Note:

This is a portion of a study performed by ASM for the Process of Assemblying 03-015 Components. For the Complete Presentation, Please Contact Tom.foley@asmpt.com

Area Ratio (AR) and Transfer Efficiency (TE) define the Aperture Design

Stencil

Area Ratio, AR

$$AR = \frac{\text{Area of paste contact on the pad}}{\text{Area of paste contact on the aperture walls}} \qquad \frac{L \times W}{2 \times (L+W) \times T}$$

.66

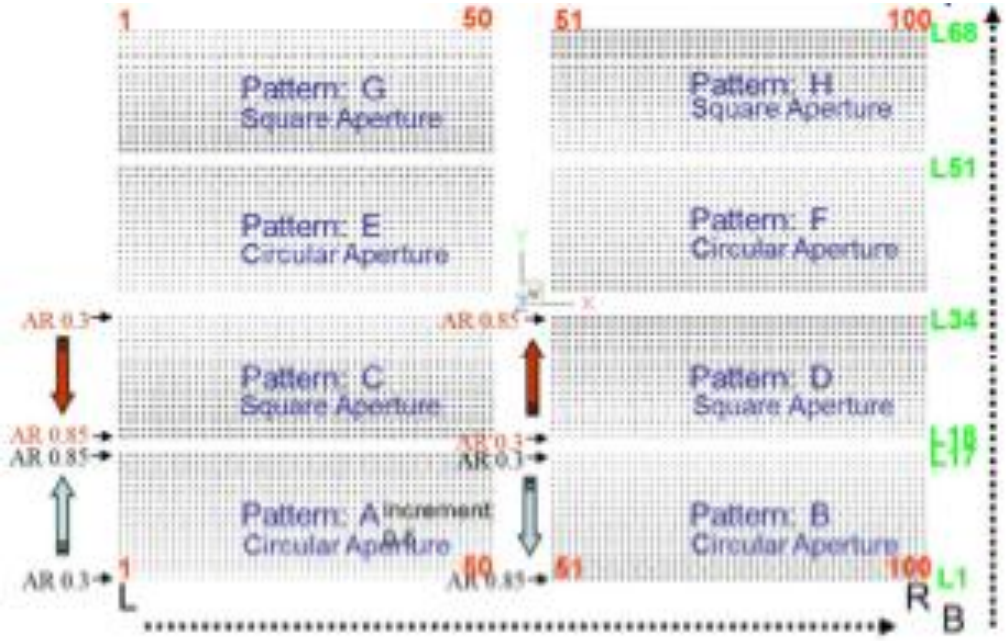
Transfer Efficiency, TE

$$\%\ TE = \left[\frac{\text{Volume of paste deposited}}{\text{Volume of stencil aperture}}\right] \times 100$$

SPI

The paste wants to stick to the pad & stick to the aperture walls.
Transfer efficiency is a measure of which one is dominant !

