***भारतीय मानक* IS 737 : 2024**

***Indian Standard***

***सामान्य इंजीनियरिंग प्रोयजनों के लिए पिटवाँ एल्यूमिनियम एवं एल्यूमिनियम मिश्र धातु की चादर एवं पत्ती ― विशिष्टि***

*(* पाँचवां पुनरीक्षण *)*

**Wrought Aluminium and Aluminium Alloy Sheet and Strip for General Engineering Purposes― Specification**

*( Fifth Revision )*

ICS 77.150.10

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भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

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**June 2024 Price Group**

Ores and Feed Stock for Aluminium Industry, its Metals/Alloys and Products Sectional Committee, MTD 07

FOREWORD

This Indian Standard (Fifth Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Ores and Feed Stock for Aluminium Industry, its Metals/Alloys and Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1956 and revised in 1965, 1974, 1986 and 2008. In this revision efforts have been taken to incorporate all the grades of wrought Al and Al alloy sheet and strip presently used and prevalent in the Indian market. The main modifications made in this revision are as follows;

1. Forty two new grades are added; and
2. Clause **4** on ordering information has been added.

The composition of the Committee responsible for the formulation of this standard is given in Annex A.

For the purpose of whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis shall be rounded off in accordance with IS 2 : 2022 ‘Rules for rounding off numerical values (*second revision*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard*

WROUGHT ALUMINIUM AND ALUMINIUM ALLOY SHEET AND STRIP FOR GENERAL ENGINEERING PURPOSES ― SPECIFICATION

*( Fifth Revision )*

# 1 SCOPE

# This standard covers the requirements for wrought aluminium and aluminium alloy sheet and strip for general engineering purposes.

# 2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicted were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards.

|  |  |
| --- | --- |
| *IS No.* | *Title* |
| IS 504 (Part 1 to 12) : 2002 | Chemical analysis of aluminium and its alloys: Parts 1 to 12 (*second revision*) |
| IS 504 (Part 13 to 16) : 2003 | Chemical analysis of aluminium and its alloys: Parts 13 to 16 (*second revision*) |
| IS 1599 : 2023/  ISO 7438 : 2020 | Metallic materials ― Bend test (*fifth revision*) |
| IS 1608 (Part 1) : 2022/ ISO 6892-1 : 2019 | Metallic materials ― Tensile testing: Part 1 Method of test at room temperature (*fifth revision*) |
| IS 2676 : 1981 | Dimensions for wrought aluminium and aluminium alloys sheet and strip (*first revision*) |
| IS 5047 | Glossary of terms relating to aluminium and aluminium alloys |
| (Part 1 : 1986) | Unwrought and wrought metals (*second revision*) |
| (Part 2 : 1979) | Plant and operations, thermal treatment, control and testing, finishing |
| IS 5052 : 1993 | Aluminium and its a1loys ― Temper designations (*first revision*) |
| IS 10259 : 1982 | General condition of delivery and inspection of aluminium and aluminium alloy products |

# 3 DEFINITION AND TERMINOLOGY

## For the purpose of this standard, the definitions as given in IS 5047 (Part 1) and IS 5047 (Part 2)and the following shall apply.

## **3.1 Heat Treatment Batch** ―A quantity of material of one alloy of the same dimensions and produced in the same way, solution-treated and subsequently precipitation treated in one furnace load. More than one heat-treatment batch may comprise a furnace load.

## **3.2 Sheet ―** Hot or cold rolled product, over 0.15 mm but less than 6.0 mm thickness in cut lengths.

## **3.3 Strip ―** Hot or cold rolled product, over 0.15 mm but less than 6.0 mm thickness in coil form.

# 4 ORDERING INFORMATION

## The ordering information shall include the following information:

1. Grade/thickness;
2. Condition;
3. Quantity in kg;
4. Size **–** thickness × width × length (T × W × L) in mm for sheets and (T × W) in mm for strips/coils;
5. Coil id and coil weight for strips/coils;
6. Core/spool requirement for coils; and
7. Packing mode.

# 5 SUPPLY OF MATERIAL

## General requirements for the supply of aluminium and aluminium alloy sheet and strip shall conform to IS 10259.

# 6 FREEDOM FROM DEFECTS

## The material shall be sound and free from harmful defects for the intended application.

# 7 CHEMICAL COMPOSITION

The material when analysed as per IS 504 (Part 1 to 12) and IS 504 (Part 13 to 16) or any other instrumental/chemical method shall conform to the requirements given in Table 1. In case of dispute, the procedure given in IS 504 shall be the referee method. However, when the method is not given in IS 504 (Part 1 to 12) and IS 504 (Part 13 to 16) the referee method shall be as agreed between the purchaser and manufacturer.

# 8 MECHANICAL PROPERTIES

## The material when tested in accordance with IS 1608 (Part 1) shall conform to the values given in Table 2 for grades mentioned in Table 1. Mechanical properties of the grades and thickness not mentioned in Table 2 may be subject to the mutual agreement between purchaser and manufacturer.

### The tensile test piece shall be rectangular section and conform to the dimension as given in IS 1608 (Part 1) with a gauge length of 50 mm. The test piece shall be cut transverse to the direction of rolling for sheet and strip 300 mm wide and over. The test piece shall be cut parallel to the direction of rolling for sheet and strip under 300 mm wide. When the width of the material to be tested in insufficient to permit preparation of the standard tensile test piece, a piece of the full width of the material may be used.

## **8.2 Bend Test (for Material 2.6 mm and Thinner)**

## Unless otherwise stated, the bend test piece shall be not less than 15 mm wide, of convenient length and cut with its longer axis transverse to the direction of rolling. The longer edges shall be carefully rounded and smoothened longitudinally so that the cross-section of the test piece has approximately semi-circular ends.

### **8.2.1** The test piece may be bent by hand to a U-form, and the piece thus obtained shall subsequently be closed in a vice until the inner surfaces of the test piece are twice the specified radius apart (or are in general contact, if the test piece is to be closed flat).

### **8.2.2** When tested in accordance with **8.2.1** the outer surface of the bend shall not show any visible crack (*see* IS 1599).

# 9 CONDITION

The material shall be supplied in the condition as required by the purchaser. While specifying the condition, the temper designations laid down in IS 5052 shall be followed.

# 10 DIMENSIONS AND TOLERANCES

## The dimensions and tolerances of sheet and strip shall be as specified in IS 2676.

# 11 SELECTION OF TEST SAMPLES

## **11.1 Sheet and Strip of Aluminium or Non-Heat Treatable Aluminium Alloy**

## Material of the same thickness, produced in the same way, and of the same nominal composition shall be grouped into batches of not more than 4 000 kg. However, if a strip in a single coil exceeds 4 000 kg in weight, it shall be deemed to represent one batch.

### **11.1.1** Mechanical tests shall be carried out on each batch for determining conformity of the material to this standard.

### **11.1.2** Before the test samples are cut off, they shall be marked to identify them with the batch they represent. The test sample shall be taken from the material as supplied and shall not be further annealed or mechanically worked. The test samples may be cut and prepared from the margins of the material before cutting it to size.

