

**STANDARD FOR INSPECTION AND TESTING OF FIRE ALARM
SYSTEMS**

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TABLE OF CONTENTS

ULC STANDARDS COMMITTEE ON FIRE ALARM AND LIFE SAFETY EQUIPMENT AND SYSTEMS	I
ULC STANDARDS SUBCOMMITTEE ON INSTALLATION, INSPECTION AND TESTING, AND VERIFICATION OF FIRE ALARM SYSTEMS	II
ULC STANDARDS WORKING GROUP ON INSPECTION, TESTING AND VERIFICATION OF FIRE ALARM SYSTEMS	III
PREFACE	IV
1 SCOPE	1
2 REFERENCE PUBLICATIONS	1
3 GLOSSARY	2
4 TESTING PROCEDURES	5
5 PERIODIC INSPECTIONS AND TESTS – DAILY AND MONTHLY	6
5.1 DAILY	6
5.2 MONTHLY	6
6 PERIODIC INSPECTIONS AND TESTS – ANNUALLY	7
6.1 DOCUMENTATION	7
6.2 CONTROL UNITS AND TRANSPONDERS	7
6.2.1 General	7
6.2.2 Control Unit or Transponder Tests	8
6.2.3 Voice Communication Tests	9
6.2.4 Control Unit or Transponder Inspections	10
6.3 POWER SUPPLIES	11
6.4 ANNUNCIATORS, REMOTE TROUBLE SIGNAL UNITS, DISPLAY AND CONTROL CENTRES TEST AND INSPECTION	12
6.5 PRINTERS	14
6.6 OPERATION TESTS FOR DATA COMMUNICATION LINKS (DCL)	14
6.7 FIELD DEVICES	15
6.7.1 General	15
6.7.2 Manual Stations	15
6.7.3 Heat Detectors	15
6.7.4 Smoke Detectors	16
6.7.4.1 General	16
6.7.4.2 Remote Indicator Units	16
6.7.4.3 Smoke Detector Alarm Verification (Status Change Confirmation)	16
6.7.4.4 Additional Requirements for Air Duct Type Smoke Detectors	17
6.7.4.5 Beam Type Smoke Detectors	17
6.7.5 Flame Detectors	17
6.7.6 Combination Type Detectors	17
6.7.7 Automatic Detectors – Other Types	17

6.7.8 Devices for Water Type Extinguishing Systems 17

6.7.8.1 Waterflow Detection Devices 17

6.7.8.2 Supervisory Devices 18

6.7.8.3 Other Fixed Type Extinguishing Systems 18

6.7.8.4 Supervisory Devices – Other Types 18

6.7.9 Signal Devices 19

6.7.10 Emergency Telephones 19

6.7.11 Circuit End-of-Line Device 20

APPENDIX A (INFORMATIVE) – QUALIFIED PERSONNEL	21
APPENDIX B (INFORMATIVE) – ALTERNATE MEASURES FOR OCCUPANT FIRE SAFETY	22
APPENDIX C (INFORMATIVE) – ANNUAL FIRE ALARM SYSTEM TEST AND INSPECTION RECORDS	23
C1 FIRE ALARM SYSTEM ANNUAL TEST AND INSPECTION REPORT	23
C2 CONTROL UNIT OR TRANSPONDER TEST RECORD	23
C3 FIELD DEVICE RECORD	32
APPENDIX D (INFORMATIVE) – MONTHLY FIRE ALARM SYSTEM TEST AND INSPECTION RECORD	35
APPENDIX E (INFORMATIVE) – DESCRIPTION OF FIRE ALARM SYSTEM FOR INSPECTION AND TEST PROCEDURES	36
APPENDIX F (INFORMATIVE) – BATTERY TESTS	38
F1 SILENT TEST	38
F2 SILENT ACCELERATED TEST	39
F3 BATTERY CAPACITY METER TEST	40
F4 BATTERY CAPACITY CALCULATION	40
F5 EMERGENCY POWER FOR FIRE ALARM SYSTEMS – NBC 2010	40
APPENDIX G (INFORMATIVE) – TESTING OF HEAT DETECTORS	42
G1 TEST MEANS	42
G2 TEST METHOD	42
APPENDIX H (INFORMATIVE) – SMOKE DETECTOR ALARM VERIFICATION (STATUS CHANGE CONFIRMATION)	44

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This Standard is dedicated to the memory of **G. Richard Morris**, Chair, 1989–2011 and member, 1976–2012 of the ULC Standards Committee on Fire Alarm and Life Safety Equipment and Systems.

