

# Anodizing

**Common Names:** Anodizing

**Applicable Specifications:** Federal Specification Mil-A-8625

**Description:** When aluminum (or other “reactive metals”) are made anodic in an aqueous electroic cell, an oxide coating forms. This electrolytic process, known as anodizing, has resulted in many applications for which un-anodized aluminum would be unacceptable. Increased corrosion resistance, excellent wear and abrasion properties, and a wide range of decorative finishes are but a few of the advantages realized by anodizing.

The nature of the oxide film is controlled by the anodizing electrolyte. If the oxide coating is not soluble in the anodizing electrolyte, it will grow until the resistance of the oxide prevents current from flowing. The coating formed will be extremely hard, non-porous, and non-conductive. At Palmetto Plating Co., Inc., we use the conventional sulfuric process and offer clear as well as dyed finishes. This is commonly know as Type II anodize.

**Function & Physical Finish:** The basic reaction in an anodizing process is the conversion of the aluminum surface to aluminum oxide. This aluminum oxide coating can vary from 0.0002” to 0.001” in thickness and is hard, dense, and dielectric. Anodic coatings may be dyed prior to the final sealing operations. For maximum corrosion resistance, the potassium dichromate sealing process should be specified (this produces a slight yellow-green color). Anodizing will increase corrosion resistance, increase paint adhesion, improve decorative appearance, provide electrical insulation, and increase abrasion resistance.

The clear anodize is silver-gray in color, and is dependent upon the specific alloy. There may be a slight dulling of bright surfaces due to the required etch step prior to anodize (wrought or plate material).

**Examples of Use:** Medical equipment and components, food equipment, automotive trim, electrical equipment, textile machinery, aircraft components.

## Considerations & Limitations:

- **Base Material:** Aluminum, aluminum alloys. Die casting alloys can be anodized but may have significant differences in appearance and performance of the coating due to the natural porosity and differences in the composition at the surface of the cast material.
- **Shape of parts:** Can be used on virtually any shaped parts. Sharp edges are not recommended as the integrity of the coating at sharp surface transitions is may not be good.
- **Size:** Parts up to 5½ feet by 28 inches by 17 inches. Maximum weight 500 lbs.
- **Quantity:** Although quantity affects price, quantity is not a limiting factor. Price is determined by how many parts can be process in an hour.
- **Thickness of Finish:** Varies from 0.0002” to 0.001”.
- **Masking:** Can be used to protect critical machined dimensions, but adds significantly to the cost per unit.
- **Heat Treatment:** Generally has no effect prior to anodizing.
- **Method of Processing:** Parts must be racked with a solid electrical contact. If this is a concern, contact points should be specified.
- **Pre-Treatment:** Parts must be clean and free from oil, grease and tape residue. Parts must be “chemically” clean prior to anodizing. Normal processing includes a non-etch cleaner, caustic etch, and de-smut/de-oxidizer. Use of abrasive blasting or mechanical finishing is sometimes used to obtain a particular surface finish. It should be noted that anodizing will amplify the visibility of any minor variations in the surface preparation.
- **Post Treatment:** After anodize, parts may be dyed. After dyeing, or after anodizing, parts are sealed to enhance and protect the surface from absorption of contaminants..
- **Packaging:** ***Parts are repacked as received.*** It is often necessary to wrap parts with paper to prevent scratching. This will be done at the customer’s request.

**Quality Control** Process solutions are checked and analyzed following an established schedule and monitored using SPC techniques. Thickness testing can be done at the customer’s request. Salt Spray testing for non-standard alloys (e.g. 7075) (and for coating weight) can be done by submitting samples to an outside laboratory. This is done for an extra charge at the customer’s request. We routinely submit samples for Salt Spray for 2024 and 6061 alloys.