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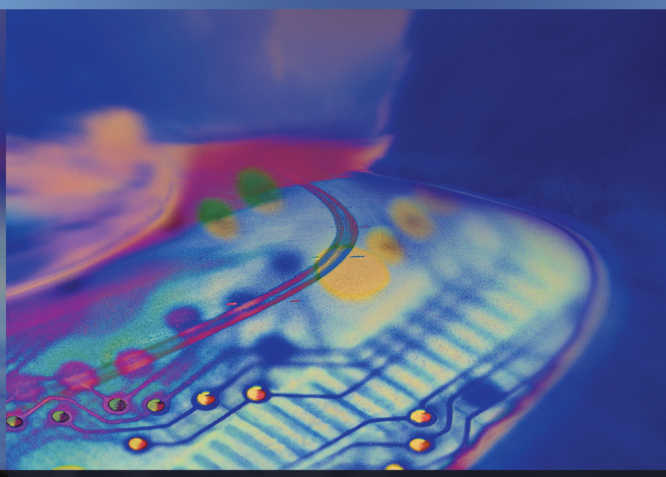
"Woman Owned Small Business"

Volume 7, Issue 3

April 2008



inside this issue:

Dave's World

Over the past couple of years, I've mentioned my thoughts on the requirements for lead free solder. (If you want to look it up, start with the key words: politicians & alcohol.) But like the rest of the world (except for the countries that smile and ignore it), we've had to go along with it and I thought we were pretty much there with most of the lead-free discussions switching from processes to reliability issues.

Here at STI we have developed processes for many companies and trained hundreds of individuals and we have invested a lot of money in our own lab making it fully capable of manufacturing lead free products. With this in mind, I was a little surprised when I did a little research recently into the products our customers are purchasing. First, let me say this is not a scientific study and the margin for error could be very large. This is based strictly on sales by our distribution department. We probably do a larger than average amount of business with government contractors which will skew the lead free numbers downward. However, unless you are someone who doesn't pay your bills, we try not to turn down any business and we try to sell lead free products just as much as any other. We are a distributor for Kester so we carry a full line of solder products. Now for the results. In the past 12 months, 99.3% or our solder paste sales were for leaded products, 96.7% of our bar solder sales contained lead, and 79.7% of our wire solder sales contained the dreaded metal. Even with our training kits, which are used by government and commercial customers all over the world, tin/lead kits are 87.8% of our sales. As I mentioned, our lab is set up to build prototypes and small volumes with lead free but the majority of our lead free work consists of taking lead free BGA's and removing the balls and replacing them with tin/lead balls. Honestly, this isn't where I expected us to be at this point in time. Maybe we are an exception and everyone outside of our little corner of the world has switched without us but I was surprised by those numbers.

Construction on our new building continues and it is amazing the amount of dirt that has been moved during this project. We now have "Mount STI" which could be Madison's 2nd highest peak. Last month we had a weather forecast for snow and we were trying to come up with ways to get tow ropes over the top of Mt. STI to have Madison's only ski slope. We didn't get it figured out in time and the snow fall amounted to millimeters (possibly nanometers) instead of inches but it seemed like a good idea at the time.

Congratulations to our Training Department which recently was awarded the contract to write the lesson plan for IPC's newly revised IPC-7711B/7721B. That program should be completed this summer and will be our 5th IPC lesson plan to write. Congratulations also to Randy Baumgarden and James Nicholson who each celebrated major milestones at STI recently. Randy celebrated his 20th Anniversary at STI. He is the only person remaining at STI (not named Raby) to have made the move from California in 1993. (We congratulate each other frequently on that decision to move.) Randy has done most jobs at STI and currently is the buyer for our lab along with whatever else needs to be done that day. In addition to the other gifts for his anniversary, Randy will have his own parking place at the new building. James celebrated his 10th Anniversary at STI and much like Randy, has done and continues to do many jobs here. His actual title is Warehouse Manager. Every company that's been around for any length of time has a person or two that gets the call whenever something odd happens because everybody knows they'll take care of it the right way. Randy and James are who we call.

You've read in my previous ramblings that I travel a good bit but I have always managed to be home for birthdays, wedding anniversary (12 in a row!), and other important occasions. You've also heard that bad things seem to happen in 3's. Over the next few months, I'm going to be missing my wedding anniversary (China), Mother's Day (Scotland), and Father's Day (Alaska). At least Delta Air Lines still loves me.

Please let us know how we can serve you better. And that can even be lead free related!

David E. Raby

President/CEO
draby@stielectronicsinc.com

David Raby presents Randy Baumgarden with a cruise for 20 Years of service. Joining in on the celebration are his wife Lynette, daughter Tanya, and son Tim.

David Raby presents James Nicholosn with a cruise for 10 Years of service. Joining in on the celebration are his wife Becky, and daughters Brianna and Jasmine.

