

Dirty Discount Supermarkets:

Dangerous Chemicals in Supermarket Clothing

Greenpeace tests clothes and shoes for children and young adults sold by supermarkets and leading retailers

1. Summary of the results

Greenpeace tested clothing and shoes for kids and young adults for harmful substances in the summer of 2014. The products were purchased in supermarkets in Germany, Austria and Switzerland. In total, 26 samples were examined in independent laboratories.

More than half of the samples contained harmful substances in concentrations above the reference values and precautionary levels used by Greenpeace for children's clothing.^a

The highest concentrations of harmful substances were found in the shoes. In all 11 of the children's shoes that were tested, most of which were plastic sandals or clogs, the laboratory tests revealed harmful substances such as dimethylformamide (DMF), polycyclic aromatic hydrocarbons (PAHs) or 2-phenyl-2-propanol (2PP). DMF can be toxic to reproduction and is classified as a substance of very high concern according to the REACH regulation. Some substances in the PAH group are considered carcinogenic. 2PP is a strong-smelling substance, and the Federal Institute for Risk Assessment (BfR) advises against its use because of its possible adverse health effects.¹ The DMF concentrations recorded in the tests were significantly higher than the recommendations of the Federal Environment Agency in the Blue Angel ecolabel for shoes² as well as the Committee on Hazardous Substances (AGS) of the Federal Institute for Occupational Safety and Health (BAuA), both of which stipulate a maximum level of 10 mg/kg.³ When these children's shoes are worn, there is always a possibility that DMF will be released from the shoe material.

Especially high concentrations of potentially harmful substances were measured in samples from Austria and Switzerland. At Hofer in Vienna, children's shoes (Hanbury sabots) were bought that were very heavily contaminated with DMF (270 mg/kg). Also purchased in Vienna were clogs from Penny and pool shoes (Simpex) from Interspar, each revealing a high 2PP content (580 mg/kg and 370 mg/kg). But also booties (Alive) purchased at Aldi Süd in Munich and a pair of shoes with a flashing light in the sole (Walkx Kids) bought at Aldi Nord in Hamburg revealed a high level of DMF contamination (190 mg/kg in each case). Children's sandals from Lidl in Hamburg (Lupilu) and Aldi Süd in Neunkirchen (Crane) also contained overly high concentrations of DMF.

Most of the clogs and plastic sandals that were examined have a very strong odour. This is often an indication that the shoes contain 2PP and/or PAHs such as naphthalene. In fact, excessively high concentrations of carcinogenic substances from the PAH group (polycyclic aromatic hydrocarbons) were found in strong-smelling Trevolution children's shoes bought at Migros in Zurich. Naphthalene, a strong-smelling substance from the PAH group that is also suspected of being carcinogenic, was detected in levels above the concentration of 0.2 mg/kg recommended by the BfR in rain boots from Tchibo (TCM) and booties from Aldi Süd (Alive). Shoes from Aldi Nord and Hofer in Austria also contained naphthalene. In the view of the BfR, PAHs can technically be avoided in the production of consumer products, and this means there should be no trace of them.⁴

^a These precautionary levels are explained in more detail in the following sections. Generally speaking, they are figures published by the Federal Institute for Risk Assessment (BfR) or the Federal Environment Agency (UBA) for the assessment of chemicals in clothes and shoes for children.

The evidence of PAHs, 2-phenyl-2-propanol and DMF in plastic shoes once again confirms the ongoing problem posed by these products for many years. Back in 2008, ÖKO-TEST⁵ identified high concentrations of harmful substances in similar products, and Westdeutscher Rundfunk confirmed this in 2014.⁶ The tests carried out by Greenpeace clearly show that a significant improvement has yet to be made in the production of plastic clogs and sandals. There is urgent need for action in this regard, especially in those cases where carcinogenic substances have been detected.

Greenpeace also tested rainwear and outdoor jackets. It had been stated that all three rain jackets and rain suits in the test contained no perfluorinated chemicals (PFCs). However, the results show that the thermal rain jacket purchased from Tchibo in Hamburg is not free of PFCs: it contains perfluorinated carboxylic acids, including perfluorooctanoic acid (PFOA), which is a substance of very high concern.

Further tests were carried out on T-shirts, a pyjama top, soft shell jackets and jeans. Some of these products contained other harmful chemicals, including nonylphenol ethoxylates (NPEs) and plasticisers in the phthalate group. NPEs were found in infant shirts from Penny in Vienna and Migros in Zurich as well as a set of pyjamas from Interspar in Vienna. The concentrations ranged from 22 to 38 mg/kg, indicating that this substance was used in production. In wastewater, NPEs create nonylphenols (NPs), persistent substances with hormonal effect. NPEs are especially toxic to aquatic organisms. Plasticisers (phthalates) are now so widespread that they are found in almost every analysis. Of the 21 samples examined, only four did not contain phthalates.

The results of various studies presented by Greenpeace as part of the Detox campaign⁷ show that hazardous chemicals continue to be used in the production of children's clothing and children's shoes across a wide range of brands, price segments and product categories – from cheap supermarket goods to expensive sports brands and even high-priced luxury articles.

The present test confirms the results of previous Greenpeace studies.⁷ Only in June 2014 did Greenpeace discover that children's shoes are often contaminated with DMF, as detailed in the report 'A Red Card for sportswear brands'.⁸ Published in January 2014, the report 'A Little Story About the Monsters In Your Closet'⁷ demonstrated that nonylphenol ethoxylates continue to be found in children's clothing, even in items from major fashion brands. In February, another Greenpeace report confirmed that toxic chemicals in children's clothing do not come down to price: clothes for youngsters from luxury brands⁷ also contain harmful substances.

However, textiles from supermarket chains are particularly prone to contamination by harmful substances. This is because low-cost promotional items are brought to market in particularly large quantities and in rapid succession, which makes clean production difficult. Furthermore, the cheap price offers little scope for fair, environmentally friendly production.

2. What was tested and how?

What was tested

In total, Greenpeace arranged for 26 samples (shoes and clothes for children and young adults) to be tested, all of which were bought from supermarkets in Germany, Austria and Switzerland between 26 May and 3 September 2014. There were 17 samples from Germany, 6 from Austria and 3 from Switzerland (see table in the appendix).

Specifically, the samples were as follows: 11 pairs of plastic sandals, clogs or slippers with a rubber sole, four pairs of rain boots, two soft shell jackets, one pair of jeans, four items of rainwear (jackets, rain suits or rain trousers), four baby T-shirts and one pyjama top.

Details of the country of production were only available for 11 of the 26 products. These were China (5), Bangladesh (3), Vietnam (1) India (1) and Italy (1).

