Chemical Guideline and Restricted Substances List

FENIX OUTDOOR

Chemical Guideline and Restricted Substances List (RSL)
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1. General Considerations

This guideline is developed to provide producers and suppliers to any Fenix Outdoor International AG entity with information on how to deliver on the individual buying terms regarding the chemical content of specific substances or substance groups in textiles, clothing, hardware, leather goods, metal goods, food packaging and accessories. These procedures and requirements shall ensure that all legal demands are fulfilled, the environment is protected in both the supplying and importing countries and that the import of goods and free trade, in particular with developing countries and the European Union (EU) is promoted.

The distinguishing properties of the chemicals and the processes in which they are used are described.

The stipulated test equipment is commonly occurring, and the detection limits are generally accepted.

We acknowledge that due to general contaminations even unwanted or prohibited substances may be detected in products and components. However, we do not accept this as an excuse for improper handling of chemicals or non-compliant behavior.

Recommended substitutes are in general less harmful or generally better while providing the desired effect or similar functional property.

This Guideline builds on the Chemical Guidance of the Swedish Chemicals Group SWEREA IVF and the Textiles Importers’ Association of Sweden in its most recent version. The Information on authorization and restrictions of substances used in textile and leather processes and products is available in various languages (Bengali, Chinese, Turkish; Vietnamese in preparation) and can be provided upon request.

2. Purpose

There are numerous local, national and international laws and regulations that dictate how retailers, brands and suppliers should manage chemicals used in processing and in final products; and these laws are constantly changing.

Every retailer, brand and supplier needs a reliable system for tracking these regulations and for determining how their chemical management programs need to respond to these requirements.

The purpose of the group-wide Chemical Guideline and Restricted Substances List is to ensure compliance of all apparel, hardware and footwear products produced by or in the name of any Fenix Outdoor International AG entity with statutory (legal) requirements and self-imposed regulations and restrictions. This Guideline is governed by the precautionary principle and includes long-term views in light of legislative changes in various regions of the world. Our group-wide aim is to not use any hazardous chemicals that threaten human health or the environment. It is our utmost wish to reduce any negative impacts throughout the supply chain of our products. Hence, our restrictions go beyond legal compliance and we...
encourage our business partners to be proactive and search for new, less harmful alternatives even before a legal demand is formulated.

3. **Scope of Application**

This corporate guideline applies to all Fenix Outdoor apparel, hardware and footwear companies and their suppliers including but not limited to materials suppliers, dye houses, chemical companies, mills, tanneries, cleaning, washing and pressing facilities and all those suppliers selling or treating materials and components that are used in or for our products. As applicable, the guide or any specified annex also applies to our technical brands and their suppliers as specified before.

Our aim is to present this Guideline as a comprehensive chemicals guidance document of substances for authorization and a Restricted Substances List (RSL) including restrictions for substances which are used in production processes and/or in products and related categories.

However, additional specific requirements maybe imposed by individual entities of Fenix Outdoor Group and those are valid beyond this Guideline.

4. **Additional Valid Instructions and Reference Documents**

- Fenix Way
- REACh I regulation (EU Regulation 1907/2006) and related amendments
- EU POP regulation (EU Regulation 850/2004 and 519/2012) and related amendments
- Biocide Product regulation (EU Regulation 528/2012) and related amendments
- EU directive concerning packaging materials (94/62/EC) and related amendments
- EU regulations concerning materials intended for contact with foodstuff (EU Regulation 1935/2004) and related amendments
- California Proposition 65 (as applicable)
- Fenix Supplier Code of Conduct
- Anti-Corruption Guideline
- Relevant Group Policies

5. **Definition of Terms**

The following definitions of abbreviations and terms shall apply.

- **CAS No.**  Chemical abstract services registration number. CAS Number is given for a specific and defined substance.

- **CCO**  is an abbreviation for Chief Compliance Officer. The CCO controls the compliance activities on Group level and ensures they are implemented at Fenix.

- **Compliance**  stands for consistency of corporate conduct with statutory and internal corporate regulations and behavior, embodied by the conduct of senior management and employees of Fenix.

- **Detection limit**:  Lowest concentration the test equipment is able to detect. This can vary between different test laboratories and the age and quality of their equipment. Please note that the detection limit is not always relevant as required/allowed -> limit values for certain chemicals can be notably higher than those. In some instances detection limits are even below
background concentrations (e.g., air or water pollution levels) which will virtually always in the detection of a substance, even when not deliberately used.

**Limit value:**

Limit value is the allowed maximum concentration of a chemical in a finished product. (Fenix defined or legally fixed). Where stated: “not to be used”, a use of the chemical in any production step is not permitted. Note that the limit value is measured in products. Weight percent shall be calculated from the weight of the stand-alone component (e.g., a zipper, a lining etc.) if not defined otherwise. This demand is a consequence from the REACh Court ruling in 2015.

**Packaging material:**

Defined according to Directive (EC) No 94/62/EC of 20 December 1994 on packaging and packaging waste. The directive regulates substances in packaging material; meaning all products made of any materials of any nature to be used for the containment, protection, handling, delivery and presentation of goods, from raw materials to processed goods, from the producer to the user or the consumer.

**pH:**

In chemistry, pH (/piːˈeɪʃ/) is a numeric scale used to specify the acidity or basicity (alkalinity) of an aqueous solution. It is roughly the negative of the logarithm to base 10 of the molar concentration, measured in units of moles per liter, of hydrogen ions. Solutions with a pH less than 7 are acidic and solutions with a pH greater than 7 are basic. Pure water is neutral (pH 7), being neither an acid nor a base.

**Properties:**

Describes the Human toxicological and Eco toxicological properties of a substance.

**Test method:**

Describes the prescribed (standardized) test method to clarify and evidence that the limit value is not exceeded. It also prescribes test equipment if no standardized test method exists. Abbreviations of recommended test equipment are explained below (test equipment abbreviations).

**GENERAL NOTE:**

In the line “Comments” we present additional information on known alternatives for and recommendations on how to avoid unwanted chemicals.

**Test equipment abbreviations**

**ANALYSES OF ORGANIC COMPOUNDS**

- **Gas chromatography**: GC
  
  Detectors used together with GC:
  - MS: Mass selective detector: GC-MS
  - DAD: Diode array detector: GC-DAD
  - ECD: Electron capture detector: GC-ECD

- **Liquid chromatography**: LC
  
  *Note: Sometimes the abbreviation HPLC is used. It stands for High Performance Liquid Chromatography.*

  Detectors used together with LC:
  - MS: Mass selective detector: LC-MS
ANALYSES OF METALS

- Inductively Coupled Plasma Spectrometry: ICP
  Detectors together with ICP:
  - OES: Optical emission spectrometer: ICP-OES
  - MS: Mass selective detector: ICP-MS

- Atomic absorption spectrophotometer: AAS

SCREENING ANALYSES OF ELEMENTS

- X-ray fluorescence: XRF

Units used in the Guideline (and their relationship)

<table>
<thead>
<tr>
<th>Unit in the Guideline</th>
<th>Conversion Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000 mg/kg</td>
<td>equals 1000 ppm (parts per million)</td>
</tr>
<tr>
<td>1000 mg/kg</td>
<td>equals 1000000 µg/kg (micrograms per kilogram)</td>
</tr>
<tr>
<td>1000 mg/kg</td>
<td>equals 1 g/kg (gram per kilogram)</td>
</tr>
<tr>
<td>1000 mg/kg</td>
<td>equals 0.1% (by weight)</td>
</tr>
<tr>
<td>1000 mg/kg</td>
<td>equals x µg/m² (micrograms per square meter, where x depends on the thickness of the material (kg/m²))</td>
</tr>
<tr>
<td>1000 mg/kg</td>
<td>equals x µg/cm²/week (cm = centimeters) x is the amount released of a substance from a surface, and is partially dependent on the concentration of the substance in a given substrate</td>
</tr>
</tbody>
</table>

pH

Limit value textiles: 4.0 – 7.5.
Limit value leather: 3.5 – 7.0.

Properties: A pH higher than 10 or lower than 3 can cause skin irritation.
Comment: The pH value in textiles can easily be corrected by washing.

Test method textiles: ISO 3071.
Test equipment: pH meter. Accuracy: 0.2 pH units

Test method leather: SS-EN ISO 4045.
Test equipment: pH meter. Accuracy: 0.2 pH units

6. Duties and Responsibilities

Fenix Outdoor assumes the responsibility regarding safety and legal compliance of all its products vis-à-vis legislators and our customers. However, we can only assume responsibility if all our direct and indirect suppliers have been working as partners and been in compliance with legal and self-
imposed rules and observed our defined requirements. Hence, violations and ignorance of this Guideline can result in damage claims and compensation in loss of sales. Subsequently: all suppliers in our supply chain – direct or indirect - shall follow our chemical specifications and inform us immediately, latest within 24 hours, should – for what reason ever – a violation of this guideline become known.

We expect all our partners to test frequently a number of materials and raw input materials for the risk chemicals listed below, setting clear priorities based on exposure risks. The tests shall only conducted in accredited laboratories – either as prescribed below or if the laboratory can show an ISO/IEC 17025 accreditation.

Test results have to be reported to the respective Fenix Outdoor entity irrespective of the outcome without delay. In case, a problem arises, the Fenix entity and the responsible supplier will discuss the best way forward to achieve compliance.

7. Content – The Chemicals List

Not all chemicals find application in all materials, products or purposes. Hence we have identified the most common use-options. However, should a chemical, restricted or banned according to this guideline also be used in other applications, please immediately inform your Fenix Outdoor contact for instructions. In case no substitute is available, a possible temporary approval of the questionable, banned or hazardous chemical can only be granted in writing by a Fenix Outdoor responsible employee. Failing to do so will lead to damage claims and possible other financial compensation demands.

We expect our suppliers to have proper safety data sheets for all chemicals used in the process. They should be presentable upon request and need to be followed at any time.

7.1 Process and Packaging-related Chemicals

7.1.1 Alkylphenol ethoxylates (APEO) and derivatives

The most common APEOs are Nonylphenol ethoxylates (NPEO) and Octylphenol ethoxylates (OPEO).

Material categories concerned: Textile, Leather

<table>
<thead>
<tr>
<th>Limit value:</th>
<th>Not to be used in processes. Max allowed occurrence in product: 25 mg/kg. Production should be free from contaminations.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Properties:</td>
<td>Irritating to skin. The metabolites affect the respiratory system, have endocrine disruptive effect (hormones) and are dangerous for the environment. Nonylphenol ethoxylates are rapidly degraded to 4-nonylphenol, which is even more dangerous for the environment. A similar environmental danger is the degradation of octylphenol ethoxylate into 4-octylphenol.</td>
</tr>
<tr>
<td>Use:</td>
<td>Dispersing and emulsifying agents in textile chemicals as well as impregnation agents in printing pastes. Occurs in leather lubricants. Manufacturing of coatings.</td>
</tr>
<tr>
<td>Comments:</td>
<td>The main alternatives for NPEs also include alcohol ethoxylates, both linear and branched, and glucose-based carbohydrate derivatives such as alkylpolyglucoside, glucamides, and glucamine oxides</td>
</tr>
<tr>
<td>Legal background:</td>
<td>Legal limit: 0.1% by weight for nonylphenol ethoxylate as a substance or constituent of preparations (closed systems exempted).</td>
</tr>
</tbody>
</table>
NPEOs shall not be placed on the market after 3 February 2021 in textile articles, in concentrations equal to or greater than 0.01 % by weight of that textile article or of each part of the textile article (= 100 mg/kg). Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). Norway restricts manufacture, import, export, sale and use of octylphenol and octylphenol ethoxylates, and mixtures containing these substances, FOR 2004-06-01-922. 4-Nonylphenol, branched and linear, 4-Nonylphenol, branched and linear, ethoxylated and 4-(1,1,3,3-tetramethylbutyl)phenol, ethoxylated (4-tert-OPnEO), 4-tert-butylphenol and tris(4-nonylphenyl, branched and linear) phosphite (TNPP) with = 0.1% w/w of 4-nonylphenol, branched and linear (4-NP) and 4-tert-butylphenol are is listed on the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

**Test method:**
- EN ISO 18254 (textile, APEO),
- EN ISO 21084:2019 (textile, AP)
- ISO 18218-1 (leather)

**Detection limit:**
- 10 mg/kg

### 7.1.2 Aliphatic organic solvents

**Material categories concerned:** Textile, Leather

**Limit value:**
- No odor.

**Properties:**
- Liquids or gases. Inhalation can affect the nervous system and cause headache, fatigue and nausea. Cause irritation on skin, eyes, and mucous membranes.

**Use:**
- Solvents for dyeing and printing. Solvents that have been used for cleaning of spinning oils from textiles are often found in amounts of 10-20 mg/kg. The limit for humans to sense a smell lies around 100 mg/kg for most substances.

**Comments:**
- Aliphatic organic solvents are volatile organic compounds (VOC). There are statutory hygienic limit values for employees in many countries.

**Legal background:**
- Manufacturers are required to follow the “VOC Directive”, 1999/13/EC.

**Test method:**

**Detection limit:**
- No odor.

### 7.1.3 Aromatic organic solvents

**Material categories concerned:** Textile, Leather, Packaging

**Limit value:**
- Not allowed to be present in products.

**Properties:**
- Liquids or gases. Inhalation can affect the nervous system and cause headache, fatigue and nausea. Cause irritation on skin, eyes and mucous membranes. Kerosene and diesel odor in finished products. Some aromatic organic compounds are carcinogenic.

**Use:**
Comments: Aromatic organic solvents are volatile organic compounds (VOC). Use solvents of higher quality with lower levels of aromatic hydrocarbons or synthetic thickeners based on polycarboxylic acids. Replace simple aromatic hydrocarbons (petrol) with low-molecular-weight aliphatic hydrocarbons. To avoid problems with organic solvents, switching to water-based dyeing and printing processes is recommended. There are statutory hygienic limit values for employees in many countries.

Legal background: Manufacturers are required to follow the “VOC Directive”, 1999/13/EC.


Detection limit: No odor.

7.1.4 Bisphenol A; BPA (4,4'-isopropylidenediphenol)

Material categories concerned: various including plastic bottles, buckles or pots

Limit value: Forbidden to be used in processes or present in products.
Properties: Toxic for reproduction
Use: Mainly used in manufacture of polycarbonate epoxy resins and chemicals; hardener in epoxy resins and in thermal prints.
Comments: Substance is often left as residues in polycarbonate and epoxy and can be found in products with material based on plastic and paper. BPA is part of a large family of chemicals called bisphenols.

Legal background: BPA is listed on the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). BPA Bisphenol A (BPA) contained in thermal paper (0,02v%) is restricted from January 2020 (entry 66, annex XVII REACH).

Test method: CEN/T1 13130-13:2005 (food contact materials) Test equipment: LC-MS, GC-MS.

Detection limit: There is no standard international detection limit yet.

7.1.5 C₃,C'-azodi(formamide) (ADCA)

Materials concerned: textiles bottoms for tents and various other

Limit value: Forbidden to be used in processes or present in products.
Properties: Respiratory sensitizer
Use: Mainly as blowing agent in the rubber and plastics industry. Foaming agent in especially EVA and PVC.
Comments: Can leave residues of formamide in the material. ADCA may decompose into semicarbazide a suspected carcinogen.


Test method: No standardised test method available for textiles. Test equipment: GC-MS
7.1.6 Chlorinated organic solvents

Material categories concerned: Textile, Leather

Limit value: Forbidden to be used in processes or present in products.

Properties: Liquid or gas. Affect the nervous system. Irritating to skin and mucous membranes. Many chlorinated organic solvents are dangerous for the environment.

Use: Solvent used in the manufacture of rubber, metal paint and fur industry used for grease and oil, e.g. in stain removers. Also used in cleaning agents and detergents. Solvents in lubricating oils. Solvents in dyeing of synthetic fibers (carriers). Solvents in printing for textile and leather. Finishing agents. Fabric softeners. Also used as moth-proofing agent in textiles and for the manufacture of silk and pearls. See also under heading “Flame retardants”.