Training Services 2008: Schedule

Madison Alabama

IPC OFFICIAL CERTIFICATION CENTER
ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES®

Ann Duncan
Training Coordinator

May

• May 12-15	IPC-A-610 CIT Certification
• May 19-23	IPC J-STD-001 CIT Certification
• May 28-29	IPC Rework/Repair and Modification CIT Certification

June

• June 02-03	IPC-A-610 CIT Recertification
• June 04-05	IPC J-STD-001 CIT Recertification
• June 06	J-STD-001DS Update, Space Application Addendum to J-STD-001D
• June 09-13	IPC Rework/Repair and Modification CIT Certification
• June 16-19	IPC-WHMA-A-620 CIT Certification
• June 23-27	J-STD-001 Certified IPC Specialist (CIS)

July

• July 07-10	IPC-A-610 CIT Certification
• July 14-18	IPC J-STD-001 CIT Certification
• July 21-22	IPC Rework/Repair and Modification CIT Recertification
• July 23-24	IPC/WHMA-A-620 CIT Recertification
• July 28-30	IPC-A-610 CIS Certification

To register for a course or for additional information go to www.stielectronicsinc.com or e-mail us at training@stielectronicsinc.com.

Training Services: Lead Free Courses

By: Dan Foster, Director of Training Services

Dan Foster

Lead Free has been and continues to be the topic of discussion in more and more companies. If you've never used it before it can be a challenge. What solder or flux should I use? What temperature do I need? Do I need new equipment? These are just a few of the questions people are asking. STI Training Services can help. We have several hands on courses that you can choose from for the answers to your question. We have instructor and operator courses to pick from. We have Basic Lead Free Soldering Courses and IPC Courses that will fit any company's needs. Any of these courses can be conducted at your facility or ours. I look forward to seeing you in class.

If you have any questions please do not hesitate to e-mail me at dfoster@stielectronicsinc.com or call me at 256-705-5527.

Engineering Services: Lead-Free and Failure Analysis

By Marietta Lemieux, Analytical Lab Manager

Marietta Lemieux

The transition towards ROHS/WEEE compatible materials in the electronics assembly industry also has had a widespread impact on the analytical/failure analysis part of the industry. With the introduction of Pb-free PCB finishes (e.g. immersion silver, immersion tin, Pb-free HASL, ENIG and OSP) and Pb-free solder alloys (e.g. SAC305, eutectic Sn/Cu, Sn100 nickel based alloy), and the use of the various combinations thereof in the assembly process, has presented the analytical field with a whole new set of challenges. Some of these challenges include, but are not limited to, the following:

- Black pad (ENIG)
- Thin immersion gold and nickel oxidation (ENIG)
- Thin immersion silver
- Thin immersion tin
- Component wetting issues
- Nickel bath contamination
- Issues relating to exposure to higher reflow temperatures
- Cross-contamination by the accidental use of leaded chemistries mixed with lead-free materials
- Problems related to the reduced shelf life of the Pb-free finishes (IAg, ISn)

Fortunately, STI's Analytical Lab is fully equipped to handle any of the above-mentioned issues. With our knowledgeable staff and state of the art equipment, we can tackle any of the issues that may come our way, Pb-free related or otherwise. A few of the services STI's analytical lab has to offer are the following:

- Scanning Electron Microscopy (SEM)
- Energy Dispersive Spectroscopy (EDS elemental analysis)
- XRF (plating thickness measurements)
- Real-time x-ray (BGA analysis, voiding, ball collapse)
- FTIR (organic contamination analysis)
- Micro-sectional analysis
- Wetting balance testing
- Ion Chromatography (cleanliness testing)
- Accelerated life testing (thermal shock, thermal cycling, vibration)
- SIR testing

