



**PRODUCT MANUAL FOR
WHEELED FIRE EXTINGUISHERS –
PERFORMANCE AND CONSTRUCTION
ACCORDING TO IS 16018: 2012**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 16018 : 2012
	Title	:	WHEELED FIRE EXTINGUISHERS – PERFORMANCE AND CONSTRUCTION
	No. of Amendments	:	2
2.	Sampling Guidelines:		
a)	Raw material	:	Please refer ANNEX - A
b)	Grouping guidelines	:	Fire Extinguishers of each variety shall be tested separately to cover that particular variety in the Scope of Licence
c)	Sample Size	:	20 pairs for all tests
3.	List of Test Equipment	:	Please refer ANNEX – B
4.	Scheme of Inspection and Testing	:	Please refer ANNEX – C
5.	Possible tests in a day : Please refer ANNEX –D		
6.	Scope of the Licence :		
	“Licence is granted to use Standard Mark as per IS 16018 : 2012 with the following scope:		
	Name of the product	WHEELED FIRE EXTINGUISHERS	
	Extinguisher media		
	Nominal charge capacity		
	Fire rating		
	Operating temperature		

ANNEX- A

DETAILS OF RAW MATERIAL:

1. Extinguishing media- Clause 5.1 of IS 16018 : 2012
 - a) Carbon dioxide – IS 15222
 - b) Clean agent – IS 15493
 - c) Powder – IS 4308 or IS 4861 or IS 14609
 - d) Foam concentrate – IS 4989 or 4989 (Part 4)

2. Propellants – Clause 5.2 of IS 16018 : 2012
 - Gas cartridge – IS 4947

3. Construction parts :
 - a) High pressure cylinder – Clause 8.2 of IS 16018
 - b) Low pressure cylinder – Clause 8.3 of IS 16018
 - c) Steel Cylinder – Clause 8.4 of IS 16018
 - i) Welded low carbon steel cylinders – Clause 8.4.1 of IS 16018
 - ii) Stainless steel cylinders – IS 7285 and Clause 8.4.2 of IS 16018
 - d) Aluminium Cylinder – IS 15660
 - e) Caps, valves and closures – Clause 8.7 of IS 16018
 - f) Safety and Anti-overfill devices – Clause 8.8 of IS 16018
 - g) Discharge assembly – Clause 8.11 of IS 16018
 - h) Control valve – Clause 8.12 of IS 16018
 - i) Horn for carbon dioxide extinguishers – Clause 8.13 of IS 16018
 - j) Safety locking devices – Clause 8.15 of IS 16018
 - k) Pressure gauges for low pressure extinguishers – Clause 8.16 of IS 16018
 - l) Dip tubes and filters for water based extinguishers – Clause 8.17 of IS 16018
 - m) Carriage assembly – Clause 8.18 of IS 16018
 - n) Gaskets and O-rings – Clause 8.19 of IS 16018

ANNEX B**List of Test Equipment***Major test equipment required to test as per the Indian Standard*

S. No.	Tests used in with Clause Reference	Test Equipment
1	Fill density (Clause 5.3), Filling tolerance(Clause 5.4) & Gross mass(Clause 5.5.2)	- Weighing balance - Measuring jar
2	Operating temperature (Clause 6.1)	- Temperature incubator - Hot air oven - Deep freezer
3	Effective Discharge Time (Clause 6.2.1) Bulk range(Clause 6.2.2) Retention of charge (Clause 6.4) Intermittent discharge test (Clause 6.5)	- Performance Chamber - Stop Watch - Measuring Tape - Air conditioner - Hot air oven - Pressure gauge
4	External corrosion test (Clause 6.6.1)	- Salt spray apparatus - Sodium chloride and - Distilled water
5	Internal corrosion test for water and foam type extinguisher (Clause 6.6.2)	- Closed glass container
6	Durability test (Clause 6.7)	- Speedometer - 300 mm & 900 mm platform - Angle protractor
7	Electrical conductivity of extinguisher discharge (clause 6.8)	- Metal plate(1 m X 1 m) - Transformer(36 kV) - Voltmeter - Ammeter - Measuring Tape - Wire
8	Construction requirements (Clause 8.1.2) Leakage Test (Clause 8.9.2)	- Water tank - Glass funnel - Stop watch
9	Construction requirements (Clause 8.1.3)	- Copper Sulphate - Cotton

