

Abstract

Galvanic coverages in aircraft building. Causing of hard oxide coverages on a detail from an aluminium.

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The project of diplom has developed a technological process of applying protective oxide coverage to aluminium parts airplane sheathing. Metallurgy has played a key role in the development of aviation. With the discovery of new materials, new applications have been found to apply these too or to fastly improve existing designs.

Aluminum important in aircraft construction, though in recent years some new alloys have been applied. These super alloys are still quite expensive for the aircraft. With its good strength to weight and cost ratio, aluminum is still used very widely in the industry.

Most common temper designations found are T3 and T6. T3 is solution heat-treated and cold-worked by the flattening process. T6 is solution heat-treated and artificially aged.

T3 is the most common of the the high-strength aluminum alloys. It is high grade aircraft quality. T3 aluminum sheet is thought of as the aircraft alloy because of its strength and it also has excellent fatigue resistance. Welding is generally not recommended. Typical uses for T3 aluminum sheet are fuselage and wing skins, cowls, aircraft structures, and also for repair and restoration because of its shiny finish.

Oxide aluminum and its alloys have high stability under atmospheric corrosion. Oxide alloy due to their high porosity with a very pronounced absorption capacity are well impregnated with lubricants and lubricating solutions, which further increases their corrosion resistance.

Entrance control

Details that acted on anodization are subject entrance control, according to requirements to quality of surface of details before overcoating.

- 1) Editing of details on pendants
- 2) Chemical depriving of fat
- 3) Washings by a warm tap water

- 4) Washings running plumbing
- 5) Digestion is chemical
- 6) Washing by a running tap water
- 7) defecation
- 8) Washing by a running tap water
- 9) Anodization
- 10) Washing by a running tap water
- 11) Washing by warm water
- 12) Drying
- 13) Dismantling
- 14) Control of quality of coverage

Sulfuric acid provides an aluminum coating of high hardness. Sulfuric acid requires less electricity than other electrolytes. Sulfuric acid is the most affordable and cheap.

Composition of the electrolyte:

sulfuric acid 180 g/l

Electrolysis mode:

Current density 2-5 A/dm²

Voltage 65 V

Temperature 0-5 °C

Standing 38 min

Material of cathodes and suspended devices

Cathodes are usually made of lead, when anodized in sulfuric acid. Pendants for details it is recommended to make from an aluminium. Fastening of details must be hard, that oxidizing tape could not appear on pin surfaces.

Voltage on bath anodizations U consists of difference of electrode potentials of anode and cathode under the current of $E_a - E_k$, Om powerfailure in the electrolyte $\Delta of U_{om}$, in the explorers of the first conductor (electrodes, in bath, barbells) $\Delta of U_I$ and in the contacts $\Delta of U_k$

Voltage balance:

1) Differences of potentials under the current of $E_a - E_k$	57,674 V
2) Powerfailure in the electrolyte $\Delta of U_{om}$	0,826 V
3) A powerfailure is in electrodes, contacts and explorers	6,5 V
4) In all	65 V

Technological information:

- 1) Productive program - 12000 m²/year
- 2) Thickness of coverage - 65 mkm
- 2) Sizes of detail from an aluminium alloy - 500×1000×1mm
- 4) Time of treatment of one loading 37min

During the application of galvanic coatings, a significant amount of Joule heat is released, which may lead to the heating of the electrolyte beyond the permissible temperature. Heat exchangers must be installed to cool the electrolyte, to ensure electrolysis.

Economic and organizational calculations

A production is low-powered (12000 m² of the anodized surface on a year) and hand labour prevails in a work. All technological process consists of fifteen stages. For that his continuity was not violated, each of them must be executed in the certain interval of time. To ensure the continuity of the production cycle it is necessary: five suspension devices, twenty baths (5 baths of warm rinsing, 5 baths of cold wash, chemical degreasing, 5 anodizing baths) and a drying chamber.

An index of Ground is for the calculations of Value of indexes of enterprise:

1. Producing, m ² /year	12000
2. Cost of capital assets, hrn.	869000
3. Cost of turnover means, hrn.	1390576,4
4. Capital investment in a project, hrn	2259576,4
5. Market value of product, hrn./m ²	160
6. Profitability of product,	32,24

7. Term of return of capital investments, years	4,8
8. Coefficient of economic efficiency	0,2
9. Productive funds, hrn./hrn.	2,2
10. funds hrn./ hrn.	0,45

AUTOMATIC CONTROL

Automatic control and management technological processes provide high quality of products, rational use of raw material and energy, lengthening of terms of the TBO period of work of equipment, reduction to the quantity of technical personnel. This project diplom for the receipt of information about the value of basic parameters of technological process of anodization and automatic maintenance of values of these parameters in the limits set by the norms of the technological mode the system of control and measuring devices and adjusting facilities is entered.

Key words: galvanic coverages, oxide coverage, atmospheric corrosion, cathodes, anode.