
Fire safety engineering — General principles

Ingénierie de la sécurité incendie — Principes généraux



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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 23932 was prepared by Technical Committee ISO/TC 92, *Fire safety*, Subcommittee SC 4, *Fire safety engineering*.

Introduction

The vast majority of fire safety designs rely on prescriptive specifications written into regional, national or local regulations. Currently, various engineering approaches are also allowed by these regulations, although information needed for an engineering approach is still generally obtained from conventional test methods. Fire Safety Engineering (FSE) is a discipline increasingly being used throughout the world in support of performance-based design, i.e. the reliance on engineering methods to determine whether a given design meets stated performance objectives. An example of such a concept already in use in the current regulatory environment is the “equivalency concept”, where FSE supplements prescriptive design by being applied in a performance-based analysis to specific aspects of a design to obtain “equivalent” performance. The eight parts to ISO/TR 13387 developed by ISO/TC 92/SC 4 have already outlined the fundamental methodologies of FSE.

The difference between prescriptive and performance-based approaches to fire-safety design is highlighted in this International Standard by emphasizing the development of quantifiable fire-safety objectives as the first step in a performance-based analysis. Such objectives can be completely deterministic in nature or contain both deterministic and probabilistic aspects as used in a fire-risk assessment approach.

The new infrastructure of International Standards supporting performance-based fire-safety design consists of two basic types of fire-safety standards:

- a) conceptual standards that describe the underlying concepts and contain general requirements for both engineering and test methods to support performance-based design; these correspond to principle and phenomenon standards in the ISO/TC 92 framework report;
- b) standards that adapt the conceptual standards to specific configurations of the built environment, e.g. structural systems, transportation systems and manufacturing processes; these correspond to configuration standards in the ISO/TC 92 framework report. Conceptual standards have the advantage of broad applicability as guides for local/regional adoption and for new types of situations, while configuration standards are more specific and detailed.

This International Standard on general design principles and design philosophy for fire-safety engineering contains a comprehensive overview of the performance-based design process for fire safety and thus represents the type of principle standard discussed in the ISO/TC 92 framework report. As such, it is also a template guiding the development of other standards applicable to a wide range of generic and specific fire-safety design situations. Hence, it is important that this International Standard be viewed as an outline of the fire-safety engineering design process, not as a detailed design methodology.

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1 Scope

This International Standard provides general principles for a performance-based methodology for engineers to assess the level of fire safety for new or existing built environments. Fire safety is evaluated through an engineered approach based on the quantification of the behaviour of fire and people and based on knowledge of the consequences of such behaviour on life safety, property and the environment.

This International Standard is not intended as a detailed technical design guide, but does contain the key elements needed by practicing fire safety engineers and peer reviewers (those entities who can be required to review the work of fire-safety engineers) for addressing the different steps and their linkages in a design process. The information contained in this International Standard is intended not only to be useful to engineers directly but also to serve as a template to guide the development of a consistent set of fire-safety engineering documents covering the role of engineering methods and test methods in performance-based design and assessment.

The basic principles of fire-safety design and related fire-safety objectives in this International Standard can be applied in any other document addressing phenomena associated with fire (e.g. fire growth, hot gases and effluents movement, structural and compartmentalization behaviour). Related fire-safety objectives include, for example,

- safety of life;
- conservation of property;
- continuity of operations;
- protection of the environment;
- preservation of heritage.

Furthermore, these basic principles can be applied to all configurations of the built environment (e.g. buildings, transportation systems and industrial installations).

Because prescriptive regulations covering fire-safety design will co-exist for some time with performance-based design, this International Standard takes into account that fire-safety designs conforming to prescriptive regulations can become the basis for comparison of engineered designs of new built environments.

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 13943, *Fire safety — Vocabulary*