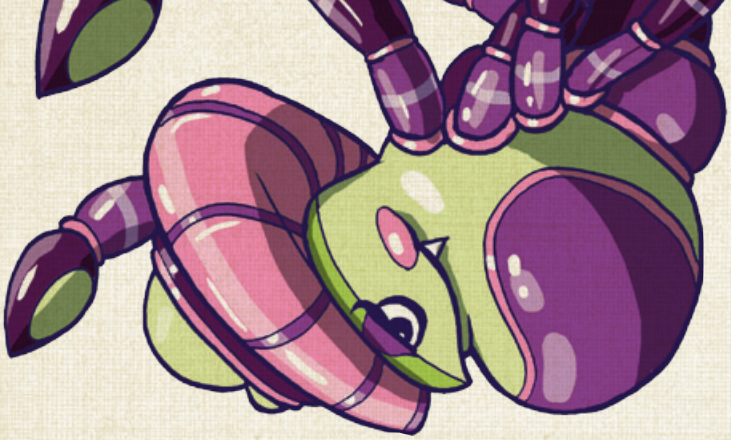


A little story about the monsters in your closet...

Greenpeace study finds hazardous chemicals in children's clothing from a wide range of well-known brands.

GREENPEACE

Contents What's in it?

Executive Summary 3

Section 1: Results – A wide range of hazardous chemicals in a wide range of brands 13

Section 2: No more play – it's time to Detox 25

Endnotes 31

Appendix 36

Acknowledgements:

We would like to thank the following people who contributed to the creation of this report. If we have forgotten anyone, they know that our gratitude is also extended to them.

Kevin Brigden, Madeleine Cobbing, Tommy Crawford, Ilze Smit, Robin Perkins, Ieva Vilimaviciute, Yifang Li, Miao Zhang, Sha Du, Chih An Lee, Yan Huang, Yuan Yuan Guan, Caidan Cao, Kristin Casper

Design, Art Direction by:
Toby Cotton @ Arc Communications

A Little Story about Monsters in Your Closet

Published January 2014

By Greenpeace East Asia

Beijing Office, 3/F, Julong Office Building, Block 7, Julong Garden, 68 Xinzhong Street, Dongcheng District, Beijing, China. 100027

greenpeace.org

Executive Summary

A new investigation by Greenpeace* has found a broad range of hazardous chemicals in children's clothing and footwear across a number of major clothing brands, including fast fashion, sportswear and luxury brands.

The study follows on from several previous investigations published by Greenpeace as part of its Detox campaign, which identified that hazardous chemicals are present in textile and leather products as a result of their use during manufacture[1]. It confirms that the use of hazardous chemicals is still widespread – even during the manufacture of clothes for children and infants.

A total of 82 children's textile products[2] were purchased in May and June 2013 in 25 countries/regions worldwide from flagship stores, or from other authorised retailers[3]. They were manufactured in at least twelve different countries/regions. The brands included fast fashion brands, such as American Apparel, C&A, Disney, GAP, H&M, Primark, and Uniqlo; sportswear brands, such as adidas, LiNing, Nike, and Puma; and the luxury brand Burberry.

The products were sent to the Greenpeace Research Laboratories at the University of Exeter in the UK, from where they were dispatched to independent accredited laboratories. All products were investigated for the presence of nonylphenol ethoxylates (NPEs); certain products were also analysed for phthalates, organotins, per/poly-fluorinated chemicals (PFCs), or antimony, where the analysis was relevant for the type of product[4]. The analysis for antimony was carried out at the Greenpeace Research Laboratories[5].

All the hazardous chemicals mentioned above were detected in various products, above the technical limits of detection used in this study. Despite the fact that all the products purchased were for children and infants, there was no significant difference between the range and levels of hazardous chemicals found in this study compared to previous studies analysing those chemicals.

my clothes are filled with little monsters!

*Investigation carried out by Greenpeace International,brought to you by Greenpeace East Asia

Mom, Dad, I don't want monsters in my closet.

Key findings

- **Nonylphenol ethoxylates (NPEs)** were found in 50 of the 82 products analysed, at levels ranging from just above 1 mg/kg (the limit of detection) up to 17,000 mg/kg. This is equivalent to 61% of all products tested. **All of the brands had at least** one article where NPEs were detected. Brands with the highest levels of NPEs in their products (above 1,000 mg/kg) were **C&A, Disney and American Apparel**. **Burberry** was not far behind – with a level of 780 mg/kg in one product.
- Products from 10 of the 12 countries of manufacture contained NPEs.
- **Phthalates** were detected in 33 out of 35 samples with plastisol prints on them, two of which contained far higher **concentrations of phthalates compared to the other articles tested**; a **Primark** t-shirt[6] sold in Germany contained 11% phthalates and a baby one-piece from **American Apparel**[7] sold in the USA contained 0.6% phthalates. The levels of phthalates found in these two items would not be permitted in certain toys and childcare products under regulations for these products sold in the EU, which do not apply to clothing.
- **Organotins** were found in three articles with plastisol prints (of 21 tested) and three footwear articles (of five tested). The highest concentrations of **organotins** were found in three footwear products by Puma and **adidas**[8], with the highest levels in a Puma sport shoe. For all of these, the concentrations of the organotin DOT were higher than the Oeko-tex standard[9] – which is a voluntary eco-label – and the standards set by adidas and **Puma** for DOT in their own Restricted Substances Lists[10].
- One or more PFC was detected in each of the 15 articles tested.
- Three **adidas** products[11], a toddler's coat from **Nike**[12], and a jacket from **Uniqlo**[13] had relatively high concentrations of **PFCs** (either for volatile or ionic).
- The analysis for ionic PFCs found PFOS in one **adidas** shoe[14] and in **Burberry** swimwear[15].
- The concentration of the ionic PFC PFOA by area in one **adidas** swimsuit[16] was far higher than the limit of 1 µg/m^2 set by Norway from 2014[17] and even by adidas in its own Restricted Substances List[18].
- Antimony was detected in all 36 articles, all of which included fabrics composed of polyester, or a blend of polyester and other fibres.

The role of corporations

Major textile companies with a global reach have the potential to implement impactful solutions towards the elimination of hazardous substances in the industry as a whole. Using their influence, they can drive change across their supply chains and are in a position to make real progress towards a toxic-free future for our children. Greenpeace is calling on these companies to recognise the urgency of the situation and act as Leaders, committing to zero discharge of hazardous chemicals by January 1st 2020. This commitment should include ambitious but achievable timelines that will lead to the swift elimination of hazardous substances and be followed through with credible actions.

Since the launch of Greenpeace's Detox campaign in July 2011, 18 major clothing companies have made public commitments to Detox their supply chains. While most of these companies are acting as Leaders, making tangible progress towards their commitments, three – adidas, Nike and LiNing – are failing to follow through sufficiently on their promises. Meanwhile, other brands have still failed to make a clear commitment to Detox their clothes, despite their implication in the toxic scandal in numerous Greenpeace reports (Refer to footnote 1). The findings of this report, in which every brand had examples of one or more children's products containing hazardous chemicals, highlight the urgency with which brands need to clean up their supply chains and ensure a toxic-free future for generations to come.

The role of governments

Greenpeace is calling governments to adopt a political commitment to zero discharge of all hazardous chemicals within one generation. This is to be based on the precautionary principle, and include a preventative approach which avoids the production and use of hazardous chemicals and therefore releases of hazardous chemicals. This commitment must be matched with a comprehensive set of chemicals management policies and regulations that establish short-term targets to ban the production and use of priority hazardous chemicals, a dynamic list of hazardous substances requiring immediate action (based on the substitution principle), and a publicly available register of data on dischargers, emissions and losses of hazardous substances.

The role of "People Power"

Our children deserve to live in a world free of hazardous chemicals and adults around the world have the power to make this a reality. As parents, global citizens and consumers, by acting together now we can challenge major brands and governments to bring about the urgent change the world needs. Already the united calls for toxic-free fashion have led to landmark Detox commitments from 18 major clothing companies, including well-known brands such as H&M, Zara, Valentino, and Puma.

It doesn't stop here.

Acting together we can build the toxic-free future our children deserve.

I don't want to play with little monsters.

Meet the monsters in my closet

Per- and poly-fluorinated chemicals (PFCs)

Per- and poly-fluorinated chemicals (PFCs) are used in many industrial processes and consumer products, including textile and leather products, due to their chemical properties such as their ability to repel both water and oil. Ionic PFCs such as PFOS and PFOA can cause adverse impacts both during development and during adulthood, in part due to their hormone disrupting properties, with impacts on the reproductive system and the immune system, as well as being potentially carcinogenic in animal tests.

Nonylphenol ethoxylates/Nonylphenols (NPEs/NPs)

NPEs are man-made chemicals that are widely used as surfactants by textiles manufacturers. Once released to the environment, NPEs degrade to nonylphenols (NP), which are known to be toxic, and acting as hormone disrupters, persistent and bioaccumulative. NP is known to accumulate in many living organisms. The presence of NPEs in finished products shows that they have been used during their manufacture, which is likely to result in the release of NPEs and NP in wastewater from manufacturing facilities.

Phthalates

Phthalates are mainly used as plasticisers (or softeners) in plastics, especially PVC. They are commonly found in human tissues, with reports of significantly higher levels of intake in children. There are substantial concerns about the toxicity of phthalates to wildlife and humans and in particular their hormone-disrupting effects. For example, DEHP, one of the most widely used to date, is known to be toxic to reproductive development in mammals, capable of interfering with development of reproductive organs in males and affecting reproductive success in females.

Antimony

Antimony shows many similarities in its chemistry and toxicity to arsenic . Trivalent antimony, such as is present in antimony trioxide, is a more toxic form of antimony compound, with effects including dermatitis, irritation of the respiratory tract, and interference with the immune system.

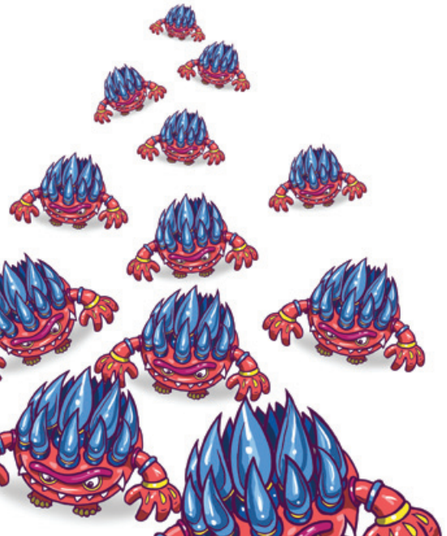
Organotins

Within the textile industry organotins are used as biocides or fungicides in products such as socks, shoes and sport clothes to prevent odour caused by the breakdown of sweat, and as stabilisers in plastisol prints. Organotins are known to be toxic at relatively low levels of exposure to a range of organisms, including mammals, with impacts on development, the immune system and the nervous system.