Testing dates and locations

Between August and September 2014, two independent laboratories were commissioned by Greenpeace to test children's shoes and children's clothing from supermarkets. Greenpeace had the test results checked in a second laboratory if samples were classified as having a noticeable level of harmful substances according to the organisation's own set of defining criteria.

Which substances were tested?

Even though they are harmful for humans as well as the environment, many chemical substances are still used in the textile industry and in the production of shoes, rainwear and sports equipment, even if the products concerned are specifically made for children.

The Bremen Environmental Institute, one of the laboratories commissioned by Greenpeace, selected the substances to be analysed depending on the material properties of the samples based on the following list of parameters:

Acetophenone, 2-phenyl-2-propanol (2PP), N,N-dimethylformamide (DMF), nonylphenol ethoxylates (NPEs), plasticisers (phthalates), polycyclic aromatic hydrocarbons (PAHs) and perfluorinated chemicals (PFCs).

Table 1 presents a summary of the test results, arranged by company and chemicals.

The table in the appendix summarises all the test results.

For a description of the analytical methods used and supplementary tables showing the results for individual substances from the PAH, phthalate and PFC groups, please refer to the technical supplement to the report (in German) 'Gefährliche Chemikalien in Kinderkleidung aus Supermärkten' at www.greenpeace.de/detox.

Dimethylformamide (DMF) is used as a solvent in the production of synthetic leather, leather and textiles.

2-phenyl-2-propanol (2PP) and acetophenone are frequently created in an uncontrolled manner as an undesired by-product in the production of plastic footwear such as clogs.

Polycyclic aromatic hydrocarbons (PAHs) are contained in tar oils, some of which are used as plasticisers in the production of plastic and rubber.

Nonylphenol ethoxylates (NPEs) are widely used as a surfactant and detergent in wet processes in the textile industry or as a stabiliser and emulsifier in the production of plastic.

Plasticisers in the phthalate group are widely used as additives for plastic products, such as in the plastic prints of T-shirts and pyjamas.

Per- and polyfluorinated chemicals are used to add a water-repellent finish to items of rainwear.

Although there are more environmentally friendly alternatives for many of these applications, companies continue to use these chemicals.

The present test is a continuation of previous Greenpeace tests that have focused on what were dubbed the eleven Detox chemicals. It includes additional harmful chemicals that are apparently used in shoe production, such as DMF, PAHs, acetophenone and 2PP.

The greatest damage to the environment and human health exists in the countries of production, most of which are in Asia, where chemicals are released into the surface water.

Table: Summary of results, sorted by company and harmful substance

| Supermarket | Number of questionable samples | | | | | | |
|--------------------|---|---|---|--|--|---|---|
| | Acetophenone | 2PP (2-phenyl-2-propanal) | DMF (N,N-dimethyl-formamide) | PAHs (polycyclic aromatic hydrocarbons) | Phthalates (plasticisers) | NPEs (nonylphenol ethoxylates) | PFCs (perfluorinated chemicals) |
| Aldi Nord | 0 of 3  | 0 of 3  | 1 of 3  | 3 of 3  | 0 of 3  1 of 1  | 1 of 1  | 1 of 1  |
| Aldi Süd | 0 of 3  | 1 of 3  | 2 of 3  | 3 of 3  | 0 of 3  0 of 1  | not tested | not tested |
| Lidl | 0 of 3  | 3 of 3  | 1 of 3  | 3 of 3  | 0 of 3  0 of 1  | not tested | not tested |
| Penny Germany | 0 of 1  | 0 of 1  | 0 of 1  | 0 of 1  1 of 1  | 0 of 1  0 of 1  | not tested | 0 of 1  |
| Tchibo | 0 of 1  | 0 of 1  | 0 of 1  | 1 of 1  | 0 of 1  0 of 1  | not tested | 1 of 1  |
| Interspar Austria | 1 of 1  | 1 of 1  | not tested | 1 of 1  | 0 of 1  | 1 of 1  | not tested |
| Penny Austria | 1 of 1  | 1 of 1  | not tested | not tested | not tested | 1 of 1  | not tested |
| Hofer Austria | 1 of 1  | 1 of 1  | 1 of 1  | 1 of 1  | 0 of 1  0 of 1  | not tested | not tested |
| Migros Switzerland | not tested | not tested | 0 of 1  | 1 of 1  | 1 of 2  | 1 of 1  | not tested |

Relevant limit or reference values: DMF = 10 mg/kg, 2PP = 10 mg/kg, acetophenone = 20 mg/kg, phthalates = 100 mg/kg, NPEs: average limit, all evidence is listed, PAHs = 0.2 mg/kg in total, PFCs: see NPEs.

3. The results in detail

3.1. Test results for shoes, clogs and rain boots

3.1.1. Dimethylformamide (DMF)

The 13 samples tested for DMF were clogs, plastic summer sandals and rain boots.

- Five samples contained a concentration of DMF significantly above 10 mg/kg – the upper limit established by the German Committee on Hazardous Substances and the Environment Agency in the Blue Angel ecolabel for shoes and gloves.
- The highest concentration of DMF among all samples (270 mg/kg) was found in shoes sold by Hofer in Austria. Next came shoes with a flashing sole from Aldi Nord (190 mg/kg) and boots from Aldi Süd (also 190 mg/kg). Of the three shoes sold by Lidl in the test, one sample contained a level of DMF above 50 mg/kg.
- The tested boots from Penny and Tchibo did not contain DMF.

DMF is toxic to reproduction, and it has the characteristics of substances of very high concern. As a result, it has been listed as a candidate for control under the REACH regulation. DMF should not be used in the production of children's shoes, and neither should it be present in the final product.

Greenpeace included DMF in its Detox tests for the first time in the summer of 2014. A report entitled 'A Red Card for sportswear brands'⁸ revealed that DMF can frequently be detected in sports shoes for children.

Box 1: N,N-dimethylformamide – DMF

Dimethylformamide (DMF) is used as a solvent in the production of polyurethane-coated materials such as synthetic leather, rainwear, protective clothing and footwear. It also serves as a solvent in the production of synthetic fibres.⁹ DMF is classified as dangerous to reproduction (it can harm the unborn child), acutely toxic and harmful to health when it makes contact with the skin.¹⁰ The German Committee on Hazardous Substances (AGS) designates DMF as a substance 'for which it must be assumed from experience that there is a health-impairing effect due to intake through the skin'.¹¹ It can also act as a carrier of other toxic substances. This means that toxic substances may penetrate the skin in combination with DMF although they are not otherwise absorbed on their own, or this happens only with difficulty.¹²

Furthermore, it has been observed that even a short exposure to DMF can lead to liver damage in animals and humans. There are also claims that long-term professional exposure to DMF through inhalation has a negative effect on the liver and causes digestive disorders.¹³ DMF is one of the most commonly found chemicals in wastewater from the production of polyurethane products and acrylic fibres.¹⁴

In the EU, DMF is on the candidate list of substances of very high concern according to the REACH regulation because of its classification as dangerous to reproduction.^{15,16} In February 2014, the European Chemicals Agency (ECHA) recommended that DMF be included in the Authorisation List because it is used in large quantities and for many possible applications that may represent a risk to human health. Once it has been added to this list, companies have a limited time to apply for authorisation. If such an application is made, a public consultation is held at the same time to discuss alternative or substitute substances.

