

STN	Požiarnobezpečnostné inžinierstvo Požiadavky na algebraické vzorce Časť 4: Dymové vrstvy	STN ISO 24678-4 92 0113
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Fire safety engineering
Requirements governing algebraic formulae
Part 4: Smoke layers

Ingénierie de la sécurité incendie
Exigences régissant les formules algébriques
Partie 4: Couches de fumée

Táto slovenská technická norma obsahuje anglickú verziu medzinárodnej normy ISO 24678-4: 2023 a má postavenie oficiálnej verzie.

This Slovak standard includes the English version of the International standard ISO 24678-4: 2023 and has the status of the official version.

Nahradenie predchádzajúcich dokumentov

Táto slovenská technická norma nahrádza anglickú verziu STN ISO 16735 z mája 2023 v celom rozsahu.



137709

Anotácia

Tento dokument špecifikuje požiadavky, ktoré upravujú používanie (aplikáciu) sústavy algebraických rovníc na výpočet konkrétnych (špecifických) charakteristík dymových vrstiev.

Národný predhovor

Dokumenty týkajúce sa požiarnebezpečnostného inžinierstva sú na medzinárodnej úrovni spracované v subkomisii ISO/TC 92/SC 4 Požiarnebezpečnostné inžinierstvo a v európskej pracovnej skupine CEN/TC 127 WG 8 Požiarnebezpečnostné inžinierstvo – angl. Fire safety engineering (ďalej len „FSE“).

Požiarnebezpečnostné inžinierstvo je určené pre nové inovatívne výrobky, návrhy a projekty a prevádzku, kde nie sú určené požiadavky požiarnej bezpečnosti stavieb.

Požiarnebezpečnostné inžinierstvo je alternatívou predpisových (právnych a normatívnych) riešení. Je zapracované v mnohých európskych a medzinárodných normách a normatívnych dokumentoch, (napr. časti eurokódov, týkajúcich sa účinkov požiaru, požiarne bezpečnosť elektrických zariadení podľa súboru IEC 60695) prijatých do sústavy STN a pokynov EÚ na požiar.

Požiarnebezpečnostné inžinierstvo sa používa v súlade s zákonom č. 314/2000 Z. z. o ochrane pred požiarimi. Národné predpisy a normy umožňujú ich používanie za špecificky určených podmienok.

Požiarnebezpečnostné inžinierstvo ako podrobné alternatívne riešenie je možné používať na návrh komplexných alebo čiastkových problémov požiarnebezpečnostného inžinierstva.

Pre správne používanie je nevyhnutná znalosť najnovších základných dokumentov FSE a spracovanie požiarinými inžiniermi – požiarinými expertmi.

Tieto dokumenty FSE sú určené pre vedeckých pracovníkov, technické inžinierske vzdelávanie, architektov a stavebných inžinierov, účastníkov stavebného procesu, schvaľujúce orgány a manažment prevádzok budov a inžinierskych diel.

Normatívne referenčné dokumenty

Nasledujúce dokumenty, celé alebo ich časti, sú v tomto dokumente normatívnymi odkazmi a sú nevyhnutné pri jeho používaní. Pri datovaných odkazoch sa použije len citované vydanie. Pri nedatovaných odkazoch sa použije najnovšie vydanie citovaného dokumentu (vrátane všetkých zmien).

POZNÁMKA 1. – Ak bola medzinárodná publikácia zmenená spoločnými modifikáciami, čo je indikované označením (mod), použije sa príslušná EN/HD.

POZNÁMKA 2. – Aktuálne informácie o platných a zrušených STN a TNI možno získať na webovom sídle www.unms.sk.

ISO 13943 prijatá ako STN EN ISO 13493 Požiarne bezpečnosť. Slovník (ISO 13943) (92 0102)

ISO 24678-1 prijatá ako STN ISO 24678-1 Požiarnebezpečnostné inžinierstvo. Požiadavky na algebraické vzorce. Časť 1: Všeobecné požiadavky (92 0113)

Vypracovanie slovenskej technickej normy

Spracovateľ: Stavebná fakulta STU v Bratislave,

doc. Ing. Juraj Olbřímek, PhD., Ing. Zuzana Lacová, PhD.

