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भारतीय मानक मसौदा

पिटवाँ एल्यूमीनियम एवं उसकी मिश्रधातुएँ — सामान्य इंजीनियरिंग प्रयोजनों के लिए चलने के लिए प्रयुक्त चारखानेदार चद्दरें — विशिष्टि

*(*आई एस 14712 *का पहला पुनरीक्षण)*

Draft Indian Standard

WROUGHT ALUMINIUM AND ITS ALLOYS — CHEQUERED/TREAD SHEETS FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

(*First Revision of* IS 14712)

ICS 77.120.10

Ores and Feed Stock for Aluminium Industry, its Metals/Alloys and Products Sectional Committee, MTD 07	Last date of comments **30 March 2024**

FOREWORD

(Formal clauses of the foreword will be added later.)

This standard was first published in 1999. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards.

In addition, the following modification have been made:

a) Additional 15 grades has been added in the material clause;

b) New variety of single star type 2, also called as north star has been included ;

c) References clauses has been updated;

d) New clause on packaging has been added;

e) Ordering information has been added;

f) Marking clause has been modified.

For the purpose of deciding 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 of value should be the same as that of the specified in this standard.

Draft Indian Standard

WROUGHT ALUMINIUM AND ITS ALLOYS — CHEQUERED/TREAD SHEETS FOR GENERAL ENGINEERING PURPOSES — SPECIFICATION

(*First Revision*)

1 SCOPE

This standard covers the requirement of wrought aluminium alloy chequered/tread sheet having base thickness 0.50 to 5.00 mm.

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 indicated were valid. All standards are subject to revision and parties to agreement based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
IS 737 (under revision)	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes (*under revision*)
IS 1599 : 2019	Method for bend test (*second revision*)
IS 1608 : Part 1:2022	Metallic materials — Tensile testing: Part 1 Method of test at room temperature (*fourth revision*)
IS 1608 : Part 2: 2020	Metallic materials — Tensile testing: Part 2 Method of test at elevated temperature (*fourth revision*)
IS 1608 : Part 3: 2018	Metallic materials — Tensile testing: Part 3 Method of test at low temperature
IS 2676 : 1981	Dimensions for wrought aluminium and aluminium alloy 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
Part 3: 1979	Geometrical properties and tolerance, structural and surface defects
IS 5052 (under revision)	Aluminium and its alloys-temper designations
IS 10259 : 1982	General conditions for delivery and inspection of aluminium and aluminium alloy products

3 TERMINOLOGY

For the purpose of this standard, the definitions of terms given in IS 5047 (Part 1), 5047 (Part 2), and IS 5047 (Part 3) and the following shall also apply.

3.1 Chequered/Tread Sheet — A sheet upon which a raised, non-slip pattern has been impressed on one face by rolling.

3.2 Pattern — An artistic mechanical design in the form of a diamond/single bar/two bars/five bars.

3.3 Base Thickness — Thickness of the sheet that serves as a base for the pattern.

3.4 Pattern Height — Height of the raised pattern above the base sheet Hence pattern height shall be difference between total thickness and base thickness.

4 ORDERING INFORMATION

The ordering information shall include the following information:

a) Type of pattern;
b) Height of pattern;
c) Base thickness;
d) Quantity (MT);
e) Cut length (m); and
f) Packing mode;

5 SUPPLY OF MATERIAL

General requirements relating to the supply of aluminium and aluminium alloy chequered/tread sheet shall conform to IS 10259.

6 PATTERN

Patterns of the chequered/tread sheet may preferably be one of the four types:

a) Diamond;
b) Single bar: type 1, type 2;
c) Two bar; and
d) Five bar

However, if agreed to between the purchaser and the manufacturer other patterns can also be used based on mutual agreement.

7 MATERIAL

The chemical composition of material used for making chequered/tread sheets shall conform to the grade and alloys 19000, 19000A, 19002, 31000, 31000A, 31200, 31500, 31500B, 31500C, 40800, 51300, 52000, 52000A, 52300, 52300B, 64430, 64430A, 65028, 65028A, 65032, 81400 and 81400A as specified in IS 737.

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

8 TENSILE PROPERTIES

8.1 The tensile properties of the chequered/tread sheet shall comply with the requirements given in IS 737. If tensile properties of the grade, temper condition is not mentioned in IS 737, then tensile properties will be based on mutual agreement of purchaser and manufactuerers.

8.1.1 The tensile test shall be carried out and proof stress determined thereby in accordance with IS 1608.

8.1.2 The tensile test piece shall be machined to obtain a flat surface. However, tensile test piece without machining the raised pattern can be used provided the pattern is not continuous along the length of the piece. In the latter case the base thickness shall be used for calculating the cross-sectional area of the tensile test piece. In case of dispute, tensile properties obtained on machined test specimen shall be final.