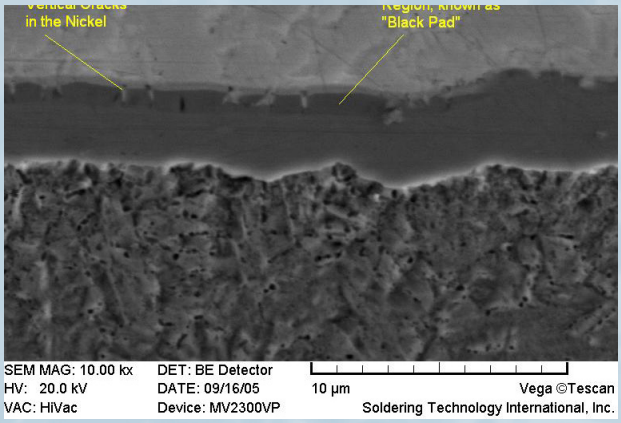


Figure 1 – SEM image of nickel surface showing black pad as seen in microsection

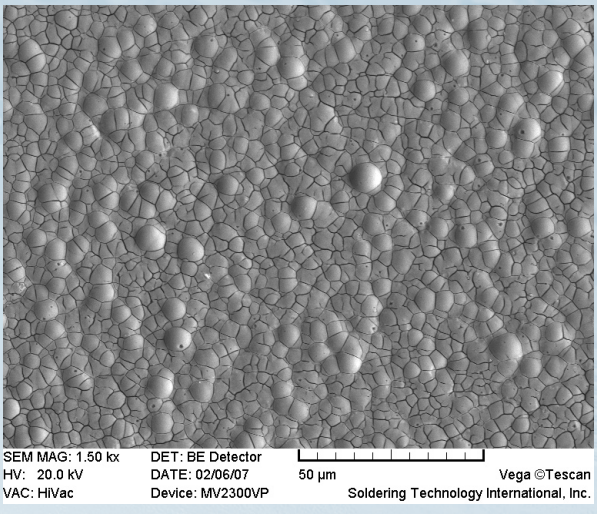


Figure 2 – SEM image of nickel surface showing mud-cracking; indicative of black pad

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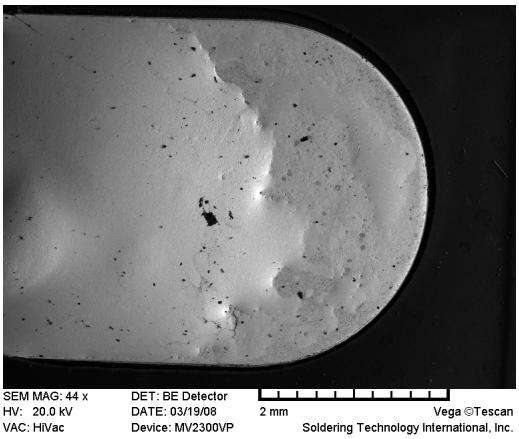


Figure 3 SEM image of wetting issue
IAg plated PCB

Should you have any questions or need assistance with any of your failure analysis needs, please contact me at mlemieux@stielectronicsinc.com or (256) 705-5531.

To receive future issues of STI's newsletter electronically, please go to www.stielectronicsinc.com.

NEW CATALOG COMING SOON!

Sales & Distribution: Feature JBC Dual Control Unit and Desoldering Station Kit

By Sissie Eckstein, Sales Manager

Sissie Eckstein

Dual Control Unit
DD5700

- Nominal power: 75 + 75W
- Total peak power: 2 x 125W
- Temperature selection between 200-752° F/100-400° C

Featuring a digital readout for precise temperature and tool control, this dual control unit allows you to operate 2 tools simultaneously, with the handpiece left in the stand automatically kept at sleep temperature. Nominal soldering iron power is 20 or 50W.

The Kit Includes: DD5700 Digital Control Unit, 2245 handpiece, PA1200 MicroTweezer, AD8245 Stand, PA8110 Stand, (1) 2245-003 Tip, (2) 1200-002 Tweezer tips.

Desoldering Station Kit
DD 5700

The complete solution for fast, safe circuit repair. Features handpiece sleep mode for fast temperature recovery, and a small, portable design. The station allows for easy connection of any Advanced Series tool in both outputs.

The Kit Includes: DD5700 Control Unit, MS9014 Desolder Pump, DR5650 Desolder Handpiece and AD8500 Stand, 2245 Solder Handpiece and AS8245 Stand, (1) 2245-003 Solder Tip, and (2) 5600-013 Desolder Tip.

3M Get Lead-Free and ROHS Compliant!

Use Pb-Free RoHS labels for proper identification.

Use green mats for Lead-Free work areas.

Mark Lead-Free work areas with Aisle Tape.

Training Materials: Lead Free Sphere Replacement

By Mel Parrish, Director of Training Materials

Mel Parrish

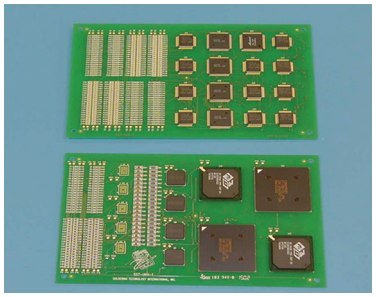
Due to limited availability of components with SnPb spheres, it's a reality today that some functional designs may require the sphere replacement of the BGA component to allow common processing with tin lead production assemblies. This practice, while commonly employed, has drawbacks due to the additional thermal cycles required for sphere removal and subsequent replacement. Additionally, the resulting interface alloy at the component to sphere attachment may not achieve the desired or expected eutectic properties due to the residual Lead Free alloy. The process however does allow the use of limited component types to comply with tin lead use strategies for performance, contract mandates, and/or compatibility with legacy or production designs that are susceptible to the additional temperature excursion required for lead free production processes.