DMF has been added to several other regulatory lists, including PRIO (a web-based tool) by the Swedish Chemicals Agency,¹⁷ the List of Undesirable Substances by the Danish Environmental Protection Agency¹⁸ and the Extremely Hazardous Substances List by the US Environmental Protection Agency.^{19,20}

Reference values for the assessment of dimethylformamide (DMF):

The German Committee on Hazardous Substances has defined a limit of 10 mg/kg for DMF in protective gloves.^{21,22} The same limit has been determined by the Blue Angel ecolabel for the use of DMF in footwear and protective gloves.

The Bluesign label permits a DMF content of up to 50 mg/kg for solvent coatings (other auxiliaries may have a maximum DMF content of 5 mg/kg).²³

3.1.2. 2-phenyl-2-propanol (2PP) and acetophenone

There was a noticeably high incidence of **acetophenone and 2-phenyl-2-propanol (2PP)** in the tests. Both of these very strong-smelling substances are often detected in children's shoes, especially plastic products such as clogs and summer sandals. In seven out of 14 pairs of children's shoes, the concentration was above 10 mg/kg, the reference value for 2PP.

The 14 samples tested for 2PP and acetophenone were clogs, plastic summer sandals and rain boots.

- Seven samples contained a concentration of 2PP significantly above 10 mg/kg, the reference value for textiles according to the Bluesign standard. Two other samples exceeded the reference value of 1 mg/kg for baby products as defined by the Bluesign standard.
- Especially high concentrations of 2PP or acetophenone were found in clogs from Penny in Austria and in slip-on shoes sold by Interspar in Austria.
- Furthermore, all three samples from Lidl (clogs and summer sandals) contained a high concentration of 2PP, as did a pair of summer sandals from Aldi Süd.
- In the clogs and sandals sold by Aldi Nord, Penny in Germany and Tchibo, 2PP and acetophenone were not detected or the concentrations were below the reference values of 10 mg/kg (2PP) and 20 mg/kg (acetophenone).

Back in 2008, the Federal Institute for Risk Assessment (BfR) advised against the purchase of plastic children's shoes that have a strong odour.²⁴ According to this recommendation, at least half of the children's shoes tested should never have gone on sale. The BfR stresses the point that the detection of substances such as acetophenone and 2PP speaks against good manufacturing practice.

Box 2: 2-phenyl-2-propanol (2PP) and acetophenone

There is evidence that 2PP can cause allergies in humans. It is irritating to the skin and eyes and it has a strong odour.

Acetophenone is considered to be harmful to health and irritating to the eyes, and it has a very strong odour.

Reference values for the assessment of 2PP:

1 mg/kg – the limit permitted by the Bluesign standard for baby textiles (up to 36 months).

10 mg/kg – the limit permitted by the Bluesign standard for other textiles with and without skin contact.

Reference values for the assessment of acetophenone:

20 mg/kg – the limit permitted by the Bluesign standard for textiles with and without skin contact.

3.1.3. Polycyclic aromatic hydrocarbons (PAHs)

PAHs are a group of chemicals, some of which are carcinogenic and/or have a strong odour. They include benzo(a)pyrene (a component of tar oils) and naphthalene, which was once used in mothballs and gives off a distinctive tar-like odour.

In total, 15 samples were tested for PAHs and only one of these contained no trace of the substances.

- An especially high level of contamination by carcinogenic PAHs was found in the sole of a children's shoe sold by Migros in Zurich. The precautionary level of 0.2 mg/kg was exceeded for a long list of carcinogenic PAHs.
- From December 2015, a limit of 1 mg/kg will apply in the EU for carcinogenic PAHs in products with skin contact. The Migros shoe exceeded even this limit for 10 substances. The total concentration of PAHs was 116 mg/kg.
- The highest concentration of naphthalene was found in Tchibo boots, which contained 2.2 mg/kg in the sole. Evidence of carcinogenic PAHs was also found in this product, including benzo(a)pyrene.
- A pair of booties from Aldi Süd, shoes with a flashing sole from Aldi Nord and another pair of shoes from Hofer contained naphthalene at a concentration of more than 0.2 mg/kg.

According to an expert report by the BfR, the use of PAHs can be avoided,²⁵ and they should not be present in clothes or shoes for children. The BfR has established particularly stringent standards for toys aimed at toddlers aged up to three years. The total level of PAHs should not exceed 0.2 mg/kg (detection limit).

Box 3: Polycyclic aromatic hydrocarbons (PAHs)

On 27 December 2015, PAH limits for products with skin contact will be introduced for the first time. From this date, any products made of plastic or rubber with possible skin contact that have a concentration of carcinogenic PAHs above 1 mg/kg will no longer be put on the market. For toys and other products aimed at children and infants, a limit of 0.5 mg/kg will apply.²⁶ (Article 2 of Commission Regulation (EU) No 1272/2013 amending Annex XVII to Regulation (EC) No 1907/2006).

Toys for children under 36 months that are intended to come into contact with the skin and materials that can be placed in the mouth may not contain a concentration of benzo(a)pyrene in excess of 0.2 mg/kg. The overall limit for the 16 PAHs according to the EPA is also 0.2 mg/kg. In an expert report published by the Federal Institute for Risk Assessment (BfR) in July 2010, a proposal was made for an EU-wide restriction on the use and marketing of PAH-contaminated products.

This recommendation stipulated a maximum content of 0.2 mg/kg for each carcinogenic PAH. The report was based on the analysis of more than 5,000 consumer products, ranging from electrical appliances to toys and materials for direct skin contact.

Reference values for the assessment of PAHs:

0.2 mg/kg – both the overall limit and the limit for individual substances proposed by the BfR for carcinogenic PAHs such as benzo(a)pyrene in toys for children under three years.

10 mg/kg – the overall limit for textiles according to the Bluesign standard; 0.2 mg/kg for benzo(a)pyrene, 1 mg/kg for other carcinogenic PAHs (benzo(e)pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(j)fluoranthene, benzo(k)fluoranthene, dibenzo(a,h)anthracene and acenaphthene).

