



उत्पाद मानुयल
रॉट एल्यूमीनियम और एल्यूमीनियम मिश्र धातु - सामान्य इंजीनियरिंग उद्देश्यों के लिए तार- विशिष्टि
IS 739:1992 के अनुसार

PRODUCT MANUAL FOR
Wrought Aluminum and Aluminum Alloys- Wire for General Engineering Purposes
Specification as per IS 739:1992

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।

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 739:1992
	शीर्षक Title	:	Wrought Aluminum and Aluminum Alloys- Wire for General Engineering Purposes Specification
	संशोधनों की संख्या No. of amendments	:	NIL
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific raw material 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 see Annex-A

c)	नमूने का परिमाण Sample Quantity	:	For chemical test: 5 pcs of 5 cm length For mechanical properties: 2 m 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).
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 संभावित परीक्षण Possible tests in a day	:	All tests are possible to be carried out in a day. 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 739:1992 with the following scope		
	Name of the product	Wrought Aluminum and Aluminum Alloys- Wire for General Engineering Purposes Specification	
	Designation	19000, 19500, 24345....	
	Condition (Temper)	M,O, H2, H4, W, WP,WD, WDP	
	Size/Shape	Round wires of diameter fromXX... mm to up to and includingXX... mm Square/Rectangular wires of width/thickness fromXX... mm to up to and includingXX... mm Hexagonal/Octagonal wires of width across flats fromXX... mm to up to and includingXX... mm	

BUREAU OF INDIAN STANDARDS

Manak Bhawan, 9, Bahadur Shah
Zafar Marg, New Delhi – 110002

ANNEXURE A**GROUPING GUIDELINES****A) Grouping based upon Designation:**

A.1 Manufacturer shall declare the Designations of Aluminium and Aluminium Alloy Wires intended to be covered in the scope of the licence.

Group	Designations	Grouping
1	19000 19500	One sample of designation having the higher aluminum purity/content shall be drawn and tested to cover designations of lower Aluminum purity within the group (Also See A.2)
2	24345	One sample of the designation shall be drawn and tested(Also See A.2)
3	31000	One sample of the designation shall be drawn and tested(Also See A.2)
4	43000 46000	One sample of any designation shall be drawn and tested from the group (Also See A.2)
5	52000 53000 55000 55380	One sample of any designation shall be drawn and tested from the group (Also See A.2)
6	63400 64430 65032	One sample of any designation shall be drawn and tested from the group (Also See A.2)

A.2 Evidence of manufacturing capability of all Designations, intended to be covered in the scope of licence within each group, in the form of Mill Test Certificates (MTCs) (of earlier consignments) etc., shall be submitted by the manufacturer and their conformity to the requirements of IS 739 shall be established before endorsing all Designations in the Scope. In case of non-availability of MTCs, samples of all those Designations shall also be drawn from each Group.

B) Grouping based upon Temper Condition:

B.1 Manufacturer shall declare the Temper Conditions, for supply of wires, intended to be covered in the scope of licence.

Temper Condition	Grouping
M,O, H2, H4, W, WP,WD, WDP	Samples of different Grade Designations, drawn at A above, shall be drawn in such a way (combination) that samples of all Temper Conditions are drawn and tested.

C) Grouping based upon Shape/Sizes:

Shape	Grouping
Round Wires	Samples, drawn at A and B, above may be of any size and shape. However, efforts shall be made to draw samples of all shapes intended to be covered in the Scope of Licence. Further, recommendation for scope of licence with regards to sizes of wires shall be restricted based upon manufacturing capability.
Hexagonal /Octagonal Wires	
Rectangular / Square Wires	

D) Scope of licence shall be restricted based on the manufacturing and testing facilities available.

