

Ecoland at a glance

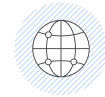
The need for high performance lightweight materials is pushing the aerospace industry to use more aluminium in many parts of the aircraft. All aircraft components, and especially those of landing gear parts, need to withstand wear and corrosive environments while continuing to operate at optimum levels.

Nowadays most landing gear parts are protected against corrosion by surface treatment via chromic anodising followed by multilayer painting, the anti-corrosion properties being conferred by compounds based on hexavalent chromium - Cr (VI). To date, **there is no Cr-free corrosion protection treatment for aluminium alloys of Al 7000 series fulfilling the aeronautics requirements.** For this reason, it is necessary to develop an environmentally acceptable, Cr-free process.

Thanks to the ECOLAND project, a new Cr-free coating system will be developed with which parts of complex geometries will be treated, making it possible to design lighter landing gear components.



The Project in numbers



2SP/1UK
countries



23
months



347K€
funding



3
partners

Partners



Topic Manager

LIEBHERR

Find out more!

<https://www.cidetec.es/en/projects/surface-engineering-6/ecoland-4>

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This project contributes to Eco Design Transversal Activity



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DEVELOPMENT OF ECO-FRIENDLY PROTECTION PROCEDURES FOR LANDING GEAR ALUMINIUM ALLOYS

The project

In this project the main goal is the development of an alternative treatment to Cr(VI) anodising that is based on an anaphoretic electrocoating or "E-coat" process that meets REACH standards. Anaphoretic electrocoating consists of applying an organic coating anodically by immersion using electric current. It has the advantage of enabling painting without the need for preliminary priming.

This makes it doubly interesting since it facilitates the reduction of application time (reducing production time by about 55 %) while replacing with a single coat, two layers that usually contain Cr(VI), such as those produced by chromic anodising and primers currently in use, will be prohibited starting in 2024 to meet European REACH regulations.

The treatment developed in the course of the project will be mainly applied to series 7000 aluminium alloys, very often used in aerospace applications for their mechanical strength. The treatment improvement is expected to lengthen the useful life of the components treated by 25 % in comparison with traditional anodised and painted systems and to reduce manufacturing costs by at least 30 %. Moreover, thanks to the new coating system, parts of more complex geometries can be treated, making it possible to design lighter landing gear components.



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Today conventional system



Total time of processing: 10-13 h
Anodising (2-3 h) + Painting (8-10 h)

Alternative E-coat system



Total time of processing: 4.7-6.3 h
E-coat (0.7-1.3 h) + Painting (4-5 h)

The objective

ECOLAND is about developing a suitable **REACH compliant anaphoretic electrocoating** (E-coat) treatment (including both the optimal pretreatment method and E-coat application conditions) that can replace the currently used **Cr(VI)-based anodising + painting** treatment for protection of Al 7000 series alloys in aeronautic applications. **Decreases in material use, production time and environment impact and costs** are intended at the same time as **increases in corrosion resistance and service life**.

Scaling up to industry levels

To show the flexibility of the ECOLAND technology, it has installed a pilot plant with a capacity of 400

litres. The project will pre-treat and e-coat a total of at least 8 prototypes from the aerospace sector.

The best-found solution to protect full size prototypes of landing gear parts, and the corresponding testing against the required aerospace standards will be evaluated. Characteristics such as **endurance** (corrosion resistance and mechanical properties) as well as **adhesion** will be assessed. Quality test of prototypes will be used for the assessment of the TRL 5 achievement ("technology validated in relevant environment").

E-coat system

