



# AEROSPACE MATERIAL SPECIFICATIONS

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

485 Lexington Ave., New York, N. Y. 10017

## AMS 4049E

Superseding AMS 4049D

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### ALUMINUM ALLOY SHEET AND PLATE, ALCLAD 5.6Zn - 2.5Mg - 1.6Cu - 0.30Cr (Alclad 7075-T6)

1. **ACKNOWLEDGMENT:** A vendor shall mention this specification number and its revision letter in all quotations and when acknowledging purchase orders.
2. **APPLICATION:** Primarily for structural use, including machine tapered parts. Certain design and processing procedures may cause this material to be susceptible to stress corrosion cracking; ARP 823 recommends practices to minimize such conditions.
3. **COMPOSITION:**

| Core (7075)             |           |      | Cladding (7072)         |           |      |
|-------------------------|-----------|------|-------------------------|-----------|------|
|                         | min       | max  |                         | min       | max  |
| Zinc                    | 5.1       | 6.1  | Zinc                    | 0.8       | 1.3  |
| Magnesium               | 2.1       | 2.9  | Silicon + Iron          | --        | 0.7  |
| Copper                  | 1.2       | 2.0  | Magnesium               | --        | 0.10 |
| Chromium                | 0.18      | 0.40 | Copper                  | --        | 0.10 |
| Iron                    | --        | 0.7  | Manganese               | --        | 0.10 |
| Silicon                 | --        | 0.50 | Other Impurities, each  | --        | 0.05 |
| Manganese               | --        | 0.30 | Other Impurities, total | --        | 0.15 |
| Titanium                | --        | 0.20 | Aluminum                | remainder |      |
| Other Impurities, each  | --        | 0.05 |                         |           |      |
| Other Impurities, total | --        | 0.15 |                         |           |      |
| Aluminum                | remainder |      |                         |           |      |

4. **CONDITION:** Solution and precipitation heat treated.
5. **TECHNICAL REQUIREMENTS:** The product shall conform to the following requirements; tensile properties shall be determined in accordance with the latest issue of AMS 2355.
  - 5.1 **Cladding Thickness:** After rolling, the average cladding thickness shall be as shown. Routine measurements are not required.

| Total Thickness of<br>Composite Product<br>Inches | Cladding Thickness Per Side<br>% of Total Thickness |     |
|---------------------------------------------------|-----------------------------------------------------|-----|
|                                                   | min                                                 | max |
| 0.008 to 0.062, incl                              | 3.2                                                 | --- |
| Over 0.062 to 0.187, incl                         | 2.0                                                 | --- |
| Over 0.187 to 0.499, incl                         | 1.2                                                 | --- |
| Over 0.499 to 4.000, incl                         | 1.2                                                 | 3.0 |

5.2 Tensile Properties:

| Nominal Thickness<br>Inches | Tensile<br>Strength<br>psi, min | Yield Strength at 0.2% Offset<br>or at Extension Indicated<br>(See 5.2.1) |                                         | Elongation<br>% in 2 in.<br>or 4D, min |
|-----------------------------|---------------------------------|---------------------------------------------------------------------------|-----------------------------------------|----------------------------------------|
|                             |                                 | psi, min                                                                  | Extension<br>Under Load<br>in. in 2 in. |                                        |
| 0.008 to 0.011, incl        | 68,000                          | 58,000                                                                    | 0.0162                                  | 5                                      |
| Over 0.011 to 0.039, incl   | 70,000                          | 60,000                                                                    | 0.0166                                  | 7                                      |
| Over 0.039 to 0.062, incl   | 72,000                          | 62,000                                                                    | 0.0171                                  | 8                                      |
| Over 0.062 to 0.187, incl   | 73,000                          | 63,000                                                                    | 0.0169                                  | 8                                      |
| Over 0.187 to 0.499, incl   | 75,000                          | 64,000                                                                    | 0.0168                                  | 8                                      |
| Over 0.499 to 1.000, incl   | 77,000                          | 66,000                                                                    | 0.0168                                  | 6                                      |
| Over 1.000 to 2.000, incl   | 77,000                          | 66,000                                                                    | 0.0168                                  | 4                                      |
| Over 2.000 to 2.500, incl   | 73,000                          | 62,000                                                                    | 0.0160                                  | 3                                      |
| Over 2.500 to 3.000, incl   | 70,000                          | 60,000                                                                    | 0.0157                                  | 3                                      |
| Over 3.000 to 3.500, incl   | 70,000                          | 57,000                                                                    | 0.0151                                  | 3                                      |
| Over 3.500 to 4.000, incl   | 67,000                          | 53,000                                                                    | 0.0143                                  | 2                                      |

5.2.1 Extension under load is based upon the following values of E:

| Nominal Thickness<br>Inches | E          |
|-----------------------------|------------|
| 0.008 to 0.062, incl        | 9,500,000  |
| Over 0.062 to 0.187, incl   | 9,800,000  |
| Over 0.187 to 0.499, incl   | 10,000,000 |
| Over 0.499 to 4.000, incl   | 10,300,000 |

5.2.2 When a dispute occurs between purchaser and vendor over the yield strength values, yield strength determined by the offset method shall apply.

5.3 Bending: Material shall be capable of withstanding, without cracking, bending at room temperature through an angle of 180 deg around a diameter equal to the bend factor times the nominal thickness of the material, with axis of bend parallel to direction of rolling.

| Nominal Thickness<br>Inch | Bend<br>Factor |
|---------------------------|----------------|
| 0.008 to 0.020, incl      | 6              |
| Over 0.020 to 0.063, incl | 7              |
| Over 0.063 to 0.091, incl | 8              |
| Over 0.091 to 0.125, incl | 9              |
| Over 0.125 to 0.249, incl | 10             |
| Over 0.249 to 0.499, incl | 12             |

6. QUALITY: Material shall be uniform in quality and condition, clean, sound, and free from foreign materials and from internal and external imperfections detrimental to fabrication or to performance of parts.

7. TOLERANCES: Unless otherwise specified, tolerances shall conform to all applicable requirements of the latest issue of AMS 2202.