AS ISO 14520.1—2009

Australian Standard®

Gaseous fire-extinguishing systems—Physical properties and system design

Part 1: General requirements (ISO 14520-1:2000, MOD)

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- Australian Industry Group
- Australian Museum
- Commerce Queensland
- CSIRO Manufacturing and Materials Technology
- Department of Defence (Australia)
- Engineers Australia
- Fire Protection Association Australia
- Institute of Security Executives
- National Fire Industry Association
- Society of Fire Protection Engineers Australasian Chapter

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Gaseous fire-extinguishing systems—Physical properties and system design

Part 1: General requirements (ISO 14520-1:2000, MOD)

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PREFACE

This Standard was prepared by the Standards Australia Committee FP-011, Special Hazard Fire Protection Systems, to supersede, in part, AS 4214—2002, *Gaseous fire extinguishing systems*.

This Standard is an adoption with Australian modifications and has been reproduced from ISO 14520-1:2006, *Gaseous media fire-extinguishing systems—Physical properties and system design*, Part 1: *General requirements* (including Technical Corrigendum 1), and has been varied as indicated to take account of Australian conditions. The modifications are specified in Appendix ZZ. Additional requirements for marking and marine environment are specified in Annexes ZA, ZB. A procedure for a discharge test is given in Annex ZC. The variations are also indicated by bar lines set in the margin against the clause, table, figure or part thereof affected.

The objective of this Standard is to provide designers and installers with minimum requirements for the design, installation, testing and commissioning of gaseous fire extinguishing systems for structures, building and plant.

As this Standard is reproduced from an International Standard, the following applies:

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

(b) In the source text 'this International Standard' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

The full suite of AS ISO 14520 Standards consists of the following parts:

AS		
14520	Gaseous fire extinguishing systems—Physical properties	
14520.1	Part 1:	General requirements
14520.2	Part 2:	CF_3I extinguishant
14520.5	Part 5:	FK-5-1-12 extinguishant
14520.6	Part 6:	HCFC Blend A extinguishant
14520.8	Part 8:	HFC 125 extinguishant
14520.9:	Part 9:	HFC 227ea extinguishant
14520.10:	Part 10:	HFC 23 extinguishant
14520.11:	Part 11:	HFC 236fa extinguishant
14520.12:	Part 12:	IG-01 extinguishant
14520.13:	Part 13:	IG-100 extinguishant
14520.14:	Part 14:	IG-541 extinguishant
14520.15:	Part 15:	IG-55 extinguishant

The terms 'normative' and 'informative' have been used in this Standard to define the application of the appendix or annex to which they apply. A 'normative' appendix or annex is an integral part of a Standard, whereas an 'informative' appendix or annex is only for information and guidance.

This Standard incorporates a Commentary on some clauses. The Commentary directly follows the relevant clause, is designated by 'C' preceding the clause number and is printed in italics in a panel. The Commentary is for information only and does not need to be followed for compliance with the Standard.

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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.

In particular, new requirements to eliminate the need to release extinguishants during testing and commissioning procedures are included. These are linked to the inclusion of enclosure integrity testing.

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).

The test protocol contained in Annex C of this International Standard was developed by a special working group of ISO/TC 21/SC 8. Annex C deals with the tests for determination of the extinguishing concentrations and system performance and they are designed in such a way to allow individual installers to use his/her/system and carry out all of the extinguishing tests. The need for the tests presented in Annex C was established by the fact that the previously used Class A fire test involved wood crib, heptane pan and heptane can test fires in an enclosure of 100 m^3, and did not necessarily indicate extinguishing concentrations suitable for the protection of plastic fuel hazards such as may be encountered in information technology, telecommunications and process control facilities.

As a consequence of the above, the current Annex C of ISO 14520.1 includes polymeric sheet fuel array (polymethyl methacrylate (PMMA)), polypropylene (PP) and acrylonitrile-butadiene-styrene (ABS)) fire tests.

Specific parts 3, 4 and 7 have been withdrawn on the basis that the extinguishing media have not been commercialized, and a new agent specific part 5 has been introduced to cover FK-5-1-12 (dodecafluoro-2-methylpentan-3-one) systems.

AUSTRALIAN STANDARD

Gaseous fire-extinguishing systems—Physical properties and system design

Part 1:
General requirements (ISO 14520-1:2006, MOD)

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, plant or other structure, 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, plant 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. CO_2 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_3I	Trifluoroiodomethane	CF_3I	2314-97-8	ISO 14520-2
FK-5-1-12	Dodecafluoro-2-methylpentan-3-one	$CF_3CF_2C(O)CF(CF_3)_2$	756-13-8	ISO 14520-5
HCFC Blend A				
HCFC-123	Dichlorotrifluoroethane	$CHCl_2CF_3$	306-83-2	
HCFC-22	Chlorodifluoromethane	$CHClF_2$	75-45-6	ISO 14520-6
HCFC-124	Chlorotetrafluoroethane	$CFClFCF_3$	2837-89-0	
	Isopropenyl-1-methylcyclohexene	$C_{10}H_{16}$	5989-27-5	
HFC 125	Pentafluoroethane	CHF_2CF_3	354-33-6	ISO 14520-8
HFC 227ea	Heptafluoropropane	CF_3CHFCF_3	2252-84-8	ISO 14520-9
HFC 23	Trifluoromethane	CHF_3	75-46-7	ISO 14520-10
HFC 236fa	Hexafluoropropane	$CF_3CH_2CF_3$	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
	Nitrogen (50 %)	N_2	7727-37-9	
IG-55	Argon (50 %)	Ar	74040-37-1	ISO 14520-14
	Nitrogen (52 %)	N_2		
IG-541	Argon (40 %)	Ar	74040-37-1	ISO 14520-15
	Carbon dioxide (8 %)	CO_2	124-38-9	