Aluminium alloy

7050
Al Zn6CuMgZr

Specifications

European standard: EN AW-7050 [Al Zn6CuMgZr]
AECMA:
- Designation: AL-P7050
WL : 3.4144
UNS : A97050

Mechanical Properties

- Forged T7452 condition. 150/175mm thickness
  - Tensile test at ambient temperature, longitudinal direction
    - UTS: > 469 N/mm²
    - 0.2 % Yield strength: > 400 N/mm²
    - Elongation (5d): > 9 %

- Closed-die forged T74 condition. 100/125mm thickness
  - Tensile test at ambient temperature, longitudinal direction
    - UTS: > 483 N/mm²
    - 0.2 % Yield strength: > 414 N/mm²
    - Elongation (5d): > 7 %
    - K1c (L-T direction): > 27.5 MPa√m

Composition

- Zinc ....................................................6.20
- Copper ..............................................2.30
- Magnesium ........................................2.30
- Zirconium ..........................................0.12
- Aluminium ..........................Base

Applications

- Closed-die forgings and large forged bars for the aerospace industry.
- This alloy has been specifically designed for structural components subject to high fatigue stress and the risk of corrosion.

Characteristics

- This alloy used in the over-aged T74 condition achieves a good balance between mechanical properties (strength, toughness and fatigue) and stress corrosion resistance.
- In the over-aged T76 condition, it is particularly resistant to exfoliation corrosion.
- Its good hardenability makes it suitable for producing thick parts.
HEAT TREATMENT

- Solution treatment 475 °C
- Water quench
- Age between 100 and 180 °C depending on properties required and the section of the component.
- The over-aged T74 and T76 conditions are the most common and are defined in Standard NF EN 515.
- Closed die forgings can be stress relieved between solution treatment and aging.
- T7452 and T7652 stress relieved by compression before T74 over-aging, and T7454 and T7654 achieved by further cold closed die forging, are the most common conditions. These are defined in Standard NF EN 515.

PHYSICAL PROPERTIES

- Density: 2.83

- Modulus of elasticity in N/mm²:
  - at 20 °C: 71.5 x 10⁶

- Mean coefficient of expansion in m/m.°C:
  - between 20 °C and 100 °C: 23.5 x 10⁻⁶
  - between 20 °C and 200 °C: 24.4 x 10⁻⁶
  - between 20 °C and 300 °C: 25.4 x 10⁻⁶

- Thermal conductivity in W.m/m².°C:
  - at 20 °C: 154 (T76 condition)

- Mean specific heat in J/g.°C:
  - between 0 °C and 100 °C: 0.86

- Electrical resistivity in µΩ.cm²/cm:
  - at 20 °C: 4.36 (T76 condition)

- Electrical conductivity in S/m:
  - at 20 °C: > 23 x 10⁶ (T76 condition)

AUBERT & DUVAL

22, rue Henri-Vuillemin • 92230 Gennevilliers - France
Tel: 33 (0)1 55 02 58 00 • Fax: 33 (0)1 55 03 58 01
Internet: http://www.aubertduval.fr • e-mail: dircom@aubertduval.fr

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