

---

---

**Fire protection — Automatic sprinkler  
systems —**

**Part 13:  
Requirements and test methods for  
extended-coverage sprinklers**

*Protection contre l'incendie — Systèmes d'extinction automatiques du  
type sprinkler —*

*Partie 13: Prescriptions et méthodes d'essai des sprinklers couvrant  
une surface plus étendue que la normale*



This document is a preview generated by EBS



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

# Contents

	Page
Foreword .....	vi
Introduction .....	vii
<b>1 Scope .....</b>	<b>1</b>
<b>2 Normative references .....</b>	<b>1</b>
<b>3 Terms and definitions .....</b>	<b>1</b>
<b>4 Product consistency .....</b>	<b>4</b>
4.1 Quality control program .....	4
4.2 Leak resistance testing .....	5
4.3 Glass bulb integrity test .....	5
<b>5 Product assembly .....</b>	<b>5</b>
5.1 General .....	5
5.2 Dynamic O-ring seals .....	5
5.3 Rated Pressure .....	5
5.4 Dry Sprinklers .....	5
<b>6 Requirements .....</b>	<b>5</b>
6.1 Dimensions .....	5
6.1.1 Orifice size .....	5
6.1.2 Nominal thread sizes .....	6
6.2 Temperature ratings and colour coding .....	6
6.3 Operating temperature (see 7.3) .....	6
6.4 Water flow constant (see 7.4) .....	6
6.5 Water distribution (see 7.5) .....	7
6.6 Function (see 7.6) .....	8
6.6.1 Lodgement (see 7.6.1) .....	8
6.6.2 Deflector strength (see 7.6.2) .....	8
6.7 Service load and strength of sprinkler body (see 7.7) .....	8
6.8 Strength of heat-responsive element (see 7.8) .....	9
6.9 Leak resistance and hydrostatic strength (see 7.9) .....	9
6.10 Heat exposure (see 7.10) .....	10
6.10.1 Glass bulb sprinklers .....	10
6.10.2 Uncoated sprinklers .....	10
6.10.3 Coated sprinklers .....	10
6.11 Thermal shock for glass bulb sprinklers (see 7.11) .....	10
6.12 Corrosion .....	10
6.12.1 Stress corrosion for copper-based alloy components (see 7.12.1) .....	10
6.12.2 Sulfur dioxide/carbon dioxide corrosion (see 7.12.2) .....	10
6.12.3 Hydrogen sulfide corrosion (see 7.12.3) .....	10
6.12.4 Salt spray loading (see 7.12.4) .....	11
6.12.5 Moist air exposure (see 7.12.5) .....	11
6.12.6 Stainless Steel Components (See 7.12.6) .....	11
6.13 Coated sprinklers (see 7.13) .....	11
6.13.1 Evaporation of wax and bitumen .....	11
6.13.2 Resistance to low temperatures .....	11
6.14 Water hammer (see 7.14) .....	11
6.15 Dynamic heating test (see 7.15) .....	12
6.15.1 Plunge Test .....	12
6.15.2 Post-exposure RTI .....	12
6.16 Resistance to heat (see 7.16) .....	12
6.17 Vibration (see 7.17) .....	12
6.18 Impact (see 7.18) .....	12
6.19 Rough usage (see 7.19) .....	12
6.20 Lateral discharge (see 7.20) .....	12

