BSI Standards Publication

Fixed firefighting systems — Gas extinguishing systems

Part 1: Design, installation and maintenance (ISO 14520-1:2023, modified)

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National foreword

This British Standard is the UK implementation of EN 15004-1:2024. It supersedes BS EN 15004-1:2019, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee FSH/18/6, Gaseous Extinguishing Media and Systems.

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

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European foreword

This document (EN 15004-1:2024) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15004-1:2019.

In comparison with the previous edition, the following technical modifications have been made:

— the Scope has been extended to cover an additional agent, halocarbon blend 55;

— the extinguishants from EN 15004-3 (HCFC Blend A, HCFC 123, HCFC 22 and HCFC 124) has been deleted from the Scope, Table 1 as EN 15004-3 was withdrawn;

— subclause 5.2.1 has been amended to require upper limit threshold concentrations to be established or any impurity that could result in acute toxicity at concentrations below the cardiac sensitization NOAEL of the agent. Subclause G.4.4 has also been added to provide further information on these requirements;

— a new subclause (6.4.4.2) has been added requiring that in the event of an electrical actuator being removed from a container valve or selector valve, an audible and visual alarm is to be provided at the control panel;

— a new subclause 7.3.5 on elevation change has been added;

— subclause 7.4.1 has been amended to draw attention to EN ISO 21805;

— a new subclause (7.5) has been added providing guidance regarding the effects of noise that can be caused by the alarm devices or the discharge of the agent;

— subclause 7.6.1.3, (previously 7.5.1.3) has been amended to give several scenarios to explain the recommended selection of regular and high hazard design concentrations;

— Annex I has been added to reflect the content of the withdrawn document ISO/TR 12854;

— Annex J has been added to reflect the content of ISO/TR 23107 (to be withdrawn).

The text of the International Standard ISO 14520-1:2023 from Technical Committee ISO/TC 21 “Equipment for fire protection and firefighting” of the International Organization for Standardization (ISO) has been taken over as a European Standard by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI, with common modifications which are indicated by a straight line in the margin of the text.

This European Standard will consist of the following parts, under the general title *Fixed firefighting systems – Gas extinguishing systems*:

— *Part 1: Design, installation and maintenance;*

— *Part 2: Physical properties and system design of gas extinguishing systems for FK-5-1-12 extinguishant;*

— *Part 4: Physical properties and system design of gas extinguishing systems for HFC 125 extinguishant;*

— *Part 5: Physical properties and system design of gas extinguishing systems for HFC 227ea extinguishant;*

— *Part 6: Physical properties and system design of gas extinguishing systems for HFC 23 extinguishant;*

— *Part 7: Physical properties and system design of gas extinguishing systems for IG-01 extinguishant;*

— *Part 8: Physical properties and system design of gas extinguishing systems for IG-100 extinguishant;*

— *Part 9: Physical properties and system design of gas extinguishing systems for IG-55 extinguishant;*

— *Part 10: Physical properties and system design of gas extinguishing systems for IG-541 extinguishant;*

— *Part 11: Physical properties and system design of gas extinguishing systems for Halocarbon Blend 55 extinguishant.*

The International Standards ISO 14520-2 and ISO 14520-11, which dealt with CF_3I and HFC 236fa extinguishants, respectively, have not been implemented by CEN, as CF_3I is only valid for local application and HFC 236fa extinguishant is only applicable for portable fire extinguishers and local application, respectively, which is not covered by the scope.

The international Standard ISO 14520-6 and therefor also EN 15004-3, which dealt with HCFC Blend A extinguishant were withdrawn.

Any feedback and questions on this document should be directed to the users' national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

Extinguishing systems covered in this document are designed to provide a supply of gaseous extinguishing medium for the extinction of fire.

Several different methods of supplying extinguishant to, and applying it at, the required point of discharge for fire extinction have been developed in recent years, and there is a need for dissemination of information on established systems and methods. This document has been prepared to meet this need.

The requirements of this document are made in the light of the best technical data known to the working group at the time of writing but, since a wide field is covered, it has been impracticable to consider every possible factor or circumstance that might affect implementation of the recommendations.

