Wentworth Laboratories

The Leader in ProbeAbility™

ACCUMAX™

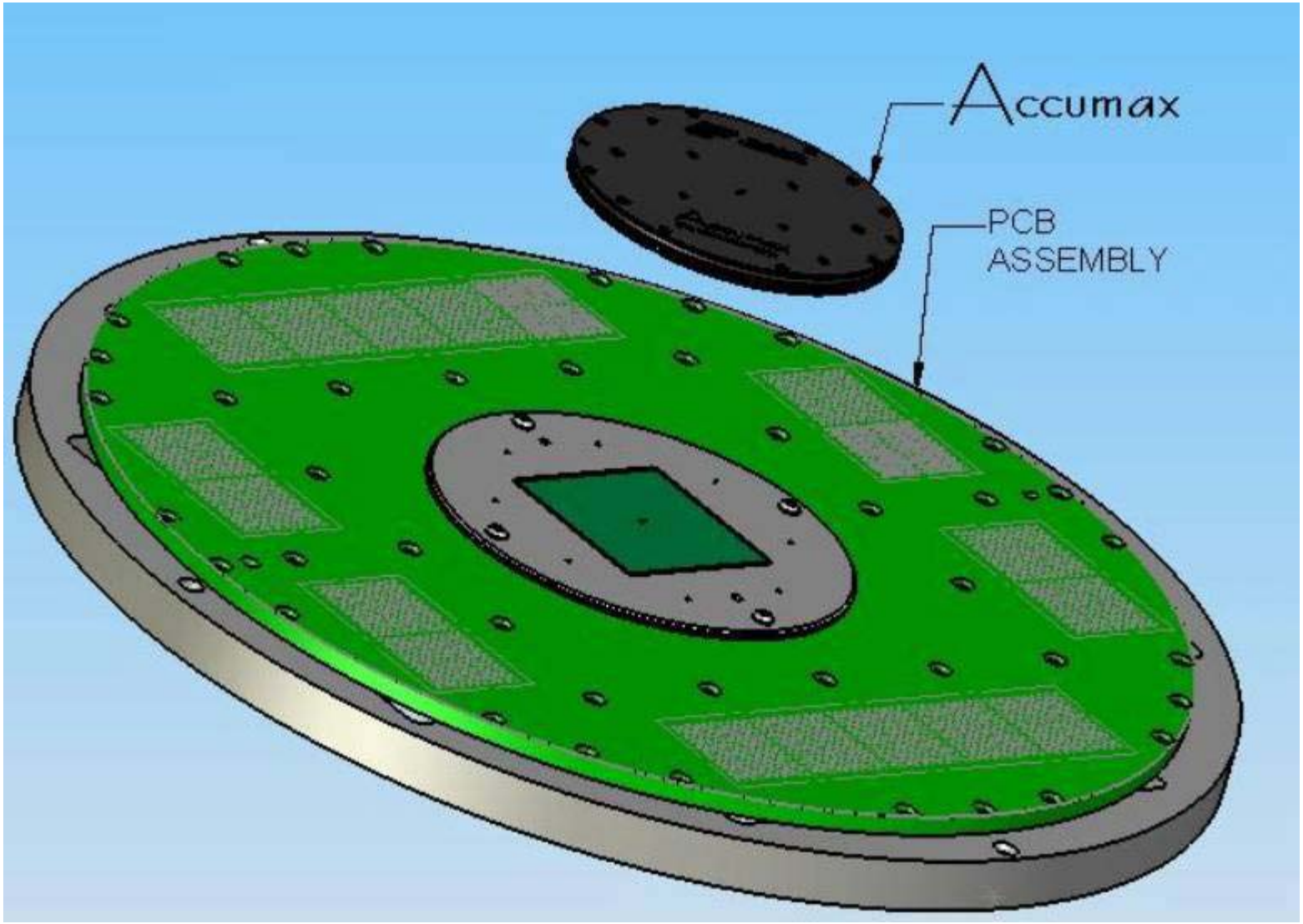
Jens Kober
AMD
&
Bob Rogers
Wentworth Laboratories, Inc.

Accumax™

- Reduced Repair Time
- Simplified Contact Replacement
- Improved Cleaning & Re-flow
- High Current, 1 amp Capability
- Tight Pitch, Low Force, Extremely High Contact Count, >10,000 contacts per head

Accumax™:

Wentworth Laboratories produced & AMD evaluated



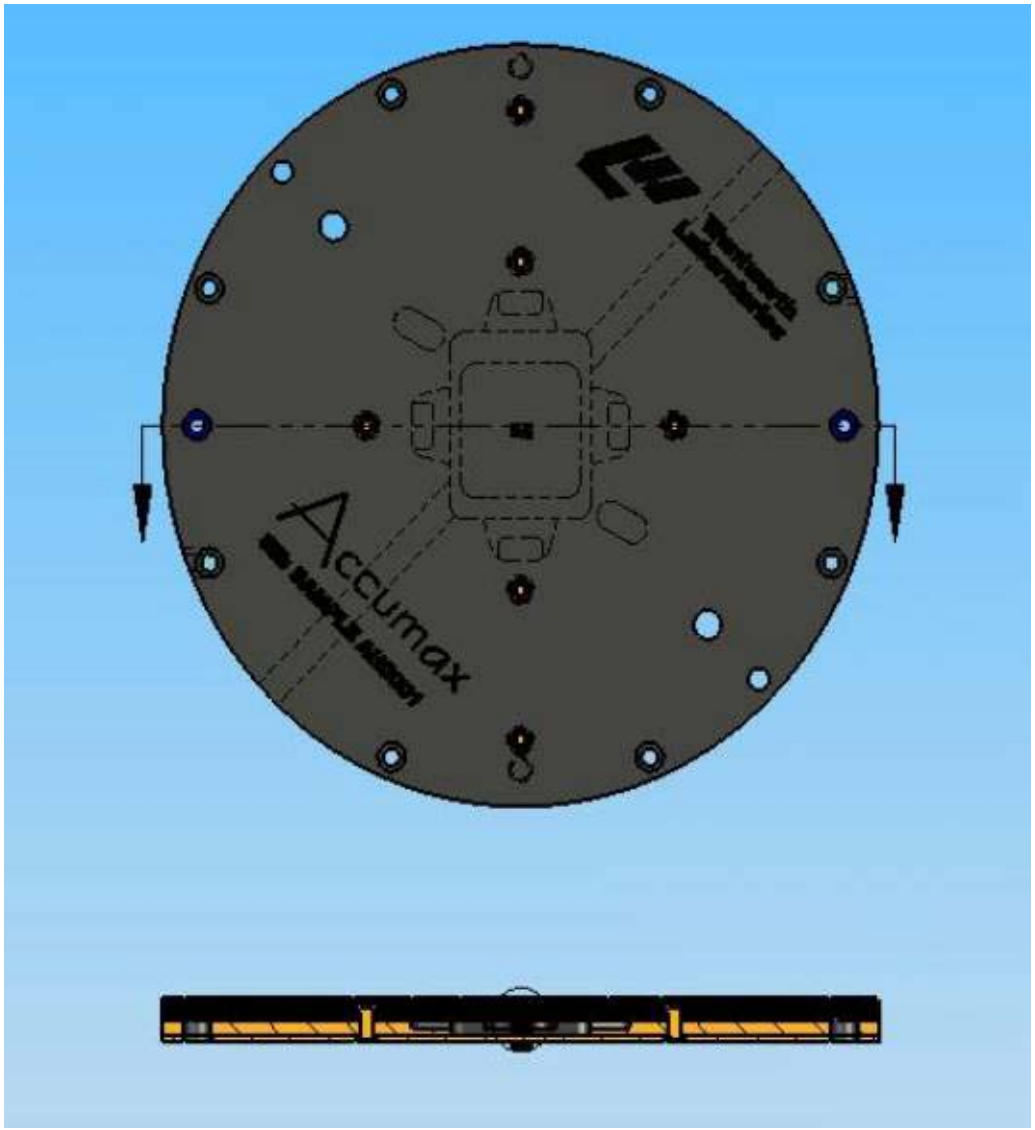
Accumax™: Reduced Repair Time

- Previously complex repairs can now be accomplished quickly onsite with very little training
- Reduced downtime and repairs offer substantial savings
- Increased test cell utilization
- Increased overall WIP flow

