

**CORPORATE PURCHASING SPECIFICATION**

AA 123 30

Rev. No. 02

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ALUMINIUM ALLOY RODS, BARS, SECTIONS AND PROFILES Gr. 64430 (WP)**1. GENERAL :**

This specification governs the requirements of wrought aluminium alloy bars, rods, sections and profiles.

2. APPLICATION :

General engineering purposes.

3. CONDITION OF DELIVERY :

Fully heat treated.

4. COMPLIANCE WITH NATIONAL STANDARDS :

The material shall comply with the requirements of the following national standard and also meet the requirements of this specification.

IS: 733-1983
(Reaffirmed 1996) } WROUGHT ALUMINIUM AND ALUMINIUM ALLOY BARS,
Gr: 64430 (WP) } RODS AND SECTIONS FOR GENERAL ENGINEERING
PURPOSES

5. DIMENSIONS AND TOLERANCES :**5.1 Sizes:**

The material shall be supplied as per the dimensions specified in the order.

5.1.1 Sizes for equal leg angles shall be as per IS: 3908 (Specification for Aluminium Equal Leg Angles)

5.1.2 Sizes for unequal leg angles shall be as per IS: 3909 (Specification for Aluminium Unequal Leg Angles)

5.1.3 Sizes for channels shall be as per IS:3921 (Specification for Aluminium Channels)

5.2 Tolerances:**5.2.1 Tolerances on diameters of rods.**

Diameter (mm)		Tolerances \pm mm
Over	Upto & incld	
-	12	0.20
12	25	0.25
25	40	0.30
40	50	0.38
50	56	0.46
56	71	0.53
71	80	0.61
80	-	1% of diameter

Note: In case of diameters other than standard and not included in the above table, the tolerances applicable are those for the nearest smaller diameters shown in the table.

Revisions:

Refer Clause.No. 13.18 of MOM MRC(NFC&W),
Cl. 16.3.65 OF MOM OF MRC-NFCW+HE

APPROVED:

**INTERPLANT MATERIAL
RATIONALISATION COMMITTEE-
MRC(NFCW+HE)**

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Amd No.01

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5.2.2 Tolerances on widths across flats of hexagonal bars.

Width Across Flats, mm	Tolerance mm
3, 3.5, 4 & 4.5	- 0.10
5, 5.5, 6, 7, 8, 9, 10	- 0.13
11 & 12	- 0.18
14, 17, 19 & 22	- 0.20
24, 27 & 30	- 0.25
32, 36, 41	- 0.30
46 & 50	- 0.38
55 & 60	- 0.51

* Plus tolerance is 0.00 mm

5.2.3 Tolerances on overall widths and widths across flats and regular sections (other than those covered in clause 5.2.1. And 5.2.2)

Width & Width across flats mm	Tolerance, ± mm	Width & Width across flats mm	Tolerance + mm
6.4	0.20	80	0.69
10.0	0.23	100	0.75
12.0	0.25	120	0.85
16.0	0.28	160	1.02
25.0	0.30	200	1.14
32.0	0.38	250	1.40
50.0	0.46	300	1.65
60.0	0.53	320	1.70

For intermediate sizes, tolerances for next higher size shall be taken.



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**5.2.4 Tolerances on thickness regular sections and bars (other than those covered by clause 5.2.1 and 5.2.2)
(All dimensions in millimeters)**