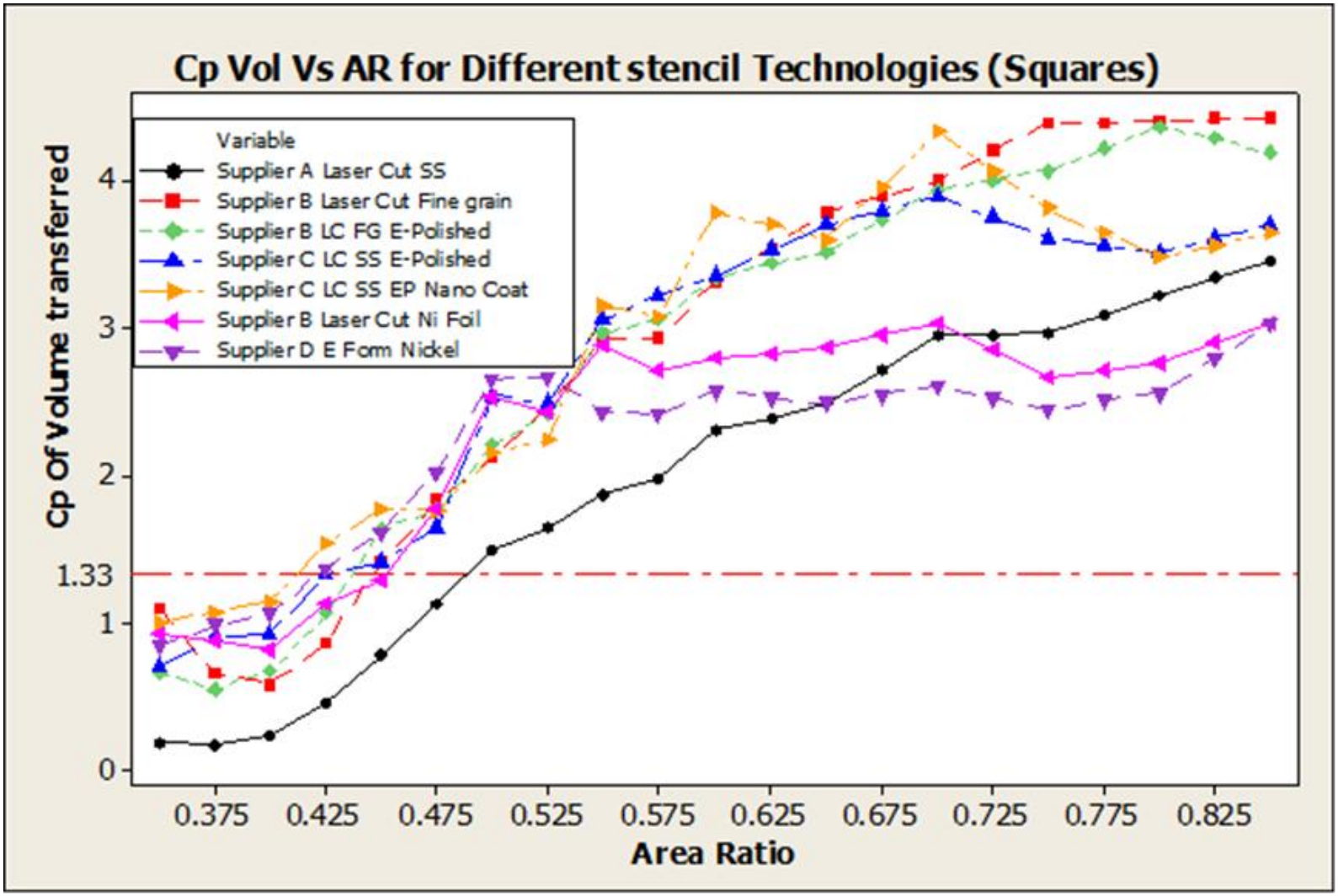
Stencil Transfer Efficiency Testing



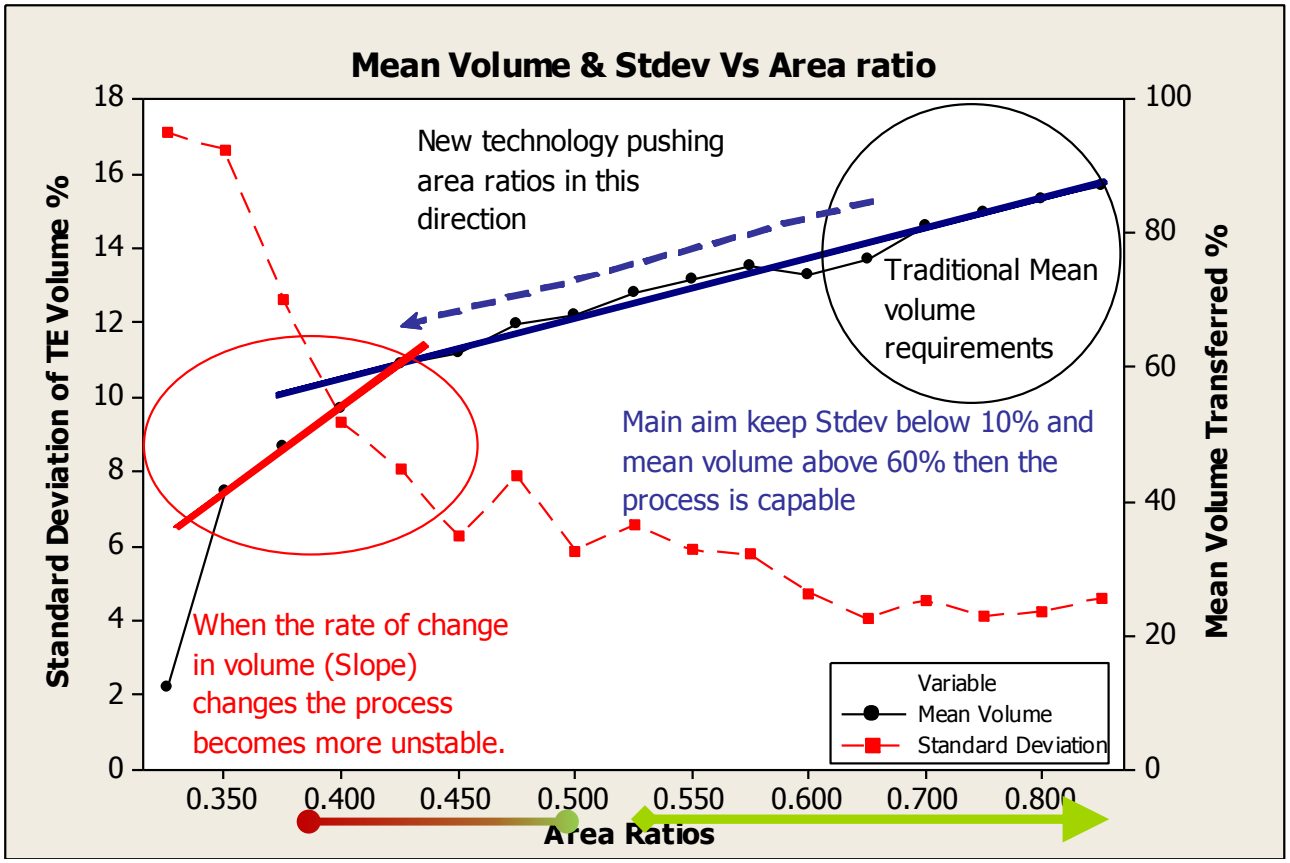
Stencil Types Tested

- Laser cut standard SS
- Laser cut fine grain SS
- E-Formed Nickel
- Laser Cut Nickel
- 3 types electro polishing
