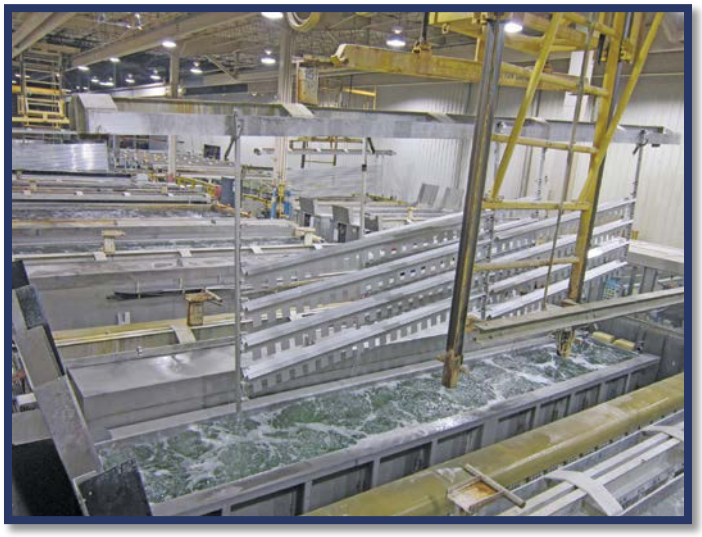
Architectural Anodize Data Sheet



Architectural Anodizing combines science with nature to create one of the world's best metal finishes. Anodizing is the process of electrochemically controlling, accelerating and enhancing oxidation of an aluminum substrate. The anodizing process, because it is an integral part of the substrate, produces an oxide film that is uniform, hard and protects the rest of the aluminum substrate from deterioration - providing excellent wear and abrasion resistance with minimal maintenance in most environments.

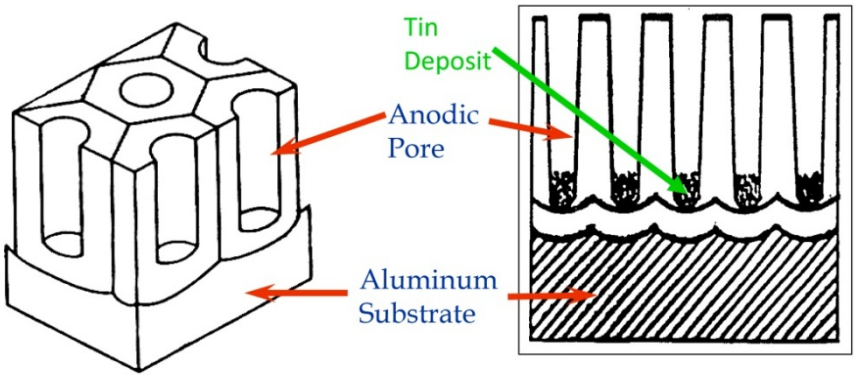
The coating produced is extremely durable, and the hardness of the surface is comparable to a sapphire—the second hardest substance on earth. This characteristic makes anodize an excellent choice for use in high-traffic areas where resistance properties are important.

Anodized aluminum resists the ravages of time, temperature, corrosion, humidity and warping, adding to it's long life cycle. Anodized aluminum is an inert material that is not combustible, 100% recyclable and poses no health risks.

Electrolytic Two-Step Anodizing Process

The typical anodizing employed in the architectural industry is called two-step electrolytic." The actual anodizing and coloring of the aluminum occur in separate steps of the process. The anodizing step takes place in a tank that contains a solution of sulfuric acid and water. The tank is charged with electrical current, and aluminum oxide is formed on the surface of the aluminum.

After anodizing is complete, the parts can be immersed in an optional coloring tank, to achieve bronze or black tones instead of the standard clear or silver finish. In the coloring tank, the anodized aluminum is immersed in a bath containing an inorganic metal such as tin, cobalt or nickel, which are deposited in the anodic pores by means of electrolytic current. The amount of time the part is immersed will determine the color achieved. Darker colors are created by extending the immersion time and increasing metal deposition. The colors typically seen on architectural products range from champagne to dark bronze and black.



