
Požarno inženirstvo - Pregled in nadzor v procesu graditve

Fire safety engineering - Review and control in the building process

Brandschutzingenieurwesen - Überprüfung und Kontrolle im Bauprozess

Ingénierie de la sécurité incendie - Revue et contrôle dans le processus de construction

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**Fire safety engineering - Review and control in the
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Ingénierie de la sécurité incendie - Revue et contrôle
dans le processus de construction

Brandschutzingenieurwesen - Überprüfung und
Kontrolle im Bauprozess

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European foreword

This document (CEN/TS 18332:2026) has been prepared by Technical Committee CEN/TC 127 “Fire safety in buildings”, the secretariat of which is held by BSI.

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Introduction

This document has been prepared to support the development of the fire safety engineering development in Europe.

In fire safety design, compliance with fire safety regulations can be demonstrated either by using pre-accepted solutions that are defined by the building authorities, or by using fire safety engineering methods.

This document describes the review and control of fire safety design in the building process and includes both design alternatives. It is inspired by Nordic Standards INSTA 952 – 2019 (ICS 13.220.01) [1], work conducted by ISO/TC 92/SC 4 on fire safety engineering [17], [18], [19], [20], [21], [22] and SFPE Guidelines (SFPE, 2007 and 2009) [4], [5]. Clauses 6 and 7 provide a general description of the phases and the fire safety design within the building process.

The aim is to facilitate verification of building solutions including innovative and sustainable solutions and to provide a process for control within the field of fire safety engineering, which can assist member states to implement or improve their review and control regime. This document is intended to be used as a reference document for building authorities and for use in connection with regulations by designers, local authorities and stakeholders in the building industry.

Performance based building regulations provide the appropriate framework for the development of fire safety engineering in the countries. They establish the fire performance objectives and harmonized functional requirements focussing on the expected performance of the building but not on the specific solutions.

Traditionally, fire regulations have had a prescriptive character. This type of regulations originated from empirical information, are assumed to deliver adequate levels of fire safety through the implementation of specific building physical requirements. Today, prescriptive codes remain a basic tool to determine the fire safety characteristics in many buildings and applications.

Prescriptive-based and performance-based regulations differ in the way of developing, implementing, and enforcing regulations that are essential to develop and maintain an efficient legal framework.

The multidisciplinary nature of fire safety engineering projects and the direct involvement of all construction stakeholders (e.g. owners, architects, designers, users, enforcers, fire engineers) are two reasons why projects can benefit from specific rules for the application of fire safety engineering principles. The function of control, normally developed by the code enforcers, should also be determined and adapted.

1 Scope

This document specifies when and how to conduct reviews and controls within the field of fire safety design, from planning and design to construction and finally, operation and maintenance.

This document describes reviews and controls, independent of national regulations, with a primary focus on technical issues within fire safety engineering. It describes how the fire safety design process, including engineering approaches, forms a normal part of the overall control and review of the building process and defines eligibility criteria for the parties performing the controls.

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.

EN ISO 13943, *Fire safety — Vocabulary (ISO 13943)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 13943 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 acceptance criteria

criteria that form the basis for assessing the acceptability of the safety of a design of a built environment

Note 1 to entry: The criteria can be qualitative, quantitative or a combination of both.

[SOURCE: EN ISO 13943:2017 [6]]

3.2 approval body

organization, office or individual authorised to approve the design of a building

Note 1 to entry: Depending on national legislation, the approval body can be local or national authorities or a privately held third-/party designer with the necessary notification. Alternatively, the companies responsible for designing the building can be authorized to “approve” their own work.

