उत्पाद मानुयल
आई एस 16534 : 2017 के अनुसार
स्वचालित स्प्रिंकलर आग बुझाने की प्रणाली के लिए क्लोरीनयुक्त पॉलीविनाइल क्लोराइड (सीपिभीसी) पाइप फिटिंग के लिए

दस्तावेज़ संख्या– पी एम/आई एस 16534/1/जुलाई 2023

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरण के प्रचलन मे रीति और पारदर्शिता के सुसंगता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप मे उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

PRODUCT MANUAL FOR CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE FITTINGS FOR AUTOMATIC SPRINKLER FIRE EXTINGUISHING SYSTEM ACCORDING TO IS 16534:2017

Document No.- PM/IS 16534/1/July 2023

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

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1.	**Product**	:	IS 16534:2017
	Title	:	Chlorinated Polyvinyl Chloride (CPVC) Pipe Fittings for Automatic Sprinkler Fire Extinguishing System
	No. of Amendments	:	01
2.	**Sampling Guidelines:**		
a)	**Raw material**	:	Clause 6 of IS 16534:2017
b)	**Grouping guidelines**	:	Please refer ANNEX – A
c)	**Sample Size**	:	20 Nos Fittings + CPVC pipes – 7 m for testing as per clause 8.6 and 8.7 of IS 16534:2017
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**		Please refer ANNEX – E

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ANNEX A

Grouping Guidelines

1. IS 16534:2017 covers requirements for various types of Chlorinated Polyvinyl Chloride (CPVC) Fittings for Automatic Sprinkler Fire Extinguishing System, to be used with CPVC pipes as per IS 16088 meant for installation of Automatic Sprinkler Fire Extinguishing Systems to IS 15015 for light hazard occupancies.

2. Chlorinated Polyvinyl Chloride (CPVC) Fittings for Automatic Sprinkler Fire Extinguishing System as per IS 16534:2017 are categorized as follows:

a) Nominal Sizes: DN 20, 25, 32, 40, 50, 65, 80 mm

b) Types of Fittings:
Elbow 90°, Tees, Couplers, Cross Tee, Cap, Elbow 45°, Red. Coupler, Red. Bush, Flanges, Plastic to Metal Transition Tee, Plastic to Metal Transition Elbow, Plastic to Metal Transition Coupler, Plastic to Metal Transition Bush, Plastic to Metal Transition Male Adaptor, Plastic to Metal Transition Female Adaptor, Plastic to Metal Transition Tee

2. Considering the above, grouping guidelines as given below shall be followed for GoL/CSoL:

a. One sample of maximum nominal size of each type of fittings shall be tested for all requirements to cover fittings of all nominal sizes up to and including the size tested and for that particular type of fitting; provided the CPVC compound composition remains the same.

b. Fire Exposure test (Clause 8.6) and Flammability test (Clause 8.7) need not be tested on each type of fitting, provided the CPVC compound composition remains the same.

3. The Firm shall declare the types of fittings and sizes they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.

4. During the operation of the Licence, BO shall ensure that all the varieties covered in the Licence are tested in rotation, to the extent possible.

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	Chlorine content (Clause 6.2.2)	- Drying Oven - Digital Balance - Equipment for Volhard Titration or Potentiometric Titration - Combustion Bomb - Nickel crucible - Safety oven } for combustion in bomb technique - Round or Flat bottom Flask with platinum wire and stopper - Filter Paper free from halogen and ash-Beaker 250 ml - Silver nitrate - Nitric acid - Sodium peroxide - Starch - Sucrose or ethylene glycol
2	Density (Clause 6.2.3 and 8.5)	- Digital Balance with holding attachment - Distilled water - Butyl Acetate - Hydrometer - Glass beaker of 250ml capacity - Thermometer - Air conditioner
3	Dimension (clause 7)	- Vernier Caliper - Micrometer - Angle Protractor - Steel Scale
4	Opacity (Clause 8.2)	- Opacity Test Apparatus - Standard sample of opacity - 0.2 %
5	Stress relief test (Clause 8.3)	- Hot air oven or thermostatically control oil bath - Thermometer - Vernier Caliper - Stop watch

6	Vicat Softening Temperature (Clause 8.4)	- Oil heating Bath equipped with means to raise the temperature at uniform rate of 50 ± 5°C/hr. with suitable stirrer. - Rod with loading plate, load and indenting tips - Micrometer dial gauge - Thermometer or temperature measuring equipment
7	Density (clause 8.5)	- Digital Balance with holding attachment - Distilled water - Butyl Acetate - Hydrometer - Glass beaker of 250ml capacity - Thermometer - Air conditioner
8	Fire Exposure test (Clause 8.6)	- Fire source – square steel pan containing n-heptane - Test room - 9.1 m × 9.1 m × 4.6 m high (1/2-inch gypsum wall board) - Test Ceiling - 3.7 m wide by 7.3 m long (1/2-inch gypsum wall board) - Closed pendent sprinklers - Digital stop watch - Temperature measuring equipment - Water source and piping arrangement
9	Flammability test (Clause 8.7)	- Lab fume hood - Lab burner - Ring stands - Methane Gas supply - Conditioning room/ chamber - Micrometer - Conditioning oven - Pressure gauge - Flow meter - Standard bar specimen/ sample - Cotton
10	Short term hydrostatic test ((Clause 9.1.1)	- Hydrostatic pressure testing apparatus with pressuring unit and multiple outlets - Water bath with temperature control - Thermometer - End plugs/ caps/pipes
11	Long term hydrostatic test (Clause 9.1.2)	
12	Vibration Test (Clause 9.2)	Test arrangement for Vibration Test (fig 1)
13	Ten-day Moist Ammonia Air Stress Cracking Test (Clause 9.3)	- Aqueous ammonia (Sp.Gravity: 0.94) - Glass chamber - Inert tray - Hot air oven
14	Flexural Strength (Clause 9.4)	- Test arrangement for Vibration Test (fig 2) And table 7 of IS 16088

