



UL Chemical Management Service

Solutions for Chemicals in
Electronic and Electrical Products

Empowering Trust™



UL offers customers with solutions on product safety encompassing assistances to thoroughly understand regulatory requirements of target markets, and professional technical guidance to reduce exposure to risk of product recalls.

With rapid development of electronic technology, various electronic and electrical products have emerged like mushrooms. According to the statistics, the global electronic and electrical product market has reached US\$2,000 billion, and consumer spending in electronic information industry will continue to grow. Under dual pressure of environmental hazards and resource constraints, green IT industry will become mainstream trend in the future, and control of harmful substances in E&E products will become more and more stringent.

As importance of environmental protection becomes more widely recognized by the general public, many countries have introduced environmental protection legislation for electronic and electrical products, such as RoHS and WEEE Directive, especially the EU REACH Directive, which impacted significantly on the production and sales of electronic and electrical products. Manufacturers need to pay attention to the latest requirements of different countries for the safety of electronic appliances.

UL has advanced test equipment and experienced industry experts to help you understand the requirements of international and national regulations and product standards, including manufacturing and performance requirements, as well as labeling requirements for products and packaging.

Definition of electronic and electrical products

Products powered by batteries or AC, including but not limited to:

- Household appliances
- Communication/medical/lighting/monitoring equipment
- Electric toys
- Industrial electronic and electrical equipment
- Leisure and sports equipment

Potential product risk

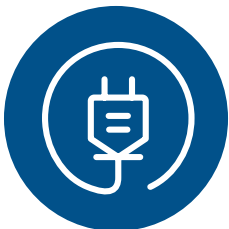
- Threat to human health
- Damage to the environment
- Regulatory recall
- Damage to brand image
- Fine

UL's experts can help you manage chemicals in your electronic and electrical products. Our testing service covers the entire supply chain:

- Raw materials management, help in building database of raw materials
- Management of raw material supply chain with higher transparency
- Reducing recall of finished products
- Monitoring the production process for consistency

UL offers a complete set of chemical management solutions for electronic and electrical products, from design to production, to help your supply chain meet regulatory requirements and achieve sustainability goals.





We can provide testing services for all types of electronic and electrical products, including but not limited to the following products:

- Lighting products
- Audio equipment
- Household appliances
- Office equipment/IT products/fax machines
- Electrical tools
- Electric toys
- Medical equipment
- Personal care products

Providing tests, including but not limited to:

- REACH
- Toy Safety Directive
- ROHS 2.0
- Packaging Directive
- Cosmetic regulations
- Label review
- California Proposition 65
- Battery Directive
- Persistent Organic Pollutants (POPs) Regulations
- CHCCs
- Antimicrobial
- Persistent effects
- Antibacterial properties
- Market validation statement

Regulations and standards applicable to electronic and electrical products

EU

EU Toy Safety Directive 2009/48/EC & Electrical Toy Safety Standard EN 62115

Electromagnetic Compatibility - EMC

Radio and Telecommunications Terminal Equipment Directive - R&TTE Directive

Restriction of the use of certain Hazardous Substances Directive - RoHS 2.0

Waste Electrical and Electronic Equipment Directive - WEEE

Battery Directive

REACH Regulation (SVHC, Total Cadmium, *Phthalates*, Polycyclic Aromatic Hydrocarbons, etc.)

1

EU Toy Safety Directive 2009/48/EC and Electrical Toy Safety EN 62115

All toys distributed and sold in the EU, whether electronic or not, must comply with the EU Toy Safety Directive. This defines the minimum safety requirements for all toys. In addition, the Directive also defines some performance requirements specific to electrical toys. This Directive aims to reduce dangerous accidents associated with toys by identifying risk factors and taking into account foreseeable uses.

EN 62115 Standard does not impose specific restrictions on electrical toy designs, it uses a risk-based test evaluation method for the product instead. It requires that a toy must be structured to minimize its risks to people or the environment when the toy is used in an intended or foreseeable manner, especially the risks that are not easily noticeable to the user.

EN 62115 covers all aspects of toy safety. It has been updated to include the use and compliance requirements for LEDs and lasers in toys, and its Amendment A12 covers risks associated with electromagnetic fields. In order to comply with EN 62115, electric toys must also comply with EN 71-1 (physical and mechanical requirements), EN 71-2 (flammability) and EN 71-3 (migration of certain specific elements).

