

# Fixing finishing defects

Finishing defects are something every finisher would like to avoid. While it's difficult to eliminate them entirely, there are things one can do to minimize them. In wood finishing, most of the problems are related to the set-up and use of spray equipment and coating preparation. These defects might include:

## Blushing:

A hazy appearance in the paint film that can't be removed by rubbing.

- **Cause:** Condensation trapped below the surface on very humid days. The use of cheap reducing solvent or solvent with an excessively fast evaporation rate for the ambient conditions can cause the film to flash-off too quickly. You should also check for excessive air turbulence around and through the booth.
- **Solution:** Add rich, slower solvents or a retarder in small amounts. Excessive temporary air turbulence can be caused by spraying an object that fills much of the booth opening. In this case, air drawn around the ends of the unit will cause the solvent to evaporate too quickly, especially on humid days. A retarder is helpful.

## Orange peel:

When the finish resembles the skin of an orange and appears bumpy.

- **Cause:** Usually due to too-high viscosity because the material isn't reduced properly. Poor flow-out due to fast solvent balance in the material can also cause orange peel. Poor operator technique such as spraying too far away is the second most common cause. Fluid delivery rate may be too high for the air to atomize properly.
- **Solution:** Check for oversized tip and/or excessive fluid pressure. Atomization air pressure may not be high enough. Check the atomization air pressure of HVLP conversion guns at the air cap, not at the handle, since the air pressure of these guns is lower at the cap than at the handle. Check the paint temperature. If it's cold, it won't fully atomize. Adjust viscosity when the paint is warm. Ensure you're using the proper tip cap and needle.

## Dry spray:

A dry grainy starved look and feel to the film.

- **Cause:** Holding the spray gun too far from the work. For HVLP and air assisted spray guns, start with a six-inch spray distance. Also, the spray speed may be too fast for the nozzle selection and pressure settings. Atomizing pressure may be too high. Air-assisted atomization pressure is usually around 15 psi, depending on viscosity.
- **Solution:** Check your spray distance and speed.

## Runs, sags, heavy film:

- **Cause:** These are indications of excessive paint supply due to low viscosity and/or too high fluid pressures. They might also be caused by a narrow fan setting on a cap best designed for a wider pattern.
- **Solution:** Check the air cap specification for fan width and CFM consumption rates. An oversized fluid tip may cause sagging even at low pressures. Too low atomization air pressure and/or spraying too close and spraying too slowly will cause sags.

## Pulsating or spitting spray pattern:

- **Cause:** Usually due to loose or damaged fluid nozzles or air caps, or leaking or dried out needle packings in the gun. Spitting may result as

a result of over-agitation in a pressure tank. Air entering the fluid siphon section in a piston pump due to an air leak on the intake side may also cause spitting, as may a nearly-empty container. Pulsation might be caused by a low pump setting in an air-assist system or sticking or worn ball valves at the pump cycle reversal times.

- **Solution:** Examine the fluid nozzle and air cap closely for slight deformations. Lower the air pressure of the agitator motor. Check the entire length of the siphon section for leaks or kinks. Check the pump pressure, or add a pulse chamber downstream of the fluid section. Disassemble the fluid pump in a safe manner and check the ball valves and their seats for grooves, pitting or out-of-roundness.

## Non-symmetrical spray pattern:

Pattern deflecting left or right, or top- or bottom-heavy.

- **Cause:** A deflected spray pattern usually due to partially-plugged air horns on one side or atomizing holes to one side of the fluid tip plugged. If the gun has been dropped, the horn may be bent and or the holes pattern may be deformed. Sporadic deflected spray patterns, may be a result of excessive lateral air turbulence at booth edges, particularly if the object being sprayed is very large, causing high velocity air around the edges. A heavy top or bottom pattern may result from clogged atomization air holes, a partially-clogged fluid tip, deformed tip or a bent or worn needle.
- **Solution:** Replace the air cap and/or tip orifice if there's any deformity. The same applies to the tapered end of the needle.

## Spray pattern heavy in the middle.

- **Cause:** Under-reduced material, the fluid pressures may be too high or air pressure too low. The fan width setting may be incorrect or the nozzle too large.
- **Solution:** Ensure you're using the correct nozzle combination.

## Split spray pattern or hour-glass pattern:

- **Cause:** Air pressure too high or material too thin for the air pressure setting. Fan width too wide for the intended end-use.
- **Solution:** Reduce air pressure. Recheck reducing or viscosity specs.

## Bubbles in film:

- **Cause:** Often due to over-agitation of the coating or wrong agitator type in the tank or container. Excessive fluid pressure induces foaming upon delivery that doesn't always dissipate. Bubbles might also be caused by excessive flash-off air velocity. Or the coating may have been put into heat too soon after spraying. Excessive wet film thickness can prevent proper escape of solvents in the flash-off stage. Spraying too close to work may cause air injection in the film.
- **Solution:** Reduce the agitator speed so aeration doesn't occur or change the agitator to an oscillating paddle, particularly if using water-based coatings. Reduce the fluid pressure setting. Add small amounts of retarder to the coating, alter baffles in the flash-off oven or decrease air circulation velocity. A slower solvent (retarder) or careful and properly-advised addition of a bubble-release additive may be helpful. Check your spray technique and distance—it should be about six inches away from the surface. **cm**

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