

EMS TRENDS

SUMMARY

This article provides an update on REACH toxicity legislation to date. One of the stark contrasts between REACH and RoHS is the number of substances that must be tracked and evaluated. The key to REACH is article definition based on composition-level data.

REACH Exposed: Stressing Environmental Compliance

In June 2007, I contributed an article to *SMT* that focused on the emergence of environmentally conscious technologies (ECTs), to address the ever present requirements for greener products and the greening of manufacturing supply chains. The key factors identified when evaluating the use of ECT's were toxicity, energy, and waste.

Toxicity requirements have been driven by global product environmental compliance (PEC) legislation such as WEEE, RoHS, and REACH. ECT toxicity considerations should include an evaluation of the hazardous substances used in the manufacturing process as well as the toxic substances that end up in electronic components, sub-assemblies, and finished products. This article provides an update on REACH, the latest and most demanding piece of

toxicity legislation to date. It will help assess the impact of REACH compliance activities on SMT companies and their customers and recommend steps to prepare for REACH.

REACH Terminology

Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH) is the latest piece of European Union (EU) toxicity legislation aimed at evaluating, monitoring, and restricting the use of hazardous chemicals or substances used in EU manufacturing facilities and in products or articles that are put on the market in member states. One of the new spins to the REACH legislation involves the terminology. To clarify: chemicals are the same as substances, and articles are the same as products. Articles are not preparations, solutions, or mixtures to create solutions, such as cleaning solutions. To keep this explanation as simple as possible, I will use the terms substances and articles throughout the remainder of this article.

SMT Companies

Most U.S. companies, including SMT manufacturers and their customers, will need to contend with toxic substances that are in the articles or products that they sell. Article manufacturers are affected by REACH if their article contains substances that will be intentionally released during normal conditions of use and more than one tonne (1,000 kg) of the substance is put on the EU market within a one-year period; or their article contains a substance that is listed as a substance of very high concern (SVHC) with a concentration value (referred to as maximum concentration value,

or MCV) of greater than 1000 ppm based on the weight of the substance as a percentage of the weight of the article.

The one tonne per year "put on the market" criteria is per importer or producer. To calculate annual substance tonnage thresholds accurately, importers and producers must know the aggregate weight of specific substances in each article at the Chemical Abstracts Service (CAS) number level. Once that is determined, manufacturers must multiply the aggregate substance weight in each article by the number of articles imported into or produced in the EU, determining if the tonnage criteria for each CAS substance was met. Conversely, an importer must track the aggregate tonnage from each manufacturer that it purchases articles from and aggregate the total weight of all of the CAS-specific substance weights for all articles imported to determine if the amount of the substance in all of the articles imported from all manufacturers ex-

The screenshot shows a software interface with a tree view on the left and a main data table. The table has columns for 'Substance Name', 'CAS Number', 'Concentration', 'Classification', and 'Status'. It lists various chemical substances and their associated data for compliance tracking.

Figure 1. A key requirement will be analyzing articles at the REACH SVHC level.

ceeds the one tonne per annum "put on the market" threshold.

The intentionally released criteria are still unclear. To date, the release of a substance is deemed to be intended when the release of the substance contributes to the added value of the article and is not connected directly to the end use function of the article. The example that has been provided in order for the intentionally released criteria to apply is the release of perfume from a perfumed eraser (function = to erase, added value/function for convenience = quality to smell good).

Understanding SVHCs and their impact on the articles that you produce is critical. Many companies are still unaware of the

SVHC list. In a nutshell, any substance that is classified as a SVHC will be restricted if it exceeds the REACH MCV threshold as described above. Restrictions could include a total ban or limited authorization for specific use cases. The following substance groups currently are classified as SVHCs: carcinogens, category 1 or 2; mutagens, category 1 or 2; toxic to reproduction, category 1 or 2; persistent, bioaccumulative, and toxic; very persistent and very bioaccumulative; substances that have endocrine-disrupting properties. These groups include many substances found in today's SMT articles — lead, nickel, beryllium, antimony, chromium, PCBs, and a variety of compounds associated with each of these substances. One of the stark contrasts between REACH and RoHS is the number of substances that must be tracked and evaluated. RoHS initially included six substance groups that contained approximately 100 substances. The REACH SVHC list is expected to include approximately 3,000 substances, increasing the substance tracking and management activities for SMT companies by 30x.

A key difference between REACH and previous toxicity legislation such as EU and China RoHS is the method used to calculate the MCV of a substance in an article. EU RoHS established the concept of "homogeneous materials;" it was determined that an article would be judged to be compliant based on a concentration value of less than 1000 ppm based on the weight of the substance as a percentage of the weight of the homogeneous material of which that substance was a part. We calculate REACH substance-level compliance for an article differently. It is based on the weight of any of the SVHC substances as a percentage of the weight of the article. The REACH MCV approach is more helpful to article manufacturers, as it is easier to be compliant when the substance weight is a percentage of article weight, not a percentage of homogeneous material weight.

Analyze Articles at the SVHC Level

Another key difference in REACH versus RoHS is the method in which articles are defined. Current REACH guidance indicates that the total weight of an article will be determined by what stage of integration an article is in when it is imported into the EU. If a substance is imported as a constituent in a small article, such as a resistor, it may exceed the MCV based on the weight of resistor. If, however, the same resistor is imported as part of a subassembly, such as a PCB assembly (PCBA), then the article may more likely be compliant. This is a result of the compliance MCV calculation being based on the aggregated weight of that specific substance in all of the other articles that make up the subassembly. REACH compliance will be calculated based on the aggregated substance weight as a percentage of the PCBA weight versus the substance weight as a percentage of the resistor weight. If this sounds like it's going to be complicated, that's because it is. It gets even more interesting when the article is a finished product, such as a radio, that contains multiple PCBAs. Then substances must be aggregated across the various components in each of the boards.

Recommended Actions

SMT companies will be asked by their customers to provide substance-level information for the articles they sell. Even if an SMT company does not export products directly to or manufacture in the EU, one of its customers most likely does and will require substance-level weight information for each component that it buys. This will apply to resistors, capacitors, ICs, bare boards, and everything else you can imagine. As noted earlier, it is easier to be compliant if an article is a finished product or a subassembly than a sin-

gle component, so having substance-level weight data for each component in each subassembly in each finished product improves both your — and your customers' — chances of passing the REACH SVHC MCV test for articles.

If you have yet to start collecting full disclosure substance-level data for your products, start immediately. We know that companies have resisted data collection activities at this level and we know why, based on personal experience. It's hard work and the accuracy of data received always is suspect. To keep your customers happy and reduce the internal costs associated with PEC activities, we strongly recommend that SMT companies:

- Create REACH awareness in the supply chain by sending out letters to all their suppliers, announcing the requirement for substance-level composition data for all purchased parts;
- Conduct a risk assessment to determine how REACH will affect business, disrupt the supply chain, and impact customer care;
- Prioritize products or product families affected by REACH and rapidly implement a program to audit their current compliance status based on analysis of full disclosure substance-level information;
- As appropriate, conduct a chemical inventory initially focused on all process and maintenance chemicals currently being used at EU manufacturing facilities;
- Consider outsourcing REACH data collection, management, and reporting activities to companies that specialize in this area. **SMT**

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