Accumax™ Section View

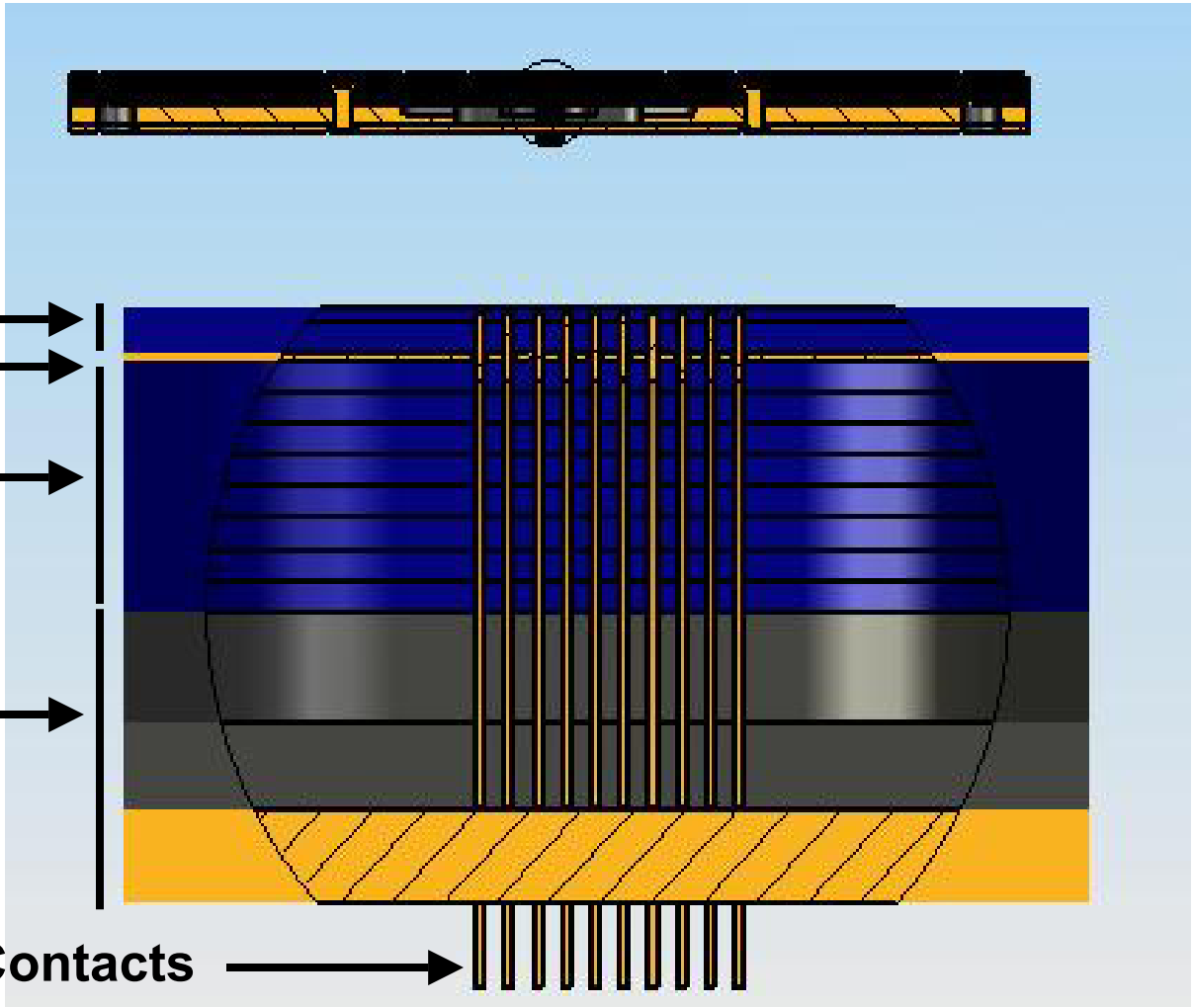
Wafer Side

Section View

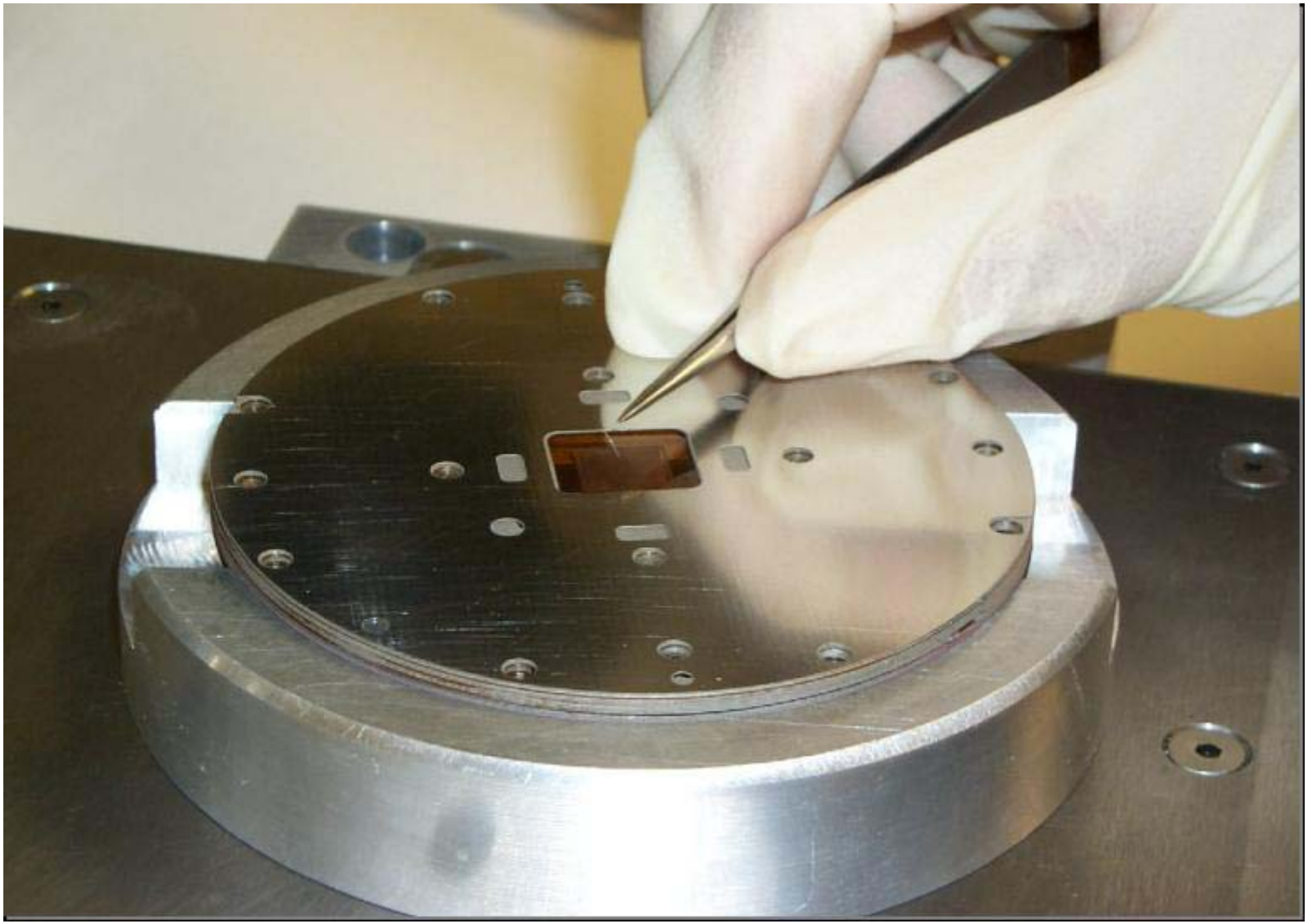


Accumax™ Section View

Showing laminates and Saber™ chemically etched contacts



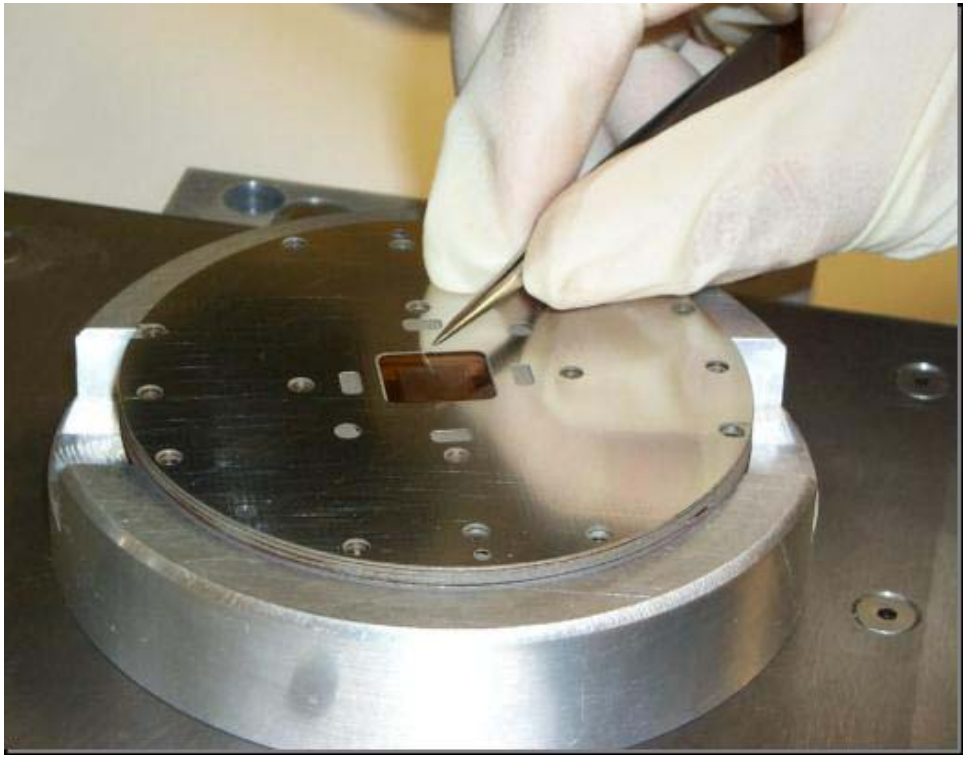
