



उत्पाद मानुयल
गढ़ा एल्यूमीनियम और एल्यूमीनियम मिश्र धातु फोर्जिंग स्टॉक और फोर्जिंग के लिए विशिष्टता
(सामान्य इंजीनियरिंग उद्देश्यों के लिए)
IS 734:1975 के अनुसार

PRODUCT MANUAL FOR
Specification for Wrought Aluminum and Aluminum Alloy Forging Stock and Forgings
(For General Engineering Purposes) as per IS 734:1975

भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन (विनियम की स्कीम-I के तहत यह उत्पाद मानुयल प्रमाणीकरणके प्रचलन में रीति और पारदर्शिता के सुसंगत 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 734:1975
	शीर्षक Title	:	Specification for Wrought Aluminum and Aluminum Alloy Forging Stock and Forgings (For General Engineering Purposes)
	संशोधन संख्या No. of amendments	:	NIL
2.	नमूनाकरण दिशा निर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific raw material requirement
b)	समूहिकरण दिशा निर्देश Grouping Guidelines	:	Please see Annex-A

c)	नमूने का परिमाण Sample Size	:	For chemical test: 5 pcs of 5 cm For mechanical test: Prepared test pieces
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 are possible to be carried out in a day
6.	लाइसेन्स का कार्यक्षेत्र /Scope of the Licence :		
	IS 734:1975 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेन्स निम्नलिखित कार्यक्षेत्रके लिए प्रदान किया जाता है Licence is granted to use Standard Mark as per IS 734:1975 with the following scope:		
	Name of the product	Specification for Wrought Aluminum and Aluminum Alloy Forging Stock and Forgings (For General Engineering Purposes)	
	Designation	19000, 19500, 22588....	
	Condition (Temper)	M/O/W/WP	

BUREAU OF INDIAN STANDARDS

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

**ANNEXURE A
TO PRODUCT MANUAL
FOR
Specification for Wrought Aluminum and Aluminum Alloy
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GROUPING GUIDELINES

1) Designations have been grouped based upon their aluminum purity/major alloying element content. For the purpose of GoL/CSoL, the following grouping guidelines may be considered:-

Designations	Purity of Al/Major Alloying Element (mean %)	Grouping
19000 19500	Al 99.0 % Min Al 99.5% Min	One sample of designation having the higher aluminum purity shall be drawn and tested to cover all the designations in the group.
22588	Cu (2.25%)	One sample of designation having the higher major alloying element content shall be drawn and tested to cover all the designations having lower major alloying element content in the group
24345	Cu (4.4%)	
24534	Cu (4.1%)	
31000	Mn (1.15%)	One sample of the designation (s) is required to be drawn and tested
52000	Mg (2.15%)	One sample of designation having the higher major alloying element content shall be drawn and tested to cover all the designations having lower major alloying element content in the group
53000	Mg(3.4%)	
54300	(Mg 4.45%)	
63400	Magnesium Silicide (3.25%)	One sample of designation having the higher major alloying element content shall be drawn and tested to cover all the designations having lower major alloying element content in the group
64423	Magnesium Silicide (4.5%)	
64430	Magnesium Silicide (4%)	
65032	Magnesium Silicide (4.75%)	

74530	Zinc (3.5%)	One sample of the designation is required to be tested

2) The sample(s) drawn above can be of any size of forging/forging stock. However, sample of each Condition(Temper) (cl.6.1) is required to be drawn to cover the Conditions (Temper) intended to be covered in the licence.

3) The requirement of Tolerances (cl.7.) of IS 734:1975 shall be tested in the factory on the sizes of forging stock or forgings, as agreed to between the manufacturer and purchaser, offered during inspection, from which samples are drawn for TPT.

4)However, it shall be ensured that the firm is having all the necessary manufacturing and testing facilities for manufacturing/testing of all the designations/conditions covered in the scope of the licence.

5) During the operation of the licence, BOs shall ensure that all designations/conditions covered in the scope of the licence are drawn for independent testing in rotation over a period of time.