Legal background: Legal limit: 0.1% by weight or forbidden for the below specified chlorinated solvents:

<table>
<thead>
<tr>
<th>Solvent</th>
<th>CAS No</th>
<th>Legal framework</th>
<th>Legal requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chloroform</td>
<td>67-66-3</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>1,1,2 Trichloroethane</td>
<td>79-00-5</td>
<td>REACH, Annex XVII</td>
<td>Shall not be placed on the market, or used as substances, as constituents of other substances or in mixtures in concentrations equal to or greater than 0.1% by weight</td>
</tr>
<tr>
<td>1,1,2,2 Tetrachloroethane</td>
<td>79-34-5</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>1,1,1,2 Tetrachloroethane</td>
<td>630-20-6</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>Pentachloroethane</td>
<td>76-01-7</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>1,1 Dichloroethylene</td>
<td>75-35-4</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>1,4-dichlorobenzene</td>
<td>106-46-7</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>Carbon tetrachloride</td>
<td>56-23-5</td>
<td>Regulation (EC) No 2037/2000 of the European Parliament and of the Council of 29 June 2000 on substances that deplete the ozone layer</td>
<td>Shall not be produced, placed on the market, or used</td>
</tr>
<tr>
<td>1,1,1 Trichloroethane</td>
<td>71-55-6</td>
<td>REACH, Annex XVII</td>
<td></td>
</tr>
<tr>
<td>Substance Description</td>
<td>CAS Number</td>
<td>Notes</td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------</td>
<td>------------</td>
<td>----------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>(\alpha,\alpha,\alpha,4)-tetrachlorotoluene; p-clorobenzotrichloride</td>
<td>5216-25-1</td>
<td>Annex VII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). 1 mg/kg in textiles (CMR fast track)</td>
<td></td>
</tr>
<tr>
<td>(\alpha,\alpha)-trichlorotoluene; benzotrichloride</td>
<td>98-07-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(\alpha)-chlorotoluene; benzyl chloride</td>
<td>100-44-7</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>79-01-6</td>
<td>Candidate List of Substances of Very High Concern for authorization and annex XIV in Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) 0.1% by weight in articles for information duty.</td>
<td></td>
</tr>
<tr>
<td>1,2,3-trichloropropane</td>
<td>96-18-4</td>
<td>Candidate List of Substances of Very High Concern for authorization in Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) 0.1% by weight in articles for information duty.</td>
<td></td>
</tr>
</tbody>
</table>

**Test method:**
Manufacturers in EU are required to follow the “IED”, 2010/75/EU. No standardized test method available. Test equipment: GC-MS, GC-ECD.

**Detection limit:**
There is no standard international detection limit as of yet. For GC-MS it is 0.1 mg/kg.

### 7.1.7 Chromium VI (Cr + 6)

**Material categories concerned:** Textile, Leather

**Limit value:**
Not allowed to occur in processes or present in products.

**Properties:**

**Use for textiles:**
Oxidation agent. Fixing chemical. Used for finishing of direct dyes to improve their wash fastness. Potassium dichromate is used for oxidation of...
vat and sulfur dyes. Chromium salts are used for preparation and finishing of acid dyes on silk and wool.

Use for leather: Tanning with basic chromium salts is the most widely used method where chromium VI (6+) may occur as an impurity. Etching of artificial leather and rubber.

Comments: Chrome (III) is an alternative as fixing agent in mordant dyeing. Use direct dyes or acid dyes with high colorfastness to avoid use of chromium salts for dyeing of polyamide, silk, wool and leather. Use hydrogen peroxide and other per-salts to avoid the use of chromium VI (6+) based salts. Vegetable tanning agents are alternatives for leather. Tanning with titanium is an emerging technology.

Legal background: Legal limit: 0.1% by weight


Chromium (VI) compounds listed on the Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH) are listed in Appendix 5. Several Chromium compounds are also included in REACH Annex XIV. The German Commodities Ordinance (Bedarfsgegenständeverordnung), Appendix 422 regulates that: chromium (VI) may not be detected in products made of leather, which is designed not only to temporarily come into contact with the human body, especially clothing, watchbands, handbags, backpacks, chair covers, etc.

Note that the EU ban on hexavalent chromium in leather articles with skin contact is regulated in REACH Annex 17 and entered into force on 1 May 2015.

From 2020, chromium VI compounds will have a restriction limit of 1 mg/kg (extractable Cr VI content) in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: ISO 17075 for leather. No standardized test method available for textiles.

Test equipment: UV-VIS Spectrometer; ICP-MS

Detection limit: <3 mg/kg for leather; legal requirement is 3 mg/kg in REACH Annex XVII; 0.5 mg/kg for textiles

7.1.8 Cobalt (II) chloride

Material categories concerned: silica gel packs or moisture absorbents in packaging

Limit value: Not allowed to use in Fenix Outdoor packaging/moisture absorbents

Cobalt dichloride: CAS Nos.: 7646-79-9; 7791-13-1 (hydr.)

Properties: Toxic for reproduction, carcinogenic.

Use: Indicator substance for moisture absorbents

Legal background: EU 2001/95/EC: SVHC according to REACH; any occurrence has to be reported under SDS Section 3

Test method: X-ray fluorescence analysis

See also: 7.2.9
7.1.9 Ethylenediamine (EDA)
Material categories concerned: textiles and textile components

Limit value: Do not use: Not to be present in products. CAS No. 107-15-3
Properties: Respiratory and skin sensitizer
Use: Used in the production of many industrial chemicals. Used in the production of polyurethane fibres.
Legal background: Ethylenediamine is listed on the Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH).
Test method: No standardised test method available.

7.1.10 Ethylenethiourea
Material categories concerned: rubber soles and other rubber components

Limit value: Should not be present in products. Use only in controlled production systems. Imidazolidine-2-thione (2-imidazoline-2-thiol) also called ethylenethiourea: CAS No. 96-45-7
Properties: Toxic for reproduction.
Use: Used primarily as an accelerator for vulcanizing rubber
Legal background: Ethylenethiourea is listed on the Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH).
Test method: No standardized test method available.
Test equipment: LC-MS

7.1.11 Formamide
Material categories concerned: eventually textiles; synthetic leather

Limit value: Forbidden to be present in products.
Properties: Toxic for reproduction.
CAS No 75-12-7
Use: Formamide is used as solvent for example in the production of synthetic leather and inks. Furthermore, formamide is used as a solvent and plasticizer in consumer products. It can be an ingredient as softener for paper, water soluble glues and wood stains. During processing of foam, formamide is formed as a by-product at higher temperatures. Especially tosylsemicarbazide and azodicarbonamide (see headline ADCA above) are responsible for the presence of formamide in EVA-consumer products.
Comments: For the application as solvent, formamide might be replaced by other solvents like dipropylene glycol.
Potential alternatives as N,N-dimethylformamide, N-methylformamide or ethylene glycol ethers are not considered to be adequate substitutes due their similar toxicity to reproduction.

**Legal background:**
Formamide is restricted in puzzle mats in Belgium and France and will be included in the Toy Safety Directive in 2017 (limit value 200 mg/kg).

**Test method:**
Solvent extraction.
Test equipment: GC-MS or LC-MS

### 7.1.12 Dimethylfumarate

**Material categories concerned:** products, accessories, leather

**Limit value:**
Not allowed in Fenix Outdoor products or packaging.
Dimethylfumarate: CAS No. 624-49-7

**Properties:**
Allergic sensitizer, toxic even in low concentrations

**Use:**
Fungicide to prevent mold

**Legal background:**
EU Regulation 1907/2006/EC

**Test equipment:**
CEN/ISO/TS 16186 ((footwear) EN 17130:2019 (textiles))

**Detection limit:**
< 0.1 mg/kg

*See also: 7.2.24*

### 7.1.13 Hydrazine

**Material categories concerned:** Accessories, Packaging

**Limit value:**
Not to be used in processes or present in products.
Hydrazine: CAS Nos.302-01-2,7803-57-8

**Properties:**
Carcinogenic, allergenic, toxic.

**Use:**
Mainly used as a foaming agent in preparing polymer foams

**Legal background:**
Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH).

**Test method:**
No standardized test method available for textiles.
Test equipment: GC-MS

**Detection limit:**
There is no standard international detection limit as yet.

### 7.1.14 Other organic solvents

**DMFa (N,N-dimethylformamide)**

**Material categories concerned:** Textile, Leather, Accessories, Packaging

**Limit value:**
Forbidden to use in processes or present in products.

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N,N-dimethylformamide (DMFa): CAS No 68-12-2

Properties: Toxic to reproduction.
Use: Used as solvent and in production of leather imitation (PU). An intermediate for paper finishing. It may have a faint amine odor in finished products. Use “water-based” PU which does not contain DMFa.

Legal background: Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH). From 2020, DMFa will have a restriction limit of 3000 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).
Restricted in polyurethane-coated work gloves work gloves in Germany. The maximum DMFa content must be less than 10 mg/kg glove material (TRGS 401).

Test method: No standardized test method available for textiles.
Test equipment: GC-MS
Detection limit: EN 16778:2016 (leather) 
EN 17131:2019 (textile)

DMAC

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: Forbidden to use in processes or present in products.
Use: Toxic to reproduction, irritating.

Legal background: Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH). From 2020, DMAC will have a restriction limit of 3000 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: No standardized test method available for textiles.
Test equipment: GC-MS, LC-MS
Detection limit: There is no standard international detection limit as yet. For LC-MS 1 mg/kg can be expected.

N-Ethyl-2-pyrrolidone (NEP)

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: Not to be used in processes or present in products.
CAS No 2687-91-4
Properties: Carcinogenic, reproduction toxicity, skin irritation, respiratory toxicity.
Use: Mainly used as a solvent in glue formulas


Test method: No standardized test method available for textiles.
CEN ISO/TS 16189 (footwear and footwear components)
Test equipment: GC-MS, LC-MS
Detection limit: There is no standard international detection limit as yet. For LC-MS 1.0 mg/kg can be expected.

N-methyl-2-pyrrolidone (NMP)

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: Not be used in processes or present in products.

N-methyl-2-pyrrolidone (NMP): CAS No 872-50-4

Properties: Toxic to reproduction, irritating.

Use: Good solvency properties for polymers. Solvent for glues. Surface treatment of textiles, resins and metal coated plastics or as a paint stripper. Intermediates for textile auxiliaries, plasticizers, stabilizers and specialty inks. Note that NEP (1-ethylpyrrolidin-2-one), CAS No 2687-91-4 is not a suitable alternative to NMP since it is Repr. Tox. 1B.

Polyamide precursor. SBR (styrene-butadiene) latex production.

Legal background: Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH). From 2020, NMP will have a restriction limit of 3000 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: No standardized test method available for textiles.

Test equipment: GC-MS, LC-MS

EN ISO 19070:2016 (leather)

Detection limit: There is no standard international detection limit as yet. For LC-MS 1.0 mg/kg can be expected.

2-methoxyethyl acetate

Material categories concerned: Textile, Accessories

Required limit value: Should not be present in products.

CAS RN: 110-49-6

Properties: Toxic for reproduction.

Use: Solvent for nitrocellulose, cellulose acetate, various gums, resins, waxes, oils; textile printing; photographic film; lacquers; dopes. Used in screen print inks and as an industrial solvent. Not registered under REACH.

Legal background: 2-methoxyethyl acetate is listed on the Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH).
Test method: No standardised test method available. Solvent extraction. Test equipment: GC-MS or LC-MS

LOQ: 50 mg/kg
7.1.15 PAH - Polycyclic aromatic hydrocarbons

Material categories concerned: Accessories (black pigmented rubber and plastics), Leather, Wood

Limit value: Forbidden to use in processes or present in products. Restricted under REACH
Benzo(a)anthracene, CAS No 56-55-3
Benzo(a)phenanthrene (chrysene), CAS No 218-01-9
Benzo(a)pyrene, CAS No 50-32-8
Benzo(b)fluoranthene, CAS No 205-99-2
Benzo(j)fluoranthene, CAS No 205-82-3
Benzo(k)fluoranthene, CAS No 207-08-9
Dibenz(a,h)anthracene, CAS No 53-70-3
Benzo[e]pyrene, CAS No 192-97-2
Benzo[ghi]perylen CAS No 191-24-2
Restricted under German laws and several US regulations:
Indeno(1,2,3-cd)pyrene, CAS No 193-39-5
Benzo(j, k)fluorene (fluoranthene), CAS No 206-44-0
Naphthaline, CAS No 91-20-3
Anthracen, CAS No 120-12-7
Pyren, CAS No 129-00-0
Benzo[g,h,i]perylen, CAS No 191-24-2
Acenaphthylen, CAS No 208-96-8
Acenaphthen, CAS No 83-32-9
Phenanthren, CAS No 85-1-8
Fluoren, CAS No 86-73-7
Benzo(r,s,t)pentaphene, CAS No 189-55-9
Dibenzo(a, h)pyrene, CAS No 189-64-0
Dibenzo(a,l)pyrene, CAS No 191-30-0
Dibenzo(a,e)pyrene, CAS No 192-65-4
7H-Dibenzo(c,g)carbazole, CAS No 194-59-2
Dibenz(a,j)acridine, CAS No 224-42-0
Dibenz(a,h)acridine, CAS No 226-36-8
5-Methylchrysene, CAS No 3697-24-3
Dibenzo(a,e)fluoranthene, CAS No 5385-75-1
1-Nitropyrene, CAS No 5522-43-0
3-Methylcholanthrene, CAS No 56-49-5
7,12-Dimethylbenz(a)anthracene, CAS No 57-97-6

Properties: Carcinogenic, allergic, toxic.

Use: PAHs are not synthesized chemically for industrial purposes. The major source of PAHs is the incomplete combustion of organic material such as coal, oil and wood. They are mostly used as intermediaries in pharmaceuticals, agricultural products, photographic products, thermosetting plastics, lubricating materials, and other chemical industries. May be found as impurities in rubber materials and leather.
Legal background: Materials in toys or childcare articles that come into direct contact with the human skin shall not include any of the listed PAHs in amounts more than 0.5 mg/kg. For materials in other product categories the limit value is 1 mg/kg. The above mentioned PAHs are listed in annex XVII of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) from 27 December 2015. The voluntary German GS standard has requirements for the sum of 16 PAH (the 16 U.S. EPA listed compounds) and also specifically benzo[a]pyrene, that most products in the German market follow. Benzo(a)anthracene (56-55-3), Chrysene, (218-01-9), Benzo(a)pyrene (50-32-8), Anthracene (120-12-7), and anthracene oil distillation fractions and Benzo[ghi]perylene (191-24-2) are included in the Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH). For products or parts of products, which may come into contact, the sum of all PAH 10 mg/kg of material and specifically benzo[a]pyrene not to exceed 1 mg/kg. For products that are expected to have only a short-term skin contact is for 200 mg PAH/kg and 20 mg benzo[a]pyrene/kg. The sum of all PAHs consists of the 16 U.S. EPA listed compounds. The limits are thus different for different product groups and can be as low as 0.2 mg/kg.

Japanese Law:
Prohibition of levels above 3 ppm of Dibenzo(a,h)anthracene (CAS No.53-70-3), Benzo (a) anthracene (CAS No. 56-55-3) and Benzo (a) pyrene (CAS No. 50 - 32-8) in wood products for consumers. Note that the prohibition of PAHs in plastic, rubber and toys in REACH Annex 17 entered into force 27 December 2015. From 2020, the following PAHs will have a restriction limit of 1 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH): Benzo(a)anthracene, Benzo(a)phenanthrene (chrysene), Benzo(a)pyrene, Benzo(b)fluoranthene (benz(e)acephenanthrylene) Benzo(j)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Benzo[e]pyrene

Test method:
AFPS GS 2014-01 PAK
EN 17132:2019 (textile accessories)
ISO/TS 16190 (footwear)
Detection limit: 0.2 mg/kg

7.1.16 Quinoline
Material categories concerned: textiles, leather and textile fabrics
Limit value: Not to be used in processes or present in products.
CAS No. 91-22-5
Properties: Carcinogenic and mutagenic.
Use: Quinoline is used mainly as an intermediate in the manufacture of other products. Quinoline is also used as a catalyst, a corrosion inhibitor, in metallurgical processes, in the manufacture of dyes, in polymers, and as a solvent for resins and terpenes.