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 16534:2017. The Standard Mark, as given in the Schedule of the licence, shall be printed or formed directly on the fittings in such a way that after storage, handling and installation, legibility is maintained and provided always that the fittings thus marked conforms to all the requirement of the specification. In addition, the licence no. CM/L-_____. Details of BIS website shall be marked on the fittings/ packaging as follows: "For details of BIS certification please visit www.bis.gov.in".

4. CONTROL UNIT – All fittings of same type and size manufactured from same CPVC compound composition in a day shall constitute a control unit.

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**			**No. of Sample**	**Frequency**	**Remarks**
		Clause	**Reference**				
6	**COMPOSITION**						
6.2.1	Compound	6.2.1	IS 15225 IS 16534	S	One	Each consignment	No further testing is required, if material received is accompanied with the test certificate or ISI Marked.
6.2.2	Compound Chlorine Content	6.2.2 Annex B	IS 15778 IS 16534	R	One	Each compound mix	
6.2.3	Density	6.2.3	IS 13360 (Pt 3/ Sec 10) and IS 13360 (Pt 3/Sec 11)	R	One	Each compound mix	
7	Dimension	7.1 and 7.1.1 Table 1 & 2	IS 16534	R	Firm to have adequate in-process controls to check compliance of this parameter as per the requirements given in the Indian Standard. Appropriate records shall be maintained by the manufacturer for evidence of conformity		
8.1	Visual appearance	8.1	16534	R			
8.2	Opacity	8.2	IS 12235 (part 3)	S	One	Once in three months	Pipe with thinnest wall section produced during the period shall be tested *
8.3	Stress relief test	8.3	IS 12235(part 6)	R	One	Each Control Unit	In case of failure, twice the number of initial samples from same control unit shall be tested and control unit may be accepted on passing of retested samples
8.4	Vicat Softening Temperature	8.4	IS 12235 (part 2)	R	One	Each Control Unit	
8.5	Density	8.5	IS 12235 (part 14)	R	One	Each Control Unit	

8.6	Fire Exposure Test	8.6	IS 16088 Annex B	S	One	Once in 1 year	*
8.7	Flammability Test	8.7	IS 16088 Annex C	S	One	Once in 1 year	*
9	**MECHANICAL PROPERTIES**						
9.1	Hydrostatic Characteristics						
9.1.1	Acceptance Test (5 times rated pressure for 1 Min 23±2°C)		IS 16534 Annex B	R	One	Each Control Unit	
9.1.2	Type Test (65°Cfor 1000 h)	9.1.2	IS 16534 Annex B	S	One	Once in 1 year	One size for each type of fitting shall be tested at least once in an operative year. *
9.2	Vibration Test	9.2	IS 16534 Annex C	S	One	Once in 1 year	This test shall be carried out whenever there is change in composition in raw material/ source of raw material.
9.3	Ten day Moist Ammonia Air Stress Cracking Test	9.3	IS 16534 Annex D	S	One	Once in 1 year	*
9.4	Flexural Strength	9.4	IS 16534 Annex E	S	One	Once in 1 year	*

* Test shall be carried out whenever polymer composition or source of compound or processing techniques is changed; or a new size is introduced. In an operative year, production from all the machines may be covered to the extent possible.

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) Dimensions (Clause 7)
b) Visual appearance (Clause 8.1)
c) Opacity (Clause 8.2)
d) Stress Relief test (Clause 8.3)
e) Vicat softening temperature (Clause 8.4)
f) Density (Clause 8.5)
g) Hydrostatic characteristics (Acceptance test) (clause 9.1.1)

ANNEX – E

Scope of the Licence

Licence is granted to use Standard Mark as per IS 16534:2017 with the following scope:	
Name of the product	Chlorinated Polyvinyl Chloride (CPVC) Pipe Fittings for Automatic Sprinkler Fire Extinguishing System
Type	Elbow 90°, Tees, Couplers, Cross Tee, Cap, Elbow 45°, Red. Coupler, Red. Bush, Flanges, Plastic to Metal Transition Tee, Plastic to Metal Transition Elbow, Plastic to Metal Transition Coupler, Plastic to Metal Transition Bush, Plastic to Metal Transition Male Adaptor, Plastic to Metal Transition Female Adaptor, Plastic to Metal transition Tee
Nominal Size, mm	20, 25, 32, 40, 50, 65, 80