors, including the requirements for vent holes, are included in NFPA 80, Standard for Fire Doors and Other Opening Protectives.

1.4 Table 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 the first category are limited in size to the maximum dimensions specified for the opening. Doors in the second category must be larger than the maximum opening dimensions to provide the minimum 100 mm lap at each side and at the top of the door as required by NFPA 80, Standard for Fire Doors and Other Opening Protectives.

2 REFERENCE PUBLICATIONS

2.1 The documents shown below are referenced in the text of this Standard. Unless otherwise stated elsewhere in this Standard such reference shall be considered to indicate the edition and/or revisions of the document available at the date on which the Committee approved this ULC Standard.

Documents Published by the American Society for Testing and Materials (ASTM International)
100 Barr Harbour Drive, PO Box C700, West Conshohocken, PA 19428-2959 U.S.A.
Telephone: (610) 832-9585
www.astm.org

- ASTM A90/A90M-13, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings
- ASTM A308/A308M-10, Standard Specification for Steel Sheet, Terne (Lead-Tin Alloy) Coated by the Hot-Dip Process
- ASTM A309-01 (R2012), Standard Test Method for Weight and Composition of Coating on Terne Sheet by the Triple-Spot Test
- ASTM A653/A653M-15, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process

Document Published by the National Fire Protection Association (NFPA)
 1 Batterymarch Park, Quincy, MA 02169-7471 U.S.A.
 Telephone: (617) 770-3000; Fax: (617) 770-0700
www.nfpa.org

- NFPA 80-2016, Standard for Fire Doors and Other Opening Protectives

Document Published by the National Lumber Grades Authority
 Suite 105, 13401 108th Ave., Surrey, BC V3T 5T3 Canada
 Telephone: (604) 584-2393; Fax: (604) 584-2890
www.nlga.org

- Standard Grading Rules for Canadian Lumber (January 2014)

Document Published by ULC Standards
 171 Nepean Street, Suite 400, Ottawa, ON K2P 0B4 Canada
 Telephone: (416) 757-3611, ext. 61744; Fax: (613) 231-5977, "ATTN: Publications"
 E-mail: publications@ulc.ca
www.ulc.ca

- CAN/ULC-S104-15, Standard Method for Fire Tests of Door Assemblies

3 MATERIALS

3.1 LUMBER

3.1.1 The following soft woods may be used, provided 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	Red Wood	Yellow Poplar
Douglas Fir	Eastern Spruce	Tupelo Gum
Western White Pine		

3.1.2 Lumber shall have a moisture content of 19 % or less at the time of manufacturing door cores.

3.1.3 The boards shall be surfaced on two sides, tongued and grooved, and without beading or bevelling, painting, or other treatment.

3.1.4 The actual thickness of the boards shall be 19 mm with a tolerance of + 3 or - 0 mm.

3.1.5 Boards shall be not less than 89 mm and not more than 184 mm in width.

3.1.6 The boards shall be free from wane (bark), decay, knot or other holes, loose knots, unsound knots, or knots exceeding 63 mm in any dimension.

3.1.7 Boards No. 2 Common Grade or better will generally meet these requirements. 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 - a disintegration of the wood substance due to action of wood-destroying fungi, and is also known as dote, rot and unsound wood;
- B KNOT - a portion of a branch or limb that has become incorporated in a piece of lumber;
- C LOOSE KNOT- a knot which is not held tightly in place by growth, shape or position;
- D TIGHT KNOT- a knot so fixed by growth, shape or position that it retains its place in the piece;
- E HOLLOW KNOT - an apparently sound knot in all respects except it contains a hole over 6 mm in diameter;
- F CHECK - a separation of the wood normally occurring across or through the rings of annual growth and usually as a result of seasoning;
- G WANE - bark or lack of wood from any cause, except eased edges, on the edge or corner of a piece of lumber;
- H WARP - any deviation from a true or plane surface, including bow, crook, cup and twist or any combination thereof;
- I KNOT CLUSTER - two or more knots grouped together as a unit with the fibres of the wood deflected around the entire unit;
- J CIRCULAR (round) KNOT - a knot cut at right angles to the length of the knot (limb);
- K OVAL KNOT - a knot cut at slightly more than right angles to the length of the knot (limb); and
- L SPIKE KNOT - a knot cut either lengthwise of the knot or diagonally across it.

NOTE: A complete description of characteristics may be found in the "Standard Grading Rules for Canadian Lumber" obtainable from the National Lumber Grades Authority.

3.1.8 The following characteristics shall be judged as unacceptable:

- A Oval, circular, spike, or cluster knots exceeding 63 mm in any direction;

NOTE: Measure across the greatest visible portion of the knot.
- B Loose knots, or any knot over 25 mm in any direction on the tongued or grooved edge;
- C Loose knots, through holes, and surface pits (deeper than 3 mm) in the central portion of the boards;
- D Hollow and decayed knots; and
- E Warpage, which would prevent the boards from being nailed flat, or which would affect the flatness of the nailed core.

3.1.9 Tight knots on the tongued or grooved edge of a board may be judged acceptable if due to manufacturing they have been chipped, but only to the extent that:

- A The dimensions of the damage do not exceed 9.5 mm in length and 5 mm in diameter; and
- B The tongued or grooved edge with a chip cannot be easily broken, such as upon exerting direct hand pressure.

3.2 METAL COVERING

3.2.1 General

3.2.1.1 The plates shall have straight edges and square corners. A taper of 0.0026:1 from square shall be accepted provided the door manufacturer is able to obtain true, straight joints and to avoid patching of the rows of sheets in the covering.

3.2.2 Terne Plate

3.2.2.1 Prime terne plate only shall be used. (For the purpose of this specification, "terne" shall be understood as indicating an alloy for the coating of tin and lead in the proportion of not less than 20 % of tin.)

3.2.2.2 The terne plate shall be uniformly coated on both sides of sheet steel having a thickness of not less than 0.25 mm. The terne coating shall not crack or flake when formed.

3.2.2.3 The plate shall be in conformance with the coating designation LT110 in ASTM A308/A308M, Standard Specification for Steel Sheet, Terne (Lead-Tin Alloy) Coated by the Hot-Dip Process; not less than 335 g/m² average of terne coating (total both sides) by triple spot test and not less than 275 g/m² of terne coating (total both sides) by the single spot test, with not less than 40 % of the coating on any side, based on the single spot test requirement. The weight of terne coating shall be established in accordance with the Hydrochloric Acid and Antimony Trichloride test method in ASTM A309, Standard Test Method for Weight and Composition of Coating on Terne Sheet by the Triple-Spot Test.

3.2.2.4 A determination for percent tin shall be made on a portion of the solution containing the stripped terne coating, using standard laboratory analytical methods. The amount of tin in the coating shall be not less than 20 %.

3.2.2.5 A determination for percent lead shall be made on a portion of the solution containing the stripped terne coating, using standard laboratory analytical methods or, the percent of lead in the coating shall be determined by subtracting the percent of tin from 100 %.

3.2.3 Galvanized Plate

3.2.3.1 Galvanized plate shall be made of not less than 0.25 mm thick sheet steel thoroughly and uniformly coated on both sides. The zinc coating shall not crack or flake when formed.

3.2.3.2 The protective coating of zinc shall be as applied to hot-dipped mill galvanized sheet steel conforming to the coating designation Z180 or ZF180 in ASTM A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process, with not less than 40 % of the zinc on any side, based on the single-spot requirement in the ASTM standard. The weight of zinc coating, minimum 155 g/m², shall be established in accordance with the test method in ASTM A90/A90M, Standard Test Method for Weight [Mass] of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.