

WELCOME TO OUR SECOND ELECTRONIC NEWSLETTER

This time we inform you of upcoming events, especially our attendance at the Nepcon Electronics Show, with participation in the Process Technology Seminars and our 'SMART Group Lead-Free Experience2'. The exhibition in Brighton is not to be missed. • In November we have our 6th major biennial SMART Group European Conference, 2½ days networking, major workshops, two keynote presentations and our Gala Dinner. • We have included reports on past events, we thank all attendees for your support. • Are you on smart-e-link? We give some examples of recent questions posed by members. • Finally, Congratulations & Happy Birthday to Colin Lea, the key person who drives our European Conference and is responsible for the European conference programme. If you have any comments or views on this newsletter please contact: press@smartgroup.org



The SMART Group Lead-Free Experience2

SMART Group has been running regular lead-free events for many years, culminating in the Nepcon Electronics/SMART Group Lead-Free Experience at last year's show. For the first time this 'show within a show' provided real hands on solutions for visitors. With July 2006 approaching rapidly, the demand was high for SMART Group to repeat this successful event. Lead-Free Experience2 will allow visitors to see and use production equipment using lead-free alternative alloys, featuring surface mount and through hole terminations. You can witness the many issues facing our industry and how to resolve them. (Bookings through the SMART Group office). Visit the SMART Group Stand U408 & U500 leadfree@smartgroup.org



Is there only one Colin Lea?
See page 2.



SMART at Nepcon Electronics 2004

At Nepcon SMART Group is located with a booth, organising the SMART Group Lead-Free Experience2 and contributing to the Process Technology Seminars.

SMART Group European Conference 2004

Special Pb-free emphasis

16-18 November 2004

SMART Group helps you tame the lead-free monster!
An A-Z of lead-free production, quality and reliability all at this single event... BE THERE !

SMART GROUP IRELAND LEAD-FREE USERS GROUP

SMART Group Ireland are developing a lead-free Users Group concentrating on issues directly affecting Irish electronics manufacturing companies. This Users Group will provide LF information to members and promote the development of a community of active contributors and participants that freely discuss the issues arising from the July 2006 deadline. A web site is in development that will act as a portal to distribute information relating to legislation, Lead-Free information and supplier contacts specific to the Irish market. Informal regional meetings will allow members to meet and discuss issues with their engineering counterparts in other companies.

For further information contact, Katherine Barry, SMART Group Ireland Administrator (Tel: 021 4904025 email: kbarry@nmrc.ie) or Moss Dore, Project Coordinator (Tel: 087 2765770 email: emtc@eircom.net)



'Lead-Free Joint Reliability & Structural Integrity'

In March SMART Group hosted a workshop at the Berrill Lecture Theatre located within the Open University in Milton Keynes. Reliability in performance of electronic equipment, in the face of demands for continuing miniaturisation and the anticipated abolition of lead-containing solders, represents a major challenge. The involvement of numerous disciplines; such as electrical, electronic, mechanical, manufacturing, and materials engineering together with physicists and computer specialists, adds to the complexity of the situation.

Nevertheless, with electronics being the World's largest industrial sector; the potential rewards to the winners are substantial. This event focused on the solder joint, its reliability and a comparison between tin/lead and lead-free alloys. The speakers included Bob Willis, Bill Plumbridge, Angus Westwater & Ray Matela.



NPL Honour's SMART Group Committee Member

Colin Lea, A scientist at National Physical Laboratory was recently honoured with a celebration of his 60th birthday and 33 years achievement at NPL. Colleagues and friends from NPL, DTI, SMART Group and UK industry gathered in the NPL Globe Room. The author of a standard industry text, 'A Scientific Guide to Surface Mount Technology' and a second best seller 'After CFCS? Option for Cleaning Electronics Assembly', he has received many accolades and awards worldwide. In early 1979 he was awarded The Metals Society Prize, in 1995 the first recipient of the ISHM UK Award for Professional Achievement. But the most important was the award of the OBE in the 1994 New Year Honours List for his work on CFC elimination. In America he received the prestigious 1991 EPA (Environmental Protection Agency) Stratospheric Ozone Protection Award and in 1997 the EPA Best of the Best Award on the 10th anniversary of the Montreal Protocol. More recently his work was recognized by the United Nations Environmental Programme.

smart-e-link

smart-e-link is a production engineer's dream, an immediate channel to answer your production challenges TODAY. Get online and your questions will be answered or search the archives on our website.

