

All Change! RoHS compliance - A matter of substance



27 May 2010

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Just as engineers were getting used to the current rules regarding 'RoHS-compliant' components, the goal-posts are about to move again. Stephen Watts & Stephen Hopwood of Syfer Technology raise some serious issues that will concern all electronics designers and specifiers.

As environmentally-conscious citizens, most engineers welcome the spirit of the RoHS legislation, the WEEE directive, REACH and similar initiatives aimed at reducing the impact of man-made waste on the environment. Engineers are responsible for ensuring electronic equipment performs as required, so keeping track of new legislative requirements, and assessing the potential impact of material changes on design, adds another layer to an already complex product development process.

Now changes are being proposed to the EU RoHS Directive (dubbed RoHS2 by industry), and although not yet confirmed, a wide range of amendments are expected. The overall scope of the directive is likely to expand to include virtually all electrical and electronic equipment not covered by existing categories, adding medical, monitoring and control equipment and fixed installations, among others. Additional hazardous substances are under review for addition to the restricted list and the rules on exemptions are being tightened up. In the future, exemptions will expire after four years if alternative materials are available, unless an extension or modification to the exemption is requested and approved.

If you thought your electronic products were not covered by the scope of the RoHS directive then that might change. If you rely on an exemption for your process or product, you may need to be more active in monitoring that exemption. If you rely on component manufacturers to provide RoHS-compliant devices, then give a thought to their predicament too!

Exemption review

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In addition to RoHS2, the European Commission has contracted the Öko-Institut with Fraunhofer IZM to provide a technical review of the exemptions listed in the current RoHS annex of lead, mercury, cadmium and hexavalent chromium. Where there is a viable technical alternative to the exemption then the Öko-Institut will recommend a change to the current exemption, including expiry dates and transition periods.

The current status of the technical review is that a further stakeholder consultation is being conducted by the Öko-Institut with a final draft report planned to be issued to the Commission on 30 October 2010. As with all stakeholder consultations, the Öko-Institut states that "Neither the fact that a stakeholder consultation is being launched, nor the results of this stakeholder consultation should be interpreted as a political or legal signal that the Commission intends to take a given action".

This is an understandable clause but it leaves the industry in the position of having to anticipate what changes may be in the final version to be adopted in the legislation. It appears that the Commission may also request the Öko-Institut to review additional new or existing exemption requests and it is not clear when RoHS2 and / or the current RoHS exemption technical review will finally be submitted by the European Commission to make the requirements EU Law.

From a component manufacturer's perspective, it is the proposed changes to the exemptions affecting the use of certain raw materials that present, perhaps, the greatest concern. Some manufactures may be in a position where alternative compliant materials may not yet be readily available for their particular manufacturing process. Whilst the Öko-Institut will recommend an expiry period to allow the industry time to adjust to an exemption removal, it is likely that there will be issues for many organisations with respect to the overall supply chain. For example, new or modified materials may require further development and qualification testing, component manufacturing processes may need to be adapted and customers may require samples for their own qualification approval tests. All of which can take a considerable amount of time (possibly

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years). Do not forget that the qualification testing may prove that the new material is not suitable, in which case the process of applying for an exemption modification or extension will need to be started afresh.

Syfer Technology is a multilayer capacitor manufacturer, producing components within the UK that are then supplied globally to the electronics industry. One of the challenges of supplying devices worldwide, is the ability to identify and react on a timely basis to legislative changes, such as evolving environmental requirements. This ability is critical where proposed legislative changes may require literally years of development work before a fully qualified replacement material is available for release to customers. Not only are component manufacturers required to meet new legislative requirements, but also there is the real possibility that the supply chain will not be ready when new legislation is enacted.

Lead-free dielectrics

Here's an example of a major concern to Syfer. Many multilayer ceramic capacitors contain lead in the ceramic material, and this is permitted by the current RoHS Directive under exemption 7c in the Annex - *Lead in electronic ceramic parts*. However, the Öko-Institut review of exemption 7c has indicated that for capacitors with a voltage rating of <125Vac / 250Vdc, lead free dielectrics are currently available. Based on this, the proposed change is to phase out the exemption in 7c, such that lead in a dielectric ceramic in electrical and electronic components for a voltage of less than 125Vac or 250Vdc will no longer be permitted by 31 December 2012, and for the repair and to the reuse of equipment put on the market before 1 January 2013.

The proposed expiry date for this exemption was originally allocated by the Öko-Institut on the assumption that the Annex of the RoHS Directive will be amended by the end of 2009. It is anticipated (but not guaranteed!) that the expiry dates will be extended accordingly, to allow the

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industry time to implement changes required, dependent on when the proposals are accepted. Nonetheless, the transition period remains short.

In anticipating the trends in RoHS legislation, Syfer has already developed lead-free dielectrics for multilayer ceramic capacitors in these voltage ranges. Consequently, it is currently in a strong position to supply devices that meet the proposed changes to the RoHS directive. However, the Öko-Institut review findings that form the basis of this proposal primarily concern dielectrics used in relatively simple chip capacitors. Lead-free dielectrics including materials used for low voltage MLCC capacitors are notoriously piezo-electric⁽¹⁾ and for certain, more complex or sensitive applications, component users may find that these materials are not suitable. In fact, to investigate properly, a detailed analysis for specific applications is the only solution.

It is possible that a further exemption request may be required. This itself can take many months to process, and it should be remembered that a banned substance cannot be used until an exemption is granted.

Supply chain hangover

An additional concern is that capacitors with dielectrics containing lead are currently widespread throughout the supply chain. If the current proposed expiry dates are approved, it is highly likely that these devices, which will not be RoHS compliant, will still be available. The result of this supply chain hangover will be potentially serious compliance problems.

This is just one example of the proposed changes to the EU RoHS directive. When RoHS2 and/or the exemption review are finally enacted, it is anticipated that there will be a significant increase in material declaration data required by OEMs, importers and distributors, to ensure that components are compliant. However, some customers may find that this data collection exercise is conducted too late. The danger is that current exemptions may expire before the

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market is fully prepared, with the potential that some products, stocks or supplies will be deemed to be non-RoHS compliant. In addition, some customers may require qualification testing to approve alternative components, which again takes additional resource and time.

Furthermore, companies serving worldwide markets need to monitor and react to other requirements such as the EU REACH directive, as well as similar directives in other parts of the world. China's RoHS and REACH legislation, for example, have different compliance requirements, including product labelling. Korea's RoHS directive is similar to the EU RoHS, but some other countries, states and even companies specify their own requirements. As new legislation is implemented and current legislation evolves, the potential for component material non-compliance issues increases throughout the supply chain. The efforts made by component manufacturers to anticipate and prepare for RoHS changes are going to be much appreciated by engineers trying to avoid the headaches of a supply chain hangover!

Ends.

Note (1). The reference to piezo electric does not refer to piezoelectric devices, for which the Öko-Institut has not recommended a lead ban, but to a known characteristic of lead free dielectrics for low voltage MLCC applications which affects their suitability for some applications.



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