Room Temperature Fast Flow Reworkable Underfil For LGA

Mary Liu and Wusheng Yin, Ph.D

YINCAE ADVANCED MATERIALS, LLC

OUTLINES

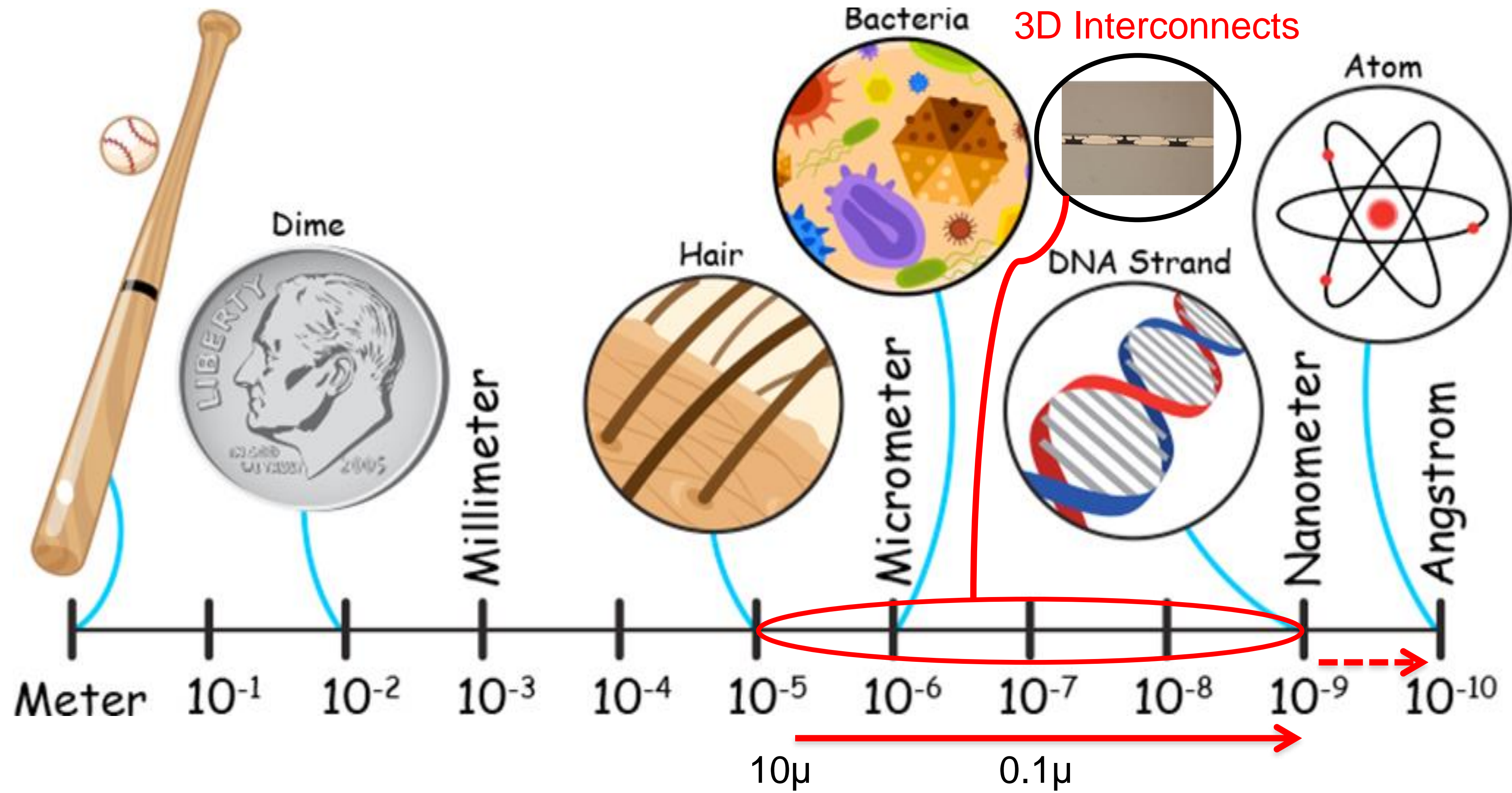
- Introduction
- Benefits Solder Joint Encapsulant (SJE)
- Current Issues of LGA, QFN…
- Test and Reliability
- Conclusions
- Acknowledgement

