



SOLDERING

# ECOREL™ FREE 305-16LVD

SAC305 LEAD FREE SOLDER PASTE  
NO CLEAN SMT PRINTING PROCESS  
EXCELLENT LOW VOIDING

## BENEFITS

ECOREL FREE 305-16LVD is especially designed to reduce the voids level when soldering bottom terminated components. This to benefit applications where excellent thermal management is crucial. A reduction of voids contributes to a better heat dissipation, more reliable electrical connection and a more robust mechanical solder joint.

The chemistry of 16LVD is also available with other alloys and particle sizes on request.

|             |  |
|-------------|--|
| PERFORMANCE | <ul style="list-style-type: none"> <li>Low voiding to offer great heat dissipation</li> <li>Very good wetting on all surface finishes, including OSP</li> <li>Transparent colourless residue, even after multiple reflow cycles</li> </ul> |
| COST        | <ul style="list-style-type: none"> <li>Good first pass yield testability in ICT</li> <li>Increase lifetime and reliability of your product, hence reduces risk of premature failures.</li> </ul>   |
| HSE         | <ul style="list-style-type: none"> <li>No Halogen</li> <li>Lead Free</li> </ul>  |

## FEATURES

| SPECIFICATIONS                     | ECOREL FREE 305-16LVD T3-88 | ECOREL FREE 305-16LVD T4-88 | ECOREL FREE 305-16LVD T4-89 |
|------------------------------------|-----------------------------|-----------------------------|-----------------------------|
| Alloy                              | Sn96,5Ag3Cu0,5              | Sn96,5Ag3Cu0,5              | Sn96,5Ag3Cu0,5              |
| Melting point (°C/°F)              | 217 / 422                   | 217 / 422                   | 217 / 422                   |
| Metal content (%)                  | 88                          | 88                          | 89                          |
| Post reflow residues               | Approximately 5% by w/w     | Approximately 5% by w/w     | Approximately 5% by w/w     |
| Halogen content                    | No Halogen                  | No Halogen                  | No Halogen                  |
| Powder size                        | 25 – 45 microns / Type 3    | 20 – 38 microns / Type 4    | 20 – 38 microns / Type 4    |
| Spiral pump* Viscosity (Pa.s 25°C) | Typical 135                 | Typical 135                 | Typical 175                 |

\*The equipment used to test spiral pump viscosity is Malcom at a 10 rpm rotation speed.

## CHARACTERISTICS

| CHARACTERISTICS                               | VALUES                    |                           |
|---|---------------------------|---------------------------|
| Flux Classification                           | ROLO                      | ANSI/J-STD-004            |
|   | 113                       | ISO 9454                  |
| Solder balling test                           | Pass                      | ANSI/J-STD-005            |
| Copper mirror                                 | Pass                      | ANSI/J-STD-004            |
| Copper corrosion                              | Pass                      | ANSI/J-STD-004            |
| SIR (IPC)                                     | Pass                      | ANSI/J-STD-004            |
| SIR (Bellcore)                                | Pass                      | Bellcore                  |
| Electromigration (IPC / Bellcore)             | Pass                      | ANSI/J-STD-004 / Bellcore |
| Bono Corrosion test (85°C / 85% HR – 15 days) | Pass Corrosion Factor <8% | Inventec procedure        |

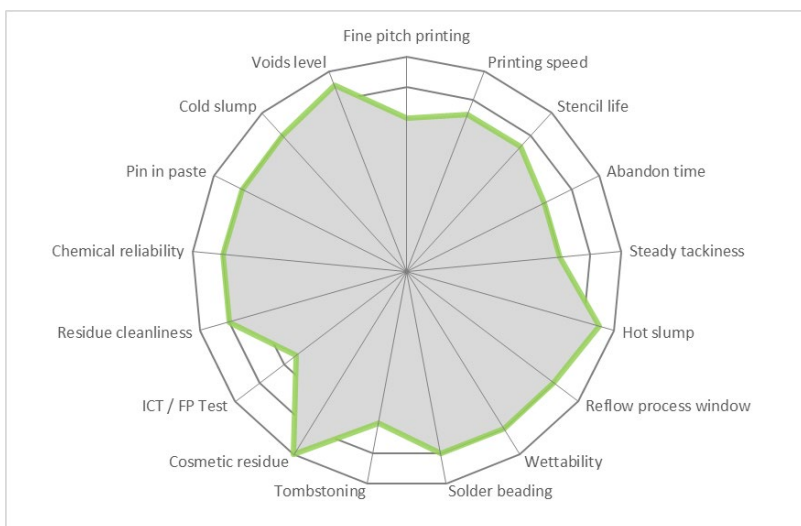
ECOREL FREE 305-16LVD achieves very low level of voiding, especially for power components (QFN, DPAK, etc.).



