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उत्पाद मैनुअल
विधुत प्रतिरोध धातु तापन तत्वों में प्रयुक्त मिश्रधातुएँ -विशिष्टता
IS 12045: 2025 के अनुसार

**Product Manual for
Alloys Used in Electrical Resistance Metallic Heating Elements-Specification
According to IS 12045: 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। 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.	भारतीय मानक संख्या IS No.	:	IS 12045:1987
	शीर्षक Title	:	Alloys Used in Electrical Resistance Metallic Heating Elements
	संशोधनों की संख्या No. of amendments	:	0
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific requirement. 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	:	Licence is to be operated on Factory Testing Basis.

		2 Factory Surveillance in a year shall be carried out for 5 days each for carrying out all tests as per IS 12045:1987 including Accelerated Life Test (cl.4.4.) which is to be carried out for a period of 100 hrs (Max). Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	Alloy Type/Composition, Form, Condition, Dimensions : Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	: Please refer to Annex- B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer to Annex- C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	
	All tests except the Accelerated Life Test (Cl 8.5). 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: IS 12045: 2025 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है □Licence is granted to use Standard Mark as per IS 12045: 2025 with the following scope:	
7.	उत्पाद का नाम Name of the product	Alloys Used in Electrical Resistance Metallic Heating Elements
	Alloy Type/Composition	80Ni-20Cr (Type-1), 70Ni-30Cr(Type-2)....(As per Table 1)
	Form/Condition	Wire/ Ribbons (Hot / Cold rolled)/ Strips (Hot / Cold rolled)
	Dimensions	Round Wire- Outside Diameter from ...xx...mm to up to and including xx... mm.

		Ribbon- Thickness from xx...mm to up to and including xx...mm, Width from xx...mm to up to and including xx...mm. Strip- Thickness from xx...mm to up to and including xx...mm, Width from xx...mm to up to and including xx...mm
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BUREAU OF INDIAN STANDARDS
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New Delhi – 110002

ANNEX-A
TO PRODUCT MANUAL FOR
Alloys Used in Electrical Resistance Metallic Heating Elements
According to IS 12045:2025

GROUPING GUIDELINES

1. The following grouping guidelines shall apply for Grant of Licence (GoL) and Change in Scope of Licence (CSoL)
 - a) Sample of each Alloy composition (Type-1, Type-2 etc) intended to be covered in the scope of licence shall be tested.
 - b) In order to cover a range of sizes of wires, wires of minimum and maximum diameter shall be tested. Similarly, to cover a range of sizes of strips and ribbons, strips and ribbons of minimum and maximum thickness (of any width) shall be tested. Width shall be restricted based upon manufacturing capability.
 - c) At least one sample each of hot rolled and cold rolled strip/ ribbon shall be tested to cover both in the scope.
2. Scope of the licence shall be restricted based on the manufacturing and testing facilities available.
3. During the operation of the licence, samples of each variety covered in the scope of licence shall be tested in rotation, to the extent possible

ANNEX – B

LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

Major test equipment required to test as per requirements of Indian Standard.

Sl. No.	Tests Used in with Clause Reference	Test Equipment/Chemicals and Identification Numbers (Where applicable)
1	Chemical Composition (Cl 6.1 & 6.2)	Optical Emission Spectrometer with requisite channels and CRMs
2	Tensile Test and Percentage Elongation Test (Cl 7.2)	Universal Tensile Testing Machine with Extensometer
3	Hardness Test (Cl 7.2)	Hardness Testing Machine with standard calibration blocks
4	Resistivity (Cl 8.1), Resistance (Cl 8.3)	Ohm meter, AC (for maintaining 27 (+-1) degree C temperature) (Also refer Annex C of IS 5484:2023)
5	Accelerated Life Test (Cl 8.5)	Rheostat, Automatic voltage controller, Ammeter, Voltmeter, Optical Pyrometer or Infrared Thermometer, Interrupter, Apparatus for Recording Life Time, Ballast Resistance, Sample Preparation (for drawing wires of 0.64 mm) ,Apparatus for Recording Life Time
6	Resistance Change with Temperature (Cl 8.6)- Optional Test	Test equipment specified in IS 11755 e.g. Resistance measurement device, Heating Chamber, Specimen Holder, Measuring Leads, Temperature controls

Note: The above is an indicative list for the purpose of guidance only

ANNEX- C 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: Wires, Ribbons and Strips of the same alloy type, condition of supply and size, manufactured on the same line in one go shall constitute a control unit

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.

