

With the availability of Liqui-Powdr™ and Powdr₂O™ products, powder coating plastics is not only possible but has advantages over simple painting as well. This document is designed to help you in deciding if this process is an option for your parts, and how to prepare and coat various types of plastic parts.

What Can and What Cannot Be Liqui-Powdr™ Coated

The use of powder coating on a plastic part depends on the part being able to withstand the heat of the curing process. This **does not** mean that the part has to be able to withstand 450° F. for 30 minutes in an oven. It **does** mean that you may need to do some experiments to find the best way to get the powder coating to melt and possibly cure without deforming the part in the process. To find out what the part will handle, it is best to start by asking the manufacturer. At what temperature does the part start to deform? If this is above the cure temperature of the powder you will have no problem using an oven to cure the coating. If the temperature is below that of the cure temperature of the powder or if the manufacturer of the part is not able to tell you the deformation temperature, you will need to be creative in melting and possibly curing the coating.

The following are some of the creative ways that have been used to melt powder coating on plastic parts:

1. Heat gun; using a hot air type heat gun to melt the powder coating is time consuming but very effective. The process involves heating the surface of the coating until it melts with the heat gun, while moving it around so that the heat stays in the surface of the coating and does not migrate into the plastic part very much. After the coating melts a spray of water can be applied to small parts to keep the overall part temperature low. Multiple thin coats are recommended with wet sanding in between coats to smooth out any orange peel. This process will melt the coating but may not cure it, to protect melted but uncured powder coating you can apply Cilgen LTC™ after the last coat to give it a very good chemical resistance.
2. Oven melt; this process uses a standard oven but the time or temperature are reduced so that the part does not reach it's deformation temperature. A low temperature in the oven (about 180° F. or more) will melt most powders over a longer time, this will not cure the coating and the powder may not flow out as well as at a higher temperature. A high temperature in the oven (normal cure temperatures or higher) and a short time (5 minutes or less) will also melt out most powders but again may not cure. With these processes it is critical that you monitor the first few parts closely so that they do not warp from the heat. These processes will melt the coating but may not cure it, to protect melted but uncured powder coating you can apply Cilgen LTC™ after the last coat to give it a very good chemical resistance.
3. Combine the above; it is possible to use an oven for part of the melting process and use a heat gun to get in the "tight" spots either before or after heating the part in the oven.

At this point it must be said that some parts are just too thin to handle any heat at all and they will warp or melt or otherwise deform while you are trying to melt the powder coating. When in doubt ask for some samples of the part and try some creative methods to melt out the powder coating.

Preparing the Parts

Plastic parts need to be prepared for coating in much the same way you prepare metal parts, with some exceptions.

1. They must be clean. Cleaning a part is just as important with plastic parts as with metal, however some solvents will attack some plastics. When in doubt test a sample part to see if the plastic will be attacked by any solvent you may use. Some plastic parts have a release coating on the surface left over from the molding process and this must be removed.
2. Etching the surface. It is best to etch the surface of the part prior to applying the coating, on plastic this can be done with sand blasting, sandpaper etc... chemical etching has not been tested at this time. The heat from the melt / curing process will also cause some plastic parts to soften and this will allow the powder coating to stick to the part. When in doubt test first.
3. It is best that the parts to be coated with the Liqui-Powdr™ process be warm but not hot (less than 100° F.). This will allow the coating to dry completely more quickly.

Previous Paint or Coatings.

If the part has been painted or coated before, it is possible to just coat over the previous coating in some cases. You will need to test to answer the following questions. Is the previous coating stable on the part? Will the previous coating delaminate when exposed to heat? Does the previous coating have any additives that will prevent the powder coating from adhering to the previous coating?

If the previous coating does not pass the above tests the coating must be stripped from the part before you can use the Liqui-Powdr™ powder coating process. If the previous coating is solid, clean and will not be adversely affected by the heat to cure the powder coating, then you can treat it just like the base plastic.

