

INTERNATIONAL STANDARD

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Zinc ingots

Zinc en lingots



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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 752 was prepared by Technical Committee ISO/TC 18, *Zinc and zinc alloys*, Subcommittee SC 3, *Primary zinc*.

This second edition cancels and replaces the first edition (ISO 752:1981), which has been technically revised.

Zinc ingots

1 Scope

This International Standard contains five grades of zinc recognized in worldwide commerce. It specifies the classifications, chemical compositions, markings and other requirements for primary zinc. It includes a table of related grades of zinc which are recognized in other International Standards.

This International Standard is applicable to primary zinc only and does not include requirements for secondary zinc produced by re-melting.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 20081:—¹⁾, *Zinc and zinc alloys — Method of sampling — Specifications*

AS 1242, *Zinc Ingots* (Australian Standard)

ASTM B6, *Standard Specification for Zinc* (American Society for Testing and Materials)

EN 1179, *Zinc and zinc alloys — Primary zinc* (European Standard)

JIS H 2107, *Zinc metal* (Japanese Industrial Standard)

KS D 2351, *Zinc metal* (Korean National Standards)

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

ingot

cast product intended for re-melting

3.2

primary zinc

zinc obtained from the ore or other zinc-bearing material, by a process of distillation or by chemical or electrolytic reduction

NOTE Primary zinc is normally supplied in ingot form, but may also be available in liquid form.

1) To be published.

3.3
cast

3.3.1
cast, for non-continuous casting

heat
product of one furnace or crucible melt

3.3.2
cast, for continuous casting
identified volume of liquid metal

3.4
batch
lot
number of ingots taken from a single cast

3.5
block
large ingot with end notches suitable for handling by overhead hoist

NOTE Normally a block weighs approximately one metric tonne.

3.6
bundle
collection of ingots taken from a single cast and secured, for example by banding, for the purposes of handling, shipment and storage

3.7
jumbo
strip jumbo
large ingot suitable for handling by mechanical equipment with holes for lifting with a chain

NOTE Normally a jumbo weighs approximately one metric tonne.

3.8
slab
small ingot suitable for manual handling normally ranging from 18 kg to 30 kg

4 Manufacture

Zinc ingots shall be manufactured by casting from liquid primary zinc.

5 Ordering information

The following information shall be supplied by the purchaser in the inquiry and/or order, to assist the supplier in providing the correct material:

- a) the number of this International Standard and the year of issue (i.e. ISO 752:2004);
- b) the grade classification of the primary zinc required (see Table 1);
- c) the total mass required;
- d) for ingots, their individual nominal mass;
- e) whether a specific ingot shape is required;
- f) whether a certificate of analysis or a declaration of conformity is required (see Clause 10).

6 Requirements

6.1 Chemical composition

The primary zinc shall comply with the chemical composition given for the appropriate grade in Table 1. In expressing the results for analysis, the values obtained shall be rounded (see 8.2) to the same number of decimals as that used to express the limits specified in Table 1.

Table 1 — Chemical composition of primary zinc

Designation	Pb	Fe	Cd	Al	Cu	Sn	Permitted Total	Minimum zinc content	Colour code
ZN-1	0,003	0,002	0,003	0,001	0,001	0,001	0,005	99,995	White
ZN-2	0,003	0,003	0,003	0,002	0,002	0,001	0,010	99,990	Yellow
ZN-3	0,03	0,02	0,01	0,01	0,002	0,001	0,05	99,95	Green
ZN-4	0,45	0,05	0,01	—	—	—	0,5	99,5	Blue
ZN-5 ^{a, b}	1,4	0,05	0,01	—	—	—	1,5	98,5	Black
NOTE 1 All composition values are expressed in percentages (mass fraction). They are maximum values unless indicated otherwise.									
NOTE 2 The specified elements are analysed and the zinc minimum is calculated by the difference between the sum of the specified elements listed and 100 %.									
^a Lead minimum for ZN-5 is 0,5 %.									
^b The cadmium level in ZN-5 may be 0,20 % maximum unless prohibited.									

