



Hazardous Chemical Substances Testing for Electrical and Electronic Products

www.tuv.com

 **TÜVRheinland®**
Precisely Right.

Demonstrating your environmentally friendly products with less hazardous chemical substances

A growing number of synthetic chemicals are helping to improve the living quality of people, yet they can also harm the environment and affect our health. Hazardous substances in the environment must be monitored effectively and in a timely manner to protect human health and ensure the sustainability of the ecosystem.

TÜV Rheinland advocates the responsible use of chemical substances. We help you to understand the laws and regulations in different markets to decrease the hazardous chemical substances during the product life cycle, including the manufacturing, use and abandonment processes. We support your products in compliance with the related market requirements, enhance your competitive edge in the international marketplace and promote your sustainable development.



TÜV Rheinland is your reliable partner

- Accredited by DAkkS (Germany), DIN CERTCO, the Taiwan accreditation foundation (TAF) and the China National Accreditation Service for Conformity Assessment (CNAS), we offer testing services for all kinds of consumer products within our accreditation scope;
- As a renowned third-party testing body with experienced experts, we help you to understand the latest international environmental regulations and; support you in ensuring product compliance;
- With our strict and professional testing services, we can help you to reduce risks and ensure product safety;
- Our test reports are well recognised by overseas buyers, providing you with greater global market access.





EU RoHS directive (2011/65/EU)

Directive 2002/95/EC (commonly known as RoHS 1.0) of the European Parliament and of the Council of 27 January 2003 (enter into force on 1 July 2006) on the restriction of the use of certain hazardous substances in electrical and electronic equipment is to protect the environment and human health.

In January 2013, the RoHS Directive 2002/95/EC was officially replaced by the Directive 2011/65/EU (commonly known as RoHS 2.0), which expanded the scope of control and further strengthened the responsibility of all links in the supply chain and required more stringently. In 2015, the European Union revised RoHS 2.0, which had a significant impact on companies, adding four phthalate requirements. This makes the technical trade barriers faced by China's electronic and electrical manufacturing enterprises "higher" and "stronger".

Restricted substances:

Restricted substances	Maximum concentration values tolerated by weight in homogeneous materials
Lead	0.10%
Mercury	0.10%
Cadmium	0.010%
Hexavalent chromium	0.10%
Polybrominated biphenyls (PBB)	0.10%
Polybrominated diphenyl ethers (PBDE)	0.10%
Diethylhexyl phthalate (DEHP)	0.10%
Butylbenzylphthalate (BBP)	0.10%
Dibutyl phthalate (DBP)	0.10%
Diisobutylphthalate (DIBP)	0.10%

Scope:

- Large household appliances
- Small household appliances
- IT and telecommunications equipment
- Consumer equipment
- Lighting equipment
- Electrical and electronic tools
- Toys, leisure and sports equipment
- Medical devices
- Monitoring and control instruments(including industrial monitoring and control instruments)
- Automatic dispensers
- Other EEE not covered by any of the categories above

Among global market, including China RoHS, UKCA RoHS, SASO RoHS and UAE RoHS are with similar requirement. Please contact us for more information.



EU REACH Regulation 1907/2006/EC

(Registration, Evaluation, Authorisation and Restriction of Chemicals)

