

Dear Colleague,

The dog days of summer are ending and it has been over 40 days since the RoHS legislation went into effect. You know what they say: No news is good news.

'Tin Whiskering' Exemption is Approved

The European Union's Technical Adaptation Committee (TAC) recently [voted](#) to allow Pb in fine-pitch components for the purpose of preventing tin whiskering, even though this latest exemption may be completely [irrelevant](#).

Reality of Pb-Free Reliability (Part I)

Where can you learn about solder joint reliability, cracking of ceramic caps, tin whiskers, immersion silver corrosion, mixed solders, pad cratering, and copper dissolution all in one place? The "[Reality of Pb-Free Reliability](#)" presented at SMTAI in Rosemount, IL on Monday, September 25. This comprehensive course will inform and educate you about the latest issues with Pb-free (before they're even published!). For more details, contact [JoAnn Stromberg](#) or [register online](#) (tutorial number is T19).

Design for Excellence (DfX)

Designing your first product? Outsourcing your designs? Risk averse? Need to keep headcount low? In a continuation of our focus on best design practices, DfR Solutions is now proud to offer a comprehensive Design for Excellence (DfX) package. Through a review of failure modes, manufacturability, reliability, derating and much more, DfX can be your turnkey solution to customer satisfaction and optimized warranty performance. For more information on DfX and how it can lead to successful product development, please contact [Craig Hillman](#).

Ceramic Capacitor Wearout

What's stopping your next generation product from achieving 10-year, 20-year, 30-year life? It could be your [ceramic capacitors](#). Understand this problem before its too late. DfR is initiating a comprehensive study on this issue, across multiple manufacturer and multiple date codes. If you would like more information or would like to be involved, please contact [Gerd Fischer](#).

The Five Do's and Don'ts of EMI/EMC

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Speaking of good design, do EMI/EMC issues have you ready to explode? Plan ahead with good design practices using these [top five rules](#) of EMI/EMC design, provided to us by our partner facility, [MET Labs](#) (www.metlabs.com). For additional assistance, please contact [Jim McLeish](#).

Component Upgrading

As part of our ongoing series on best practices in reliable and cost-effective design, we are pleased to continue our discussions on upgrading, which involves performing a risk assessment of parts used outside their manufacturer's specifications (typically temperature). This month's component is [Crystal Oscillators](#). For more information on our upgrading and derating services, please contact [Norm Anderson](#).

Tin Whiskering and Corrosion

To better understand tin whiskering in non-standard environments (industrial, military, or avionics) and to identify more rapid qualification procedures, DfR has initiated a set of experiments that will expose tin-plated components to a variety of corrosive environments. If you are interested in staying informed of the results, please contact [Heidi Reynolds](#) for information on joining the [iNEMI Tin Whisker Accelerated Test Project](#).

Reality of Pb-Free Reliability (Part II)

DfR will be releasing two publications on predicting the reliability of SnAgCu (SAC) solder at SMTAI. The "[Epidemiological Study on SnAgCu Solder](#)" provides hard numbers on test data from over 100 publications and uses this information to predict the long-term reliability of SnAgCu relative to SnPb. "[A First-Order Model for Leadless Ceramic Chip Devices with Pb-Free Solder](#)" gives the reader a simple, easy-to-use model for predicting lifetime without the use of arbitrary constants.

Strange Bedfellows

It looks like the electronics marketplace has found a surprising friend in the battle over RoHS. [Salon Magazine](#), one of the more liberal online magazines, recently posted an [article](#) (warning: may require viewing an ad) blasting the European Union for RoHS and other environmental legislation.

Meet DfR Senior Staff

There will be several upcoming opportunities to meet with DfR Senior Staff. If you are interested in having these experts stop by your facilities and discuss your latest quality/reliability needs, please contact us as soon as possible.

- [Dr. Blatta](#) will be in the [New England](#) area the week of September 4, [Chicago](#) the week of September 24, and [San Francisco](#) the week of October 2.
- [Dr. Hillman](#) will be in the [Los Angeles](#) area the week of September 11 and [Singapore](#) the week of October 8.
- [Dr. Fischer](#) will be in [France/Netherlands/Germany](#) October 30 through November 13.
- [Jim McLeish](#) is available in the [Detroit](#) area for onsite presentations and consultation.

Congratulations Keith!

Dr. Keith Rogers, a long-time co-worker of some of the staff at DfR Solutions, is leaving the University of Maryland for a new opportunity in the federal government. We all wish him the best of luck.

UPCOMING EVENTS

Lead-free Electronics in Aerospace Project: LEAP (Vergennes, VT: Sept 6)

Nathan Blattau will be presenting a comprehensive review of SAC reliability studies and what it means for predicting long-term reliability in severe operating environments. For additional information, please contact [Nathan Blattau](#).

SMTA Capital Vendor Show (Columbia, MD: Sept 7)

Come stop by the DfR Solutions booth to meet our senior staff, learn the latest about Pb-free, and submit your toughest, most confounding quality and reliability questions. Stay to watch a demonstration of our latest product, '[The Therminator](#)', and learn how it could cut your reliability testing costs by as much as 50% or more. For more information, contact [Joelle Arnold](#) or [register online](#).

Accelerated Reliability Technology Symposium (ARTS) - 06 EAST (NY, NY: Sept. 20)

Jim McLeish will be presenting a full day Seminar on "Integrating Advanced QRD (Quality, Reliability, Durability) Tactics with Accelerated Product Development". A timely seminar on the challenges of how to achieve product QRD objectives on a fast to market development schedule. When the time table is insufficient for reliability growth techniques, advanced QRD methods could be the design for reliability solutions that enable your company to achieve product integrity objectives and meet time line milestones. For more information, please contact [Jim McLeish](#).

