
BASECOATS FOR VACUUM METALLIZING

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This TIPs is a commentary on thermal-cured lacquers used for basecoating in vacuum metallizing. The role lacquers play in vacuum metallizing is as important as the metallizing itself for many applications. A knowledge of the functions, limitations, and proper usage of lacquers is essential to the metallizer who wishes to use these lacquers. Be aware that there are other types of basecoats available, such as ultraviolet-cured and water-based coatings. Although some of these are becoming more popular because of solvent emission control regulations, solvent-based lacquer coatings are still the most widely used. This discussion will be limited to these types of coatings

The basecoat is a lacquer which is applied to the surface of a part prior to metallization. Basecoats serve two primary functions for the vacuum metallizer. Basecoats level out small imperfections on the substrate, allowing for a smooth, mirrorlike surface. Basecoats also promote adhesion of the metallizing to the substrate.

All lacquer-type coatings are composed of three main ingredients. First is the **resin** or solids of a coating. The resin is a plastic material and is what remains of a coating when it dries. Which plastic resin is in the coating depends on a number of factors, including what plastic the substrate is made of. The percentage of solids in the liquid coating will affect the method of application and the cost per gallon of the coating. Usually, the higher the percentage of solids in a coating, the more expensive it is. The second type of ingredient is **solvents**. Solvents are used to carry and disburse the resin onto the parts. Multiple solvents may be combined to achieve the exact properties required for a particular job. Solvents in the coating can be matched to the method of application and the substrate material, and can be adjusted to optimize wettability and adhesion of the coating. The final ingredients in a coating are **additives**. These are a variety of materials used in small quantities to fine tune a coating's properties. Additives can affect the drying time, the wettability, the hardness, adhesion, and other properties of the coating.

Obviously, some basecoats are better than others for a specific job. Some of the desirable properties of a basecoat would be that it is as environmentally safe as possible, can be applied by a variety of methods, dries quickly and avoids runs, adheres well to an untreated substrate, promotes adhesion of the metallized layer, and provides gloss. Not all basecoats provide all of the properties equally. As an end user, it is your responsibility to decide which of these factors are most important and choose your product accordingly. Obviously, cost is an important factor as well. To assist in evaluating basecoat properties, the table on the reverse side of this page lists properties and variables which control them.

<u>CHARACTERISTIC</u>	<u>VARIABLES</u>	<u>ADJUSTMENTS</u>
COST	Capital Equipment Materials Time	Resin Type Percentage of Solids Coating Thickness Drying Time
GLOSS AND BRILLIANCE	Basecoat Substrate Surface Dust and Dirt	Percentage of Solids Coating Thickness Filling and Leveling Air and Coating Filtration
COVERAGE	Viscosity Evaporation Rate	Percentage of Solids Solvent Mixture Additives
ADHESION	Surface Tension Surface Chemistry	Substrate Material Coating Solvent or Resin Additives (surfactant) Substrate Pretreatment
FLEXIBILITY	Substrate Flexibility Basecoat	Substrate Resin or Additives Dry Time & Temperature

Even after carefully choosing a basecoat for an application, problems can arise. The best course of action is usually to contact your coating supplier. Listed here, however, are some of the more common coating problems and some suggested solutions.

POOR ADHESION - Use additives to promote adhesion, reduce solids to thin the coating, increase bake time, check substrate surface, change coatings.

POOR COVERAGE - Increase solids, increase evaporation rate, change solvent mix to prevent runoff.

ORANGE PEEL - Reduce viscosity, use additive or retarder to reduce evaporation rate, use additive (surfactant) to reduce surface tension.

SAGS AND RUNS - Solvent too slow or viscosity too high, use temperature different from mix temperature, coating applied too heavily, or rotated inadequately.

DULL FINISH - Low density area in substrate, contaminated coating/solvent, solvent attacking substrate, basecoat too thin.

FISH EYES - Silicone or other contaminant on substrate or in coating, over-reduced paint, use of epoxy coatings.

CONTACT MTS FOR MORE INFORMATION ON COATINGS FOR VACUUM METALLIZING.

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