



CAN/ULC-S101-14-REV1 (Including Revision 1)

STANDARD METHODS OF FIRE ENDURANCE TESTS OF BUILDING CONSTRUCTION AND MATERIALS



ULC Standards
Normes ULC



Standards Council of Canada
Conseil canadien des normes

This is a preview. [Click here to purchase the full publication.](#)

Underwriters Laboratories of Canada (ULC) was established in 1920 by letters patent issued by the Canadian Government. It maintains and operates laboratories and certification services for the examination, testing and certification of appliances, equipment, materials, constructions and systems to determine their relation to life, fire and property hazards as well providing inspection services.

ULC Standards develops and publishes standards and other related publications for building construction, security and burglar protection, environmental safety, electrical equipment, fire protection equipment, gas and oil equipment, thermal insulation products, materials and systems, energy use in the built environment and electrical utility safety.

ULC Standards is a not-for-profit organization and is accredited by the Standards Council of Canada as a Standards Development Organization.

National Standards of Canada developed by ULC Standards conform to the criteria and procedures established by the Standards Council of Canada. Such standards are prepared using the consensus principle by individuals who provide a balanced representation of interests relevant to the subject area on a national basis.

National Standard of Canada

A National Standard of Canada is a standard developed by a Standards Council of Canada (SCC) accredited Standards Development Organization, in compliance with requirements and guidance set out by SCC. More information on National Standards of Canada can be found at www.scc.ca.

SCC is a Crown corporation within the portfolio of Innovation, Science and Economic Development (ISED) Canada. With the goal of enhancing Canada's economic competitiveness and social well-being, SCC leads and facilitates the development and use of national and international standards. SCC also coordinates Canadian participation in standards development, and identifies strategies to advance Canadian standardization efforts.

Accreditation services are provided by SCC to various customers, including product certifiers, testing laboratories, and standards development organizations. A list of SCC programs and accredited bodies is publicly available at www.scc.ca.

For further information on ULC standards, please contact:

ULC STANDARDS
171 Nepean Street, Suite 400
Ottawa, Ontario K2P 0B4
Telephone: (613) 755-2729

To purchase ULC Standards, visit: www.ulc.ca/ulcstandards

The intended primary application of this standard is stated in its scope. It is important to note that it remains the responsibility of the user of the standard to judge its suitability for the particular application.

Copies of this National Standard of Canada may be ordered from ULC Standards.

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

Standard Methods of Fire Endurance Tests of Building Construction and Materials, CAN/ULC-S101

Fifth Edition, Dated June 2014

Summary of Topics

This March 2019 revision of CAN/ULC-S101-14 contains revisions to support the National Research Council of Canada program to address Climate Change Adaptation in Canadian Codes and Standards.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated September 7, 2018.

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

PLEASE NOTE THAT CERTAIN CODES MAY REFER TO A SUPERSEDED VERSION OF THIS STANDARD. IN THOSE INSTANCES, THE RELEVANT VERSIONS ARE AVAILABLE FOR PURCHASE.

No Text on This Page



CAN/ULC-S101-14-REV1

STANDARD METHODS OF FIRE ENDURANCE TESTS OF BUILDING CONSTRUCTION AND MATERIALS

ICS 13.220.50; 19.040



First Edition	August 1982
Second Edition	October 1989
Third Edition	April 2004
Fourth Edition	July 2007
FIFTH EDITION	JUNE 2014
REVISION 1	MARCH 2019

Copyright © 2019

ULC Standards

All rights reserved. No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without prior permission.

This is a preview. [Click here to purchase the full publication.](#)