7 Sampling

In cases of dispute, the method for the sampling of primary zinc for verification of its conformity to the chemical composition requirements of this International Standard shall be that described in ISO 20081.

8 Chemical analysis

8.1 Analysis methods

The chemical compositions listed in this International Standard shall be determined by methods of analysis specific for zinc and zinc alloys; for this purpose, procedures existing within appropriate ISO International Standards, together with AS 1242, ASTM B6, EN 1179, JIS H 2107 and KS D 2351 standards apply, the selection of standards being bound to the following rules:

- the scope of the method of analysis shall fit into the chemical compositions scope of the product;
- analysis of solid samples by optical emission spectrometry is recommended only for production control purposes and end-product certification;
- in the case of commercial dispute, wet chemical reference methods shall be used;
- in the case of commercial dispute, procedures existing within appropriate ISO Standards (if available) shall be used primarily, the AS, ASTM, EN, KS and JIS standards cited above secondarily, in the latter case with priority given to the method selected by the customer.

8.2 Rounding procedure

In expressing the results of the analyses, the values obtained shall be rounded to the same number of figures used to express the specified limit in Table 1. The following rules shall be used for rounding:

- a) if the digit immediately after the last digit to be retained is less than five, the last digit to be retained shall be kept unchanged;
- b) if the digit immediately after the last digit to be retained is greater than five, the last digit to be retained shall be increased by one;
- c) if the digit immediately after the last digit to be retained is equal to five, and there are no digits beyond the five, or only zeros, round the digit in the last place to be retained to the nearest even number.

9 Marking and labelling

All ingots or bundles of ingots shall be marked, or labelled, with the following minimum information, unless specifically agreed otherwise by the producer and user:

- a) the producer's mark;
- b) the zinc grade (by grade classification or by colour code — see Table 1);
- c) the batch or cast reference; and
- d) the mass of the ingot or bundle.

10 Inspection documents

If requested by the purchaser at the time of ordering, the supplier shall furnish inspection documents with each consignment. The documentation shall be as chosen by the purchaser [see 5 f)] and shall be in accordance with either a) or b) as follows:

- a) a certificate of analysis, giving the results obtained on the specific cast in the consignment;
- b) a declaration of conformity of the consignment with the order requirements. This declaration shall include the following information:
 - 1) the name and address of the supplier;
 - 2) the date of declaration of conformity;
 - 3) the name and address of the purchaser;
 - 4) the purchaser's order number;
 - 5) a description of the goods and the quantity supplied;
 - 6) the identification of this International Standard and the grade classification supplied;
 - 7) the following declaration:

"The goods detailed hereon have been manufactured to conform to the requirements of the purchaser's order and specification detailed thereon."

Signed:

(Supplier's authorized representative)

11 Related grades

The zinc grades of the present International Standard that are recognized in EN 1179, ASTM B6, JIS H 2107, KS D 2351 the Unified Numbering System (UNS), and AS 1242 are enumerated in Table 2.

Table 2 — Related grades

ISO 752	UNS	EN 1179	ASTM B6	JIS KS	H 2107 D 2351	AS 1242
ZN-1	Z12002	Z1 99,995		Highest Pure Zinc Metal	99,995	
ZN-2	Z13001	Z2 99,99	Special High Grade 99,990	Special Zinc Metal	99,99	Special High Grade 99,99
ZN-3	Z14002	Z3 99,95	High Grade 99,90	Ordinary Zinc Metal	99,97	High Grade 99,95
ZN-4	Z16003	Z4 99,5		Distilled Zinc Metal, Special	99,6	
ZN-5	Z18004	Z5 98,5	Prime Western 98,0	Distilled Zinc Metal, Class 1 Distilled Zinc Metal, Class 2	98,5 98,0	Prime Western 98,5

