

NATIONAL
STANDARD
OF CANADA

STANDARD FOR HEAT ACTUATED FIRE DETECTORS FOR FIRE ALARM SYSTEMS



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NATIONAL STANDARD OF CANADA

CAN/ULC-S530-M91

**STANDARD
FOR
HEAT ACTUATED FIRE DETECTORS
FOR
FIRE ALARM SYSTEMS**

Prepared and Published by
UNDERWRITERS' LABORATORIES OF CANADA



Approved by
STANDARDS COUNCIL OF CANADA



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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 revision of the document available at the date on which the Committee approved this ULC Standard.

Standards Published by the American National Standards Institute

- ANSI Z118.1-1966, Standard Method of Salt Spray (Fog) Testing

Standards Published by the American Society for Testing and Material

- ASTM B117-85, Standard Method of Salt Spray (Fog) Testing
- ASTM B154-82, The Mercurous-Nitrate Test for Copper and Copper Alloys

Standards Published by the Canadian Standards Association

- C22.1-1990, Safety Standard for Electrical Installations, Canadian Electrical Code, Part 1

Standards Published by Underwriters' Laboratories of Canada

- CAN/ULC-S524-M91, Standard for the Installation of Fire Alarm Systems

CAN/ULC-S530-M91

STANDARD
FOR
HEAT ACTUATED FIRE DETECTORS
FOR
FIRE ALARM SYSTEMS

PREFACE

This First Edition of CAN/ULC-S530M, entitled "Standard for Heat Actuated Fire Detectors for Fire Alarm Systems", has been formally approved by the ULC Committee on Fire Alarm Equipment and Systems. Earlier editions of this Standard were published under the designation "ULC-S530".

A product which complies with these requirements will not necessarily be acceptable if, when examined and tested, it is found to have features not covered by the Standard which may impair the result contemplated by these requirements.

A product employing materials or having forms of construction differing from those detailed in these requirements may be examined and tested according to the intent of the requirements, and if found to be substantially equivalent, may be given recognition.

Only Metric SI units of measurement are used in this Standard. Imperial equivalents of the most commonly used units may be determined by referring to the conversion factors itemized in the Table located inside the back cover.

1. SCOPE

1.1 These requirements cover heat actuated fire detectors in ordinary (nonhazardous) and outdoor locations, for use as components in automatic fire protective systems, to be installed in accordance with the Standard for the Installation of Fire Alarm Systems, CAN/ULC-S524M.

1.2 These requirements cover:

- A** ~~Fixed-temperature~~ detectors;
- B** ~~Rate-of-rise~~ detectors;
- C** Combination of ~~fixed-temperature~~ detectors and ~~rate-of-rise~~ detectors; and
- D** Heat Sensitive Cable.

2. GLOSSARY

2.1 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.

2.2 FIXED-TEMPERATURE DETECTOR - A fire detector designed to operate when the temperature at the detector exceeds a predetermined temperature.

2.3 HEAT DETECTOR - A fire detector designed to operate at a predetermined temperature or rate of temperature rise.

2.4 HEAT SENSITIVE CABLE - A line type device whose sensitive element comprises two current-carrying wires held separate by heat-sensitive insulation that softens at the rated temperature, thus allowing the wires to make electrical contact.

2.5 LINE-PATTERN DETECTOR - A detector in which the thermo-responsive element is continuous along a line.

2.6 NONRESTORABLE HEAT DETECTOR - A device whose sensing element is designed to be destroyed in the process of detecting a fire.

2.7 RATE-COMPENSATION HEAT DETECTOR - A device that will respond when the temperature of the surrounding air reaches the predetermined level, regardless of the rate of temperature rise.

2.8 RATE-OF-RISE DETECTOR - A detector designed to operate within a specified time when the temperature rise at the detector exceeds a predetermined rate.

2.9 RESTORABLE HEAT DETECTOR - A device whose sensing element is not destroyed during intended service by the processes of detecting a fire. Restoration may be manual or automatic.

2.10 SELF-RESTORING HEAT DETECTOR - A restorable detector whose sensing element is designed to be returned to normal automatically.

2.11 SPOT-PATTERN DETECTOR - A detector in which the thermo-responsive element is concentrated at a particular area.

3. GENERAL REQUIREMENTS

3.1 GENERAL

3.1.1 The term "product" as used in this Standard refers to all items of equipment covered by the Scope.

3.1.2 Unless otherwise indicated, all voltage and current values mentioned in this Standard are root-mean-square (rms).

3.2 TEMPERATURE DESIGNATION

3.2.1 Heat detectors of the fixed-temperature spot type are designated according to temperature of operation as indicated in Table 1.

T A B L E 1
TEMPERATURE RATING

Temperature Rating	Temperature Rating Range °C
Low	37.8 - 56.7
Ordinary	57.5 - 78.9
Intermediate	79.5 - 120.6
High	121 - 162.2
Extra High	163 - 203.8

3.2.2 Low-degree rated heat detectors apply only to self-restoring type detectors. Low-degree heat detectors are intended only for installation in controlled ambient conditions, such as in a computer room.

