INTERNATIONAL STANDARD

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Fire protection — Portable and wheeled fire extinguishers —

Part 2: Inspection and maintenance

Protection contre l'incendie — Extincteurs portatifs et extincteurs sur roues —

Partie 2: Contrôle et maintenance

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Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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 part of ISO 11602 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 11602-2 was prepared by Technical Committee ISO/TC 21, *Equipment for fire protection and fire fighting*, Subcommittee SC 2, *Manually transportable fire extinguishers*.

ISO 11602 consists of the following parts, under the general title *Fire protection — Portable and wheeled fire extinguishers*:

— *Part 1: Selection and installation*

— *Part 2: Inspection and maintenance*

Annexes A, B and C form a normative part of this part of ISO 11602. Annex D is for information only.

Fire protection — Portable and wheeled fire extinguishers —

Part 2:
Inspection and maintenance

1 Scope

This part of ISO 11602 specifies the inspection, maintenance, and periodic testing of portable and wheeled fire extinguishers.

Portable fire extinguishers are intended as a first line of defence against fires of limited size. They are needed, even if the property is equipped with automatic sprinklers, standpipe and hose, or other fixed protection equipment.

This part of ISO 11602 is not applicable to permanently installed systems for fire extinguishment, even though portions of such systems may be portable (such as hose and nozzles attached to a fixed supply of extinguishing media).

Extinguishers for use on board aircraft, watercraft and vehicles are considered to be outside the scope of this part of ISO 11602.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 11602. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of ISO 11602 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 5923, *Fire protection — Fire extinguishing media — Carbon dioxide.*

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

ISO 7201-2, *Fire extinguishing media — Halogenated hydrocarbons — Part 2: Code of practice for safe handling and transfer procedures of halon 1211 and halon 1301.*

ISO 11602-1, *Fire protection — Portable and wheeled fire extinguishers — Part 1: Selection and Installation.*

3 Terms and definitions

For the purposes of this part of ISO 11602, the terms and definitions given in ISO 11602-1 apply.

4 Inspection, maintenance and recharging

4.1 General

4.1.1 The owner or designated agent or occupant of a property in which extinguishers are located shall be responsible for inspection, maintenance and recharging.

4.1.2 The procedure for inspection and maintenance of extinguishers varies considerably. Minimal knowledge is necessary to perform a monthly inspection procedure as outlined in 4.2. Only competent persons shall service extinguishers, as outlined in 4.3 and 4.4. See annex A.

4.1.3 Maintenance and recharging shall be performed in accordance with the appropriate manual(s), using the proper types of tools, recharge materials, lubricants, and the manufacturer's recommended and identified replacement parts.

4.1.4 Extinguishers out of service for maintenance or recharge shall be replaced at once by spare extinguishers of the same type and at least equal classification and rating.

4.2 Inspection

4.2.1 Extinguishers shall be checked when initially placed in service and thereafter should be checked at approximately 30-day intervals. Extinguishers shall be checked at more frequent intervals when circumstances require.

4.2.2 Periodic checks shall be made to ensure that the extinguisher:

a) is located in the designated place;

b) is unobstructed and visible, and its operating instructions face outwards;

c) operating instructions are legible;

d) seals and tamper indicators are not broken or missing;

e) is full (by weighing or lifting);

f) is not obviously damaged, corroded, leaking or has a clogged nozzle;

g) where provided, the pressure gauge reading or indicator is in the operable range or position.

4.2.3 When a check of any extinguisher reveals a deficiency in the conditions listed as a) and b) of 4.2.2, immediate corrective action shall be taken.

4.2.4 When a check of any rechargeable extinguisher reveals a deficiency in any of the conditions c), d), e), f) or g) of 4.2.2, it shall be subjected to appropriate maintenance procedures.

4.2.5 When a check of any non-rechargeable powder extinguisher reveals a deficiency in any of the conditions c), d), e), f) or g) of 4.2.2, it shall be removed from service.

4.2.6 When a check of any non-rechargeable halon extinguisher reveals a deficiency in any of the conditions c), d), e), f) or g) of 4.2.2, it shall be removed from service and the medium shall be recovered or destroyed.

