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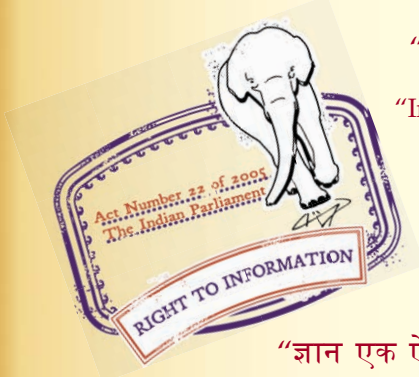
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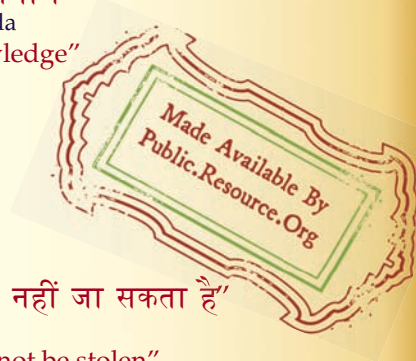
IS 4862-1 (1986): Specification for portable fire extinguishers for aircraft, Part 1: Halon 1211 Type [CED 22: Fire Fighting]



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Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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IS : 4862 (Part 1) - 1986

Indian Standard

SPECIFICATION FOR
PORTABLE FIRE EXTINGUISHER
FOR AIRCRAFT

PART 1 HALON 1211 TYPE

(First Revision)

UDC 614.845.4 : 629.13

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

*Indian Standard*SPECIFICATION FOR
PORTABLE FIRE EXTINGUISHER
FOR AIRCRAFT

PART 1 HALON 1211 TYPE

(First Revision)

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AMENDMENT NO. 3 FEBRUARY 2010
TO
IS 4862 (PART 1) : 1986 SPECIFICATION FOR PORTABLE
FIRE EXTINGUISHER FOR AIRCRAFT

PART 1 HALON 1211 TYPE

(First Revision)

(Page 9, clause 9.1) — Substitute the following for the existing:

“Each extinguisher body shall be painted either with epoxy powder coating or synthetic enamel paint. The shade shall be ‘Fire Red’ or ‘Post Office Red’ conforming to Shades No. 536 or 538 of IS 5.

NOTES

1 Whenever epoxy powder coating is applied on the external surface of mild steel body for anti-corrosive treatment, synthetic enamel paint coating is not required.

2 The body of extinguisher shall be of good finish, clear of all burrs and sharp edges.”

(Page 9, clause 9.3) — Delete the last sentence.

(CED 22)

Indian Standard

SPECIFICATION FOR
PORTABLE FIRE EXTINGUISHER
FOR AIRCRAFT

PART 1 HALON 1211 TYPE

(First Revision)

0. FOREWORD

0.1 This Indian Standard (Part 1) (First Revision) was adopted by the Indian Standards Institution on 22 December 1986, after the draft finalized by the Fire Fighting Sectional Committee had been approved by the Civil Engineering Division Council.

0.2 Since requirements for the fire extinguisher used in aircraft by the crew are different, a separate Indian Standard has been formulated. This Indian Standard was first published in year 1968 covering carbon dioxide and water type of fire extinguisher. In this revision, in Part 1, Halon 1211 type fire extinguishers are being covered which are now normally used (specification of which are different to the ordinary Halon 1211 type fire extinguisher intended to be used for all types of Class B and C fires and covered in IS : 11108-1984*). The fire extinguisher used in aircraft for passengers cabin is of other types which will be covered in other parts.

0.3 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS: 2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Specification for portable fire extinguishers — Halon 1211 type.

†Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard lays down the requirements regarding material, shape, construction, anti-corrosive treatment and performance test of portable fire extinguishers of Halon 1211 type, used for aircraft for the use of crew.

2. CAPACITY

2.1 The water capacity of the container when filled to the specified level shall be maximum 2.5 litres. This standard covers the capacities of 1.25 and 2.5 kg.

3. PRINCIPLE

3.1 The extinguisher shall be designed to operate upright type and shall be fitted with squeeze grip valves. By holding the extinguishers upright, removing the locking pin from the valve handle and pressing down the spring loaded piercer by pressing downwards the operating handle thereby the contents are discharged.

