



DPC: 25/30507298 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 22 September 2025

Origin: International

Latest date for receipt of comments: 15 November 2025

Project No. 2025/00076

Responsible committee: FSH/12/2 Fire detectors

Interested committees:

Title: Draft BS ISO 7240-33 Fire detection and alarm systems. Part 33: Thermal Imaging Fire Detectors.

Please notify admin.start@bsigroup.com if you are aware of any keywords that might assist in clarifying or identifying the standard or of the content of this standard:

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 15 November 2025

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/ Figure/Table/Note	Type of comment	Comment (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



DRAFT International Standard

ISO/DIS 7240-33

Fire detection and alarm systems — Part 33: Thermal Imaging Fire Detectors

ICS: 13.220.20

ISO/TC 21/SC 3

Secretariat: **SA**

Voting begins on:
2025-09-22

Voting terminates on:
2025-12-15

This document has not been edited by the ISO Central Secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENTS AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

Reference number
ISO/DIS 7240-33:2025(en)

Full document details: 25/30507298 DC

© ISO 2025  **Documents**
Document Sharing Hub



COPYRIGHT PROTECTED DOCUMENT

© ISO 2025

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

Contents

Page

Foreword	vi
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Definitions	1
3.2 Abbreviated terms	2
4 Requirements	2
4.1 Conformity	2
4.2 Fire phenomena	3
4.3 Immunity to unwanted alarms	3
4.4 Detection range	3
4.5 Camera lens monitoring	3
4.6 Individual alarm indication	3
4.7 Connection of ancillary devices	3
4.8 Monitoring of detachable cameras	3
4.9 Connection of more than one TIFD to the FDCIE transmission path	3
4.10 Manufacturer's adjustments	4
4.11 On-site adjustment of response behaviour	4
4.12 Protection against the ingress of foreign bodies	4
4.13 Operating temperature	4
4.14 Software	5
4.14.1 General	5
4.14.2 Software design	5
4.14.3 Storage of programs and data	5
5 Tests	5
5.1 General	5
5.1.1 Atmospheric conditions for tests	5
5.1.2 Mounting arrangements	5
5.1.3 Operating conditions for tests	6
5.1.4 Tolerances	6
5.1.5 Provision for tests	6
5.1.6 Measurement of response threshold value	6
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 Reproducibility	8
5.3.1 Object of test	8
5.3.2 Test procedure	8
5.3.3 Requirements	9
5.4 Pixel Array Uniformity	9
5.4.1 Object of test	9
5.4.2 Test procedure	9
5.4.3 Requirements	9
5.5 Detector lens blocking	9
5.5.1 Object of test	9
5.5.2 Test procedure	9
5.5.3 Requirements	9
5.6 Fire sensitivity (optional)	9
5.6.1 Object of test	9