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 or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.2 For MSME manufacturers, the requirement of maintaining a laboratory/in-house testing facility for routine tests (indicated as “R” in Column 2 of Table 1) is also optional.

2.2.1 MSME manufacturers may utilize common cluster based facilities as per guidelines for the utilization of cluster based test facilities by MSMEs or the provisions of Sharing of testing facilities or get testing done from BIS recognized/empanelled laboratory or any other laboratory having valid NABL accreditation as per IS/ISO/IEC 17025.

2.3 Large Scale manufacturers shall maintain an in-house laboratory equipped at least with test facilities for routine tests (indicated as “R” in Column 2 of Table 1), where different tests given in the specification shall be carried out in accordance with the method given in the specification. They shall also implement a calibration plan for the in-house test equipment.

2.3.1 Alternatively, in lieu of an in-house laboratory, large scale manufacturers can also utilize the provisions of Sharing of testing facilities as per the Guidelines for Grant of Licence available on BIS website www.bis.gov.in. (Under Conformity Assessment>Product Certification Process). Even for subcontracted tests, provisions for sharing of testing facilities can be utilized.

2.4 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.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L...) shall be incorporated legibly and indelibly on each package containing the product and on the test certificate provided always that the material so marked conforms to each requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 Additional Marking requirements: The material or packaging shall also be marked with the following additional requirement:

- a) “For BIS certification details please visit www.bis.gov.in”
- b) Any other requirement not specified in the Indian Standard

4. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 12045:2025 there shall be a test certificate which shall contain the Standard Mark, the cast/Control Unit number and the corresponding test results (as given in Annexure-I enclosed).

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)		(4)
TEST DETAILS					LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		Test equipment requirement R: required (or) S:Sub-contracting permitted	No. of Samples	Frequency	
		Clause	Reference				
9	Physical Condition	9.1, 9.2	IS 12045	R	Manufacturer shall exercise adequate in-process controls to ensure that the material remains free from harmful defects		
6	Chemical Composition	6.1, 6.2	IS 228 (relevant parts), IS 14644 (relevant parts), IS 17320, IS 17322, IS 17323, IS 17324 or any other established instrumental/chemical method	R	One	Each control unit	---
7	Mechanical Properties (Tensile and percentage Elongation Test, Hardness Test)	7.1, 7.2	IS 12045, IS 1608 (Part 1), IS 1586 (Part 1)	R	---	---	The mechanical properties for the different types of alloys are given for guidance only.

8	Electrical Properties (Resistivity (Cl 8.1)	8.1, 8.2, 8.3, 8.4	IS 3635	R	One	Each control unit	—
8.5	Accelerated Life Test	8.5	IS 12045, IS 3394	R	One	Once in 6 months	Accelerated life test shall be carried out in accordance with IS 3394: 2024. The time in hours until the wire burn out or for a period of 100 h, whichever is less shall be indicated. Sample mounting can also be carried out by any other method as agreed to between the contracting parties.
8.6	Resistance Change with Temperature	8.6	IS 12045, IS 11755	S	--	--	When it is desired to determine how the resistance or resistivity changes in temperature, it shall be measured in accordance with IS 11755.

Annexure-I
(Para 4 of the Scheme of Inspection and Testing)
ABC Limited
(Registered office Address and works address)

ISI Mark
With IS No.
and CM/L
no.

**Test Certificate for Alloys Used in Electrical Resistance Metallic Heating Elements
According to IS 12045:2025**

TEST CERTIFICATE NO. _____

To M/s _____

Dated _____

We certified that the material described below fully conforms to IS 12045:2025. Properties of the product as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks Licence No. CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS 12045:2025 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Alloy Type	Coil No./Batch No./Heat No. and Date of Mfg.	Quantity	Form	Condition of Supply	Chemical Composition (in %)							Mechanical Properties*	Resistance change with temperature*	Electrical Properties	Accelerated Life Test	Physical Condition	Remarks
					Ni	Cr	Al	C	Si	Mn	Fe						

* If Required

Remarks

Wagon No.

Truck No.

(For BIS Certification details, visit www.bis.gov.in)

FOR ABC COMPANY

(It is suggested that size A4 paper be used for this test Certificate)