3.3 authority having jurisdiction AHJ

organization, office or individual responsible for approving designs, equipment, installations, materials and/or procedures

[SOURCE: SFPE Engineering Guide to Performance-Based Fire Protection, 2nd edition [4]]

3.4 building solution

solution adopted to any aspects related to the life of the building (from design to demolition)

3.5**concept design**

design that takes place after feasibility studies and options appraisals have been carried out and a project brief has been prepared

3.6**contractor**

company responsible for the physical construction of a building

3.7**design objective**

description of the performance benchmark against which the predicted performance of a design is evaluated

[SOURCE: FPE Engineering Guide to Performance-Based Fire Protection, 2nd edition [4]]

3.8**design review**

overall review process during the design

[SOURCE: SFPE Guidelines for Peer Review in the Fire Protection Design Process [3]]

3.9**detailed design**

process of taking on and developing the approved concept design

3.10**fire scenario**

qualitative description of the course of a *fire* with respect to time, identifying key events that characterize the studied fire and differentiate it from other possible fires

[SOURCE: EN ISO 13943:2017 [6]]

3.11**fire safety design**

design of fire safety selected for implementation from the successful trial design

[SOURCE: SFPE Engineering Guide to Performance-Based Fire Protection, 2nd edition, amended [4]]

3.12**fire safety engineer**

person undertaking fire safety engineering

3.13**fire safety engineering**

application of engineering methods to the development or assessment of designs in the built environment through the analysis of specific fire scenarios or through the quantification of risk for a group of fire scenarios

[SOURCE: EN ISO 13943:2017 [6]]

3.14**fire safety design brief**

summary of the agreed upon performance criteria and methods that will be used as a basis for the fire safety design

[SOURCE: SFPE Engineering Guide to Performance-Based Fire Protection, 2nd edition, amended [4]]

CEN/TS 18332:2026 (E)**3.15****fire safety design documentation**

set of documents that describes the fire safety strategy including both the fire safety design brief and the complete verification of sufficient safety based on the level of fire safety engineering aspects that have been reviewed

3.16**fire safety strategy**

combination of fire safety measures that has been shown by reference to design codes or analysis to be capable of satisfying the specified functional objective

[SOURCE: EN ISO 13943:2023 – [6]]

3.17**design review**

evaluation of the conceptual and technical soundness of a design

3.18**performance criteria**

quantitative criteria which form an acceptable basis for assessing the safety of a design for a built environment

Note 1 to entry: The performance criteria are usually ones that have been agreed by an authority having jurisdiction or by codes or a standardization committee.

[SOURCE: EN ISO 13943:2023 – [6]]

3.19**pre-accepted solution**

solution that has been determined by the authority having jurisdiction (AHJ) to comply with the objectives stipulated in the fire safety requirements

Note 1 to entry: The definition may vary in different countries. Other terms are, for example, deemed-to-satisfy solutions, acceptable solutions, prescriptive solutions.

[SOURCE: INSTA/TS 950:2014 – [7]]

3.20**quality assurance**

process to ensure correct quality during an internal quality control review

3.21**qualitative design review**

first step in the fire safety design process that focuses on conducting an initial risk screening to identify possible ways in which a fire hazard might arise with regards to the fire safety objectives

3.22**stakeholder**

person or organization who has a share or an interest in the building

Note 1 to entry: Example of stakeholders:

- building owner;
- building manager;

- design team;
- authorities having jurisdiction, (AHJ):
 - fire;
 - building;
 - insurance;
- accreditation agencies;
- construction team:
 - construction manager;
 - general contractor;
 - subcontractors;
- tenants;
- building operations and maintenance;
- emergency responders;
- enforcers.

[SOURCE: Based on SFPE Engineering Guide to Performance-Based Fire Protection, 2nd edition [4]]

3.23

third party reviewer

organisation or individual which is independent of the project stakeholders and conducts the review

3.24

trial design

fire safety system design intended to achieve the stated fire safety goal and expressed in terms that make it possible to assess whether the fire safety goals have been achieved

[SOURCE: SFPE Engineering Guide to Performance-Based Fire Protection, 2nd edition [4]]

3.25

validation

process of determining the degree to which a calculation method is an accurate representation of the real world from the perspective of the intended uses of the calculation method

[SOURCE: ISO 16730:2008 [8]]

3.26

verification

process of determining that a calculation method implementation accurately represents the developer's conceptual description of the calculation method and the solution to the calculation method

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Note 1 to entry: Verification methods can include: qualitative arguments, calculation methods, the use of recognized analytical methods and mathematical models; laboratory tests, the use of tests (sometimes to destruction) on prototype components and systems; *in situ* tests that may involve the examination of plans and verification by test, in which compliance with specified numbers, dimensions or locations is required (non-destructive tests, such as pipe pressure tests, are also included).

