

AZR

Long Life Material For **Cu** Wire Bonding



Mass Production Proven

- Extended Capillary Touchdowns
- Improved MTBA

Portable

- No Change In Bonding Parameters
- Consistent Bond Quality

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AZR Capillary

The conversion of gold-to-copper wire has been successfully implemented from simple to complex device-package combinations for leaded (e.g. SOIC, QFP, QFN) and laminates, ranging from low-to-high pin counts. Embracing the economic benefits of using copper wire interconnect to compete in the electronic consumer driven market, the semiconductor assembly companies are constantly searching for methods to reduce the cost of ownership, and one of which is through cost per number of touchdowns from the capillary.

Excellent Fine Grain Material Suitability for Copper Wire Bonding

The introduction of SPT's new material **AZR** (specifically for copper bonding application), provides the avenue to extend its useful bonding tool life of at least 2x of Alumina Zirconia (AZ). The table shows the essential physical and mechanical differences between **AZR** and AZ material.

	AZ	AZR
Color	White	Pink
Hardness (HV1)	2060	2100
Grain size μm	<0.9	<0.9
Density g/cm^3	4.25	4.25
Composition	$\text{Al}_2\text{O}_3 + \text{ZrO}_2$	$\text{Al}_2\text{O}_3 + \text{ZrO}_2 + \text{Cr}_2\text{O}_3$

The microstructure in SPT's **AZR** material (Fig 1) is made of high purity, fine-grained homogenous Alumina Zirconia with Chromium Oxide totally dissolved in the matrix, a highly dense material with excellent hardness, most suitable for rugged metallization terrain used for copper bonding application.

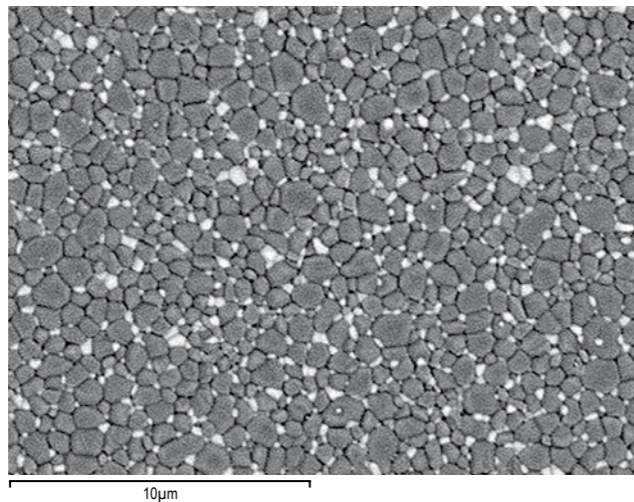


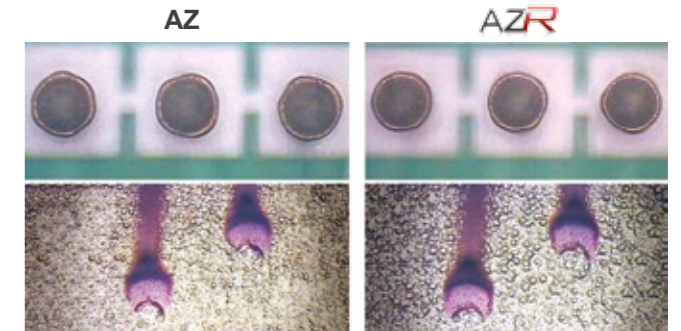
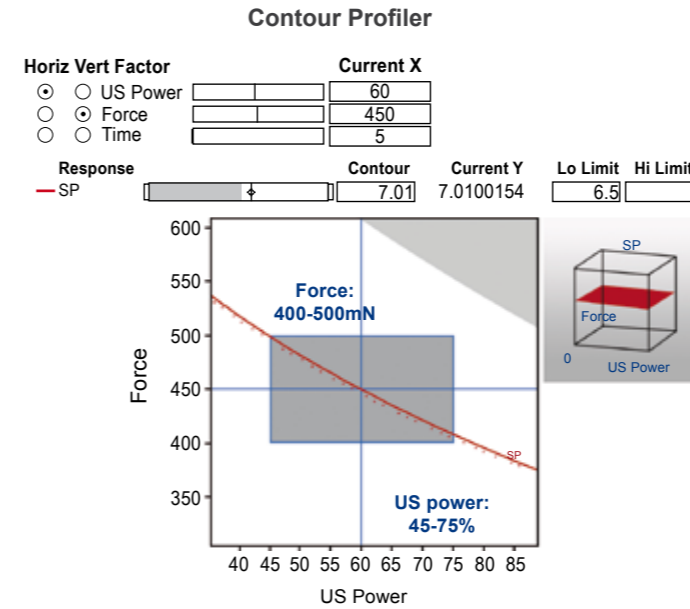
Fig 1. **AZR** microstructure

