SAE Aerospace
An SAE International Group

AEROSPACE MATERIAL SPECIFICATION

SAE MAM 4208B

Issued OCT 1985
Revised APR 1990
Cancelled MAR 2003

Superseding MAM 4208A

Aluminum Alloy Sheet
6.0Cu - 0.40Zr (2004-F)
As Rolled

UNS A92004

CANCELLATION NOTICE

This specification has been declared "CANCELLED" by the Aerospace Materials Division, SAE, as of March, 2003. By this action, this document will remain listed in the Numerical Section of the Index of Aerospace Material Specifications.

AMS 4208 covers the same material.

"CANCELLED" specifications are available from SAE.

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

1. SCOPE:

1.1 Form: This specification covers an aluminum alloy in the form of sheet, procured to metric dimensions and properties.

1.2 Application: Primarily for parts requiring a high degree of formability (superplasticity) and response to heat treatment.

1.3 AMS-4208 is the inch/pound version of this MAM.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

2.1.1 Aerospace Material Specifications:

MAM-2202 - Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate
MAM-2355 - Quality Assurawe Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units
AMS-2811 - Identification, Aluminum and Magnesium Alloy Wrought Products

2.2 ASTM Publications: Available from ASTM, 1916 Race Street, Philadelphia, PA 19103-1187.

ASTM B 660 - Packaging/Packing of Aluminum and Magnesium Products
ASTM E 21 - Elevated Temperature Tension Tests of Metallic Materials

3. TECHNICAL REQUIREMENTS:

3.1 Composition: Shall conform to the following percentages by weight, determined in accordance with MAM-2355:

	min	max
Copper	5 5	- 6 5
Zirconium	0.30	- 0.50
Magnesium	- -	0.50
Silicon	- -	0.20
Iron	- -	0.20
Manganese	- -	0.10
Zinc	- -	0.10
Titanium	- -	0.05
Other Impurities, each	- -	0.05
Other Impurities, total		0.15
Aluminum	remainder	

3.2 Condition: As-rolled GF temper). Sheet shall not be flattened, leveled, or straightened.

3.3 Properties: Sheet shall conform to the following requirements, determined in accordance with MAM-2355 except as specified in 3.3.1:

3.3.1 As-Rolled (Superplasticity): Specimens, conforming to Figure 1, shall have the following properties after being heated to 45O°C ± 5, held at heat for 20 - 30 minutes before testing, and tested in accordance with ASTM E 21 at 45O°C ± 5 using a constant crosshead speed of 12.5 mm per minute.

Elongation in 12.5 mm, minimum	
Individual Test	350%
Average of All Tests	400%

3.3.2 Pseudo As-Formed: Sheet shall have the following properties after being heated to 450°C ± 5, held at heat for 20 minutes ± 2, and cooled in air:

Tensile Strength	220 - 270 MPa
Yield Strength at 0.2% Offset	110 - 170 MPa
Elongation in 50 mm	10 - 20%

3.3.3 After Solution and Precipitation Heat Treatment: Sheet shall have the following properties after being solution heat treated by heating to 53O°C ± 5, holding at heat for 30 - 60 minutes, and quenching in warm (approximately 40°C water, with quenching being completed within 20 seconds, and precipitation heat treated by heating to 165°C ± 5, holding at heat for 16 - 20 hours, and cooling in air or, when permitted by purchaser, heating to 185°C ± 5, holding at heat for 3.5 - 5 hours, and cooling in air:

Tensile Strength	370 - 470 MPa
Yield Strength at 0.2% Offset	270 - 330 MPa
Elongation in 50 mm	8 - 20%

3.4 Quality: Sheet, as received by purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from imperfections detrimental to usage of the sheet.

3.4.1 Edge cracking is not acceptable.

3.5 Tolerances: Shall be as follows:

3.5.1 Thickness: Shall conform to all applicable requirements of MAM-2202.

3.5.2 Length and Width: ±12.5 millimetres.

4. QUALITY ASSURANCE PROVISIONS:

4.10 Responsibility for Inspection: The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the sheet conforms to the requirements of this specification.

4.2 Classification of Tests: Tests for all technical requirements are acceptance tests and shall be performed on each lot.

4.30 Sampling and Testing: Shall be in accordance with MAM-2355 and the following: a lot shall be all sheet produced from one ingot processed and rolled to the same nominal thickness in one series of operations.

4.3.1 Specimens for as-rolled (superplasticity) elongation (3.3.1) shall be taken in duplicate in both the longitudinal direction and transverse direction from sheet 58 mm and over in nominal width.

4.4 Reports: The vendor of sheet shall furnish with each shipment a report stating that the sheet conforms to the chemical composition and other technical requirements of this specification. This report shall include the purchase order number, lot number, MAM-4208A, size, and quantity.