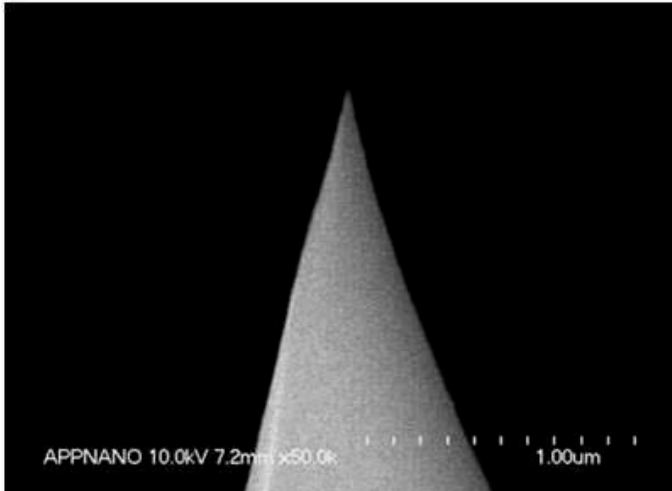
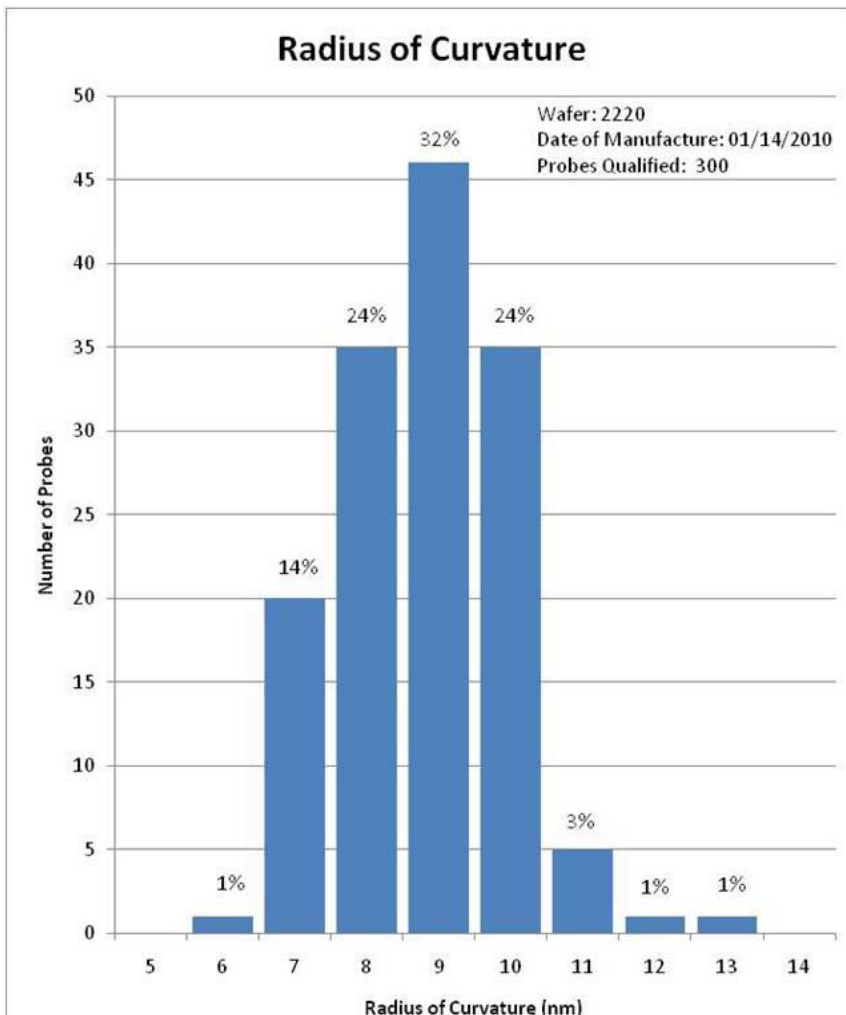


CONSISTENT TIP SHARPNESS AND PROBE SHAPE are important for scanning probe researchers today. Developing a reproducible design and process is crucial for reliability. APPNANO has pioneered several processes and technologies to manufacture the most reliable probes for AFM research.



SEAMLESS PLANE TRANSITION - APPNANO has created processes for smooth plane transition. Tips are manufactured with a 4-sided pyramidal shape but to make a sharp tip the apex must be at the convergence of three planes. By maintaining a seamless transition of two planes APPNANO maintains tighter control of the tip shape and sharpness.

APPNANO plane transition technologies provide control of important tip dimensions for consistently reliable probes.



RADIUS OF CURVATURE - The curvature radius measures the sharpness of a particular probe. Typically the sharper the curvature radius the more fragile a silicon tip will be. Conversely a larger curvature radius will provide greater durability but reduces the benefits of a sharper tip.

Radius of curvature measurements were completed with SEM. APPNANO tested 300 tips (out of 420 in a wafer) from a randomly selected wafer.

Radius of curvature results:

- 7 nm to 10 nm: 94%
- Less than 7nm: 1%
- More than 10nm: 5%

APPNANO Standard Silicon probes have between 7-10nm curvature radius. Providing tips within this range ensures both sharpness and durability. Achieving a consistent balance delivers reliable and accurate results.