5.6.2	Test procedure.....	10
5.6.3	Requirements.....	10
5.7	Moving object immunity (optional).....	11
5.7.1	Object of test.....	11
5.7.2	Test procedure.....	11
5.7.3	Requirements.....	11
5.8	Response at maximum and minimum distance.....	11
5.8.1	Object of test.....	11
5.8.2	Test procedure.....	11
5.8.3	Requirements.....	12
5.9	Variation in supply parameters.....	12
5.9.1	Object of test.....	12
5.9.2	Test procedure.....	12
5.9.3	Final measurements.....	12
5.9.4	Requirements.....	12
5.10	Dry heat (operational) – Indoor and Outdoor 2.....	12
5.10.1	Object of test.....	12
5.10.2	Test procedure.....	12
5.10.3	Requirements.....	13
5.11	Dry heat (operational) — Outdoor 1.....	13
5.11.1	Object of test.....	13
5.11.2	Test procedure.....	13
5.11.3	Requirements.....	14
5.12	Cold (operational) - Indoor.....	14
5.12.1	Object of test.....	14
5.12.2	Test procedure.....	14
5.12.3	Requirements.....	15
5.13	Cold (operational) — Outdoor 1 and Outdoor 2.....	15
5.13.1	Object of test.....	15
5.13.2	Test procedure.....	15
5.13.3	Requirements.....	16
5.14	Cold controllers (operational).....	16
5.14.1	Object of test.....	16
5.14.2	Test procedure.....	16
5.14.3	Requirements.....	17
5.15	Damp heat, steady-state (operational).....	17
5.15.1	Object of test.....	17
5.15.2	Test procedure.....	17
5.15.3	Requirements.....	18
5.16	Damp heat, steady-state (endurance).....	18
5.16.1	Object of test.....	18
5.16.2	Test procedure.....	18
5.16.3	Requirements.....	19
5.17	Protection against ingress of foreign bodies (endurance).....	19
5.17.1	Object of test.....	19
5.17.2	Enclosure of the TIFD.....	19
5.17.3	Test procedure.....	19
5.17.4	Requirements.....	20
5.18	Sulfur dioxide (SO ₂) corrosion (endurance).....	20
5.18.1	Object of test.....	20
5.18.2	Test procedure.....	20
5.18.3	Requirements.....	20
5.19	Shock (operational).....	21
5.19.1	Object of test.....	21
5.19.2	Test procedure.....	21
5.19.3	Requirements.....	21
5.20	Impact (operational) for cameras.....	22
5.20.1	Object of test.....	22
5.20.2	Test procedure.....	22

5.20.3	Requirements.....	22
5.21	Impact (operational) for controllers.....	23
5.21.1	Object of test.....	23
5.21.2	Test procedure.....	23
5.22	Vibration, sinusoidal (endurance).....	23
5.22.1	Object of test.....	23
5.22.2	Test procedure.....	24
5.22.3	Requirements.....	24
5.23	Vibration, sinusoidal controller (endurance).....	24
5.23.1	Object of test.....	24
5.23.2	Test procedure.....	24
5.23.3	Requirements.....	25
5.24	Electromagnetic compatibility (EMC) immunity (operational).....	25
5.24.1	Object of test.....	25
5.24.2	Test procedure.....	25
5.24.3	Requirements.....	26
6	Test report	26
7	Marking	27
8	Data	27
8.1	General.....	27
8.2	Software documentation.....	28
8.3	Hardware documentation.....	28
8.4	Installation and user documentation.....	28
	Annex A (normative) Fire test room	30
	Annex B (normative) Flaming liquid (n-heptane) fire (TF5)	32
	Annex C (normative) Smoke-measuring instruments	34
	Bibliography	40

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 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 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*.

The main changes are as follows:

— xxx xxxxxxxx xxx xxxxx

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

Introduction

A thermal image fire detection system differs from some point-type detectors (e.g. ISO 7240-6, ISO 7240-7) in that the detection is performed remotely from the actual fire and therefore does not involve sensor contact with the products of combustion. The fire detection is based on mathematical algorithm analysis of a thermal image. The thermal image from a thermal camera might be processed by software to determine the presence of heat and/or flame (depending on the capability of the system) which is visible in the image.

Thermal image fire detectors consist of three elements: a sensor, an image processor, and a transmission path between the sensor and image processor. The elements can be in a single cabinet, or the sensor and processor can be in separate cabinets, interconnected by a transmission path.

The processor incorporates an alarm and fault signalling interface to connect to a compatible fire detection control and indicating equipment transmission path.

Two enclosure protection ratings are specified for dust and water ingress protection.

Three environmental temperature ranges are specified, for detectors suitable for installation indoors or outdoors.

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. Tests are intended to assess the performance of the thermal image fire detectors under such conditions.

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

Fire detection and alarm systems —

Part 33: Thermal Imaging Fire Detectors

1 Scope

This document specifies requirements, test methods and performance criteria for thermal image fire detectors (TIFD), which operate in the infrared spectrum, for use in fire detection and alarm systems installed in and around buildings (see ISO 7240-1).

