

Manufacturers like General Formulations have a wide variety of adhesive types to choose from when developing pressure sensitive graphic media. One popular choice is acrylic resins that use water as the solvent. Common names for these adhesives are emulsion acrylic or water based acrylic pressure sensitive adhesive. This type of adhesive is similar to common retail paints that can be cleaned up with water versus paint thinner used in traditional paints. The advantages when using an emulsion pressure sensitive adhesive are; minimal environmental impact, a wide formulation window, and adaptability to common coating methods. These are beneficial attributes and can be achieved without added emission control costs. As water based retail paints have improved from an application and durability perspective over the past 20 years, emulsion pressure sensitive adhesives now can be formulated for many uses in the graphics industry. Formulations for emulsion pressure sensitive adhesives ranging from ultra-removable short duration to long term permanent graphic application are commercially available.

The mutual component of all emulsion pressure sensitive adhesive formulations is water. Water has a relatively high surface tension and requires the addition of surfactants and additives to maintain a stable emulsion and allow the emulsion to be coated and processed with graphic media raw materials. While the water is evaporated from the adhesive resin in the coating process, surfactants and additives will remain in the adhesive resin portion of the graphic. Appearance of the emulsion pressure sensitive adhesive can be compared to white glue used around the house. When applied, white glue is hazy white in color. After drying, the glue resin is clear. In most instances the presence of surfactants and additives in the adhesive does not impact adhesive performance. The one instance where adhesive appearance can be effected is if the emulsion pressure sensitive adhesive comes into direct contact with water. In that case, residual surfactants and additives will absorb a small percentage of water back into the adhesive layer. When this happens the water will cause a clouding of the clear adhesive resulting with a hazy white fog visible in the clear adhesive.

WHERE CAN A GRAPHIC ADHESIVE BE SUBJECTED TO DIRECT WATER CONTACT?

Wet application of graphics subjects the emulsion pressure sensitive adhesive to direct water contact. Residual surfactants will absorb some of the water before it can be squeegeed out inducing a haze in the adhesive layer that may be visible right after application. Graphics based on clear media will exhibit adhesive hazing or fogging when wet applied. Additionally, if the graphic has a dark or black background hazing or fogging may be apparent if applied to glass or a clear substrate. On the other hand, if the graphic has a white background, hazing or fogging will still occur but not be visible because it will blend in with the white background. In very heavy applications of wetting solutions or failure to thoroughly squeegee out application solution, excess water will plasticize the adhesive compromising the holding power of the adhesive which could lead to edge curl, edge lift or possibly total delamination.

HOW TO GUARD AGAINST GRAPHIC HAZING OR FOGGING WHEN USING WET APPLICATION?

The obvious solution is to apply all graphics dry. However, that may not be practical given the size of the graphic or the customer's requirements. Most customers will not tolerate excessive bubbles or creases in their graphic. Additionally, many installers commonly use wet application procedures for all their installations. If you have to install a clear media graphic using wet application, consider:

Rapid Tac II as the wetting solution. That will minimize the formation of haze or fog. There are other commercially available application fluids. Consult with the application fluid manufacturer for those recommended for use with emulsion/ water based pressure sensitive adhesives.

Isopropyl alcohol can be an effective application fluid especially for exterior applications. Use either anhydrous or rubbing alcohol with an alcohol content between 91% and 88%. This will minimize water content along with the faster evaporation of the alcohol. Use with adequate ventilation and be aware the odor may be bothersome for confined interior applications. For a more detailed application procedure see [General Formulations Cold Weather Application Guide](#) under Technical Tips on the website.

NOTE: If using isopropyl alcohol as a wetting agent for ultra-removable or removable graphics, isopropyl alcohol may accelerate bond to the substrate compromising removability. Test thoroughly before large scale application.

If you install a graphic and note hazing or fogging it does not necessarily mean the application has failed. Under normal exposure conditions, 72° F and 50% relative humidity, hazing and fogging will dissipate within 24 to 48 hours of application, depending on the amount of water trapped in the adhesive.

Emulsion/water based pressure sensitive adhesives offer distinct advantages when producing graphics. Research and development continues to improve the performance of these adhesives to meet every demand of the graphic industry. Water resistant resin and surfactant development are improving adhesive haze and fogging resistance in new generation emulsion pressure sensitive adhesive formulations. Eventually, hazing and fogging encountered with emulsion/water based acrylic pressure sensitive adhesives will be eliminated. Until then knowing these limitations will allow the applicator to take advantage of the benefits these adhesives offer. If you have additional questions concerning emulsion/water based pressure sensitive adhesives in your specific application, contact your General Formulations Customer Service Representative at 800 253-3664 or through the website at www.generalformulations.com. Your customer service representative is available under Contact Us/ Customer Service Team.