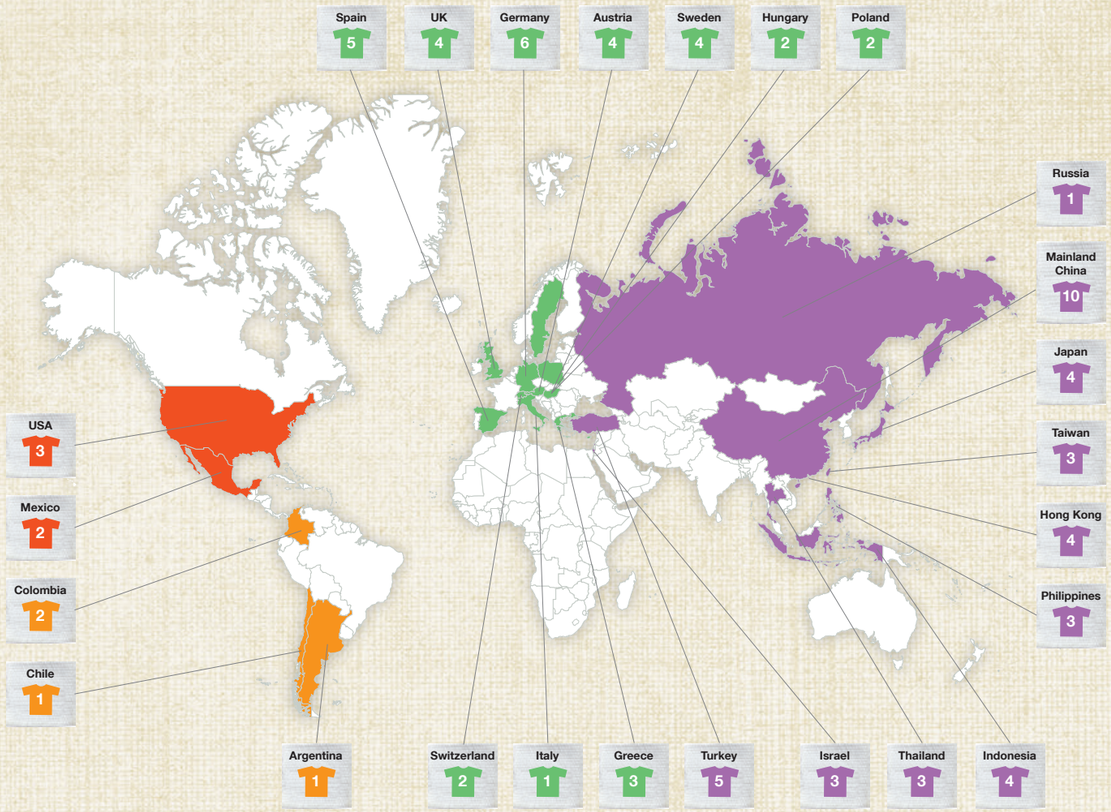
executive summary

Table 1. The number of samples in which NPEs, phthalates, organotins, PFCs, and antimony in polyester fibre were identified. The testing was process by various fabric and parts of the products. Results are shown by product brand.

	No. of samples	NPEs	Phthalates	Organotins	PFCs	Antimony
adidas	11	5/11	6/6	2/4	3/3	10/10
American Apparel™	4	3/4	1/1	0/0	0/0	1/1
BURBERRY	9	6/9	1/1	0/0	2/2	1/1
C&A	7	3/7	4/4	0/2	1/1	1/1
Disney	5	4/5	3/3	0/3	1/1	2/2
GAP	11	4/11	5/7	0/7	0/0	2/2
H&M	7	6/7	4/4	1/2	2/2	3/3
LI-NING	4	3/4	2/2	0/2	0/0	2/2
NIKE	9	5/9	3/3	0/4	2/2	5/5
PRIMARK	6	5/6	2/2	0/2	2/2	3/3
PUMA	6	5/6	1/1	3/4	1/1	3/3
UNIQLO	3	1/3	1/1	0/2	1/1	3/3

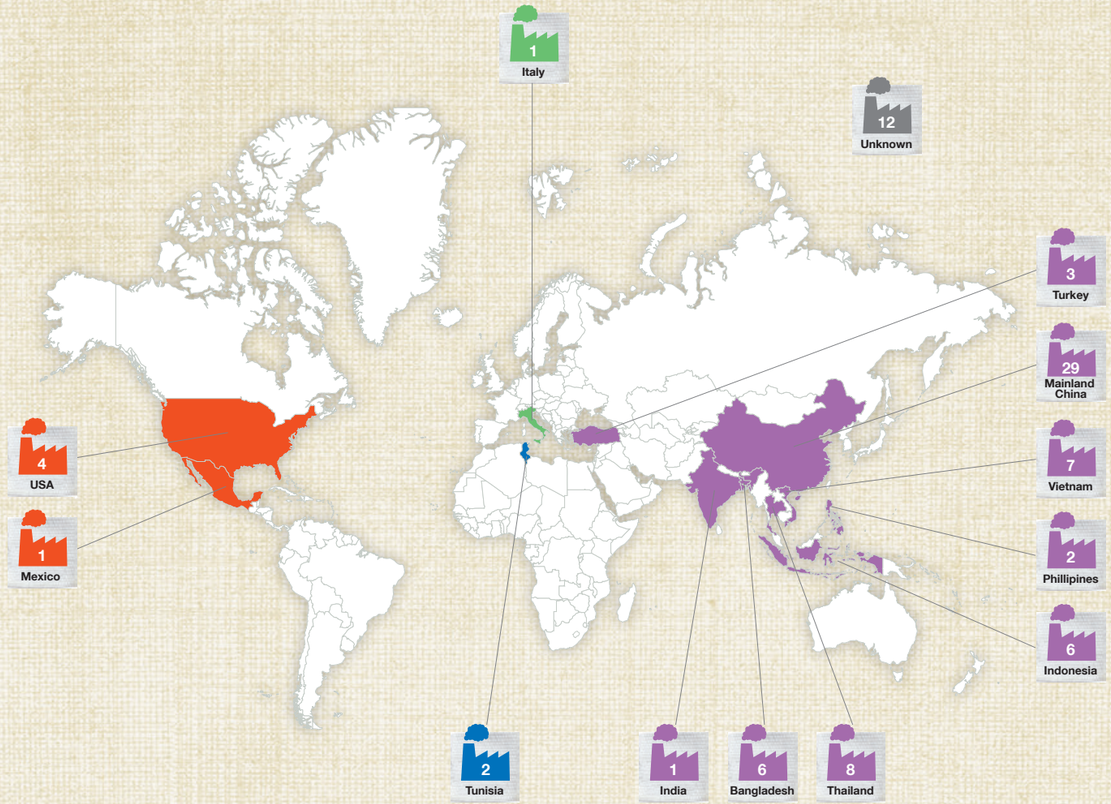


Where the products were bought

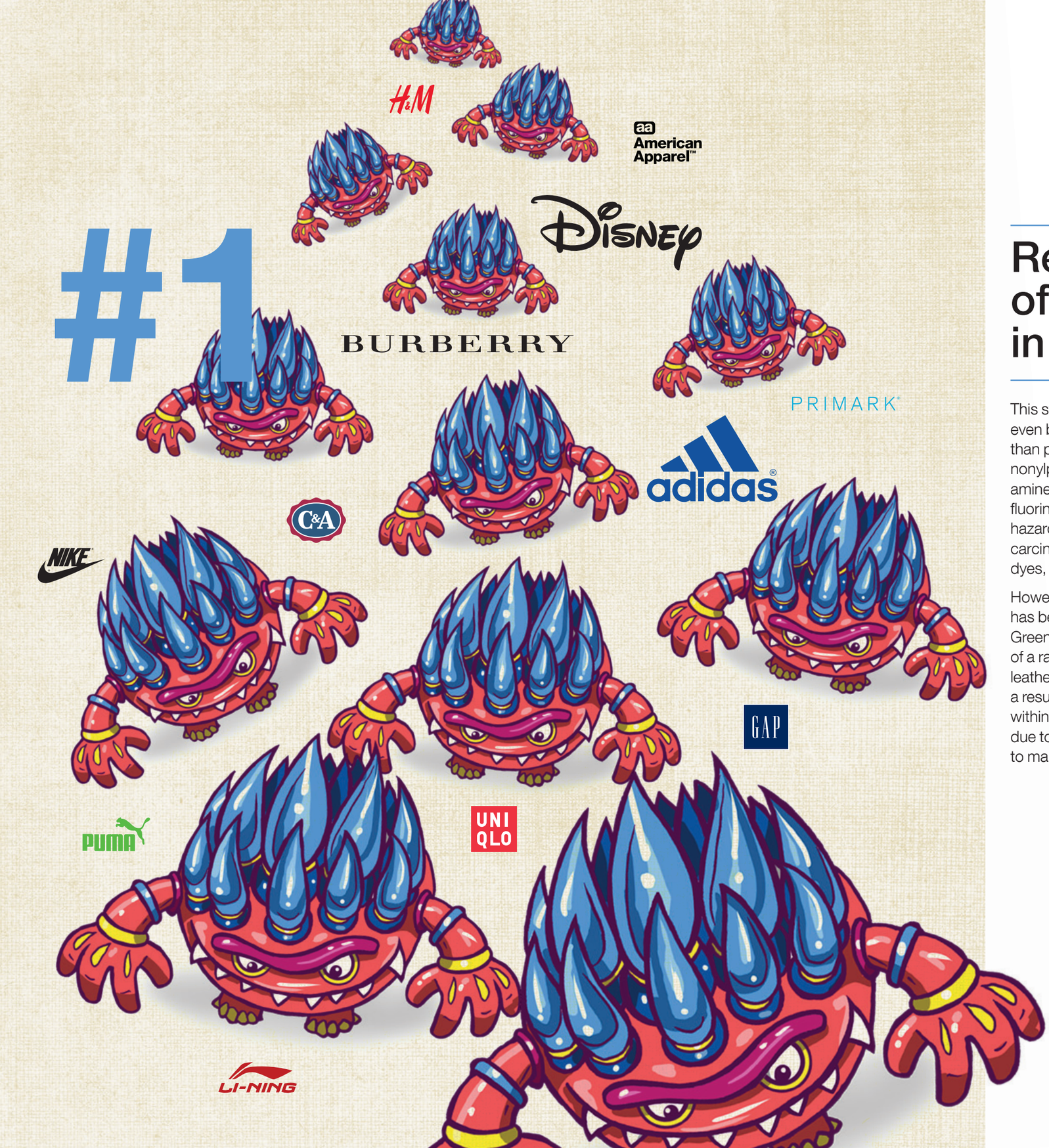


The products were bought in 25 different countries/regions representing Asia, the Americas and Europe.

