

Standard for Safety

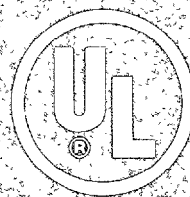
UL 539

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Single and Multiple Station Heat Detectors



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Standard



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July 20, 1995

Standard for

Single and Multiple Station Heat Detectors

UL 539, Fourth Edition

Accompanying this transmittal notice is a copy of the fourth edition of UL 539.

THIS EDITION OF THE STANDARD IS NOW IN EFFECT.

Revised and/or additional pages may be issued from time to time.

JULY 20, 1995

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UL 539

Standard for

Single and Multiple Station Heat Detectors

The first edition was titled Fire Alarm Devices, Single and Multiple Station, Mechanically Operated Type.

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Second Edition – December, 1976

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Fourth Edition

July 20, 1995

An effective date included as a note immediately following certain requirements is one established by Underwriters Laboratories Inc.

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 published set of revision pages.

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FOREWORD

A. This Standard contains basic requirements for products covered by Underwriters Laboratories Inc. (UL) under its Follow-Up Service for this category within the limitations given below and in the Scope section of this Standard. These requirements are based upon sound engineering principles, research, records of tests and field experience, and an appreciation of the problems of manufacture, installation, and use derived from consultation with and information obtained from manufacturers, users, inspection authorities, and others having specialized experience. They are subject to revision as further experience and investigation may show is necessary or desirable.

B. The observance of the requirements of this Standard by a manufacturer is one of the conditions of the continued coverage of the manufacturer's product.

C. A product which complies with the text of this Standard will not necessarily be judged to comply with the Standard if, when examined and tested, it is found to have other features which impair the level of safety contemplated by these requirements.

D. A product employing materials or having forms of construction differing from those detailed in the requirements of this Standard may be examined and tested according to the intent of the requirements and, if found to be substantially equivalent, may be judged to comply with the Standard.

E. UL, in performing its functions in accordance with its objectives, does not assume or undertake to discharge any responsibility of the manufacturer or any other party. The opinions and findings of UL represent its professional judgment given with due consideration to the necessary limitations of practical operation and state of the art at the time the Standard is processed. UL shall not be responsible to anyone for the use of or reliance upon this Standard by anyone. UL shall not incur any obligation or liability for damages, including consequential damages, arising out of or in connection with the use, interpretation of, or reliance upon this Standard.

F. Many tests required by the Standards of UL are inherently hazardous and adequate safeguards for personnel and property shall be employed in conducting such tests.

INTRODUCTION

1 Scope

1.1 These requirements cover heat-actuated, mechanically- or gas-operated, single and multiple station heat detectors intended for indoor installation in accordance with the National Fire Alarm Code, NFPA 72, Chapter 2.

1.2 These requirements do not cover electrically operated single or multiple station smoke, flame, or heat detectors.

1.3 A product that contains features, characteristics, components, materials, or systems new or different from those covered by the requirements in this standard, and that involve a risk of fire, electric shock, or injury to persons shall be evaluated using the appropriate additional component and end-product requirements as determined necessary to maintain the level of safety as originally anticipated by the intent of this standard. A product whose features, characteristics, components, materials, or systems conflict with specific requirements or provisions of this standard cannot be judged to comply with this standard. Where considered appropriate, revision of requirements shall be proposed and adopted in conformance with the methods employed for development, revision, and implementation of this standard.

2 General

2.1 Components

2.1.1 Except as indicated in 2.1.2, a component of a product covered by this standard shall comply with the requirements for that component.

2.1.2 A component need not comply with a specific requirement that:

- a) Involves a feature or characteristic not needed in the application of the component in the product covered by this standard, or
- b) Is superseded by a requirement in this standard.

2.1.3 A component shall be used in accordance with its recognized rating established for the intended conditions of use.

2.1.4 Specific components are recognized as being incomplete in construction features or restricted in performance capabilities. Such components are intended for use only under limited conditions, such as certain temperatures not exceeding specified limits, and shall be used only under those specific conditions for which they have been recognized.