Accumax™: Repairability



Accumax™: Repairability

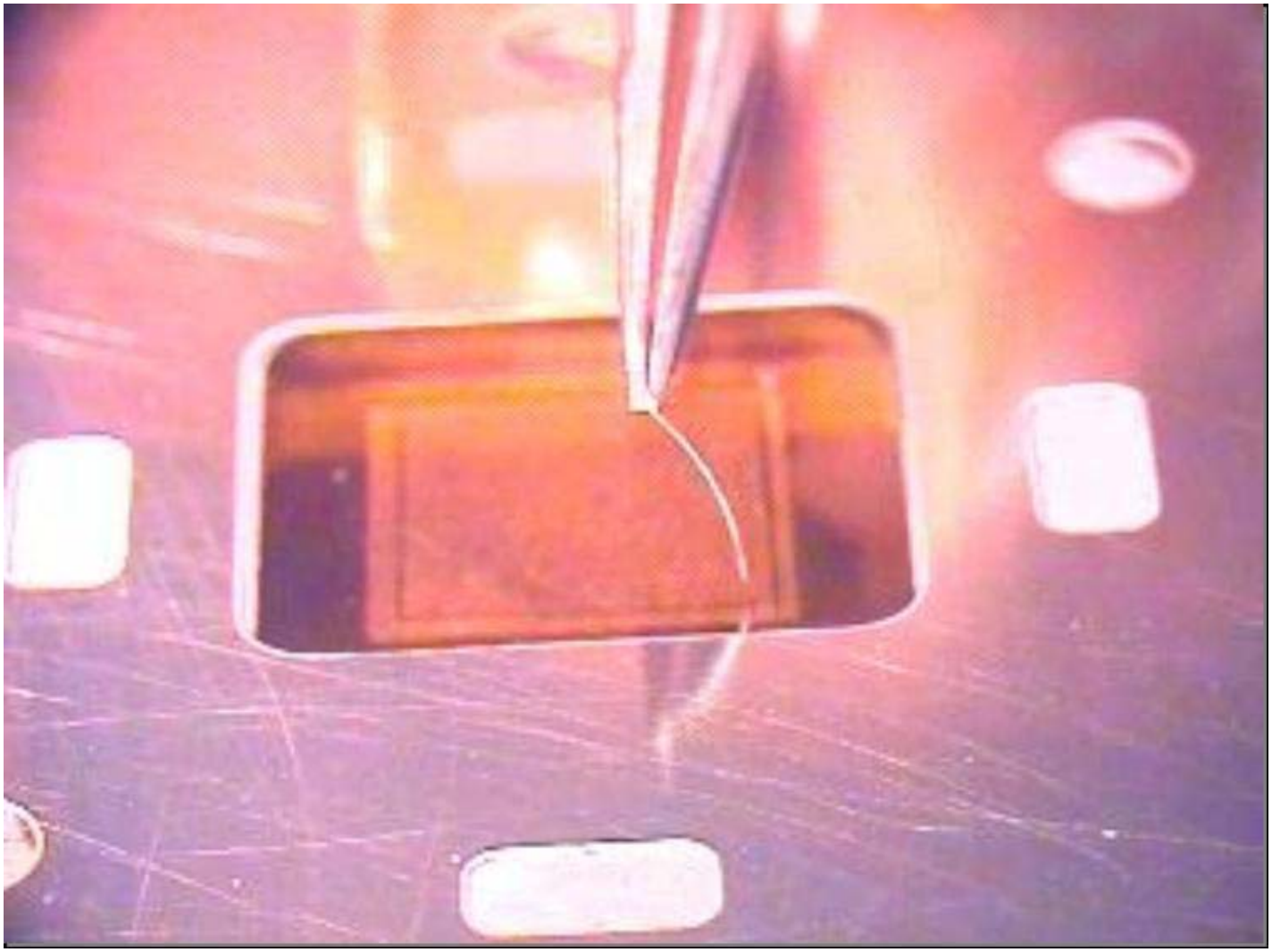
Accumax Repair

1. Pull out contact(s)
2. Re-insert replacement contact(s)



- No need to remove upper die
- No pulling back of mounting film
- Contact replacement in a couple of minutes