NON-OPTIMIZED PASTE



ECOREL FREE 305-16LVD



The radar chart shows the excellent characteristics of Ecorel Free 305-16LVD, including high speed printing, excellent abandon time, and high pin in paste performance. Its large process window allows for good soldering of medium and large boards.

## PROCESS RECOMMENDATION

The best process will depend on factors such as operating conditions, equipment, board or component design. Our team is ready to advise you.

### SOLDER PASTE PREPARATION

- Put the paste at room temperature for at least 4 hours prior to use.
- Before printing, it is essential to properly mix the solder paste, either manually with a spatula or by doing several preliminary prints on the stencil.
- Automatic solder paste mixing is neither required nor advised.

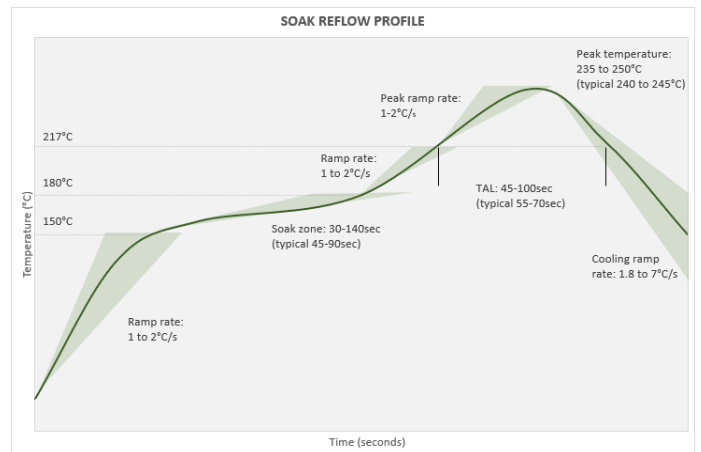
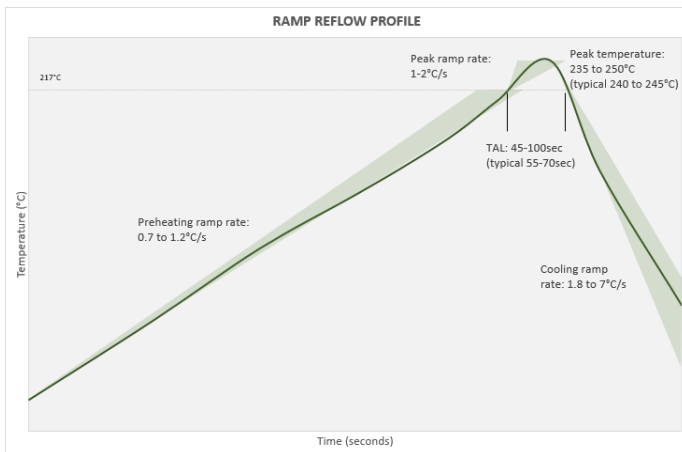
### PRINTING GUIDELINE

Apply the solder paste to the stencil to form a roll of 1 to 2 cm in diameter all along the squeegee or around 100g per 10 cm of squeegee length. This way, the solder paste will roll easily under the squeegees to offer excellent printing quality.

| PARAMETER                                   | REMARK   |
|---|--|
| Printing speed                              | Minimum 20 to maximum 150 mm/s (1 to 6 inch/s)<br>Maximum depends on printer capabilities  |
| Minimum pitch                               | 0.4 mm for Type 3 powder   |
| Pressure                                    | Guideline value for a 250 mm squeegee is 7 Kg at 100 mm/s<br>Actual value depends on equipment, printing speed and squeegee length |
| Stencil life in continuous printing process | >12 hours  |
| Abandon time between prints                 | >2 hours   |
| Steady tackiness                            | >12 hours  |

**REFLOW GUIDELINE**

This paste can be processed under air or nitrogen. Linear preheating ramp rate is recommended, however high-density boards may require a soak zone during preheating to stabilize the temperature over the circuit board before peak reflow.



| REFLOW STEPS                                     | REMARKS  |
|--|--|
| Preheating ramp rate with linear preheating      | 0.7 to 1.2°C/s (33 to 34°F/s) ( according to the circuit board size and density  |
| Preheating steps in case of preheating soak zone | <ul style="list-style-type: none"> <li>From 20 to 150°C (68 to 302°F): ramp rate 1 to 2°C/s (33 to 36°F/s)</li> <li>Soak zone between 150 to 180°C (302 to 356°F): 30-140s reflow (typical soak 45-90s)</li> <li>From 170°C (380°F) to liquidus 1 to 2°C/s (33 to 36°F/s)</li> </ul> |
| Peak ramp rate                                   | 1 to 2 °C/s (33 to 36°F/s)   |
| Peak temperature                                 | 235 to 250°C (455 to 582°F) / 240 to 245°C (464 to 473°F) is optimum<br>The paste can stand a temperature higher than 250°C (482°F), but it is not recommended to preserve component integrity   |
| Time above liquidus                              | 45 to 100s - 55 to 70s typical   |
| Cooling ramp rate                                | 1.8 to 7°C/s (35 to 45°F/s)  |