3.2. Test results for T-shirts, pyjamas and rainwear

3.2.1. Per- and polyfluorinated chemicals (PFCs)

Three samples were tested for **ionic PFCs**. The items concerned were outdoor clothing for children: splash rain trousers from Penny, a children's rain suit from Aldi Nord and a thermal rain jacket from Tchibo. All three products were declared PFC-free.

- However, the rain jacket from Tchibo contained PFC. Due to the concentrations detected, it is not possible to determine the source of the PFC without doubt – this is an issue Tchibo must discuss with its suppliers.
- The concentration of **PFOA** was below the EU limit value for PFOS^b in textiles (1 µg/m²), which was used as a reference value.
- A short-chain compound (PFBA) was found in the Tchibo rain jacket at a concentration of 1.6 µg/m². Short-chain PFCs are frequently used in the textile industry as an 'alternative' to PFOA and PFOS, both of which are now largely banned from production. However, short-chain PFCs are also persistent and do not degrade in the environment, or they do so very slowly.
- An initial examination even revealed evidence of perfluorooctanesulphonic acid (PFOS), a dangerous substance that has been strictly controlled for several years because of its toxic properties. The follow-up test was unable to confirm these findings.
- Residues of PFCs were also detected in the children's rain suit from Aldi Nord, but the concentration of PFOA and PFOS was below 1 µg/m² in each case.
- The third sample in the test, the children's splash rain trousers from Penny, was also declared PFC-free. Indeed, no PFCs were found in the sample.

The concentration of ionic PFCs can vary greatly, as discovered by Greenpeace East Asia in a recent study:²⁷ This variation may possibly occur not only between different products, but also between different parts of the same product.²⁸

Box 4: Per- and polyfluorinated chemicals (PFCs)²⁹

Per- and polyfluorinated chemicals (PFCs) are used in many industrial processes and consumer goods, including the production of textiles and leather, for instance, because of their dirt- and water-repellent properties. A well-known example is the polymer PTFE, which is marketed as a non-stick coating for pans under the trademark Teflon, but it is not used for textiles.

Many PFCs, especially ionic PFCs such as PFOS and PFOA, are extremely persistent and hardly degrade at all when released into the environment, which is why they can be detected even in remote regions of the world. Due to their bioaccumulative properties, ionic PFCs have been detected in a variety of land and water organisms and in the blood and breast milk of humans around the world. Studies have shown that PFCs such as PFOS and PFOA can disrupt the hormonal system during the development phase and in adulthood, having a negative effect on the reproductive organs and the immune system. Furthermore, they have been identified as potentially carcinogenic in animal research.

Volatile PFCs such as fluorotelomer alcohols (FTOHs) are still widely used as precursor materials in a variety of production processes. FTOHs can be converted to form ionic PFCs (e.g. PFOA) in the body or in the

^b Since 2008, it has been forbidden to market products with a PFOS concentration of 1 µg/m² or more, and such products may not be used for certain purposes. This limit applies to PFOS only, but it has been used as a reference value for the use of PFOA as well because PFOA has similar hazardous properties to PFOS. Norway introduced a ban on the production of textiles with a PFOA concentration above 1 µg/m² in June 2014, and a ban on the sale of such products is scheduled for 2018.

atmosphere, and they also have harmful effects in their original state.

Perfluorooctane sulphonate (PFOS) was classified as a persistent organic pollutant (POP) under the Stockholm Convention. The Stockholm Convention is an international agreement concerning measures to prohibit and restrict the production and use of PFOS that is binding under international law.³⁰ The sale and use of PFOS has been banned in the EU since 2008 for certain purposes. For textiles, a limit of 1 µg/m² has been defined for PFOS.³¹ For other PFCs, however, there are no limits at present, although there are justified concerns about their hazardous properties and they can usually be found in textiles in much higher concentrations.

Norway is the first country where the sale of textiles with a PFOA content of more than 1 µg/m² is prohibited, with effect of June 2014. In addition, certain PFCs were recently put on a list of priority chemicals, which means that their release into the environment must be stopped or significantly reduced by 2020.³² Norway and all other countries are to enforce the abolition of PFOA (and the PFC group in general) after ensuring much lower levels and are using the best modern test technology to do so. Furthermore, PFOA and four other long-chain PFCs have been classified as substances of very high concern (SVHCs) within the EU under the REACH regulation.³³

3.2.2. Nonylphenol ethoxylates (NPEs)

NPEs are still used widely in the textile manufacturing industry. With NPEs, the amount of substance residue in the textile is affected by various processes, including frequent rinsing and washing, which cause NPEs to enter wastewater. At a later stage, the residual NPEs in the textile are released into the environment during domestic laundry cycles.³⁴

- Four products were tested for NPEs, and residues were found in three samples at concentrations ranging from 22 to 38 mg/kg. The detection limit was 3 mg/kg.
- The baby pyjamas purchased at Interspar in Vienna contained a level of 38 mg/kg, while the infant shirts from Penny in Vienna contained 22 mg/kg.
- The Smile baby T-shirt purchased at Migros in Zurich contained NPEs at a concentration of 23 mg/kg.
- Only in the Pocopiano jeans from Aldi Nord were no NPEs found.

Box 5: Nonylphenol ethoxylates (NPEs) and nonylphenols (NPs)³⁵

Nonylphenol ethoxylates (NPEs) are a group of synthetically produced chemicals that are very often used as surfactants in textile production or as plasticisers and emulsifiers in plastics. In the environment, NPEs degrade to form nonylphenols (NPs); these are toxic, persistent, bioaccumulative and can disrupt the hormonal system. There is evidence that NPs accumulate in the tissues of many creatures. The detection of NPEs in end products shows that these substances were used in the manufacturing process. This probably means that NPEs and NPs are discharged into the wastewater from factories. Moreover, NPE residues in the final products are rinsed out when washed, at which point they enter the public sewage systems of those countries where the products are sold.

Since 2005, certain limits have applied in the EU for the industrial use of NPEs;³⁶ similar restrictions also apply in the United States and Canada.³⁷ Although there is currently no law in the EU that restricts the sale of textiles containing NPE residues, appropriate measures are being developed following a proposal by KEMI, the Swedish Chemicals Agency.³⁸ At the same time, NPs and NPEs are on the list of priority

substances recently published the Chinese Ministry of Environmental Protection. This means that factories that produce or use these chemicals must be registered with the local environmental authorities and disclose the relevant data, making it publicly accessible.³⁹ Furthermore, NPs and NPEs are also listed as hazardous chemicals in China, and they have been addressed in the Twelfth Five-Year Plan for the Prevention and Control of Chemical Risks to the Environment.

