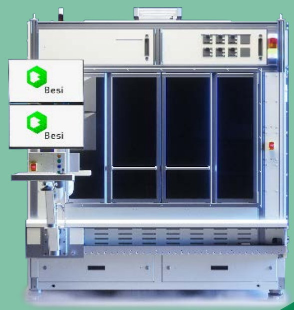


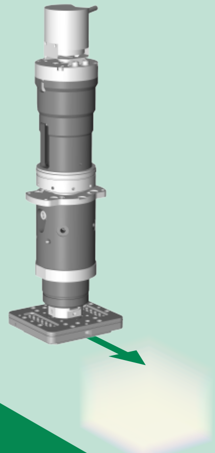
9800 TC *next*

Inline Oxide Reduction with CDSC

Extensive research on

Controlled Deoxidation and Surface Conditioning

has revealed new possibilities for improving the bonding process.
By integrating embedded atmospheric plasma cleaning into Thermo Compression Bonders, SnO_2 layers can now be effectively removed from dies featuring structures down to 5 µm.
This breakthrough, with its future-proof capabilities, has a significant impact on the development and production of advanced microelectronic devices.



Controlled Deoxidation and Surface Conditioning

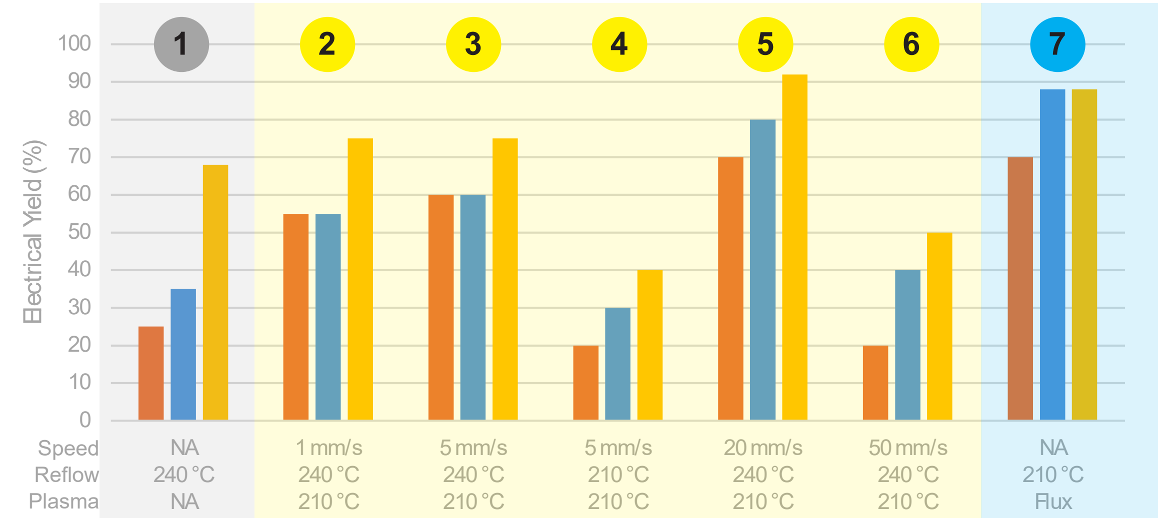
Before bonding in its advanced micro-inert chamber, the **9800 TC *next* Thermo Compression Bonder** moves the die on the bondhead through a radical flow generated by an atmospheric plasma.
This oxide reduction process can be controlled with adjustable

- speed,
- temperature and
- reflow profile.

The aim of our experiments was to

Compare CDSC to flux as reduction agent.

The results shown here substantiate that CDSC removes oxide layers as efficiently and cleanly as flux. However, when it comes to processing dies with structures smaller than < 15 µm, CDSC offers a significant advantage by overcoming the issue of flux residue.

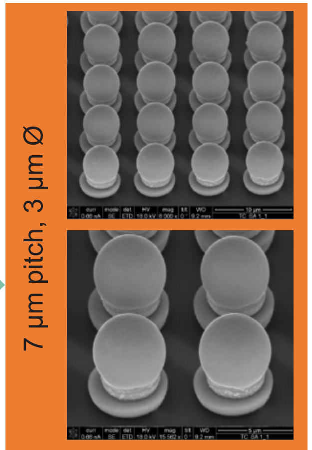


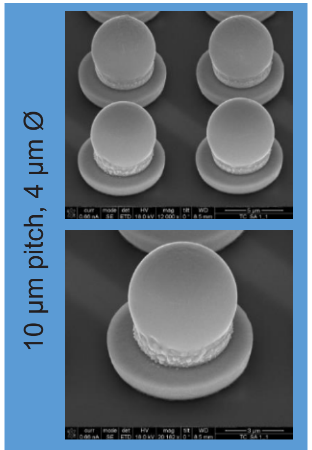
The experiments were conducted using:

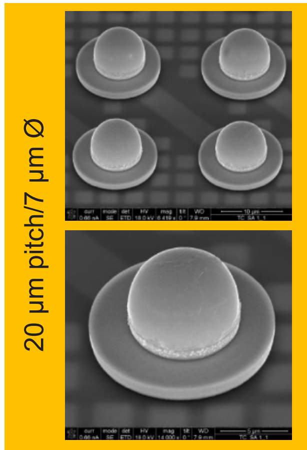
- Different die treatments:

no oxide reduction | CDSC with different speeds/reflow temperatures | Flux

- Different die structures:







Optimized plasma and reflow conditions
produce perfectly shaped
spherical Sn bumps

This work has received funding from the European Union's Horizon research and innovation program under grant agreement No 101075725 and from the Austrian Research Promotion Agency (FFG) for the projects TC MoreThanMoore and ARTIC.

FFG Forschung wirkt. Chips JU

Besi in cooperation with imec

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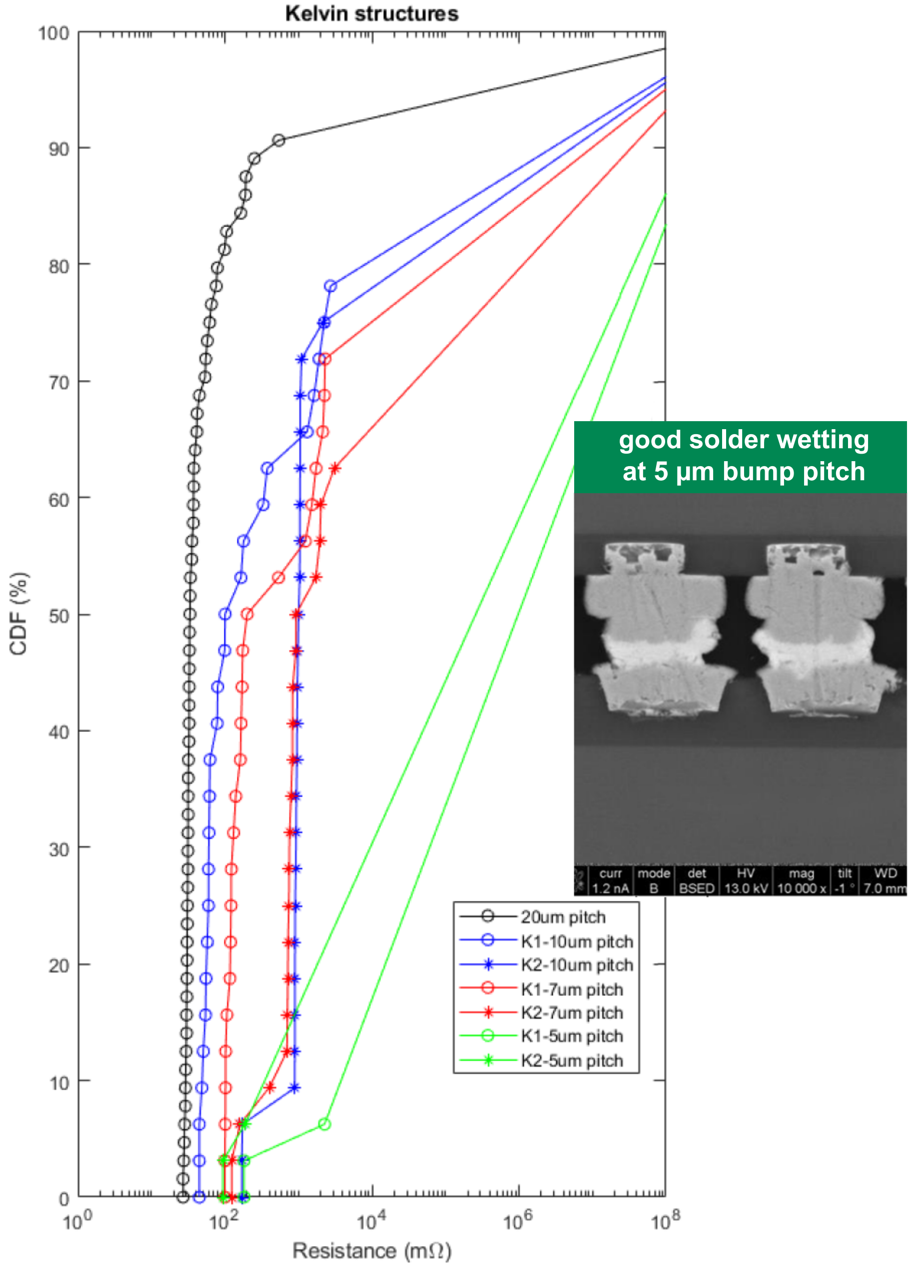
Doc No. 5020-2914