4.3 Maintenance

4.3.1 General

All extinguishers, except as noted in annex C, shall be subjected to maintenance as follows:

a) not more than once a year but not less than 6 months apart;

b) at the time of hydrostatic testing; and

c) when specifically indicated by an inspection.

Maintenance procedures shall be performed in accordance with 4.3.2.

4.3.2 All extinguishers

4.3.2.1 At each maintenance, all extinguishers shall be subjected to the following:

a) a check of the seal and safety device to determine whether the extinguisher may have been used;

b) subsequent to maintenance, replacement of the safety device and fitting of a new seal;

c) attachment of a label to the extinguisher or marking of a label attached to the extinguisher indicating that the required maintenance has been performed.

4.3.2.2 For the balance of the procedures to be carried out when maintaining portable fire extinguishers, extinguisher types are categorized as follows:

— Category 1: stored-pressure-type extinguishers with water, water with additives, or foam, as the extinguishing media;

— Category 2: stored-pressure-type extinguishers with powder or halon as the extinguishing media;

— Category 3: gas-cartridge-type extinguishers with water, water with additives, or foam as the extinguishing media;

— Category 4: gas-cartridge-type extinguishers with powder as the extinguishing media;

— Category 5: carbon dioxide extinguishers.

4.3.2.3 In addition to the requirements of 4.3.2.1 a), b) and c), extinguishers shall be maintained as shown in Table 1.

4.3.2.4 **CAUTION**: Before any powder extinguisher is opened, it shall be ascertained that, during inspection and maintenance, the precautions described in 4.3.2.4.1 and 4.3.2.4.2 can and will be observed.

4.3.2.4.1 Powder extinguishers shall be opened only in the driest available conditions and for the minimum time necessary for examination, to minimize the effect of atmospheric moisture on the powder (powder may absorb deleterious amounts of moisture if exposed to air of high relative humidity, or if the powder is colder than the ambient air).

4.3.2.4.2 Mixing or cross-contamination of different types of powder shall be avoided. (Some types of powder are capable of reacting with other types to produce water and carbon dioxide. This reaction often does not become apparent until after a delay of weeks during which no apparent reaction occurs. The water causes caking and, in a closed container, the carbon dioxide causes a pressure rise that can be dangerous. Only extinguishers containing the same powder should be opened and examined at any one time.)

Table 1

Ref. No.	Maintenance procedure	Category				
		1	2	3	4	5
1	Examine and verify that the pressure indicating device (if fitted) is reading the internal pressure correctly or, where a device is not fitted, that the internal pressure is correct. If the extinguisher shows a loss of pressure of more than 10 %, or more than the manufacturer's recommended maximum loss if less than 10 %, refer to the manufacturer's instructions for appropriate action.	X	X			
2	Examine the extinguisher body externally for corrosion or damage. If the extinguisher is slightly corroded, or has sustained minor damage, it shall be discarded or subjected to hydrostatic testing. If heavily corroded or severely damaged, it shall be discarded.	X	X	X	X	X
3	Weigh the extinguisher (with or without the operating mechanism according to the manufacturer's instructions) or use suitable alternative means to check that it contains the correct mass of medium. Check the mass against the mass recorded when it was first put into service.	X	X	X	X	X
4	Examine the nozzle and hose (if provided) and clean if necessary. Replace if worn or otherwise not in good condition.	X	X	X	X	X
5	Where extinguishers are designed to have the operating mechanism removed, check the operating mechanism and discharge control (where fitted) for free movement. Clean, rectify or replace if necessary. Protect the moving parts and threads against corrosion with a lubricant as recommended by the manufacturer.	X	X	X	X	
6	Open the extinguisher or otherwise remove the head assembly. Remove the gas cartridge.			X	X	
7	(Water with additive, or foam extinguishers only.) Pour the liquid into a clean container. If evidence of deterioration is apparent (refer to manufacturer's instructions regarding specific products), discard the liquid and refill with the manufacturer's specified liquid. Where the foam concentrate or additive is in a separate container, check this for leakage. Discard leaking containers and replace with a new container and charge.			X		
8	Clean the inside and outside of the extinguisher and examine the body externally and internally for corrosion or damage. If the extinguisher is slightly corroded, or has sustained minor damage, it shall be discarded or subjected to hydrostatic testing. If heavily corroded or severely damaged, it shall be discarded.			X		

