

Press Release

NewTek™ Probe Needle Material Provides Low and Stable Contact Resistance

Boulder, CO – January 2002:
Advanced Probing Systems, Inc. is pleased to introduce NewTek™ probes. NewTek probes have a number of significant advantages over other probe needle materials. NewTek probes provide low and stable contact resistance and require significantly less frequent cleaning regardless of temperature. Probe cards built with NewTek probes have been used successfully to test aluminium wafers and to probe the bare copper bond pads of some next generation integrated circuits.

The most common probe needle materials today are tungsten (W), tungsten-rhenium (WRe), beryllium-copper (BeCu), and a high palladium (Pd) alloy. Despite their popularity, each of these materials has limitations that

“...unlike tungsten probes NewTek Probes maintain low and stable contact resistance at elevated temperatures...”

affect service life.

Desirable probe needle materials should have a high elastic modulus value, superior wear characteristics and good overall electrical

“...NewTek probes have better stiffness, strength and wear characteristics than BeCu and Pd-Alloys...”

NewTek probes do not demonstrate temperature dependent oxidation behavior. The development of tungstenates on the surface of W and WRe probes at room and elevated temperatures contributes significantly to the increase in contact resistance during wafer test. These oxide films as well as bond pad contaminants produce semi-conducting and insulating regions on the contact surface of the W and WRe probe tip. The resulting increase in contact resistance (C_{RES}) during wafer test necessitates the frequent cleanings which reduce probe card life.

