



**उत्पाद मैनुअल
विद्युत अनुप्रयोगों के लिए
गढ़ा एल्यूमीनियम और एल्यूमीनियम मिश्र
धातु बार, छड़, ट्यूब, अनुभाग, प्लेट और शीट
IS 5082:1998 के अनुसार**

**PRODUCT MANUAL for
Wrought Aluminium and Aluminium Alloy
Bars, Rods, Tubes, Sections, Plates and Sheets
For Electrical Applications as per IS 5082:1998**

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

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 5082:1998
	शीर्षक Title	:	Wrought Aluminium And Aluminium Alloy Bars, Rods, Tubes, Sections, Plates And Sheets For Electrical Applications
	संशोधन संख्या No. of amendments	:	2
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific requirement.
b)	समूहिकरण दिशा निर्देश	:	Please refer Annex - A

	Grouping Guidelines		
c)	नमूने का परिमाण Sample Size	:	For Chemical test: 5 pcs of 50 mm X 50 mm For mechanical tests and Electrical Resistivity/Electrical Conductivity: 1 pc of 1 m length Tests for Dimensional Tolerances as per cl.10. to be carried out in factory.
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 5082 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per IS 5082 with the following scope:		
	Name of the product	Wrought Aluminium And Aluminium Alloy Bars, Rods, Tubes, Sections, Plates And Sheets For Electrical Applications	
	Designation	19501, 63401	
	Condition	M,H1,H2,W,WP(Range 1), WP(Range 2)	
	Form/Size	Mention range of sizes of the products such as <u>For Plates and Sheets</u> Thickness From -----mm upto and including thickness -----mm Width from ---mm upto and including-----mm For other products (Sections, Tubes etc.) As per relevant ISS specified at cl.10. of IS 5082	

New Delhi – 110002

ANNEXURE A
TO PRODUCT MANUAL FOR
Wrought Aluminium and Aluminium alloy bars, rods, tubes,
sections, plates and sheets for electrical applications
According to IS 5082:1998

GROUPING GUIDELINES

- 1) IS 5082:1998 is applicable to
 - a) extruded bars and rods above 6mm diameter; extruded angles, channels, other sections and profiles including tubes, hollow sections of thickness, 3 mm and above thickness.
 - b) rolled-plates, sheets of 3 mm and above thickness.
- 2) Further, IS 5082:1988 specifies two Alloy Designations (19501 and 63401) and five Temper designations (M, H1, H2, WP range 1 and WP range).
- 3) Wrought Aluminum and Aluminum Alloys as per IS 5082 have been grouped based upon their form as follows:-

Group No.	Form
1	a) Extruded round tube as per IS 2673 b) Hollow sections as per IS 6477
2	Cold Rolled Sheets as per IS 2676
3	Plates and Hot Rolled Sheets as per IS 2677
4	Drawn Round Tube as per IS 2678
5	Bar,Rod and Sections as per IS 3965

- 4) For the Purpose of GoL, CSoL, the following grouping guidelines shall be considered:-
 - a) Sample of each alloy designation for each temper shall be drawn and tested from each group.
 - b) The sample drawn above shall also include sample(s) of:-
 - i) For Group 1- Lowest and Highest Outside/Inside Diameter/Width Across Flats of Extruded Round Tubes and Hollow Sections
 - ii) For Group 2& 3 – Any size of plate and sheet
 - iii) For Group 4- Lowest and Highest Outside/Inside Diameter of Drawn Round Tube
 - iv) For Group 5 –For regular sections (including bars), lowest and highest nominal size. Separate sample for each irregular section/complicated shape shall be drawn.
- 5) While considering Grant of license/inclusion of additional varieties, it shall be ensured that the applicant/licensee has got the complete manufacturing and testing facilities for all the sizes and grades, for grant

of license and inclusion of additional varieties.

6) During operation of license, "BO shall ensure that all the sizes/grades covered in the license are tested in rotation.