[SOURCE: ISO 16730:2008 [8]]

3.27**compliant design system****CDS**

fire safety design system complying with applicable regulations or standards

3.28**factory acceptance test****FAT**

test performed in the factory to verify the performance of products

3.29**inspection and testing plan****ITP**

planning and identification of all the tests and inspections to be performed during the construction and commissioning phases

3.30**non-compliance report****NCR**

document reporting the non-compliance with the referenced document after an inspection or a test

3.31**site acceptance test****SAT**

tests performed on construction sites to verify functionality or performance of a product or a system

3.32**operation and maintenance****O&M**

phase of use of a building

3.33**health and safety****H&S**

conditions related to the health and safety of persons whatever are their function (e.g. occupants, visitors, workers, firefighters)

3.34**integrated acceptance test****IAT**

commissioning test performed on site to verify the functionality and performance of an installed system

Note 1 to entry: For example for a smoke and heat exhaust system, this would require tests of the system and verification that each component of the system has been correctly installed and performs as designed

3.35**competent**

possessing of the skills, knowledge and experience in the required domain

3.36**competence team**

group of individuals competent in all domains to be covered

4 Fire safety strategy**4.1 General fire safety objectives**

The fire safety objectives are the societal goals, which are normally set by the legislature. They can be divided in the fire safety objectives themselves (objectives that the EU member states have in common) and additional objectives, that can be set by a Member State or a private sector body like an insurance company or that one wishes to fulfil voluntarily.

NOTE For general principles of fire safety engineering, see ISO 23932-1 [24].

The following general safety objectives are relevant to life and safety:

- protection of human life from injuries and death caused by a fire in and around a building;
- protection of animals from injuries and death caused by a fire in and around a building.

4.2 Additional objectives

For completing the set of fire safety objectives that can be applied as a function of the use of the building, additional fire safety objectives such as the following can be required:

- protection of the environment from the effects from a fire in and around a building;
- property protection (buildings, business/operational continuity, strategic functions, cultural heritage (see EN 16893 [26]));
- information impact (see ISO 26367) [27]) from damage caused by a fire in and around a building.

4.3 Functional requirements

Functional requirements are qualitative specifications to ensure that the fire safety objectives are being fulfilled, such as the following:

- a) Fire occurrence shall be prevented.
- b) The structural stability of load-bearing structures shall be ensured for a specific time.

NOTE Local regulations can require that a fire not lead to the likely collapse of a building.

- c) The spread of fire and smoke within buildings shall be limited.
- d) The spread of fire to neighbouring buildings¹ shall be limited.
- e) The occupants shall be enabled to leave the building themselves or shall be enabled to be rescued by other means.

¹ Surrounding environment, forest, industrial installation, cultural heritage, operation continuity, good property.

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- f) The safety of the rescue teams shall be taken into consideration.
- g) Effective firefighting shall be enabled.
- h) The building elements, technology and operational procedures for fire safety shall be maintained as appropriate during the life of the building.

According to the model of performance-based codes given in CEN/TR 17524:2020 Figure 1 [28], the qualitative functional requirements shall be specified by quantitative performance requirements. The compliance with both functional requirements and the paramount fire safety objectives can be demonstrated by fulfilment of the performance requirements. The design of a building according to given acceptable solutions is an alternative to fulfilling the performance requirements.

4.4 Implementation of the fire safety strategy

The fire safety strategy should satisfy the functional requirements and be based on applicable building code and references, and more generally on stakeholders' requirements. It should include the list of the main fire hazards and should identify the mitigating measures. Generally, the simplest method to achieve the design objectives and gain approvals by AHJ should be selected, which is usually a "code-compliant" approach. More advanced methods, including fire-engineering, can be deployed in instances where code-compliant methods are inappropriate or if greater confidence is required, notably in case of:

- use of new materials (e.g. bio sourced);
- complex building design (e.g. multi materials, structural approach);
- high-risk building design (e.g. hazards, occupant characteristics, project size, firefighting access).

The fire safety strategy should include the building design parameters that affect fire safety design (e.g. structural materials).

