

May 22, 2007

1

**SUBJECT 1626A**

**OUTLINE OF INVESTIGATION**

**FOR**

**FIRE TESTING OF RESIDENTIAL SPRINKLERS FOR USE WITH SMOOTH,  
FLAT, SLOPED CEILINGS HAVING PITCHES NOT EXCEEDING 8/12**

**Issue Number: 1**

**May 22, 2007**

***Summary of Topics***

***This is the First Issue of the Subject 1626A Outline of Investigation for Fire Testing of Residential Sprinklers for Use With Smooth, Flat, Sloped Ceilings Having Pitches not Exceeding 8/12.***

The UL Foreword is no longer located within the UL Standard. For information concerning the use and application of the requirements contained in this Standard, the current version of the UL Foreword is located on ULStandardsInfoNet at: <http://ulstandardsinfo.net/ulforeword.html>

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## CONTENTS

## INTRODUCTION

|                              |   |
|------------------------------|---|
| 1 Scope .....                | 4 |
| 2 Components .....           | 4 |
| 3 Units of Measurement ..... | 5 |
| 4 Undated References .....   | 5 |
| 5 Fire Test .....            | 5 |
| 5.1 General .....            | 5 |
| 5.2 Test Arrangement .....   | 6 |
| 5.3 Test method .....        | 8 |

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## INTRODUCTION

### 1 Scope

1.1 These requirements cover the fire testing of residential sprinklers for use with smooth, flat, sloped ceilings having pitches not exceeding 8/12 for installation in accordance with the Standards for Installation of Sprinklers Sprinkler Systems in One-and Two-Family Dwellings and Manufactured Homes, NFPA 13D; Installation of Sprinkler Systems in Residential Occupancies up to and Including Four Stories in Height, NFPA 13R; and and Installation of Sprinklers, NFPA 13.

1.1 effective May 22, 2009

1.2 Residential sprinklers covered herein are also required to comply with the fire and other applicable requirements in the Standard for Residential Sprinklers for Fire-Protection Service, UL 1626.

1.2 effective May 22, 2009

1.3 The requirements contained herein are not intended to restrict the application of representative fire and other tests for special sprinklers, as referenced in NFPA 13, that are intended to provide protection for specific fire hazards.

1.3 effective May 22, 2009

1.4 These fire test methods and requirements contained herein are based upon the following installation conditions:

- a) A maximum distance from the floor to the ceiling peak of 24 ft (7.3 m).
- b) A maximum of two sprinklers are installed within 3 ft (0.9 m). vertically of the peak.
- c) For sidewall sprinklers discharging across the slope, sprinklers are installed on one side of the room only.
- d) Installation is for smooth, flat ceilings only that do not extend into or serve as a ceiling for an upper level floor in the structure.

1.4 effective May 22, 2009

### 2 Components

2.1 Except as indicated in 2.2, a component of a product covered by this Outline shall comply with the requirements for that component.

2.1 effective May 22, 2009

2.2 A component is not required to comply with a specific requirement that:

- a) Involves a feature or characteristics not needed in the application of the component in the product covered by this Outline; or
- b) Is superseded by a requirement in this Outline.

2.2 effective May 22, 2009

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

2.3 effective May 22, 2009

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

2.4 effective May 22, 2009

### 3 Units of Measurement

3.1 Values stated without parentheses are the requirement. Values in parentheses are explanatory or approximate information.

3.1 effective May 22, 2009

### 4 Undated References

4.1 Any undated reference to a code or standard appearing in the requirements of this Outline shall be interpreted as referring to the latest edition of that code or standard.

4.1 effective May 22, 2009

### 5 Fire Test

#### 5.1 General

5.1.1 When fire tested as described in 5.1.2 – 5.3.5, a residential sprinkler shall limit temperatures as specified in 5.1.1 (a) – (d) when tested at each rated spacing referenced in the installation instructions. Additionally, a maximum of two residential sprinklers shall operate within the test room and no sprinkler shall operate in the doorways. The sprinklers shall limit temperatures as follows

- a) The maximum temperature 3 inches (76 mm) below the ceiling at either location as illustrated in Figures 5.1, 5.4, 5.7, or 5.10 shall not exceed 600° F (316° C).
- b) The maximum temperature 5-1/4 feet (1.6 m) above the floor shall not exceed 200° F (93° C).
- c) The temperature at the location described in (b) shall not exceed 130° F (54° C) for more than any continuous 2-minute period.
- d) The maximum ceiling material temperature 1/4 inch (6.4 mm) behind the finished ceiling surface shall not exceed 500° F (260° C).