Accumax™: Inserting & Removing Contacts

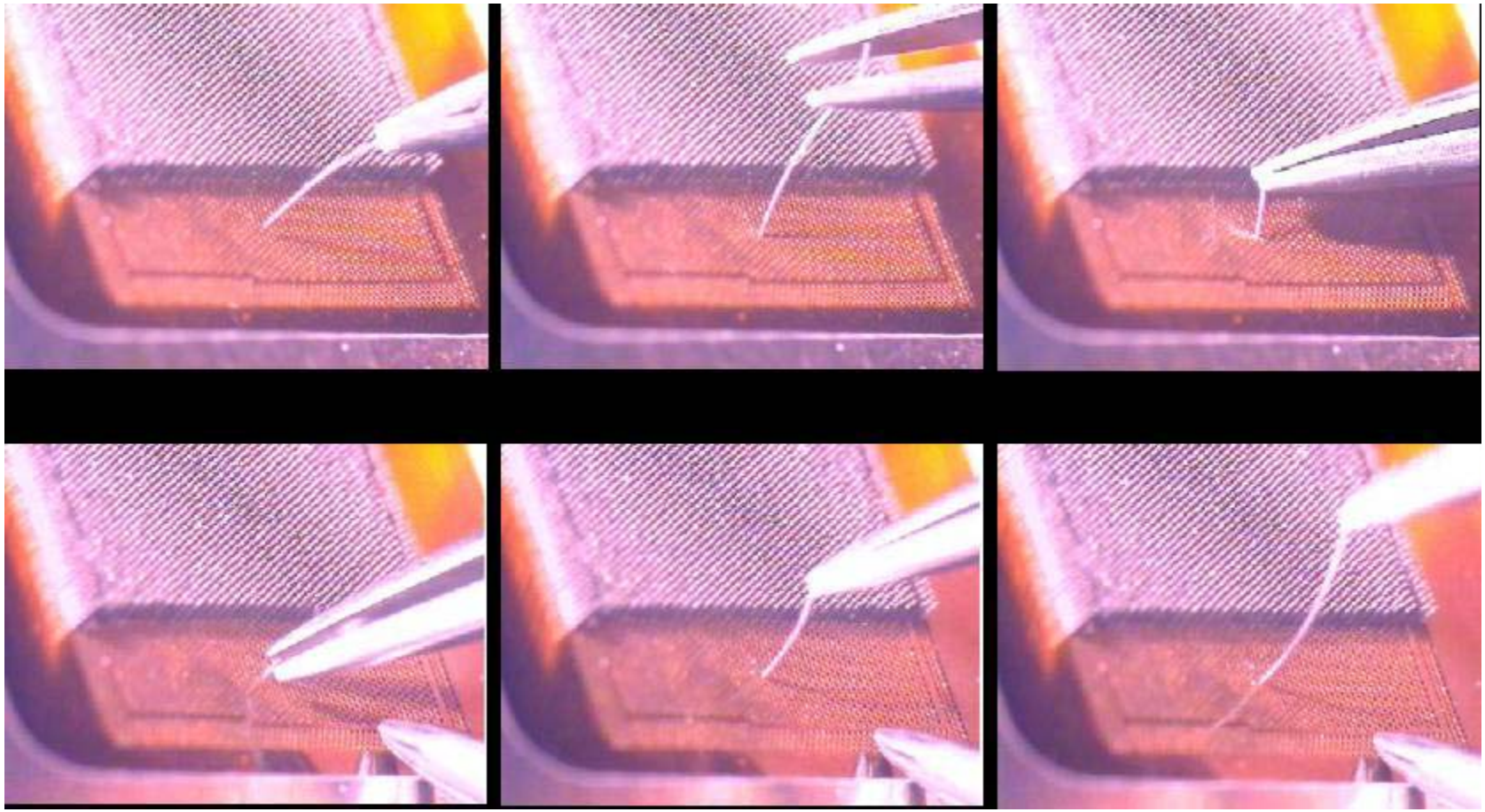


Accumax™: Inserting & Removing Contacts

Insert contact thru upper die

Insert contact thru lower die

Push contact past detent



Removal: Grasp contact

Removal: Pull contact out

Accumax™: Improved Cleaning

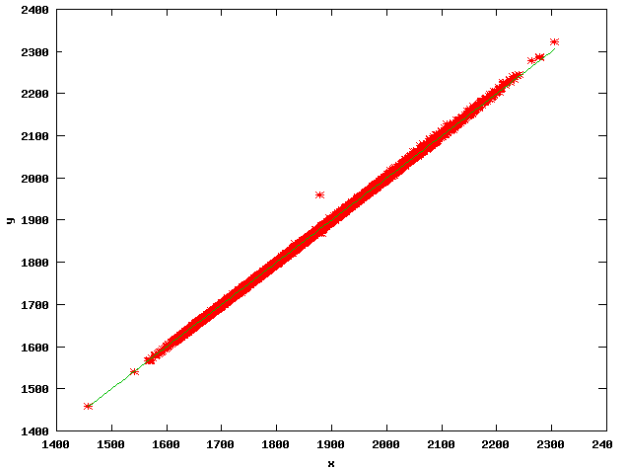
The following results are based on tests at AMD facilities using AMD processes on a tool provided by Wentworth.

- The Ring_O frequency repeatability for the Accumax/Saber™ head is very good.
- There seems to be no difference whether an on-line cleaning is performed or not.

Accumax™: Improved Cleaning

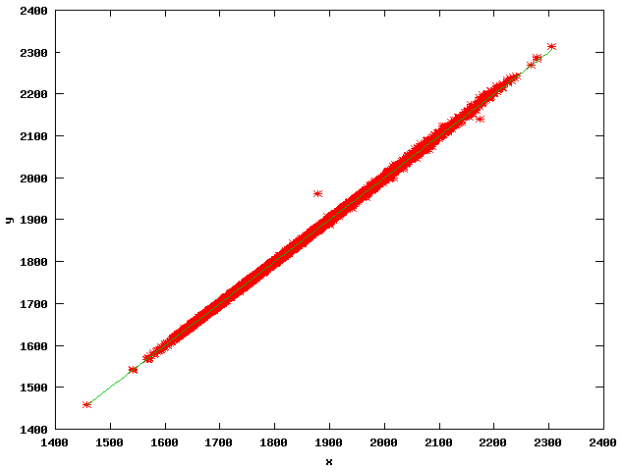
AMD Data: Correlation Results – Ring_O (Cobra® vs. Saber™ Contacts)

COBRA (1) vs. SABER (2)



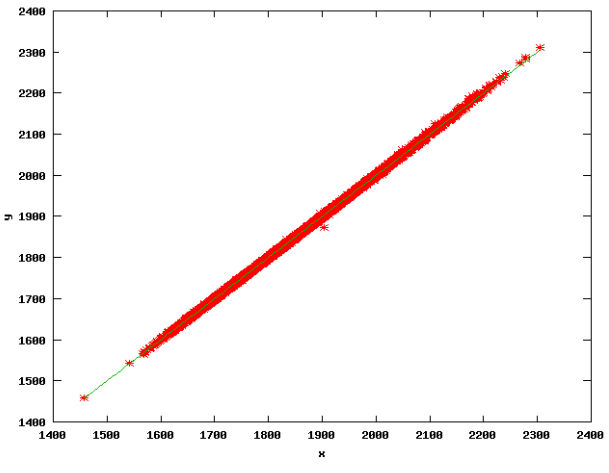
No on-line cleaning at all was performed while testing the lot with the SABER head

COBRA (1) vs. SABER (3)



On-line cleaning after every other wafer was performed while testing the lot with the SABER head

COBRA (1) vs. SABER (4)

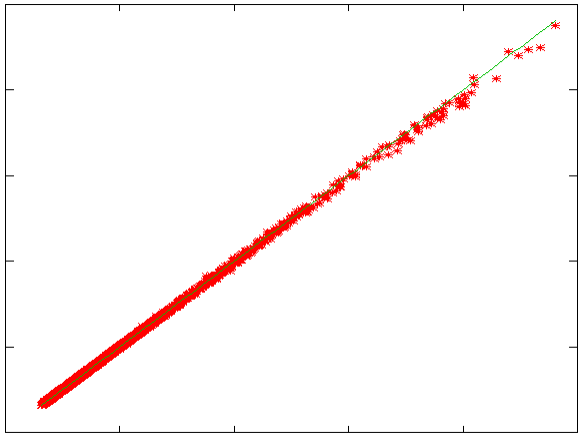


On-line cleaning after every wafer was performed while testing the lot with the SABER head