Legal background: From 2020, quinoline will have a restriction limit of 50 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: No standardised test method available for textiles.
Test equipment: GC-MS, LC-MS.

7.1.17 Methylene diphenyl diisocyanate (MDI)
Material categories concerned: polyurethane, polyamide, other plastics (textiles, coated leather, accessories, packaging)

Limit value: Forbidden to be present in finished product
Methylene diphenyl diisocyanate CAS No.: 26447-40-5
Properties: carcinogenic; other properties under review
Use: Input material for various plastics, including PU and acrylamide; possible residue in Elastane / Spandex
Legal background: currently under evaluation (REACH); classified as hazardous according to Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).
Test method: EN 13130-8:2004; LC-MS
Detection Limit: 0.1%

7.1.18 Trichlorobenzene
Material categories concerned: products and packaging; substance is used in colors, solvents and process reactants.

Limit value: Not to be used in process and not be present in products
1,2,3-Trichlorobenzene CAS No.: 87-61-6
1,2,4-Trichlorobenzene CAS No.: 120-82-1
1,3,5-Trichlorobenzene CAS No.: 108-70-3
Properties: very toxic to aquatic life, very toxic to aquatic life with long lasting effects, harmful if swallowed, causes skin irritation
Use: solvent and reactant or intermediary product in processes, coloring and polyester production; certain processes substitute trichlorobenzene with naphthalene (CAS No.: 91-20-3), often used in mothballs (specific odor). Since naphthalene is banned within Fenix Outdoor as well, this substitution is not an option.
Test method: EN 17137:2018

7.1.19 Cyclohexane
Material categories concerned: cleaning solvent for textiles and leather

Limit value: Not be used
Cyclohexane CAS No.: 110-82-7
Properties: Highly flammable, respiratory allergen, skin sensitizer

Use: Often used as spot-remover in final quality control of fabrics, textiles, shoes and hardware

Legal background: EU Regulation 1907/2006/EC

Test method: GC-MS, semi-quant.; headspace 30 min/110°C

Detection limit: 0.1 mg/kg

7.1.20 Solvents miscellaneous (in conjunction with Section 7.1.3)

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: The following solvents must have specific statements on the label of the product they are part of:

(1) diethylene glycol,
(2) ethylene glycol,
(3) benzene, toluene, xylene, petroleum distillates,
(4) Methyl alcohol (methanol),
(5) turpentine

There are exceptions for smaller containers shoe waxes, furniture polish, etc. products at low volatility of the solvent.

Legal background: Regulated in the (USA) Federal Hazardous Substances Act (FHSA) - 16 CFR 1500.14 –Products. Requiring special labeling of the product under section 3 (b) of the act. From 2020, benzene (CAS-RN 71-43-2) will have a restriction limit of 5 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

7.1.21 Tin organic compounds (Organostannic compounds)

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: Forbidden to be present in products. Various compounds are even banned to be detected. Do not use in production!

Properties: Tributyltin(TBT), dibutyltin and dioctyltin compounds are different chemical substances that are toxic and dangerous for the environment. They are bio-accumulative and persistent.

Use: Dibutyltin compounds (DBT) and dioctyltin compounds (DOT) are used in consumer products as stabilizers (mainly PVC) or as catalysts (PU and PVC). Organo-tin catalysts are used in a wide variety of polyurethane applications, aiding formation of the urethane bond and generally functioning as Lewis acid catalysts.

Comments: Alternative stabilizers are barium/zinc, potassium/zinc, calcium, or calcium/zinc organic stabilizers or methyltin stabilizers. Alternative catalysts can be organo-titanate or zirconate compounds (e.g. titanium 2-ethylhexanoate) or amines such as bis- (dimethylaminoethyl) ether (BDMAEE) and triethylenediamine (TEDA) along with organo-metallic compounds such as potassium acetate. Dialkyl tin compounds represents a large family of substances that consist of the following common constituents, see list of DBTs in Appendix 4. Trialkyltin compounds are biocides, see also the section regarding biocidal agent.
Legal background: Legal Limit: 0.1% by weight
Dioclytin (DOT), dibutyltin (DBT) compounds and tri-substituted organo-
stanic compounds such as tributyltin (TBT) are listed in annex XVII of the
Council (REACH). Tributylin oxide (TBTO), 56-35-9, is listed on the
Candidate List of Substances of Very High Concern for authorization of the
Council (REACH) Triphenyltin (TPT) and tributyltin (TBT) compounds are
banned in detectable levels in textiles and other consumer products by
Japan Law 112 for the Control of Household Products Containing Harmful
Substances (10/01/1974).

Test method: No standardized test method for textile available.
EN ISO17353 (water and sediment)
CEN ISO/TS 16179 (footwear)
Test equipment: GC-MS.
Detection limit: 0.015 mg/kg.

7.2 Product-related Chemicals

7.2.1 Allergenic disperse dyes

Material categories concerned: Textile (such as polyester and possibly polyamide and textile
accessories)

➔ 21 substances listed in Appendix 1

<table>
<thead>
<tr>
<th>Limit value</th>
<th>Forbidden to be present in textiles or leather imitation.</th>
</tr>
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</table>
| Properties                      | Highly allergenic (strong sensitizers). They may also have other
                                    hazardous properties.                                     |
| Use                             | Dyeing of textile and synthetic leather goods.            |
| Comments                        | Alternatives: Use other dyes that do not cause allergies.  |
| Legal background                | Legal limit: 0.1% by weight for Navy Blue, EC# 405-665-4 in chemical
                                    preparations used for coloring textile and leather articles in Annex XVII
                                    (entry 43) of Regulation (EC) No 1907/2006 of the European Parliament
                                    and of the Council (REACH). Eight disperse dyestuffs are banned in Germany, see Appendix 1. |
| Test method                     | DIN 54231 (qualitative) Extractable dyestuffs will be tested by EN ISO
                                    16373                                                        |
| Detection limit                 | 50 mg/kg (per substance)                                  |

7.2.2 Azo dyes, degradable to carcinogenic arylamines

Material categories concerned: Textile, Leather, Accessories, Packaging

➔ 24 substances listed in Appendix 2

| Limit value                      | Azo-dyes that are degradable to carcinogenic arylamines should not be
                                    present in products. It is strongly recommended to use more
                                    environmentally suitable alternatives. |
|---------------------------------|---------------------------------------------------------------------------------|
Properties: Carcinogenic. Some are allergenic. Arylamines can form part of the molecular structure of a dye. Certain azo-dyes can form the 24 listed banned arylamines.

Use: Constituent of dyes, mainly disperse dyes. Dyeing and printing.

Comments: Dyes that can release any of the 24 aromatic amines may not be used. See Appendix 2 for a description and listing of banned dyes. This regulation applies toazo-colorants which also covers azo-dye stuffs and azo-pigments.

Legal background: Legal limit textile: 0.002 % by weight (20 mg/kg) per each of the arylamine breakdown products. Legal limit leather 0.003 % by weight (30 mg/kg) per each of the arylamine breakdown products. Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) and GB/T 17592.1

Test method: EN 14362-1, -3 for textile. EN 17234-1 for leather. GB/T 17592.1

Detection limit: 20 mg/kg (per each of the arylamine breakdown products)

See Appendix 1 and Appendix 3

7.2.3 Benzotriazols (UV-320, UV-327, UV-328 and UV-350)

Limit value: Forbidden to be present in products.
2-benzotriazol-2-yl-4,6-di-tert-butylphenol (UV-320), CAS No 3846-71-7
2,4-di-tert-butyl-6-(5-chlorobenzotriazol-2-yl)phenol (UV-327), CAS No 3864-99-1
2-(2H-benzotriazol-2-yl)-4,6-diterpentylphenol (UV-328), CAS No 25973-55-1
2-(2H-benzotriazol-2-yl)-4-(tert-butyl)-6-(sec-butyl)phenol (UV-350), CAS No 36437-37-3

Properties: Persistent, Bioaccumulative and Toxic; Very Persistent and very Bioaccumulative

Use: UV-stabilizer for plastics, polyurethanes and rubber and constituent in formulations used for coating of surfaces, e.g. cars or special industrial wood coatings. Also used in dishwasher detergents, dry cleaning equipment, and de-icing/anti-icing fluids

Legal background: Legal limit: 0.1% by weight UV-320, UV-327, UV-328 and UV-350 are listed in the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: No standardised test method available. Test equipment: GC-MS, LC-MS, GC-ECD

7.2.4 Boric acid, borate compounds

Material categories concerned: Packaging

Limit value: Not to be present in products.
Boric acid, CAS No. 10043-35-3 and 11113-50-1
Disodium tetraborate anhydrous, CAS No. 1303-96-4, 12179-04-3 and 1330-43-4, Disodium octaborate, CAS No. 12008-41-2
Tetraboron disodium heptaoxid, hydrate, CAS No. 12267-73-1
Sodium perborate; perboric acid, sodium salt, CAS No. 234-390-0
Sodium peroxometaborate, CAS No. 7632-04-0

Properties:
Toxic. May impair fertility and cause harm to unborn child.

Use:
Wood veneers/pressed wooden panels and boards. Boric acid and other boron compounds may be used as flame retardant in cellulosic materials, mainly wood and biocide in boards. Borate compounds may be used as bleaching agents in chemical preparations.

Legal limit:
0.1 % by weight
Boric acid, disodium tetraborate anhydrous, disodium octaborate, tetraboron disodium heptaoxid, hydrate, sodium perborate; perboric acid, sodium salt and sodium peroxometaborate are listed on the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH)

Test method:
Test equipment: 1) AAS. 2) ICP-MS and ICP-OES
Detection limit: 1) 1000 μg/kg as Boron. 2) 100 μg/kg as Boron.

7.2.5 Cadmium (Cd) and cadmium salts

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: Forbidden to be present in products. Occurrence in materials below 0.5 mg/kg is regarded as contaminations, which cannot be controlled.

Cadmium (metal), CAS No. 7440-43-9


Use (textile/leather):
Can occur in pigmented plastisol prints.

Use (accessories/packaging):
Surface treatment. Pigment in coloring agent. Also in plastics as stabilizers and pigment. Cadmium based stabilizers are used to increase the endurance of the material. For recycled packaging cadmium may have had a different original use.

Comments: Alternatives are available, such as calcium-zinc based stabilizers. Order cadmium-free processes and materials.

Legal background: Legal limit: 0.01 % by weight (100 mg/kg).
The sum of concentration levels of lead, cadmium, mercury and hexavalent chromium present in packaging or packaging components shall not exceed 100 ppm by weight.
From 2020, cadmium and its compounds will have a restriction limit of 1 mg/kg (extractable content) in textiles (CMR fast track) according to
Cadmium is restricted in Denmark. Danish legal limits: 75 mg/kg. (Bekendgørelse nr. 858 af 5. September 2009 om forbud mod import salg og fremstilling af cadmiumholdige varer).

Test method:
- EN 16711-1 (total content in textiles).
- EN 16711-2 (extractable content in textiles)
- EN ISO 17072-1 (extractable content in leather)
- EN ISO 17072-2 (total content in leather)
- LOQ: 10 mg/kg (total content), (0.1 mg/kg (extractable content).

7.2.6 CMR, Carcinogenic, Mutagenic, Reproductive toxic dyestuffs

Material categories concerned: Textile, Leather, Accessories, Packaging

→ 15 substances listed in Appendix 3

Limit value:
Forbidden to be present in products.

Properties:
Carcinogenic Mutagenic, Reproductive toxic. Characteristics: Dyestuffs that are classified as carcinogens, mutagenic, reproductive toxic according to CLP including class 2 (only 1A and 1B are CMR)

Use:
Dyeing of textile and leather goods.

Comments:
Alternatives: Use other dyestuff than the substances in Appendix 3.

Legal background:
C.I. Solvent Blue 4, C.I. Basic Blue 26, C.I. Basic Violet 3, Michler’s base (CAS No. 101-61-1), 4,4’-bis(dimethylamino)-4”- (methylamino) trityl alcohol (CAS No. 561-41-1) 1), C.I. Direct Black 38 (CAS No. 1937-37-7) and C.I. Direct Red 28 (CAS No. 573-58-0) are listed on the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) Restrictions for use of substances, harmonized classified as CMR according to CLP, as substances, as constituents of other substances or in mixtures. These are found in REACH Annex XVII, entry 28-30.

From 2020, C.I. Disperse Blue 1, C.I. Basic Red 9 and C.I. Basic Violet 3 with ≥ 0,1 % of Michler’s ketone will have a restriction limit of 50 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method:
Azo-dyestuffs can be tested indirectly by breakdown product aryamines with EN 14362-1, -3 for textiles and leather. EN ISO 17234 for azo-colorants in leather. Extractable dyestuffs will be tested by EN ISO 16373

Other relevant dye stuff

Material categories concerned: textiles

Limit value:
Not be used
7.2.7 Chloroparaffins

Material categories concerned: Textile, Leather, Accessories, Packaging

**Limit value:** Forbidden to be present in products.
Short-chain chloroparaffins (C10-C13), CAS No.85535-84-8
Medium-chain chloroparaffins (C14-C17), CAS No. 85535-85-9
Long-chain chloroparaffins (C18-), CAS No. 85535-86-0

**Properties:** Dangerous for the environment. Allergenic. Toxic.

**Use in textile:** Plasticizers and flame retardant in plastic material.

**Use in leather:** Plasticizers in coated synthetic or "fake"-leather. Fat liquoring agent in leather production.

**Use in accessories and packaging:** Plasticizers and flame retardant in plastic material and rubber.

**Comments:** Replace chloro-organic chemical flame retardants with phosphorus- and/or nitrogen-based organic chemical flame retardants or non chemical barrier technologies. Alternative plasticizers are available but must be evaluated.

**Legal background:** Legal limit: Shall not occur, meaning below the detection limit according to best laboratory practice (< 100 mg/kg).
Short-chain chloro-paraffins are listed as proposed POP\(^1\) in the Stockholm Convention on Persistent Organic Pollutants (POPs) and are banned by Regulation (EC) No 850/2004. Short-chain chloroparaffins (C10-C13) are listed on the Candidate list of Substances of Very High Concern (SVHC) for the authorization of the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH).

**Test method:** No standardized test method available for textiles.
ISO 18219 (leather)
Test equipment: GC-MS, LC-MS

**Detection limit:** There is no standard international detection limit as yet.

7.2.8 Chromium VI (Cr + 6)

Material categories concerned: Leather, Accessories, Packaging

**Limit value:** Forbidden to be present in products.
Chromium VI (Cr+6), CAS No.18540-29-9.

**Properties:** Dangerous for the environment. Carcinogenic. Allergenic. Toxic.

**Use:** Chromated metal parts. Chromic acid is used as wood preservative; chromium tanning of leather may produce Cr + 6 as unwanted by-product

**Comments:** Chrome (III) is an alternative in surface treatment of metal

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\(^1\) Persistent Organic Pollutants (POPs) are organic chemical substances, which remain intact for exceptionally long periods of time, become widely distributed in the environment, accumulate in the fatty tissue of living organisms and toxic to both humans and wildlife
Legal background:

Legal limit: 0.0003% by weight (3 mg/kg) for leather in direct skin contact. 
Chromium (VI) compounds listed on the Candidate list of Substances of Very High Concern (SVHC) for the authorization of 
the Regulation (EC) No 1907/2006 of the European Parliament of the Council (REACH) are listed in Appendix 5: Several Chromium compounds are also included in REACH Annex XIV. 
The sum of concentration levels of lead, cadmium, mercury and hexavalent chromium present in packaging or packaging components shall not exceed 100 ppm by weight. 

