

## Greetings Colleague,

### RoHS Police Busy at Work

After a brief grace period, European enforcement agencies have [started](#) to quietly inspect a variety of electronic products. The end result?

- Nearly all products are 99% RoHS compliant, but few are 100% compliant
- Almost all non-compliance is off-board (paints, cables, plastics, housings)
- Enforcement agencies are focusing on cheap products without a recognizable brand name ("promotion of the week")
- Agencies are developing databases that rank OEMs on their risk of non-compliance based on test results, tips from whistleblowers, product type, company size, and market performance
- UK, Belgium, and Denmark will launch major enforcement campaigns in 2007, with Belgium rejecting the due diligence defense

### Uprating

DfR Solutions provides extensive guidance and expertise in reliable and cost-effective design. Part of this process is uprating, which involves performing a risk assessment of parts used outside their manufacturer's specifications (typically temperature). As part of an ongoing series for our readers, DfR Solutions has provided brief white papers on how to uprate [Electrolytic Capacitors](#), [Crystal Oscillators](#), and [Ceramic Capacitors](#). This month's component is [Schottky Diodes](#). For more information on our uprating and derating services, please contact Norm Anderson or Craig Hillman.

### Service of the Month: Finite Element Analysis

DfR Solutions is one of the industry leaders in the proper use of finite element analysis (FEA) for assessing the mechanical and thermal integrity of electronic designs and predicting time to failure. Our unique capabilities include:

- An extensive database of validated packaging material properties, including polymers (encapsulants, printed boards, conformal coatings), ceramics, glass, ferrous metals, non-ferrous metals, and SnPb and Pb-free solders (both SnAgCu and SnNiCu)
- An understanding of likely locations of stress concentrations within electronic packages and designs that allows us to tailor-mesh design to avoid discontinuities and singularities that can result in worthless analysis
- A comprehensive library of damage models to provide not just stress information, but also time-to-failure under both test and field conditions

For more information on our FEA services, please contact [Nathan Blattau](#) or [Joelle Arnold](#).

### Say Goodbye to Bromide; Say Hello to Halogen-Free

The march towards green electronics continues and tetrabromobisphenol A (TBBPA) is the big loser. While the focus has been on Pb and the other RoHS materials, pressures from the marketplace and non-governmental organizations (NGOs) have resulted in a slow, but methodical reduction or elimination in bromide flame retardants from epoxy encapsulants and FR-4 material.

These include initial [legal uncertainty](#) over deca-BDE, followed by a [definitive ban](#), followed by

## In This Issue

- [Uprating](#)
- [Service of the Month](#)
- [Bromide to Halogen-Free](#)
- [Five Myths of Reliability](#)
- [RoHS Around the World](#)
- [EMS Providers](#)
- [DfR in the News](#)
- [Upcoming Events](#)
- [Advertisements](#)

[press releases](#) from major computer OEMs. All these indicators seem to spell the end for brominated flame retardants (BFRs). What's next? Click [here](#) to learn the latest on halogen free.

### **The Five Myths of Reliability**

One of the bigger surprises in the electronics world is the failure to understand what is really important in regards to ensuring reliability. Based on numerous conversations with technical and managerial personnel from numerous companies, DfR Solutions has put together the five most common '[myths of reliability](#)'. They include:

- Is it design or defects?
- What's a severe environment?
- When to test, what to test
- How to use HALT
- Reliability is all statistics

### **RoHS Around the World (cont.)**

Legislative action on hazardous substances continues. China's [labeling requirements](#) came into affect on March 1<sup>st</sup> of this year and Korea has just released the English translation of their [legislative requirements](#).

### **EMS Providers Take Baby Steps**

Can you consistently and successfully grow a company with a 2% operating margin? Many electronic manufacturing services (EMS) providers have recently decided the answer is no. While some have modified their product offerings to include higher-margin avionics and medical builds, the majority of Tier 1 EMS providers ([Sanmina](#), [Benchmark](#), [Jabil](#), etc.) have decided to get into the design business.

