BSI Standards Publication

Fixed firefighting systems – Gas extinguishing systems

Part 1: Design, installation and maintenance (ISO 14520-1:2015, modified)

bsi.

National foreword

This British Standard is the UK implementation of EN 15004-1:2019. It is derived from ISO 14520-1:2015 (for details see the European Foreword). It supersedes BS EN 15004-1:2008, which is withdrawn.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 secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Published by BSI Standards Limited 2019

ISBN 978 0 580 93864 1

ICS 13.220.20

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 April 2019.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD **EN 15004-1**

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2019

ICS 13.220.20

Supersedes EN 15004-1:2008

English Version

Fixed firefighting systems - Gas extinguishing systems - Part 1: Design, installation and maintenance (ISO 14520-1:2015, modified)

Installations fixes de lutte contre l'incendie - Installations d'extinction à gaz - Partie 1 : Calcul, installation et maintenance (ISO 14520-1:2015, modifiée)

Ortsfeste Brandbekämpfungsanlagen - Löschanlagen mit gasförmigen Löschmitteln - Teil 1: Planung, Installation und Instandhaltung (ISO 14520-1:2015, modifiziert)

This European Standard was approved by CEN on 28 May 2018.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 15004-1:2019 E

Contents

Page

European foreword

This document (EN 15004-1:2019) 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 September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

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 15004-1:2008.

This document contains the following technical changes in comparison to EN 15004-1:2008:

— the normative references have been updated;

— in Clause 3, the terms "lock-off device" and "regulated systems" have been included;

— in Clause 4.2.2, "Environmental properties" has been included;

— in Clause 5 "Safety", a table and equations for the maximum inert gas agent concentration at the NOAEL and LOAEL limits as a function of altitude have been included;

— Clause 6.3 "Distribution" has been revised;

— Clause 9.3 "Maintenance" has been revised;

— in Annex B "Determination of flame-extinguishing concentration of gaseous extinguishants by the cup burner method", the procedures for flammable liquids and gases have been replaced by the procedures for inflammable liquids and gases and the reporting of results has been revised;

— Annex C "Fire extinguishment/area coverage fire test procedure for engineered and pre-engineered extinguishing units" has been revised;

— in Annex E "Door fan test for determining of minimum hold time", the values for Interface Thickness (Ip) and Interface Position (It) have been included and the method of estimating F has been revised;

— in Annex G "Safe personnel exposure guidelines", the extinguishant HFC 236fa and CF3I have been deleted;

— Annex H "Flow calculation implementation method and flow calculation verification and testing for approvals" has been revised;

— the standard has been editorially revised.

The text of the International Standard ISO 14520-1:2015 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 *3: Physical properties and system design of gas extinguishing systems for HCFC Blend A 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.*

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.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Extinguishing systems covered in this part of EN 15004 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 EN 15004 has been prepared to meet this need.

The requirements of this part of EN 15004 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 EN 15004 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 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 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).

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 part of EN 15004 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 EN 15004 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
HCFC Blend A				EN 15004–3
HCFC-123	Dichlorotrifluoroethane	$CHCl_2CF_3$	306–83–2	
HCFC-22	Chlorodifluoromethane	$CHClF_2$	75–45–6	
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	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
	Nitrogen (50 %)	N_2	7727–37–9	
IG-55	Argon (50 %)	Ar	74040–37–1	EN 15004–9
	Nitrogen (52 %)	N_2	7727–37–9	
IG-541	Argon (40 %)	Ar	74040–37–1	EN 15004–10
	Carbon dioxide (8 %)	CO_2	124–38–9	