YINCAE

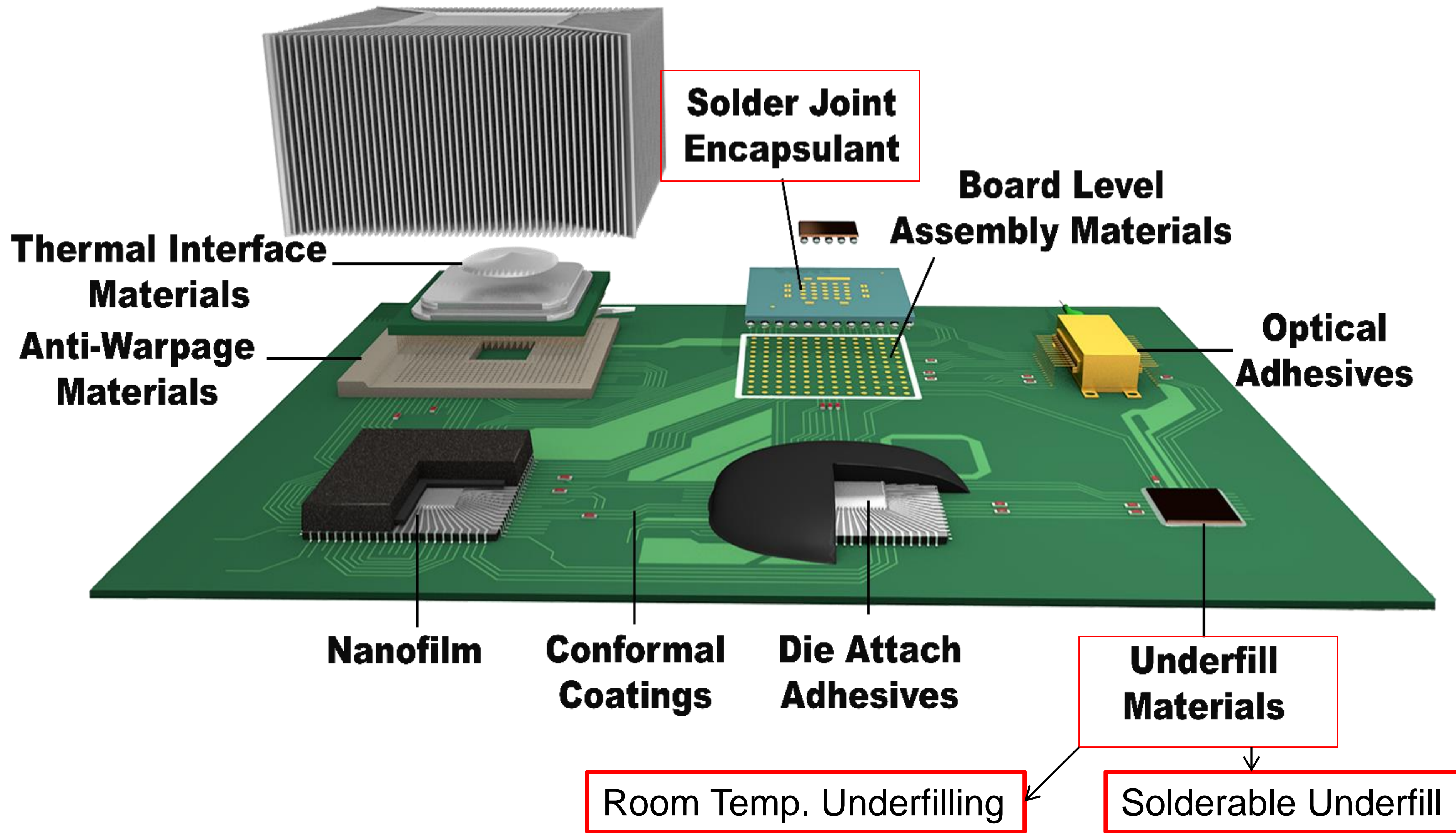
INTRODUCTION

YINCAE

Miniaturization



Solutions

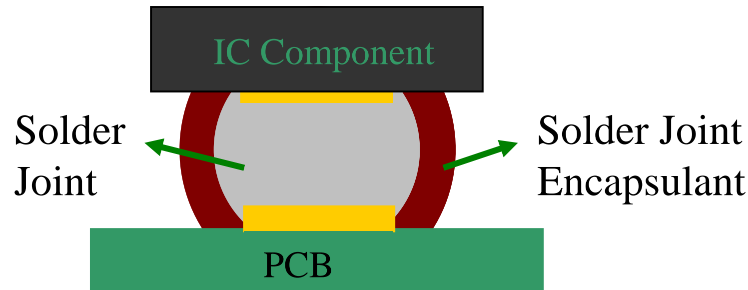


Confidential

Benefits of Solder Joint Encapsulant

YINCAE

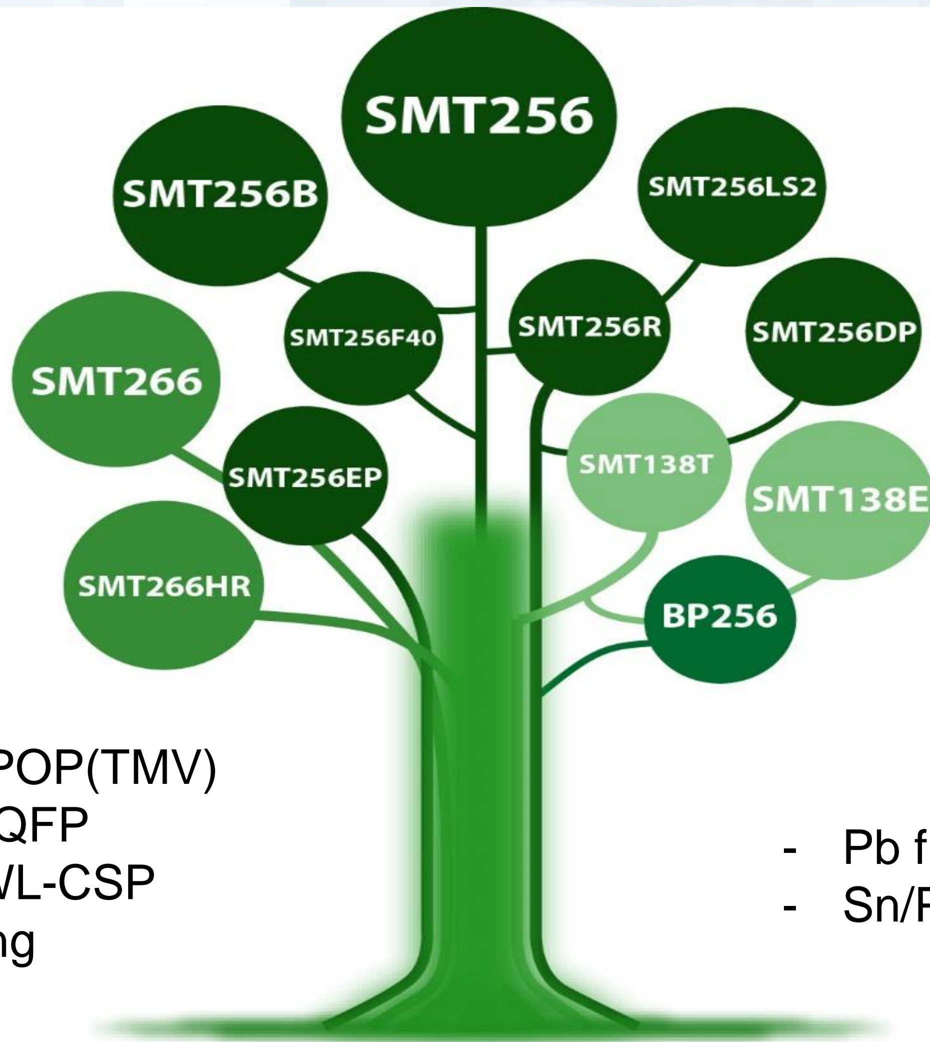
What Is Solder Joint Encapsulant ?



YINCAE

➤ All have flux function which can remove metal oxide from pads and bumps to allow solder joint formed.
➤ All are not no-flow underfill which can not be used to fully fill the gap between a component and a chip.
➤ During the reflow process both adhesives can be cured with the formation of 3-D polymer network which encapsulates individual solder joint.
➤ All are easily reworkable.

