



उत्पाद मैनुअल
आई एस 4159: 2021 के अनुसार
“खनिज भरे ढके तापन एलिमेंट”—के लिए

दस्तावेज संख्या - पी एम/आई एस 4159/ 1/ मई 2021

भारतीय मानक ब्यूरो की स्कीम-I (अनुरूपता मूल्यांकन) विनियम, 2018 के तहत यह उत्पाद मैनुअल प्रमाणीकरण के प्रचालन में रीति और पारिशिष्ट की सुसंगतता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसी द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस प्रमाणीकरण लाइसेंस/ प्रमाणपत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज का उपयोग किया जा सकता है।

**PRODUCT MANUAL FOR
Mineral Filled Sheathed Heating Elements
ACCORDING to IS 4159: 2021**

Document No.- PM/ IS 4159/ 1/ May 2021

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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PRODUCT MANUAL FOR MINERAL FILLED SHEATHED HEATING ELEMENTS ACCORDING TO IS 4159: 2021

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1.	Product	:	IS 4159: 2021
	Title	:	Mineral Filled Sheathed Heating Elements
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	—
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	2 nos. of mineral filled sheathed heating elements
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 4159: 2021 with the following scope:		
	Name of the Product	Mineral Filled Sheathed Heating Elements	
	Heating medium	Water / Air / Oil	
	Sheathing material		
	Rating	_____ W, _____ V, _____ Hz	
	Degree of Protection	_____	

ANNEX A

Grouping Guidelines

- 1) For considering GoL/CSoL, following grouping shall be considered:
 - a) **Group I** – up to and including 1000 W
 - b) **Group II** – above 1000 W and upto 2500 W
 - c) **Group III** – above 2500 W
- 2) One sample from each group of the same type, preferably of the highest wattage, intended to be covered in the licence may be drawn for testing to cover the entire range of wattages in that group.
- 3) The heating elements used for Water heating, Air heating and Oil heating may be considered different types. The elements having different sheathing material, different voltage and frequency shall also be considered as different type.
- 4) If heating elements with a higher IP is tested, heating element with a lower IP may also be covered.
- 5) The Firm shall declare the varieties of Mineral Filled Sheathed Heating Elements they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing capability and Testing facilities of the Manufacturer.
- 6) 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*

Sl. No.	Test Equipment	Tests used in with Clause Reference
1	Testing panel consisting of Voltmeter, Ammeter, Wattmeter, Ammeter, Frequency Meter	Cl. 10
2	I.R tester, Voltmeter, Micro ammeter, High Voltage Tester	Cl. 13, Cl. 16
3	Digital Temp Indicator with thermocouple wire, Test corner and Insulated water tank	Cl. 11
4	Digital Temperature Controller	Cl. 19
5	Endurance tester with Wattmeter, Voltmeter and Time Totalizer	Cl. 12, Cl. 18
6	Humidity Chamber with hygrometer, hour meter and temperature controller	Cl. 15
7	Oven with beakers and Chemicals	Cl. 31
8	Spring hammer tester and 50mm hardwood board	Cl. 21
9	ECR Tester with ammeter and voltmeter	Cl. 27
10	Torque Screw Driver	Cl. 28
11	Measuring tape, Vernier callipers and Filler gauge	Cl. 22, Cl. 29
12	Ball Pressure test apparatus, Glow wire tester	Cl. 30

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 4159:2021.

4. CONTROL UNIT –All heating elements of same type and rating manufactured in a day shall constitute a control unit. If heating elements of more than one type and rating are manufactured on the same day, heating elements of each type and rating shall constitute a separate 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				
101.3(i)	Protection against electric shock	8	IS 4159	R	Each heating element		—
101.3(ii)	Power Input and Current	10		R			
101.3(iii)	Leakage Current and Electric Strength Test at operating temperature	13		R			
101.3(iv)	Leakage & hydrostatic strength (for oil heating element)	102		R			
11	Heating	11		R	One	Every week for each type and rating	
15	Moisture resistance	15		R			
16	Insulation resistance and Electric Strength	16		R			
27	Provision for Earthing	27		R			
23	Internal wiring	23		R			
14	Transient overvoltages	14		S	One	Every six months for each type and rating	
18	Endurance	18		S			
19	Abnormal Operation	19		S			
20	Stability & Mechanical Hazards	20		S			
21	Mechanical Strength	21		S			
22	Construction	22		S			

24	Components	24		S	One	Every six months for each type and rating	
25	Supply connection and external flexible cables and cords	25		S			
26	Terminals for external conductors	26		S			
28	Screws and connections	28		S			
29	Creepage distances and clearances	29		S			
30	Resistance to heat, fire and tracking	30		S			
31	Resistance to rusting	31		S			

Note-1: In case of failure in any type and rating, a thorough investigation of the cause of failure shall be made and defects rectified. Five samples of that type and rating from the improved lot shall be tested for these requirements till samples from five consecutive control units pass. The original frequency may then be restored.

Note-2: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empanelled by the Bureau.

Note-3: 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

1. Protection against access to live parts
2. Power input and current
3. Heating
4. Leakage current and electric strength at operating temperature
5. Leakage & hydrostatic strength (for oil heating element)
6. Mechanical strength
7. Internal wiring
8. Supply connection and external flexible cord
9. Terminals for external conductors
10. Provision for earthing
11. Screws and connections
12. Stability and Mechanical hazards