



उत्पाद मैनुअल
आई एस 13466: 1992 के अनुसार
विद्युत मशीनों के लिए ब्रश के लिए

दस्तावेज संख्या – पी एम/आई एस 13466/ 1/जनवरी 2021

भारतीय मानक ब्यूरो की स्कीम-I (अनुरूपता मूल्यांकन) विनियम, 2018 के तहत यह उत्पाद मैनुअल प्रमाणीकरण के प्रचालन में रीति और पारिश्रिता 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
BRUSHES FOR ELECTRICAL MACHINES
ACCORDING to IS 13466: 1992**

Document No.- PM/ IS 13466/ 1/Jan 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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1.	Product	:	IS 13466:1992
	Title	:	Brushes for Electrical Machines
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	As per Clause 4 & 5 of IS 13466
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	5 brushes
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:		
	i) Workmanship (Clause 16.4) ii) Dimensional accuracy (Clause 16.5) iii) Connection drop test (Clause 16.6) iv) Pull-out strength test (Clause 16.7)		
6.	Scope of the Licence:		
	“Licence is granted to use Standard Mark as per IS 13466:1992 with the following scope:		
	Name of the product	Brushes for Electrical Machines	
	Brush Grade		
	Type of Connection		
	Dimension (in mm)	t × a × r	

ANNEX A

Grouping Guidelines

1. The parameters as given below shall be considered for grouping of Brushes for Electrical Machines as per IS 13466: 1992 for GoL/CSoL:
 - i. Brush Grade - as per Clause 4.1 of IS 13466.
 - ii. Type of Connection – as per Clause 5.5 of IS 13466.
 - iii. Dimensions (in mm) - $t \times a \times r$
2. Brushes with different Dimensions having same Grade and Type of Connection shall be considered as one group. Brush of any dimension in a group shall be tested for covering all dimensions of Brushes in that group.
3. The Firm shall declare the Grades, Type of Connections and Dimensions of Brushes 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.	Workmanship as per Cl. 16.4	Magnifying glass 10X
2.	Dimensional accuracy as per Cl. 16.5	i) Vernier Callipers of min. LC 0.01 mm ii) Screw gauge of min. LC 0.01mm iii) Dial gauge of min. LC 0.01mm iv) Go and No-Go gauges
3.	Connection Drop test as per Cl. 16.6	As per D-1 of IS 13466
4.	Pull-out Strength test as per Cl. 16.7	As per E-1 of IS 13466

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 Clause 14 of IS 13466.

4. CONTROL UNIT – Brushes of same type and grade manufactured under similar conditions of production 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				
Test on Brush Material (Carbon Blocks)							
4 & 16.1	Density & Porosity	6	IS 13584	R*	5	Each mix	*No further testing is required if tests were already carried out by brush material manufacturer and each consignment is accompanied with the TC or ISI marked.
	Hardness	7		R*	5	Each mix	
	Resistivity	8		R*	5	Each mix	
	Transverse Strength	9		R*	2	Each mix	
	Ash content	10		R*	2	Each mix	
	Operational Characteristics of Brushes:	11		R*	1	Each mix	
	a) Co-efficient of friction	11.2					
b) Brush wear	11.3						
Tests on Carbon Brushes							
16.4	Workmanship	16.4	IS 13466	R	10%	Each control unit	In case of failure, marking shall be stopped, causes of failure investigated and corrective actions taken. Marking shall be resumed only when there is no failure of fresh sample.
16.5	Dimensional Accuracy	13		R	5 pcs		
	a) Dimensions and Tolerances						
	b) Chamfer of Brushes						
	c) Bevel						
	d) Depth of Insertion of flexible (shunt) in brush	5.7					
16.6	Connection Drop Test	16.6		R	5 pcs		
16.7	Pullout Strength test	16.7		R	1 pc		
5	Flexible Shunt	5.1 to 5.9		R	5 pcs		
6	Termination of Brushes	6.1 to 6.3		R	5 pcs		
7	Clips	7		R	5 pcs		
8	Insulated Top	8		R	5 pcs		
9	Pressure Area	9.1 to 9.2		R	5 pcs		
10	Dust Grooves	10.2		R	5 pcs		

Note-1: 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.