Where the products were made



The majority of products were not made in the country where they were sold. Most of the products were manufactured in China and other Asian countries, as well as the USA, Turkey, Tunisia, Italy and Mexico. For 12 products, the country of manufacture was not identified by the labelling, which is symptomatic of an industry that is not as transparent about its manufacturing practices as it should be.



#1

Results – A wide range of hazardous chemicals in a wide range of brands

This study has analysed for the presence of an even broader range of hazardous chemicals than previous studies published by Greenpeace: nonylphenol ethoxylates, certain types of amines, phthalates, organotins, per-/poly-fluorinated chemicals, and antimony. All these hazardous chemicals were found, except for carcinogenic amines released by certain azo dyes, which were found in previous studies[19].

However, The new findings are in line with what has been established by earlier investigations: Greenpeace has already identified the presence of a range of hazardous chemicals in textile and leather products and concluded that this was as a result of their use during manufacture, either within the processes used in textile factories or due to their presence in materials that are used to make the products[20].

It is obvious that, despite the documented hazards associated with them, hazardous chemicals continue to be used for a variety of purposes in the textiles process or in the product itself: NPEs are widely used as surfactants and detergents in textiles processing; phthalates are used as additives in plastisol prints on clothing; organotins can also be an ingredient in plastisol prints as well as a fungicide; clothes are treated with per-/poly-fluorinated chemicals to impart waterproofing or oil proofing properties, while a compound of antimony (antimony trioxide) is used as catalyst in the manufacture of polyester.

All this is the case even though in many instances more environmentally responsible alternatives are available for these substances.

I want to grow up without the Little monsters

Some of the branded products analysed for this report.

TX13094 - PRIMARK

TX13004 - adidas

TX13082 - NIKE

TX13014 - AMERICAN APPAREL

TX13025 - BURBERRY

TX13100 - PUMA

TX13023 - BURBERRY

TX13043 - DISNEY

TX13063 - H&M

TX13056 - GAP

TX13048 - GAP

TX13069 - H&M

TX13018 - BURBERRY

TX13031 - C&A

TX13040 - DISNEY

TX13003 - adidas

TX13006 - adidas

TX13074 - LI NING

TX13017 - BURBERRY

TX13030 - C&A

TX13091 - PRIMARK

TX13073 - LI NING

TX13101 - PUMA

TX13088 - NIKE

TX13097 - PUMA

TX13015 - AMERICAN APPAREL

1.1. Nonylphenol ethoxylates

All 82 products were analysed for nonylphenol ethoxylates (NPEs). They were found in 50 of these products, at levels ranging from just above 1 mg/kg (the limit of detection) up to 17,000 mg/kg. This is equivalent to 61% of all the products and is consistent with the findings from Greenpeace's two previous studies.

- The fact that NPEs were detected in products across all brands, in most of the countries/regions where they were sold and in almost all countries of manufacture, suggests that the use of NPEs by the textile industry remains widespread. This includes the supply chains used by the major international clothing brands in this study[20].
- The highest concentration of NPEs was detected in a C&A branded shoe[21] manufactured and sold in Mexico at levels well above the limit that **C&A** sets in its own Restricted Substances List[22].
- Eight articles (10% of the samples) contained NPEs at concentrations above 100 mg/kg and, of these, three samples (4% of articles tested) had concentrations over 1,000 mg/kg (0.1% by mass).
- All of the brands had at least one article where NPEs were detected. Brands with the highest levels of NPEs in their products (above 1,000 mg/kg)[23] were **C&A, Disney**[24] and **American Apparel**[25]. **Burberry**[26] was not far behind – with levels of 780 mg/kg in one product.
- Products from 10 of the 12 countries of manufacture contained NPEs.
- The concentration for the single sample manufactured in Mexico (17,000 mg/kg) was considerably higher than any of the other samples (as only a single sample manufactured in Mexico was analysed, it is not possible to draw any conclusions from this about articles manufactured in Mexico in general).

Nonylphenol ethoxylates/ nonylphenols (NPEs/NPs)

NPEs are man-made chemicals that are widely used as surfactants by textiles manufacturers. Once released to the environment, NPEs degrade to nonylphenols (NP), which are known to be toxic, and acting as hormone disrupters, persistent and bioaccumulative. NP is known to accumulate in many living organisms. The presence of NPEs in finished products shows that they have been used during their manufacture, which is likely to result in the release of NPEs and NP in wastewater from manufacturing facilities. In addition, NPE residues in these products will be washed out during laundering and released into the public wastewater systems of the countries where the products are sold.

There have been restrictions on certain uses of NPEs by industry since 2005 in the EU[27], with similar restrictions in place in the US and Canada[28]. Although there are currently no EU regulations that restrict the sale of textile products containing NPE residues, measures are currently under development within the EU, proposed by the Swedish Chemicals Agency[29]. Elsewhere, NP and NPEs are included on the list of toxic chemicals severely restricted for import and export in China, which means that their import or export across China's borders now requires prior permission, though their manufacture, use and release are not currently regulated in China[30]; NP/NPEs are also included in China's dangerous chemicals list and in the 12th 5-year plan for Prevention and Control of Environmental Risk of Chemicals.

1.2. Phthalates in plastisol prints

A sub-set of 35 samples were analysed for the presence of phthalates within plastisol printed fabric on the articles.

- Phthalates were detected in 33 out of the 35 samples.
- Two of these samples contained phthalates above 0.1%, indicating their deliberate use as a plasticiser.
- One of these samples, a **Primark**[31] t-shirt[32] sold in Germany, contained a particularly high concentration of the phthalate DEHP, at 110,000 mg/kg (11.0%).
- The other sample, a baby one-piece[33] from **American Apparel**[34] purchased in the USA contained the phthalate DINP at 5,900 mg/kg (0.59% by weight) in addition to 2,000 mg/kg of NPE, as noted above.

Phthalates

Phthalates are mainly used as plasticisers (or softeners) in plastics, especially PVC. Because phthalates are not chemically bound to the plastics, they are released into the indoor and outdoor environment during the lifetime of the products and again following disposal. Phthalates are found widely in the indoor environment, including in air and dust[35]. They are commonly found in human tissues, with reports of significantly higher levels of intake in children. There are substantial concerns about the toxicity of phthalates to wildlife and humans and in particular their hormone-disrupting effects. For example, DEHP, one of the most widely used to date, is known to be toxic to reproductive development in mammals, capable of interfering with development of reproductive organs in males and affecting reproductive success in females[36].

Legislation does not currently exist in any of the countries where the 35 tested articles were sold that prohibits the sale of clothing containing phthalates[37]. However, probably the best known legislation on phthalates is the EU-wide ban on the use of six phthalates in children's toys and childcare articles, first agreed as an emergency measure in 1999 and finally made permanent in 2005. The use of certain phthalates, including DEHP, is prohibited in all toys or childcare articles put on the market within the EU (with a limit of 0.1% by weight, equivalent to 1,000 mg/kg), and the use of others, including DINP, is prohibited in such articles if they can be placed in the mouth by children (EU 2005). Such regulations have been replicated in other countries such as the US[38], and most recently in China, where a new standard on toy safety prohibiting the use of six phthalates in children's toys was notified to the World Trade Organisation (WTO) in July 2013 and will come into force in June 2014[39].

The definition of "childcare articles" does not include items of clothing in these regulations[40]. However, draft legislation has been proposed in China which would prohibit the presence of six phthalates, including DEHP and DINP, at concentrations above 0.1% by weight (1,000 mg/kg), in clothes sold for babies and young children (under 36 months old)[41]. Another exception is South Korea, where the restriction on six phthalates in toys and childcare articles also applies to clothing for infants under 24 months[42].

Within the European Union, certain phthalates, including DEHP, DBP, DiBP and BBP, have been listed as Substances of Very High Concern (SVHC) under the EU REACH[43].

1.3. Organotins

A total of 32 products were analysed for organotins, which consisted of 21 items of clothing with a large plastisol print, five footwear articles, and six sportswear tops.

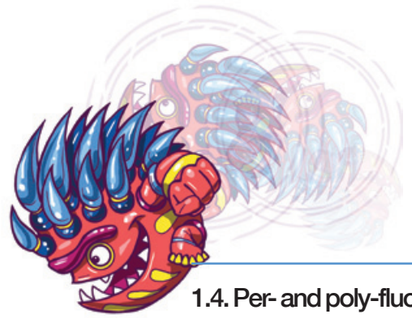
- One or more organotin compounds were detected in six articles.
- Overall, far higher concentrations of organotins were detected in three of the footwear articles – one by **adidas** and two by **Puma**[44] – compared to the printed articles. The product with the highest concentrations[45] was a Puma sportshoe. All three articles exceeded the Oeko-tex labelling standard for the organotin DOT[46], and the standards set by adidas and Puma for DOT[47]. However, the credibility of such standards can be questioned, as they do not publicly indicate that the best current testing technology is applied, which requires the lowest possible reporting levels for hazardous chemicals[48].
- Three of the five footwear articles contained organotins. Different individual organotins were detected in these articles compared to the printed articles: monooctyltin (MOT) in the range 0.26-34 mg/kg and dioctyltin (DOT) in the range 0.18-369 mg/kg.
- Three of the 21 articles bearing a plastisol print contained organotins, all of them t-shirts, from **adidas**, **Puma** and **H&M**[49].

Organotins

Within the textile industry organotins are used as biocides or fungicides in products such as socks, shoes and sport clothes to prevent odour caused by the breakdown of sweat, and as stabilisers in plastisol prints. A recent Greenpeace study detected organotins in outerwear[50] and other recent studies have also identified organotins in textiles products, specifically within plastisol prints[51].

The organotin compound tributyltin (TBT) is best known for its use in antifouling paint for ships, which is now banned, due to evidence that it persists in the environment and builds up in the body; it is listed as a "priority hazardous substance" under EU regulations which require that measures be taken to eliminate its pollution of surface waters in Europe. However, TBT is also used in textiles and several other organotin compounds are in common use, most notably mono- and dibutyltin (MBT, DBT), mono- and dioctyltin (MOT, DOT), as found in this study, and triphenyltins (TPT).

Organotins are known to be toxic at relatively low levels of exposure to a range of organisms, including mammals, with impacts on development, the immune system and the nervous system. While seafood is the predominant source of organotin exposure for the general population, exposure to consumer products that contain them or to dusts in the home may also be significant[52].