Table 1 *(continued)*

Ref. No.	Maintenance procedure	Category				
		1	2	3	4	5
9	Examine the gas cartridge externally for corrosion or damage. If the gas cartridge is damaged or corroded, replace the cartridge as recommended by the manufacturer. Weigh the gas cartridge and check the mass against that marked on the cartridge. A gas cartridge which has a content less than the minimum as marked, or which is found to be leaking, shall be withdrawn from service or replaced by a cartridge as recommended by the manufacturer.			X	X	
10	Clean if necessary and pass air through the vent holes (or other venting device) in the cap.			X	X	
11	Examine the branch pipe (where used) nozzle, strainer and (where fitted) the internal discharge tube and breather valve, and clean if necessary.			X		
12	Clean and examine the nozzle, hose and internal discharge tube for blockage by passing air through them; rectify or replace if necessary.				X	
13	Examine all washers, diaphragms and hose, and replace if damaged or defective. If the hose is fitted at the bottom end of the extinguisher and a diaphragm is used, it shall be replaced.			X	X	
14	Examine the powder in the extinguisher to check that there are no visual signs of caking, lumps or foreign bodies. Agitate the powder by inverting and shaking the extinguisher, taking care to avoid spillage. If there is any evidence of caking, lumps or foreign bodies, if it is not free flowing, or if there is any doubt, discard all the powder, and recharge the extinguisher with the original manufacturer's powder.				X	
15	Return the original charge to the extinguisher, topping up any loss with water, or replacing with fresh water as necessary. For water with additives, or foam, recharge the extinguisher in accordance with the manufacturer's instructions.			X		
16	Re-assemble the extinguisher in accordance with the manufacturer's instructions.			X	X	
17	Examine the horn, hose and valve assembly, and clean and replace if not in good condition.					X
18	Perform a conductivity test on hose assemblies.					X

NOTE In some countries, where it is judged by a competent authority that the quality control procedures and reliability of manufacture of certain dry chemical internal hermetically sealed (welded seal) cartridge-type extinguishers are considered adequate, the first internal examination only may be delayed from the date of manufacturer until required by 4.3.3.5.

4.3.2.5 In addition to the annual maintenance specified in 4.3.1 to 4.3.2.4, the following maintenance, as described in Table 2, shall also be performed at intervals not exceeding five years.

EXCEPTION 1: Non-rechargeable fire extinguishers, other than halon types, shall be discharged and discarded not later than 5 years from their date of manufacture.

EXCEPTION 2: Non-rechargeable fire extinguishers of the halon type, shall be removed from service and returned to a recycling centre for recovery of the halon not later than 5 years from their date of manufacture.

Table 2

Ref. No.	Maintenance procedure	Category		
		1 (5 years)	**2** (5 years)	**5** (5 years)
1	Discharge the extinguisher completely. After discharge, the zero pressure gauge (where provided) shall indicate zero pressure, and an indicator (where provided) shall shown a discharged position.	X	X	X
2	Open the extinguisher, clean the inside and examine the body internally for corrosion or damage. If the extinguisher is slightly corroded, or has sustained minor damage, it shall be discarded or subjected to hydrostatic testing. If heavily corroded or severely damaged, it shall be discarded.	X	X	X
3	Examine, as appropriate, the nozzle, strainer and hose, vent holes (or other venting device) in the cap or valve assembly, and the internal discharge tube. Clean, if necessary.	X	X	X
4	Examine all sealing washers and hose (if fitted), and replace if defective.	X	X	X
5	Check the operating mechanism for free movement and clean, rectify or replace as necessary.	X	X	X
6	Re-assemble the extinguisher and recharge. See 4.4.	X	X	X

4.3.2.6 Halon extinguishers shall not be discharged to the atmosphere but shall be emptied at intervals not exceeding 5 years by a method that permits recovery of the halon. Following emptying, the additional maintenance as described in Table 2 shall be performed. When emptied, measures should be taken to minimize any emissions of halons into the atmosphere.

