

Fourth edition
2023-07

Fire detection and alarm systems — Part 7: Point-type smoke detectors using scattered light, transmitted light or ionization

Systèmes de détection et d'alarme d'incendie —

Partie 7: Détecteurs de fumée ponctuels utilisant le principe de la diffusion de la lumière, de la transmission de la lumière ou de l'ionisation



Reference number
ISO 7240-7:2023(E)

© ISO 2023



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of ISO 7240-7:2023. [Click here to purchase the full version from the ANSI store.](#)

Contents

	Page
Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 General requirements	3
4.1 Conformance.....	3
4.2 Response threshold value of detectors using scattered or transmitted light.....	3
4.3 Individual alarm indication.....	3
4.4 Connection of ancillary devices.....	3
4.5 Monitoring of detachable detectors.....	3
4.6 Manufacturer's adjustments.....	4
4.7 On-site adjustment of response behaviour.....	4
4.8 Protection against the ingress of foreign bodies.....	4
4.8.1 Closed detectors.....	4
4.8.2 Open detectors.....	4
4.9 Response to slowly developing fires.....	4
4.10 Requirements for software-controlled detectors.....	5
4.10.1 General.....	5
4.10.2 Software design.....	5
4.10.3 Storage of programs and data.....	5
5 Tests	5
5.1 General.....	5
5.1.1 Atmospheric conditions for tests.....	5
5.1.2 Operating conditions for tests.....	5
5.1.3 Mounting arrangements.....	6
5.1.4 Tolerances.....	6
5.1.5 Measurement of response threshold value.....	6
5.1.6 Provision for tests.....	7
5.1.7 Test schedule.....	7
5.1.8 Test report.....	8
5.2 Repeatability.....	8
5.2.1 Object of test.....	8
5.2.2 Test procedure.....	8
5.2.3 Requirements.....	8
5.3 Directional dependence.....	8
5.3.1 Object of test.....	8
5.3.2 Test procedure.....	8
5.3.3 Requirements.....	9
5.4 Reproducibility.....	9
5.4.1 Object of test.....	9
5.4.2 Test procedure.....	9
5.4.3 Requirements.....	9
5.5 Variation in supply parameters.....	9
5.5.1 Object of test.....	9
5.5.2 Test procedure.....	9
5.5.3 Requirements.....	10
5.6 Air movement.....	10
5.6.1 Object of test.....	10
5.6.2 Test procedure.....	10
5.6.3 Requirements.....	10
5.7 Dazzling.....	11

This is a preview of ISO 7240-7:2023. [Click here to purchase the full version from the ANSI store.](#)

5.7.1	Object of test.....	11
5.7.2	Test procedure.....	11
5.7.3	Requirements.....	11
5.8	Additional tests for open detectors.....	11
5.8.1	Object of the test.....	11
5.8.2	Test procedure.....	11
5.9	Dry heat (operational).....	12
5.9.1	Object of test.....	12
5.9.2	Test procedure.....	12
5.9.3	Requirements.....	12
5.10	Cold (operational).....	13
5.10.1	Object of test.....	13
5.10.2	Test procedure.....	13
5.10.3	Requirements.....	13
5.11	Damp heat, steady state (operational).....	13
5.11.1	Object of test.....	13
5.11.2	Test procedure.....	14
5.11.3	Requirements.....	14
5.12	Damp heat, steady state (endurance).....	14
5.12.1	Object of test.....	14
5.12.2	Test procedure.....	14
5.12.3	Requirements.....	15
5.13	Sulfur dioxide (SO ₂) corrosion (endurance).....	15
5.13.1	Object of test.....	15
5.13.2	Test procedure.....	15
5.13.3	Requirements.....	16
5.14	Shock (operational).....	16
5.14.1	Object of test.....	16
5.14.2	Test procedure.....	16
5.14.3	Requirements.....	17
5.15	Impact (operational).....	17
5.15.1	Object of test.....	17
5.15.2	Test procedure.....	17
5.15.3	Requirements.....	18
5.16	Vibration, sinusoidal, (operational).....	18
5.16.1	Object of test.....	18
5.16.2	Test procedure.....	18
5.16.3	Requirements.....	19
5.17	Vibration, sinusoidal (endurance).....	19
5.17.1	Object of test.....	19
5.17.2	Test procedure.....	19
5.17.3	Requirements.....	20
5.18	Electromagnetic compatibility (EMC) immunity tests (operational).....	20
5.19	Fire sensitivity.....	20
5.19.1	Object of test.....	20
5.19.2	Test procedure.....	20
5.19.3	Requirements.....	22
6	Test report.....	22
7	Marking.....	22
8	Data.....	23
8.1	Hardware documentation.....	23
8.2	Software documentation.....	23
Annex A (normative) Smoke tunnel for response threshold value measurements.....		25
Annex B (normative) Test aerosol for response threshold value measurements.....		26
Annex C (normative) Smoke-measuring instruments.....		27

This is a preview of ISO 7240-7:2023. [Click here to purchase the full version from the ANSI store.](#)

Annex D (normative) Apparatus for dazzling test	31
Annex E (normative) Apparatus for impact test	32
Annex F (normative) Fire test room	34
Annex G (normative) Smouldering (pyrolysis) wood fire (TF2)	36
Annex H (normative) Glowing smouldering cotton fire (TF3)	39
Annex I (normative) Flaming plastics (polyurethane) fire (TF4)	42
Annex J (normative) Flaming liquid (<i>n</i>-heptane) fire (TF5)	45
Annex K (informative) Information concerning the construction of the smoke tunnel	48
Annex L (informative) Compensation for detector drift	50
Annex M (informative) Information concerning the construction of the measuring ionization chamber	54
Annex N (normative) Apparatus for open detector static object test	56
Annex O (normative) Apparatus for testing the protection against the effect of moving objects	57
Bibliography	59

This is a preview of ISO 7240-7:2023. [Click here to purchase the full version from the ANSI store.](#)

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 document 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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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

For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

This fourth edition cancels and replaces the third edition (ISO 7240-7: 2018), which has been technically revised.

The main changes are as follows:

- a simplification of the use of the threshold values of Band 1 and Band 2, previously introduced in the third edition. The intention of this change is to improve the readability of the document by removing unnecessary repetition.
- various editorial modifications to bring the document in line with current editorial rules.

A list of all parts in the ISO 7240 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

This is a preview of ISO 7240-7:2023. [Click here to purchase the full version from the ANSI store.](#)

Introduction

A fire detection and alarm system is required to function satisfactorily not only in the event of fire, but also during and after exposure to conditions likely to be met in practice, including corrosion, vibration, direct impact, indirect shock and electromagnetic interference. Specific tests are intended to assess the performance of the smoke detectors under such conditions.

This document is not intended to place any other restrictions on the design and construction of such detectors.

This edition of this document introduces a requirement that smoke detectors that operate on the scattered or transmitted light principle be marked with one of two possible nominal response threshold value bands. This marking provides for a clearer choice of response values, enabling a decrease in the risk of unwanted alarms in installations where unfavourable environmental conditions are present.

NOTE For some test fires, smoke detectors that operate on the scattered or transmitted light principle and that have been factory set to the upper response threshold value band can fall outside one of the classification limits given in ISO/TR 7240-9.