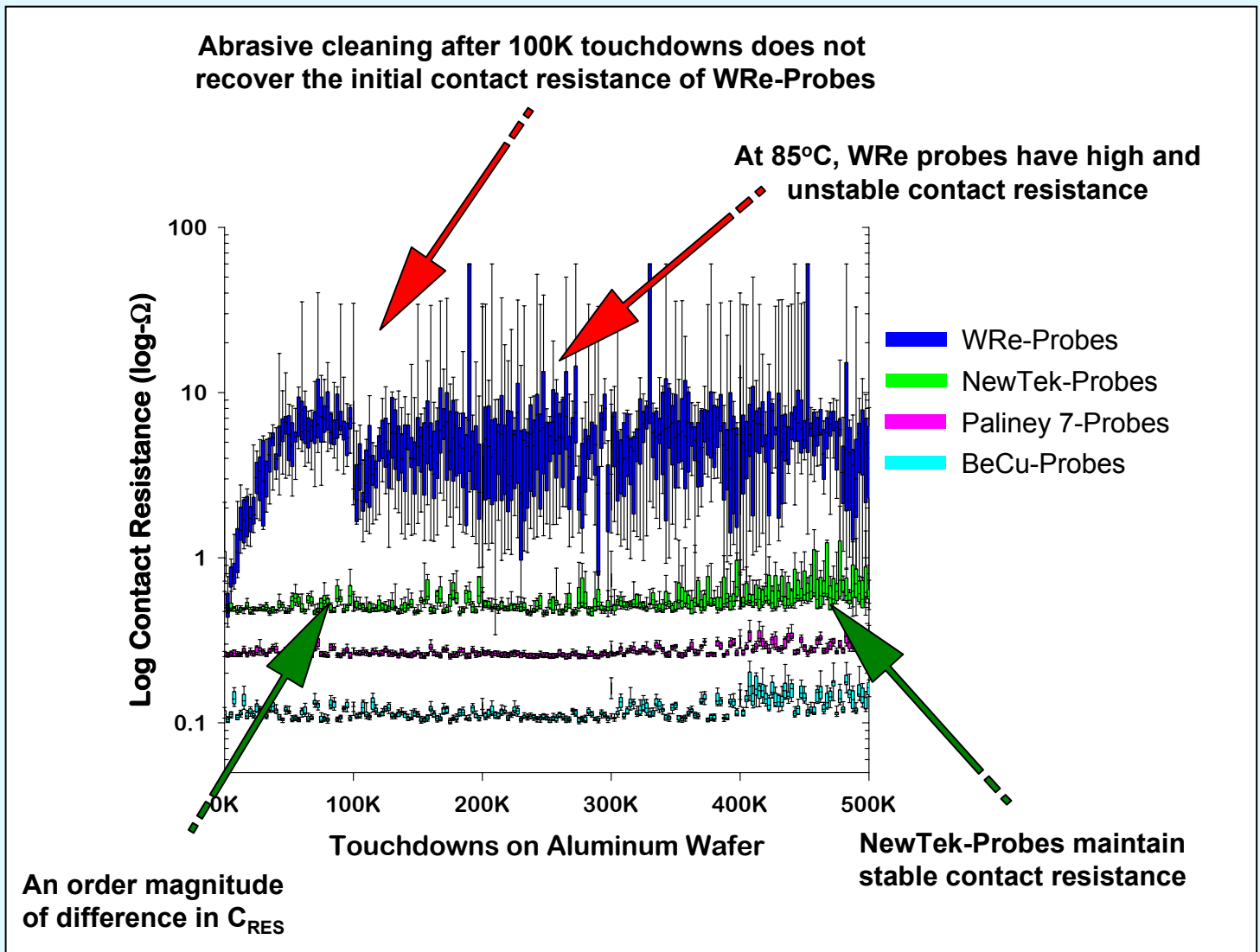


Figure 1: Properties of probe needle materials commonly used in the construction of cantilevered and vertical probe cards.

NewTek probes have CRES values comparable to those of BeCu and the Pd-alloy probes. For small pitch applications, an appropriately designed probe card using NewTek probes can provide contact forces higher than comparable BeCu and Paliney probes, albeit lower than W and WRe probes. The higher stiffness values of the NewTek probe material makes it possible to maintain BCF values comparable to Pd-alloy and BeCu at smaller probe needle diameters. As a result, NewTek probes can be used for fine pitch and small tip diameter probe applications inappropriate for BeCu and the Pd-alloy. Cards built with NewTek probes will not be as robust as those built with W and WRe probes and must be handled appropriately during wafer level testing.

Details of the NewTek probe research performed with the support of Texas Instruments, Inc., were published in the 1999 IEEE - International Test Conference Proceedings and presented at the 1999 IEEE SouthWest Test Workshop. NewTek probes are currently being used successfully in both cantilevered and vertical test applications.

PROPERTY	Tungsten	Tungsten Rhenium	Beryllium Copper	Paliney 7 [®]	NewTek VerTek
<i>Electrical and Thermal Properties:</i>					
Bulk Resistivity at 20°C (mohm-cm)	5.59 to 5.86	9.15 to 9.65	6.10 to 7.93	30.9 to 34.9	55.1 to 58.2
Melting Point (°C)	3410	3410	870 to 980	1015	1300 to 1350
Coeff. of Lin. Exp. (0 to 500 °C) (mm/mm ×1/°C)	4.45 ×10 ⁻⁶	4.45 ×10 ⁻⁶	17.8 ×10 ⁻⁶	13.5 ×10 ⁻⁶	7.6 ×10 ⁻⁶
<i>Material Properties:</i>					
Elastic Modulus (GPa)	394.5±6.1	395.7±6.4	131.5±5.5	121.2±4.9	179 to 181
Tensile Strength (GPa)	2.65 to 2.90	2.90 to 3.36	1.28 to 1.31	0.90 to 1.25	1.30 to 1.55
Vicker's Hardness (100 gm load) (kg/mm ²)	665 to 738	745 to 877	288 to 384	320 to 357	382 to 438

Table 1: The properties of probe needle materials commonly used in the construction of cantilevered and vertical probe cards. NewTek Probes have physical and material properties intermediate between W & WRe and BeCu & Paliney 7[®].

