
**Gaseous fire-extinguishing
systems — Physical properties and
system design —**

**Part 1:
General requirements**

*Systèmes d'extinction d'incendie utilisant des agents gazeux —
Propriétés physiques et conception des systèmes —*

Partie 1: Exigences générales



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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 documents 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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 8, *Gaseous media and firefighting systems using gas*.

This third edition cancels and replaces the second edition (ISO 14520-1:2006), which has been technically revised, with the following highlighting the more important changes.

Methods are given to calculate the effects of atmospheric pressure on the inert gases.

The discharge time for inert gas agents has been increased from a maximum of 60 seconds to a maximum of 120 seconds for the protection of Class A hazards.

The height at which agent concentrations are to be held following a discharge, and during the hold time, has been revised to reflect the height of the protected hazard replacing the previous requirement of 10%, 50% and 90% of the enclosure height.

Annexes B, C and E have been modified to reflect experience gained in the areas covered by these Annexes, since the last edition.

Annex H has been amended to reflect the content of what was previously ISO/TS 13075.

Certain environmental data has been added in the specific agents parts of ISO 14520 and an explanation and advice on where additional information can be found has been added as Clause 4.2.1.

ISO 14520 consists of the following parts, under the general title *Gaseous fire-extinguishing systems — Physical properties and system design*

- Part 1: General requirements
- Part 2: CF3I extinguishant
- Part 5: FK-5-1-12 extinguishant
- Part 6: HCFC Blend A extinguishant
- Part 8: HFC 125 extinguishant

- *Part 9: HFC 227ea extinguishant*
- *Part 10: HFC 23 extinguishant*
- *Part 11: HFC 236fa extinguishant*
- *Part 12: IG-01 extinguishant*
- *Part 13: IG-100 extinguishant*
- *Part 14: IG-55 extinguishant*
- *Part 15: IG-541 extinguishant*

Introduction

Fire fighting systems covered in this part of ISO 14520 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 part of ISO 14520 has been prepared to meet this need.

The requirements of this part of ISO 14520 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 part of ISO 14520 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.

It is important that the fire protection of a building or plant be considered as a whole. Gaseous extinguishant systems form only a part, though an important part, of the available facilities, but 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 or emergency use, or to deal with special hazards.

Gaseous extinguishants have for many years been a recognized effective medium for the extinction of inflammable liquid fires and fires in the presence of electrical and ordinary Class A hazards, but it should not be forgotten, in the planning of comprehensive schemes, that there may be hazards for which these media are not suitable, or that in certain circumstances or situations there may be dangers in 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. In addition, reference should be made as necessary to other national standards and statutory regulations of the particular country.

It is essential that fire-fighting equipment be carefully maintained to ensure instant readiness when required. Routine maintenance 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 at 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).

Gaseous fire-extinguishing systems — Physical properties and system design —

Part 1: General requirements

1 Scope

This part of ISO 14520 specifies requirements and gives recommendations for the design, installation, testing, maintenance and safety of gaseous fire fighting 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.

It covers 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 part of ISO 14520 is not applicable to explosion suppression.

This part of ISO 14520 is not intended to indicate approval of the extinguishants listed therein by the appropriate authorities, as other extinguishants may be equally acceptable. CO₂ is not included as it is covered by other International Standards.

This part of ISO 14520 is applicable to the extinguishants listed in [Table 1](#). It is essential that it be used in conjunction with the separate parts of ISO 14520 for specific extinguishants, as cited in [Table 1](#).

Table 1 — Listed extinguishant

Extinguishant	Chemical	Formula	CAS No.	International Standard
CF ₃ I	Trifluoroiodomethane	CF ₃ I	2314-97-8	ISO 14520-2
FK-5-1-12	Dodecafluoro-2-methylpentan-3-one	CF ₃ CF ₂ C(O)CF(CF ₃) ₂	756-13-8	ISO 14520-5
HCFC Blend A				
HCFC-123	Dichlorotrifluoroethane	CHCl ₂ CF ₃	306-83-2	
HCFC-22	Chlorodifluoromethane	CHClF ₂	75-45-6	ISO 14520-6
HCFC-124	Chlorotetrafluoroethane	CFCIFCF ₃	2837-89-0	
	Isopropenyl-1-methylcyclohexene	C ₁₀ H ₁₆	5989-27-5	
HFC 125	Pentafluoroethane	CHF ₂ CF ₃	354-33-6	ISO 14520-8
HFC 227ea	Heptafluoropropane	CF ₃ CHFCF ₃	2252-84-8	ISO 14520-9
HFC 23	Trifluoromethane	CHF ₃	75-46-7	ISO 14520-10
HFC 236fa	Hexafluoropropane	CF ₃ CH ₂ CF ₃	27070-61-7	ISO 14520-11
IG-01	Argon	Ar	74040-37-1	ISO 14520-12
IG-100	Nitrogen	N ₂	7727-37-9	ISO 14520-13
IG-55	Nitrogen (50 %)	N ₂	7727-37-9	ISO 14520-14
	Argon (50 %)	Ar	74040-37-1	

Table 1 (continued)

Extinguishant	Chemical	Formula	CAS No.	International Standard
IG-541	Nitrogen (52 %)	N ₂	7727-37-9	ISO 14520-15
	Argon (40 %)	Ar	74040-37-1	
	Carbon dioxide (8 %)	CO ₂	124-38-9	

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 14520-2, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 2: CF3I extinguishant*

ISO 14520-5, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 5: FK-5-1-12 extinguishant*

ISO 14520-6, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 6: HCFC Blend A extinguishant*

ISO 14520-8, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 8: HFC 125 extinguishant*

ISO 14520-9, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 9: HFC 227ea extinguishant*

ISO 14520-10, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 10: HFC 23 extinguishant*

ISO 14520-11, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 11: HFC 236fa extinguishant*

ISO 14520-12, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 12: IG-01 extinguishant*

ISO 14520-13, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 13: IG-100 extinguishant*

ISO 14520-15, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 15: IG-541 extinguishant*

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

NOTE For the purposes of this document, the term “bar” shall be taken as “gauge”, unless otherwise indicated. Concentrations or quantities expressed in percentages (%) shall be taken as by volume, unless otherwise indicated.

3.1

approved

acceptable to a relevant authority

Note 1 to entry: See [3.2](#).