## **11.2 Sheet and Strip of Heat-Treatable Aluminium Alloys**

## One test sample shall be cut from a sheet or strip selected from each heat treatment batch. Before the test samples arc cut off, they shall be marked to identify with the heat treatment batch they represent.

### Unless otherwise agreed, the test samples shall be tested in the same condition in which the material is to be supplied. The test sample, after heat treatment, shall not be mechanically worked before being tested.

# 12 RETESTS

### For the purpose of this standard, the retest clauses as given in IS 10259 shall apply.

# 13 PACKAGING

For the purpose of this standard, packaging clauses as given in IS 10259 shall apply.

# 13.1 MARKING

## The material shall be marked with the following;

1. Indication of the source of manufacture;
2. Grade designation, size;
3. Condition;
4. Batch number;
5. Quantity; and
6. Date of manufacture.

The supplier shall furnish a certificate that the material supplied complies with the requirements of this standard.

## **13.2 BIS Certification Marking**

## The products(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provision of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the product may be marked with the Standard Mark.

**Table 1 Chemical Composition of Wrought Aluminium and Aluminium Alloy Sheet and Strip**

**(****Composition Limits are in Weight Percent Maximum, Unless Shown Otherwise)**

(*Clause* 7)

| **Sl No.** | **IS Designation** | **ISO Designation** | **Si** | **Fe** | **Cu** | **Mn** | **Mg** | **Cr** | **Zn** | **Ti** | **Others (Each)** | **Others**  **(Total)** | **Al** | **Remarks** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) | (14) | (15) |
|  | 19900 | 1190 | 0.05 | 0.07 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 | - | 0.01 | - | 99.90, *Min* | V + Ti = 0.01 B: 0.01 Ga : 0.02 |
|  | 19990 | 1199 | 0.006 | 0.006 | 0.006 | 0.002 | 0.006 | - | 0.006 | 0.002 | 0.002 | - | 99.99, *Min* | Ga: 0.005; V: 0.005 |
|  | 19850 | 1085 | 0.10 | 0.12 | 0.03 | 0.02 | 0.02 | - | 0.03 | 0.02 | 0.01 | - | 99.85, *Min* | Ga: 0.03; V: 0.05 |
|  | 19800 | 1080 | 0.15 | 0.15 | 0.03 | 0.02 | 0.02 | - | 0.03 | 0.03 | 0.02 | - | 99.80, *Min* | Ga: 0.03; V: 0.05 |
|  | 19800A | 1080A | 0.15 | 0.15 | 0.03 | 0.02 | 0.02 | - | 0.06 | 0.02 | 0.02 | - | 99.80, *Min* | Ga: 0.03 |
|  | 19700 | 1070 | 0.2 | 0.25 | 0.04 | 0.03 | 0.03 | - | 0.04 | 0.03 | 0.03 | - | 99.70, *Min* | V: 0.05 |
|  | 19700A | 1070A | 0.20 | 0.25 | 0.03 | 0.03 | 0.03 | - | 0.07 | 0.03 | 0.03 | - | 99.70, *Min* | - |
|  | 19600 | 1060 | 0.25 | 0.35 | 0.05 | 0.03 | 0.03 | - | 0.05 | 0.03 | 0.03 |  | 99.60, *Min* | V: 0.05 |
|  | 19500 | 1050 | 0.25 | 0.40 | 0.05 | 0.05 | 0.05 | - | 0.05 | 0.03 | 0.03 | - | 99.50, *Min* | V: 0.05 |
|  | 19500A | 1050A | 0.25 | 0.40 | 0.05 | 0.05 | 0.05 | - | 0.07 | 0.05 | 0.03 | - | 99.50, *Min* | - |
|  | 19450 | 1145 | - | - | 0.05 | 0.05 | 0.05 | - | 0.05 | 0.03 | 0.03 | - | 99.45, *Min* | Si + Fe: 0.55 V: 0.05 |
|  | 19350 | 1235 | - | - | 0.05 | 0.05 | 0.05 | - | 0.10 | 0.06 | 0.03 | - | 99.35, *Min* | V: 0.05; Si + Fe: 0.65 |
|  | 19002 | 1100 | - | - | 0.05 to 0.20 | 0.05 | - | - | 0.10 | - | 0.05 | 0.15 | 99.00, *Min* | Si + Fe: 0.95 |
|  | 19000 |  | 0.5 | 0.7 | 0.1 | 0.1 | 0.2 | - | 0.10 | - | - | - | 99.00, *Min* | Cu + Mg + Si + P + Mn + Zn = 1.0 |
|  | 19000A | 1200 | - | - | 0.05 | 0.05 | - | - | 0.10 | 0.05 | 0.05 | 0.15 | 99.00, *Min* | Si + Fe: 1.00 |
|  | 24345 |  | 0.50 to 1.2 | 0.7 | 3.8 to 5.0 | 0.3 to 1.2 | 0.20 to 0.80 | 0.3 | 0.2 | 0.3 | - | - | Remainder | - |
|  | 24345A | 2014 | 0.50 to 1.2 | 0.7 | 3.9 to 5.0 | 0.40 to 1.2 | 0.20 to 0.8 | 0.10 | 0.25 | 0.15 | 0.05 | 0.15 | Remainder | - |
|  | 24345B | 2014A | 0.5 to 0.9 | 0.50 | 3.9 to 5.0 | 0.40 to 1.2 | 0.20 to 0.8 | 0.10 | 0.25 | 0.15 | 0.05 | 0.15 | Remainder | Zr + Ti: 0.20 |
|  | 24530 | 2024 | 0.50 | 0.50 | 3.8 to 4.9 | 0.30 to 0.9 | 1.2 to 1.8 | 0.10 | 0.25 | 0.15 | 0.05 | 0.15 | Remainder | - |
|  | 26388 | 2219 | 0.20 | 0.30 | 5.8 to 6.8 | 0.20 to 0.40 | 0.02 | - | 0.10 | 0.02 to 0.10 | 0.05 | 0.15 | Remainder | V: 0.05 to 1.5, Zr: 0.10 to 0.25 |
|  | 31000 | - | 0.6 | 0.7 | 0.10 | 0.8 to 1.5 | 0.10 | 0.20 | 0.20 | 0.2 | - | - | Remainder | - |
|  | 31000A | 3103 | 0.50 | 0.7 | 0.10 | 0.9 to 1.5 | 0.30 | 0.10 | 0.20 | - | 0.05 | 0.15 | Remainder | Zr + Ti: 0.10 |
|  | 31200 | 3003 | 0.6 | 0.7 | 0.05 to 0.20 | 1.0 to 1.5 | - | - | 0.10 | - | 0.05 | 0.15 | Remainder | - |
|  | 31400 | 3102 | 0.4 | 0.7 | 0.10 | 0.05 to 0.40 | - | - | 0.30 | 0.1 | 0.05 | 0.15 | Remainder | - |
|  | 31500 | - | 0.4 | 0.7 | 0.20 | 1.0 to 1.5 | 0.6 to 1.3 | - | 0.20 | 0.20 | - | - | Remainder | - |
|  | 31500A | 3004 | 0.30 | 0.7 | 0.25 | 1.0 to 1.5 | 0.8 to 1.3 | - | 0.25 | - | 0.05 | 0.15 | Remainder | - |
|  | 31500B | - | 0.4 | 0.7 | 0.1 | 0.30 to 0.8 | 0.20 to 0.8 | 0.10 | 0.20 | - | - | - | Remainder | - |
|  | 31500C | 3105 A | 0.6 | 0.7 | 0.30 | 0.30 to 0.8 | 0.20 to 0.8 | 0.20 | 0.25 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 31540 | 3104 | 0.6 | 0.8 | 0.05 to 0.25 | 0.8 to 1.4 | 0.8 to 1.3 | - | 0.25 | 0.10 | 0.05 | 0.15 | Remainder | V: 0.05; Ga: 0.05 |
|  | 31542 | 3005 | 0.6 | 0.7 | 0.30 | 1.0 to 1.5 | 0.20 to 0.6 | 0.10 | 0.25 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 40800 | - | 0.6 to 0.95 | 0.6 to 0.95 | 0.2 | 0.1 | 0.1 | - | 0.2 | 0.2 | - | - | 98.0 %, *Min* | - |
|  | 41352 | 4015 | 1.4 to 2.2 | 0.7 | 0.2 | 0.6 to 1.2 | 0.10 to 0.50 | - | 0.2 | - | 0.05 | 0.15 | Remainder | - |