Liqui-Powdr™ Coating the Parts

Due to the diversity of plastics and their fillers, coating the part using the Liqui-Powdr™ powder coating process is going to require a little testing on your part to see what will be the exact procedure to use in a production setting. That being said the following instructions will help you to do the one-off parts, and give you a

starting point on the production procedures.

1. The part needs to be completely clean and dry before applying the coating.
2. A small paintbrush may be used to apply the coating to very tight areas before spraying, or after melting the coating.
3. Using a spray gun (gravity feed is best) with a 2 mm spray aperture (smaller can be used but tend to clog up quickly), apply the coating to hard to reach areas first as a light fog coat. Then apply to the rest of the part in a light even coat. DO NOT apply a heavy coat at first, this will cause problems during the melt, especially if you are using creative heating methods to melt the powder coating.
4. Examine the part and make sure that there are no runs, sags, or areas of excessive material. If there are, wait until the coating dries and try lightly rubbing off the excess material with a dry paintbrush, or simply wash off the part and try again.
5. Allow the part to completely dry before applying heat to melt the coating. Placing the part in a warm (below 100° F.) environment with air moving over the surface can accelerate drying. The time to dry a part will depend on the temperature and humidity of the air moving over the surface.

Melting / Curing the Coating

As mentioned at the beginning of this document there are many ways to melt / cure the powder coating. On some powders there is a difference between melting and curing the powder. The melting allows the powder to flow together and make a continuous surface, this happens at a lower temperature than the curing. When the coating is cured it will cross-link together and become more solvent resistant it will also be more resistant to heat in that it will not flow as readily or at all after cross-linking. Other powders do not cross-link at all but simply melt at temperature then solidify when cooled, these will tend to remelt if heated again.

If your part can withstand the temperatures and time of the curing process without changing shape just follow the powder coating manufacturer's instructions for curing the powder.

If your part requires creative melting / curing then use the method that best melts the powder without damaging the part. (See section: What Can and What Cannot be Liqui-Powdr™ Coated for suggestions)

In all cases the part needs to be completely dry before beginning the melting / curing process.

Multiple Coats

The Liqui-Powdr™ powder coating process allows you to apply multiple coats of powder coating. After each application - melting / curing cycle you can wet sand smooth any imperfections and apply another coat of material, either the same coating or another to achieve the appearance desired. Wet sanding is not required for multiple coats unless you desire to smooth out an uneven surface.

Some of the reasons for multiple coats are as follows:

- Cover over surface roughness of the part or to fill imperfections
- Special effects such as: flames, fire, lettering, other graphics, pearls, color transition effects, sparkles, metal flakes, base - clear effects, tints, etc...
- Repair damage to an existing powder coating
- Additional protection for the part
- Touch up areas that were missed in the original powder coating

Why Powder Coat Plastics

After all this you may ask why would I want to powder coat a plastic part. The following are some of the possible reasons to look at Liqui-Powdr powder coating plastic parts:

- Your customer says they want it
- To match metal parts on the same assembly (Car, Motorcycle, Boat, etc...)
- Special effect colors can be applied at a much lower cost than many special effect paints
- It will add stiffness to some parts
- A higher gloss than the base part may have or that would be provided by paint
- The application and melt / cure cycle is shorter than watching paint dry
- Chemical resistance of powder coating (compared to paint)
- Heat resistance of powder coating (compared to paint)
- Your customer wants it

Additional Tips

When looking at a plastic part for Liqui-Powdr™ coating the most heat resistant plastics are reinforced with glass or other fibers. A thick wall section is also desirable for heat resistance. If the part uses a foam core, this will be less resistant to heat than solid. Injection molded parts are more resistant to heat than extruded. Knowing the type of plastic is important, PVC, ABS, acrylic, polycarbonate, polyethylene and the like are thermoplastics, and are more susceptible to damage from heat than thermosets like polyester, epoxy, urethane, etc...

When using self-adhesive backed stickers to mask off areas on a coated surface use a low tack adhesive to make removal of the sticker easier and cleaner. (flames, lettering, stripes, etc...)

If more than 3 coats of powder will be applied to the part make sure to fully cure each coat before adding another. If a coat is not fully cured it can wrinkle or bubble the coatings on top of it.