9 DIMENSIONS AND TOLERANCES

9.1 Base thickness tolerances for chequered/tread sheet shall be as per the thickness of sheet and strip specified in Table 5 of IS 2676.

9.2 Tolerances for pattern height shall be as per Table 1.

9.3 Shearing tolerances on length and width of the chequered/tread sheet shall be as per Table 1 of IS 2676.

9.4 Squareness Tolerances for Chequered/ Tread Sheet

The difference of the two diagonal distances between opposite corner of any sheet shall not exceed total tolerances on the length of the chequered/tread sheet, that is, sum of positive and negative tolerances.

NOTE ― For example for length upto and including 1000 mm , shearing tolerance in Table 1 of IS 2676 is +/- 3 mm, therefore total squareness tolerances will be 6 mm.

9.5 Straightness Tolerance (Curvature of Cut Edges)

The permissible deviation of the cut edges from the straight line must not exceed the values as given in Table 2.

10 FREEDOM FROM DEFECTS

The chequered/tread sheet shall be clean and reasonably free from harmful defects.

11 SELECTION OF SAMPLE

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 sheet or 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.

11.1.3 *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.

11.1.4 Unless otherwise agreed, the test samples shall be tested in the O, T4 or T6 conditions (that is 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.

11.1.5 Material in the 'O' condition, when heat-treated, may have properties of the order of 15 MPa less than the specified properties for the T4 or T6 conditions as appropriate.

11.1.5.1 Unless otherwise agreed, the tests shall be carried out either in T4 or in T6 condition. The test samples shall not be further heat-treated or mechanically worked except for making the test piece before being tested. The test samples may be cut from the margins of the material before cutting it to size.

12 TEST CERTIFICATE AND RETEST

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

13 PACKAGING

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

14 MARKING

Each package of chequered/tread sheet may be suitably marked for identification with the name of the manufacturer, grade, condition of the material and batch number.

a) Name of the manufacturer;
b) Grade of material;
c) Condition of the material;
d) Batch/lot Number.

14.1 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 Pattern Height Tolerances for Various Vase Thickness of Chequered/ Tread Sheet

(All dimensions in millimetres)

(*Clause* 9.2, 9.3 *and* 9.4)

Sl No.	**Base Thickness**	**Pattern Height**		
		Nominal	**Thickness**	
(1)	(2)	(3)	(4) plus	(5) minus
i)	0.5	0.3	+0.1	-0.2
ii)	0.8	0.5	+0.3	-0.3
iii)	1.0	0.5	+0.3	-0.3
iv)	1.5	1	+0.3	-0.5
v)	2.0	1	+0.4	-0.4
vi)	2.5	1	+0.4	-0.4
vii)	3.0	1	+0.5	-0.3
viii)	3.5	1	+0.6	-0.2
ix)	4.0	1	+0.6	-0.2
x)	4.5	1	+0.6	-0.3
xi)	5.0	1	+0.6	-0.3

NOTE — For intermediate base size patterns, height tolerances shall be taken as for the next higher size in the table.

Table 2 Tolerances for Curvature of Cut Edges of Chequered/ Tread Sheet

(All dimensions in millimetres)

(*Clause* 9.5)

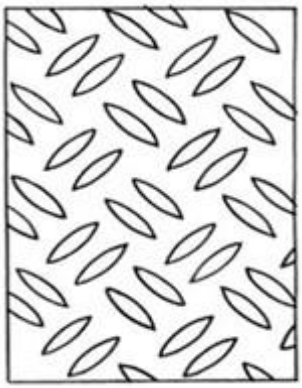
Sl No.	**Allowable Dimension from Straightness of Width and Length**				
(1)	(2)	(3)	(4)	(5)	(6)
i)	Length	Upto 1 000	Over 1 000 Upto 2 000	Over 2 000 Upto 3 000	Over 3 000 Upto 4 000
ii)	Deviation	3	4	5	6

Figure 1 Patterns of the chequered/ tread sheets

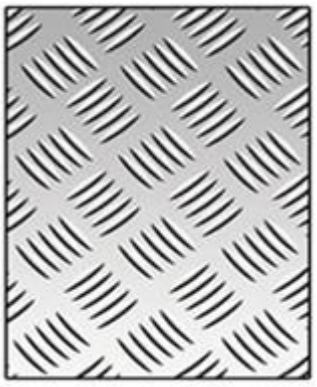
i) Diamond

ii) Single Bar (Type 1)

ii) Single Bar (Type 2)



iii) Two Bar



iv) Five Bar

FIG. 1 PATTERN OF THE CHEQUERED/TREAD SHEETS