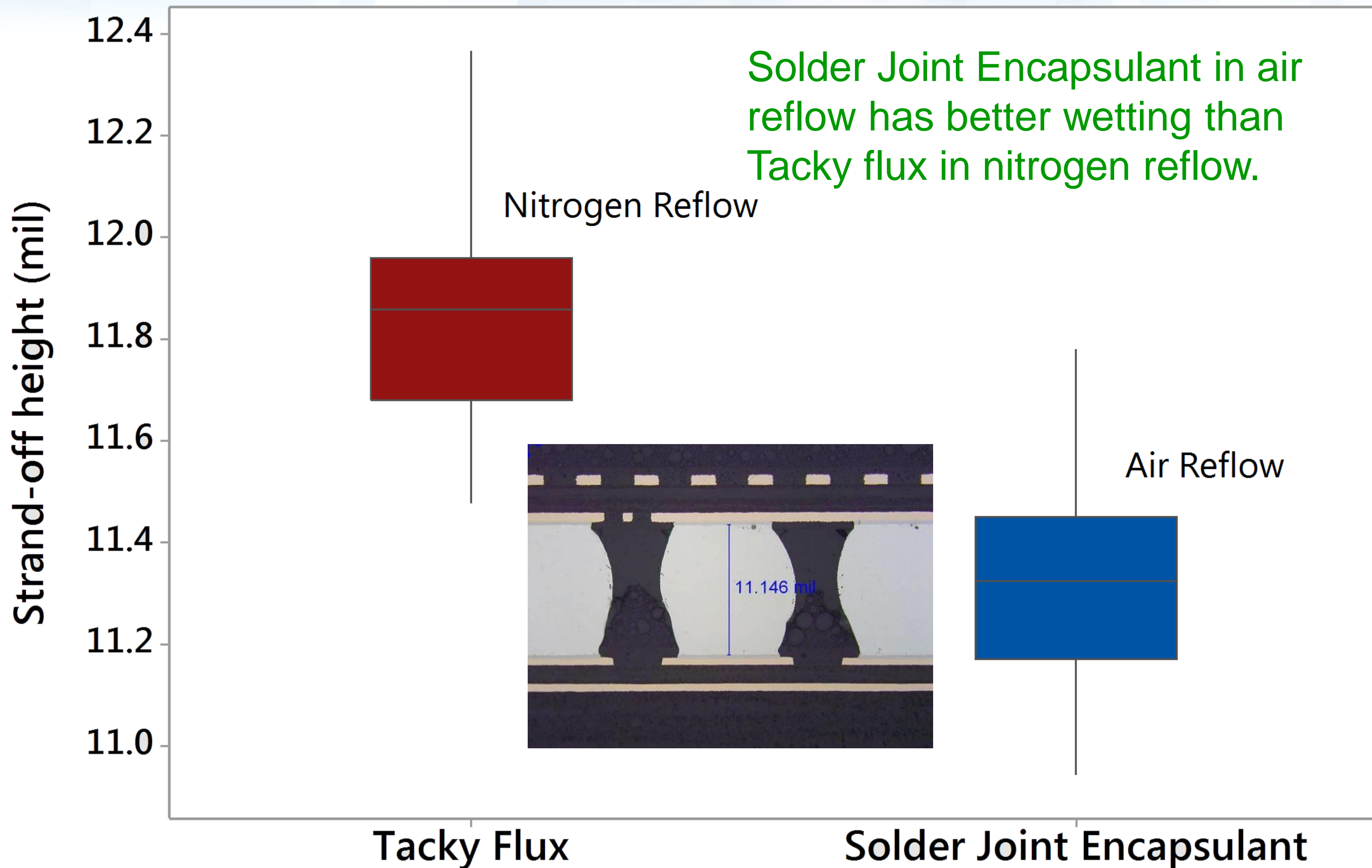
Solder Joint Encapsulant Family



- BGA/CSP, POP(TMV)
- LGA/QFN, QFP
- Flip Chip, WL-CSP
- Ball Bumping

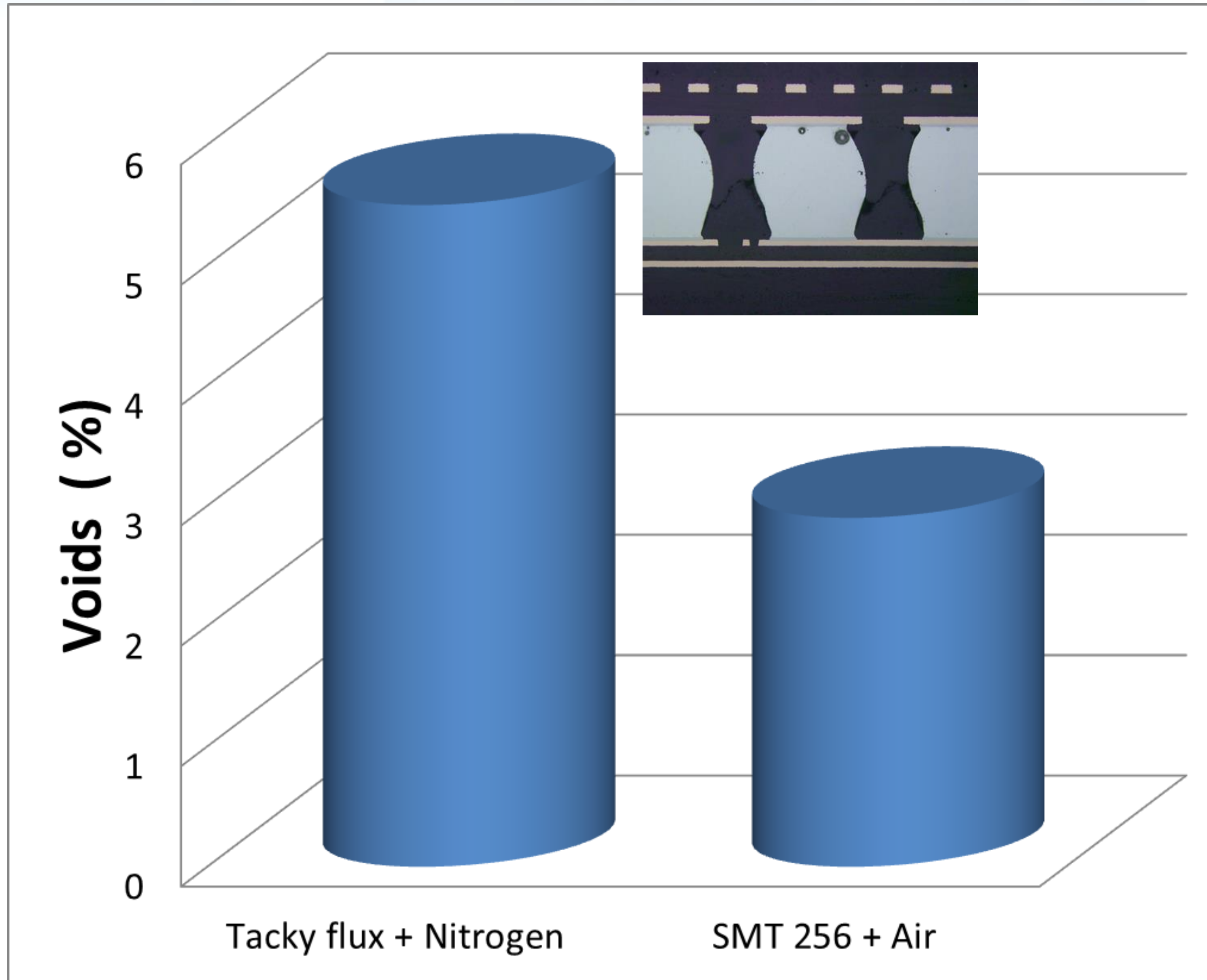
- Pb free
- Sn/Pb

POP

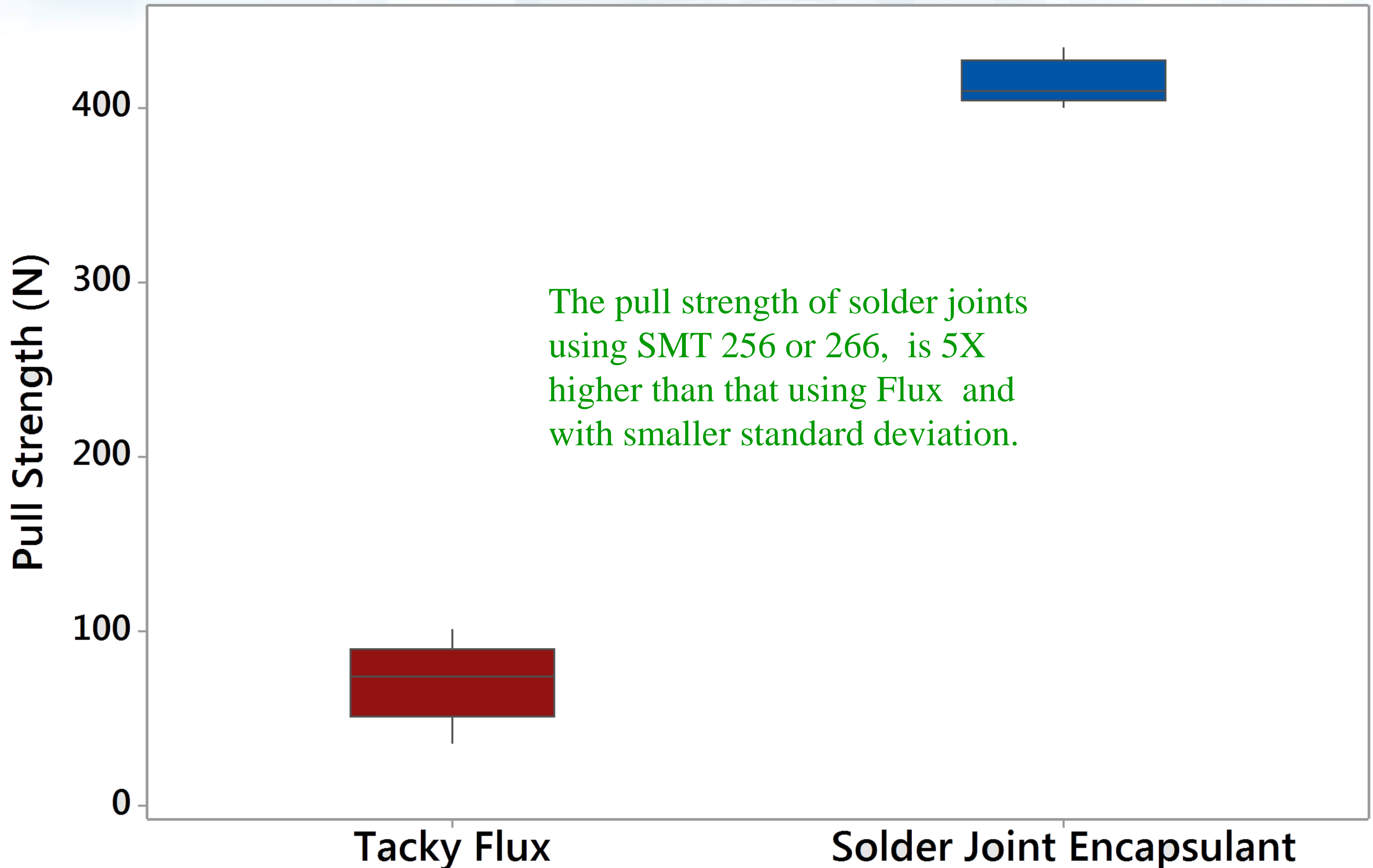


SJE Has Much Better Solder Wetting.

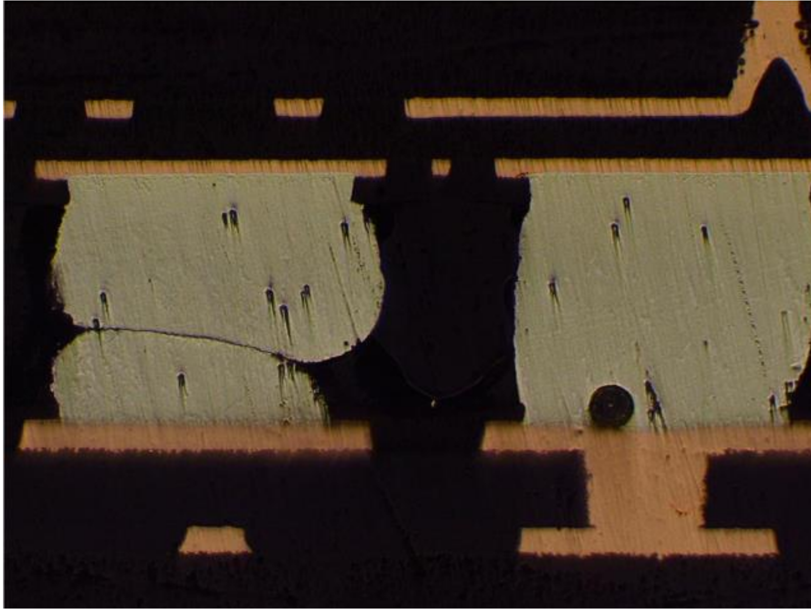
Voids of Solder Joints



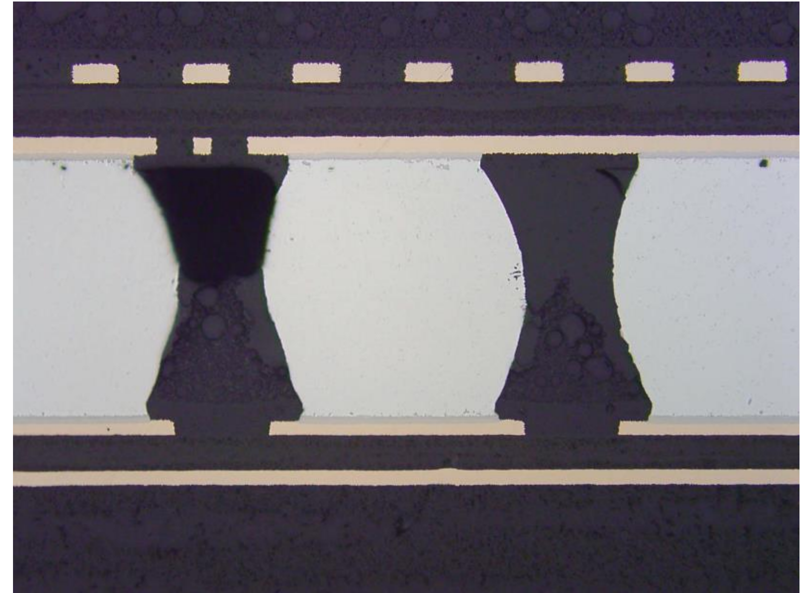
Pull Strength of POP



POP TMV



Tacky Flux

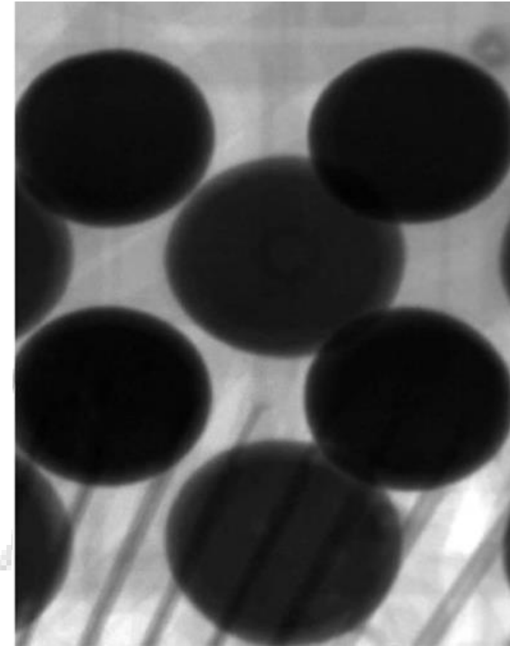


SMT 256

Head-in-pillow issue was resolved!