10	Burst test (Clause 8.3.1) Low pressure cylinder (Clause 8.9.1)	- Burst Test apparatus with pressure gauge and pressurizing unit
11	Deformation test (Clause 8.3.2)	- Water jacket apparatus
12	Pressure cycling test (Clause 8.3.3)	- Pressure cycling apparatus
13	Minimum wall thickness (clause 8.6)	- Micrometer - Vernier caliper
14	U V Light exposure (Clause 8.10.3)	- UV Light exposure apparatus
15	Exposure to extinguishing agent test (Clause 8.10.5)	- Compression testing machine - Tensile testing machine - Hot air oven - Air conditioner
16	Horn for carbon dioxide (Clause 8.13)	- Torque tester - 25 kg load
17	Method of operation (Clause 8.14)	- Dynamometer - Cylindrical steel weight with flat face 75 mm dia and weight of 4 kg
18	Safety locking devices (Clause 8.15)	- Safety Locking Device
19	Pressure gauges for low-pressure extinguishers (Clause 8.16)	- Dead gauge testes with hydraulic pressure pump - Pressure impulse tester - Inverted water column/flow meter - Air/Nitrogen - Bourdon tube - water tank - Leak detector apparatus
20	Carriage assembly (Clause 8.18)	- Load equivalent to 400 N and 150 N
21	Gasket and O-rings (Clause 8.19)	- Oxygen conditioning chamber - Compression testing machine
22	Requirements of plastic components (Clause 8.10.1.4)	- Impact Test Equipment

The above list is indicative only and may not be treated as exhaustive.

ANNEX C

Scheme of Inspection and Testing

1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipment.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING AND MARKING – As per the requirements of IS 16018: 2012. The user manual and service manual shall be provided as per clause 10 of IS 16018: 2012.

4. CONTROL UNIT – 50 Fire extinguishers or part thereof of same type/classification and capacity manufactured continuously or on consecutive days from same consignment of material under similar condition of manufacturing shall constitute a control unit.

4.1 For Plastic components fabricated in house, a control unit may be taken as the quantity manufactured continuously on same machine using same source and consignment of raw material, with same mix of ingredients, if any used.

4.2 For Pressure gauges fabricated in house, a control unit may be taken as the quantity of Gauges and indicators of same size, model, and material received from same supplier/ manufacturer.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of [Table 1](#) and the levels of control in column 3 of [Table 1](#), shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standard and covered by the licence should be marked with Standard Mark.

6. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016.

TABLE 1

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
Cl.	Requirement	Test Methods Clause Reference	No. of Sample		Frequency	Remarks	
5	EXTINGUISHING MEDIA, PROPELLANTS AND FILLING REQUIREMENTS						
5.1.1	Carbon dioxide	5.1.1	IS 16018 IS 15222	S	1	Each consignment	Further testing is not required if consignment received with test certificate. However one sample may be tested once in six month as verification sample
5.1.2	Clean agent	5.1.2	IS 16018 IS 15493	S	1	Each consignment	Further testing is not required if consignment received with test certificate.
5.1.3	Powder	5.1.3	IS 16018 IS 4308	S	1	Each consignment	
5.1.4	Foam concentrate	5.1.4	IS 16018 IS 4989 IS 4989 (Part 4)	S	1	Each type in a consignment received	
5.2	Propellants	5.2	IS 16018	-	Each extinguisher	-	-
	Gas cartridge	5.2	IS 16018 IS 4947	S	1	Each consignment	Further testing is not required if consignment received with test certificate.
5.3	Fill density	5.3	IS 16018	R	1	Each control unit	-
5.4	Filling tolerance	5.4	IS 16018	R	1	Each control unit	-
5.5.1	Nominal charge	5.5.1	IS 16018	R	1	Each control unit	-
5.5.2	Gross mass	5.5.2	IS 16018	R	Each extinguisher	-	-

