INTERNATIONAL STANDARD

ISO 7201-2

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Fire extinguishing media — Halogenated hydrocarbons —

Part 2:

Code of practice for safe handling and transfer procedures of halon 1211 and halon 1301

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Agents extincteurs — Hydrocarbures halogénés —
Partie 2: Code de bonne pratique pour les procédures de manipulation et de transfert sans danger des halons 1211 et 1301

Reference number
ISO 7201-2:1991(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 voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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International Standard ISO 7201-2 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Sub-Committee SC 6, *Extinguishing media for fire fighting*.

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ISO 7201 consists of the following parts, under the general title *Fire extinguishing media — Halogenated hydrocarbons*:

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

— *Part 2: Code of practice for safe handling and transfer procedures of halon 1211 and halon 1301*

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Introduction

ISO 7201 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. This series includes at present the following International Standards:

ISO 5923:1989, *Fire protection — Fire extinguishing media — Carbon dioxide*

ISO 7202:1987, *Fire protection — Fire extinguishing media — Powder*

ISO 7203-1:—, *Fire protection — Extinguishing media — Foam — Part 1: Low expansion foam.* (Under development.)

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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.

This part of ISO 7201 gives procedures for the transfer of halon 1211 and halon 1301 from one container to another. These procedures can be applied to the filling and emptying of halon fire extinguishers and the containers used in halon extinguishing systems, to the handling of halon shipping containers and to the recovery of halons from containers which are to be scrapped, cleaned, internally examined, etc.

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These procedures are recommended as good practice to reduce unnecessary emission of these halons which may have a damaging effect on the atmosphere.

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Fire extinguishing media — Halogenated hydrocarbons —

Part 2:
Code of practice for safe handling and transfer procedures of halon 1211 and halon 1301

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1 Scope

This part of ISO 7201 recommends procedures to be used in the transfer of halon 1211 and halon 1301 from one container to another to reduce unnecessary emission of these halons to the atmosphere. It also provides recommendations and information relevant to the health and safety of persons engaged in such procedures.

2 Normative reference

The following standard contains provisions which, through reference in this text, constitute provisions of this part of ISO 7201. At the time of publication, the edition indicated was 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 edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 7201-1:1989, *Fire protection — Fire extinguishing media — Halogenated hydrocarbons — Part 1: Specifications for halon 1211 and halon 1301.*

3 Definition

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

3.1 halon: Halogenated hydrocarbon used as a fire extinguishing medium.

The term "halon(s)" is used in this part of ISO 7201 to mean halon 1211 and halon 1301.

NOTES

1 The following numbering system is used to identify individual halons. The word "halon" is followed by a number, usually comprising four digits, which represents, in the order given, the number of carbon, fluorine, chlorine and bromine atoms. Where this number would terminate with one (or more) zero(s), such zeros are omitted. Thus halon 1211 is bromochlorodifluoromethane (CF_2ClBr) and halon 1301 is bromotrifluoromethane (CF_3Br).

2 Halon 1211 is a colourless, faintly sweet-smelling gas. Halon 1301 is a colourless, odourless gas.

4 Materials for use in contact with halon 1211 and halon 1301

Halon 1211 and halon 1301 are stable and inert to most common construction materials.

Manufacturers' test data should be consulted when selecting materials suitable for use in contact with halons.

5 Avoidance of mixing and/or contamination

5.1 Avoidance of mixing

Halon 1211 and halon 1301 are miscible in all proportions. Halons should not be mixed because this will unnecessarily complicate their subsequent recovery and reprocessing.

5.2 Avoidance of contamination

Precautions should be taken to prevent the entry of oil, water and/or other foreign matter into halon containers.

NOTE 3 Excessive moisture in containers may lead to corrosion, either directly, or indirectly by causing hydrolysis of the halon.

6 Pressure hazard

6.1 General

Halons are shipped, stored and used in fire extinguishing equipment as liquefied gases under pressure. Appropriate precautions should be observed when filling and handling containers.

6.2 Pressure control in transfer procedures

It is essential that nitrogen cylinders are fitted with a pressure-reducing valve to control the nitrogen pressure to not more than the working pressure of the halon containers in use at any particular time. The pressure-reducing valve should be fitted with a pressure gauge on the outlet side, and with a pressure-relief valve in the line to vent excess pressure if the pressure-reducing valve fails.

WARNING — Bursting discs are not suitable pressure-relief devices for this application because their operation will vent the total contents of the halon container.

7 Toxicity hazard

7.1 Skin contact hazard

Direct contact with liquid halons can degrease the skin and cause a strong chilling effect. Gloves and eye protection should be worn during transfer procedures.

7.2 Inhalation hazard

7.2.1 Natural (undecomposed) halons

7.2.1.1 Effects of exposure

Tests on human volunteer subjects have shown that the maximum safe exposures are 7 % (V/V) to 10 % (V/V) of halon 1301 for 1 min and 4 % (V/V) to 5 % (V/V) of halon 1211 for 1 min.

After exposure for 1 min at these concentrations, the volunteers experienced symptoms of dizziness and slight tingling of the fingers and toes. Exposures to concentrations less than these for several minutes would be unlikely to produce any significant effect, but prolonged exposure to concentrations greater than these is hazardous and should be avoided.

