HOW MUCH ENERGY DO YOU USE USING SOLVENT, EMULSION OR HOT MELT TECHNOLOGY

The thermal energy used in the drying process is becoming increasingly important and definite savings can be demonstrated with water-based dispersions. The amount of energy needed to raise the temperature of the volatile liquid carrier (i.e. water or organic solvent) to achieve efficient vapourisation will depend on the specific heat and heat of vapourisation of the particular carrier. The energy required will be greater in the case of water than organic solvent although, as previously stated, there will be less water to evaporate in view of the higher solids content of water-based dispersions.

However, in spite of high velocity air drying systems being increasingly used for water-based dispersions, much larger volumes of air are required for organic solvent drying ovens to keep the proportion of solvent vapour in the mixture below about 5% in order to avoid an explosive combination. This high volume of air must be heated to the required level and results in high energy demand. If only the influence of solids content, air to solvent or water vapour ratio and temperature increase are considered the following table gives a theorectical indication of energy consumption in BTU's per 1,000 sq ft. of a given coating weight. It must be borne in mind that dispersions above 50% solids are often used and that a 200:1 air:solvent vapour ratio is on the low side for solution coating. Thus, energy savings could be even greater in practice. Comparison with hot melt coatings is given for interest[17].

Energy consumption during solidification

Energy consumption per 1000 sq ft.

(at 1.5 mil. deposit)

	Solutions	Emulsions	Hot melts
Solids	40%	50%	100%
Air/Vehicle Vapour	200/1	100/1	--
T, °F	100	100	300
BTU's	83,000	55,000	2,000

(Data courtesy of Shell Chemical Co., Texas, USA)