

# Footwear testing

Meeting hazardous chemical requirements for footwear products



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**Add value.  
Inspire trust.**

White paper

## Abstract

Chemicals used in footwear products pose potential health risks to factory workers and consumers alike. In response to these risks, regulators around the world have implemented restrictions on the use of certain chemicals in a wide range of consumer products, including footwear. This white paper summarises key regulations regarding the use of chemicals in footwear products. The paper also discusses how TÜV SÜD's certification process can assist footwear manufacturers in their efforts to achieve compliance with these regulations, and how the TÜV SÜD Footwear Mark can build positive brand awareness and customer loyalty.

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# Introduction

Approximately 17 billion pairs of shoes are produced each year, ranging from functional work boots and shoes, casual footwear and fashionable high-heeled shoes for adults to play shoes for children. Shoes are made from dozens of different types of materials, including leather and textiles, but also wood, plastics and synthetics, and the process of manufacturing a pair of shoes can include more than 100 separate processes. However, certain chemicals found in shoe materials or used in the manufacturing process are potentially harmful to both factory workers and consumers, leading to

increased concerns about risk from exposure.

To address these concerns, regulators in the United States, the European Union (EU) and other jurisdictions around the world have enacted requirements that restrict or prohibit the use of certain chemicals in shoe materials and the shoe manufacturing processes. These regulations differ from jurisdiction to jurisdiction, further complicating the compliance process for manufacturers and importers. In addition, regulations are enforced through rigid inspections,

and non-compliant products can be denied market entry or can be subject to recall once placed on the market.

This TÜV SÜD white paper presents the requirements applicable to chemicals used in footwear products and production processes in key global markets, and discusses how TÜV SÜD's Footwear Mark and certification process can help shoe manufacturers and importers meet these requirements. The white paper is intended for manufacturers and importers of shoes and other footwear products.

## Safety challenges in the footwear industry

A major industry sector in the global marketplace, sales of shoes and footwear products are projected to generate revenue of over \$210 billion (USD) worldwide by 2018 <sup>[1]</sup>. Ever-changing fashion trends are expected to be a key driver in future industry growth, as consumers around the world continually seek footwear products featuring the latest styles and designs. Growing populations with increased levels of disposal income, especially in the Asia-Pacific region, are also expected to stimulate market demand.

Keeping pace with growing consumer demand presents significant challenges for footwear designers and manufacturers. Major footwear manufacturers rely on vast and complex global supply chains to source materials and fabricate

finished products. Without rigorous supply chain management and oversight, manufacturers are often unaware of all of the materials and processes used to manufacture finished goods.

As if the process of manufacturing footwear was not complex enough, the number and type of materials and chemicals used in footwear have expanded significantly, as designers continually experiment with a range of different materials to create a unique look with market appeal. Leather, for example, is a long-standing traditional material in footwear products that is typically treated with tanning agents and other chemicals to preserve or soften the material or to better protect the wearer. In many instances, leather is being supplemented or replaced with rubber, plastics and synthetic

materials that have been developed or processed with chemicals. Finally, assembling finished footwear product usually requires the use of adhesives, solvents and still other chemical products.

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This expanded use of chemicals in the manufacture of footwear poses increased safety risks to shoe factory workers and consumers alike. For example, in the factory, solvents used in adhesives and finishing materials may be flammable, posing a fire risk to workers when used incorrectly. Exposure to solvents can also cause acute and chronic effects on the central nervous system, including a neurologic condition known as “shoemakers’ paralysis”. [2] Other

potential health risks associated with exposure to chemicals used in footwear production include leukemia (resulting from exposure to benzene), lung cancer (resulting from exposure to methylene chloride) and reproductive disorders (resulting from exposure to toluene). [3]

In addition to the potential harmful effects experienced by shoe production workers, chemicals used in footwear can also have

adverse health consequences for humans. As worn in normal use, footwear is typically in continuous contact with the human body. This contact can result in skin irritation, rashes and other dermal reactions. Prolonged exposure can also lead to the migration of potentially harmful chemicals to internal tissues and bodily fluids, thereby exposing consumers to more serious health risks.

## Restrictions regarding the use of hazardous chemicals in footwear

The concern regarding potentially harmful chemicals used in footwear stems from a growing public awareness about the impact of chemicals on human health and the environment. This increased awareness has resulted in regulations in the EU, the U.S., and other countries that restricts or bans the use of certain potentially harmful chemicals in footwear products. The following sections provide a summary of current regulations regarding the use of chemicals in footwear.