4. MATERIAL

4.1 The material for construction of various components are given in Table 1.

5. CONTENTS

5.1 Halon 1211 shall conform to IS: 11070-1984*. The quantity shall be:

a) *For 1.25 kg capacity*

1.25 kg $\begin{matrix} + \\ - \end{matrix}$ $\begin{matrix} 50 \\ 0 \end{matrix}$ g and shall be charged to a pressure of 9.5 kgf/cm² \pm 0.5 kgf/cm² (0.95 MN/m² \pm 0.05 MN/m²) and temperature 27 \pm 5°C

b) *For 2.5 kg capacity*

2.5 kg $\begin{matrix} + \\ - \end{matrix}$ $\begin{matrix} 50 \\ 0 \end{matrix}$ g and shall be charged to a pressure of 10.5 kgf/cm² \pm 0.5 kgf/cm² (1.05 MN/m² \pm 0.05 MN/m²) and temperature 27 \pm 5°C.

6. SHAPE

6.1 The shape of the body shall be cylindrical and filling ratio shall not be more than 0.75 by volume.

*Specification for bromochlorodifluoromethane (Halon 1211) for fire fighting.

TABLE 1 MATERIALS OF CONSTRUCTION OF VARIOUS COMPONENTS

(Clause 4.1)

SL No.	COMPONENT	MATERIAL	CONFORMING TO RELEVANT IS
i)	Body	Steel	Grade D or DD of IS : 513-1973 ¹ or Any grade of IS : 6240-1976 ²
ii)	Neck ring	Steel	Any grade of IS : 226-1975 ³ or Any grade of IS : 1875-1978 ⁴ or Any grade of IS : 7283-1974 ⁵ or Any grade of IS : 9550-1980 ⁶
iii)	a) Valve body b) Nozzle	} Leaded tin bronze Extruded brass section	Grade LTB-2 of IS : 318-1981 ⁷ Grade I of IS : 291-1977 ⁸ or Type I of IS : 319-1974 ⁹
iv)	Spring		Steel (plated) Grade I of IS : 4454 (Part 1)-1981 ¹⁰
v)	a) Piercer b) Spindle	} Steel	04 Cr 13 of IS : 6528-1972 ¹¹

1. Specification for cold-rolled carbon steel sheets and strips (*second revision*).
2. Specification for hot-rolled steel plate (up to 6 mm) sheets and strip for the manufacture of low pressure gas cylinders (*first revision*).
3. Specification for structural steel (standard quality) (*fifth revision*).
4. Specification for carbon steel billets, blooms, slabs and bars for forgings (*fourth revision*).
5. Specification for hot-rolled bars for production of bright bars.
6. Specification for bright bars.
7. Specification for leaded tin bronze ingots and casting (*second revision*).
8. Specification for naval brass rods and sections (suitable for machining and forging) (*second revision*).
9. Specification for free-cutting brass bars, rods and sections (*third revision*).
10. Specification for steel wires for cold formed springs: Part I Patented and cold drawn steel wires — unalloyed (*second revision*).
11. Specification for stainless steel wire.

(Continued)

TABLE 1 MATERIALS OF CONSTRUCTION OF VARIOUS COMPONENTS — *Contd*

Sl. No.	COMPONENT	MATERIAL	CONFORMING TO RELEVANT IS	
vi)	Siphon tube	Brass copper	Alloy No. 2 of IS : 407-1981 ¹² or IS : 1545-1982 ¹³	
vii)	a) Sealing nuts b) Piercer disc c) Discharge fitting	} Extruded brass section	Grade I of IS : 291-1977 ⁸ or Type I of IS : 319-1974 ⁹	
viii)	Washer		Rubber	IS : 937-1981 ¹⁴
ix)	Sealing disc		Copper	IS : 1972-1977 ¹⁵
	12. Specification for brass tubes for general purposes (<i>third revision</i>).			
	13. Specification for solid-drawn copper alloy tubes for condensers and heat exchangers (<i>second revision</i>).			
	14. Specification for washers for water fittings for fire fighting purposes (<i>second revision</i>).			
	15. Specification for copper plate, sheet and strip for industrial purposes (<i>first revision</i>).			

7. CONSTRUCTION

7.1 The cylinder shall be of welded construction having cold or hot drawn cylindrical portion with hemi-spherical ellipsoidal or tori-spherical ends welded to it or be of two halves cold or hot drawn and circumferential welded together. The end of dished part shall have hemi-spherical, semi-ellipsoidal or tori-spherical shape and the end shall have cylindrical skirt or parallel portion of minimum length 10 mm or three times the shell thickness whichever is greater.