|  | 41800 | 4006 | 0.8 to 1.2 | 0.50 to 0.8 | 0.1 | 0.05 | 0.01 | 0.20 | 0.05 | - | 0.05 | 0.15 | Remainder | - |
|  | 44000 | 4343 | 6.8 to 8.2 | 0.8 | 0.25 | 0.10 | - | - | 0.2 | - | 0.05 | 0.15 | Remainder | - |
|  | 45000 | 4045 | 9.0 to 11.0 | 0.8 | 0.30 | 0.05 | 0.05 | - | 0.10 | 0.20 | 0.05 | 0.15 | Remainder | - |
|  | 51000A | 5005 | 0.30 | 0.7 | 0.20 | 0.20 | 0.50 to 1.1 | 0.10 | 0.25 | - | 0.05 | 0.15 | Remainder | - |
|  | 51000B | 5050 | 0.40 | 0.7 | 0.20 | 0.10 | 1.1 to 1.8 | 0.10 | 0.25 | - | 0.05 | 0.15 | Remainder | - |
|  | 51300 | - | 0.6 | 0.9 | 0.3 | 0.2 to 0.7 | 0.20 to 0.9 | 0.2 | 0.4 | 0.2 | - | - | Remainder | - |
|  | 51300A | 5010 | 0.4 | 0.7 | 0.25 | 0.10 to 0.30 | 0.20 to 0.60 | 0.15 | 0.30 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 52000 | - | 0.6 | 0.7 | 0.1 | 0.5 | 1.7 to 2.6 | 0.25 | 0.2 | 0.2 | - | - | Remainder | Cr + Mn: 0.5 |
|  | 52000A | 5251 | 0.4 | 0.5 | 0.15 | 0.10 to 0.50 | 1.7 to 2.4 | 0.15 | 0.15 | 0.15 | 0.05 | 0.15 | Remainder | - |
|  | 52300 | - | 0.8 | 0.9 | 0.2 | 0.5 to 1.0 | 1.5 to 2.4 | 0.20 | 0.40 | 0.20 | - | - | Remainder | - |
|  | 52300A | - | 0.6 | 0.4 to 0.7 | 0.2 | 1.1 to 1.15 | 1.3 to 1.7 | 0.2 | 0.4 | 0.2 | - | - | Remainder | - |
|  | 52302 | 5049 | 0.40 | 0.50 | 0.10 | 0.50 to 1.1 | 1.6 to 2.5 | 0.30 | 0.20 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 53000 | - | 0.6 | 0.5 | 0.1 | 0.5 | 2.8 to 4.0 | 0.25 | 0.2 | 0.2 | - | - | Remainder | Cr + Mn: 0.5 |
|  | 53000A | 5754 | 0.4 | 0.40 | 0.10 | 0.50 | 2.6 to 3.6 | 0.30 | 0.20 | 0.15 | 0.05 | 0.15 | Remainder | Cr + Mn: 0.10 to 0.6 |
|  | 53800 | 5052 | 0.25 | 0.40 | 0.10 | 0.10 | 2.2 to 2.8 | 0.15 to 0.35 | 0.10 | - | 0.05 | 0.15 | Remainder | - |
|  | 54000 | 5154A | 0.50 | 0.50 | 0.10 | 0.50 | 3.1 to 3.9 | 0.25 | 0.20 | 0.20 | 0.05 | 0.15 | Remainder | Cr + Mn: 0.10 to 0.50 |
|  | 54300 | - | 0.4 | 0.7 | 0.1 | 0.5 to 1.0 | 4.0 to 4.9 | 0.25 | 0.2 | 0.2 | - | - | Remainder | - |
|  | 54300A | 5083 | 0.40 | 0.40 | 0.10 | 0.40 to 1.0 | 4.0 to 4.9 | 0.05 to 0.25 | 0.25 | 0.15 | 0.05 | 0.15 | Remainder | - |
|  | 54380 | 5086 | 0.40 | 0.50 | 0.10 | 0.20 to 0.7 | 3.5 to 4.5 | 0.05 to 0.25 | 0.25 | 0.15 | 0.05 | 0.15 | Remainder | Zr 0.05 |
|  | 55000 | - | 0.6 | 0.7 | 0.1 | 0.05 | 4.5 to 5.5 | 0.25 | 0.2 | 0.2 | 0.05 | 0.15 | Remainder | Cr + Mn: 0.50 |
|  | 64430 | - | 0.6 to 1.3 | 0.6 | 0.10 | 0.4 to 1.0 | 0.4 to 1.2 | 0.25 | 0.1 | 0.2 | - | - | Remainder | - |
|  | 64430A | 6351 | 0.7 to 1.3 | 0.5 | 0.1 | 0.4 to 0.8 | 0.4 to 0.8 | - | 0.20 | 0.2 | 0.05 | 0.15 | Remainder | - |
|  | 64430B | 6081 | 0.7 to 1.1 | 0.5 | 0.1 | 0.10 to 0.45 | 0.6 to 1.0 | 0.1 | 0.2 | 0.15 | 0.05 | 0.15 | Remainder | - |
|  | 65028 | - | 0.4 to 0.8 | 0.7 | 0.15 to 0.40 | 0.2 | 0.7 to 1.2 | 0.15 to 0.35 | 0.2 | 0.2 | - | - | Remainder | - |
|  | 65028A | 6061 | 0.40 - 0.8 | 0.7 | 0.15 to 0.40 | 0.15 | 0.8 to 1.2 | 0.04 to 0.35 | 0.25 | 0.15 | 0.0 to 5 | 0.15 | Remainder | - |
|  | 65032 | - | 0.4 to 0.8 | 0.7 | 0.15 to 0.40 | 0.2 to 0.8 | 0.7 to 1.2 | 0.15 to 0.35 | 0.20 | 0.2 | - | - | Remainder | - |
|  | 65032A | 6261 | 0.40 to 0.7 | 0.40 | 0.15 to 0.40 | 0.20 to 0.35 | 0.7 to 1.0 | 0.10 | 0.20 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 65430 | 6082 | 0.7 to 1.3 | 0.50 | 0.10 | 0.40 to 1.0 | 0.6 to 1.2 | 0.25 | 0.20 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 71000 | 7072 | - | - | 0.10 | 0.10 | 0.10 | - | 0.8 to 1.3 | - | 0.05 | 0.15 | Remainder | Si + Fe: 0.7 |
|  | 74530 | - | 0.4 | 0.7 | 0.2 | 0.2 to 0.7 | 1.0 to 1.5 | 0.2 | 4.0 to 5.0 | 0.2 | - | - | Remainder | - |
|  | 74538 | 7039 | 0.30 | 0.40 | 0.10 | 0.10 to 0.40 | 2.3 to 3.3 | 0.15 to 0.25 | 3.5 to 4.5 | 0.1 | 0.05 | 0.15 | Remainder | - |
|  | 75530 | 7005 | 0.35 | 0.40 | 0.10 | 0.20 to 0.7 | 1.0 to 1.8 | 0.06 to 0.20 | 4.0 to 5.0 | 0.01 to 0.06 | 0.05 | 0.15 | Remainder | Zr: 0.08 to 0.20 |
|  | 76528 | 7075 | 0.40 | 0.50 | 1.2 to 2.0 | 0.30 | 2.1 to 2.9 | 0.18 to 0.28 | 5.1 to 6.1 | 0.20 | 0.05 | 0.15 | Remainder | - |
|  | 76528A | 7175 | 0.15 | 0.20 | 1.2 to 2.0 | 0.10 | 2.1 to 2.9 | 0.18 to 2.8 | 5.1 to 6.1 | 0.10 | 0.05 | 0.15 | Remainder | - |
|  | 81000 | 8021 | 0.15 | 1.2 to 1.7 | 0.05 | - | - | - | - | - | 0.05 | 0.15 | Remainder | - |
|  | 81000B | 8021B | 0.40 | 1.1 to 1.7 | 0.05 | 0.03 | 0.01 | 0.03 | 0.05 | 0.05 | 0.03 | 0.10 | Remainder | - |
|  | 81400 | 8011 | 0.50 to 0.9 | 0.6 to 1.0 | 0.10 | 0.20 | 0.05 | 0.05 | 0.10 | 0.08 | 0.05 | 0.15 | Remainder | - |
|  | 81472 | 8079 | 0.05 to 0.30 | 0.7 to 1.3 | 0.05 | - | - | - | 0.10 | - | 0.05 | 0.15 | Remainder | - |
|  | 81400A | 8011A | 0.40 to 0.8 | 0.50 to 1.0 | 0.10 | 0.10 | 0.10 | 0.10 | 0.10 | 0.05 | 0.05 | 0.15 | Remainder | - |
|  | 81400B | 8111 | 0.30 to 1.1 | 0.40 to 1.0 | 0.10 | 0.10 | 0.05 | 0.05 | 0.10 | 0.08 | 0.05 | 0.15 | Remainder | - |
|  | 82300 | 8006 | 0.40 | 1.2 to 2.0 | 0.3 | 0.30 to 1.0 | 0.10 | - | 0.10 | - | 0.05 | 0.15 | Remainder | - |
| NOTES   1. Aluminium shall be determined by difference. The aluminium content for unalloyed aluminium (1 series) is the difference between 100.00 percent and the sum of all other metallic elements. 2. ‘Others’ includes the listed elements for which no specific limits are mentioned and also unlisted metallic elements. Identification of unlisted elements shall be as per the mutual agreement between the manufacturer and the purchaser. Others’ does not include modifying or refining elements such as Na, Sr, Sb and P. | | | | | | | | | | | | | | |

