



LEAD TESTING IN TOYS

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When Mattel, the world's largest toy maker, recently announced a toy recall due to elevated levels of lead paint, most companies purchasing products from China took notice. Almost immediately, toy distributors and licensors, such as Disney, Toys-R-Us and Sesame Workshop indicated that they would initiate their own independent testing of their products, including random testing of toys already on store shelves.

Lead Poisoning

Lead is a heavy metal that naturally occurs in the Earth's crust, but it is also very hazardous. Elevated levels of lead in adults can increase blood pressure and irritability, create nervous system disorders, and affect concentration and kidney function. Lead is especially dangerous for small children whose bodies are still developing. Children with high lead blood levels may develop anemia, severe stomachache, cognitive language deficiency, and brain damage.

Lead can be ingested into the body through the air, drinking water, food, or by handling dirt that contains lead. One of the most common forms of lead contamination is exposure to lead dust from older homes painted with lead paint. Children can get this dust on their hands and toys and it eventually finds its way into their mouths.

During the 19th and early 20th centuries, lead was intentionally added to many products. Lead paint is cheaper, harder and lasts longer than lead-free paints. Lead was added to gasoline to reduce engine knocking and boost octane levels. And although a phase-out is currently underway, lead is still used in solder to reduce stress and cracking on electronic components. A large volume of lead is used in automotive and industrial batteries.

Lead paint usage in the United States was greatly reduced in the 1950s and completely eliminated in 1977. Also in the 1970s, leaded gasoline began a phase-out and it was banned entirely in 1996. As a result, the blood lead levels of American's have been reduced significantly, as has the incidence of lead poisoning.

China has recently implemented a Restriction of Hazardous Substances (RoHS) initiative. However, enforcement of individual companies is much harder to accomplish. And since lead-free paint can cost three times as much as lead paint, manufacturers sometimes skirt the legislation and use the cheaper material.



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However, the responsibility of ensuring a quality product rests with the company whose name is on the package.

The Supplier Qualification of product can be done in numerous different ways. It can be conducted through supplier self-assessment and self-certification, supplier quality audits, and/or third party audit, as per defined Acceptable Quality Level (AQL). The most effective and efficient way is having an internationally accredited laboratory certifying your supplier as per your AQL requirements. The third party supplier assessment and AQL audits eliminate the expense of having lead testing equipment, and the personnel performing the audit in different parts of the world.

Lead Testing

Products can be tested for lead in different ways and the choice of test depends on the budget and accuracy requirements. A quick and simple method to test for lead is commercially available do-it-yourself test kits. The kits are easy to use and indicate if lead is present on the surface of the product. These kits do not indicate how much lead is present, however, and their reliability at detecting low levels of lead is questionable. In addition, the kits measure the presence of lead only on the surface of the product. A toy could be made entirely of lead but painted with lead-free paint and show a "good" result.

Lead evaluations can be conducted by X-Ray fluorescence (XRF.) XRF is a common method because readings can be obtained in seconds and it is non-destructive (the product is not affected

by the measurement.) XRF measurements have limitations but they can provide results indicating various amounts of lead and they have the capability of testing below the surface of the product.

There are two common types of XRF instruments that are differentiated by the type of X-ray technology used. Hand-held devices are portable and less-expensive, but are less accurate than table-top XRF machines. Due to their limitations, XRF machines are typically used to conduct verification analysis. Manufacturing companies often run a lead test on a regular basis as a sanity check of their process. XRF Test laboratories are often used as an independent certifier between material suppliers and product manufacturers.

In order to obtain precise readings, destructive physical analysis should be conducted in a scientific laboratory. Instruments such as IPC (Inductively Coupled Plasma) and SEM-EDX can provide lead concentrations into the parts per million. These high-end instruments are expensive and require analytical expertise. As a result, manufacturers typically contract independent scientific laboratories to conduct this analysis.

The type of testing a company chooses to conduct depends on their control of the supply-chain, product volume, cost, and potential liability. Recent events have indicated that control is lower than anticipated and cost and liability higher. When it comes to lead-testing, all companies must have a pro-active plan in order to compete in this global-marketplace.



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