



CHEMICALS IN CHILDREN'S TOYS: ADDRESSING STRICTER LIMITS AND ENVIRONMENTAL CONCERNS





Chemicals in Children's Toys: Addressing Stricter Limits and Environmental Concerns

The safety of children's toys has been regulated in the United States and the European Union (EU) for decades. But a number of significant product safety recalls in 2007 related to lead in children's toys made in China directly resulted in important regulatory changes, including the 2008 passage of the Consumer Product Safety Improvement Act (CPSIA) in the United States and the development of the EU's new Directive on the Safety of Toys (2009/48/EC), issued in 2009. As a result, toys available on the market today are generally safer than those manufactured as recently as 10 years ago.

Current regulations and standards in the U.S. already address the physical hazards traditionally associated with the use of toys, including sharp edges, small parts, strangulation, shock, and entrapment. However, except for limits on lead and phthalates mandated under the CPSIA, there has been scant attention given to chemicals and other substances for which stated limits do not yet exist. Since children's toys are used by populations that are potentially more vulnerable to the effects from chemical exposure, limiting the use of these chemicals can improve overall toy safety and ultimately, the health of children.

UL has introduced a new voluntary leadership standard that addresses the use of chemicals in children's toys. Harmonized with the requirements of the European Union's Directive on the Safety of Toys (2009/48/EC), UL 172, the Standard for Sustainability of Toys, will support manufacturers' efforts to design and develop toys that reduce children's exposure to certain chemicals. The new standard will also offer guidance on the socially and environmentally responsible production of toys.

This UL white paper begins with a brief overview of the U.S. toy industry and the unique issues associated with children's exposure to chemicals in toys. The paper then reviews the current regulatory requirements applicable to chemicals in children's toys, and discusses the key aspects of UL 172. The white paper concludes with a summary of compliance issues for manufacturers.





The Toy Industry in the U.S.

Toys are generally understood to mean play products and games that have been designed or intended by the manufacturer for use by children 14 years of age or younger.¹ In practice, this broad definition includes a number of product categories, including infant and preschool toys, action figures, dolls, plush toys, games and puzzles, outdoor and sports toys, arts and crafts supplies, and various types of electronic devices. In addition, the past decade has seen the emergence of electronic video games as an important new toy category.

According to the U.S. Toy Industry Association, sales of traditional toys in the U.S. (not including video games) generated nearly \$22 billion in revenue in 2010. Revenue from the sale of traditional toys has remained relatively constant during the period from 2003 through 2010. However, revenues from the sale of video games has doubled during the same period, growing from around \$10 billion in 2003, to just under \$19 billion in 2010.²

There are about 700 manufacturers of traditional toys based in the U.S. But, despite the relatively large number of manufacturers, only a handful of companies, such as Mattel, Inc. and Hasbro, Inc., dominate the marketplace. Mattel, the parent company behind iconic brands like Barbie® and Hot Wheels®, owns approximately 20% of U.S. market share, while Hasbro, producer of American favorites like MR. POTATO HEAD and MONOPOLY, owns an estimated 13% of U.S. market share. The majority of traditional toy manufacturers based in the U.S. (roughly 75%) are small companies with 20 or fewer employees.³

Nevertheless, the majority of toys sold in the U.S. are manufactured in China. According to the U.S. Department of Commerce, toys imported from China accounted for 85% of the total revenue generated in 2010 from the sale of traditional toys in the U.S. Combined imports from the top five exporting countries, China, Japan, Mexico, Denmark, and Canada, accounted for 88% of all U.S. toy imports in 2010.⁴

Chemicals and Children

Exposure to chemicals is an inevitable consequence of modern life. According to the U.S. Centers for Disease Control (CDC), there are an estimated 70,000 chemicals in use worldwide. Further, the CDC estimates that industry introduces between 200 and 1000 new chemicals each year.⁵ This means that consumers are routinely exposed to a wide range of chemicals in their homes, at their places of work, and in the general environment.

