SLOVENSKI STANDARD
SIST ISO 16220:2002

01-februar-2002

Magnezij in magnezijeve zlitine - Ingoti magnezijevih zlitin in ulitki

Magnesium and magnesium alloys -- Magnesium alloy ingots and castings

Magnésium et alliages de magnésium -- Lingots et pièces moulées en alliages de magnésium

Ta slovenski standard je istoveten z: **ISO 16220:2000**

ICS:

77.150.20 Magnezijevi izdelki Magnesium products

SIST ISO 16220:2002 **en**

INTERNATIONAL STANDARD

ISO 16220

First edition
2000-06-15

Magnesium and magnesium alloys — Magnesium alloy ingots and castings

Magnésium et alliages de magnésium — Lingots et pièces moulées en alliages de magnésium

Reference number
ISO 16220:2000(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 734 10 79
E-mail copyright@iso.ch
Web www.iso.ch

Printed in Switzerland

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 16220 was prepared by Technical Committee ISO/TC 79, *Light metals and their alloys*, Subcommittee SC 5, *Magnesium and alloys of cast or wrought magnesium*.

Annexes A to C of this International Standard are for information only.

Introduction

This International Standard classifies the commercially available magnesium alloys into a number of grades suitable for the applications to which they might be put.

Some of the alloys referenced in this International Standard can be the subject of a patent or of patent applications and their listing herein is not to be construed in any way as the granting of a licence under such patent rights.

This International Standard is technically identical with the European Standard EN 1753, except for some minor deviation in Mn content and Fe/Mn ratio. The grade designation is slightly different in this International Standard and EN 1753, and the correlation is given in annex A.

Magnesium and magnesium alloys — Magnesium alloy ingots and castings

1 Scope

This International Standard specifies the chemical composition of magnesium alloy ingots and of magnesium alloy castings. It also specifies the mechanical properties of separately cast samples of these alloys (see clause 6) and, by agreement, the mechanical properties of magnesium alloy castings determined from samples cut from a casting.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 31-0:1992, *Quantities and units — Part 0: General principles*.

ISO 2092, *Light metals and their alloys — Code of designation based on chemical symbols*.

ISO 6506[1)], *Metallic materials — Hardness test — Brinell test*.

ISO 6892, *Metallic materials — Tensile testing at ambient temperature*.

EN 1559-5, *Founding — Technical condition of delivery — Part 5: Additional requirements for magnesium alloy castings.*

EN 1753, *Magnesium and magnesium alloys — Magnesium alloy ingots and castings*.

1) Since withdrawn and replaced by ISO 6506-1:1999, ISO 6506-2:1999 and ISO 6506-3:1999.

3 Designation

3.1 Material

The material shall be designated by symbols as given in Tables 1 to 5.

The material symbol designations are in accordance with ISO 2092. The material number designations are identical to those used in EN 1753.

NOTE A list of European designations, national and former national European designations corresponding to this International Standard is given in annex A.

3.2 Temper designation

The following symbols shall be used for temper designation:

— F: as-cast; applies to products that acquire some temper from the casting processes with special control over the amount of thermal treatment;

— T4: solution heat-treated and naturally aged; applies to products that undergo no further treatment after solution heat treatment;

— T5: as cast and artificially aged; applies to products that are cooled after casting, and then artificially aged to improve mechanical properties or dimensions;

— T6: solution heat-treated and artificially aged; applies to products that are solution heat-treated followed by artificial aging.

3.3 Casting process designation

The following symbols shall be used for the designation of the different casting processes:

— S: sand casting;

— K: permanent mould casting;

— D: pressure die casting;

— L: investment casting.

3.4 Designation for ordering

EXAMPLE

An order for 20 castings, conforming to this International Standard, of magnesium alloy EN-MC 21120, delivered in as-cast (F temper) and made by sand casting (S) is as follows:

