

DfR Solutions

reliability designed, reliability delivered

DfR Solutions Newsletter May/June 2008

Pb-Free/RoHS Special Edition!

In response to huge demand from our readers, we have made this issue about everything RoHS and Pb-free. From tin whiskers to manufacturing to reliability prediction, we hope you find the answer to every question. If not, take advantage of our open door policy and give us a call or send us an email!

RoHS Legislation: The Current Status and The Likely Future

The 'greening' movement in electronics is unlike any technology insertion activity in history. It is therefore important for all companies to be fully aware of environmental regulations worldwide and how these laws are evolving. Click [here](#) to learn where the legislation is expanding and which exemptions will likely disappear. For more information contact [Craig Hillman](#).

Tin Whiskers: An Introduction to Mitigation

Numerous high reliability companies (avionics, industrial control, medical, enterprise) and government agencies are spending time and resources attempting to mitigate the risks of tin whiskers without recognizing the fundamental issues and current state of knowledge. This brief [presentation](#) developed by DfR provides a clear and comprehensive understanding of this pivotal issue. For more information contact [Nate Blatta](#).

IPC Rips into Oko Institute

In a [letter](#) that borders on accusations of incompetence and malpractice, the IPC has raised strong objections to the Oko Institute's report to the Technical Adaptation Council (TAC) regarding an expansion of the existing list of restricted substances. Read the [report](#) and [presentation](#) and judge for yourself.

Transitioning to RoHS: Industry Trends in 2008

Several DfR clients, exempt from the RoHS legislation, have indicated that 2008 will be a critical year in their transition to Pb-free. Due to requests from customers, pressure from the supply chain, or just preparing for the inevitable, a majority of electronic OEMs are likely to either begin or complete the transition to Pb-free in 2008. Click [here](#) to learn more about these important trends in the industry. For more information contact [John McNulty](#).

The Tin Myth: How OEMs Are Winning the Battle

Especially critical to responding to tin whiskers is breaking-down the myth that component manufacturers are only providing tin plating. In [The Tin Myth](#) we explain how some of the world's largest OEMs have been misled about their influence on the component market and how whisker resistant platings are becoming available for the majority of fine pitch components. For more information on tin whiskers and effective mitigation, please contact [Gerd Fischer](#).

Counterfeiting at It's Worst (Best?)

As a respite from the RoHS focus of this newsletter, DfR invites you to read this fascinating [presentation](#) put together by the FBI showing exactly how counterfeit products get into our supply chain. For more information contact [Bob Esser](#).

In This Issue:

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US Air Force on Pb-Free

The drama with the Pentagon and Pb-free continues. The Aeronautical Systems Center (AMFC) has released its second '[Airworthiness Advisory](#)' on Pb-free. What does it mean? Not much. The document is not a contractual requirement, which means that any action that adds significant costs or is not inline with current activities will probably be ignored. And that is especially true for AMFC's request to re-tin all pure Sn coated surfaces.

Service of the Month: Pb-Free and RoHS

DfR Solutions offers a broad range of services designed to provide companies in the electronic marketplace with the right solution regarding all their lead-free needs. We start with robust scientific principles and develop realistic recommendations that ensure optimum performance with a minimal amount of resources. Services we provide include:

- Accelerated Test Plan Development and Execution
- Research into High Temperature Pb-free Alloys
- Reliability Models for 2nd Generation Solder Alloys
- Bill of Materials (BOM) Scrub
- Tin Whisker Testing
- Qualifying Pb-free Manufacturing (including Repair and Rework)
- Test and Analysis of Tin Whisker Mitigation Effectiveness
- Generation of Lead Free Control Plans (LFCP)
- Review of Supplier Lead-Free Control Plans (LFCP)
- Guidelines for a Successful Pb-free Transition
- Onsite Training and Education
- Ensuring Compliance with GEIA-STD-0005-1, -2, and -3

For more information on our Service of the Month contact [Ed Dodd](#).

US Government and Pb-free

Government agencies are struggling to deal with the Pb-free issue. Should they specify compliance to GEIA in the contract? Should they ban Pb-free completely? Should they even care? DfR can provide clear and concise guidance on this issue. If you would like more information or wish to arrange an onsite visit, please contact [Bob Esser](#).

Expand your Knowledge

Looking for a greater understanding of Pb-free and RoHS? Look no further than DfR's numerous publications and presentations on this important topic:

Papers

[Lead Free: Predicting and Ensuring Reliability in Military Avionics](#)

[Epidemiological Study of Pb-Free Solder](#)

[An Engelmaier Model for Leadless Ceramic Chip Devices with Pb-free Solder](#)

[Design Guidelines for Ceramic Capacitors Attached with SAC Solder](#)

[Comparison of the Isothermal Fatigue Behavior of Sn-Ag-Cu to Sn-Pb](#)

[What I Don't Know That I Don't Know: Things to Worry About with the Pb-Free Transition](#)

[A Comparison of the Isothermal Fatigue Behavior of SnAgCu to SnPbSolder](#)

[Microstructure and Damage Evolution in Sn-Ag-Cu Solder Joints](#)

[Has the Electronics Industry Missed the Boat on Pb-Free? Failures in Ceramic Capacitors with Pb-Free Solder](#)

[Interconnects](#)

[Robustness of Surface Mount Multi-Layer Ceramic Capacitors Assembled with Pb-Free Solder](#)

[Intermetallic Growth on PWBs Soldered with Sn3.8Ag0.7Cu](#)

[Effect of PWB Plating on the Microstructure and Reliability of SnAgCu Solder Joints](#)

[Tin Whisker Risk Assessment Case Study](#)

Presentations

[Developing a Pb-Free Qualification Plan](#)

[Tin Whiskers: An Introduction](#)

[Reality of Pb-Free Reliability](#)

[Whisker Resistant Platings](#)

[Impact of Lead Free Transition on Reliability of Warfighter Electronics due to Sn Whiskers](#)

[Understanding Failure and Root Cause Analysis in Lead Free Electronics](#)

[How is the Commercial World Responding to RoHS: A guide for military and avionics](#)

[Accelerated Reliability Testing of Ni-Modified SnCu and SAC305](#)

[Selecting a Lead-Free Solution for Military, Avionics, Space](#)

DfR News

DfR Solutions Invited to Give Talk on the Status of Solid State Drive (SSD) Reliability

Due to our increasing reputation as an industry leader in qualification of new technologies, DfR Solutions was invited to present on the status of solid state drive (SSD) reliability at the International Disk Drive Equipment and Materials Association's (IDEMA) Technical Symposium held May 15. This critical technology node, currently creeping into portable devices and destined for wider acceptance over the next several years, must be able to demonstrate the reliability improvements it claims over the current market leader, disk drive technology. IDEMA recognized the importance of SSD reliability, and DfR's expertise in the area. For more information about IDEMA, visit their [website](#).

DfR Welcomes Ed Dodd as New Sales/Marketing Engineer

DfR is happy to announce the promotion of Ed Dodd from East Coast Sales Manager to Internal Sales/Marketing Engineer. Ed has extensive experience from across the product development and usage cycle. This includes factory experience with production and packaging and installation and maintenance of electrical systems. He has a background in Electrical Engineering, with additional schooling in project management and product compatibility. Ed served four years in the United States Navy working in Engineering. In his new position, Ed will be focusing on sales for DfR, as well as assisting with marketing activities. He can be reached at EDodd@DfRSolutions.com.

Upcoming Events

DfR Solutions in Cleveland (May 27 – 28, 2008)

If your company is located in the Cleveland area and you are interested in a visit or brief presentation on topics such as failure avoidance, supply chain benchmarking, Pb-free, etc., please contact [Angela Lawson](#).

DfR Solutions in Boston, MA (May 27 – 30, 2008)

If your company is located in the Boston area and are interested in a visit or brief presentation on topics including opto-electronics, MEMS, component packaging, Pb-free, etc., can contact [John McNulty](#).

DfR Solutions in Seattle, WA (June 10 – 12, 2008)

If your company is located in the Seattle area and are interested in a visit or brief presentation from DfR on [topics such as failure avoidance, supply chain benchmarking, Pb-free, opto-electronics, MEMS, component packaging, etc.](#), can contact [Angela Lawson](#) to make arrangements.

Lead Free Electronics in Aerospace (LEAP) Meeting (Los Angeles, CA: June 10-12, 2008) Nathan Blattau will present *Accelerated Reliability Testing of Ni-Modified SnCu and SAC305: Accelerated Thermal Cycling* at the LEAP meeting on June 11. For more information contact him at NBlattau@DfRSolutions.com.