Reference values for the assessment of nonylphenol ethoxylates:

10 mg/kg – minimum concentration for which the source should be sought under the Bluesign standard.⁴⁰

20 mg/kg – maximum concentration for which the textiles produced are still permitted according to the GOTS.⁴¹

3.2.3 Phthalates (plasticisers)

Phthalates are ubiquitous, or in other words they can be found everywhere due to the high quantities that are used in global industry. In contrast, the use of certain phthalates, including DEHP, is banned for all toys and other children's products in the EU. Here a limit of 0.1% applies, or 1,000 mg/kg. Natural textile associations allow a maximum of 100 mg/kg. In all the products tested, phthalates were detected at a concentration well below 0.1%. Any contamination of these products is not necessarily due to the deliberate use of phthalates in production; it can also result from the packaging material, among other things. It is therefore important to systematically identify and eliminate sources of phthalates in the production chain.

- Of the 21 samples examined, only four did not contain evidence of phthalates.
- In the remaining samples, the content of plasticisers on the REACH candidate list of SVHCs varied between 2 and 57 mg/kg.
- The Impidimpi indoor slippers sold by Aldi Süd were found to contain 57 mg/kg of the plasticiser substance DIBP.
- In the Impidimpi baby body suit sold by Hofer in Vienna, the plasticiser DBP was present at a concentration of 36 mg/kg.
- The Walkx Kids children's shoes with flashing sole sold by Aldi Nord were shown to contain the plasticiser DEHP at a concentration of 24 mg/kg and DIBP at 25 mg/kg.
- The Simpex children's pool shoes from Interspar in Vienna had a DBP content of 29 mg/kg and a DEHP content of 21 mg/kg.
- The Lupilu children's sandals from Lidl were found to contain DEHP at a concentration of 30 mg/kg.

The test revealed phthalates that are not included in the EU regulation for two samples:

- The Pocopiano children's rain suit from Aldi Nord had an overall content of 512 mg/kg. The individual substances measures were DEHP at a concentration of 430 mg/kg and DEP at a concentration of 75 mg/kg.
- In the print of the Smile baby T-Shirt sold by Migros in Zurich, total phthalates were measured at a concentration of 27 mg/kg as well as an unspecified substance from the phthalate group with an estimated concentration of about 170 mg/kg.

Box 6: Phthalates⁴²

Phthalates are mainly used as plasticisers in plastics such as soft PVCs. Since phthalates do not create a chemical bond to the plastic, they enter the environment when the product is used and after its disposal. Phthalates are often found in indoor environments, for instance in air and in dust. They are also commonly found in human tissue, and the reported quantities ingested in children are significantly higher than in adults. There is a reasonable suspicion that phthalates are toxic to animals and humans and that they disrupt the hormonal system. For example, it is known that DEHP, one of the most commonly used phthalates, has an adverse effect on reproduction in mammals, can compromise the development of the testes in early childhood⁴³ and may even have a negative effect on female fertility.⁴⁴

There is currently no law in Germany that restricts the sale of clothing containing plasticisers.⁴⁵ In contrast, six phthalates have been banned across Europe in children's toys and baby products.

The definition of 'baby products' in these laws does not include items of clothing.⁴⁶ In China, however, draft legislation has been introduced that will prohibit the presence of six phthalates (including DEHP and DINP) in concentrations of more than 0.1% in mass (1,000 mg/kg) in clothing for babies and young children (under three years).⁴⁷ Another exception is South Korea, where a ban on six phthalates in children's toys and baby products also applies to clothing for children under two years.⁴⁸

Within the EU, certain phthalates (DEHP, DBP, DIBP and BBP) have been added to the REACH regulation and are included on the list of substances of very high concern.⁴⁹

Reference values for the assessment of phthalates:

1,000 mg/kg – maximum concentration allowed under EU law for baby products and toys
100 mg/kg – maximum concentration allowed for textiles produced according to the GOTS guidelines⁵⁰ and maximum concentration allowed according to the Bluesign standard⁵¹ for textiles aimed at young children or textiles with skin contact.

4. Components of an effective detox plan

In order to contain the risk of these chemicals for people and the environment, Greenpeace calls on all the investigated companies to commit themselves to an effective and credible plan of action. The aims are to reduce the level of toxic chemicals released into the environment, bringing this to zero by 2020, and to establish obligations and action based on the following three points:

- Basic principles
- Transparency
- Elimination

The only reasonable approach is based on risk and is comprehensive in nature. At the same time, any commitment to detox by a company must include and precisely define the following principles: the precautionary principle,⁵² zero-discharge of toxic chemicals, corporate responsibility⁵³ and the public right to information⁵⁴ concerning the use and release of hazardous chemicals in the supply chain and in end products. A commitment to these principles creates the necessary framework to gradually reduce the use of toxic chemicals to zero.

To effectively eliminate the use of toxic chemicals in the textile industry and to solve the problem of the pollution of our waterways by toxic chemicals, companies must adhere to the following steps:

- A credible commitment to gradually eliminate the use of all toxic chemicals in the global supply chain and in all products by 1 January 2020.
- In the months following an agreement and then at regular and relevant intervals (at least annually), to publish information about the discharge of toxic chemicals by the factories of suppliers, especially at the local and national level (e.g. by using credible information platforms⁵⁵).
- The obligation to eliminate the 11 priority chemical groups⁵⁶ within an appropriate time frame and to define clear, credible interim targets for the elimination of hazardous chemicals other substance groups. Finally, the introduction of non-hazardous chemicals at the earliest possible time, which should be stated. Responsible businesses are already beginning to take action now and are not waiting until 31 December 2019 to reduce their use of hazardous chemicals to zero!

Greenpeace demands

- An end to the pollution of rivers and other waterways by the textile industry all over the world.
- The replacement of hazardous chemicals with harmless substances in textile and shoe production.
- Countries of production such as China, the powerhouse of the global fashion industry, must establish and enforce more stringent environmental laws in textile production.
- No double standards: textile brands must ensure that EU standards are met as a minimum requirement in the production of their clothing.

More about this topic can be found online at www.greenpeace.de/detox.

Greenpeace is an international organisation with no party affiliation and complete independence from the political system, political parties and industry. Greenpeace fights for the protection of natural resources with non-violent action. More than half a million people in Germany donate to Greenpeace, helping to ensure our daily work to protect the environment.

