



SLOVENSKI STANDARD

oSIST prEN 15004-4:2015

01-marec-2015

Vgrajeni gasilni sistemi - Sistemi za gašenje s plinom - 4. del: Fizikalne lastnosti in načrtovanje sistema za gašenje s plinom za gasilo HFC 125

Fixed firefighting systems - Gas extinguishing systems - Part 4: Physical properties and system design of gas extinguishing systems for HFC 125 extinguishant

Ortsfeste Brandbekämpfungsanlagen - Löschanlagen mit gasförmigen Löschmitteln - Teil 4: Physikalische Eigenschaften und Anlagenauslegung für Feuerlöschmittel HFC 125

(standards.iteh.ai)

Installations fixes de lutte contre l'incendie - Installations d'extinction à gaz - Partie 4: Propriétés physiques et conception des systèmes pour agent extincteur HFC 125

Ta slovenski standard je istoveten z: prEN 15004-4

ICS:

13.220.20 Požarna zaščita Fire protection

oSIST prEN 15004-4:2015

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 15004-4:2015](#)

<https://standards.iteh.ai/catalog/standards/sist/f3154261-7e28-428f-b7fb-1fdb6843bb2/osist-pren-15004-4-2015>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 15004-4

December 2014

ICS 13.220.20

Will supersede EN 15004-4:2008

English Version

Fixed firefighting systems - Gas extinguishing systems - Part 4: Physical properties and system design of gas extinguishing systems for HFC 125 extinguishant

Installations fixes de lutte contre l'incendie - Installations
d'extinction à gaz - Partie 4: Propriétés physiques et
conception des systèmes pour agent extincteur HFC 125

Ortsfeste Brandbekämpfungsanlagen - Löschanlagen mit
gasförmigen Löschmitteln - Teil 4: Physikalische
Eigenschaften und Anlagenauslegung für Feuerlöschmittel
HFC 125

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 191.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	Page
Foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Characteristics and uses	4
4.1 General.....	4
4.2 Use of HFC 125 systems	5
5 Safety of personnel.....	9
6 System design.....	10
6.1 Fill density	10
6.2 Superpressurization	10
6.3 Extinguishant quantity	10
7 Environmental properties	12

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15004-4:2015](https://standards.iteh.ai/catalog/standards/sist/f3154261-7e28-428f-b7fb-1fdb6843bb2/osist-pren-15004-4-2015)

<https://standards.iteh.ai/catalog/standards/sist/f3154261-7e28-428f-b7fb-1fdb6843bb2/osist-pren-15004-4-2015>

Foreword

This document (prEN 15004-4:2014) has been prepared by Technical Committee CEN/TC 191 “Fixed firefighting systems”, the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 15004-4:2008.

EN 15004 consists 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 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”*

prEN 15004-4:2014 (E)**1 Scope**

1.1 This part of EN 15004 contains specific requirements for gaseous fire-extinguishing systems, with respect to the HFC 125 extinguishant. It includes details of physical properties, specification, usage and safety aspects.

1.2 This part of EN 15004 covers systems operating at nominal pressures of 25 bars and 42 bar, superpressurized with nitrogen. This does not preclude the use of other systems.

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.

EN 15004-1, Gaseous fire-extinguishing systems — Physical properties and system design — Part 1: General requirements.

3 Terms and definitions

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

4 Characteristics and uses**4.1 General**

Extinguishant HFC 125 shall comply with the specification shown in Table 1.

HFC 125 is a colourless, almost odourless, ~~electrically non-conductive~~ gas, with a density approximately four times that of air.

<https://standards.iteh.ai/catalog/standards/sist/f3154261-7e28-428f-b7fb-1fdb6843bb2/osist-pren-15004-4-2015>

The physical properties are shown in Table 2.

