



उत्पाद मैनुअल

आई एस 2993 (भाग 1) : 2024/ आई ई सी 60252-1 : 2010 + संशोधन 1 : 2013 के अनुसार
ए. सी. मोटर संधारित्र भाग 1 सामान्य - निष्पादन, परिक्षण और रेटिंग - सुरक्षा अपेक्षाएं - स्थापना
और सञ्चालन के लिए दिशानिर्देश (तीसरा पुनरीक्षण) के लिए

दस्तावेज संख्या – पीएम/आईएस 2993 (भाग 1) / आई ई सी 60252-1 /1/ जनवरी 2025
*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।
दस्तावेज का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया
जा सकता है।*

PRODUCT MANUAL FOR

**A. C. MOTOR CAPACITORS PART 1 GENERAL – PERFORMANCE, TESTING AND RATING – SAFETY
REQUIREMENTS – GUIDANCE FOR INSTALLATION AND OPERATION (THIRD REVISION)**

ACCORDING TO IS 2993 (Part 1) : 2024/IEC 60252-1 : 2010 + AMD 1 : 2013

Document No - PM/IS 2993 (Part 1)/IEC 60252-1/1/ January 2025

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.

भारतीय मानक ब्यूरो
BUREAU OF INDIAN STANDARDS
मानक भवन, ९, बहादुर शाह ज़फ़र मार्ग
Manak Bhawan, 9, Bahadur Shah Zafar Marg
नई दिल्ली- ११०००२
New Delhi – 110002



उत्पाद मैनुअल

आई एस 2993 (भाग 1) : 2024/ आई ई सी 60252-1 : 2010 + संशोधन 1 : 2013 के अनुसार
 ए. सी. मोटर संधारित्र भाग 1 सामान्य - निष्पादन, परिक्षण और रेटिंग –
 सुरक्षा अपेक्षाएं - स्थापना और सञ्चालन के लिए दिशानिर्देश (तीसरा पुनरीक्षण) के लिए
 आई एस 2993 (भाग 1) : 2024/ आई ई सी 60252-1 : 2010 + संशोधन 1 : 2013 के अनुसार

PRODUCT MANUAL

A. C. MOTOR CAPACITORS PART 1 GENERAL – PERFORMANCE, TESTING AND RATING – SAFETY REQUIREMENTS
 – GUIDANCE FOR INSTALLATION AND OPERATION (THIRD REVISION)

ACCORDING TO IS 2993 (Part 1) : 2024/IEC 60252-1 : 2010 + AMD 1 : 2013

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 2993 (Part 1) : 2024/IEC 60252-1 : 2010 + AMD 1 : 2013
	शीर्षक Title	:	a.c. Motor Capacitors Part 1 General – Performance, Testing and Rating – Safety Requirements – Guidance for Installation and Operation (Third Revision)
	संशोधनों की संख्या No. of amendments	:	1
2.	नमूना दिशानिर्देश Sampling Guidelines:		
a)	कच्चा माल Raw material	:	NA

b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer ANNEX – A
c)	नमूने का परिमाण Sample Quantity	:	As per Table 1 of IS 2993 (Part 1)
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer ANNEX – B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	:	Please refer ANNEX – C
5.	एक दिन में संभा वत परीक्षण Possible tests in a day:	:	Please refer ANNEX-D
6.	लाइसेंस का दायरा /Scope of the Licence	:	
	Licence is granted to use Standard Mark as per IS 2993 (Part 1) : 2024/IEC 60252-1 : 2010 + AMD 1 : 2013 with the following scope:		
	Name of the Product	a.c. Motor Capacitors	
	Rating	Rated Capacitance (C_N): __ F, Rated Voltage (U_N): __ V, Rated Frequency (f_N): __ Hz, Climatic Categories: __, Kind of operation: __, Class of operation: A/B/C/D, Type: self-healing/non-self-healing type, Class of safety protection: S0/S1/S2/S3.	

ANNEX – A**समूहीकरण दिशानिर्देश**
Grouping Guidelines

1. The parameters as given below shall be considered for grouping of “AC motor capacitors” as per IS 2993 (Part 1) : 2024/IEC 60252-1 : 2010 + AMD 1 : 2013 for GoL/CSoL:
 - a. Rated Capacitance (C_N);
 - b. Rated Voltage(U_N);
 - c. Rated frequency(f_N);
 - d. Climatic category;
 - e. Kind of operation;
 - f. Class of operation – A/B/C/D;
 - g. Type: Self-healing capacitor/ non-self-healing capacitor;
 - h. Class of safety protection: S0/S1/S2/S3.
2. Capacitors with different rated capacitances shall be considered as one group, provided the parameters stated at 1(b) & 1(c) remain the same. Capacitors with the highest and lowest rated capacitance in a group shall be tested for covering the entire range of capacitors in that group.

NOTE 1 Capacitors of the same type can differ only in rated capacitance and size; minor differences between terminations and mounting devices are permitted.