Accumax™: Improved Cleaning

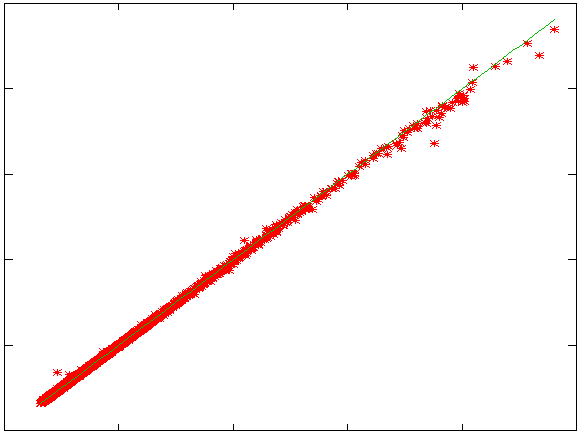
AMD Data: Correlation Results Static_IDD (Cobra® vs. Saber™)

COBRA (1) vs. SABER (2)



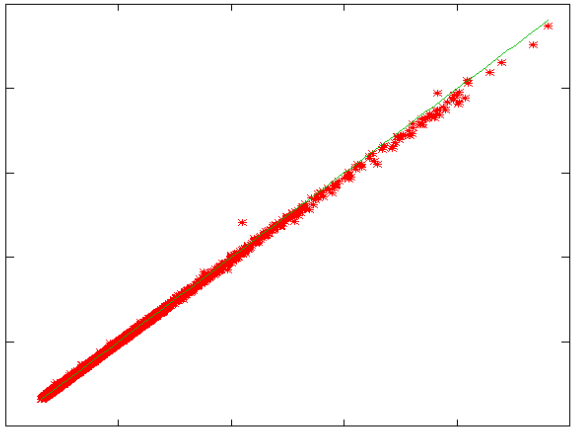
No on-line cleaning at all was performed while testing the lot with the SABER head

COBRA (1) vs. SABER (3)



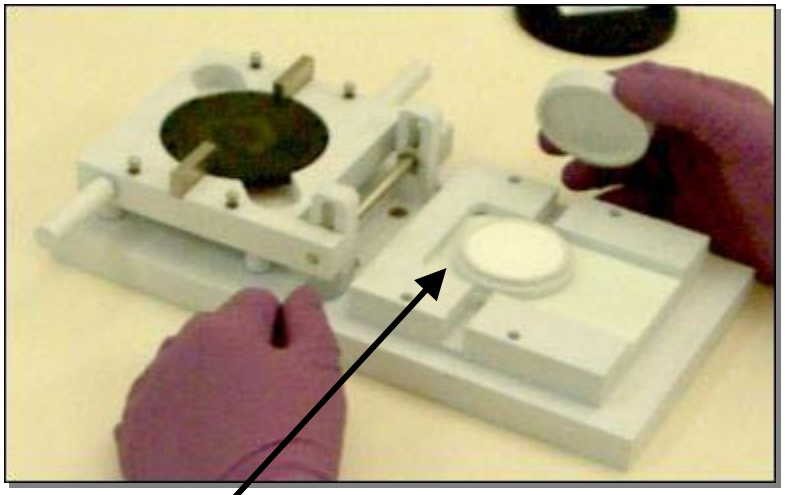
On-line cleaning after every other wafer was performed while testing the lot with the SABER head

COBRA (1) vs. SABER (4)

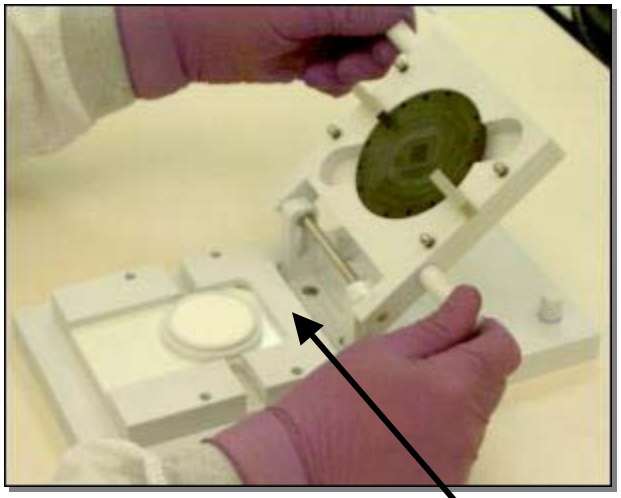


On-line cleaning after every wafer was performed while testing the lot with the SABER head

Accumax™: ProbeWash - Off Line Cleaning

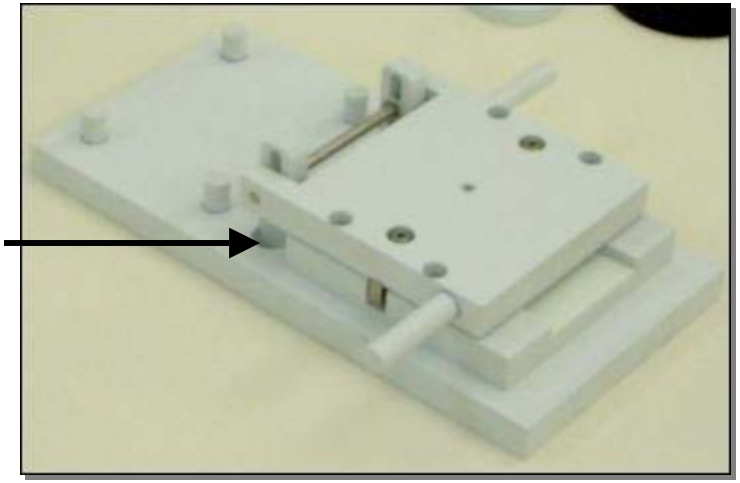


Open chemical cartridge



Lift and rotate mounting bracket

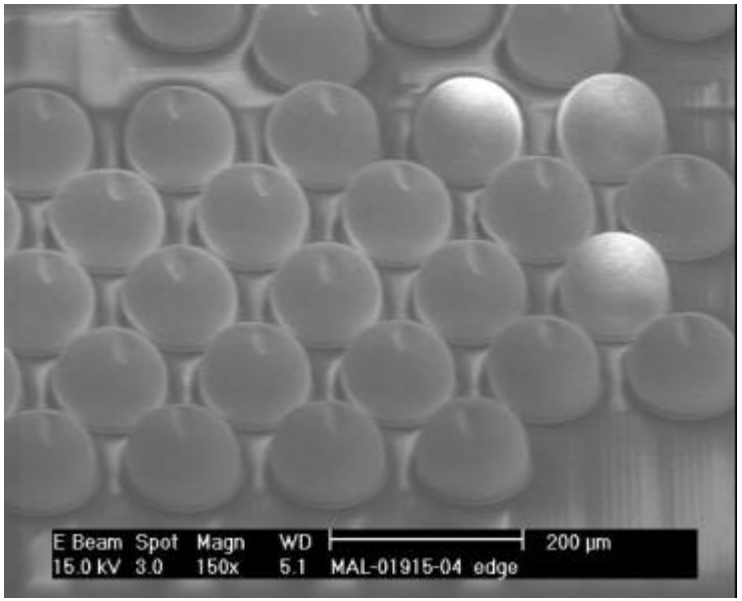
Closed assembly in cleaning position



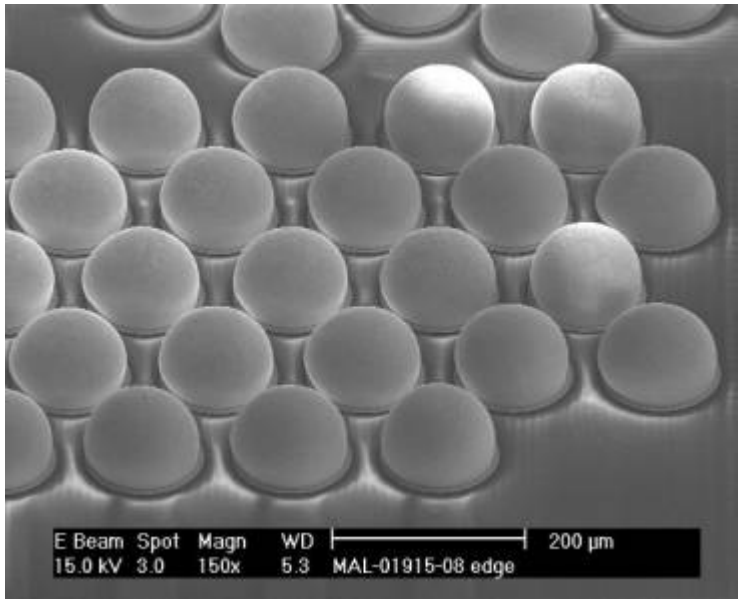
Accumax™: Improved Re-Flow

Bumps that were touched by a Saber™ contact appear to return to the original rounded shape after re-flowing the wafer