4. INSTALLATION AND OPERATING INSTRUCTIONS

4.1 A copy of the installation and operating instructions or equivalent information, if intended to accompany each product, is to be used as a guide in the examination and test of the product.

4.2 The instructions shall include such directions and information as deemed by the manufacturer to be adequate for proper installation, maintenance, and use of the product.

4.3 An installation wiring diagram shall be provided with any detector employing more than one pair of field connections. The diagram may be attached to the unit or, if separate, shall be referenced in the marking attached to the unit with the drawing number and issue number or issue date.

4.4 The drawing shall show a pictorial or schematic view of the installation terminals and lead connections. A drawing not attached to the product shall be marked with the name or identifying symbol of the manufacturer, drawing number and issue number or issue date.

5. CONSTRUCTION

5.1 GENERAL

5.1.1 The material, form and arrangement of parts shall be such that the detector may be maintained, and be reliable and consistent in operation.

5.1.2 The detector shall be constructed so that its operation, when installed, will not be significantly affected by moisture, dust, insects, and other foreign material. See Section 7, Performance.

5.1.3 A detector shall be so constructed that the parts will not become displaced during shipment, after installation, or when being maintained.

5.2 MOUNTING

5.2.1 A detector shall be provided with means for mounting it securely and the mounting shall be independent of the installation wiring.

5.2.2 An acceptable mounting is generally considered to be a base of insulating material, mounting feet, bracket, or surfaces electrically insulated from current-carrying parts of the device.

5.2.3 The mounting means shall have sufficient strength to resist distortion when installed on an uneven surface, to the extent that any distortion thus occurring would not alter the operating-temperature adjustment.

5.3 ADJUSTMENT

5.3.1 The means for calibrating the thermo-responsive element shall be guarded or sealed to effectively prevent readjustment by hand or by ordinary tools after shipment from the factory.

5.4 MATERIALS

5.4.1 All parts shall be either inherently resistant to corrosion or shall be plated or otherwise treated to afford adequate protection against corrosion.

5.4.2 Materials used in the detector shall be such as will not deform or fail as a result of continuous exposure to other ambient temperatures for which the detector is rated.

5.4.3 A fusible alloy, if used as the operating member of a detector, shall be constructed so as not to be affected adversely by the conditions to which it will be exposed in service, as represented by the tests described in Section 7, Performance.

5.5 FIELD WIRING CONNECTIONS

5.5.1 General

5.5.1.1 A wiring terminal or lead shall be acceptable for the connection of conductors of at least the size required by the Canadian Electrical Code, Part I, corresponding to the electrical rating of the unit.

5.5.2 Leads

5.5.2.1 If wire leads are used in lieu of wiring terminals, they shall be not smaller than No. 18 AWG, not less than 150 mm in length, provided with strain relief, and employ a minimum 0.08 mm wall of insulation, or the equivalent. They shall also conform to the temperature limit of the product.

5.5.2.2 Duplicate terminals or leads, or equivalent means to achieve electrical supervision, shall be provided for each incoming and outgoing alarm-initiating-circuit connection.

5.5.2.3 A common terminal may be used for connection of both incoming and outgoing wires, provided that the construction of the terminal does not permit an uninsulated section of a single conductor to be looped around the terminal and serve as two separate connections, thereby precluding supervision of the connection in the event that the wire becomes dislodged from under the terminal.

5.5.2.4 A notched clamping plate under a single securing screw, in which separate conductors of an initiating circuit are intended to be inserted under each notch, is acceptable, but this arrangement shall be supplemented by additional marking in the wiring area or on the installation wiring diagram specifying the intended connections to the terminals.

5.5.2.5 For a **heat sensitive cable**, the stripped ends of each wire shall be used for field connections.

5.5.3 Wiring Terminals

5.5.3.1 If binding head screws or machine screws and washers are used as clamping means for conductors, the size of screw shall be not less than:

A No. 8 if for use with copper conductors of No. 12 AWG; or

B No. 6 if for use with copper conductors No. 14 AWG or smaller.

5.5.3.2 A terminal plate tapped for a wire-binding screw shall:

A Be of metal not less than 1.27 mm in thickness for a No. 8 or larger screw;

B Be of metal not less than 0.76 mm in thickness for a No. 6 screw; and

C Have not less than two full threads in the metal.

NOTE: A terminal plate may have the metal extruded at the tapped hole for the binding screw so as to provide two full threads. Other constructions may be employed if they provide equivalent strength.

5.5.3.3 A wire-binding screw shall thread into metal.

NOTE: The wire-binding screw should have the end threads upset or otherwise arranged to prevent complete removal of the screw.

5.5.3.4 A separate terminal shall be provided for each installation wire and in the case of the normally open contact type of detector, dual terminals or the equivalent shall be provided.