The normal routes of consumer chemical exposure includes absorption through the skin (dermal absorption), inhalation of chemicals through the respiratory tract, and ingestion of chemicals through food, water or objects that are placed in the mouth. Exposure to chemicals also depends upon hand-washing behavior and food consumption patterns. Activity patterns, e.g., time spent indoors versus outdoors, time spent playing on grass or dirt, are also factors in exposure to chemicals.⁶

Some chemicals and chemical compounds, including heavy metals and lead, have been linked with potentially adverse health effects in humans. In the U.S., most of these potentially harmful chemicals are already subject

to regulations promulgated by the U.S. Consumer Product Safety Commission (CPSC), the U.S. Environmental Protection Agency (EPA) and other federal agencies. Public health and safety agencies in various states have developed additional regulations, in some cases mandating chemical use limits that are more stringent than federal requirements.

However, even for the majority of chemicals that pose little or no known health risk to adult consumers, there are special concerns regarding the use of chemicals in toys and other products used predominantly by children.⁷ These concerns include the following:

- **Early childhood and infant development:** The critical process of human development is most active in children and especially infants. Vital human organs, including the brain and essential body systems, are potentially more susceptible to chemical disruption during the various stages of childhood development
- **Increased exposure:** The normal habits of children, especially those under the age of two, increase the likelihood of contact with chemicals through the routes of exposure mentioned previously. Toys and other play objects inevitably find their way into children's mouths, where chemicals can be more easily ingested
- **Increased impact:** Chemical reactions typically depend on the size and weight of the individual who has been exposed. Because children are smaller in size and weight than adults, they can be more susceptible to the potential effects of chemical exposure



For these reasons, exposure to even small amounts of chemicals has the potential to create health and safety concerns for children. That's why the use of all types of chemicals in children's toys is a focal point for manufacturers, importers, and retailers who are concerned about children's health.

Recent U.S. Efforts to Regulate Chemicals in Toys

In 2007 more than 45 million toys and other children's products were recalled in the U.S. due to concerns about lead paint and the presence of small magnets that could pose harm to children if swallowed.⁸ The unprecedented magnitude of product recalls garnered significant attention from toy manufacturers, consumers, regulators and elected officials, and resulted in extensive hearings in the U.S. Congress. Ultimately, congressional deliberations led to the passage of the CPSIA, which was signed into law by then President George W. Bush in 2008.

As currently implemented by the U.S. CPSC, all toys sold in the U.S. market and intended for use by children 14 years of age and younger must meet the safety requirements of ASTM F963-08, Standard Consumer Safety Specification for Toy Safety. In addition to addressing potential hazards associated with magnets, acoustics, impact and flammability, F963-08 includes specific requirements regarding lead content, consistent with

the provisions of the CPSIA. Specifically, overall lead levels in children's products cannot exceed 100 parts per million, and lead content in paint used in children's products cannot exceed 90 parts per million.⁹

F963-08 also bans the use of certain phthalates, a group of chemicals that are added to plastics to make them more pliable. Restricted phthalates include DEHP, DBP, and BBP in concentrations above 0.1%. Pending further study, the use of DINP, DIDP, and DnOP is also restricted in concentrations above 0.1% in children's products or toys that can be placed in a child's mouth.¹⁰

The CPSIA requires that every domestic manufacturer or importer of children's products have their products tested by a CPSC-recognized, independent testing laboratory, and certify that their products meet all applicable CPSC requirements.¹¹

In addition to federal regulation of certain chemicals in children's toys, the State of Washington has recently implemented reporting requirements for manufacturers of children's products regarding their use of certain chemicals. Under the Children's Safe Products Act, manufacturers will be required to report their use of any of 66 "Chemicals of High Concern to Children" (CHCC) to the Washington Department of Ecology. The initial reporting requirement takes effect in August 2012.¹²





The EU's Directive on the Safety of Toys

The widespread recall of toys in 2007 also prompted further regulatory action in the EU. While efforts there were already underway to revise the EU's 1988 Directive on the safety of toys (88/378/EEC), the EU's 2009 Toy Safety Directive (TSD--2009/48/EC), further strengthened regulations in a number of areas.¹³