2 Electromagnetic Compatibility - EMC

The Electromagnetic Compatibility (EMC) Directive 2004/108 / EC has been revised and replaced by the new EMC Directive 2014/30 / EU. The new directive applies to all new products produced and sold in the EU, including electric toys, as well as new and used products produced outside the EU but sold within the EU. This directive specifies electromagnetic compatibility for a device. All electric toy's design and production must ensure that:

- It will not generate electromagnetic energy that might interfere with safe operation of other devices
- The device's normal operation won't be affected by electromagnetic interference generated by other devices

The standards applicable to toys in the Directive are EN 55014-1, EN 55014-2 and its amendments. The tests include:

1. For battery powered (B / O) products:

- EN 55014-1 A1 and A2: Radiation interference test
- EN 55014-2 A1 and A2: Electrostatic discharge immunity (ESD) test

2. For AC power products:

- EN 55014-1 A1 and A2:

Power interference test, terminal voltage test

- EN 55014-2 A 1 and A2:

Electrostatic discharge immunity (ESD) test

Radio frequency electromagnetic field test

Fast transient test

Surge test

Injection current test

Voltage drop and interrupt test

Harmonic test

Voltage fluctuation test

3 Radio and Telecommunications Terminal Equipment Directive - R&TTE Directive

All radio equipment, as well as equipment intended to be connected to the public telecommunications network within the European Union, are covered by the R&TTE Directive. It establishes a regulatory framework for the sale and use of radio equipment within the EU to ensure:

- The health and safety of people, livestock and property are protected, including the safety requirements specified in the Directive 2014/53/EU, but without voltage restrictions
- Electromagnetic compatibility requirements in accordance with the EMC Directive (2014/30/EU)

EN standard for battery powered remote control toys are:

1. For toys using a frequency of 13.56MHz:

- EN 300 330-2 / EN 301 489-3
- EN 62479

2. For toys using the 27/40 / 49MHz frequency:

- EN 301 489-3 / EN 300 220-2 V2.4.1
- EN 62479

3. For toys using a frequency of 2.4GHz and battery less than 10mW:

- EN 300 440-2 / EN 301 489-3
- EN 62479

Radio Equipment Directive (RED) replaces the R&TTE Directive and became effective on June 12, 2016.

4

Restriction of the use of certain Hazardous Substances Directive - RoHS 2.0

EU RoHS (Directive on the Restriction of the use of Certain Hazardous Substances in Electrical and Electronic Equipment), i.e., the directive which restricts the use of certain harmful substances (lead, cadmium, mercury, hexavalent chromium, polybrominated diphenyl ethers, polybrominated biphenyls, *phthalates*) in electrical and electronic equipment. On January 27, 2003, the Council of the European Union adopted the first version of the RoHS Directive: 2002/95/EC; On July 1, 2011, the EU announced a new version of the RoHS Directive: 2011/65/EU, which came into effect on July 21, 2011, replaced the previous version 2002/95/EC.

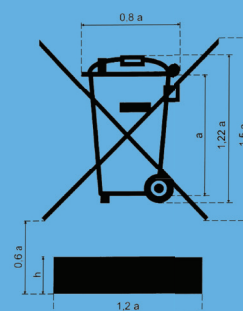
The EU RoHS Directive covers a wide range of products, covering almost all electronic, electrical, medical, communications, toys, security information and other products. It includes not only complete machine products, but also parts, raw materials and packaging used in production of complete machines, so it involves the entire production chain.

5

Waste Electrical and Electronic Equipment Directive - WEEE

On January 27, 2003, the European Union adopted the 2002/96/EC "Waste Electrical and Electronic Equipment (WEEE)", the Waste Electrical and Electronic Equipment Directive requires manufacturers to bear the responsibility of collecting, recycling, and proper disposal of discarded electronic appliances in order to better recycle and/or reuse electronic and electrical products. The directive came into effect on February 13, 2003 and was replaced by 2012/19/EU on February 15, 2014. Standard EN 50419 specifies the labeling requirements to ensure compliance with the WEEE Directive (identifiers as shown below). They are applicable to all electrical and electronic equipment manufacturers in the European Union.

The WEEE Directive covers ten categories of electronic and electrical products - large household appliances, small household appliances, information and communication equipment, user equipment, lighting equipment, electronic and electrical tools, toys, leisure and sports equipment, medical equipment, monitoring and control equipment, and vending machines.

