Understanding Chemical And Physical Requirements For Footwear

TÜV SÜD

FDRA

FOOTWEAR DISTRIBUTORS AND RETAILERS OF AMERICA

2014 Global Product Safety Guidebook

As regulations and test methods continue to impact the footwear industry, companies are facing compliance challenges throughout the global footwear supply chain. In the past year alone, Minnesota and Vermont have issued or considered new regulations that restrict or prohibit the use of certain potentially harmful chemicals in consumer products. Meanwhile, the European Union's REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals) (Regulation (EC) 1907/2006) Candidate List continues to go through annual updates. Currently 155 Substances of Very High Concern (SVHCs) are listed on the Candidate List. More SVHCs will certainly be added in the coming years. Moreover, the REACH Annex XVII restriction of chromium VI and polycyclic aromatic hydrocarbons (PAH) has also been published. In addition to concerns with chemical content in footwear manufacturing, the number of recall cases due to physical and mechanical hazards in shoes have increased rapidly during the last 12 months in the U.S. and European markets. This is why FDRA, along with TÜV SÜD, have for the first time included a comprehensive physical testing matrix to help footwear companies ensure the physical quality and integrity of its products.

Compared to previous editions of the FDRA Guide, this new Guidebook provides an update on chemical and physical requirements applicable to footwear and its production processes. It is also designed to keep shoe manufacturers and importers apprised of key regulations affecting the global footwear industry. For clarity, a matrix was developed to prioritize both chemical and physical tests into a systematic tier system.

More specifically, in order to help companies develop a ***common-sense and pragmatic approach*** to managing compliance, the tier system of chemical tests is laid out in the following way:

TIER 1: Tier 1 includes those chemicals that are currently covered by State and Federal laws within the U.S. or European Union, based on industry counsel and intelligence, likely to be the subject of regulation and/or legal action in the very near future.

TIER 2: Substances in Tier 2 are regulated outside the United States, including within the European Union, and may be present in some footwear materials. Some of these chemicals are also covered by California's Proposition 65, but have yet to be the subject of increased regulatory scrutiny. Companies can assume that future regulations may include these chemicals.

TIER 3: These substances are partially regulated outside the United States, including within the EU, and may be present in some footwear specific materials. California's Proposition 65 covers some chemicals contained within Tier 3. These chemicals could be a focus of US regulation in the medium to long term.

Any changes to these regulations will be updated periodically in future editions of this Guide. In addition, major retailers and brands have developed their own restricted substances lists as a procurement requirement for manufacturers and other suppliers. FDRA, in partnership with TÜV SÜD, is helping manufacturers meet regulatory compliance requirements and satisfy customer needs. Footwear manufacturers can successfully address these market challenges by seeking certification that affirms their products are compliant with applicable chemical restrictions though TÜV SÜD Footwear Mark, and Footwear Fit Mark for physical measurement.

This Guidebook is the product of countless hours of work by FDRA's Product Safety Enhancement Committee, Product Safety Working Group and other FDRA members. FDRA and TÜV SÜD would not have been able to publish this Guide without the counsel and guidance of these important groups.

Chemical Requirements

TIER 1: These substances include chemicals that are currently covered by State and Federal laws within the U.S. and should be tested as part of a reasonable testing program.

