Flux Residue Cleaning Characterization

Solder Paste: Indium7.16
Revision Date: 5-Jan-2015
Process Type: Assembly Cleaning

FEATURES & CLASSIFICATION
- B/X Alloy - Replacement solder paste for high lead (Pb)
- Halogen Free
- Formulated for automated SMT printing applications
- IPC to J-STD-004B - ROHS

**Material compatibility should be verified with every process change.**

**packaging and storage**

<table>
<thead>
<tr>
<th>PROCESS CAPABILITY</th>
<th>A4625</th>
<th>A4639</th>
<th>A4703</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non Flash process</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ECO Friendly process</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Distillable process</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Biodegradable process</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Fast Drying</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Solder Joint Appearance</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Cosmetic cleanliness</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>DI Rinsing</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cleaning Before Conformal Coating</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

**control method**

- Refractive Index  | 3     | 1     | 1     |
- Titation          | 3     | 3     | 3     |
- Phase Split Method | 1     | 4     | 4     |

**reliability**

- Low Ionic contamination | 1     | 1     | 1     |
- No corrosion          | 1     | 2     | 2     |
- High SIR             | 1     | 1     | 1     |

**Cleaning Process**

<table>
<thead>
<tr>
<th>Cleaning Process</th>
<th>A4625</th>
<th>A4639</th>
<th>A4703</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Printed Circuits</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>MIL-STD and Aerospace</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Med-Rel Electronics</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Double Sided SMT</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Ceramic Hybrids</td>
<td>1</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Advanced Packages</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

**Method**

- Cold Cleaning (CC) | 4     | 4     | 4     |
- Hot Liquid Cleaning (HLC) | 1     | 1     | 1     |
- Vapor Phase Cleaning (VPC) | 5     | 5     | 5     |
- Ultrasonic (US) | 3     | 4     | 3     |
- Spray Under Immersion (SUI) | 3     | 4     | 4     |
- Batch Spray In Air (SIA) | A4625B | 1     | 1     |
- Inline Spray In Air | 1     | 2     | 1     |
- Rework / Manual | 4     | 4     | 4     |

**pH as Delivered**

- 9.0-10.0
- 10.5-11.5
- 9.1-9.9

**Packaging and Storage**

- Packaging can (HDPE) [liter / gallon] 5 / 1
- Packaging Drum (HDPE) [liter / gallon] 25 / 5
- Packaging Drum (HDPE) [liter / gallon] 200 / 55
- Recommended shelf-life 5-Years in Unopened Containers of 25L or more
- Storage temperature Cool/Dry/Controlled Conditions

**Additional Information**

- KEEN is an ISO 9001:2008 certified company.
- KEEN products DO NOT CONTAIN, in any amount, substances prohibited by EU Directive 2011/65/EU, Restriction of Hazardous Substances (RoHS).
- KEEN products comply with EU Directive 1907/2006/EC, Registration, Evaluation, Authorization and Restriction of Chemicals (REACH) and DO NOT CONTAIN, in any amount, constituents defined by REACH as Substances of Very High Concern (SVHC).

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## Flux Residue Cleaning Characterization

**Solder Paste:** Indium7.16  
**Revision Date:** 5-Jan-2015  
**Process Type:** Maintenance Cleaning

### Features & Classification
- BiX Alloy - Replacement solder paste for high lead (Pb)
- Halogen Free
- Formulated for automated SMT printing applications
- IPC to J-STD-004B - RoHS

*Material compatibility should be verified with every process change.*

### Cleaning Process

#### Cleaning Process

<table>
<thead>
<tr>
<th>Feature</th>
<th>Cybersolv® C8502</th>
<th>Cybersolv® C8508</th>
<th>KYZEN® E5321</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Colorless</td>
<td>Amber</td>
<td>Straw</td>
</tr>
<tr>
<td>Odor</td>
<td>Mild</td>
<td>Mild</td>
<td>Mild</td>
</tr>
<tr>
<td>Flashpoint COC [dgr c]</td>
<td>None to Boil</td>
<td>None to Boil</td>
<td>None to Boil</td>
</tr>
<tr>
<td>Boiling point 1000 mBar [dgr C]</td>
<td>&gt;93°C</td>
<td>105°C</td>
<td>103°C</td>
</tr>
<tr>
<td>VOC content - Method 24 [g/L]</td>
<td>503.2 g/L</td>
<td>339 g/L</td>
<td>477.4 g/L</td>
</tr>
<tr>
<td>Surface tension 20 dgr C [dynes/cm]</td>
<td>28 dynes/cm</td>
<td>31 dynes/cm</td>
<td>30 dynes/cm</td>
</tr>
</tbody>
</table>

