



The Definitive Guide to **POWDER COATING**



WHO'S IT FOR?

Manufacturers of industrial products that require a powder coating.

SUMMARY

This eBook reviews the range of available powder coat finishes and discusses the numerous benefits of working with a manufacturer with in-house powder coating capabilities.



How to Select the Right Finish and a Manufacturer

Powder coating is a common practice because it's one of the most effective ways to paint a wide range of industrial products. Over the past couple of decades, powder coating has evolved to include just about every color, texture and gloss imaginable, which means you're faced with many choices.

This eBook will explore:

- The importance of partnering with a manufacturer with in-house powder coating capabilities, particularly as it relates to processes and quality assurance
- Powder finish options, including key differences between glosses and textures, when each should be used and common adhesion tests

CHAPTER 1: Choosing a Manufacturer with In-House Powder Coating Capabilities

Working with a manufacturer that has in-house painting capabilities is beneficial in two key areas: speed and quality control.

Speed

If a manufacturer doesn't have the knowledge and tools to paint in-house, required outsourcing to a painting facility can, in some cases, set back your lead time by as much as two weeks—a delay that's both time- and cost-inefficient. On the other hand, manufacturers like HUI that powder coat can have a product finished and ready to ship in one day.

Quality Control

Manufacturers without in-house painting capabilities have a difficult time controlling paint and finish quality, which could be detrimental. Mistakes happen—scratches and grind marks from fabrication aren't always covered by the paint, especially if it's a gloss. In-house painters can detect flaws and inspect parts for standard finish requirements, streamlining the process and avoiding waste. Also, quality issues may stem from shipping—parts might get jumbled or rub against one another and in-house painting virtually eliminates this issue.

HUI trains its in-house painters to be highly sensitive to quality issues that may occur in manufacturing, so your product has the clean, pristine finish of your choosing.

Chapter 2: Powder Coat Finishes: Gloss and Textures

Choosing a color for your product may not be difficult, since many customers already have defined brand colors. However, the wide range of options for powder coat finishing may throw you for a loop. No worries! Here's a basic guide on glosses and textures, thanks to consultant Dan Wolf from Akzo Nobel Powder Paint.

Gloss Levels

Glossy finishes—like a smooth poly-TGIC—are compatible with any chemistry or material. There are four levels of gloss. A comparison of the photos reveals the aesthetic differences.

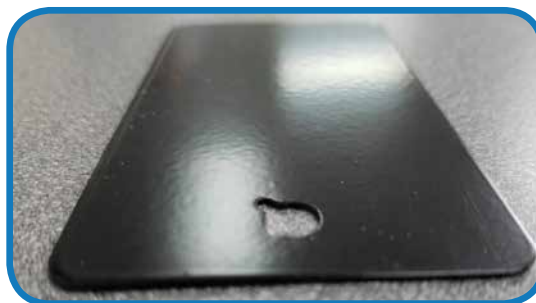
1. Matte

- Levels 0-10
- A matte gloss, also known as “flat” gloss has almost no shine to it



2. Satin

- Levels 20-40
- A satin gloss is less two-dimensional than matte gloss, but doesn't have a clear reflection



3. Medium Gloss

- Levels 40-60
- A medium gloss is somewhat reflective



4. Full Gloss

- Level 80 or higher
- A full gloss is very shiny and reflective



Textures

Textures offer visual depth and tangibility to product surfaces, and are typically compatible with any color. Of the many textures available, the following are the most popular:

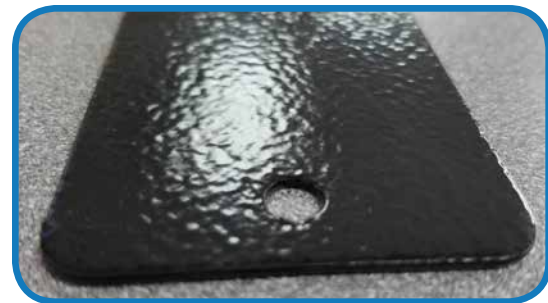
Sand Texture

A sand texture looks similar to sandpaper, but cannot be paired with anything above a level 20 on the gloss scale.



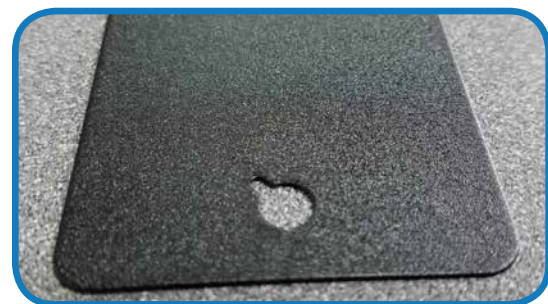
Hammer Texture

A hammer texture looks similar to an orange rind and is more likely to be paired with a higher gloss. Keep in mind that the hammer texture will detract from its reflective clarity.



