Material Declarations: Risky Business - Perspectives from your Supply base

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Abstract

Component Material Declarations are a key building block for all OEMs (Original Equipment Manufacturer) and CMs (Contract Manufacturer) preparing a sound due diligence case for RoHS Compliance. These reference documents would assist in absolving your company's liability should RoHS-Compliancy be questioned. The amount of data, timeliness, and accuracy are all elements that could make or break your organization. What is available in the Supply Chain? What are you supplying to your customers? What can you expect from Suppliers? How will you maintain and guarantee the accuracy of the data? What is your distributor partner passing on to their customers and suppliers?

Simplicity, accuracy and common sense are required for successful RoHS Implementation, and this paper will provide you with the experiences of the past 18 months from leading components manufacturers.

Introduction

Implementation of the RoHS Directive implementation has been compared to a Y2K on steroids. With less than 250 days to the July 1, 2006 deadline, we are still faced with apocalyptic sounding headlines: Train Wreck[1], and most recently, Material Declaration Still a Mess[2]. With such little time remaining, much must still done, including the most fundamental of all: completing the conversion to RoHS-compliant production. However, the biggest obstacle appears to be getting adequate information for the myriad of components in the supply chain. The key elements include surface finish, temperature capability, part identification and availability. Furthermore, additional reference information to prove the validity of RoHS-compliance is required to provide the engineer and his company with the confidence expected in the transaction between supplier and customer. While the intention of the RoHS and WEEE Directives was meant to be based on a simple and understandably inexpensive transaction, the conversion to RoHS-compliant products has been everything but. Coupled with the difference in the interpretation of the law in the USA and Europe, and in the absence of a precedence case, there are still many unknowns particularly relevant to what is required to successfully defend a regulatory challenge.

Presumably many will follow the UK's lead in allowing for a due diligence defense. As a result, a material declarations forms the cornerstone of building a sound due diligence case.[3] While material declarations do not absolve a producer of responsibility for some level of validation, they are the fundamental building block for the entire supply chain.

There is a lot riding on the accuracy and comprehensiveness of material declarations. The consequences of not getting it right are quite large, including amongst other results, loss of brand image, lost sales, penalties and fines. The implementation framework most

cited also allows for passing liability down the supply chain if the producer can show that they took all reasonable steps to comply with the directive.[4] While the RoHS Directive applies to finished products, this approach puts the entire supply chain on equal footing relative to responsibility for compliance with the requirements.

The result has been a capricious landscape over the past few years. Since the RoHS Directive was ratified, component suppliers have observed the changing response of their customer base from initial inquiries to determine basic awareness of the directive and transition plans to most recently, addition of compliance requirements in contracts, purchase orders, and even EDI transmissions.

From a supplier's perspective, regardless of the component produced, there are significant risks associated with material declarations that need to be shared, explored, and contemplated across the supply chain. We all share in the burden of establishing full compliance with existing directives and new ones as they emerge in the most cost-effective, agile manner possible. The remainder of this paper explores steps in the declaration process, incorporating supply base experience and concerns along the way.

Define Compliance

In terms of using a material declaration to prove due diligence in complying with the requirements of the RoHS Directive, one must first establish what is required to be considered compliant. As published, the RoHS Directive requirements were open to significant interpretation. It took over two and a half years between ratification of the Directive in January 2003 and the Commission Decision of August, 2005[5] to legally define the maximum concentration values (MCVs). The subject of homogeneous level definition still leaves much to be desired, and its impact, has hit newer technologies of the past decade the hardest. The ERA executive summary of April, 2004 [6] gave fairly clear indication of what the accepted definition would become. Subsequently, this definition has been endorsed by the TAC [7] and included in the UK's guidance notes[8], but remains undefined in the Directive. In fact, the UK's guidance notes document states that the Directive will be amended to reflect the homogeneous level definition when decided.[9]

Many will argue that it has been decided and there should be no further debate. Note that in most references, the subject of MCVs can be addressed in a simple paragraph, but it takes six to address and define the meaning of homogeneous levels. Even with the examples provided, there is debate within specific industries regarding proper application of this definition for a specific component. The possible resulting differences between suppliers of similar components can add to the confusion, making comparisons between multiple sources somewhat problematic.

The most overwhelming concern, however, is that many of the early material declarations were made at the component level instead. Shifting definitions render much of this early data irrelevant and even inaccurate. One major EMS provider indicates that all their declarations had to be redone and provides an example of dedicating a resource for two months to correctly define a single BOM. [10]

Determine Declaration Scope

The simplest of all material declaration would be the simple Yes or No answer certified by an electronic signature. However, the overwhelming fear appears to be that this will not be enough. In the absence of case law to better define the minimum required to successfully establish due diligence, declaration requests for PPM content are becoming the norm.