- Nano coating treatment

Stencil Material Influence on Transfer Efficiency



Stencil Transfer Efficiency Testing
- TE the science behind printing

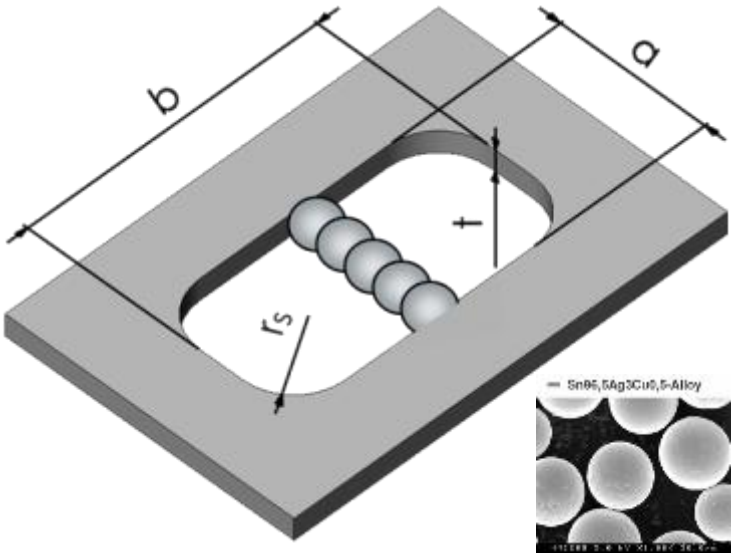


Important is that a sufficient mean Volume is transferred.
(good paste volume)