Detectors developed for the protection of specific risks that incorporate special characteristics (including additional features or enhanced functionality for which this document does not define a test or assessment method) are beyond the scope of 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.

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

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

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

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

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

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

IEC 60068-2-75, *Environmental testing — Part 2-75 Tests – Test Eh: Hammer tests*

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

IEC 60081, *Double-capped fluorescent lamps — Performance specifications*

IEC 60529, *Degrees of protection provided by enclosures (IP code)*

IEC 62262, *Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)*

IEC 62599-2, *Alarm systems — Part 2: Electromagnetic compatibility — Immunity requirements for components of fire and security alarm systems*

3 Terms and definitions

3.1 Definitions

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

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

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

3.1.1

controller

optional information technology equipment that connects to thermal image fire detectors that record and/or perform analytics on images

3.1.2

response threshold value (T)

the temperature at which a detector signals an alarm

Note 1 to entry: When tested as specified in [5.1.6](#).

3.1.3

field of view

FOV

image captured by the thermal image fire detector

Note 1 to entry: The FOV can be expressed as an angle or as a width and height, at a specified distance.

3.1.4

Thermal image fire detector

TIFD

self-contained device or distributed system in which analysis of thermal images is performed to measure temperature in order to detect the likely presence of fire within the images being analysed

3.2 Abbreviated terms

EM	electromagnetic compatibility
FDCIE	fire detection control and indicating equipment
FOV	field of view
MIC	measuring ionization chamber
IP	ingress protection
RTV	response threshold value
TIFD	thermal image fire detector

4 Requirements

4.1 Conformity

In order to comply with this document, the TIFD shall meet the following requirements:

- comply with the requirements of [Clause 4](#), which shall be verified by visual inspection or engineering assessment;
- be tested as specified in [Clause 5](#), meeting the requirements of the tests;
- be marked in accordance with [Clause 7](#) and be accompanied by the documentation specified in [Clause 8](#), which shall be verified by visual inspection.

4.2 Fire phenomena

The manufacturer shall declare, in the data presented in [Clause 8](#), the stimulus to which the TIFD is designed to respond. The stimulus that the TIFD responds to shall consist of objects radiating in the infrared wavelength, flames, or both.

4.3 Immunity to unwanted alarms

Detectors shall be immune from phenomena that can cause unwanted alarms.

Tests shall be performed where the manufacturer claims immunity to the phenomena.

4.4 Detection range

The manufacturer shall declare the ranges at which the TIFD shall detect a fire in the data supplied in [Clause 8](#). The manufacturer shall define the size of the hot object which can be detected at the declared distance.

4.5 Camera lens monitoring

Complete obscuration of the camera lens that inhibits fire detection in the operating FOV shall cause a fault signal.

4.6 Individual alarm indication

Where the TIFD does not display an image of the FOV to the user, then each thermal image fire detector shall be provided with an integral red visual indicator by which the individual detector signaling an alarm can be identified, until the alarm condition is reset. Where other conditions of the detector can be visually indicated, these shall be clearly distinguishable from the alarm indication.

Where the indicator is mounted on the camera, 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.

4.7 Connection of ancillary devices

The detector may provide for connections to ancillary devices (remote indicators, control relays, etc.), but open- or short-circuit failures of these connections shall not prevent the correct operation of the detector.

4.8 Monitoring of detachable cameras

For detachable cameras, a means shall be provided to detect the disconnection of the camera, in order to give a fault signal.

4.9 Connection of more than one TIFD to the FDCIE transmission path

Where a TIFD is designed to share the transmission path to the FDCIE with other devices; connections shall be such that a single transmission fault does not prevent an alarm signal from more than one TIFD.

Where more than one TIFD share the transmission path to the FDCIE, connections shall be such that one TIFD fault signal does not prevent the alarm signal from any other TIFD.

A TIFD fault shall raise a fault at the FDCIE where the TIFD forms part of a distributed system and transmission path to the FDCIE connecting other devices.

