
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



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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 7240-22 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 3, *Fire detection and alarm systems*.

ISO 7240 consists of the following parts, under the general title *Fire detection and alarm systems*:

- *Part 1: General and definitions*
- *Part 2: Control and indicating equipment*
- *Part 4: Power supply equipment*
- *Part 5: Point-type heat detectors*
- *Part 6: Carbon monoxide fire detectors using electro-chemical cells*
- *Part 7: Point-type smoke detectors using scattered light, transmitted light or ionization*
- *Part 8: Carbon monoxide fire detectors using an electro-chemical cell in combination with a heat sensor*
- *Part 9: Test fires for fire detectors* [Technical specification]
- *Part 10: Point-type flame detectors*
- *Part 11: Manual call points*
- *Part 12: Line type smoke detectors using a transmitted optical beam*
- *Part 13: Compatibility assessment of system components*
- *Part 14: Guidelines for drafting codes of practice for design, installation and use of fire detection and fire alarm systems in and around buildings* [Technical report]
- *Part 15: Point type fire detectors using scattered light, transmitted light or ionization sensors in combination with a heat sensor*

- *Part 16: Sound system control and indicating equipment*
- *Part 19: Design, installation, commissioning and service of sound systems for emergency purposes*
- *Part 21: Routing equipment*
- *Part 22: Smoke-detection equipment for ducts*

The following parts are under preparation:

- *Part 26, dealing with oil-mist detectors*
- *Part 27, dealing with carbon fire detectors using optical or ionization smoke sensors, electrochemical cell carbon monoxide sensors and heat sensors*
- *Part 28, dealing with fire protection control equipment*

Introduction

Smoke-detection equipment for ducts (s.d.e.d.) 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.

A fire-detection and alarm system 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 s.d.e.d. under such conditions.

The performance of s.d.e.d. is assessed from results obtained in specific tests. This part of ISO 7240 is not intended to place any other restrictions on the design and construction of such equipment.

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Fire detection and alarm systems —

Part 22:

Smoke-detection equipment for ducts

1 Scope

This part of ISO 7240 specifies requirements, test methods and performance criteria for smoke-detection equipment for ducts (s.d.e.d.) for use in fire-detection and fire alarm systems installed in buildings; see ISO 7240-1.

The s.d.e.d. 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 s.d.e.d. can use smoke detectors complying with ISO 7240-7 or other detectors complying with tests specified in this part of ISO 7240.

A common application for s.d.e.d. 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 part of ISO 7240 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 part of ISO 7240 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 material. The national requirements for radiation protection differ from country to country and are not specified in this part of ISO 7240.

2 Normative references

The following referenced documents are indispensable for the application 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 209-1, *Wrought aluminium and aluminium alloys — Chemical composition and forms of products — Part 1: Chemical composition*

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

ISO 7240-7:2003, *Fire detection and fire 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 60068-2-27:1987, *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*

EN 50130-4, *Alarm systems — Part 4: Electromagnetic compatibility — Product family standard: Immunity requirements for components of fire, intruder and social alarm systems*

3 Terms and definitions

For the purposes of this document the terms and definitions given in ISO 7240-1 and the following apply.

3.1 response threshold value

A_{th}
aerosol concentration in the proximity of the specimen at the moment that it generates a signal which indicates the presence of smoke, when tested as specified in 5.1.5

NOTE The response threshold value may depend on signal processing in the detector and in the control and indicating equipment.

3.2 smoke-detection equipment for ducts s.d.e.d.

apparatus with an integral or associated point-type smoke detector that samples the air moving in a duct and detects smoke in the sample

4 General requirements

4.1 Compliance

In order to comply with this part of ISO 7240, the s.d.e.d. shall meet the requirements in 4.2 to 4.8, which shall be verified by visual inspection or engineering assessment, shall be tested as described in Clause 5 and shall meet the requirements of these tests.

4.2 Visual alarm indication

Each s.d.e.d. shall be provided with a red visual indicator, by which the s.d.e.d. can be identified when the associated detector releases an alarm and which remains illuminated until the alarm condition is reset. Where other conditions of the s.d.e.d. can be visually indicated, they shall be clearly distinguishable from the alarm indication, except when the s.d.e.d. is switched into a service mode. The alarm indicator may be the smoke detector indicator provided the indicator is visible when the detector is in-situ as part of the s.d.e.d.

The visual indicator shall be visible from a distance of 6 m in an ambient light intensity up to 500 lx at an angle of up to

- a) 5° from the axis of the detector in any direction, and
- b) 45° from the axis of the detector in at least one direction.