But at the same time it is important that the variation stays within controlled limits
(stable paste vVolume)

Type Solder Paste Influence on TE-Performance
Comparison of Paste Type 4 and 5

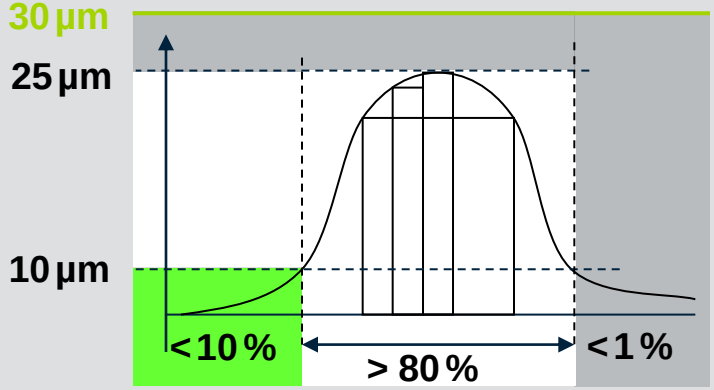
Ty



5 Solder Ball Rule

Type 5

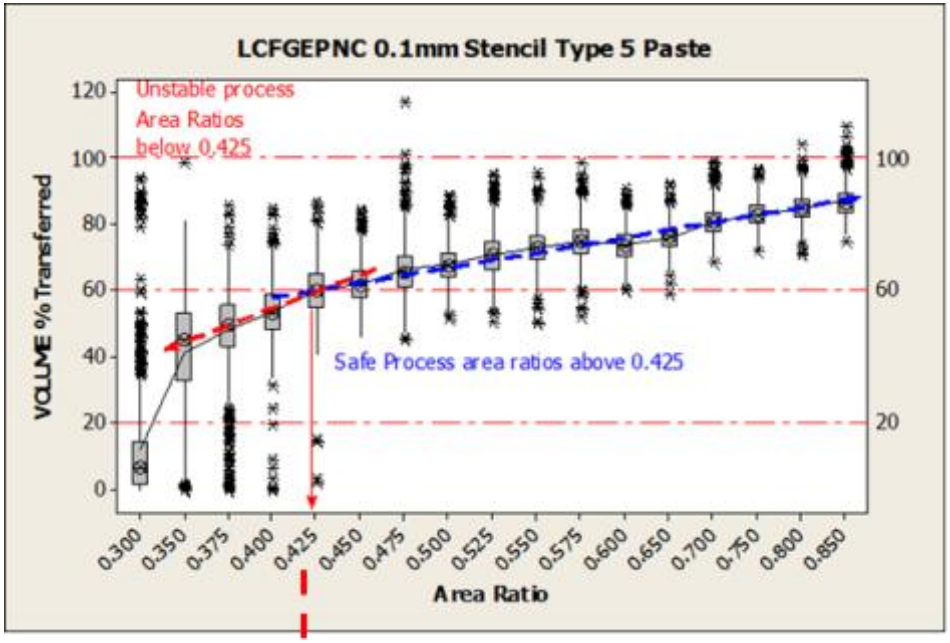
Particle Size Distribution

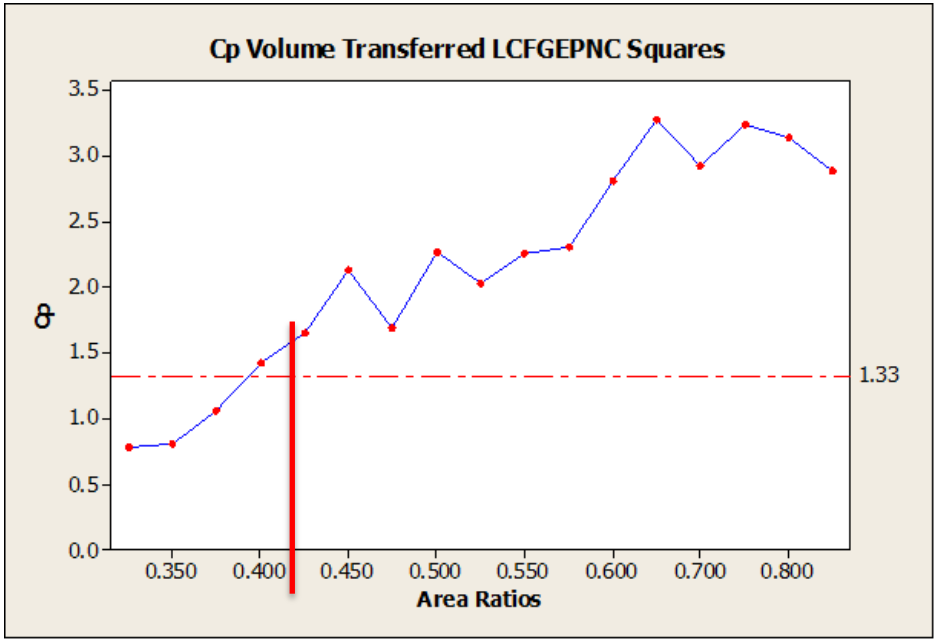


Type 5

Recommended for 01005 and a must for 03015