4.10 Manufacturer's adjustments

It shall not be possible to change the manufacturer's settings, including the response behaviour of the TIFD, except by special means (e.g. the use of a special code or tool) or by breaking or removing a seal.

4.11 On-site adjustment of response behaviour

If there is provision for on-site adjustment of the response behaviour of the detector, then:

- a) for all of the settings at which the manufacturer claims compliance, the detector shall comply with the requirements of this document and access to the adjustment means shall be possible only by the use of a code or special tool or by removing the detector from its base or mounting;
- b) any setting or settings at which the manufacturer does not claim compliance with this document shall be accessible only by the use of a special code or tool, and it shall be clearly marked on the detector or in the associated data that if these setting or settings are used, the detector does not comply with this document.

Adjustments may be carried out at the TIFD or at the fire detection control and indicating equipment.

4.12 Protection against the ingress of foreign bodies

The manufacturer shall declare, in the data presented in [Clause 8](#), an enclosure protection rating (i.e. IP rating in accordance with IEC 60529) from [Table 2](#) to which the TIFD is designed to be protected against.

Table 2 — Thermal image fire detector enclosure protection

Application	IP rating (minimum) (see IEC 60529)
Indoor	30
Outdoor	54
Other	A rating nominated by the manufacturer exceeding the minimum for the application.

Where the TIFD includes more than one subassembly (e.g. a separate sensor and controller), some parts of the detector not designed to be installed in the environment to which the rating applies need not be assessed. In this case, the manufacturer's data shall declare the IP rating of each subassembly.

4.13 Operating temperature

The manufacturer shall declare the operating temperature specified in [Table 3](#) to which the TIFD is designed to operate.

Table 3 — Thermal image fire detector operating environment

Application	Temperature
Indoor controlled	0 °C to 40 °C
Indoor	-10 °C to 55 °C
Outdoor 1	-25 °C to 70 °C
Outdoor 2	-40 °C to 55 °C

Where the TIFD includes more than one subassembly (e.g. a separate sensor and controller i.e. a distributed system), some parts of the TIFD not designed to be installed in the temperature to which the rating applies shall be assessed separately for their intended installation location. In this case, the manufacturer's data shall declare the environment suitable for each subassembly.

4.14 Software

4.14.1 General

The requirements of 4.15.2 and 4.15.3 shall be met for detectors which rely on software control in order to fulfil the requirements of this document. See [Section 8.2](#) for software data.

4.14.2 Software design

In order to ensure the reliability of the detector, the following requirements for software design apply:

- a) the software shall have a modular structure;
- b) the design of the interfaces for manually and automatically generated data shall not permit invalid data to cause error in the program operation;
- c) the software shall be designed to avoid the occurrence of deadlock of the program flow.

4.14.3 Storage of programs and data

4.14.3.1 The program necessary to comply with this document and any preset data, such as manufacturer's settings, shall be held in non-volatile memory. Writing to areas of memory containing this program and data shall be possible only by the use of some special tool or code and shall not be possible during normal operation of the detector.

4.14.3.2 Site-specific data shall be held in memory which will retain data for at least two weeks without external power to the detector, unless provision is made for the automatic renewal of such data, following loss of power, within 1 h of power being restored.

5 Tests

5.1 General

5.1.1 Atmospheric conditions for tests

Unless otherwise stated in a test procedure, carry out the testing after the test specimen has been allowed to stabilize in the standard atmospheric conditions for testing as specified in IEC 60068-1 as follows.

Temperature: (15 to 35) °C

Relative humidity: (25 to 75) %

Air pressure: (86 to 106) kPa

The temperature and humidity shall be substantially constant for each environmental test where the standard atmospheric conditions are applied.

5.1.2 Mounting arrangements

Mount the specimen by its normal means of attachment in accordance with the manufacturer's instructions. If these instructions describe more than one method of mounting, then choose the method considered to be most unfavourable for each test.