
Fire detection and alarm systems —
Part 22:
Smoke-detection equipment for ducts

Systèmes de détection et d'alarme d'incendie —

Partie 22: Équipement de détection des fumées dans les conduits



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
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
4 Requirements	2
4.1 Compliance	2
4.2 Visual alarm indication	2
4.3 Connection of ancillary devices	2
4.4 Monitoring of detachable detectors	3
4.5 Manufacturer's adjustments	3
4.6 On-site adjustment of response behaviour	3
4.7 Requirements for software-controlled smoke-detection equipment for ducts	3
4.7.1 General	3
4.7.2 Software design	3
4.7.3 Storage of programs and data	3
5 Tests	4
5.1 General	4
5.1.1 Atmospheric conditions for tests	4
5.1.2 Mounting arrangements	4
5.1.3 Operating conditions for tests	4
5.1.4 Tolerances	4
5.1.5 Response threshold value	4
5.1.6 Provision for tests	5
5.1.7 Test schedule	6
5.1.8 Test report	6
5.2 Repeatability	6
5.2.1 Object of test	6
5.2.2 Test procedure	6
5.2.3 Requirements	7
5.3 Reproducibility	7
5.3.1 Object of test	7
5.3.2 Test procedure	7
5.3.3 Requirements	7
5.4 Variation in supply parameters	7
5.4.1 Object of test	7
5.4.2 Test procedure	8
5.4.3 Requirements	8
5.5 Dazzling	8
5.5.1 Object of test	8
5.5.2 Test procedure	8
5.5.3 Requirements	9
5.6 Dry heat (operational)	9
5.6.1 Object of test	9
5.6.2 Test procedure	9
5.6.3 Requirements	10
5.7 Cold (operational)	10
5.7.1 Object of test	10
5.7.2 Test procedure	10
5.7.3 Requirements	11
5.8 Damp heat, steady-state (operational)	11
5.8.1 Object of test	11

5.8.2	Test procedure	11
5.8.3	Requirements	11
5.9	Damp heat, steady-state (endurance)	12
5.9.1	Object of test	12
5.9.2	Test procedure	12
5.9.3	Requirements	12
5.10	Sulfur dioxide, SO ₂ , corrosion (endurance)	13
5.10.1	Object of test	13
5.10.2	Test procedure	13
5.10.3	Requirements	13
5.11	Shock (operational)	14
5.11.1	Object of test	14
5.11.2	Test procedure	14
5.11.3	Requirements	14
5.12	Impact (operational)	15
5.12.1	Object of test	15
5.12.2	Test procedure	15
5.12.3	Requirements	15
5.13	Vibration, sinusoidal (operational)	16
5.13.1	Object of test	16
5.13.2	Test procedure	16
5.13.3	Requirements	17
5.14	Vibration, sinusoidal (endurance)	17
5.14.1	Object of test	17
5.14.2	Test procedure	17
5.14.3	Requirements	18
5.15	Air leakage	18
5.15.1	Object of test	18
5.15.2	Test procedure	18
5.15.3	Requirements	18
5.16	Electromagnetic compatibility (EMC) immunity tests (operational)	19
5.16.1	Object of test	19
5.16.2	Test procedure	19
5.16.3	Requirements	19
5.17	Fire sensitivity	20
5.17.1	Object of test	20
5.17.2	Test procedure	20
5.17.3	Requirements	21
6	Test report	21
7	Marking	22
8	Data	22
8.1	Hardware documentation	22
8.2	Software documentation	23
Annex A (normative)	Smoke tunnel and fire test room arrangement for response measurements	24
Annex B (normative)	Test aerosol for response threshold value measurements	25
Annex C (normative)	Smoke-measuring instruments	26
Annex D (normative)	Apparatus for dazzling test	30
Annex E (normative)	Apparatus for impact test	31
Annex F (informative)	Air-leakage test apparatus	33
Annex G (normative)	Rapid smouldering (pyrolysis) wood fire (TF2)	34
Annex H (normative)	Open plastics (polyurethane) fire (TF4)	37

Annex I (informative) Information concerning the construction of the smoke tunnel	39
Annex J (informative) Information concerning the construction of the measuring ionization chamber	42
Bibliography	44

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).

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).

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 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 the following URL: 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 second edition cancels and replaces the first edition (ISO 7240-22:2007), which has been technically revised.

The main changes compared to the previous edition are as follows:

- in [5.16](#) (electromagnetic compatibility immunity tests), EN 50130-4 has been replaced by IEC 62599-2;
- marking has been moved to a new [Clause 7](#);
- data and software requirements have been moved to [Clause 8](#).

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

Introduction

Smoke-detection equipment for ducts (SDED) is used as part of a fire detection system to sample the environment within air ducts of a building. Detection of smoke releases a signal to the connected control and indicating equipment and can be used as a signal to an air-handling system to prevent the spread of smoke within the building.

SDED is required to function satisfactorily not only in the event of a fire, but also during and after exposure to conditions likely to be met in practice such as corrosion, vibration, direct impact, indirect shock and electromagnetic interference. Some tests specified are intended to assess the performance of the SDED under such conditions.

The performance of SDED is assessed from results obtained in specific tests. This document is not intended to place any other restrictions on the design and construction of such equipment.

Fire detection and alarm systems —

Part 22: Smoke-detection equipment for ducts

1 Scope

This document specifies requirements, test methods and performance criteria for smoke-detection equipment for ducts (SDED) for use in fire detection and alarm systems installed in buildings (see ISO 7240-1).

The SDED samples the air from a duct and detects smoke in the sample.

NOTE 1 A common method of operation is to use differential pressure arising from airflow in the duct.

The SDED can use smoke detectors complying with ISO 7240-7 or other detectors complying with tests specified in this document.

A common application for SDED is to detect visible smoke, for which detectors using scattered light or transmitted light can be more suitable. However, requirements for detectors using ionization are also included in this document for use in applications where detection of less visible fire aerosols is desired.

For the testing of other types of smoke detectors or smoke detectors working on different principles, this document can be used for guidance. Smoke detectors with special characteristics, developed for specific risks, are not covered.

NOTE 2 Certain types of detectors contain radioactive materials. The national requirements for radiation protection differ from country to country and are not specified in this document.

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 209, *Aluminium and aluminium alloys — Chemical composition*

ISO 7240-1, *Fire detection and alarm systems — Part 1: General and definitions*

ISO 7240-7:2011, *Fire detection and alarm systems — Part 7: Point-type smoke detectors using scattered light, transmitted light or ionization*

IEC 60068-1, *Environmental testing — Part 1: General and guidance*

IEC 60068-2-1, *Environmental testing — Part 2: Tests. Tests A: Cold*

IEC 60068-2-2, *Environmental testing — Part 2: Tests. Tests B: Dry heat*

IEC 60068-2-6, *Environmental testing — Part 2: Tests — Test Fc: Vibration (sinusoidal)*

IEC 60068-2-27, *Environmental testing — Part 2: Test Ea and guidance: Shock*

IEC 60068-2-42, *Environmental testing — Part 2-42: Tests. Tests Kc: Sulphur dioxide tests for contacts and connections*

IEC 60068-2-78, *Environmental testing — Part 2-78: Tests — Test Cab: Damp heat, steady state*