1.4. Per- and poly-fluorinated chemicals (PFCs)

- A total of 15 articles were analysed for the presence of per- and poly-fluorinated chemicals (PFCs), consisting of seven waterproof clothing articles, three footwear articles and five swimwear articles. Textiles can be treated with PFCs (per-fluorinated chemicals) for their water and oil repellent properties. Two different types of PFCs were analysed – ionic PFCs (for example PFOS and PFOA) and volatile PFCs, which are used as precursors or generated during manufacturing processes, such as fluorotelomer alcohols (FTOHs) and fluorotelomer acrylates (FTAs), which can break down into ionic PFCs.
- One or more PFC was detected in each of the 15 articles tested. Ionic PFCs were found in all but one article. For the volatile PFCs, examples were detected in five of the 15 articles (four of the seven waterproof clothing articles and one footwear article).
- Although only detected in five products, volatile PFCs were generally found in considerably higher concentrations than ionic PFCs.
- Our investigations have shown concentrations of PFCs can vary widely not only between products but also within different parts of the same product. The variation in results between different parts of the five articles tested in duplicate reflects real variation in concentrations within the clothing and does not result from the testing method.
- Two products with high concentrations of volatile PFCs (a waterproof coat at 2,420 µg/kg and shoes at 499 µg/kg) and one product with the second highest concentration of ionic PFCs (swimwear at 68.0 µg/kg) were from **adidas**[53].
- Similar levels of volatile PFCs were also found in jackets by C&A and **Uniqlo**[54]. These products were produced before their new PFC-ban come to effect.**
- The analysis for ionic PFCs found the restricted substance PFOS in one portion of an adidas shoe (at 0.855 µg/m², though not in a second portion (<0.422 µg/m²)) and in Burberry swimwear (at 0.464 µg/m²)[55]. This is of some significance given that regulations in some countries set a maximum allowable concentration by area for PFOS in textiles of 1 µg/m², although this limit was not exceeded in either of these samples.
- PFOA is another PFC with similar properties to PFOS; the concentration of PFOA by area in the **adidas** swimwear[56] was 15.3 µg/m² in one portion and 15.8 µg/m² in a second portion, both far higher than the limit of 1 µg/m² set by adidas in its own Restricted Substances Lis[57]. It These are also considerably higher than the regulatory limit for the related compound PFOS as well as the planned restriction in Norway on PFOA of 1 µg/m² from June 2014 (although not sold in Norway).
- A **Nike** waterproof coat[58] had the highest total concentration of volatile PFCs at 6,970 µg/kg, as well as the fourth highest levels of ionic PFCs at 29.7 µg/kg which included PFOA (above Nike's own reporting limit[59]) and PFDA, a chemical which is classified as a Substance of Very High Concern by the EU's REACH and is one of two PFCs that are listed as priority substances in Norway[60].
- The highest levels of ionic PFCs in footwear were found in a Puma shoe[61].
- High concentrations of ionic PFCs were detected in waterproof trousers sold by H&M (2,290 µg/kg[62] in one portion and 26.4 µg/kg in a second portion) and a H&M coat (at 314 µg/kg in one portion and 32.7 µg/kg[63] in a second portion) . These products were produced before the new PFC-ban of H&M came to effect*.
- Apart from PFOS, there are no restrictions on any other PFCs in textiles, despite concerns about their hazardous nature and the fact that they can commonly be found at far higher concentrations. For example, the concentration by area of PFHxS (which shares many properties with PFOS), in the H&M waterproof trousers[64], and H&M coat are higher than the regulatory limit for the related compound PFOS.
- The levels of volatile PFCs found in the waterproof jackets are broadly in the same range as those found in two recent Greenpeace reports which investigated PFCs in outdoor clothing[65]. The second of these reports found that volatile PFCs evaporated from the clothing samples into the air.

* H&M is the first brand to publicly report that as from January 2013 it has instructed its suppliers across their global supply-chain to eliminate all PFCs from the production of their products. H&M indicate that the products tested were from 2012 production before its PFC ban.

** C&A Updated C&A Individual Action Plan, 16 November 2012 http://www.candacr.com/en/2012/11/16/updated-ca-individual-action-plan-in-the-frame-of-the-joint-roadmap-towards-zero-discharge-of-hazardous-chemicals-by-2020/ Uniqlo: FAST RETAILING Greenpeace Detox Solution Commitment, 9 January 2013, http://www.fastretailing.com/eng/csr/environment/zero.html

Per- and poly-fluorinated chemicals (PFCs)

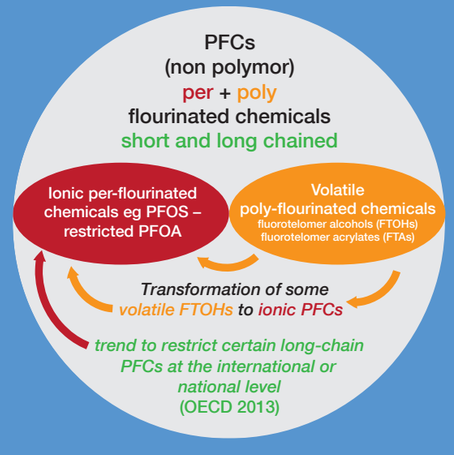
Per- and poly-fluorinated chemicals (PFCs) are used in many industrial processes and consumer products, including textile and leather products, due to their chemical properties such as their ability to repel both water and oil. A well-known example is the polymer PTFE, marketed as Teflon and widely used for "non-stick" cookware, but not for textiles.

Many PFCs, especially **ionic PFCs** such as PFOS and PFOA, are highly persistent and do not readily break down once released to the environment, which has led to their presence throughout the environment, even in remote regions. Ionic PFCs have been reported in a wide range of both aquatic and terrestrial biota, due to their ability to bioaccumulate, as well as in human blood and milk in the general population in many countries around the world. Studies show that PFCs such as PFOS and PFOA can cause adverse impacts both during development and during adulthood, in part due to their hormone disrupting properties, with impacts on the reproductive system and the immune system, as well as being potentially carcinogenic in animal tests.

Volatile PFCs such as FTOHs, are generally used as precursors during manufacturing processes. However, FTOHs can be transformed into ionic PFCs (such as PFOA) in the body or in the atmosphere. The process of transformation can also form intermediate products in the body that may be more harmful than the end product. Studies indicate that some FTOHs show endocrine disrupting activity themselves, including disturbing fish reproduction, though far less information exists compared to the compounds that FTOHs can give rise to (eg PFOA). In addition to these direct hazards from FTOH, the potential for FTOHs to transform into other ionic PFCs, poses an additional hazard. Precursor PFCs, such as FTOHs, are volatile and have frequently been detected in air samples, even in remote areas. Recent Greenpeace tests have found evaporation of volatile PFCs from outdoor clothes[66].

The ionic PFC, PFOS, has been classified as a persistent organic pollutant (POP) under the Stockholm Convention, a global treaty that requires contracting parties to take measures to restrict the production and use of PFOS[67]. And the marketing and use of PFOS within the EU has been prohibited for certain uses since 2008, with a maximum limit of 1 µg/m^2 set for PFOS in textiles[68]. However, there are currently no limits set for any other PFCs, despite concerns about their hazardous nature and the fact that they can commonly be found at far higher concentrations in textiles.

Norway is the first country where the sale of textiles containing PFOA above 1 µg/m^2 will be prohibited from June 2014; certain PFCs have also recently been added to a list of priority chemicals, meaning that releases to the environment must be eliminated or substantially reduced by 2020[69]. Norway, and all other countries, should enforce the elimination of PFOA (and the PFC chemical group as a whole) at much lower levels, using the best current testing technology. In addition, PFOA and four other long chain PFCAs are also classified as substances of very high concern (SVHCs) within the EU under the REACH regulations (ECHA 2013)[70].



1.5. Antimony in polyester

Polyester fibres are known to contain residues of antimony trioxide where it was used as a catalyst during their manufacture[71 72]. Factories that manufacture polyester fabrics or use polyester fibres can also discharge antimony in their wastewater, as found by a recent Greenpeace investigation into a textiles facility that processes polyester in Indonesia[73].

- Antimony was detected in all of the 36 articles that included fabrics composed of polyester, or a blend of polyester and other fibres.
- Concentrations in the polyester and the fabric blends were in the range 14-293 mg/kg of polyester.

Antimony

Antimony shows many similarities in its chemistry and toxicity to arsenic[74]. Trivalent antimony, such as is present in antimony trioxide, is a more toxic form of antimony compound, with effects including dermatitis, irritation of the respiratory tract, and interference with the immune system. In addition, antimony trioxide is listed as "possibly carcinogenic to humans" principally due to inhalation of dusts and vapours[75]. Inhalation exposure to antimony is more common in occupational settings, whereas the general population is exposed to antimony mainly through ingestion of food and water.

No regulations currently exist which prohibit the use of antimony in textile manufacture worldwide, despite the availability of alternative catalysts for polyester manufacture. Recently, Greenpeace found antimony being discharged from manufacturing facility processing polyester in Indonesia[76]. Within the EU, the Ecolabel Regulation[77] requires that the antimony content in polyester fibres does not exceed 260 mg/kg for articles bearing the Ecolabel[78].

The effects on children

Finding residues of hazardous chemicals in clothing is a case for concern – especially if the clothing is made for children: infants and children may be more sensitive to the effects of some hazardous chemicals compared to adults[79].

This is already reflected in some voluntary standards[80], as well as in the restrictions that some textiles companies set for themselves, with more protective limits for concentrations of certain chemicals in clothing items for children, compared to adult clothing[81]. It is also recognised in the restrictions on the presence of certain phthalates in toys and articles for children under three in the EU and other countries[82], which do not apply to clothing.

A draft regulation in China sets restrictions on phthalates in clothes for children under three[83]. In South Korea (which was not included in this report) the restriction on six phthalates in toys and childcare articles also applies to clothing for infants under 36 months[84]. These voluntary and regulatory restrictions do not go far enough and only cover a very limited part of hazardous chemicals.

Hazardous chemicals have the potential to cause a range of adverse health effects. Some may interfere with the hormone system.

Hazardous chemicals have the potential to cause adverse health effects. Many hazardous chemicals are known to accumulate in our bodies; some of these have known hazardous properties and the potential to cause adverse health effects. The use of hazardous chemicals in children's clothing leads to the release of such chemicals into the environment, either during manufacturing or from the products directly. In some instances, there may also be the potential risk of direct exposure to these hazardous chemicals for children.

Many of the chemicals found in this report are known endocrine disruptors, or (in the case of NPEs) able to give rise to chemicals which are endocrine disruptors – chemicals which can interfere with hormone systems in animals and humans. A recent UNEP & WHO report[85] on endocrine disruptors concluded that some can act at very low doses and that the timing of some impacts on hormone systems can be critical. Many endocrine-related diseases and disorders are on the rise (though in many cases the extents to which exposure to endocrine disruptors are contributing is still unclear)[86]. In particular, the report highlights that:

"Effects shown in wildlife or experimental animals may also occur in humans if they are exposed to EDCs at a vulnerable time and at concentrations leading to alterations of endocrine regulation. Of special concern are effects on early development of both humans and wildlife, as these effects are often irreversible and may not become evident until later in life."

