

| Mechanical Properties | Die Cast | Die Cast | Die Cut | Die Cast | Perm Mold | Die Cast | Sand Cast | Perm Mold | Die Cast | Sand | Cast | Sand | Cast HT | Die Cast |
|--|------------|------------|------------|------------|-----------------|----------|-----------------|-----------------|----------|-----------------|-----------------|----------|---------|----------|
| Ultimate Tensile Strength σ_{UTS} $\times 10^6$ (MPa) | 41 (282.7) | 48 (326.0) | 41 (282.7) | 52 (358.5) | 32-37 (221-255) | 54 (374) | 40-46 (276-317) | 45-50 (310-345) | 58 (404) | 58-64 (400-441) | 45-47 (310-324) | 61 (425) | | |
| Yield Strength - 0.2% Offset $\sigma_{0.2}$ $\times 10^6$ (MPa) | - | - | - | - | 29 (207) | 42 (290) | 30 (207) | 39 (268) | 46 (320) | 53 (372) | 37 (255) | 53 (371) | | |
| Elongation ϵ % | 10 | 7 | 13 | 7 | 1-2 | 6-10 | 1-3 | 1-3 | 4-7 | 3-6 | 8-11 | 1-3 | | |
| Shear Strength σ_s $\times 10^6$ (MPa) | 31 (213.7) | 38 (262.0) | 31 (213.7) | 46 (317.0) | 35 (241) | 40 (275) | 37 (255) | - | 43 (296) | 42 (290) | 33 (228) | 47 (325) | | |
| Hardness, Brinell | 82 | 91 | 80 | 100 | 85-90 | 95-110 | 90-105 | 90-105 | 95-115 | 110-120 | 90-110 | 105-125 | | |
| Impact Strength K_{IC} (J) | 43 (58.3) | 48 (65.1) | 43 (58.3) | 35 (47.5) | - | 31 (42) | 19 (25) | - | 21 (29) | 35 (47) | 43 (58) | 9 (5) | | |
| Fatigue Strength Rotary Bend - 5×10^7 cycles σ_f $\times 10^6$ (MPa) | 6.9 (47.6) | 8.2 (56.5) | 6.8 (46.9) | 8.5 (58.6) | 7.5 (52) | 15 (103) | 15 (103) | - | 17 (117) | 25 (172) | 15 (103) | 21 (145) | | |
| Compressive Yield Strength - 0.1% Offset $\sigma_{0.1}$ $\times 10^6$ (MPa) | 60 (413.7) | 87 (599.8) | 60 (413.7) | 93 (641.2) | 30.5 (210) | 37 (252) | 33 (227) | 34 (234) | 39 (269) | 48 (331) | 37 (255) | 52 (365) | | |

Physical Properties

| | | | | | | | | | | | | | | |
|---|-------------------|-------------------|-------------------|-------------------|-------------------|------|-------------------|-----------|-------------------|------------|------------|------|--|--|
| Density ρ (g/cm ³) | 24 (6.6) | 24 (6.6) | 24 (6.6) | 24 (6.6) | 0.227 (6.3) | | 0.218 (6.0) | | 0.181 (5.0) | | | | | |
| Melting Range (°F/°C) | 719-728 (381-387) | 717-727 (380-386) | 718-728 (381-387) | 715-734 (379-390) | 707-759 (375-404) | | 710-810 (377-432) | | 708-903 (376-484) | | | | | |
| Electrical Conductivity % IACS | 27 | 26 | 27 | 25 | 27.7 | | 28.3 | | 29.7 | | | | | |
| Thermal Conductivity k (W/m·K) (BTU-in/ft ² ·h·°F) | 65.3 (113.0) | 62.9 (108.9) | 65.3 (113.0) | 60.5 (104.7) | 66.3 (114.7) | | 67.1 (116.1) | | 72.5 (125.5) | | | | | |
| Coefficient of Thermal Expansion α (55-212°F) (100-200°C) (mm/mm·°C) | 15.2 (27.4) | 15.2 (27.4) | 15.2 (27.4) | 15.4 (27.4) | 12.9 (23.3) | | 13.4 (24.2) | | 14.4 (26.0) | | | | | |
| Specific Heat c_p (BTU/lb·°F) (J/kg·°C) | .10 (418.7) | .10 (418.7) | .10 (418.7) | .10 (418.7) | .104 (435.4) | | .107 (448.0) | | .125 (534.4) | | | | | |
| Pattern or Die Shrinkage: in/in | .006 | .006 | .006 | .006 | 1/8 in/in | .007 | 1/8 in/in | 1/8 in/in | .0075 | 5/32 in/in | 5/32 in/in | .008 | | |

Chemical Specifications

(per ASTM) % by weight

| | Ingot | Casting | Ingot | Casting | Ingot | Casting | Ingot | Casting | Ingot | Casting | Ingot | Casting | | |
|----|-----------|---------|----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Al | 3.9-4.3 | 3.5-4.3 | 3.9-4.3 | 3.5-4.3 | 3.9-4.3 | 3.5-4.3 | 3.9-4.3 | 3.5-4.3 | 8.2-8.8 | 8.0-8.8 | 10.8-11.5 | 10.5-11.5 | 25.5-28.0 | 25.0-28.0 |
| Mg | .025-.050 | .02-.05 | .03-.06 | .03-.08 | .01-.02 | .005-.020 | .025-.050 | .020-.050 | .020-.030 | .015-.030 | .020-.030 | .015-.030 | .012-.020 | .010-.020 |
| Cu | .10 max | .25 max | .75-1.25 | .75-1.25 | .10 max | .25 max | 2.6-2.9 | 2.5-3.0 | 0.8-1.3 | 0.8-1.3 | 0.5-1.25 | 0.5-1.25 | 2.0-2.5 | 2.0-2.5 |
| Fe | .075 | .10 | .075 | .10 | .075 | .075 | .075 | .10 | 0.65 | 0.75 | 0.65 | 0.75 | 0.72 | 0.75 |
| Pb | .004 | .005 | .004 | .005 | .002 | .003 | .004 | .005 | .005 | .006 | .005 | .006 | .005 | .006 |
| Cd | .003 | .004 | .003 | .004 | .002 | .002 | .003 | .004 | .005 | .006 | .005 | .006 | .005 | .006 |
| Sr | .002 | .003 | .002 | .003 | .001 | .001 | .002 | .003 | .002 | .003 | .002 | .003 | .002 | .003 |
| Ni | - | - | - | - | .005-.020 | .005-.020 | - | - | - | - | - | - | - | - |
| Zn | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance | Balance |

Industry Standards

| | Ingot | Casting | Ingot | Casting | Ingot | Casting | Ingot | Casting | | | | | | |
|------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| ASIM | 8240-88 | B86-88 | 8240-88 | 886-88 | 8240-88 | 886-88 | 8240-88 | 886-88 | 8669-89 | 8791-88 | 8669-89 | 8791-88 | 8669-89 | 8791-88 |
| | AG40A | AG40A | AC-11A | AC41A | AG408 | AG408 | AC43A | AC43A | | | | | | |
| | J4688 | J4688 | J468B | J468B | | | former | | | | | | | |
| | 903 | 903 | 925 | 925 | | | 921 | | | | | | | |