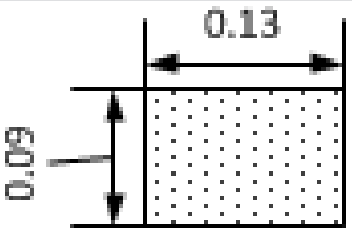
Best Performing Stencil





Best Stencil Result : Laser Cut, Fine Grain SS, Electro polished , Nano coated

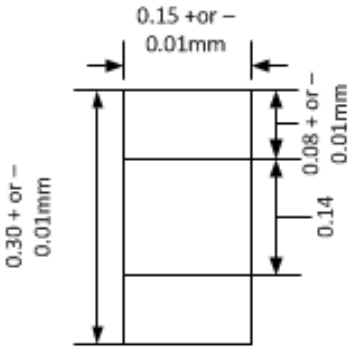
03015 Stencil Aperture Design

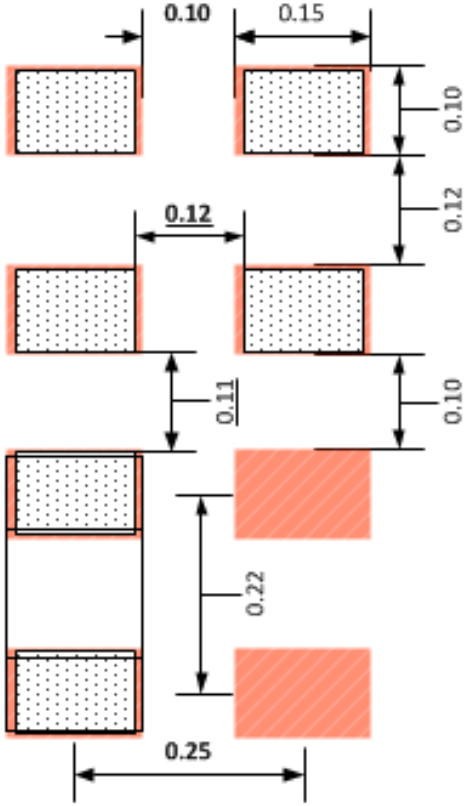


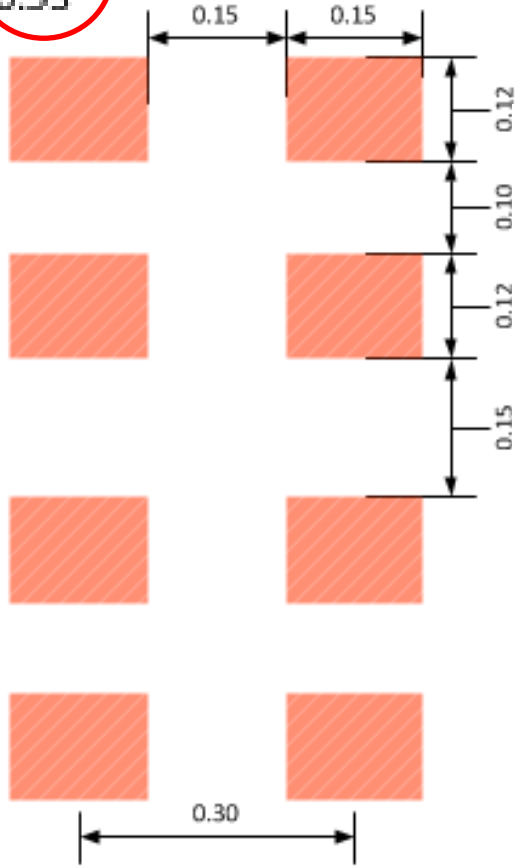
Small Rectangle 03015
Aperture 0.13 by 0.09mm
For a 0.06mm thick stencil AR = 0.44
