

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

www.spt.net

SPT Roth Ltd.

Werkstrasse 28, CH-3250 Lyss, Switzerland
Tel : +41 32 387 80 80
Fax : +41 32 387 80 88
E-Mail : info-ch@spt.net

Small Precision Tools (Phil.) Corp.

35, Domingo M. Guevara Street,
Mandaluyong City 1550, Philippines
Tel : +632 533 7067
Fax : +632 531 5780
E-Mail : info-ph@spt.net

Small Precision Tools Inc.

1330 Clegg Street, Petaluma, CA 94954, USA
Tel : +001 707 765 4545
Fax : +001 707 778 2271
E-Mail : info-usa@spt.net

Small Precision Tools Co. Ltd.

A2 Building, Liyuan Economic Development Zone,
Wuxi, Jiangsu, P.R.China 214072
Tel : +86 510 8516 1968
Fax : +86 510 8516 5233
E-Mail : info-cn@spt.net

SPT Asia Pte. Ltd.

970 Toa Payoh North, #07-25/26, Singapore 318992
Tel : +65 6253 5577
Fax : +65 6250 2725
E-Mail : info-sg@spt.net

SPT Japan Co.,Ltd.

901, 2-5-2 Shin-Yokohama Kohoku-ku
Yokohama-Shi, Kanagawa, 222-0033
Tel : +81 45 470 6288
Fax : +81 45 470 6755
E-Mail : info-jp@spt.net

SPT
small precision tools



Long Life Material For **Cu** Wire Bonding

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)	2000	2050
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.

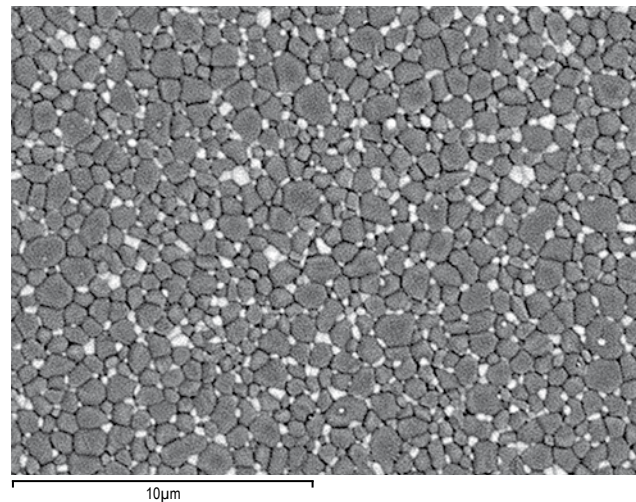


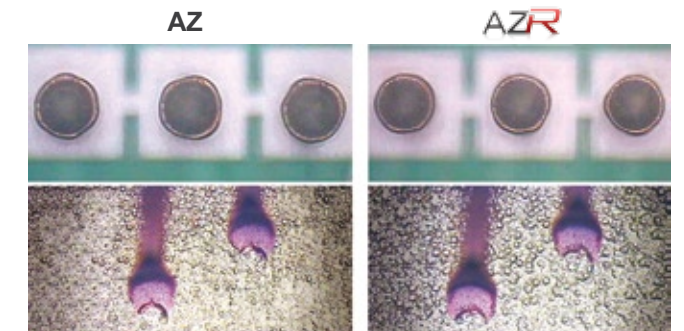
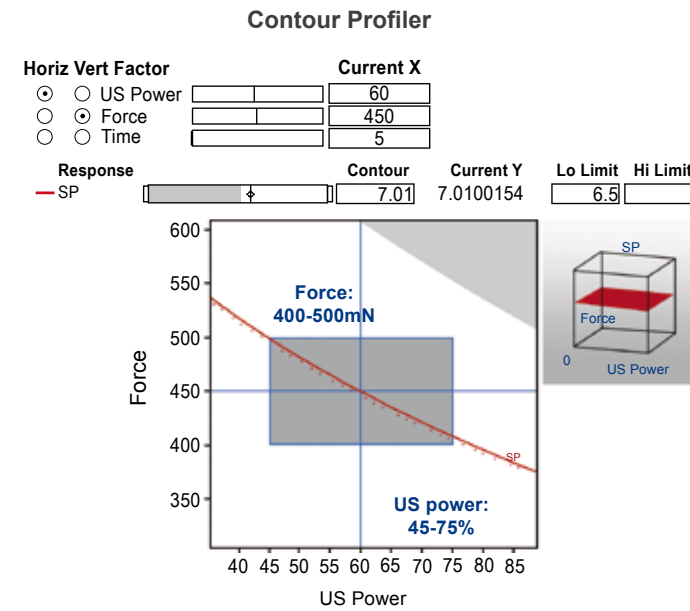
Fig 1. **AZR** microstructure

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.



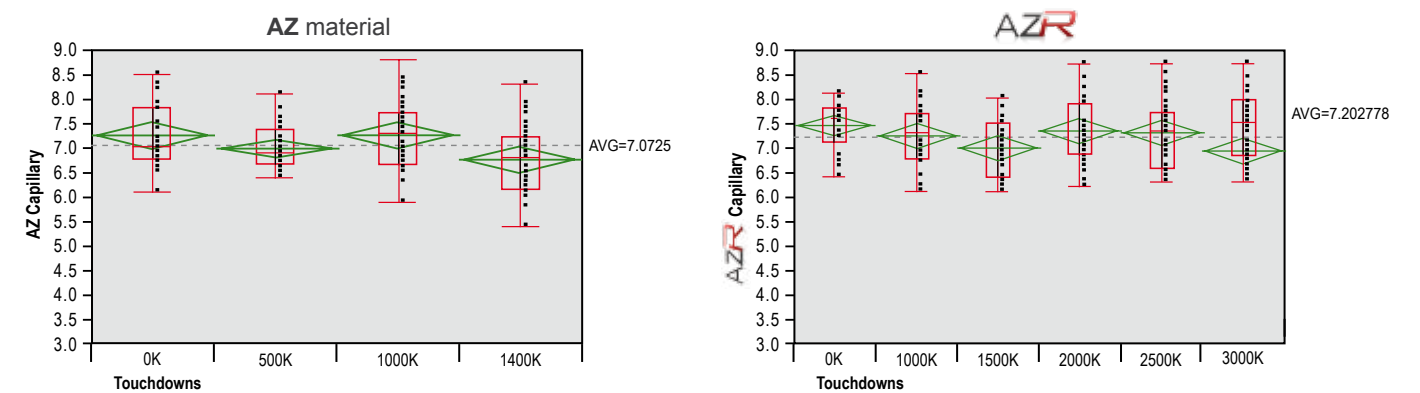
Plug & Play

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.

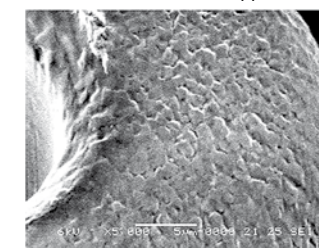


Extended Tool Life

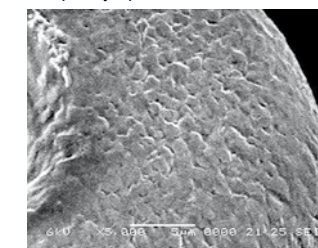
SPT's **AZR** capillary has proven to be at least 2x extended tool life in comparison with AZ, in terms of stitch pull readings as shown in the box & whisker graph:



Actual appearance of the capillary tip surface



(Fig 4) AZ at 1.4KK bonds



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