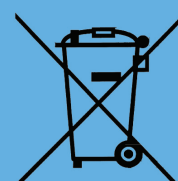


WEEE identifiers

6

Battery Directive

On March 26, 1991, the European Parliament issued the Battery and Accumulator Directive 91/157/EEC for batteries and accumulators containing certain dangerous substances. On September 26, 2006, the European Union issued the new Battery and Accumulator Directive 2006/66/EC "batteries and accumulators and waste batteries and accumulators", which officially replaced 91/157/EEC on September 26, 2008. Waste batteries and accumulators are also added to the control list, making it applicable to battery packs, portable batteries, car batteries, industrial batteries, etc. With a few exceptions, all batteries and accumulators, regardless of their chemical nature, size or design, are covered by the Battery Directive 2006/66/EC and the subsequently amended Directive 2013/56/EU. The directive is aimed at minimizing negative effects of batteries and accumulators and their wastes. It controls substances such as lead, cadmium, mercury in batteries and accumulators, and establishes measures to achieve collection and recycling goals.



Cd
(if cadmium
content > 0.002%)



Pb
(if lead
content > 0.004%)

EU battery label

7

REACH (total cadmium, ortho-benzene, polycyclic aromatic hydrocarbons)

EU REACH is the abbreviation of "Registration, Evaluation, Authorisation and Restriction of Chemicals"; i.e., (EC) No. 1907/2006, which is a European Union regulation on the registration, evaluation, authorization and restriction of chemicals. It officially came into effect on June 1, 2007 and was officially implemented on June 1, 2008. The implementation of this regulation has a major impact on the export of Chinese electronic and electrical products to the EU. The requirements include but are not limited to:

Enterprises producing products containing substances of very high concern (SVHC) are required to fulfil report and information transfer obligations in accordance with REACH regulations;

Product must meet the restrictions of Annex XVII of REACH, such as total cadmium, ortho-benzene, polycyclic aromatic hydrocarbons, etc.

USA

In the United States, electrical and electronic products must also comply with a range of similar regulations and standards, including:

California 65 Proposal

The California 65 Test Standard, i.e., the Safe Drinking Water and Toxic Substances Act of 1986, was unanimously passed by California residents in 1986. Since its adoption, the 65 Proposal has led to numerous lawsuits requiring formula reconstitution of consumer products containing hazardous chemicals. As a result, it has reduced the use of carcinogenic and reproductively toxic chemicals in California.

Products involved in the proposal include: Jewelry, toys, electrical installations, glass-ceramic materials, clothing, accessories, medicines, pesticides, dyes, cosmetics, gifts, manufacturing or construction supplies, by-products of chemical processes such as automobile exhaust, smoke, natural gas burning and more, covering almost all products, with exposure scenarios of dangerous goods.

Battery Directive

The United States is one of the countries with the most and finest legislations on waste battery pollution management. Its legislation mainly targets at nickel-cadmium batteries, small sealed lead-acid batteries, and all other types of batteries and mercury-containing batteries. In addition, the United States has not only established a complete waste battery recycling system, but also established a number of waste battery treatment plants. The Federal Act of 1996, the Mercury-Containing Batteries and Rechargeable Batteries Management Act (US Public Law 104-142), was implemented on May 13, 1996. The law has laid out rules for the labeling, production, collection, transportation, storage and more for waste nickel-cadmium batteries, waste small sealed lead-acid batteries and other waste rechargeable batteries.

California RoHS

The California Electronic Waste Recycling Act (SB20 and its Amendment SB50), issued in 2003, stipulates the requirements for restricted substances (lead, mercury, cadmium, and hexavalent chromium) in video display devices, regulating 9 categories of specific electronic equipment with the screen diagonal length greater than 4 inches, including products refurbished by manufacturer for retail:

- Products containing cathode ray tubes (CRT)
- Cathode ray tube displays
- Computer displays with cathode ray tubes
- Laptops with LCD monitors
- Desktop with liquid crystal displays (LCD)
- TV with cathode ray tubes
- LCD TV
- Plasma TV
- Portable DVD players with LCD displays



About UL

As a global company with more than 120 years of experience, UL works with clients and stakeholders to help them cope with increasingly complex changes in the market. UL ensures information transparency and enables trust, providing professional support for the development, production, marketing and purchase of current and future commodities, solutions and innovative technologies. We bring people safer and more sustainable products, services, experiences and environments that allow them to make better choices and have a better life.



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