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STANDARD FOR INSPECTION AND TESTING OF FIRE ALARM SYSTEMS

PREFACE

This is the Fifth Edition of the Standard for Inspection and Testing of Fire Alarm Systems, CAN/ULC-S536.

This Edition of the Standard was developed by the ULC Standards Working Group on Inspection, Testing and Verification of Fire Alarm Systems, reviewed by the ULC Subcommittee on Installation, Inspection and Verification of Fire Alarm Systems, and was formally approved by the ULC Standards Committee on Fire Alarm and Life Safety Equipment and Systems.

These requirements presuppose that the inspection and testing procedures shall be conducted by qualified personnel acceptable to the authority having jurisdiction. (Refer to Appendix A, Qualified Personnel.)

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.

Appendices A to H, identified as informative, are for informational purposes only.

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

This Fifth Edition National Standard of Canada is based on, and now supersedes, the Fourth 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 the Standards Department of Underwriters Laboratories of Canada. 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 initiation of the review of this Standard will commence within 5 years of 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 for conformity assessment.

1 SCOPE

1.1 This Standard prescribes requirements for the *inspection* and *testing* of *fire alarm systems* and specifies the devices and functions to be *inspected*, *tested*, and documented for the periodic *inspection* and *test*.

2 REFERENCE PUBLICATIONS

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. All undated references shall be interpreted as referring to the latest edition of that document.

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- CAN/ULC-S524, Standard for the Installation of Fire Alarm Systems
 - CAN/ULC-S528, Standard for Manual Stations for Fire Alarm Systems, Including Accessories
 - CAN/ULC-S529, Standard for Smoke Detectors for Fire Alarm Systems
 - CAN/ULC-S530, Standard for Heat Actuated Fire Detectors for Fire Alarm Systems
 - CAN/ULC-S537, Standard for Verification of Fire Alarm Systems
 - CAN/ULC-S561, Standard for Installation and Services for Fire Signal Receiving Centres and Systems
-

3 GLOSSARY

NOTE: Terms used in this Standard that are in *italic print* are defined as follows:

3.1 *ACTIVE FIELD DEVICE* – A *field device* that can be uniquely identified by the *control unit* or *transponder* to determine its presence and operating status, and which may be commanded to operate or to change its operating parameters independently of other *field devices* that share a common circuit.

3.2 *ALARM SIGNAL* – An audible signal transmitted throughout a *zone* or *zones* or throughout a *building* to advise occupants that a fire emergency exists.

3.3 *ALERT SIGNAL* – An audible signal to advise designated persons of a fire emergency.

3.4 *ANCILLARY CIRCUIT* – A circuit which connects a *control unit* and or *transponder* to *ancillary devices* located in the protected premises

3.5 *ANCILLARY DEVICE* – A device which has a life safety application, and is actuated by the *fire alarm system*, but is not part of the *fire alarm system*.

3.6 *ANNUNCIATOR* – A *control unit* or *transponder* component to visually indicate signals from a *fire alarm system*.

3.7 *AUDIBLE SIGNAL DEVICE* – A device to indicate by means of sound output the actuation of the *fire alarm system*.

3.8 *AUTHORITY HAVING JURISDICTION* – The government body responsible for the enforcement of any part of this Standard or the official or agency designated by that body to exercise such a function.