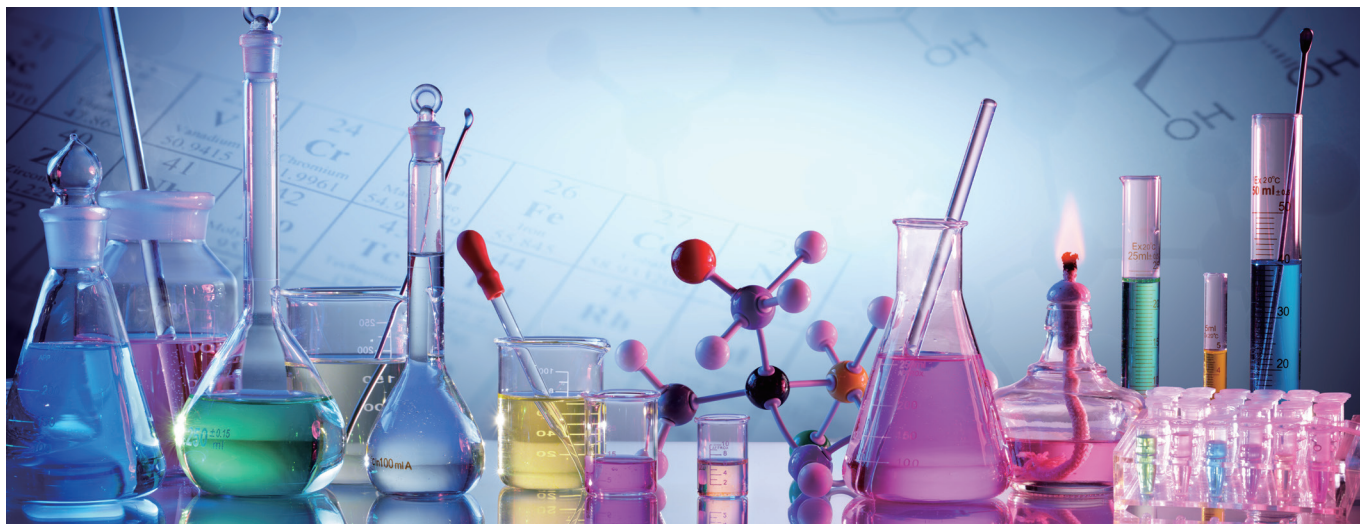
REACH — Regulation for Registration, Evaluation, Authorisation and Restriction of Chemicals, is a very important regulation for the control of chemicals in the European Union. The regulation sets out requirements for the safe use of chemical substances in all products and came into force in the European Union on 1 June 2007.

- The implementation of REACH has raised the attention of the electronic and electrical industry to a new level of hazardous substances, especially the continuous updating of the candidate list of substances of very high concern (SVHCs), which has made the attention of organizations and consumers to REACH continue to heat up.
 - If SVHC is present in the product and reaches the specified concentration, the manufacturer and importer are with the duty to make a declaration. According to Article 33(1), when the content of SVHC substances in a product above 0.1% weight by weight, manufacturers and importers shall inform customers that SVHC substances are contained in the product and provide instructions for safe use of the product.
- The requirement of REACH means that the products placed on the EU market by the manufacturer or importer **MUST NOT CONTAIN** the restricted substances specified in Annex XVII of REACH. The scope covers electronic and electrical products, toys and many other products. Typical restriction requirements related to consumer products include (but are not limited to*) polycyclic aromatic hydrocarbons, phthalates, organotin chemicals, azo dyes, nickel release, asbestos, heavy metals, flame retardants, CMRs and other substances, and companies must ensure that products sold in the EU do not contain relevant restricted substances or contain substances within the limit requirements.

Our services

- Evaluation and testing for Substances of Very High Concern (SVHCs)
- Evaluation and testing for restricted substances in Annex XVII
- Safety Data Sheet (SDS)
- Training and consulting for Substances of Very High Concern
- Training for SCIP registration
- Training for supply chain control process

*mentioned substances are only little part of REACH Annex 17, please contact us for more details.



Persistent organic pollutants (POPs)

Persistent organic pollutants are the chemical substances are transported across international boundaries far from their sources and they persist in the environment, bioaccumulate through the food web, and pose a risk to human health and the environment.

- Toxicity
- Persistent
- Accumulation
- Semi-volatility

In 2004, the EU published the Regulation (EC) No 850/2004 on persistent organic pollutants, which sets out specific

requirements for the use of POPs in the EU. Since then, the European Commission has amended the POPs regulation several times to include POPs commonly used in a variety of industrial and consumer sectors, many of which are widely used in the electrical and electronic industry. On 25 June 2019, the European Union published the new POPs Regulation (EU) 2019/1021, which enter into force on 15 July 2019, and the original Regulation (EC) No 850/2004 was repealed. In recent years, the European Commission has amended the POPs regulation several times.

