

# Hands-On, Lead-Free Technology Workshop

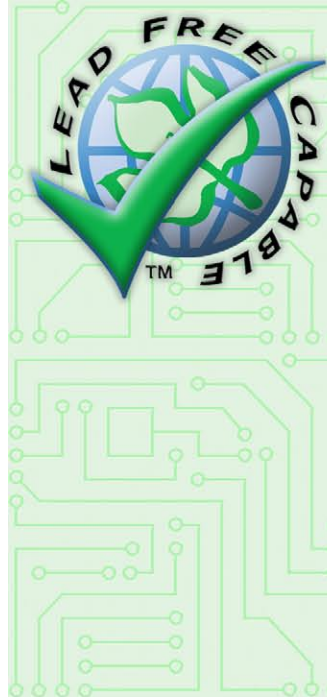
## Lead-Free Technology Seminar Series

Presented by: KIC, Henkel Technologies, Engent, Speedline

The conversion from a leaded process to a lead-free process is not a simple transition. A solid understanding of the alloys, fluxes, board and component finishes, and how they impact the process will be required. Additionally, another critical aspect of converting to lead-free is the shrinking process window caused by the higher solder melting temperatures butting up against the temperature tolerances of the most sensitive components.

This **comprehensive two-day, hands-on training** program will provide participants with a broader knowledge of lead-free materials interactions, and a greater understanding of the process including advantages and limitations. A sample lead-free board manufactured over the two-day course will be produced and taken away by each attendee.

*Engineering and Technical Representatives will be available for one-on-one discussion.*



### Registration Information

**Space is limited, so register today!**

You may register in one of these ways:

**Online:** [Online registration form](#)

**Phone:** +1.858.673.6050  
Option #1, Sales & Ordering

**Fax:** Complete the Registration Form  
and fax to +1.858.673.0085

### Seminar Details:

**Who:** Engineers & Engineering Management

**What:** Lead-free technology workshop

**When:** October 13<sup>TH</sup> & 14<sup>TH</sup>, 2004

**Where:** Engent  
3140 Northwoods Pkwy  
Norcross, GA 30071

**Cost:** \$495/person

### Panel of Industry Experts Include

**Dr. Neil Poole** – Henkel Technologies

- Alloys reliability
- Material interactions
- Surface mount adhesives
- Underfills
- Conformal coatings

**Dr. Daniel Baldwin** – Engent

- Process engineering methods
- Analytical tools
- DOE

**Keith Howell** – Speedline Technologies

- Wave and reflow processes

**Marybeth Allen** – KIC

- Thermal profiling technologies for lead-free applications

### Hands-On Production Floor Training

- Screen printing surface mount adhesives and solder paste, and placement
- Reflow profiling
- Rework
- Inspection/analytical
- Wave

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### Hotel Information

Holiday Inn Select  
Atlanta-Peachtree Corners  
6050 Peachtree Industrial Blvd  
Norcross, GA 30071  
Phone: (770) 448-4400  
Fax: (770) 840-8008  
[Holiday Inn Website](#)

Hilton Atlanta Northeast  
5993 Peachtree Industrial Blvd  
Norcross, GA 30092  
Phone: (770) 447-4747  
Fax: (678) 533-2888  
[Hilton Website](#)

Wingate Inn - Norcross  
5800 Peachtree Industrial Blvd  
Norcross, GA 30071  
Phone: (770) 263-2020  
Fax: (770) 263-2022  
[Wingate Inn Website](#)

### Hotel Reservations:

Attendees are responsible for making their own hotel reservation. To make a reservation, please contact the hotel of your choice by visiting the hotel's web site, or by contacting the hotel via telephone.

### Contact Information

For registration information pertaining to the seminar, please contact:  
KIC Sales, +1.858.673.6050, Option #1

For technical information on the content of these seminars, please contact:  
[Marybeth Allen](#), +1.858.673.6050 x6030  
[Doug Dixon](#), +1.626.968.6511 x275

### Registration Form:

**Fax completed +1.858.673.0085  
form to: Attn: Sales Admin**

Mr.  Ms.  Dr.

First Name

Last Name

Company Affiliation

Job Position

Address

City

State

Zip/Post code

Country

Phone

Fax

E-mail

Payment Method: Course Fee: **\$495.00 per person**

Credit Card

Pre-pay with Company Check

PO # \_\_\_\_\_

A KIC sales administrator will contact you to confirm and finalize your seminar registration, and to provide you with an invoice/receipt.

**Oct 13-14, 2004  
Engent  
Norcross, GA**

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### Presentation Summaries

#### Engent

With the transition to lead-free electronics in many high volume applications (i.e. mobile phones, consumer electronics, etc.), companies are being forced to deal with lead-free solder terminations on commodity components much earlier than their roadmaps mandate lead-free solder implementation. In these circumstances, a number of significant solderability and yield problems can occur in even the most robust processes based on eutectic lead tin solder. In order for companies to implement a complete lead free solder process solution, they must analyze literally thousands of permeations of materials, process variables, reliability factors, design factors, etc.