APPNANO'S UNIQUE PROCESSES create the most consistent probes in the AFM tips market. See below for details on this claim and consider how APPNANO probes can improve the reliability of your research.

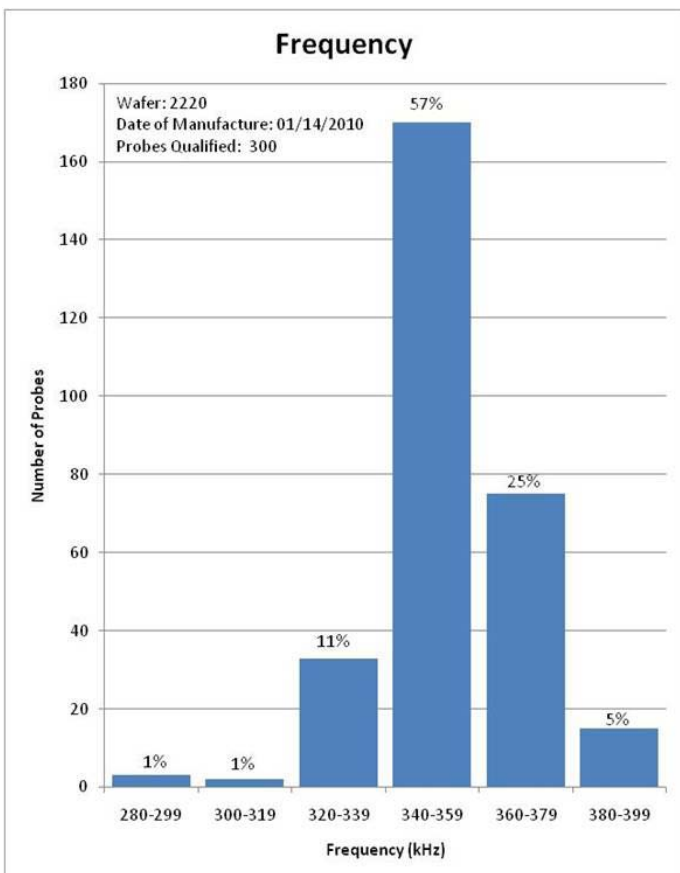
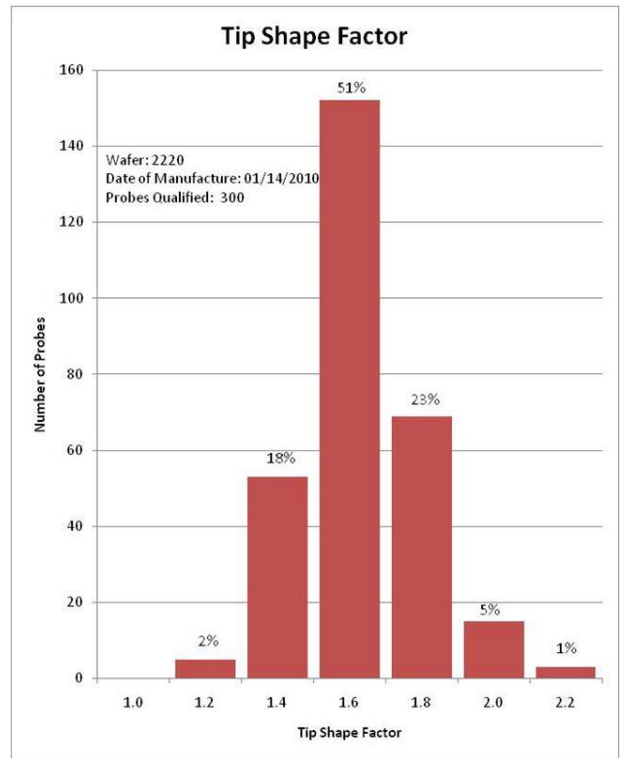
TIP SHAPE FACTOR - Tip shape factor is an engineering parameter APPNANO uses to gauge the tip consistency. A higher value indicates Higher Aspect Ratio Probe. A tighter range of values indicates a more consistent tip shape.

APPNANO measured tip shape factor of 300 probes at random from a wafer of 420.

Tip Shape Factor results:

- 92% probes between 1.4 to 1.8
- 2% below 1.4
- 6% above 1.8

Results of the tip shape factor tests show consistent and close grouping of data. Known tip shape insures accuracy of results.



RESONANCE FREQUENCY - APPNANO probes are designed to maintain a tight range of resonance frequency. Reliability in cantilever specifications insures dependable results.

To demonstrate the reliability of resonance frequency for APPNANO probes. 300 probes underwent frequency sweeps (randomly selected from a wafer of 420 tips)

Below is the frequency spread by percent:

100 % between 200kHz to 400 kHz (APPNANO specs)

- 93 % between 320kHz to 380 kHz
- 2 % below 320 kHz
- 5% between 380 kHz and 400 kHz

APPNANO probes are guaranteed to meet or exceed our specifications. Cantilevers with these specifications are recommended for reliability of research.

* Purely experimental results, all internal research conducted by AppNano. Individual results may vary. Above data reached from randomly selected wafer, Percentages not intended as a guarantee.