

## TEMPERATURE VERSUS DRY TIME

By Ron Bryze

Temperature certainly does affect the dry time of both stains and finishes. An important step in the drying process is the evaporation of the solvents from these liquids. Only after the solvents evaporate can the liquid level out and start to form a film. The higher the temperatures the faster the solvents evaporate...think pot of water on a hot stove, only a lot more flammable. So if the temperature is lower than normal, then the solvents evaporate more slowly and it takes longer than normal to dry.

A nifty little rule of thumb is that the dry time changes by a factor of 2 for every 12 degree change in temperature. Said another way, dropping your temperature 12 degrees will double your dry time; increasing your temperature by 12 degrees will cut your dry time in half.

As an example: if your dry time is normally 20 minutes at 77 degrees, then it will be about 40 minutes at 65 degrees, 80 minutes at 53 degrees, and 160 minutes at 41 degrees. Lower than this is a good temperature for beer, not finish. Conversely if you increase the temperature from 77 degrees to 89 degrees your dry time will drop from 20 minutes to about 10 minutes.

As long as we are talking temperature there are two other issues that should be pointed out.

As the temperature drops the viscosity of the finish material increases. If sprayed in this state the finish doesn't flow out as well and will often develop orange peel. The normal reaction to this is to add more solvent to the finish to lower the viscosity, which brings us right back to the temperature – evaporation thing. More solvent...more dry time.

The final temperature related issue applies only if you are using any type of catalyzed finish (pre or post cat). As the solvent in these types of finishes evaporates the catalyst starts a chain reaction that cross links the resin molecules in the finish. Think of the resin molecules as strands of rope. Cross linking is like welding all of the strands together to form one big strand - molecule. It is the welding, or cross linking of all of the resin molecules that gives these finishes their enhanced wear, water and chemical resistance. Once sprayed the object must stay at a temperature of at least 68 degrees for a minimum of 6 hours in order for the catalyst to complete this chain reaction. At lower than 68 degrees the film will dry but it will lose many of the performance characteristics that you paid good money for and that the client expects.

### **Pack & Stack**

While a finish may feel dry to the touch in a matter of hours, this does not mean that it is ready to travel.

- Finish should be dry for a minimum of 48 hours before being packed and stacked
  - Longer in humid weather
  - Longer for glazed & full-fill finishes
  - Most wood finishes take 30 days to fully cure and harden
- Never stack pieces "finish to finish" without a protective layer between
  - Always use plain paper or a closed cell foam between layers when bundling multiple shelves, doors or panels
  - Never use corrugated cardboard between layers – it will leave an imprint
  - Never use newspaper between layers as the ink may transfer onto the finished piece
- Whenever possible ship bundles of shelves, doors or panels on edge rather than laying flat
- Never leave newly finished products in a truck for an extended period of time
  - Summer heat can cause freshly finished pieces to stick together or to leave an imprint from their wrapper
  - Winter cold can cause freshly finished pieces to cold check and crack
- Store shelves, doors or panels standing on end at the jobsite rather than laying flat.
  - Cut the tape or wrapper on bundles as soon as possible after the product is delivered to relieve pressure
- Make sure moving pads and blankets are clean and free of debris