Thickness of section	Width of Section															
	12	16	20	25	32	40	50	63	80	100	125	160	200	250	320	
1.2	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	
1.6	0.18	0.20	0.20	0.20	0.20	0.20	*	*	*	*	*	*	*	*	*	
2	0.18	0.20	0.20	0.20	0.20	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	*
2.5	0.18	0.20	0.20	0.20	0.20	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.46	*
3.2	0.18	0.20	0.20	0.20	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.48	*	
4	0.20	0.23	0.23	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.46	0.51	*	
5	0.20	0.23	0.23	0.23	0.25	0.28	0.30	0.33	0.36	0.38	0.41	0.43	0.46	0.51	*	
6	0.20	0.23	0.23	0.23	0.25	0.28	0.30	0.33	0.36	0.41	0.46	0.51	0.56	0.66	*	
8	0.23	0.25	0.25	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48	0.53	0.58	0.71	*	
10	0.23	0.25	0.25	0.25	0.28	0.30	0.33	0.36	0.38	0.43	0.48	0.53	0.58	0.71	*	
12	0.25	0.28	0.28	0.28	0.30	0.33	0.36	0.38	0.41	0.46	0.48	0.53	0.58	0.74	0.97	
16	0.28	0.30	0.30	0.30	0.33	0.36	0.38	0.41	0.43	0.48	0.51	0.56	0.61	0.76	1.02	
20		0.30	0.30	0.30	0.36	0.38	0.41	0.43	0.46	0.51	0.53	0.61	0.69	0.79	1.03	
25		0.30	0.30	0.30	0.36	0.38	0.41	0.43	0.46	0.51	0.53	0.61	0.69	0.79	1.04	
32					0.38	0.41	0.43	0.46	0.48	0.53	0.56	0.66	0.74			
40						0.46	0.48	0.5V	0.53	0.56	0.61	0.71	0.79			
50							0.53	0.56	0.58	0.61	0.66	0.76	0.84			
63								0.61	0.64	0.66	0.71	0.81	0.89			
80									0.69	0.71	0.74	0.86	0.94			
100										0.76	0.79	0.91	0.99			
125											0.89	0.97	1.04			
160												1.02	1.09			
200														1.14		

* To be regarded as special sections.

Note: 1. For Intermediate sizes take tolerances for the next higher value.

2. All the tolerances are plus and minus tolerances.

5.2.5 Tolerances for bars and sections of dimensions larger than those covered above shall be subject to mutual agreement between supplier and the purchaser.

5.2.5.1 Sections not covered in clause 5.2.1 and 5.2.4 and where additional manufacturing operations are necessary, where specially close tolerances are required, such tolerances shall be agreed upon between the supplier and the purchaser.

5.3 Tolerances for concavity and convexity:

Width of section (mm)		Tolerances
Over	up to & includ.	+ mm
—	25	0.18
25	38	0.25
38	50	0.30
50	—	0.30 plus 0.13 for every 25mm of width



5.4 Tolerances for straightness and twist:

All bars and sections shall be supplied in straightened condition and reasonably free from twist. The tolerances for straightness & twist shall be as follows:

Dia. of circumscribing circle, mm		Allowable deviation from straightness, (mm/in of length)
Upto & Includg.	25	2.1
Over	25	2.7

Note: I. Twist is normally measured by placing the extruded section on a flat surface and measuring the maximum distance at any point along its length between the bottom surface of the section and flat surface. From the measurement, the deviation from true straightness is subtracted. The remainder is twist.

5.5 The bars, profiles, rods etc., shall be cut at right angle to the longitudinal axis. The skewing of the cut relative to the axis shall not exceed 3°.

5.6 Angular Tolerance:

The tolerance on angles of regular sections measured at the extremities of the section shall be as follows:

Thickness of thinnest leg		Allowable Deviation from angle specified
Over mm	Upto & incldg. mm	
-	5.0	±2°
5.0	19.0	± 1.5°
19.0	—	± 1°

5.6.1 Tolerance on angle of other sections shall be agreed to between the supplier and the purchaser.

6. MANUFACTURE:

The method of manufacture of the material shall be at the discretion of the manufacturer.

7. HEAT TREATMENT:

The bars, rods, sections and profiles shall be fully heat treated i.e., solution treated and subsequently precipitation hardened.

8. FREEDOM FROM DEFECTS :

The material shall be clean, smooth and free from fins, spills, porosity, cracks or other defects and shall be reasonably straight and free from twists.