Pesticides

- DDT
- Aldrin
- Chlordane
- Dieldrin
- Endrin
- Heptachlor
- Mirex
- Toxaphene
- Lindane
- Alpha hexachlorocyclohexane
- Beta hexachlorocyclohexane
- Chlordecone
- Endosulfan

Unintended by-product

- Polychlorinated dibenzo-p-dioxins (PCDD)
- Polychlorinated dibenzofurans (PCDF)

Industrial chemicals

- Hexachlorobenzene (HCB)
- Polychlorinated biphenyls (PCB)
- Tetrabromodiphenyl ether
- Pentabromodiphenyl ether
- Hexabromodiphenyl ether
- Heptabromodiphenyl ether
- Perfluorooctane sulfonic acid (PFOS) and its derivatives Perfluorooctanoic acid (PFOA), its salts and PFOA-related substances
- Short-chain chlorinated paraffin (SCCP)
- Polychlorinated naphthalens (PCNs)
- Hexachlorobutadiene

Packaging Directive

Market Directive

- EU: EU 94/62/EC
- US: US TPCH (CONEG Legislation)



Substances	Limit	French Mineral Oil Arrêté du 13 avril 2022	Besides heavy metals testing service, we can also provide packaging labelling and information check, various countries' packaging regulation interpretation and training.
Lead (Pb)	/	From 1 Januray 2023, MOAH consisting of 1 to 7 aromatic rings in ink cannot exceed 1%.	
Cadmium (Cd)	/		
Mercury (Hg)	/	From 1 January 2025, MOAH consisting of 1 to 7 aromatic rings in ink cannot exceed 1%; MOAH coumpounds consisting of 3 to 7 aromatic rings in ink cannot exceed 1 ppm (0.0001%).	
Hexavalent chromium (CrVI)	/		
Sum of 4 heavy metals	100 mg/kg	From 1 January 2025, MOSH consisting of 16 to 35 carbon atoms in ink cannot exceed 0.1%	

Battery Directive

Market Directive

- EU: 2006/66/EC
- US: US Public Law 104-142



EU REGULATION REQUIREMENT

Substances	Limit	Label limit
Cadmium (Cd)	Portable batteries / Accumulators: 0.002 %	Other batteries: 0.002 %
Lead (Pb)	/	0.004 %
Mercury (Hg)	0.0005 %	/

US REGULATION REQUIREMENT

Substances	Regulation requirement
Mercury (Hg)	Alkaline-manganese button cells: 25 mg/cell Alkaline-manganese battery zinc-carbon battery: no intentionally use Other batteries: /

Polycyclic Aromatic Hydrocarbon PAHs

NEW SPECIFICATION: AFPS GS 2019:01 PAK

On 15 May 2019, the Committee for Product Safety (AfPS) issued the new GS specification for PAHs. It was published on 28 August on the website of the Federal Institute for Occupational Safety and Health (BAuA):

https://www.baua.de/DE/Aufgaben/Geschaeftsfuehrung-von-Ausschuessen/AfPS/pdf/AfPS-GS-2019-01-PAK.pdf?__blob=publicationFile&v=5

Product scope

- Electronic and electrical products
- Toy
- Food contact materials
- Plastic products
- Rubber products
- Mechanical products



The new PAHs content table according to AfPS GS 2019:01 PAH

Parameters	Category 1	Category 2		Category 3	
	Materials intended to be placed into the mouth, or Materials in toys or articles for children up to 3 years of age with intended long-term skin contact (more than 30 s)*	Materials that do not fall into Category 1 with intended or foreseeable long-term skin contact (more than 30 s) or repeated short-term skin contact		Materials not covered by category 1 or 2, with foreseeable short term contact (shorter than 30 s)	
		Cat. 2a Use by children ****	Cat. 2b Other consumer products	Cat. 3a Use by children ****	Cat. 3b Other consumer products
Carcinogenic PAH (10 substances)* each [mg/kg]	< 0.2	<0.2	< 0.5	< 0.5	< 1
Naphthalene [mg/kg]	< 1	< 2		< 10	
Sum of Marker PAH (4 substances) ** [mg/kg]***	< 1	< 5	< 10	< 20	< 50
Sum of all 15 PAH [mg/kg]***	< 1	< 5	< 10	< 20	< 50

* PAH classified as carcinogenic resp. suspected to cause cancer (besides naphthalene): Benzo[a]pyrene, Benzo[e]pyrene, Benzo[a]anthracene, Benzo[b]fluoranthene, Benzo[k]fluoranthene, Chrysene, Dibenzo[a,h]anthracene, Indeno[1'2,3 cd]pyrene as well as Benzo[ghi]perylene. For the first 8 of these substances (EU-PAH) there are already legal bans for articles according to REACH-VO 1907/2006/EG Annex XVII entry no. 50.