Restricted Chemical	Recommended Test Method	Maximum recommended (from legislation and/or industry best practice)	Coated Leather	Leather	Textiles	Coated Textiles	Polymer/Plastic/ Rubber	Coating (Ink/Paint)	Metal hardware	Adhesive	Electrical components	Packaging	Legislation Examples	Example Alternatives**
Lead in Paint (this applies to the finish or coating and is required for all children's products)	CPSC CH 1003 09.1; ASTM F2853-10 ICP analysis—total digestion	≤90 ppm						X					CPSIA, REACH, Prop 65, KC Mark	Organic pigments / non-toxic heavy metal pigments
Lead in Substrate (required for all children's products)	CPSC CH E1001 08.3; CPSC CH E1002 08.3 ICP analysis—total digestion	≤100 ppm	X		X*	X	X	X	X	X	X		CPSIA, REACH, Prop 65, KC Mark	No lead containing dyes
Cadmium	ICP analysis—total digestion	<75 ppm	X		X*	X	X	X	X	X	X		REACH, Prop 65, KC Mark	Organic pigments/ non-toxic heavy metal pigments
Restricted Phthalates screen	BS EN 14372 Screening for DEHP, BBP, DBP, DINP, DIDP, DNOP, DnHP & DIBP	≤0.1% by weight (sum)	X			X	X	X		X			CPSIA, Prop 65, REACH, KC Mark	Alternatives include citrates, sebacates, adipates, and phosphates
Formaldehyde	Leather EN ISO 17226-1 (HPLC analysis) Textile EN ISO 14184-1	Materials without skin contact <150 ppm Materials with skin contact <75 ppm Children's products (up to 24 months) with skin contact <16 ppm	X	X	X	X				X			Retailer and brand specified (legislated in Japan). Prop 65, Minnesota, KC Mark	Avoid using formaldehyde to process products
Total Heavy Metal for Packaging	ICP / UV-Vis analysis— Pb, Cd, Hg, CrVI	Pb + Hg + Cd + Cr ⩽0.01% by weight										X	Directive 94/62/EC, TPCH	Use non-toxic heavy metal materials

PPM is equivalent to mg/kg.

* Tested only for printed textile

** Please note that any alternative chemical products are listed as examples only. The list is not exhaustive. New chemicals should be sourced in consultation with a reputable chemical company and tested accordingly for quality and safety purposes.

TIER 2: These substances are partially regulated outside the U.S., including within the European Union, and may be present in some footwear materials. Some of these chemicals are covered by California's Proposition 65, but have yet to be the subject of increased regulatory scrutiny. Companies can assume that future regulations may include these chemicals.

Restricted Chemical	Recommended Test Method	Maximum recommended (from legislation and/or industry best practice)	Coated Leather	Leather	Textiles	Coated Textiles	Polymer/Plastic/ Rubber	Coating (Ink/Paint)	Metal hardware	Adhesive	Electrical components	Packaging	Legislation examples
Azo dyestuffs—Arylamines	Leathers BS EN 17234-1:2010 and BS EN 17234-2:2011 Textiles BS EN 14362-1:2012 and BS EN14362-3:2012	None detected (detection limit: 30 ppm)	X	X	X	X							REACH, Prop 65, KC Mark
Chrome VI Soluble	Aging, followed by EN ISO 17075	None detected (detection limit: 3 ppm)	X	X									Prop 65, REACH (will apply on 1 May 2015), Germany, KC Mark
Chlorinated Phenols PCP, TCP and TeCP	EN ISO 17070	None detected (detection limit: 5 ppm)	X	X	X	X							REACH, Prop 65, KC Mark (PCP only)
Flame Retardants	GC-MS/GC-ECD	PBE, OBE and PBDE—none TRIS, TEPA, PBB—none detected for skin contact TCEP, TDCPP—0.1% by weight			X	X	X						REACH, Prop 65, KC Mark (For TRIS, PentaBDE, OctaBDE only) Various State laws
Restricted Phthalates Screen	BS EN 14372 Screening for DMEP, DHNUP, DIHP, DIPP, DPP, 1,2-Benzenedicarboxylic acid, dipentylester, branched and linear	≤0.1% by weight (sum)	X			X	X	X		X			CPSIA, Prop 65, REACH, KC Mark
Disperse Dyes	DIN 54231	<5mg/l in extract (each)			X	X							BfR recommendation in Germany, KC Mark (Only test for synthetic textile with direct skin contact.)
Dimethyl Fumarate (DMFu)	CEN ISO TS 16186 (or equivalent)	≤0.1 ppm	X	X	X	X						X	REACH, KC Mark
Extractable Heavy Metals Screening (for children's products)	BS EN71-3:2013	See Table 1 for limit	X	X	X	X	X	X	X	X	X		Toy Directive 2009/48/EC
Nickel Release of Metallic Components in Direct Prolonged Contact with Skin	BS EN 12472: 2005 + A1:2009 BS EN 1811:2011	<0.5 µg/cm²/week							X				REACH, KC Mark
NPEO, NP, OPEO and OP	HPLC analysis	<100 ppm	X	X	X	X	X	X		X			REACH (processing) and focus of NGO campaigns
PFOS/PFOA (for water / stain resistance treated materials)	CEN TS 15968 (or equivalent)	<1000 ppm <1 µg/m² for coated materials	X			X							REACH and focus of NGO campaigns
SCCP	GC-MS analysis	Not detected (Detection limit: ppm)	X	X		X	X						EU POPs

TIER 3: These substances are partially regulated outside the U.S., including within the European Union, and may be present in some footwear specific materials. California's Proposition 65 covers some chemicals contained within tier 3. These chemicals could be a focus of U.S. regulations in the long term.

