

## Drying Water and Solvent Based Adhesives



Almost all adhesives contain either water or some other solvent. The amount of liquid in an adhesive depends on how it will be processed. For example, wire wound bar coating requires a relatively dilute, watery formula, while structural adhesives may need to be quite viscous. The pre-cure viscosity of a formula is precisely engineered to permit uniform coating of a dry film of adhesive.

After the adhesive is coated it is essential that the liquid be removed. Normally even “dry” adhesives contain 1-3% residual volatile liquids, but too much residual liquid is one of the most common causes of adhesive failure. Excessive residual volatiles can reduce shear and heat resistance, chemical resistance and product uniformity.

Two widely used methods of drying are by using a forced-air oven, or simply allowing the coating to air dry. The following is a list of some of the most important factors to consider when drying an adhesive coating:

- Time
- Temperature
- Air velocity (when using a forced-air oven)
- Relative humidity
- The hygroscopic nature of the adhesive
- The surface quality of the material being coated
- The uniformity of the adhesive coating
- Coating thickness

### Factors that affect drying are

The removal of retained volatiles is critical creating a proper adhesive bond. Standard test methods are described in the ASTM (ISO) and PSTC test methods books. The table below may help as a starting point for trouble-shooting problems with drying adhesives.

### Effect of retained solvents on various adhesive types

ADHESIVE TYPE	PROBLEM	POSSIBLE SOLUTION
Pressure Sensitive Adhesive	Increased peel and tack	Reduce coating machine speed
	Reduced shear resistance	Increase drying temperature Reformulate adhesive
Heat Activated Adhesive	Coating blisters when heat activated or over-molded	Increase drying time
	Rolls of finished product “block” (will not unroll)	Reduce adhesive thickness Increase drying temperature
Contact Adhesive	Cohesion failure	Reduce coating thickness
	Edges lift when coated material is applied to a curved surface	Increase drying temperature Increase drying time