

Surface Finish Guide: Ra Values, Anodizing, Plating and Powder Coating

Finish protects the part and defines how it looks and feels. This guide pairs the roughness values we machine to with the finishing processes that protect the metal, so the drawing and the finish specification match.

Roughness values by preparation

Preparation	Ra (µm)	Typical use
As-machined finish	1.6 - 3.2	General surfaces, non-sealing
Fine machined	0.4 - 1.6	Sealing faces, sliding fits
Ground	0.2 - 0.8	Precision fits, seal seats
Polished / lapped	0.05 - 0.4	Optics, seals, low friction
Bead blasted	0.8 - 3.2	Matte decorative, pre-paint

Finishing options compared

Finish	Thickness	Appearance	Best for
Anodizing (Type II)	5 - 25 µm	Clear, black, dyed colours	Aluminium, corrosion and wear
Hard anodizing (Type III)	25 - 50 µm	Dark grey to black	Aluminium, heavy wear
Zinc plating	5 - 12 µm	Blue, yellow, black	Steel fasteners and brackets
Nickel plating	5 - 25 µm	Bright metallic	Wear and corrosion, electrical
Powder coating	60 - 120 µm	Wide colour range	Outdoor steel and aluminium parts
Passivation	None	Bare, clean	Stainless, removes free iron
Electropolishing	Removes 5 - 20 µm	Mirror, bright	Stainless hygiene and finish

Choosing a finish

- Aluminium that must stay conductive or be masked for grounding should be chromate conversion coated, not anodized.
- Anodizing adds a few microns - allow for it on threads and close fits.
- For stainless parts, specify passivation after machining to remove embedded free iron and stop rust spots.
- Powder coating is for appearance and weather, not for a precision fit.

Frequently asked questions

Which finish should I specify for an aluminium part?

Clear anodizing (Type II) for general protection, hard anodizing (Type III) for sliding or wear surfaces, and chromate conversion coating where the part must stay conductive or grounded.

Does anodizing change the part dimensions?

Yes. Anodizing adds 5 to 25 µm per surface, and hard anodizing up to 50 µm. On tight fits and threads, allow for the coating in the drawing or specify masking.

How do I prevent rust on stainless parts?

Specify passivation after machining. It removes free iron left by tooling and prevents the surface rust spots that appear on otherwise correct stainless steel.

Can you provide the finish as well as the machining?

Yes. Machining and finishing are arranged together so the coating thickness is planned into the tolerances, and the parts ship finished in one delivery. Email sc@bquq.com.