** Indicators compounds for PAH-contamination: Phenanthrene, Pyrene, Anthracene, Fluoranthene.

*** In the sum, only the PAH components quantified in the material from 0.2 mg/kg are included.

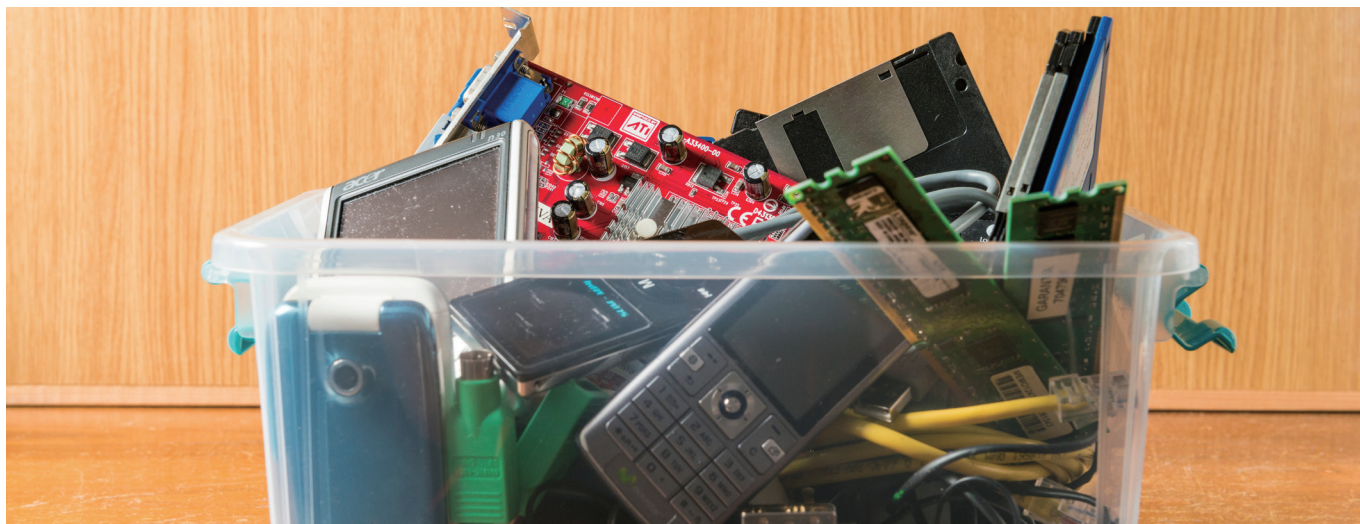
**** The definition of „child“ means persons before the age of 14 years. „Use by children“ includes both active and passive direct contact by children.

When selecting the relevant areas, the GS certification body (testing laboratories recognised by the ZLS for granting the GS mark) carries out a risk assessment. In this context, it is determined which relevant contact/grip and activity surfaces of the product shall be considered for testing and which not.

It also plays a role whether PAH contamination is to be expected in the type of material used. PAH not only occur

in rubber, but also for example in various types of plastics, synthetic fibers, paints and natural materials treated with naphthalene.

Materials that are completely inaccessible or accessible only by the use of tools do not have to be regarded, with the exception of samples showing conspicuous odor.



