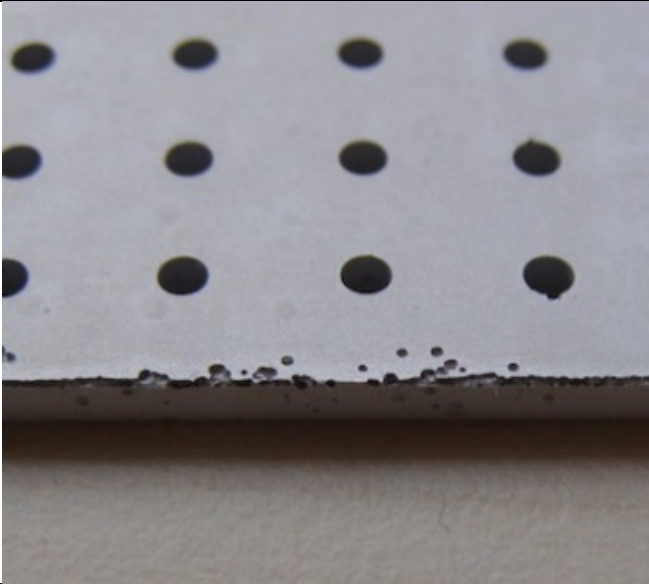


Common Defects

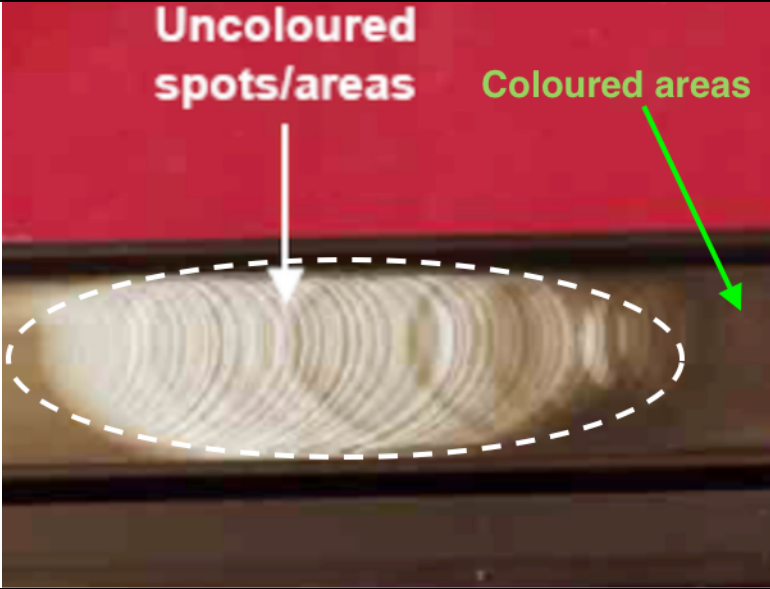
Defect	Anodizing Burn	
Image		
Defect visible after	Anodizing	
Description	- Bright areas on anodic coating surrounded by black or darker area. - Usually no anodic film or very soft film present in the defective area.	
Cause	- Excessive current - Poor movement of electrolyte across part - Poor electrical contact between rack/jig and the part.	
Remedy	- Reduce current - Check electrolyte concentration and ensure temperature is controlled properly - Improve electrical contact area between rack/jig and the part	

Defect	Chloride Corrosion	
Image		
Defect visible after	Anodizing	
Description	Pits formed on all surfaces of part. Relatively deep and usually black in appearance. There is no anodic film over the pits.	
Cause	Exceeded critical level of chloride of 80ppm measured as the Cl ⁻ ion in the sulfuric acid electrolyte, corrodes the highly active aluminum during the anodizing process.	
Remedy	Use of deionized water in anodizing electrolyte make-up and top-up and ensure thorough rinse to eliminating this problem.	

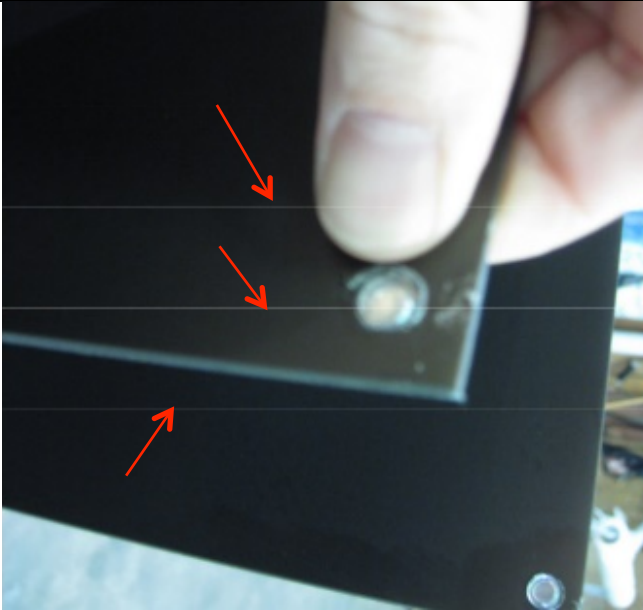
Defect	Color Differences	
Image		
Defect visible after	Coloring	
Description	Poor visual color match, outside the agreed upper and lower color limits.	
Cause	• Alloy inconsistency • Differences in the anodizing parameter • Incorrect dyeing conditions • Lack of control of electrolytic coloring process	
Remedy	• Make sure the base metals are from the same batch. • Check anodizing electrolyte concentration, PH, anodizing time and temperature • Check dye concentration, dye time, temperature, PH and for contamination with sulphates and chlorides. • In the case of electrolytic coloring, this can be due to the wrong coloring condition or contamination of the coloring electrolyte with sodium. Fix racking configuration to ensure color uniformity	

