

# Circudep Black Knight

Advanced Dielectric Metallization Process



**TECHNIC**

[www.technic.com](http://www.technic.com)

## Colloidal Graphite Process

Technic's Circudep Black Knight is an exclusive colloidal graphite process meticulously crafted to make dielectric material conductive, facilitating effective copper plating. Tailored for single-pass coverage, this formulation adeptly tackles the intricacies presented by challenging dielectric materials like Teflon and polyimide.

The unique formulation of Circudep Black Knight adeptly addresses stability and coverage concerns associated with outdated direct metallization processes. Serving as the pioneering and comprehensive alternative to electroless copper, it not only improves the reliability essential for critical applications but also streamlines the process steps, leading to an overall reduction in costs.

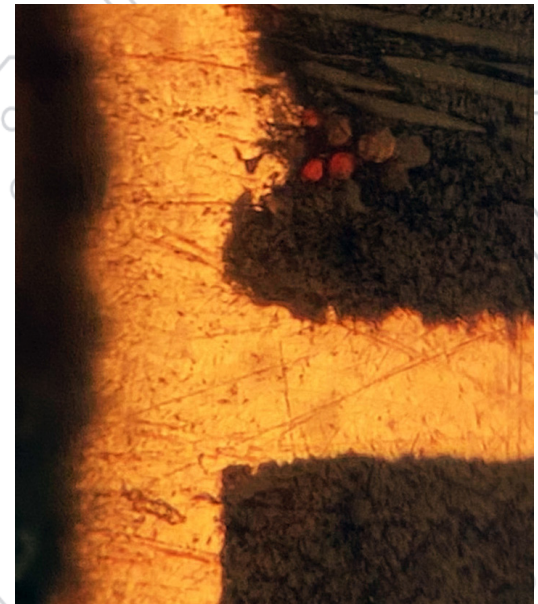


## Features

- Superior adhesion to Cu and dielectric materials
- Elimination of heavy metals, formaldehyde, and reduced water usage
- Reduced water usage
- Simple 4 step process with easy process control
- Fine particle size
- Unique proprietary additives
- Resistant to contamination

## Benefits

- Unsurpassed reliability
- Green process eliminating environmental and health hazards with reduced water usage.
- High productivity with a major cost savings from
- reduced man hour requirement for production and process control
- Excellent coverage of difficult to plate materials like PI, PTFE & LCP
- Long bath life yielding cost savings and consistent coverage



10/1 aspect ratio  
No desmear  
1 Pass in Graphite  
Standard plating



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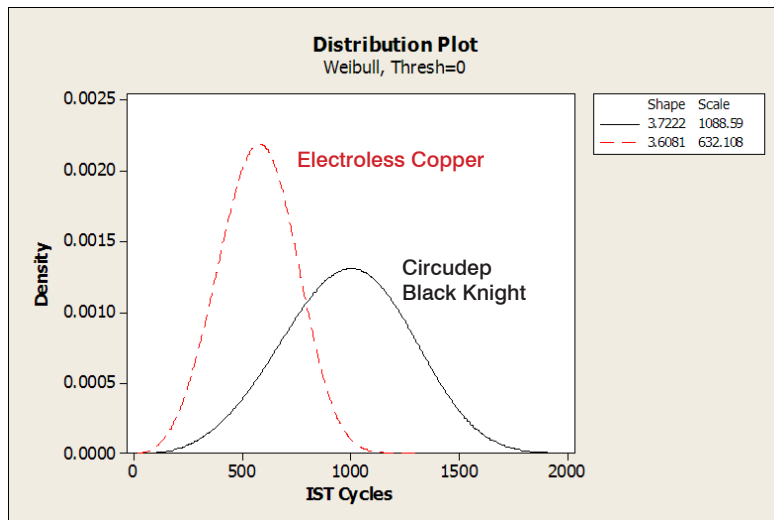
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### Reliability Results:

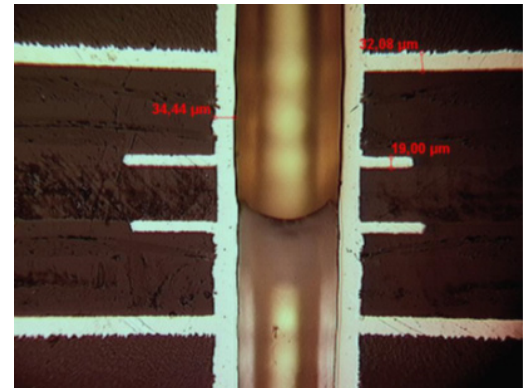
The Black Knight process improves reliability, making it possible to produce advanced technology at an overall cost savings. Rigid, flex, PI, PTFE, LCP, complex design, HDI, BV, high aspect ratios do not matter, Black Knight makes it possible.

Reliability Test	Test Conditions	Acceptability Criteria	$\sigma$
Hot Oil Shock	<ul style="list-style-type: none"> <li>• 260 °C/20 sec↓cooling</li> <li>• 10 sec</li> <li>• 20 times</li> </ul>	Drop less than 10% in resistance	Pass
Thermal Shock	<ul style="list-style-type: none"> <li>• 125 °C / 40 °C</li> <li>• 15 min</li> <li>• 500 times</li> </ul>	Drop less than 10% in resistance	Pass
Reflow	<ul style="list-style-type: none"> <li>• Max 260 °C</li> <li>• 20 sec</li> <li>• 12 times</li> </ul>	Drop less than 10% in resistance	Pass
Solder Float	<ul style="list-style-type: none"> <li>• 288 °C</li> <li>• 10 sec</li> <li>• 6 times</li> </ul>	Drop less than 10% in resistance	Pass
IST	<ul style="list-style-type: none"> <li>• 125 °C/ - 40°C</li> <li>• 15 min hold time</li> </ul>	Drop less than 10% in resistance	Circudep Black Knight exceeds most electroless copper results with average of ~1000 cycles

### Black Knight vs. Electroless Cu IST Distributions



Circudep Black Knight averages 1000 IST Cycles



IST test coupon after 1000 cycles



Solder shock PI flex multilayer