Part Drying

It is important to define the goal or goals in the process of drying parts after the finishing operation. Is it to prevent rusting before some additional steps, to avoid water spots resulting in some cosmetic problems, or is it to provide dry parts for the next operation?

Water spotting:
The easiest way to prevent water spotting is with the use of DI (deionized) water in the final rinse. The water spots are typically due to minerals in normal process water and can be eliminated by removal of the minerals.

A second method that at least will minimize water spots is with an air blow-off process to remove the water droplets before they have time to dry on the parts. This method will be very dependent on part geometry and part orientation on the racks. If the air cannot reach certain areas on the parts due to geometry or if parts block each other then the spotting may still occur in those areas.

The Drying Process:
Ideally the method or methods employed to dry parts should be as energy conservative as possible. For example, high pressure blowers should be used instead of compressed air since the electricity costs are much lower for blowers than compressors. As a side note, the risk of getting air carried contaminants on the parts is higher for compressed air than with blowers.

Hot final rinse
One of the easiest methods of drying parts is with a hot final rinse using DI water. The parts will flash dry if the part geometry does not have any areas allowing water to puddle. This method requires energy to heat the water but totally eliminates the need for any hot air drying.

Air drying
There are two means of drying parts with air, which can be used in conjunction with each other or independently.

- High velocity air: Primary purpose is to knock the water off the parts rather than dry the water off the parts. One manufacturer of high velocity drying systems is Sonic Air Systems.
Example of an air knife drying system with blower

![Image](http://www.sonicairsystems.com/air-knife.php)

- **Heated air (convection drying):** Primary purpose is to evaporate the water off the parts. These means that the parts have to warm up in the heated air to effectively evaporate the water

- **Combination; hot and high velocity air:** This combination allows the parts to dry rapidly without the necessity of heating the parts up to cause evaporation. The large water droplets are knocked off the parts and any residual fine droplets are evaporated.

**Infrared drying**

Infrared (IR) is a line-of-sight method of drying parts that is energy efficient compared to convection heating of parts. The IR light is rapidly absorbed by the surface of the part resulting in a high surface temperature. Water remaining on the part surface is rapidly evaporated without the need for the whole part to reach a high enough temperature to cause evaporation. Since the process is line-of-sight, it is best used for either thin parts that allows rapid through-heating of the part and part cavities, or best used on flat parts such as panels which have simple geometries.
Typical quartz tube IR panel with ceramic fiber reflectors