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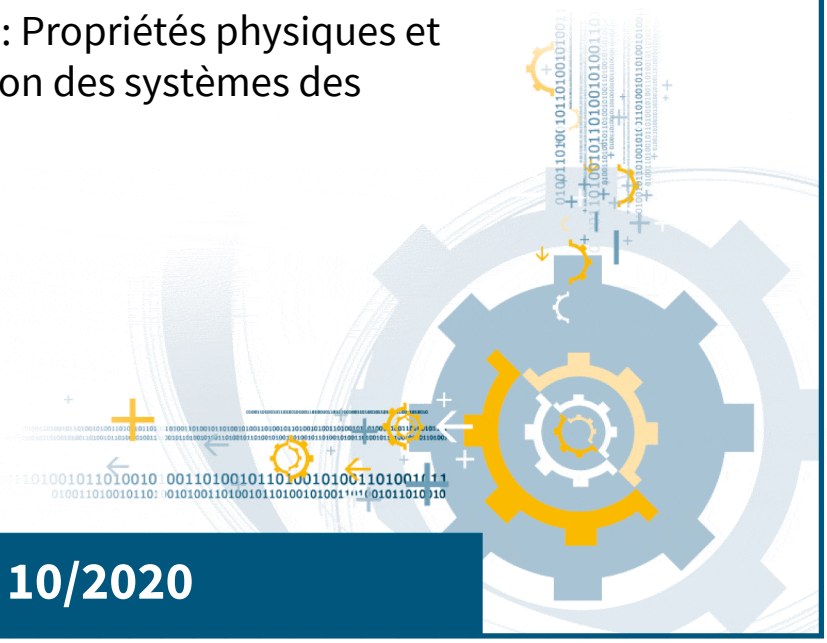
Institut luxembourgeois de la normalisation
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ILNAS-EN 15004-2:2020

Fixed firefighting systems - Gas extinguishing systems - Part 2: Physical properties and system design of gas extinguishing systems for

Ortsfeste Brandbekämpfungsanlagen - Löschanlagen mit gasförmigen Löschmitteln - Teil 2: Physikalische Eigenschaften und Anlagenauslegung für

Installations fixes de lutte contre l'incendie - Installations d'extinction à gaz - Partie 2 : Propriétés physiques et conception des systèmes des



10/2020

National Foreword

This European Standard EN 15004-2:2020 was adopted as Luxembourgish Standard ILNAS-EN 15004-2:2020.

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 15004-2

September 2020

ICS 13.220.20

Supersedes EN 15004-2:2008

English Version

Fixed firefighting systems - Gas extinguishing systems - Part 2: Physical properties and system design of gas extinguishing systems for FK-5-1-12 extinguishant (ISO 14520-5:2019, modified)

Installations fixes de lutte contre l'incendie - Installations d'extinction à gaz - Partie 2 : Propriétés physiques et conception des systèmes des installations d'extinction à gaz pour agent extincteur FK-5-1-12 (ISO 14520-5:2019, modifiée)

Ortsfeste Brandbekämpfungsanlagen - Löschanlagen mit gasförmigen Löschmitteln - Teil 2: Physikalische Eigenschaften und Anlagenauslegung für Feuerlöschmittel FK-5-1-12 (ISO 14520-5:2019, modifiziert)

This European Standard was approved by CEN on 17 August 2020.

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.

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European foreword

This document (EN 15004-2:2020) 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 April 2021, and conflicting national standards shall be withdrawn at the latest by April 2021.

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 15004-2:2008.

The main changes in EN 15004-2:2020 compared to EN 15004-2:2008 are the following:

— European foreword: Part 3 was removed from the list;

— Foreword of ISO 14520-5 was removed;

— Scope: Nominal pressure level 34,5 bar and 50 bar were added;

— Table 1: Purity requirement was updated;

— 6.1, Fill density: 34,5 bar and 50 bar storage container were added;

— 6.4, Other fill density and superpressurization levels: new sub-clause added;

— Clause 7, Environmental properties: new clause added.

The text of the International Standard ISO 14520-5:2019 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.

EN 15004 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;*

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— 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, 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, Turkey and the United Kingdom.

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1 Scope

This document specifies requirements for gaseous fire-extinguishing systems, with respect to FK-5-1-12 extinguishant. It includes details of physical properties, specification, usage and safety aspects.

This document covers only systems operating at nominal pressures of 25 bar, 34,5 bar, 42 bar and 50 bar with nitrogen propellant. This does not preclude the use of other systems.

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.

EN 15004-1:2019, *Fixed firefighting systems — Gas extinguishing systems — Part 1: Design, installation and maintenance (ISO 14520-1:2015, modified)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 15004-1 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at http://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

4 Characteristics and uses

4.1 General

Extinguishant FK-5-1-12 shall comply with the specification shown in Table 1.

FK-5-1-12 is a clear, colourless, almost odourless, electrically non-conductive gas with a density approximately 11 times that of air.

The physical properties are shown in Table 2.

FK-5-1-12 extinguishes fires mainly by physical means, but also by some chemical means.

Table 1 — Specification for FK-5–1–12

Property	Requirement
Purity	99,0 % mol/mol min.
Acidity	3×10^{-6} by mass, max.
Water content	0,001 % by mass, max.
Non-volatile residue	0,03 % by mass, max.
Suspended matter or sediment	None visible

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Table 2 — Physical properties of FK-5–1–12

Property	Units	Value
Molecular mass	n/a	316,04
Boiling point at 1,013 bar (absolute)	°C	49,2
Freezing point	°C	–108,0
Critical temperature	°C	168,66
Critical pressure	bar	18,646
Critical volume	cm^3/mol	494,5
Critical density	kg/m^3	639,1
Vapour pressure 20 °C	bar abs	0,326 0
Liquid density 20 °C	g/ml	1,616
Saturated vapour density 20 °C	kg/m^3	4,330 5
Specific volume of superheated vapour at 1,013 bar and 20 °C	m^3/kg	0,071 9
Heat of vapourization at boiling point	kJ/kg	88,0
Chemical formula	$CF_3CF_2C(O)CF(CF_3)_2$	
Chemical name	Dodecafluoro-2-methylpentan-3-one	

4.2 Use of FK-5-1-12 systems

FK-5-1-12 total flooding systems may be used for extinguishing fires of all classes within the limits specified in EN 15004-1:2019, Clause 4.

The extinguishant requirements per volume of protected space are shown in Table 3 for various levels of concentration. These are based on methods shown in EN 15004-1:2019, 7.6.

The extinguishing concentrations and design concentrations for heptane and Surface Class A hazards are shown in Table 4. Concentrations for other fuels are shown in Table 5 and inerting concentrations in Table 6.

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