Bump – Contact Mark



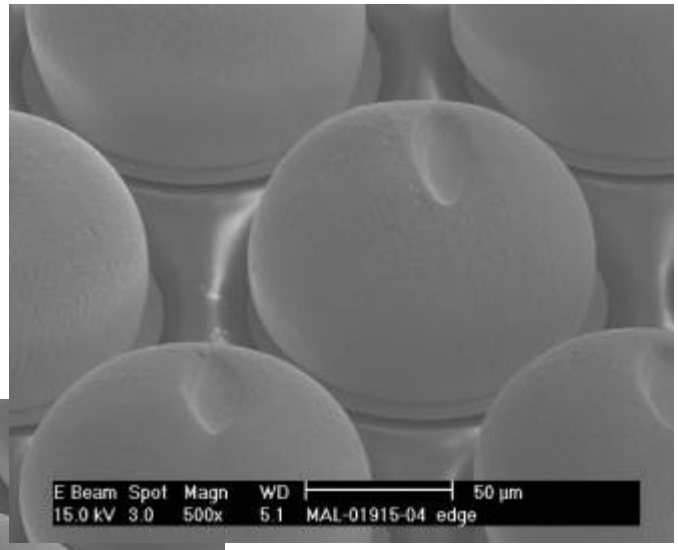
Bump – After Reflow

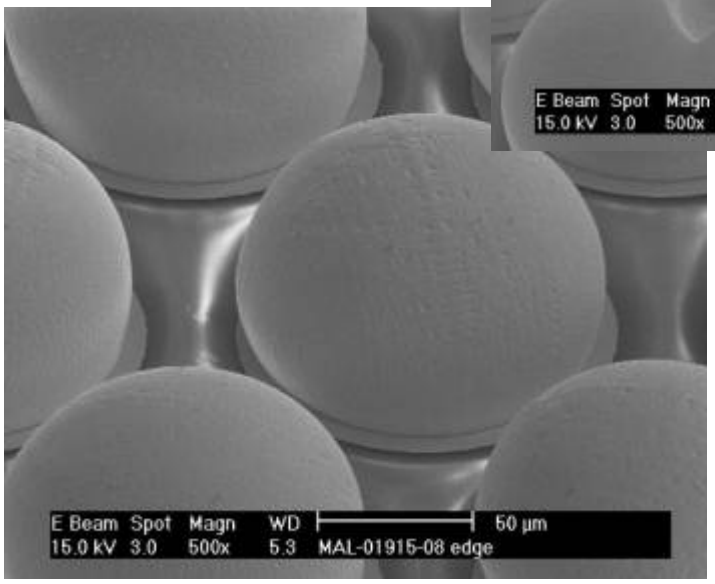


(Test and images from AMD)

Accumax™: Improved Re-Flow

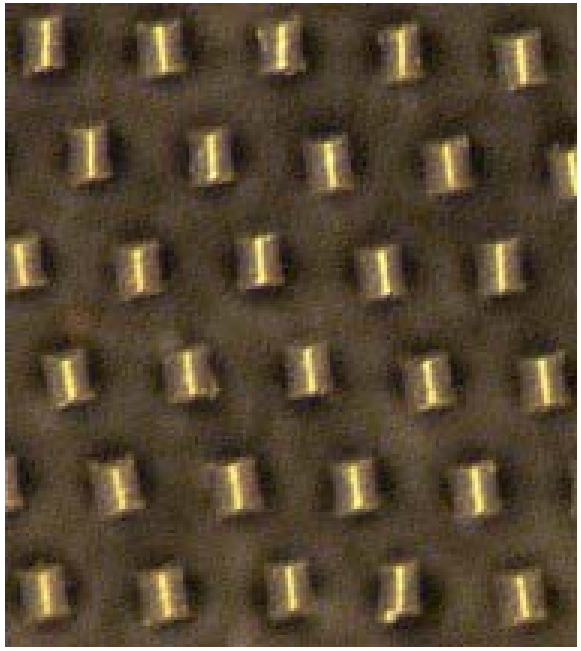
Bump – Contact Mark, Saber™ – Accumax™





Bump–
After Reflow

Accumax™ Saber™
Wedge Tip Contacts

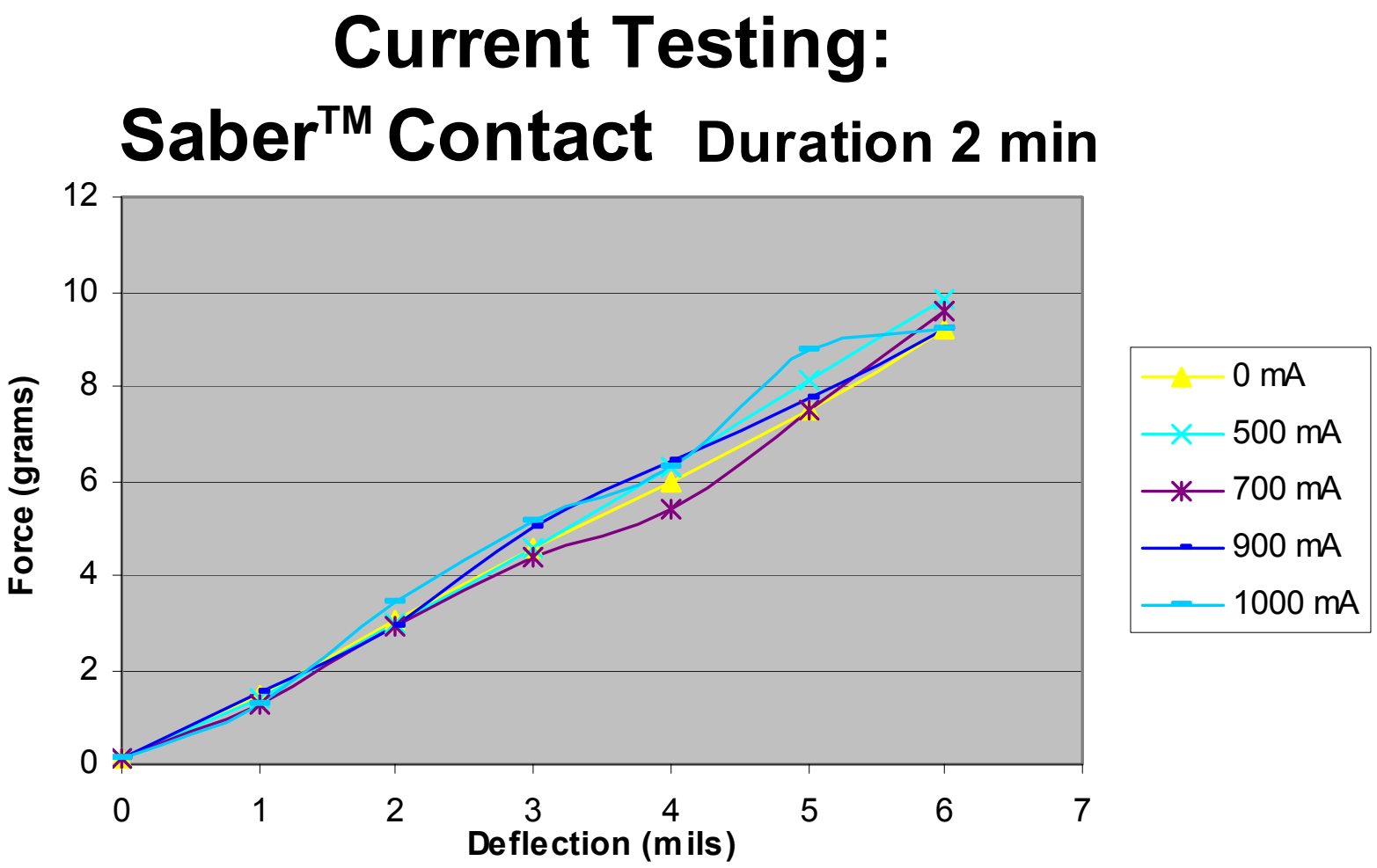


(Test and images from AMD)