#### Diluted Properties

<table>
<thead>
<tr>
<th>Feature</th>
<th>Cybersolv® C8502</th>
<th>Cybersolv® C8508</th>
<th>KYZEN® E5321</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH as delivered</td>
<td>11.0 - 12.0</td>
<td>9.0 - 11.0</td>
<td>&gt;13</td>
</tr>
<tr>
<td>Min concentration in water [% w/w]</td>
<td>Ready to use</td>
<td>Ready to use</td>
<td>3%</td>
</tr>
<tr>
<td>Max concentration in water [% w/w]</td>
<td>Ready to use</td>
<td>Ready to use</td>
<td>10%</td>
</tr>
<tr>
<td>pH @ 1.0% Solution</td>
<td>10.5</td>
<td>10.7</td>
<td>12.2</td>
</tr>
<tr>
<td>Thinner</td>
<td>n/a</td>
<td>n/a</td>
<td>Di-water</td>
</tr>
<tr>
<td>Recommended process temperature</td>
<td>20-60°C</td>
<td>Ambient</td>
<td>20-40°C</td>
</tr>
</tbody>
</table>

#### Cleaning Before Conformal Coating

- 5-Years in Unopened Containers of 25L or more
- Cool/Dry/Controlled Conditions

#### Personal Handling Conditions

- Available

**Process Capability**

- Low Ionic contamination: 4
- No corrosion: 2
- High SIR: 4

**Control Method**

- Refractive Index: n/a
- Titration: n/a
- Phase Split Method: n/a

**Reliability**

- 5
- 4

**Packaging and Storage**

- Packaging can (HDPE) [liter / gallon]: 5 / 1
- Packaging Drum (HDPE) [liter / gallon]: 200 / 55

**Product Documentation**

- RoHS Compliance Certificate: Available
- REACH Compliance Certification: Available
- Certificates of Compliance and Analysis: Available
- Product Supplement: Available in English

**Packaging**

- Packaging can (HDPE) [liter / gallon]: 5 / 1
- Packaging Drum (HDPE) [liter / gallon]: 200 / 55

**Methods**

- Cold Cleaning (CC): 1
- Hot Liquid Cleaning (HLC): 3
- Ready To Use: 1
- Ultrasonic (US): 1
- Spray Under Immersion (SUI): 1
- Batch Spray In Air (SIA): 4
- Inline Spray in Air: 4
- Rework / Manual: 1

**Cleaning Before Conformal Coating**

- Wave Solder Pallets: n/a
- Wave Solder Fingers: n/a
- Reflow Oven Interior: 1
- Reflow Oven Filters / Condenser: 1
- Flux Traps: 1
- Spray Fluxer: n/a

**PROCESS CAPABILITY**

- Non Flash process: 2
- ECO Friendly process: 2
- Distillable process: 5
- Biodegradable process: 2
- Fast Drying: 2
- Soldier Joint Appearance: 4
- Cosmetic cleanliness: 1
- DI Rinsing: 2
- Cleaning Before Conformal Coating: 3

**FEATURES & CLASSIFICATION**

- Generally not usable for this purpose
- Generally usable, but not the best choice
- Especially made for this purpose

**CLEANING PROCESS**

- Wave Solder Pallets: n/a
- Wave Solder Fingers: n/a
- Reflow Oven Interior: 1
- Reflow Oven Filters / Condenser: 1
- Flux Traps: 1
- Spray Fluxer: n/a

**Legend**

- 5: Wrong Choice
- 4: Generally not usable for this purpose
- 3: Generally usable, but not the best choice
- 2: Especially made for this purpose
- 1: Especially made for this purpose

Please refer to the product Safety Data Sheet (SDS) for complete safety information.