NOTE 2 The same construction includes, for example, the same dielectric material, dielectric thickness and type of case (metal or plastic).
3. In case a capacitor is designed to operate under two or more different conditions (rated voltages, classes, rated duty cycles, etc.), the following tests shall be performed, once only, at the highest test voltages:
 - a. Voltage between terminals (Cl. 5.7);
 - b. Voltage between terminals and cases (Cl. 5.8);
 - c. Self-healing test (Cl. 5.15).
4. If capacitors with a wider climatic category are tested, capacitors with a narrower climatic category shall also be covered. However, capacitors with lower minimum permissible operating temperature can be included without further testing.
5. Within a group, if capacitor with higher class of operation is tested, capacitors with lower class of operation shall be covered. For e.g, if capacitor with class of operation A is tested, Capacitors with class of operation B, C, D shall be covered.
6. To cover all varieties in the scope of the Licence with respect to kind of operation and healing within a group:

- a. One capacitor of self-healing and non-self-healing type shall be tested;
 - b. One capacitor for each kind of operation shall be tested.
7. Test for class of safety protection (S1/S2) is optional. However, if safety class S2 is tested, S1 and S0 shall be covered and if safety class S1 is tested, S0 shall also be covered. Separate testing shall be carried out for capacitors with safety class S3.
8. The Firm shall declare the varieties of Capacitors they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
9. 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**परीक्षण उपकरणों की सूची****List Of Test Equipment*****(INDICATIVE LIST, FOR GUIDANCE ONLY)******Major test equipment required to test as per the Indian Standard***

Sl. No.	Tests Used In With Clause Reference	Test Equipment/ Chemical
1.	For test conditions - Cl 5.1.2	Air Conditioner, Thermometer
2.	Tangent of Loss Angle - Cl 5.5	Loss Factor Meter
3.	Discharge devices - Cl 7.4	Voltmeter
4.	Voltage test between terminals - Cl 5.7 Voltage test between terminals and Case - Cl 5.8	High Voltage tester
5.	Capacitance measurement - Cl 5.9	Capacitance Bridge
6.	Check of Dimensions - Cl 5.10 Creepage distances and Clearances - Cl 7.1 Terminals and Connecting cables - Cl 7.2	Vernier Calipers
7.	Sealing test - Cl. 5.12	Heating Oven and temperature recorder
8.	Indelibility of Marking - Cl 5.6	Cotton Cloth and Petroleum Spirit
9.	Test Ua-Tensile - Cl 5.11.1.1	Tensile testing machine
10.	Test Ub-Bending - Cl 5.11.1.2	Suitable Loads
11.	Test Uc- Torsion - Cl 5.11.1.3	Set up for Torsion test
12.	Test Ud – Torque - Cl 5.11.1.4	Torque wrench
13.	Vibration - Cl 5.11.3	Set up for Vibration Test

14.	Soldering- CI 5.11.2	Set up for Soldering Test
15.	Endurance Test - CI 5.13	Test Chamber
16.	Damp heat test - CI 5.14	Damp heat test chamber
17.	Destruction Test- CI 5.16	Destruction Test apparatus - Test apparatus for d.c Conditioning and a.c. destruction test

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

ANNEX – C

निरीक्षण और परीक्षण की स्कीम

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: **a. c. motor capacitors of same rating manufactured in a day** shall constitute a control unit. The manufacturer has the choice to define their own control unit/batch/lot and submit the same to the BIS.

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. They shall also implement a calibration plan for the in-house test equipment.

2.1 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.

3.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.

4.MARKING –

- 4.1 The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on **each a.c. motor capacitor and also on its packaging or on the accompanying notice** provided always that the material so marked conforms to each requirement of the specification.
- 4.2 Marking shall be done as per IS 2993 (Part 1) : 2024/ IEC 60252-1 : 2010 + AMD 1 : 2013.
- 4.3 **Additional Marking requirements:** The material shall also be marked with the following additional requirement on product or packaging:
- a) "For BIS certification details please visit www.bis.gov.in".

5.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. No. as per IS 2993 (Part 1)	Requirement	Test Methods			No. of Sample	Frequency	Remarks
		Clause	Reference				
5. 4.1 a)	Sealing test (if applicable)	5.12	IS 2993 (Part 1)/ IEC 60252-1	R	Every capacitor		
5.4.1 b)	Voltage test between terminals	5.7		R			
5.4.1 c)	Voltage test between terminals and case	5.8		R			
5.4.1 d)	Visual examination	5.6		R			
5.4.1 e)	Capacitance measurement	5.9		R			
5.4.1 f)	Tangent of loss angle	5.5		R			
8	Marking	8			R	Firm should exercise adequate control so that whole production should meet the requirements. Records shall be maintained.	
7.1	Creepage distances and clearances	7.1			R		
7.2	Terminals and connecting Cables	7.2			R		
7.3	Earth connections	7.3			R		
7.4	Discharge devices	7.4			R		
5.7	Voltage test between terminals (type test)	5.7	IS 2993 (Part 1)/ IEC 60252-1	S	Once in three years for each a. c. motor capacitors of same rating manufactured during the period		Refer Note - 1
5.8	Voltage test between terminals and case (type test)	5.8		S			

5.10	Check of dimensions	5.10	IS 2993 (Part 1)/ IEC 60252-1	S	Once in three years for each a. c. motor capacitors of same rating manufactured during the period	Refer Note - 1
5.11	Mechanical tests (other than soldering)	5.11		S		
5.11.2	Soldering (if applicable)	5.11.2		S		
5.13	Endurance test	5.13		S		
5.14	Damp heat test	5.14		S		
5.15	Self-healing test (if applicable)	5.15		S		
5.16	Destruction test (if marked on the capacitor)	5.16		S		
5.17	Resistance to heat, fire and tracking (not applicable to capacitors with lead terminations)	5.17		S		

Note -1: Sample selection shall be in accordance with clause 3.21 and Table 1 of IS 2993 (Part 1)/ IEC 60252-1.

ANNEX – D

एक दिन में संभा वत परीक्षण

Possible Tests in a day

1. Marking (Cl.8)
2. Sealing test (Cl. 5.12, if applicable)
3. Voltage tests between terminals (Cl. 5.7)
4. Voltage tests between terminals and case (Cl. 5.8)
5. Visual examination (Cl. 5.6)
6. Capacitance Measurement (Cl. 5.9)
7. Tangent of loss angle (Cl. 5.5)