### A. Chemical requirements for footwear in the European Union

The EU’s REACH (registration, evaluation, authorisation and restriction of chemicals) Regulation (Regulation (EC) 1907/2006) applies to any company that places products in the EU marketplace, including manufacturers, importers and retailers of footwear products. The Regulation sets out the primary

requirements for the use of chemicals, and Annex XVII of the Regulation provides an exhaustive list of chemicals and substances that have been classified as “restricted substances.” In addition, the Regulation identifies other chemicals as “substances of very high concern” (SVHC). Manufacturers, importers or

retailers of footwear and of articles containing more than 0.1% by weight of any SVHC must provide customers and consumers with adequate information on the safe use and disposal of the product upon request. [4]

### B. Chemical requirements for footwear in the United States

In the U.S., the 2008 Consumer Product Safety Improvement Act (CPSIA) regulates specific chemicals and substances in products, including footwear, intended for or used by children age 12 years and younger.

The specific chemical provisions applicable to children’s footwear include limits on lead content of not more than 100 parts per million (ppm) for footwear products and components. In addition, paint or

surface coatings containing lead on children’s footwear products cannot exceed 90 ppm.

Compliance with the provisions of the CPSIA applicable to children’s

products, including footwear, requires manufacturers or importers to certify that their products comply with all relevant product safety standards. This certification must be supported by testing conducted by an accredited third-party laboratory accepted by the U.S. Consumer Product Safety Commission (CPSC). [5]

Other U.S. federal regulations applicable to chemicals in footwear

products include the U.S. Federal Hazardous Substances Act (FHSA), which generally bans the sale in the U.S. of any toy or other article intended for use by children that contains a hazardous chemical or substance as defined in the Act. [6] Separately, the U.S. Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) requires the registration with the U.S. Environmental Protection Agency

(EPA) of chemicals that kill or repel bacteria or germs, including antimicrobial materials impregnated with such chemicals such as antifungal footwear linings. [7]



## C. Chemical requirements in other jurisdictions

At the local level in the U.S., the states of Washington and California have enacted regulations that restrict the use of certain potentially hazardous chemicals in footwear and other products. The State of Washington Department of Ecology has adopted

rules under that state's Children's Safe Product Act, and identifies 66 separate chemicals of "high concern." The Act requires manufacturers, importers or distributors to report the use of such high concern chemicals in any children's products

in concentrations of greater than 100 ppm. Children's products covered under the Act include clothing and footwear. [8]

Perhaps the most sweeping regulation applicable in the U.S. regarding

the use of potentially harmful chemicals in footwear can be found in California. There, the provisions of Proposition 65 require businesses to provide a “clear and reasonable” warning before exposing anyone to one or more of over than 800 listed chemicals associated with cancer,

birth defects or other reproductive hazards. Proposition 65 notification requirements apply all products sold in the state, regardless of whether they are used exclusively by children or not. [9] As the leading state economy in the U.S. and the 12th largest economy in the world,

Proposition 65 restrictions on the use of potentially harmful chemicals in footwear and other products establishes a de facto compliance standard for manufacturers in many industries, including footwear.

## D. Restricted substance lists

Given the widespread concern regarding the use of potentially harmful chemicals in footwear, a number of major retailers have developed their own proprietary lists of restricted chemical substances. At a minimum, these so-called restricted substances lists (RSLs) include

chemicals and other substances whose use is banned or restricted under applicable regulations in the retailer’s target markets. In some cases, however, RSLs may restrict the use of chemicals that are not subject to regulation but whose use is incompatible with broader corporate

values, such as workplace health and safety or environmental sustainability. RSLs can create an additional compliance challenge for footwear manufacturers seeking to gain visibility and acceptance in preferred retail channels.

# The benefits of footwear certification

Building and maintaining buyer trust and confidence is ongoing challenge for manufacturers in every industry. The TÜV SÜD footwear certification process provides retailers with assurances

that a footwear manufacturer has successfully passed a comprehensive battery of product tests and factory inspections to safeguard against the use or presence of potentially harmful chemicals. Footwear products bearing the TÜV SÜD Footwear Mark provide consumers with evidence of a manufacturer’s commitment to offer only safe products, thereby support efforts to build positive brand awareness and trust.

chemical requirements applicable to footwear products, including the EU’s REACH Regulation, the U.S. CPSIA requirements for children’s footwear, and California’s Proposition 65 chemical restrictions.