Here are some recent questions:

Q. Is there an industry standard formula for calculating the volume of solder paste prior to reflow? I am trying to estimate potential paste usage for a range of products, but at the moment estimates bear little relation to reality! Any help would be very much appreciated.

Q. Does anyone have links to any papers, or know of work currently being done, which has evaluated the reliability of the new 'Pb-free component terminations when used with SnPb solders? I am particularly interested in joint performance at -40 deg C and +125 deg C.

Q. Is there anyone out there placing Flip Chips (of any size/pitch) in anger and willing to

share information? I'm looking for hints and tips about process problems, do's, don'ts, failure modes and general recommendations, also any information regarding fluxing vs adhesive attach.

Q. Does anybody know of an off-the-shelf test PCB for defining optimum pad sizes for AOI? Something that starts with a given X x Y and increments gradually. Are there any general rules of thumb for AOI friendly pad design that people are willing to share?

Q. There has been a lot of discussion and preference given to Immersion Tin as a PCB finish within a lead-free process and I would be very interested to hear from anyone who has practical experience in this area with regards to implementation and pitfalls. I am also currently investigating the potential for using Immersion Gold, Tin 97%/Copper 3% solder levelled, Gold over Nickel Board finishes with lead-free and would be grateful of any feedback.



PRINTED CIRCUIT BOARDS-SPECIFICATION / PROCUREMENT REQUIREMENT WORKSHOP & FACTORY TOUR

On Wednesday 18th February SMART Group organized this practical workshop for process/quality engineers, purchasing staff and development engineers to help them define the key issues for modern printed board manufacture and procurement. Printed boards are the key building block of modern electronics and it's important to understand the specification issues and the most common failure modes and how to avoid them. The workshop showed practical issues and what can be done on site to evaluate printed circuit boards to avoid process defects occurring in manufacture.

The venue was printed circuit board equipment manufacturer CEMCO, based in Waterlooville, Hampshire, who also kindly arranged a tour of their facility. Manufacturers of Cleaning, Process Handling, Solder and Test Systems, CEMCO are globally known for their Hot Air Solder Levelling Machines.

The speakers included: Dennis Price - Merlin, Peter Starkey - Starkey Technical Services, Philip Stolten - EMSNow, Bob Willis - EPS & SMART Group Technical Director.



SMART Group 6th Annual Lead-Free Seminar & Table-Top Exhibition



Steven Andrews - DTI
Martin Allison - Senju Manufacturing (Europe)
Kay Nimmo - Soldertec
Mary Gregory - A & D Automation
Bob Willis - EPS / SMART.

A record attendance, on Tuesday 3rd February 2004, sold-out seven days prior to event, exceptional response from delegates: "The best Pb-free event attended", interesting survey results compiled on the day, DTI announced visit to USA, still lack of action-delegate asks for government tax assistance. SMART Group would like to thank all members for their tremendous support and also our speakers:

Chris Hunt - NPL
Steve Brown - Cookson Electronics
Mike Fenner - Indium
Angus Westwater of Rohm Electronics

Survey

A survey was conducted during the day and most delegates are still conducting investigations, low numbers had actually built demo or test boards, or selected the lead-free alloy, (although most expect it to be Tin/Silver/Copper). Clearly help and advice is still needed, including a help desk, hands-on experience and regular lead-free forums. Nick Jolly (DTI) asked twice during the day, what was needed to get industry moving?

The only positive response was for Government to give some financial help, by way of tax benefits, especially in the first year of the changeover from processing with lead solders to lead-free.

