Doc: MTD 07 (26124) WC
December 2024

भारतीयमानकब्यूरो

DRAFT FOR WIDE CIRCULATION

भारतीयमानकमसौदा

बर्तन निर्माण के लिए पिटवाँ एल्युमिनियमऔर एल्युमिनियम मिश्रधातुएँ — विशिष्टि

(आईएस 21 का पांचवा पुनरीक्षण)

Draft Indian Standard

Wrought Aluminium and Aluminium Alloy for Manufacture of Utensils — Specification

[*Fifth Revision of IS 21*]

ICS 77.150.10

Ores and Feed Stock for Aluminium Industry, its Metals/Alloys and Products Sectional Committee, MTD 07	Last date of comments **03 January 2025**

FOREWORD

(Formal foreword clauses will be added later)

This standard was first published in 1972 and subsequently revised in 1953, 1959, 1975 and 1992.

In IS 21:1992 version IS 737:2008 version was referred. However IS 737 has recently been revised to include various grades manufactured and used in the country. Therefore the committee felt a need to also revise IS 21 and include additional grades used in manufacture of utensils mentioned in IS 737. Keeping in view the industrial practises followed in the country especially the micro, small scale industries, in the standard Clause **5.3.1** and Clause**5.3.2** are added in line with the requirements mentioned in EN 602.
Comparison of ISO and IS designations used in the standard (for informative purposes) is given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, thefinal 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.

Draft Indian Standard

WROUGHT ALUMINIUM AND ALUMINIUMALLOYS FOR MANUFACTURE OF UTENSILS — SPECIFICATION

(Fifth Revision)

1 SCOPE

1.1 This standard covers the requirements for wrought aluminium and aluminium alloys used for manufacture of utensils.

1.2 The material may be supplied in the form of sheet , strip, plates ,circles, ovals or in other shapes in flat form.

1.3 This standard specifies the grades, maximum contents of alloying elements and impurities in wrought aluminium and aluminium alloys for use in contact with foodstuff applications.

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 the standards indicated below.

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 737: 2024	Wrought aluminium and aluminium alloy sheet and strip for general engineering purposes — Specification(*fifth revision*)
IS 2676: 1981	Dimension for wrought aluminium and aluminium alloy sheet and strip (*first revision*)
IS 2677: 1979	Dimensions for wrought aluminium and aluminium alloys, plates and hot rolled sheets (*first revision*)
IS 10259: 1982	General condition of delivery and inspection of aluminium and aluminium alloy products

3 ORDERING INFORMATION

3.1 The ordering information shall include the following information:

a) Alloy/grade and temper;

b) Deep drawing quality/non deep drawing quality;

c) Quantity, in pieces or kg; and

d) Packing mode.

3.2 Surface Treatments— When subsequent decorative anodising, anti-adhesive coating, enamelling, etc. by the customer is intended, this shall be expressly stated on the order. In all other cases, indication of the customer application is recommended.

4 SUPPLY OF MATERIAL

General requirements relating to the supply of material shall conform to IS 10259.

5 MATERIAL

5.1 Wrought aluminium or aluminium alloys used for the manufacture of utensils shall comply with the requirements of one of the following grades specified in IS 737.

Sl No.	*Grades*
(1)	(2)
i)	19000
ii)	19000A
iii)	19002
iv)	19500
v)	19600
vi)	31000
vii)	31000A
viii)	31200
ix)	31500
x)	31500A
xi)	31500B
xii)	31500C
xiii)	40800
xiv)	51000A
xv)	51000B
xvi)	53800
xvii)	64430
xviii)	64430A
xix)	64430B
xx)	81400 and 81400A

5.2 The chemical composition and mechanical properties of the grades referred in **5.1** shall be as mentioned in IS 737. Mechanical properties for grades, tempers not mentioned in IS 737, shall be agreed to between purchaser and manufacturer.

5.3 Chemical composition not falling under any of the grades mentioned in **5.1** shall adhere to requirements of permissible content of elements as mentioned in **5.3.1** and **5.3.2**.Mechanical

properties for chemical composition mentioned in **5.3.1** and **5.3.2** are subject to agreement between buyer and seller.

5.3.1 *Wrought Aluminium (with Minimum 99 Percent Al Content)*

The content by mass of the elements which are present in wrought aluminium shall not exceed the following limits:

a) Iron + silicon ≤ 1.0 percent;

b) Chromium, magnesium, manganese, nickel, zinc, titanium, tin ≤ 0.10 percent each;

c) Copper ≤ 0.2 percent. Copper is permitted in a proportion greater than 0.10 percent but not more than 0.20 percent and provided that neither the chromium nor manganese content exceeds 0.05 percent;

d) Other elements ≤ 0.05 percent each;

NOTES
1 Aluminium shall be determined by difference. The aluminium content for unalloyed aluminium is the difference between 100.00 percent and the sum of all other metallic elements.
2 'Others' includes 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.

5.3.2 *Wrought Aluminium Alloys*

The content by mass of the elements which are added to from wrought aluminium alloys or which are present as impurities, shall not exceed the maximum values given in Table 1.

