उत्पाद मैनुअल

माप, नियंत्रण, और प्रयोगशाला उपयोग के लिए विद्युत् उपकरण की सुरक्षा अपेक्षाएँ

भाग 1 सामान्य अपेक्षाएँ

आईएस 17724 (Part 1) : 2023 के अनुसार

PRODUCT MANUAL
SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL, AND LABORATORY USE
PART 1 GENERAL REQUIREMENTS
According to IS 17724 (Part 1): 2023

यह उत्पाद नियमावली सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसधारियों द्वारा विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना-I के अंतर्गत प्रमाणन के संचालन में एकरूपता और पारदर्शिता सुनिश्चित करने के लिए संदर्भ सामग्री के रूप में उपयोग की जाएगी। बीआईएस प्रमाणन प्राप्त करने के इच्छुक भावी आवेदक भी इस दस्तावेज़ का उपयोग कर सकते हैं।

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 17724 (Part 1) : 2023
	शीर्षक / Title	:	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1 General Requirements
	संशोधनों की संख्या **No. of amendments**	:	Nil
2.	**नमूनाकरण दिशानिर्देश / Sampling Guidelines**		
a)	**कच्चा माल** **Raw material**	:	Components and sub-assemblies (Cl. 14) *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**	:	Please refer **ANNEX – A**
c)	**नमूने का परिमाण** **Sample Quantity**	:	03 numbers
d)	**परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर** **Parameters to be Declared in Test Request**		Same as the parameters given in scope of the licence under S. No. 6. *Note: Apart from the above, any other requirements/ parameters may also be declared as per the standard, as applicable.*
3.	**परीक्षण उपकरण की सूची** **List of Test Equipment**	:	Please refer **ANNEX – B**

4.	**निरीक्षण एवं परीक्षण योजना** **Scheme of Inspection and Testing**	:	Please refer **ANNEX – C**
5.	**एक दिन में संभावित परीक्षण** **Possible tests in a day**	:	Please refer **ANNEX – D** *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 17724 (Part 1): 2023** with the following scope:

Name of the product	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use Part 1 General Requirements
Model(s)	
Name of the Equipment	
Equipment Type	• Electrical test and measurement equipment • Electrical industrial process-control equipment • Electrical laboratory equipment
State of Equipment	Hand-held / Portable / Fixed / Permanently connected / Direct plug-in
Rated Input	____ V, ___ Hz, ___ Phase Battery, if any: ____ V, Type ____
Rated Output	____ W or VA (or ___ A)
Nature of Supply	a.c. / d.c. / a.c. and d.c. / Battery
Protection against electric shock	Class – I / Class – II / Class – III
Type of Operation	Continuous / Short-term (or) Intermittent
Pollution Degree	1 / 2 / 3 / 4
Overvoltage Category	II / III / IV
Material Group	I / II / IIIa / IIIb
Degree of ingress protection	IP ____
7. Any other product specific guidelines	In case product specific Indian standard (whether indigenous or adopted) exist (e.g. IS 17724 (Part 2) for Mixing and stirring equipment), then certification to be granted as per that Indian Standard. While processing any new application for a product which involves specialized tests incurring high testing charges, such as tests for protection against radiation or against sonic pressure etc., the same will be informed to CMD-III for necessary actions.

ANNEX - A

समूहीकरण दिशानिर्देश
Grouping Guidelines

1. Manufacturer shall submit the declaration for each of the parameters specified in scope of the licence (as per SI. No. 6 above) for each model of each type of electrical equipment they intend to cover in the scope of licence.

2. The manufacturer shall also submit the picture/drawing of each model, indicating its identification and relevant constructional details.

3. For Grant of Licence/ Change in Scope of Licence, each Model of electrical equipment shall be tested.

4. The Scope of Licence may be restricted based on the Manufacturing and testing capabilities of the Manufacturer.

5. During the operation of the Licence, BO shall ensure that all the model(s) covered in the Scope of the Licence are tested in rotation to the extent possible.

ANNEX- B

परीक्षण उपकरण की सूची

List of Test Equipments

(Indicative List, For Guidance Only)