ANNEXURE B
TO PRODUCT MANUAL FOR
(Wrought aluminium and aluminium alloy bars, rods, tubes, sections,
plates and sheets for electrical applications)
According to IS 5082:1998

LIST OF TESTING EQUIPMENT

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

Sr. No.	Test Equipment	Tests used in with Clause Reference
1	Vernier Caliper	Dimensions and Tolerances (Clause 10)
2.	Micrometer	
3.	Steel Scale, Steel Tape	
4.	Right Angle	
5.	Measuring Tape	
6.	Feeler Gauge	
7.	Straight Surface	
8.	Universal Tensile Testing Machine, Bend Test Machine	Mechanical Test (Clause 8) And Table 2
9	Equipment for measurement of resistivity/conductivity	
9.	Extensometer	
10.	Device for instrumental chemical analysis such as Optical Spectrometer with all requisite channels and Certified/Standard Reference Materials OR Chemicals and Reagents for Chemical method as per IS 504 for each element given below**	Chemical Composition (Clause 1)
11.	Analytical Balance(0-200gm, LC- 0.1mg)	
12.	Hot Plate	
13.	Hot Air Oven	
14.	Photometer (Absorption cell)	
15.	Porcelain/Silica Crucible	
16.	Platinum Crucible	
17.	Thermometer	
18.	Filter Paper including ashless filter paper pad	
19.	Stainless steel/nickel beaker, Plastic/polyethene/SS Beaker	
20.	Pyrex beakers and other glassware	
21.	Reagents-Mixed Acid(Conc.HCL, Conc. Sulphuric Acid, Conc. Nitric Acid), Dilute Sulphuric Acid, Hydrofluoric Acid, Hydrogen Sulphide(gas), Hydrogen Sulphide Wash Solution, Dilute Nitric Acid, 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 (Below 0.1%)

22.	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	Copper (Above 0.1%)
23.	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 (0.01 to 12 %)
24.	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.	Magnesium (0.5 to 11%)
25.	Reagents- Sodium Hydroxide Solution, Dilute Nitric Acid, Ammonium Molybdate Solution, Standard Silicon Solution.	Silicon (0.02 to 0.3%)
26.	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	Silicon (Above 0.3%)
27.	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 (0.03 to 0.10%)

28.	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, Standard Titanous Chloride Solution. Equipment – Apparatus for Storing Titanous Chloride Solution, Solid Glass Beads.	Iron (0.01 to 2.0%)
29.	Reagents - Sodium Hydroxide Solution, Acid Mixture(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 (Chromium Content upto 0.5%)
30.	Reagents – Conc. Nitric Acid, Sodium Bismuthate, Sulphurous Acid, Dilute Nitric Acid, Phosphoric Acid, Standard Ferrous Ammonium Sulphate Solution, Standard Sodium Oxalate Solution, Standard Potassium Permanganate Solution. Equipment- Asbestos Gooch Crucible.	Manganese (Mn content between 0.1 to 1.5%)
31.	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 (Photometric Method for Zn content below 0.1%)
32.	Reagents – Mixed Acid(Conc. Sulphuric Acid, Conc. HCl and Conc. Nitric Acid), Dilute Sulphuric Acid, Hydrogen Sulphide(gas), Hydrogen Sulphide Wash Solution, Tartaric Acid Solution, Conc. Ammonium Hydroxide, Methyl Red Indicator Solution, 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.	Zinc (By Mercuric Thiocyanate Method)
33.	Reagents – Sodium Hydroxide Solution, Nitric Acid-Sulphuric Acid Mixture, Dilute Sulphuric Acid, Hydrogen Peroxide, Standard Titanium Solution.	Titanium
34.	Reagents – Conc. Sulphuric Acid, Conc. Nitric Acid, Silver Nitrate, Hydrofluoric Acid, Ammonium persulphate, Dilute HCl, Standard Ferrous Ammonium Sulphate Solution, Standard Potassium Permanganate Solution.	Chromium