Úrad pre normalizáciu, metrológiu a skúšobníctvo SR, Bratislava

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

This first edition cancels and replaces ISO 16735:2006, which has been technically revised.

The main changes are as follows:

- the main body has been simplified by making reference to ISO 24678-1;
- the arrival time of smoke front has been introduced in the calculations of smoke filling time in [Annex A](#);
- comparisons with experimental data have been added in [Annex A](#).

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

The ISO 24678 series is intended to be used by fire safety practitioners involved with fire safety engineering calculation methods. It is expected that the 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 a fire safety design. Such a 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 subjected 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.

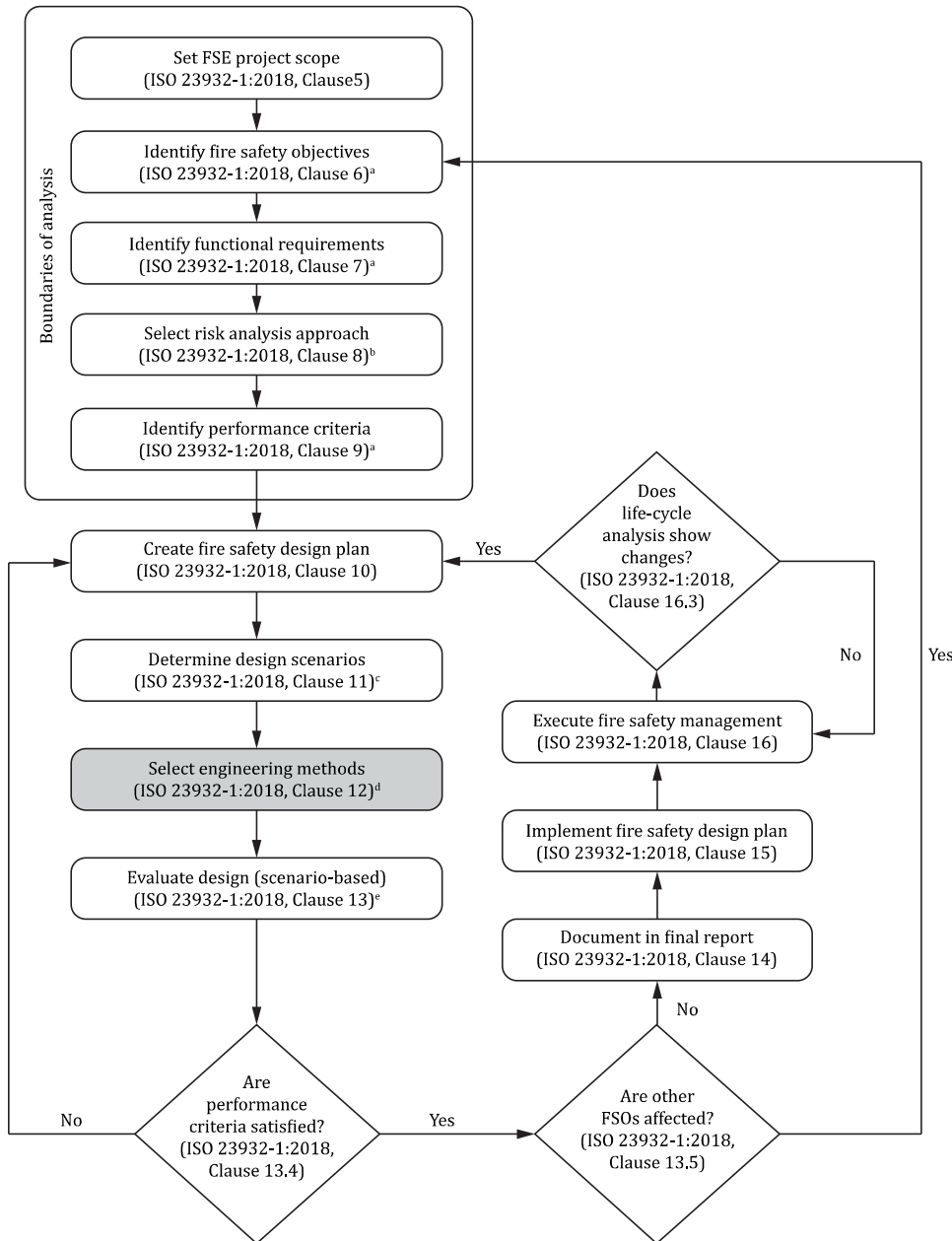
The subjects of engineering calculations include the fire-safe design of entirely new built environments, such as buildings, ships or vehicles, as well as the assessment of the fire safety of existing built environments.