In effect, the BGA package receives a similar treatment to pretinning of leaded component with a Tin Lead alloy solder. The sphere replacement process can avoid paste alloy, PCB surface finish, and component finish compatibility issues that can be very complex to balance for successful production results.

Reballing of BGA components involves removal of the original spheres with a localized heat source such as a vacuum desoldering tool, blade tip or solder wick. The component surface is then cleaned and prepared for attachment of new spheres that are located with a fixture like the STI BGA Reballer which aligns to the original pattern of the component. The spheres are then attached to the component using a typical rework heat source such as a convection reflow oven, or the STI fixture with the component and replacement spheres can be placed in a reflow oven. In either case, the heat source must be controlled using a thermal profile appropriate for the component and new sphere alloy. Once the spheres are attached, the BGA package is removed from the fixture and the spheres can be examined and cleaned in preparation for installation and soldering with the remainder of the assembly components. As with all BGA component processes, thermal ramp rates, moisture and ESD sensitivity must be considered. Solder Spheres are available from STI in a wide range of solder alloys and dimension but they must be selected for compatibility with other process elements such as the board surface plating and solder paste. It is also critical to maintain the component design spacing and pitch through proper sphere size and placement. Sphere replacement should only be employed after considering all of the available options. If available, it would be better to source components with the correct alloy rather that to replace the spheres with another alloy.

Additional detailed procedures for BGA Reballing are available in IPC-7711/21B, "Rework, Modification and Repair of Electronic Assemblies".

Feature Kit of the Month: STI Fine Pitch Kit



This kit contains an array of BGA as well as QFP components. It's a great way to evaluate production capability and is available in either Lead Free or Tin Lead versions (without Sphere Replacement). The alloy options could even be mixed if that would be desirable. Mention the article and receive a 10% discount on the Fine Pitch Kit during this publication month.

Surplus Inventory Sale

STI Electronics, as one of the largest distributors of electronic assembly and solder supplies, occasionally has overstock on some items. We have created a surplus inventory list with prices drastically reduced. The surplus inventory list is available at our website, www.stielectronicsinc.com, and is updated monthly. Please call (256) 705-5545 and ask for Sales or (800) 858-0604. Quantities are limited so don't delay.

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Phone: (256) 461-9191
Fax: (256) 461-9566

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STI is a Resource for Training Services, Training Materials, Engineering Services, and Product Distribution.
Visit www.stielectronicsinc.com

Jim's Corner

By: Jim D. Raby, PE, Technical Director

It was 1979, and several people at an IPC meeting were sitting in a lobby of the convention center talking about trivial things regarding the use of solder when one party asked the group what was the thought about "lead-free" solder alloys. That was an interesting question since none of us had had a thought on the subject. This person told of a brief article about the government planning to ban lead from our holy Sn/Pb that we were so accustomed to. Of course we each had harsh words for the subject and decided that it would never really happen. The next year I was invited to Washington, DC to participate in a congressional hearing on the use of lead in the electronics industry.

The meeting started out with older and wiser congressmen talking about children eating/chewing on paint chips from New Jersey apartment buildings and ending up with blood poisoning from lead in the paint chips. Since this was before a sophisticated group and my first encounter with this type of people, I chose not to ask any questions about the stupidity of one eating paint chips. Instead the group that I was in sat for a full day listening to unbelievable stories and rationale for the decisions that these people had already made.

My first opportunity to speak came on the second day when one of the congressional committee members cleared his throat and stated, "Mr. Raby, since you are considered to be an expert in the field of soldering, doesn't solder contain lead?" I responded that it did. He then asked me to tell why lead was in solder. I was given about three minutes before he cut me off and asked why we didn't just eliminate the use lead in solder alloys? By this time I had decided that nothing was being accomplished from our team or that of the committee's and asked if I could speak for five minutes. I was reluctantly given the five minutes.

I began my discussion with a question. "Mr. Congressman, do you and your wife have a remote control for a garage door, or television, and do you also have a nice collection of pewter and crystal in your dining room?" He stated, "Mr. Raby, I do not see what that has to do with the subject, but yes, we do have remotes and my wife has a very fine collection of crystal and pewter." I asked if the crystal had a blue tinge to it and he answered that the finest crystal had a blue tinge. Now that my path was clear, I stated, "Mr. Congressman, your fine crystal and your remotes contain lead and the blue in the fine crystal is lead. Do you propose to tell your wife that she can no longer have these items?" The meeting was over and we were dismissed. I was never invited back again. Didn't accomplish anything but it was fun.

We have several examples where the use of lead in pewter mugs stunted the growth of and scrambled the brain of persons of wealth in the old country but that is a subject for another article. I have studied the subject of lead free for a long time and the problem is real. I do not know however why it affects the electronics industry other than products possibly ending up in a land fill somewhere. What are your thoughts on this subject?

Jim D. Raby