The **AZR** mechanical properties are further enhanced using SPT's proprietary state-of-the-art thermal treatment process to ensure high material strength, by elimination of porosity through a combination of high pressure and exact sintering temperature.



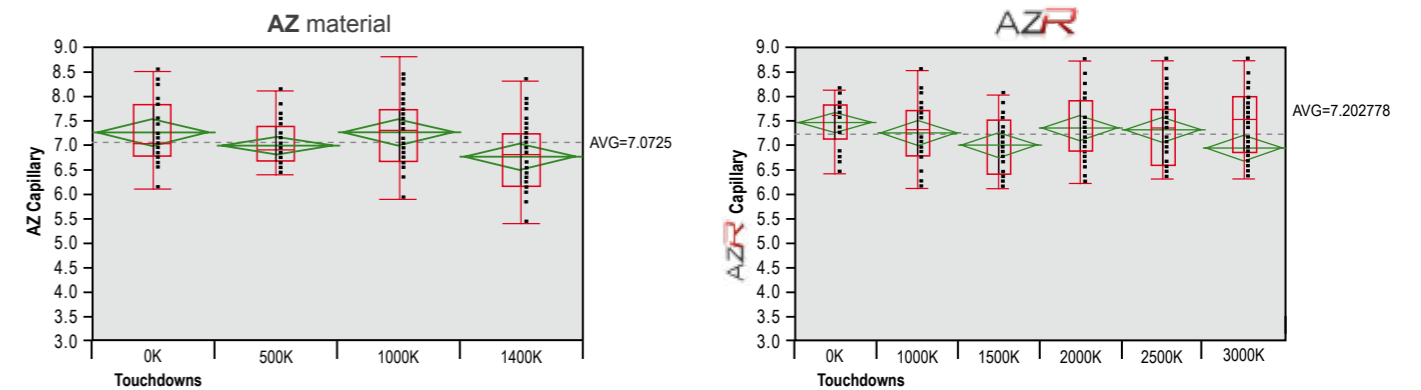
Plug & Play

In actual bonding application, the bonding parameters previously defined for AZ (Alumina Zirconia) material can be used for **AZR** without the need to change existing settings. This important characteristic of the **AZR** material saves time and resources required of wire bond engineers to perform additional DOE evaluation and qualification.

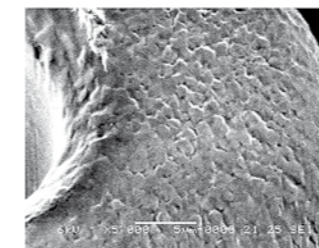


Extended Tool Life

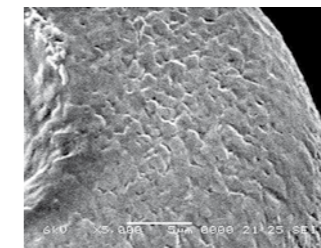
SPT's **AZR** capillary has proven to be at least 2x extended tool life in comparison with AZ, in terms of stitch pull readings as shown in the box & whisker graph:



Actual appearance of the capillary tip surface



(Fig 4) AZ at 1.4KK bonds



(Fig 5) **AZR** at 3KK bonds