CDSC (sample 5)

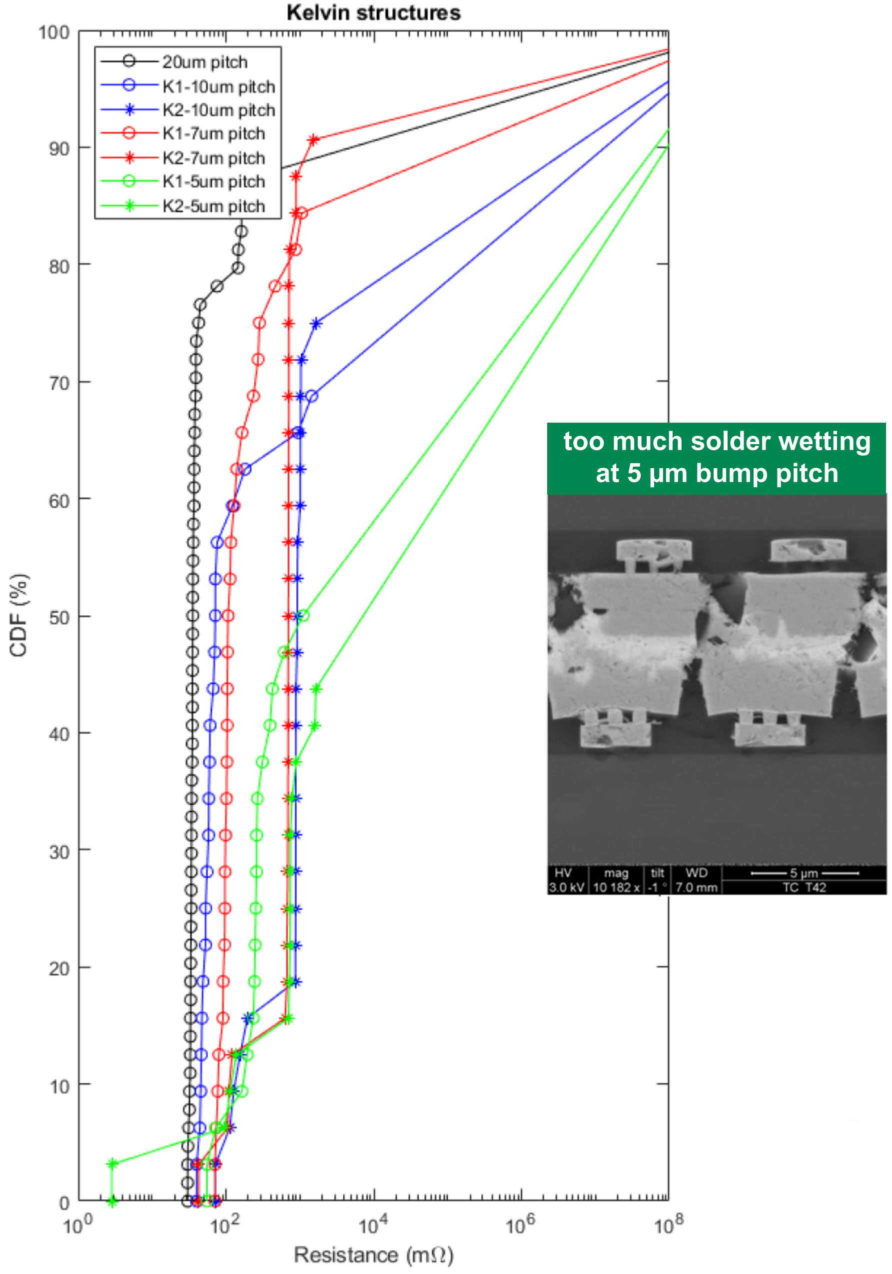
- speed: 20 mm/s
- reflow: at 240 °C
- substrate temperature: 150 °C



good solder wetting at 5 µm bump pitch

Flux DELTALUX 901K3 (sample 7)

- speed: n/a
- reflow: n/a
- substrate temperature: 150 °C



too much solder wetting at 5 µm bump pitch