



INDUSTRIAL HARDWARE

AND SPECIALTIES INCORPORATED

Hard Anodize

[MIL-A-8625F] Type III, Class 1 & 2

Hard anodizing is a term used to describe anodic coatings with surface hardness and/or abrasion resistance as their primary characteristic.

These anodic coatings are usually thick, greater than .001" (50%-buildup & 50%-penetration), by normal anodizing standards, and they are produced using special anodizing conditions. Thick coatings (over .004") will tend to break down sharp edges. Alloys with a very high copper or silicon content are less suitable for this process.

The color of the natural anodic coating depends on the alloy and the coating thickness. e.g. 6061 has a tan or gray color which darkens to almost black at .003"; 6063 has an amber shade which darkens to bronze. Both are considered clear.

After hard anodizing, surfaces may be sealed in boiling distilled water, sodium dichromate solution, dewatering oil, wax or PTFE solutions.

Dichromate sealing improves the fatigue properties, but decreases the abrasion resistance to some extent (in common with other aqueous sealing solutions). For this reason, aqueous sealing processes are not normally used where high wear resistance is required. Hard anodized coatings may be impregnated with oils, silicones or dry lubricants for improvement of anti-friction properties during this seal procedure. Corrosion resistance could be improved by PTFE impregnation.

For the best resistance to wear and abrasion it is preferable to use pure aluminum or alloys with the lower values of alloying additions.

Hard anodized aluminum shows a good heat resistance, and the coatings give also very good electrical insulation. This property can be further improved by hot water sealing and waxing.

Abrasion resistance for unsealed coatings are tested by method 6192 of FED-STD-141 using CS-17 wheels with 1000 gm load.

"The anodic coating shall have a maximum wear index of 3.5 mg/1000 cycles on aluminum alloys having a copper content of 2 percent or higher. The wear index for all alloys shall not exceed 1.5 mg/1000 cycles".

Type III: Thickness as specified on drawing. If not specified nominal thickness shall be $0.002" \pm .0002$

Class 1: Not dyed or pigmented.

Class 2: Dyed. (Specify color on contract).

Hard anodic oxide coatings find application in the engineering industry for components which require a very wear resistant surface. "Flash" hard anodize may be used instead of conventional anodize for corrosion resistance

Typical Applications:

Hydraulic cylinders, wear surfaces, actuating cams, pistons, cylinders, and hydraulic gear. Other applications include the coating for the production of flame and chemically resistant surfaces.