

Mechanical Properties

| Commercial | A360 | A380 | 384 | 518 | #3 Zinc | ZA-8 | ZA-12 | ZA-27 |
|-------------------------|-------|-------|-------|-------|---------|-----------|-----------|-----------|
| Tensile strength | | | | | | | | |
| Ksi | 46 | 47 | 48 | 45 | 41 | 54 | 59 | 62 |
| (MPa) | (320) | (320) | (330) | (310) | (283) | (372) | (400) | (426) |
| Yield strength | | | | | | | | |
| Ksi | 24 | 23 | 24 | 28 | 32 | 41–43 | 45–48 | 52–55 |
| (MPa) | (170) | (160) | (170) | (190) | (221) | (283–296) | (310–331) | (359–379) |
| Elongation | | | | | | | | |
| % in 2"(51mm) | 3.5 | 3.5 | 2.5 | 5.0 | 10 | 6–10 | 4–7 | 2.0–3.5 |
| Hardness | | | | | | | | |
| BHN | 75 | 80 | 85 | 80 | 82 | 100–106 | 95–105 | 116–122 |
| Shear strength | | | | | | | | |
| Ksi | 26 | 27 | 29 | 29 | 31 | 40 | 43 | 47 |
| (MPa) | (180) | (190) | (200) | (200) | (214) | (275) | (296) | (325) |

Physical Properties

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|-----------------------------------|--------|--------|--------|--------|---------|--------|--------|--------|
| Density | | | | | | | | |
| (lb/in ³) | 0.095 | 0.098 | 0.102 | 0.093 | 0.24 | 0.227 | 0.218 | 0.181 |
| (g/cm ³) | (2.63) | (2.71) | (2.82) | (2.57) | (6.6) | (6.3) | (6.03) | (5.0) |
| Electrical conductivity | | | | | | | | |
| %IACS | 29 | 23 | 22 | 24 | 27 | 27.7 | 28.3 | 29.7 |
| Thermal conductivity | | | | | | | | |
| BTU/ft hr °F | 65.3 | 55.6 | 55.6 | 55.6 | 65.3 | 66.3 | 67.1 | 72.5 |
| (W/m °k) | (113) | (96.2) | (96.2) | (96.2) | (113) | (115) | (116) | 122.5 |
| Coef. of thermal expansion | | | | | | | | |
| μ in./in./ °F x 10 ⁻⁶ | 11.6 | 12.1 | 11.6 | 13.4 | 15.2 | 12.9 | 13.4 | 14.4 |
| (μ m/m°k) | (21.0) | (21.8) | 21.0 | (24.1) | (27.4) | (23.2) | (24.1) | (26.0) |

Chemical Specification

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|-----------------------------|------------------|-----------------|-------------------|---------|--------------------|------------------------------|-------------------------------|--------------------------------|
| Nominal composition | Mg 0.5 Si 9.5 | Cu 30 Si 8.5 | Cu 3.8 Si 11.0 | Mg 8.0 | Al 4.0 Mg 0.035 | Al 8.4 Mg 0.023 Cu 1.0 | Al 11.0 Mg 0.023 Cu .88 | Al 27.0 Mg 0.015 Cu 2.25 |
| Detailed composition | | | | | | | | |
| Silicone (Si) | 9.0–10.0 | 7.5–9.5 | 10.5–12.0 | 0.35 | — | — | — | — |
| Iron (Fe) | 1.3 | 1.3 | 1.3 | 1.8 | 0.10 | 0.075 | 0.075 | 0.075 |
| Copper (Cu) | 0.6 | 3.0–4.0 | 3.0–4.5 | 0.25 | 0.25 max | 0.8–1.3 | 0.5–1.2 | 2–2.5 |
| Manganese (Mn) | 0.35 | 0.5 | 0.5 | 0.35 | — | — | — | — |
| Magnesium (Mg) | 0.4–0.6 | 0.10 | 0.10 | 7.5–8.5 | .02–.05 | .015–.030 | .015–.030 | .010–.020 |
| Nickel (Ni) | 0.5 | 0.5 | 0.5 | 0.15 | — | — | — | — |
| Zinc (Zn) | 0.5 | 3.0 | 3.0 | 0.15 | Balance | Balance | Balance | Balance |
| Tin (Sn) | 0.15 | 0.35 | 0.35 | 0.15 | 0.003 | 0.003 | 0.003 | 0.003 |
| Cadmium (Cd) | — | — | — | — | 0.004 | 0.006 | 0.006 | 0.006 |
| Aluminum (Al) | Balance | Balance | Balance | Balance | 3.5–4.3 | 8.0–8.8 | 10.5–11.5 | 25.0–28.0 |

Characteristics

On a scale from 1–5, with 1 being most desirable and 5 being the least desirable

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|----------------------------------|------|------|-----|-----|---------|------|-------|-------|
| Resistance to hot cracking | 1 | 2 | 2 | 5 | 1 | 2 | 3 | 4 |
| Pressure tightness | 2 | 2 | 2 | 5 | 1 | 3 | 3 | 4 |
| Corrosion resistance | 2 | 4 | 5 | 1 | 3 | 2 | 2 | 1 |
| Ease and quality | | | | | | | | |
| Machining | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 4 |
| Polishing | 3 | 3 | 3 | 1 | 1 | 2 | 3 | 4 |
| Electroplating | 2 | 1 | 2 | 5 | 1 | 1 | 2 | 3 |
| Strength at elevated temperature | 1 | 3 | 2 | 4 | — | — | — | — |
| Die filling capacity | 3 | 2 | 1 | 5 | 1 | 2 | 3 | 3 |
| Anodizing | 3 | 3 | 4 | 1 | 1 | 1 | 2 | 2 |