20 castings - ISO 16220 - EN - MgAl9Zn1 (A) (or MC 21120) - F - S

Table 1 — Chemical composition of magnesium alloy ingots

Alloy group	Material designation		Composition % by mass														
	In accordance with ISO 2092	In accordance with EN 1753	min. or max.	Mg	Al	Zn	Mn [a]	RE [b]	Zr	Ag	Y	Li	Si	Fe	Cu	Ni	Others (each)
MgAlZn	ISO-MgAl8Zn1	EN-MB21110	min.	Balance	7,2	0,45	0,17	–	–	–	–	–	–	–	–	–	–
			max.		8,5	0,90	0,40	–	–	–	–	–	0,05	0,004	0,025	0,001	0,01
	ISO-MgAl9Zn1 (A)	EN-MB21120	min.	Balance	8,5	0,45	0,17	–	–	–	–	–	–	–	–	–	–
			max.		9,5	0,90	0,40	–	–	–	–	–	0,05	0,004	0,025	0,001	0,01
	ISO-MgAl9Zn1 (B)	EN-MB21121	min.	Balance	8,0	0,3	0,1	–	–	–	–	–	–	–	–	–	–
			max.		10,0	1,0	0,50	–	–	–	–	–	0,3	0,03	0,20	0,01	0,05
MgAlMn	ISO-MgAl2Mn	EN-MB21210	min.	Balance	1,7	–	0,35	–	–	–	–	–	–	–	–	–	–
			max.		2,5	0,20	0,60	–	–	–	–	–	0,05	0,004	0,008	0,001	0,01
	ISO-MgAl5Mn	EN-MB21220	min.	Balance	4,5	–	0,28	–	–	–	–	–	–	–	–	–	–
			max.		5,3	0,20	0,50	–	–	–	–	–	0,05	0,004	0,008	0,001	0,01
	ISO-MgAl6Mn	EN-MB21230	min.	Balance	5,6	–	0,26	–	–	–	–	–	–	–	–	–	–
			max.		6,4	0,20	0,50	–	–	–	–	–	0,05	0,004	0,008	0,001	0,01
MgAlSi	ISO-MgAl2Si	EN-MB21310	min.	Balance	1,9	–	0,2	–	–	–	–	–	0,7	–	–	–	–
			max.		2,5	0,20	0,6	–	–	–	–	–	1,2	0,004	0,008	0,001	0,01
	ISO-MgAl4Si	EN-MB21320	min.	Balance	3,7	–	0,2	–	–	–	–	–	0,7	–	–	–	–
			max.		4,8	0,20	0,6	–	–	–	–	–	1,2	0,004	0,008	0,001	0,01
MgZnCu	ISO-MgZn6Cu3Mn	EN-MB32110	min.	Balance	–	5,5	0,25	–	–	–	–	–	–	–	2,4	–	–
			max.		0,2	6,5	0,75	–	–	–	–	–	0,20	0,05	3,0	0,01	0,01
MgZnREZr [c]	ISO-MgZn4RE1Zr	EN-MB35110	min.	Balance	–	3,5	–	1,00	0,1	–	–	–	–	–	–	–	–
			max.		–	5,0	0,15	1,75	1,0	–	–	–	0,01	0,01	0,03	0,005	0,01
	ISO-MgRE3Zn2Zr	EN-MB65120	min.	Balance	–	2,0	–	2,4	0,1	–	–	–	–	–	–	–	–
			max.		–	3,0	0,15	4,0	1,0	–	–	–	0,01	0,01	0,03	0,005	0,01
MgREAgZr [d]	ISO-MgAg2RE2Zr	EN-MB65210	min.	Balance	–	–	–	2,0	0,1	2,0	–	–	–	–	–	–	–
			max.		–	0,2	0,15	3,0	1,0	3,0	–	–	0,01	0,01	0,03	0,005	0,01
	ISO-MgRE2Ag1Zr	EN-MB65220	min.	Balance	–	–	–	1,5	0,1	1,3	–	–	–	–	0,05	–	–
			max.		–	0,2	0,15	3,0	1,0	1,7	–	–	0,01	0,01	0,10	0,005	0,01
MgYREZr [e, f]	ISO-MgY5RE4Zr	EN-MB95310	min.	Balance	–	–	–	1,5	0,1	–	4,75	–	–	–	–	–	–
			max.		–	0,20	0,15	4,0	1,0	–	5,5	0,20	0,01	0,01	0,03	0,005	0,01
	ISO-MgY4RE3Zr	EN-MB95320	min.	Balance	–	–	–	2,4	0,1	–	3,7	–	–	–	–	–	–
			max.		–	0,20	0,15	4,4	1,0	–	4,3	0,20	0,01	0,01	0,03	0,005	0,01

[a] For maximum manganese content, see annex B.

[b] RE = Rare earth metals.

[c] Cerium-rich.

[d] Neodymium-rich.

[e] Neodymium- and heavy RE-rich.

[f] Improved corrosion resistance may be obtained by reducing the maximum manganese content to 0,03 %, the maximum iron content to 0,01 %, the maximum copper content to 0,02 % and the maximum zinc + silver content to 0,2 %.