Restricted Chemical	Recommended Test Method	Maximum recommended (from legislation and/or industry best practice)	Coated Leather	Leather	Textiles	Coated Textiles	Polymer/Plastic/ Rubber	Coating (Ink/Paint)	Metal hardware	Adhesive	Electrical components	Packaging	Legislation examples
Organotin Compounds (MBT, DBT, TBT, MOT, TeBT, DOT, TPhT & TcyT)	CEN ISO TS 16179 (or equivalent)	TBT—<25 µg/kg (0.025 ppm) Others—<50 µg/kg (0.050 ppm)	X			X	X	X		X			REACH, Prop 65, KC Mark (For DBT, TBT only)
PAH	GC-MS analysis	≤1 ppm (each)*	X			X	X	X					REACH (will apply on 27 December 2015)
N,N-Dimethyl—formamide	GS-MS analysis	<50 ppm—direct skin contact <300 ppm—indirect skin contact	X		X	X	X						REACH
Total Heavy Metals Screening	ICP analysis—total digestion Screening for Sb, As, Ba, and Hg	<100 ppm per metal	X	X	X	X	X	X	X	X	X		Prop 65, Metal Specific Directives
Pesticides Screening	LC-MS analysis	Total <1.0 ppm	X	X	X	X							REACH, Prop 65
Volatile Organic Compounds (toluene, benzene & naphthalene)	GC-MS analysis	<5.0 ppm per compound	X	X	X	X	X			X			REACH, Prop 65
Nitrosamines	EN 12868 (or equivalent)	<0.1 ppm					X						EU Directive 1993/11/EEC
Bisphenol A	LC-MS analysis	None present					X			X			Country/US State specific controls
REACH Screening for SVHC	Various methods	<0.1% by weight of the product	X	X	X	X	X	X	X	X	X		REACH
Children's Product Safety Act—Chemical of High Concern (CHCC)	Various method	Below PQL; <100 ppm as contamination	X	X	X	X	X	X	X	X	X		Washington State CPSA

* For German market, it is recommended to follow ZEK 01.4-8 requirement i.e Sum of 18 PAH<10 mg/kg, BaP<1 mg/kg are recommended.

TABLE 1, EXTRACTABLE HEAVY METALS SCREENING (FOR CHILDREN'S PRODUCTS)—LIMITS

Substance	Limit of Category III of BS EN 71-3:2013 (mg/kg)
Aluminium	70,000
Antimony	560
Arsenic	47
Barium	18,750
Boron*	15,000
Cadmium	17
Chromium III	460
Chromium VI	0.2
Cobalt	130
Copper	7,700
Lead	160
Manganese	15,000
Mercury	94
Nickel	930
Organo tin **	12
Selenium	460
Strontium	56,000
Tin	180,000
Zinc	46,000

* Boron is a non-metal.

** Organotin compounds are organo-metallic compounds.

Additional Restricted Substances Information:

Substance	Description
Lead	Lead is a toxic metal that can cause irreversible neurological damage as well as renal disease, cardiovascular defects and reproductive toxicity. Lead can be used as a stabilizer in PVC production. It can be found in metal alloys of metallic components as well as a component of pigments in textiles and paints.
Cadmium	Cadmium is relatively abundant in our everyday life from various sources such as diet, fertilized soils and cigarette smoke. Cadmium is a naturally occurring heavy metal which is often used as a stabilizer or pigment in plastics and dyestuffs; it is also sometimes used in biocides and fertilizers. Cadmium is known to be toxic to humans and aquatic life and due to its cumulative effects it is also considered to be very harmful to the environment.
Phthalates	Phthalates are mainly used as plasticizers (softeners) for PVC and other polymers. They can be also found in adhesives, coated leathers, plasticized components and some synthetic rubbers. Phthalate plasticizers are not chemically bound to PVC so they may leach out. The fear is that young children and infants will chew or place an offending item containing phthalates into their mouths and absorb some of the chemicals into their bodies. Studies have found phthalates to be endocrine disrupting. Bis (2-ethylhexyl) phthalate (DEHP) has also been listed as a possible carcinogen. It should be noted that only a few phthalates are restricted.
Azo Dyes	Azo colorants are coloring agents widely used in the production of textiles, leather, plastics, paper and many other everyday items. The term colorant includes both pigments and dyes. Aromatic amines are produced during the degradation or breakdown of certain azo dyes and it is some of these degradation products that are restricted in textile and leather articles. This breakdown occurs if the dyes are able to enter the body through ingestion or skin migration. There are currently 24recognised aromatic amines restricted by various legislations worldwide. Some of these are known to be carcinogenic whilst some are only suspected to be carcinogenic.
Heavy Metals	Some metals have no known biological function such as arsenic, cadmium, chromium, lead and mercury. Other metals are required in order for cells to function normally, such as copper, nickel, iron and zinc. Most metals are toxic in high concentrations; however the metals that do not have a biological function can also be toxic in very low concentrations. This method screens for those metals already identified as being of potential risk.
Chrome VI	Chromium is a transition element and can exist in three stable forms known as metallic chromium, chromium III and chromium VI. The vast majority of the leather produced today is tanned using chromium salts and in the finished leather this is present as chromium III. Chromium (III) sulphate is safe to use and is non-hazardous. It is possible that small amounts of this chromium III can be reduced to the harmful chromium VI at any point during the tanning process (due to high pH or contaminated chemical supplies) or the lifetime of the finished leather under specific conditions (such as high temperature). Chrome VI is believed to be a dermatological irritant and, if present in large enough quantities, is a potential carcinogen.
Formaldehyde	Formaldehyde can be toxic, allergenic, and carcinogenic. Because formaldehyde resins are used in many construction materials, it is one of the more common indoor air pollutants. At concentrations above 0,1 ppm in air, formaldehyde can irritate the eyes and mucous membranes, resulting in watery eyes, if inhaled at this concentration may cause headaches, a burning sensation in the throat, and difficulty breathing, as well as triggering or aggravating asthma symptoms. Formaldehyde is also classified as a probable human carcinogen. Formaldehyde can cause allergies, and is part of the standard patch test series.
Chlorinated Phenols	Used historically as a herbicide, pesticide, fungicide and disinfectant in natural materials such as wood, paper, leather and cotton, PCP is known to be toxic to humans and has been linked to some forms of cancer. Tetrachlorophenol (TeCP) is an insecticide and a bactericide and is used as a preservative for latex, wood, and leather. Trichlorophenol (TriCP) has been used as a fungicide, herbicide, insecticide, antiseptic, defoliant, and glue preservative. It is a yellow solid with a strong, sweet odour. It decomposes on heating to produce toxic and corrosive fumes including hydrogen chloride and chlorine. It is carcinogenic in animals, and is considered an environmental pollutant.

