



उत्पाद मैनुअल

एल्युमीनियम मिश्र धातु रेड्रा रॉड - विद्युत उद्देश्यों के लिए

IS 9997:2023 के अनुसार

PRODUCT MANUAL FOR

Aluminium Alloy Redraw Rods - For Electrical Purposes

According to IS 9997:2023

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम 2018 की स्कीम-I के तहत यह उत्पाद मैनुअल प्रमाणीकरण की संचालन रीति में सुसंगतता और पारदर्शिता सुनिश्चित करने के लिए सभी क्षेत्रीय/शाखा कार्यालयों एवं लाइसेन्स धारियों द्वारा संदर्भ सामग्री के रूप में उपयोग किया जाएगा। बीआईएस लाइसेन्स/प्रमाण पत्र प्राप्त करने के इच्छुक भावी आवेदकों द्वारा भी इस दस्तावेज़ का उपयोग किया जा सकता है।

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.

1.	उत्पाद Product	:	IS 9997:2023
	शीर्षक Title	:	Aluminium Alloy Redraw Rods - For Electrical Purposes
	संशोधन संख्या No. of amendments	:	Nil
2.	नमूनाकरण दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	The redraw rods shall be manufactured from Aluminium magnesium silicon alloy. Aluminium grades as mentioned in IS 2590 shall be used as primary input for manufacture of wire rods.
b)	समूहिकरण दिशानिर्देश Grouping Guidelines	:	Please see Annex-A
c)	नमूने का परिमाण Sample Size	:	5 metres
3.	परीक्षण उपकरणों की सूची List of Test Equipment	:	Please refer Annex –B

4.	निरीक्षण व परीक्षण स्कीम Scheme of Inspection and Testing	:	Please refer Annex - C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	:	All tests
6.	लाइसेन्स का कार्यक्षेत्र /Scope of the Licence :		
	IS 9997:2023 के अनुसार निम्नलिखित दायरे के साथ मानक चिह्न का उपयोग करने के लिए लाइसेंस प्रदान किया गया है: Licence is granted to use Standard Mark as per IS 9997:2023 with the following scope:		
	Name of the product	Aluminium Alloy Redraw Rods - For Electrical Purposes	
	Size (nominal diameter)	.. in mm	
	Temper Designation	O/F/T4	

ANNEX-A

GROUPING GUIDELINES

- 1) For the purpose of grant of licence/change in scope of licence, the following grouping guidelines shall apply

Group	Nominal diameter (mm)
I	<9.5mm
II	9.5 to 12.7mm
III	>12.7mm

- i. One sample of lower nominal diameter in a particular Group shall be tested to include all nominal diameters in that particular Group.
 - ii. Separate samples in each of the temper designation (O, F & T4) and size (lower nominal diameter) shall be tested to include all nominal diameters in that particular Group of size and respective temper designation.
- 2) The scope of licence shall be restricted based on the manufacturing and testing capability.
- 3) During operation of licence, sample(s) of each variety covered in the scope of licence shall be drawn and tested, to the extent possible

Annexure B
LIST OF TEST EQUIPMENT

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

Tests used in with Clause Reference	Test Equipment
Dimensions (Clause9)	Vernier Caliper Micrometer
Tensile Test (Clause 7.1)	Universal Tensile Testing Machine Extensometer
Electrical Resistivity (Clause 8)	Kelvin Double Bridge or Potentiometer (For resistance < 10ohms) or Wheatstone Bridge (For resistance $\geq$ 10 ohms)Temperature recorder Instruments for cutting of test specimen
Chemical Composition (Clause 6)	Spectrometer (for instrumental Analysis) or Apparatus and Reagents required for chemical analysis as per IS 504 as follows:
	Analytical Balance(0-200gm, LC- 0.1mg)
	Hot Plate
	Hot Air Oven
	Photometer (Absorption cell)
	Porcelain/Silica Crucible
	Platinum Crucible
	Thermometer
	Filter Paper including ashless filter paper pad
	Stainless steel/nickel beaker, Plastic/polyethene/SS Beaker
	Pyrex beakers and other glassware
Copper (Below 0.1%)	Reagents-Mixed Acid(Conc.HCL, Conc. Sulphuric Acid, Conc. Nitric Acid), Dilute Sulphuric Acid, Hydrofluoric Acid, HydrogenSulphide(gas), Hydrogen Sulphide Wash Solution, Dilute NitricAcid, Concentrated Ammonium Hydroxide, Dilute Ammonium Hydroxide Wash Solution, Citric Acid Solution, Sodium-Diethyl- Dithiocarbonate solution, Carbon Tetrachloride, Sodium Sulphate, Standard Copper Solution, silica basin.
Copper (Above 0.1%)	Reagents – Concentrated Sulphuric Acid, Concentrated Nitric Acid, Concentrated Hydrochloric Acid, Mixed Acids(Conc.HCL,Conc. Sulphuric Acid, Conc. Nitric Acid), Hydrofluoric Acid, Dilute Sulphuric Acid,

