SULPHURIC ANODISING

Sulphuric anodising is now almost universally accepted as the preferred treatment for general, decorative and protective use of Aluminium. The natural film is clear but can be dyed to produce a range of attractive colours. By varying the film thickness it is suitable for interior and outdoor uses. Correct specification of alloy type is critical when the appearance of the final finish is important, it important to advise the material supplier that the Aluminium is to be anodised and to confirm the alloy type with the processor.

PRE-TREATMENTS

Since the anodic film is clear, the original surface is visible after anodising. It is important then to correctly use the wide range of pre-treatments available.

Matt finished ranging from a lightly etched satin appearance through to heavily etched texture are normally selected for general engineering and architectural applications. Mirror surface scuffing will be removed.

Chemically brightened finishes can be produced on the purer alloys to give a lustrous sheen to the final product. If the original surface finish is not of a high quality, then mechanical polishing might be necessary prior to brightening and anodising.

POST TREATMENTS

An anodic film has a very fine columnar pore structure, this structure has two consequences.

Firstly, the film must be correctly sealed in order to ensure good corrosion resistance. Sealing is normally achieved by immersion of the workpiece in de-ionized water held just below boiling point. Other methods involving nickel salts or dichromate solutions can be chosen for particularly aggressive environments such as salt water exposure.

Secondly this structure makes it possible prior to sealing, for the anodic film to absorb dyes and pigments into its pores thereby producing a range of coloured finishes.

PROPERTIES OF SULPHURIC ANODISED FILMS

CORROSION RESISTANCE

Anodising protects Aluminium against most forms of corrosion. This resistance will increase with film thickness. The table opposite gives a guide to the film thickness required in a number of applications. In harsh marine environments the special sealing mentioned above or the hard anodising process may be required.

If the product is to be exposed to a harsh chemical environment it is advised to discuss the specific chemical conditions with the technical department at Acorn.

Grade	Film Thickness	Application
AA5	5 microns	Decorative bright trim
AA10	10 microns	Interior use
AA15	15 microns	Heavy interior or Mild Exterior
AA20	20 microns	Normal exterior use
AA25	25 microns	Arduous exterior use

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HEAT REFLECTIVITY AND EMISSION

Anodic coatings in the order of 1-2 microns retain the reflectivity of the substrate for infra-red radiation and have been used in electric fire and mechanical lamp reflectors for many years. Thicker anodic films of 10 microns or more are good heat emitters or absorbers having an emissivity exceeding 70%.

The thermal conductivity of the anodic coating is about $1/10^{th}$ that of the Aluminium. But it has been found that anodic coatings of 10 microns and over produce an excellent heat dissipating surface where the maximum rate of radiant heat transfer is required. An example of this is on heavy duty electronic heat sinks.

WEAR RESISTANCE

The anodic film is much harder than the base Aluminium and therefore can confer a high degree of abrasion resistance to the anodised component. For true wear and abrasion resistance however, the specialised process known as hard anodising must be used.

The major SPECIFICATIONS worked to at Acorn Surface Technology for sulphuric anodising are:-

1. **DEF STAN 03-25** Sulphuric anodising of Aluminium and its alloys. This replaces **DEF151 Type 1.**
2. **NWS 1000/5/2-1** Sulphuric anodising.
3. **Mi1-A-8625 Type 2** Sulphuric acid anodising.
4. **BS 1615.** Methods for specifying anodic oxidation coatings on Aluminium and its alloys.
5. **BS 3987.** Specification for anodic oxide coatings on wrought Aluminium for external architectural applications.