

## APPLICATIONS BULLETIN

# What's the Difference Between Transfer Efficiency and Transfer Effectiveness?

**Transfer Efficiency:** The total volume of solder released from an aperture, expressed as a %  
**A measurable, quantitative metric**

**Transfer Effectiveness:** The quality of the deposit shape and the variation in volumes  
**A qualitative characteristic that affects yields and reliability**



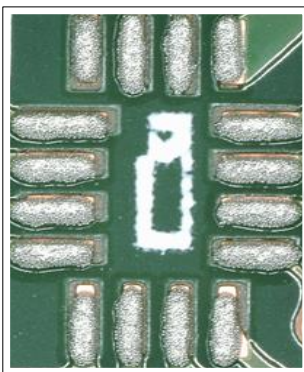
## More paste is not always better!

If a  $\mu$ BGA or 0201 typically runs with 400 mils<sup>3</sup> of solder paste on its I/O pads and gets a 25% volume increase, 500 mils<sup>3</sup> of paste can cause shorts, solder balls, tombstones or excessive skewing, all of which require rework.

**On miniature devices, more paste can cause lower yields.**

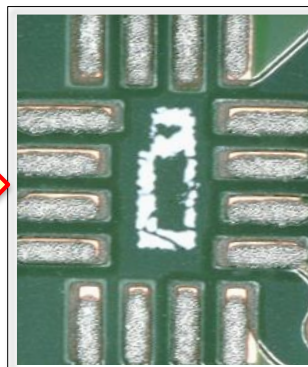
## Production 0.4mm QFN (100 $\mu$ m stencil)

Before coating



- Excessive paste volumes
- Higher volume variation
- Poor shape quality
- High risk of solder defects

After applying *nanoclear*



- Proper paste volumes
- Less volume variation
- Good shape quality
- Low risk of solder defects