Most notably, the new EU TSD includes significantly expanded provisions regarding the use of chemicals in toys, which are addressed in Annex II, Part III of the Directive. These provisions, which exceed current U.S. CPSC requirements, will go into effect July 20, 2013 and include the following:

- **CMRs:** Chemical substances that have been classified as "carcinogenic, mutagenic or toxic for reproduction" (CMR) may not be used in toys or in toy components. Exceptions are made in cases where CMRs are inaccessible to children in any form
- **Fragrances:** Fifty-five allergenic fragrance ingredients are banned from use in children's toys. The use of an additional 11 allergenic fragrance ingredients is permitted, but manufacturers must provide labeling or other information to indicate the presence of these ingredients when concentrations exceed 100 mg/kg
- **Metals:** Concentration limits for 19 metals, including aluminum, cadmium, chromium, copper, lead, mercury, and nickel, are established. These limits vary depending on the physical state of

the metals, i.e., dry versus liquid. Concentration limits are also set for toy material that might be scraped or rubbed off as a result of normal wear and tear of the product

- **Other Chemicals:** The use of nitrosamines and nitrosable substances is restricted in toys intended for use by children under the age of three or in toys intended to be placed in the mouth

To demonstrate conformity with the requirements of the EU's TSD, manufacturers can self-verify compliance and issue a Declaration of Conformity. However, in those cases where harmonized standards do not exist, or when their provisions have only been partially applied, manufacturers must have their products tested and certified by an independent third-party testing laboratory authorized by the EU.

The Importance of UL 172

To meet the demands of today's global marketplace effectively and efficiently, manufacturers must design products consistent with the provisions of harmonized standards that also meet required regulations worldwide. However, standards that address the broad use of chemicals in children's toys are only now emerging. Further, no existing standard addresses both the use of chemicals in children's toys and issues of socially and environmentally sustainable production practices.

UL 172, the Standard for Sustainability of Toys is a voluntary leadership standard that aims to address these concerns. This standard identifies specific limits for chemicals in children's toys that meet or

exceed those defined in ASTM-F963-08 as well as the EU's TSD. Consistent with its emphasis on socially and environmentally responsible production practices, UL 172 also provides a management system framework that addresses both environmental concerns and worker health and safety issues. Finally, UL 172 prescribes environmentally preferable packaging practices designed to maximize recyclability and minimize non-recyclable waste.

The following sections provide a brief summary of the key aspects of UL 172.

Prohibited and Restricted Substances

Children's toys certified to UL 172 will be expected to comply with all of the chemical requirements prescribed in Annex II, Part III of the EU's TSD, including the limits on CMRs, fragrance ingredients and metals. Other chemicals prohibited or restricted under UL 172 include:

- Endocrine disruptors classified as Category 1 or 2 on the EU's Priority List of Endocrine Disruptors
- Substances that are persistent, bioaccumulative, and toxic (PBTs), or very persistent and very bioaccumulative (vPvBs), according to Annex XIII of the EU's REACH regulations (EC 1907/2006)
- Anti-bacterial or anti-microbial agents not authorized under the EU's Biocide Product Directive (98/8/EC) and subsequent revisions
- Any substances that can potentially contribute to the development of asthma in humans (asthmagens), as classified by the Association of Occupational and Environmental Clinics (AOEC)



Additionally, heavy metal concentrations must comply with the limits detailed in ASTM International standard F963-11, as measured by the method described in the standard.

Material-Specific Requirements

Chemicals used in the production or manufacture of component materials used in children's toys are also covered under UL 172. This is because residual amounts of chemical compounds can linger in finished products, indirectly subjecting children to additional chemical exposure.