Table 1 Aluminium Alloys Maximum Content of Elements

(*Clause* 5.3.2)

Sl No.	**Element**	**Maximum content** *Percent* (by mass)
(1)	(2)	(3)
i)	Silicon	13.5
ii)	Iron	2.0
iii)	Copper	0.6
iv)	Manganese	4.0
v)	Magnesium[1)]	11.0
vi)	Chromium	0.35
vii)	Nickel	3.0
viii)	Zinc	0.25
ix)	Zirconium	0.3
x)	Titanium	0.3
xi)	Other elements[2)]	0.05 each 0.15 in total

NOTES

1 Alloys containing more than 5 percent magnesium shall not be used for the production of pressure resisting parts in pressure cooking applications.

2 For some alloying elements (for example Ag) as mentioned under 'Other elements' the maximum content is limited at 0.05 percent because of insufficient knowledge about behaviour in contact with food. Higher limits may be introduced when more information is available.

3 Aluminium shall be determined by difference. The aluminium content for unalloyed aluminium is the difference between 100.00 percent and the sum of all other metallic elements.

4 'Others' includes 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.

5.4 In addition to chemical composition of Aluminium and Aluminium alloys mentioned in **5.1**, **5.2** and **5.3**; lead, cadmium, arsenic content shall not exceed 0.05 percent each.

5.5 The chemical analysis of the material shall be carried out either in accordance with the methods specified in IS 504 (Part 1 to Part 12) and (Part 13 to Part 16)) or by any other established instrumental/ chemical method. In case of any dispute the method specified in IS 504 shall be used as referee method. However, when the method is not given in IS 504, the referee method shall be as agreed to between the purchaser and the manufacture.

6 INSPECTION AND TESTING

The inspection and testing will be as per IS 10259.

7 DIMENSIONS

7.1 The dimensions and tolerances for the material supplied in sheet, strip or plates shall be as per IS 2676 or IS 2677.

7.2 For circles ovals or any other shape the thickness tolerance shall be as agreed between purchaser and manufacturer.

7.3 Unless otherwise agreed, the diameter of circles and major and minor diameter of ovals of wrought aluminium or aluminium alloys used for the manufacture of utensils shall be within range of 100 mm to 2200 mm and the tolerance for the same shall be as mentioned in Table 2.

7.4 If the product is supplied in other shapes (other than sheet, strips, circles and ovals); dimensions and tolerance may as per agreement between purchaser and manufacturer.

Table 2 Tolerances on Diameter (for Circles) and Major/Minor Diameter (for Ovals)

(*Clause* 7.3)

Specified Thickness (mm)		**Method of Production**	**Diameter Tolerances for Specified Diameter** (mm)		
Over	up to		up to 600	over 600 up to 1000	over 1000 up to 2200
0.7	4.0	Blanking	±0.5	±0.5	-
		Circular Sawing or Shearing	+3,-0	+4,-0	+7,-0
4.0	6.0	Blanking	±0.5	±0.5	-
		Circular Sawing or Shearing	+4,-0	+5,-0	+8,-0
6.0	12.0	Blanking	±0.7	±0.7	-
		Circular Sawing or Shearing	+5,-0	+6,-0	+10,-0

8 EARING TEST (Optional test)

When applications, such as deep drawing and spinning require a limited level of earing, the maximum acceptable levels and method of tests shall be agreed between purchaser and supplier.

9 RETEST

For the purpose of this standard, the retest clause as given in IS 10259 shall apply

10 PACKAGING

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

10.1 The material shall be packed on pallet or box in such a manner so as to facilitate easy handling and transportation.

10.2 The type of packing and gross weight of individual pallet shall be as mutually agreed between the supplier and customer/purchaser.

10.3 Pallet or box should be free from protruded nails/fastener which may damage the product.

10.4 Each package shall contain only one size, alloy or temper of material when packed for despatch unless otherwise agreed upon.

10.5 The circles shall be packed on pallet with interleave paper/polythene or the stacks on pallet to be separated with paper board without any interleaving as specified in the customer order or any other method as agreed between purchaser and supplier.

10.6 The product shall be covered with water resistant material and adequately packed from outside to protect it from possible damage during shipment and storage.

10.7 Pallets and boxes shall be strapped with PET strap. Goods should be securely packed to guard against rough handling,

10.8 Packed pallet must be marked properly and have the proper label indicating the product details, dimension, alloy, lot number, gross weight and net weight.

11 MARKING

11.1 Each package may be suitably marked for identification with the name of manufacturer, grade and temper of the material, batch number and date of manufacture.

11.2 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.

ANNEX A

(Foreword)

COMPARISON OF ISO AND IS DESIGNATIONS (FOR INFORMATION ONLY)

IS Designation	ISO Designation	IS Designation	ISO Designation
19000	—	31500C	3105A
19000A	1200	40800	—
19002	1100	51000A	5005
19500	1050	51000B	5050
19600	1060	64430	—
31000	—	64430A	6351
31000A	3103	64430B	6081
31200	3003	81400	8011
31500	—	81400A	8011A
53800	5052	—	—