Major test equipment required to test as per the Indian Standard

Sl. No.	Cl. Ref.	Requirements	Test Equipment
1.	4.3	Reference test conditions	• Air-conditioned test area • Thermo-hygrometer • Barometer • Variable a.c./d.c. power supply • Frequency meter
2.	5	Marking and documentation	• Wattmeter/power analyser and ammeter • Vernier caliper and depth gauge • Cloth, isopropyl alcohol or the cleaning agent specified by the manufacturer • Stopwatch
3.	6.2	Determination of ACCESSIBLE parts	• Jointed test finger, rigid test finger • Metal test pin • Force gauge
4.	6.3, 6.6.2, 6.10.3	Limit values for ACCESSIBLE parts, TERMINALS for external circuits, Plugs and connectors	• True r.m.s. voltmeter • Touch current measuring circuits • Digital storage oscilloscope with high-voltage probe • Resistor • Capacitance meter • Stopwatch
5.	6.5.2	PROTECTIVE BONDING	• Earth bond tester • Micro-ohmmeter • Torque screwdriver
6.	6.7, Annex C, Annex K	Insulation Requirements CLEARANCES, CREEPAGE DISTANCES and Solid insulation	• Vernier caliper • Feeler gauges • Measuring microscope • Magnifier with graticule • Depth gauge • Micrometer • CTI test apparatus
7.	6.8	Procedure for voltage tests	• a.c. high-voltage tester • d.c. high-voltage tester • Impulse voltage generator with oscilloscope • Metal foil • Humidity chamber • Stopwatch

Sl. No.	Cl. Ref.	Requirements	Test Equipment
8.	6.10, 6.11	Connection to the MAINS supply source and connections between parts of equipment, Disconnection from supply source	• Cord anchorage push-pull and torque test apparatus • Steel scale/vernier caliper • Measuring tape • High-voltage tester
9.	7	Protection against mechanical HAZARDS	• Test object representing a finger for sharp edges • Force gauge • Gap gauges/steel scale • Tilting platform • Push-pull gauge • Test weights • Plasterboard on studs
10.	8	Resistance to mechanical stresses	• Hard rod with hemispherical end • Smooth steel sphere • Hammer test apparatus • Hardwood board on rigid base • Concrete or steel test surface • Cold chamber
11.	9	Protection against the spread of fire	• Vertical burning test apparatus • Flame propagation test apparatus • White tissue paper, cheesecloth and softwood surface • Resistive load bank, voltmeter and ammeter • Vernier caliper
12.	10	Equipment temperature limits and resistance to heat	• Multi-channel temperature data logger with fine-wire thermocouples • Micro-ohmmeter • Test corner of plywood painted matt black • Plywood for cabinet walls • Environmental chamber • Hot air oven • Ball-pressure test apparatus with heating cabinet • Vicat softening temperature apparatus
13.	11	Protection against HAZARDS from fluids and solid foreign objects	• Cleaning/decontamination agents specified by the manufacturer • Measuring cylinder and stopwatch • Tilting platform • IP test equipment • Hydraulic test pump with calibrated pressure gauge

Sl. No.	Cl. Ref.	Requirements	Test Equipment
14.	12	Protection against radiation, including laser sources, and against sonic and ultrasonic pressure	• Ionizing radiation survey meter • Spectroradiometer/radiometer • Microwave leakage meter • Sound level meter • Ultrasonic pressure measuring system • Laser power/energy meter
15.	13	Protection against liberated gases and substances, explosion and implosion	• Multimeter • Short-circuit and open-circuit links • Battery charging/discharging set-up with monitoring
16.	14	Components and subassemblies	• Variable resistor • Short-circuit links • Timer • Current probe/ammeter • Set-up for operating overtemperature protection devices • Jointed test finger • Hybrid impulse generator
17.	15	Protection by interlocks	• Interlock cycling apparatus with counter
18.	16	HAZARDS resulting from application	Conformity is checked by inspection and by evaluation of the RISK assessment documentation.
19.	17	RISK assessment	
20.	Annex F	ROUTINE TESTS	• Protective earth continuity tester • High-voltage tester for a.c., d.c. or impulse test voltages and for floating circuits
21.	Annex H	Qualification of conformal coatings for protection against POLLUTION	• Scratch Resistance Tester • Cold chamber • Dry heat chamber • Rapid change of temperature chamber • Humidity chamber • Adhesion (tape) tester • Insulation resistance tester

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

ANNEX C

निरीक्षण एवं परीक्षण योजना

Scheme of Inspection and Testing

1. QUALITY ASSURANCE PLAN

1.1 It is expected that during operation of BIS licence manufacturers will implement a Quality Assurance Plan (QAP) 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 (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or sub-contracting/ sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 Recommended Levels of Control/ Control Unit:

1.3.1 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in Table 1. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

1.3.2 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.

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

2. ENSURING COMPLIANCE THROUGH TESTING

The manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

i) Shared testing resources like common facility,

ii) Cluster based testing facility,

iii) Sub-contracting to outside laboratories which may either be:

a) BIS recognized/ empanelled laboratories, or

b) Any accredited laboratory as per ISO/IEC 17025

2.1 Test Records- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made available for inspection by BIS.

2.2 RISK MANAGEMENT FILE- The licensee shall maintain a Risk Management File for each model in the scope of licence as per the requirement of IS 17724 (Part 1): 2023. The Risk Management File shall be submitted to BIS at the time of Grant of Licence/Inclusion/Surveillance.

