

# Alpha-Probes Inc.

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## Probe Wear Characteristics

The purpose of this document is to define the probe wear for probe cards built on a defined standard procedure. We know that for standard tungsten probe cards, probe wear is brought about by the following factors:

Probe Force  
Hardness of probe material  
Scrubbing action  
Pad oxide thickness  
Cleanliness of wafer pads, and probe environment

With that said, the answer to the question, "How many touch downs can you get from a probe?" Using the factors above, as a comparison of a standard probe to a co-axial probe, will help as a guide to probe life.

Probe Force:	Standard 10 mil probe with a beam length of between 120 and 220, exhibits a force of about 2 – 3 grams/mil of overdrive.
Hardness of probe material:	Hardness of the material will effect overall probe life. Rhenium/Tungsten will give up to 30% longer life than a Tungsten probe. Palladium material (the softest) will give up to 70% less wear, but it won't damage the die pad, like a tungsten probe will.
Scrubbing action:	The tip angle will be a factor. The more open the tip bend, the greater the scrub action, the greater the wear.
Pad oxide thickness:	Will effect the life of a probe. The material of the pad will also effect the wear. The harder the oxide, the less the probe life.
Cleanliness:	Probe cards used in a ultra clean environments will last longer. This is due to dust collection on the surface to the wafer. Cleaner the room, the longer lasting the probe will be.

Still true today, no probe card supplier will tell you exactly how many touch downs you can achieve from a probe card. Data from customers suggest that the factors above greatly determine probe life, and that from customer to customer the change is dramatic. As much as 30-50%!

Alpha-Probes prides itself in manufacturing a high quality probe card. We are suggesting that with proper care, in a standard work environment, our probe cards will achieve the greatest number of touchdowns possible. Data collected from two independent customers tells us that our probe card life runs between 500K to 1M touchdowns before reaching replacement status. This is defined as 2-3 mils of tip wear. As a disclaimer, no probe card supplier guarantees a specific number of touchdowns for any epoxy style probe card. Performance of a probe card contains other factors not listed, i.e. set up, skill level of operator, probe angle, etc. It should also be noted that as the probe tip on a standard tungsten needle wears, the probe pressure will vary. This is due to the fact that the standard tungsten needle is tapered and the tip diameter will change with wear.