**9. CHEMICAL COMPOSITION:**

The chemical composition of the material, when analysed in accordance with IS: 504(Methods of chemical analysis of aluminium and its alloys) or any other conventional/instrumental methods shall be as follows:

Element	Percent	
	Min	Max
Magnesium	0.4	1.2
silicon	0.6	1.3
Manganese	0.4	1.0
*Copper	-	0.1
*Iron	-	0.6
*Zinc	-	0.1
*Titanium and /or other grain Refining elements		0.2
*Chromium	-	0.25
Aluminium	Remainder	

Note: These elements need not be determined when the material supplied conforms with the mechanical properties specified in this specification. However the supplier shall ensure that the composition of the material lies within the limits specified above.

10. TEST SAMPLES:

10.1 Bars, rods, sections and profiles of the same dimensions produced under similar conditions and of the same composition, shall be grouped into lots as follows:

Diameter or Equivalent Cross-section Over mm	Upto & inldg. mm	Weight of each lot in kg.
-	10	1000
10	50	2000

Note: In case a heat treatment batch is less than a lot size as defined above, it shall be considered as a lot by itself

10.2 One test sample shall be cut from a bar rod, section or profile selected from each lot.

10.2.1 The test samples, after heat treatment shall not be mechanically worked except for preparing the test piece before they are tested.

10.2.2 Before any test samples are cut off, they shall be marked to identify them with the lot or heat treatment batch they represent.

10.3 One sample form each heat shall be analysed for chemical composition.

**11. MECHANICAL PROPERTIES:****11.1 Tensile Test:**

The material when tested in accordance with IS: 1608 shall show the following tensile properties:

Size Diameter or Minor cross sectional dimension,		0.2% proof stress N/mm ²	Tensile Strength, N/ mm ²	Percentage Elongation on 50mm gauge length
Over mm	Upto & includg. mm	Min.	Min.	Min.
—	5	255	295	7
5	75	270	310	7
75	150	270	295	7
150	200	240	280	6

12. RETESTS:

Should any of the test pieces first selected, fail to pass the prescribed tests mentioned under various clauses in this specification, two further samples from the same batch shall be selected for testing, one of which shall be from the same component from which the original test sample was taken, unless that component has been withdrawn by the supplier.

Should the test pieces from both these additional samples pass, the batch represented by the test sample shall be accepted. Should the test pieces from either of these additional samples fail, the batch represented by the test sample shall be rejected.

13. INSPECTION AT SUPPLIER'S WORKS:

Tests and inspection are to be conducted in the presence of the customer's representative. The representative shall have free access at all times while the work on the contract is being performed, to all parts of the manufacturer's works. The supplier shall offer the purchaser's representative all reasonable facilities, without charge, to satisfy the latter that the material is being furnished in accordance with this specification. The supplier shall prepare and provide necessary test specimens for testing to be carried out at his premises. If facilities are not available at his works, the supplier shall make necessary arrangement for carrying out the prescribed test elsewhere.

14. TEST CERTIFICATES:

The supplier shall submit 5 copies of test certificates giving the following information:

BHEL Order No.

AA 12330 (Rev No xx) - Aluminium Alloy rods, bars, section and profiles Gr. 64430(WP)

Supplier's reference and Name

Batch No.

Results of chemical analysis, mechanical and all other tests as called for in this

Specification/order

Heat treatment details

Drawing/Pattern No.

Consignment/Identification No.



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15. PACKING AND MARKING :

The material shall be suitably packed to prevent corrosion and damage during transit.

Each package or crate shall be legibly marked with the following information:

BHEL Order No. No. AA 12330

Batch No.

Identification Mark/No

Weight

Supplier's reference and Name

16. REJECTION AND REPLACEMENT:

In the event of the material proving defective in the course of manufacture, such material shall be rejected notwithstanding any previous certification of satisfactory testing and/or inspection.

The supplier shall undertake to replace the material free of charge without delay and arrange to take back the rejected material at his own cost.