For a 0.05mm thick stencil AR = 0.53

Large Rectangle 03015
Aperture same as pad 0.15 by 0.12mm
For a 0.08mm thick stencil AR = 0.42
For a 0.06mm thick Stencil AR = 0.57

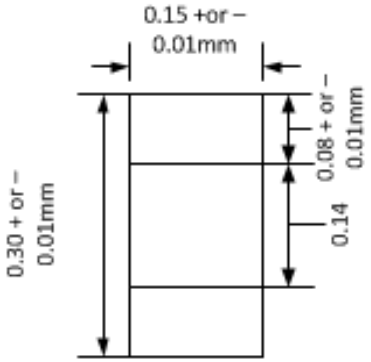
Metric
03015 R



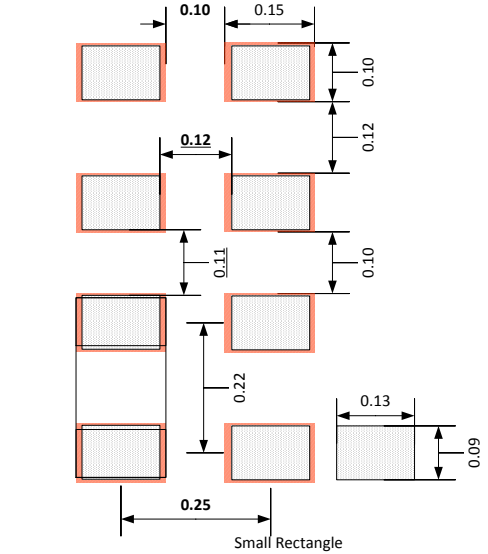




Metric
03015 C



Actual 03015 Print performance



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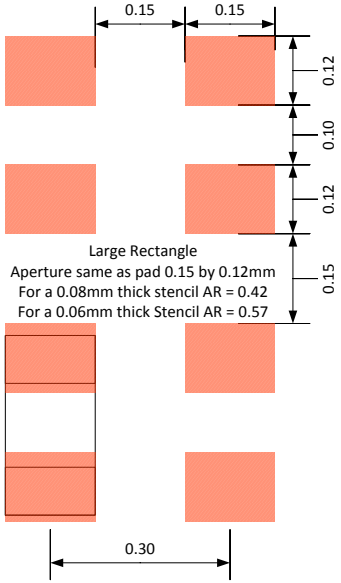