The welding shall be done by an electric arc welding process and shall conform to IS : 2825-1969* and, if radiographed, to IS : 817-1966†. There shall not be any longitudinal seam to the cylinder and number of circumferential seams shall not exceed two. The thickness of the shell and ends shall be calculated as in **7.1.1** and shall not be less than 1.4 mm and the actual thickness of the end of dished part shall not be less than 1.4 mm. The neck-ring shall be welded with the body of the cylinder and shall be threaded to suit the type of valve hose.

*Code for unfired pressure vessels.

†Code of practice for training and testing of metal arc welders (*revised*).

7.1.1 This minimum thickness shall be calculated from the following formulae:

a) For cylindrical portion:

$$t = \frac{ph D_o}{200 \times 0.8 \mathcal{J} R_e + ph} = \frac{ph D_i}{200 \times 0.8 \mathcal{J} R_e - ph}$$

b) For tori-spherical part or end

$$t = \frac{ph D_o}{200 \times 0.8 \mathcal{J} R_e + ph} \times \frac{K\mathcal{Z}}{5}$$

c) For semi-ellspoidal part end

$$t = \frac{ph D_o}{200 \times 0.8 \mathcal{J} R_e + ph} \times \frac{K(0.65 + 0.1K)}{4}$$

where

t = calculated minimum wall thickness of cylindrical shell in mm from bursting point of view;

ph = test pressure above atmosphere (kgf/cm²);

D_i = inner diameter in mm;

D_o = outer diameter in mm;

\mathcal{J} = weld joint factor (0.9);

R_e = yield strength in kgf/mm² (given in relevant Indian Standards);

H = depth of dishing in mm;

K = the ratio D_o/H ;

r = knuckle radius in mm ($r \geq 0.1$);

R = dishing radius in mm ($R \leq D_o$); and

$$\mathcal{Z} = \begin{cases} \frac{20r}{H} + 3 \\ \frac{20r}{R} + 1 \end{cases}$$

7.2 The screw threads for attachment of valve shall be in accordance with class A of IS : 2643 (Part 1)-1975*. The neck-ring shall be secured to the body by welding or pressing (where welding shall be at least 20 mm away from the circumferential wall of the cylinder).

7.3 The valve shall be screwed for fixing to the neck-ring for not less than 12 mm effective length with parallel threads conforming to IS : 2643 (Part 1)-1975*.

*Dimensions for pipe threads for fastening purposes; Part I Basic profile and dimensions.

7.4 Valve Mechanism — A spring-loaded, pressure sealed sliding spindle shall be provided in such a way that it is operated by manual depression by means of a cantilever hinged grip lever. The spindle shall be so designed, that the extinguisher can be regulated by means of pressing and releasing the squeeze grip handle. A safety pin shall be provided for prevention of accidents which shall be fitted on cantilever hinged grip lever through valve body.

7.4.1 The length of the spindle piercer shall be sufficient to pierce/operate the extinguisher by pressing the piercer.

7.5 Discharge Fittings

7.5.1 Nozzle — The discharge nozzle shall be screwed to valve body or it can be an integral part of valve body. The design of the nozzle and area of the orifice shall be such that it satisfies the performance requirement given in clause 10.5.

7.5.2 A siphon tube shall be fitted to the bottom end of the valve.

7.6 Pressure Gauge — Pressure gauge shall be fitted to the extinguisher to indicate its internal pressure. The gauge shall be marked suitably with normal pressure at which the extinguisher shall be charged and also indicate when it is wholly or partially released.

7.7 Mounting-Bracket — The extinguisher shall be fitted with a mounting bracket which shall be such so as to prevent mounting of extinguisher upside down and when subjected to vibration as in 7.7.1 shall remain intact.

7.7.1 The extinguisher shall be placed in its bracket which shall be attached to a vibration stand. The test shall be conducted at 2 400 cycles per minute with a total excursion of 2.38 mm and at 3 000 cycles per minute with a total excursion of 0.4 mm. The assembly shall be vibrated for a three hour period with its major axis vertical and for a similar period with its major axis horizontal.