While there are countless conference papers and consortia reports presenting various aspects of lead-free solder implementation, they represent a seemingly endless and contradictory set of materials and process solutions. Under current cost pressures and limited resources, it makes it prohibitively difficult to wade through, analyze, test, and validate this information. This discussion is geared to provide a discussion of materials and process solutions for lead free-solder including materials selection, materials qualification, materials & process.

#### Henkel

Alloy selection: A wide range of alloys has been investigated with a range of different metals. How has the industry come to choose the SAC alloy and what is it? Patent situation of SAC alloys; reliability data for different alloys and how this compares to Sn63 for different conditions and alloys.

Underfill as a way of improving reliability of array packages; capillary flow underfills and no-flow self-fluxing underfills.

Conformal coatings of lead-free solder products and flux compatibility.

Processing lead-free solder paste practical considerations: What's the same and what's different? Printing lead-free solder paste; reflow of lead-free solder paste; comparison of solder pastes. Profile challenges, joint inspection and defects.

Lead-free wave soldering and alloy options: Process considerations, limitations, and defects; lead-free requirements on surface mount adhesives.

#### Speedline

Lead-free solder alloys behave differently than traditional tin/lead alloys. This results in process differences and concerns when implementing lead-free alloys. Equipment considerations for reflow soldering and wave soldering will be presented. This includes power consumption and flux extraction considerations for the reflow oven and selecting a lead-free machine configuration for the lead-free wave solder process.

#### KIC

KIC will outline the impact that lead-free production has on the reflow process. The combination of lead-free solder alloys' higher melting temperature and lead-free components' peak temperature limitations contribute to a significantly smaller process window. The presentation will review the required methods for oven setup and process development to accommodate the narrow process window. Additionally, it will discuss the root causes for the most common reflow defects and provide application related "tips" to eliminate those thermally related defects. Finally, KIC will briefly outline recommended process control capabilities to maintain a high yield lead-free production.



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### Speakers

#### **Daniel F. Baldwin, Ph.D.**

Ph.D. and S.M., Mechanical Engineering: M.I.T.

B.S.E, Mechanical Engineering, Arizona State University

Dr. Baldwin has been a leading expert in the Microelectronics Packaging industry for eight years. He was pursued and hired by Siemens to synthesize, construct, and run the Advanced Assembly Technology Division of Siemens Dematic serving as the Director and promoted to the Vice President of the Division.

Dr. Baldwin joined Siemens Dematic from the Georgia Institute of Technology where he served as a Professor of Mechanical Engineering, with specialization in MEMS/MOEMS Packaging, Electronics Packaging, Electronics Manufacturing and Board Assembly since 1995. Dr. Baldwin managed large technology development programs at Georgia Tech with over 50 employees. During his tenure at Georgia Tech he raised over \$10M in capital funding and constructing a \$10M state of the art electronics manufacturing and MEMS/MOEMS packaging development facility. He received his Master of Science and his Doctoral degrees in Mechanical Engineering from Massachusetts Institute of Technology (MIT), and has over 250 published or delivered articles, scholarly papers, keynote addresses, conference proceedings, and textbooks. These include many specialized topics in low cost flip chip assembly, MEMS/MOEMS packaging, failure analysis, and advanced surface mount processing.



#### **Neil Poole, Henkel Technologies**

Born in England, Neil graduated from Edinburgh University with a first class honors B.Sc. in Chemistry. He followed this with a Ph.D. in Catalytic chemistry also at Edinburgh. His first industrial experience was as a Vibrational Spectroscopist working on infra red spectroscopy technique development for filled polymers and catalysts for ICI Plastics and Petrochemicals. A stint in product development followed at ICI films working on surface modification of PET (Mylar) film. From here, Neil moved to BP Chemicals where he was responsible for the technical support of their \$100M glycolether solvent business. During this time amongst other things he worked on CFC replacements in conjunction with Multicore Solders. Finally moving to Multicore to work on product development including water soluble and lead free solder pastes. Following the purchase of Multicore Neil moved to applications engineering supporting all Henkel's electronic products.



#### **Keith Howell, Speedline Technologies**

Keith has over 20 years experience in product development, manufacturing and marketing of capital equipment, with the last 12 in the electronics industry. He was previously Director of Speedline Electrovert's wave solder products and is now responsible for Electrovert's cleaning and wave solder products. He holds a bachelor's degree in Mechanical Engineering from the University of Illinois and a MBA from the University of Rochester.



#### **Marybeth (MB) Allen, KIC**

As the National Sales Manager for KIC, Marybeth Allen's expertise lies within the management of the thermal process. She has twenty years of experience in the electronics assembly industry covering surface mount, thick film and packaging. Traveling throughout North America she has the opportunity to work with varied EMSs and OEMs with commercial, medical and military products. As Project Manager she works with manufacturers of equipment and materials for board and package assembly for thermal processes. Marybeth is in charge of KIC's Partner Program. She is a past chapter president of SMTA & IMAPS and has authored various industry papers.



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