No Text on This Page

CONTENTS

ULC STANDARDS COMMITTEE ON FIRE TESTS	9
PREFACE	11
1 SCOPE	13
2 REFERENCE PUBLICATIONS	13
3 TEST SPECIMEN	14
4 PROTECTION AND CONDITIONING OF TEST SPECIMEN	15
5 CONTROL OF FIRE ENDURANCE TESTS	16
5.1 STANDARD TIME-TEMPERATURE CURVE	16
5.2 FURNACE TEMPERATURES.....	16
5.3 TEMPERATURE OF UNEXPOSED SURFACES OF FLOORS, ROOFS, WALLS AND PARTITIONS.....	17
5.4 DIFFERENTIAL PRESSURE.....	18
6 FIRE ENDURANCE TESTS AND HOSE STREAM TESTS	19
6.1 FIRE ENDURANCE TEST.....	19
6.2 HOSE STREAM TEST	20
6.3 ROVING THERMOCOUPLE	21
6.4 COTTON PADS	21
6.5 FURNACE PERFORMANCE VERIFICATION.....	21
7 TESTS OF LOADBEARING WALLS AND PARTITIONS	21
7.1 SIZE OF TEST SPECIMEN	21
7.2 LOADING.....	22
7.3 EXPOSURE TO FIRE	22
7.4 DETERMINATION OF FIRE ENDURANCE PERIOD.....	22
8 TESTS OF NON-LOADBEARING WALLS AND PARTITIONS.....	23
8.1 SIZE OF TEST SPECIMEN	23
8.2 EXPOSURE TO FIRE	23
8.3 DETERMINATION OF FIRE ENDURANCE PERIOD.....	23
9 TESTS OF COLUMNS	23
9.1 SIZE OF TEST SPECIMEN	23
9.2 LOADING.....	23
9.3 EXPOSURE TO FIRE	24
9.4 DETERMINATION OF FIRE ENDURANCE PERIOD.....	24
10 TESTS OF PROTECTION FOR STRUCTURAL STEEL COLUMNS	24
10.1 APPLICATION	24
10.2 SIZE AND CHARACTERISTICS OF TEST SPECIMEN	24
10.3 TEMPERATURE MEASUREMENT	25
10.4 EXPOSURE TO FIRE	25
10.5 DETERMINATION OF FIRE ENDURANCE PERIOD	25
11 TESTS OF FLOOR AND ROOF ASSEMBLIES	25
11.1 APPLICATION	25
11.2 SIZE AND CHARACTERISTICS OF TEST SPECIMEN	25
11.3 EXPOSURE TO FIRE.....	26
11.4 LOADING	26
11.5 TEMPERATURE MEASUREMENT	26
11.6 DETERMINATION OF FIRE ENDURANCE PERIOD – RESTRAINED ASSEMBLY.....	27
11.7 DETERMINATION OF FIRE ENDURANCE PERIOD – UNRESTRAINED ASSEMBLY.....	27
12 TESTS OF LOADED, RESTRAINED BEAMS OR JOISTS	28
12.1 APPLICATION	28
12.2 SIZE AND CHARACTERISTICS OF TEST SPECIMEN	28
12.3 LOADING.....	29

12.4	DETERMINATION OF FIRE ENDURANCE PERIOD	29
13	ALTERNATIVE CLASSIFICATION PROCEDURE FOR LOADED BEAMS OR JOISTS	29
13.1	APPLICATION	29
13.2	TEMPERATURE MEASUREMENT	29
13.3	DETERMINATION OF FIRE ENDURANCE PERIOD	30
14	TESTS OF LOADED UNRESTRAINED BEAMS	30
14.1	APPLICATION	30
14.2	SIZE AND CHARACTERISTICS OF TEST SPECIMEN	30
14.3	DEFLECTION.....	31
14.4	LOADING.....	31
14.5	DETERMINATION OF FIRE ENDURANCE PERIOD	32
15	ALTERNATIVE TESTS OF PROTECTION FOR SOLID STRUCTURAL STEEL BEAMS AND GIRDERS	32
15.1	APPLICATION	32
15.2	SIZE AND CHARACTERISTICS OF TEST SPECIMEN	32
15.3	TEMPERATURE MEASUREMENT	32
15.4	DETERMINATION OF FIRE ENDURANCE PERIOD	33
16	TESTS OF PROTECTION FOR COMBUSTIBLE FRAMING, OR FOR COMBUSTIBLE FACINGS ON THE UNEXPOSED SIDES OF WALLS, PARTITIONS AND FLOORS	33
16.1	CHARACTERISTICS OF TEST SPECIMEN	33
16.2	SIZE OF TEST SPECIMEN	33
16.3	DETERMINATION OF FIRE ENDURANCE PERIOD	33
17	TESTS OF CEILING MEMBRANES	33
17.1	APPLICATION	33
17.2	SIZE AND CHARACTERISTICS OF SPECIMEN	34
17.3	TEMPERATURE MEASUREMENT	34
17.4	DETERMINATION OF FIRE ENDURANCE PERIOD	34
18	TEST REPORT.....	34
	TABLES	36
	FIGURES	43

APPENDIX A (INFORMATIVE)

A1	GUIDE FOR DETERMINING CONDITIONS OF THERMAL RESTRAINT FOR FLOOR AND ROOF ASSEMBLIES AND FOR INDIVIDUAL BEAMS	53
A2	METHOD OF CORRECTING FIRE ENDURANCE PERIOD DETERMINED BY UNEXPOSED SURFACE TEMPERATURE RISE FOR NONSTANDARD MOISTURE CONTENT.....	55
A2.1	Scope	55
A2.2	Nomenclature.....	55
A2.3	Calculation Of Moisture Content	55
A2.4	Correction Procedure	56
A2.5	Illustrative Example.....	56

APPENDIX B (INFORMATIVE)

B1	TYPICAL FURNACES	59
----	------------------------	----

APPENDIX C (INFORMATIVE)

C1	LOADING FOR TEST ASSEMBLIES	61
C1.1	General	61
C1.2	Superimposed Load Calculation	61
C1.3	Concrete and Structural Steel Floor and Roof Assemblies	63
C1.4	Wood Assemblies.....	68
C1.5	Cold-Formed Steel Assemblies	73

**APPENDIX D (INFORMATIVE) – DISCUSSIONS REGARDING ENVIRONMENTAL CONDITIONS OR
CLIMATE CHANGE ADAPTATION AND RESILIENCE**