Eliminate Dendrite in POP TMV

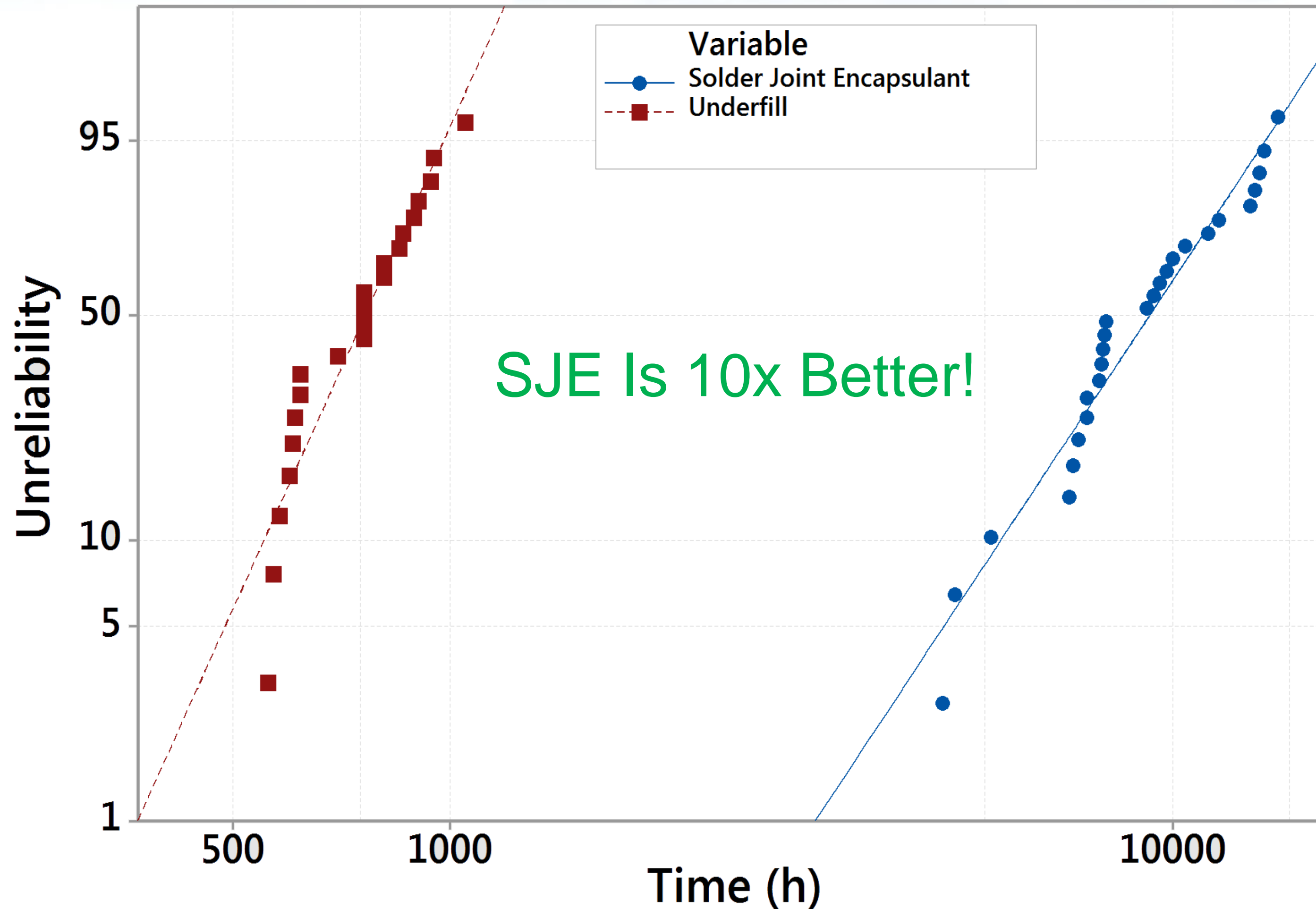
Tacky Flux



SMT 256

Dendrite issues in POP after sale!
SMT 256 eliminated the PAIN for the customer.

Thermal Cycling Performance



SMT256/266 has demonstrated outstanding reliability and won't cause extra stress for solder joints but enhancement(-55–125◦C; 1h/cycle, I/O 1156).

Current Issue Of LGA

- Crack Issue
- Narrow Gap
- Dense Neighboring Component

YINCAE

YINCAE Solutions To LGA

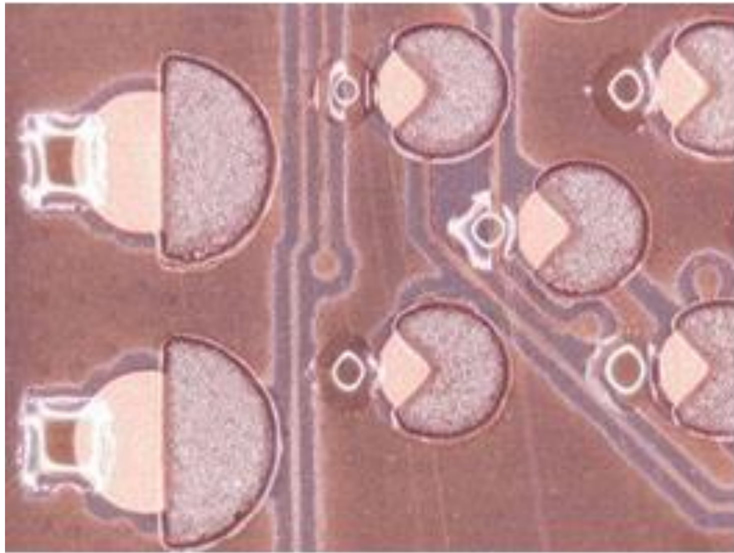
- Solder Joint Encapsulant Adhesive
- Room Temperature Fast Flow Reworkable Underfill

