LOCTITE® ECCOBOND NCP 5209
ADVANCED UNDERFILL SOLUTION

LOCTITE® ECCOBOND NCP 5209 is a non-conductive paste (NCP) underfill designed to facilitate next-generation fine-pitch copper pillar and copper OSP flip-chip devices. Overcoming the voiding and protection drawbacks of conventional capillary underfills, LOCTITE ECCOBOND NCP 5209 leverages thermal compression (TC) bonding to offer robust, complete bump protection of flip-chip devices, with bump pitches less than 100 µm and gaps less than 40 µm for a high-reliability result.

Key Benefits

- Outstanding joint formation with SOP, NiAu and Cu OSP pad
- Compatible with a variety of substrates and passivations (polyimide and SiN)
- Design flexibility on chip size and bump configuration
- Ease of processability and workability
  - Good dispensing
  - Long stage life (90 to 120 min.)
- Excellent reliability performance
  - MSL3 capable
  - 1,000 hr. TCT (-55°C to 125°C)
  - 1,000 hr. HTS (150°C)
  - 96 hr. b-HAST (130°C at 85% relative humidity)
- 24 hr. work life
### NCP Technology

#### Process Overview

**Application Process**

1. **NCP Dispense**
2. **Die Alignment**
3. **Thermal Compression Bonding**
4. **Release**

#### NCP Dispensing

- **Volume of NCP used** will control fillet formation and gap filling
- **Dispensing equipment for TC-NCP**
  - Time pressure
  - Auger pump
  - Room-temperature dispense; no heat on substrate during dispense
- **Dispense pattern**: Asterisk (die size > 6 mm × 6 mm)

#### Comparison Table

<table>
<thead>
<tr>
<th><strong>CONVENTIONAL CAPILLARY UNDERFILL (POST-APPLIED UNDERFILL)</strong></th>
<th><strong>HENKEL THERMAL COMPRESSION NCP (PRE-APPLIED UNDERFILL)</strong></th>
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<tbody>
<tr>
<td>Warpage after mass reflow, leading to “white bump” issue</td>
<td>Provide bump protection for fine pitch during bonding process</td>
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<tr>
<td>No bump or solder joint protection before underfill</td>
<td>Designed for Cu OSP, allowing for cost reduction in high bump count applications</td>
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<td>Higher chip warpage after underfill cure</td>
<td>Very low warpage and no underfill void</td>
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<td>Voiding with low gap height, tight bump pitch and increased NSMD size</td>
<td>No flux residue</td>
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<td>-</td>
<td>Reduced keep-out zone (small fillet and no resin bleed-out)</td>
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<tr>
<td>-</td>
<td>No “white bump” issue</td>
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</tbody>
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**Across the Board, Around the Globe.**

henkel-adhesives.com/electronics

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