



उत्पाद मैनुअल
पहिये वाले अग्नि शामक - कार्यकारिता और निर्माण,
आई एस 16018 : 2012 के अनुसार

PRODUCT MANUAL FOR PORTABLE FIRE EXTINGUISHERS –
PERFORMANCE AND CONSTRUCTION
ACCORDING TO IS 15683: 2018

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो) अनुरूपता मूल्यांकन (विनियम, 2018 की योजना -I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity 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.

1.	मानक संख्या IS No.	:	IS 16018:2012
	शीर्षक Title	:	Wheeled Fire Extinguishers – Performance and Construction
	संशोधनों की संख्या No. of amendments	:	3
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	Please refer to Annex-A Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/ Factory Surveillance
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Fire Extinguishers of each variety shall be tested separately to cover that particular variety in the Scope of Licence
c)	नमूने का परिमाण Sample Quantity	:	20 pairs for all tests Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (incase of market surveillance, effort may be made to procure therequired quantity of product sample, as far as possible since raw material sample may not be available in market)

d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	-	Same as the scope of licence
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer to Annex-B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer to Annex-C
5.	एक दिन में संभावित परीक्षण Possible tests in a day		
	(i) Fill density (Clause 5.3), (ii) Effective discharge time (Clause 6.2.1), (iii) Burst strength of normally pressurized components (before air-oven ageing and Ultraviolet light exposure (Clause 8.10.2.1), (iv) Burst strength of normally non- pressurized components (before air-oven ageing and Ultraviolet light exposure (Clause 8.10.4.1), (v) Discharge assembly (Clause 8.11), (vi) Control valve (Clause 8.12), (vii) Horn for carbon dioxide extinguisher (Clause 8.13), (viii) Method of operation (Clause 8.14), (ix) Colour (Clause 9.1), (x) Marking (Clause 9.2) Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.		
6.	लाइसेंस का दायरा /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 – Performance and Construction	
	Extinguisher media	Water based/ powder based/ clean agent based/ CO ₂ based	
	Nominal charge capacity	4.5kg/6.5 kg/ 9kg/ 10kg/ 20kg/ 22.5kg/ 25kg/ 30kg/ 45kg/ 50kg/ 75kg/ 20ltr/ 45ltr/ 60ltr/ 125ltr	
	Fire rating	Class A/ Class B/ Class C/ Class D/	
	Operating temperature	(+ 5°C to + 55°C)/ (-5°C to + 55°C)/ (– 10°C to + 55°C)/ (– 20°C to + 55°C)/ (– 30°C to + 55°C)/ (– 40°C to + 55°C)/ (– 55°C to + 55°C)	

भारतीय मानक ब्यूरो
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ANNEX- A
Raw Materials

Raw Material	Requirements
Extinguishing Media- Clause 5.1 of IS 16018 : 2012	
Carbon dioxide	Carbon dioxide used in wheeled fire extinguishers shall comply with IS 15222
Clean agent	Clean agents used in wheeled fire extinguishers shall comply with IS 15493
Powder	Powder used in wheeled fire extinguishers shall comply with IS 4308 or IS 4861 or IS 14609.
Foam concentrate	Foam concentrates used in wheeled fire extinguishers shall comply with IS 4989 or IS 4989 (Part 4).
Propellants	The propellants for stored pressure and cartridge-operated extinguishers shall be air, carbon dioxide, or nitrogen. (Clause 5.2)
Construction Parts - Clause 8 of IS 16018 : 2012	
High pressure cylinder	High pressure cylinder shall confirm to Clause 8.2 of IS 16018.
Low pressure cylinder	Low pressure cylinder shall confirm to Clause 8.3 of IS 16018.
Welded low carbon steel cylinders	Welded low carbon steel cylinders shall confirm to Clause 8.4.1 of IS 16018.
Stainless steel cylinders	Stainless steel cylinders shall confirm to Clause 8.4.2 of IS 16018.
Aluminium cylinders	Aluminium cylinders shall confirm to IS 15660.
Caps, valves and closures	Caps, valves and closures shall confirm to Clause 8.7 of IS 16018
Safety and Anti-overfill devices	Safety and Anti-overfill devices shall confirm to Clause 8.8 of IS 16018
Discharge assembly	Discharge assembly shall confirm to Clause 8.11 of IS 16018
Control valve	Control valve shall confirm to Clause 8.12 of IS 16018
Horn for carbon dioxide extinguishers	Horn for carbon dioxide extinguishers shall confirm to Clause 8.13 of IS 16018.
Safety locking devices	Safety locking devices shall confirm to Clause 8.15 of IS 16018
Pressure gauges for low pressure extinguishers	Pressure gauges for low pressure extinguishers shall confirm to Clause 8.16 of IS 16018.
Dip tubes and filters for water based extinguishers	Dip tubes and filters for water based extinguishers shall confirm to Clause 8.17 of IS 16018.
Carriage assembly	Carriage assembly shall confirm to Clause 8.18 of IS 16018
Gaskets and O-rings	Gaskets and O-rings shall confirm to Clause 8.19 of IS 16018