35.	Potassium Permanganate, N-Cinnamylol 1-N Phenyl Hydroxalmine (CPHA), Dilute Hydrochloric Acid, Hydrochloric Acid ,Chloroform ,Dilute Sulphuric Acid ,Standard Vanadium Solution, Filter Papers ,Hot Plate ,Weighing Balance, Heating Apparatus/Burner	Vanadium
36.	<u>Electrical Resistivity</u> Kelvin Double Bridge, Potentiometer, Wheatstone Bridge, 1 mili Ohm resistance, Baking Oven, Thermometer, Immersion Oil, Temperature Bath <u>Electrical Conductivity</u> Eddy Current Tester	Electrical Resistivity or Electrical Conductivity

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

ANNEXURE C
TO PRODUCT MANUAL FOR
(Wrought Aluminium and Aluminium alloy
bars, rods, tubes, sections, plates and
sheets for electrical applications as per IS
5082:1998
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 a calibration plan for the test equipment`s.

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

3. STANDARD MARK - The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L) shall be incorporated, and the marking shall be done as per the provisions of the Indian Standard, provided always that the product thus marked conforms to all the requirement of the specification.

4. CONTROL UNIT- All quantity of material of same thickness, designation, temper designation and manufactured under uniform conditions of production from the same raw material shall constitute a control unit.

5. 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. Any rejected material which is potentially resalable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose except re-melting. A separate record shall be maintained giving information on quantity and cast number/coil number/control unit number, as applicable, relating to all such rejections/defective/substandard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification. The Standard Mark (if already applied) on rejected material should be defaced.

6. TEST CERTIFICATE : For each consignment of BIS Certified material conforming to IS 5082:1998 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)

ANNEXURE C
TO PRODUCT MANUAL FOR
IS 5082:1998

(Wrought Aluminium and Aluminium alloy bars, rods, tubes, sections, plates and sheets for electrical applications)

TABLE 1 LEVELS OF CONTROL
(Para 5.0 of the Scheme of Testing and Inspection)

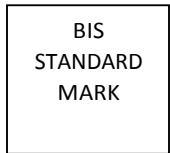
TEST DETAILS				Test Equipment Requirement		LEVELS OF CONTROL		
Cl	Requirement	Test Methods			No. of samples	Frequency	Remarks	
		Clause	Reference					
5	Freedom from defects	5	IS 5082	R	Adequate inspection to ensure that the material is free from harmful defects-			
6	Chemical composition	6	Table 1 of IS 5082 & IS 504 (relevant parts) or any other established instrumental/ chemical method	R	One	Each Control unit	---	
8	Mechanical properties	8						
8.1	Tensile test	8.1	IS 1608	R	One	Each Control unit	----	
8.2	Bend Test	8.2	IS 5082	R	One	Each Control unit	----	
9.0	Electrical Resistivity or Electrical Conductivity	9.1,9.2	IS 3635	R	One	Each Control unit	----	
10	Dimensions & Tolerances	10	IS 736 IS 3965 IS 2673 IS 2678 IS 2677 IS 6477 IS 2676	R	Adequate inspection to ensure that the material conforms to the requirements of the specification			

13. 1	Packing	13.1	IS 5082	R	Adequate inspection to ensure that the material conforms to the requirements of the specification
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Note-1: Whether test equipment is required (R) or sub-contracting (S) 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 empanelled 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.

ANNEXURE I
(Para 7 of the Scheme of Inspection and Testing)
XYZ Company
(Registered office Address and works address)



**TEST CERTIFICATE FOR
WROUGHT ALUMINIUM AND ALUMINIUM ALLOY BARS, RODS, TUBES, SECTIONS, PLATES AND SHEETS FOR ELECTRICAL APPLICATIONS**

TEST CERTIFICATE No. _____ DATE_

To M/s _____

We certified that the material described below fully conforms to 5082:1998 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 5082:1998 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	Nominal Size	Control Unit No.	Type	Quantity in tonnes	CHEMICAL COMPOSITION								PHYSICAL PROPERTIES				Remark
					% Al	% Cu	% Mg	% Si	% Fe	% Mn	% Zn	% Ti	% Cr	% Other Element	Shape, Size and dimensions and	Tensile Test	

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ COMPANY