Surface Mount Technology Association International (Chicago, IL: Sept 25)

Craig Hillman will be presenting his annual full-day seminar, "Reality of Pb-Free Reliability". Attendees will receive a clear and comprehensive presentation on all aspects of Pb-Free reliability concerns, including tin whiskering, pad cratering, selecting a Pb-free solderability plating, copper dissolution, and long-term reliability under thermal cycling, vibration, and mechanical shock. Especially informative will be an extensive review of relevant case studies. For more information, please contact [Craig Hillman](#) or [JoAnn Stromberg](#). You can also [register online](#) (tutorial number is T19).

Surface Mount Technology Association International (Chicago, IL: Sept 27/28)

Nathan Blattau will be presenting two papers, "[Epidemiological Study on SnAgCu Solder: Benchmarking Results from Accelerated Life Testing](#)" and "[A First-Order Model for Leadless Ceramic Chip Devices with Pb-Free Solder](#)." The first paper provides test engineers with a general expectation of Pb-free performance based on standard test environments (0 to 100C, -40 to 85C, etc.). The second paper provides a simple, easy-to-use model for predicting the lifetime of components most likely to experience solder joint fatigue without the use of arbitrary constants. For more information, please contact [Nathan Blattau](#).

IEEE Accelerated Stress Testing and Reliability Workshop (SF, CA: Oct 3-5)

Nathan Blattau and Joelle Arnold will be demonstrating DfR's latest product, '[The Therminator](#)'. Learn how this revolutionary product could cut your reliability testing time

by as much as 50% and your testing costs by even more. Contact [Nathan Blattau](#) for more details or click [here](#) to register.

IPC/JEDEC International Conference on Lead Free Electronics (Singapore: Oct 8-10)

Craig Hillman will be presenting his full-day seminar, "[Understanding Failure and Root-Cause Analysis in Lead Free Electronics](#)". This seminar is designed to educate engineers and managers on the failure mechanisms of concern with Pb-free and the tools and analyses that will help identify root-cause. For more information, contact [Craig Hillman](#) or [Michelle Michelotti](#) or [register online](#).

Europe (September/October)

Dr. Fischer, who is fluent in German and Danish, will be visiting European customers of DfR this fall. If you are interested in a visit to learn about ceramic capacitors, tin whiskers, or other areas of expertise at DfR, please contact [Dr. Fischer](#) to make arrangements. Please contact Dr. Fischer soon, as his schedule is almost full.

IPC International Conference on Lead Free Electronics (Frankfurt, Germany: Nov 1)

Craig Hillman will be presenting his full-day seminar, "[Understanding Failure and Root-Cause Analysis in Lead Free Electronics](#)". This seminar is designed to educate engineers and managers on the failure mechanisms of concern with Pb-free and the tools and analyses that will help identify root-cause. For more information, contact [Craig Hillman](#) or [Michelle Michelotti](#), or [register online](#).

TMS/SMTA Webcast on Lead-Free Solder Reliability (Nov 15)

Craig Hillman has been invited to facilitate an extensive [discussion](#) on the potential reliability issues with the use of lead-free solders. For more information, please contact [Craig Hillman](#).

Defense Manufacturers Conference (Nashville, TN: November 27-30)

Come by our booth and learn how DfR Solutions' experience and expertise can help you through the entire product lifecycle (technology insertion, design, supply chain, manufacturing, product qualification, field performance). We will be providing special guidance on how to be compliant with the new GEIA/IEC specifications for Pb-free product in military/avionics applications. We look forward to seeing you [there](#).

EMPLOYMENT

Positions Available

Member of Technical Staff

DfR Solutions is currently seeking one or two engineers or scientists with strong verbal and writing skills who are interested in working in the field of electronics. Our primary focus is providing consultation and analysis services to a variety of Fortune 500 technology companies, with additional in-house development focused on test equipment and reliability prediction software.

The optimum candidate will thoroughly enjoy problem solving, a la CSI (think forensic engineering), combined with the ability to communicate, both verbally and written, findings to customers. While a minimum of a bachelor's degree in engineering/physical sciences and a basic understanding of electronics are required, applicants with advanced

degrees and/or extensive experience are encouraged to apply. Pay commensurate with experience and education. Our atmosphere is very collegial and moves at a rapid pace with plenty of teamwork. There are strong opportunities for advancement, management, and travel around the US and the world. We are currently located in College Park, MD, 0.5 mile from the University of Maryland. Applicants can send a cover letter and resume to [Cherelle Jeudy](#).

Positions Wanted

A recent PhD graduate from the University of Maryland is looking for employment. Strong background in reliability, power electronics packaging, and finite element analysis (FEA). A resume for your perusal can be found [here](#). You can contact Dr. Zheng directly by email (yunqi.zheng@terpalum.umd.edu or zheng_yunqi@yahoo.com) or phone (240-481-1315). You can also contact Drs. [Hillman](#) or [Blattau](#) for their experience working with Dr. Zheng.

CALL FOR PAPERS

SMTA Medical Electronics Symposium

The SMTA is pleased to announce that the 4th annual Medical Electronics Symposium will be held May 1 -3, 2007 in Minneapolis, Minnesota. This symposium will focus on the medical electronics and medical device applications. A Call for Papers can be found [here](#). Abstracts are due December 1, 2006, with written papers due by March 30, 2007.