



## Aluminum 2219-T851

**Subcategory:** 2000 Series Aluminum Alloy; Aluminum Alloy; Metal; Nonferrous Metal

**Close Analogs:** none

**Composition Notes:** This designation is considered the sole original alloy for this alloy family. Aluminum content reported is calculated as remainder. Composition information provided by the Aluminum Association and is not for design.

**Key Words:** UNS A92219; ISO AICu6Mn; Aluminium 2219-T851; AA2219-T851

| Component | Wt. %       | Component    | Wt. %     | Component | Wt. %       |
|-----------|-------------|--------------|-----------|-----------|-------------|
| Al        | 91.5 - 93.8 | Mn           | 0.2 - 0.4 |           |             |
| Cu        | 5.8 - 6.8   | Other, each  | Max 0.05  | V         | 0.05 - 0.15 |
| Fe        | Max 0.3     | Other, total | Max 0.15  | Zn        | Max 0.1     |
| Mg        | Max 0.02    | Si           | Max 0.2   | Zr        | 0.1 - 0.25  |

**Material Notes:** Data points with the AA note have been provided by the Aluminum Association, Inc. and are NOT FOR DESIGN.

| Physical Properties       | Metric    | English                  | Comments                              |
|---------------------------|-----------|--------------------------|---------------------------------------|
| Density                   | 2.84 g/cc | 0.103 lb/in <sup>3</sup> | AA; Typical                           |
| Mechanical Properties     | Metric    | English                  | Comments                              |
| Hardness, Brinell         | 130       | 130                      | 500 kg load with 10 mm ball           |
| Hardness, Knoop           | 163       | 163                      | Converted from Brinell Hardness Value |
| Hardness, Rockwell A      | 49,50     | 49,50                    | Converted from Brinell Hardness Value |
| Hardness, Rockwell B      | 80        | 80                       | Converted from Brinell Hardness Value |
| Hardness, Vickers         | 149       | 149                      | Converted from Brinell Hardness Value |
| Ultimate Tensile Strength | 455 MPa   | 66000 psi                | AA; Typical                           |

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|------------------------------|--|--|--|
| Tensile Yield Strength       | 352 MPa  | 51000 psi  | AA; Typical  |
| Elongation at Break          | 10 %   | 10 %   | AA; Typical; 1/16 in. (1.6 mm) Thickness   |
| Modulus of Elasticity        | 73.1 GPa                                       | 10600 ksi  | AA; Typical; Average of tension and compression. Compression modulus is about 2% greater than tensile modulus. |
| Poisson's Ratio              | 0.33   | 0.33   | Estimated from trends in similar Al alloys.  |
| Fatigue Strength             | 103 MPa  | 15000 psi  | AA; 500,000,000 cycles completely reversed stress; RR Moore machine/specimen                                   |
| Shear Modulus                | 27 GPa   | 3920 ksi   | Estimated from similar Al alloys.  |
| Shear Strength               | 285 MPa  | 41300 psi  |  |
| <b>Electrical Properties</b> | <b>Metric</b>                                  | <b>English</b>                                   | <b>Comments</b>  |
| Electrical Resistivity       | 5.7e-006 ohm-cm                                | 5.7e-006 ohm-cm                                  |  |
| <b>Thermal Properties</b>    | <b>Metric</b>                                  | <b>English</b>                                   | <b>Comments</b>  |
| CTE, linear 68°F             | 22.3 $\mu\text{m}/\text{m}\cdot\text{C}^\circ$ | 12.4 $\mu\text{in}/\text{in}\cdot\text{F}^\circ$ | AA; Typical; Average over 68-212°F range.  |
| CTE, linear 250°C            | 24.1 $\mu\text{m}/\text{m}\cdot\text{C}^\circ$ | 13.4 $\mu\text{in}/\text{in}\cdot\text{F}^\circ$ | Estimated from trends in similar Al alloys. 20-300°C.  |
| Specific Heat Capacity       | 0.864 J/g·C°                                   | 0.207 BTU/lb·F°                                  |  |
| Thermal Conductivity         | 120 W/m-K                                      | 833 BTU-in/hr-ft <sup>2</sup> ·F°                |  |



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|--|---------------|----------------|--|
| Melting Point  | 543 - 643 °C  | 1010 - 1190 °F | AA; Typical range based on typical composition for wrought products 1/4 inch thickness or greater. Eutectic melting is not eliminated by homogenization. |
| Solidus  | 543 °C        | 1010 °F        | AA; Typical  |
| Liquidus   | 643 °C        | 1190 °F        | AA; Typical  |
| <b>Processing Properties</b>   | <b>Metric</b> | <b>English</b> | <b>Comments</b>  |
| Annealing Temperature  | 413 °C        | 775 °F         |  |
| Solution Temperature   | 535 °C        | 995 °F         |  |
| Aging Temperature  | 163 - 191 °C  | 325 - 375 °F   | from 18 to 36 hr at temperature  |
| <p><b>References</b> are available for this material.</p> <p>Source: <a href="#">MatWeb, The Online Materials Database</a></p> |               |                |  |