ANNEX-B

List of Test Equipment

(INDICATIVE LIST, FOR GUIDANCE ONLY)

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	Air Oven ageing (Clause 8.10.1)	- Air Oven
15	Impact Resistance test for Plastic Make valve (Clause 8.10.2)	- Nitrogen - Water and anti-freeze solution - Conditioning chamber - Impact test set up
16	Test for exposure to extinguishing medium (Clause 8.10.3)	- Extinguishing media - Oven
17	Horn for carbon dioxide (Clause 8.13)	- Torque tester - 25 kg load
18	Method of operation (Clause 8.14)	- Dynamometer - Cylindrical steel weight with flat face 75 mm dia and weight of 4 kg
19	Safety locking devices (Clause 8.15)	- Safety Locking Device
20	Pressure gauges for low-pressure extinguishers (Clause 8.16)	- Dead gauge tester with hydraulic pressure pump - Pressure impulse tester - Inverted water column/flow meter - Air/Nitrogen - Bourdon tube - water tank - Leak detector apparatus
21	Carriage assembly (Clause 8.18)	- Load equivalent to 400 N and 150 N
22	Gasket and O-rings (Clause 8.19)	- Ozone chamber with temperature control arrangement - Magnifying glass

ANNEX C

SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that manufacturers (licensees/applicants) will implement a Quality Assurance Plan i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan defining the control unit (i.e. lot/batch etc.) and the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and submit the same to BIS Branch Office for information. The manufacturer shall comply with the same and maintain test records in accordance with para 2.4.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is : 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.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in **Table 1**.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan. Alternatively, the manufacturer has the option of adherence to the quality plan as per levels of control recommended in column 3 of Table 1.

1.4 However, all manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard.

2 ENSURING COMPLIANCE THROUGH TESTING- It is expected that manufacturers (licensees/applicants) will establish a suitably equipped and staffed in house laboratory (In house testing facility) for testing at least those parameters of the Indian Standard which require routine testing for ensuring quality of the product. This includes in-process controls as may be defined and put in place by the manufacturer and testing parameters/requirements which can only be performed in the factory.

2.3 For the guidance of manufacturers, Table 1 giving the recommended levels of control is given below. Column 2 of Table 1 indicates routine tests where test equipment is required in house as “R” or other tests which can be subcontracted as “S”. Subcontracting is permitted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.4 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.4.2 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empaneled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.5 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.5.2 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.6 TEST RECORDS- The manufacturers maintaining an in-house laboratory or utilizing common cluster based facilities or shared test facilities shall maintain test records for the tests carried out to establish conformity. For the tests being subcontracted to BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025, test reports issued by the laboratories shall be available for inspection by BIS.

3 PACKING AND MARKING - The Standard Mark as given in the Schedule of the licence shall be marked on each fire extinguisher, provided always that the material so marked conforms to all requirements of the specification.

3.3 Marking and colour shall be done as per Clause 9 of IS 16018:2012.

3.4 Operating instructions as per Clause 9.3 to 9.7 of IS 16018:2012 and manual as per Clause 10 of IS 16018:2012 shall be provided with each extinguisher.

3.5 Additional Marking requirements: The material shall also be marked with the following additional requirement on each plywood:

a) “For BIS certification details please visit www.bis.gov.in”

4 REJECTION - All the production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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
(ONLY FOR GUIDANCE PURPOSE)

(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	
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	R	Each extinguisher	-	-
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	-	-

5.5.3	Requirements for fire extinguishants (charges) filled in extinguisher	5.5.3	IS 16018	S			
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

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	<i>Requirements for Normally pressurised components</i>						
	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	Pressure gauges for low pressure extinguishers						
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 for 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	-	-

In-house 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 in-house.