Our main theme of "TRINITY SMIC" represents a fusion of innovative materials, equipment, and process technologies. Through these three integration enabling Soldering Solutions, we will be introducing our newest materials combined with cutting-edge equipment, backed by the experience and expertise of industry's leading soldering manufacturer.
Solder Paste Pursuing Ultimate Versatility

New M705-ULT369 for Better Printability, Wettability and Less BGA Solder Defects

Features

- Stable solder print amount to 0402 chip component
- Good wettability on leads of QFP and QFN
- Resolve no fusion of Non-Wet Open defects of BGA
- Extended warranty period of solder paste

Revolutionary Products

- M705-ULT369

Comparison of printed solder paste amount at each mask opening

- Improved wetting
- Countermeasure for BGA fusion defects (Non-Wet Open)
3D Jet Dispensing Solder Paste

Lineup includes Halogen-Free Solder Paste and Paste for Laser Soldering

**Features**

- High accurate dotted and linear dispensing
- Stable dispensing performance even after 25000 shots
- Stable dispensing performance even after 1 week refrigeration storage
- High speed supply of solder paste without contacting the board
- Selective supply of solder paste to uneven boards such as boards after mounting or 3D boards
- Lineup includes Halogen-Free NXD900ZH
- Lineup includes SGC007 for Laser Soldering

**Revolutionary Products**

Jet dispensing

Without a mask, mounting a component in a depressed area after mounting other components is possible. Laser selective soldering of a component, which can prevent remelting, is also possible.

Allows supplying additional solder paste to a land on which solder quantity is expected to be insufficient. (The solder quantity can be changed for each type of the mounted components even in the same land area.)

**High accurate dotted and linear dispensing**

- **Distribution of application height**
  - Height after reflow:
    - 0.04
    - 0.065
    - 0.0625
    - 0.05
    - 0.0475
    - 0.045
    - 0.0425
    - 0.04

- **Distribution of application diameter**
  - Diameter (mm):
    - 0.04
    - 0.045
    - 0.05
    - 0.055
    - 0.06
Solder Materials for Packaging at 200°C

PET Film is now available as a PCB Material

Features

● Applicable for packaging components or substrates having low heat resistance, and expected for significant material cost reductions
● L20-JPP is ideal for low temperature packaging in which sufficient joint strength is obtained even when the FPCs are rolled
● Environmentally-friendly products that contribute to energy conservation by low-temperature and short-time profile
● Low-temperature flux-cored solder LEO, developed ahead of world, applicable for repairs

Revolutionary Products

Low-melting point products promote low-temperature soldering

To enable low-temperature soldering, which is energy-efficient and environment-friendly, to be performed in any conditions, SMIC has prepared a lineup of soldering products in a wide variety of forms. With the development of LEO, a flux cored solder achieved through our original technology which is the first to make processing of hard, low-melting point alloys possible, our lineup now includes all forms of soldering products.

We offer solder materials that promote low-temperature packaging, which contribute to environmental-friendliness and cost reduction

Allows low-temperature flow soldering
L20 Solder bar for flow soldering

Hard, brittle alloys have been processed with flux cores and wire-drawing
LEO L20 Cored solder

Can be used for bump forming on materials with low heat resistance
L20 Solder balls

Allows reflow profiles at low temperatures in short times
L20-LT142 Solder paste

Can be used on shield cases, to prevent rewelding and for reworking at low temperatures
L20 Solder preform

Flux residue acts as an adhesive to reinforce joint strength, and is optimal for flexible substrates
L20-JPP Solder paste

Soldering can be performed even at 200 °C
 Ahead of world, LEO series has developed by processing hard and fragile alloys into solder wire

Example of low-temperature packaging by reflow soldering
L20-JPP realized high strength bonding of substrates with low heat resistance
LED lights mounted on a PEN film FPC by L20-JPP
Enhanced Cost Reduction Solution following Material Cost