2.2 Units of measurement

2.2.1 If a value for measurement is followed by a value in other units in parentheses, the second value may be only approximate. The first stated value is the requirement.

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

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.

3 Glossary

3.1 For the purpose of this standard the following definitions apply.

3.2 **GAS-OPERATED-TYPE** — A heat detector having a temperature sensitive bimetal or eutectic element, compressed gas, usually in a liquid state in a cylinder, and a sounding means such as a horn or whistle. When the element actuates, the compressed gas is released in a gaseous state through the alarm sounding device.

3.3 **HEAT DETECTOR, MULTIPLE STATION** — Two or more gas-operated single station units interconnected by metal tubing to one or more remote alarm sounding devices.

3.4 **HEAT DETECTOR, SINGLE STATION** — A self-contained fire alarm system comprising of a heat detector, an alarm sounding device, and a stored energy source incorporated in one integral package. The basic types are gas-operated units and spring-wound units.

3.5 **MECHANICALLY-OPERATED-TYPE** — A heat detector having a temperature sensitive bimetal or eutectic element and a spring-wound-type mechanism with clapper mounted within a bell housing. The snap action of the bimetal or melting of the eutectic element releases the spring mechanism resulting in a bell-type sound.

3.6 **STORY** — That portion of a building included between the upper surface of a floor and upper surface of the next floor or roof above.

4 Temperature Classification

4.1 The temperature sensitive elements of single and multiple station heat detectors are classified as to their temperature of operation. See Table 4.1.

Table 4.1
Temperature classifications

Temperature classification	Rating range,		Maximum ceiling temperature,	
	°F	(°C)	°F	(°C)
Low	115 – 134	46 – 57	90	32
Ordinary	135 – 174	57 – 79	100	38
Intermediate	175 – 225	79 – 107	150	66

4.2 The maximum rating of a heat detector shall not exceed 225°F (107°C).

CONSTRUCTION

5 Mounting

- 5.1 A heat detector shall be provided with a means for mounting either to a ceiling or wall.
- 5.2 The means for mounting shall not result in any distortion of the heat detector that alters its operating characteristics.

6 Calibration

- 6.1 Any means for calibration or adjustment shall be guarded or sealed to reduce the risk of manipulation by hand or ordinary tools. A thermal responsive element adjustment, if provided as part of a unit, shall not be readjustable after shipment from the factory.
- 6.2 A calibration means considered to be not accessible or apparent is one not exposed to manipulation by tools, or one not readily replaceable. The complete concealment of tool-engagement means in a screw, such as a slot, recessed head, and the like, by the use of solder or brazing material may be used for the purpose of reducing the risk of manipulation or replacement.

7 Materials

- 7.1 Diaphragms and spring parts shall be made of nonferrous material, such as phosphor bronze, nickel, silver, and the like or of ferrous materials. If ferrous materials are used, they shall be hermetically sealed or plated so as to protect against corrosion.
- 7.2 An eutectic element, provided that it is used as the operating member of a heat detector, shall be protected against conditions it is likely to be exposed to when in service, as represented by the tests described in Sections 12 – 26 of this standard.
- 7.3 All exposed parts whose required performance can be impaired by corrosion shall be protected by enameling, galvanizing, sherardizing, plating, or other means determined to be equivalent.

8 Operating Mechanisms

- 8.1 The moving parts of a heat detector shall have sufficient play at bearing surfaces to protect against binding.
- 8.2 A gear train driving spring shall be securely anchored at each end. The spring winding means shall be provided with a positive stop to limit the winding or shall withstand the maximum force likely to be applied without impairing the operation of the mechanism.

9 Mechanical Assembly

- 9.1 Any servicing or restoration operations intended to be made by the user shall be simple and capable of being accomplished with ordinary hand tools.
- 9.2 A detector shall be so constructed that parts will not become displaced during or after installation.
- 9.3 An obstruction means, such as a wire mesh screen, shall be provided to protect against the entry of foreign bodies or materials into sounding devices that could prevent their operation. The maximum size of the openings shall be 1/8 inch (3.2 mm). The obstruction means is to be attached securely in place. See the Vibration Test, Section 19.