3.9 *BEAM TYPE SMOKE DETECTOR* – A *fire detector* where light from an internal source is transmitted externally, monitored by a photosensitive receiver and designed to operate when products of combustion are introduced in the light path.

3.10 *BUILDING* – Any structure used or intended for supporting or sheltering any use or occupancy.

3.11 *BUSS* – A circuit that serves as a common connection for distribution of power, data, or audio to multiple circuits or devices.

3.12 *CONTROL UNIT* – A unit which provides the central control and logic processing for the *fire alarm system*.

3.13 *CONVENTIONAL FIELD DEVICE* – A *field device* that is usually connected to the *control unit* or *transponder* on a common wiring circuit with other devices so that all devices on the circuit provide common status change information (e.g. fire alarm detection or *signalling*). Such devices cannot be uniquely identified by the *control unit* or *transponder* unless there is only one device on the circuit. (Refer to *active field device*)

3.14 *DATA COMMUNICATION LINK (DCL)* – The data channel between the central processing unit (CPU) and the *transponders*, *annunciators*, *active field devices* and *supporting field devices* of a *distributed type control unit* or a *remote receiving equipment control unit*.

3.15 *DEFICIENCY* – For the purposes of this Standard, this term refers to a device or function that does not operate as intended.

3.16 *DEGRADED MODE CAPABILITY* – A network operating feature where, under conditions of a communication link failure, each network segment remaining in communication shall maintain continual function as a group.

3.17 *DESIGN* – The selection, application and layout of the *fire alarm system* components.

3.18 *DISPLAY AND CONTROL CENTRE* – Equipment used for the status display of required *input circuits* and for the manual control of the fire alarm *control unit* or *transponder*, and may include manual control for emergency *voice alarm* and emergency telephone functions. The *display and control centre* may be located remotely from the fire alarm *control unit* or *transponder*.

3.19 *DISTRIBUTED TYPE CONTROL UNIT* – A *control unit* consisting of two or more assemblies, one of which operates as the central processing unit (CPU) and the others as *transponder* units for terminating the system inputs and outputs.

3.20 *EMERGENCY POWER SUPPLY* – A secondary source of electrical energy, independent of the *main power supply*, used to power the *fire alarm system* in the event of a failure of the *main power supply*.

3.21 *FAULT ISOLATION MODULE* – A device used in *data communication links* for wire-to-wire *short circuit fault* protection.

3.22 *FIELD DEVICE* – A device located remotely from, but connected electrically to the *control unit* or *transponder* to provide status change information (e.g. fire alarm detection or *signalling*).

3.23 *FIRE ALARM SYSTEM* – A combination of devices designed to warn the *building* occupants of an emergency condition.

3.24 *FIRE DETECTOR* – A device which detects a fire condition and automatically initiates an electrical signal to actuate an *alert signal* or an *alarm signal* and includes *heat detectors* and *smoke detectors*.

3.25 *FIRMWARE* – Basic operating program which is inherent to the system and is not field programmable.

3.26 *FIXED TYPE EXTINGUISHING SYSTEM* – A system that initiates release of an extinguishing agent upon the detection of an alarm condition.

3.27 *FLAME DETECTOR* – A device which detects the infrared, ultraviolet, or visible radiation produced by products of combustion.

3.28 *GROUND* – A connection to earth obtained by a grounding electrode.

3.29 *GROUND FAULT* – A circuit impedance to *ground* sufficient to prevent normal operation.

3.30 *HEAT DETECTOR* – A *fire detector* designed to operate at a predetermined temperature or rate of temperature rise.

3.31 *INPUT CIRCUIT* – A circuit connected directly to *conventional field devices* and employed to provide a *control unit* or *transponder* with *field device* status information.

3.32 *INPUT ZONE* – An area or *field device* within a *building* which initiates *annunciator* indication as required by the National Building Code of Canada.

3.33 *INSPECT (inspection/inspected)* – A visual examination to determine that the device or system will apparently perform in accordance with its intended function.

3.34 *MAIN POWER SUPPLY* – The primary source of electrical energy used to power the *fire alarm system*.

