BS ISO 16732-1:2012

BSI Standards Publication

Fire safety engineering — Fire risk assessment

Part 1: General

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National foreword

This British Standard is the UK implementation of ISO 16732-1:2012.

The UK participation in its preparation was entrusted to Technical Committee FSH/24, Fire safety engineering.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Fire safety engineering — Fire risk assessment —

Part 1: General

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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 16732-1 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 4, *Fire safety engineering*.

This first edition of ISO 16732-1 cancels and replaces ISO/TS 16732:2005, which has been technically revised.

ISO 16732 consists of the following parts, under the general title *Fire safety engineering — Fire risk assessment*:

— *Part 1: General*

The following parts are under preparation:

— *Part 2: Example of an office building*

— *Part 3: Example of an industrial facility* [Technical Report]

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Introduction

This part of ISO 16732 is for use by fire safety practitioners who employ risk assessment based methods. Any fire safety practitioner can have reason to employ such methods. All fire safety decisions involve uncertainty. Probabilities are the mathematical representation of uncertainty, and risk assessment is the form of fire safety analysis that most extensively uses probabilities and so most extensively addresses all types of uncertainty.

Examples of types of such fire safety practitioners include fire safety engineers; authorities having jurisdiction, such as territorial authority officials; fire service personnel; code enforcers; code developers; insurers; fire safety managers; and risk managers. Users of this part of ISO 16732 are to be appropriately qualified and competent in the fields of fire safety engineering and risk assessment. It is particularly important that the user understand the limitations of application of any methodology that is used.

Risk assessment is preceded by two steps: establishment of a context, including the fire safety objectives to be met, the subjects of the fire risk assessment to be performed, and related facts or assumptions; and identification of the various hazards to be assessed. A “hazard” is something with the potential to cause harm.

The subjects of fire risk assessment include the design and control of any part of the built environment, such as buildings or other structures. Fire risk assessment of a design consists of analysis of the risks, e.g. frequency and severity of harm, that are predicted to result if the design is implemented, combined with an evaluation of the acceptability of those risks.

Fire risk assessment can be used to support any decisions about fire prevention or fire protection of new or existing built environments, such as buildings, where probabilistic aspects, such as fire ignition or the reliability of fire precautions, are important. Fire risk assessment can also be used to establish safety equivalent to a code, to assess the balance between the cost and the risk reduction benefit of a proposal, or to examine acceptable risk specifically for severe events. Fire risk assessment can also be used to provide general guidance or to support choices in the selection of scenarios and other elements of a deterministic analysis.

Fire risk assessment can be used as part of compliance with ISO 23932, and all the requirements of ISO 23932 apply to any application of this part of ISO 16732. ISO 23932 identifies different applications of fire risk assessment. One application is for the limited purpose of identifying a manageable number of design fire scenarios for a deterministic analysis. This use of fire risk assessment is cited in ISO 23932:2009, 9.2.2.2 and 9.2.2.3. Additional guidance for this application is contained in ISO/TS 16733.

The other application, cited in ISO 23932:2009, 10.1.1.2, is as a calculation method to assess whether a proposed or existing design plan meets fire safety objectives when the performance criteria for the fire safety objectives are expressed in a probabilistic form. That application is the one for which ISO 16732 is principally designed. In that application the concept of design fire scenario, as described in ISO 23932, is better addressed through the dual concepts of fire scenario cluster and representative fire scenario used in this part of ISO 16732. The user should regard representative fire scenarios as the types of design fire scenarios used in fire risk assessment. The term “representative” and the linkage with fire scenario clusters are necessary to establish that calculations based on the selected scenarios will produce an acceptably accurate estimate of the required performance criteria, expressed as measures of fire risk, in accordance with ISO 23932.

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Fire safety engineering — Fire risk assessment —

Part 1:
General

1 Scope

This part of ISO 16732 provides the conceptual basis for fire risk assessment by stating the principles underlying the quantification and interpretation of fire-related risk. These fire risk principles apply to all fire-related phenomena and all end-use configurations, which means these principles can be applied to all types of fire scenarios. The principles and concepts in this part of ISO 16732 can be applied to any fire safety objectives, including the five typical objectives listed as examples in Clause 1 of ISO 23932:2009:

— safety of life,

— conservation of property,

— continuity of business and safety operations,

— protection of the environment,

— preservation of heritage.

This part of ISO 16732 is designed as a guide for future standards that provide formal procedures for the implementation of the risk assessment principles for specific applications, e.g. situations in which only certain types of fire scenarios are possible. Those future standards will complete the process of full standardization begun by this part of ISO 16732, which not only specifies the steps to be followed in fire risk assessment but also provides guidance for use in determining whether the specific approach used for quantification falls within an acceptable range.

Principles underlying the quantification of risk are presented in this part of ISO 16732 in terms of the steps to be taken in conducting a fire risk assessment. These quantification steps are initially placed in the context of the overall management of fire risk and then explained within the context of fire safety engineering, as discussed in ISO/TR 13387. The use of scenarios and the characterization of probability (or the closely related measure of frequency) and consequence are then described as steps in fire risk estimation, leading to the quantification of combined fire risk. Guidance is also provided on the use of the information generated, i.e. on the interpretation of fire risk. Finally, there is guidance on methods of uncertainty analysis, in which the uncertainty associated with the fire risk estimates is estimated and the implications of that uncertainty are interpreted and assessed.

This part of ISO 16732 is not structured to conform with any national regulation or other requirement regarding the use of fire risk assessment or the type of analysis that is to be performed under the name of fire risk assessment.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 13943:2008, *Fire safety — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 13943 and the following apply.

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