Defect	Crazing	
Image		
Defect visible after	Sealing	
Description	Hairline cracks form in the anodic coating.	
Cause	- Stress produced in the anodic oxide coating when parts are transferred from rinse tank to sealing tank due to differences in thermal expansion coefficient between the anodic oxide coating and the base metal. - Caused by a mechanical deformation of an anodized part by bending or impact. Can be enhanced by high current, low electrolyte temp, thick anodic films (hard anodizing conditions). - Anodic oxide coatings exposed to high ambient temperatures (e.g. lighting) and strong sunlight are more likely to develop crazing than those exposed in the more temperate climates	
Remedy	- Reduce thermal shock (70°C water before boiling sealing) - Any bending of the parts should be carried out before anodizing. Pre heat parts to even out stress in material (130°C for 40min). Reduce current (1.4-1.6 A/dm²). Electrolyte temperature should be around 20°C. Reduce anodic film thickness (<30µm) Don't heat thick film above 120°C	

Defect	Etch Staining	
Image		
Defect visible after	Etching/ Coloring	
Description	Staining develops on the part after etching. This may not be immediately visible after etching.	
Cause	• Etching solution dries on part during transfer to rinse • Poor cleaning/rinsing after etching. • Poor jigging in combination with poor cleaning • Wrong etch solution composition • Etch solution too hot	
Remedy	• Improve time from etching to rinse • Ensure good and fast cleaning/rinsing after etching. • Proper jigging of difficult or thick walled profiled parts • Check the level of wetting agent in the etching solution is adequate • Ensure etch solution temperature isn't too high (<60°C)	

Defect	Gas Trapping	
Image		
Defect visible after	Anodizing/ Coloring	
Description	Random spots or areas that are uncolored, different hue or lighter on the underside of the racked work piece.	
Cause	Gas or air bubbles trapped on underside of work piece. These air or gas pockets act as insulators for anodizing process or masking agents for the coloring process	
Remedy	Rack parts so there are no horizontal surfaces or inverted channels on the underside so gas can escape.	

Defect	Insufficient Degreasing	
Image		
Defect visible after	Etching/ Brightening	
Description	Non uniform Degreasing	
Cause	Poor degrease solution or practice (e.g. temperature too low), oil or grease is still left on some areas. This leads to differential etching/ brightening of the section surface	
Remedy	Renew the degreasing solution or extent the treatment time or increase the temperature.	

Defect	Jig Marks	
Image		
Defect visible after	Anodizing/ coloring	
Description	Exposed areas/ marks on the anodized part	
Cause	If the work piece do not have threaded holes, jig marks are inevitable as the parts must be clamped to be anodized/ colored	
Remedy	• Use threaded rods in existing threaded holes • Select location of contact areas to be in an unimportant hidden place	

Defect	Blistering / Delaminating
Image	-
Defect visible after	Coloring
Description	Blisters form on the anodic coating of the work-piece. It occurs on high zinc alloys (Aluminum 7000 series)
Cause	During anodizing process, the alloying element, in this case zinc, when oxidizes, is too big to jump through the aluminum oxides porous layer and remains at the interface between the substrate and the anodic film layer. This naturally serves as stress point and subsequent thermal cycling during coloring process causes these areas to blister. <u>Note:</u> Identify delamination by determining if a coating is present at the spot. A quick test is to apply a drop of acidified copper solution (about 1 N hydrochloric acid with about 10 g/l copper sulfate) to the spot. If no coating is present, the spot will turn red within a few minutes.
Remedy	When anodizing, extending the ramp up period to allow zinc to move away from the interface between substrate and the anodic aluminum oxide layer. This reduces the blistering effect.

Defect	White Spots
Image	
Defect visible after	After electrolytic coloring or dye coloring
Description	Little white spots develop in the anodized layer after electrolytic or dye coloration.
Cause	• <u>White spot that can't be wiped off, and in round shape</u> - Likely due to the surface contamination that is result of residue that was not adequately removed by anodizer that inhibit dye from picking up. Another may be the presence of alkaline particles floating around in the air and adhering to the anodize surface while being transferred to the dye tank. • <u>White spot that can't be wiped off, and not in round shape</u> - Usually the result of entrapped anodize acid in tiny pits, cavities or groves. Pits may be due to unwanted iron-containing inclusions in the metal that are etched out during the anodize step. Cavities may be due to the porosity of cast aluminum. Tiny groves may occur on machined surfaces. Anodizing can open up surface or near-surface defects, leaving voids that can be very difficult to rinse clean. As a result, dye pickup will be inhibited in the area where any acid remains. Usually the acid oozes out of the pit or cavity while in the dye tank, forming irregular shaped spots, including comet tails.
Remedy	• Thoroughly clean the rinse tanks or improve fume/gas extraction in alkaline etching stage. To prevent disturbing air currents from etching area to coloration area. • A 30- to 60-second rinse in 5-10 percent nitric acid followed by a fresh water rinse.