Test method:
ISO 17075 for leather. 
Test equipment: XRF screening for metal chromium No standardized test method available for textiles. 
Test equipment: UV-VIS Spectrometer

Detection limit:
3 mg/kg / (leather) 
0.5 mg/kg (in textiles)

7.2.9 Cobalt (II) chloride

Material categories concerned: Packaging 
Limit value: Banned. Strictly forbidden to be present in products. CAS No.7646-79-9 
Properties: Pale-blue; hygroscopic powder; it turns pink on exposure to air and moisture. The substance may have effects on the heart, thyroid and bone marrow. Repeated or prolonged inhalation exposure may cause asthma.

Use: Added in Silica gel for the detection of moisture, in the silica gel.


7.2.10 Formaldehyde

Material categories concerned: Textile, Leather, Accessories (wood) 
Limit value: 20 mg/kg for textiles and leather goods for children under the age of two. 
75 mg/kg for all textiles and leather goods that come into direct contact with the skin during normal use. 
300 mg/kg for all other textiles and leather goods. 
Japanese law 112 requires under detection limit for products for infants (less than 5 absorbance units). 
Formaldehyde, CAS No. 50-00-0 
Properties: Volatile colorless gas. Occurs naturally in small quantities in the atmosphere and in nature. Formaldehyde is a human carcinogen that can also cause skin irritation and allergy.
Use:

Comments:
Use products without formaldehyde in textiles and shoes or with very low concentrations of formaldehyde in accessories. Due to its volatility, formaldehyde is "contagious". If a garment containing formaldehyde is placed on top of a garment without formaldehyde, the latter garment will be “infected”. Fabric samples for testing must be packed in air dense plastic bags (polyethylene, PE, or polypropylene, PP).

Legal background:

<table>
<thead>
<tr>
<th>Country</th>
<th>Regulations / Requirements</th>
<th>Objection limit / Limit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>Bedarfsgegenständeverordnung (German Commodities Regulation), Annex III, No 9. 26.10.1993</td>
<td>Textiles that normally come into contact with the skin and release more than 1500ppm formaldehyde must bear the label “Contains formaldehyde! Washing this garment is recommended prior to first time use in order to avoid irritation of the skin.”</td>
</tr>
<tr>
<td>France</td>
<td>Official Gazette of the French Republic, Notification 97/0141/F</td>
<td>For products intended to come in contact with human skin – Textiles for babies: 20ppm Textiles in direct skin contact: 100ppm Textiles not in direct skin contact: 400ppm</td>
</tr>
<tr>
<td>Netherlands</td>
<td>The Dutch (Commodities Act) Regulation on Formaldehyde in Textiles (July 2000)</td>
<td>Textiles in direct skin contact must be labeled “Wash before first use” if they contain more than 120ppm formaldehyde and the product must not contain more than 120ppm after wash.</td>
</tr>
<tr>
<td>Austria</td>
<td>Formaldehydverordnung, BGBl Nr. 194/1990</td>
<td>Textiles that contains 1500 mg/kg or above must be labeled. Textiles for babies under 2 years: 30ppm Textiles in direct skin contact: 100ppm Textiles not in direct skin contact: 300ppm</td>
</tr>
<tr>
<td>Finland</td>
<td>Decree on Maximum Amounts of Formaldehyde in Certain Textiles products (Decree 210/1988)</td>
<td>Textiles for babies under 2 years: 30ppm Textiles in direct skin contact: 100ppm Textiles not in direct skin contact: 300ppm</td>
</tr>
<tr>
<td>Norway</td>
<td>Regulations Governing the Use of a Number of Chemicals in Textiles (April 1999)</td>
<td>Textiles for babies under 2 years: 30ppm Textiles in direct skin contact: 100ppm Textiles not in direct skin contact: 300ppm</td>
</tr>
<tr>
<td>China</td>
<td>Limits of Formaldehyde Contents in Textiles GB18401-2001</td>
<td>Textiles for infants and babies: ≤ 20ppm Textiles in direct skin contact:</td>
</tr>
</tbody>
</table>
≤75ppm
Textiles not in direct skin contact:
≤ 300ppm
Textiles for infants: not detectable
(16ppm)
Textiles in direct skin contact:
75ppm

Japan
Japanese Law 112

From 2020, formaldehyde will have a restriction limit of 75 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).
NOTE: During a transition period, jackets, coats or upholstery will have a restriction limit of 300 mg/kg.

Test method:
EN ISO 141 84-1(textiles)
ISO 17226 (leather)
Test method specified in Japan law 112, JIS L1041:2011
GB/T 2912.1

Detection limit:
Children wear in Japan: 0.05 absorbance units; < 16 mg/kg

7.2.11 Hexabromocyclododecan (HBCDD)

Material categories concerned: Textile, Packaging

Limit value:
Forbidden to be present in products.
Hexabromocyclododecane (HBCDD), CAS No. 25637-99-4, 3194-55-6, 134237-50-6,134237-51-7 and 134237-52-8

Properties:
Persistant, bioaccumulative and toxic. Halogenated organic additives in polymers may leach-out and have a negative impact on health and environment. Halogen containing polymers may form highly corrosive substances and an undefined range of halogenated substances that may be PBT or CMR when incinerated.

Use:
Flame-retardant treatment of products, (i.e upholstery and interior textiles), where fire protection is required. Also used in packaging flakes made of polystyrene (PS).

Comments:
Avoid this form of treatment. Replace bromo-organic chemical flame retardants with less problematic alternatives, e.g., phosphorus- and/or nitrogen-based organic chemical flame retardants or non-chemical barrier-technologies such as blends of natural and synthetic fibers used in furniture and mattresses and high performance synthetic materials used in firefighter uniforms and other protective clothing.
Textile goods for private use are basically never flame-retardant-treated. The only case when textile goods are treated with flame retardant is if the end customer orders this property. Usually it is done to satisfy regulatory requirements of fire protection.

Legal background:
Legal limit: Shall not occur, meaning below the detection limit according to best laboratory practice. Hexabromocyclododecane (HBCDD) and all major isomers are listed in both annex XIV and in the Candidate List of Substances of Very High Concern for authorization of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: EN ISO 17881-1 (textiles).
Test equipment: GC-MS, LC-MS, GC-ECD
Detection limit: There is no standard international detection limit as yet. For LC-MS. 1.0 mg/kg can be expected.

7.2.12 Lead (Pb) and lead salts

Material categories concerned: Accessories, Packaging, Hardware
Limit value: Not to be present in products. In case it is part of the construction it should not leach or get into the atmosphere (smelt) or in contact with human skin/ mucosal membranes or foodstuff.

Properties: Lead exposure can give rise to a number of negative health effects, including damage to liver, nervous system and fetuses. Lead is mainly accumulated in bone tissue. It has a very long half-life. Use of lead in plastics has not been deemed to cause any significant environmental or health effects in the short term, but in the long term such use increases lead concentrations in the environment.

Use: Lead salts are additives in plastics as stabilizers to increase the service of life of the material. May be used in paint and in colored plastic material. Metallic surface coating of buttons and accessories. For recycled packaging material lead may have had a different original use. Lead metal can also be used to increase ductility of other metals.

Comments: Alternative stabilizers are barium/zinc, potassium/zinc, calcium, calcium/zinc organic or methyltin stabilizers. Alternative catalysts can be organo-titanate or zirconate compounds (e.g. titanium 2-ethylhexanoate) or amines such as bis- (dimethylaminoethyl) ether (BDMAEE) and triethylenediamine (TEDA) along with organo-metallic compounds such as potassium acetate.

The sum of concentration levels of lead, cadmium, mercury and hexavalent chromium present in packaging or packaging components shall not exceed 100 ppm by weight. Directive (EC) No 94/62/EC of 20 December 1994 on packaging and packaging waste.
Lead salts are restricted in paint products (no restriction on painted articles) within the EU. Lead and its compounds are restricted in jewelry articles and hair accessories within EU with a legal limit: 500 mg/kg (0.05%). Lead and its compounds are restricted in articles that may be placed in the mouth by children with the legal limit 500 mg/kg (0.05%). Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Lead is restricted in Denmark.

Danish legal limits: 100 mg/kg. (Bekendgørelse nr. 856 af 5. September 2009 om forbud mod import og salg af produkter, der indeholder bly).

Prohibited to manufacture, import, sell or offer for sale, a product designed for children which have more than 100 ppm lead in any part that is accessible to children. Prohibited to manufacture, import, sell or offer for sale, a consumer product which has more than 90 ppm of lead in paint and similar surface coating materials. This restriction also applies to toys and other articles intended for children as well as some furniture.

Requires that legal compliance is confirmed with a certificate. Regulated in the (USA) Federal Consumer Product Safety Improvement Act (CPSIA) -Sec. 101. Children's products containing lead; lead paint rule

Exposure Reduction:

TSCA regulates the monitoring and management of the ban on lead-based paint. The term" lead-based paint" is defined as paint or other surface coatings that contain lead in excess of 1.0 mg per square centimeter or 0.5 percent by weight. Regulated in the (USA) Federal Toxic Substances Control Act (TSCA) Title IV-Lead

From 2020, lead and its compounds will have a restriction limit of 1 mg/kg (extractable content) in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method:

EN 16711-1 (total content in textiles).
EN 16711-2 (extractable content in textile)
ISO 17072-1 (extractable content in leather)
ISO 17072-2 (total content in leather)
10 mg/kg (total content), 0.1 mg/kg (extractable content).

7.2.13 Mercury

Material categories concerned: Packaging, Textiles, Accessories

Limit value: Forbidden to be present in products. Constructive use only if in a closed system.

Mercury (metal), CAS No. 7439-97-6
Phenylmercury neodecanoate, CAS No 26545-49-3
Phenylmercury octanoate, CAS No 13864-38-5
Phenylmercury 2-ethylhexanoate, CAS No 13302-00-6
Phenylmercury propionate, CAS No 103-27-5
Phenylmercury acetate, CAS No 62-38-4
Properties: Heavy metal that occurs naturally in small quantities in nature. Toxic to aquatic organisms and non-biodegradable. Dangerous for the environment. Can cause kidney damage.

Use: Phenylmercury compound are used as catalysts in the production of polyurethane coatings, adhesives, sealants and elastomers. For recycled packaging mercury may have had a different original use as, e.g., pesticide in woods.

Legal background: 0.01 % Phenylmercury compound are restricted in articles in Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). The sum of concentration levels of lead, cadmium, mercury and hexavalent chromium present in packaging or packaging components shall not exceed 100 ppm by weight. Directive (EC) No 94/62/EC of 20 December 1994 on packaging and packaging waste. Mercury and its compounds are listed in the Rotterdam convention. Prohibition of detectable levels (above 1 ppm) of organic mercury compounds in textiles and other consumer products. by Japan Law 112 for the Control of Household Products Containing Harmful Substances (10/01/1974)

Test method: EN 16711-1 (textiles) EN ISO 17072-2 (leather) Test equipment: 1) XRF. 2) AAS. 3) ICP-MS and ICP-OES

Detection limit: 1) 50 mg/kg. 2) 100 μg/kg. 3) 10 μg/kg

7.2.14 Nickel (Ni), in accessories

Material categories concerned: Accessories

Limit value: 0.5 μg per cm² and week for products intended to come into direct and prolonged contact with the skin. 0.2 μg per cm² and week for piercing items.

Properties: Nickel is one of the most common substances that cause contact dermatitis. Highly allergenic (strong sensitizer).

Use: Nickel is often used to improve alloys used in clothing accessories such as zippers, buttons and rivets.

Comments: Refrain from using nickel-treated metals or nickel-containing metal coatings.

Legal background: 0.5 μg per cm² and week for products intended to come into direct and prolonged contact with the skin. 0.2 μg per cm² and week for piercing items. Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: Test method I: EN 12472 and EN 1811.

Detection limit I: 0.01 μg/cm²/week

Test method II: Screening test for nickel emission. Swedish pharmacies sell a test kit.

Detection limit II:
7.2.15 Arsenic Compounds

Material categories concerned: Textiles, Accessories, Packaging

Limit value: Forbidden in Fenix Outdoor products.

Properties: May cause cancer. Toxic by inhalation and toxic if swallowed. Persistant, bioaccumulative and toxic.

Use: In glass, in metal alloy, preservative.

Comments: Apply arsenic free compounds.

Legal limit: 0.1% by weight

Diarsenic Pentoxide; 1303-28-2
Diarsenic Trioxide; 1327-53-3
Triethyl arsenate; 15606-95-8
Arsenic acid; 7778-39-4
Calcium arsenate; 7778-44-1

are listed on the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH)

As wood preservatives regulated in Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) (limit level; no intentionally added content)

From 2020, arsenic and its compounds will have a restriction limit of 1 mg/kg (extractable content) in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Test method: EN 16711-1 (total content in textiles).
EN 16711-2 (extractable content in textiles)

7.2.16 Other heavy metals

Material categories concerned: accessories, textiles, leather, packaging

Metals: Antimony CAS No.: 7440-36-0
Arsenic CAS No.: 7440-38-2
Barium CAS No.: 7440-39-3
Cobalt CAS No.: 7440-48-4

Limit value: Forbidden in product: Shall not be detectable/extractable

Properties: Toxic when ingested and inhaled, skin irritation, sensitizer

Use: Various uses (catalysts and stabilizers)

Comments: Can be extracted by sweat and water and cause skin irritation; toxicity risks during production

Test methods: EN 16711-1/-2; DIN EN ISO 17072-1;ISO 11083/ DIN EN ISO 105-E04 (Cr VI)

Detection limit: Not to be detected (max 0.1 mg/kg)
7.2.17 Phthalate esters

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value:

- 0.1% by weight (1000 mg/kg) for regulated phthalate in the material of interest (e.g., a print).
- 0.05% by weight (500 mg/kg) in toy's and childcare articles (for infants 0 - 3 years).

- DEHP, CAS No 117-81-7
- DBP, CAS No 84-74-2
- BBP, CAS No 85-68-7
- DINP, CAS No 28553-12-0 & 68515-48-0
- DIDP, CAS No 26761-40-0 & 68515-49-1
- DNOP, CAS No 117-84-0
- DIBP, CAS No 84-69-5
- DIHP, CAS No 71888-89-6
- DHNUP, CAS No 68515-42-4
- DMEP, CAS No 117-82-8
- 1,2-Benzenedicarboxylic acid, dipentylester, branched and linear, CAS No 84777-06-0
- DIPP, CAS No 605-50-5
- N-pentyl-isopentylphthalate, CAS No 776297-69-9
- Dipentyl phthalate (DPP), CAS No 131-18-0
- Dihexyl phthalate (DnHP), CAS No 84-75-3
- 1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear (DIHP), CAS No 68515-50-4
- Di-n-octyl phthalates (DnPP)
- DCHP (dicyclohexyl phthalate):84-61-7

Properties:
DEHP and DIBP are classified as hazardous to health. DBP is classified as having health and environmental effects. BBP is classified as having health and environmental effects. DIDP is of concern in connection with hepatic toxicity. Many phthalates are suspected endocrine disrupters.

Use:
Phthalates may be used as plasticizers in polymers. Additives in adhesives, paints, lacquers, varnishes and solvents.

Comments:
Alternative plasticizers include citrates, sebacates, adipates, and phosphates etc. The terephthalate, DEHT and the cyclohexane DINCH are example of commercial available alternatives with low human and environmental toxicity. There are also plastics that do not require phthalates. However each application needs to be individually assessed for each best specific technical performance.
Legal background: Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH) addresses the following legal limits:

- 0.1% by weight of the plasticized material in toys and childcare articles for DEHP, DBP and BBP.

- 0.1% by weight of the plasticized material in toys and childcare articles which can be placed in the mouth for DEHP, DBP, BBP, DINP, DIPD and DNOP.

