



## ELEKTRON<sup>®</sup> 43 PLATE PRODUCTS

Elektron 43 is a light, high strength wrought magnesium alloy for use at temperatures up to 250°C. Designs in Elektron 43 can be 20% to 30% lighter than a corresponding aluminium design. Elektron 43 is available as rolled plate, extruded bar and profile, and forging stock. Elektron 43 is a wrought evolution of the original casting alloy, Elektron WE43.

### APPLICATIONS

The isotropic properties of Elektron 43 means it is well suited for use as feedstock material from which to machine high performance components, especially those associated with elevated temperature applications.

Elektron 43 has undergone extensive flammability testing by the Federal Aviation Administration (FAA). The FAA has shown that the use of Elektron 43 in aircraft interior components does not reduce the level of safety of the aircraft when compared to heavier aluminium seat components<sup>1</sup>.

The high specific stiffness and good ductility of the alloy make it an ideal metallic material for achieving weight reduction in applications that would traditionally employ aluminium alloys.

Elektron 43 free machines at significantly higher rates than aluminium alloys, which leads to much shorter part fabrication times where machining is key aspect of the part cost.

### DESIGNATIONS

|                         |        |
|-------------------------|--------|
| ASTM alloy designation: | WE43C  |
| UNS number:             | M18434 |

### SPECIFICATIONS

**AMS 4371** - Magnesium Alloy, Plate  
4.0Y - 2.25Nd - 0.5Zr (WE43C - T5)  
Precipitation Heat Treated

**MMPDS-09** (and later versions) – including full A & B basis statistical analysis of properties.

### CHEMICAL COMPOSITION

|             |            |
|-------------|------------|
| Yttrium     | 3.7 – 4.3% |
| Rare Earths | 2.3 – 3.5% |
| Zirconium   | 0.2% min   |
| Magnesium   | Balance    |

### HEAT TREATMENT

Elektron 43 develops its maximum strength in the artificially aged (T5) heat treated condition.

### PHYSICAL PROPERTIES

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| Specific Gravity:                 | 1.83                                 |
| Coefficient of Thermal Expansion: | $25.6 \times 10^{-6} \text{K}^{-1}$  |
| Thermal Conductivity:             | $57.6 \text{ Wm}^{-1} \text{K}^{-1}$ |
| Specific Heat:                    | $993 \text{ Jkg}^{-1} \text{K}^{-1}$ |
| Electrical Resistivity:           | 148 nΩm                              |
| Modulus of Elasticity:            | 44.1 GPa                             |
| Poisson's Ratio:                  | 0.3                                  |
| Melting Range:                    | 540 – 640°C                          |
| Damping Index:                    | 0.09                                 |
| Brinell Hardness:                 | 70-90                                |

# ELEKTRON<sup>®</sup> 43 DATA

## MECHANICAL PROPERTIES

### AVERAGE TENSILE PROPERTIES

Nominal Thickness Range:  
12mm to 38mm (0.5 inch to 1.5 inch)

|                             | L        | LT       |
|-----------------------------|----------|----------|
| 0.2% Proof Stress MPa (ksi) | 262 (38) | 234 (34) |
| Tensile Strength MPa (ksi)  | 345 (50) | 352 (51) |
| Elongation %                | 19       | 19       |

Nominal Thickness Range:  
39mm to 76mm (1.501 inch to 3 inch)

|                             | L        | LT       |
|-----------------------------|----------|----------|
| 0.2% Proof Stress MPa (ksi) | 241 (35) | 241 (35) |
| Tensile Strength MPa (ksi)  | 372 (54) | 379 (55) |
| Elongation %                | 17       | 17       |

Nominal Thickness Range:  
77mm to 153mm (3.001 inch to 6 inch)

|                             | L        | LT       |
|-----------------------------|----------|----------|
| 0.2% Proof Stress MPa (ksi) | 262 (38) | 248 (36) |
| Tensile Strength MPa (ksi)  | 365 (53) | 372 (54) |
| Elongation %                | 9        | 9        |

L - Longitudinal direction    LT - Long Transverse direction

## DESIGN DATA

Longitudinal – Specification minima (A-basis statistical)

Nominal Thickness Range:  
12.7 to 38.1 mm (0.5 to 1.5 inch)

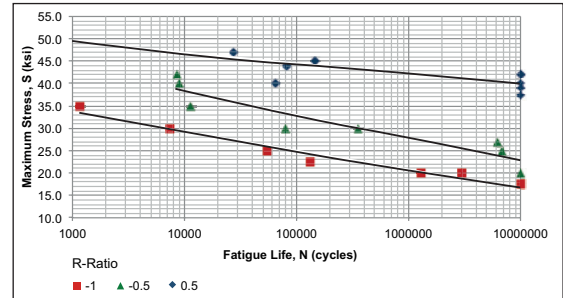
| 0.2% Proof Stress MPa (ksi) | 303 (44) |
|-----------------------------|----------|
| Tensile Strength MPa (ksi)  | 228 (33) |
| Elongation %                | 12       |

Nominal Thickness Range:  
38.1 to 152.4 mm (1.5 to 6 inch)

| 0.2% Proof Stress MPa (ksi) | 324 (47) |
|-----------------------------|----------|
| Tensile Strength MPa (ksi)  | 207 (30) |
| Elongation %                | 6        |

## Fatigue Properties

### ASTM E466 Axial Fatigue



## OTHER PROPERTIES

### MACHINING

Elektron 43, like all magnesium alloys, machines faster than any other metal. The power per cubic centimetre of metal removed varies from 9 to 14 watts per minute, depending on the operation.

### CORROSION RESISTANCE

Corrosion rate < 30mpy

### SURFACE TREATMENT

Elektron 43 can be anodised with treatments including: Keronite<sup>®</sup>, Tagnite<sup>®</sup> and MagOxid<sup>®</sup>, amongst others.

Conversion coatings that are Hexavalent chromium free are also available. These include:

Alodine<sup>®</sup> 160/161, Surttec<sup>®</sup> 650, Metalast<sup>®</sup> TCP-HF, Oxsilan<sup>®</sup> MG 0611, Gardobond<sup>®</sup> X4729, and MagPass<sup>®</sup>, amongst others.

Like all magnesium alloys, Elektron 43 can be painted or coated using conventional techniques following pre-treatment.

† The information contained within is meant as a guideline only

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