

Hard Anodising



Why Hard Anodise ?

Aluminium because of its light weight, and the fact it can be readily cast extruded and machined is the material of choice to replace steel as part of the current drive for longer lasting lighter components to aid economy and provide for a greener future.

Suitable Aluminium alloys

The International Alloy Designation System is the most widely accepted named scheme for wrought alloys. Each alloy is given a four-digit number, where the first digit indicates the major alloying elements. In general the purer the aluminium the better it will anodise, conversely the higher the content of silicon or copper the more problematic the process; this will lead to increased cost and reduction in some properties.

1000 series is essentially pure aluminium with a minimum 99% aluminium content by weight, will anodise very well, some micro crazing may be present although not detrimental to performance.

2000 series is alloyed with copper. Formerly referred to as duralumin, the presence of copper will create problems with anodising, a poor surface finish being the most apparent.

3000 series is alloyed with manganese, these are ok for anodising.

4000 series is alloyed with silicon, and again problematical.

5000 series is alloyed with magnesium. Very good for anodising with special high finish grades available

6000 series is alloyed with magnesium and silicon, good for anodising, 6082 (H30) and H20 being particularly common for Hard Anodising

7000 series is alloyed with zinc, and can be precipitation hardened to the highest strengths of any aluminium alloy, and will anodise with care, H17 is an example of an older designation type of this material. The surface may craze, but film thicknesses of 200 microns can be achieved.

8000 used for lithium alloys,



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Table of Suitable Cast Aluminium Grades

Aluminium Grade	Hard Anodise	Clear Anodise	Dye or Colour
LM10	Excellent	Excellent	Both
LM2	Fair	Unsuitable	Unsuitable
LM4	Good	Unsuitable	Hard only
LM5	Excellent	Excellent	Both
LM6	Fair	Unsuitable	Hard only
LM9	Fair	Unsuitable	Hard only
LM10	Excellent	Unsuitable	Both
LM12	Fair	Unsuitable	Unsuitable
LM13	Fair	Unsuitable	Unsuitable
LM16	Good	Unsuitable	Hard only
LM18	Good	Unsuitable	Hard only
LM20	Good	Unsuitable	Hard only
LM21	Fair	Unsuitable	Unsuitable
LM24	Fair	Unsuitable	Unsuitable
LM25	Good	Unsuitable	Hard only
LM26	Fair	Unsuitable	Unsuitable
LM27	Good	Unsuitable	Hard only
LM28/28/29	Unsuitable	Unsuitable	Unsuitable

Jigging

It must be remembered that to anodise any component the item must have an electrical connection to the anode; it is therefore unrealistic to expect a total all over coating.

Jigging points are typically small and can usually be accommodated in hidden places so not to be visible or affect the performance of the component in use. It would normally be best to speak with one of our application engineers when considering jigging points.

Anodising has good covering capabilities and does not tend to have high and low coating thickness areas. That said, deep blind holes, particularly if they are a small diameter will have the anodising film thickness at best tapering off towards the bottom, and at worse be an air or solution trap and not anodise. It is normally preferred to bung these holes particularly if threaded as the increase in thread growth can be difficult to compensate for when manufacturing. The major and minor diameters will increase twice the amount of growth; however the pitch diameter for a 60°, including angle will increase fourfold.

It is possible to mask areas of anodising, although sealing of the joint area can be problematical with solution creep, the necessary answers are frequently time consuming and relatively expensive. Again it is best to discuss this with an Anochrome application engineer.

Typical Properties

- o Hardness 350 to 600 Vickers (depending upon alloy choice).
- o Providing excellent wear resistant surfaces for moving or sealing applications .
- o Corrosion resistance-typically 500 hours unsealed on LM25 although the resistance of the base alloy will have a great effect on this as will the sealing of the film.
- o Temperature performance-the melting point of the aluminium oxide film will be in the region of 2050oc which is much higher than of pure Aluminium at 658oc.
- o Cleanliness – anodising does not out gas or flake off, it is chemically inert and easily cleaned and is therefore suitable for environments which require clean room type operations, whether they are within the food industry, medical environments or laboratory conditions.
- o None Conductivity, because of the good dielectric strength of the aluminium oxide film plus its in-situ performance and resistance to damage and temperature performance, it makes an ideal choice in certain electrical application.
- o Primer /cleaner coat. Anodising is an ideal preparation for further coating; the process leaves the part clean and the micro pores provides a good mechanical lock for further coatings of wet paints and powder coats.



Plant Capabilities

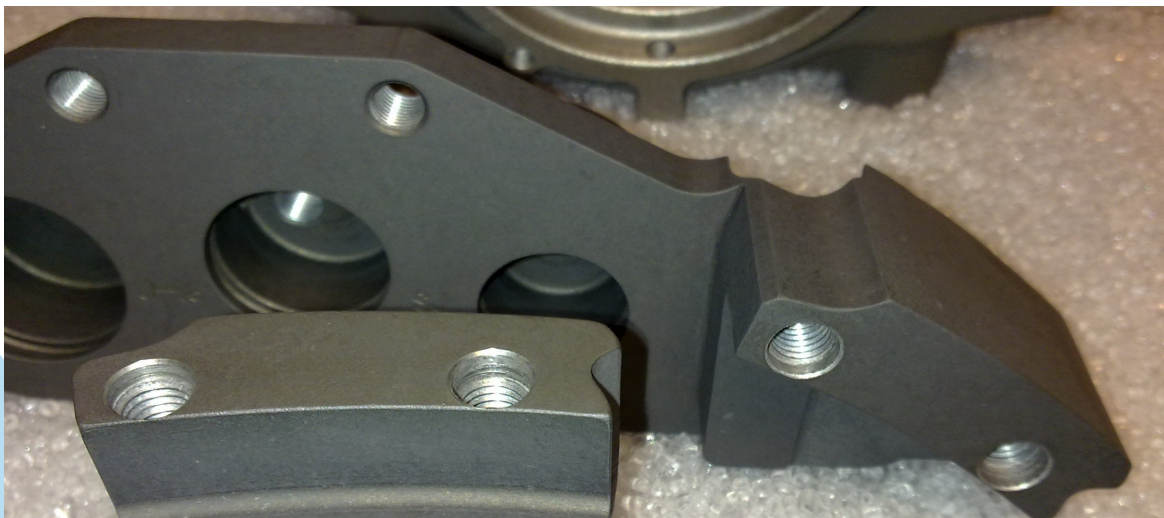
Anochrome has two Anodising plants.

One at Walsall based Anochrome Technologies. This automatic plant has 16 tanks each capable of holding 400kg of work, and processing components up to 20m² in size, the second plant at Farnborough is a manual plant capable of producing both hard anodised components and black anodised components with a minimum individual weight of 5kg and size of 1m long.

Thicknesses of 5 - 80 μ m on various aluminium alloys are produced and the associated pre-treatment solutions and reusable titanium jigs, allow great adaptability, and longevity highlighted by the range of components from 4 V8 engine blocks to small intricate valves and pistons.

In addition Anochrome Technologies' specialist spray coating facility can provide a complete one-stop-shop facility for these requirements

Weight saving is a major factor with aluminium components, for example the following two calipers with similar size performance requirements are 40% lighter in aluminium, yet with the combined hard anodised coating and the same top barrier coating offer double the protection against corrosion,



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