

Eliminating Solder Paste Hang-Up on Squeegee Blades

APPLICATION NOTE

Definition

Paste hang up is when solder paste adheres to the squeegee blade after lift-up from stencil.

Process Impact

Paste hangup may cause insufficient deposition.

Printer Parameters

- **Print speed** may affect amount of shear. A faster print speed will result in greater shear thinning and consequently better drop-off.
- **Print pressure** will affect the squeegee blade's flex angle and consequently the surface area blade's interaction with the paste. Lower print pressure will result in less interaction between the paste and the blade, giving the paste less of an anchor and enhancing drop-off.
- **Blade angle** will affect the paste-blade interface. A greater blade angle (more vertical) will result in less of the blade's surface area contacting paste. The more the paste coats the blade the more likely the paste bead will hang-up.
- **Blade composition** (squeegee type) may also affect hang-up. Old worn blades will provide a surface which allows for mechanical hang-up.
- **Blade wings** or stoppers on blade edges keep paste within the blade's path. These wings may provide an anchor site for paste hang-up. However, by preventing bead thin-out, the likelihood of hang-up is reduced.
- **Release method** will also affect drop-off. A blade lifting straight up after a print will allow paste to flow down and off the blade. A blade that flips back off the paste does not facilitate flowing and requires the paste to release simultaneously along the paste-blade interface.
- **Lift height** may affect paste release. If the blade is not lifted high enough off the stencil, the paste will not flow completely off the blade. However, too much lift height will exacerbate problems caused by hang-up and the swinging release of paste.

Paste Parameters

- **Viscosity** will affect paste release. If viscosity is too high, the paste may not flow off the blade resulting in hang-up. Paste viscosity also increases with decreasing temperatures. Consequently, adequate time is required for the paste to reach ambient conditions after refrigerated storage.
- **Shear thinning** (thixotropic index) can compensate for high viscosity. If a paste is worked (mixed) thoroughly, the shear will cause a reduction in viscosity and consequently better release. The thixotropic index is primarily determined by the flux vehicle.
- **Tack** can also affect release. If tack is too great, the paste will stick to the squeegee. Tack is determined by the flux vehicle.

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