DEHP, DBP, BBP and DIBP, DIHP, DHNUP, DMEP, 1,2-Benzenedicarboxylic acid, dipentylester, branched and linear, DIPP, N-pentyl-isopentylphthalate, , and DPP, are listed in both annex XIV and in the Candidate List of Substances of Very High Concern for authorization of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Dihexyl phthalate, 1,2-Benzenedicarboxylic acid, dihexyl ester, branched and linear and, 1,2-benzenedicarboxylic acid, mixed and even numbered di-C6-10-alkyl esters with $\geq 0.3\%$ of dihexyl phthalate and DCHP are listed in the Candidate List of Substances of Very High Concern for authorisation of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

From 2020, DIHP, DIBP (entry 51), DMEP, DIPP, DPP and DnHP will have a restriction limit of 1000 mg/kg in textiles (CMR fast track) according to Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). This limit applies to each substance individually or in combination with other phthalates that are classifies as CMR substances.

All phthalates in toys and childcare articles for children aged 0-3 years are restricted (0.05%) in Denmark (BEK nr 855).

Test method:
EN-ISO 14389
Test equipment: GC-MS, LC-MS

Detection limit: 100 mg/kg

7.2.18 Polybrominated biphenyls (PBB) and Polybrominated diphenyl ethers (PBDE)
Material categories concerned: Textile,, Accessories, Packaging

Limit value: Forbidden to be present in products.
Polybrominated biphenyls, CAS No 59536-65-1(mix)
Hexabromobiphenyl, CAS No 36355-01-8
Penta bromo diphenyl ether (PentaBDE), CAS No 32534-81-9, 60348-60-9
Octa bromo diphenyl ether (OctaBDE), CAS No 32536-52-0
Deca bromo diphenyl ether (DecaBDE), CAS No 1163-19-5
Tetra bromodiphenyl ether (TetraBDE), CAS No 5436-43-1
Heptabromodiphenyl ether (HeptaBDE), CAS No 207122-16-5, 446255-22-7
Hexabromodiphenyl ether (HexaBDE), CAS No 68631-49-2, 207122-15-4

Properties: Persistant, bioaccumulative and toxic. Halogenated organic additives in polymers may leach-out and have a negative impact on health and environment.
Halogen containing polymers may form highly corrosive substances and undefined range of halogenated substances that may be PBT or CMR when incinerated.

Use: Flame-retardant treatment of products where fire protection is required.

Comments: Avoid use. Replace bromo-organic chemical flame retardants with more environmentally sound alternatives, e.g., phosphorus- and/or nitrogen-based organic chemical flame retardants or non-chemical barrier-technologies such as blends of natural and synthetic fibers used in furniture and mattresses and high performance synthetic materials used in fire fighter uniforms and other protective clothing.
Textile goods for private use are basically never flame-retardant-treated. The only case when textile goods are treated with flame retardant is if the end customer orders this property. Usually it is done to satisfy regulatory requirements of fire protection.

Legal background: 10 mg/kg for several PBDEs as POPs
Commercial TetraBDE, PentaBDE HexaBDE, HeptaBDE) and Hexabromobiphenyl are listed in the Stockholm Convention on Persistent Organic Pollutants (POPs) and banned by Regulation (EC) No 850/2004
Commercial OctaBDE (0.1 % by weight) and Polybrominated biphenyls (PBBs) are banned in Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). The legal limit for PBBs in textile articles with skin contact is detection limit.
OctaBDE is suggested as a POP according to the Stockholm Convention.
Deca-BDE is banned in all products in Norway since 2008, legal limit 0.1 weight %. PBBs are listed in the Rotterdam Convention
Chlorinated phosphate esters are, together with several other halogenated flame retardants, under scientific review in several countries and regions worldwide.

Test method: EN ISO 17881-1 (textiles). Test equipment: GC-MS, LC-MS, GC-ECD

Detection limit: There is no standard international detection limit as yet. For LC-MS 1.0 mg/kg can be expected.
7.2.19 PVC and PVCD

Material categories concerned: Textile, Leather, Accessories, Packaging

Limit value: Not allowed: Phase-out if used. Forbidden to be present in products.
Polyvinyl Chloride, CAS No 9002-86-2
Polyvinylidene Chloride, CAS No 9002-85-1

Properties: Thermoplastic polymer, constructed of repeating vinyl groups having one hydrogen replaced by chloride

Use: Widely used in clothing industry: fabric, fake leather, trims and packaging, etc.

Test method: Beilstein and/or FTIR. (qualitative)

7.2.20 Siloxane

Material categories concerned: Textiles, Leather, Accessories, Packaging

Limit value: 0.1% by weight
CAS Nos:
556-67-2 Octamethylcyclotetrasiloxane (D4)
541-02-6 Decamethylcyclopentasiloxane (D5)
540-97-6 Dodecamethylcyclohexasiloxane (D6)

Properties: Suspected of damaging fertility. Toxic to aquatic life with long lasting effects.


Test method: No standardised test methods
Test equipment: GC-MS

7.2.21 TCEP

Material categories concerned: Textile, Leather (lubricant), Accessories, Packaging

Limit value: Forbidden to be present in products.
Tris(2-chlorethyl)phosphate (TCEP), CAS No 115-96-8
Tris (2,3 dibromopropyl) phosphate (TRIS), CAS No 126-72-7
Tris (1-aziridinyl)fosfin oxid (TEPA), CAS No 5455-55-1
Bis (2,3-dibromopropyl) phosphate (BDBPP), CAS No 5412-25-9

Properties: Persistant, bioaccumulative and toxic. Halogenated organic additives in polymers may leach-out and have a negative impact on health and environment.
Halogen containing polymers may form highly corrosive substances and undefined range of halogenated substances that may be PBT or CMR when incinerated.
Use: Flame-retardant treatment of products (i.e. coated textiles) where fire protection is required. Plasticizers.

Comments: Avoid. Replace chloro-organic chemical flame retardants with more environmentally sound alternatives, e.g., phosphorus- and/or nitrogen-based organic chemical flame retardants or non-chemical barrier-technologies such as blends of natural and synthetic fibers used in furniture and mattresses and high performance synthetic materials used in fire-fighter uniforms and other protective clothing.

Textile goods for private use are basically never flame-retardant treated. The only case when textile goods are treated with flame retardants is if the end customer orders this property. Usually it is done to satisfy regulatory requirements of fire protection.

Legal background:

Legal limit: 0.1% by weight

Tris(2-chlorethyl) phosphate (TCEP) and Tris (2,3 dibromopropyl) phosphate (TRIS) (entry 4), tris (1-aziridinyl)fosfin oxid (TEPA) is listed in the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).

Tris (1-aziridinyl)-phosphate oxide (TEPA / APO)
Tris (2,3-dibromopropyl) phosphate (TRIS / TDBPP) and Bis (2,3-dibromopropyl) phosphate (BDBPP) are prohibited in detectable levels in textiles for consumers by Japan Law 112 for the Control of Household Products Containing Harmful Substances (10/01/1974)

Test method:

EN ISO 17881-2
Test equipment: GC-MS, LC-MS, GC-ECD

Detection limit:

There is no standard international detection limit as yet. For LC-MS 1.0 mg/kg can be expected.

7.2.22 Tri phenyl phosphate (see also TCEP and Tri xylil phosphate)

Material categories concerned: Textiles

Limit Value: Forbidden to be present in products. Legally required use needs prior approval by CSO

Tri phenyl phosphate CAS No.: 115-86-6

Properties: Reproductive and developmental toxicity

Use: Plasticizer, flame-retardant


Detection limit: 0.03 mg/l

7.2.23 Tri (nx) cresyl phosphate (TCP)

Material categories concerned: Textiles

Limit value: Not to be present in products

Tri (m) cresyl phosphate CAS No.: 563-04-2
Tri (o) cresyl phosphate CAS No.: 78-30-8
Tri (p) cresyl phosphate CAS No.: 78-32-0
7.2.24 Trixylyl phosphate

Material categories concerned: Textile, Leather (lubricant), Accessories, Packaging

Limit value: Forbidden to be present in products.
Trixylyl phosphate, CAS No 25155-23-1

Properties: Toxic for reproduction

Use: Mainly used as functional fluid. Plasticizer of vinylite (a copolymer of vinyl chloride and vinyl acetate), cellulosic resins and natural and synthetic rubber. Plasticizer and flame retardant of PVC and PU.

Legal background: Legal limit: 0.1% by weight

Test method: EN ISO 17881-2 (textiles)
Test equipment: GC-MS, LC-MS, GC-ECD

Detection Limit: Use limit the prescribed lab can offer.

Impregnations

7.2.25 Perfluorooctane carboxylic acid (PFOA) and related substances

Material categories concerned: Textile, Leather, Accessories

Limit value: Forbidden to be present in products or production. No contamination from other production lines or impurities during handling is accepted.
PFOA, CAS No 335-67-1

Properties: Per and Polyfluorocarbons are surfactants, stable, temperature-resistant and water- and grease-repellent substances. PFOA is used as an emulsifier in the production of fluoropolymers such as polytetrafluoroethylene (PTFE) etc.

Use: Degradation products from additives in cleaning agents, fire extinguishing agents, metal plating and impregnation agents in leather and textiles.

Comments: Various alternatives are available, e.g., fluorine free waxes and other new formulas (e.g., dendrimeric technologies) shall be used but no silicones-based (siloxanes) solutions.
Legal background: Pentacosfluorotridecanoic acid (PFTrDA), CAS No 72629-94-8, Tricosfluorododecanoic acid (PFDoA), CAS No 307-55-1, Henicosfluoroundecanoic acid (PFUnA), CAS No 2058-94-8, Heptacosfluorotetradecanoic acid (PFTA), CAS No 376-06-7, Pentadecfluorooctanoic acid (PFOA), CAS No 335-67-1, Ammonium pentadecafluoroctanoate (APFO), CAS No 3825-26-1 and Nonadecafluorodecanoic acid (PFDA) and its sodium and ammonium salts, CAS Nos. 3108-42-7, 335-76-2, 3830-45-3 are listed in the Candidate List of Substances of Very High Concern for authorization of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). Restricted in Norway since June 2014 with the following legal limits:

0.001 % in chemical products
0.1 % (1000 ppm) in articles and parts there of
1 μg/m² in textiles.

Test method: No standardized test method available. Test Labs are prescribed. See also Appendix 7.
Test equipment: LC-MS

Detection limit: 0.005 mg/kg.

7.2.26 Perfluorooctane sulfonate (PFOS and related substances)

Material categories concerned: Textile, Leather, Accessories

Limit value: Forbidden to be present in product or production. Legally, 1 μg/m² applies to fluoro coated textiles and leather products 0.1% by weight applies to fluoro impregnated textiles and leather products.
PFOS, CAS No 1763-23-1

Properties: Polyfluorocarbons are surfactants, stable, temperature-resistant and water- and grease-repellent substances. PFOS is dangerous for the environment. PFOS hardly degrades (persistent) and is bio accumulative.

Use: Degradation product from additives in cleaning agents, ant pesticide bait, fire extinguishing agents, metal plating and impregnation agents in leather and textiles etc.

Comments: Avoid any Cₙ-technologies and use alternatives that are not based on long chain fluorotelomers (> C₆) and long chain perfluorosulfonic compounds (> C₅). Various alternatives are available, e.g., fluorine free waxes but not silicones-based solutions.

Legal background: Legal limit: 1 μg/m² applies to fluoro coated textiles and leather products 0.1% by weight applies to or part of articles.

Test method: EN/TS 15968:2009
Test equipment: LC-MS

Detection limit: 0.1 μg/m²

3 The total amount of PFOS and PFOS related substances counted as PFOS, see test method EN/TS 15968:2009
7.2.27 Flourochemicals (PFCs)

Material categories concerned: Textile, Leather, Accessories, Packaging

**Limit value:** Forbidden to be present in products or production. GoreTex® Material excluded, unless otherwise advised by CSO.

**Use:**
Impregnation agents in leather and textiles, fluoropolymer membranes.

**Comments:**
Various alternatives are now available and new technologies are developed on a regular basis. Consider the use of the product and use alternatives; PFCs are not allowed except for GoreTex® materials. Phase-out from all materials including accessories required by 2020; forbidden of use in packaging.

**Legal background:**
Restrictions are currently developed under the REACH legislation.

**Test method:**
Following test labs are available: Nilu (Norsk institutt for luftforsking) Eurofins. See Appendix 7 for details.
Test equipment: SEM-EDS analyze GC-MS HPLC-MS

**Detection Limit:**
Use the detections limits of the Labs prescribed for full range of PFCs and FTOHs.
Biocidal Agents

Biocidal agents are both used as *process chemicals* to prohibit growth of microbes and *product related chemicals* to render biocidal property to the article. For hygienic reasons, we recommend, that biocidal agents, that include antibacterial, antifungal and insecticide agents shall not be used in textile and leather products.

7.2.28 Cu-HDO (Bis-(N-cyclohexyldiazeniumdioxy)-copper)

Material categories concerned: textiles, shoes, fungizide for transport (may be used instead of silica gel)

| Limit value: | Forbidden.  
  CAS No 312600-89-8 |
| Properties: | Fungicide. Cu-HDO is classified as very toxic to aquatic organisms. |
| Use: | Fungicide. |
| Comments: | The alternative to biocidal agents during storage and transport is a cool and dry environment. |
| Legal background: | Cu-HDO is banned within PT9 (product type 9) that includes textiles, polymers and leather, according to the Biocidal Product Regulation (EU 528/2012). |
| Test method: | No standardised test method available. |
| Test equipment: | ICP-AES |

7.2.29 Dimethylfumarate (DMFu)

Material categories concerned: Textile, Leather, Packaging

| Limit value: | Avoid use. Not to be present in products.  
  DMFu, CAS No 624-49-7 |
| Properties: | Fungicide. DMFu is harmful to skin and a strongly allergenic substance. |
| Use: | To counteract fungus growth in clothes, shoes and other leather items. DMFu can e.g. be found in silica gel bags, but is also applied on the product both as a powder and in tablet form. |
| Comments: | The alternative to biocidal agents during storage and transport is a cool and dry environment. If use of biocidal agents is vital, folpet, chlorocresol, propiconazol, azoxystrobin and fludioxonil are approved for PT9 according to the Biocidal Product Regulation (EU 528/2012). |
| Legal background: | Legal limit: 0.00001 % by weight (0.1 mg/kg) Annex XVII of Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH).  
  (Note: Previously banned according to EC directive 2001/95/EC (general product safety) from 1 May 20094 to 15 May 2012.)  
  Test equipment: GC-MS, LC-MS. |
| Detection limit: | 0.1 mg/kg. |
7.2.30 Guanidine, N,N''-1,6-hexanediylbis(N'-cyano-),polymer with 1,6-heanediamine, hydrochloride (PHMB 1600; 1.8)

Material categories concerned: textiles, leather

Limit value: Forbidden to be present in products.
CAS Nos 27083-27-8; 32289-58-0

Properties: PHMB is very toxic to aquatic life, is suspected of causing cancer and may cause an allergic skin reaction.

Use: Biocide.

Comments: The alternative to biocidal agents during storage and transport is a cool and dry environment.

Legal background: PHMB 1600; 1.8 is banned within PT9 (product type 9) that includes textiles, polymers and leather, according to the Biocidal Product Regulation (EU 528/2012)

Test method: No standardized test method available.

7.2.31 Pentachlorophenol (PCP) and all isomers of Tetrachlorophenols (TeCP)

Material categories concerned: Textile, Leather

Limit value: Do not use. Not be present in products.
CAS No 87-86-5, 131-52-2 (PCP)

Properties: Organic compounds. Toxic and dangerous for the environment.
On combustion, PCP emits dioxins, which are extremely toxic to humans.


Comments: The alternative to biocidal agents during storage and transport is a cool and dry environment.

Danish ban (BEK No. 854) on the import, export, sale and use of products containing 5 ppm or more of PCP and its salts and esters.
Pentachlorophenol and its salts and esters, is banned in Germany in textiles and leather. Legal limit 5 ppm, (Chemikalien-Verbotsverordnung, Abschnitt 15)
Pentachlorophenol is listed in the Rotterdam convention.

Test method:
ISO 17070 (leather)
XP G 08-015 (French standard method for PCP in textiles)
CEN/TR 14823 (wood)
EN ISO 15320 (pulp, paper and board)

Detection limit: 0.05 mg/kg (for individual chlorophenols); detection limit wood: 25 mg/kg.
7.2.32 Permethrin

Material categories concerned: Textile, Leather

**Limit value:** Forbidden in Fenix products. Should not be present in products. Exception: UN or NATO demands in specific products; formulas approved by EU/CAN/US/CAL (e.g., InsectShield® and HeiQ); always written approval from CSO needed.

**Properties:** Insecticide. Permethrin is like all synthetic pyrethroids a neurotoxin. It is considered more acutely toxic to children than to adults.

**Use:** Permethrin is a biocide in textiles. It is used for home pest control, forestry, and in public health programs, including head lice control. It is also used for anti-mosquito/anti-tick treatment.

**Legal background:** Permethrin is on the list of temporarily permitted existing biocides within PT9 (product type 9) that includes textiles, polymers and leather, according to the Biocidal Product Regulation (EU 528/2012).

**Test method:** No standardised test method available.

**Detection limit:** 0.1 mg/kg.

7.2.33 Silver complexes in nano size (Ag +)

Material categories concerned: Textile, Leather

**Limit value:** Not be present in products.

**Properties:** Slight skin and eye irritant. Disturb denitrification processes in nature that is vital for provision of nutrition to plants. Dissolved (free) silver ions are very toxic to aquatic organisms.

**Use:** Silver particle complexes in nano-size (< 100nm) are antibiotic additives in plastics and fibres.

**Comments:** The alternative to antibacterial agents during use is satisfactory washing.

**Legal background:** Legal limit: No legal limits for nano size silver complexes in textiles and leather. Metallic silver is on the list of temporarily permitted existing biocides within PT9 (product type 9) that includes textiles, polymers and leather, according to the Biocidal Products Directive (98/8/EC). Some silver products are registered in USA and the EU as biocidal products.

**Test method:** No standardized test method available.

**Detection limit:** Total silver 0.1 mg/kg.
7.2.34 Tributyltin oxide compounds

Material categories concerned: Textile, Leather

**Limit value:** Not be present in products.
- Tributyltin oxide (TBTO), CAS No 56-35-9
- Tributyltin chloride, CAS No 1461-22-9
- Tributyltin fluoride, CAS No 1983-10-4
- Tributyltin methacrylate, CAS No 2155-70-6
- Tributyltin benzoate, CAS No 4342-36-3
- Tributyltin linoleate, CAS No 24124-25-2
- Tributyltin naphthenate, CAS No 85409-17-2

**Properties:** Antibacterial agent. Tributyltin compounds are different chemical substances that are toxic and dangerous for the environment. Bioaccumulative and persistent.

**Use:** To counteract noxious odors in clothes and shoes. Preservative, fungicide and antifouling agent.

**Comments:** The alternative to antibacterial agents during use is satisfactory washing.

**Legal background:** Legal Limit: 0.1% by weight
All tri-substituted organo stannic compounds such as tributyltin (TBT) are listed in annex XVII of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH). The seven TBT compounds listed above are also included in the Rotterdam convention.
- Tributyltin oxide (TBTO), CAS No 56-35-9 and Dibutyltin dichloride (DBTC), CAS No 683-18-n are listed on the Candidate List of Substances of Very High Concern for authorization of the Regulation (EC) No 1907/2006 of the European Parliament and of the Council (REACH)

**Test method:** No standardized test method for textile available. DIN EN ISO17353 (water and sediment)
Test equipment: GC-MS.

**Detection limit:** 0.015 mg/kg.

7.2.35 Triclosan

Material categories concerned: Textile, Leather

**Limit value:** Forbidden to be present in products.
- Triclosan, CAS No 3380-34-5

**Properties:** Antibacterial agent. Triclosan is classified as a probable human carcinogen and bio accumulative.

**Use:** Anti-bacterial agent in clothes and other commodities.

**Comments:** The alternative to antibacterial agents during use is satisfactory washing.

**Legal background:** Triclosan is on the list of temporarily permitted existing biocides within PT9 (product type 9) that includes textiles, polymers and leather, according to the Biocidal Products Directive (98/8/EC).

**Test method:** EN 17134:2019
0.01 mg/kg for both leather and textiles.

**Detection limit:**
7.2.36 DTTB (4,6-dichloro-7-(2,4,5-trichlorophenoxy)-2-trifluoromethylbenzimidazole) and Dieldrin

Material categories concerned: Textile

**Limit value:**
Do not use. 30 ppm in textiles for consumers

**Properties:**
Biocide.

**Legal background:**
Japan Law 112 for the Control of Household Products Containing Harmful Substances (10/01/1974)
8. Updated List: Chemicals Restricted and Forbidden under the REACH Legislation

The European and International Chemicals Registration and restriction legislation is a developing and hence dynamic process. Thus far, not even 30 percent of all chemicals have been screened and categorized. Subsequently, Fenix Outdoor needs to regularly update and revise its Restricted Substances List. In light of the aforementioned precautionary approach, we expect all suppliers and business partners to collaborate closely with us and replace critical and potentially hazardous chemicals and those which may have a negative impact on the environment (water bodies, soil, air and living beings) as early in a process as possible. Under no circumstances shall restricted or forbidden chemicals occur in our finished products. The following table gives an overview on recently added chemicals to the REACH List (List of Substances of Very High Concern for authorization of the Regulation of the European Parliament and of the Council). We expect our partners to ensure that those chemicals do not form part of the processes needed to create and deliver our products, nor that it occurs in the finished products.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Relevance</th>
<th>EC number</th>
<th>CAS No</th>
<th>SVHC property</th>
<th>Potential uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formamide</td>
<td>Packaging</td>
<td>200-842-0</td>
<td>75-12-7</td>
<td>Toxic for reproduction (Article 57 c)</td>
<td>Mainly used as an intermediate. Minor uses as solvent, as reagent chemical (in the pharmaceutical industry) and as laboratory chemical. The substance seems further to be used in the agrochemical industry and as a plasticizer.</td>
</tr>
<tr>
<td>TGIC (1,3,5-tris(oxiranylmethyl)-1,3,5-triazine-2,4,6(1H,3H,5H)-trione)</td>
<td>Packaging</td>
<td>219-514-3</td>
<td>2451-62-9</td>
<td>Mutagenic (Article 57b)</td>
<td>Mainly used as a hardener in resins and coatings; also used in inks for the printed circuit board industry, electrical insulation material, resin moulding systems, laminated sheeting, silk screen printing coatings, tools, adhesives, lining materials and stabilizers for plastics.</td>
</tr>
<tr>
<td>ß-TGIC (1,3,5-tris(2S and 2R)-2,3-epoxypropyl]-1,3,5-triazine-2,4,6-(1H,3H,5H)-trione)</td>
<td>Packaging</td>
<td>423-400-0</td>
<td>59653-74-6</td>
<td>Mutagenic (Article 57b)</td>
<td>Mainly used as a hardener in resins and coatings; also used in inks for the printed circuit board industry, electrical insulation material, resin moulding systems, laminated sheeting, silk screen printing coatings, tools, adhesives, lining materials and stabilizers for plastics.</td>
</tr>
<tr>
<td>4,4'-bis(dimethylamino)benzophenone (Michler's ketone)</td>
<td>Leather, textiles and packaging</td>
<td>202-027-5</td>
<td>90-94-8</td>
<td>Carcinogenic (Article 57a)</td>
<td>Intermediate in the manufacture of triphenylmethane dyes and other substances. Further potential uses include as additive.</td>
</tr>
<tr>
<td>Substance</td>
<td>Relevance</td>
<td>EC number</td>
<td>CAS No</td>
<td>SVHC property</td>
<td>Potential uses</td>
</tr>
<tr>
<td>-----------</td>
<td>-----------</td>
<td>-----------</td>
<td>--------</td>
<td>---------------</td>
<td>----------------</td>
</tr>
<tr>
<td>bis(dimethylamino)-4''-(methylamino)trityl alcohol</td>
<td>Process chemical Textiles and packaging</td>
<td>209-218-2</td>
<td>561-41-1</td>
<td>Carcinogenic (Article 57a)</td>
<td>(photosensitiser) in dyes and pigments, in dry film products, as a process chemical in the production of electronic circuit boards, in research and development applications.</td>
</tr>
<tr>
<td>Cadmium fluoride</td>
<td>Accessories</td>
<td>232-222-0</td>
<td>7790-79-6</td>
<td>Carcinogenic (Article 57 a); Mutagenic (Article 57 b); Toxic for reproduction (Article 57 c); Equivalent level of concern having probable serious effects to human health (Article 57 f)</td>
<td>Used in the production of writing inks and potentially in the production of other inks, as well as for dyeing of a variety of materials.</td>
</tr>
<tr>
<td>Cadmium sulphate</td>
<td>Accessories</td>
<td>233-331-6</td>
<td>10124-36-4, 31119-53-6</td>
<td>Carcinogenic (Article 57 a); Mutagenic (Article 57 b); Toxic for reproduction (Article 57 c); Equivalent level of concern having probable serious effects to human health (Article 57 f)</td>
<td>Used as pigment (e.g. glass and plastic). Its semiconducting property together with chemical/physical properties makes cadmium sulphide useful for photoelectronic</td>
</tr>
</tbody>
</table>
9. Documentation*

For replicability of specifications and in light of the REACH Regulation, the following documentation requirements apply:

<table>
<thead>
<tr>
<th>Records</th>
<th>Author</th>
<th>Archived At</th>
<th>Minimum Retention Period</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>(evtl. centrally archived)</td>
</tr>
<tr>
<td>Approval documents</td>
<td>Head of Production</td>
<td>Head of Production</td>
<td>Statutory</td>
</tr>
<tr>
<td>Test Reports</td>
<td>Test Lab</td>
<td>1 Copy at Facility; 1 Copy Head of Production</td>
<td>5 years</td>
</tr>
<tr>
<td>Cross-testing Reports</td>
<td>Test Lab</td>
<td>Head CSR/Prod.</td>
<td>Statutory</td>
</tr>
<tr>
<td>REACH Requests</td>
<td>Var.</td>
<td>Sales Entity/ Head CSR/Prod.</td>
<td>Statutory</td>
</tr>
<tr>
<td>Product and Material Samples</td>
<td>Production</td>
<td>Production/QA Team</td>
<td>Archive</td>
</tr>
<tr>
<td>Internal relevant documents</td>
<td>Product Resp.</td>
<td>Head Office</td>
<td>Statutory</td>
</tr>
<tr>
<td>Complaints</td>
<td>Var.</td>
<td>Head CSR/Prod.</td>
<td>Statutory</td>
</tr>
<tr>
<td>Internal Complaints Handling Reports</td>
<td>Var.</td>
<td>Head CSR/ QA</td>
<td>Statutory</td>
</tr>
<tr>
<td>Inspection reports</td>
<td>Inspection team</td>
<td>Head CSR/Prod.</td>
<td>Archive</td>
</tr>
<tr>
<td>Compliance Reports</td>
<td>Compliance Office</td>
<td>CCO</td>
<td>5 years</td>
</tr>
</tbody>
</table>

List of Abbreviation
CCO = Chief Compliance Officer’s Office
CSR = Corporate Social Responsibility
Dept. = Department
Lab = Laboratory
Prod. = Product(ion)
QA = Quality Assurance Team
Resp. = Responsible
Var. = various authors/actors

NOTE: In some entities specific roles mentioned are not assigned. In that case the given alternative or most plausible solution should be sought.

* Additional resources may be required to implement the documentary requirements
10. Liability
The supplier is required to follow – in all incidences – the laws and regulations of the European Union and their member states. We request to pay special attention to the following points:

10.1 Chemicals

10.1.1 Forbidden Chemicals in products
The requirements apply to all products that defines as merchandise according to the European Parliament and the Councils ordinance 1907/2006 (REACH), article 3.3. It also applied to the definition of “product” as rules by the European Supreme Court in April 2015.

The supplier is responsible that all deliveries to any Fenix Outdoor entity do not contain any products with chemicals which use is limited according to the European parliament and the councils ordinance 1907/2006 (REACH), Appendix XVII.

This includes any component of the product supplied by any local supplier/subcontractor.

10.1.2 Chemicals requiring permission at the European Chemical Agency (ECHA)
The requirements apply to all products that are defined as merchandise in accordance the European Parliament and the Councils ordinance 1907/2006 (REACH), article 3.3. The supplier is liable according to law to inform the respective Fenix Outdoor entity about the presence of chemicals which are listed in the Candidate List of Substances of Very High Concern for Authorization, which is to be found on the website of the European Chemicals Agency, (http://echa.europa.eu/), together with chemicals that can be used for different intended uses and over chemicals listed in the European parliament and the council ordinance 1907/2006 (REACH), Appendix XIV whose intended use requires the permission of ECHA.

Every partner ensures that all deliveries do not contain products with chemicals listed in the Candidate List of Substances of Very High Concern for Authorization and in the European parliament and the councils ordinance 1907/2006 (REACH), Appendix XIV.

10.1.3 Stockholm Convention on Persistent Organic Pollutants (POPs)
The Stockholm Convention on Persistent Organic Pollutants is an international environmental treaty, signed in 2001 and effective from May 2004, that aims to eliminate or restrict the production and use of persistent organic pollutants (POPs), addressed as the Stockholm Convention, Regulation (EC) 850/2004 and EU Regulation No 519/2012 in EU.

10.1.4 Biocidal Product Regulation
The Biocidal Product Regulation (BPR, Regulation (EU) 528/2012) concerns the placing on the market and use of biocidal products, which are used to protect humans, animals, materials or articles against harmful organisms, like pests or bacteria, by the action of the active substances contained in the biocidal product.

The Biocidal Products Regulation (BPR) also sets rules for the use of articles treated with, or intentionally incorporating, one or more biocidal products.

10.1.5 Chemicals classified as dangerous
The supplier ensures that chemicals classified as dangerous in accordance to the European parliament and the councils ordinance 1272/2008 (CLP regulations for classification, labeling and packaging of substances), are not used in process of production or added as an additive in
products. This requirement applies only if the chemicals not classified as dangerous is available on the market and whose technical usability is equal or better than the chemicals classified as dangerous is used.

Chemicals classified as CMR-chemicals, i.e. carcinogenic, mutagenic, toxic to reproduction, endocrine toxic (endocrine disruption), allergenic or classified as PBT or/and vPvB- chemicals, i.e. persistent, bio accumulative and eco toxic according to definitions in the European Parliament and the Councils ordinance 1907/2006 (REACH), article 57.

If chemicals classified as dangerous are used in production process or as an additive in products the supplier shall in the quotation apply relative safety sheet in accordance to the European Parliament and the Councils ordinance 1907/2006 (REACH), Appendix II.

The supplier is obliged to inform about all chemical substances used in the production process or as an additive in the product as a separate appendix to the quotation. In case of a substance used in process or present in product of a forbidden quantity orders will not be signed.

In case, products are intended to be sold in the US markets, the supplier provides Fenix Outdoor with the appropriate and necessary labelling required by California Proposition 65.

The supplier performs tests and analyses on his own expense to ensure that specifications and chemical laws and restrictions are fulfilled and that all products delivered to the respective Fenix Outdoor entity are in accordance with the specifications, order and quotation agreements.

Fenix Outdoor reserves the right to perform unannounced test to cross-test delivered products in order to ensure, all requirements are met.

If needed and from time-to-time, Fenix Outdoor or any of its entities may conduct random checks of suppliers at any time during the contract period performed by own staff or through a 3rd party – announced or unannounced.