An increasing portion of declaration requests go far beyond the 6 Hazardous substances in the RoHS Directive. As a response to both current global legislation and other market requirements, release of the Joint Industry Guide, JIG-101, in April 2005, added to the list of substances required for declaration.[11] The final draft of IPC 1751/2 material declaration standard, also speaks to the "more is better" approach. In addition to the six RoHS-restricted substances, it also supports extended compliance declaration to JIG A and B, a customized list, or ultimately, a full declaration. The IPC 1752 version supports not only full declaration, but full declaration at the homogeneous level. [12]

No one can accurately predict what will be required with future environmental legislation, such as the European REACH (Registration, Evaluation and Authorization of Chemicals) Directive, ratification of new RoHS-like directives across the globe, as well as enhancements to the existing EU RoHS directive. Customers and consultants frequently indicate that even with all the 'unknowns', material declaration can be a "one time deal". Asking for more than is required to establish RoHS compliance eliminates the consequences of not having enough information at some future point in time. From the component supplier's perspective, some concerns quickly surface.

It has taken some time to navigate changing declaration scope definitions to get to our current state of a fairly common understanding across the supply chain. There is at least one concern that remains and it is a challenge to all of us being pressed for full declaration. A past Design Chain Associates (DCA) newsletter describes a "significant disconnect" between what some customers are asking for and their suppliers are willing to deliver.[13] At the heart of the disconnect is the desire to protect proprietary formulations. Many suppliers concur with DCA's call for a compromise on adequate declaration to support all forms of due diligence while protecting intellectual property.

Define the Declaration Format

Initial declaration requests were as varied as the number of organizations submitting the requests. Getting to a standardized format has taken time. Standardization supports being able to deliver relevant and accurate responses with reduced cycle times and resource involvement. It is a good thing for the entire supply chain.

Standardization for material declaration has been a slow process and along the way, a number of methodologies have emerged, all vying for, but none becoming the global standard of choice.

As the End of Life Vehicles (ELV) Directive (2000/53/EC) came into force, the **IMDS and Compliance Connect** systems evolved. Component manufacturers have been logging material declarations into these systems for several years now. Both require full declaration. The Compliance Connect system offers more user friendly features and provides an "other" category to allow for protection of proprietary formulations that IMDS does not. Both systems require fairly significant component manufacturer resources to maintain.

In response, the **Umbrella Specifications** were developed by the Electronic Components Division within the German Electrical and Electronic Manufacturers' Association (ZVEI). Based on what they defined as Good Declaration Practice, this German-based industry group created a suggested sheet which could be used to provide data on an individual product, or product group basis. Individual parts containing like materials made from similar processes would be declared under the "umbrella" of the product group. This simplified approach was presented as an alternative to IMDS and Compliance Connect to eliminate non-value added

effort required in maintaining these systems. [14]

Other methodologies have proliferated as well: the Japanese Green Procurement Initiative (JGPSSI), Joint Insudstry Guide (JIG-101), and Sony's Green Partner Certification all provide other declaration formats. Until a global standard exists, the confusing array of versions will continue.

In the final stages of development, the IPC 1751/2 material declaration standard, provides another opportunity for global acceptance of a material declaration format. OEMs and EMS providers have lead the charge in developing the IPC standard. Component suppliers and distributors have supported it. To some extent throughout development and most certainly during industry review, Europe and Asia have followed progress with growing interest and support.

On the path to standardization, the entire supply chain has struggled. Early declarations that came in a multitude of formats required an individualized approach to completing each declaration request. As requests for more detailed material declarations began to emerge, many high-powered technical resources added "Excel Spreadsheet guy" to their resume skill set.

Compounding this effect, many early systems apparently did not provide for much centralization and resulted in a promulgation of requests stemming from the same requester. A single component supplier may have completed up to 50 or so spreadsheets for the same OEM – each OEM's location having had submitted the same request and each of the OEM's EMS providers subsequently having had submitted the same request for each of their locations. This type of activity has dissipated to a large degree as organizations have been able to develop the internal infrastructure supporting adequate coverage of their supply base.

Added to the complexity appears to be an overload of requests of parts that are no longer required, or purchased. In addition, many requests relating to packaging and batteries, themselves covered in other Directives, have appeared. For the manufacturer of a device with 100 to 1000 components from various channels and suppliers, the task has not been made any easier since there is no central point of contact for such information.

And implementation of the pending IPC 1751/2 is not without issue. The primary concern centers around the fact that B2B communication is not fully adopted throughout the supply chain. Without electronic push and pull of requests and responses, those not able to support B2B can easily become overwhelmed with the volume requests generated by a 1 part per form solution. The experience of component manufacturers is that material declaration requests can include 1 to potentially thousands of parts. The typical declaration request, contains several hundred part numbers. Even at that level, with an extensive customer base, the volume of PDF file requests could reach the million range quickly.

However, IPC 1751/2 is ultimately a leap in the right direction. Given time to build the IT infrastructure required, the 1751/2 solution can run seamlessly in the background because of the common format. This not only opens the door for spreadsheet guys to go back to their technical positions in development, applications, or operations, but it also provides an opportunity for the requester to access data as needed, allaying some of the accuracy concerns covered earlier.

Getting the Declaration

How a trading partner obtains their material declaration influences the degree to which the reliance on a declaration

outdated by subsequent transition comes into play. A number of approaches are currently employed. Each captures unique considerations and results in further areas of concern. They are presented in progressing order from lowest to highest risk relative to the accuracy and validity of the declaration obtained in any given request situation.

1. Manufacturer Source

In many cases, customers desiring a material declaration request it directly from the component manufacturer. Having long established relationships with our individual customers, there is familiar knowledge of our approach to change control, ordering and shipping methods, technical request and response systems, and in most cases, a basic (sometimes fairly advanced) knowledge of component material sets and construction methods. All this better positions the material declaration requester to quickly obtain accurate data for their specific products, work directly with their supplier to resolve any questions regarding correct identification strategies, reliance on exemptions, or other issues and ultimately, facilitates a win-win situation for both trading partners.

By this time, virtually all manufacturers have established their website as an electronic vehicle for access to at the very least compliance status and timelines to offering material declaration information. Early "green" website pages quickly became stale and inaccurate, again due to lack of infrastructure to maintain updates and also, partially to ongoing product transitions. As the pace of product transitions picked up, many in search of information quickly became concerned about relying on this method.

However, there is data out there to support that this is showing some signs of improvement. The RoHSwell.com site evaluates data posted on manufacturer websites and assigns ratings based on defined criteria. When they began publishing data on over 90 manufacturer websites in January 2005, no manufacturer was awarded the highest score. Since that time, TI has achieved that rank and others' scores have improved. [15] While websites are becoming a better source of information, the overall results, > 50% still capture the lowest two possible scores, would indicate more work needs to be done.

2. Distribution Source

The distribution channel is clearly divided into two primary camps when it comes to material declarations. One subscribes to the theory that the distributor assumes liability for accuracy of the material declaration if they pass on to their customer declarations provided to them by their component suppliers.[16] On the other extreme, some distributors, recognizing the need for immediate and easy access to compliance status and material declarations, presumably are either not concerned or accept the implications of liability by making data obtained from their supply base available to their customer base.

Regardless of which approach is taken, all U.S. distributors have used the NEDA spreadsheet to collect RoHS-related information such as compliant versus non-compliant part numbering, availability dates, peak temperature capability and moisture sensitivity from all component suppliers on their line card.

While distributors wary of assuming liability for data they did not generate do not provide material declarations, they do provide information collected from the spreadsheet. In this regard, they are an excellent source of information for companies purchasing components through the distribution channel. Additionally, they provide links to component manufacturer websites, providing an avenue for their customers to become self-serving in their

quest for any additional component compliance information or material declarations. For distributors who do provide material declarations, this may be considered a premium level of service for which the customer pays.

3. Third Party Source

Based on repetitive exposure to many of the same components, third party consultant services offer the small to medium size companies who do not have the resources, the additional personnel to collect data from suppliers and manufacturers. The risk of not being part of the physical supply chain means that an implied Compliance must still be verified between Supplier and Customer, since no guarantee exists between the information and the product in the supply stream.

It is not the intent of this paper to put data providers at any level in the supply chain in a bad light. Some organizations do an admirable job dealing with a foray of requests, managing data and responses both wisely and with high regard for business ethics. The intent is to point out that significant potential abounds for honest error, negligence and possible abuse. As is the case with anything being sold in a free trade system, the ground rule is "buyer beware."

For users who must obtain data in any manner other than directly from the manufacturer, the key message to remember is that the component manufacturer has lost visibility of that data beyond the organization they originally released it to. While RoHS compliance status is typically readily available, many component manufacturers require a non-disclosure agreement (NDA) before releasing actual content data to any entity. Always question the validity of any content data received by alternate means and check the fine print regarding what, if any, responsibility your source assumes for accuracy of the information provided and / or your resulting use of that data. Question what process is used to maintain an evergreen and accurate pool of supplier information. Validate a sample of the supplier data obtained using the component manufacturer's web site or by contacting the component manufacturer directly. If anything does not match, all the data obtained should be considered suspect until the reason for the disparity is both understood and corrected.

Manage the Declaration Response

Feedback from customer partners is that results of the material declaration are used to 1) establish BOM compliance against the legislative requirements and 2) provide guidance in future sourcing decisions. The management tool of choice appears to be archiving the information into a database.