DfR Solutions in Southern California (June 10 – 12, 2008)

If your company is located in the Southern California region and you are interested in a visit or brief presentation (failure analysis, reliability prediction, etc.), please contact [Clayton Bonn](#).

IPC National Electronics Week (London, England: June 17-19, 2008)

[Craig Hillman](#) will teach two courses during the IPC's new event, National Electronics Week.

Understanding Failure and Root-Cause Analysis in Lead-Free Electronics and *True Design for Reliability:*

Understanding What is, and What is Not DfR will be presented on June 19. For more information on the event, please visit the IPC [website](#).

DfR Solutions in Albuquerque, NM (June 23-24, 2008)

If your company is located in the Albuquerque area and you are interested in a visit or brief presentation on a number of topics (failure avoidance, supply chain benchmarking, Pb-free, opto-electronics, MEMS, component packaging, etc.), please contact [John McNulty](#).

DfR Solutions to Co-Sponsor Lead Free Webcast (June 24, 2008)

DfR will co-sponsor Military & Avionics Electronics magazine's webcast on Lead Free June 24. Watch for more details here or in our next newsletter!

IDEMA Reliability Symposium (Santa Clara, CA: July 31, 2008)

John McNulty will participate in the IDEMA Reliability Symposium on July 31. For more information please contact him at JMcNulty@DfRSolutions.com.

SMTA 2008 (Orlando, FL: August 17-21)

DfR Solutions will have a strong presence at this important conference (for more information, visit the SMTA [website](#)):

[Craig Hillman](#) will present two seminars: *Selecting a Lead-Free Solution for High Reliability Applications (Industrial, Telecom, Automotive, Medical, Military, and Avionics)* and *Next Generation Technologies in Electronic Packaging and Production (NEW!)*

[Joelle Arnold](#), in collaboration with Nihon Superior, will present two papers: *Reliability Testing of Nickel-Modified SnCu and SAC305: Accelerated Thermal Cycling and Reliability Testing of Nickel-Modified SnCu* and *SAC305: Vibration and Shock*.

DfR in East Texas (Mid September, 2008)

DfR Solutions will be visiting companies in East Texas (Dallas, Austin, and Houston) in mid-September. If you and your associates are interested in an onsite visit and/or presentation, please contact [Angela Lawson](#).

IPC Midwest Technical Conference (Chicago, IL: September 26-28, 2008)

DfR Solutions will have a strong presence at this important conference (for more information, visit the IPC [website](#)):

Craig Hillman will present two seminars: *Selecting a Lead-Free Solution for High Reliability Applications (Industrial, Telecom, Automotive, Medical, Military, and Avionics)* and *Next Generation Technologies in Electronic Packaging and Production (NEW!)* [Gerd Fischer](#) will present the paper *A Pb-free Reliability Model for BGA*.

DfR in Milwaukee (Mid October, 2008)

If you and your associates are interested in an onsite visit and/or presentation, please contact [Angela Lawson](#).

SAE Convergence (Detroit, MI: October 20-22, 2008)

DfR will exhibit at Convergence 2008. Stop by and visit us at Booth #1328! For more information on the conference, visit the SAE [website](#).

Employment

DfR Solutions is currently looking to hire two additional members of technical staff. The first position is for an Electrical Engineer with approximately 3-6 years of industrial experience. This candidate will assist in the design and development of test and measurement equipment, perform circuit and component stress analyses for customers, and provide general support on a wide range of electrical and other issues. Experience in power and analog design is desirable. All resumes should be sent to askdfr@dfrsolutions.com

The second position is for Experts in the following areas: Integrated Circuit (IC) Design, IC Fabrication, IC Packaging, Solid State Drive (SSD) Technology, Display Technology, Battery Technology, Printed Circuit Board (PCB) Fabrication, Power Electronics Design. Desirable candidates will have an advanced degree and 7+ years of experience. Those candidates with exceptionally strong backgrounds and an existing customer base may be provided the opportunity to work from home. All resumes should be sent to askdfr@dfrsolutions.com

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Our patented lead-free solder SN100C is based on a unique formulation of tin, copper, nickel and germanium that delivers cost-effectively high performance in production and reliability in service. SN100C matches the performance of the tin-lead solder it replaces in delivering smooth, bright, crack-free fillets and high first pass yield. And its combination of strength and ductility ensure superior performance in high strain conditions such as vibration. Visit our [website](#) for more information.

Advertise Here & Reach Over 8,000 Electronics Professionals Each Month!

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