

SPTB-10

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WHAT IS A PLASTISOL?

A plastisol is PVC resin dispersed in a plasticizer to form a liquid. PVC resin is a white powder that resembles flour or cornstarch; plasticizer is a thick liquid that resembles corn oil or corn syrup. Other ingredients in a plastisol include stabilizers, inert fillers such as calcium carbonate, and pigments. There are hundreds of each, and they all have different physical properties that effect and control the plastisol's viscosity, rheology, cure and gel times, gloss and elasticity. The uncured product may have the constancy of mayonnaise or pancake batter.

Plastisols do not air dry, they must be heated. When heated, the resin swells and absorbs the plasticizer; when all the plasticizer has been absorbed it is known as gelation. At this point the plastisol film has the characteristics of Colby cheese, crumbly and hard, and will not go back to its original liquid state. It is also the point that the plastisol shows the least amount of tack. The gelation point is important when printing in conjunction with a flash cure unit because it is the point in which the greatest efficiency can be obtained.

I would like to point out that any plasticizer absorption by the resin might effect viscosity and rheology. If you have placed a pail of ink next to a dryer or other warm place you may have experienced this, the ink becomes thick, tacky, and sticky, and does not print well. Also, most Plastisols by their nature gradually build in viscosity, yet adding shear can lower their viscosity. This phenomenon underlines the importance of mixing or shaking plastisol textile inks that have been sitting before any extenders or reducers are added.

The cure temperature of plastisols can vary, ranging from 275° F to 350° F for textiles. It is difficult to establish a cure time. This is because film thickness, temperature, fabric color, substrate and weight can all affect the heat transfer rate. Higher heat speeds the heat transfer rate.

Cure can be described as the point in which all the PVC resin particles have melted into one continuous film and obtain all desired physical properties. Uncured plastisol may be reheated to the desired temperature to ensure cure.

For further information, consult SPTB-07, Plastisol Glossary.