

			PRODUCT STANDARD SWITCHGEAR ENGINEERING DIVISION		SG 10403 Rev.: 00		
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<u>SPECIFICATION OF ELECTRICAL GRADE ALUMINIUM ALLOY (HE30)</u>							
1. General: This specification governs the requirements of wrought aluminum alloy bars, rods, sections and profiles.							
2. Application: This material is used in switchgear and tap changer application.							
3. Compliance with National/International standards : The material shall comply with the requirements of the following national standard and also meet the requirements of this specification. A. BHEL Specification : AA12330 B. INDIAN : IS : 733 : Alloy 64430 (WP), [HE 30 (WP)] C. AMERICAN : ASTM:B 221M Gr 6351(T6) D. GERMAN : DIN 1747 Gr.Al Mg Si 1(F32) DIN 1725 Gr.Al Cu Mg 2(F44)							
4. Dimensions and Tolerances: As per drawings/Purchase order							
5. Finish: a. Surface finish of the components shall be at least RA 0.8. b. The component shall be free from dirt, grease and loose particles. c. Drawn profiles, to size, only shall be used for direct welding. No smithy is allowed for formation/ matching of profiles in view of defect inception. d. Weld splatter, if any, shall be removed by chipping or grinding on completion of the weld. e. Any sharp corners shall be removed as per the drawing. Wherever not specified in the drawing, a radius of R1 shall be provided at the sharp corners and edges. f. Parallelism of the tube must be maintained within 0.1 degree and any deviation shall be subjected to rejection in supply.							
6. Silver Plating: If specified in drawing, the components shall be CNC finished to final dimensions prior to silver plating. Silver plating to a thickness of 10-12 microns shall be done on the marking area. An initial flash of 2 micron nickel is advised.							
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		ALTD.			HR Patel		
		APPD.			PREPARED	ISSUED	DATE
		DATE.			S K Prasad		16.8.2014

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		7. Properties :																																																														
		<table><tr><th>Sl. No</th><th>Parameter</th><th>Test method</th><th>Unit</th><th>Value (Minimum)</th></tr><tr><td rowspan="10">1.</td><td>Chemical</td><td rowspan="10">IS 504</td><td rowspan="10">%</td><td></td></tr><tr><td>a) Aluminium</td><td>Remainder</td></tr><tr><td>b) Copper</td><td>0.1</td></tr><tr><td>c) Magnesium</td><td>0.4-1.2</td></tr><tr><td>d) Silicon</td><td>0.6-1.3</td></tr><tr><td>e) Iron</td><td>0.6</td></tr><tr><td>f) Manganese</td><td>0.4-1.0</td></tr><tr><td>g) Zinc</td><td>0.1</td></tr><tr><td>h) Titanium and/or other grain refining elements</td><td>0.2</td></tr><tr><td>i) Chromium</td><td>0.25</td></tr><tr><td>2.</td><td>Density</td><td>IS 5802</td><td>g/cm³</td><td>2.7</td></tr><tr><td>3.</td><td>Tensile strength Min</td><td>IS 1816</td><td>MPa</td><td>275-300</td></tr><tr><td>4.</td><td>Brinell Hardness</td><td>IS 1500</td><td>HB</td><td>84-91</td></tr><tr><td>5.</td><td>Elongation</td><td>IS 1608</td><td>%</td><td>6-9</td></tr><tr><td>6.</td><td>0.2 percent Proof-Stress (Minimum)</td><td>IS 1816</td><td>N/mm²</td><td>240-255</td></tr><tr><td>7.</td><td>Electrical Conductivity at 20°C (Minimum)</td><td>IS 5802</td><td>% IACS</td><td>45</td></tr></table>					Sl. No	Parameter	Test method	Unit	Value (Minimum)	1.	Chemical	IS 504	%		a) Aluminium	Remainder	b) Copper	0.1	c) Magnesium	0.4-1.2	d) Silicon	0.6-1.3	e) Iron	0.6	f) Manganese	0.4-1.0	g) Zinc	0.1	h) Titanium and/or other grain refining elements	0.2	i) Chromium	0.25	2.	Density	IS 5802	g/cm ³	2.7	3.	Tensile strength Min	IS 1816	MPa	275-300	4.	Brinell Hardness	IS 1500	HB	84-91	5.	Elongation	IS 1608	%	6-9	6.	0.2 percent Proof-Stress (Minimum)	IS 1816	N/mm ²	240-255	7.	Electrical Conductivity at 20°C (Minimum)	IS 5802	% IACS	45
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		8. Test Methods Unless otherwise specified, the tests shall be conducted in accordance with relevant methods as mentioned against clause 7.																																																														
		9. Sample for Tests The set of test specimens prepared from same batch and in same manner as consignments shall be supplied for testing and approval. The test sample size should be as per requirement specified in relevant test method of clause 7.																																																														



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10. Test Certificate

The supplier shall submit 5 copies of test certificates for tests specified in clause 6 giving the following information:

- BHEL Order No.
- Component name ,Drawing no and Rev no
- Supplier's Name
- Batch No.
- Results of chemical analysis, mechanical and all other tests as called for in this specification/order
- Heat treatment details
- Silver plating thickness and adhesion report

11. Packing and Marking

The material shall be suitably packed to prevent corrosion and damage during transit. The lot should be supplied in shock proof, unbreakable containers. Each package shall be legibly and indelibly marked with the following:

- Component name ,Drawing no and Rev no
- BHEL Purchase Order No.
- Batch/Lot No.
- Manufacturer's /Suppliers Name
- Size & Quantity supplied
- Net & Gross Weight

12. Acceptance criteria:

- Dimensional Report as per drawing.
- Finish as per clause 5.
- Silver Plating as per clause 6
- Test samples as per clause 9.
- Test certificate as per clause 10.
- Packing and Marking as per clause 11.

13. 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.