**Table 2 Mechanical Properties of Wrought Aluminium and Aluminium Alloy Sheet and Strip**

(*Clause* 8)

| **Sl No.** | **IS Designation** | **ISO Designation** | **Condition** | **0.2 Percent Proof Stress** | **Tensile Strength** | | **Elongation on 50 mm Gauge Length, Percent, for Thickness**  *Min* | | | | | **Bend Test, Radius of Bend** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **MPa** | **MPa** | |
| *Min* | *Min* | *Max* | 0.2 mm to 0.5 mm | 0.5 mm to 0.8 mm | Over 0.8 mm, up to and including 1.3 mm | Over 1.3 mm, up to and including 2.6 mm | Over 2.6 mm, up to and including 6.0 mm |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) | (13) |
|  | 19990 | 1199 | O | - | - | 65 | - | 30 | 35 | 40 | 45 | close |
| H14 or H24 | - | 80 | 100 | - | 7 | 6 | 10 | 12 | 1/2t |
| H18or H28 | - | 100 | - | - | 3 | 4 | 5 | 6 | 1t |
|  | 19850 | 1085 | O | 15 | 55 | 95 | 20 | 25 | 30 | 35 | 35 | close |
| H12 | 55 | 70 | 110 | 3 | 4 | 6 | 8 | 8 | close |
| H14 | 65 | 85 | 120 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 | 75 | 100 | 135 | 1 | 2 | 3 | 4 | 4 | 1.5t |
| H18 | ­- | 120 | ­- | 1 | 2 | 3 | 4 | 4 | - |
|  | 19800 | 1080 | O | 15 | 55 | 95 | 20 | 25 | 30 | 35 | 35 | close |
| H12 or H22 | 55 | 70 | 110 | 3 | 4 | 6 | 8 | 8 | close |
| H14 or H24 | 65 | 85 | 120 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | 75 | 100 | 135 | 1 | 2 | 3 | 4 | 4 | 1.5t |
| H18 | ­- | 120 | ­- | 1 | 2 | 3 | 4 | 4 | ­- |
|  | 19800A | 1080A | O | 15 | 60 | 90 | 26 | 28 | 28 | 28 | 31 | 0.5t |
| H12 | 55 | 80 | 120 | 5 | 6 | 6 | 6 | 7 | 0.5t |
| H14 | 70 | 100 | 140 | 4 | 4 | 4 | 4 | 5 | 1t |
| H16 | 90 | 110 | 150 | 2 | 2 | 2 | 2 | 3 | 1t |
| H18 | 105 | 125 | ­- | 2 | 2 | 2 | 2 | 2 | - |
|  | 19700 | 1070 | O | 15 | 55 | 95 | 20 | 25 | 30 | 35 | 35 | close |
| H12 or H22 | 55 | 70 | 110 | 3 | 4 | 6 | 8 | 8 | close |
| H14 or H24 | 65 | 85 | 120 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | 75 | 100 | 135 | 1 | 2 | 3 | 4 | 4 | 1.5t |
| H18 | ­- | 120 | ­- | 1 | 2 | 3 | 4 | 4 | ­- |
|  | 19700A | 1070A | O | 15 | 60 | 90 | 23 | 25 | 25 | 25 | 29 | 0.5t |
| H12 | 55 | 80 | 120 | 5 | 6 | 6 | 6 | 7 | 0.5t |
| H14 | 70 | 100 | 140 | 4 | 4 | 4 | 4 | 5 | 1t |
| H16 | 90 | 110 | 150 | 2 | 2 | 2 | 2 | 3 | 1t |
| H18 | 105 | 125 | ­- | 2 | 2 | 2 | 2 | 2 | - |
|  | 19600 | 1060 | O | - | - | 95 | - | 25 | 25 | 29 | 32 | close |
| H14 or H24 | - | 95 | 125 | - | 4 | 5 | 6 | 6 | 0.5t |
| H18 or H28 | - | 125 | - | - | 3 | 3 | 4 | 4 | 1t |
|  | 19500 | 1050 | O | 20 | 60 | 100 | 15 | 20 | 20 | 25 | 30 | close |
| H12 or H22 | 65 | 80 | 120 | 3 | 4 | 6 | 8 | 8 | 0.5t |
| H14 or H24 | 75 | 95 | 125 | 2 | 3 | 4 | 5 | 5 | 0.5t |
| H16 or H26 | 85 | 120 | 145 | 1 | 2 | 3 | 4 | 4 | 2t |
| H18 | ­- | 125 | ­- | 1 | 2 | 3 | 4 | 4 | ­- |
|  | 19500A | 1050A | O | 20 | 65 | 95 | 20 | 22 | 22 | 22 | 26 | - |
| H14 | 85 | 105 | 145 | 2 | 3 | 3 | 3 | 4 | - |
| H18 | 120 | 120 | ­140 | 1 | 2 | 2 | 2 | 2 | - |
|  | 19350 | 1235 and 1200 | O | ­25 | 75 | 105 | 17 | 22 | 22 | 30 | 30 | Close |
| H12 or H22 | ­75 | 95 | 125 | 3 | 4 | 6 | 8 | 8 | 0.5 t |
| H14 or H24 | ­95 | 120 | 145 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | ­115 | 135 | 165 | 1 | 2 | 3 | 4 | 4 | 2t |
| H18 | ­130 | 150 | - | 1 | 2 | 3 | 4 | 4 | - |
|  | 19002 | 1100 | O | 25 | 75 | 105 | 17 | 22 | 22 | 30 | 30 | close |
| H12 or H22 | 75 | 95 | 125 | 3 | 4 | 6 | 8 | 8 | close |
| H14 or H24 | 95 | 120 | 145 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | 115 | 135 | 165 | 1 | 2 | 3 | 4 | 4 | 2t |
| H18 | 130 | 150 | ­- | 1 | 2 | 3 | 4 | 4 | - |
|  | 19000 | 1200 | O | ­25 | 75 | 105 | 17 | 22 | 22 | 30 | 30 | close |
