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sti electronics

NEWSLETTER

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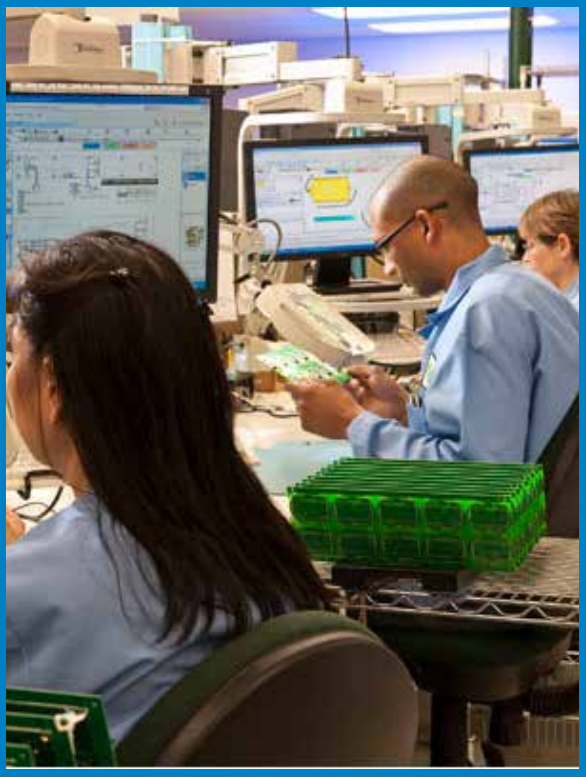

Dave's World

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By: David Raby

May, 2019

As always, the first quarter is always a busy time. I'm trying to think of what time isn't busy but first quarter seems to be particularly so. Business is good. (My job description says it can always be better.)

We started out probably like most of you, recovering from the holidays and getting the momentum rolling again. Then came APEX in San Diego which is the best place (in North America anyway) to see what's new in the industry and to catch up with industry friends. This year's version did not disappoint and is hopefully a good sign for all of us for 2019. APEX is also important for STI because of all of the IPC Committee meetings that happen during the week (and preceding weekend). Those committee meetings determine how many of us will do our jobs, train our people, and build our products in the future. Be assured, STI is well represented in those meetings. JB Straubel, CTO and co-founder of Tesla, gave an interesting keynote describing many of the technological jumps Tesla has had to make to get their cars on the road. He used one of my favorite quotes (from Oren Harari) which is "The electric light did not come from the continuous improvement of candles." You'll hear me talking often about improving what we are doing and we should always be doing that. But to make big advances, sometimes we have to stop the incremental advances and do something a completely different way. STI is a believer and practicer of this concept. Outside the conference center, life was exciting as there were free scooters to use for getting around in the Gaslamp area of San Diego. I don't know of any major injuries but there are some good stories. After being home for a week, it was off to Lihue, Hawaii for the Pan Pacific Conference. As usual, some of our industry leaders presented their thoughts on research that has been done and where technology is headed in the future. The quality of the people and presentations at this conference make it one of the most important of the year. The location doesn't hurt although this year the weather was horrible much of the week. A funny thing from this year's conference was that in the midst of all the technical presentations, we listened to a local Community College professor who spoke about how long before the technology we have today, people sailed thousands of miles across the Pacific and somehow found/discovered the Hawaiian Islands. The presentation was completely out of context with the rest of the program but it did generate a lot of thought and discussion. While I

was away in Lihue, STI was going through probably our most rigorous audit yet and passed with flying colors (and a couple of minor findings). Chris Cosgray and his quality team have done a great job of getting our processes in place and making sure they are followed. Our manufacturing is a much different and better operation now than it has ever been. Speaking of our manufacturing and its continuous improvements, we received our biggest honor and surprise when Circuits Assembly Magazine chose STI Electronics as its EMS Company of the Year. A few things to note regarding that award is we did not apply for it. We did not enter a competition or fill out an application. It was a complete surprise. I think it is also the first big award we have won that didn't include the words "small business" in the title. This was something we were chosen for among all size companies. Mike Buetow, Circuits Assembly's Editor-in-Chief, wrote a very kind article about us. I learned of the award the day the article came out. Thanks Mike! What the award emphasizes to me is the quality of the people we have here at STI and the things we can accomplish if we can all go together in the same direction. Our goal is not to win awards but to do all the right things to make our customers successful (and attract new customers) and that's something we work towards every day. Accolades can happen randomly if we are doing things right.

