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Magnesium and magnesium alloys — Unalloyed magnesium — Chemical composition

Magnésium et alliages de magnésium — Magnésium non allié — Composition chimique

ICS: 77.120.20

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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.

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ISO 8287 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 5, *Magnesium and alloys of cast or wrought magnesium*.

This fourth edition cancels and replaces the third edition (ISO 8287:2011), which has been technically revised. The main changes compared with the third edition are as follows: a) in Introduction and [Clause 2](#), EN 12421:1998 has been replaced by EN 12421:2017; b) Four new grades of cast unalloyed magnesium have been added in Table 1, namely ISO Mg99,95C, ISO Mg99,995A, ISO Mg99,995B and ISO Mg99,995C.

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Introduction

This International Standard classifies commercially available cast unalloyed magnesium into a number of grades suitable for the applications for which they might be used. The grades listed in this International Standard are identical to those in EN 12421:2017.

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Magnesium and magnesium alloys — Unalloyed magnesium — Chemical composition

1 Scope

This International Standard specifies the chemical composition of cast unalloyed magnesium. It specifies classification, designation, testing rules, marking, packing, transportation, storage, and information contained in the contract.

This International Standard is for cast unalloyed magnesium produced by the silicon-thermo process or molten salt electrolysis process.

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 80000-1:2009, *Quantities and units — Part 1: General*

EN 12421:2017, *Magnesium and magnesium alloys — Unalloyed magnesium*

3 Terms and definitions

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

3.1

unalloyed magnesium

magnesium with a minimum purity of 99,0 % by mass.

3.2

cast unalloyed magnesium

unalloyed magnesium cast in a variety of shapes.

4 Information to be supplied by the purchaser

The enquiry and order shall define the product required and shall contain the following information:

- a) material designation;
- b) product shape;
- c) quantity (for example number, mass, etc.);
- d) any requirements for declarations of conformity;
- e) any additional requirements agreed between the manufacturer and the purchaser.

5 Designation

The material shall be designated by the appropriate symbols given in Table 1.

Chemical composition of cast unalloyed magnesium

Material designation		Chemical composition / % by mass												
In accordance with ISO system	In accordance with EN 12421	Al	Mn	Si	Fe	Cu	Ni	Pb	Sn	Na	Ca	Zn	Other-s ^a (each)	Mg ^b
		no more than, ≤												
ISO Mg99,5	EN-MB99,5	0,1	0,1	0,1	0,1	0,1	0,1	-	-	0,01	0,01	-	0,05	99,5
ISO Mg99,80A	EN-MB99,80-A	0,05	0,05	0,05	0,05	0,02	0,001	0,02	0,01	0,003	0,003	0,05	0,05	99,80
ISO Mg99,80B	EN-MB99,80-B	0,05	0,05	0,05	0,05	0,02	0,002	0,02	0,01	-	-	0,05	0,05	99,80
ISO Mg99,80C	EN-MB99,80-C	0,05	0,1	0,02	0,004	0,005	0,001	-	-	-	-	-	0,01	99,80
ISO Mg99,90	EN-MB99,90	0,02	0,03	0,03	0,04	0,004	0,001	-	-	-	-	-	0,01	99,90
ISO Mg99,95A	EN-MB99,95-A	0,01	0,006	0,006	0,003	0,005	0,001	0,005	0,005	0,003	0,003	0,005	0,005	99,95
ISO Mg99,95B	EN-MB99,95-B	0,015	0,015	0,015	0,005	0,005	0,001	0,005	0,005	-	-	0,01	0,005	99,95
ISO Mg99,95C	-	0,005	0,006	0,005	0,03	0,002	0,001	0,005	0,005	-	-	0,005	0,005	99,95
ISO Mg99,98	EN-MB99,98	0,004	0,002	0,003	0,002	0,0005	0,0005	0,001	0,004	-	-	0,004	0,005	99,98
ISO Mg99,99	EN-MB99,99	0,002	0,002	0,003	0,002	0,0003	0,0003	0,002	0,002	0,001	0,001	0,003	0,003	99,99
ISO Mg99,995A	-	0,0005	0,0005	0,001	0,001	0,0003	0,0002	0,001	0,0005	-	-	0,002	0,002	99,995
ISO Mg99,995B	-	0,0005	0,001	0,001	0,001	0,0003	0,0002	-	-	0,001	0,002	0,002	0,002	99,995
ISO Mg99,995C	-	0,001	0,001	0,001	0,001	0,0003	0,0002	-	-	-	-	0,002	0,002	99,995

a The sum of the mass percents of Cd, Hg, As and Cr should be less than 0,01 %. For products used in the food and medicine fields, these four elements must be inspected.

b By difference

6 Manufacture

The manufacturing process shall be left to the discretion of the manufacturer unless otherwise agreed at the time of ordering.

NOTE The manufacturing process covers all operations up to the delivery of the product.

7 Chemical composition

The chemical composition of cast unalloyed magnesium shall conform to the requirements for the appropriate material given in Table 1.

Unless otherwise specified in the enquiry and order, the chemical composition of the cast unalloyed magnesium shall relate to that of samples taken from the melt at the time of pouring.

8 General condition of the product

The product shall have a clean surface in accordance with the agreement between the manufacturer and the purchaser, and shall be free from visible and internal defects to a level also agreed between the manufacturer and the purchaser.

9 Testing conditions

9.1 Inspection and acceptance

9.1.1 The product quality certificate should be filled in by the supplier.

9.1.2 The purchaser should retest the products received. If the results of the retest do not conform to this International Standard or the purchase order, the purchaser should inform the supplier within 3 months from the date the products were received, and a solution should be reached between the supplier and the purchaser.

9.2 Batches

Pure magnesium should be submitted to testing in batches; each consignment should be from the same issue of the melting furnace products. No limits exist on the weight of each single consignment.

10 Testing

Analysis to ensure conformity with the chemical composition requirements given in Table 1 shall be carried out on samples taken by the manufacturer and representative of the material delivered. Test method of analysis shall be subject to an agreement between the manufacturer and the purchaser.

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11 Rounding of results

In recording the results of the chemical analysis, the result obtained for any property specified in this International Standard shall be expressed to the same number of decimal places as the corresponding value in this International Standard. Rounding shall be carried out as specified in ISO 80000-1:2009, Annex B, Clauses B.2 and B.3. In Clause B.3, it is left to the discretion of the manufacturer as to whether to use Rule A or B, unless the use of one of the rules has been agreed at the time of acceptance of the order.

12 Declaration of conformity and inspection documents

If agreed between the manufacturer and the purchaser or when specified on the order, the manufacturer shall provide a declaration of product conformity or an inspection document listing the results of the analysis of the chemical elements given in Table 1, and of any other element which may have been previously agreed upon.

13 Marking

Unless otherwise agreed, each product, or bundle of products, shall be clearly marked with the following:

- a) manufacturer's identification, molten furnace number, and mark of test on each ingot;
- b) each bundle should have a bright colour, waterproofing, a label that does not fall off easily and on which is clearly marked the smelting number, bunch of numbers, net weight, number of ingots, designation, manufacturing date, place of origin, and manufacturer's logo.