DRAFT INTERNATIONAL STANDARD

ISO/DIS 23694

ISO/TC **79**/SC **5**	Secretariat: **SAC**
Voting begins on: **2020-06-18**	Voting terminates on: **2020-09-10**

Wrought magnesium and magnesium alloys — Extruded rods/bars and tubes

ICS: 77.150.01

This document is circulated as received from the committee secretariat.

Reference number
ISO/DIS 23694:2020(E)

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Published in Switzerland

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Foreword

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For an explanation of the voluntary nature of standards, the meaning of ISO specific terms et expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document classifies the commercially available magnesium et magnesium alloy extruded rods/ bars et tubes into a number of grades suitable for the application to which they might be put.

Wrought magnesium and magnesium alloys — Extruded rods/bars and tubes

1 Scope

This international standard gives specifies the technical conditions for inspection et delivery of wrought magnesium et magnesium alloy rods/bars et tubes for general engineering applications.

It applies to wrought magnesium et magnesium alloy extruded round, square et hexagonal rods/bars et seamless round tube (In this standard document, it is referred to as tube).

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 documents (including any amendments) applies.

ISO 3116:2019, *Magnésium et alliages de magnésium — Magnésium et alliages de magnésium corroyés*

ISO 6892-1, *Matériaux métalliques — Essai de traction — Partie 1: Méthode d'essai à température ambiante*

3 Terms et definitions

No terms et definitions are listed in this document.

3.1
rod/bar
Solid wrought product of uniform cross-section along its whole length, supplied in straight lengths.

Note 1 to entry: The cross-sections are in the shape of circles, squares, rectangles or regular hexagons. Products with a square, rectangular or hexagonal cross-section may have corners rounded along their whole length.

Note 2 to entry: Rod is normally less than 6 mm in diameter or minor dimension. In North America, the minimum diameter of a rod is 9,525 mm (0,375 in). Below this limit the product is called wire.

Note 3 to entry: For rectangular bars, the thickness exceeds one-tenth of the width. The term “rectangular bar” includes “flattened circles” et “modified rectangles”, of which two opposite sides are convex arcs, the other two sides being straight, of equal length et parallel.

3.2
tube
hollow wrought product of uniform cross-section with only one enclosed void along its whole length, et with a uniform wall thickness, supplied in straight lengths or in coiled form, provided the inner et outer crosssections are concentric et have the same form et orientation.

Note 1 to entry: The cross-sections are in the shape of circles, squares, rectangles or regular hexagons. Hollow products with square, rectangular or regular hexagonal cross-sections may have corners rounded along their whole length.

3.3
sample
either a quantity of molten metal, product or products which are used for the production of specimens.

3.4
test specimen
one or more pieces taken from each product in the sample, for the purpose of producing test pieces.

3.5
test piece
piece taken from each test specimen et suitably prepared for the test.

3.6
test
operation to which the test piece is subjected in order to measure or classify properties.

4 Orders or tenders

The order or tender shall define the product required et shall contain the following details:

a) the type et form of product:

— the designation of the magnesium or magnesium alloy;

— the form of the product (sheet, plate, etc.);

b) the metallurgical temper (degree of hardness or heat treatment condition) of the material for delivery et, if different, metallurgical temper for use;

c) the number of ISO 23694 or specification number, or, where none exists, properties agreed between the supplier et the purchaser;

d) dimensions et shape of the product (thickness, width, length, diameter of the coil);

e) tolerances of the dimensions et form, with reference to the appropriate part of ISO 23694;

f) quantity;

g) any requirements for certificates of conformity, test et/or analysis;

h) any special requirements agreed between the supplier et the purchaser (for example drawings).

5 Requirements

5.1 Designation

The alloy designation et temper shall be given in Table 1. If there is any alloy not specified in Table 1, the alloy designation et temper shall be in conformity with those specified in ISO 3116:2019 or those agreed upon between the supplier et purchaser et stated in the order.