	Ammonium Fluoride, Concentrated Ammonium Hydroxide, Acetic Acid, Urea Solution, Potassium Iodide Solution, Standard Sodium Thiosulphate Solution, Starch solution, ammonium thiocyanate, Sodium Hydroxide Solution, Sodium Sulphate Solution, Sodium Hydroxide- Sodium Sulphate Wash Solution, Dilute Nitric Acid, Sulphurous Acid, Hydrogen Sulphide(gas), Hydrogen Sulphide Wash Solution
Magnesium (0.01 to 12 %)	Reagents – Sodium Hydroxide, Hydrogen Peroxide, Sodium Carbonate, Methyl Red Indicator Solution, Conc. Ammonium Hydroxide, Ammonium Chloride Wash Solution, Ammonium Chloride, Conc. Hydrochloric Acid, Ammonium Sulphide Solution, Ammonium Persulphate, Ammonium Sulphide Wash Solution, Bromine Water, 8-Hydroxyquinoline Solution, Dilute Ammonium Hydroxide, Methyl Orange Indicator Solution, Potassium Bromate-Potassium Bromide Solution, Potassium Iodide Solution, Starch Solution, Standard Potassium Iodate Solution, Standard Sodium Thiosulphate Solution
Magnesium (0.5 to 11%)	Reagents – Sodium Hydroxide Solution, Hydrogen Peroxide, Potassium Cyanide Solution, Dilute Hydrochloric Acid, Ammonium Chloride, Bromine Water, Conc. Ammonium Hydroxide, Sodium Acetate, Tartaric Acid, Chrome Blank T Indicator, Standard Magnesium Sulphate, Standard EDTA Solution.
Silicon (0.02 to 0.3%)	Reagents- Sodium Hydroxide Solution, Dilute Nitric Acid, Ammonium Molybdate Solution, Standard Silicon Solution.
Silicon (Above 0.3%)	Reagents – Sodium Hydroxide Solution, Hydrogen Peroxide, Conc. Sulphuric Acid, Sulphuric Acid-Perchloric Acid Mixture, Perchloric Acid Solution, Conc. Nitric Acid, Sulphurous Acid, Dilute Sulphuric Acid, Conc. Hydrochloric Acid, Ammonium Acetate Solution, Dilute Hydrochloric Acid, Hydrofluoric Acid
Iron (0.03 to 0.10%)	Reagents- Sodium Hydroxide Solution, Finely granulated lead containing under 0.001% iron, Acetate Buffer Solution, Hydroxylamine Hydrochloride Solution, O-phenanthroline solution, Standard Iron Solution. Equipment – Magnet, Nickel Beaker.
Iron (0.01 to 2.0%)	Reagents -Concentrated Sulphuric Acid, Concentrated Nitric Acid, Concentrated Hydrochloric Acid,

	Mixed Acids (Conc.HCL,Conc. Sulphuric Acid, Conc. Nitric Acid), Dilute Sulphuric Acid, Hydrofluoric Acid, Potassium Bisulphate, Hydrogen Sulphide, Hydrogen Sulphide Wash Solution, Potassium Permanganate Solution, Potassium Thiocyanate Solution, StandardTitanous Chloride Solution. Equipment – Apparatus for Storing Titanous Chloride Solution, Solid Glass Beads.
Manganese (Mn content between 0.01 to 0.1%)	Reagents – Sodium Hydroxide Solution, Sodium Nitrite Solution, Acid Mixture(Conc.Nitric Acid and Phosphoric Acid), Hydrofluoric Acid, Potassium Periodate Solution, Standard Manganese Solution
Manganese (Chromium Content up to 0.5%)	Reagents - Sodium Hydroxide Solution, AcidMixture(Conc. Sulphuric Acid, Phosphoric Acid and Nitric Acid), Silver Nitrate Solution, Ammonium Persulphate Solution, Ammonium Chloride Solution, Standard Arsenite-Nitrite Mixture, Sodium Arsenite,Standard Manganese Solution.
Manganese (Mn content between 0.1 to 1.5%)	Reagents – Conc. Nitric Acid, Sodium Bismuthate, Sulphurous Acid, Dilute NitricAcid, Phosphoric Acid, Standard Ferrous Ammonium Sulphate Solution, Standard Sodium Oxalate Solution, Standard Potassium Permanganate Solution. Equipment- Asbestos Gooch Crucible.
Zinc (Photometric Method for Zn content below 0.1%)	Reagents – Dilute Hydrochloric Acid, Potassium Chlorate, Carbon Tetrachloride,Complex Forming Solution (Conc. Ammonium Hydroxide, Ammonium Oxalate,HCl acid, sodium acetate, sodium thiosulphate solution and sodium sulphide solution), Dithizone Solution, Sodium Sulphide Wash Solution, Standard Zinc Solution.
Zinc (By Mercuric Thiocyanate Method)	Reagents – Mixed Acid(Conc. Sulphuric Acid, Conc. HCl and Conc. Nitric Acid), Dilute Sulphuric Acid, Hydrogen Sulphide(gas), Hydrogen Sulphide WashSolution, Tartaric Acid Solution, Conc. Ammonium Hydroxide, Methyl Red IndicatorSolution, Formic Acid Mixture, Formic Acid Wash Solution, Dilute Hydrochloric Acid, Ammonium Nitrate, Methylated Spirit, Mercuric Potassium Thiocyanate Solution, Chloroform, Standard Zinc Solution, Standard Potassium Iodate Solution.
Titanium	Reagents – Sodium Hydroxide Solution, Nitric Acid-Sulphuric Acid Mixture, DiluteSulphuric Acid, Hydrogen Peroxide, Standard Titanium Solution.