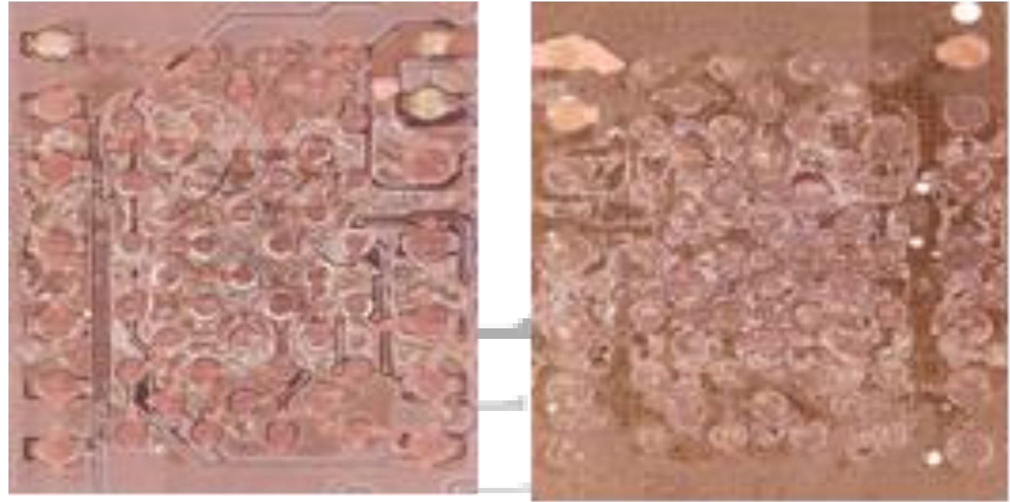
YINCAE

Solder Joint Encapsulant Solution

YINCAE

LGA





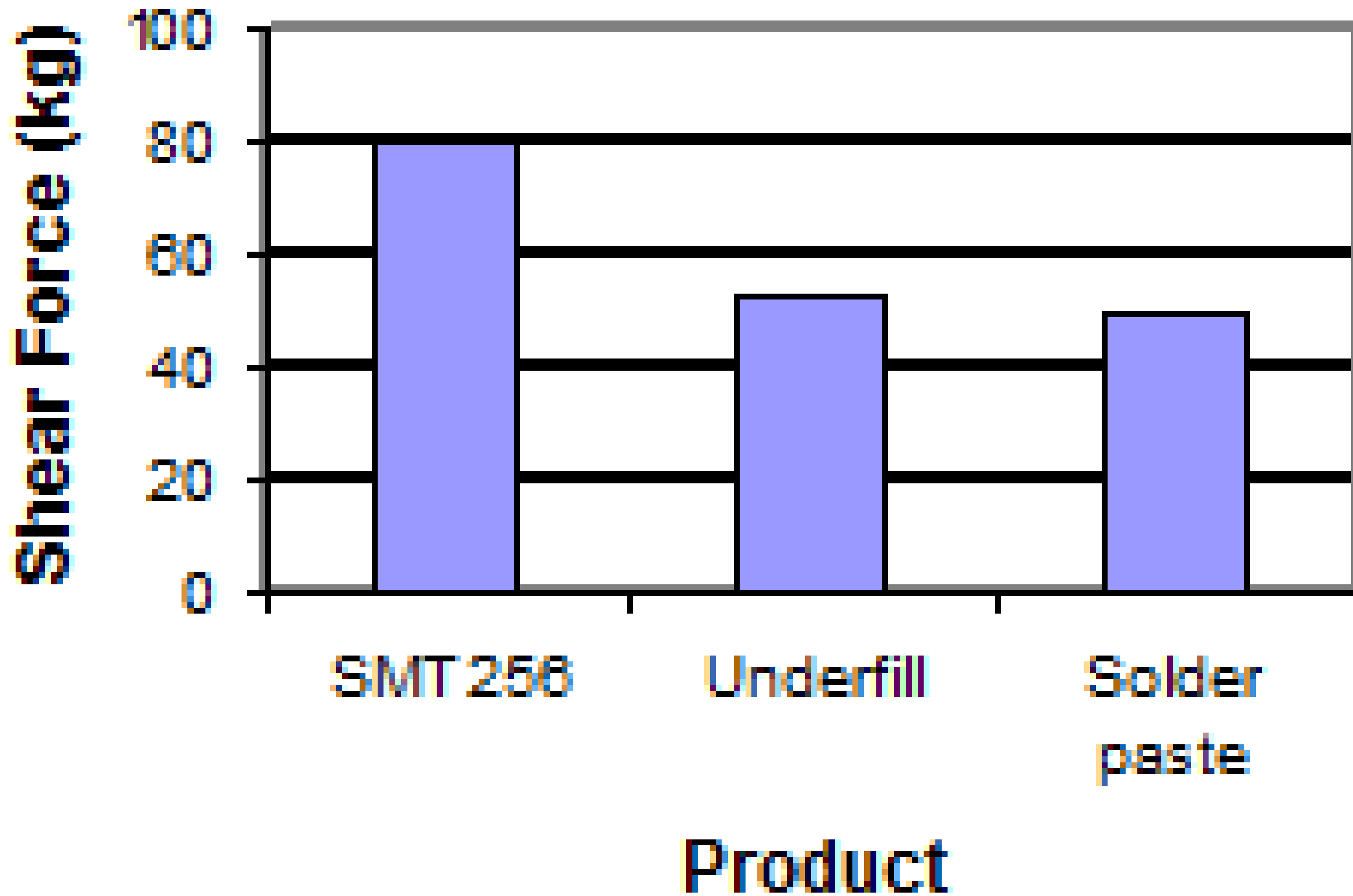
Substrate

Component

Pin Transfer Process

Pictures After Shear Test

Shear Strength of LGA



Room Temperature Fast Flow Reworkable Underfill Solution

Confidential

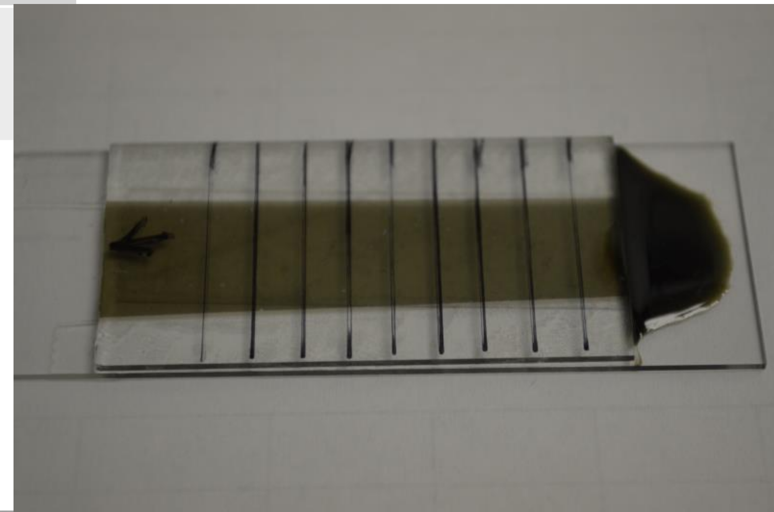
Test And Reliability

YINCAE

Flow Test

Gap: 20-50μ, Temp. 25ºC

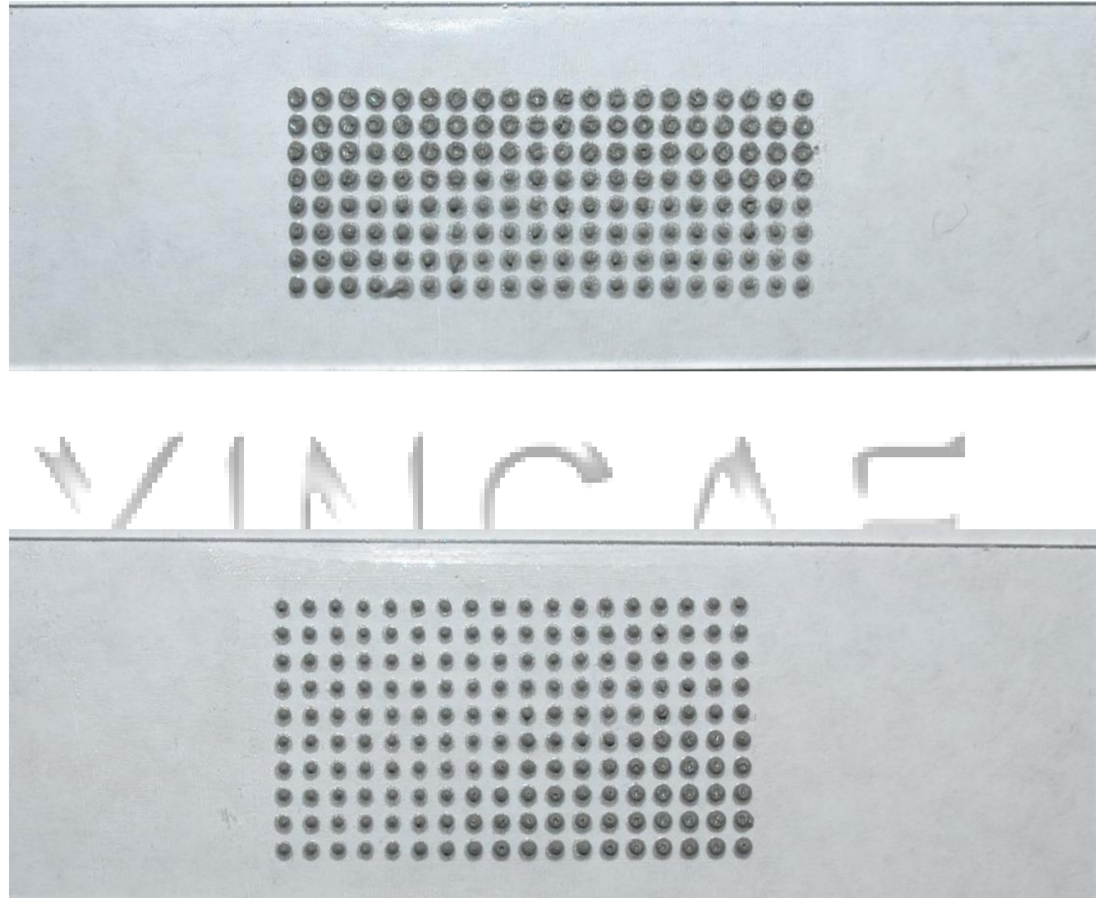
Gap (μ)	Distance(mm)	5	15	25
50	Flow time(s)	2	19	55
50 (16h at RT)	Flow time(s)	2	19	55
20	Flow time(s)	6	44	110