Table 1 — Alloy designation et temper

Alloy symbol	Alloy designation	Temper	Product type	Diameter or thickness
				mm
ISO-MgAl4Zn	MAZ40	H112、F	rods/bars	D ≤ 130
ISO-MgMn2(A)	MM2a	H112、F	rods/bars	D ≤ 130
ISO-MgZn6Zr(A)	MZK60a	T5	rods/bars	D ≤ 130
ISO-MgGd7Y5RE1	MVWE751	T5	bars	D ≤ 160
ISO-MgGd9Y2Nd1Zr	MVW92	H112、T5、T6	bars	D ≤ 50
ISO-MgGd8Y2ZrAgEr	MVW93M	T5	bars	D ≤ 160
ISO-MgGd9Y4Zn1Zr	MVW94M	H112	bars	D ≤ 160
		T5	bars	D ≤ 80

5.2 Production et manufacturing processes

Unless otherwise specified in the order, the production et manufacturing processes shall be left to the discretion of the producer. Unless it is explicitly stated otherwise in the order, no obligation shall be placed on the producer to use the same processes for subsequent et similar orders.

5.3 Quality control

The supplier shall be responsible for the performances of all inspection et tests required by the relevant International Standard, specification or customer requests, prior to shipment of the product.

If the purchaser wishes to inspect the product at the supplier's works, he shall notify the supplier at the time of placing the order.

5.4 Chemical composition

The chemical composition of ISO-MgAl4Zn, ISO-MgMn2(A), ISO-MgZn6Zr(A), ISO-MgGd9Y2Nd1Zr, ISO-MgGd8Y2ZrAgEr et ISO-MgGd9Y4Zn1Zr shall comply with the requirements specified in Table 2,others chemical composition shall comply with the requirements specified in ISO 3116:2019.If the purchaser requires content limits for elements not specified in ISO 3116:2019, these limits shall be stated in the order document.

Table 2 — Chemical composition of ISO-MgAl4Zn, ISO-MgMn2(A), ISO-MgZn6Zr(A), ISO-MgGd9Y2Nd1Zr, ISO-MgGd8Y2ZrAgEr et ISO-MgGd9Y4Zn1Zr

Alloy group	Material designation		Composition %(mass fraction)																
	Symbol	Designation	Elment	Mg	Al	Zn	Mn	Gd	RE	Li	Zr	Y		Si	Fe	Cu	Ni	Others	
																		each	total
MgAl	ISO-MgAl4Zn	MAZ40	min. max.	Rem -	0.20	0.30	1.3 2.2	—	0.15 0.35Ce	—	—	—	0.01Be	0.10	0.05	0.05	0.007	0.01	0.30
MgMn	ISO-MgMn2(A)	MM2a	min. max.	Rem -	3.0 4.0	0.20 0.8	0.15 0.50	—	—	—	—	—	0.01Be	0.10	0.05	0.05	0.005	0.01	0.30
MgZn	ISO-MgZn6Zr(A)	ZK60a	min. max.	Rem -	0.05	5.0 6.0	0.10	—	—	—	0.30 0.9	—	0.01Be	0.05	0.05	0.05	0.005	0.01	0.30
MgGdY	ISO-MgGd9Y2Nd1Zr	VW92	min. max.	Rem -	—	1.6 2.4	—	8.8 9.8	0.7 1.4Nd	—	0.4 1.0	1.6 2.4	—	—	0.01	0.02	0.005	0.02	0.20
	ISO-MgGd8Y2ZrAgEr	VW93M	min. max.	Rem -	—	—	—	8.0~9.6	0.02 0.30Er	—	0.3 0.7	1.8 3.2	0.02 0.50Ag	0.02	0.02	0.005	0.003	0.01	0.1
	ISO-MgGd9Y4Zn1Zr	VW94M	min. max.	Rem -	—	0.8 1.5	—	8.5 9.5	—	—	0.4 0.7	3.5 4.5	—	—	0.005	0.005	0.005	0.02	0.3