We've added several new employees already this year scattered among our departments. I always like the new energy and talents they bring to our team. We are working on a couple of exciting projects that I can't speak of yet (although one is very close and some of you may have seen at APEX). These projects are not improving candles but inventing light bulbs and are designed to keep us moving forward as opposed to just doing the same things we've always done although we intend on continuing to do those things too (just better).

I hope your year is off to an equally good start and I look forward to crossing paths with you in the near future. Thank you for your continued support!

PS. I'm scheduled for my quarterly blood test next week to hopefully re-confirm all the good news I've had since my surgery. Please remember to get your tests done.

2018 EMS Company of the Year

sti electronics inc.

CIRCUITS ASSEMBLY magazine bestows the award annually on an EMS company that has demonstrated and sustained excellence among their peers over a period of years.

STI Electronics, Inc. is a full service EMS provider of Flexible/Rigid Flex and Rigid PCB assemblies with special emphasis on High density and RF assemblies as well as safety/ human critical design objectives. Most of our military business is focused on our war fighter having critical electronic advantages on the battle field which is used tactically to their advantage.

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MIXING POLYMERIC MATERIALS

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One of STI's training courses offered is the NASA STANDARD 8739.1 Workmanship Standard for Polymeric Application. During this course, students not only review requirements and acceptability for the use of polymeric materials, but also complete a hands-on exercise that includes mixing and applying polymeric materials for the staking of electronic components.

Before application or reapplication of the polymeric materials the materials must be completely homogenous without bubbles. Mixing by hand is a tiring and time-consuming task. Much like the mixing of solder paste before use on a solder stencil. Hand mixing can also result in a lumpy, bubbled mix (pic: Hand Mixed).

2 Compund

STI has begun the use of the Thinky ARE-310 – Plantetary centrifugal mixer. This table top unit weighs in at about 21 kg (46.3 lbs) and is 390 mm high by 300mm wide by 340mm deep (15.35 in high by 11.81in wide by 13.39in deep). User controls are set into a wide panel at the top, front of the machine for easy access. With 10 programmable memories (each of which may have up to 5 steps for continuous running), the most common mixing recipes are a button push away. The ARE-310 can handle total max volumes of up to 310g (10.93 oz) in either standard solder paste storage containers or, with adapters, can prepare syringes of paste, or plastic cups for smaller batch mixing procedures such as board repair.

Set up is simple.

For solder paste, simply remove the solder paste from refrigeration following the manufacturer's recommended procedures. Place the closed solder paste container into the angled, multi-axis centrifuge fixture & set the

counter balance to offset the weight of the item being mixed. Manually enter the time to mix or select a mix recipe programmed previously. Close the lid, press, "Start", and wait. Using over 400g of acceleration generated by spinning, and rotation of the mix cup the paste is fully homogeneous and de-foamed in as little as 60 seconds.

The ARE-310 is capable of mixing higher viscosity compounds such as oil-based clay. This series of images (pic: Clay Mix) shows that in a few minutes the white and red clays are fully homogeneous with no bubbles.

If a measured polymer mix, such as a measure of epoxy for a board level repair that is part of the IPC-7711/7721 Training and Certification programs, the use of a digital scale will be needed. Place the mixing cup on the scale and set the tare. Measure each part of the needed components into the cup (pic:2 compound). Insert the cup into the mixing cup adapter and, after closing the lid of the mixer, start the mix process as before (pic: final mix).

If you'd like to see the Thinky ARE-310 in action and practice your mixing techniques, schedule either the NASA STANDARD 8739.1 Workmanship training or the IPC-7711/7721 Training and Certification. The kits below are used in these classes and can be ordered with the included links. Don't forget your coupon code: **7711kit**

Tin-Lead 405-2875 advanced-rework-repair-certification-kit-tin-lead

Lead-Free 405-2874 advanced-rework-repair-certification-kit-lead-free

Final Mix

Clay Mix from Thinky Website

Call our customer service number to talk to one of our friendly team members about your order.