6.21	Wall wetting (see 7.21)	12
6.22	Room fires (see 7.22)	13
6.23	Thirty-day leakage resistance (see 7.23)	13
6.24	Vacuum resistance (see 7.24)	13
6.25	Thermal response of extended coverage sprinklers (see 7.25)	13
6.25.1	Thermal response test (see 7.25)	13
6.26	Freezing test (see 7.26)	14
6.27	Dry-type sprinkler deposit loading (see 7.27)	14
6.28	Dry sprinkler air tightness (see 7.28)	14
6.29	Dezincification of Brass Components (see 7.29)	14
6.30	Protective Covers (see 7.30)	14
<b>7</b>	<b>Test methods</b>	<b>15</b>
7.1	General	15
7.2	Examination	15
7.2.1	Preliminary examination	15
7.2.2	Visual examination	15
7.3	Operating temperature test (see 6.3)	15
7.3.1	Test of static operation	15
7.4	Water flow constant (see 6.4)	18
7.5	Water distribution tests (see 6.5)	19
7.5.1	Sprinklers other than sidewall types	19
7.5.2	Sidewall sprinklers	22
7.6	Functional test (see 6.6)	24
7.6.1	Lodgement test (see 6.6.1)	24
7.6.2	Deflector strength test (see 6.6.2)	27
7.7	Service load and strength of sprinkler body test (see 6.7)	27
7.7.1	Test Option 1	27
7.7.2	Test Option 2	28
7.7.3	Test Option 3	28
7.8	Strength of heat responsive element test (see 6.8)	29
7.8.1	Glass Bulbs	29
7.8.2	Fusible elements	29
7.9	Leak resistance and hydrostatic strength tests (see 6.9)	30
7.10	Heat exposure test (see 6.10)	30
7.10.1	Glass bulb sprinklers (see 6.10.1)	30
7.10.2	Uncoated sprinklers (see 6.10.2)	30
7.10.3	Coated sprinklers (see 6.10.3)	30
7.11	Thermal shock test for glass bulb sprinklers (see 6.11)	31
7.12	Corrosion tests (see 6.12)	31
7.12.1	Stress corrosion test for copper-based alloy components (see 6.12.1)	31
7.12.2	Sulfur dioxide/carbon dioxide corrosion test (see 6.12.2)	31
7.12.3	Hydrogen-sulfide corrosion test (see 6.12.3)	32
7.12.4	Salt spray loading test (see 6.12.4)	32
7.12.5	Moist air exposure (see 6.11.5)	33
7.12.6	Stainless steel components (see 6.12.6)	33
7.13	Tests for sprinkler coatings (see 6.13)	34
7.13.1	Evaporation of wax and bitumen test (see 6.13.1)	34
7.13.2	Low-temperature test (see 6.13.2)	34
7.14	Water-hammer test (see 6.14)	34
7.15	Dynamic heating test (see 6.15)	34
7.15.1	Plunge Test	34
7.16	Resistance to heat test (see 6.16)	35
7.17	Vibration test (see 6.17)	35
7.18	Impact test (see 6.18)	36
7.19	Rough usage test (see 6.19)	37
7.20	Lateral discharge test (see 6.20)	38
7.21	Wall wetting test (see 6.21)	38
7.22	Room fires (see 6.22)	39

7.23	Thirty-day leakage test (see 6.23)	42
7.24	Vacuum test (see 6.24)	42
7.25	Thermal response of extended coverage sprinklers (see 6.25)	42
7.26	Freezing test (see 6.26)	47
7.27	Dry-type sprinkler deposit loading test (see 6.27)	48
7.28	Dry sprinkler air tightness test (see 6.28)	48
7.29	Dezincification of brass components (see 6.29)	49
7.30	Protective cover impact test for glass bulb sprinklers (see 6.30)	50
<b>8</b>	<b>Marking</b>	<b>52</b>
8.1	Sprinklers	52
8.2	Sprinkler housings and concealed sprinkler cover plates	53
8.3	Protective covers	53
<b>9</b>	<b>Manufacturer's installation instructions</b>	<b>53</b>
	<b>Annex A (informative) Analysis of the strength test for release elements</b>	<b>54</b>
	<b>Annex B (normative) Tolerances</b>	<b>55</b>
	<b>Annex C (normative) Tolerance limit calculation methods</b>	<b>56</b>
	<b>Bibliography</b>	<b>58</b>

## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see [www.iso.org/patents](http://www.iso.org/patents)).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: [www.iso.org/iso/foreword.html](http://www.iso.org/iso/foreword.html).

This document was prepared by ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 5, *Fixed firefighting systems using water*.

A list of all parts in the ISO 6182 series can be found on the ISO website.

## Introduction

Extended coverage sprinklers are intended provide fire control in occupancies or portions of occupancies where the quantity and/or combustibility of contents is low and fires with relatively low rates of heat release are expected. Examples of occupancies where these sprinklers may be installed include offices, restaurant seating areas, educational facilities and other areas having similar fire challenges.

These sprinklers have a relatively flat spray pattern compared to the sprinklers described in ISO 6182-1. This allows the sprinklers to effectively distribute water over a larger area; thus permitting the sprinklers to be spaced greater distances from each other, as well as from the walls of the compartment. Obstructions can pose a greater challenge to extended coverage sprinklers because of the flat spray pattern. Extended coverage sprinkler installation guidelines need to account for the flat spray pattern when considering the distances between obstructions and the sprinkler.

Product standards, such as this one, can provide a minimum level of safety in the built environment, as well as a level of quality to the products on the market.





# Fire protection — Automatic sprinkler systems —

## Part 13:

# Requirements and test methods for extended-coverage sprinklers

## 1 Scope

This document specifies performance and marking requirements and test methods for extended coverage sprinklers.

These sprinklers are intended to provide control of fires in occupancies or portions of occupancies where quantity and/or combustibility of contents is low such as office spaces.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 7-1, *Pipe threads where pressure-tight points are made on the threads — Part 1: Dimensions, tolerances and designation*

ASTM G36, *Standard Practice for Evaluating Stress-Corrosion-Cracking Resistance of Metals and Alloys in a Boiling Magnesium Chloride Solution*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.1 General

#### 3.1.1

##### **assembly load**

force exerted on the sprinkler body excluding hydrostatic pressure

#### 3.1.2

##### **average design strength**

glass bulb supplier's specified lowest average axial design strength of any batch of 50 bulbs

#### 3.1.3

##### **design load**

force exerted on the release element at the service load of the sprinkler