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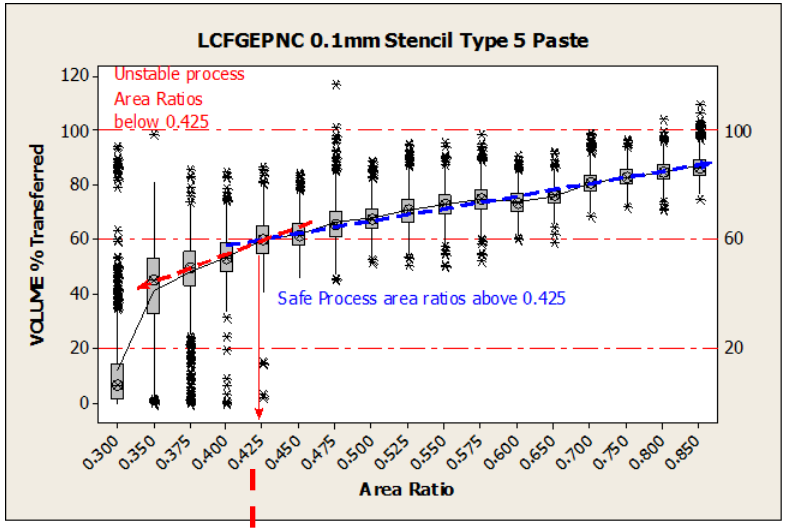

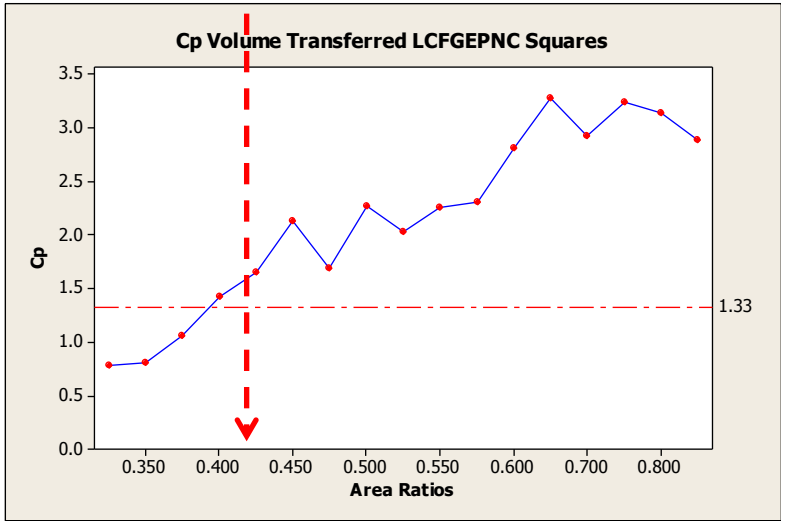

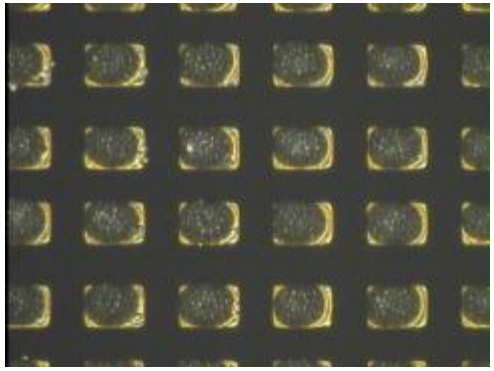

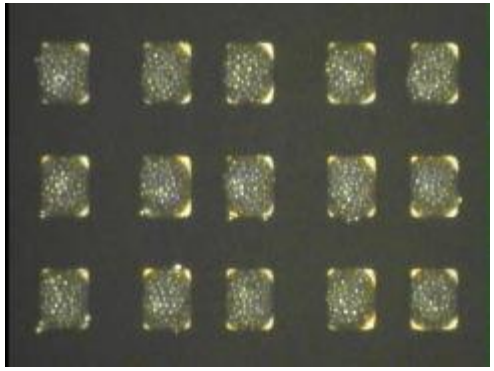

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THANK YOU