Compatibility Test

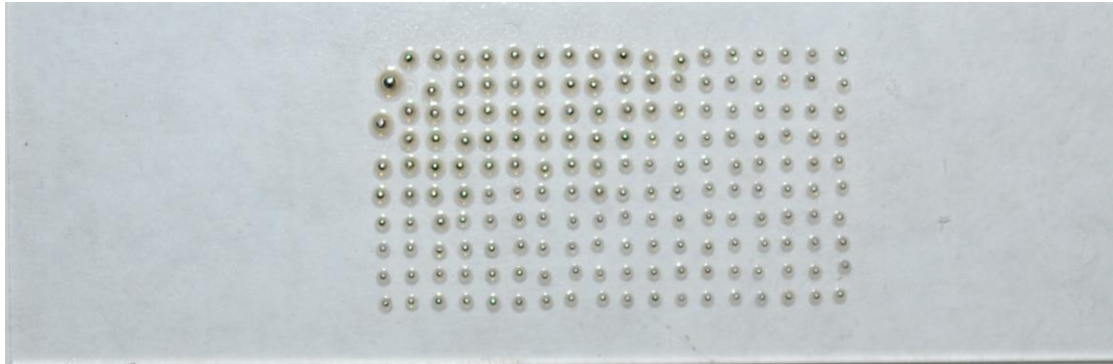
YINCAE

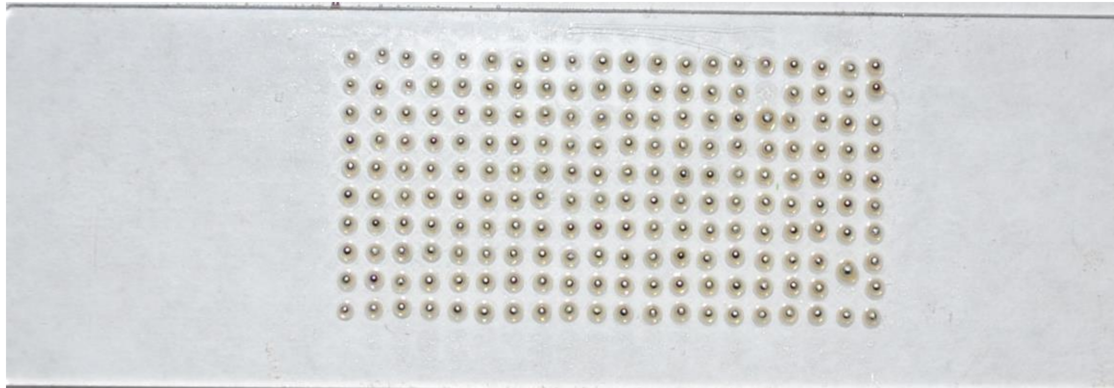
Printing Solder Paste



Printing Solder Paste Onto Glass Slides

After Solder Paste Reflow





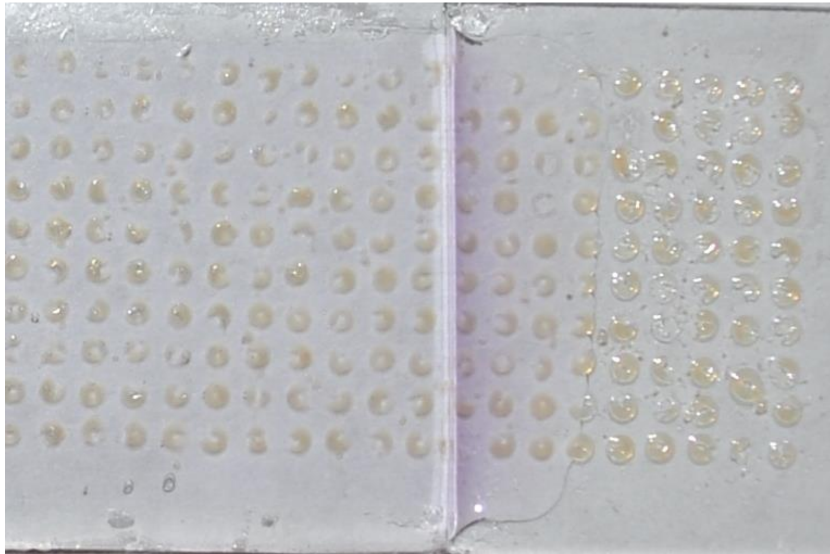
Solder sphere on the glass slides

Typical Pb-free profile was used with 255C peak temp.

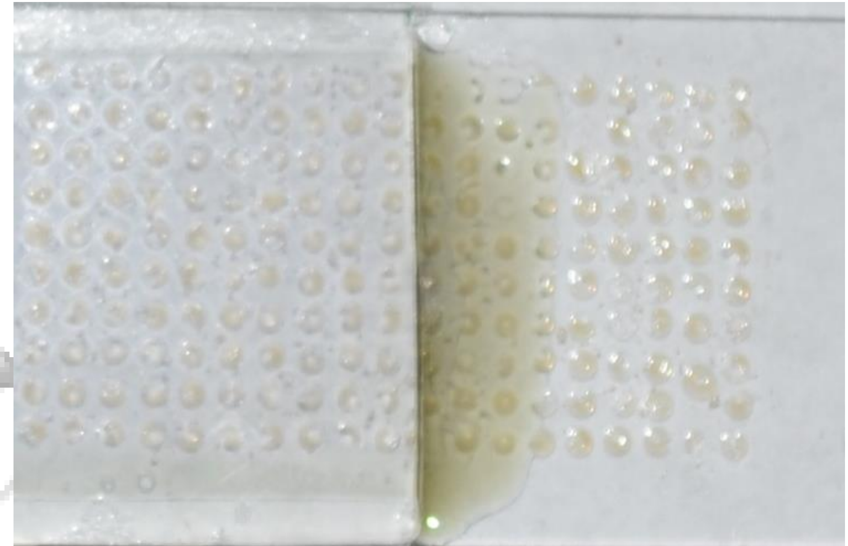
After Solder Sphere Removal

Flux residue left on the glass slide

Void Observation



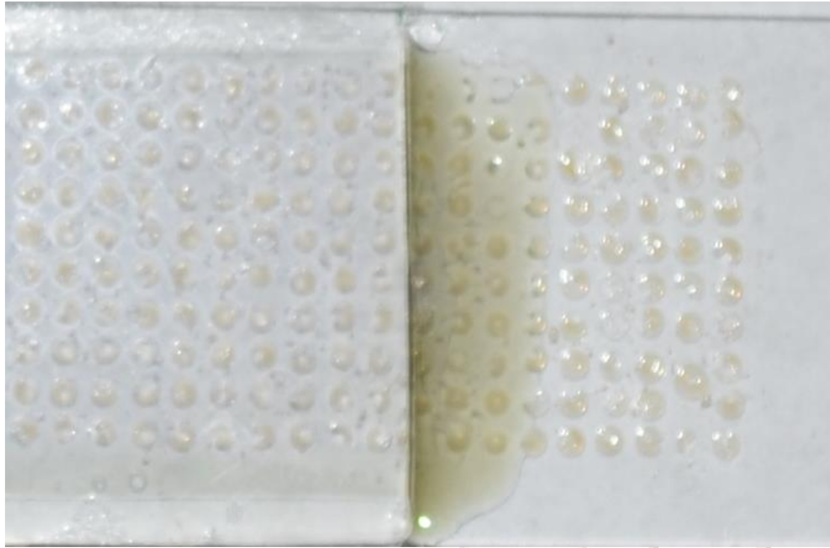
Before SMT 88UL cure



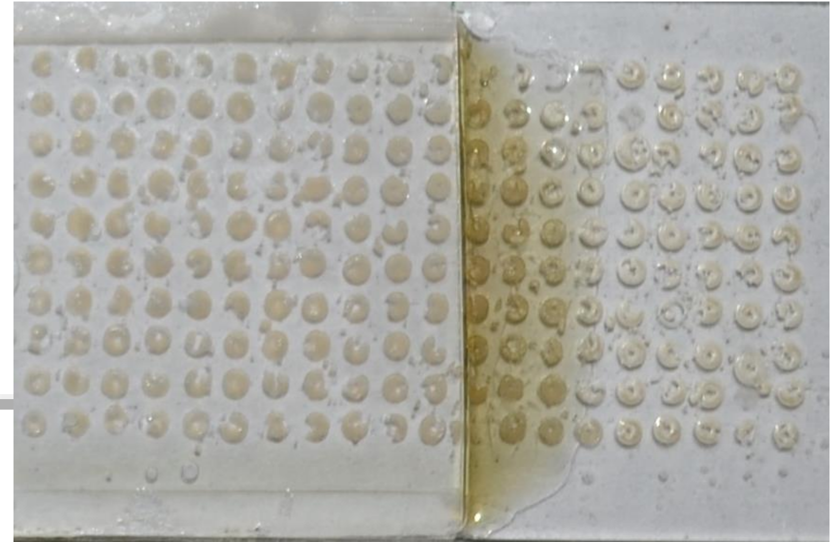
After SMT 88UL Cure

No underfill voids was found before and after underfill cure.