E) During operation of licence, samples of each variety covered in the scope of licence, shall be tested in rotation, to the extent possible

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

Sl. No.	Tests Used in with Clause Reference	Test Equipment/Chemicals and Identification Numbers (Where applicable)
1.	Chemical Composition, cl.8	Spectrometer, 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
2.	Copper (Below 0.1%)	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.
3.	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 Copper (Above 0.1%)

		Sulphide(gas), Hydrogen Sulphide Wash Solution
4.	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
5.	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.
6.	Silicon (0.02 to 0.3%)	Reagents- Sodium Hydroxide Solution, Dilute Nitric Acid, Ammonium Molybdate Solution, Standard Silicon Solution.
7.	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
8.	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.

9.	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, Standard Titanous Chloride Solution. Equipment – Apparatus for Storing Titanous Chloride Solution, Solid Glass Beads.
10.	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
11.	Manganese (Chromium Content up to 0.5%)	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, odium Arsenite, Standard Manganese Solution.
12.	Manganese (Mn content between 0.1 to 1.5%)	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
13.	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.
14.	Zinc (By Mercuric Thiocyanate	Reagents – Mixed Acid(Conc. Sulphuric Acid,

	Method)	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.
15.	Titanium	Reagents – Sodium Hydroxide Solution, Nitric Acid-Sulphuric Acid Mixture, Dilute Sulphuric Acid, Hydrogen Peroxide, Standard Titanium Solution.
16.	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.
17.	Tensile Strength,cl.9.2	Universal Tensile Testing Machine
18.	Wrapping Test, cl.9.3	Wrapping Test Machine, Mandrels for round wires and shaped wires
19.	Dimensions and Tolerances, cl.7.	Micrometer, Vernier Caliper

ANNEXURE 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 : All wires of the same designation ,condition (temper) ,size ,shape and manufactured from the same cast of raw material 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/empaneled 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 schedule of the licence and Licence Number (i.e. CM/L) shall be incorporated on the metal tag/sticker/label attached to each coil/bundle of wires and on the test certificate accompanied along with each consignment, provided always that the product thus marked conform to all the requirements of the specification.

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

4. TEST CERTIFICATE - For each consignment of BIS Certified material conforming to IS **739:1992** 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				
6	Freedom from Defects	----	IS 739	R	Manufacturer shall maintain adequate in- process controls to ensure that the material remains free from harmful defects.		
7	Dimensions and Tolerances	----	IS 2525	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		
8	Chemical Composition	8.1, 8.2, Table 1	IS 739 IS 504(Part 1 to 12)/IS 504 (Part 13 to 16) or any other established instrumental/chemical method	R	One	Each Cast	In case of raw material wire rods procured from outside, the manufacturer shall ensure that the material is received with test certificate indicating the designation and its chemical composition. No further testing is required if the raw material wire rods procured are ISI marked.
9	Mechanical Properties						
9.1,9.2	Tensile Test	Table 2	IS 739 IS 1608 (Part1)	R	One	Each Control Unit	-----

9.3,9.3.1	Wrapping Test	9.3, 9.3.1	IS 734 IS 1755	R	One	Each Control Unit	-----
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ANNEXURE I

XYZ ALUMINUM COMPANY
(Registered office Address and works address)
TEST CERTIFICATE



**Wrought Aluminum and Aluminum Alloys- Wire for General
Engineering Purposes Specification as per IS 739:1992**
TEST CERTIFICATE No.

To M/s _____

DATE _____

We certified that the material described below fully conforms to IS **739:1992** Chemical composition and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks LicenceNo.CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS **739:1992** FOR DETAILS OF SPECIFICATION
REQUIREMENTS)
TEST RESULTS

Order No. & Date	Size/Shape	Control Unit No.	Designation	Quantity in tonnes	CHEMICAL COMPOSITION								Tensile Strength	Dimensions and Tolerances	Wrapping Test	Remarks
					Al %	Si %	Mn %	Fe %	Mg%	Zn%	Cu%	Ti% etc.				

REMARKS
WAGON
NO.
TRUCK NO.
(It is suggested that size A4 paper be used for this test certificate)

FOR XYZ ALUMINUM COMPANY