Substance	Description
Disperse Dyes	Disperse dyes are generally water-insoluble colorants that are mainly used for coloring polyester, nylon, and cellulose acetate textile fibres. Some of these dyes can cause and allergenic response and it is estimated that up to 5% of the population could have an allergic response to these substances.
Dimethyl Fumarate	Dimethyl fumarate, also known as DMF, is an ester of Fumaric acid with a chemical formula of C6H8O4. DMF has good antifungal properties, and has been used as a mold inhibitor in sachets for footwear and furniture. Recently, DMF has been highlighted as being an allergenic sensitizer causing eczema at low concentrations. As a result, member states have voted in favor of a draft European Commission decision to ensure that products containing DMF are not placed on the EU market and a ban on the import of products containing dimethyl fumarate is likely to be enforced.
Alkylphenol and Alkylphenol Ethoxylate (NP, OP, NPEO, OPEO)	Alkylphenols (AP) and alkylphenol ethoxylates (APEO) are used in plastics, as additives, plasticizers and surface-active ingredients in industrial detergents and emulsifiers. Ethoxylated alkylphenols, alkylphenol ethoxylates (APEO), are used as industrial surfactants in manufacture of textile, leather, wool and metal, as emulsifiers for polymerization, in laboratory detergents, and pesticides. Nonylphenol and nonylphenol ethoxylates (NPEO) are a believed to be bio-accumulative and a hazard to human and environmental safety.
Flame Retardants	Flame retardants are chemicals used in textiles and leather goods to inhibit or resist the spread of fire. Many of these chemicals are considered harmful, having been linked to liver, thyroid, reproductive/developmental, and neurological effects.
Organotin Compounds	Organotins (also known as organic tin or organostannic compounds) are a large family of chemicals compounds with a structure that is based on tin (Sn) with a number of hydrocarbon substituents. These compounds have many uses in the production of consumer products and, depending on their composition, have uses ranging from antifungal agents to stabilizers in the production of plastics. Although organotin compounds have a large scope of uses depending on the wide range of possible structures available, certain compounds have been highlighted by the EU as having adverse effects on human health and the environment. As a result, the Commission of European Communities has put together a proposal to restrict the use of organostannic compounds in consumer articles.
PFOS/PFOA	PFOS belongs to the perfluorinated surfactants. Perfluorinated surfactants are very stable to chemicals, heat and also light (UV radiation). They have excellent dirt, oil and water repelling properties. Compounds derived from perfluorooctane sulphonate (PFOS), therefore, have numerous applications in the surface finishing of packaging materials, carpets, textiles, leather and furniture. Polymeric compounds are often used for such applications; they are chemically firmly bonded to the substrate to prevent washing out. PFOS are categorized as potentially carcinogenic to humans. This substance is considered as very persistent and very bioaccumulative (vPvB). Perfluorooctanoic acid (PFOA), also known as C8, is an artificial acid that has many industrial uses.
Pesticides	A pesticide is any substance or mixture of substances intended for: preventing, destroying, repelling, or mitigating any pest. Though often misunderstood to refer only to insecticides, the term pesticide also applies to herbicides, fungicides, and various other substances used to control pests. By their very nature, most pesticides create some risk of harm—Pesticides can cause harm to humans, animals, or the environment because they are designed to kill or otherwise adversely affect living organisms.
VOC	VOC is short for volatile organic compounds, which are chemical compounds that have high enough vapor pressures under normal conditions to significantly vaporize and enter the air. VOCs that escape into the air contribute to air pollution outdoors and inside our homes. Emissions and odor are sometimes used instead of VOC but are often used to mean the same thing. VOCs include a variety of chemicals, some of which may have short- and long-term adverse health effects.
Nitrosamines	Nitrosamines can be used in rubber products, latex, pesticides and certain cosmetics. Some nitrosamines can cause cancers in a wide variety of animal species, a feature which suggests that they might also be carcinogenic in humans. Epidemiological data suggests that nitrosamines in preserved food cause stomach cancer.