Survey results can be seen on: www.smartgroup.org/leadfree2004/lfreesurvey2004.pdf



ELECTRONICS MANUFACTURING COMPETING IN A GLOBAL ECONOMY

April 1st saw this subject covered at ISLI, Alba Centre on the Alba Campus in Livingston, Scotland.

Speakers included:

Moore Allison - 6 Sigma Scotland
Peter Grundy - PG Engineering
Pete Collins - JTAG Technologies
Stewart McCracken - Materials Consultancy Services
Joe O'Neill - Plexus
Willie Henderson - Motorola GSG
Bob Willis - EPS / SMART

DIARY 2004

6-7 May

SMART Ireland Lead-Free Seminar;
Golf/Shooting (7th).
Shannon Ireland.

26-27 May

Nepcon Electronics -
Process Technology Seminars
Nepcon Electronics - SMART Group
Hands-On Lead-Free Experience2
SMART Booth U408 & U500
Brighton

8 July

SMART Ireland AOI Day
Kostal, Mallow

9 September

3rd SMART Ireland Lead-Free Seminar
& Table Top Exhibition
Dublin - Ireland

16-18 November

SMART Group European Conference
Brighton

2 December

SMART Ireland Photonics /
Nanotechnology Seminar
Cork

7 December

SMART Group Advanced Reliability and Test
Techniques for Lead-Free Assemblies

Upcoming Event

SMART Lead-Free Seminar Table-Top Exhibition

Great Southern Hotel, Shannon, Ireland

Thursday, 6th May 2004 - 9.30am - 4.00pm

Welcome by Philip O'Rourke, Chairman, SMART Group Ireland

- 1) **'The Impact of the WEEE and RoHS directives on Irish Industry'**
Padraig Kelly, Dundalk Institute of Technology.
- How prepared is Irish Industry for the forthcoming legislation?
- What will be the direct and indirect cost of both directives on Irish Industry?
- How will Irish industry absorb these costs?
- What can Irish industry do to better equip itself for the forthcoming legislation?
- 2) **'Finding your Lead-free solder paste: a difficult task?'**
Serge Tuerlings, Market Development Manager, Kester Europe.
One of the challenges being faced by the electronics industry is to choose a lead-free solder paste that will take its user over the lead-free hurdle without any hassle. But what does the ideal lead-free solder paste look like? What should it do, or not do? What are the performances we can expect? How can it be found? Looking at flux classification, test set up, solder paste comparison criteria, acceptance levels.
- 3) **'An Overview of Lead-Free Reliability Testing'**
Bryan Rodgers, Senior Research Engineer, Stokes Research Institute.
Tin-Silver-Copper (SnAgCu) alloys are the primary lead-free replacement candidate for traditional Tin-Lead (SnPb) solders in electronics manufacturing. Results from a range of reliability tests on SnAgCu micro-BGA assemblies are presented. These include accelerated temperature cycling (ATC), impact and shock stimuli, and mechanical fatigue tests. Detailed investigation of the crack propagation was carried out after ATC and impact testing.
- 4) **'Environmentally Superior Products (ESP) - a business and environmental success story'**
Dorothy Maxwell, Senior Environmental Specialist, Environment Policy Department, Enterprise Ireland.
- Key drivers (legal, market and financial) for electronics producers to incorporate environment into the design and development of products and services.
- Introduction to the Enterprise Ireland ESP initiative supporting Irish industry exploit the business and environmental benefits of ecodesign.
- Ecodesign examples from Irish electronics producers.
- 5) **'Lead-free in a Weekend'**
Des Tiernan, Process Engineer, RyuSyo Ltd.
The story of RyuSyo Europe's conversion to lead-free, from conception to reality. This presentation will cover the planning, preparation, practicalities and follow-up monitoring required to comply with EU regulations.
- 6) **'Status Update of Lead-Free Manufacturing in Japan & the movement to Lead-free in Mainland Europe'**
Martin Allison - Senju Manufacturing (Europe) Note: This is an additional paper.
- 7) **'Discussion Forum'**