See Figure 5.1 (pendent, upright, flush, recessed pendent, and concealed pendent sprinklers), or Figures 5.4, 5.7, or 5.10 (sidewall sprinklers) for temperature measuring locations.

5.1.1 effective May 22, 2009

5.1.2 Residential sprinklers in each temperature rating are to be subjected to the tests specified in 5.2.1 – 5.3.5.

5.1.2 effective May 22, 2009

## 5.2 Test Arrangement

### 5.2.1 General

5.2.1.1 Pendent, upright, flush, recessed pendent, and concealed pendent sprinklers are to be subjected to both high and low corner fire test arrangements for the applicable rated spacings as illustrated in Figures 5.1 to 5.3. Sidewall sprinklers discharging across the slope are to be subjected to both high and low corner fire test arrangements for the applicable rated spacings as described in Figures 5.4 to 5.6. Sidewall sprinklers discharging down the slope are to be subjected to both high and low corner fire test arrangements for the applicable rated spacings as described in either Figures 5.7 to 5.9, or 5.10 to 5.12.

5.2.1.1 effective May 22, 2009

### 5.2.2 Test room

5.2.2.1 The test room dimensions for pendent, upright, flush, recessed pendent, and concealed pendent sprinklers are to be as specified in Figures 5.1 to 5.3. The test room dimensions for sidewall sprinklers discharging across the slope are to be as specified in Figures 5.4 to 5.6. The test room dimensions for sidewall sprinklers discharging down the slope are to be as specified in Figures 5.10 to 5.12 for a reduced scale test. For sidewall sprinklers discharging down the slope, the manufacturer shall be permitted to have the option to conduct the test in a standard scale test room as specified in Figures 5.7 to 5.9.

5.2.2.1 effective May 22, 2009

5.2.2.2 The test room ceiling is to be covered with acoustical panels or gypsum board attached to furring strips. Acoustical panels used in the 4 by 4 foot (1.2 by 1.2 m) area directly over the fire source are to measure 2 by 4 foot (0.6 by 1.2 m), be 1/2 inch (12.7 mm) thick, have a density of  $13.5 \pm 1.5 \text{ lb/ft}^3$  ( $216 \pm 24 \text{ kg/m}^3$ ), and have a maximum flame spread index of 25 when tested in accordance with the Standard for Test for Surface Burning Characteristics of Building Materials, UL 723. For each test, new acoustical panels in the 4 by 4 foot (1.2 by 1.2 m) area directly over the fire source are to be installed.

5.2.2.2 effective May 22, 2009

5.2.2.3 The test room is to have provisions for ventilation through two door openings on opposite test room walls. Each opening is to be 7 feet 4 inches (2.2 m) high. The door widths are to be as specified in Figures 5.1 to 5.12.

5.2.2.3 effective May 22, 2009

5.2.2.4 Douglas fir, 3-ply panels measuring 4 by 8 feet (1.2 by 2.4 m) are to be placed on two of the test room walls extending out from a common corner. For the fire tests conducted in the low corner of the room, one panel is to be placed on each wall with an additional piece of plywood installed on the sloped wall so that it extends to the ceiling. For the fire tests conducted in the high corner of the room, one and a half panels are to be placed on each wall so that the total height of the plywood is 12 ft (3.66 m) and the top portion of the second panel is attached directly to the wall. The panels are to be 1/4 inch (6.4 mm) thick with each ply constructed of Douglas fir. The plywood panels are to be conditioned at  $70 \pm 5^\circ\text{F}$  ( $21 \pm 2.8^\circ\text{C}$ ) and  $50 \pm 10$  percent relative humidity for at least 72 hours prior to test. They are to be placed on the walls by being attached to 1/2-inch (12.7 mm) thick wood furring strips. The Douglas fir plywood panels shall have the burning characteristic properties specified in the Standard for Residential Sprinklers for Fire-Protection Service, UL 1626..

5.2.2.4 effective May 22, 2009