भारतीय मानक

IS 211 : 2024

Indian Standard

ऐंटीमनी इंगट — विशिष्टि

(पाँचवां पुनरीक्षण)

Antimony Ingot — Specification

(Fifth Revision)

ICS 77.120.99

भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI - 110002

www.bis.gov.in www.standardsbis.in

April 2024 **Price Group 4**

Ores and Feed Stock for Non-Ferrous (Excluding Aluminium and Copper) Industry, their Metals/ Alloys and Products Sectional Committee, MTD 09

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 Non-Ferrous (Excluding Aluminium and Copper) Industry, their Metals/ Alloys and Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was first published in 1950 and was subsequently revised in 1956, 1966, 1977 and 1992. While reviewing the standard the committee felt to revise this standard keeping in view the latest developments in the requirements of antimony in the form of ingots and also to modify the grades in the standard which have international acceptance and traded on various commodity exchanges. In this current revision following modification have been made:

a) The scope has been modified to cover refined antimony manufactured irrespective of source that is either from primary or secondary sources by any smelting and refining process as per international practices:

b) A separate clause **3** on terminology has been added;

c) Clause **5** has been modified to include basis for order/enquiry;

d) Clause **6** on manufacture has been modified to cover ingots produced from recycled materials;

e) Clause **7** on chemical composition has been modified, the maximum limit of sulphur percent reduced to 0.10 in grade Sn99.50;

f) Clause **8** on freedom from defects has been modified;

g) Clause **9** on mass has been modified, introduced the shape of the ingot;

h) Clause **10** on sampling has been modified to introduce the definition of lot and new method of sampling for chemical analysis; and

i) Clause on BIS Certification Marking has been added.

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

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 off value should be the same as that of the specified value in this standard.

Indian Standard

ANTIMONY INGOT — SPECIFICATION

(Fifth Revision)

1 SCOPE

This standard covers the requirements of refined antimony in the form of ingots.

2 REFERENCES

The standards given below 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 agreements based on this standard are encouraged to investigate the possibility of applying the most recent edition of these standards:

IS No.	*Title*
IS 1047 : 1965	Methods of chemical analysis of antimony (*revised*)
IS 1387 : 1993	General requirements for the supply of metallurgical materials (*second revision*)
IS 1817 : 1961	Methods of sampling non-ferrous metals for chemical analysis

3 TERMINOLOGY

For the purpose of this standards the definitions given in IS 1817 and the following shall apply:

3.1 Ingot — Cast, unwrought product intended for remelting and/or processing.

NOTE — Usually the shape of the ingot is a rectangular trapezoid with a flat bottom or grooves/notches at the bottom and with or without protruding ears/lugs at both ends (*see* IS 1817).

3.2 Melt or Cast — It is the product of one furnace or crucible melt. Sometimes the furnace contents are tapped into two or more ladles where the product of each ladle may be called a separate cast.

NOTE — All the ingots from the same cast have the same identifying mark.

4 GRADES

This standard covers three grades of refined antimony ingots, designated as follows, in accordance with their minimum antimony content:

a) Sb99;

b) Sb99.50; and

c) Sb99.80.

5 SUPPLY OF MATERIAL

5.1 General requirements relating to supply of refined antimony ingots shall conform to IS 1387.

5.2 Information to be Given by the Purchaser

5.2.1 *Basis for Order/Enquiry*

While placing an order/enquiry for the purchase of material covered by this specification, the purchaser should specify the following information in enquiry and/or order, to assist the supplier in providing the correct material:

a) The number of this Indian Standard;

b) The designation of the antimony grade required, for example, Sb99.50, (*see* Table 1);

c) Chemical composition of each grade (*see* **7**, Table 1 and its accompanying notes);

d) Quantity of product required (metric tonnes or kilograms);

e) Whether a specific ingot shape and mass is required (*see* **9**);

f) Whether a certificate of analysis or statement of conformity is required; and

g) Any other special requirements.

