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400 Commonwealth Drive, Warrendale, PA 15096-0001

# AEROSPACE MATERIAL SPECIFICATION

AMS 4255

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Submitted for recognition as an American National Standard

## ALUMINUM ALLOY SHEET, CLAD ONE SIDE
## 0.6Mg - 0.35Si - 0.28Cu (No. 21 Brazing Sheet)
## As Fabricated

1. SCOPE:

1.1 Form: This specification covers a clad aluminum alloy in the form of sheet.

1.2 Application: Primarily for brazed assemblies which are subjected to heat treatment after joining.

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 as specified in AMS 2350.

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

2.1.1 Aerospace Material Specifications:

AMS 2202 - Tolerances, Aluminum Alloy and Magnesium Alloy Sheet and Plate
MAM 2202 - Tolerances, Metric, Aluminum Alloy and Magnesium Alloy Sheet and Plate
AMS 2770 - Heat Treatment of Wrought Aluminum Alloy Parts
AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings
MAM 2355 - Quality Assurance Sampling and Testing of Aluminum Alloys and Magnesium Alloys, Wrought Products (Except Forging Stock) and Flash Welded Rings, Metric (SI) Units

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

ASTM B 660 - Packaging/Packing of Aluminum and Magnesium Products

3. TECHNICAL REQUIREMENTS:

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

| | Core (6951) | | Cladding (4343) | |
|---|---|---|---|---|
| | min | max | min | max |
| Magnesium | 0.40 | 0.8 | -- | -- |
| Silicon | 0.20 | 0.50 | 6.8 | 8.2 |
| Copper | 0.15 | 0.40 | -- | 0.25 |
| Iron | -- | 0.8 | -- | 0.8 |
| Zinc | -- | 0.20 | -- | 0.20 |
| Manganese | -- | 0.10 | -- | 0.10 |
| Other Impurities, each | -- | 0.05 | -- | 0.05 |
| Other Impurities, total | -- | 0.15 | -- | 0.15 |
| Aluminum | remainder | | remainder | |

3.2 Condition: As fabricated (F).

3.3 Cladding: Shall be applied to only one face of the core.

3.3.1 Cladding Thickness: After rolling, the average cladding thickness shall be as follows:

| Total Thickness of Composite Product | | Cladding Thickness Percent of Total Thickness | |
|---|---|---|---|
| Inch | Millimetres | min avg | max avg |
| 0.010 to 0.090, incl | 0.25 to 2.29, incl | 8 | 12 |
| Over 0.090 to 0.249, incl | Over 2.29 to 6.32, incl | 4 | 6 |

3.4 Properties: Product shall conform to the following requirements, determined in accordance with AMS 2355 or MAM 2355:

3.4.1 As Fabricated: No properties apply to sheet as fabricated.

3.4.2 After Solution and Precipitation Heat Treatment: Sheet shall have the following properties after being solution and precipitation heat treated in accordance with AMS 2770 for 6951 alloy:

3.4.2.1 Tensile Properties: Shall be as shown in Table I.

TABLE I

| Nominal Thickness Inch | Tensile Strength psi, min | Yield Strength at 2% Offset psi, min | Elongation in 2 Inches %, min |
|---|---|---|---|
| Over 0.010 to 0.019, incl | 35,000 | 30,000 | 6 |
| Over 0.019 to 0.249, incl | 35,000 | 30,000 | 8 |

TABLE IV (SI)

| Nominal Thickness Millimetres | Tensile Strength MPa, min | Yield Strength at 2% Offset MPa, min | Elongation in 50.8 mm %, min |
|---|---|---|---|
| Over 0.25 to 0.48, incl | 241 | 207 | 6 |
| Over 0.48 to 6.32, incl | 241 | 207 | 8 |

3.4.2.2 Bending: Sheet shall withstand, without cracking, bending at room temperature through an angle of 180 degrees around a diameter equal to the bend factor times the nominal thickness of the sheet with axis of bend parallel to the direction of rolling.

| Nominal Thickness Inch | Nominal Thickness Millimetres | Bend Factor |
|---|---|---|
| 0.010 to 0.036, incl | 0.25 to 0.91, incl | 3 |
| Over 0.036 to 0.064, incl | Over 0.91 to 1.63, incl | 4 |
| Over 0.064 to 0.128, incl | Over 1.63 to 3.25, incl | 5 |
| Over 0.128 to 0.249, incl | Over 3.25 to 6.32, incl | 6 |

3.5 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.

3.6 Tolerances: Shall conform to all applicable requirements of AMS 2202 or MAM 2202.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of sheet shall supply all samples for vendor's tests and shall be responsible for performing all required tests. Results of such tests shall be reported to the purchaser as required by 4.4. 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:

4.2.1 Acceptance Tests: Tests for composition (3.1), tensile properties after solution and precipitation heat treatment (3.4.2.1), and tolerances (3.6) are acceptance tests and shall be performed on each inspection lot.

4.2.2 Periodic Tests: Tests for cladding thickness (3.3.1) and bending after solution and precipitation heat treatment (3.4.2.2) are periodic tests and shall be performed at a frequency selected by the vendor unless frequency of testing is specified by purchaser.

4.3 Sampling and Testing: Shall be in accordance with AMS 2355 or MAM 2355; the number of specimens to be sampled shall be the minimum number of specimens tested.

4.3.1 Sampling for Chemical Analysis:

4.3.1.1 Ingot Analysis: At least one sample from each group of ingots used to form the clad and core of the braze sheet shall be analyzed to verify conformance with 3.1. Complete ingot analysis records shall be available at the producer's facility.

4.3.1.2 Finished Product Analysis: In lieu of ingot analysis, chemical analysis may be performed on both the clad and core material to verify conformance to 3.1.

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, AMS 4255, size, and quantity.

4.5 Resampling and Retesting: Shall be in accordance with AMS 2355 or MAM 2355.

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each sheet shall be marked on the clad face, in the respective location indicated below, with the brazing sheet number, temper, AMS 4255, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be legible, shall be applied using a suitable marking fluid, and shall be sufficiently stable to withstand normal handling. The markings shall have no deleterious effect on the sheet or its performance.

5.1.1 Flat Sheet Under 6 Inches (152 mm) Wide: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3.3 feet (one metre).

5.1.2 Flat Sheet 6 to 48 Inches (152 to 1219 mm), Inclusive, Wide and 36 to 200 Inches (914 to 5080 mm), Inclusive, Long: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3.3 feet (one metre), the rows being spaced approximately 6 inches (152 mm) on centers across the width and staggered. Every third row shall show the manufacturer's identification and nominal thickness. The other rows shall show the brazing sheet number, temper, and AMS 4255.