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**Flux Residue Cleaning Characterization**

**Solder Paste:** Indium7.16  
**Revision Date:** 5-Jan-2015  
**Process Type:** Solvent Cleaning

**FEATURES & CLASSIFICATION**

- BiX Alloy - Replacement solder paste for high lead (Pb)
- Halogen Free
- Formulated for automated SMT printing applications
- IPC to J-STD-004B - ROH0

Material compatibility should be verified with every process change.

<table>
<thead>
<tr>
<th>CLEANING PROCESS</th>
<th>I3302</th>
<th>MX2501</th>
<th>141-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flexible Printed Circuits</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>MIL-STD and Aerospace</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Med-Rel Electronics</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Double Sided SMT</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Ceramic Hybrids</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Advanced Packages</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

**METHOD**

- Cold Cleaning (CC) | 3 | 3 | 1 |
- Hot Liquid Cleaning (HLC) | 1 | 5 | 5 |
- Vapor Phase Cleaning (VPC) | 5 | 1 | 1 |
- Ultrasonic (US) | 2 | 2 | 5 |
- Spray Under Immersion (SUI) | 1 | 2 | 5 |
- Batch Spray In Air (SIA) | 4 | 5 | 5 |
- Inline Spray In Air | 4 | 5 | 5 |
- Rework / Manual | 3 | 5 | 1 |

**PROCESS CAPABILITY**

- Non Flash process | 3 | 1 | 2 |
- ECO Friendly process | 2 | 2 | 3 |
- Distillate process | 3 | 1 | 2 |
- Biodegradable process | 2 | 4 | 3 |
- Fast Drying | 3 | 1 | 1 |
- Solder Joint Appearance | 1 | 1 | 1 |
- Cosmetic cleanliness | 1 | 1 | 1 |
- DI Rinsing | 2 | 5 | 5 |
- Cleaning Before Conformal Coating | 3 | 2 | 3 |

**CONTROL METHOD**

- Refractive Index | 4 | n/a | n/a |
- Titration | 4 | n/a | n/a |
- Phase Split Method | 5 | n/a | n/a |

**RELIABILITY**

- Low Ionic contamination | 1 | 2 | 2 |
- No corrosion | 2 | 1 | 1 |
- High SIR | 1 | 2 | 2 |

**CLEANING PROCESS**

- Color | Straw | Colorless | Colorless |
- Odor | Mild | Characteristic | Ethereal |
- Flashpoint COC (dgr c) | 82°C | None to Boil | None to Boil |
- Boiling point 1000 mBar (dgr C) | 150°C | 44°C | 47°C |
- VOC content - Method 24 (g/L) | 1034.9 g/L | 878 g/L | 1175 g/L |
- Surface tension 20 dgr C [dynes/cm] | 32 dynes/cm | 24 dynes/cm | 26 dynes/cm |

**DILUTED PROPERTIES**

- pH as delivered | 9.5-10.4 | Neutral | Neutral |
- Min concentration in water [% w/w] | Ready to use | Ready to use | Ready to use |
- Max concentration in water [% w/w] | Ready to use | Ready to use | Ready to use |
- pH @ 1.0% Solution | 9.9 | n/a | n/a |
- Thinner | n/a | n/a | n/a |
- Recommended process temperature | 40-60°C | 44-46°C | Ambient |

**PRODUCT DOCUMENTATION**

- RoHS Compliance Certificate | Available |
- REACH Compliance Certification | Available |
- Certificates of Compliance and Analysis | Available |
- Product Supplement | Available in English |

**PACKAGING AND STORAGE**

- Packaging can [kg / pound] | 5/1 (HDPE) (l/g) | 4/9 (Steel) |
- Packaging can [kg / pound] | 26/5 (HDPE) / g | 20/45 (Steel) |
- Packaging drum [kg / pound] | 30/65 (HDPE) / g | 200/440 (Steel) |
- Recommended shelf-life | 5-Years in Unopened Containers of 25L or more |
- Storage temperature | Cool/Dry/Controlled Conditions |
- Personal Handling Conditions |

Please refer to the product Safety Data Sheet (SDS) for complete safety information.