RK Series Alloys Reduce Erosion and Contamination at Solder Iron Chip

Features

- Lower consumption of iron tip and reduce the manufacturing cost
- Prevents contamination on the iron tip and improve the productivity
- Applicable for automatic soldering machines rather than manual soldering
- Lineups of 3Ag base M705RK, 0.3Ag base M35RK, and Non Ag base M20RK

Revolutionary Products

Iron tip erosion

- M705 (SAC305): Reaches the heater component in 20,000 shots
- Conventional product (SAC305+Fe): Does not reach the heater component even after 60,000 shots
- M705RK (SAC305+α): Does not reach the heater component even after 60,000 shots

Iron tip contamination after 5000 shots

- M705 (SAC305): Carbides increased
- Conventional product (SAC305+Fe): Carbides decreased
- M705RK (SAC305+α): Carbides decreased

Test conditions

- Solder wire diameter: φ0.8 mm
- Iron tip temperature: 420 °C
- Solder feed length: 10 mm
- Solder feed rate: 20 mm/sec

<table>
<thead>
<tr>
<th></th>
<th>M705RK</th>
<th>Conventional product</th>
<th>M705</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soldering iron Erosion</td>
<td>○</td>
<td>○</td>
<td>×</td>
</tr>
<tr>
<td>Carbonization</td>
<td>○</td>
<td>△</td>
<td>○</td>
</tr>
<tr>
<td>Equipment maintenance</td>
<td>○</td>
<td>△</td>
<td>○</td>
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</table>
JIS AA Class Non-Splash Flux Cored Solder

- JIS Z 3283. AA class

Features

- Splash control in a wide working temperature range
- Non-splash mounting even in laser soldering with rapid heating
- Splash control even in high-speed operation with various alloys

Non-splash flux-cored solder SEN meeting new soldering requirements

- Splash control in a wide working temperature range
- Non-splash mounting even in laser soldering with rapid heating
- Splash control even in high-speed operation with various alloys

- Splash when the solder is directly put on a soldering iron
- Splashes in laser soldering
- Splashes of various alloys

Revolutionary Products

Evaluation by applying a chemical agent

- When the difference between the solidus and the liquidus is large, the number of splashes is more likely to increase
- When an alloy has a high melting point, the number of splashes is more likely to increase

<table>
<thead>
<tr>
<th>Product</th>
<th>Composition</th>
<th>Solidus line-Liquids line</th>
</tr>
</thead>
<tbody>
<tr>
<td>M705</td>
<td>Sn-3Ag-0.5Cu</td>
<td>217-220</td>
</tr>
<tr>
<td>M35</td>
<td>Sn-0.3Ag-0.7Cu</td>
<td>217-227</td>
</tr>
<tr>
<td>M24MT</td>
<td>Sn-Cu-Ni-P-Ge</td>
<td>228-230</td>
</tr>
</tbody>
</table>

Conventional product

- SEN

<table>
<thead>
<tr>
<th>Flux</th>
<th>Solder ball</th>
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<tbody>
<tr>
<td>Flux</td>
<td>Solder ball</td>
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</tbody>
</table>
Compact Selective Dip Soldering Machine

SNF-2017 Automatic Slide Nozzle for Hi-Mix Production

Features

- Automatic slide nozzle provides compatibility with various components with no solder nozzle replacement
- Automatic correction of solder wave height
- Supports inclined, point, and drag soldering with the use of a 6-axis robot
- Simple teaching of soldering points
- Shortens the production takt time with inline conveyance system

Revolutionary Products

Automatic slide nozzle

6-axis robot

Simple teaching of soldering points

Point soldering

Drag soldering

Inclined soldering
Solder Paste that Suppresses Voids
Product Design has Fully Applied Clarified Void Formation Mechanism

**Features**

- We clarified the mechanism of void formation, and with a unique organic synthetic technologies, we achieved void reduction
- Optimum for bottom surface electrode type components in which temperature rise is difficult
- Ideal for soldering of components or substrates that are easily being oxidized due to their high wettability
- Development of new product that supports chip components, in addition to the bottom surface electrode type components is now in progress