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 performance criteria and to compare among multiple trial designs. Detailed numerical calculations can be carried out up until the final design documentation. Examples of areas where algebraic formulae have been applicable include determination of convective and radiative heat transfer from fire plumes, prediction of ceiling jet flow properties governing detector response times, 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 simultaneously in the design scenarios.

The general principles of fire safety engineering are described in ISO 23932-1, which provides 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 based on knowledge of the consequences of such behaviour on life safety, property and the environment. ISO 23932-1 provides the process (i.e. necessary steps) and essential elements for conducting a robust performance-based fire safety design.

ISO 23932-1 is supported by a set of fire safety engineering documents on the methods and data needed for all the steps in a fire safety engineering design as 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 standards provides an awareness of the interrelationships between fire evaluations when using the set of fire safety engineering documents. The set of documents includes ISO/TS 13447, ISO 16730-1, ISO 16732-1, ISO 16733-1, ISO/TS 16733-2, ISO/TR 16738, ISO 24678-1, ISO 24679-1, 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 that document to the steps in the fire safety engineering design process outlined in ISO 23932-1. ISO 23932-1 requires that engineering methods be selected properly to predict the fire consequences of specific scenarios and scenario elements (ISO 23932-1:2018, Clause 12). Pursuant to the requirements of ISO 23932-1, this document provides the requirements 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.



a See also ISO/TR 16576 (Examples).

b See also ISO 16732-1, ISO 16733-1, ISO/TS 16733-2, ISO/TS 29761.

c See also ISO 16732-1, ISO 16733-1, ISO/TS 16733-2, ISO/TS 29761.

d See also ISO/TS 13447, ISO 16730-1, ISO/TR 16730-2 to ISO/TR 16730-5 (Examples), ISO/TR 16738, ISO 24678-1, ISO 24678-2, ISO 24678-3, ISO 24678-4 (this document), ISO 24678-5, ISO 24678-6, ISO 24678-7 and ISO 24678-9.

e See also ISO/TR 16738, ISO 16733-1, ISO/TS 16733-2.

NOTE Documents linked to large parts of the fire safety engineering design process: ISO 16732-1, ISO 16733-1, ISO 24678-1, ISO 24679-1, ISO/TS 29761, ISO/TR 16732-2 and ISO/TR 16732-3 (Examples), ISO/TR 24679-2 to ISO/TR 24679-4, ISO/TR 24679-6, ISO/TR 24679-8 (Examples).

Figure 1 — Flow chart illustrating the fire safety engineering (FSE) design process (adapted from ISO 23932-1:2018)

Fire safety engineering — Requirements governing algebraic formulae —

Part 4: Smoke layers

1 Scope

This document specifies the requirements governing the application of a set of explicit algebraic formulae for the calculation of specific characteristics of smoke layers.

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.

ISO 13943, *Fire safety — Vocabulary*

ISO 24678-1, *Fire safety engineering — Requirements governing algebraic formulae — Part 1: General requirements*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN