NEWSLETTER

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Wishing
you a
very
MERRY
CHRISTMAS
sti
electronics

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features

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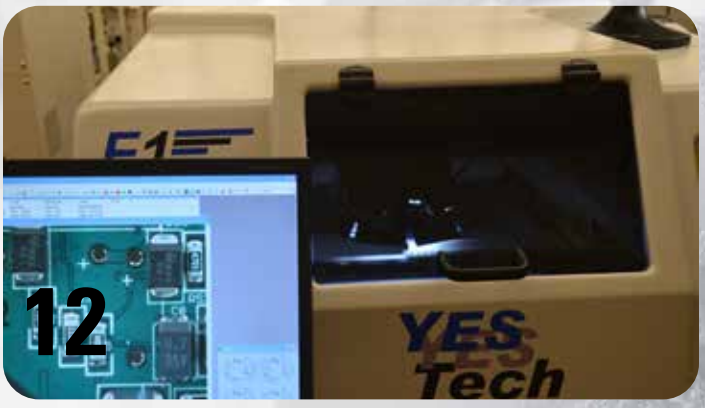


Dave's World

2021, What A Year!

As we get ready to begin our yearlong 40th Anniversary Celebration, let's look back on what a crazy ride year 39 turned out to be.

Like the rest of the world, we were happy to put 2020 behind us and entered 2021 with a lot of optimism Those expectations were not met early as business stumbled for a few months but by summer things had picked up and we are up over 20% year over year growth which means we are all running full speed again. Our future looks bright as our high reliability contract manufacturing continues to grow. Our US Government and commercial customers are showing excellent growth and our medical business is slowly growing but expecting to take a giant leap in 2022. Our Training Resources sales are up well over 20% as well as increasing our customer base. Almost everyone is travelling again and making up for some of the training that was delayed in 2020. We've added more online capabilities, basic knowledge classes as well as NASA related topics. We keep updating our IPC certification classes as updated documents are released. We also just delivered a professional grade

David Raby

President/CEO

customized lesson plan for a customer's internal classes.

I'm thankful for our team members sticking with us when business was slow. We were preparing for better days and now I'm thankful all the hardwork is now allowing us to reap those benefits.

In the past year, the federal government has been both a tremendous help and a big burden. The PPP loans allowed us to keep everyone employed when we would not have been able to otherwise. The rapid vaccine development allowed us to feel confident returning to some level of normalcy. The CMMC requirements (IT security), while understandable and necessary, have cost a tremendous amount of time and money and now we are more or less on hold while the CMMC requirements are reviewed yet again. The vaccine mandate (we are a federal contractor) has also caused us to spend a lot of time and money on implementation. We realize there are a lot of strong feelings and opinions on both sides of the issues and yet, here we are. Our goal is to comply with the mandate and maintain all of our existing employees in the process. The absolute worst of the year had nothing to do with business or covid. I'll never think of 2021 without thinking of the loss of STI team member Teresa Seals. We miss her attitude and smile every day.

Thank you for your support over the past couple of years as I know we've all had to feel our way around a world we weren't familiar with. I thank you for your patience and I trust we have been able to meet your needs and hopefully exceed your expectations.

Thank you for your support over the past 39 years. Your business has allowed us to grow and be part of an exciting industry. I never imagined in 1982 that I'd still be working for STI. It has allowed me to mentor and give back to our industry but also allowed me to be mentored by some very smart industry leaders. To say I have been blessed is a big understatement. I'm really not sure what our 40th year is going to look like but I'm excited and optimistic about where we are headed. Thank you again and please let us know how we can help you and your company.

David Raby

UP CLOSE and PERSONAL

Meet Katherine

Mechanical Assembly Technician

How long have you been part of STI Electronics, Inc.? **6 Months**

What do you do for STI? **A little bit of everything.**

Just For Fun

Tell us about your pets. **I have a cat name Zoe Zoe she's old, mean, and will only like you if you feed her.**

Do you have a favorite place to visit? **Anywhere that's not my house.**

What's your favorite type of music/song/artist? **I don't really have a favorite type of music.**

What is your favorite movie or TV show? **The Red Sea Diving Resort or Black Widow movie right now.**

What's your favorite meal/food? **Food**

Tell us about any hobbies that you enjoy. **Reading and Sewing**

What's one fun thing to know about you? **Sleep**

What's your favorite thing about working at STI? **I get off on the weekend.**

Anything else you'd like to share with your team members? **I'm not a morning person so if I don't say good morning don't take it personal, I most likely didn't hear you or I didn't say it loud enough, I'm sorry.**

From all of the "behind the scenes" Operations Staff, we thank you for your business and another successful year! We wish you and your family a very Merry Christmas and a healthy, prosperous New Year! Please let us know how we can better serve you and we look forward to working with you in 2022!

Thanks,

Diana Bradford
Vice President,
Operations/Training Resources

From

OPERATIONS

Merry Christmas

Christy
Executive Assistant

Sheila
Corporate Secretary

Donna
Receptionist

Erick
Job Cost Analyst

Scott
Accounting Manager

Robbie
Marketing Coordinator

Roger
Facilities Manager

Jean
Facilities Maintenance

From all of us in Training Services, we thank you for your business and another successful year! We wish you and your family a very Merry Christmas and a healthy, prosperous New Year! We look forward to working with you in 2022!

Thanks,

Pat Scott

Training Services Manager

Merry Christmas

from

TRAINING SERVICES


Frank
Lead Master Instructor
Michelle
Customer Service Manager
Julio
Training Ctr. Manager, TX
Robert
Master Instructor
Travis
Master Instructor
Melissa
Customer Service Rep.
Martin
Master Instructor

Merry CHRISTMAS

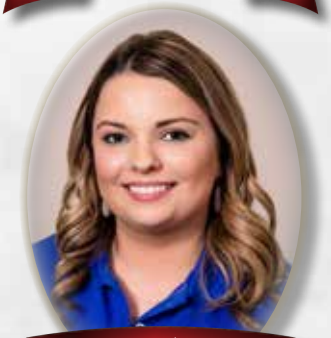
Engineering Services/Manufacturing

Mark
VP, Engineering Srvs./Manuf.

Joe
Quality Manager

Troy
Systems Engineer

Chris
Manufacturing Manager



Caroline
Analytical Lab Mgr.

A.J.
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Kelli King
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James Nicholson
Customer Account Manager

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Why is Rose Testing of PCB Assemblies a problem for Objective Evidence as required by Section 8 of the J-STD-001 Rev. H.

By Mark McMeen V.P. of Engineering Services/ Manufacturing at STI Electronics

Resistance of Solvent Extract (ROSE) testing is one of the oldest ionic cleanliness test methods in the industry. It continues to get applied to the newest electronics, without a second thought. It is not uncommon for things that were grandfathered into an industry or society to fly under the radar and escape scrutiny. An example of this is aspirin, which if it were to go through regulatory approval now, many medicinal chemists would expect it to be rejected due to the risks of its well documented side effects. Modern electronics have feature sizes, material sets (fluxes, solder alloys, etc.) and component densities that could not have been envisioned when ROSE was developed in the early 1970's. Does this mean ROSE is the aspirin of our industry - comfortably familiar and effective, or an anachronism ready for retirement? That is the question – Is it the right question and is it fair? I get asked this question a lot today as companies are trying to understand why they have field failures for bottom terminated components. "My ROSE testing results show no issues or problems, but yet I still have field failures on certain components or component types such as bottom terminated components", is the comment we hear frequently.. More specifically, the question before us is, "Is ROSE still capable of providing useful data in 2021?" This is some of the challenges and issues that ROSE testing has when trying to answer that question.

Higher density packaging has resulted in smaller components, closer signal and ground spacing, poor outgassing channels, and higher electric field gradients. When properly reflowed [and outgassed] modern fluxes leave behind a non-conductive benign residue. However, electrochemical failure occurs when two oppositely biased and closely spaced conductors are "connected" by a continuous electrolyte layer (such as moisture) that is in contact with a flux system that has an ionic residue or weak organic acid by product. Detection of residues that can drive failure requires a lead-to-lead, via to lead, and hole to hole testing techniques. The objective of a process control plan is to detect process deviations that can adversely affect system operations, and to validate that the assembly meets agreed upon quality requirements, thereby reducing the risk of failure when deployed in its final end use environment. The goal is a product that is repeatable, reproducible and performs as promised in the field. Rose does not have a way of measuring the electro chemical signature

or reaction on a lead to lead; via to lead; via to via; ground pad to signal pad on a singular basis to know if there is a problem present. Rose needs to measure the conductivity of dissolved ionics and weak organic acids in a solution and assumes that everything is equal as it relates to sodium chloride equivalent. The issues / problem can be as simple as these ionics have different conductivity levels and are not equivalent to the conductivity level of sodium chloride and some are not soluble at all in the DI water / Alcohol solution and sometimes, we cannot get the ionics out from under low standoff height components so they could be dissolved and measurable.

Listing of Rose Challenges as an effective process control tool:

ROSE TEST METHOD APPLICABILITY 1970'S VS 2020'S – DOES 50 YEARS MAKE A DIFFERENCE?

1. ROSE was developed 49 years ago to meet the needs of the current process technology of that day, and perceived challenges in the near future (low density SMT). – The year 1972/1973.
2. ROSE uses a conductivity meter which was designed around measuring highly conductive salts, such as sodium chloride.- The year 1972/73 – pine rosin flux systems – natural chlorides present.
3. ROSE was designed for large size PCB assemblies half a century ago, which utilized low density axial and radial through hole parts and pine rosin flux systems which had chloride ionics as its byproducts.
4. The fluxes that ROSE was developed to detect utilized highly conductive activators, typically chloride, in quantities that are no longer used today; vs. low conductivity weak organic acids used today.

Challenges (Problems) with using Rose Today 2020 vs 1970

1. ROSE testing was not designed nor can it measure weak organic acids and low conductivity anions reliably which is the foundation of today's no-clean flux systems
2. ROSE testing cannot dissolve flux residues and their associated weak organic acids and ionics under low standoff height components such as bottom terminated and large grid array devices and complex connector systems.
3. ROSE testing is a full board extraction which assumes there is enough flux residue present and available that can be dissolved into solution for measuring the overall cleanliness level of small to medium size PCB assemblies, which can be challenging because most flux systems are complex chemical formulations that are not easily dissolved in IPA/DI water solution. Correlation analysis between different size boards and their corresponding component density as well as their component type adds to the complexity of getting a meaningful measurement.
4. Cleanliness is really a local component type issue which is driven by each component types outgassing capability and thus this drives cleanliness to pad to pad or via to pad or ground pad to signal pads; and thus, one could view this as a point-to-point micro issue and not a whole board issue. Lead to lead; via to via; ground pad to signal pad – this is a point to point problem and not a whole board issue.
5. ROSE testing also has challenges in measuring the low level of contamination that is present on modern PCBs, i.e., the amount/ volume of ionic present - It appears to have potentially met the needs of the industry half a century ago, but not today. Today is really a component specific problem and a true localized electro chemical signature / cubic volume amount of that specific components' flux residue outgassing capability which is influenced by the flux type and your manufacturing process control.
6. ROSE has a limit of decision (LOC), where the false positive rate for contamination is 5% may be acceptable for sodium chloride, but not for weak organic acids.
7. For process control a more important metric is the limit of detection (LOD), which has only a 5% false negative rate (passing a contaminated PCB) is unacceptably high. For weak organic acids the LOD is orders of

magnitude higher than for sodium chloride. This adds a larger margin of error to ROSE testing when the ionic that is present is a low conductivity ionic such as weak organic acids.

8. Sodium chloride produces an apparently linear response with ROSE, however, for WOAs the response is not linear. The response of sodium chloride appears linear but fails goodness of fit tests.

9. ROSE is relatively "blind" towards weak organic acids that are used in modern no-clean fluxes, with a sensitivity order of magnitude lower than for sodium chloride. – weak organic acids requires a higher magnitude of volume present to be measurable than a higher conductivity chloride which can be detected at lower volume levels present.

10. Today flux systems are complex chemical formulations that use low conductivity weak organic acids and low conductivity thermal stabilizers and thus are blind to the conductivity cell detection systems used inside the Rose tester and this blindness requires a large amount of volume / concentration of a low conductivity ionic material to be detectable thus supporting the definition of Rose testing has "blindness" as it relates to modern flux systems or no -clean flux materials.

As one reviews the initial question: "Is ROSE still capable of providing useful data in 2021?" The above analysis is designed to help those make up their own mind as to the usefulness of Rose Testing in today's Electronic assembly process control methodologies and its data output. The real question does it answer the following question: How clean is "Clean" and is my electronics systems clean enough for my end use environment? Do you know the answer to this question: What is the cleanliness level of my electronic assembly? If you would like more information on this article's background then please pull down the following white paper and presentation from the 2021 SMTAI where I am one of the co-authors on the paper called: **Cleanliness Detection and Resistance of Solvent Extract – A Critical Evaluation**

What is a better electro chemical signature test for determining the cleanliness of an Electronic Printed Circuit Board assembly?

SIR testing is the test methodology that allows one to answer the question because its output gives a specific discriminating log ohm number (Electrochemical Signature) that allows one to answer the question: What is my cleanliness level on a specific electronic assembly? This number can be used to answer and build a qualified manufacturing process and it can also be used to answer the ionic process control monitoring question on a lot per lot basis.

If you have any questions or comments, please feel to email or call me at

mmcmeen@stiusa.com or mmcmeen@magnalytix.com or by phone at 256-694-1293

Training Services

Contact Information:
Pat Scott
Training Services Mgr.
pscott@stiusa.com

STI's Training Services Department met the challenges of 2021 head-on. While the pandemic continued to be a concern, STI was still able to teach classes on the road and at our facilities in Madison, AL and Houston, TX. STI worked diligently to ensure that all masking and social distancing protocols were in place and followed. A special thanks to those students who attended classes this past year and who followed all masking and physical distancing protocols.

STI's customer service representatives have been receiving questions about certification extensions. Here is a quick recap regarding the certification renewal period which can be found in the IPC Policy and Procedures Version 7.3 which was effective August 1, 2021.

The IPC policy and procedures states "All certification renewals may only occur within 6 calendar months prior to the expiration of an existing certification. When a Certificant renews their certification within 6 months of the certification expiration date, the renewed certification will be valid for an additional 2 years from the expiration date of their currently held certification."

What if a certification has expired? Well, the policy states that "All candidates that let their certification expire may not apply for initial certification for a period of 90 days after the date of expiration. After this 90-day period, these candidates must demonstrate they meet all the criteria for initial certification." So make sure to renew your certification 6 months prior to the certification expiration date.

In addition, when signing up for online courses which require remote proctoring of exams make sure and sign up at least two weeks in advance so the hard copy standards that are used for remote testing can be shipped to you prior to the course start date. As always feel free to contact Customer Service if you have any questions regarding class registration.

Coming First Quarter of 2022

Principles of Soldering to the Requirements of J-STD-001 course covers the fundamental of soldering along with the technical requirements of J-STD-001. This week-long course covers the following topics:

- Component ID
- Tools and Equipment
- General Requirements of J-STD-001
- Materials
- Preparing to Solder
- Wires and Terminals
- Through Hole Assembly and Soldering
- Surface Mount Assembly and Soldering

Upon completion of this course students will receive an STI certificate of completion.

As of January 1, 2022 STI will be slightly increasing the pricing of the IPC Courses and NASA Courses. As always, we appreciate your business and always strive to make sure your experience at STI is enlightening and informative. Happy Holidays

STI Celebrated 39 Years in 2021

STI Electronics, Inc. (STI) celebrated our 39th year in business in 2021. Our purpose and vision have always been and will continue to be about providing the highest quality manufacturing, training, and engineering services to our customers around the world.

STI's world renowned training will continue to grow with advanced programs, updated standards as well as customized courses covering new technology in our Alabama, Indiana, and Texas classrooms. This is on top of our always popular IPC Certification programs.
STI's AS9100 certified manufacturing operations will continue to grow our high reliability government and commercial production in both flex and ridged assemblies. We reorganized our STI team in 2019 to better utilize existing talents and strengths. That reorganization is already paying off for STI and its customers. In addition, we will continue to add talent, capital equipment and software to better serve our customers.

I'm quite confident that STI is positioned to take advantage of whatever surprises the new year may bring.

Merry Christmas

We would like to express our sincerest appreciation for the trust you have placed in us and best wishes for the holidays.

We will be closed
December 24th and 31st

sti electronics inc.