**Footwear products bearing the TÜV SÜD Footwear Mark provide consumers with evidence of a manufacturer’s commitment to offer only safe products, thereby support efforts to build positive brand awareness and trust.**

TÜV SÜD footwear certification offers manufacturers the following additional benefits:

- **Certifies compliance with all applicable chemical requirements** - The TÜV SÜD footwear certification process includes product testing to all

- **Addresses RSL requirement of major retailers** - Depending on a manufacturer’s specific requirements, testing and product evaluation can be expanded to include compliance with RSLs of major retailers. Testing can also be expanded to include specific product attributes, such as sole adhesion, shape retention and water permeability.
- **Reduces total testing and certification burden** - Because

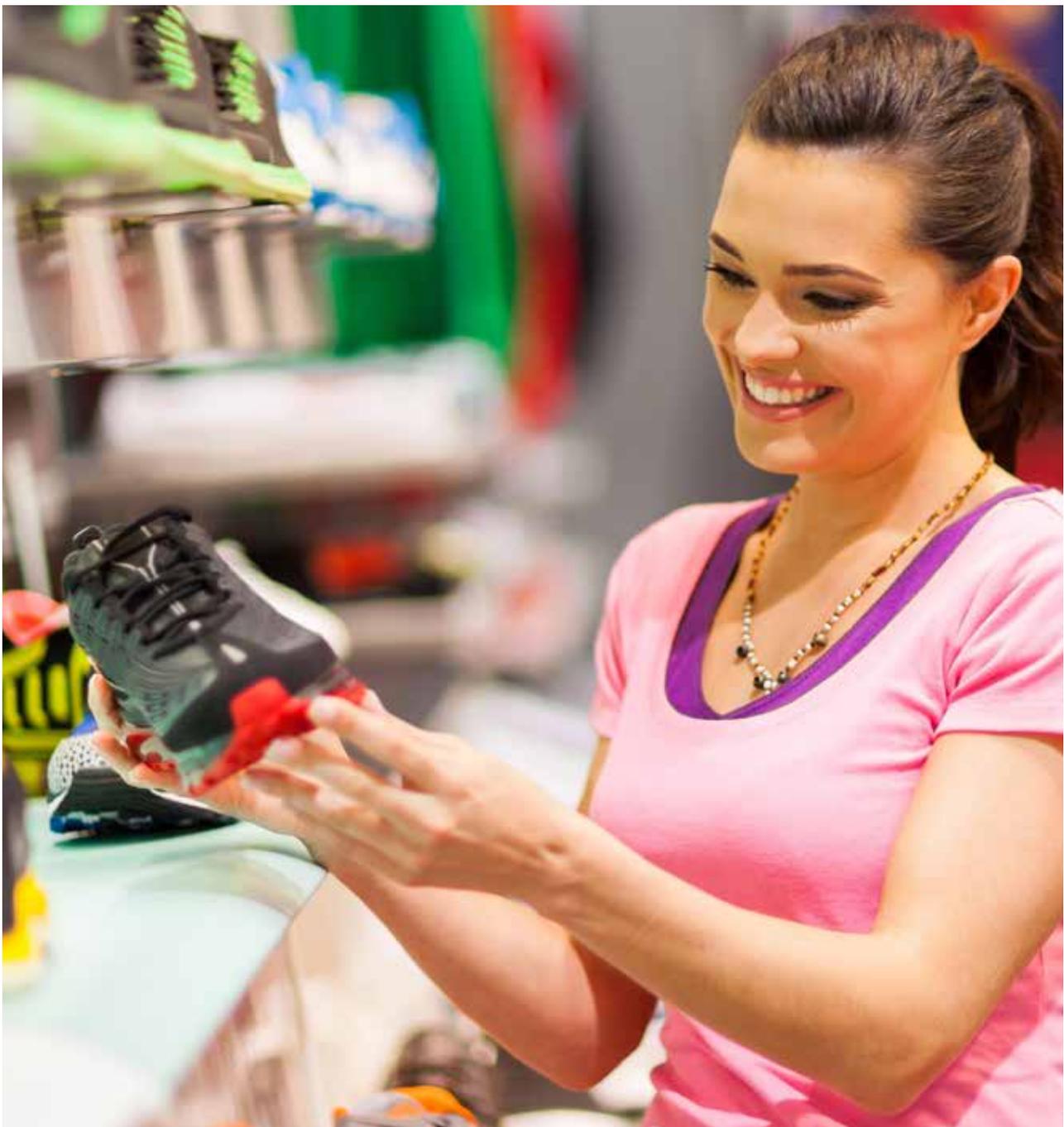
TÜV SÜD's footwear certification process address all required and voluntary chemical restrictions, manufacturers can avoid duplicate product testing and get new products to market in less time.

- **Strengthens market positioning and acceptance** - The TÜV SÜD Footwear Mark is widely accepted as a trusted symbol of product

safety, easing the procurement and product acceptance process by retailers in the marketplace.

- **Signifies alignment with consumer concerns and interests**
  - Manufacturers whose footwear products bear the TÜV SÜD Footwear Mark signal their understanding of consumer's concerns about product safety, as

well as their interest in reducing the overall use of potentially harmful chemicals.



# TÜV SÜD's footwear certification process

The TÜV SÜD footwear certification involves a comprehensive, multi-step process to assess the manufacturer's sourcing and production operations throughout its entire supply chain. The certification process typically includes all or most of the following steps:

## REQUEST FOR CERTIFICATION AND PRELIMINARY EVALUATION

The process begins with the manufacturer's request to undergo the footwear certification process. TÜV SÜD client advisors will review the request and conduct a preliminary evaluation to ensure the suitability and readiness of the manufacturer for the footwear certification program.

