

EDU[**CAD**]TION **STUDY GUIDE**

How to Get Perfect Results with Additive Finishes

Chapter 5, Lesson 14

SendCutSend

What Are Additive Finishes?

- Additive finishes are protective or cosmetic coatings applied to the surface of a part. They 'add' to the surface, increasing the part's overall dimensions while decreasing internal clearances.
- This category includes powder coating, paint, and other applied surface treatments.
- These finishes protect parts from corrosion, wear, and environmental damage, while improving their visual appeal.

Dimensional Impact of Additive Finishes

- When a coating is applied, it adds thickness equally on all surfaces, both internal and external.
- This means outer dimensions increase and inner holes or clearances decrease.

For example:

- Powder coating typically adds 0.004" to 0.010" (4–10 thousandths of an inch).
- Thicker coatings (like wrinkle finishes) add more than smooth or glossy coatings.
- These changes affect hole fits, slot connections, and tab alignments.

Designers must account for coating buildup to avoid interference or fitment issues after finishing.

Tolerancing Considerations

- Because coatings apply to all exposed surfaces, dimensional tolerances must account for double the coating thickness on the outside of parts and in holes.

For example:

- A hole's internal diameter decreases by twice the coating thickness.
- A tab-and-slot joint requires clearance for coating on both the tab and the slot (four layers total).
- Failing to compensate for these changes can cause parts not to fit together after coating.

Powder Coating Overview

- Powder coating is the most common additive finish used by SendCutSend. It applies an electrostatically charged powder that melts and fuses during curing.
- Powder coating provides excellent durability, corrosion resistance, and aesthetics.

Types include:

- **Gloss:** smooth and thinner finish.
 - **Wrinkle:** textured and thicker finish.
 - **Matte:** smooth and non-reflective finish.
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- Designers should choose coating types based on both cosmetic and functional requirements.

Note: Available colors through SendCutSend (see Figure 1.1)

Resources:

Powder Coat Guidelines: <https://sendcutsend.com/guidelines/powder-coating/>

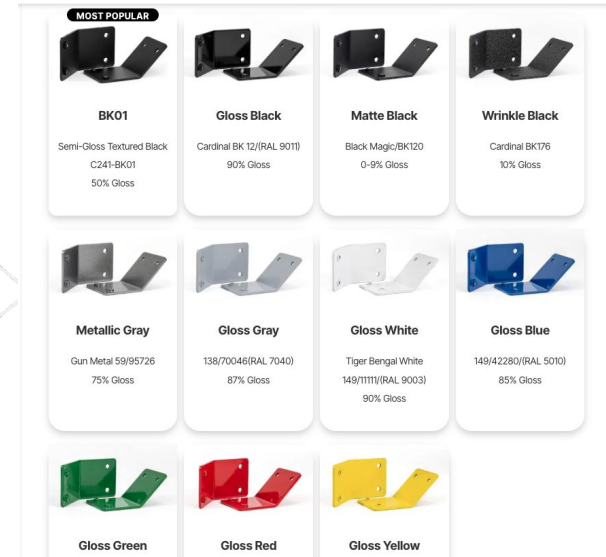


Figure 1.1

Hardware and Thread Protection

- When hardware is pre-installed before coating, its internal threads must be protected.
- SendCutSend uses plugs and caps to prevent powder from filling threaded holes. The coating is applied around the outer surfaces of hardware while leaving internal threads clean and functional.
- Hardware is installed before powder coating.
- Thread protection prevents re-tapping or cleaning afterward.
- Avoid using hardware holes for hanging, add separate hanger holes instead.

Post-Coating Considerations

- Once coated, parts should not be bent, welded, or tapped without removing the finish in those areas. Doing so may crack or burn the coating and damage the finish.
- However, laser engraving can be used after coating to remove or etch the top layer for labeling or design details.
- **Common post-coating guidelines:**
 - Avoid secondary machining or bending after coating.
 - Laser engraving can be used safely.
 - If modifications are necessary, mask those areas before coating.

Summary

Additive finishes are the final step to enhance both the durability and appearance of your parts. Properly accounting for coating thickness ensures your assemblies fit correctly after finishing. Remember to plan for hanging holes, protect hardware threads, and design with the final thickness in mind. Next, we'll explore anodizing, a subtractive surface process that strengthens and colors metal through electrochemical means.

Learn more at <https://sendcutsend.com/education/>