| H12 or H22 | ­75 | 95 | 125 | 3 | 4 | 6 | 8 | 8 | close |
| H14 or H24 | ­95 | 120 | 145 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | ­115 | 135 | 160 | 1 | 2 | 3 | 4 | 4 | 2t |
| H18 | ­130 | 150 | ­- | 1 | 2 | 3 | 4 | 4 | - |
|  | 19000A | 1200 | O | 25 | 75 | 105 | 17 | 22 | 22 | 22 | 30 | close |
| H12 or H22 | 75 | 95 | 125 | 3 | 4 | 6 | 8 | 8 | close |
| H14 or H24 | 95 | 120 | 145 | 2 | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | 115 | 135 | 165 | 1 | 2 | 3 | 4 | 4 | 2t |
| H18 | 130 | 150 | ­- | 1 | 2 | 3 | 4 | 4 | close |
|  | 24345 | -- | O | ­- | ­- | 240 | - | 14 | 14 | 14 | 14 | close |
| T4 | 240 | 380 | ­- | - | 13 | 14 | 14 | 14 | 3.0t |
| T6 | 345 | 425 | ­- | - | 6 | 6 | 6 | 6 | 5t |
|  | 24345A | 2014 | O | ­- | ­- | 220 | 16 | 16 | 16 | 16 | 16 | 0.5t |
| T4 | 240 | 395 | ­- | 14 | 14 | 14 | 14 | 14 | 3.0t |
| T6 | 390 | 440 | ­- | 6 | 6 | 6 | 7 | 7 | 5t |
|  | 24345B | 2014A | O | - | - | 220 | 16 | 16 | 16 | 16 | 16 | - |
| T3 or T4 | 240 | 395 | - | 14 | 14 | 14 | 14 | 14 | - |
| T6 | 380 | 440 | - | 6 | 6 | 6 | 7 | 7 | - |
|  | 24530 | 2024 | O | ­- | ­- | 220 | 12 | 12 | 12 | 12 | 12 | close |
| T4 | 275 | 425 | ­- | 12 | 15 | 15 | 15 | 15 | 3t |
| T6 | 345 | 440 | - | 5 | 5 | 5 | 5 | 5 | - |
|  | 26388 | 2219 | O | ­- | ­- | 220 | - | 12 | 12 | 12 | 12 | 4t |
| T6 | 250 | 370 | - | - | 6 | 6 | 7 | 8 | 5t |
|  | 31000 | -- | O | ­- | 90 | 115 | - | 20 | 23 | 24 | 24 | Close |
| H12 or H22 | ­- | 115 | 150 | - | 5 | 6 | 7 | 8 | Close |
| H14 or H24 | ­- | 130 | 180 | - | 3 | 4 | 5 | 5 | 1/2t |
| H16 or H26 | ­- | 150 | 195 | - | 2 | 3 | 4 | 4 | 1t |
| H18 | ­- | 170 | ­- | - | 2 | 2 | 3 | 3 | 3t |
|  | 31000A | 3103 | O | 35 | 90 | 130 | 17 | 19 | 19 | 19 | 21 | - |
| H 14 | 120 | 140 | 180 | 2 | 2 | 2 | 2 | 4 | - |
| H18 | 165 | 185 | ­- | 1 | 2 | 2 | 2 | 2 | - |
|  | 31200 | 3003 | O | 35 | 95 | 135 | 18 | 20 | 22 | 22 | 25 | Close |
| H12 or H22 | 85 | 120 | 155 | 3 | 6 | 7 | 8 | 9 | Close |
| H14 or H24 | 115 | 140 | 180 | 2 | 4 | 4 | 5 | 6 | 0.5t |
| H16 or H26 | 145 | 165 | 205 | 1 | 3 | 3 | 4 | 4 | 2t |
| H18 | 165 | 180 | ­- | 1 | 2 | 2 | 3 | 3 | - |
|  | 31500 | -- | O | ­- | 125 | 165 | - | 16 | 16 | 18 | 20 | Close |
| H12 / H22 | ­- | 150 | 210 | - | 5 | 5 | 6 | 8 | Close |
| H14 / H24 | ­- | 190 | 245 | - | 3 | 4 | 5 | 5 | 1/2t |
| H16 / H26 | ­- | 215 | 275 | - | 2 | 2 | 3 | 4 | 1/2t |
| H18 / H28 | ­- | 245 | ­- | - | 1 | 1 | 1 | 2 | 1t |
|  | 31500A | 3004 | O | 60 | 155 | 195 | 10 | 14 | 16 | 18 | 18 | 0t,0.5t |
| H12 or H22 | 145 | 195 | 245 | 3 | 3 | 4 | 5 | 5 | 1t |
| H14 or H24 | 175 | 225 | 65 | 1 | 3 | 3 | 4 | 4 | 1.5t |
|  | 31500B | -- | O | ­- | 95 | 145 | - | 16 | 16 | 18 | 20 | Close |
| H12 or H22 | ­- | 130 | 180 | - | 5 | 5 | 6 | 8 | 1/2t |
| H14 or H24 | ­- | 150 | 200 | - | 3 | 4 | 5 | 5 | 1t |
| H16 or H26 | ­- | 170 | 220 | - | 2 | 2 | 3 | 4 | 2t |
| H18 | ­- | 190 | ­- | - | 1 | 1 | 1 | 2 | 4t |
|  | 31500C | 3105A | O | 40 | 100 | 155 | 14 | 15 | 15 | 15 | 17 | 0.5t |
| H12 | 105 | 130 | 180 | 3 | 4 | 4 | 4 | 4 | 1.5t |
| H14 | 130 | 150 | 200 | 2 | 2 | 2 | 2 | 2 | 2.5t |
| H16 | 160 | 175 | 225 | 1 | 2 | 2 | 2 | 2 | - |
| H18 | 180 | 195 | ­ | 1 | 1 | 1 | 1 | 1 | - |
|  | 31540 | 3104 | O | 60 | 155 | 195 | 10 | 14 | 16 | 18 | 18 | 0.5t |
| H12 or H22 | 145 | 195 | 245 | 1 | 3 | 4 | 5 | 5 | 1t |
| H14 or H24 | 175 | 225 | 265 | 1 | 3 | 3 | 4 | 4 | 1.5t |
|  | 31542 | 3005 | O | 45 | 120 | 165 | 14 | 16 | 18 | 18 | - | 0t |
| H12 or H22 | 120 | 135 | 185 | 1 | 2 | 2 | 2 | - | 1t |
| H14 or H24 | 145 | 165 | 215 | 1 | 1 | 2 | 2 | - | 2t |
| H16 or H26 | 165 | 195 | 245 | 1 | 1 | 2 | 2 | - | 3t |
