



Technical guide

A Technical Guide – Part Six

Surface Finish and Post-Processing for Professional Results

Surface finish is often the first thing people judge when they see a 3D printed part. Even when a part functions perfectly, visible layer lines or rough surfaces can give the impression of low quality. Achieving a professional finish begins long before any post-processing starts.

The most important factor influencing surface finish is orientation. Surfaces printed parallel to the build plate tend to appear smooth because they are formed in continuous layers. Vertical and curved surfaces reveal the stepped nature of layer-by-layer printing. Choosing orientation carefully can dramatically improve appearance without changing any settings.

Layer height also affects finish, but it is not the only factor. A well-tuned print at moderate resolution often looks better than a poorly tuned print at very fine resolution. Speed, cooling, and material flow all influence how cleanly layers are deposited.

Cooling plays a subtle role. Excessive cooling can cause poor layer adhesion and brittle surfaces. Insufficient cooling can lead to sagging and blurred details. The correct balance depends on material and geometry.

Once the print is complete, post-processing begins. Mechanical methods such as sanding and filing are the most common. Effective sanding is gradual and patient. Starting with coarse grit removes major imperfections, while progressively finer grits refine the surface.

Rushing sanding often causes more harm than good. Excessive pressure generates heat, which softens plastic and smears the surface. Controlled, even strokes produce the best results.

Chemical smoothing is another option for certain materials. ABS and ASA can be smoothed using controlled solvent exposure. This melts the outer surface just enough to allow it to flow together, removing layer lines entirely.

Chemical smoothing must be used carefully. It alters dimensions slightly and can soften sharp edges. For aesthetic parts, this trade-off is often acceptable. For precision components, it may not be.

Painting is one of the most effective ways to achieve a professional appearance. Proper preparation is critical. Light sanding, cleaning, and the use of plastic-compatible primer improve adhesion and durability.

Paint also adds functional benefits. It can protect parts from UV exposure, seal moisture-sensitive materials, and improve wear resistance. Thin, even coats produce better results than thick layers.

Clear coatings offer protection without changing appearance significantly. They are especially useful for

outdoor parts where UV and moisture are concerns.

Professional finishes are rarely the result of a single technique. They combine good print planning, appropriate material choice, and careful post-processing.

At BritForge3D, surface finish requirements are discussed at the start of a project. This ensures the print strategy aligns with the desired final appearance, saving time and cost.

Understanding surface finish as a process rather than an afterthought elevates printed parts from prototypes to finished products.

Guide 6 Summary – Surface Finish and Post-Processing

In this guide, we examined how professional-looking results are achieved through a combination of good print planning and careful post-processing. You learned how orientation, layer height, cooling, sanding, chemical smoothing, and coating all contribute to final appearance.

The key takeaway is that surface finish should be planned from the start, not treated as an afterthought. When finishing is considered early, time and effort are saved later.

In the next guide, we focus on design strategies that improve efficiency, reliability, and cost control without compromising performance.