6	PERFORMANCE						
6.1	Operating temperature range	6.1	IS 16018	-	-	-	Shall be declared by the manufacturer
6.2	Minimum effective discharge time and Bulk range of discharge	6.2.1 6.2.2	IS 16018	S	1	Once in three months for each type, classification and capacity	
6.3	Resistance to temperature changes	6.3.1 6.3.2	IS 16018	S	2	Once in three months for each capacity and type with highest fire rating produced	
6.4	Retention of charge	6.4.1 6.4.2	IS 16018	R	1	Each control unit	-
6.5	Intermittent discharge test	6.5.1 6.5.2	IS 16018	R	1	Every seventh control unit	-
6.6	Resistance to corrosion						
6.6.1	External corrosion test	6.6.1	IS 16018	S	1	Once in three months	All types of extinguishing media shall be covered over a period of one year.
6.6.2	Internal corrosion test for water and foam type extinguishers	6.6.2	IS 16018	S	1	Once in three months	
6.7	Durability test	6.7.1 to 6.7.4	IS 16018	S	1	Once in three month for each type of fire extinguisher	
6.8	Electrical conductivity of extinguisher discharge	6.8.1 6.8.2	IS 16018	S	1	Once in six month	Applicable to water based extinguishers that are marked as suitable for use on energized electrical equipments
7	Fire performance test	7.1 to 7.3	IS 16018 IS 15683	S	1	Once in a year	All type of fire extinguishers and extinguishing media to be tested in a year. Preferably, the test may be carried out in presence of BIS Inspecting Officer. If inhouse test facility does not exist, the test may be carried out at BIS recognized laboratory.

8	CONSTRUCTION REQUIREMENTS						
8.1	General requirements	8.1.1 & 8.1.2	IS 16018	S	3	Once in three months for each type, classification and capacity	
		8.1.3 to 8.1.7	IS 16018	R	Each extinguisher	-	-
8.2	High pressure cylinder	8.2	IS 16018	-	Each extinguisher	-	-
8.3	<i>Low pressure cylinder</i>						
8.3.1 8.9.1	Burst test	8.3.1 8.9.1.1	IS 16018	R	1	From a batch of 500 cylinders or less	In case of failure, five additional samples from same batch shall be tested and batch accepted on passing of all retested cylinder. Non-destructive testing as per note below clause 8.9.1.1 of IS 16018 is also permitted.
8.3.2 8.9.1	Deformation test	8.3.2 8.9.1.1	IS 16018	R	1		
8.3.3	Pressure cycling test	8.3.3	IS 16018	S	One sample from each type and size	Once in three month	-
8.4	<i>Steel cylinder</i>						
8.4.1	Welded low carbon steel cylinder	8.4.1	IS 16018	S	1	From a batch of 500 cylinders or less if cylinder manufactured inhouse or from each consignment received	No testing is required if consignment received with manufacturers test certificate.
8.4.2	Stainless steel cylinder	8.4.2	IS 16018	S	1		
8.4.3	Carbon dioxide extinguisher	8.4.3	IS 16018 IS 7285	S	1		
8.5	Aluminium cylinder	8.5	IS 16018 IS 15660	S	1		
8.6	Minimum wall thickness	8.6	IS 16018	R	Each extinguisher	-	-
8.7	Caps, valves and closures	8.7.1 to 8.7.4 & 8.7.6	IS 16018	R	Each component	-	-

8.7.5	Burst test of caps, valve and closures	8.7.5	IS 16018	R	2	Each lot of same size.	-
8.8.1	Safety device	8.8.1	IS 16018	R	Each extinguisher	-	-
8.8.2	Anti-overfill devices	8.8.2	IS 16018	R	Each extinguisher	-	Applicable for water based fire extinguishers
8.9.1.2	Low pressure cylinder	8.9.1.2	IS 16018	R	Each extinguisher	-	-
8.9.2	Leakage test (Type test)	8.9.2	IS 16018	S	One sample of each type/capacity and classification	Once in a year	-
8.10	Requirement for plastic components						
8.10.2	Requirements for Normally pressurised components						
	Burst strength (before air oven ageing and ultraviolet light exposure)	8.10.2.1 8.10.2.1.2	IS 16018	S #	6	Each consignment received or each control unit	No testing is required if consignment received with test certificate or ISI marked.
	Burst strength after air oven ageing	8.10.2.1 8.10.2.1.2 8.10.2.2	IS 16018	S	3	Once in year for each type of plastic used	
	Burst strength test after ultraviolet light exposure	8.10.2.1 8.10.2.1.2 8.10.2.3	IS 16018	S	6		
8.10.4	Requirements for Normally non-pressurised components						
	Burst strength (before air oven ageing and ultraviolet light exposure)	8.10.4.1	IS 16018	S #	6	Each consignment received or each control unit	No testing is required if consignment received with test certificate or ISI marked.
	Burst strength after air oven ageing	8.10.4.1	IS 16018	S	3	Once in year for each type of plastic used	
	Burst strength test after ultraviolet light exposure	8.10.4.1 8.10.4.2 8.10.3	IS 16018	S	6		