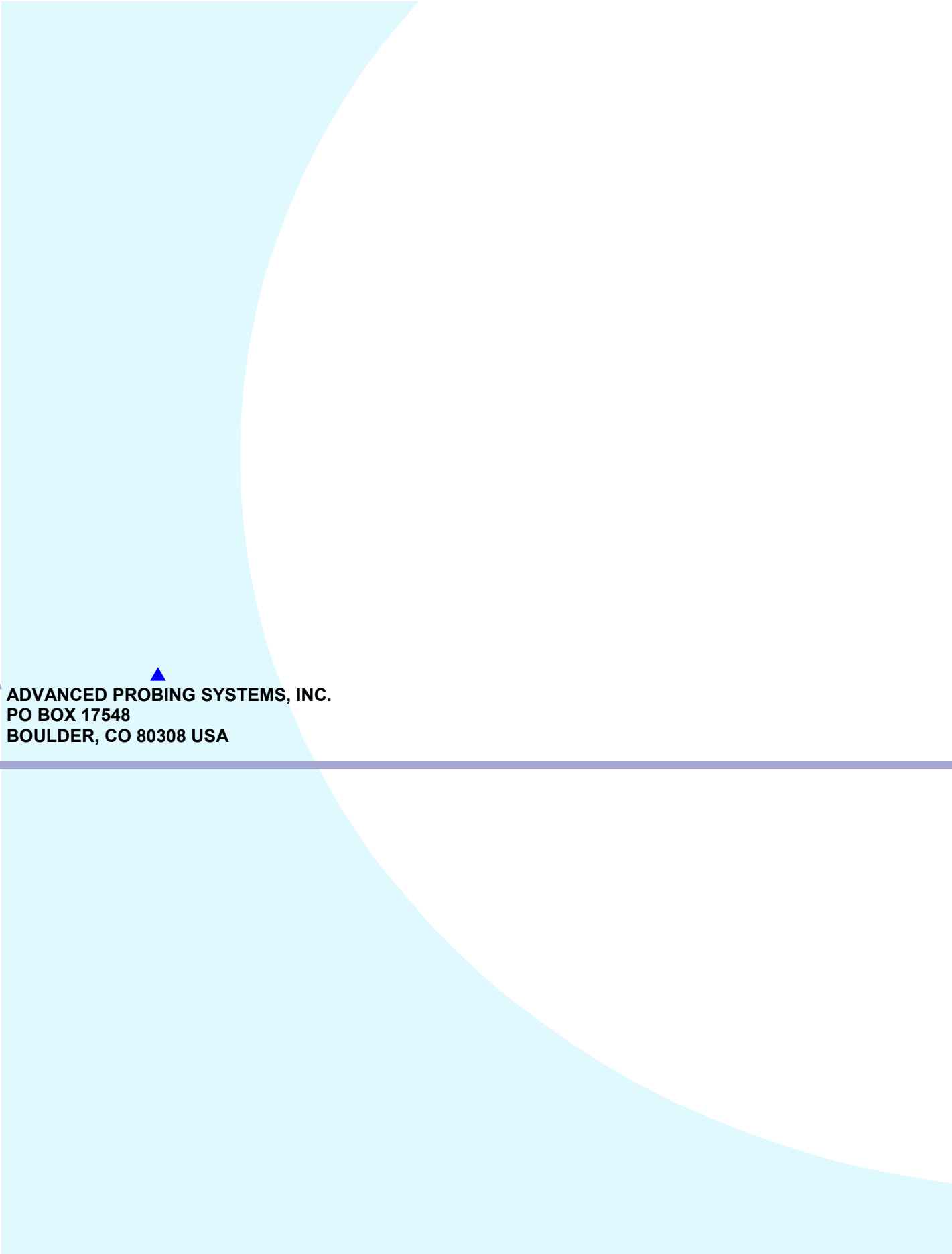
Advanced Probing Systems, Inc., fabricates NewTek, VerTek, tungsten, tungsten-rhenium and beryllium-copper probe needles. Probe needles are available for both cantilevered and vertical probe applications. Diameters range from .0025" to .0400". Probe lengths range from 0.50" to 4.0" with sharp, radiused, or diameter tips. All probes are custom manufactured with parabolic or Isolinear taper shapes that match customer specifications. Advanced Probing Systems, Inc. offers nickel plating, silver plating, gold plating, bent probes, double etched probes, and TIP-M Coating to provide an insulative, solvent resistant polymeric coating.

Please direct any questions and/or requests for additional information to:

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NewTek and VerTek probe materials are exclusively available from Advanced Probing Systems, Inc. Paliney 7[®] is a high palladium content alloy containing gold, platinum, silver, copper, and zinc and a registered trademark of the J.M. Ney Company.



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contact properties. NewTek probes have these characteristics.