Appendix 1: Summary of test results

Table: Summary of the test results for acetophenone, 2-phenyl-2-propanol, dimethylformamide (DMF), polycyclic aromatic hydrocarbons (PAHs), phthalates, nonylphenol ethoxylates (NPEs), perfluorinated chemicals (PFCs) and optical brighteners in children's clothing and children's shoes bought from supermarkets

| No. | Supermarket | Product | Country of production | Size (age) | Material | Colour | Acetophenone | 2-phenyl-2-propanol | Dimethylformamide | Polycyclic aromatic hydrocarbons | ∑ Phthalates | Nonylphenol ethoxylates NPEs | Perfluorinated chemicals |
|-----|----------------------|---|-----------------------|-----------------|--|-------------------------------------|----------------------------------|----------------------------------|---|---|--|------------------------------|---|
| | | | | | | | in mg/kg | 2PP in mg/kg | DMF in mg/kg | ∑ PAHs in mg/kg | in mg/kg | in mg/kg | in µg/m ² |
| 1 | Aldi Nord Hamburg | Walkx Kids children's shoes with flashing sole | | girl: 29 | upper material: synthetic and textile fibres, inner material: 'textile', outer sole: TPR | purple and white | 9 | 8 | 190; test in second laboratory: upper material 300, inner material 75 | 2.4 (naphthalene 0.55, pyrene 1.1, phenanthrene 0.26) | Sole: 53, test in second laboratory: < 50, upper material: 6 | not tested | not tested |
| 2 | Aldi Nord Hamburg | Walkx Kids indoor slippers for small children | | unisex: 23 | outer material and inner lining: synthetic felt, outer sole: TPR | turquoise | sole: ND | sole: ND | sole: ND | sole: 0.48 (naphthalene 0.06, phenanthrene 0.27) | sole: 6 | not tested | not tested |
| 3 | Aldi Nord Hamburg | Pocopiano children's five-pocket jeans | | boy: 128 | 100% cotton | blue (denim) | not tested | not tested | not tested | not tested | not tested | < 5 | not tested |
| 4 | Aldi Nord Hamburg | Pocopiano children's rain suit | | girl: 140 | 100% polyester | turquoise and pink, trousers: black | not tested | not tested | not tested | not tested | 512 | not tested | 1.852 (PFOA 0.87, PFDA 0.60), second test: 1.098 (PFOA < 0.1, PFDA < 0.1, PFOS 1.0) |
| 5 | Aldi Nord Hamburg | Pocopiano children's rain boots | | boy: 31/32 | | black and green | ND | ND | ND | 1.8 (naphthalene 0.08, fluoranthene 0.62, phenanthrene 0.54, pyrene 0.45) | ND | not tested | not tested |
| 6 | Aldi Süd Neunkirchen | Crane summer sandals | | children: 26 | Phylon with EVA straps | blue | 8 test in second laboratory: < 5 | 21 test in second laboratory: 14 | 57 test in second laboratory: 160 | 0.53 (naphthalene 0.11) | 11 | not tested | not tested |
| 7 | Aldi Süd Munich | Crane Kids children's soft shell outdoor jacket | | unisex: 135/140 | 100% polyester | black and green | not tested | not tested | not tested | not tested | ND | not tested | not tested |
| 8 | Aldi Süd Munich | Impidimpi indoor slippers for small children | | unisex: 26 | upper material and inner lining: synthetic felt, insole: EVA, | grey | sole: ND | sole: ND | sole: ND | sole: 1.2 (naphthalene 0.15, fluoranthene 0.36, | upper material: ND, sole: 57 | not tested | not tested |

| No. | Supermarket | Product | Country of production | Size (age) | material | Colour | Acetophenone in mg/kg | 2-phenyl-2-propanol 2PP in mg/kg | Dimethylformamide DMF in mg/kg | Polycyclic aromatic hydrocarbons ∑ PAHs in mg/kg | ∑ Phthalates in mg/kg | Nonylphenol ethoxylates NPEs in mg/kg | Perfluorinated chemicals PFCs in µg/m ² |
|--|---------------------|---|-----------------------|-----------------------------|---|-------------------------------|----------------------------------|--|---|---|--------------------------|---|--|
| | | | | | | | | | | pyrene 0.56) | | | |
| Table (continued): Summary of the test results for acetophenone, 2-phenyl-2-propanol, dimethylformamide (DMF), polycyclic aromatic hydrocarbons (PAHs), phthalates, nonylphenol ethoxylates (NPEs), perfluorinated chemicals (PFCs) and optical brighteners in children's clothing and children's shoes bought from supermarkets | | | | | | | | | | | | | |
| 9 | Aldi Süd – Munich | Alive children's booties | | unisex: 33 | upper material: synthetic PU material and textile, lining: textile, insole: PU, outer sole: TPR | black | outer sole 4, upper material: 5 | outer sole: 2, upper material: 5 | outer sole: 96 – second test: 180, upper material: 194 test in second laboratory: 200 | outer sole: 4.9 (naphthalene 0.7, phenanthrene 1.4, pyrene 0.66, benzo(a)anthracene 0.67), second test: 2.5 (naphthalene 0.8) | sole: 22 | not tested | not tested |
| 10 | Lidl – Hamburg | Lupilu children's sandals | | girl: 24 | no details | pink and brown | upper material: 9, sole: 3 | upper material: 13, sole: 3 | upper material: 68, sole: 22 | sole: 0.42 (naphthalene 0.14) | 44 | not tested | not tested |
| 11 | Lidl – Hamburg | Lupilu children's clogs | | unisex: 28/29 | Phylon | dark blue | 12 | 20 | ND | 0.3 (naphthalene ND) | 6.1 | not tested | not tested |
| 12 | Lidl – Hamburg | Pepperts children's clogs | | unisex: 30/31 | Phylon | dark green | 7 test in second laboratory: < 5 | 33 test in second laboratory: 27 | ND | 0.31 (naphthalene 0.08) | 2 | not tested | not tested |
| 13 | Lidl – Hamburg | Crivit Outdoor children's soft shell jacket | China | girl: 110/116 (age: 4 to 6) | 100% polyester | pink with multicoloured print | not tested | not tested | not tested | not tested | ND | not tested | not tested |
| 14 | Penny – Norderstedt | Tom Tino children's splash rain trousers | China | unisex: 86/92 | outer fabric: 100% polyester, polyurethane coating; lining: 100% polyester (fleece) | dark blue | not tested | not tested | not tested | 0.81 (naphthalene 0.12, phenanthrene 0.32) | 17 | not tested | < detection limit |
| 15 | Penny – Norderstedt | Tom Tino children's rain boots | Italy | boy: 28/29 | | dark blue and blue | ND | ND | ND | ND | ND | not tested | not tested |
| 16 | Tchibo – Hamburg | TCM rain boots | | girl: 28/29 | 100% polyester | green, pink and white | ND | 1 | ND | 7.5 (naphthalene 2.2, phenanthrene 1.4, fluoranthene 1.3, pyrene 0.7, chrysene 0.4, benzo(a)anthracene 0.43, benzo(a)pyrene 0.7) second test: | 5 | not tested | not tested |

| | | | | | | | | | | | | | |
|--|--|--|--|--|--|--|--|--|--|--------------------|--|--|--|
| | | | | | | | | | | naphthalene 1.2 | | | |
|--|--|--|--|--|--|--|--|--|--|--------------------|--|--|--|