Cooking Test



Before Cooking

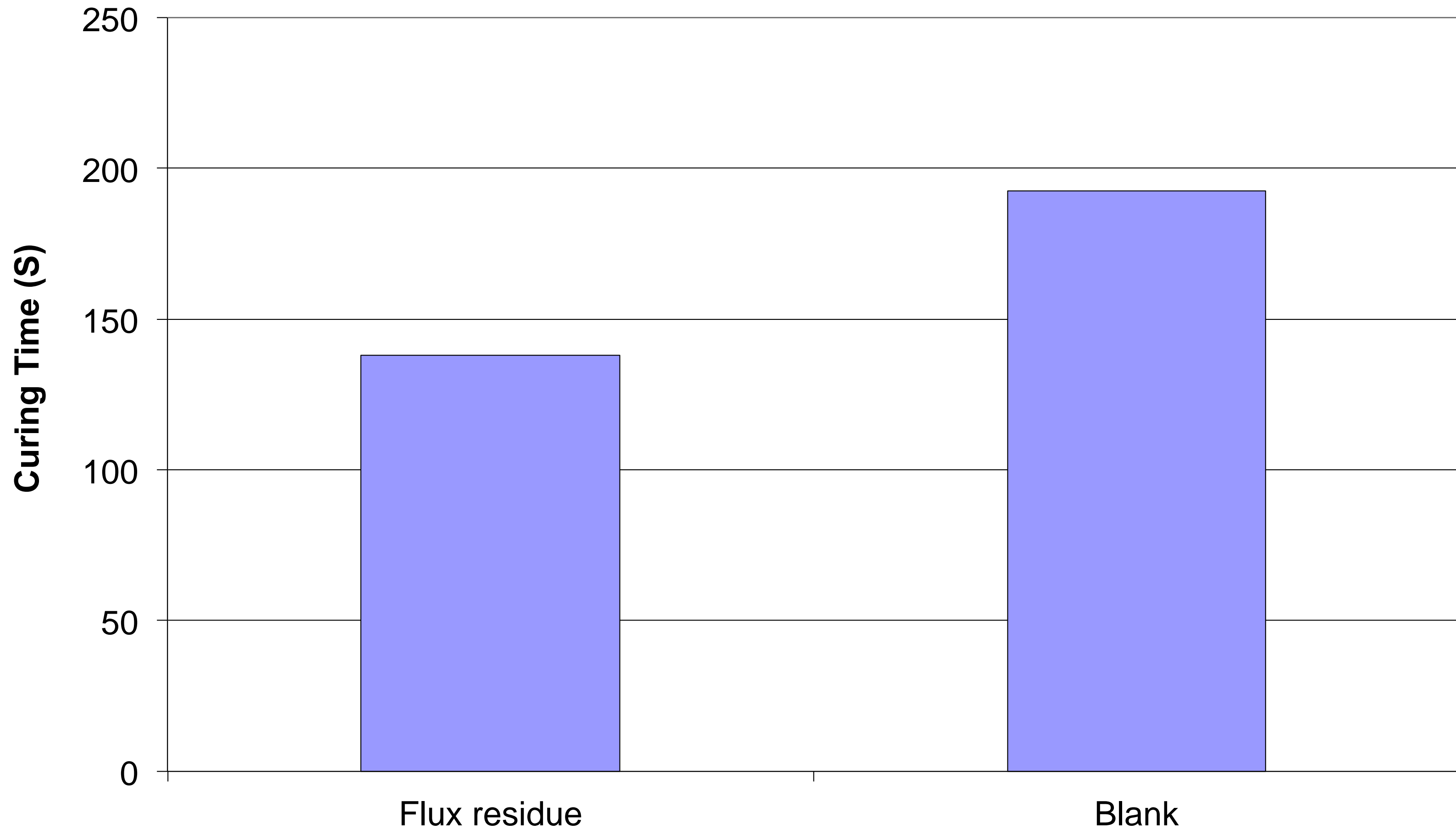


After Cooking

No any voids and delamination was found after cooking 96 hours at 60C.

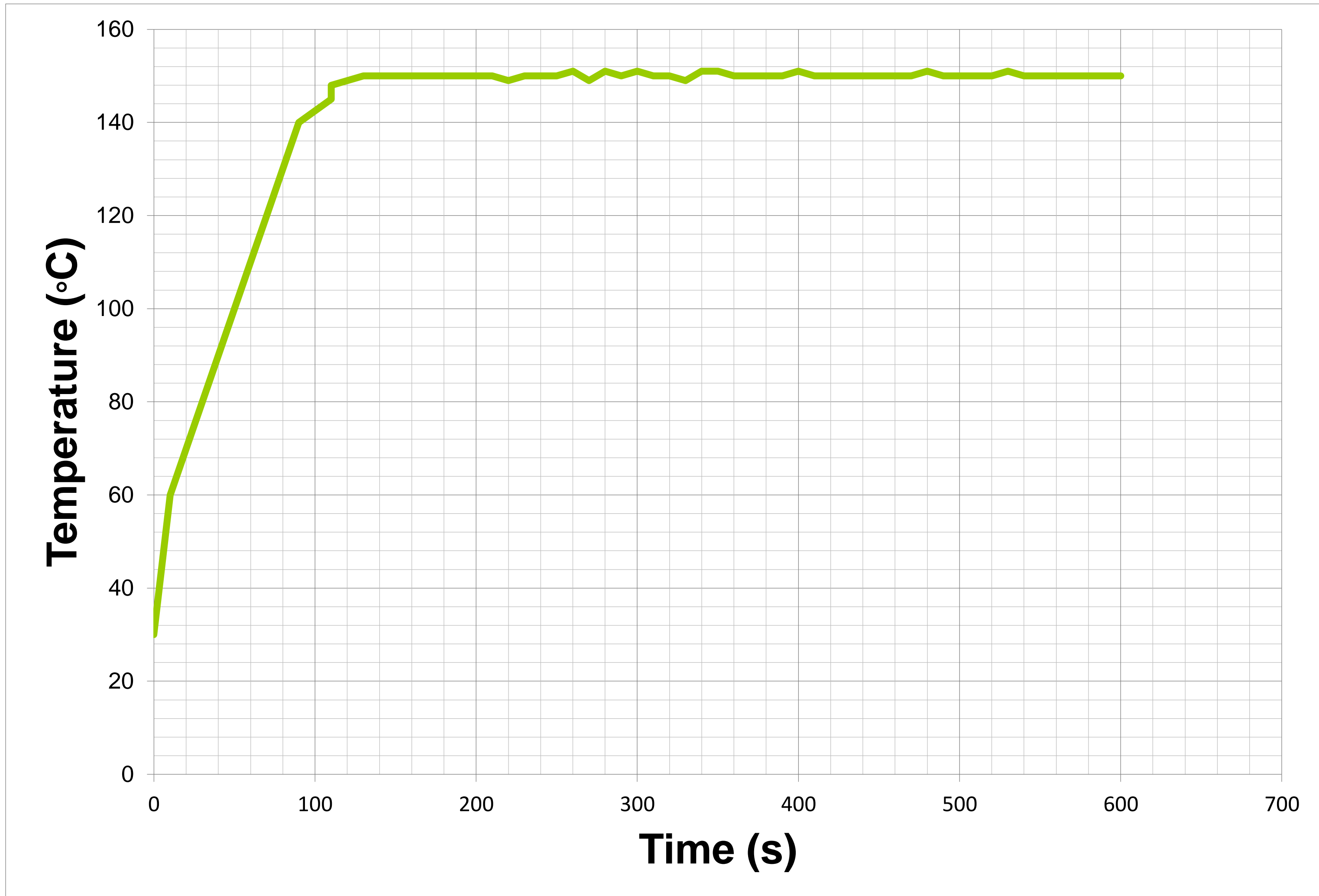
Confidential

Curing Test

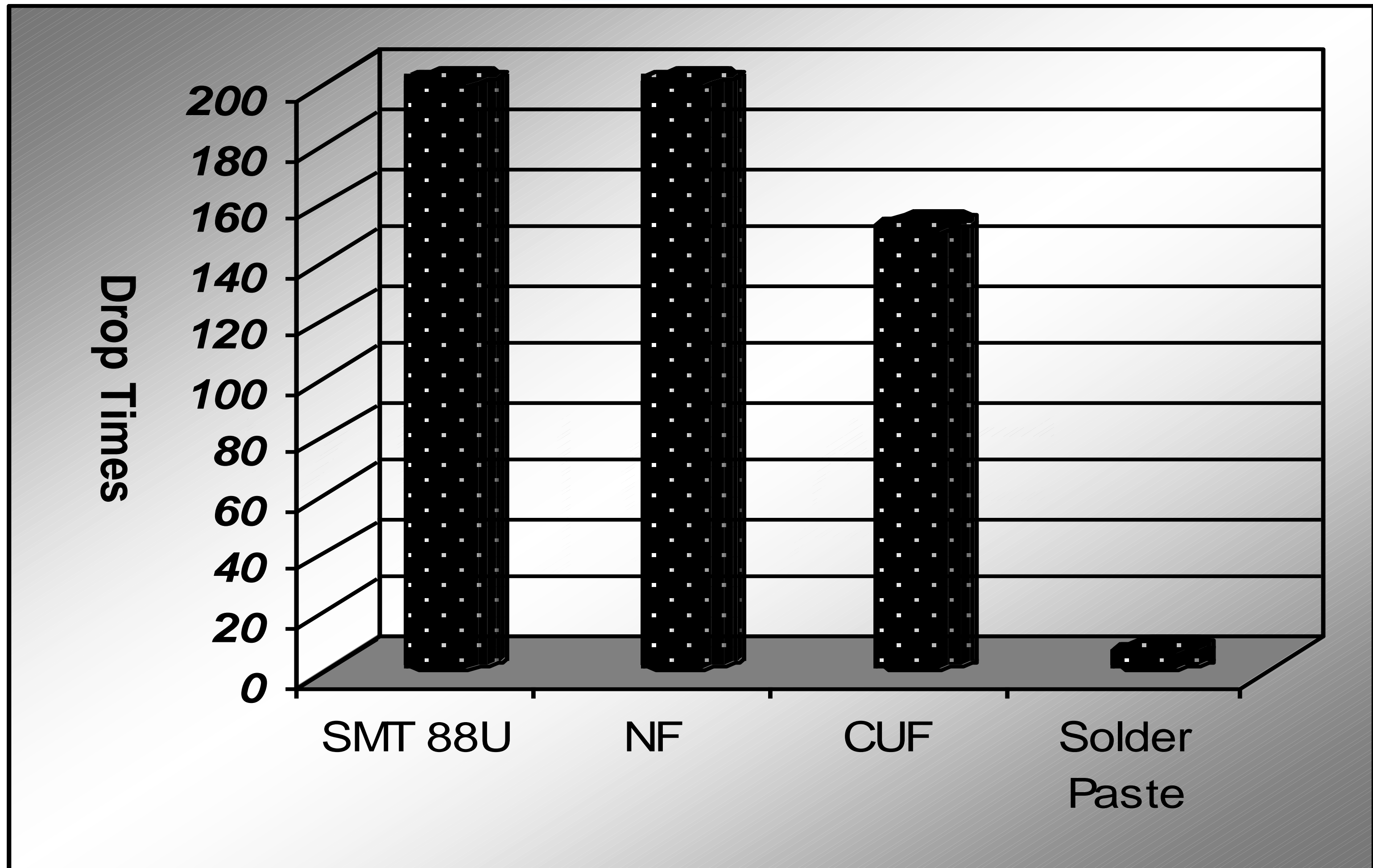


SMT 88UL cures faster onto flux residue than blank glass surface.

