UL 1767

STANDARD FOR SAFETY

Early-Suppression Fast-Response Sprinklers

UL Standard for Safety for Early-Suppression Fast-Response Sprinklers, UL 1767

Fourth Edition, Dated April 30, 2013

SUMMARY OF TOPICS

These revisions to ANSI/UL 1767 include the following changes in requirements:

Revisions to Clarify Requirements and Update Testing Details

ESFR Sprinklers Having a RTI Greater Than 36 (m•s)$^{1/2}$

Revised Heat Resistance Test Requirements

Sprinkler Test Orientation for Salt Spray Exposure

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.

The new and revised requirements are substantially in accordance with Proposal(s) on this subject dated August 28, 2015.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form by any means, electronic, mechanical photocopying, recording, or otherwise without prior permission of UL.

UL provides this Standard ″as is″ without warranty of any kind, either expressed or implied, including but not limited to, the implied warranties of merchantability or fitness for any purpose.

In no event will UL be liable for any special, incidental, consequential, indirect or similar damages, including loss of profits, lost savings, loss of data, or any other damages arising out of the use of or the inability to use this Standard, even if UL or an authorized UL representative has been advised of the possibility of such damage. In no event shall UL's liability for any damage ever exceed the price paid for this Standard, regardless of the form of the claim.

Users of the electronic versions of UL's Standards for Safety agree to defend, indemnify, and hold UL harmless from and against any loss, expense, liability, damage, claim, or judgment (including reasonable attorney's fees) resulting from any error or deviation introduced while purchaser is storing an electronic Standard on the purchaser's computer system.

The requirements in this Standard are now in effect, except for those paragraphs, sections, tables, figures, and/or other elements of the Standard having future effective dates as indicated in the note following the affected item. The prior text for requirements that have been revised and that have a future effective date are located after the Standard, and are preceded by a ″SUPERSEDED REQUIREMENTS″ notice.

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

No Text on This Page

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

April 30, 2013
(Title Page Reprinted: October 29, 2015)

ANSI/UL 1767-2015

UL 1767

Standard for Early-Suppression Fast-Response Sprinklers

First Edition – February, 1990
Second Edition – January, 1995
Third Edition – January, 2005

Fourth Edition

April 30, 2013

This ANSI/UL Standard for Safety consists of the Fourth Edition including revisions through October 29, 2015.

The most recent designation of ANSI/UL 1767 as an American National Standard (ANSI) occurred on October 28, 2015. ANSI approval for a standard does not include the Cover Page, Transmittal Pages, Title Page, or effective date information.

Comments or proposals for revisions on any part of the Standard may be submitted to UL at any time. Proposals should be submitted via a Proposal Request in UL's On-Line Collaborative Standards Development System (CSDS) at http://csds.ul.com.

UL's Standards for Safety are copyrighted by UL. Neither a printed nor electronic copy of a Standard should be altered in any way. All of UL's Standards and all copyrights, ownerships, and rights regarding those Standards shall remain the sole and exclusive property of UL.

COPYRIGHT © 2015 UNDERWRITERS LABORATORIES INC.

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

No Text on This Page

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

CONTENTS

INTRODUCTION

1 Scope 6
2 Components 6
3 Unit Of Measurement 6
4 Undated References 7
5 Glossary 7

CONSTRUCTION

6 General 9
7 Inlet Threads 9
8 Temperature Ratings 10
9 Pressure Rating 10
10 Nominal “K” Factors 10
11 Coatings and Platings 11
12 Protective Covers 11

PERFORMANCE

GENERAL

13 General 11
14 Samples 12

PHYSICAL STRENGTH AND LEAKAGE TESTS

15 Load on Heat Responsive Element Test 12
16 Strength of Heat Responsive Element Test 12
16.1 Fusible-alloy types 12
16.2 Glass-bulb types 13
17 Glass Bulb Thermal Shock Test 13
18 Strength of Frame Test 14
19 Impact Resistance Test 14
20 Impact Test for Protective Covers 16
21 Rough Usage Test 18
22 Flow Endurance Test 18
23 Leakage Test 19
24 Hydrostatic Strength Test 19
25 Dry Sprinkler Air Tightness Test 19
26 30-Day Leakage Test 21
27 Water Hammer Test 21
28 Vacuum Test 22

OPERATION TESTS

29 Operating Temperature (Bath) Test 22
30 Air Bath Test for Glass Bulb Sprinklers 23
31 Sensitivity Test 23
32 Operation – Lodgement Test 26

