

भारतीय मानक

(Reaffirmed 1999)

टिन पाउडर — विशिष्ट
(पहला पुनरीक्षण)

Indian Standard

TIN POWDER — SPECIFICATION
(*First Revision*)

UDC 669.6 — 492.2

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FOREWORD

This Indian Standard (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Powder Metallurgical Materials and Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

This standard was published in 1977. In view of the experience gained during the subsequent years it was decided to revise this standard. In this revision following modifications have been made:

- a) A new clause giving latest references has been incorporated;
- b) Four grades based on particle size have been reduced to three grades;
- c) The requirements of chemical composition have been modified; and
- d) Requirements of packing, marking and test certificate have been added.

This standard contains clauses **6.2**, **8.2** and **10** which call for agreement between the purchaser and the manufacturer.

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 : 1960 'Rules for rounding off numerical values (*revised*)'. 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

TIN POWDER — SPECIFICATION

(First Revision)

1 SCOPE

This standard covers the requirements for granular tin powders for powder metallurgical applications.

2 REFERENCES

The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 TERMINOLOGY

For the purpose of this standard, definitions as given in IS 5432 : 1982 shall apply.

4 SUPPLY OF MATERIAL

General requirements relating to the supply of tin powder shall be laid down in IS 1387 : 1967.

5 MANUFACTURE

Tin powder may be manufactured from ingots conforming to IS 26 : 1992.

6 GRADES

6.1 There shall be three grades and maximum particle size for each grade when determined in accordance with IS 5461 : 1984 shall be as follows:

Grade A	180 microns
Grade B	125 microns
Grade C	90 microns

6.2 The requirements of particle size other than specified above shall be subject to mutual agreement between the purchaser and the manufacturer.

7 CHEMICAL COMPOSITION

7.1 The chemical composition of the tin powder shall be as given in Table 1.

7.2 The chemical analysis of tin powder shall be carried out by the methods specified in IS 1940 : 1969 or any other established instrumental/chemical method. However, in case of dispute the test method specified in IS 1940 : 1969 shall be the referee method.

7.3 Hydrogen loss shall be determined in accordance with IS 5644 (Part 2) : 1993.

Table 1 Chemical Composition of Tin Powder
(Clause 7.1)

Constituent	Percent
Tin, <i>Min</i>	99.00
Lead, <i>Max</i>	0.10
Antimony, <i>Max</i>	0.04
Copper, <i>Max</i>	0.05
Bismuth, <i>Max</i>	0.04
Iron, <i>Max</i>	0.02
Arsenic, <i>Max</i>	0.04
Other impurities, <i>Max</i>	0.05
Hydrogen Loss, <i>Max</i>	0.60

8 PHYSICAL PROPERTIES

8.1 Apparent Density

8.1.1 The apparent density for all the grades of powder shall be at least 2.7 g/cm³ but not more than 4.2 g/cm³.

8.1.2 The apparent density shall be determined in accordance with IS 4848 : 1981 or IS 10441 : 1991.

8.2 Flow Rate

8.2.1 The flow rate shall be as agreed to between the purchaser and the manufacturer.

8.2.2 The flow rate shall be determined in accordance with IS 4840 : 1984.

9 SAMPLING

The sampling of powder for conducting various tests shall be done in accordance with IS 6492 : 1972.

10 PACKING

The powder shall be packed in suitable containers in quantity mutually agreed to between the purchaser and the manufacturer.

11 MARKING

11.1 Each container of tin powder shall be marked with the following information:

- a) Name and grade of powder,
- b) Batch number and/or date of manufacture,

c) Net mass of powder in the container, and

d) Indication of the source of manufacture.

11.2 Standard Mark

Each container of tin powder may also be marked with the Standard Mark.

12 TEST CERTIFICATE

If required, a test certificate may be supplied with each consignment of tin powder indicating details of batch number, grade, chemical composition and physical properties.

ANNEX A

(Clause 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
26 : 1992	Tin ingot (<i>fourth revision</i>)	5461 : 1984	Methods for sieve analysis of metal powders (<i>first revision</i>)
1387 : 1967	General requirements for the supply of metallurgical materials (<i>first revision</i>)	5644 (Part 2) : 1993	Metallic powders — Determination of oxygen content by reduction methods : Part 2 Loss of mass on hydrogen reduction (hydrogen loss)
1940 : 1969	Methods of chemical analysis of tin ingot (<i>first revision</i>)	6492 : 1972	Methods for sampling of powders for powder metallurgical purposes
4840 : 1984	Method for determination of flow rate of metal powders for powder metallurgical purpose (<i>first revision</i>)	7438 : 1985	Methods of tests for acid insoluble content in iron, copper, tin and bronze powders (<i>second revision</i>)
4848 : 1981	Method for determination of apparent density of free flowing powders for powder metallurgical purposes (<i>first revision</i>)	10441 : 1991	Metallic powders — Determination of apparent density — Oscillating funnel method (<i>first revision</i>)
5432 : 1982	Glossary of terms relating to powder metallurgy (<i>first revision</i>)		

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The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The Standard Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well defined system of inspection, testing and quality control which is devised and supervised by BIS and operated by the producer. Standard marked products are also continuously checked by BIS for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Review of Indian Standards

Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'. Comments on this Indian Standard may be sent to BIS giving the following reference:

Doc : No. MTD 25 (3016)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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**AMENDMENT NO. 1 MAY 2009
TO
IS 8367 : 1993 TIN POWDER — SPECIFICATION**

(First Revision)

(Page 1, clause 3) — Substitute 'IS 1387 : 1993' for 'IS 1387 : 1967'.

(Page 1, clause 6.1, tabular matter) — Add 'Grade D 75 microns' at the end.

(Page 1, clause 7.3) — Substitute 'IS 5644 (Part 2) : 2005/ISO 4491-2 : 1997' for 'IS 5644 (Part 2) : 1993'.

(Page 1, clause 8.1.2) — Delete 'or IS 10441 : 1991'.

(Page 2, clause 11.2) — Substitute the following for the existing:

'11.2 BIS Certification Marking

Each container may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act, 1986* and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers, may be obtained from the Bureau of Indian Standards.'

(Page 2, Annex A):

- a) Substitute 'IS 1387 : 1993' for 'IS 1387 : 1967' and '(second revision)' for '(first revision)'.
- b) Substitute 'IS 5644 (Part 2) : 2005/ISO 4491-2 : 1997' for 'IS 5644 (Part 2) : 1993' and add '(fourth revision)' at the end of the title.
- c) Substitute 'first revision' for 'second revision' in the title of 'IS 7438 : 1985'.
- d) Delete 'IS 10441 : 1991 Metallic powders — Determination of apparent density — Oscillating funnel method (first revision)'.

(MTD 25)