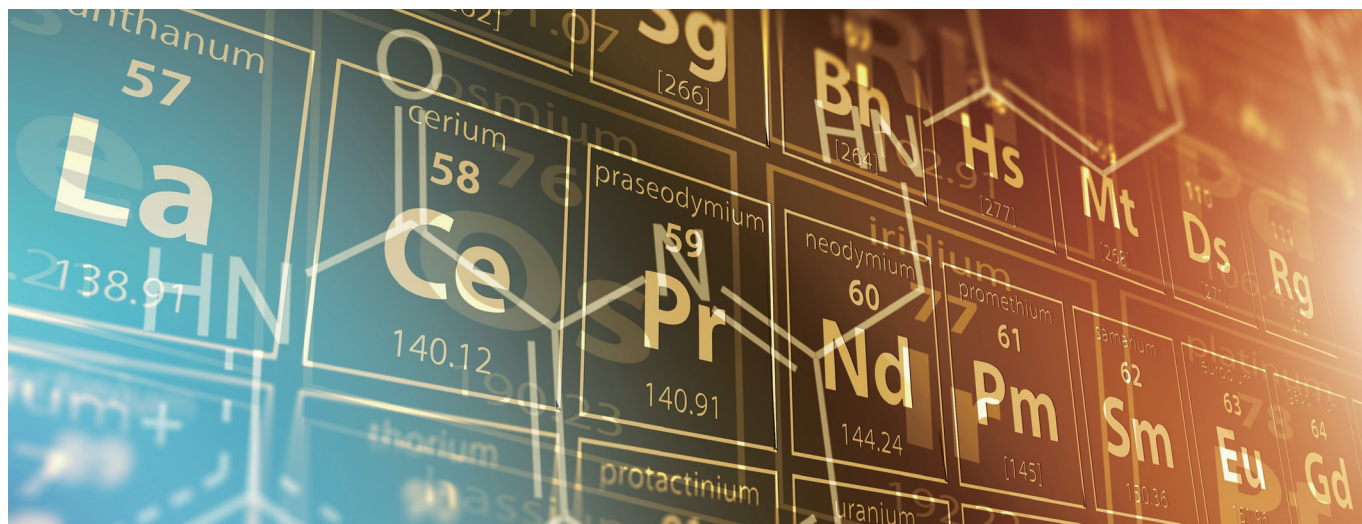
EU New WEEE Directive 2012/19/EU

WEEE (waste electrical and electronic equipment) directive is to control electrical and electronic equipment at the end of product life cycle, sets out certain rules in recycling of waste electrical and electronic equipment, in order to contribute the efficient use of resources and to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste from electrical and electronic equipment. Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 enter into force on 24 July 2012.

In the new directive, the scope of products has been revised. Since 15 August 2018, the new WEEE Directive divides all electrical and electronic equipment into 6 categories of products from the original 10 categories of electronic and electrical products with the exception of large-scale stationary industrial tools (such as large-scale equipment and tools, photovoltaic modules, etc.).

Product Categories, Limit and Labelling requirements:

Categories of EEE	Limit	Labelling
1. Temperature exchange equipment 2. Screens, monitors, and equipment containing screens having a surface greater than 100 cm ² 3. Lamps 4. Large equipment (any external dimension more than 50 cm) 5. Small equipment (no external dimension more than 50 cm) 6. Small IT and telecommunication equipment (no external dimension more than 50 cm)	Category 1&4: <ul style="list-style-type: none"> Recovery 85%, and Reuse and recycling 80%; Category 2: <ul style="list-style-type: none"> Recovery 80%, and Reuse and recycling 70%; Category 5&6: <ul style="list-style-type: none"> Recovery 75%, and Reuse and recycling 55% Category 3: <ul style="list-style-type: none"> Recovery 80% 	<p> $a \geq 3.33 \text{ mm}$ $h \geq 0.3a \text{ or } h \geq 1 \text{ mm}$ </p>



California Proposition 65 (CP65)

California Proposition 65 (CP 65), also known as the Safe Drinking Water and Toxic Enforcement Act of 1986, was enacted in November 1986 to control drinking water, environmental exposures, professional exposures, and consumer products. The products affected are electrical and electronic products, metal products, toys, textiles, and some common consumer products sold or distributed in California.

According to the requirement California Proposition 65, the state of California will issue a list of chemicals that are carcinogenic, mutagenic, or other reproduction harmful annually. Since the Proposition was first issued in 1987, nearly 1,000 substances have been added to the list, which covers a wide range of chemicals. Products in daily use may contain some of the chemicals on the list, such as heavy metals (lead, cadmium, nickel, etc.), organic substances (such as phthalates, flame retardants, PAHs, BPA, etc.), solvents, pesticides, etc.

The proposition requires compliant business individuals to place clear and reasonable warning labels on products that expose consumers to chemicals are known to be allergic, carcinogenic or reproduction toxic in order to reduce the risk of exposure to humans.

There are numerous court cases related to California Proposition 65 initiated by public environmental organizations and private law firms in California. In order to avoid becoming one of these cases and facing the large amount of damages and risks, manufacturers and producers need to understand the requirements of California Proposition 65 and ensure that the products they are selling comply with the requirements.