Chromium	Reagents – Conc. Sulphuric Acid, Conc. Nitric Acid, Silver Nitrate, Hydrofluoric Acid, Ammonium persulphate, Dilute HCl, Standard Ferrous Ammonium Sulphate Solution, Standard Potassium Permanganate Solution.
Vanadium	Potassium permanganate, N-Cinnamoyl 1-N Phenyl Hydroxylamine, Chloroform, Dilute Hydrochloric acid, Dilute Sulphuric acid, Ammonium metavanadate

This is an indicative list for the purpose of guidance only and may not be taken as exhaustive.

Annexure 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 and implement the calibration plan for the test equipments.

2. **TEST RECORDS** –The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. **PACKING AND MARKING**—Each coil shall bear a tag. Standard Mark as given in the Schedule of the Licence shall be marked on the tag provided always that each coil thus marked conforms to all the requirements of the Indian Standard.

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

3.2 **TEST CERTIFICATE**—For each consignment of BIS Certified material conforming to the specification there shall be a test certificate which shall contain the Standard Mark, the lot/cast number and the corresponding test results (as given in Annexure I enclosed). Standard Mark shall be marked on each test certificate for BIS certified material.

4. **CONTROL UNIT** –For the purpose of this scheme, all the coils of rods of the same size and temper, manufactured by the same process from the same cast of raw material, shall constitute a single control unit.

5. **LEVELS OF CONTROL** – The test 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 Standards 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
LEVELS OF CONTROL

(1)				(2)	(3)		
Test Details				Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
CI No	Requirement	Test Method			No. of Sample	Frequency	Remarks
		Clause	Reference				
6	Chemical Composition	6.2	IS 504 (Parts 1 to 12), IS 504 (Parts 13 to 16) or any other established instrumental/ Chemical method	R	1	Each control unit	
7	Mechanical Properties (Tensile Strength and Elongation)		IS 1608 (Pt 1)	R	1	Each control unit	
8	Electrical Resistivity		IS 3635	R	1	Each control unit	
9	Dimensions and permissible variations	9	IS 9997	R	Firm to have adequate in-process controls to check compliance of this parameter as per the tolerances given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity		
10	Joints	10	-do-	R	Firm to have adequate in-process controls to check compliance of this parameter as given in the Indian Standard. However, appropriate records shall be maintained by the manufacturer for evidence of conformity		
11	Finish and freedom from defects	11	-do-	R			

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau

Note-2: The control unit and levels of control as decided by the Bureau are obligatory, to which the licensee shall comply with.

ISI Mark

ANNEXURE I
TEST CERTIFICATE FORMAT
XYZ COMPANY

TEST CERTIFICATE FOR Aluminium Alloy Redraw Rods - For Electrical Purposes According to IS 9997:2023

TEST CERTIFICATE NO. _____ DATED _____
TO M/s _____

It is certified that the material described below fully conforms to IS 9997:2023. Chemical and physical 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. etc.

(PLEASE REFER TO IS 9997:2023 FOR DETAILS OF SPECIFICATION REQUIREMENTS) TEST RESULTS

Order no and date	Size (Thickness and OD)	Temper condition	Cast No./Lot No.	Quantity (in tonnes)	Chemical Analysis (in %)											Tensile properties		Electrical resistivity	Joints	Finish and freedom from defects	Remarks
					Si	Mg	Fe	Cu	Mn	Cr	Zn	B	Other (Each)	Other (total)	Al	Tensile Strength (MPa)	Elongation (%)				

The material supplied conforms to specified tolerances
REMARKS
SHIPPING ADVICE NO.
WAGON NOS

FOR XYZ COMPANY