

ROD & BAR ALLOY 7068

ALLOY DESCRIPTION

Alloy 7068 offers some of the highest strength mechanical properties available in an extruded product. Intended for aerospace, ordnance and light weight recreational applications where extremely high strength is required. Property levels are typically in the 100 KSI range for ultimate strengths.

TYPICAL MECHANICAL PROPERTIES

| Temper | Tensile (.500" Dia. Specimen) | | | | Elongation/4D | Hardness Brinell 500 kg 10 mm | Shear | | Fracture Toughness | |
|-------------|-------------------------------|-----|-------|-----|---------------|--|----------------------------|----------|--------------------|-----|
| | Ultimate | | Yield | | | | Ultimate Shearing Strength | ksi √in. | | |
| | KSI | MPa | KSI | MPa | | | | % | KSI | MPa |
| T6, T6511 | 103 | 710 | 99 | 683 | 9 | 190 | 53 | 365 | 25 | 15 |
| T6, T651 | 100 | 698 | 94 | 648 | 9 | 185 | | | | |
| T76, T76511 | 89 | 614 | 83 | 572 | 9 | 170 | | | | |

COMPARATIVE CHARACTERISTICS

| Temper | Corrosion Resistance | | Cold Workability ³ | Machinability ³ | Anodize Response ³ | Brazeability ⁴ | Weldability ⁴ | | |
|-------------|----------------------|---------------------|-------------------------------|----------------------------|-------------------------------|---------------------------|--------------------------|-----|------|
| | General ¹ | Stress ² | | | | | Gas | Arc | Spot |
| T6, T6511 | C | C | D | C | B | D | D | D | B |
| T76, T76511 | C | B | D | C | B | D | D | D | B |

- Ratings A through E are relative ratings in decreasing order of merit, based on exposures to sodium chloride solution by intermittent spraying or immersion. Alloys with A and B ratings can be used in industrial and seacoast atmospheres without protection. Alloys with C, D and E ratings generally should be protected at least on faying surfaces.
- Stress-corrosion cracking ratings are based on service experience and on laboratory tests of specimens exposed to the 3.5% sodium chloride alternate immersion test.
 A= No known instance of failure in service or in laboratory tests.
 B= No known instance of failure in service; limited failures in laboratory tests of short transverse specimens.
 C= Service failures with sustained tension stress acting in short transverse direction relative to grain structure; limited failures in laboratory tests of long transverse specimens.
 D= Limited service failures with sustained longitudinal or long transverse areas.
- Ratings A through D for Workability (cold), A through E for Machinability and A through C for Anodize Response, are relative ratings in decreasing order of merit.
- Ratings A through D for Weldability and Brazeability are relative ratings defined as follows:
 A= Generally weldable by all commercial procedures and methods.
 B= Weldable with special techniques or for specific applications that justify preliminary trials or testing to develop welding procedure and weld performance.
 C= Limited weldability because of crack sensitivity or loss in resistance to corrosion and mechanical properties.
 D= No commonly used welding methods have been developed.

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APPLICABLE SPECIFICATIONS

| Cold Finished | Extruded |
|---------------|----------|
| | AMS 4331 |

CHEMICAL COMPOSITION LIMITS

| | | | | | | | | | | Others | |
|----------|------|------|------|------|------|------|------|------|------|--------|-------|
| Weight % | Si | Fe | Cu | Mn | Mg | Cr | Zn | Ti | Zr | Each | Total |
| Minimum | | | 1.60 | | 2.20 | | 7.30 | | 0.05 | | |
| Maximum | 0.12 | 0.15 | 2.40 | 0.10 | 3.00 | 0.05 | 8.30 | 0.10 | 0.15 | 0.05 | 0.15 |

TYPICAL PHYSICAL PROPERTIES

| Characteristic | | | English | Metric |
|---|--|-------------|---|---|
| Nominal Density (68 °F / 20 °C) | | | 0.103 lbs./in. ³ | 2.85 Mg/m ³ |
| Melting Range | | | 890 °F - 1175 °F | 476 °C - 635 °C |
| Specific Heat (212 °F / 100 °C) | | | 0.25 BTU/lb. - °F | 1050 J/kg - °K |
| Coefficient of Thermal Expansion | Linear 68 °F - 212 °F 20 °C - 100 °C | | 13.0 micro in./in. - °F | 23.4 micro m/m - °K |
| | Volumetric 68 °F / 20 °C | | 3.78 x 10 ⁻⁵ in. ³ /in. ³ - °F | 68 x 10 ⁻⁶ m ³ /m ³ - °K |
| Thermal Conductivity (68 °F / 20 °C) | T6, T6511 | | 110 BTU/ft. - hr. - °F | 190 W/m - °K |
| Electrical Conductivity (68 °F / 20 °C) | Equal Volume | T6, T6511 | 31% IACS | |
| | | T76, T76511 | 39% IACS | |
| Electrical Resistivity (68 °F / 20 °C) | T6, T6511 | | | 49.4 micro ohm meter |