| H18 | 205 | 225 | ­- | 1 | 1 | 2 | 2 | - | - |
|  | 40800 | -- | O | ­- | 85 | 120 | 19 | 20 | 23 | 25 | 30 | close |
| H12 or H22 | ­- | 105 | 140 | 4 | 5 | 6 | 7 | 8 | close |
| H14 or H24 | ­- | 125 | 160 | 1/3 | 3 | 4 | 5 | 5 | 1/2t |
| H16 or H26 | ­- | 150 | 180 | 1/2 | 2 | 3 | 4 | 4 | 1t |
| H18 | ­- | 175 | ­- | 1 | 2 | 2 | 3 | 3 | 3t |
|  | 41352 | 4015 | O | 45 | ­- | 150 | 20 | 20 | 20 | 20 | 20 | - |
| H12 | 90 | 120 | 175 | 4 | 4 | 4 | 4 | 4 | - |
| H14 | 120 | 150 | 200 | 2 | 3 | 3 | 3 | 3 | - |
| H16 | 150 | 170 | 220 | 1 | 2 | 2 | 2 | 2 | - |
| H18 | 180 | 200 | 250 | 1 | 1 | 1 | 1 | 1 | - |
|  | 41800 | 4006 | **O** | 40 | 95 | 130 | 17 | 19 | 19 | 19 | 22 | **0t, 1t** |
| H12 | 90 | 120 | 160 | 4 | 4 | 4 | 4 | 5 | 1.5t |
| **H14** | 120 | 140 | 180 | 3 | 3 | 3 | 3 | 3 | **0t, 2t** |
|  | 51000A | 5005 | O | - | 105 | 150 | - | 18 | 18 | 18 | 22 | close |
| H12 | 85 | 120 | 160 | - | 2 | 2 | 2 | 4 | 0.5t |
| H14 | 105 | 140 | 180 | - | 2 | 2 | 2 | 3 | 1.5t |
| H16 | 125 | 160 | 200 | - | 2 | 2 | 3 | 3 | 3t |
| H18 | - | 185 | ­- | - | 2 | 2 | 2 | 2 |  |
|  | 51000B | 5050 | O | 45 | 130 | 170 | 16 | 17 | 17 | 17 | 19 | 0.5t |
| H12 | 130 | 155 | 195 | 2 | 2 | 2 | 2 | 4 | - |
| H14 | 150 | 175 | 215 | 2 | 2 | 2 | 2 | 3 | - |
| H16 | 170 | 195 | 235 | 1 | 2 | 2 | 2 | 2 | - |
| H18 | 190 | 220 | ­- | 1 | 2 | 2 | 2 | 2 | - |
|  | 51300 | - | O | - | 95 | 145 | **-** | 14 | 14 | 15 | 16 | close |
| HX 2 | - | 130 | 180 | **-** | 6 | 6 | 7 | 8 | 1/2t |
| HX 4 | - | 150 | 200 | **-** | 4 | 4 | 5 | 6 | 1t |
| HX 6 | - | 175 | 215 | **-** | 2 | 2 | 3 | 4 | 2t |
| H X8 | - | 195 | - | **-** | 1 | 1 | 1 | 2 | 4t |
|  | 51300 A | - | O | 35 | 90 | 130 | 17 | 19 | 19 | 19 | 21 | 1t |
| H12 | 85 | 110 | 155 | 2 | 3 | 3 | 3 | 4 | 2t |
|  |  |  | H14 | 115 | 140 | 175 | 2 | 2 | 2 | 2 | 3 | 2.5t |
| H16 | 140 | 155 | 195 | 1 | 2 | 2 | 2 | 2 | 2.5t |
| H18 | 160 | 175 | ­ | 1 | 2 | 2 | 2 | 2 | - |
|  | 52000 | - | O | 60 | 175 | 215 | 13 | 16 | 16 | 16 | 18 | Close |
| H x 2 | 125 | 200 | 240 | 3 | 3 | 4 | 5 | 6 | 1/2t |
| H x 4 | 175 | 230 | 275 | 2 | 2 | 2 | 3 | 4 | 1t |
|  | 52000 | - | H x 6 | 190 | 235 | 295 | 1 | 2 | 2 | 3 | - | - |
| H x 8 | 215 | 265 | ­- | 1 | 1 | 2 | 3 | - | - |
|  | 52000A | 5251 | O | 60 | 160 | 200 | 13 | 14 | 14 | 14 | 16 | 0.5t |
| H12 | 150 | 190 | 230 | 3 | 4 | 4 | 4 | 5 | 2t |
| H14 | 170 | 210 | 250 | 2 | 2 | 2 | 2 | 3 | 2.5t |
| H16 | 200 | 230 | 270 | 1 | 2 | 2 | 2 | 3 | 3.5t |
| H18 | 230 | 255 | ­ | 1 | 2 | 2 | 2 | 2 | - |
|  | 52300 | - | O | 75 | 160 | 210 | - | 12 | 14 | 16 | 18 | Close |
| H12 or H22 | 140 | 170 | 220 | - | 4 | 5 | 6 | 7 | 1t |
| H14 or H24 | 180 | 190 | 250 | - | 4 | 4 | 5 | 5 | 2t |
| H16 or H26 | 200 | 225 | 285 | - | 3 | 3 | 4 | ­- | - |
| H18 | 225 | 250 | ­- | - | 2 | 2 | 3 | ­- | - |
|  | 52300A | - | O | ­- | 160 | 210 | - | 12 | 13 | 14 | 14 | Close |
| H12 or H22 | ­- | 190 | 260 | - | 4 | 4 | 5 | 5 | 2t |
| H14 or H24 | ­- | 220 | 280 | - | 3 | 3 | 4 | 4 | 3t |
| H16 or H26 | ­- | 250 | 300 | - | 2 | 2 | 3 | 3 | - |
| H18 | ­- | 270 | ­- | - | 2 | 2 | 3 | 3 | - |
|  | 52302 | 5049 | O | 80 | 190 | 240 | 12 | 14 | 14 | 14 | 16 | 1t |
| H12 | 170 | 220 | 270 | 4 | 5 | 5 | 5 | 6 | - |
| H14 | 190 | 240 | 280 | 3 | 3 | 3 | 3 | 4 | - |
|  |  |  | H16 | 220 | 265 | 305 | 2 | 3 | 3 | 3 | 3 | - |
| H18 | 250 | 290 | ­- | 1 | 2 | 2 | 2 | 2 | - |
|  | 53000 | - | O | 85 | 210 | 270 | - | 12 | 14 | 16 | 18 | Close |
| H 12 | 160 | 240 | 290 | - | 4 | 5 | 6 | 7 | 1t |
| H 14 | 220 | 270 | 320 | - | 3 | 3 | 5 | 5 | 2t |
| H 16 | 225 | 290 | 340 | - | 2 | 2 | 4 | 0 | 0 |
| H 18 | 235 | 310 | 0 | - | 2 | 2 | 3 | 0 | 0 |