3.35 *MANUAL STATION* – A device designed to initiate a signal when operated manually.

3.36 *OPEN CIRCUIT FAULT* – A circuit impedance increase sufficient to prevent normal operation.

3.37 *OUTPUT CIRCUIT* – A circuit connected directly to *field devices* and employed to provide an *alert signal*, *alarm signal* or other output functions.

3.38 *POWER ISOLATION MODULE* — A device used in a power distribution riser for wire-to-wire short circuit fault protection.

3.39 *RECOMMENDATION* – A proposal or suggestion as to the best course of action for improvement.

3.40 *REMARK* – Supplemental information for the purpose of clarification and/or additional details specific to the device or function being tested.

3.41 *REMOTE CONNECTION* – A connection on the *control unit* or *transponder* which provides status information to *remote receiving equipment* or *fire signal receiving centre*.

3.42 *REMOTE RECEIVING EQUIPMENT* – *Control units* or *transponders* which receive information from *control units* or *transponders* in other *buildings*.

3.43 *SEQUENTIAL DISPLAY* – Any visual indicating means which cannot display all events simultaneously.

3.44 *SHORT CIRCUIT FAULT* – A circuit impedance decrease sufficient to prevent normal operation.

3.45 *SIGNAL RECEIVING CENTRE* – A facility that receives *alarm signals* and at which trained personnel and service persons are on duty at all times.

3.46 *SIGNALLING* – Operation of audible and/or visual devices for the purpose of indicating an *alert signal* or an *alarm signal* condition.

3.47 *SMOKE CONTROL SYSTEM* – An engineered system that utilizes mechanical fans and dampers to produce airflows and pressure differences across smoke barriers to limit and direct smoke movement.

3.48 *SMOKE DETECTOR* – A *fire detector* designed to operate when the concentration of airborne combustion products exceed a predetermined level.

3.49 *SMOKE DETECTOR ALARM VERIFICATION (Status Change Confirmation)* — Confirmation of a normal to off-normal status change of a *smoke detector input circuit*.

3.50 *SMOKE DETECTOR SENSITIVITY* – The relative degree of response of a *smoke detector*. A high sensitivity detector responds to a lower concentration of smoke while a low sensitivity detector responds to a high concentration of smoke under identical fire *test conditions*.

3.51 *SOFTWARE* – A program, or set of programs and associated data, procedures, rules, documentation, and materials concerned with the use, operation, and maintenance of an automated information, message processing or computing system. (Also refer to *software program*).

3.52 *SOFTWARE PROGRAM* – A series of instructions designed to achieve a certain result that is translated into machine-readable form (code).

3.53 *SPECIFICATION* – A detailed and precise presentation of required work and performance approved by the designer.

3.54 *SUBSEQUENT ALARM* – Automatic resounding of an *alert signal* or *alarm signal* upon the initiation of a device in a separate *zone*.

3.55 *SUITE ISOLATOR DEVICE* – A device serving suites of residential occupancies for wire-to-wire *short circuit fault* protection.

3.56 *SUPERVISORY DEVICE* – A *field device* to detect a condition that could prevent the proper operation of a fire protection system.

3.57 *SUPERVISORY SIGNAL* – A visual and audible indication of the off-normal status of equipment that has been installed for the protection of life and property.

3.58 *SUPPORTING FIELD DEVICE* – An *active field device* that monitors and/or controls other *field devices* on a separate circuit and reports the status of the separate circuit to the *control unit* and/or *transponder*.

3.59 *TEST (tested/testing)* – Operation of the device or system to determine that it will perform in accordance with its intended operation or function.

3.60 *TRANSPONDER* – A component in a distributed type system, which interfaces to, and supports the operation of *field devices*, and communicates the status of such devices to the *fire alarm system*.

3.61 *TROUBLE SIGNAL* – A visual and audible indication of equipment failure, circuit failure, fault condition or operational malfunction.

