INTERNATIONAL STANDARD

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Fire safety engineering — Requirements governing algebraic formulae —

Part 1: General requirements

Ingénierie de la sécurité incendie — Exigences régissant les équations algébriques —

Partie 1: Exigences générales

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Foreword

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

A list of all parts in the ISO 24678 series can be found on the ISO website.

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Introduction

The ISO 24678 series is intended to be used by fire safety practitioners involved with fire safety engineering calculation methods. Examples include fire safety engineers; authorities having jurisdiction such as: territorial authority officials, fire service personnel, code enforcers and code developers. It is expected that users of this document are appropriately qualified and competent in the field of fire safety engineering. It is particularly important that users understand the parameters within which particular methodologies may be used.

Algebraic formulae conforming to the requirements of this document are used with other engineering calculation methods during fire safety design. Such design is preceded by the establishment of a context, including the fire safety goals and objectives to be met, as well as performance criteria when a trial fire safety design is subject to specified design fire scenarios. Engineering calculation methods are used to determine if these performance criteria are met by a particular design and if not, how the design needs to be modified. The subjects of engineering calculations include the fire-safe design of entirely new built environments, such as buildings, ships or vehicles as well as the assessment of the fire safety of existing built environments.

The algebraic formulae discussed in this document can be useful for estimating the consequences of design fire scenarios. Such formulae are valuable for allowing the practitioner to quickly determine how a proposed fire safety design needs to be modified to meet the performance criteria and to compare among multiple trial designs. Detailed numerical calculations can be delayed until final design documentation. Examples of areas where algebraic formulae have been applicable include determination of heat transfer, both convective and radiant, from fire plumes, prediction of ceiling jet flow behaviours governing detector response, calculation of smoke transport through vent openings and analysis of compartment fire hazards such as smoke filling and flashover. However, the simple models often have stringent limitations and are less likely to include the effects of multiple phenomena occurring in the design scenario.

ISO 23932-1 is supported by a set of fire safety engineering documents available on the methods and data needed for the steps in a fire safety engineering design summarized in Figure 1 (taken from ISO 23932-1:2018, Clause 4). This set of documents is referred to as the Global Fire Safety Engineering Analysis and Information System. This global approach and system of documents provides an awareness of the interrelationships between fire evaluations when using the set of fire safety engineering documents. The set includes ISO 16730-1, ISO 16732-1, ISO 16733-1, ISO 16734, ISO 16735, ISO 16736, ISO 16737, ISO/TS 13447, ISO 24678, ISO/TS 24679, ISO/TS 29761 and other supporting technical reports that provide examples of and guidance on the application of these documents.

Each document supporting the Global Fire Safety Engineering Analysis and Information System includes language in the introduction to tie said document to the steps in the fire safety engineering design process outlined in ISO 23932-1. ISO 23932-1 requires that engineering methods are selected properly to predict the fire consequences of specific scenarios and scenario elements (ISO 23932-1:2018, Clause 10). Pursuant to the requirements of ISO 23932-1, this document provides the requirement governing algebraic formulae for fire safety engineering. This step in the fire safety engineering process is shown as a highlighted box in Figure 1 and described in ISO 23932-1.

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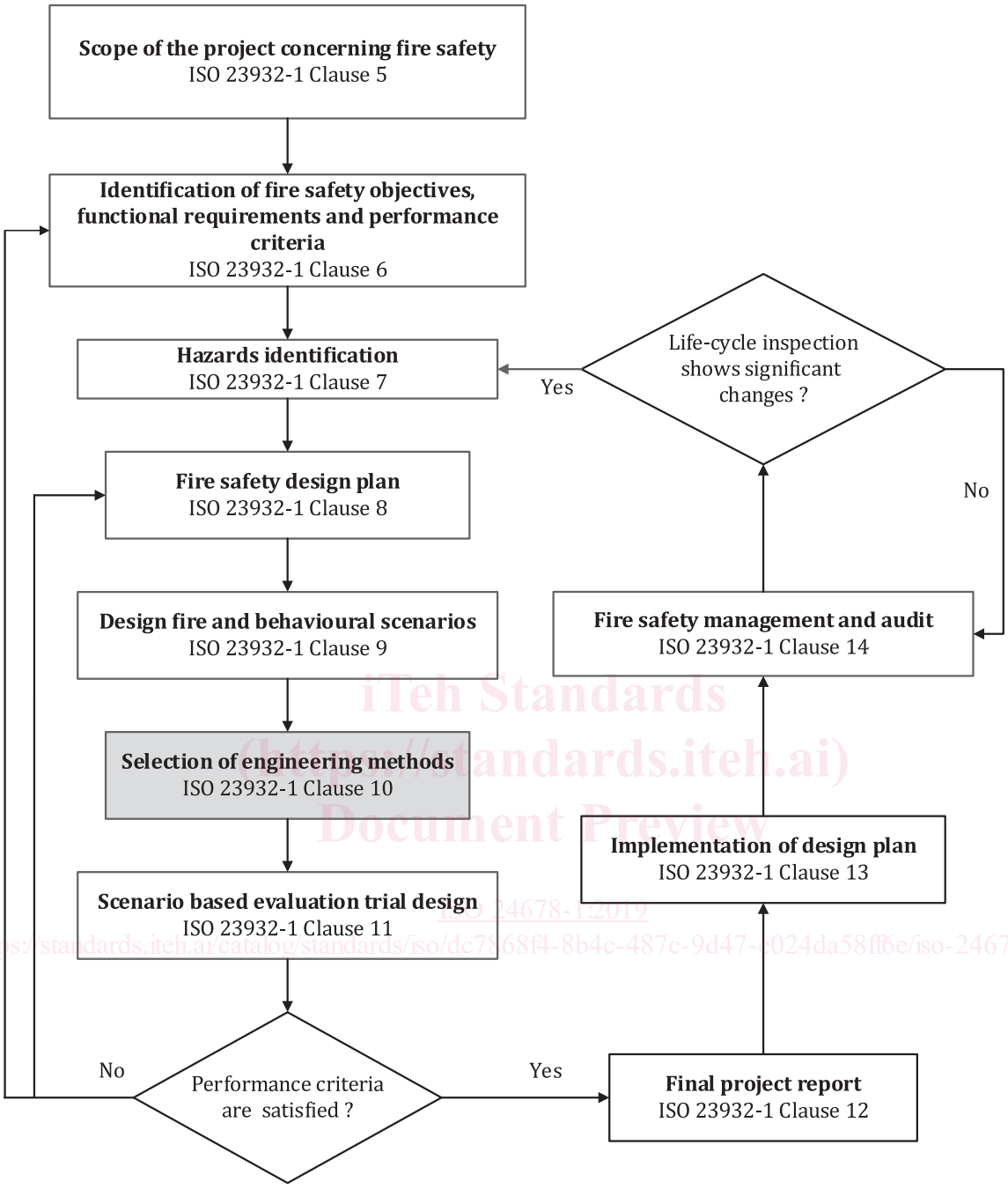

Figure 1 — Fire-safety engineering process: Design, implementation and maintenance flowchart (from ISO 23932-1:2018)

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