8. ANTI-CORROSIVE TREATMENT

8.1 On all internal and external surface of the body, anti-corrosive treatment shall be applied. The anti-corrosive treatment shall be of following types. The thickness of the coating shall be measured by any of the methods given in IS : 3203-1982*.

- a) Lead tin alloy (tin not less than 10%) shall be applied by hot dipping process or by electrolytic process, to a thickness not less than 0.012 mm.

*Methods of testing local thickness of electroplated coatings (*first revision*).

- b) Copper coating by suitable process, thickness not less than 0.005 mm.

9. PAINTING

9.1 Each extinguisher shall be painted fire red conforming to Shade No. 536 of IS : 5-1978*. The paint shall conform to IS : 2932-1974†.

9.2 The picture showing the operation of the extinguisher in the correct manner shall be provided on the body of the extinguisher.

9.3 The extinguisher shall be marked with letters B and C indicating their suitability for the respective classes of fires laid down in 2190-1979‡. The letters B and C shall be of 2.5 cm size printed in black colour centrally, contained in a square of 4 cm size and circle of 2 cm radius respectively. The square and circle shall be coloured green conforming to Shade No. 284 of IS : 5-1978*. The paint shall conform to IS : 2932-1974†.

10. TEST REQUIREMENT

10.1 Hydrostatic Test — The extinguishers having 1.25 kg capacity shall be capable of withstanding the internal hydraulic pressure of 2.5 MN/m² (25 kgf/cm²) and 2.5 kg capacity of 3 MN/m² (30 kgf/cm²) for a period of 30 seconds without leakage or visible distortion.

NOTE — For in-process quality control this test shall be carried out before the extinguishers are painted and after heat treatment.

10.2 Leakage Test — The fire extinguisher after being covered by inverted glass-transparent jar shall be dipped in suitable water tank filled with water, the level of which is sufficiently higher than the height of fire extinguisher for 24 hours. There shall not be any collection of even a single bubble on the inside top of the inverted glass after elapse of 24 hours. The air bubble collected in first 6 hours shall be neglected.

NOTE 1 — The size of water tank will depend on lot size to be tested at a time. The fire extinguishers shall be arranged in rows having two grids having square opening, the top one being about 8 cm below top of fire extinguishers.

NOTE 2 — To ensure this requirement pneumatic leakage test shall be conducted during in-process control.

*Specification for colours for ready mixed paints and enamels (*third revision*).

†Specification for enamel, synthetic, exterior (a) under coating, (b) finishing (*first revision*).

‡Code of practice for selection, installation and maintenance of portable first-aid fire extinguishers (*second revision*).

10.3 Drop Test — This shall be conducted at a temperature of $27 \pm 5^{\circ}\text{C}$. The extinguisher shall be filled with water to 90 percent by volume and pressurised to its charged pressure (see 5.1). The extinguisher complete with fittings shall be dropped from a height of 3 m to a concrete surface. Two drops shall be made for each extinguisher, first with cylindrical axis horizontal and the second with cylindrical axis vertical with its head up. There shall be no leakage from the body permitting the loss of pressure after the test. The leakage shall be observed by immersing the extinguisher in water.

10.4 In case of ultimate failure, structural failure shall not occur at a pressure of less than 4 MN/m^2 (40 kgf/cm^2).

10.5 The design and construction of extinguishers shall be such that when it is filled to the specified mass (as determined by the difference of full mass in charged condition and after discharge and after being stored for 24 h at -40°C followed by 24 h at $+70^{\circ}\text{C}$, followed by 24 h at the test temperature then discharged at temperatures $-26 \pm 2^{\circ}\text{C}$ and $+55 \pm 2^{\circ}\text{C}$ (separate tests) whilst it is being held at an angle of 60° from the vertical position; it shall be capable of discharging not less than 75 percent of the liquid contents in not less than ten seconds. The contents shall be expelled in the form of a continuous discharge.

11. SAMPLING AND CRITERIA FOR CONFORMITY

11.1 The details of sampling and criteria for conformity is given in Appendix A.

12. MARKING

12.1 Each extinguisher shall be clearly and permanently marked in accordance with the requirements laid down as under:

- a) Manufacturer's name and trade-mark;
- b) Method of operation in prominent letters;
- c) The words Halon 1211 Aircraft Extinguisher in prominent letters and numbers;
- d) The capacity and charged pressure and whether radiographed;
- e) The words 'Send for re-charging immediately after use';
- f) Year of manufacture;
- g) Test pressure and capacity in kg;
- h) The tare weight, full weight partly as gas and partly as liquid; and
- j) The words 'WARNING : Ventilate the area after use'.