**Revolutionary Products**

The **GLV** series solder paste that reduce voids in components of all types

- GLV series discharges voids due to its excellent fluidity when melted

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![Graph showing void area ratio and melting temperature](image-url)
Solder Materials that are Resistant to Temperature Changes

Solder Paste with Flux and Solder Alloy at Hi-Resistant for Thermal Fatigue

Features

- High thermal fatigue-resistant alloys continue to evolve through ongoing developments in new technology
  - M731 is ideal for flow soldering
  - M758 is a general-purpose high thermal fatigue-resistant alloy for SMT
  - M794 is a new alloy with low thermal fatigue degradation
- Ion migration caused by dew condensation is prevented even in severe environments
  - Solder paste C3T shows no flux residue cracking even in thermal fatigue resistance tests

Revolutionary Products

M794 has achieved improved thermal fatigue resistance through accumulation of new technologies

Features a lineup of thermal fatigue-resistant alloys tailored to various applications or requirements

- M705 (Sn-Ag-Cu)
- M731 (Sn-Ag-Cu-Sb)
- M758 (Sn-Ag-Cu-Bi-Ni)
- M794 (Sn-Ag-Cu-Bi-Sb-Ni-x)

- Crack-free flux residue enhances ion migration resistance

Crack-free solder paste C3T

-40°C/+125°C Retained for 30 minutes

Temperature/humidity cycle (in everyday life)
High-Quality Die Bonding Mounting
Hi Precision Wire Bonding without Splash and Contamination

Features

- HQ type that enables flux-free & no-clean die bonding
- Solder preform containing Ni balls that achieves excellent head radiation with a low amount of voids
- Tape and reel package type, which enables automatic high-precision mounting by machines
- Flux-coated type that does not require the flux application process

Available in different product types that can be chosen according to the application or purpose

<table>
<thead>
<tr>
<th>HQ type that does not require flux, owing to its specially-processed surface</th>
<th>Flux-coated type with flux applied on the surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>HQ</td>
<td>Coating flux can be chosen according to the purpose</td>
</tr>
<tr>
<td>Tray or tape and reel packaging type that enables automatic mounting</td>
<td>Type containing Ni balls that realizes horizontal packaging</td>
</tr>
<tr>
<td>Supports irregular-shaped or large products</td>
<td>Various ball sizes can be chosen</td>
</tr>
</tbody>
</table>

Crack-free solder preform that achieves an excellent heat radiation effect

- **High heat dissipation**
  - Air in cracks inhibits thermal conductivity and lowers the heat radiation effect
  - Cracks caused by tilt
  - Crack caused when solder is thin

- Unique ball inclusion technology exhibits an excellent reaction and prevents voids
  - Ni balls provide stand-off heights between components, ensuring even solder thickness

- Ni balls offer stand-off heights between components, ensuring even solder thickness
Maintenance-Free Flux Collection

Water Cyclone Method Saves the Energy Consumption

Features

● Flux collection using the water cyclone method eliminates reflow oven maintenance
● Water treatment enables low-energy operation with no conventional requirements for cooling

Specifications

● Comparison of reflow ovens after running for 3 months without maintenance

<table>
<thead>
<tr>
<th>Conventional oven</th>
<th>SNR-1030GTD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labyrinth part</td>
<td><img src="image1" alt="Labyrinth part comparison" /></td>
</tr>
<tr>
<td>Heating zone panel</td>
<td><img src="image2" alt="Heating zone comparison" /></td>
</tr>
<tr>
<td>Cooling zone panel</td>
<td><img src="image3" alt="Cooling zone comparison" /></td>
</tr>
</tbody>
</table>

- Ventilator
- N₂
- Steam removal
- N₂
- Reflow oven
- Flux + N₂
- Water (Spray)
- Water
- Water film
- Water film
- Water film
- Chiller
- Flux + Activated Carbon (recover occasionally)
- Decomposition / adsorption
- Water + Flux

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SMIC