Some examples for Substances and products recorded in court cases by far:

Product	Substance	Requirement
Charger, Diverter, Charger cord, Power cord	Lead DEHP	Lead: 100ppm (0.01%) DEHP: 1000ppm (0.1%)
Speaker system, Computer speakers	Lead Phthalates	100ppm (0.01%) DEHP/DINP/DIDP: 1000ppm (0.1%)
Tool, Garden tool	Lead Phthalates	100ppm (0.01%) DEHP, BBP, DBP: 1000ppm (0.1%)
Kitchen utensils	Lead Phthalates	100ppm (0.01%) DEHP, BBP, DBP: 1000ppm (0.1%)
Cellphone cases	Lead BPA	Lead: 90ppm (0.01%) BPA: 3ppm(0.003%)
Headphone	Lead Phthalates	Lead: 100ppm (0.01%) BBP/DBP/DEHP/DnHP/DIDP/DINP: 100ppm (0.01%)
Enclosure of electronic equipment	Lead DEHP	Lead: 100ppm (0.01%) DEHP: 1000ppm (0.1%)



Toxic Substances Control Act (TSCA)

The Toxic Substance Control Act (TSCA), enacted by the U.S. Congress in 1976 and effective in 1977, is implemented by the U.S. Environmental Protection Agency (EPA). U.S. Customs and Border Protection (CBP) cooperates with the EPA to conduct routine inspections of imported chemicals.

In January 2021, the U.S. Environmental Protection Agency (EPA) published five final rules in the Federal Register (86 FR 866-932) to control five persistent, bioaccumulative and toxic (PBT) chemicals under Section 6(h) of the Toxic Substances Control Act (TSCA), of which 2,4,6-TTBP is controlled only for substances and mixtures, and the other four substances are controlled for articles including electrical and electronic products.

Violation of the requirements of the final rule issued by TSCA will result in a prohibition on release into the U.S. market. At the same time, Section 16 of TSCA authorizes EPA to impose daily penalties for violations. Therefore, TSCA compliance is particularly critical for companies whose products to the U.S. fall within the TSCA regulated categories to conduct normal trade.

The five chemicals:

Parameters	Name	CAS NO.	Requirements
DecaBDE	Decabromodiphenyl ether	1163-19-5	Prohibited
PCTP	Pentachlorothiophenol	133-49-3	1%
HCBD	Hexachlorobutadiene	87-68-3	Prohibited
PIP(3:1)	Phenol, isopropylated phosphate (3:1)	68937-41-7	Prohibited
2,4,6-TTBP	2,4,6-Tris(tert-butyl)phenol	732-26-3	≤ 0.30%



Microbial-Antibacterial/sterilization testing services

Nowadays, people's living standards continually improving, the requirements for quality of life are also increasing, more and more attention is paid to healthy quality of life, and the safety requirements for products are greatly improved. Various technological products have gradually joined the group of antibacterial/sterilization, closely linking life and health.

The market often hears about various antibacterial technologies, negative ions, silver ions, nanotechnology, etc. and various sterilization technologies, UV (ultraviolet), ozone sterilization, high temperature sterilization, etc., but whether these technologies are really effective is unknown. Various antibacterial/sterilization products attract consumers' attention, but the hard-to-understand antibacterial and sterilization technology and the real and fake market also make many people hesitate.

TÜV Rheinland refers to relevant industry standards, investigates the current market situation, focuses on consumer pain points, and launches a new set of healthy antibacterial/sterilization experience services, which is not only a simple basic antibacterial test for antibacterial materials, but also a multi-dimensional and all-round antibacterial/sterilization ability evaluation of products combined with structural functions.

The test strains were not limited to *Staphylococcus aureus*, *Escherichia coli*, *Candida albicans*. In view of the diversification of antibacterial technologies and use environments, a variety of strains were selected to comprehensively evaluate the antibacterial ability under different usage scenarios.

Scope



Keyboard



Mouse



Earphone



Air humidifier



Washing machine



Refridgerator

TÜV Rheinland Greater China
Hotline
+886 2 21721001 (Taiwan)
+852 21921022 (Hong Kong)
+86 4008831300 (Mainland China)
service-gc@tuv.com

www.tuv.com