3.62 *VISIBLE SIGNAL DEVICE* – A product which utilizes light to alert occupants of a *building* to an emergency situation in a direct or indirect manner.

3.63 *ZONE* – A *building* area or location that has a separate visible indication at the *control unit* or *transponder* and/or *annunciator*.

4 TESTING PROCEDURES

NOTE: Where a shutdown of the *fire alarm system*, or parts thereof is necessary, the alternate measures for occupant safety described in the Building Fire Safety Plan shall be implemented. (Refer to Appendix B, Alternate Measures for Occupant Fire Safety.)

4.1 Systems covered by this Standard shall be subjected to periodic *inspection* and *testing* in accordance with Section 5, Periodic Inspections and Tests – Daily and Monthly; and Section 6, Periodic Inspections and Tests – Annually.

4.2 For the purposes of this Standard, an annual inspection shall be held within a period not exceeding 12 months from the date of the previous *inspection*.

4.3 Where a *control unit* or *transponder* is replaced in a *fire alarm system*, the *fire alarm system* shall be verified in accordance with the requirements of Section 7, System Modifications, of CAN/ULC-S537, Standard for Verification of Fire Alarm Systems.

4.4 Additions, deletions, or modifications, including *firmware*, *software* or hardware replacements at the *control unit* or *transponder* shall be verified in accordance with the requirements of Section 7, System Modifications, of CAN/ULC-S537, Standard for Verification of Fire Alarm Systems.

4.5 Additions, deletions, modifications or replacements to *field devices* installed in a *fire alarm system* shall be verified in accordance with the requirements of Section 7, System Modifications, of CAN/ULC-S537, Standard for Verification of Fire Alarm Systems.

4.6 *Control unit* or *transponder* and devices shall be *inspected* and *tested* as installed.

4.7 Documentation shall be produced for any periodic *inspection* and *test*. (Refer to Appendix C, Annual Fire Alarm System Test and Inspection Records, for examples of Inspection and Test Record Forms; and Appendix D, Monthly Fire Alarm System Test and Inspection Record.)

4.8 A description of the system, as installed at the time of the annual *inspection* and *test*, including the sequence of operation of the system, shall be available on site and documented as detailed in Appendix E, Description of Fire Alarm System for Inspection and Test Procedures.

NOTE: The intent of the documentation is to provide a description for operation, *inspection* and *testing*. The documentation as shown in Appendix E, Description of Fire Alarm System for Inspection and Test Procedures, should be a description of each item or identified as not provided.

5 PERIODIC INSPECTIONS AND TESTS – DAILY AND MONTHLY

5.1 DAILY

5.1.1 The following *daily inspections* shall be conducted to confirm the operability of the *fire alarm system*:

- A Status of the primary and remote *trouble signal* indicators; and
- B Status of the primary power 'on' or equivalent indicator.

5.2 MONTHLY

NOTE: The *inspection* and *test* requirements in this Subsection may be omitted during the month when the annual *tests* required by Section 6, Periodic Inspections and Tests – Annually, are being performed.

5.2.1 While on the *emergency power supply*, *inspect* and *test* the following to confirm the operability of the *fire alarm system*. (Refer to Appendix D, Monthly Fire Alarm System Test and Inspection Record, for an example of a *test* record form.):

NOTE: It is recommended that *tests* be coordinated with emergency power generator *tests*.

- A One initiating *field device* or *manual station* shall be operated on a rotational basis and the system *inspected* for operation as follows:
 - (i) An *alert signal* and an *alarm signal* confirmed on a rotational basis to a minimum of one *zone* or as may be required by the Fire Safety Plan for the *building*;
 - (ii) The primary *annunciator* *inspected* to determine that the *tested* device annunciated correctly;
- B Operation of the common audible and visual *trouble signals*;
- C Confirmation of alarm transmission to the fire *signal receiving centre* where applicable;
- D One emergency telephone shall be *tested* on a rotational basis for two-way communication and correct indication at the *control unit* or *transponder*; and