SLOVENSKI STANDARD
SIST EN 12438:2017

01-november-2017

Nadomešča:
SIST EN 12438:2000

Magnezij in magnezijeve zlitine - Magnezijeve zlitine za lite anode

Magnesium and magnesium alloys - Magnesium alloys for cast anodes

Magnesium und Magnesiumlegierungen - Magnesiumlegierungen für Gussanoden

Magnésium et alliages de magnésium - Alliages de magnésium pour anodes coulées

Ta slovenski standard je istoveten z: EN 12438:2017

ICS:

77.120.20	Magnezij in magnezijeve zlitine	Magnesium and magnesium alloys

SIST EN 12438:2017 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 12438

September 2017

ICS 77.120.20; 77.150.20

Supersedes EN 12438:1998

English Version

Magnesium and magnesium alloys - Magnesium alloys for cast anodes

Magnésium et alliages de magnésium - Alliages de magnésium pour anodes coulées

Magnesium und Magnesiumlegierungen - Magnesiumlegierungen für Gussanoden

This European Standard was approved by CEN on 2 July 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. EN 12438:2017 E

Contents

Page

European foreword

This document (EN 12438:2017) has been prepared by Technical Committee CEN/TC 190 “Foundry technology”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2018, and conflicting national standards shall be withdrawn at the latest by March 2018.

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

This document supersedes EN 12438:1998.

Within its programme of work, Technical Committee CEN/TC 190 requested CEN/TC 190/WG 9 “Cast magnesium” to revise:

EN 12438:1998, *Magnesium and magnesium alloys — Magnesium alloys for cast anodes*

Annex D provides details of significant technical changes between this European Standard and the previous edition.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

This European Standard classifies magnesium alloys for cast anodes into a number of grades suitable for the applications for which they might be used.

In this European Standard, a new designation system by number, as established in EN 1754 [1], is given.

NOTE This designation system by number is based on the structure and rules of EN 10027–2 [2] and so corresponds with the European numbering system for steel and other materials.

1 Scope

This European Standard specifies the grades and the corresponding requirements for magnesium alloys for cast anodes.

This European Standard specifies 2 groups of cast magnesium alloy grades by a classification based on chemical composition. The first group deals with magnesium alloy ingots for anodes. The second group deals with magnesium alloy anode castings.

This European Standard specifies chemical composition, designation, testing and inspection documentation.

This European Standard does not cover technical delivery conditions for magnesium alloy anode castings (see EN 1559-1 [3] and EN 1559-5 [4]).

2 Normative references

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

EN 10204, *Metallic products - Types of inspection documents*

EN ISO 80000-1:2013, *Quantities and units - Part 1: General (ISO 80000-1:2009 + Cor 1:2011)*

3 Terms and definitions

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

3.1
anode
electrode where oxidation reactions take place

3.2
galvanic anode
anode attached to a metal object to inhibit the corrosion of the object

4 Designations

4.1 Material

The material shall be designated either by symbol or by number as given in Table 1 and Table 2.

NOTE The comparison of EN 12438 grade designations with the designations from the previous version of this European Standard is given in Annex C.

4.2 Casting process

The following symbols shall be used to indicate the different casting processes:

— S Sand casting;

— K Permanent mould casting (gravity);

— C Continuous casting.

NOTE Examples of the use of these designations are given in EN 1559–5 [4].

5 Order information

The following information shall be supplied by the purchaser:

a) the number of this European Standard;

b) the designation of the material;

c) any special requirements.

All requirements shall be agreed between the manufacturer and the purchaser by the time of acceptance of the order (e.g. technical delivery conditions according to EN 1559-1 [3] and EN 1559-5 [4]).

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 Requirements

7.1 Chemical composition

The chemical composition of magnesium alloy ingots for anode castings shall be in accordance with the requirements given in Table 1.

The chemical composition of magnesium alloy cast anodes shall be in accordance with the requirements given in Table 2.

If not otherwise specified in the enquiry and order, the chemical composition of the ingots or the cast anodes shall relate to that of the samples taken from the melt at the time of pouring.

