

Tungsten Probes

Quick Tips

- Clean the probe to remove the tungsten oxide naturally forming on the probe tip before the first use or after several weeks without use (see *Tungsten Probe Tip Cleaning*)
- Clean the probe frequently when probing on aluminum (see standard *Air Coplanar® Probe Quick Guide* for cleaning procedures)
- Probe wear, when probing on aluminum, depends significantly on the quality of the aluminum on the device pads, as well as general level of other contaminants in the lab area and on the wafer surface
- Assure a vibration-free environment when probing on aluminum pads (see *Achieving Repeatable Electrical Contact*)
- Exercise caution when placing tungsten probe tips on gold pads residing on the calibration substrate (see *Achieving Repeatable Electrical Contact*)

Achieving Repeatable Electrical Contact

Tungsten probe tips are most suitable for testing devices with aluminum pads. Tungsten is a harder material than the tip material on the standard Air Coplanar probes and can easily break through the naturally forming oxide on aluminum pads. This will allow you to achieve a more repeatable and stable electrical contact.

The quality of the aluminum on the device pads, and the general level of other contaminants in the lab area and on the wafers will affect the probe wear. In the clean lab environment, a total of more than 100,000 contacts have been achieved with tungsten probe tips.

A vibration-free environment must be assured for effective aluminum pad probing with the use of vibration isolation tables or other means. Even small vibrations will cause the probe to lose full contact momentarily, and will result in the natural formation of aluminum oxide on the pads, dramatically increasing the contact resistance.

Tungsten is a harder material and has the potential of making damage to your device pads. Because of the potential damage, use a tungsten probe tip only if the standard tip material does not allow you to achieve repeatable electrical contact.

Exercise caution when placing tungsten probe tips on gold pads residing on the calibration substrate or the Device Under Test. If the probes are placed before the pads when making contact, the probe will tend to go underneath the pads and remove the pads from the substrate.

Tungsten Probe Tip Cleaning

When used on aluminum pads, the probe has to break through the naturally forming aluminum oxide every time it makes contact. Because of the properties of tungsten and aluminum oxide, the tungsten probe tip gets quickly contaminated with aluminum oxide, which results in increased contact resistance and poor measurement repeatability. Consequently, more frequent and thorough probe cleaning is required. The quality of the aluminum on the device pads, and the general level of other contaminants in the lab area and on the tested device wafers determines the actual frequency of the probe cleaning. Wafer contaminants and quality of aluminum on the pads will also affect probe wear.

A thin layer of naturally forming tungsten oxide may form during shipment on a new probe or on a probe that has not been in use for a few weeks. The tungsten oxide on the probe tip will result in increased contact resistance. Normal use on aluminum pads will quickly eliminate the tungsten oxide on the probe tips. Placing the probe tips on the Contact Substrate (PN 005-018) with normal overtravel and skate has been used by our customers as effective means of removing tungsten oxide from the probe tip. Landing the probes several times on the nickel surface of the chuck on Cascade probe station will have a similar effect.



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