

ALUMINUM-SILICON-COPPER

| ANSI AA NUMBER | 319.0 | | | | 355.0 | | | |
|--|---|------------|-----------|--|------------|------------|-----------|------------|
| Common Name (Not recommended) | | | | | | | | |
| UNS Designation | A03190 | | | | A03550 | | | |
| COMPOSITION PERCENT | Min | Max | | | Min | Max | | |
| Silicon (Si) | 5.50 | 6.50 | | | 4.50 | 5.50 | | |
| Iron (Fe) | | 1.00 | | | | 0.60 | | |
| Copper (Cu) | 3.00 | 4.00 | | | 1.00 | 1.50 | | |
| Manganese (Mn) | | 0.50 | | | | 0.50 | | |
| Magnesium (Mg) | | 0.10 | | | 0.40 | 0.60 | | |
| Chromium (Cr) | | | | | | 0.25 | | |
| Nickel (Ni) | | 0.35 | | | | | | |
| Zinc (Zn) | | 1.00 | | | | 0.35 | | |
| Titanium (Ti) | | 0.25 | | | | 0.25 | | |
| Other (Total) | | 0.50 | | | | 0.15 | | |
| NEAREST APPLICABLE CASTING STANDARDS | | | | | | | | |
| ASTM (B Series) | B26 | | | | B26 | | | |
| SAE (J Series) | | | | | | | | |
| Federal (QQ-C- Series) | 601e | | | | 601e | | | |
| Military (Mil-C- Series) | 21180c | | | | 21180c | | | |
| MINIMUM PROPERTIES | F | T5 | T6 | | T51 | T6 | T7 | T71 |
| Tensile Strength (ksi) | 23 | 25 | 31 | | 25 | 32 | 35 | 30 |
| Yield Strength (.5% extension under load) (ksi) | 13 | 21 | 20 | | 18 | 20 | 34 | 22 |
| Elongation (2 inch gauge length) (%) | 1.5 | 1 | 1.5 | | 1.5 | 2 | 0.5 | 1 |
| Compressive Yield Strength (ksi) | 19 | 27 | 25 | | 24 | 26 | 38 | 30 |
| Hardness (Brinell) (HB @ 500kg) | 70 | 80 | 80 | | 65 | 80 | 85 | 75 |
| Shear Strength (ksi) | 22 | 24 | 29 | | 22 | 28 | 28 | 26 |
| Endurance Limit (K ksi) | 10 | 11 | 11 | | 8 | 9 | 10 | 10 |
| Modulus of Elasticity (K ksi) | 10.7 | 10.7 | 10.7 | | 10.2 | 10.2 | 10.2 | 10.2 |
| Density (lb/cu.in. @ 68F) | .101 | | | | .098 | | | |
| Electrical Conductivity (% IACS @ 68F) | 27 | | | | 43 | 36 | 42 | 39 |
| Thermal Conductivity (cal/sec/sq cm/cm/C @ 25C) | 0.26 | | | | 0.4 | 0.34 | 0.39 | 0.36 |
| Coefficient of Thermal Expansion (per F @ 68-212F) | 11.9 | | | | 12.4 | | | |
| Coefficient of Thermal Expansion (per F @ 68-572F) | 12.7 | | | | 13.7 | | | |
| Melting Range (Liquidus-Solidus)(F) | 960-1120 | | | | 1015-1150 | | | |
| Resistance to Hot Cracking | VG | | | | E | | | |
| Pressure Tightness | VG | | | | E | | | |
| Fluidity | VG | | | | E | | | |
| Solidification Shrinkage Tendency | VG | | | | E | | | |
| Strength at Elevated Temperatures | G | | | | VG | | | |
| Corrosion Resistance | G | | | | G | | | |
| Machinability | G | | | | G | | | |
| Polishing | F | | | | G | | | |
| Gas Welding | VG | | | | E | | | |
| Arc Welding | VG | | | | E | | | |
| Brazing | No | | | | No | | | |
| Normally Heat Treated | Optional | | | | Yes | | | |
| Anodizing Appearance | Gray | | | | Gray | | | |
| Electroplating | VG | | | | VG | | | |
| Applications: | Rear axle housings, engine parts, impellers, aircraft fittings, water jackets, crank cases, electric motor parts, engine blocks, jet engine compressor cases, transmission cases, flywheel housings, airframe castings, missile components. 319.0 is one of the most popular aluminum alloys. | | | | | | | |

* Not Recommended



All mechanical properties listed are typical and not minimums. Always consult applicable specs and use good engineering judgment. Consult your foundry early in the design process.

St. Paul Brass and Aluminum Foundry

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