HFC 125 extinguishes fires mainly by physical means, but also by some chemical means

Table 1 — Specification for HFC 125

Property	Requirement
Purity	99,6 % by mass, min.
Acidity	3×10^{-4} % by mass (3 ppm), max.
Water content	10×10^{-4} % by mass (10 ppm), max.
Non-volatile residue	0,01 % by mass, max.
Suspended matter or sediment	None visible

Table 2 — Physical properties of HFC 125

Property	Units	Value
Molecular mass	—	120,02
Boiling point at 1,013 bar (absolute)	°C	-48,09
Freezing point	°C	-101
Critical temperature	°C	66,02
Critical pressure	bar abs	36,18
Critical volume	cm ³ /mol	210
Critical density	kg/m ³	573,6
Vapour pressure 20 °C	bar abs	12,05
Liquid density 20 °C	kg/m ³	1 218,0
Saturated vapour density 20 °C	kg/m ³	77,97
Specific volume of superheated vapour at 1,013 bar and 20 °C	m ³ /kg	0,1972
Chemical formula	CF ₃ CHF ₂	
Chemical name	Pentafluoroethane	

4.2 Use of HFC 125 systems

HFC 125 total flooding systems may be used for extinguishing fires of all classes within the limits specified in Clause 4 of EN 15004-1.

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 7.6 of EN 15004-1.

The extinguishing concentrations and design concentrations for n-heptane and surface class A hazards are shown in Table 4. Concentrations for other fuels are shown in Table 5

Table 3 — IG-55 total flooding quantity

Temperature <i>T</i> °C	Specific vapour volume <i>S</i> m ³ /kg	HCFC 125 mass requirements per unit volume of protected space, <i>m/V</i> (kg/m ³)									
		Design concentration (by volume)									
		7%	8%	9%	10%	11%	12%	13%	14%	15%	16%
-45	0,1497	0,5028	0,5809	0,6607	0,7422	0,8256	0,9109	0,9982	1,0874	1,1788	1,2724
-40	0,1534	0,4907	0,5669	0,6447	0,7243	0,8057	0,8889	0,9741	1,0612	1,1504	1,2417
-35	0,1572	0,4788	0,5532	0,6291	0,7068	0,7862	0,8675	0,9505	1,0356	1,1226	1,2117
-30	0,1608	0,4681	0,5408	0,6151	0,691	0,7686	0,848	0,9293	1,0124	1,0975	1,1846
-25	0,1645	0,4576	0,5286	0,6012	0,6754	0,7513	0,829	0,9084	0,9896	1,0728	1,1579
-20	0,1682	0,4475	0,517	0,588	0,6606	0,7348	0,8107	0,8884	0,9678	1,0492	1,1324
-15	0,1719	0,4379	0,5059	0,5753	0,6464	0,719	0,7933	0,8693	0,947	1,0266	1,1081
-10	0,1755	0,4289	0,4955	0,5635	0,6331	0,7042	0,777	0,8514	0,9276	1,0055	1,0853
-5	0,1791	0,4203	0,4855	0,5522	0,6204	0,6901	0,7614	0,8343	0,9089	0,9853	1,0635
0	0,1828	0,4118	0,4757	0,541	0,6078	0,6761	0,746	0,8174	0,8905	0,9654	1,042
5	0,1864	0,4038	0,4665	0,5306	0,5961	0,6631	0,7316	0,8016	0,8733	0,9467	1,0219
10	0,19	0,3962	0,4577	0,5205	0,5848	0,6505	0,7177	0,7864	0,8568	0,9288	1,0025
15	0,1935	0,389	0,4494	0,5111	0,5742	0,6387	0,7047	0,7722	0,8413	0,912	0,9844
20	0,1971	0,3819	0,4412	0,5018	0,5637	0,6271	0,6919	0,7581	0,8259	0,8953	0,9664
25	0,2007	0,375	0,4333	0,4928	0,5536	0,6158	0,6794	0,7445	0,8111	0,8793	0,9491
30	0,2042	0,3686	0,4258	0,4843	0,5441	0,6053	0,6678	0,7318	0,7972	0,8642	0,9328
35	0,2078	0,3622	0,4185	0,4759	0,5347	0,5948	0,6562	0,7191	0,7834	0,8492	0,9166
40	0,2113	0,3562	0,4115	0,4681	0,5258	0,5849	0,6454	0,7072	0,7704	0,8352	0,9014
45	0,2149	0,3503	0,4046	0,4602	0,517	0,5751	0,6345	0,6953	0,7575	0,8212	0,8863
50	0,2184	0,3446	0,3982	0,4528	0,5088	0,5659	0,6244	0,6842	0,7454	0,808	0,8721
55	0,2219	0,3392	0,3919	0,4457	0,5007	0,557	0,6145	0,6734	0,7336	0,7953	0,8584
60	0,2254	0,3339	0,3858	0,4388	0,493	0,5483	0,605	0,6629	0,7222	0,7829	0,8451
65	0,2289	0,3288	0,3799	0,4321	0,4854	0,54	0,5957	0,6528	0,7112	0,771	0,8321
70	0,2324	0,3239	0,3742	0,4256	0,4781	0,5318	0,5868	0,643	0,7005	0,7593	0,8196
75	0,2358	0,3192	0,3688	0,4194	0,4712	0,5242	0,5783	0,6337	0,6904	0,7484	0,8078
80	0,2393	0,3145	0,3634	0,4133	0,4643	0,5165	0,5698	0,6244	0,6803	0,7374	0,796
85	0,2428	0,31	0,3581	0,4073	0,4576	0,509	0,5616	0,6154	0,6705	0,7268	0,7845
90	0,2463	0,3056	0,3531	0,4015	0,4511	0,5018	0,5536	0,6067	0,6609	0,7165	0,7734
95	0,2498	0,3013	0,3481	0,3959	0,4448	0,4948	0,5459	0,5982	0,6517	0,7064	0,7625