800-858-0604

Engineering Services

Electrical Leakage and Electrical Shorts

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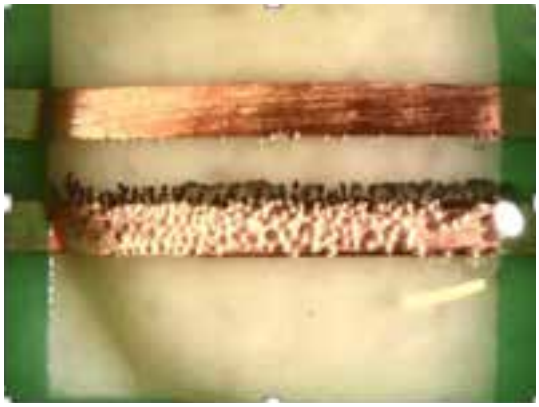
They say a picture is worth a thousand words. By the end of this article, you should have a basic understanding of what the difference in these two terms is and how to use the values measured to give you an idea of the potential risk posed by your materials, processes and designs.

In electronics, leakage usually refers to a gradual loss of energy from a charged capacitor. For our purposes, electrical leakage can be evidenced by dendritic growth. Dendrites may grow and reduce the dielectric gap between adjacent conductors and thus once these gaps are reduced by 25% to 50% then there is leakage which can interfere with electrical performance or signal integrity.

An electrical short is described as an electrical circuit that allows current to travel along an unintended path with no, or very little electrical impedance. The "short" we are looking at is a true electrical short between two adjacent traces as evidenced by the photograph below. Note the dendritic tree like structure is forming a true electrical short as it migrates or grows from the anode (-) to cathode (+).

In a galvanic voltaic cell such as the pictures show below you need a medium such as 3 to 6 monolayers of water. Then you need an ionic contamination source such as chloride (anion) which reacts with the copper trace material to dissolve metal ions to form the dendritic tree like structure which starts to grow and cross the gap between the two traces. The last variable required is a voltage bias differential between the adjacent traces which can be anywhere from 3.3 volts to 8 volts or 20 volts etc. The idea is that one needs a transport medium which in this case is 3 to 6 monolayers of water, then an ionic contaminate of enough volume to trigger an electro chemical reaction (chloride). Last but not least a voltage differential between adjacent traces (3.3 to 8 plus volts). How and where do these variables come from and how do they get under the components? The answers lie in the manufacturing processes, material choices, handling and processing of the different components and the original component parts and printed circuit board fabrication.



Leakage Currents

Short

First, where does water come from? Relative humidity – amount of water in the air itself we breathe - is present all the time but once you cross 65% RH then we start adding monolayers of water to all surfaces and as we continue to increase in RH% then we add more and more monolayers of water to all available surfaces. As one increases above 75% to 80% RH then there is enough water present for the first required variable for a galvanic voltaic cell to start which is a medium for an electrochemical reaction. Once the medium is present then the next variable is an ionic contaminate such as anions, cations and weak organic acids,

which can be chloride from the anion family or adipic acid from the weak organic acid family or ammonium from the cation family. Any one of these in the correct concentration could trigger a chemical reaction on the copper conductors such as metal dissolution. Once the medium and the ionic contaminate is present then having a voltage bias field +/- will be the last variable which will drive the galvanic voltaic cell reaction. As you can see, the metal ions dissolve and start alignment on the anode trace. The leakage currents start to form and reduce the gap between the two traces. This occurrence will drop the dielectric resistance between the two traces and this phenomenon will and can be measured by a drop in Surface Insulation Resistance (SIR) between these traces. So hypothetically if this trace gap was measured dry below 60% RH then this SIR value could be 1 E10 or higher. Once the RH goes to 85% RH then we could see a drop to 1E8 or below. But again it takes three things to occur for there to be a drop in SIR – medium (monolayers of water) and then there must be an ionic present (anion, cation, weak organic acid) and a voltage bias to help drive the electrochemical reaction.

The best way to test for Surface Insulation Resistance (SIR) is to perform SIR testing on test cards which evaluates your material choices - solder fluxes, cleaning agents and general handling of components and printed circuit boards. The incoming components and printed circuit boards can come in with high levels of ionic contamination from their manufacturing processes so one can see there are a number of sources for ionic contamination into their finished electronic assembly. The ability to test for SIR underneath your critical BTC style components, BGA's and even QFP and connectors is the way to insure that your cleanliness level underneath low standoff components meets your cleanliness expectation or objectives.