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LIST OF TEST EQUIPMENTS

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

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1.	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/polyethylene/SS Beaker, Pyrex beakers and other glassware	Chemical Composition, cl.5.1
2.	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%)

3.	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%) PM/ IS 733/1 Oct 2018 Sulphide(gas), Hydrogen Sulphide Wash Solution	Copper (Above 0.1%)
4.	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 %)
5.	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%)
6.	Reagents- Sodium Hydroxide Solution, Dilute Nitric Acid, Ammonium Molybdate Solution, Standard Silicon Solution.	Silicon (0.02 to 0.3%)
7.	Reagents – Sodium Hydroxide Solution, Hydrogen Peroxide, Conc. Sulphuric Acid, Sulphuric Acid-Perchloric Acid Mixture,	Silicon (Above 0.3%)

	Perchloric Acid Solution, Conc. Nitric Acid, Sulphurous Acid, Dilute Sulphuric Acid, Conc. Hydrochloric Acid, Ammonium Acetate Solution, Dilute Hydrochloric Acid, Hydrofluoric Acid	
8.	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%)
9.	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%)
10.	Reagents – Sodium Hydroxide Solution, Sodium Nitrite Solution, Acid Mixture(Conc. Nitric Acid and Phosphoric Acid), Hydrofluoric Acid, Potassium Periodate Solution, Standard Manganese Solution	Manganese (Mn content between 0.01 to 0.1%)
11.	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 up to 0.5%)
12.	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%)

13.	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%)
14.	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)
15.	Reagents – Sodium Hydroxide Solution, Nitric Acid-Sulphuric Acid Mixture, Dilute Sulphuric Acid, Hydrogen Peroxide, Standard Titanium Solution.	Titanium
16.	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
17.	Universal Tensile Testing Machine with extensometer	Mechanical Test ,cl.5.1.2

Note 1: The above is an indicative list for the purpose of guidance only and may not be treated as exhaustive

ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

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 equipments.

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

3. LABELLING, MARKING, PACKING - The Standard Mark as given in schedule of the licence and Licence Number (i.e. CM/L) shall be incorporated on the product and on the test certificate accompanied along with each consignment, and the marking and packing shall be done as per the provisions of the Indian Standard, provided always that the product thus marked conform to all the requirements of the specification.

4. CONTROL UNIT - All material of the same designation and condition manufactured under conditions of production shall constitute a control unit.

5. LEVELS OF CONTROL - The tests 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.

All the production which conforms to the Indian Standards and covered by the

licence should be marked with Standard Mark.

6. TEST CERTIFICATE - For each consignment of BIS Certified material conforming to IS **734:1975** 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)

7. 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 re-salable 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/control unit number, as applicable, relating to all such rejections/defective/sub-standard 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.

TABLE 1: LEVELS OF CONTROL

(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					
4	Freedom from Defects	4.1, 4.1.1, 4.2	IS 734	R	Manufacturer shall maintain adequate inspection/in-process controls to ensure freedom from defects			
5.1.1	Chemical Composition	Table 1	IS 734 IS 504 (all parts)	R	One	Each Cast		
5.1.2	Mechanical Properties	Table 2	IS 734 IS 1608 (Part 1)	R	One	Each Control Unit	-----	
7	Tolerances	---	IS 734	R	Adequate inspection to ensure that the material conforms to the requirements agreed to between the purchaser			

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 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 6 of the Scheme of Inspection and
Testing) XYZ ALUMINUM
COMPANY

(Registered office Address and works address)

TEST CERTIFICATE FOR

**Specification for Wrought Aluminum and Aluminum Alloy
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Purposes) as per IS 734:1975**

BIS
STANDA
RD
MARK

DATE_____

TEST CERTIFICATE No.

To M/s_____

We certified that the material described below fully conforms to IS **734:1975** 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 **734:1975** FOR DETAILS OF SPECIFICATION
REQUIREMENTS)

TEST RESULTS

Order No. & Date	Size	Control Unit No.	Designation	Quantity in tonnes	CHEMICAL COMPOSITION								Mechanical Requirements	Tolerances	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