Accumax™: Current Rating Saber™ vs Stamped

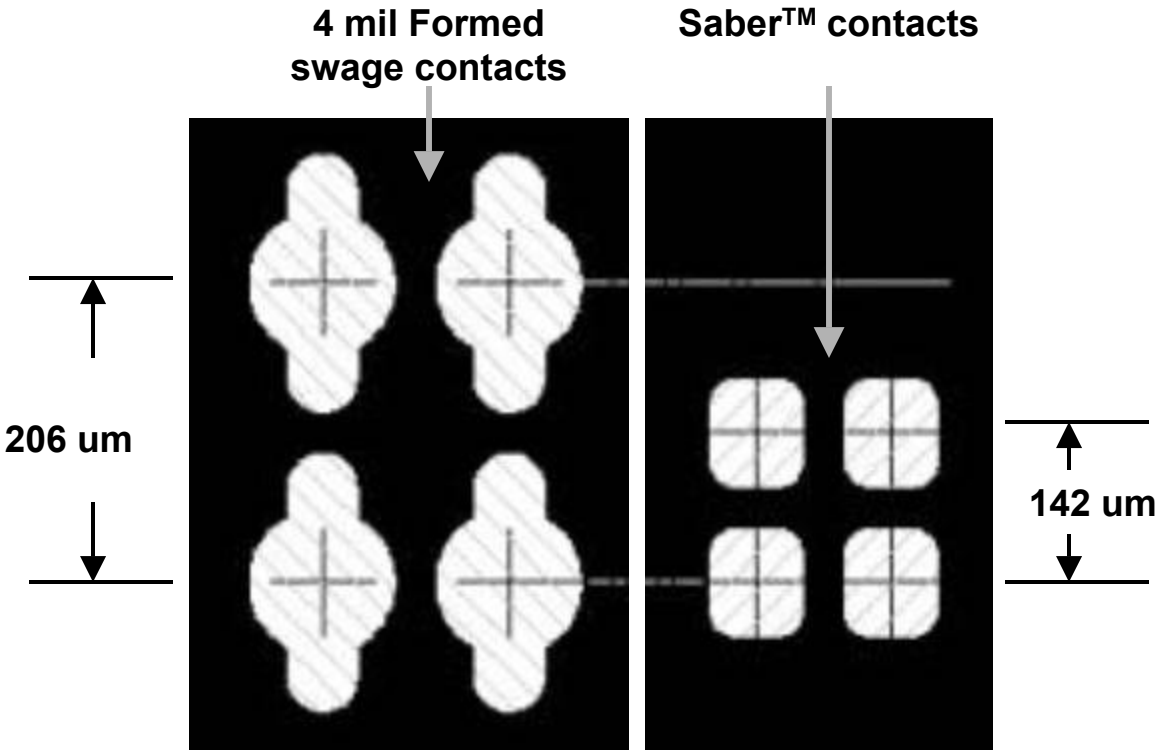
Contact	Current capacity at room temperature	Current required to "blow"
SABER™ (Chem Etched)	1,000mA for 2 minutes	2,200mA
3-mil stamped BeCu	500mA for 2 minutes	1,400mA
3-mil stamped P7	500mA for 2 minutes	1,400mA

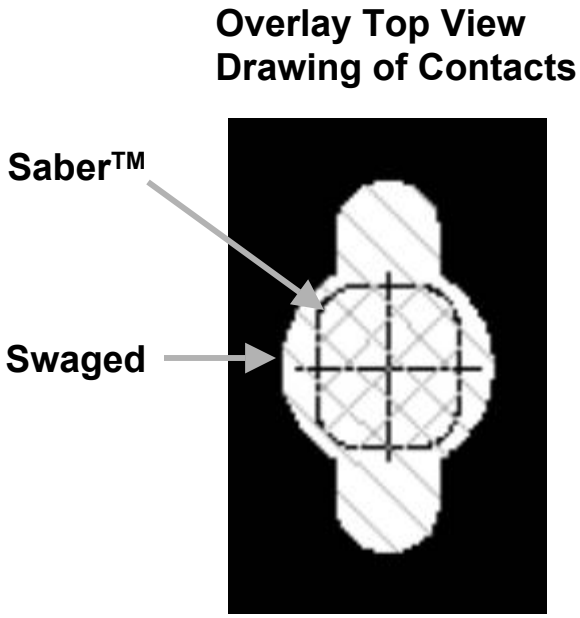
Accumax™: Current Testing



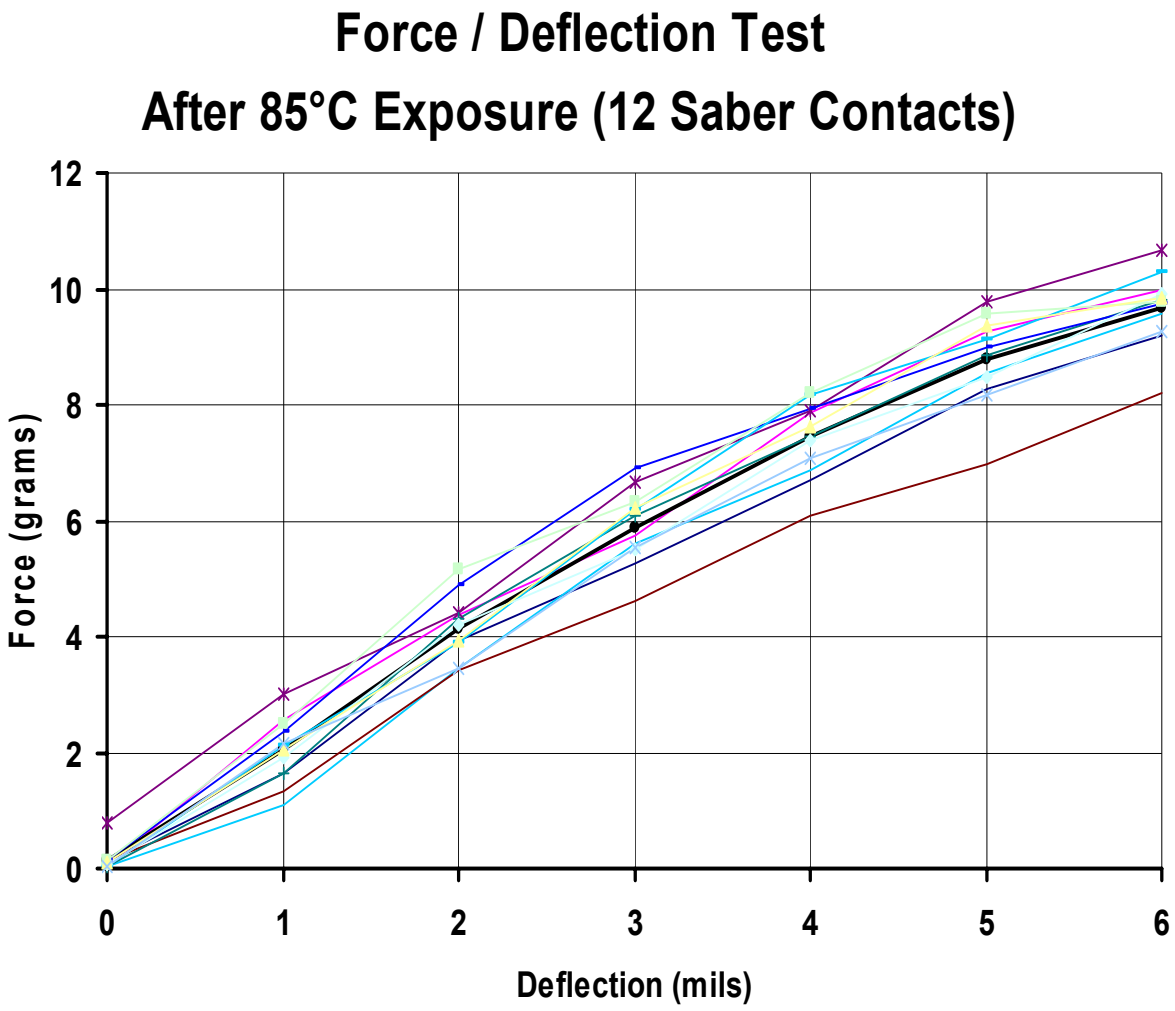
Accumax™: Current Rating Stamped vs Saber™