OEMs win by reducing costs and sharing risks in the new product development process. EMS providers win because design activities provide higher margins and tend to prevent the OEM from easily transitioning to another supplier. The design activities range from designs at the request of OEMs to spec designs intended for the larger marketplace.

What's missing? Design for reliability (DfR). While design for manufacturability (DfM) should be the bread and butter of EMS providers, DfR can often be overlooked because of a lack of experience or direct insight into the customer's reliability requirements and usage environment. DfR includes not just good design practices, but also developing relevant life tests and predicting time to failure, which can require tools and insight not available at most EMS providers.

What's the solution? [DfR Solutions](#). With years of experience in quality, reliability, and durability (QRD) research and consulting, we can provide the knowledge and science-based solutions that will ensure product integrity. Our integrated use of [Physics of Failure \(PoF\)](#) and [Best Practices in Design](#) provides insights and solutions throughout the life cycle of a product. For more information contact [Nathan Blattau](#), or visit [www.dfrsolutions.com](http://www.dfrsolutions.com).

## **IN THE NEWS**

### **DfR Adds a New Regional Sales Manager**

Clayton Bonn has joined DfR Solutions in the new position of Regional Sales Manager. His primary focus will be the Southwestern Region of the U.S. emphasizing on the military and aerospace industry. Clayton will be responsible for DfR's failure analysis, physics-of-failure reliability prediction, and component level testing services, along with the BQR software. Clayton has almost 30 years experience as a sales engineer. He previously held the position of Partner Program Manager and National Sales Manager of QualMark's lab division. Clayton owns and operates Reliability Resources, a manufacturer's representation firm. He can be reached at [cbonn@dfrsolutions.com](mailto:cbonn@dfrsolutions.com).

## **UPCOMING EVENTS**

### **IPC/JEDEC Global Conference on Lead Free Reliability & Reliability Testing for RoHS Lead Free Electronics (Boston, MA: April 10-12)**

[Joelle Arnold](#) will present findings from DfR Solutions' recent research study, Accelerated Life Testing of SN100C for Surface Mount Devices: Vibration. The need for a manufacturable, reliable lead-free solder is becoming increasingly important as Sn alloys containing Ag-Cu (SAC) experience difficulties in manufacturing and field performance. This report will detail the results of vibration testing on a life model of SN100C. For more information regarding the study, contact Joelle Arnold. For more information on the conference, contact [registration@ipc.org](mailto:registration@ipc.org).

### **MIT/Industry Consortium on Advanced Automotive Electrical/Electronic Components & Systems (Seattle, WA: April 12-13)**

[Jim McLeish](#) will present an hour-long seminar regarding the importance of utilizing a Physics of Failure (PoF)/Reliability Physics strategy in automobile technology and design. Attendees will learn how PoF can be used with hybrid, voltage control, and other new automotive electronic technologies to ensure ultimate product integrity. For more information regarding the presentation, please contact [Jim McLeish](#). For more information regarding the event, contact [Gary DesGroseilliers](#).

### **DfR Solutions in Philadelphia (April 12 - 13)**

[Craig Hillman](#) will be presenting to a number of companies in the Philadelphia area in mid-April on a variety of topics (Pb-free, design-for-reliability assessments, supplier assurance, etc.). If you are interested in having Dr. Hillman speak to your company, please contact [Sheena Mitchell](#) to make arrangements.

### **SMTA International Conference for Soldering & Reliability (Toronto, ON, Canada: April 17-19)**

[Craig Hillman](#) will be presenting a full-day seminar, "Reality of Pb-Free Reliability". Attendees will receive a clear and comprehensive presentation on the latest information regarding Pb-Free reliability, 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, contact [Sheena Mitchell](#) or [Melissa Serres](#).

### **DfR Solutions in Toronto (April 16 - 19)**

[Craig Hillman](#) will be presenting to a number of companies in the Toronto area in mid-April on a variety of topics (Pb-free, design-for-reliability assessments, supplier assurance, etc.). If you are interested in having Dr. Hillman speak to your company, please contact [Sheena Mitchell](#) to make arrangements.