10.1.6 Sanctions

In case that tests, on-site visits, cross-test and controls or audits performed by us or a 3rd party show forbidden or too high concentrations of restricted substances according to

a. Appendix XIV to REACH (SVHC-substances subject to authorization) and associated candidate list

b. Appendix XVII to REACH (Restrictions) OR/AND

c. Fenix Outdoor International’s Chemical Guideline or the specific Guideline of any Fenix Outdoor entity

OR

Does violate legal labelling and information disclosure requirements,

We reserve the right to hold payment fully or partly until the delivered goods have been corrected, removed or taken-back by the supplier and goods, fulfilling our specifications and which have been approved are delivered.

In case of the violation of any of the above mentioned elements of our guideline, we reserve the full right to take other sanctions arising from the contract / or under other contractual and legal
frameworks and agreements. This entails, *inter alia*, the right to receive compensation in the form of claimed damages equivalent to the so-called positive contractual interest for both the direct and the indirect damages, losses of sales, penalties by clients for non- or delayed deliveries and claims by authorities, fees, fines and other arising from third party demands as a result of the delivery of forbidden, unauthorized or harmful products or substances therein.
11. Chemical Restrictions Compliance Commitment

Every business partner confirms as follows:

We hereby confirm that we have taken note of and fully understand Fenix Outdoor’s “Chemicals Guideline” and its appendices 1, 2, 3, and 4. We confirm that we will comply with the restrictions and provisions mapped out in this document and will enter into a dialogue should we deem the fulfillment difficult or impossible. We will ensure that our suppliers and partners will adhere to the requirements and we will inform them about Fenix Outdoor group’s chemical policies. We are also taking note of the legislative changes or prospective changes and will discuss with our Fenix Outdoor partners possible developments and alternatives.

Date

Company Name

Signature

Name of Undersigning

Company Stamp

The provisions of this Guideline are binding for all business partners. In case of a dispute on test results or in case of findings that would constitute a violation of this Guideline, be it by third parties, authorities or internal investigations, both parties will strive to resolve the issue in the spirit of partnership and cooperation. This holds also true in case of publications issued by authorities, consumer groups or special-interest groups.

This Chemical Guideline was last revised on 08 August 2018. The next review is scheduled for February 2019 or on an ad hoc basis should legal changes require us to do so.
### 13. Appendix

#### 13.1 Appendix 1  List of 20 allergenic disperse dyestuffs and Navy Blue (banned mordant dye)

<table>
<thead>
<tr>
<th>C.I. Name</th>
<th>CAS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>C.I. Disperse Yellow 1</td>
<td>119-15-3</td>
</tr>
<tr>
<td>C.I. Disperse Blue 35*</td>
<td>12222-75-2</td>
</tr>
<tr>
<td>C.I. Disperse Blue 102</td>
<td>12222-97-8</td>
</tr>
<tr>
<td>C.I. Disperse Blue 106*</td>
<td>12223-01-7</td>
</tr>
<tr>
<td>C.I. Disperse Yellow 39</td>
<td>6816-81-4</td>
</tr>
<tr>
<td>C.I. Disperse Blue 35*</td>
<td>12236-29-2</td>
</tr>
<tr>
<td>C.I. Disperse Orange 37/59/76*</td>
<td>13301-61-6</td>
</tr>
<tr>
<td>C.I. Disperse Brown 1</td>
<td>23355-64-8</td>
</tr>
<tr>
<td>C.I. Disperse Blue 3</td>
<td>2475-46-9</td>
</tr>
<tr>
<td>C.I. Disperse Orange 1</td>
<td>2581-69-3</td>
</tr>
<tr>
<td>C.I. Disperse Yellow 3*</td>
<td>2832-40-8</td>
</tr>
<tr>
<td>C.I. Disperse Red 11</td>
<td>2872-48-2</td>
</tr>
<tr>
<td>C.I. Disperse Red 1*</td>
<td>2872-52-8</td>
</tr>
<tr>
<td>C.I. Disperse Red 17</td>
<td>3179-89-3</td>
</tr>
<tr>
<td>C.I. Disperse Blue 7</td>
<td>3179-90-6</td>
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<tr>
<td>C.I. Disperse Blue 26</td>
<td>3860-63-7</td>
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<td></td>
<td>100357-99-1</td>
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<tr>
<td></td>
<td>13324-23-7</td>
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<tr>
<td>C.I. Disperse Yellow 49</td>
<td>54824-37-2</td>
</tr>
<tr>
<td></td>
<td>12239-15-5</td>
</tr>
<tr>
<td>C.I. Disperse Blue 124*</td>
<td>61951-51-7</td>
</tr>
<tr>
<td>C.I. Disperse Yellow 9</td>
<td>6373-73-5</td>
</tr>
<tr>
<td>C.I. Disperse Orange 3*</td>
<td>730-40-5</td>
</tr>
<tr>
<td>Navy Blue</td>
<td>405-665-4 (EC #) BANNED</td>
</tr>
<tr>
<td>C.I. Disperse Blue 1*</td>
<td>2475-45-8</td>
</tr>
</tbody>
</table>

All chemicals marked with * are strictly forbidden and banned in Germany.
## 13.2 Appendix 2  List of 24 banned arylamines

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
</tr>
</thead>
<tbody>
<tr>
<td>4,4-Methylene-bis[2-chloroaniline]</td>
<td>101-14-4</td>
</tr>
<tr>
<td>4,4-Methylenedianiline</td>
<td>101-77-9</td>
</tr>
<tr>
<td>4,4'-oxydianiline</td>
<td>101-80-4*</td>
</tr>
<tr>
<td>4-chloroaniline</td>
<td>106-47-8</td>
</tr>
<tr>
<td>o-Dianisidine</td>
<td>119-90-4</td>
</tr>
<tr>
<td>4,4'-bi-o-toluidine</td>
<td>119-93-7</td>
</tr>
<tr>
<td>p-Cresidine</td>
<td>120-71-8*</td>
</tr>
<tr>
<td>2,4,5-trimethylaniline</td>
<td>137-17-7</td>
</tr>
<tr>
<td>4,4'-thiodianiline</td>
<td>139-65-1</td>
</tr>
<tr>
<td>4-Aminoazobenzene</td>
<td>60-09-3</td>
</tr>
<tr>
<td>4-methoxy-m-phenylenediamine</td>
<td>615-05-4</td>
</tr>
<tr>
<td>4,4-Methylenedi-o-toluidine</td>
<td>838-88-0*</td>
</tr>
<tr>
<td>2,6-xyldine</td>
<td>87-62-7</td>
</tr>
<tr>
<td>o-Anisidine</td>
<td>90-04-0*</td>
</tr>
<tr>
<td>2-Naphthylamine</td>
<td>91-59-8</td>
</tr>
<tr>
<td>3,3-Dichlorobenzidine</td>
<td>91-94-1</td>
</tr>
<tr>
<td>Biphenyl-4-ylamine</td>
<td>92-67-1*</td>
</tr>
<tr>
<td>Benzidine</td>
<td>92-87-5</td>
</tr>
<tr>
<td>o-Toluidine</td>
<td>95-53-4*</td>
</tr>
<tr>
<td>2,4-xyldine</td>
<td>95-68-1</td>
</tr>
<tr>
<td>4-Chloro-o-toluidine</td>
<td>95-69-2</td>
</tr>
<tr>
<td>4-methyl-m-phenylenediamine</td>
<td>95-80-7*</td>
</tr>
<tr>
<td>o-Aminoazotoluene</td>
<td>97-56-3*</td>
</tr>
<tr>
<td>5-Nitro-o-toluidine</td>
<td>99-55-8</td>
</tr>
</tbody>
</table>

4-chloro-o-toluidinium chloride                                       | 3165-93-3**|
2-Naphthylammoniumacetate                                            | 553-00-4**|
4-methoxy-m-phenylene diammonium sulphate;                           |            |
2,4-diaminoanisole sulphate                                          | 39156-41-7**|
2,4,5-trimethylaniline hydrochloride                                 | 21436-97-5**|

Substances marked with * fall in the REACH category "substances of very high concern" – SVHC; ** are CMR fast track substances
### List of 15 carcinogenic dye stuffs

<table>
<thead>
<tr>
<th>C.I. Name</th>
<th>CAS No</th>
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<tbody>
<tr>
<td>C.I. Direct Brown 95</td>
<td>16071-86-6</td>
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<td>C.I. Direct Black 38</td>
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<tr>
<td>C.I. Disperse Blue 1</td>
<td>2475-45-8 **</td>
</tr>
<tr>
<td>C.I. Direct Blue 6</td>
<td>2602-46-2</td>
</tr>
<tr>
<td>C.I. Acid Red 26</td>
<td>3761-53-3</td>
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<tr>
<td>C.I. Basic Red 9</td>
<td>569-61-9 **</td>
</tr>
<tr>
<td>C.I. Direct Red 28</td>
<td>573-58-0</td>
</tr>
<tr>
<td>C.I. Basic Violet 14</td>
<td>632-99-5</td>
</tr>
<tr>
<td>C.I. Disperse Orange 11</td>
<td>82-28-0</td>
</tr>
<tr>
<td>C.I. Disperse Orange 149</td>
<td>85136-74-9</td>
</tr>
<tr>
<td>C.I. Solvent Blue 4</td>
<td>6786-83-0*</td>
</tr>
<tr>
<td>C.I. Basic Blue 26</td>
<td>2580-56-5*</td>
</tr>
<tr>
<td>C.I. Basic Violet 3</td>
<td>548-62-9* , **</td>
</tr>
<tr>
<td>Acid Violet 49</td>
<td>1694-09-3</td>
</tr>
<tr>
<td>Basic Violet 1</td>
<td>8004-87-3</td>
</tr>
<tr>
<td>C.I. Pigment Yellow 83</td>
<td>5567-15-7</td>
</tr>
<tr>
<td>Michler's base</td>
<td>101-61-1*</td>
</tr>
<tr>
<td>4,4'-bis(dimethylamino)-4''-(methylamino)trityl alcohol</td>
<td>561-41-1*</td>
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<tr>
<td>C.I. Disperse Yellow 3</td>
<td>2832-40-8</td>
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</table>

Substances marked with * fall in the REACH category “substances of very high concern” – SVHC; ** are CMR Fast Track substances
### 13.4 Appendix 4  List of DBTs

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<th>Constituent</th>
<th>CAS No</th>
<th>No of carbons</th>
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<td>R = oxide (DBTO)</td>
<td>818-08-6</td>
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<tr>
<td>R = acetate</td>
<td>1067-33-0</td>
<td>2</td>
</tr>
<tr>
<td>R = butoxide</td>
<td>3349-36-8</td>
<td>4</td>
</tr>
<tr>
<td>R = metilmaleate</td>
<td>15546-11-9</td>
<td>5</td>
</tr>
<tr>
<td>R = octanoate</td>
<td>4731-77-5</td>
<td>8</td>
</tr>
<tr>
<td>R = isoocanoate</td>
<td>85702-74-5</td>
<td>8</td>
</tr>
<tr>
<td>R = (monobutyl)maleate</td>
<td>15546-16-4</td>
<td>8</td>
</tr>
<tr>
<td>R = 2-ethylhexanoate</td>
<td>2781-10-4</td>
<td>8</td>
</tr>
<tr>
<td>R = laurate</td>
<td>77-58-7</td>
<td>12</td>
</tr>
<tr>
<td>R = palmitate</td>
<td>13323-63-2</td>
<td>16</td>
</tr>
<tr>
<td>R = stearate</td>
<td>5847-55-2</td>
<td>18</td>
</tr>
<tr>
<td>R = oleate</td>
<td>13323-62-1</td>
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<tr>
<td>R = linoleate</td>
<td>85391-79-3</td>
<td>18</td>
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<tr>
<td>R = linolenate</td>
<td>95873-60-2</td>
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### 13.5 Appendix 5  List of Chromium (VI) SVHC compounds

<table>
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<th>Name</th>
<th>CAS No</th>
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<tr>
<td>Ammonium dichromate</td>
<td>7789-09-05*</td>
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<tr>
<td>Potassium chromate</td>
<td>7789-00-6*</td>
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<td>Potassium dichromate</td>
<td>7778-50-9*</td>
</tr>
<tr>
<td>Sodium chromate</td>
<td>7775-11-03*</td>
</tr>
<tr>
<td>Sodium dichromate dehydrate</td>
<td>7789-12-0, 10588-01-9*</td>
</tr>
<tr>
<td>Strontium chromate</td>
<td>7789-06-2</td>
</tr>
<tr>
<td>Chromium trioxide</td>
<td>1333-82-0*</td>
</tr>
<tr>
<td>Chromic acid</td>
<td>7738-94-5*</td>
</tr>
<tr>
<td>Dichromic acid</td>
<td>13530-68-2*</td>
</tr>
<tr>
<td>Lead chromate</td>
<td>7758-97-6*</td>
</tr>
<tr>
<td>Lead sulfochromate</td>
<td>1344-37-2</td>
</tr>
<tr>
<td>Lead chromate molybdate sulphate</td>
<td>12656-85-8*</td>
</tr>
<tr>
<td>Dichromium tris(chromate)</td>
<td>24613-89-6</td>
</tr>
<tr>
<td>Potassium hydroxyoctaoxodizincatedichromate</td>
<td></td>
</tr>
<tr>
<td>Pentazinc chromate octahydroxide</td>
<td>49663-84-5</td>
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</table>

Substances, marked with an * are also listed in Annex XIV in addition to the candidate list.
13.6 Appendix 6  List of SVHC Lead compounds

<table>
<thead>
<tr>
<th>Name</th>
<th>CAS No</th>
</tr>
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<tbody>
<tr>
<td>Lead chromate</td>
<td>7758-97-6</td>
</tr>
<tr>
<td>Lead sulfochromate</td>
<td>1344-37-2</td>
</tr>
<tr>
<td>Lead chromate molybdate sulphate</td>
<td>12656-85-8</td>
</tr>
<tr>
<td>Lead dipicrate</td>
<td>6477-64-1</td>
</tr>
<tr>
<td>Lead stypnate</td>
<td>15245-44-0</td>
</tr>
<tr>
<td>Lead diazide</td>
<td>13424-46-9</td>
</tr>
<tr>
<td>Lead hydrogen arsenate</td>
<td>7784-40-9</td>
</tr>
<tr>
<td>Lead monoxide (Lead oxide)</td>
<td>1317-36-8</td>
</tr>
<tr>
<td>Orange lead (Lead tetroxide)</td>
<td>1314-41-6</td>
</tr>
<tr>
<td>Lead bis(tetrafluoroborate)</td>
<td>13814-96-5</td>
</tr>
<tr>
<td>Trilead bis(carbonate)dihydroxide</td>
<td>1319-46-6</td>
</tr>
<tr>
<td>Lead titanium trioxide</td>
<td>12060-00-3</td>
</tr>
<tr>
<td>Lead titanium zirconium oxide</td>
<td>12626-81-2</td>
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<tr>
<td>Lead(II) bis(methanesulfonate)</td>
<td>17570-76-2</td>
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<tr>
<td>Silicic acid, lead salt</td>
<td>11120-22-2</td>
</tr>
<tr>
<td>Silicic acid (H2Si2O5), barium salt (1:1),</td>
<td></td>
</tr>
<tr>
<td>Lead-doped</td>
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<tr>
<td>Acetic acid, lead salt, basic</td>
<td>51404-69-4</td>
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<td>Lead oxide sulfate</td>
<td>12036-76-9</td>
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<tr>
<td>[Phthalato(2-)]dioxotrilead</td>
<td>69011-06-9</td>
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<td>Dioxobis(stearato)trilead</td>
<td>12578-12-0</td>
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<tr>
<td>Fatty acids, C16-18, lead salts</td>
<td>91031-62-8</td>
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<tr>
<td>Lead cynamidate</td>
<td>20837-86-9</td>
</tr>
<tr>
<td>Lead dinitrate</td>
<td>10099-74-8</td>
</tr>
<tr>
<td>Pentalead tetraoxide sulphate</td>
<td>12065-90-6</td>
</tr>
<tr>
<td>Pyrochlore, antimony lead yellow</td>
<td>8012-00-8</td>
</tr>
<tr>
<td>Sulfurous acid, lead salt, dibasic</td>
<td>62229-08-7</td>
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<tr>
<td>Tetraethyllead</td>
<td>78-00-2</td>
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<tr>
<td>Tetralead trioxide sulphate</td>
<td>12202-17-4</td>
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<tr>
<td>Trilead dioxide phosphonate</td>
<td>12141-20-7</td>
</tr>
<tr>
<td>Lead di(acetate)</td>
<td>301-04-2</td>
</tr>
</tbody>
</table>
### Appendix 7: Test methods for fluorochemicals (PFC’s)

Laboratory: Norwegian Institute for Air Research (NILU)
FRAM Centre
9296 Tromsø / Norway

Sample preparation: Extraction with ethyl acetate for sulphonamides, sulfonamidoethanols and fluorotelomer alcohols. Extraction with methanol for carboxylates and sulfonates

Analytical method: Gas chromatograph coupled to mass spectrometer (GC-MS) for ethyl acetate extracts. Ultra High performance liquid chromatograph coupled to mass spectrometer (UPLC-MS/MS) for methanol extracts. Quantification was performed using an internal standard method. Use of blank extraction experiments and determination of recovery rates for all internal standards.