7.2 General condition of the product

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

Table 1 — Chemical composition of magnesium alloy ingots for cast anodes

Alloy group	Material designation		Composition % (mass fraction)									
	Symbol	Number	Element	Mg	Al	Zn	Mn	Si	Fe	Cu	Ni	Others (each)
MgAlZn	EN-MBMgAl3Zn1	3.5212	min.	Rem.	2,6	0,7	0,20	–	–	–	–	–
			max.	–	3,5	1,4	1,0	0,30	0,01	0,05	0,001	0,05
	EN-MBMgAl6Zn1	3.5213	min.	Rem.	5,6	0,7	0,20	–	–	–	–	–
			max.	–	6,5	1,4	1,0	0,30	0,01	0,05	0,001	0,05
	EN-MBMgAl6Zn3	3.5214	min.	Rem.	5,1	2,1	0,20	–	–	–	–	–
			max.	–	7,0	4,0	1,0	0,30	0,01	0,05	0,001	0,05
MgMn	EN-MBMgMn1	3.5230	min.	Rem.	–	–	0,50	–	–	–	–	–
			max.	–	0,01	0,05	1,3	0,05	0,02	0,02	0,001	0,05
	EN-MBMgMn2	3.5231	min.	Rem.	–	–	1,20	–	–	–	–	–
			max.	–	0,01	0,05	2,5	0,05	0,02	0,02	0,001	0,05
NOTE The material designation is in accordance with EN 1754 [1].												

Table 2 — Chemical composition of magnesium alloy cast anodes

Alloy group	Material designation		Casting process[a]	Composition % (mass fraction)											
	Symbol	Number		Element	Mg	Al	Zn	Mn	Si	Fe	Cu	Ni	Others (each)	As+Sb+ Pb+Cr+Ni[b]	Cd+Hg+Se[b]
MgAlZn	EN-MAMgAl3Zn1	3.5112	S, K, C	min.	Rem.	2,5	0,6	0,2	–	–	–	–	–	–	–
				max.	–	3,5	1,4	1,0	0,3	0,02	0,05	0,002	0,05	0,1	0,01
	EN-MAMgAl6Zn1	3.5113	S, K, C	min.	Rem.	5,5	0,6	0,2	–	–	–	–	–	–	–
				max.	–	6,5	1,4	1,0	0,3	0,02	0,05	0,002	0,05	0,1	0,01
	EN-MAMgAl6Zn3	3.5114	S, K, C	min.	Rem.	5,0	2,0	0,2	–	–	–	–	–	–	–
				max.	–	7,0	4,0	1,0	0,3	0,02	0,05	0,002	0,05	0,1	0,01
MgMn	EN-MAMgMn1	3.5130	S, K, C	min.	Rem.	–	–	0,5	–	–	–	–	–	–	–
				max.	–	0,01	0,05	1,3	0,05	0,03	0,02	0,002	0,05	0,1	0,01
	EN-MAMgMn2	3.5131	S, K, C	min.	Rem.	–	–	1,2	–	–	–	–	–	–	–
				max.	–	0,01	0,05	2,5	0,05	0,03	0,02	0,002	0,05	0,1	0,01

NOTE The material designation is in accordance with EN 1754 [1].

[a] S = Sand casting; K = Permanent mould casting (gravity); C = Continuous casting.

[b] Only for anodes used in potable water (tap water).

8 Sampling

8.1 General

Samples for the determination of the chemical composition shall be made from the same material as that used to produce the product which they represent.

All samples shall be adequately marked to guarantee full traceability to the product which they represent.

The samples for the determination of the chemical composition shall be cast in a manner which ensures accurate results.

8.2 Frequency and number of tests

Samples, representative of the material, shall be produced at a frequency in accordance with the process quality assurance procedures adopted by the manufacturer or as agreed with the purchaser.

The quality assurance procedures for sampling should be based on appropriate and recognized statistical principles.

9 Testing

9.1 Determination of the chemical composition

The methods used to determine the chemical composition of the material shall be in accordance with standardized methods or validated procedures.

9.2 Rounding of results of chemical analysis

In recording the result obtained for any value specified in this European Standard, it shall be expressed to the same number of decimal places as the corresponding value in this European Standard. Rounding shall be carried out as specified in EN ISO 80000-1:2013, B.2 and B.3. In 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.

9.3 Electrochemical testing

If applicable, electrochemical testing shall be carried out in accordance with Annex A and Annex B.

10 Inspection documentation

When requested by the purchaser and agreed with the manufacturer, the manufacturer shall issue for the products the appropriate inspection documentation according to EN 10204.

11 Packaging and surface protection

Packaging and/or surface protection, if any, for the transport or storage of the products, shall be at the discretion of the manufacturer unless a specific agreement has been made by the time of acceptance of the order.

The packaging method should ensure the full protection of the products until their final destination.