

Components of automatic fire detection systems —

Part 5: Heat sensitive detectors — point detectors containing a static element

This European Standard EN 54-5 was given, as from 31 March 1977, the status of a British Standard, replacing BS 3116-1 which is accordingly withdrawn.

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Cooperating organizations

The European Committee for Standardization, under whose supervision this European Standard was prepared, comprises the national standards organizations of the following Western European countries:

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Switzerland	Association Suisse de Normalisation
United Kingdom	British Standards Institution

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National foreword

This standard, prepared under the authority of the Fire Standards Committee, specifies the requirements and methods of test for point type heat detectors containing a static element. Components of automatic fire detection systems to be specified in other Parts of this standard are described in Part 1 “Introduction”.

The following is a general guide to the purpose, interpretation and use of this standard. The standard is broadly similar to BS 3116 “Automatic fire alarm systems in buildings”, Part 1 “Heat sensitive (point) detectors”, which it supersedes and which is therefore withdrawn.

The standard is intended to apply to point type heat detectors installed in normal accommodation spaces in buildings. It applies to all such detectors containing a static (fixed temperature) element, whether or not that element is combined with a rate-of-rise element. Detectors without a fixed temperature element do not comply with the standard and are not normally acceptable for installation in the UK.

The tests are in the nature of “type tests” and are not intended as manufacturers’ tests to maintain uniformity of quality in production. While they are intended to assess the most important features of the design of automatic fire alarm systems, they cannot remove the necessity for regular inspection and maintenance, which are essential for reliable operation.

The requirements of clause 3 are intended to ensure that sufficient information is supplied with the detector to allow its correct application and that sufficient identification is marked on the detector to allow it to be identified in any post-installation inspection. The information to be supplied with the detector should include details of the required electrical interface with the control and indicating equipment, which may take the form either of values of the currents, voltages, etc., and their allowable tolerances, or of a restriction of the detector to be used only in conjunction with specified control and indicating equipments.

The time of response of a heat sensitive detector to fire conditions depends upon a number of factors. First, it depends upon the rate of growth of heat output from the fire. Second, it depends upon certain characteristics of the detection system, including the thermal capacity of the heat sensitive element(s), the rate of heat transfer from the hot gases to the sensitive element and the adjustment or “setting” of the detector or its indicating equipment or both. Third, it depends upon certain characteristics of the building itself and the siting of the detector in it. These characteristics include the height of the ceiling, the depth to which the detector projects below the ceiling, the shape or type of ceiling and the horizontal distance of the detector from the fire. In the tests described in annex C, the response time of a detector is measured under conditions representative of the range of air temperatures and velocities occurring beneath the ceiling of an enclosure in which a fire is developing. The curve of response time obtained in these tests indicates the combined sensitivity of the detector and its indicating equipment.

The limits imposed on the response time of the detector in clause 4, which relate to the grading, are given in Table 1. The upper limits of response time are intended to ensure that detectors respond sufficiently quickly to a fire. As the size of fire to which a detector will respond increases markedly with the height of the ceiling on which it is mounted, three upper limits are provided, appropriate to ceilings of different height, so that the more sensitive detectors may be specified for the higher ceilings.

The lower limit of response time is specified in order to ensure that false alarms are not given due to changes in the ambient temperature where no fire has occurred.

The range of ceiling heights appropriate to the three grades of detector referred to in clauses 3 and 4 are given in the appropriate code of practice, together with suitable guidance on the siting of detectors, which should be such as to ensure a flow of hot gas to at least one detector.

Fire detectors in service are required to withstand the effect of the vibration of the structure on which they are mounted. If a component of a detector has a natural frequency within the frequency range of the structure, it is possible for its amplitude of vibration to become large, which may result either in false alarms or in failure of the detector.

The test specified in clause 5 has been designed to show whether such resonance can be produced and whether failure is likely to occur.

The corrosive conditions occurring in buildings vary widely and their effects on the materials and protective treatments of detectors may also be expected to vary. It is not considered possible to specify a standard corrosive atmosphere suitable for predicting the degree of corrosion likely to occur after a period of service in any one of a number of atmospheres, ranging from those of normal office accommodation to those in chemical and other industrial premises. The test described in annex E, however, will indicate the weak points in the design and protection of a detector and will give a general appraisal of its resistance to corrosion.

Detectors in service may be struck by carelessly handled ladders, pipes, etc., and may suffer damage that will impair their operation. The test specified in clause 7 is designed to assess the effect of impact on detectors after installation.

Detectors in service may also suffer shock due to weights being dropped onto the floor above. The test specified in clause 8 is designed to assess the effect of shock on detectors after installation.

Detectors in service may be subjected to low ambient temperatures, and the test specified in clause 9 is designed to ensure that operation does not occur as a result of low temperatures and that such temperatures do not inhibit subsequent operation in fire.

Similarly, where detectors are exposed to high ambient temperatures in the absence of fire, the tests specified in clause 10 are intended to ensure that such exposure does not excessively lengthen the response time in case of fire.

The tests specified in clause 11 are intended to ensure that the response of the detector is not affected by variations of the main power supply.

A British Standard does not purport to include all the necessary provisions of a contract. Users of British Standards are responsible for their correct application.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Summary of pages

This document comprises a front cover, an inside front cover, pages i to iv, the EN title page, pages 2 to 16, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

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Bestandteile automatischer Brandmeldeanlagen; Teil 5: Wärmemelder; Punktförmige Melder mit einem Element mit statischer Ansprechschwelle

This Amendment was accepted by CEN on 7 May 1987 in accordance with the conditions given on the title page of the European Standard to which this amendment refers and of which it is an integral part.

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European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue Bréderode 2, B-1000 Brussels

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Brief history

This Amendment 1 to the European Standard EN 54-5 was drawn up by the Technical Committee CEN/TC 72 (the EN has been voted in 1976) “Automatic fire detection systems”, the Secretariat of which is held by BSI. This amendment clarifies the procedures for certain tests.

In accordance with the Common CEN/CENELEC Rules, following countries are bound to implement this Amendment:

Austria, Denmark, Finland, Germany, Greece, Ireland, Italy, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom.