INTERNATIONAL STANDARD

ISO 7201-1

Second edition
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Fire protection — Fire extinguishing media — Halogenated hydrocarbons —

Part 1: Specifications for halon 1211 and halon 1301

Protection contre l'incendie — Agents extincteurs — Hydrocarbures halogénés — Partie 1: Spécifications pour les halons 1211 et 1301

Reference number
ISO 7201-1 : 1989 (E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7201-1 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting.*

This second edition cancels and replaces the first edition (ISO 7201 : 1982), which has been technically revised.

At present, ISO 7201 consists of the following part, under the general title *Fire protection — Fire extinguishing media — Halogenated hydrocarbons*:

— *Part 1: Specifications for halon 1211 and halon 1301*

Annex A of this part of ISO 7201 is for information only.

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Introduction

This International Standard is one of a series giving specifications for fire extinguishing media in common use and which are in need of standardization for fire fighting purposes. These specifications are designed to establish that the medium in question has at least a minimum useful fire extinguishing capability and can therefore be reasonably sold for fire extinguishing purposes.

Requirements for media used in particular equipment will form the subject of future International Standards.

Fire protection — Fire extinguishing media — Halogenated hydrocarbons —

Part 1:
Specifications for halon 1211 and halon 1301

1 Scope

This part of ISO 7201 specifies requirements for the following halogenated hydrocarbons for use as fire extinguishing media:

a) halon 1211 [bromochlorodifluoromethane (CF_2ClBr)];

b) halon 1301 [bromotrifluoromethane (CF_3Br)].

This part of ISO 7201 does not deal with the conditions of use of these products in fire fighting equipment. Such equipment (portable fire extinguishers, fixed installations, etc.) will be dealt with in future International Standards.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 7201. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 7201 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3363 : 1976, *Fluorochlorinated hydrocarbons for industrial use — Determination of acidity — Titrimetric method.*

ISO 3427 : 1976, *Gaseous halogenated hydrocarbons (liquified gases) — Taking of a sample.*

ISO 5789 : 1979, *Fluorinated hydrocarbons for industrial use — Determination of non-volatile residue.*

3 Definition

For the purpose of this part of ISO 7201, the following definition applies.

halon: A halogenated hydrocarbon used as a fire extinguishing medium.

NOTE — The following numbering system is used to identify halons. The word "halon" is followed by a number, usually of four digits, giving, in turn, the number of carbon, fluorine, chlorine and bromine atoms. Terminal zeros are omitted. Thus halon 1211 is bromochlorodifluorobromomethane (CF_2ClBr) and halon 1301 is bromotrifluoromethane (CF_3Br).

4 Requirements

Halons 1211 and 1301 shall comply with the requirements of table 1, when tested by the appropriate method of test specified in clause 6.

Table 1 — Requirements

Property	Requirements	
	Halon 1211	**Halon 1301**
Purity, % (mol/mol) min.	99,0	99,6
Acidity, ppm by mass, max.	3,0	3,0
Water content, ppm by mass, max.	20	10
Non-volatile residue, % (m/m) max.	0,01	0,01
Halogen ion	Passes test	Passes test
Suspended matter or sediment	None visible	None visible

5 Sampling

Samples of halons shall be taken from the manufacturer's shipping container using the method specified in ISO 3427.[1)]

1) The sampling bottle should be capable of safely resisting the vapour pressure of the sample at the highest temperature that could be encountered.

6 Methods of test

6.1 General

For all tests, the sample shall be taken from the liquid phase.

6.2 Purity

Determine the purity by gas-liquid chromatography, using generally accepted laboratory techniques.

6.3 Acidity

Determine the acidity by the appropriate method specified in ISO 3363.

6.4 Water content

Determine the water content by the orthodox Karl Fischer method or by any other method giving equivalent results.

6.5 Non-volatile residue

Determine the non-volatile residue by the method specified in ISO 5789.

6.6 Halogen ions

Mix 5 g of the sample with 5 ml of absolute methanol containing several drops of a saturated methanolic silver nitrate ($AgNO_3$) solution. The resulting solution shall exhibit no turbidity or precipitation of silver halide.

6.7 Suspended matter or sediment

Examine the liquid phase of the sample visually.

7 Packaging and labelling

7.1 Halons shall be shipped and stored in containers which will not alter the medium or be detrimentally affected by it.

NOTE — The containers may need to comply with national regulations.

7.2 Containers shall be marked with the following information:

a) supplier's name and address;

b) "Halon 1211" or "Halon 1301", as appropriate;

c) package identification number;

d) the number of this part of ISO 7201, i.e. ISO 7201-1;

e) recommended storage precautions.

Annex A
(informative)

General properties

A.1 Physical properties

Halon 1211 is a colourless, faintly-smelling gas. Halon 1301 is an odourless gas. A number of their other more important physical properties are given in table A.1.

Table A.1 — Physical properties of halons 1211 and 1301

Property	Halon 1211	Halon 1301
Relative molecular mass	165,38	148,93
Boiling point at 1,013 bar*, °C	−4,0	−57,8
Freezing point, °C	−160,5	−168,0
Critical temperature, °C	153,8	67,0
Critical pressure, bar	42,06	39,6
Critical volume, m^3/kg	0,001 41	0,001 34
Critical density, kg/m^3	713	745
Vapour pressure		
at 20 °C, bar	2,53	14,63
at 60 °C, bar	7,20	34,58
Liquid density at 20 °C, kg/m^3	1 830	1 575
Saturated vapour density at 20 °C, kg/m^3	17,4	115,6
Specific volume of superheated vapour at 1,013 bar and 20 °C, m^3/kg	0,145	0,159

* 1 bar = 10^5 Pa

A.2 Electrical conductivity

Halons 1211 and 1301 have a very low electrical conductivity. In many cases they can be used to extinguish fires involving live electrical equipment, but this, to a significant extent, may depend on the circumstances, particularly the method of discharge. In case of doubt, reference should be made to the instructions on the fire extinguishing equipment to be used.

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