Substance	Description
Bisphenol A	Bisphenol A (BPA) is used primarily to make plastics. It is a key monomer in production of epoxy resins and in the most common form of polycarbonate plastic. Polycarbonate plastic is used to make a variety of common products including baby and water bottles, sports equipment, medical and dental devices, dental fillings and sealants, eyeglass lenses, CDs and DVDs, and household electronics. BPA is also used in the synthesis of polysulfones and polyether ketones, as an antioxidant in some plasticizers, and as a polymerization inhibitor in PVC. Bisphenol A is also a precursor to the flame retardant tetrabromobisphenol A, and was formerly used as a fungicide. BPA is an endocrine disruptor that interrupts hormones. In has been linked to breast cancer, heart disease, obesity, prostate cancer, hyperactivity and behavioral problems. BPA is primarily restricted in baby bottles and food contact plastics; however in March 2010 the EPA listed BPA as a chemical of concern.
Polycyclic Aromatic Hydrocarbons (PAH's)	PAH's are found in oil, coal and tar deposits and in oils used for the production of tyres and some plastic or rubber components. They are not added to the products intentionally but are present as impurities. PAH's are toxic to the environment and bioaccumulative as they readily evaporate into the air from soil or surface water, breaking down through reaction with sunlight and other chemicals in the air.
Nickel	The presence of nickel in certain products which come into direct and prolonged skin contact, such as jewelry, may cause sensitisation of humans to nickel and may lead to allergic reactions. The objective of the nickel directive is to reduce the incidence of nickel dermatitis by preventing non-compliant items from reaching the marketplace. There are many factors which can affect the level and rate of nickel release from a nickel alloy. Apart from the actual nickel content and composition of the alloy itself, these could include surface finish, non-homogeneity, and plating among others.
REACH—SVHCs	REACH is a European Union regulation concerning the Registration, Evaluation, Authorisation and restriction of Chemicals. It came into force on 1st June 2007 and replaced a number of European Directives and Regulations with a single system. Some substances have hazards that have serious consequences, e.g. they cause cancer (carcinogenic), or they have other harmful properties and remain in the environment for a long time (persistent) and gradually build up in animals (bioaccumulative). These are substances of very high concern. This category also includes substances demonstrated to be of equivalent concern, such as "endocrine disruptors". One of the aims of REACH is to control the use of such substances via authorization and encourage industry to substitute these substances for safer ones.
Short-chain Chlorinated Paraffins (SCCPs)	SCCPs have both human health hazards (carcinogenic) and environmental hazards. It is classified as persistent organic pollutants and restricted under a number of EU regulations including POP regulation and it is listed on the EU REACH Candidate List
N,N-Dimethyl—Formamide	Dimethylformamide (DMF) is primarily used as a solvent in the production of polyurethane products and acrylic fibers. It is also used in the pharmaceutical industry, in the formulation of pesticides, and in the manufacture of synthetic leathers, fibers, films, and surface coatings. It affects proper functioning of liver and irritate human respiratory system.
Washington State—Children's Product Safety Act—Chemical of High Concern (CHCC)	Under the Children's Safe Product Act (CSPA), manufacturers of children's products are required to notify the department of ecology by a specific due date when a Chemical of High Concern to Children (CHCC) is present in their products. It is necessary to report if Intentionally added in the product at any concentration above the CHCC's Practical Quantification Limit (PQL); or present as a contaminant at any concentration above 100ppm

Physical Requirements

TIER 1: These test items are currently covered by State and Federal laws within the U.S. or are vital to the overall physical integrity of the shoe.

Test Item	Legislation Examples or Recommended Test Method	Recommended (from legislation and/or industry best practice)	Children's shoe			Adult's					
			0-3 years	4-8 years	Over 8 years	Sandals	Shoes with heels	Canvas	Sports	Thongs	Slippers
Finished Shoe											
Small Part	U.S. Federal Law 16 CFR 1501	No potentially small parts	X								
Sharp Point	U.S. Federal Law 16 CFR 1500.48	No potentially hazardous sharp points	X	X	X						
Sharp Edge	U.S. Federal Law 16 CFR 1500.49	No potentially hazardous sharp edges	X	X	X						
Tracking Label	Consumer Product Safety Improvement Act (CPSIA) Section 103	Meet requirement	X	X	X						
Country of Origin	U.S. Federal Law 16 CFR part 134	Meet requirement	X	X	X	X	X	X	X	X	X
Slip Resistance	ASTM F2913	Min.0.3	X	X	X	X	X	X	X	X	X
Strap Attachment	SATRA TM181	Children & Men: Min. 250 N Women: Min. 200 N Elastic: 150 N	X	X	X	X	X		X	X	
Toe Post Attachment	SATRA TM118	EVA: Min. 150 N								X	
Heel Attachment	ISO 22650	Min. 500 N Max.15% at 400 N					X				
Other Considerations for Safety Footwear and Certain Performance Claims											
Water Resistance **(If applicable – e.g., safety or performance claim made)**	SATRA TM77	No water penetration after 20,000 cycles, water level 5mm above feather line		Oil Resistance **(If applicable – e.g., safety or performance claim made)**		ISO 1817		Max 12%			

TIER 2: These test items are very important for your product quality and brand. Some of these tests should be conducted before material purchasing.

