



**ALUMINIUM ALLOY SAND AND CHILL
CASTINGS Gr. 4635 M**

1.0 GENERAL:

This specification governs the requirements of Aluminum alloy sand and chill castings of grade 4635 M.

2.0 APPLICATION:

For complex, thin walled, pressure tight and vibration resistant castings with high strength, moderate corrosion resistance and dimensional stability on temperature variations.

3.0 CONDITION OF DELIVERY: As cast.

4.0 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 : 617 - 1994 Gr. 4635 M : Aluminum and Aluminum alloy ingots and castings for general engineering purposes

5.0 DIMENSIONS AND TOLERANCES:

The dimensions of the castings shall be in accordance with the drawings supplied with the order. For un-machined surfaces, unless otherwise specified in the order/drawing, the tolerances on linear dimensions and wall thickness shall be as per BHEL standard AA 023 04 02.

6.0 MANUFACTURE :

The castings shall be sand or chill cast as specified in the order/drawing.

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**7.0 FINISH :**

The castings shall be properly fettled and dressed and shall be thoroughly cleaned. The castings shall be supplied either in **un-machined**, rough machined or finish machined conditions as specified in the order/drawing.

8.0 FREEDOM FROM DEFECTS :

The castings shall be sound and free from harmful defects, such as blow holes, inclusions, shrinkage, gas cavities, hot spots, cold shuts cracks gross porosities, dross etc, which may adversely affect the machining and utility of castings.

9.0 CHEMICAL COMPOSITION :

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

Element	Percent	
	Min	Max.
*Copper	-	0.1
Silicon	10.0	13.0
Magnesium	0.2	0.6
Iron	-	0.6
Manganese	0.3	0.7
*Nickel	-	0.1
*Zinc	-	0.1
*Lead	-	0.1
*Tin	-	0.05
*Titanium	-	0.2
Aluminum	Remainder	

* 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 is within the limits specified above.

10.0 TEST SAMPLES:

10.1 One test specimen shall be selected from each heat for chemical analysis. Care shall be taken to discard the first drillings till a clean oxide-free surface is reached :

10.2 One test specimen for mechanical test shall be prepared as per clause 6 of IS : 617.

**11.0 MECHANICAL PROPERTIES :**

The test specimen when tested in accordance with IS : 1608 shall the following tensile properties:

Methods of casting	Tensile strength N/mm ² , min	% Elongation on 5.65√So gauge Length, min.	Hardness BHN, min.
Sand Chill Cast	— 170	- 3	55 65

12.0 ADDITIONAL TEST:

If specified in the Order/drawing the following additional tests shall be conducted on the castings.

1. Pressure Test.
2. Radiographic Test.

The requirements of these tests shall be as prescribed in the order/drawings or as mutually agreed upon.

13.0 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.

14.0 REPAIR OF CASTINGS:

The castings shall not be repaired unless permission in writing has been obtained previously from BHEL.

**15.0 TEST CERTIFICATES :**

The supplier shall submit five copies of test certificates giving the following information.

In **addition**, supplier shall ensure to enclose one copy of the test certificate along with the dispatch documents to facilitate quick clearance of the material.

BHEL Order No,

CPS No. 199 53, Rev.03: Aluminium alloy sand and chill castings, Gr: 4635M

Supplier's Reference and Name :

Method of manufacture

Heat No.

Results of chemical analysis, mechanical and all other tests called for in this **specification/order/drawing**.

Drawing/Pattern No.

16.0 PACKING AND MARKING:

Castings shall be suitably packed to prevent corrosion and damage during transit. Machined surfaces shall be properly protected with anti-corrosive compounds.

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

BHEL Order No,

AA 199 53

Heat No.

Identification mark/No.

Weight

Supplier's Reference and Name :

17.0 REFERRED STANDARDS (Latest Publications Including Amendments):

1. AA 023 04 02

2. IS : 504

3. IS : 617

4. IS : 1608