- Greater Current Density
- 30% More Cross-Sectional Area at the Same Outer Dimension
- Rectangular Geometry More Efficient for Packing





Accumax™: Life Testing

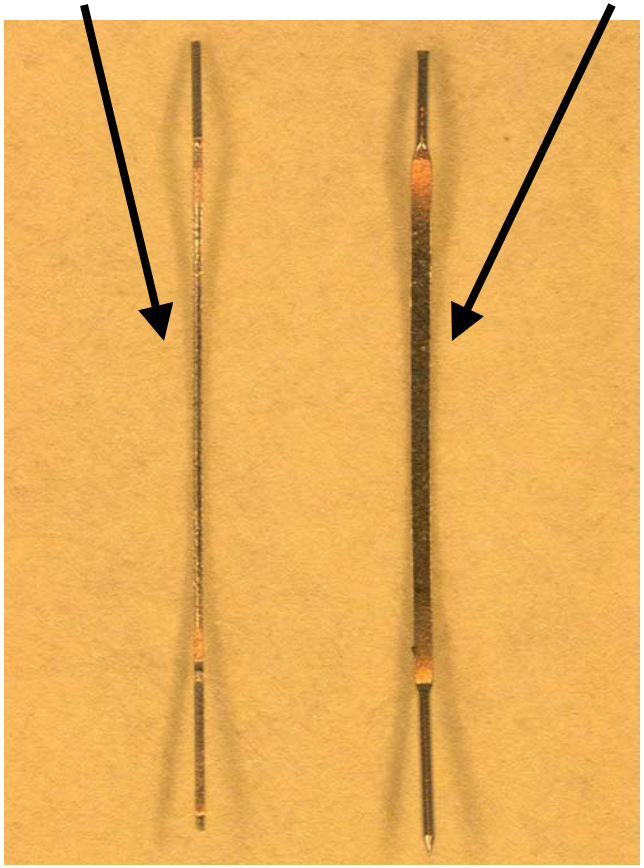


- Tested to 1 Million Touchdowns @ Room Temperature
- Tested an additional 1 Million Touchdowns @ 85°C
- 6 mil Over-Travel
- Al Wafer

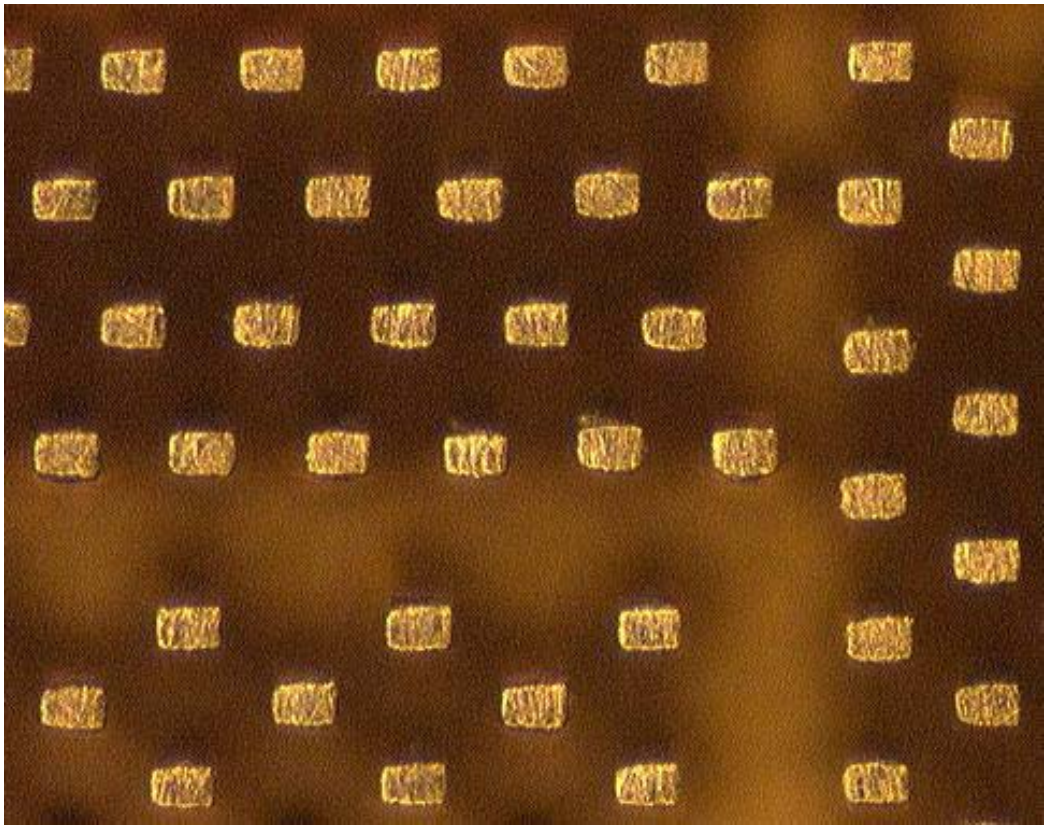
Accumax™: Extremely High Contact Count / Tight Pitch /Low Force

Saber™* Contact

Formed Swage Contact

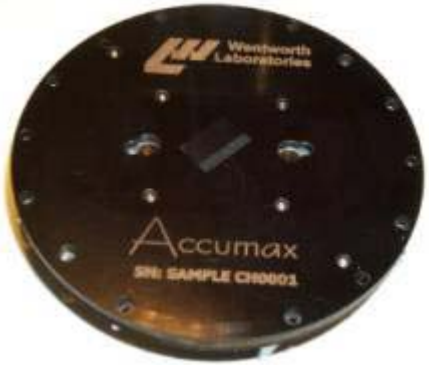


Dense Array of Saber™ Contact Heads



*Patent Pending

Accumax™: Technical Specifications



Contact Force	3.0 gram/mil standard, 1.5 gram/mil lower force
Maximum Pin Count	Greater than 10,000 contacts
Minimum Pitch	140 µm
Tip Geometry	Flat, Wedge
Contact Tip Extension	Flat 500 µm, Wedge 400 µm
Inductance	3.1 nH
Current	1000 mA for 2 mins @ 20°C
FUSE Current	2200 mA
Planarity	50 um or less with interchangeability
Alignment	25 um
Lifetime	Greater than 1,000,000 touchdowns
Operating Temperature Range	0°C to 90°C
Interfaces with:	Both MLCs and MLOs

Accumax™: Conclusions

Accumax = Reduced Repair Time

- Low risk / simplified contact replacement allows for quick on site repairs reducing down time.
- Saber wedge tip contacts require fewer cleaning cycles than flat tip contacts.
- High current capability reduces the probability of burning contacts, quantity of contacts, and total test power requirements.
- The compact high current Saber™ contact provides extremely high contact count and contact pitch density.

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