Box 1. What makes infants and children more vulnerable to some effects of certain hazardous chemicals?

A number of factors including size, metabolism and behaviour, can make infants, children and the developing foetus more vulnerable to some hazardous chemicals[87]:

Absorption and metabolism, relative to body weight

- Food, liquid and air intake is higher relative to their body weight and gastrointestinal absorption is increased in infants under six to eight months old which can increase absorption of some chemicals.
- The potential for more intensive contact with parts of home surroundings. Higher skin surface area relative to body weight, means potential for higher absorption relative to body weight of those chemicals which can be absorbed via the skin.

Physiological differences

- The blood-brain barrier, which limits the penetration of chemicals from the blood to the brain, develops gradually, resulting in potentially higher exposure of the foetal and infant brain to certain chemicals present in blood.
- There is greater storage and distribution of certain chemicals in children's organs.
- Reduced metabolic capacity to break down or eliminate chemicals absorbed into the body risks more severe adverse effects than adults for the same equivalent level of exposure.

Behaviour and exposure

- During infancy and as toddlers, many children spend a lot of time on or near the floor, where they are more exposed to dense vapours, car exhausts, house dust and chemicals leaching from flooring products.
- Babies and children regularly place objects and fingers in their mouths, leading to relatively high ingestion of labile chemicals on their surfaces, in addition to dietary sources.

The special vulnerability of children to certain chemicals has led regulators to enforce relatively more restrictive – but still insufficient – regulations on a small number of hazardous chemicals in certain products (such as phthalates in toys). Although necessary to protect children from direct exposure to hazardous chemicals in such cases, this approach is nowhere near enough: Where the limits are set they are not as low as could be achieved.

The focus of some regulations on children under three also excludes older children and other vulnerable people, in particular the unborn baby – via its parents and in particular the mother. Most importantly, such an approach ignores the often much greater indirect exposure to hazardous industrial chemicals from the environment and in particular through diet. The use of hazardous chemicals by manufacturing facilities which are discharged into waterways and the release of chemical residues from clothes into the air and water, for example when they are washed, contributes to the presence of hazardous chemicals in our environment. Only eliminating the use of hazardous chemicals across the whole textiles supply chain will address the problem.

#2

No more play – it's time to Detox

There is no "safe" level for hazardous chemicals – that is why the target of zero use is the only credible basis for taking effective action to eliminate these harmful substances. Both companies and governments need to clearly commit to this aim.

"Acceptable" levels of hazardous chemicals are not acceptable

This new Greenpeace study clearly confirms what previous investigations have found: in spite of decades of regulation and corporate responsibility programmes, hazardous chemicals – including the 11 priority groups identified for the textile sector by Greenpeace[88] – continue to be used by supply chain manufacturers of clothes for many well-known brands. Residues of hazardous chemicals are present in a wide range of children's clothing. So-called "acceptable" limits of these chemicals, set by regulations, have allowed releases from a multitude of sources, from the manufacturing processes through to the final products. For some of these chemicals this has resulted in their built-up in the environment and in some cases their accumulation in animal and humans over the years.

The findings of this study show that both companies and governments need thorough and comprehensive plans to achieve the elimination of hazardous chemicals, including those used in textiles manufacturing, and therefore prevent residues of these chemicals from contaminating consumer products, as well their release from manufacturing facilities. Some companies have taken on the challenge to be Detox *Leaders* and have begun this process. Unfortunately, other companies – adidas, Nike and LiNing – promote themselves as Detox brands but do not have an effective plan to eliminate the use of hazardous chemicals within their supply chains or their products. More companies have yet to make any commitment at all to Detox and need to do so urgently.

Credible actions taken by companies need to be matched with credible regulatory action from governments, to level the playing field and to send a strong message to the textile industry, as well as other sectors, that the use and release of hazardous chemicals is not acceptable. Although many of the Detox principles (see Box 2) are accepted by governmental bodies, this is not yet reflected by the thorough implementation of bans and restrictions on hazardous chemicals that will lead to their elimination by no later than 1 January 2020. Specific regulation needs to be targeted at each of the hazardous chemicals found in the children's clothing in this, to address the particular problems posed by each chemical group.

the grown ups need to stop these monsters!

Companies: some progress has been made, but much more needs to be done

The Detox commitment – to eliminate the use of all hazardous chemicals by no later than 1 January 2020 – is necessarily ambitious, to match the urgency of the problem. But it is achievable, so long as companies do not compromise on their commitments.

As a result of actions taken by some of the companies that have committed to Detox, significant changes have taken place. For example, the public's "Right to Know" about the chemical-by-chemical discharge from an individual supply chain facility used by a brand is becoming a reality. This has been continually rejected by the textile industry and considered almost impossible before the Detox campaign began. Today, several companies – Including Mango, Fast Retailing(Uniqlo), Inditex, H&M, Benetton, Valentino, G-Star, M&S, Limited Brands (Zara), C&A, Puma, Coop, Canepa and Esprit – have ensured they begin the publication of data from their suppliers about discharges of hazardous chemicals, on the global online platform IPE[89].

An **effective, credible Detox commitment and action plan** – aiming at zero discharges of hazardous chemicals by 2020 – consists of commitments and actions under three headings:

- core principles,
- transparency, and
- elimination.

An adequate approach needs to be hazard-based, comprehensive and have credible definitions for the "**Precautionary Principle**"[90], zero discharge of hazardous chemicals, individual corporate accountability[91], and the public's "**Right to Know**"[92] about the use and discharge of hazardous chemicals from a company's supply chain facilities, and their presence in the final product. Together, a commitment to these principles frames the practices that are necessary to progress towards zero hazardous chemical use.

To effectively eliminate the use of hazardous chemicals in the textile industry and resolve the problem of pollution of our waters with hazardous chemicals, companies should:

- Adopt a credible commitment to phase out the use, from their global supply chain and all products, of all hazardous chemicals by 1 January 2020. Credible means based on the unambiguous adoption of "**Precautionary Principle**"[93], zero discharge of hazardous chemicals, individual corporate accountability[94], and the public's "**Right to Know**"[95].
- Start disclosing – in the months following a commitment and at regular (at least annually) and relevant intervals afterwards information on the releases of hazardous chemicals that are still used at their supplier's facilities to the public, especially to local/national inhabitants (e.g. using credible public information platforms[96]).
- Commit to the elimination of the 11 priority chemical groups within a reasonable timeline, and set clear and credible intermediate progress targets for the elimination of other hazardous chemicals beyond these groups. Introduce non-hazardous chemistry by the earliest specific date possible: responsible companies will act now and not wait until 31 December 2019 to eliminate their hazardous chemical use.

Detox *Greenwashers* and *Laggards* must act now

In the two years since the public launch of Greenpeace's Detox campaign, companies that are Detox *Leaders* have ensured they begin the publication of hazardous chemical discharge data from many of their facilities – an achievement previously rejected by the textile industry as unrealistic. Communities local to textiles manufacturers and the wider public have now begun to gain their "Right to Know" about pollution from textile facilities. This, combined with information about current levels of hazardous chemicals in certain products, such as the findings presented in this report, is the starting point for the progressive reduction and elimination of hazardous chemicals pollutants into local waterways and in consumer products.

This report should remind the Detox *Leaders* of the urgency of eliminating hazardous chemical use in the supply chain and the need to apply their efforts comprehensively. Companies that continue to Greenwash and companies that are *Laggards* and have no Detox plan, need to act immediately to address the inadequacies in their policy and practice. The path to zero discharges requires every company to invest sufficient resources with urgency and there is no excuse to delay taking the first step.

Box 2. How do the products testing results reflect on the Detox Leaders, Greenwashers and Laggards?

This product testing is an independent investigation conducted by Greenpeace's Detox Campaign and separate from the Detox Catwalk. Nevertheless, the industry should consider the results of this product testing as a wake up call to urgently eliminate hazardous chemicals from their supply chain.

The Detox Catwalk assessed the progress of 17 Detox committed clothing brands towards their zero discharge goal[97] Greenpeace International identified 14 companies as Leaders undertaking concrete actions to address the problem of hazardous chemicals with the urgency that it requires. Three companies were found to be Greenwashers, failing to fully implement the credible on-the-ground outcomes they committed to. Meanwhile, seven companies that were yet to make a Detox commitment were classified as Laggards for their failure to commit.

Products from brands featured all three categories in the Detox Catwalk were included in this study: Leaders (C&A, H&M, Puma, Uniqlo), Greenwashers (adidas, Nike, LiNing) and Laggards (GAP). In this report, hazardous residues were detected in products across all of the brands. Despite committing to Detox two years ago, there is still insufficient evidence from the three Greenwashers to show they are delivering credible outcomes on the ground. Each of these companies has repeatedly rejected its corporate responsibility to take action towards the elimination of any of the identified hazardous chemicals. Neither have they been able to act with credible transparency towards the public, failing to actively support the public's "Right-to-Know" about hazardous chemical pollution from their individual suppliers. These three companies prefer to shield themselves under the umbrella of collective inaction – the ZDHC Group[98] – which has so far done little more than set up tools, processes and conduct pilot studies. Instead of taking the urgent action necessary to make credible progress towards the elimination of hazardous chemicals, adidas and Nike are "spinning" their public promises into public relations exercises.

Among the Greenwashers, three products from adidas had some of the highest concentrations of both volatile and ionic PFCs; a Nike coat also had the highest levels of volatile PFCs. For the Detox Leaders, this product testing shows that the implementation of some brand commitments has not yet impacted on the presence and levels of hazardous chemicals in some products. Some Detox Leaders brands were still tested high concentration of ionic PFCs and volatile PFCs for example waterproof trousers sold by H&M[99]; As well as a high concentration sample of NPE in a C&A branded shoe[100]. One Puma sportshoe was found to have high concentration of organotins[101], and a Uniqlo waterproof jacket was tested for a high level of volatile PFCs[102].

These Detox Leaders already have credible commitments and action plans in place and are in the process of implemented them. The presence of hazardous chemicals in their products should be used to inform and accelerate these plans, following a thorough investigation of the use of these hazardous chemicals by their suppliers. As there are no products from any one brand in this study that are free from hazardous chemicals at the detection limits used in this study, Greenpeace urges American Apparel, Burberry, Disney and Primark as well as GAP – already identified as a Laggard – to commit to Detox.

Governments: a political commitment to zero discharge is vital

Detox *Leaders* have taken up the challenge, but the current nature of the textiles industry, which outsources much of its production, means that the continued use of hazardous chemicals by companies that ignore the need to Detox can undermine these efforts. Therefore, regulation to implement this change across the whole sector is vital. To be effective, this needs to be defined to the strictest testing standards possible, so that the truth of where and how hazardous chemicals are turning up in our clothing and in the effluent of manufacturers is fully revealed.