|  | 53000A | 5754 | O | 80 | 190 | 240 | 12 | 14 | 14 | 14 | 16 | - |
| H24 or H34 | 160 | 240 | 280 | 6 | 6 | 6 | 6 | 7 | - |
| H38 | 230 | 290 | - | 3 | 3 | 3 | 3 | 4 | - |
|  | 53800 | 5052 | O | 65 | 170 | 215 | 15 | 17 | 17 | 19 | 19 | 1t |
| H12 or H22 | 155 | 215 | 265 | 4 | 5 | 5 | 7 | 7 | 1.5t |
| H14 or H24 | 180 | 235 | 285 | 3 | 4 | 4 | 6 | 6 | 2t |
| H16 or H26 | 205 | 255 | 305 | 3 | 3 | 4 | 4 | 4 | 3t |
| H18 or H28 | 220 | 270 | - | 3 | 3 | 4 | 4 | 4 | - |
|  | 54000 | 5154A | O | 85 | 215 | 275 | 12 | 13 | 13 | 13 | 15 | 1t |
| H12 | 190 | 250 | 305 | 3 | 4 | 4 | 4 | 5 | - |
| H14 | 220 | 270 | 325 | 2 | 3 | 3 | 3 | 3 | - |
| H18 | 270 | 310 | ­- | 1 | 1 | 1 | 1 | 1 | - |
|  | 54300 | - | O | 130 | 265 | 365 | - | 12 | 14 | 16 | 16 | 1t |
| H x 2 | 235 | 315 | 395 | - | 5 | 6 | 7 | 7 | 2t |
| H x 4 | 275 | 355 | ­- | - | 4 | 4 | 5 | 5 | 3t |
|  | 54300A | 5083 | O | 125 | 275 | 350 | - | 16 | 16 | 16 | 16 | 2t |
| H22 or H32 | 215 | 305 | 380 | - | 8 | 8 | 8 | 8 | 5t |
| H34 | 270 | 345 | 405 | - | ­- | ­- | 6 | 6 | - |
|  | 54380 | 5086 | O | 100 | 245 | 305 | - | 15 | 15 | 18 | 18 | 2.5t |
|  |  |  | H22 or H32 | 195 | 275 | 325 | - | 6 | 6 | 8 | 8 | 3t |
| H24 or H34 | 235 | 305 | 355 | - | 4 | 5 | 6 | 6 | 4t |
| H26 or H36 | 265 | 325 | 375 | - | 3 | 4 | 6 | 6 | 5t |
| H18 or H38 | 285 | 345 | ­- | - | 3 | 3 | - | - | - |
|  | 55000 | - | O | 130 | 265 | 365 | - | 12 | 14 | 16 | 16 | close |
| H x 2 | 220 | 310 | 395 | - | 5 | 6 | 7 | 7 | 2t |
|  | 64430 | - | O | ­- | ­- | 175 | - | 14 | 16 | 16 | 17 | Close |
| T4 | 115 | 200 | ­- | - | 12 | 15 | 15 | 15 | 2t |
| T6 | 250 | 295 | ­- | - | 5 | 5 | 5 | 6 | 3t |
|  | 65028 | - | O | ­- | ­- | 175 | - | 14 | 16 | 16 | 18 | Close |
| T4 | 110 | 200 | ­- | - | 12 | 15 | 15 | 15 | 2t |
| T6 | 235 | 280 | ­- | - | 5 | 5 | 5 | 6 | 3t |
|  | 65028A | 6061 | O | ­- | ­- | 145 | - | 16 | 16 | 16 | 16 | 1.5t |
| T4 | 110 | 205 | ­- | - | 16 | 16 | 16 | 16 | 1.5t |
| T6 | 245 | 295 | ­- | - | 10 | 10 | 10 | 10 | 3t |
|  | 65032 | - | O | - | - | 175 | - | 14 | 16 | 16 | 18 | Close |
| T4 | 110 | 200 | 0 | - | 12 | 15 | 15 | 15 | 2t |
| T6 | 235 | 280 | 0 | - | 5 | 5 | 5 | 6 | 3t |
|  | 65430 | 6082 | O | ­- | ­- | 150 | - | 16 | 16 | 16 | 16 | 2.5 t |
| T4 | 110 | 205 | ­- | - | 15 | 15 | 15 | 15 | 2t |
| T6 | 260 | 310 | ­- | - | 10 | 10 | 10 | 10 | 4.5t |
|  | 74530 | - | T4 | 175 | 280 | ­- | - | 8 | 9 | 9 | 10 | 5t |
| T6 | 270 | 315 | ­- | - | 6 | 7 | 7 | 8 | 5t |
|  | 74538 | - | O | 103 | ­227 | - | - | 22 | 22 | 22 | 22 | 1.5t |
| T6 | 330 | 400 | ­- | - | 13 | 13 | 14 | 14 | 6t |
|  | 76528 | 7075 | O | ­- | ­- | 275 | - | 10 | 10 | 11 | 11 | 1.5t |
| T6 | 460 | 525 | ­- | - | 6 | 6 | 7 | 7 | 6t |
|  | 81000 | 8021B | H14 | - | 135 | 185 | 2 | - | - | - | - | - |
|  | 81472 | 8079 | H14 | ­- | 125 | 175 | 2 | - | ­- | ­- | ­- | - |
|  | 81400 | 8011 | O | ­30 | 85 | 130 | - | 20 | 23 | 25 | 30 | close |
| H12 or H22 | ­90 | 105 | 140 | - | 5 | 6 | 7 | 8 | close |
| H14 or H24 | ­110 | 120 | 165 | - | 3 | 4 | 5 | 5 | 1/2t |
| H16 or H26 | ­130 | 150 | 180 | - | 2 | 3 | 4 | 4 | 1t |
| H18 | ­145 | 175 | ­- | - | 2 | 2 | 3 | 3 | 3t |
|  | 81400A | 8011A | O | 30 | 85 | 130 | 19 | 21 | 21 | 21 | 24 | - |
| H14 | 110 | 125 | 165 | 1 | 3 | 3 | 3 | 3 | - |
| H16 | 130 | 140 | 190 | 1 | 2 | 2 | 2 | 3 | - |
| H18 | 145 | 160 | ­ | 1 | 2 | 2 | 2 | 2 | - |
| NOTES  **1** 1 MPa = 1 N/mm2 = 1 MN/m2 = 0.102 kgf/mm2 = 144.4 psi.  **2**  ‘t’ is the thickness of the test piece.  **3** For thickness 2.6 mm and less, elongation values are for guidance only and not guaranteed. For this purpose, bend test as specified in **8.2** may be carried. | | | | | | | | | | | | |