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

EXPOSURE AND CORROSION TEST

33 High Temperature Exposure Test – (90-Day) 28
34 Heat Resistance Test 29
35 Elastomeric Parts Test 29
36 Vibration Test 30
37 Freezing Test 30
38 Evaporation Test for Wax Coatings 31
39 10-Day Corrosion Test 31
39.1 General 31
39.2 Salt spray exposure 32
39.3 Moist hydrogen sulfide air mixture 32
39.4 Moist carbon dioxide-sulfur dioxide air mixture 32
40 30-Day Corrosion Test 32
41 90-Day Moist Air Test 33
42 Exposure Tests on Sprinklers Incorporating Polymeric Gaskets 33
42.1 General 33
42.2 Corrosive exposures 33
42.3 Temperature cycling exposure 33
42.4 Hydrocarbon exposure followed by moist air exposure 34
42.5 Hydrocarbon exposure followed by water immersion exposure 34
42.6 Exposure to antifreeze solutions 34
43 Dry-Type Sprinkler Deposit Loading Test 35
44 Dezincification Test of Brass Parts 36
44.1 General 36
44.2 Reagent 36
44.3 Test Pieces 36
44.4 Method 36
45 Stress-Corrosion Cracking of Brass Sprinkler Parts Test 37
46 Stress-Corrosion Cracking of Stainless Steel Parts Test 37

WATER FLOW AND DISTRIBUTION TESTS

47 Calibration Test 38
48 Distribution Tests for Pendent ESFR Sprinklers Having a Nominal K-factor of 14.0 or 16.8 .40
49 Thrust Force Test for for Pendent ESFR Sprinklers Having a Nominal K-factor of 14.0 or 16.8 .41

FIRE TESTS

50 Water Impingement Test 42
51 Large Scale Fire Tests for Pendent ESFR Sprinklers 43
52 Actual Delivered Density (ADD) Test for Pendent ESFR Sprinklers Having a Nominal K-factor of 14.0 or 16.8 60

MANUFACTURING AND PRODUCTION TESTS

53 General 65
54 Production Leakage Test 65
55 Glass Bulb Integrity Test 65

MARKINGS

56 General 65

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

INSTALLATION INSTRUCTIONS

57 reserved 66

APPENDIX A

Standards for Components. A1

APPENDIX B – TOLERANCE LIMIT CALCULATION METHODS

B1 General B1

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

INTRODUCTION

1 Scope

1.1 These requirements cover early suppression fast response (ESFR) sprinklers having nominal discharge coefficients and installation orientations as referenced in this standard for installation as part of sprinkler systems for fire-protection service. Requirements for installation and use of ESFR sprinklers are included in the Standard for the Installation of Sprinkler Systems, NFPA 13, as well as other NFPA standards.

1.2 The requirements in this standard are not intended to restrict the application of representative fire and other tests for special sprinklers, as referenced in the Standard for the Installation of Sprinkler Systems, NFPA 13, that are intended to provide protection for specific fire hazards.

2 Components

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

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

a) Involves a feature or characteristic not required in the application of the component in the product covered by this standard, or

b) Is superseded by a requirement in this standard.

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

2.4 Specific components are 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.

3 Unit Of Measurement

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

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL

4 Undated References

4.1 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.

5 Glossary

5.1 For the purpose of these requirements, the following definitions apply.

5.2 ACTUAL DELIVERED DENSITY (ADD) – The rate at which water, discharged from a sprinkler, is actually deposited onto the top of the protected horizontal surface under a fire condition.

5.3 ASSEMBLY LOAD – The extension force applied to the sprinkler frame by the assembly of its operating mechanism.

5.4 DELIVERED DENSITY – The rate at which water, discharged from a sprinkler, is actually deposited onto the top of the protected horizontal surface under a nonfire condition.

5.5 DISCHARGE COEFFICIENT ″K″ – Coefficient of discharge in the formula:

$$K = \frac{Q}{\sqrt{p}}$$

in which:

Q is the flow in gallons per minute; and

p is the pressure in pounds per square inch gauge.

In SI units:

Q is the flow in liters per minute; and

p is the pressure in bar

5.6 DRY-TYPE SPRINKLER – A sprinkler secured in an extension nipple that has a seal at the inlet end to prevent water from entering the nipple until the sprinkler operates.

Note: Dry-type ESFR sprinklers are intended for use on wet systems only since ESFR sprinklers are not intended for use in dry systems as referenced in NFPA 13.

5.7 EARLY SUPPRESSION – A characteristic of sprinkler performance whereby the first few operating sprinklers are able to deliver sufficient water to the fire to promptly reduce the fire growth and ultimately suppress the fire as indicated in the Standard for the Installation of Sprinkler Systems, NFPA 13.

5.8 EARLY-SUPPRESSION FAST-RESPONSE (ESFR) SPRINKLER – A quick responding sprinkler that automatically discharges water over a specified area to provide early suppression of a fire.

UL COPYRIGHTED MATERIAL –
NOT AUTHORIZED FOR FURTHER REPRODUCTION OR
DISTRIBUTION WITHOUT PERMISSION FROM UL