Getting greener

A year after RoHS came into effect, it's business as usual for some, but the ripples are building in the high reliability sector.
By **Vanessa Knivett**.

As the transition to RoHS compliance gathered pace last year, a feeling of relief might have been detected across the electronics industry. In the UK at least, there is evidence of business as usual – thanks to UK 'enforcer' National Weights and Measure Laboratory, whose 'softly softly' approach coached companies through the compliance process. However, it isn't possible to say that most companies are compliant or that RoHS hasn't had a dramatic impact. But the real impact of RoHS is only just being felt in some sectors.

Initially, companies that sought to comply with RoHS ahead of the deadline experienced difficulties sourcing compliant parts. Then, with the deadline looming, concern was voiced that excess non compliant stock would lead to expensive and wasteful write offs. In reality, components for the increasingly powerful consumer segment quickly made the transition, whilst the supply chain's inventory control kept a tight rein on non compliant stock volumes.

As a result, apprehension has built about limited supplies of non compliant inventory, with the greatest effect in areas where RoHS' impact was predicted to have the least impact – in exempt industries such as aerospace, defence, medical equipment and telecommunications, where systems typically have high development costs, long availability and require decades of support.

Over the last decade, the electronics industry has changed and RoHS has underlined the extent to which power has shifted to consumer electronics. The erosion in the high reliability sector's influence may have been exacerbated by its willingness to adopt COTS products and thus capitalise on the performance gains and price of consumer electronics components, plus by the squeeze of global competition – leaving contract manufacturers, already working to tight margins, unable or unwilling to support compliant and non compliant processes.

Dr Chris Robertson, head of ERA Technology's reliability and failure analysis team (www.era.co.uk/rfa) confirms that RoHS is affecting the high reliability sector in a number of ways. "Firstly, there is the supply chain movement – it is not being driven by that sector." Market analysis by Prismark suggested the total available market for all high reliability categories represents around 10% of revenue for the component supply base.

Dr Robertson adds: "With some components rendered obsolete, they are suffering problems finding replacements and are considering moves such as retinning components. Also, many of their clients are applying pressure to their supply chains without understanding the true requirements of RoHS. For example, aircraft component manufacturers are being encouraged to produce RoHS compliant sub assemblies, despite being an exempt industry."

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Gary Nevison, **Farnell**

One of ERA's customers is Smiths, several of whose commercial customers have asked suppliers to meet RoHS and WEEE type requirements, despite some products falling outside scope. Dr Robertson comments: "Those specifying some of these procurement contracts need to understand why you might be using something [environmentally harmful] – generally, there is a very good reason and you don't choose to use something like cadmium wilfully."

Re-education

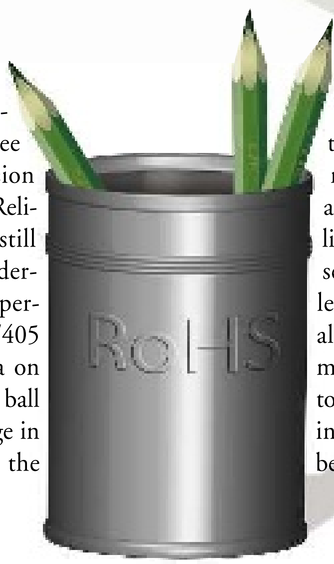
Many within the high reliability industry believe more education is needed about the characteristics of high reliability product life cycles. The aim is to persuade suppliers to maintain dual supply chains by offering components in tin lead and lead free. Needless to say, many suppliers aren't too excited about that.

One organisation voicing concern for the high reliability sector is the International Electronics Manufacturing Initiative (iNEMI), whose ceo Jim McElroy confirmed: "Many have been surprised by how quickly things have unfolded. The high reliability community realised its exemptions wouldn't last forever, but felt that at least it took some of the immediate pressure off whilst they went about trying to close the knowledge gaps related to lead free and other substances within RoHS' scope.

"Our job is to make sure the sector is focused on closing these knowledge gaps and convincing suppliers, in the interim, that their continued support is needed. But the biggest challenge right now is to address the availability of components – we can almost forget about exemptions."

Most components involve a change of surface finish from tin lead to pure tin. From an assembly point of view, such components are backwards compatible and can be soldered with either tin lead or pure tin paste, although performance impairment can result from the growth of tin whiskers. The high reliability industry remains concerned about the risk of rapidly converting to lead free products prior to fully understanding the implications on long term reliability.

Of most concern though, is the threat of not being able to secure SnPb compatible bgas. Although more environmentally friendly ball metallurgies are coming on stream, the consortium is campaigning to ensure that different part numbers are used to differentiate them. Mike Davisson, RoHS technical program manager for Agilent Technologies, commented recently: "The proliferation of solder ball metallurgies only makes it more difficult to close the remaining knowledge gaps for Pb free conversion of mission critical applications. Reliability experts are still working to fully understand the long life performance of SAC 305/405 and have limited data on some of the alternate ball formulations. A change in metallurgy without the ability to track the change will only make Pb free conversion more difficult and could delay the process."



McElroy says industry is making headway on closing the knowledge gaps; adding that iNEMI is working on understanding where the remaining knowledge gaps are and ensuring that R&D activities are coordinated.

Looking to the future, Gary Nevison, Directives expert at Farnell, intimates the true implications of RoHS are yet to be felt. "The RoHS Directive has been in force for less than a year and is already being reviewed by the EC. Any changes are possible, including adding more substances to the list or changing the scope. The closely related WEEE Directive is also being reviewed and it is likely that changes will be made in the near future – and these are unlikely to reduce its scope."

In its reexamination of RoHS, the EC is looking at some of the unintended consequences of RoHS, such as more tin mining and increased demand for silver. Nevison says that, as yet, there is little visibility as to which substances, if any, will be added to the list. Robertson agrees, although makes the point that manufacturers should bear in mind that Chinese RoHS isn't restricted to six substances, but leaves the door open for more. He also advises manufacturers to pay attention to the European Chemical Bureau's investigations into a number of substances, including the flame retardant TPPA, Bisphenol-A, hexabromocyclododecane (HBCDD) and decaBDE (for more, see **http://ecb.jrc.it**)

Asked whether there is evidence of exempt industries moving towards compliance, Nevison confirmed that 'medical seems to be the most active.' With category 8 and 9 equipment considered likely to come within scope, it seems that lessons are being learnt about acting early, although the EC knows that manufacturers will need time to comply and the general feeling is that it won't happen before 2012.