**ANNEX A**

(*Foreword*)

**COMMITTEE COMPOSITION**

Ores and Feedstock for Aluminium Industry, its Metals/Alloys and Products Sectional Committee, MTD 07

|  |  |  |
| --- | --- | --- |
| *Organization* |  | *Representative(s)* |
| CSIR - Institute of Minerals and Materials Technology, Bhubaneswar |  | Dr Kali Sanjay **(*Chairperson*)** |
| Aluminium Association of India, Bengaluru |  | Shri Anil Mathew |
|  | Shri T. Vimal Raj (*Alternat*e) |
| Aluminium Secondary Manufacturers Association, New Delhi |  | Shri Naveen Pant |
|  | Shri Praveen Dixit (*Alternat*e) |
| Bharat Aluminium Company Limited, New Delhi |  | Ms Anjali Pawar |
|  | Shri Jitendra Kumar Verma (*Alternat*e) |
| Century Extrusions Limited, Kolkata |  | Shri V. Jhunjhunwala |
|  | Shri Sanjay Singh Sehrawat (*Alternat*e) |
| Century Metal Recycling Limited, Faridabad |  | Shri Mohan Agarwal |
| CSIR - Advanced Materials and Processes Research Institute, Bhopal |  | Dr D. P. Mondal |
| CSIR - National Metallurgical Laboratory, Jamshedpur |  | Dr Kanai Sahoo |
|  | Dr V. C. Srivastava (*Alternat*e) |
| Defence Metallurgical Research Laboratory, Ministry of Defence, Hyderabad |  | Dr G. Jagan Reddy |
|  | Dr S. N. Sahu (*Alternat*e) |
| Defence Research and Development Laboratory, Ministry of Defence, Hyderabad |  | Dr G. Raja Singh |
|  | Dr N. A. Arun (*Alternat*e) |
| Directorate General Quality Assurance, New Delhi |  | Shri K. Saha |
|  | Shri Ajay Kumar (*Alternat*e) |
| Hindalco Industries Limited, Mumbai |  | Shri Rajan Kumar Sur Chaudhury |
|  | Shri Tushar Panda (*Alternat*e) |
| Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur |  | Dr Anupam Aghinotri |
|  | Shri R. N. Chauhan (*Alternat*e) |
| Jindal Aluminium Limited, Bengaluru |  | Shri O. K. Sharma |
|  | Shri P. Devaraj (*Alternat*e) |
| Material Recycling Association of India (MRAI), Mumbai |  | Shri Dhawal Shah |
|  | Shri Jayant Jain (*Alternat*e) |
| National Aluminium Company Limited, Bhubaneswar |  | Shri Tarun Kant |
|  | Ms Kiran Kandeyang (*Alternat*e) |
| National Test House, Kolkata |  | Dr Nishi Srivastava |
|  | Shri Buddh Prakash (*Alternat*e) |
| Vedanta Limited, Mumbai |  | Shri Vivek Saxena |
|  | Shri Ram Sandipam (*Alternat*e) |
| BIS Directorate General |  | Shri Sanjiv Maini, Scientist ‘F’/Senior Director and Head (Metallurgical Engineering) [Representing Director General (*Ex-officio*)] |

*Member Secretary*

Shri Ashish Prabhakar Wakle

Scientist ‘C’/Deputy Director

(Metallurgical Engineering), BIS

Panel on Wrought Product Panel, Panel 2

|  |  |  |
| --- | --- | --- |
| *Organization* |  | *Representative(s)* |
| Bharat Aluminium Company Limited, Korba |  | Ms Anjali Pawar **(*Convenor*)** |
| Aluminium Association of India, Bengaluru |  | Shri Siddharth Manjrekar |
| Aluminium Secondary Manufacturers Association, New Delhi |  | Shri Anil Agarwal |
| Bharat Aluminium Company limited, Korba |  | Shri Dugeshwar Sahu (*Alternate*) |
| Century Extrusions Limited, Kolkata |  | Shri V. Jhunjhunwala |
|  |
| Defence Research and Development Laboratory, Ministry of Defence, Hyderabad |  | Dr G. Raja Singh |
| Hindalco Industries Limited, Mumbai |  | Shri Ranjan Kumar Sur Chaudhury |
| Jawaharlal Nehru Aluminium Research Development and Design Centre, Nagpur |  | Dr Anupam Agnihotri |
| Jindal Aluminium Limited, Bengaluru |  | Shri P. Devaraj |
| Material Recycling Association of India (MRAI), Mumbai |  | Shri Jayant Jain |
| National Aluminium Company Limited, Bhubaneswar |  | Shri Tarun Kant Tripathy  Ms Kiran Kandeyang (*Alternate*) |
| National Test House, Kolkata |  | Shrimati Anshu Mala Shukla |
|  |  | Shri B. Govindan Nair |
| Shriram Institute for Industrial Research, Delhi |  |
|  |  |