Table (continued): Summary of the test results for acetophenone, 2-phenyl-2-propanol, dimethylformamide (DMF), polycyclic aromatic hydrocarbons (PAHs), phthalates, nonylphenol ethoxylates (NPEs), perfluorinated chemicals (PFCs) and optical brighteners in children's clothing and children's shoes bought from supermarkets

| No. | Supermarket | Product | Country of production | Size (age) | material | Colour | Acetophenone in mg/kg | 2-phenyl-2-propanol 2PP in mg/kg | Dimethylformamide DMF in mg/kg | Polycyclic aromatic hydrocarbons Σ PAHs in mg/kg | Σ Phthalates in mg/kg | Nonylphenol ethoxylates NPEs in mg/kg | Perfluorinated chemicals PFCs in $\mu\text{g}/\text{m}^2$ |
|-----|-----------------------------|--|-----------------------|-----------------------------|---|---------------------------|-----------------------------------|--|--------------------------------------|---|---------------------------------|---|--|
| 17 | Tchibo – Hamburg | TCM thermal rain jacket | | boy: 98/104 | 100% polyester | green and blue | not tested | not tested | not tested | not tested | 12 | not tested | 4.66 (PFBA 1.55, PFOA 0.34, PFDA 0.41, PFUnA 0.51, PFDoA 0.55) second test: 5.95 (PFBA 0.29, PFOA 0.43, PFDA 0.5, PFUnA 0.55, PFDoA 0.61, PFOS > 1) |
| 18 | Hofer – Vienna, Austria | Hanbury Unisex Shoes sabots (clog shoes) | | unisex: 39 | upper material: synthetic and textile fibres, inner material: soft textile, sole: TPR | white and blue | 16 | 15 | 270, test in second laboratory: 220 | 2.5 (naphthalene 0.24, pyrene 1.9) | 13 | not tested | not tested |
| 19 | Hofer – Vienna, Austria | Impidimpi baby body suits (twin pack) | Bangladesh | unisex: 98/104 (age 3 to 4) | 100% cotton | red and white | | | | | 40 (DIBP 1, DBP 36, DEHP 3) | not tested | |
| 20 | Interspar – Vienna, Austria | Simpex baby set, pyjama tops (twin pack) | Bangladesh | girl: 6/9 | 95% cotton, 5% elastane | white, pink print | not tested | not tested | not tested | not tested | | 38 | not tested |
| 21 | Interspar – Vienna, Austria | Simpex children's pool shoes | China | girl: 29 | upper material and sole: synthetic fibres | pink, multicoloured print | 100 test in second laboratory: 71 | 370 test in second laboratory: 320 | not tested | 0.7 (naphthalene 0.3) | 50 | not tested | not tested |
| 22 | Penny – Vienna, Austria | Dimo Tex infant shirts (3 pack) | Bangladesh | unisex: 86/92 | 100% cotton | green | not tested | not tested | not tested | not tested | not tested | 22 | not tested |

Table (continued): Summary of the test results for acetophenone, 2-phenyl-2-propanol, dimethylformamide (DMF), polycyclic aromatic hydrocarbons (PAHs), phthalates, nonylphenol ethoxylates (NPEs), perfluorinated chemicals (PFCs) and optical brighteners in children's clothing and children's shoes bought from supermarkets

| No. | Supermarket | Product | Country of production | Size (age) | material | Colour | Acetophenone | 2-phenyl-2-propanol | Dimethylformamide | Polycyclic aromatic hydrocarbons | ∑ Phthalates | Nonylphenol ethoxylates | Perfluorinated chemicals |
|-----|----------------------------------|--|-----------------------|------------|----------------|-------------------------------|-------------------------------------|------------------------------------|--------------------|--|--|-------------------------|--------------------------|
| | | | | | | | in mg/kg | in mg/kg | in mg/kg | ∑ PAHs in mg/kg | in mg/kg | in mg/kg | in mg/kg |
| 23 | Penny – Vienna, Austria | clogs | China | unisex: 36 | no details | yellow, red sole and strap | 270, test in second laboratory: 720 | 580 test in second laboratory: 390 | not tested | not tested | not tested | not tested | not tested |
| 24 | Migros – Zurich, Switzerland and | Trevolution children's jacket | China | boy: 92 | 100% polyester | orange, blue, red | not tested | not tested | not tested | not tested | 9 | not tested | not tested |
| 25 | Migros – Zurich, Switzerland and | Trevolution children's shoes (Montana) | Vietnam | unisex: 33 | | black and grey | not tested | not tested | upper material: ND | sole: 116 (naphthalene 0.32, phenanthrene 14, fluoranthene 16, pyrene 14, chrysene 8.6, benzo(a)anthracene 9.1, benzo(a)pyrene 8.4) – second test: sole: 28, upper material: ND, insole: 3.9 (e.g. naphthalene 0.2/0.3, benzo(a)anthracene 1.6, benzo(a)pyrene 0.8) | not tested | not tested | not tested |
| 26 | Migros – Zurich, Switzerland and | Smile baby T-shirt | India | unisex: 80 | 100% cotton | blue with multicoloured print | not tested | not tested | not tested | not tested | 27 (unknown phthalate, terephthalate: 170) | 23 | not tested |

Note:

< x = not detectable (ND); concentration below the detection limit

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³ TRGS 401 'Risks resulting from skin contact – identification, assessment, measures', www.baua.de/en/Topics-from-A-to-Z/Hazardous-Substances/TRGS/TRGS-401.html.

This technical rule for hazardous substances (TRGS) applies to activities involving skin contact with chemical substances, preparations or products. The German version of the TRGS specifies the requirements of the Hazardous Substances Ordinance (GefStoffV). According to this legislation, employers are required to determine and evaluate the type, extent and duration of any skin hazards as part of their risk assessment, and the necessary precautions must be taken in the risk management plan to avoid or minimise skin contact.

⁴ www.bfr.bund.de/cm/343/krebs erzeugende_polyzyklische_aromatische_kohlenwasserstoffe_pak_in_verbraucherprodukten_sollen_euweit_reguliert_werden.pdf.

⁵ www.oekotest.de/cgi/index.cgi?artnr=67820&bernr=10.