## TESTING OF RAW MATERIALS AND FINISHED PRODUCTS

Footwear materials and finished products are evaluated and tested for the presence of banned or restricted chemicals, consistent with REACH and CPSIA requirements, as well as applicable RSLs.

## FACTORY INSPECTION AND PRODUCTION LINE TESTING

Next, TÜV SÜD field auditors conduct detailed factory inspections and extensive production line testing that includes checks before and during production. Inspections also include product packaging and pre-shipment activities.

## EVALUATE AND APPROVE TESTING AND INSPECTION REPORTS

Upon the completion of testing of raw materials and finished product and factory inspection activities, TÜV SÜD technical experts review all testing and inspection reports and determine whether the manufacturer has met all applicable certification criteria.

## CERTIFICATION AND APPLICATION OF TÜV SÜD'S FOOTWEAR MARK

Permission to use TÜV SÜD's Footwear Mark is granted upon the successful completion of the testing, inspection and review process. The TÜV SÜD Footwear Mark can be displayed on product packaging or directly on the footwear product itself, whichever is most feasible.

## POST-CERTIFICATION INSPECTIONS AND TESTING

Beyond initial product certification, the continued use of the TÜV SÜD Footwear Mark requires annual factory inspections and ongoing market surveillance activities. These steps ensure that new and existing footwear products continue to comply with certification requirements.

# Other TÜV SÜD footwear testing and certification services

In addition to testing and certifying footwear for compliance with chemical restrictions, TÜV SÜD also offers testing and certification of footwear product fit. The TÜV SÜD Footwear Fit Mark indicates that the physical measurements of footwear products are consistent with the relevant standards of the international shoe size system. The Footwear Fit Mark provides consumers with

independent assurances that the footwear they purchase will fit as expected.

TÜV SÜD also provides footwear testing in support of other product certification schemes, including CE marking, GB regulations in China, GOST certification in Russia and the KC Mark in Korea. TÜV SÜD also offers a range of additional services

for footwear manufacturers, including auditing and system certifications covering quality systems, energy management and social responsibility compliance. These and other services can help footwear manufacturers achieve efficient market entry for new products, and build a reputation for safe, quality products among both retailers and consumers.



# Summary and conclusion

Chemicals found in footwear materials or used during the footwear production process are subject to oversight by regulators in the EU, the U.S. and other jurisdictions. As a result, the use of a number of potentially harmful chemicals and other substances traditionally found in footwear are either significantly restricted or banned altogether. In addition to regulatory requirements, major retailers are mandating compliance with their own restricted substances lists as a procurement requirement for manufacturers and other suppliers. Footwear

manufacturers can successfully address these market challenges by seeking certification that affirms their products' compliance with applicable chemical restrictions. Aside from helping manufacturers meet regulatory compliance requirements, footwear certification also supports efforts to develop a positive image with retailers, and provides additional leverage with consumers in a highly competitive market.

TÜV SÜD is a leading international service organisation providing one-stop global solutions for product

quality and safety testing and inspections, engineering support, management system certification, and training. With over 17,000 employees, TÜV SÜD operates worldwide at more than 800 locations. As partners in our customers' processes, our specialist teams ensure that technology, systems, and know-how are optimised, thus strengthening our customers' global competitiveness.

## GLOSSARY OF ACRONYMS

CPSC – consumer product safety commission  
CPSIA – consumer product safety improvement act  
EPA – environmental protection act  
EU – european union

FIFRA – federal insecticide, fungicide, and rodenticide act  
REACH – registration, evaluation, authorization and restriction of chemicals  
RSL – restricted substances list  
SVHC – substances of very high concern

## FOOTNOTES

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- [8] "Children's Safe Products Act," Department of Ecology, State of Washington, <http://www.ecy.wa.gov/programs/swfa/cspa/index.html>. (Last accessed on September 19, 2013)
- [9] "Proposition 65 in Plain Language," Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, <http://oehha.ca.gov/prop65/background/p65plain.html>. (Last accessed on September 19, 2013)

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## Access global markets by ensuring quality and performance

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### **Add value. Inspire trust.**

TÜV SÜD is a trusted partner of choice for safety, security and sustainability solutions. It specialises in testing, certification, auditing and advisory services. Since 1866, the company has remained committed to its founding principle of enabling progress by protecting people, the environment and assets from technology-related risks. Through 24,000 employees across 1,000 locations, it adds tangible value to customers and partners by enabling market access and managing risks. By anticipating technological developments and facilitating change, TÜV SÜD inspires trust in the physical and digital world to create a safer and more sustainable future.

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