AEROSPACE MATERIAL SPECIFICATION

AMS4371™	REV. C
Issued 2013-03 Revised 2023-12 Superseding AMS4371B	

Magnesium Alloy, Plate
4.0Y - 2.25Nd - 0.5Zr (WE43C - T5)
Precipitation Heat Treated
(Composition similar to UNS M18434)

RATIONALE

AMS4371C results from a Five-Year Review and update of this specification with changes to prohibit unauthorized exceptions (see 3.4.1.2, 3.7, 4.4.1, 5.1.1, and 8.4), relocate Definitions (see 2.4), update presentation of Corrosion Resistance (see 3.4.2), Applicable Documents (see Section 2), and allow the use of the immediate prior specification revision (see 8.3).

1. SCOPE

1.1 Form

This specification covers a magnesium alloy in the form of rolled plate from 0.500 up to 6.0 inches (12.7 to 152.4 mm), inclusive (see 8.5).

1.2 Application

This product has been used typically for parts requiring a combination of light weight, high yield strength up to 480 °F (250 °C), relatively high corrosion resistance, and good flammability resistance for magnesium alloys, but usage is not limited to such applications.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
SAE WEB ADDRESS: **http://www.sae.org**

For more information on this standard, visit
https://www.sae.org/standards/content/AMS4371C

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2355 Quality Assurance, Sampling and Testing, Aluminum Alloys and Magnesium Alloy, Wrought Products (Except Forging Stock), and Rolled, Forged, or Flash Welded Rings

AMS2750 Pyrometry

AS7766 Terms Used in Aerospace Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B117 Operating Salt Spray (Fog) Apparatus

ASTM B557 Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products

ASTM B557M Tension Testing Wrought and Cast Aluminum- and Magnesium-Alloy Products (Metric)

ASTM B660 Packaging/Packing of Aluminum and Magnesium Products

ASTM B666/B666M Identification Marking of Aluminum and Magnesium Products

ASTM B953 Sampling Magnesium and Magnesium Alloys for Spectrochemical Analysis

ASTM B954 Analysis of Magnesium and Magnesium Alloys by Atomic Emission Spectrometry

2.3 ANSI Accredited Publications

Copies of these documents are available online at https://webstore.ansi.org/.

ANSI H35.2 Dimensional Tolerances for Aluminum Mill Products

ANSI H35.2M Dimensional Tolerances for Aluminum Mill Products (Metric)

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Composition

Shall conform to the percentages by weight shown in Table 1, determined by spectrochemical methods in accordance with ASTM B954, or by other analytical methods acceptable to the purchaser.

Table 1 - Composition

Element	Min	Max
Yttrium	3.7	4.3
Neodymium	2.0	2.5
Zinc	--	0.06
Zirconium	0.2	1.0
Other Rare Earths (3.1.1)	0.3	1.0
Manganese	--	0.03
Copper	--	0.02
Iron	--	0.005
Nickel	--	0.0020
Other Elements, each (3.1.2)	--	0.01
Magnesium	remainder	

3.1.1 Other rare earths are heavy rare earths, such as gadolinium, dysprosium, erbium, samarium, and ytterbium. The total of gadolinium + dysprosium + erbium shall be 0.3 to 1.0%. Samarium shall not exceed 0.04% and ytterbium shall not exceed 0.02%.

3.1.2 Determination not required for routine acceptance.

3.2 Condition

Precipitation heat treated.

3.2.1 Rolled plate shall be supplied with an as-rolled surface finish; light polishing to remove minor surface imperfections is permissible provided such imperfections can be removed within specified dimensional tolerances.

3.3 Heat Treatment

Plate shall be precipitation heat treated by heating to a temperature between 392 to 482 °F (200 to 250 °C), holding at heat for the proper time for precipitation heat treatment to meet the requirements of 3.4, and air cooling. Pyrometry shall be in accordance with AMS2750.

3.4 Properties

Plate shall conform to the requirements of 3.4.1 and 3.4.2.

3.4.1 Tensile Properties

Shall be as shown in Table 2, determined in accordance with ASTM B557 or ASTM B557M.

3.4.1.1 Properties outside the range listed in 1.1 shall be agreed upon between the purchaser and producer.

Table 2A - Minimum tensile properties, inch/pound units

Nominal Thickness Inches	Tensile Strength ksi	Yield Strength at 0.2% Offset ksi	Elongation in 4D %
0.500 to 1.50 incl	44	33	12
Over 1.50 to 6.0, incl	47	30	6

Table 2B - Minimum tensile properties, SI units

Nominal Thickness Millimeters	Tensile Strength MPa	Yield Strength at 0.2% Offset MPa	Elongation in 4D %
12.7 to 38.1, incl	303	228	12
Over 38.1 to 152.4, incl	324	207	6

3.4.1.2 Mechanical property requirements for product outside the size range covered by Table 2 shall be agreed upon between the purchaser and producer and reported per 4.4.1.

3.4.2 Corrosion Resistance

Corrosion rate of material, tested in accordance with 3.4.2.1, shall be less than 50 mils per year (1.3 mm/year).

3.4.2.1 Corrosion rate (CR) shall be determined in accordance with ASTM B117 except that, prior to exposure, specimens shall be accurately weighed to within ±0.01 g (W_1). Specimens shall be exposed to the salt spray for not less than 120 hours. Following exposure, specimens shall be rinsed with tap water and cleaned of adherent corrosion product by immersing in a hot (190 °F [88 °C]) 20% Chromic acid plus 1% silver nitrate solution for 1 to 2 minutes. Cleaned specimens shall be rinsed in hot water, dried in a stream of hot air, and weighed (W_2). The measured weight loss (WL) shall be calculated (W_1 - W_2) and used for calculating corrosion rate, using the following equations:

$$WL = W_1 - W_2$$

$$CR\ (mcd) = WL / (SA \times EP)$$

$$CR\ (mpy) = (CR\ (mcd) / D) \times 143.7$$

where:

WL = measure weight loss in mg

SA = total surface area of specimen in cm^2

EP = exposure time in days

D = density, 1.82 gram/cm^3

mcd = mg/cm^2 per day

mpy = mils per year (0.001 inch per year)

3.5 Quality

Plate, as received by the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the plate.

3.6 Tolerances

Shall conform to all applicable requirements of ANSI H35.2 or ANSI H35.2M.

3.7 Exceptions

Any exceptions shall be authorized by the purchaser and reported as in 4.4.1.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection

The producer of plate shall supply all samples for the producer's tests and shall be responsible for the performance of all required tests. The purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the plate conforms to specified requirements.