NOTE This information refers only to the product HFC-125, and does not represent any other products containing enptafluoroethane as a component.

Symbols: *m/V* is the agent mass requirements (kg/m³); i.e. mass, *m*, in kilograms of agent required per cubic metre of protected volume *V* to produce the indicated concentration at the temperature specified;
V is the net volume of hazard (m³); i.e the enclosed volume minus the fixed structures impervious to extinguishant

$$m = \left(\frac{c}{100 - c} \right) \frac{V}{S}$$

T is the temperature (°C); i.e. the design temperature in the hazard area;

S is the specific volume (m³/kg); the specific volume of superheated HCFC 125 vapour at a pressure of

1,013 bar may be approximated by the formula:

$$S = k_1 + k_2 T$$

where

$$k_1 = 0,182\ 5$$

$$k_2 = 0,000\ 7$$

c is the concentration (%); i.e. the volumetric concentration of HCFC 125 in air at the temperature indicated, and a pressure of 1,013 bar.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 15004-4:2015](https://standards.iteh.ai/catalog/standards/sist/f3154261-7e28-428f-b7fb-1fdb6843bb2/osist-pren-15004-4-2015)

<https://standards.iteh.ai/catalog/standards/sist/f3154261-7e28-428f-b7fb-1fdb6843bb2/osist-pren-15004-4-2015>

Table 4 — HFC 125 reference extinguishing and design concentrations

Fuel	Extinguishment % by volume	Minimum design % by volume
Class B		
Heptane (cup burner)	9,3	12,1
Heptane (room test)	9,3	
Surface class A		
Wood Crib	6,7	11,2
PMMA	8,6	
PP	8,6	
ABS	8,6	
Higher Hazard Class A	See Note 4	11,5
<p>NOTE 1 The extinguishment values for the Class B and the Surface Class A fuels are determined by testing in accordance with Annexes B and C of EN 15004 -1.</p> <p>NOTE 2 The minimum design concentration for the Class B fuel is the higher value of the heptane cup burner or room test heptane extinguishment concentration multiplied by 1,3.</p> <p>NOTE 3 The minimum design concentration for Surface Class A fuel is the highest value of the wood crib, PMMA, PP or ABS extinguishment concentrations multiplied by 1,3. In the absence of any of the 4 extinguishment values the minimum design concentration for Surface Class A shall be that of Higher Hazard Class A.</p> <p>NOTE 4 The minimum design concentration for Higher Hazard Class A fuels shall be the higher of the Surface Class A or 95% of the Class B minimum design concentration.</p> <p>NOTE 5 See 7.5.1.3 of EN 15004 -1 for guidance on Class A fuels.</p> <p>NOTE 6 The extinguishing and design concentrations for room-scale test fires are for informational purposes only. Lower and higher extinguishing concentrations than those shown for room-scale test fires may be achieved and allowed when validated by test reports from internationally recognized laboratories.</p>		