12.1.2 The extinguisher may also be marked with the Standard Mark.

NOTE — The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act 1986 and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions, under which a licence for the use of the Standard Mark may be granted to manufacturers or processors, may be obtained from the Bureau of Indian Standards.

APPENDIX A

(Clause 12.1)

SAMPLING AND CRITERIA FOR CONFORMITY

A-0. GENERAL

A-0.1 The risk involved in failure of a fire extinguisher to work when needed is extremely large. Fire extinguishers, therefore, ought to have a high degree of reliability of performance during the entire specified period of its service. It can be achieved only through adequate design and control of quality of all raw materials, component parts and fittings followed by process control in all stages of manufacture and assembly.

A-1. SAMPLING

A-1.1 All portable fire extinguishers of the same type, shape, design and capacity produced by the same manufacturer from similar materials under almost identical conditions of manufacture shall be grouped together to constitute a lot.

A-1.2 Each lot shall be considered individually for the purpose of evaluation of quality in accordance with this specification.

A-1.2.1 The number of samples for testing to be taken at random from a lot and the criteria for conformity shall be as given in **A-1.2.2**.

A-1.2.2 From each lot a number of samples as indicated below shall be selected at random:

<i>Number of Items in the Lot</i>	<i>Sample Size</i>
Up to 25	3
26 to 50	5
51 to 100	8
101 and up to 200	8 percent

A-1.2.3 They shall be examined visually as far as possible in respect of requirements specified in 2 to 7, 9 and 11 in respect of hydraulic pressure test (*see 10.1*), leakage test (*see 10.2*) and anti-corrosion treatment (*see 8*).

A-1.2.4 All the samples tested shall pass all these tests for the lot to be declared to conform to those requirements.

A-1.2.5 One sample shall then be examined for each of the property vibration (*see 7.7*), drop test (*see 10.3*), and performance test (*see 10.5*).

A-1.2.6 In respect of bursting pressure (*see 10.4*), the manufacturer shall produce a certificate with the lot to the effect that these tests had been performed and had been found satisfactory in respect of the type of fire extinguishers presented in the lot. Alternatively, one sample shall be tested and the sample shall pass the test for the lot to be considered to conform to this requirement.

A-1.2.7 In the absence of a test certificate from a manufacturer about conformity of various components (*see 4*) and the quality of charge (*see 5*) to the requirements of this specification, from a sample fire extinguisher one item each of all the component parts and fittings shall be taken separately and examined individually in respect of the relevant requirements laid down in this specification. The sample shall also meet the requirements regarding the quality of charge (*see 5*).

(Continued from page 2)

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INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹)
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²

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'F' Block, Unity Bldg, Narasimharaja Square, 22 48 05
BANGALORE 560002

Gangotri Complex, 5th Floor, Bhadbhada Road, T. T. Nagar, 6 67 16
BHOPAL 462003

Plot No. 82/83, Lewis Road, BHUBANESHWAR 751002 5 36 27

53/5, Ward No. 29, R. G. Barua Road, 5th Byelane —
GUWAHATI 781003

5-8-56C L. N. Gupta Marg (Nampally Station Road), 23 10 83
HYDERABAD 500001

R14 Yudhister Marg, C Scheme, JAIPUR 302005 { 6 34 71
6 98 32

117/418 B Sarvodaya Nagar, KANPUR 208005 { 21 68 76
21 82 92

Patliputra Industrial Estate, PATNA 800013 6 23 05

Hantex Bldg (2nd Floor), Railway Station Road, 7 66 37
TRIVANDRUM 695001

Inspection Offices (With Sale Point):

Pushpanjali, 205A West High Court Road, 2 51 71
Bharampeth Extension, NAGPUR 440010

Institution of Engineers (India) Building, 1332 Shivaji Nagar, 5 24 35
PUNE 411005

*Sales Office in Bombay is at Novelty Chambers, Grant Road, 89 65 28
Bombay 400007

†Sales Office in Calcutta is at 5 Chowringhee Approach, P. O. Princep 27 68 00
Street, Calcutta 700072