Many of the chemicals within the 11 groups of hazardous chemicals identified are already regulated in some places, in one form or another, including certain APEOs, PFCs[103], organo tins, carcinogenic amines and phthalates. However, the fact that these hazardous chemicals appear to be so widely present in clothing products, as well as found in examples of effluent from the manufacturing supply chain, means that there can be only one conclusion: existing regulations are failing to protect human health and the environment.

Some shortcomings in the current regulatory approach are:

- The use of NPEs/NPs in textile manufacturing within Europe has been effectively banned for many years, in order to protect surface waters, yet there are no restrictions on the import of clothes containing these chemicals, which are released into public wastewater systems on a wide scale as a result of laundering[104].
- Regulations are not consistent across different product groups. For example, the EU has restriction on phthalates in children's toys, but not children's clothes.
- In general, the permitted levels of hazardous chemicals for use in manufacturing and in the finished product, set both by regulators and by voluntary industry labels are far too high, and allow their continued use in manufacturing. Therefore these 'permitted' chemical residues in clothing products, distributed across the globe via the numerous products that are traded, add up to significant quantities of hazardous and persistent chemicals which can lead to their continued build-up in the environment.
- Restrictions on the use of hazardous chemicals in manufacturing, such as NPEs/NPs in Europe (above) are not yet in place in the countries where the majority of manufacturing takes place, such as China, Bangladesh, Indonesia, Thailand, Turkey and Mexico.

China

China is the biggest textile manufacturing country in the world, consuming 42% of the textile chemicals used globally every year[105]. The country is the single largest manufacturer of the products analysed in this report at 35%, far ahead of the next largest which is Thailand at 9%. There are signs of increased awareness in China about the problem of hazardous chemical pollution from the textile industry, which is now beginning to be addressed; recently, there has been some progress towards greater restrictions on hazardous chemicals. A new Priority Chemicals List will be released by China's Ministry of Environmental Protection to cover environmental and human health hazards, which goes beyond the previous concept of "dangerous" and which will include some endocrine disruptors. However, unlike the EU REACH list of Substances of Very High Concern[106], the priority list currently lacks a clear mechanism on how and when it is to be updated and it does not have a clear objective to eventually eliminate the most hazardous substances. Meanwhile draft regulation is proposed that will restrict six phthalates in textile products for infants and children under three (under 36 months) covering six kinds of phthalates, including DEHP, DBP and DiBP[107].

Governments need to re-enforce efforts by companies to Detox – by adopting a political commitment to **zero discharge** of all hazardous chemicals within one generation, incorporating the **precautionary principle** and including a **preventative approach** by avoiding the production and use, and therefore, exposure to hazardous chemicals. Within this context, action is needed to tackle the hazardous chemicals that have been found in children's clothing in this report, to ensure the progressive elimination of their use, leading to zero discharges into waterways and adequate protection for consumers.

Some specific steps include:

- Regulation that will lead to the elimination of APEs (which includes NPEs) needs to implement a restriction that does not allow use, including within textiles production. There should also be an enforcement of no- allowable-residues in clothing articles, imported or otherwise. In order to offer adequate protection, both of these measures would need to set any limit for NPEs in products as low as possible, to the strictest possible testing limits, and cover as wide a range of NPEs as possible.
- The immediate extension of regulations that restrict phthalates in toys needs to include all articles for children, in particular clothing that bears plastisol prints. Ultimately, this needs to be extended to all products, including all textiles.
- The regulatory limits for the presence of all organotins in clothing need to be reduced to the lowest levels possible.
- The restriction on PFOS needs to be implemented globally and expanded to all PFCs, both ionic and volatile, to recognize the intrinsic hazard posed by this group of chemicals and prevent the current trend of substituting regulated PFCs with other PFCs.
- Regulations also need to restrict the use of antimony in polyester manufacture to encourage the use and development of alternative catalysts in polyester production.

For all measures, limits should be set at the lowest technical detection limit with the potential for this to be reduced further in the future, as technology improves.

These measures need to be part of a comprehensive implementation plan containing intermediate short term targets, a dynamic list of priority hazardous substances requiring immediate action based on **the substitution principle,** and a publicly available register of data on discharge emissions and losses of hazardous substances, such as a Pollutant Release and Transfer Register (PRTR).

Such a plan would prevent ongoing releases into the environment that may require future clean-up and have serious impacts on the environment and on people's health and livelihoods, especially in the Global South. It would set a clear direction for the textiles industry by showing that hazardous chemicals have no place in a sustainable society, which will in turn drive innovation towards safer alternatives. Finally, it would level the playing field and make the actions of leading companies a reality throughout the entire sector and beyond, as many of the hazardous chemicals used in textiles are also in use in other sectors.

In the context of the global textiles industry, the greatest quantities of hazardous chemical emissions take place where clothes are manufactured, by the suppliers of major clothing companies, which mostly take place in the Global South. Inevitably, clothing products containing hazardous chemicals because they were manufactured using hazardous chemicals will release these substances when they are bought and washed by consumers – wherever they are in the world.

People will naturally be concerned about their own exposure to hazardous chemicals in clothes, particularly when these clothes are for infants and young children. After using second-hand clothes wherever possible, the best option currently available when buying new clothes for infants and children is to look for clothes certified with labels108, and to avoid clothes with strong colours which might require more dyeing processes.

The role of people power

As global citizens we can also collectively:

- Choose to buy fewer new clothing products, and instead buy second-hand clothes where possible. This can also involve re-purposing and re-using older items to create "new" pieces for our wardrobes, or taking part in clothes swaps with friends.
- Influence brands to act responsibly on behalf of the planet and its people. The need for companies to make the right choices and protect future generations has never been greater than it is today, and brands need to be challenged on whether they have set a date for the elimination of the use of hazardous chemicals in their supply chains.
- Demand that governments act to restrict the sales and import of products containing hazardous chemicals.

Our children deserve to live in a world free of hazardous chemicals and adults have the power to make this a reality. By using our collective power, as adults, parents and global citizens, we can bring about the transformational change the textile industry desperately needs, ensuring companies and governments take real steps to Detox our clothes, Detox our water and Detox our future.

Creating a toxic-free future for our children is not only necessary, it is possible.

To find out how you can make your voice heard visit:

www.greenpeace.org/detox

Endnotes

1 Greenpeace International (2011b). Dirty Laundry 2: Hung Out to Dry: Unravelling the toxic trail from pipes to products. August 2011.

http://www.greenpeace.org/international/en/publications/reports/Dirty-Laundry-2/

Greenpeace International (2012a). Dirty Laundry: Reloaded. How big brands are making consumers unwitting accomplices in the toxic water cycle. 20 March 2012.

http://www.greenpeace.org/international/en/publications/Campaign-reports/Toxics-reports/Dirty-Laundry-Reloaded/

Greenpeace International (2012b). Toxic Threads: The Big Fashion Stitch-Up. November 2012.

http://www.greenpeace.org/international/big-fashion-stitch-up

Greenpeace e.V. (2012), Chemistry for any weather, October 2012. http://www.greenpeace.org/romania/Global/romania/detox/Chemistry%20for%20any%20weather.pdf

Greenpeace e.V. (2013), Chemistry for any weather II, December 2013, http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/chemie/20131212-Greenpeace-Outdoor-Report-2013-Summary.pdf

Greenpeace e.V. (2013b) Greenpeace: Bademoden mit gefährlichen Chemikalien belastet (German). http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/chemie/Factsheet_Bademode.pdf

Greenpeace e.V. (2013c) Schadstoffe in G-Star Produkten (German) http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/chemie/20130408_Factsheet_PFOS_in_G-Star-Produkten.pdf

2 All products were for children, while several were aimed at babies and children under three. Garments, including swimwear, made up the majority. Four items were footwear.

3 Based on public representations by the brand at the time of purchase (e.g. via their public website).

4 Some were also tested for carcinogenic amines released under reducing conditions, which were not detected in this study.

5 For full details of the samples, the methodology and results, see Greenpeace (2013), Technical Report

6 Sample number TX13094

7 Sample number TX13015

8 Sample numbers adidas TX13004; Puma TX13097 and TX13100

9 2 mg/kg di-octyl tin. See Oeko-tex, Limit values and fastness, https://www.oeko-tex.com/en/manufacturers/test_criteria/limit_values/limit_values.html

10 Puma website (2013), http://about.puma.com/wp-content/themes/aboutPUMA_theme/media/pdf/2013/PUMARSLMRSLV_01_13.pdf; adidas website (2013), http://www.adidas-group.com/media/filer_public/85/09/850915ac-f85f-4533-8e87-3c84c8093193/a01_sept_2013_en.pdf.

11 Sample numbers TX13003, 2420 µg/kg volatile PFCs, TX13004 499 µg/kg volatile PFCs, TX 13006 68 µg/kg ionic PFC

12 Sample number TX13082, contained 6967 µg/kg volatile PFCs

13 Sample number TX13108, contained 2346 µg/kg volatile PFCs

14 Sample number TX13004, 0.855 µg/m² sold in Hong Kong

15 Sample number TX13023, 0.464 µg/m²

16 Sample number TX 13006, 15.3 µg/m²

17 Norwegian Environment Agency (2013), The sale of textiles containing PFOA above 1 µg/m² in Norway will be prohibited from June 2014. Although this item was bought in Germany, comparison is made with this limits as Norway is the first, and so far only, country to regulate PFOA in textile products. NEA (2013) Flere stoffer på verstinglista (additional substances added to the priority list); http://www.miljodirektoratet.no/no/Nyheter/Nyheter/2013/November-2013/Flere-stoffer-pa-verstinglista/ (Norwegian).

18 adidas Group Policy for the Control and Monitoring of Hazardous Substances A-01 September 1st 2013, 1 µg/m² (p.26) http://www.adidas-group.com/media/filer_public/85/09/850915ac-f85f-4533-8e87-3c84c8093193/a01_sept_2013_en.pdf

19 Carcinogenic amines were not released under the test conditions at levels above the method detection limit (<5 mg/kg) in any of the 41 articles tested.

See footnote 1.

20 Greenpeace Detox 1, Dirty Laundry

21 Sample number TX13030, 17,000 mg/kg NPE

22 Sample TX13030, 17,000 mg/kg. C&A's Restricted Substances List (April 2013) sets a limit of 100 mg/kg. http://www.c-and-a.com/uk/en/corporate/fileadmin/templates/master/img/fashion_updates/International_Press_Releases/RSL_version_April_2013.pdf

23 C&A: Sample number TX13030, 17,000 mg/kg NPE; Disney, TX13040, 3,900 mg/kg; American Apparel TX13015, 2000 mg/kg; Burberry TX13025, 780 mg/kg.