It has been assumed in the preparation of this document that the execution of its provisions is entrusted to people appropriately qualified and experienced in the specification, design, installation, testing, approval, inspection, operation and maintenance of systems and equipment, for whose guidance it has been prepared, and who can be expected to exercise a duty of care to avoid unnecessary release of extinguishant.

Attention is drawn to the Montreal Protocol on substances that deplete the ozone layer and those that contribute towards climate change.

It is important that the fire protection of a building or plant be considered as a whole. Gaseous extinguishant systems form only a part of the available facilities. It should not be assumed that their adoption necessarily removes the need to consider supplementary measures, such as the provision of portable fire extinguishers or other mobile appliances for first aid, emergency use or to deal with special hazards.

Gaseous extinguishants have been a recognized effective medium for the extinction of flammable liquid fires and fires in the presence of electrical and ordinary Class A hazards for many years. However, in the planning of comprehensive schemes, it should be remembered, that these media are not suitable for all hazards. Additionally in certain circumstances or situations there can be dangers related to their use requiring special precautions.

Advice on these matters can be obtained from the appropriate manufacturer of the extinguishant or the extinguishing system. Information may also be sought from the appropriate fire authority, the health and safety authorities and insurers. Also, reference should be made as necessary to other national standards and statutory regulations of the particular country.

It is essential that extinguishing systems be carefully maintained to ensure instant readiness when required. Maintenance measures is liable to be overlooked or given insufficient attention by the owner of the system. It is, however, neglected at peril to the lives of occupants of the premises and the risk of crippling financial loss. The importance of maintenance cannot be too highly emphasized. Installation and maintenance should only be done by qualified personnel.

Inspection preferably by a third party, should include an evaluation that the extinguishing system continues to provide adequate protection for the risk (protected zones, as well as state of the art can change over time).

1 Scope

This document specifies requirements and gives recommendations for the design, installation, testing, maintenance and safety of gas extinguishing systems in buildings, plants or other structures, and the characteristics of the various extinguishants and types of fire for which they are a suitable extinguishing medium.

This document describes total flooding systems primarily related to buildings, plants and other specific applications, utilizing electrically non-conducting gaseous fire extinguishants that do not leave a residue after discharge and for which there are sufficient data currently available to enable validation of performance and safety characteristics by an appropriate independent authority. This document is not applicable to explosion suppression.

This document is not intended to indicate approval of the extinguishants listed therein by the appropriate authorities, as other extinguishants may be equally acceptable. CO_2 is not included as it is covered by its own European standard.

This document is applicable to the extinguishants listed in Table 1. This document is intended to be used in conjunction with the given parts of EN 15004 for fire extinguishing agents in Table 1.

Table 1 — Listed extinguishant

Extinguishant	Chemical	Formula	CAS No.	European Standard
FK-5–1-12	Dodecafluoro-2-methylpentan-3-one	$CF_3CF_2C(O)CF(CF_3)_2$	756–13–8	EN 15004–2
HFC 125	Pentafluoroethane	CHF_2CF_3	354–33–6	EN 15004–4
HFC 227ea	Heptafluoropropane	CF_3CHFCF_3	2252–84–8	EN 15004–5
HFC 23	Trifluoromethane	CHF_3	75–46–7	EN 15004–6
IG-01	Argon	Ar	74040–37–1	EN 15004–7
IG-100	Nitrogen	N_2	7727–37–9	EN 15004–8
IG-55	Nitrogen (50 %)	N_2	7727–37–9	EN 15004–9
	Argon (50 %)	Ar	74040–37–1	
IG-541	Nitrogen (52 %)	N_2	7727–37–9	EN 15004–10
	Argon (40 %)	Ar	74040–37–1	
	Carbon dioxide (8 %)	CO_2	124–38–9	
Halocarbon Blend 55	E-1-chloro-3,3,3-trifluoropropene (50 % by mass)	$CF_3CHCHCl$	102687-65-0	EN 15004-11
	Dodecafluoro-2-methylpentan-3-one (50% by mass)	$CF_3CF_2C(O)CF(CF_3)_2$	756-13-8	