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Fire detection and alarm systems —

Part 12: Line type smoke detectors using a transmitted optical beam

Systèmes de détection d'incendie et d'alarme —

Partie 12: Détecteurs linéaires de fumée utilisant une transmission par faisceaux lumineux

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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.

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 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 third edition cancels and replaces the second edition (ISO 7240-12:2014), which has been technically revised.

The main changes are as follows:

— references to EN 50130-4 have been replaced with references to IEC 62599-2 (electromagnetic compatibility immunity test);

— uniform acceptance criteria has been adopted for all line-type smoke detectors;

— editorial corrections have been made to bring the document in line with current ISO drafting 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.

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.

Fire detection and alarm systems —

Part 12: Line type smoke detectors using a transmitted optical beam

1 Scope

This document specifies requirements, test methods and performance criteria for line-type smoke detectors for use in fire detection systems installed in buildings. The detectors consist of at least a transmitter and a receiver and can include reflector(s) for the detection of smoke by the attenuation and/or changes in attenuation of an optical beam.

This document is not applicable to:

— line-type smoke detectors designed to operate with separations between opposed components of less than 1 m;

— line-type smoke detectors whose optical path length is defined or adjusted by an integral mechanical connection;

— line-type smoke detectors with special characteristics, which cannot be assessed by the test methods in this document.

NOTE The term "optical" is used to describe that part of the electromagnetic spectrum produced by the transmitter to which the receiver is responsive; this is not restricted to visible wavelengths.

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

IEC 60064, *Tungsten filament lamps for domestic and similar general lighting purposes — Performance requirements*

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

IEC 60068-2-1:2007, *Environmental testing — Part 2-1: Tests. Tests A: Cold*

IEC 60068-2-2:2007, *Environmental testing — Part 2-2: Tests. Tests B: Dry heat*

IEC 60068-2-6:2007, *Environmental testing — Part 2-6: Tests. Test Fc: Vibration (sinusoidal)*

IEC 60068-2-42:2003, *Environmental testing — Part 2-42: Tests. Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-75:2014, *Environmental testing — Part 2-75: Tests Eh: Hammer test*

IEC 60068-2-78:2012, *Environmental testing — Part 2-78: Tests. Test Cab: Damp heat, steady state*

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

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

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
attenuation
A
reduction in intensity of the optical beam at the receiver, defined by the formula:

$$A = 10 \log_{10} \left(\frac{I_0}{I} \right)$$

where

I_0 is the received intensity without reduction in intensity;

I is the received intensity after reduction in intensity.

Note 1 to entry: The attenuation is expressed in units of decibels (dB).

3.2
opposed component
component [transmitter and receiver or transmitter-receiver and reflector(s)] of the detector whose position determines the optical path

3.3
optical path length
total distance traversed by the optical beam between the transmitter and the receiver

3.4
receiver
component that receives the optical beam

3.5
response threshold value
C
value of attenuation at which an alarm signal is generated, calculated using the formula:

$$C = F \times \left(\frac{n_f}{n_v} \right)$$

where

F is the value of attenuation resulting from a beam passing once through a filter, given by the formula $10 \log_{10} \left(\frac{I_0}{I} \right)$;

I_0 is the received intensity of the optical beam without reduction through an attenuating filter;