2.2.1 The Risk Management File shall be maintained till the End of Life of the model.

2.2.2 Licensee shall declare the frequency of periodic review of the Risk Management File to BIS and record of review in the file to be maintained. In case of any change in the Risk Management File due to any periodic review/ change in the product, the licensee shall inform the same to BIS at the earliest and provide the copy of the latest version of Risk Management File to BIS within 30 days of issue of the revised/ modified Technical File.

3. PACKING AND MARKING

The Standard Mark as given in the Schedule of the licence shall be incorporated legibly and indelibly on each Electrical Equipment provided always that the Electrical Equipment so marked conforms to each requirement of the specification.

3.1 **Additional Marking requirements**: The Electrical Equipment shall also be marked with the following additional requirement on the product/packaging:

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

4. REJECTION

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

(Recommended Levels of Control by BIS- for Guidance Only)

(1)				(2)		
Test Details				**Levels of Control**		
Cl.	**Requirement**	**Test Methods**		**No. of sample**	**Frequency**	**Remarks**
		Clause	**Reference**			
5	**Marking and documentation**					
	Marking	5.1	IS 17724 (Part 1)	Each Electrical Equipment		
	General	5.1.1				
	Identification	5.1.2				
	MAINS supply	5.1.3				
	Fuses	5.1.4				
	Terminals, connections and operating devices	5.1.5				
	Switches and circuit- breakers	5.1.6				
	Equipment protected by double insulation or reinforced insulation	5.1.7				
	Field-wiring terminal boxes	5.1.8				
	Warning markings	5.2				
	Durability of markings	5.3				
	Documentation	5.4				
	General	5.4.1				
	Equipment ratings	5.4.2				
	Equipment installation	5.4.3				
	Equipment operation	5.4.4				
	Equipment maintenance and service	5.4.5				
	Integration into systems or effects resulting from special conditions	5.4.6				
6	**Protection against electric shock**					
	Determination of accessible parts	6.2	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period	
	Limit values for accessible parts	6.3				
	Primary means of Protection	6.4				
	Enclosures and protective barriers	6.4.2				
	Basic insulation	6.4.3				
	Impedance	6.4.4				
	Additional means of protection in case of single fault conditions	6.5				
	Protective bonding	6.5.2				
	Supplementary insulation and reinforced insulation	6.5.3				
	Protective Impedance	6.5.4				
	Automatic disconnection of the supply	6.5.5				
	Current- or voltage- limiting device	6.5.6				
	Connections to external circuits	6.6				
	General	6.6.1				
	Terminals for external circuits	6.6.2				
	Circuits with terminals which are hazardous live	6.6.3				
	Insulation requirements	6.7				
	Terminals for stranded conductors	6.7.1				
	General	6.7.1.1				
	Clearances	6.7.1.2				
	Creepage Distances	6.7.1.3				

	Solid insulation	6.7.1.4	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Requirements for insulation according to type of circuit	6.7.1.5			
	Insulation for mains circuits of overvoltage category II with a nominal supply voltage up to 300 V	6.7.2			
	Clearances and Creepage distances	6.7.2.1			
	Solid insulation	6.7.2.2			
	Insulation for secondary circuits derived from mains circuits of overvoltage category II up to 300 V	6.7.3			
	General	6.7.3.1			
	Clearances	6.7.3.2			
	Creepage distances	6.7.3.3			
	Solid insulation	6.7.3.4			
	Procedure for voltage tests	6.8			
	General	6.8.1			
	Humidity preconditioning	6.8.2			
	The a.c. voltage test	6.8.3.1			
	The 1 min d.c. voltage test	6.8.3.2			
	The impulse voltage withstand test	6.8.3.3			
	Constructional requirements for protection against electric shock	6.9			
	General	6.9.1			
	Insulating materials	6.9.2			
	Colour coding	6.9.3			
	Connection to the mains supply source and connections between parts of equipment	6.10	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	MAINS supply cords	6.10.1			
	Fitting of non- detachable mains supply cords	6.10.2			
	Cord entry	6.10.2.1			
	Cord anchorage	6.10.2.2			
	Plugs and connectors	6.10.2.3			
	Disconnection from supply source	6.11			
	General	6.11.1			
	Exceptions	6.11.2			
	Requirements according to type of equipment	6.11.3			
	Permanently Connected Equipment and multi-phase equipment	6.11.3.1			
	Single-phase cord- connected equipment	6.11.3.2			
	Disconnecting devices	6.11.4			
	General	6.11.4.1			
	Switches and circuit- breakers	6.11.4.2			
	Appliance couplers and plugs	6.11.4.3			
7	**Protection against mechanical hazards**				
	Sharp edges	7.2	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Moving parts	7.3			
	Stability	7.4			
	Provisions for lifting and carrying	7.5			
	Expelled parts	7.6			