### **SMTA Medical Electronics Symposium (Bloomington, MN: May 1-3)**

[Craig Hillman](#) will present an all-day seminar entitled "Failure & Root Cause Analysis in Medical Electronics." Attendees will learn about failure mechanisms unique to medical electronics, and the tools and techniques used to identify these mechanisms. For more information, contact [Sheena Mitchell](#) or [Melissa Serres](#).

### **DfR Solutions in Minneapolis, MN (April 30 - May 3)**

[Craig Hillman](#) will be presenting to a number of companies in the Minneapolis area in early May on a variety of topics (Pb-free, design-for-reliability assessments, supplier assurance, etc.). If you are interested in having Dr. Hillman speak to your company, please contact [Sheena Mitchell](#) to make arrangements.

**IMAPS Military, Aerospace, Space & Homeland Security (MASH): Packaging Issues and Applications (Baltimore, MD: May 7-10)**

On Monday, May 7 at 1:00pm, [Gerd Fischer](#) will present a [tutorial](#) on lead free reliability issues and solutions. For more information on the presentation contact Gerd Fischer. For more information regarding the event contact [Tom Green](#).

On Tuesday, May 8 at 4:30pm, [Craig Hillman](#) will be on an [expert panel](#) that will address the global transition to lead-free solders and finishes in electronic assemblies.

**Lead-free Electronics in Aerospace Project (Crane, Indiana: mid-June)**

[Nathan Blattau](#) will be attending the LEAP meeting in mid-June and will be available for site visits to companies in the Indianapolis - Cincinnati - Louisville area. If you are interested in having Dr. Blattau speak to your company on a variety of topics (reliability prediction, thermal and mechanical modeling, component qualification and failure analysis), please contact [Sheena Mitchell](#) to make arrangements.

**SMTA Successful Lead-Free RoHS Strategies Conference (Boxborough, MA: June 20-21)**

[Craig Hillman](#) will be presenting a paper on "A Case Study in Tin Whisker Risk Assessment" at the SMTA Lead-Free focused event in June. For more information regarding the event, please contact [Melissa Serres](#). He will also be available for site visits to companies in the Boston area. If you are interested in having Dr. Hillman speak to your company, please contact [Sheena Mitchell](#) to make arrangements.

**SEMICON West (San Francisco, CA: July 18-19)**

[DfR Solutions](#), in conjunction with [PTI](#), is proud to announce two workshops at the upcoming SEMICON West:

[Craig Hillman](#) will present a two-day workshop, "[Understanding Failure & Root Cause Analysis in Electronics](#)," that will provide an in-depth understanding of the common mechanisms that initiate failure in electronics, and provide a comprehensive review of the tools and techniques used to identify those mechanisms. For more information contact [Sheena Mitchell](#) or click [here](#) to register.

[Jim McLeish](#) will present a two-day workshop, "[Best Practices in Failure Avoidance](#)," that will provide reliability engineers and management a foundation by providing a comprehensive review of the best practices in engineering and reliability assurance with case studies that will provide guidance on the practices most appropriate for a given design, use environment, desired lifetime, and available resources. For more information contact [Sheena Mitchell](#) or click [here](#) to register.

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OPS A La Carte provides professional consulting services to assist clients in developing and executing all elements of reliability throughout an organization and product life cycle - hardware and software! OPS A La Carte pioneered *Reliability Integration*<sup>SM</sup> - using multiple tools in conjunction to increase the power and value of any Reliability Program. Visit our website at [www.opsalacarte.com](http://www.opsalacarte.com) for more information, or contact us at [info@opsalacarte.com](mailto:info@opsalacarte.com), or (408) 472-3889.

**Advertise Here & Reach Over 5,000 Electronics Professionals Each Month!**

DfR is now accepting advertisements in the DfR Solutions Newsletter.  
For more information, [click here](#).