Do you know your cleanliness level underneath your most critical components? SIR testing and Ion Chromatography testing is the objective evidence you need to meet your J-STD-001 Rev. G Amendment 1 section 8.1.

If you would like to know more information on SIR testing and IC testing to insure you know your cleanliness level underneath your critical electrical components;
PLEASE CALL
or
EMAIL

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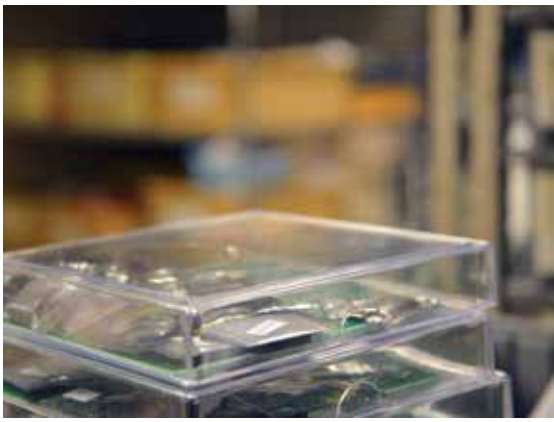

EMPLOYEE *Spotlight*

Meet Melissa

MELISSA HUFFMAN

Work Background: Melissa has been a car buyer, office worker and previously worked in the electronics industry.

Family Information: Melissa has three children, her oldest Cody passed away at age 28 in Jan. 2019, her middle child is her daughter, Megan (27 years old) and her youngest is daughter Amber (age 20). She also has two grandchildren ages 8 and 4.

Hobbies: Melissa enjoys fishing, playing pool and spending time outdoors.

Training Services

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IPC-6012

The IPC-6012 – "Qualification and Performance Specification for Rigid Boards" is used in the manufacture of rigid printed boards to ensure that the board manufacturing process is capable of producing an acceptable printed board. Definitions of board types based on the lay-up of the substrate are defined as types 1 through 6. Types of boards grow more complex from 1 to 6. A type 1 board is a single-sided printed board. Type 6 is a multi-layer, metal core printed board with blind and/or buried vias and may include micro vias.

The requirements section of the 6012 contains criteria addressing all aspects of a printed board construction. From the procurement of the materials used in the manufacturing of the substrate to the drilling accuracy of through holes, tooling holes, vias and microvias, to the plating of the lands and holes, and even the number of samples to be tested to qualify the process; it's all in the IPC-6012.

As the J-STD-001 document is used to verify that the electronics manufacturing process is capable of producing and assembly that will be acceptable when inspected to the IPC-A-610, the IPC-6012 verifies

that the board manufacturing process is capable of producing a printed board that, when inspected according to the IPC-A-600 is an acceptable board. This relationship between documents is present between many documents within the IPC library.

The best way to learn about the requirements necessary to produce an acceptable printed board is to attend an IPC Training course and complete the IPC Certification exam for the IPC-6012.

With the addition of Master Instructor Kris Roberson, STI is pleased to offer Certified IPC Specialist training and certification courses for the IPC-6012 – Qualification and Performance Specification for Rigid Printed Boards.

Contact STI customer service at

1-800-858-0604

or connect with us through our website at

www.stiusa.com

to schedule training at your facility or in one of our state-of-the-art classrooms.

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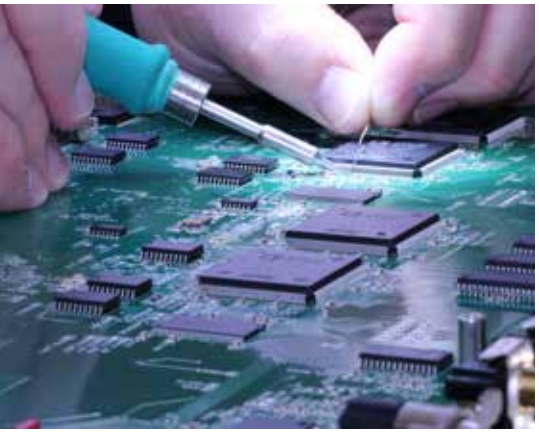

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