Wrinkle Texture

A wrinkle texture looks similar to the sand texture, except it's "tighter" and feels rougher. Wrinkle textures are not compatible with glosses.



To demonstrate the difference in finishes, here's a side-by-side comparison of sand and wrinkle textures.



Sand Texture

Wrinkle Texture

Which Option is Best for Your Product?

Generally speaking, textures are favored over high glosses when the product will experience wear and tear—scuffs, scratches and dents from everyday use. In addition to showing exterior damage, gloss finishes have higher finishing requirements from a manufacturing standpoint. Unless this standard is met, gloss finishes will show grind marks and scratches that occur during fabrication. This means you'll inevitably have to invest in a higher finishing standard. Textures cover these imperfections without the higher finishing standard, so it's more cost effective in the long run.

Powder coating requires precision, a keen eye and proven processes to ensure that nothing mars the finish. HUI powder coats in-house and conducts quality tests from beginning to end to ensure the optimal powder coat finish outcome.

CHAPTER 3: Testing a Powder Coat Finish

There are four approaches to testing a powder coat finish:

1. Adhesion Tests

Crosshatch

The crosshatch test assesses the adhesion of the powder coating to the metal substrate. It's performed by cutting a crosshatched grid pattern into the coating all the way down to the substrate. A special pressure-sensitive tape is then applied to the crosshatched area and removed quickly at close to a 180° angle. The area is inspected to see if any of the coating lifted away from the substrate.

Mandrel Bend

The mandrel bend test checks the elasticity and adhesion of the powder coating to the substrate. A cured sample panel is placed into a small device that bends the panel over onto itself. The coating should not crack or lose adhesion in the area of the bend.

Impact Test

Similar to the mandrel bend test, the impact test deforms a sample panel to test the adhesion of the powder coating. The sample panel is placed into the testing machine where a ball is dropped onto it, producing a deep depression. The finish should not crack or lose adhesion to the substrate in the impact area.



2. Durability Test

Salt Spray Test

This is a corrosion-resistance test performed by scribing a line or "X" into the surface of a finished powder-coated panel and subjecting it to a corrosive mist. The panel is inspected at set time intervals and the distance the coating has "crept" away from the scribed line is measured and recorded. If the amount of creep doesn't exceed the allowable distance in the pre-determined time intervals, the panel passes the test.

3. Cure and Finish Tests

MEK Rub Test

This MEK rub test is used to ensure proper cure of the powder coating to the substrate. Methyl Ethyl Ketone (MEK) is applied to a surface of the part or panel then rubbed with a cotton swab. The area is observed for degradation or loss of paint adhesion to the substrate.

Color Match

Once powder-coated parts have cured and cooled after being in the bake oven, the finished color is compared to an approved color chip sample. This visual inspection is the most common and quickest method to check the color. If there is a variance, the color is measured using a photo spectrometer to provide data that is compared to a known sample and tolerance range for the specific color.

Gloss Measurement

The gloss of a finished powder-coated part is validated by measuring the specular reflection of its surface. This test is performed using a gloss meter, which shines a light onto the surface of the part at a fixed angle then measures the amount of light reflected off it. If the measurement is out of tolerance, it may be an indication the powder coating has not cured properly.

4. Coating Thickness Test

To achieve the best coating performance, each powder has a specified thickness range within which it must be applied. HUI measures thickness at two different stages during the powder coating process. Our powder room technician uses a dry mil gauge to take the first measurement right after the part comes out of the powder booth. The technician can then relay to the painters if they're applying the correct amount of powder onto the parts. This immediate feedback is beneficial because it catches possible light- or heavy-coated parts before the powder is cured—when it's too late to fix. After the parts have cured, the mil thickness is checked a second time to verify the coating thickness is within tolerance for the specified powder.



HUI's proven expertise means you'll have access to insights on texture and finish choices, and to our unique problem-solving processes. Why add a step to your production process—one that could result in quality and timeline issues—when you could have your fabrication partner do quality powder coating in-house? It's a smart move that will save time, money and the headaches inherent in outsourcing this important step.

To learn more about HUI's capabilities,
contact **Ryan Arnold** at **800-877-8913 Ext 146**