6 MANUFACTURE

The grades of refined antimony ingot shall be produced by any smelting and refining process from ore or recycled materials to meet the chemical requirements of this specification.

7 CHEMICAL COMPOSITION

7.1 The chemical composition of the refined antimony ingots shall conform to the requirements as prescribed in Table 1.

7.2 The chemical composition shall be determined either by the methods specified in IS 1047 or any other established instrumental/chemical method. In case of dispute, the procedure specified in IS 1047 shall be the referee method.

NOTE — If it is necessary to determine the content of other impurity elements other than those specified in Table 1, the method of determination shall be as agreed between the purchaser and the supplier.

8 FREEDOM FROM DEFECTS

8.1 The surface of the each ingot shall be clean, free from slag and dross, and reasonably free of foreign adhering material.

8.2 Unless otherwise agreed between the purchaser and the supplier, the appearance quality/surface condition of ingots shall be determined visually.

9 SHAPE AND MASS

9.1 Unless otherwise agreed between the purchaser and the supplier, the mass of each ingot shall not exceed 25 kg.

9.2 The shape of the ingots shall be at the discretion of the supplier, unless a specific shape of the ingots is agreed between the purchaser and the supplier and is stated in the enquiry and/or order.

10 SAMPLING

10.1 Lot

In any consignment, all the tin ingots of the same type, and grade produced from the same cast/melt under uniform conditions of manufacture and offered for inspection at one time. A lot may consist of whole or a part of the quantity ordered for.

10.2 Method of Sampling for Chemical Analysis

10.2.1 *Sampling*

Unless otherwise agreed between the purchaser and the supplier, ten ingots shall constitute a representative sample of any consignment lot up to 20 000 kg or fraction thereof. When the lot exceeds 20 000 kg, one additional/incremental ingot for every 2 000 kg or fraction thereof, shall be added. In case the lot consists of ten or less number of ingots, each ingot shall be sampled in accordance with **10.2.2** to provide a sufficient sample for chemical analysis.

10.2.2 *Sample Preparation*

Samples for chemical analysis shall be prepared from ingots selected as per **10.2.1** in accordance with IS 1817.

11 RETEST

If the sample prepared as per **10.2.2** and tested for chemical composition as per **7.2** fails to meet the requirements specified under **7.1**, two more tests shall be conducted on the same sample in order to confirm that the analysis has been done properly. If both the test results satisfy the relevant requirements, the lot shall be accepted. Should either of the retest fail, the lot represented shall be deemed as not complying with this standard.

12 INSPECTION

12.1 All inspection and testing of antimony ingots covered in this standard shall be carried out by the manufacturer, unless otherwise agreed to between the purchaser and the supplier. The inspection requirements shall be stated in the enquiry and order.

12.2 The purchaser shall notify the supplier while placing the order, if it is his intention to inspect the material at the supplier's end. The supplier shall offer the purchaser all the necessary facilities for testing of antimony ingots in accordance with this standard. For this purpose, the purchaser or his representative may, by prior arrangement, attend to inspect the antimony ingots, to select and identify the test samples for testing and to witness the testing.

13 MARKING

13.1 Each ingot shall be legibly marked with the following:

a) Cast/lot number;
b) Grade of antimony ingots; and
c) Indication of the source of manufacture.

13.2 BIS Certification Marking

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

14 TEST CERTIFICATE

When specified in the purchase order or contract, the supplier shall provide test certificate for each consignment giving information like cast/lot number and corresponding chemical composition, net weight and weight of each ingot, date of manufacture, etc.

