



Anodized Aluminum Variation Advisory

The color variation on anodized aluminum is the result of many factors. Aluminum has several alloying elements, primarily Copper, Manganese, Magnesium, Silicon and Zinc. Chromium and Titanium may also be added or present as impurities. The main impurity in aluminum is Iron.

The alloying elements and impurities present create many different types of intermetallic particles in the aluminum. The number, size and distribution of these intermetallic particles can vary from extrusion to extrusion as well as by the wall thickness and part geometry. This is particularly the case on wider extrusion surfaces and some variation should be expected along the length of those surfaces.

Additionally, anodizing is not an opaque coating like paint, but rather a translucent to transparent coating that results from the conversion of the surface aluminum into aluminum oxide, i.e. an anodic coating. The apparent color resulting from the anodizing process is highly dependent upon the intermetallic particles present and their orientation in the aluminum. Therefore the apparent color of anodized aluminum will vary from run to run and also when observed from one angle or another.

In addition to that, small variations in anodizing process chemistry as well as (in the case of color anodized work), the amount of tin metal filling the anodic porous surface will have a slight effect on color variation.

Because aluminum alloys and the process itself have variation, it is not possible to anodize to a specific uniform color. Some variation should be expected as a perfect color match is not practical or even possible. Our suppliers provide some of the tightest color ranges for exterior color anodized finishes but it all starts with the aluminum substrate.

In summary the orientation and type of alloy particles, thickness of coating, viewing angle, (the greater the angle – the thicker the anodic film being viewed), color (lighter colors show more variation), alloy, temper or hardness and the anodizing process itself will all result in real and apparent color variations in anodic films. This adds to the soft, natural beauty of this long lasting aluminum finish. A reasonable analogy would be the difference between painting a piece of wood and staining it. The stain on wood, like anodizing aluminum, allows the natural variation show through. That is simply part of the uniqueness and beauty of anodizing.



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