<table>
<thead>
<tr>
<th>Analytes Abbreviation</th>
<th>Full name</th>
<th>Detection method</th>
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</thead>
<tbody>
<tr>
<td>4:2 FTOH</td>
<td>4:2 Fluorotelomer alcohol</td>
<td>GC-MS</td>
</tr>
<tr>
<td>6:2 FTOH</td>
<td>6:2 Fluorotelomer alcohol</td>
<td>GC-MS</td>
</tr>
<tr>
<td>8:2 FTOH</td>
<td>8:2 Fluorotelomer alcohol</td>
<td>GC-MS</td>
</tr>
<tr>
<td>10:2 FTOH</td>
<td>10:2 Fluorotelomer alcohol</td>
<td>GC-MS</td>
</tr>
<tr>
<td>6:2 FTS</td>
<td>6:2 Fluorotelomer sulfonate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>8:2 FTS</td>
<td>8:2 Fluorotelomer sulfonate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFBS</td>
<td>Perfluorobutane sulfonate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFHxS</td>
<td>Perfluorohexane sulfonate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFOS</td>
<td>Perfluorooctane sulfonate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFDcS</td>
<td>Perfluorodecane sulfonate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFBA</td>
<td>Perfluorobutanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFFPA</td>
<td>Perfluoropentanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFHxA</td>
<td>Perfluorohexanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFHpA</td>
<td>Perfluorheptanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFOA</td>
<td>Perfluoroctanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFNA</td>
<td>Perfluorononanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFDcA</td>
<td>Perfluorodecanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFUnA</td>
<td>Perfluoroundecanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFDoA</td>
<td>Perfluorododecanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFTrA</td>
<td>Perfluorotridecanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFTeA</td>
<td>Perfluorotetradecanoate</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>PFOSA</td>
<td>Perfluoroctane sulfonamide</td>
<td>HPLC-MS</td>
</tr>
<tr>
<td>N-Me-FOSA</td>
<td>N-Methyl-heptadecafluoroctane sulfonamide</td>
<td>GC-MS</td>
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<td>N-Et-FOSA</td>
<td>N-Ethyl-heptadecafluoroctane sulfonamide</td>
<td>GC-MS</td>
</tr>
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<td>N-Me-FOSE</td>
<td>N-Methyl-heptadecafluoroctane sulfonamidoethanol</td>
<td>GC-MS</td>
</tr>
<tr>
<td>N-Et-FOSE</td>
<td>N-Ethyl-heptadecafluoroctane sulfonamidoethanol</td>
<td>GC-MS</td>
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</tbody>
</table>

Laboratory: Eurofins GfA Lab Service GmbH in Hamburg, Germany.
**Method:** GF016 PFC (22) ~ internal method, LC-MS/MS

<table>
<thead>
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<th>Detectables/Analytes</th>
<th>Abbreviation</th>
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<tr>
<td>Perfluorohexane sulfonate</td>
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<td>PFHpS</td>
</tr>
<tr>
<td>Perfluoroctane sulfonate</td>
<td>PFOS</td>
</tr>
<tr>
<td>Perfluorodecane sulfonate</td>
<td>PFDS</td>
</tr>
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<td>Perfluorobutane carboxylate</td>
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</tr>
<tr>
<td>Perfluoropentane carboxylate</td>
<td>PFPa</td>
</tr>
<tr>
<td>Perfluorohexane carboxylate</td>
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<td>Perfluoroheptane carboxylate</td>
<td>PFHpA</td>
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<td>PFOA</td>
</tr>
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<td>Perfluoroundecane carboxylate</td>
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<td>Perfluorododecane carboxylate</td>
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<td>Perfluorotridecane carboxylate</td>
<td>PFTrA</td>
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<td>Perfluorotetradecane carboxylate</td>
<td>PFTeA</td>
</tr>
<tr>
<td>Perfluoroctane sulfonamide</td>
<td>PFOSA</td>
</tr>
<tr>
<td>Perfluoro-3,7-dimethyloctane carboxylate</td>
<td>PF-3,7-DMOA</td>
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<td>7H-Dodecanefluoroheptane carboxylate</td>
<td>HPFHpA</td>
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<td>2H,2H-Perfluorodecane carboxylate</td>
<td>H2PFDA</td>
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<td>1H,1H,2H,2H-Perfluoroctane sulfonate</td>
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<tr>
<td>2H,2H,3H,3H-Perfluoroundecane carboxylate</td>
<td>H4PFUnA</td>
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</table>

**Method:** GF016 PFC (22) ~ internal method, LC-MS/MS

<table>
<thead>
<tr>
<th>Detectables/Analytes</th>
<th>Abbreviation</th>
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<tbody>
<tr>
<td>Perfluorohexane sulfonate</td>
<td>PFHxS</td>
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<td>Perfluoroheptane sulfonate</td>
<td>PFHpS</td>
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<td>Perfluoroctane sulfonate</td>
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<tr>
<td>Perfluorodecane sulfonate</td>
<td>PFDS</td>
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<td>PFTeA</td>
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<tr>
<td>Perfluoroctane sulfonamide</td>
<td>PFOSA</td>
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<tr>
<td>Perfluoro-3,7-dimethyloctane carboxylate</td>
<td>PF-3,7-DMOA</td>
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<tr>
<td>7H-Dodecanefluoroheptane carboxylate</td>
<td>HPFHpA</td>
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<tr>
<td>2H,2H-Perfluorodecane carboxylate</td>
<td>H2PFDA</td>
</tr>
<tr>
<td>1H,1H,2H,2H-Perfluoroctane sulfonate</td>
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<tr>
<td>2H,2H,3H,3H-Perfluoroundecane carboxylate</td>
<td>H4PFUnA</td>
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</tbody>
</table>
### 13.8 Appendix 8 – Overview Table on chemicals in various use applications (Excel)

Please refer to separate file Appendix 8
13.9 Appendix 9: Structure
13.10 Appendix 10: Recommendations and Instructions for our Business Partners

The first major step toward better access to chemicals data is to know and document the company name and geographic location of your chemical suppliers, i.e., the companies that should have access to the chemical data that must be passed up the supply chain from the chemical supplier himself via the original “Tier 4” partner, to users of chemicals in the manufacture of product, to brands and ultimately also to the retailers.

Retailers and brands should maintain an inventory or map of the companies from which they purchase the final product, in order to establish a source of chemical data related to that product. In the case of a retailer this is a brand. In the case of a brand this is likely a garment cut/sew/finish facility or other intermediary.

Suppliers to brands should maintain an inventory for chemical suppliers for all chemicals purchased.

The second major step is to obtain chemical data. When communicating, be clear in specifying the types of information needed, how that information should be provided, how the information will be used, and consequences of not providing that information. Fenix Outdoor has mapped its expectations in the Chemical Guideline/RSL and expects business partners to adhere to these principles therein.

For chemical products that you are purchasing from your suppliers, use a Material Safety Data Sheet (MSDS) or SDS as a starting point to get an initial view of chemical ingredient information. If the ingredients listed on the MSDS do not total 100%, ask your supplier to provide complete ingredient information. You can use the template suggested in this document.

1. When selecting a raw materials supplier/chemical/production process: ensure that it meets international standards. How can I know that those standards are met? Look for certifications (ISO 17095, ISO 14000, ISO 9000, bluesign).
2. When using a chemical: get a reconfirmation that the chemical does not contain any of the substances listed in the Chemical Guideline and that they did not play part in the production of the chemical. Should they have been part in any step of the production, get confirmation that the prescribed limits and thresholds are met.
3. Cross-test chemicals and YOUR product, delivered to the respective Fenix Outdoor entity for potential traces of chemicals, listed in the RSL. Select those chemicals you know (a) were/are part of a formulation or (b) were/are present in the product or (c) are used in any of your production places but for a different customer.
4. Ensure that cross-contamination and infection during your production cannot take place.
5. Clean your machines and production line regularly.
6. Do not mix formulations, fabrics or production lines for Fenix Outdoor with those for any other given customer present at the same location at the same time.
7. Develop operational manuals and work instructions accordingly.
8. When testing materials – send reports to the respective Fenix entity, irrespective of the results immediately.
9. Produce regular reports (at least once half a year) on water usage/wastewater treatment and present test results on the wastewater samples. Do not “cheat” by diluting the waste water or sludge – look for a viable solution to get better results by actually being better.
10. Continue to develop a partnership with Fenix Outdoor by using open dialogue and engagement. If there is a problem, we will find a solution for that – together. Speak to us. Frequently.
13.10.1  Sample, customizable letter to suppliers requesting chemical information

Name
Company
Address

Dear :

I am writing to request information on the following chemicals/materials/components/products that you are supplying to us/we are interested in purchasing from you:

Product 1
Product 2

This information is needed by Company (choose one or more of the following):

- to help us comply with regulations that restrict the use of certain chemicals in our products
- to help us comply with regulations that require disclosure of chemical content in our products
- to support our company’s program that restricts the use of certain chemicals in our products
- to evaluate environmental, health and safety characteristics of chemicals prior to selection for use in our products
- to ensure that all the chemical ingredients in our products meet our standards for safety
- to support our participation in a green certification program, called name of program
- to help us comply with a retailer customer’s requirements to disclose chemical ingredients in our products
- to support our company’s voluntary program to disclose chemical ingredients to our customers

Please fill out the form below, sign and return to us.

If you have questions, need additional guidance, or would like to set up a non-disclosure agreement (NDA) or other mechanism to protect trade secret information, please contact ______________________ at ____________________

Sincerely,
_______________________
13.10.2 Sample, Customizable Material Information Form

Material Information Form

Material Name (INCI format, if possible):
CAS No:
Trade Name:
Producing Company:
Location of Manufacture:

For each product supplied, we request the information indicated below. Please check each item that is being provided, attach documents requested and sign at the bottom.

___ Material Safety Data Sheet (MSDS)/Safety Data Sheet (SDS) - attach
___ Technical data sheet - attach
___ Certificate of analysis (COA) (if available) – attach
___ Chemical composition information – fill in information below

Please copy and complete the table for each product that we are requesting information on. Target weights should total to 100%

List all intentionally-added⁴ constituents in part 1 of the table below and impurities in part 2

<p>| Part 1. Intentionally-added constituents - if supplied material is the product of chemical synthesis, list feedstock materials and solvents |</p>
<table>
<thead>
<tr>
<th>Constituent name (INCI or equivalent)</th>
<th>CAS number⁵/EINECS or ELINCS⁶/EC No⁷/ C.I.⁸</th>
<th>Weight % (minimum/maximum/target)</th>
<th>Constituent Function in Product⁹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

⁴ Intentionally added means anything deliberately utilized in the formulation of a material, part or product where its use in the formulation or continued presence in the finished article is desired to provide a specific characteristic, appearance or quality or where it is added in manufacturing and where some or all remains in the final product (e.g., a catalyst or solvent carrier). Intentionally added substances and materials can be introduced at any point in the supply chain -- a sub-tier supplier may add a material or substance to a material or part that a tier 1 supplier sells to a customer.

If supplied material is the product of chemical synthesis, feedstock materials and solvents should be listed.

⁵ CAS (Chemical Abstract Service) registry number are unique numerical identifiers for chemical compounds, polymers, biological sequences, mixtures and alloys.

⁶ The EINECS number is a registry number given to each chemical substance commercially available in the EU between January 1, 1971 and September 18, 1981. The inventory was created by Directive 67/548/EEC. As of September 19, 1981, the inventory has been replaced by the ELINCS. All new substances brought in to the European market are allocated an ELINCS number after their notification to the European Commission.

⁷ EC-No, or European Commission number, is the seven-digit code that is assigned to chemical substances that are commercially available within the European Union.

⁸ Colorants (dyes and pigments) are listed according to Colour Index Generic Names and Colour Index Constitution Numbers.
*Constituent function can be: raw material/feedstock, preservative/anti-oxidant, solvent, catalyst, coating, finishing chemical, fragrance, UV filter, or other categories.

### Part 2. Impurities

List impurities regardless of amount, including residues, catalysts, reaction by-products, residual solvent carriers, unreacted raw materials (e.g., monomers).

<table>
<thead>
<tr>
<th>Constituent name</th>
<th>CAS number/EINECS or ELINCS/EC No/ C.I.</th>
<th>Maximum level in weight %, ppm or ppb</th>
<th>Comments (including explanation of why impurity is in the product)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

If composition is not completely listed, please indicate reason below

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

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### Human Safety information

If your company has conducted toxicological testing of chemicals/materials/components/products that you are supplying/that we are evaluating, please attach robust summaries of the tests performed.

*Please provide test summary information for chemical/material/component/product as supplied in the table below.*

<table>
<thead>
<tr>
<th>Test</th>
<th>Test Protocol</th>
<th>Date</th>
<th>Result</th>
<th>No information available&lt;sup&gt;9&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>carcinogenicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>mutagenicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>reproductive toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>developmental toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>endocrine disruption</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>acute toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>chronic toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>irritation potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>sensitization potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>other</td>
<td></td>
<td></td>
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<tr>
<td>other</td>
<td></td>
<td></td>
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<tr>
<td>other</td>
<td></td>
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</tbody>
</table>

**General Comments/Notes:**

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<sup>9</sup> List reason for lack of information.
Ecotoxicological information

If your company has conducted ecotoxicological testing of chemicals/materials/components/products that you are supplying/that we are evaluating, please attach robust summaries of the tests performed.

Please provide test summary information for chemicals/materials/components/products as supplied in the table below.

<table>
<thead>
<tr>
<th>Test</th>
<th>Test Protocol</th>
<th>Date</th>
<th>Result</th>
<th>No information available(^{10})</th>
</tr>
</thead>
<tbody>
<tr>
<td>fish toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>algae toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>daphnia toxicity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>biodegradability</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>bioaccumulation potential</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>organohalogen content</td>
<td>Yes, as follows:</td>
<td></td>
<td>No organohalogen content</td>
<td></td>
</tr>
<tr>
<td>metal content</td>
<td>Yes, as follows:</td>
<td></td>
<td>No metal content</td>
<td></td>
</tr>
<tr>
<td>other</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>other</td>
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<tr>
<td>other</td>
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</tr>
</tbody>
</table>

General Comments/Notes:

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Potential for human or environmental exposure to chemicals of concern

Please provide the following information related to potential for human or environmental exposure.

In what form is the product shipped? (e.g., powder, liquid, gas, etc.)

In what form is the product used by the factory (e.g., dust form, liquid emulsion form, …)

How should excess product be disposed of?

Are there any special wastewater treatment requirements for this material?

\(^{10}\) List reason for lack of information.
"As an authorized representative of the company, I verify that all responses provided above are correct, based upon our currently available data."

Name

Title

Location

Date

Signature
13.11 Recommended Test Matrix for Fenix Outdoor Int. entities (Excel)

Please refer to separate file Appendix 11