7.2.1.2 Precautions

Attention should be paid to checking for and sealing any leaks in the equipment. All transfer procedures should be carried out in well-ventilated areas. It is good practice to avoid all unnecessary exposure to halons and an occupational exposure limit of 1 000 ppm (8 h time-weighted average) should be applied.

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7.2.1.3 Treatment of affected persons

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Persons suffering from overexposure to halon vapour should immediately move, or be moved, to an area containing fresh air. In treating persons suffering from the effects of overexposure to halons, the use of epinephrine (adrenaline) and similar drugs should be avoided because they may produce cardiac arrhythmias, including ventricular fibrillation.

7.2.2 Decomposition products

7.2.2.1 Formation of decomposition products

On exposure to a flame or hot surface, halons pyrolyse into decomposition products usually identified as halogen acids (i.e. HF, HCl and HBr) and free halogens (e.g. Cl_2 and Br_2). Halon decomposition products have a characteristic, sharp, acrid odour even in minute concentrations that are far below the concentrations considered to be immediately dangerous. The irritation produced by these products provides a built-in warning system and thus encourages people to evacuate the area.

7.2.2.2 Precautions

Radiant heaters, heaters with open flames and heaters with hot elements in contact with the air should not be used in areas in which halon transfer procedures are carried out. Other open flames and, in particular, smoking should be prohibited in these areas.

8 Methods of transfer

8.1 General

Halon should be transferred from one container to another by one of the methods described in 8.2 and 8.3.

8.2 Nitrogen overpressurization method

Use dry nitrogen to pressurize the vapour space in the supply container to dispense the contents. It is essential that the moisture content of the nitrogen should not exceed 0,006 % (*m*/*m*) (see also 5.2).

It is essential that the safe working pressure of the supply container is not exceeded.

NOTES

4 Excessive moisture in containers may lead to corrosion, either directly, or indirectly by causing hydrolysis of the halon.

5 Halon 1211 and halon 1301 can be propelled from extinguishing equipment by using nitrogen.

8.3 Pumping

The pump should be located as near as possible to the supply container. If a positive displacement pump is used, provision should be made to recycle halon back to the supply container, so as to avoid the need to stop the pump every time that halon is not being dispensed.

9 Filling operations

9.1 General

To avoid contamination, operations involving the filling and/or refilling of shipping containers, halon extinguishers and/or halon extinguishing system containers should be completely separate from recovery operations.

9.2 Filling rig construction

The rig should withstand, without leakage or permanent deformation, a test pressure of not less than twice the anticipated normal working pressure. Pipe runs should be as short as possible. Hose of a suitable pressure rating may be used to make any necessary flexible connections. The filling hose should be as short as possible and should be valved at the outlet.

9.3 Filling rig use

The rig should be dry before use. It should be tested for leaks before use and at regular intervals during service.

NOTE 6 Soap solution or an electronic leak detector may be used.

9.4 Containers for filling or refilling

Only extinguishers and halon containers complying with appropriate standards should be filled or refilled.

Extinguishers for refilling should be free of halon residues from the original filling. This recommendation should also be followed when refilling other halon containers, except where the original manufacturer can advise appropriate procedures and good practice. Where extinguishers or containers are to be emptied before refilling, residual halon should not be discharged to atmosphere but transferred to suitable containers using the recovery rig (see clause 10). Extinguishers and containers should be checked and rectified as necessary and should be free from external and internal corrosion or damage, and should be clean and dry at the time of filling or refilling.

Large containers should be checked for leakage before refilling with halon.

After filling or refilling, it is essential that containers are checked for leakage and that any showing excessive leakage that cannot be corrected should be emptied as soon as is practicable using the recovery rig.

9.5 Shipping containers

On delivery of shipping containers, the valves should be checked for leaks before transfer to the store or connection to the filling rig.

When the container has been emptied, the valves should be closed and the container disconnected from the transfer system. The protective covers should be fitted immediately over the valves.

NOTE 7 If the valves are left open, the inside of the container will be exposed to atmospheric moisture and the risk of corrosion.

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10 Recovery operations

10.1 General

To avoid contamination, recovery operations should be completely separate from filling and refilling operations.

10.2 Recovery rig construction

The rig should withstand, without leakage or permanent deformation, a test pressure of not less than twice the anticipated normal working pressure. Pipe runs should be as short as possible. Hose of a suitable pressure rating may be used to make any necessary flexible connections.

10.3 Recovery rig use

The rig should be dry before use. It should be tested for leaks before use and at regular intervals during service.

NOTE 8 Soap solution or an electronic leak detector may be used.

All liquid halon, and in the case of halon 1301 as much vapour as possible, should be recovered from each container presented for halon recovery.

10.4 Receiving containers

Receiving containers should comply with an appropriate standard for pressure vessels.

It is essential that receiving containers are not overfilled, and a means of weighing the containers should be provided.

To minimize the need for reprocessing, it is essential that separate receiving containers are used for halon 1211 and halon 1301 and for any mixtures which may be presented for recovery (see 5.1).

Receiving containers should be clearly labelled to identify the halon contents and whether the halon is, is not, or may be contaminated.

10.5 Recovered halon

It is essential that recovered halon is not used unless it can be properly checked and shown to comply with the requirements of ISO 7201-1. Where this cannot be done, or if the halon is contaminated, it is essential that the material is reprocessed so that it complies with the requirements of ISO 7201-1 before it is used.

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