8.10.5	Exposure to extinguishing agent test	8.10.5.1 8.10.5.2	IS 16018	S	3	Once in year for each type of dip tube received from a source	
8.11	Discharge assembly	8.11.1 to 8.11.3	IS 16018	R	1	Every 7 th control unit	-
8.12	Control valve	8.12	IS 16018	R	1	Each consignment	No testing is required if consignment received with test certificate.
8.13	Horn for Carbon Di-oxide Extinguishers	8.13.1 to 8.13.3	IS 16018	R	One	Every 10th control unit	-
8.14	Method of operation	8.14	IS 16018	R	One	Every 10th control unit	-
8.15	Safety locking devices	8.15	IS 16018	R	One	Every 10th control unit	-
8.16	<i>Pressure gauges for low pressure extinguishers</i>						
8.16.1	General	8.16.1.1 to 8.16.1.7	IS 16018	-	All	-	-
8.16.2	Pressure gauge calibration test	8.16.2 8.16.2.1 & 8.16.2.2	IS 16018	S #	All	-	Calibration from recognized laboratory is acceptable.
8.16.3	Pressure gauge for Burst strength test	8.16.3.1 & 8.16.3.2	IS 16018	S #	One	From each control unit or each consignment received, as applicable	In case the consignment is received with test certificate of conformity of product as per the Standard, no further testing is required.
8.16.4	Pressure gauge for Over pressure test	8.16.4.1 & 8.16.4.2	IS 16018	S #	One		
8.16.5	Pressure gauge for impulse test	8.16.5.1 & 8.16.5.2	IS 16018	S #	One		
8.16.6	Pressure gauge for relief test	8.16.6.1 & 8.16.6.2	IS 16018	S #	One		
8.16.7	Pressure gauge for Water resistance test	8.16.7	IS 16018	S	One	Once in three months for each size	-
8.16.8	Pressure gauge for Leakage test	8.16.8	IS 16018	S	Twelve	Once in six month for each type of pressure gauge	-

8.16.9	Pressure gauge Plastic components	8.16.9 8.10	IS 16018	S #	Three	From each control unit or each consignment received, as applicable	In case the consignment is received with test certificate of conformity of product as per the Standard, no further testing is required
8.17	Dip tubes and filters for water based extinguisher	8.17.1 & 8.17.2	IS 16018	R	One		
8.18	Carriage assembly	8.18.1 to 8.18.3	IS 16018	R	One		
8.19	Gasket and O-rings	8.19.1 & 8.19.2	IS 16018	S #	One		
9.1	Colour	9.1	IS 16018	-	Each extinguisher	-	-

Inhouse testing facility for these testing for gaskets and O-rings (Clause 8.19), plastic components (Clause 8.10) and pressure gauges for low pressure extinguishers (Clause 8.16) is required, if these components are manufactured inhouse.

Note-1: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-2: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

ANNEX- D

POSSIBLE TESTS IN A DAY:

- a) Fill density (Clause 5.3)
- b) Effective discharge time (Clause 6.2.1)
- c) Burst strength of normally pressurized components (before air-oven ageing and Ultraviolet light exposure (Clause 8.10.2.1)
- d) Burst strength of normally non- pressurized components (before air-oven ageing and Ultraviolet light exposure (Clause 8.10.4.1)
- e) Discharge assembly (Clause 8.11)
- f) Control valve (Clause 8.12)
- g) Horn for carbon dioxide extinguisher (Clause 8.13)
- h) Method of operation (Clause 8.14)
- i) Colour (Clause 9.1)
- j) Marking (Clause 9.2)