4.4 Recharging

4.4.1 All rechargeable-type extinguishers shall be recharged after any use or when indicated by an inspection or maintenance deficiency.

4.4.2 When performing the recharging, the recommendations of the manufacturer shall be followed.

4.4.3 The amount of recharge medium shall be verified by weighing. The recharged gross mass shall be the same as the gross mass that is marked on the manufacturer's label.

For those extinguishers that do not have the gross mass marked on the label, a permanent marking that indicates the gross mass shall appear elsewhere on the extinguisher.

4.4.4 After recharging, a leak test shall be performed on stored pressure and self-expelling media extinguishers and cartridges.

Where liquid leak detection methods are employed, caution shall be exercised to prevent contamination of the media with the liquid.

4.4.5 Aqueous film-forming foam (AFFF) and film-forming fluoroprotein foam (FFFP) extinguishers shall be recharged with fresh media in accordance with the instructions on the extinguisher.

4.4.6 Only the medium specified on the nameplate shall be used.

4.4.7 One powder shall not be mixed or allowed to be contaminated with another powder.

4.4.8 Extinguishers shall not be converted from one type to another, nor shall any extinguisher be converted to use a different type of extinguishing medium.

4.4.9 The remaining powder in a discharged extinguisher shall not be re-used.

4.4.10 Extinguishers removed for 5-year maintenance or hydrostatic testing shall be emptied. The powder shall not be re-used unless a closed recovery system is used and the media separately stored in a sealed container to prevent contamination. Prior to re-use, the powder shall be thoroughly checked. Where doubt exists with respect to the type, contamination or condition of the powder, it shall be discarded.

4.4.11 For all non-water types of extinguishers, any moisture present in the emptied extinguisher shall be removed before recharging.

4.4.12 Halon-type extinguishers shall only be charged with the proper type and mass of medium as specified on the nameplate. Halon for recharging shall meet the requirements of ISO 7201. Extinguishers that have not previously contained halon meeting the requirements of ISO 7201 shall not be recharged.

4.4.13 The removal of media from halon extinguishers shall only be done using a closed recovery system for halon. The extinguisher cylinder shall be examined internally for contamination and/or corrosion. The media retained in the system recovery cylinder shall be re-used only if no evidence of internal contamination is observed in the extinguisher cylinder. Halon removed from extinguishers that exhibit evidence of internal contamination or corrosion shall be processed in accordance with the extinguisher manufacturer's instructions.

4.4.14 Carbon dioxide shall meet the requirements of ISO 5923.

4.4.15 When recharging water-type extinguishers, overfilling will result in improper discharge. The correct amount of liquid medium shall be determined by using one of the following:

— exact measurement by mass;

— exact measurement by volume;

— use of an anti-overfill tube when provided; or

— use of a fill mark, if provided.

4.4.16 Gauges used to set the regulated source of pressure shall be calibrated at least annually.

4.4.17 A rechargeable stored- pressure-type extinguisher shall be pressurized only to the charging pressure specified on the extinguisher nameplate. The manufacturer's pressurizing adaptor shall be connected to the valve assembly before pressurizing the extinguisher. A regulated source of pressure, set to no higher than 0,2 Mpa above the operating (service) pressure, shall be used to pressurize fire extinguishers.

WARNING: An unregulated source of pressure, such as a nitrogen cylinder without a pressure regulator, shall never be used because the extinguisher could be over pressurized and possibly rupture.

Never leave an extinguisher connected to the regulator of a high-pressure source for an extended period of time. A defective regulator could cause the shell to rupture due to excess pressure.

4.4.18 Only standard industrial-grade nitrogen or other inert gas with a dew point of –55 °C or lower shall be used to pressurize stored pressure powder and halon fire extinguishers. Compressed air through moisture traps shall not be used for pressurizing, even if this is stated in the instructions on older extinguishers.