

# Surface Protection Design for Magnesium Components in Aircraft Cabin

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Despite increasing use in the automotive industry, the use of magnesium in the aerospace industry has been relatively stable, relying upon specialty areas such as engines and gearbox applications. Nowadays, however, interest in magnesium is growing for more general use in civil aircraft, as well as in the general aerospace industry. Magnesium, as the lightest construction metal, has a high potential to offer cost effective options for weight reduction in system and secondary structure components.

Historically, every aerospace engineer planning to use magnesium has faced two challenges – chemical reactivity of magnesium (general corrosion) and the risk of galvanic corrosion. In recent years, high-purity based magnesium alloys with tailored compositions, such as AZ91E, Elektron 43 and Elektron 21 have largely addressed the general corrosion issue, providing a competitive light-weight solution to commercially used aluminum alloys. Despite these alloy improvements, demanding applications still require good design and correct application of appropriate surface protection schemes. Meanwhile galvanic corrosion is unchanged by the high-purity alloys and requires attention to detail in component design and choice of protection system.

Solutions for these design challenges cannot be based on only one specific coating, but should be provided by proper design of the protection scheme based on an optimal combination of conductive and non-conductive surface treatments, selective coatings, sealants, sealers and paints.

The presentation provides up-to-date information about base alloy and temper selection, and the cleaners, chemical coatings, flammability retardant coating, anodizing technology and sealants used to protect magnesium components in aircraft cabins. Examples of applications based on real aerospace components and test data will be shown.

The presentation includes some data and test results from the FP6 Aeromag and FP6 Magforming projects that were funded by the European Commission.