## CLEANING POST SOLDERING

ECOREL FREE 305-16LVD is a no-clean solder paste, so cleaning is not required to meet IPC standards. The chemistry is specially designed so that any remaining flux residue is chemically inert and will not impact your assembled board or packaging under normal conditions. However, when cleaning is desired or required (e.g. high reliability assembly or to improved conformal coating adhesion), the flux residue can be easily removed with INVENTEC's own formulated flux cleaners.

*Inventec has more than 40 years experience in high-tech cleaning for aqueous and solvent based systems. Our solder materials are aligned with our cleaning solutions, providing you a guaranteed cleaning result with our materials.*

| PROCESS TYPE                        | PCBA DEFLUXING SOLUTIONS                        |
|-------------------------------------|---|
| Manual                              | Quicksolv™ DEF90 EL                             |
| Aqueous system (Immersion or spray) | Promoclean™ DISPER 607                          |
| Co-solvent system                   | Topklean™ EL 20P or EL 20A + HFE bases solvents |
| Mono-solvent (Azeotropic)           | Promosolv™ 70ES                                 |

Other products available, depending on specific customer requirements. Check also our maintenance cleaning solutions.

## PACKAGING, STORAGE & SHELF LIFE

- To ensure the best product performance, the recommended storage temperature range is from 0°C to 10°C.
- For an optimal preservation, store cartridges in a vertical position, tip downwards.
- Shelf-life is 12 months for jar packaging & 9 months for cartridges

### AVAILABLE PACKAGING



JAR  
250g & 500g



CARTRIDGE  
600g & 1200g

## HEALTH, SAFETY & ENVIRONMENT

No issues when used as recommended.

In accordance with the Annex II of Directive 2011/65/UE (RoHS), including its amendments, we certify that this product does not contain quantities above 0.1% of Hg, Pb, Cr VI, PBB, PBDE, DEHP, BBP, DBP, DIBP and above 0.01% of Cd. . INVENTEC PERFORMANCE CHEMICALS also fulfils its direct obligations under the REACH and Conflict Mineral regulations.

Please refer always to the Safety Data Sheet (SDS or MSDS) prior to use. Our SDS can be downloaded at [www.quickfds.com](http://www.quickfds.com). We will request to provide your email address, so we can automatically send you a new version of the SDS when a future update would occur.

## TECHNICAL SUPPORT & FREE-OF-CHARGE TESTING

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Inventec has a worldwide dedicated Technical Support team to help you along the different stages of our cooperation.

Depending on your request, we provide online or onsite support

- to select the right product based on your specific needs
- to assist you in your product qualification process
- to guide you with the initial set up of your process at all your worldwide manufacturing facilities
- to provide fast response on technical issues which could occur at any time during mass production.

When prior cleaning is required, customers are also welcome in our CLEANING CENTERS to see the process in action and to get convinced by our solutions. We cover water- and solvent based processes.

Inventec is unique in the world by developing not only soldering materials but also cleaning and coating solutions. These materials are very closely linked with each other from a process point of view. Talking to our Technical Team, who understands very well these 3 different product groups, will help you greatly to overcome technical challenges within your overall process.

Contact our technical support via [contact@inventec.dehon.com](mailto:contact@inventec.dehon.com) or your local sales representative.

## ABOUT INVENTEC

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Inventec is a global provider of SOLDERING, CLEANING & COATING materials for Electronic, Semiconductor and Industrial applications. For over 40 years we have shown leadership in innovation by putting HEALTH IMPACT, SUSTAINABILITY and RELIABILITY at the core of our product development.

With ISO 9001 & 14001 production sites in France, Switzerland, USA, Mexico, Malaysia and China we can guarantee a smooth and cost-effective supply chain.

We supply to many industries but the excellent performance of our products in applications which demand high reliability, leads us to focus especially on the AUTOMOTIVE, AEROSPACE, SEMICONDUCTOR, ENERGY and MEDICAL industry.

[www.inventec.dehon.com](http://www.inventec.dehon.com)



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This data is based on information that the manufacturer believes to be reliable and offered in good faith. In no event will INVENTEC PERFORMANCE CHEMICALS be responsible for special, incidental and consequential damages. The user is responsible to the Administrative Authorities (regulations for the protection of the Environment) for the conformity of his installation.

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