

## The Importance of Drying Conditions

Ensuring the finish is sufficiently dried before recoating or allowing traffic across the floor is very important to a beautiful and lasting wood floor finish. It is true that waterbased coatings are noted for their fast drying times compared to oil-modified urethane finishes, but it must be kept in mind that although it is fast, there are limitations. Dry times and recoat times are stated in manuals. These are meant to be a guide only because the actual dry time can vary significantly. There are a number of factors that influence dry times in finishes. These are listed below:

- A) Amount of air movement and circulation over the drying surface**
- B) Film thickness**
- C) Relative Humidity**
- D) Temperature**

### Amount of Air Circulation

This is considered the major contributing factor to dry time. Without air circulation, the solvent and water evaporating from the surface can quickly saturate a small layer of air just above the coating. If this saturated layer is not moved away from the surface, the rate of evaporation slows significantly.

If the coating is in an enclosed room or space with limited air circulation, the dry rates will be significantly slower and there is a higher risk of marring the finish by walking on it or placing objects on it too soon. This is because solvents still in the coating will make it “soft”.

A window that is open a crack will in a lot of circumstances not provide the type of circulation required. This is why having a fan to circulate the air is strongly recommended. Note: It is not necessary to have a hurricane, but “dead air” kills the finish hardness.

### Film Thickness

The curing process happens at a relatively slow rate. The drying of a coating begins at the coating/air interface. In other words, it dries from the top down. The solvents and water molecules nearest to the surface dissipate first and form a film. The remaining solvents in the coating below must pass through the film. Since the second coat is done over top of the previous coat, any solvents not dry on the first coat will have to travel twice as far, through twice as much solid finish in order to escape.

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### **Film Thickness (cont.)**

As multiple film layers build and get thicker, the curing process becomes slower and the finish stays softer, longer. Softer finish is more susceptible to being marred. This also applies to large pets whose paws and toenails will tend to dig into a slow drying and curing finished caused by limited circulation. Dry each coat well with air movement.

### **Relative Humidity**

This affects dry time by changing the solvent carrying capacity of the air. The higher the humidity is, the more water the air contains. When the air contains more water, there is less availability (at a given temperature and barometric pressure) to pick up and carry away solvents from the finish. More airflow over the finish will help to compensate for this problem; along with higher temperature.

### **Temperature**

Temperature affects drying rate in two ways. First, it increases the air's capacity to carry vapor. This can increase the drying rate but only if the air is moving and circulating. Second, temperature can increase the rate of curing solvents, meaning that it can result in a faster drying time. Curing rates are a couple of orders of magnitude slower than the air transport and still can result in relatively slow dry times. This is also why even opening a window a crack, particularly in the winter, will not give satisfactory results. Not only does it decrease the temperature which slows the curing rate, but the airflow is still not good. The result can be a floor that dries slowly and remains in a softer state for a long period of time.

If dry times are achieved too quickly, there may be some combing lines in the finish and the finish may not be as smooth as you would like. In knowing what influenced dry times, it is possible to create conditions so that a perfect finish is achieved every time. This is why our instructions read "allow 30-45 minutes for flow and leveling, then open up and ventilate to dry".

A properly dried finish means that enough solvents have been removed from the finish to allow good coalescence. This coalescence in turn allows the polymer chains to entangle each other helping with chemical resistance and the physical properties of the finish. Close entanglements in finishes, such as StreetShoe®, allow cross-linking to occur; thus further enhancing the adhesion, durability and overall beauty of the floor finish.

It can be clearly seen from the above discussion that air movement and circulation are the most important factors in drying any floor finish. Other factors do have influence but they are only significant when used along with air circulation. So, taking ALL the above mentioned factors into consideration to ensure your wood floor finish is sufficiently dried is very important to a long lasting and beautiful wood floor finish.