

Dear Colleague,

Happy Pb-Free Day! Pop the champagne, grab a slice of cake, and wait for the RoHS police to knock on your door...

RoHS Enforcement

Speaking of RoHS police, the European RoHS enforcement bodies, including the National Weights and Measures Laboratory (NWML) for the UK, have put together a RoHS Enforcement Guidance Document.

What's the bottom line?

- The first products selected for assessment will probably be consumer electronics (high volume, short life, unlikely to be recycled). No surprise there.
- The RoHS police will willingly accept information from competitors (external parties).
- Your product may be inspected (XRF) before you are asked for documentation.
- Small to medium companies will be asked to demonstrate compliance of product; large companies will be asked to demonstrate compliance of internal processes.
- Important: If you rely exclusively on your suppliers (statements of RoHS compliance, material declaration sheets), you will have to show that you have a system to determine if their statements can be trusted.

Our prediction? Keep your eye on the Pb-containing COG ceramic caps and the Br-containing printed boards and watch the sparks fly.

PS, NWML has also provided a nice explanation of "[due diligence](#)."

Sulfur and Immersion Silver (cont.)

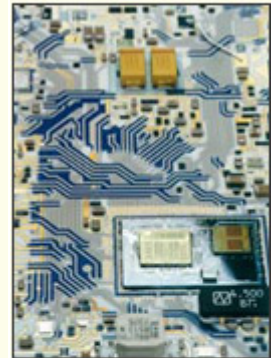
Due to intensive interest in our article on sulfur corrosion of exposed immersion silver, DfR has written a brief '[white paper](#)' on the topic. There are currently strong suggestions that a complex combination of design, process, and environment may play a role in this mechanism. If you are concerned about your own product, please contact [Craig Hillman](#).

Component Upgrading

DfR provides extensive guidance and expertise in reliable and cost-effective design. Part of this process is upgrading, which involves performing a risk assessment of parts used outside their manufacturer's specifications (typically temperature). As part of an ongoing

This issue:

[RoHS Enforcement](#)
[Sulfur and Silver \(Cont.\)](#)
[Component Upgrading](#)
[Tin Whiskers and NASA](#)
[RoHS Exempt?](#)
[Update: Risk and Ceramic Capacitors](#)
[SnPb More Expensive](#)
[Growth of Tin Whiskers](#)
[Update: RoHS Legislation](#)
[RoHS Overturned?](#)
[New to DfR](#)
[Upcoming Events](#)
[Employment](#)



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series for our readers, DfR will provide a brief white paper on how to uprate components. This month: [Electrolytic Capacitors](#). For more information on our uprating and derating services, please contact [Norm Anderson](#).

Tin Whiskers and NASA

NASA seems to be experiencing a dichotomy. On one hand, NASA is the most extensive source for [information on tin whiskers](#), performs some excellent research on the topic, and is the leader in pressing industry to acknowledge the risks of tin plating. On the other hand, NASA has decided that whiskers over 8 mm long are [not a failure risk](#). Confused?

RoHS Exempt?

Many manufacturers are relying on an exemption for monitoring and control equipment. ERA, under authorization from the TAC, has drafted an interim [presentation](#) and [report](#) on this issue. Two very interesting findings. One, ERA recommends proceeding cautiously because Europe has a larger market share in this category (who said RoHS wasn't a trade issue?). Two, the elimination of the monitoring and control equipment exemption is expected to be delayed out to 2010-2012.

Update on Risk and Ceramic Capacitors

In a continuation of our article in the April/May newsletter, DfR recommends that the appropriate industry bodies (EIA, IEC, and IPC) draft specifications that would require ceramic capacitor manufacturers to specify lifetimes. Lifetimes should be at maximum rated voltage and maximum rated temperature and should come with a recommended voltage exponent for extrapolation to use environments. This is a common sense approach on dealing with a known wearout mechanism. For more discussions on this topic, feel free to contact [Gerd Fischer](#).

A Penny Here, A Few Thousand Dollars There

Looking for that ball grid array with SnPb solder balls? Or that leaded device with 90Sn/10Pb to prevent tin whiskers? They are out there, but you better bring your paycheck. Some distributors and EMS providers are [reporting](#) price increases of 40-50% for components that are not RoHS-compliant.

Long-Term Growth of Tin Whiskers

In one of the longest studies on tin whiskers on record, Barrie Dunn of the European Space Research and Technology Centre provides some fascinating insight into the [long-term behavior of tin whiskers](#).

RoHS Legislation (Update)

You've probably already read that copycat RoHS legislation has been adopted in [China](#) and [Korea](#). Did you also know that the fever has spread to [South America](#)? And don't forget the 50 States of America. Most have [various forms](#) of WEEE legislation under consideration, with some adding RoHS-type requirements as well. California legislators lead the way, but they are starting to listen. The [latest version](#) of their RoHS legislation will not go into effect until January 2010.

RoHS Overturned?

Think again. While there are some voices of [protestation](#), many non-governmental organizations continue to push for these laws ([California League of Conservation Voters](#), [Sierra Club](#), [Californians Against Waste](#)).

New to DfR Solutions (Part II)

DfR Solutions continues to grow. We have hired another employee, [Joelle Arnold](#). Ms.

Arnold has already been written up in the [Washington Post](#) and CNN and has an impressive resume consisting of failure analysis, computational fluid dynamics (CFD) and finite element analysis (FEA).

UPCOMING EVENTS

Diminishing Manufacturing Sources and Materials Shortages (DMSMS) Conference (Charlotte, NC: July 11 – 12)

Craig Hillman will join Vance Anderson of DMEA, Charlie Minter of ONR, and Dr. Stephen Meschter of BAE Systems on an invited panel discussing the concerns regarding the RoHS legislation and government/military electronics. For more information, please contact [Cherelle Jeudy](#) or [Michael Erk](#).

Surface Mount Technology Association International (Chicago, IL: September 24)

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, popcorning, selecting a Pb-free solderability plating, choosing a Pb-free solder, 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](#).

Surface Mount Technology Association International (Chicago, IL: September 28)

Nathan Blattau and Craig Hillman will be presenting their publication, "Epidemiological Study on SnAgCu Solder: Benchmarking Results from Accelerated Life Testing". This paper will be the first to provide test engineers with a general expectation of Pb-free performance based on standard test environments (0 to 100C, -40 to 85C, vibration per MIL-STD-810, etc.).

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.

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

[Craig Hillman](#) has been invited to participate in an extensive discussion on the potential reliability issues with the use of lead-free solders. More information, including date and time, will be provided once it is available.

EMPLOYMENT

Positions Wanted

A manufacturing/process engineer with 30 years of experience, including 0201's, micro-BGAs/CSPs, and Pb-free, is looking for a position in the Washington-Baltimore area. Previous products include telecommunications, high-end servers, military, consumer, and oil drilling. For more information, please contact [Cherelle Jeudy](#).