Test Item	Recommended Test Method	Recommended (from legislation and/or industry best practice)	Children's shoe			Adult's					
			0-3 years	4-8 years	Over 8 years	Sandals	Shoes with heels	Canvas	Sports	Thongs	Slippers
Finished Shoe											
Sole Bond	ISO 17708	Children & Men: Min. 4 N/m Women: Min. 3 N/mm Sidewall & foxing: Min. 2 N/mm	X	X	X		X	X	X		
Whole Shoe Flexing	ISO 19955	No damage after 500,000 cycles at room temperature.		X	X	X	X	X	X		
Color Fastness											
Color Fastness to Light	ISO 105-B02	Min. 4 B.W.S (4 Grade)	X	X	X	X	X	X	X	X	X
Color Fastness to Rub	ISO 105-X12—textile ISO 11640-leather	Min. 3 Grade	X	X	X	X	X	X	X	X	X
Color Fastness to Perspiration	ISO 105-E04—textile ISO 11641-leather	Min. 3 Grade	X	X	X	X	X	X	X		X
Outsole											
Outsole Abrasion	ISO 4649	PVC: Max. 250 mm^3 Solid Vulcanised Rubber & soft TPR: Max. 300 mm^3 Hard TPR: 400 mm^3	X	X	X	X	X	X	X	X	X
Outsole Flexing	ISO 17707	Cut growth Max. 4 mm		X	X	X	X	X	X	X	X
Upper Material											
Flexing Resistance	ISO 17694	No cracking after 80,000 cycles at room temperature.	X	X	X		X		X		
Accessories											
Corrosion Resistance	ISO 9227	Not worse than moderate amount and Rating 7	X	X	X	X	X	X	X	X	X

TIER 3: These test items are important for your product quality and brand. Most of these tests are conducted before material purchasing.

Test Item	Recommended Test Method	Recommended (from legislation and/or industry best practice)	Children's shoe			Adult's					
			0-3 years	4-8 years	Over 8 years	Sandals	Shoes with heels	Canvas	Sports	Thongs	Slippers
Finished Shoe											
Seam Strength	ISO 17697	Min. 10 N/mm	X	X	X		X	X	X		X
Upper Material											
Coating Adhesion	ISO 17698	Dry: Min. 1.2 N/mm Wet: Min. 1.0 N/mm	X	X	X	X	X		X		
Tear Strength	ISO 17696	Children & Men: Min. 45 N Women: Min. 36 N	X	X	X		X	X	X		
Accessories											
Shearing for velcro	ISO 22776-Shear	Initial:Min. 75 kPa After:Min. 65 kPa	X	X	X	X	X	X	X		
Peeling for velcro	ISO 22777-peel	Initial:Min. 0.10 N/mm After Min. 0.08 N/mm									
Heel impact	ISO 19953	Min. 5.5 J			X	X	X				
Heel Fatigue	ISO 19956	Min. 14,000 cycles			X	X	X				
Elastic Fatigue	SATRA TM103	No more than 10% rubber thread breakage—before aging No more than 20% rubber thread breakage—after aging	X	X	X	X	X	X	X		X
Lace Tag Strength	SATRA TM175	Min. 150 N	X	X	X	X	X	X	X		

Additional Physical Testing Information:

As with all footwear designed and/or marketed as safety footwear or containing features such as a steel toe or having slip resistance, you need to understand the legal requirements of the countries in which they are marketed and sold and have them tested accordingly because they will likely receive heightened product integrity scrutiny.

Term	Description
Small Part	A small part is any object that fits completely into a specially designed test cylinder 2.25 inches long by 1.25 inches wide that approximates the size of the fully expanded throat of a child under three years old.
Sharp Point	Points on toys and other articles intended for use by children under 8 years of age, and such points exposed in normal use or as a result of reason-ably foreseeable damage or abuse of such toys and articles, present a potential risk of injury by puncture or laceration.
Sharp Edge	Metal or glass edges on toys and other articles intended for use by children under 8 years of age, and such edges exposed in normal use or as a result of reasonably foreseeable damage or abuse of such toys and articles, present a potential risk of injury by laceration.
Tracking Label	The tracking label provides information to help a manufacturer or importer ascertain and initiate an effective corrective action program in the event of a recall. Manufacturers should look at the totality of the information permanently marked on the product and packaging and not interpret “label” to mean a singular collection of information in one discrete location.
Country of Origin	Country of origin. ‘‘Country of origin’’ means the country of manufacture, production, or growth of any article of foreign origin entering the United States.
Water Resistance	The footwear is placed in a tray of water and is flexed through a specified angle about its natural flexing line. After a predetermined time or number of flexes, the footwear is subject assessed for signs of water penetration. This test is important if a specific pair of shoes is portrayed to the consumer as water resistant.
Oil Resistance	Evaluating the resistance of rubber to the action of liquids by measurement of properties of the rubbers before and after immersion in test liquids.
Slip Resistance	The coefficient of friction between footwear and flooring under conditions simulating those experienced in the phases of a typical walking step when slip is most likely to occur.
Strap Attachment	The strength of buckle and strap attachments in a completed shoe.
Toe Post Attachment	The strength of a toe post and its attachment.
Heel Attachment	The strength of heel attachment in a completed shoe.
Sole Bond	Force required to separate the sole-upper interface.
Whole Shoe Flexing	The resistance of whole shoe to repeated flexing.
Color Fastness to Light	The resistance of the color of textiles of all kinds and in all forms to the action of an artificial light source representative of natural daylight
Color Fastness to Rub	The resistance of the color of textiles of all kinds, including textile floor coverings and other pile fabrics, to rubbing off and staining other materials.