Table 1 Chemical Composition of Antimony Ingots

(*Clauses* 5.2.1, 7.1 *and* 7.2)

Sl No.	Grade Designation	Limit of Elements in Percent (*m/m*)									
		Sb, *Min*	As, *Max*	S, *Max*	Pb, *Max*	Fe, *Max*	Cu, *Max*	Sn, *Max*	Ag, *Max*	Ni, *Max*	Total of All Impurities, *Max*
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
i)	Sb99	99.00	0.30	0.25	0.50	0.20	0.10	0.10	0.10	0.10	1.00
ii)	Sn99.50	99.50	0.10	0.10	0.20	0.10	0.10	0.10	0.10	0.10	0.50
iii)	Sb99.80	99.80	0.05	0.10	0.15	0.05	0.05	0.05	0.05	0.05	0.20

NOTES

1 The possible presence of other unnamed/incidental elements is not precluded. However, analysis shall regularly be made only for the impurities listed in the table. The major element (Sb) shall be determined by difference between the sum of total elements analysed and 100 percent. By agreement between the purchaser and the manufacturer, analysis may be required and limits established for elements not specified in Table 1.

2 For some applications, the purchaser may require individual elements to be specified at the lower levels than the maxima given in this Table 1 and the same shall be stated in the order and/or enquiry by the purchaser.

ANNEX A

(*Foreword*)

COMMITTEE COMPOSITION

Ores and Feed Stock for Non-Ferrous (Excluding Aluminium and Copper) Industry, their Metals/ Alloys and Products Sectional Committee, MTD 09

Organization	*Representative(s)*
CSIR - National Metallurgical Laboratory, Jamshedpur	DR ABHILASH **(*Chairperson*)**
Arya Alloys Private Limited, New Delhi	SHRI AMRENDRA K. JHA
Bhabha Atomic Research Centre, Mumbai	DR DHRUVA KUMAR SINGH DR BHASKAR PAUL (*Alternate*)
BT Solders Private Limited, Bengaluru	SHRI ANANT TOSHNIWAL SHRI S. RAMESH (*Alternate*)
CSIR - Central Electrochemical Research Institute, Karaikudi	DR C. NAVEEN KUMAR DR M. JAYA KUMAR (*Alternate* I) DR N. RAJASEKARAN (*Alternate* II)
CSIR - National Metallurgical Laboratory, Jamshedpur	DR PRATIMA MESHRAM
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Indian Rare Earths Limited, Mumbai	SHRI D. SINGH DR B. R. MISHRA (*Alternate*)
IZA India (International Zinc Association), New Delhi	DR RAHUL SHARMA SHRI KENNETH DE SOUZA (*Alternate*)
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Mishra Dhatu Nigam Limited, Hyderabad	SHRI GURURAJA U. V. SHRIMATI ASHMITA PATRA BANERJEE (*Alternate*)

Organization	*Representative(s)*
MSME Testing Center, New Delhi	SHRI D. D. GAJBHIYE SHRI G. PRASAD (*Alternate*)
National Mineral Development Corporation, Hyderabad	SHRI G. VENKATESWARA RAO
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The Tinplate Company of India Limited, Jamshedpur	DR SOURAJYOTI DEY SHRI SUBRATA SADHU (*Alternate*)
BIS Directorate General	SHRI SANJIV MAINI, SCIENTIST 'F'/SENIOR DIRECTOR AND HEAD (METALLURGICAL ENGINEERING) [REPRESENTING DIRECTOR GENERAL (*Ex-officio*)]

Member Secretary
SHRI SAAQIB RAAHI
SCIENTIST 'B'/ASSISTANT DIRECTOR
(METALLURGICAL ENGINEERING), BIS

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BUREAU OF INDIAN STANDARDS

Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002
Telephones: 2323 0131, 2323 3375, 2323 9402 *Website*: www.bis.gov.in

Regional Offices:		*Telephones*
Central	: 601/A, Konnectus Tower -1, 6th Floor, DMRC Building, Bhavbhuti Marg, New Delhi 110002	2323 7617
Eastern	: 8th Floor, Plot No 7/7 & 7/8, CP Block, Sector V, Salt Lake, Kolkata, West Bengal 700091	2367 0012 2320 9474
Northern	: Plot No. 4-A, Sector 27-B, Madhya Marg, Chandigarh 160019	265 9930
Southern	: C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113	2254 1442 2254 1216
Western	: Manakalya, 4th Floor, NTH Complex (W Sector), F-10, MIDC, Andheri (East), Mumbai 400093	283 25838

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