

## Probe Form™ on a Silicon Wafer

**Probe Form™** was developed for cantilevered probe technologies to provide a cost effective method of uniformly “reforming” a flat probe tip into a radius shape with a smooth contact surface. **Probe Form™** uses a highly cross-linked, non-corrosive polymer that has an operating temperature range of -50°C to +200°C. The abrasive material in the polymer is designed to be aggressive enough to remove probe material.

**Probe Form™** shaping operation can be easily incorporated into a probe card build process to “form” radius tips or into a probe card maintenance cycle to restore worn or deformed probe tips. To facilitate these operations, **Probe Form™** is available on a number of different substrates readily used by wafer prober and probe card analyzers.

### GENERAL

**Probe Form™** is formulated to change the shape of the probe tips. The forming product is designed to reduce the size of the probes when they are inserted into the material for a series of several touchdowns. The rate of tip reshaping depends on the initial diameter, the probe needle material (i.e., tungsten, tungsten-rhenium, beryllium-copper, and Pd-alloy probes will be reshaped at different rates) and the grade of **Probe Form™** which can be used for “rough-cut” or polish the probe tip.

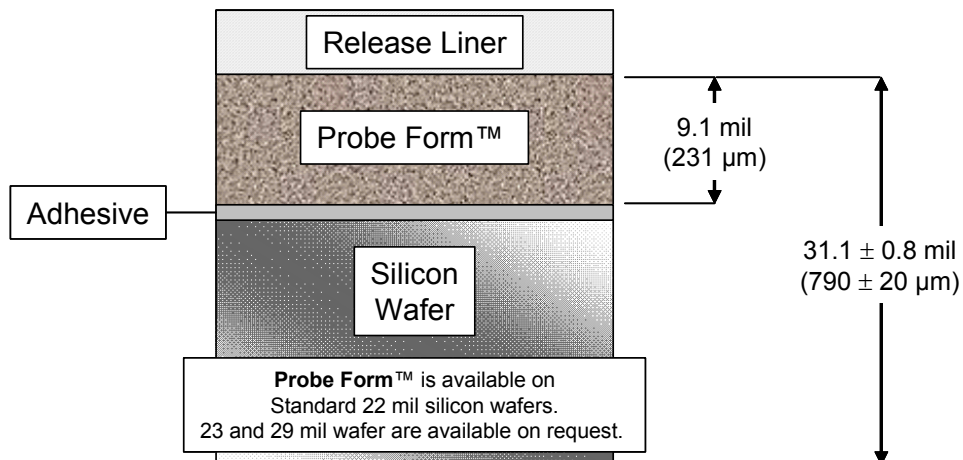
The primary reshaping action with **Probe Form™** occurs during a Z-axis (up and down) motion into the polymer material. During the probe tip reshaping operation, no lateral loads or excessive vertical force to the probe (< 3 g/mil) are applied to the probes and the probe card planarity and alignment are unaffected. In fact, the forces exerted on the probe when reshaping will be substantially less than those of normal testing operations.

To maximize the tip size reduction and development of a highly polished radius shape, the probes are inserted into new locations of the polymer with an offset of approximately 2X the probe diameter in the X and Y directions, giving consideration to the probe array size and orientation.

### CROSS SECTION

#### Probe Form™ on Silicon Wafer

Nominal Stack Height = 31.1 ± 0.8 mil (790 ± 20 μm)



*Probe Form™ is a registered trademark of International Test Solutions.*

### International Test Solutions

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### RECOMMENDED USAGE ON A PROBER

1. Remove protective cover from the working surface of the polymer by touching the edge of the cover with a piece of tape and gently peeling the cover back across the forming wafer.
2. Modify the prober settings to overtravel into the abrasive polymer 200  $\mu\text{m}$  (~7.8 mil) but do not exceed the remaining tip length of the probe needles.
  - a. Set the "0" height equal to measured total install height as recorded on protective cover of the wafer. Note - The total height of each cleaning wafer is measured at the four quadrants of the wafer and recorded on each wafer
  - b. Set the cleaning overtravel equal to 200  $\mu\text{m}$  (~7.8 mil), depending on probe style.
3. Modify the prober operation settings to move over the entire surface area, ensuring that the probe array remains within the **Probe Form™** surface area.
  - a. **International Test Solutions** recommends that the probe tip is inspected and tip diameter is measured frequently to determine a rate of material removal.
  - b. Most customers have observed significant tip changes in less than 1000 touchdowns. The rate of tip reshaping depends on the initial diameter, the probe needle material and, most importantly, the grade of **Probe Form™**.
  - c. Offset the touchdown point by at least 2X the probe diameter in the " $\pm Y$ " direction and 2X the probe diameter in the " $\pm X$ " direction each touchdown. For example, 25  $\mu\text{m}$  (1 mil) probe diameter is offset 50  $\mu\text{m}$  (2 mil) in the "X" direction and 50  $\mu\text{m}$  (2 mil) in the "Y" direction.
  - d. By continuing the offset each touchdown a pattern can be developed which will fully utilize the entire cleaning surface.
  - e. Repeating the touchdown pattern in an area of the wafer that has been used may result in reduced reshaping efficiency.
  - f. In order to realize the full forming properties, each touchdown should be in a new location on the wafer.
  - g. By changing the grade of **Probe Form™** a radiused tip with a highly polished contact surface can be obtained.

Contact **International Test Solutions** at 775-284-9220, or via email at [techsupport@inttest.net](mailto:techsupport@inttest.net), to discuss your specific probe card cleaning or tip shaping application and requirements.

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