Note that tin is deposited at the bottom of the anodic pore. The intensity of the color depends on the amount of tin deposited

Architectural Class I and Class II Anodize

Class I and Class II anodic coatings are designations created by the Aluminum Association for the purpose of codifying the specification of anodized aluminum.

Class I coating has a mil thickness of 0.7 (18 microns) or greater
Class II coating has a minimum mil thickness of 0.4 (10 microns)

Class I coating is a high performance anodic finish used primarily for exterior building products and other products that must withstand continuous outdoor exposure.

Class II coating is a commercial anodic finish recommended for interior applications or light exterior applications receiving regularly scheduled cleaning and maintenance such as storefronts.

Coating thickness can be measured by an "eddy current", a nondestructive test instrument, or by cutting a cross-section of the anodized aluminum, mounting it in a slide, polishing the edge, and reading the coating thickness directly with a microscope.

All Linetec anodize finishes are a Class I coating, with the exception of ANO-204 Clear, which is a Class II coating. Clear anodize is available in both Class I and Class II. Class I anodize coatings are the only finishes that carry a warranty.

Strengths of Anodize

- Durability, abrasion resistance
- Metal appearance
- Excellent weatherability (Class I)
- Color stability
- Non-hazardous, produces no harmful or dangerous by-products

The first illustration shows the anodized aluminum scratched multiple times by a nickel. The second image shows the aluminum after being wiped with a wet cloth. The scratch residue comes right off and the aluminum is completely unharmed.

Anodize Warranties

While Linetec warranties finishes for a specified amount of years, many more years of service life should be expected. Anodize finishes are tested in the most extreme conditions possible for adhesion, chalk, fade and gloss (the primary things warranted in a paint finish.) The standard testing grounds are in south Florida where the sun, salt air and humidity are the most extreme in the country.

Linetec's documented testing allow us to offer warranties of 5 years, on Class I Anodize finishing, with confidence that your product will perform as intended.

In some cases, with prior approval and a minimal up-charge, Linetec can offer an extended warranty up to 10 years.

The anodizing warranty for Class I, (0.7 mil) clear, bronze-tones, black and copper finishes is backed by the strength of Linetec. We warrant that the finish will not chip, crack, or peel (adhesion), chalk, or color change / fade.

AAMA Specifications

In order to ensure the anodize performance expected for an architectural / commercial application, AAMA 611-14 specification should be referenced along with the anodize color.

Beyond the stringent standards and regulations, Linetec offers a downloadable guide spec with specifiable differences that contribute to a projects long life, durability and sustainability.

AAMA 611 - Class I
Class I anodic coating is a high-performance finish used for exterior building structures and other products that must withstand continuous outdoor exposure. Class I anodize is more resistant to salt spray and the sea coast, and it is more durable in high traffic areas.

AAMA 611- Class II

Class II anodic coatings are recommended for interior applications or light exterior applications receiving regularly scheduled cleaning and maintenance such as storefronts and entrance ways. Class II anodize is not as durable or wear resistant as a Class I finish.

AAMA 611 Specification for Anodize

Specification	Class II	Class I
South Florida Weathering:		
Color retention	10 yrs: Fade = 5 Delta E	10 yrs: Fade = 5 Delta E
Chalk resistance	N/A	N/A
Gloss retention	15 unit variation	15 unit variation
Erosion resistance	No specification	No specification
Dry film thickness	0.4 mils minimum	0.7 mils minimum
Pretreatment System:	No specification	No specification
Accelerated Testing:		
Salt Spray	1,000 hours	3,000 hours
Humidity	No specification	No specification

Linetec is 100% compliant of all AAMA specifications. **AAMA's Certification Program Verified Components List** is a complete list of window and door component manufacturers who have submitted samples for testing and those samples were found to be in full compliance with the applicable specification.

For detailed spec information or to purchase AAMA specifications visit **www.aamanet.org.** All AAMA documents may be ordered through the Public Store

Proud Member

Linetec is a longstanding AAMA member. AAMA is the source of performance standards, product certification and educational programs for the fenestration industry.

For more information contact us at sales@linetec.com, www.linetec.com or 715-843-4100