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**Solder Paste:** Indium7.16  
**Revision Date:** 5-Jan-2015  
**Process Type:** Stencil Cleaning

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**FEATURES & CLASSIFICATION**

- B/X Alloy - Replacement solder paste for high lead (Pb)  
- Halogen Free

Formulated for automated SMT printing applications.  

PIC to J-STD-004B - ROH0

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**CLEANING PROCESS**

<table>
<thead>
<tr>
<th>METHOD</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under Stencil Wipe Cleaning</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Squeegees / Blades / Hardware</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Stencils Poly - Pump Print</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Stencils Metal</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Single Side Misprint</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Double Side Misprint</td>
<td>2</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Uncured SMT Adhesives</td>
<td>1</td>
<td>1</td>
<td>3</td>
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</tbody>
</table>

**DILUTED PROPERTIES**

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>pH as delivered</td>
<td>Neutral</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Min concentration in water [% w/w]</td>
<td>20%</td>
<td>Ready to use</td>
<td>N/A</td>
</tr>
<tr>
<td>Max concentration in water [% w/w]</td>
<td>100%</td>
<td>Ready to use</td>
<td>25%</td>
</tr>
<tr>
<td>pH @ 1.0% Solution</td>
<td>7.0</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Thinner</td>
<td>Di-water</td>
<td>N/A</td>
<td>Di-water</td>
</tr>
</tbody>
</table>

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**PROCESS CAPABILITY**

<table>
<thead>
<tr>
<th>METHOD</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cold Cleaning (CC)</td>
<td>2</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Hot Liquid Cleaning (HLC)</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Ready to use available</td>
<td>Yes</td>
<td>1</td>
<td>Yes</td>
</tr>
<tr>
<td>Ultrasonic (US)</td>
<td>2</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Spray Under Immersion (SUI)</td>
<td>2</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Batch Spray In Air (SIA)</td>
<td>1</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Inline Spray in Air</td>
<td>3</td>
<td>5</td>
<td>3</td>
</tr>
</tbody>
</table>

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**CONTROL METHOD**

<table>
<thead>
<tr>
<th>METHOD</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refractive Index</td>
<td>1</td>
<td>n/a</td>
<td>5</td>
</tr>
<tr>
<td>Titration</td>
<td>4</td>
<td>n/a</td>
<td>5</td>
</tr>
<tr>
<td>Phase Split Method</td>
<td>2</td>
<td>n/a</td>
<td>1</td>
</tr>
</tbody>
</table>

**RELIABILITY**

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Ionic contamination</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>No corrosion</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Nano Coating Safe</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flashpoint COC [drg c]</td>
<td>None to Boil</td>
<td>61°C</td>
<td>&gt;93°C</td>
</tr>
<tr>
<td>Boiling point 1000 mBar [dgr C]</td>
<td>103°C</td>
<td>132°C</td>
<td>144°C</td>
</tr>
<tr>
<td>VOC content - Method 24 [g/L]</td>
<td>822 g/l</td>
<td>875.6</td>
<td>884.5 g/L</td>
</tr>
<tr>
<td>Surface tension 20 dgr C [dynes/cm]</td>
<td>36</td>
<td>NE</td>
<td>28</td>
</tr>
<tr>
<td>Recommended process temperature</td>
<td>20-45°C</td>
<td>Ambient</td>
<td>20-45°C</td>
</tr>
</tbody>
</table>

---

**PRODUCT DOCUMENTATION**

- RoHS Compliance Certificate: Available
- REACH Compliance Certification: Available
- Certificates of Compliance and Analysis: Available
- Product Supplement: Available in English

**PACKAGING AND STORAGE**

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>E5611</th>
<th>C8882</th>
<th>A8820</th>
</tr>
</thead>
<tbody>
<tr>
<td>Packaging can (HDPE) [liter / gallon]</td>
<td>5 / 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Packaging can (HDPE) [liter / gallon]</td>
<td></td>
<td>25 / 5</td>
<td></td>
</tr>
<tr>
<td>Packaging Drum (HDPE) [liter / gallon]</td>
<td></td>
<td>200 / 55</td>
<td></td>
</tr>
<tr>
<td>Recommended shelf-life</td>
<td>5-Years in Unopened Containers of 25L or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Storage temperature</td>
<td>Cool/Dry/Controlled Conditions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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