24 Disney does not publish a Restricted Substances List but is "developing a strong chemicals management framework, with the Restricted Substances List as an initial step." http://www.sec.gov/divisions/corpfin/cf-noaction/14a-8/2013/bostoncommon110413-14a8-incoming.pdf

25 American Apparel does not publish a Restricted Substances List http://www.americanapparel.net/aboutus/corpresp/environment/

26 Burberry does not publish a Restricted Substances List http://www.burberryplc.com/corporate_responsibility/great_brand_great_company

27 NP and NPEs were included on the first list of chemicals for priority action towards achieving the OSPAR Convention target of ending discharges, emissions and losses of all

hazardous substances to the marine environment of the north-east Atlantic by 2020. NP has also been included as a “priority hazardous substance” under the EU Water Framework Directive. Furthermore, within the EU, since January 2005 products (formulations used by industry) containing greater than 0.1% of NP or NPEs may no longer be placed on the market, with some minor exceptions principally for closed loop industrial systems. See Brigden et.al 2013, Technical Report, Box A.

28 CEPA (2004) Notice requiring the preparation and implementation of pollution prevention plans in respect of effluents from textile mills that use wet processing (TMEs) and nonylphenol (NP) and its ethoxylates (NPEs), under the Canadian Environmental Protection Act (CEPA), 1999. Canada Gazette Part I, Vol. 138, No. 49, 4th December 2004. http://www.ec.gc.ca/planp2-p2plan/B2D19B6D-325F-458A-88E1-F69291E58DE3/g1-13849.pdf

USPEA (2010) Nonylphenol (NP) and Nonylphenol Ethoxylates (NPEs) Action Plan. Unites States Environmental Protection Agency (USEPA), August 18, 2010. http://www.epa.gov/oppt/existingchemicals/pubs/actionplans/np-npe.html

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

30 MEP (2011). List of Toxic Chemicals Severely Restricted for Import and Export in China Ministry of Environmental Protection (MEP), The People’s Republic of China, 2011.

http://www.crc-mep.org.cn/news/NEWS_DP.aspx?TitID=267&T0=10000&LanguageType=CH&Sub=125

31 Primark does not publish a Restricted Substances List http://www.abf.co.uk/responsibility/retail/environment

32 Sample number TX13094

33 Sample number TX13015

34 American Apparel does not publish a Restricted Substances List, op.cit.

35 Howdeshell et al. 2008, Lin et al. 2008). See Technical report

36 Lovekamp-Swan & Davis 2003, Grande et al. 2006, Gray et al. 2006. See Technical report.

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

38 American Apparel and Footwear Association (2013), op.cit. refers to the U.S. Consumer Product Safety Improvement Act (PL 110-787), which restricts each of the six phthalates DEHP, DNOP, BBP, DBP, DNIP, DIDP to 0.1%.

39 SAC (2013) a, National Standard of the PRC, “Safety of toys - Part 1 Basic Specifications”, notification to World Trade Organisation, Integrated Business Management Update :2013 -07-02 14:46 , http://www.sac.gov.cn/zwgk/wtotb/tbttb/201307/t20130702_138723.htm

40 http://www.cpsc.gov/phthalates

41 European Commission, Guideline on the interpretation of the concept “which can be placed in the mouth” as laid down in

the entry 52 of Annex XVII to REACH Regulation 1907/2006 http://echa.europa.eu/documents/10162/13645/guideline_interpretation_concept_mouth_en.pdf

Regulation on phthalates in toys and childcare articles in China and the US also do not apply to children’s clothing.

42 SAC (2012b) The safety technical code for infants and children textile products (edition for authorizing/approval). General Administration of Quality Supervision, Inspection and Quarantine of the People’s Republ ic of China & Standardization Administration of the People’s Republic of China (SAC). http://www.cttc.net.cn/Upload/fck/E85819E943C6D099FFB911B819472341C442E47D.pdf

43 American Apparel and Footwear Association (2013), op.cit.

23 Regulation (ECHA 2013). See Technical report.

44 adidas TX13004 0.28-106 mg/kg, Puma TX13097 <0.1-401 mg/kg, Puma TX13100 0.44-105 mg/kg

45 Sample TX13097 contained up to 401mg/kg total organotins in various materials.

46 2 mg/kg di-octyl tin. See Oeko-tex, Limit values and fastness, https://www.oeko-tex.com/en/manufacturers/test_criteria/limit_values/limit_values.html

47 adidas Group Policy for the Control and Monitoring of Hazardous Substances A-01 September 1st 2013, DOT 1ppm, footwear and apparel (p.22) http://www.adidas-group.com/media/filer_public/85/09/850915ac-f85f-4533-8e87-3c84c8093193/a01_sept_2013_en.pdf

Puma Safe Handbook of Environmental Standards 2012, 1ppm for all remaining organotins (other than MBT, DBT, TBT), in all materials, p.70, http://about.puma.com/wp-content/themes/aboutPUMA_theme/media/pdf/PUMASafeEnvironmentHandbook-Vol2_final.pdf

48 Mango website (2013), op.cit. Credible chemical scope and reporting limits are employed by Detox committed brands such as Mango .

49 adidas TX13009, 0.22 – 0.48 mg/kg, Puma TX13102, <0.1 – 0.48 mg/kg, H&M TX13063 0.16-0.32mg/kg

50 Greenpeace e.V. 2012, Chemistry for any weather, Greenpeace tests outdoor clothes for perfluorinated toxins, October 2012, Greenpeace e.V. http://www.greenpeace.de/fileadmin/gpd/user_upload/themen/chemie/gp_outdoor_report_2012_engl_fol_fin_neu_02_es.pdf

51 Ökotest (2011), Kinder & Familie, Test: Kinderschlafanzüge, Druckfehler, November 2011.

52 Santillo, D., Johnston, P. & Brigden, K. (2001b) The presence of brominated flame retardants and organotin compounds in dusts collected from Parliament buildings from eight countries. Greenpeace Research Laboratories Technical Note 03/2001, March 2001: 24 pp.

53 adidas TX13003 2420 µg/kg volatile PFCs, TX13004 499 µg/kg volatile PFCs, TX13005, 68 µg/kg ionic PFCs.

54 C&A TX13026 380 µg/kg, Uniqlo TX13108 2346 µg/kg.

55 adidas TX13004 PFOS, Burberry TX13023 PFOS

56 adidas TX13005, ionic PFCs

57 adidas Group Policy for the Control and Monitoring of Hazardous Substances A-01 September 1st 2013, 1ppm (p.26) http://www.adidas-group.com/media/filer_public/85/09/850915ac-f85f-4533-8e87-3c84c8093193/a01_sept_2013_en.pdf

58 Nike TX13082 6967 µg/kg

59 Nike sets a reporting limit of 0.005mg/kg PFOA (not a maximum concentration limit). Sample TX13082 contained 7400 ng/kg PFOA, equivalent to 0.007 mg/kg. Nike Abbreviated Restricted Substances List, August 2011, p.7, http://www.nikeincchemistry.com/wp-content/uploads/Abbreviated-RSL.pdf

60 PFDoA and another long chained PFCA have recently been added to a list of priority chemicals in Norway, meaning that releases to the environment must be eliminated or substantially reduced by 2020. NEA (2013) Flere stoffer på verstinglista (additional substances added to the priority list); http://www.miljodirektoratet.no/no/Nyheter/Nyheter/2013/November-2013/Flere-stoffer-pa-verstinglista/ (Norwegian)

61 Puma TX13097 25.2 µg/kg ionic PFCs

62 H&M TX13067 2290 µg/kg ionic PFCs, waterproof trousers for a child of 1.5 – 2 years

63 H&M TX13065, 32.7 µg/kg ionic PFCs

64 H&M TX13067

65 Greenpeace e.V. (2012), Chemistry for any weather, http://www.greenpeace.org/romania/Global/romania/detox/Chemistry%20for%20any%20weather.pdf, and Greenpeace e.V. (2013) Chemistry for any weather II, http://www.greenpeace.org/switzerland/Global/switzerland/fr/publications/toxiques/2013_Toxiques_Resume_OutdoorClothing.pdf .

66 Greenpeace e.V. (2013), Chemistry for any weather II, add link.

67 Although a wide range of uses are currently exempted. UNEP (2009) Adoption of amendments to Annexes A, B and C of the Stockholm Convention on Persistent Organic Pollutants under the United Nations Environment Programme (UNEP). http://chm.pops.int/Portals/0/download.aspx?d=UNEP-POPS-COP-NOTIF-DN-CN524-2009.English.pdf

68 EU (2006) 2006/122/EC of the European Parliament and of the Council of 12 December 2006 amending for the 30th time Council Directive 76/769/EEC on the approximation of the laws, regulations and administrative provisions of the member states relating to restrictions on the marketing and use of certain dangerous substances and preparations (perfluorooctane sulfonates). Official Journal L 372/32, 27.12.2006

69 NEA (2013) Flere stoffer på verstinglista (additional substances added to the priority list), Norwegian Environment agency (NEA); http://www.miljodirektoratet.no/no/Nyheter/Nyheter/2013/November-2013/Flere-stoffer-pa-verstinglista/ (Norwegian)

70 ECHA (2013) Candidate List of Substances of Very High Concern for authorization. European Chemicals Agency. http://echa.europa.eu/chem_data/authorisation_process/candidate_list_table_en.asp

71 Duh 2002, Lacasse & Baumann 2004. See Technical Report

72 Jaffe & East 2007, Thiele 2004, See Technical Report

73 Greenpeace (2013a). Toxic Threads: Polluting Paradise. A story of big brands and water pollution in Indonesia, pp 44; including the accompanying Technical report, pp30. http://www.greenpeace.org/international/en/publications/Campaign-reports/Toxics-reports/Polluting-Paradise/

74 Arsenic and many of its compounds are especially potent poisons. Acute arsenic poisoning is associated initially with nausea, vomiting, abdominal pain, and severe diarrhoea. Chronic arsenic toxicity results in multisystem disease. Arsenic is a well

documented human carcinogen affecting numerous organs. Ratnaike RN (2003), Acute and chronic arsenic toxicity. Postgrad Med J. 2003 Jul;79(933):391-6.

http://www.ncbi.nlm.nih.gov/pubmed/12897217

75 Listed by the International Agency for Research on Cancer (IARC) as "possibly carcinogenic to humans" (group 2B), principally due to inhalation of dusts and vapours. IARC (1989). International Agency for Research on Cancer (IARC) Monographs programme on the evaluation of carcinogenic risks to humans: Some Organic Solvents, Resin Monomers and Related Compounds, Pigments and Occupational Exposures in Paint Manufacture and Painting vol. 47, pp. 291–306

76 Greenpeace 2013, Toxic Threads: Polluting Paradise

77 Which aims to promote products with a reduced environmental impact compared with other products in the same product group.