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www.greenpeace.org/international/Global/international/publications/toxics/2014/A-Fashionable-Lie.pdf.

⁸ Greenpeace (2014), A Red Card for sportswear brands, <http://www.detoxfootball.org/src/Report.pdf>.

⁹ ECHA (2014), Background Document for N,N-Dimethylformamide (DMF), echa.europa.eu/documents/10162/34ec457d-045e-4836-82ee-2753fcb32b62.

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¹¹ TRGS 401 'Risks resulting from skin contact – identification, assessment, measures', www.baua.de/en/Topics-from-A-to-Z/Hazardous-Substances/TRGS/TRGS-401.html.

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¹⁴ Vidhya, R., and A.J. Thatheyus. 'Biodegradation of Dimethylformamide Using *Bacillus Subtilis*.' *American Journal of Microbiological Research* 1.1 (2013): pp. 10–15. <http://pubs.sciepub.com/ajmr/1/1/3/>.

¹⁵ N,N-dimethylformamide meets the criteria for classification as dangerous to reproduction (under Article 57(c) of the REACH regulation), SVHC Support Document – DMF. echa.europa.eu/documents/10162/9eb46be5-9399-49e2-a353-98a5e5091245.

¹⁶ 'SVHCs may be included in the Authorisation List and become subject to authorisation. These substances cannot be placed on the market or used after a given date, unless an authorisation is granted for their specific use, or the use is exempted from authorisation.' echa.europa.eu/regulations/reach/authorisation.

¹⁷ KEMI PRIO database www2.kemi.se/templates/PRIOEngframes___4144.aspx.

¹⁸ List of Undesirable Substances. www2.mst.dk/udgiv/publications/2011/05/978-87-92708-95-3.pdf.

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²¹ TRGS 401 'Risks resulting from skin contact – identification, assessment, measures', www.baua.de/en/Topics-from-A-to-Z/Hazardous-Substances/TRGS/TRGS-401.html.

²² This technical rule for hazardous substances (TRGS) applies to activities involving skin contact with chemical substances, preparations or products. The German version of the TRGS specifies the requirements of the Hazardous Substances Ordinance (GefStoffV). According to this legislation, employers are required to determine and evaluate the type, extent and duration of any skin hazards as part of their risk assessment, and the necessary precautions must be taken in the risk management plan to avoid or minimise skin contact.

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www.bfr.bund.de/cm/343/krebserzeugende_polyzyklische_aromatische_kohlenwasserstoffe_pak_in_verbraucherprodukten_sollen_eu_weit_reguliert_werden.pdf.

²⁶ Article 2 of Commission Regulation (EU) No 1272/2013 amending Annex XVII to Regulation (EC) No 1907/2006 of the European Parliament and of the Council on the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) as regards polycyclic aromatic hydrocarbons: www.reach-clp-biozid-helpdesk.de/en/Downloads/REACH-Verordnung-1907-2006-en.pdf?__blob=publicationFile&v=2.

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From a sample of five products (three items of clothing with a water-repellent finish, one pair of shoes and one swimsuit), two different parts of each product were analysed separately for ionic PFCs. The aim was to determine the degree of variation in PFC concentrations found in different parts of the same product.

²⁸

Quality control checks confirmed that differences in the PFC levels measured for different parts of individual items of clothing reflect real variations in concentrations within the clothing; they do not result from the testing method. Although the variations within individual products were determined using samples manufactured by certain brands, the reported variations are likely to reflect a general characteristic of textile products treated with PFCs rather than not a phenomenon limited to the products sold by those brands. The full extent of such variations, and the underlying causes, deserves further investigation.

²⁹ For more information about PFCs, please refer to Chemistry for any weather. Greenpeace International (2012) and Chemie für Gipfelstürmer. Greenpeace e.V. (2013), op. cit.

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³² NEA (2013), Flere stoffer på verstinglista (Additional Substances Added to the Priority List), Norwegian Environment agency (NEA), www.miljodirektoratet.no/no/Nyheter/Nyheter/2013/November-2013/Flere-stoffer-pa-verstinglista/ (in Norwegian).

³³ ECHA (2013), Candidate List of Substances of Very High Concern for Authorisation, European Chemicals Agency, www.echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp.

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³⁸ KEMI (2012), Proposals for new restrictions under REACH, Swedish Chemicals Agency, www.kemi.se/en/Content/Rules-and-regulations/Reach/Begransningsregler-bilaga-XVII/Proposals-for-new-restrictions.

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⁴⁰ Bluesign System Substances List (BSSL): Consumer safety limits and usage restrictions, Version 4.0 op. cit.

⁴¹ Global Organic Textile Standard (GOTS) Version 4.0 (March 2014), www.global-standard.org/images/GOTS_Version4-01March2014.pdf.

⁴² Greenpeace (2014), A little story about the monsters in your closet. op. cit.

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⁴⁵ American Apparel and Footwear Association (2013), Restricted Substances List, September 2013, 13th ed., p.40, phthalates, www.wewear.org/assets/1/7/RSL13english-September2013.pdf.

⁴⁶ www.cpsc.gov/phthalate.

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⁵² This means that preventive measures should be taken for chemicals where there are reasonable grounds for concern about their intrinsic risk, even if the information available is not sufficient to actually verify the existence of these risks. This approach is partly based on the assumption that some hazardous substances are not rendered harmless by the receiving environment (i.e. there are no 'environmentally sustainable' or 'safe' stages of use or disposal) and that the prevention of possible damage is necessary. The process of the precautionary principle must involve an examination of all the various alternatives, including (where necessary) substitution by developing sustainable alternatives if these do not already exist.

⁵³ All brands must accept corporate responsibility for an individual and transparent action plan that defines the necessary steps to comply with the obligation not to use toxins. Brands need to check these steps continuously and remain up to date.

⁵⁴ The 'right to information' refers to practices that allow the public to access environmental information, in this case specifically about the use and discharge of chemicals based on reported quantities for the release of hazardous chemicals into the environment – for each chemical, for each factory and at least once a year.

⁵⁵ www.ipe.org.cn/En

⁵⁶ The 11 priority hazardous chemical groups are as follows: 1. alkylphenol ethoxylates and alkylphenols (APEOs and APs); 2. phthalates; 3. brominated flame retardants and chlorinated flame retardants (BFRs and CFRs); 4. azo dyes, which may release carcinogenic amines; 5. organotin compounds; 6. perfluorinated and polyfluorinated chemicals (PFCs); 7. chlorobenzenes; 8. chlorinated solvents; 9. chlorophenols; 10. short-chain chlorinated paraffins (SCCPs); 11. heavy metals such as cadmium, lead, mercury and chromium (VI).