

Aluminum Anodizing Design Guide

Version 1.0

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1. What is Anodizing?

Anodizing is an electrochemical surface treatment specifically designed for aluminum and aluminum alloys.

The process creates a hard and stable aluminum oxide layer on the material surface.

Unlike paint or powder coating, the anodized layer becomes part of the material and will not peel or flake off.

2. Why Choose Anodizing?

Customer Requirement	Value Provided by Anodizing
Better appearance	Premium metallic finish
Corrosion protection	Improved corrosion resistance
Wear resistance	Increased surface hardness
Product value	Enhanced product image
Color flexibility	Multiple color options
Longer lifespan	Reduced maintenance cost

3. Types of Anodizing

Type	Thickness Range	Main Features
Decorative Anodizing	5–10 µm	Appearance focused
Standard Anodizing	10–20 µm	Most widely used
Thick Film Anodizing	20–25 µm	Enhanced corrosion resistance
Hard Anodizing	25–50 µm	High hardness and wear resistance

4. Common Colors

- Clear
- Black
- Silver
- Gold
- Blue
- Red

Note:

Slight color variation may occur between different aluminum alloys and production batches.

5. Best Aluminum Alloys for Anodizing

Alloy	Anodizing Appearance	Strength	Color Consistency	Recommended Applications
1050 / 1060	★★★★☆	★★☆☆☆	★★★★★	Nameplates, decorative panels, lighting reflectors
5052	★★★★☆	★★★★☆	★★★★☆	Sheet metal enclosures, cabinets, brackets
6061	★★★★★	★★★★★	★★★★☆	CNC machined parts, medical devices, industrial equipment
6063	★★★★★	★★★★☆	★★★★★	Heat sinks, telecom equipment, cosmetic parts
7075	★★★☆☆	★★★★★	★★★☆☆	Aerospace components, drones, high-strength structural parts

6. Typical Thickness Reference

Application	Recommended Thickness
Consumer Electronics	5–10 µm
CNC Cosmetic Parts	10–15 µm
Sheet Metal Components	10–20 µm
Outdoor Equipment	20–25 µm
Industrial Equipment	≥25 µm
Wear-Resistant Parts	25–50 µm

7. Design Considerations

- ✓ Define cosmetic surfaces before production
- ✓ Place rack marks in non-visible areas
- ✓ Consider coating thickness in critical dimensions
- ✓ Apply compensation for threaded holes when required
- ✓ Different alloys may produce different color results
- ✓ Approve samples before mass production

8. Innoway Recommendations

Product Type	Recommended Material	Recommended Finish
AI Server Heat Sinks	6063	Clear / Black Anodizing
CNC Precision Parts	6061	Black Anodizing
Sheet Metal Enclosures	5052/1050	Black Anodizing
Medical Devices	6061	Clear Anodizing
Telecom Equipment	6063	Clear Anodizing
Robotics Components	6061	Hard Anodizing