Material categories covered under UL 172 include:

- **Wood-based materials:** Chemical products used to treat and/or coat wood-based materials must not contain any of the prohibited or restricted substances noted elsewhere in the standard. Wood products containing formaldehyde must conform with the standard's requirements applicable to volatile organic compounds (VOCs)
- **Plastic and rubber materials:** Plastics used in certified toys may not contain bisphenol-A or any phthalates, including DEHP, DBP, BBP, DINP, DIDP or DnOP. Nitrosamines or nitrosamine-forming substances in excess of minimum limits cannot be intentionally added to plastic or rubber. Certified toys cannot include chlorinated plastics, such as polyvinyl chloride

- **Textiles and padding materials:** Formaldehyde in padding materials cannot exceed 30 parts per million (ppm) and must be verified using the test method defined in the standard. Antimony in polyester fiber cannot exceed 60 ppm
- **Metals:** All metals used in certified toys must contain a minimum total recycled content of 50% or a minimum total post-consumer content of 15% and must be recyclable. Halogenated organic compounds cannot be used in the preparation or treatment of metals. Chromium VI cannot be used at any stage of preparation or surface treatment of metals used, and

Chromium III can only be used in cases where heavy physical wear and tear is anticipated

- **VOC emissions:** Children's toys certified to UL 172 must be tested for compliance with the VOC emissions requirements of the GREENGUARD Children & Schools Standard

Other Requirements

To maximize the recyclability of packaging materials used in children's toys, UL 172 requires that at least 90% of product packaging (by weight) be recyclable or compostable. Plastics used must be clearly marked with the appropriate industry recycling classification.





Paper used in packaging must not be bleached with any compounds that produce elemental chlorine. Polystyrene and chlorinated plastics cannot be used in packaging materials, nor can packaging include any intentionally-added lead, mercury, cadmium, or hexavalent chromium.

Finally, manufacturers of children's toys certified to UL 172 must operate in a manner consistent with the goals of socially and environmentally responsible manufacturing practices. These requirements include the establishment and maintenance of a facility's environmental management system, preferably one that has achieved ISO 14001 or equivalent certification. In addition, manufacturers must document compliance with all applicable environmental and occupational health and safety requirements, and affirm their commitment to upholding and protecting the rights of workers.

Compliance Issues for Toy Manufacturers

In the U.S., the CPSIA's limits on the use of certain chemicals in children's toys have recently been expanded. In February 2012, the CPSC adopted the latest version of ASTM F963, ASTM F963-11, which specifies concentration limits for heavy metals other than lead, as well as

other chemicals. With this change, U.S. requirements are now in closer alignment with the more extensive requirements of the EU's TSD.

Manufacturers should also anticipate further legislation and regulation of chemicals in toys at the state level. In addition to reporting requirements in the State of Washington regarding certain chemicals used in children's toys, the State of California is reportedly developing a regulatory framework addressing the use of chemicals in consumer products, including children's toys.¹⁴ As with other regulations applicable to potentially hazardous substances, strict regulations at the state level can foreshadow more stringent federal requirements. Finally, the EU's extensive requirements will apply to most traditional toys placed on the market as of July 2013.

Manufacturers whose toys are certified to UL 172 can gain significant advantages in their efforts to achieve compliance with chemical requirements worldwide. The standard's requirements for chemicals in toys exceed current U.S. federal and state requirements, thereby easing market access in the U.S. The standard's chemical requirements are also harmonized with those mandated in the EU, providing manufacturers with EU market access after July 20, 2013.

Finally, UL 172's emphasis on socially and environmentally responsible manufacturing and production processes can assist toy manufacturers in their efforts to meet ethical standards that are consistent with the values of their customers and of modern society as a whole. Such an achievement is certainly good for consumers, but it can also positively impact a manufacturer's financial results, since consumers may prefer to purchase children's products produced by manufacturers whose practices reflect those values.



Conclusion

The safety of children's toys continues to be a paramount concern for consumers. In particular, the use of chemicals in children's toys is under increased scrutiny by regulators in the U.S., the EU, China and elsewhere in the world, and new limits on chemicals in toys are scheduled to take effect in 2012 and 2013. UL 172 Sustainability of Toys offers manufacturers clear, comprehensive guidance in meeting current and anticipated requirements regarding chemicals in toys, thereby easing market access now and in the future. In addition, UL 172 sets socially and environmentally responsible benchmarks for the production of toys, which are aligned with the values of the modern consumer.

For further information about UL 172 and certification programs for children's toys, contact Angela Griffiths, director of operations, UL Environment, at angela.griffiths@ul.com.

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