Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA. 15096

# AEROSPACE MATERIAL SPECIFICATION

AMS 4055B
Superseding AMS 4055A
Issued 9-15-57
Revised 1-15-77

## ALUMINUM ALLOY SHEET, CLAD TWO SIDES
## 0.6Mg - 0.35Si - 0.28Cu (No. 22-0 Brazing Sheet)





1. SCOPE:

1.1 Form: This specification covers an 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 Aerospace Material Specifications (AMS) shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2202 - Tolerances, Aluminum-Base and Magnesium-Base Alloy Sheet and Plate
AMS 2350 - Standards and Test Methods
AMS 2355 - Quality Assurance Sampling and Testing of Aluminum-Base and Magnesium-Base Alloys, Wrought Products (Except Forgings and Forging Stock) and Flash Welded Rings

2.2 Government Publications: Available from Commanding Officer, Naval Publications and Forms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.1 Military Standards:

MIL-STD-649 - Aluminum and Magnesium Products, Preparation for Shipment and Storage

3. TECHNICAL REQUIREMENTS:

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

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



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3.2 Condition: Annealed.

3.3 Cladding: Shall be applied to both faces 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 per Side % of Total Thickness |
|---|---|---|
| Inch | (Millimetres) | min avg |
| 0.010 to 0.091, excl | (0.25 to 2.31, excl) | 8 |
| 0.091 to 0.249, incl | (2.31 to 6.32, incl) | 4 |

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

3.4.1 As Annealed:

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

TABLE I

| Nominal Thickness Inch | Tensile Strength psi, max | Elongation in 2 in. %, min |
|---|---|---|
| 0.010 to 0.020, excl | 20,000 | 14 |
| 0.020 to 0.031, incl | 20,000 | 18 |
| Over 0.031 to 0.050, incl | 20,000 | 20 |
| Over 0.050 to 0.249, incl | 20,000 | 23 |

TABLE I (SI)

| Nominal Thickness Millimetres | Tensile Strength MPa, max | Elongation in 50.8 mm %, min |
|---|---|---|
| 0.25 to 0.51, excl | 138 | 14 |
| 0.51 to 0.79, incl | 138 | 18 |
| Over 0.79 to 1.27, incl | 138 | 20 |
| Over 1.27 to 6.32, incl | 138 | 23 |

3.4.1.2 Bending: Sheet shall withstand, without cracking, bending at room temperature through an angle of 180 deg (3.14 rad) 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 | | Bend Factor |
|---|---|---|
| Inch | (Millimetres) | |
| 0.010 to 0.128, incl | (0.25 to 3.25, incl) | 1 |
| Over 0.128 to 0.249, incl | (Over 3.25 to 6.32, incl) | 2 |

3.4.2 After Solution and Precipitation Heat Treatment: Sheet, after proper solution and precipitation heat treatment, shall meet the following requirements.

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

TABLE II

| Nominal Thickness Inch | Tensile Strength psi, min | Yield Strength at 0.2% Offset psi, min | Elongation in 2 in. %, min |
|---|---|---|---|
| 0.010 to 0.020, incl | 35,000 | 30,000 | 6 |
| Over 0.020 to 0.249, incl | 35,000 | 30,000 | 8 |

TABLE II (SI)

| Nominal Thickness Millimetres | Tensile Strength MPa, min | Yield Strength at 0.2% Offset MPa, min | Elongation in 50.8 mm %, min |
|---|---|---|---|
| 0.25 to 0.51, incl | 241 | 207 | 6 |
| Over 0.51 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 deg (3.14 rad) 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 | | Bend Factor |
|---|---|---|
| Inch | (Millimetres) | |
| 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 the purchaser, shall be uniform in quality and condition, sound, and free from foreign materials and from internal and external imperfections detrimental to usage of the sheet.

3.6 Tolerances: Unless otherwise specified, tolerances shall conform to all applicable requirements of AMS 2202.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection: The vendor of sheet shall supply all samples 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 perform such confirmatory testing as he deems necessary to ensure that the sheet conforms to the requirements of this specification.

4.2 Classification of Tests:

4.2.1 Acceptance Tests: Tests to determine conformance to composition (3.1), tensile property as annealed (3.4.1.1), and tolerance (3.6) requirements are classified as acceptance tests.

4.2.2 Periodic Tests: Tests to determine conformance to cladding thickness (3.3.1), tensile property after solution and precipitation heat treatment (3.4.2.1), and bending (3.4.1.2 and 3.4.2.2) requirements are classified as periodic tests.

4.3 Sampling: Shall be in accordance with AMS 2355. Frequency of sampling for periodic tests shall be as agreed upon by purchaser and vendor.

4.4 Reports:

4.4.1 The vendor of sheet shall furnish with each shipment, three copies of 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, material specification number and its revision letter, size, and quantity.

4.4.2 The vendor of finished or semi-finished parts shall furnish with each shipment three copies of a report showing the purchase order number, material specification number and its revision letter, contractor or other direct supplier of sheet, part number, and quantity. When sheet for making parts is produced or purchased by the parts vendor, that vendor shall inspect each lot of sheet to determine conformance to the requirements of this specification, and shall include in the report a statement that the sheet conforms, or shall include copies of laboratory reports showing the results of tests to determine conformance.

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

5. PREPARATION FOR DELIVERY:

5.1 Identification: Each sheet shall be marked on one face, in the respective location indicated below, with the brazing sheet number and temper, AMS 4055, manufacturer's identification, and nominal thickness. The characters shall be of such size as to be clearly 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 In. (152 mm) Wide: Shall be marked in one or more lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm).

5.1.2 Flat Sheet 0.249 In. (6.32 mm) and Under Thick, 6 - 48 In. (152 - 1219 mm), Incl, Wide, and 36 - 200 In. (914 - 5080 mm), Incl, Long: Shall be marked in lengthwise rows of characters recurring at intervals not greater than 3 ft (914 mm), the rows being spaced approximately 6 in. (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 and temper and AMS 4055.

5.1.3 Coiled Sheet: Shall be marked near both the outside and inside ends of the coil; the markings at either or both ends shall be applied as in 5.1 or shall appear on a durable tag or label attached to the coil and marked with the information of 5.1. When the inside end of the coil is inaccessible, as when the sheet is wound on cores, the tag or label may be attached to the core.

5.2 Protective Treatment: Flat sheet shall be protected, during shipment and storage, by interleaving with suitable paper sheets. Coiled sheet shall not be interleaved.

5.3 Packaging:

5.3.1 Sheet shall be prepared for shipment in accordance with commercial practice to ensure carrier acceptance and safe transportation to the point of delivery. Packaging shall conform to carrier rules and regulations applicable to the mode of transportation.