In addition to the Directive definition being a moving target (reference previous discussion on MCV and homogeneous level definitions), we have all been in a state of transition relative to both our products and processes. In a Summer 2004 study conducted jointly by Avnet and Technology Forecasters Inc. (TFI), 44% of the component suppliers interviewed were already manufacturing compliant parts and virtually all, 94% were designing them.[17] That equates to 50% transition between the mid-2004 timeframe and the end of 2005.

In a perfect world, the long-establish Process Change Notification (PCN) system would work to minimize or even eliminate this grave concern. Literature searches lead one to believe that this is potentially a great myth on the road to compliance. One very clearly documented example comes from the transition guidelines published by the EMS Forum, a consortium of EMS providers Celestica, Flextronics, Jabil, Plexus, and Sanmina-SCI. Referencing JESD46-B, their first logistical guideline is that all part changes to lead-free / RoHS compliance

should be documented by PCN and should be considered major changes. [18]

In the case of directive compliance, the sheer volume of PCN activity is overwhelming. An OEM recently reported to one of this paper's writers that they currently receive an average of 45 PCNs per day and at best, are 6 months behind. It is not practical to believe that the PCN system approach will provide us with a mechanism to assure that material declarations are maintained up-to-date as transition continues. Couple this factor with many component suppliers not offering a part number change, despite the mandate of industry heavyweights such as the National Electronics Distributors Association (NEDA), the EMS Forum, and numerous major OEMs and EMS organizations. Not changing the part number necessitates maintaining multiple declarations for the same part based on date code, adding a whole new volume of data to pursue and maintain.

Reliance on a declaration outdated by subsequent transition is a significant concern for the supply base for the impact it has on sourcing decisions and the subsequent potential for unwarranted loss in business.

Conclusions

Today's electronics supply chain operates in an environment of rapid fire change. Components must continually become smaller and more powerful with improved efficiency and offered at a lower cost – a tall order for an industry with already razor thin margins. The time to market required to remain competitive has reduced development cycles to a fraction of what they were just 5 years ago. In this industry, timing is everything in many aspects of the business. Establishing material content compliance is significant enough on its own. Coming on the heels of Sarbanes Oxley, it has been a challenge for even the most prepared from a resource perspective. And, to add to the problem, there is a clear understanding across the supply chain that compliance must be delivered at cost parity. At all levels in the supply chain, the additional resources required in Engineering, Procurement, Manufacturing, and IT must be absorbed. These costs potentially even surpass the immediately obvious costs of higher raw materials and energy costs related to higher processing temperatures. Bottom line, lead-free is not free and neither is RoHS.

With less than 9 months to go before the July 1, 2006 deadline, the entire supply chain has been navigating both uncharted and tumultuous terrain. A number of the concerns pointed out by this paper are becoming less of a concern as time goes by as the industry becomes better prepared.

- Directive definition is shaping up. The RoHS restricted substances finally have a legal definition of MCV and homogeneous levels are better understood.
- IT and other infrastructure to support material declaration is strengthening. This leads to less repeat requests, better management of data, and ultimately ability to support B2B capabilities for automatic real-time data sharing.
- Product transitions are nearing completion. As pre-existing inventories in the supply chain depleted, the risk of obtaining and using non-compliant products manufactured before conversion lessens.
- Material declarations formats have reduced from one for every trading partner to a handful of commonly used formats. Global standardization may be just around the corner with the pending release of IPC 1751/2.

On the other hand, a number of concerns remain unresolved. Trading partners along

the supply chain must work together to resolve these effectively.

- Compromise positions on full material declaration at the component and homogeneous level to allow manufacturers to provide their customer with sufficient evidence to support due diligence while at the same time protect their proprietary formulations.
- Work together to identify a standard method of reporting material declarations and support future requests using this method. Drive toward building the B2B connections that automate this process, achieving both superior accuracy and minimized resource allocation.
- Assure validity of material declarations being used. The highest level of confidence is achieved when it can be confirmed that the information is current and correct.
- While the transition is increasingly more complete, some volume of components manufactured prior to the transition remain in the supply chain and some components still have to convert. We are nearing a more settled environment where the PCN system will not be so overloaded and can once again do what it was designed to do – manage change effectively.

Consider the merits of a central registry as a solution that absolved all these concerns. Having a central, single source of data that as suppliers, we push into, and further down the supply chain, partners pull out of makes a lot of sense. In this electronic age, such a centralization of real-time data is not only a possibility that could support the supply base, but the legislative enforcement authorities as well.

Component suppliers, distributors, EMS providers, and OEMs share a long history of partnering to overcome the significant challenges this industry has faced over time. The transition dictated by the RoHS and WEEE Directives has been taxing on us all and is not over yet. As in the past, successful resolution requires that all trading partners in the supply chain truly engage in partnership. Now more than ever, get close to your suppliers and stay close to them. By working together, years from now, we'll all be able to reflect that meeting the RoHS Directive really was like Y2K – come and gone, business as usual.

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