Term	Description
Color Fastness to Perspiration	The resistance of the color of textiles of all kinds and in all forms to the action of human perspiration.
Outsole Abrasion	The determination of the resistance of rubber to abrasion by means of a rotating cylindrical drum device.
Outsole Flexing	To assess the effect of sole materials and surface patterns on cut growth under flexing resistance.
Flexing Resistance	The flex resistance of uppers and linings irrespective of the material, in order to assess the suitability for the end use.
Corrosion Resistance	The procedure to be used in conducting the neutral salt spray(NSS) tests for assessment of the corrosion resistance of metallic materials, with or without permanent or temporary corrosion protection.
Seam Strength	The breaking strength of stitched seams in shoe upper and lining material.
Coating Adhesion	The strength of adhesion between a coating and its base.
Tear Strength	The force required to tear a material.
Shearing for Velcro	Both parts of a touch and close fastener are pressed together under controlled conditions, with one of the parts offert to the other so that there is a standard contact area between the two parts. The max shear force required to pull them apart along their length in both direction is measured with a tensile testing machine.
Peeling for Velcro	Both parts of a touch and close fastener are pressed together under controlled conditions, and the average force required to peel them apart along their length form either end is measured with a tensile testing machine.
Heel Impact	The resistance of the heels of women's shoes to the occasional heavy blows that occur in wear.
Heel Fatigue	The resistance of the heels of women's shoes to the repeated impacts that occur in normal walking.
Elastic Fatigue	The resistance of elastic to repeated stretching to the limit of its useful extension both before and after an artificial ageing treatment.
Lace Tag Strength	The attachment strength of a tag to a shoelace.

FDRA

FOOTWEAR DISTRIBUTORS AND RETAILERS OF AMERICA

TÜV SÜD Footwear

Production monitored

Tested for hazardous substances

Voluntary Testing
TÜV SÜD Product Service Standard
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About FDRA

Founded in 1944, the Footwear Distributors and Retailers of America (FDRA) is the oldest, largest, and most effective footwear trade association in the U.S. It represents the full breadth of the footwear industry, supporting more than 100 companies and over 200 brands, from research, design and development, to manufacturing and distribution, to retailers selling to consumers all over the globe. What FDRA does is simple: It advocates for lower costs for consumers, allowing its members to sell more shoes and create jobs. FDRA is also the leader in industry educational events and business intelligence products on a variety of important footwear regulations and trends. More information on FDRA, and the product safety programs and products, can be found by visiting FDRA.org or calling 202.737.5660.

About TÜV SÜD

TÜV SÜD is a premium quality, safety, and sustainability solutions provider that specializes in testing, inspection, auditing, certification, training, and knowledge services. Headquartered in Munich, Germany, TÜV SÜD is represented in more than 800 locations worldwide. Our dedicated team of 20,000 multi-disciplinary experts are recognized as specialists in their respective fields. By combining impartial expertise with invaluable insights, we add tangible value to businesses, consumers and the environment. We offer one-stop solution for the leather and footwear supply chain, our exclusive TÜV SÜD Footwear Mark provides consumers with evidence of a manufacturer's commitment to offer only safe products, thereby supporting efforts to build positive brand awareness and trust. While the TÜV SÜD Footwear Fit Mark provides consumers with independent assurances that the footwear they purchase will fit as expected. For more information please contact cps@tuv-sud.com or visit www.tuv-sud.com/cps.

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