The fire safety strategy should specify whether the building should be designed with fire safety engineering methods of any kind or mainly pre-accepted solutions.

When prescriptive rules are applied, deviations shall have performance-based applications to justify solutions. Prescriptive rules and performance code shall be strongly connected. The fire safety objectives shall be listed and the functional requirements that are met by performance-based applications should be defined.

Justification for alternative solutions should be given if the performance-based code requires it. However, the requirements of all stakeholders, in particular from insurance, should be mentioned and addressed.

In any case, the fire safety strategy shall include the definition of fire safety acceptance criteria, which should be approved by all relevant stakeholders.

5 Description of the phases of the building process**5.1 General**

The life phases of a building are the following:

- planning and design;
- construction;
- use and its associated maintenance;

- changes in the building or in its the use;
- demolition at end of life, noting that materials or products could be reused.

This process can generally be described, as in Figure 1, in different phases.

The requirements of control and review vary with the life phases depending on the complexity of the project. Using a combination of the different types of control is often the most effective in each life phase.

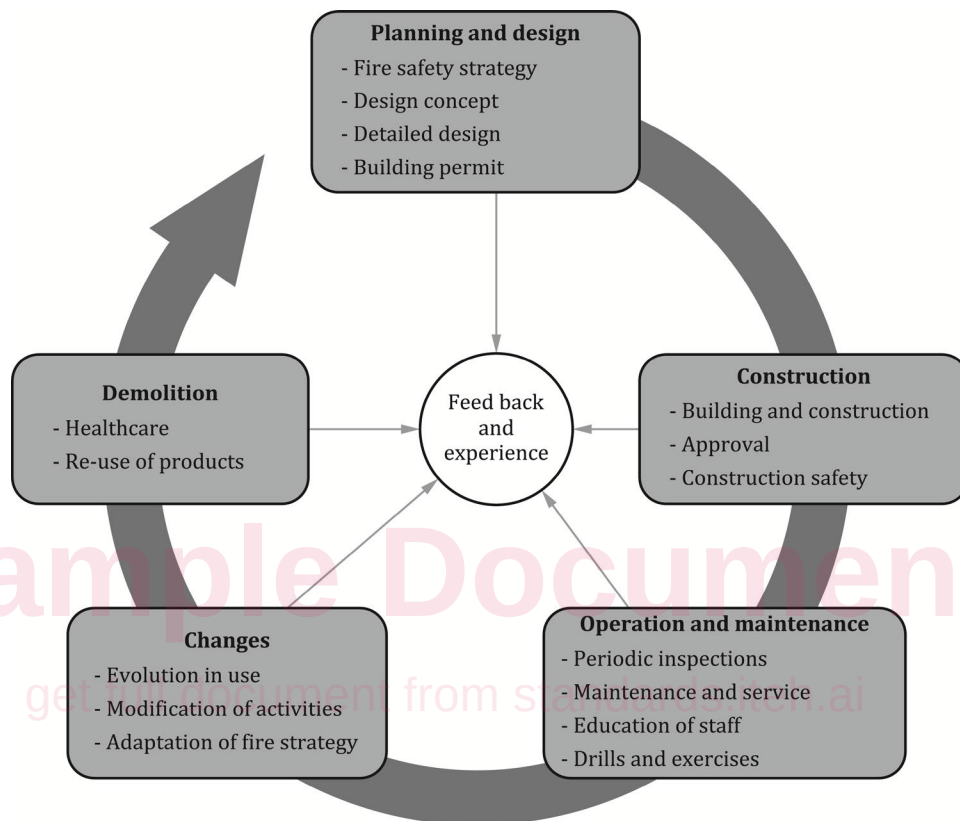


Figure 1 — Description of the different life phases of the building process

5.2 Planning and design phase

5.2.1 General

The planning and design phase involves different stakeholders (see 3.22).

Whether the authorities should be involved depends on the complexity of the building and potential consequences of fire. When the building is complex or the consequences of a fire can be high, it is important to involve the AHJ soon in the project to ensure compliance with the fire safety objective and with the method used for validating the functional requirements. If the project is simple (such as an office of limited size) the required involvement of authorities can be at the end of this stage to validate compliance with national or local requirements.

NOTE Local regulation can apply.