
**Naprave za gašenje s plinom - Fizikalne lastnosti in projektiranje - 14. del:
Gasilo IG-55**

Gaseous fire-extinguishing systems - Physical properties and system design - Part
14: IG-55 extinguishant

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

Part 14:
IG-55 extinguishant

*Systemes d'extinction d'incendie utilisant des agents gazeux —
Proprietés physiques et conception des systemes —
Partie 14: Agent extincteur IG-55*

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Fax + 41 22 749 09 47
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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 14520-14 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 8, *Gaseous media and firefighting systems using gas*.

This second edition cancels and replaces the first edition (ISO 14520-14:2000), which has been technically revised.

ISO 14520 consists of the following parts, under the general title *Gaseous fire-extinguishing systems — Physical properties and system design*: [SIST ISO 14520-14:2006](https://standards.iteh.ai/catalog/standards/sist/51fdc263-f497-43ca-8f04-2155a0e9aa20/sist-iso-14520-14-2006)

— *Part 1: General requirements* [2155a0e9aa20/sist-iso-14520-14-2006](https://standards.iteh.ai/catalog/standards/sist/51fdc263-f497-43ca-8f04-2155a0e9aa20/sist-iso-14520-14-2006)

— *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*

Parts 3, 4 and 7, which dealt with FC-2-1-8, FC-3-1-10 and HCFC 124 extinguishants, respectively, have been withdrawn, as these types are no longer manufactured.

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

Part 14: IG-55 extinguishant

1 Scope

This part of ISO 14520 gives specific requirements for gaseous fire-extinguishing systems, with respect to the IG-55 extinguishant. It includes details of physical properties, specification, usage and safety aspects and is applicable to systems operating at nominal pressures of 150 bar, 200 bar and 300 bar, at 15 °C. This does not preclude the use of other systems; however, design data for other pressures were not available at time of publication.

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 14520-1:—¹⁾, *Gaseous fire-extinguishing systems — Physical properties and system design — Part 1: General requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14520-1 apply.

4 Characteristics and uses

4.1 General

Extinguishant IG-55 shall comply with the specification according to Table 1.

IG-55 is a colourless, odourless, electrically non-conductive gas with a density approximately the same as that of air. It is an inert gas mixture consisting nominally of 50 % argon and 50 % nitrogen with the following mixture specification.

- a) Argon: range of (50 ± 5) %.
- b) Nitrogen: range of (50 ± 5) %.

The physical properties are given in Table 2.

IG-55 extinguishes fires by a reduction of the oxygen concentration in the atmosphere of the hazard enclosure.

1) To be published. (Revision of ISO 14520-1:2000)

Table 1 — Specification for IG-55

| Property | Requirement | |
|---|-----------------------|-----------------------|
| | Argon | Nitrogen |
| Purity | > 99,9 % | > 99,9 % |
| Water content | < 15×10^{-6} | < 10×10^{-6} |
| Only principal contaminants are shown. Other measurements may include hydrocarbons, CO, NO, NO ² , CO ² , etc. Most are < 20×10^{-6} . | | |

Table 2 — Physical properties of IG-55

| Property | Unit | Value |
|--|--|-------|
| Molecular mass | — | 33,98 |
| Boiling point at 1,013 bar (absolute) ^a | °C | — |
| Freezing point | °C | — |
| Critical temperature | °C | — |
| Critical pressure | bar abs ^a | — |
| Critical volume | cm ³ /mol | — |
| Critical density | kg/m ³ | — |
| Vapour pressure 20 °C | bar abs ^a | — |
| Liquid density 20 °C | kg/m ³ | — |
| Saturated vapour density 20 °C | kg/m ³ | — |
| Specific volume of superheated vapour at 1,013 bar and 20 °C | m ³ /kg | 0,708 |
| Chemical formulas | N ₂ 50 % by volume Ar 50 % by volume | |
| Chemical names | Nitrogen Argon | |
| ^a 1 bar = 0,1 MPa = 10 ⁵ Pa; 1 MPa = 1 N/mm ² . | | |

4.2 Use of IG-55 systems

IG-55 total flooding systems may be used for extinguishing fires of all classes within the limits specified in ISO 14520-1:—²⁾, Clause 4.

The specific vapour volumes are shown in Table 3. The quantity, *Q*, of agent required per volume of protected space is determined using the equation in Table 3.

The extinguishing concentrations and design concentrations for *n*-heptane and Surface Class A hazards are given in Table 4, and concentrations for other fuels in Table 5.

2) To be published. (Revision of ISO 14520-1:2000)

Table 3 — IG-55 specific vapour volumes

| Temperature <i>T</i> °C | Specific vapour volume <i>S</i> m ³ /kg | Temperature <i>T</i> °C | Specific vapour volume <i>S</i> m ³ /kg |
|-------------------------------|--|-------------------------------|--|
| -40 | 0,5632 | 30 | 0,7323 |
| -35 | 0,5752 | 35 | 0,7444 |
| -30 | 0,5873 | 40 | 0,7564 |
| -25 | 0,5994 | 45 | 0,7685 |
| -20 | 0,6115 | 50 | 0,7806 |
| -15 | 0,6236 | 55 | 0,7927 |
| -10 | 0,6356 | 60 | 0,8048 |
| -5 | 0,6477 | 65 | 0,8168 |
| 0 | 0,6598 | 70 | 0,8289 |
| 5 | 0,6719 | 75 | 0,8410 |
| 10 | 0,6840 | 80 | 0,8531 |
| 15 | 0,6960 | 85 | 0,8652 |
| 20 | 0,7081 | 90 | 0,8772 |
| 25 | 0,7202 | 95 | 0,8893 |
| 30 | 0,7323 | 100 | 0,9014 |

This information refers only to IG-55, and may not represent any other products containing nitrogen and argon as components.

The quantity Q (in cubic metres) of agent required at a reference temperature of 20 °C and a pressure of 1,013 bar per cubic metre of protected volume to produce the indicated concentration at the temperature specified is calculated from:

$$Q_R = m \cdot S_R$$

where S_R is the specific reference volume (in cubic metres per kilogram); i.e. the specific vapour volume at the filling reference temperature for superheated IG-55 vapour at a pressure of 1,013 bar which may be approximated by the formula:

$$S_R = k_1 + k_2 \cdot T_R$$

where $k_1 = 0,6598$; $k_2 = 0,002416$; T_R is the reference temperature (in degrees Celsius), i.e. filling temperature (20 °C in the table);

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

V is the net volume of hazard (in cubic metres); i.e. the enclosed volume minus the fixed structures impervious to extinguishant;

T is the temperature (in degrees Celsius); i.e. the design temperature in the hazard area;

S is the specific volume (in cubic metres per kilogram); the specific volume of superheated IG-55 vapour at a pressure of 1,013 bar may be approximated by

$$S = k_1 + k_2 \cdot T$$

c is the concentration (in percent); i.e. the volumetric concentration of IG-55 in air at the temperature indicated, and a pressure of 1,013 bar absolute.