8	**Resistance to mechanical stresses**				
	General	8.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Enclosure rigidity tests	8.2			
	Static test	8.2.1			
	Impact test	8.2.2			
	Drop test	8.3			
9	**Protection against the spread of fire**				
	General	9.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Eliminating or reducing the sources of ignition within the equipment	9.2			
	Containment of fire within the equipment, should it occur	9.3			
	Limited-energy circuit	9.4			
	Requirements for equipment containing or using flammable liquids	9.5			
	Overcurrent protection	9.6			
10	**Equipment temperature limits and resistance to heat**				
	Surface temperature limits for protection against burns	10.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Temperatures of windings	10.2			
	Other temperature measurements	10.3			
	Conduct of temperature tests	10.4			
	Resistance to heat	10.5			
	Integrity of clearances and creepage distances	10.5.1			
	Non-metallic enclosures	10.5.2			
	Insulating material	10.5.3			
11	**Protection against hazards from fluids**				
	Cleaning	11.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Spillage	11.2			
	Overflow	11.3			
	Battery electrolyte	11.4			
	Specially protected equipment	11.5			
	Specially protected equipment	11.6			
	Fluid pressure and leakage	11.7			
	Maximum pressure	11.7.1			
	Leakage and rupture at high pressure	11.7.2			
	Leakage from low- pressure parts	11.7.3			
	Overpressure safety device	11.7.4			
12	**Protection against radiation, including laser sources, and against sonic and ultrasonic pressure**				
	General	12.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period
	Equipment producing ionizing radiation	12.2			
	Ionizing radiation	12.2.1			
	General	12.2.1.1			
	Equipment intended to emit radiation	12.2.1.2			
	Equipment not intended to emit radiation	12.2.1.3			
	Accelerated electrons	12.2.1.4			
	Ultraviolet (UV) radiation	12.3			
	Microwave radiation	12.4			
	Sonic and ultrasonic pressure	12.5			
	Sound level	12.5.1			
	Ultrasonic pressure	12.5.2			
	Laser sources	12.6			

13	**Protection against liberated gases and substances, explosion and implosion**					
	Poisonous and injurious gases and substances	13.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period	
	Explosion and implosion	13.2				
	Components	13.2.1				
	Batteries and battery charging	13.2.2				
	Implosion of cathode ray tubes	13.2.3				
14	**Components and subassemblies**					
	General	14.1	IS 17724 (Part 1)	One	Each Consignment	No further testing is required if accompanied with Test Certificate or ISI marked.
	Motors	14.2				
	Motor temperatures	14.2.1				
	Series excitation motors	14.2.2				
	Over-temperature protection devices	14.3				
	Fuse holders	14.4				
	Mains voltage selection devices	14.5				
	Mains transformers tested outside equipment	14.6				
	Printed wiring boards	14.7				
	Circuits or components used as transient overvoltage limiting devices	14.8				
15	**Protection by interlocks**					
	General	15.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period	
	Prevention of reactivating	15.2				
	Reliability	15.3				
16	**Hazards resulting from application**					
	Reasonably foreseeable misuse	16.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period. By evaluation of Risk Assessment Documentation.	
	Ergonomic aspects	16.2				
17	**Risk assessment**	17	IS 17724 (Part 1)	One		
Annex F	**Routine Tests**					
	General	F.1	IS 17724 (Part 1)	Each Electrical Equipment		
	Protective earth	F.2				
	Mains Circuits	F.3				
	General	F.3.1				
	Mains Circuits with voltage limiting devices	F.3.2				
	Floating circuits	F.4				
Annex H	**Qualification of conformal coatings for protection against pollution**					
	Cold Conditioning	Table H.1	IS 17724 (Part 1)	One	Once in every six months for each model manufactured during that period	
	Dry Heat					
	Rapid change of temperature					
	Damp Heat					
	Adhesion of coating					
	Humidity Conditioning					
	Insulation resistance of conductors					

ANNEX D

एक दिन में संभावित परीक्षण

Possible tests in a day

(1) Marking and documentation (Cl. 5), including durability of markings (Cl. 5.3);
(2) Protective earth (F.2)
(3) Voltage test on MAINS CIRCUITS (F.3)
(4) Voltage test on floating circuits (F.4)
(5) Determination of ACCESSIBLE parts (Cl. 6.2)
(6) PROTECTIVE BONDING (Cl. 6.5.2)
(7) Measurement of CLEARANCES and CREEPAGE DISTANCES (Cl. 6.7)
(8) Cord anchorage (Cl. 6.10.2.2)
(9) Sharp edges (Cl. 7.2)
(10) Static test (Cl. 8.2.1)
(11) Drop test (Cl. 8.3)