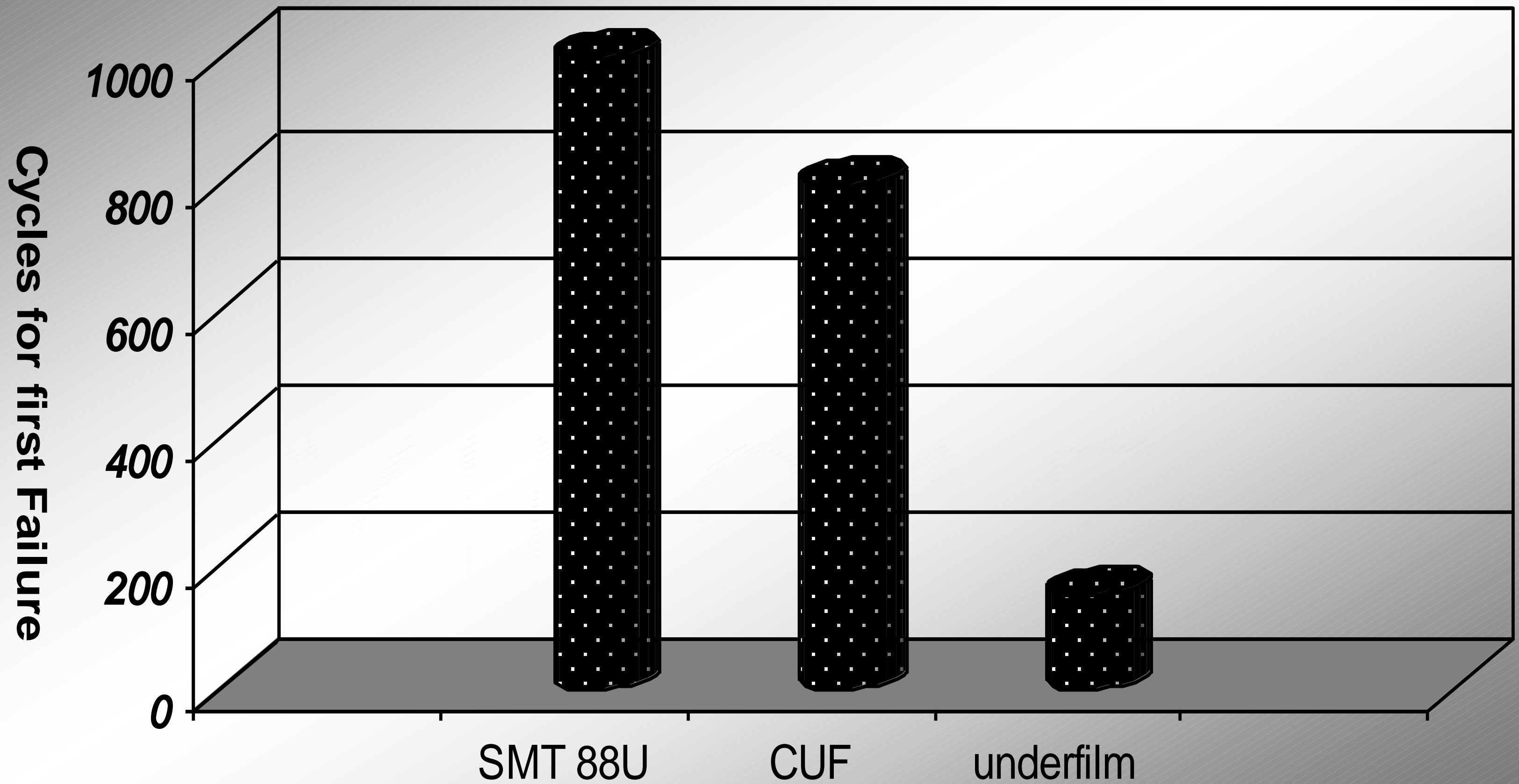
Curing Profile



Drop Test Performance



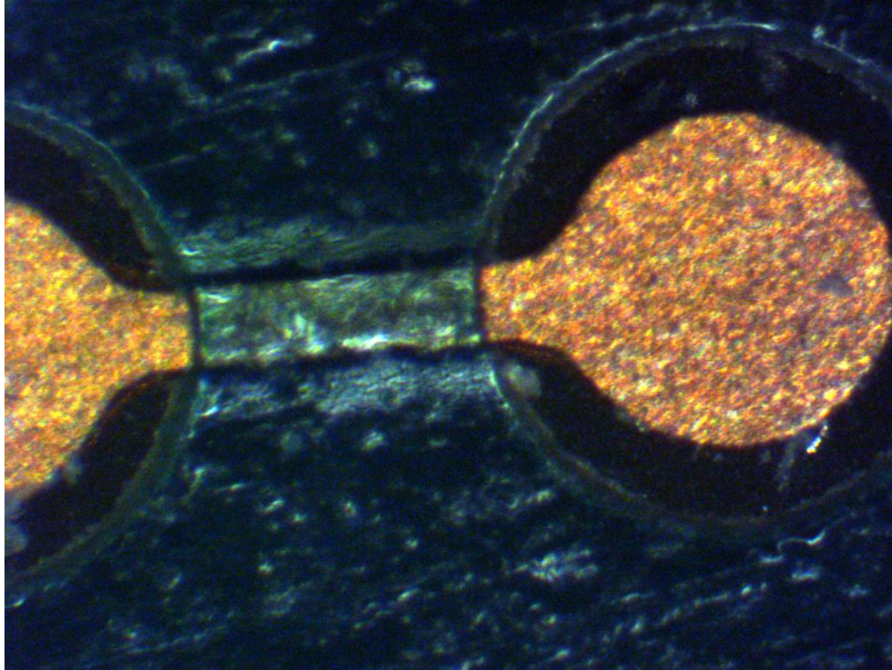
SMT 88UL is compatible with all flux reduce!!!



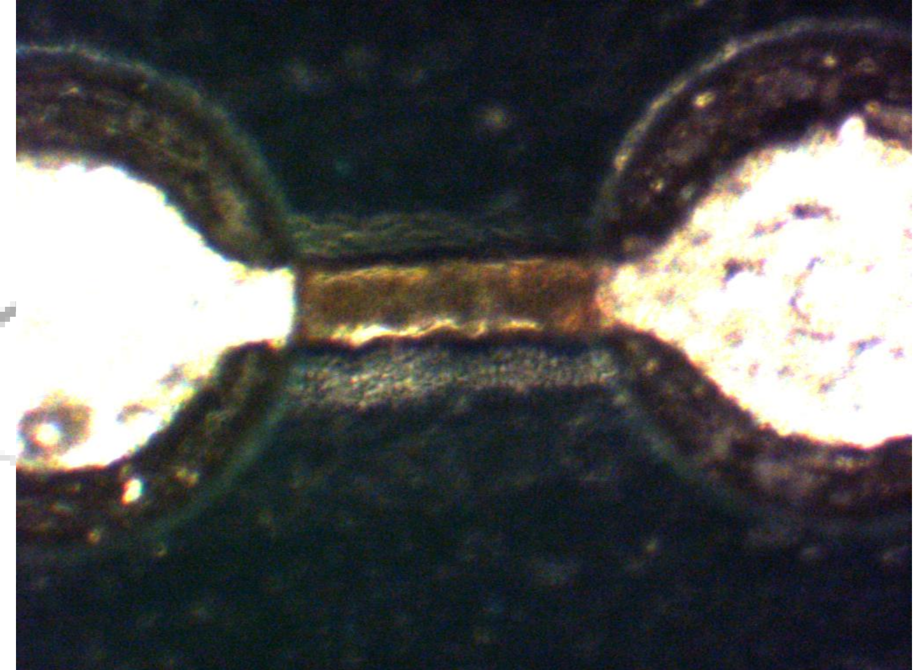
Thermal cycling conditions:

-55° C to 125 ° C, one hour/cycle; 15 min at two extremes.

Rework



New one



One after rework

After rework no any solder mask damage and underfill residue

Confidential

Conclusion

1. SMT 88UL is fast flow at room temperature and can flow into narrow gap such as LGA and QFN easily.

2. SMT 88UL is compatible with the flux residue of solder paste.

3. SMT 88UL can provide excellent reliability and underfill voids free, high throughput process and also very easy to rework.

YINCAE

Acknowledgement

- Thanks for all your attention.
- Please visit YINCAE booth 101 with any questions.