78 EC (2009) op.cit.

79 Dorey, C.N. (2003), Chemical Legacy: Contamination of the Child, Greenpeace UK, October 2003, ISBN 1-903907-06-3, http://www.greenpeace.org/international/Global/international/planet-2/report/2003/10/chemical-legacy-contaminatio.pdf

80 For example: Oeko-tex, which has separate product categories for infants and children as well as for products that have "direct skin contact" which provide specific guarantees to the consumer.

81 For example, M&S does not permit any biocidal finish on its childrenswear products but for all products only triclosan is not permitted. M&S Restricted Substances List May 2013, p. 4: http://corporate.marksandspencer.com/documents/how_we_do_business/restrictedsubstancelist_may_2013.pdf

82 American Apparel and Footwear Association (2013), Restricted Substances List, September 2013, 13th Edition, p.40, phthalates, https://www.wewear.org/assets/1/7/RSL13english-September2013.pdf lists countries which restrict phthalates in toys and childcare articles are listed asas the EU, the US, South Korea, Denmark, Egypt and Turkey Similar restrictions are proposed in China: SAC (2013) Toys safety, Part 1: Basic Code, GB 6675.1—201. SAC (Standardization Administration of the People's Republic of China http://www.sac.gov.cn/zwgk/wtotb/tbttb/201307/t20130702_138723.htm (Chinese)

83 SAC (2012b) The safety technical code for infants and children textile products (edition for authorizing/approval). General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China & Standardization Administration of the People's Republic of China (SAC). http://www.cttc.net.cn/Upload/fck/E85819E943C6D099FFB911B819472341C442E47D.pdf

84 American Apparel and Footwear Association (2013), op.cit. ;SAC (2012b) The safety technical code for infants and children textile products (edition for authorizing/approval).

85 WHO 2013b, op.cit.

86 WHO 2013b, State of the science of endocrine disrupting chemicals - 2012.

An assessment of the state of the science of endocrine disruptors prepared by a group of experts for the United Nations Environment Programme (UNEP) and WHO, 2013, http://www.who.int/ceh/publications/endocrine/en/index.html

87 Dorey, (2003), op.cit.

88 The 11 priority hazardous chemical groups are : 1. Alkylphenols and their ethoxylates (APEOs & APs) 2. Phthalates 3.Brominated and chlorinated flame retardants (BFRs, CFRs) 4. Azo dyes that can release carcinogenic amines 5. Organotin compounds 6. Per- and poly-fluorinated chemicals (PFCs) 7. Chlorobenzenes 8. Chlorinated solvents 9. Chlorophenols 10. Short chain chlorinated paraffins 11. Heavy metals such as cadmium, lead, mercury and chromium (VI).

89 IPE – Chinese Institute for Environmental Affairs, which is the only credible global chemical discharge disclosure platform.

90 This means taking preventive action where there are legitimate reasons for concern regarding the intrinsic hazards of a chemical, even if information is insufficient to verify those hazards. It is based, in part, on the premise that some hazardous substances cannot be rendered harmless by the receiving environment (i.e. there are no 'environmentally acceptable'/ 'safe' use or discharge levels) and that prevention of potential damage is required, (NOTE – deleted as duplicate of above). The process of applying the Precautionary Principle must involve an examination of the full range of alternatives, including, where necessary, substitution through the development of sustainable alternatives where they do not already exist.

91 All brands need to take corporate responsibility for a clear Individual Action Plan that identifies the steps it will take to follow through on its Detox commitment and continuously review and update these steps.

92 "Right to Know" is defined (Is this our definition, of the universally accepted one? I read this to say that it is that latter) as practices that allow members of the public access to environmental information – in this case specifically about the uses and discharges of chemicals based on reported quantities of releases of hazardous chemicals to the environment, chemical-by-chemical, facility-by-facility, at least year-by-year.

93 This means taking preventive action where there are legitimate

reasons for concern regarding the intrinsic hazards of a chemical, even if information is insufficient to verify those hazards. It is based, in part, on the premise that some hazardous substances cannot be rendered harmless by the receiving environment (i.e. there are no 'environmentally acceptable'/ 'safe' use or discharge levels) and that prevention of potential damage is required, (NOTE – deleted as duplicate of above). The process of applying the Precautionary Principle must involve an examination of the full range of alternatives, including, where necessary, substitution through the development of sustainable alternatives where they do not already exist.

94 All brands need to take corporate responsibility for a clear Individual Action Plan that identifies the steps it will take to follow through on its Detox commitment and continuously review and update these steps.

95 "Right to Know" is defined (Is this our definition, of the universally accepted one? I read this to say that it is that latter) as practices that allow members of the public access to environmental information – in this case specifically about the uses and discharges of chemicals based on reported quantities of releases of hazardous chemicals to the environment, chemical-by-chemical, facility-by-facility, at least year-by-year.

96 http://www.ipe.org.cn/En/

97 http://www.greenpeace.org/international/en/campaigns/toxics/water/detox/Detox-Catwalk/

98 Zero Discharge of Hazardous Chemicals Group, Joint Roadmap, http://www.roadmaptozero.com

99 H&M reports that "From January 2013, PFCs were banned from all our products globally. This means that all orders placed from 1 January or later have been produced without PFCs". H&M Conscious Actions Sustainability Report 2012, http://about.hm.com/AboutSection/en/About/Sustainability/Reporting-and-Resources/Reports.html#cm-menu email 12 Dec 2013 from H&M representative Mattias Bodin.

100 "By the end of 2013 …. Report to the public the results of the APEO investigation, including the detection levels and substitute chemistry used (and how/why it was chosen – non-hazardousness profile)." C&A Updated Individual Action Plan, 16 November 2012 http://www.candacr.com/en/2012/11/16/updated-ca-individual-action-plan-in-the-frame-of-the-joint-roadmap-towards-zero-discharge-of-hazardous-chemicals-by-2020/

101 Puma aims to integrate the phasing out of hazardous chemicals in the supply chain as an additional element of the existing PUMA sustainability scorecard, 2015 PUMA Individual Action Plan v.2. http://about.puma.com/wp-content/themes/aboutPUMA_theme/media/pdf/2011/pumaroadmap.pdf

102 Fast Retailing Detox Commitment, 2013, op.cit. "eliminate all C7 and C8 PFC use by no later than 31 Dec 2013; and eliminate all remaining PFC use by no later than 01 July 2016"

103 For example PFOS.

104 Such a regulation has been proposed within the EU, by the Swedish Chemical Inspectorate, KEMI, see: KEMI (2012) Proposals for new restrictions under REACH. Swedish Chemicals Agency (KEMI). http://www.kemi.se/en/Content/Rules-and-regulations/Reach/Begransningsregler-bilaga-XVII/Proposals-for-new-restrictions/

105 UNEP Global Chemicals Outlook (2012) Pillar I: Trends and Indicators, Chemicals Used in Textile Production, p. 14, the 42% is a fraction of all chemicals that used, including non-hazardous chemicals.

106 REACH list of Substances of Very High Concern (SVHC)

107 Draft textile product safety standard, 6 kinds of phthalates (DEHP, DBP, BBP, DiNP, DiDP, DnOP) are regulated not to exceed 0.1% by mass in articles.

108 A selective list of some of the most comprehensive and stringent ecolabels currently available is provided in a recent report by Women in Europe for a Common Future. See WECF (2013), op.cit.

Appendix

Appendix.

Concentrations of NPEs, carcinogenic amines, phthalates, organo tins, ionic PFCs, volatile PFCs and antimony in all articles tested

Sample code	Brand	Place of sale	Place of manufacture	Kind of product	Fabric	NPEs (mg/kg)	amines (mg/kg)	phthalate total (mg/kg)	Organotin total (mg/kg)	Ionic PFCs (µg/kg)	volatile PFCs (µg/kg)	Antimony in fabric (mg/kg)	Antimony polyester (mg/kg)*
TX13001	adidas	Hungary	Thailand	trousers & pullover set	70% cotton, 30% polyester	8.7	<5	-	-	-	-	62	208
TX13002	adidas	Mainland China	Mainland China	t-shirt	70% cotton, 30% polyester	<1.0	-	44	<0.1	-	-	55	184
TX13003	adidas	Taiwan	Mainland China	coat	shell 100% polyester; lining 65% polyester, 35% coton	1.8	<5	-	-	2.18 - 10.2	2420	105	105
TX13004	adidas	Hong Kong	Indonesia	shoes	upper coated leather; lining textile; outer sole rubber	16	-	-	0.28 - 106	ND - 2.55	499	-	-
TX13005	adidas	Colombia	Mainland China	football shirt	100% polyester	<1.0	<5	50	<0.1	-	-	49	49
TX13006	adidas	Germany	Mainland China	swimwear	shell 80% nylon, 20% elastane; lining 100% polyester	<1.0	-	12	-	68.0 - 68.0	ND	100	100
TX13007	adidas	Indonesia	Thailand	t-shirt	100% polyester	<1.0	<5	54	-	-	-	197	197
TX13008	adidas	Israel	Indonesia	top	100% polyester	<1.0	-	-	-	-	-	46	46
TX13009	adidas	Sweden	Thailand	t-shirt	60% cotton, 40% polyester	19	-	21	0.22 - 0.48	-	-	97	242
TX13010	adidas	Philippines	Thailand	t-shirt	60% cotton, 40% polyester	38	-	45	-	-	-	54	135
TX13011	adidas	Russia	Mainland China	swimsuit	shell 80% nylon, 20% elastane; lining 100% polyester	<1.0	<5	-	-	-	-	293	293
TX13012	American Apparel	Mainland China	USA	leggings	80% nylon, 20% elastane	<1.0	-	-	-	-	-	-	-
TX13013	American Apparel	Japan	USA	baby body suit	100% cotton	25	-	-	-	-	-	-	-
TX13014	American Apparel	UK	USA	sweatshirt	50% cotton, 50% polyester	660	<5	-	-	-	-	99	197
TX13015	American Apparel	USA	USA	baby one-piece	100% cotton	2000	-	6100	-	-	-	-	-
TX13016	Burberry	Austria	Tunisia	swimsuit	80% polyamide (nylon), 20% elastane; lining 100% polyamide (nylon)	<1.0	<5	-	-	1.39	ND	-	-
TX13017	Burberry	Mainland China	Mainland China	t-shirt	100% cotton	54	-	11	-	-	-	-	-
TX13018	Burberry	Taiwan	Mainland China	camise	100% cotton	27	-	-	-	-	-	-	-
TX13019	Burberry	Hong Kong	Thailand	jacket	Shell 100% polyester; lining 100% cotton	390	<5	-	-	-	-	47	47
TX13020	Burberry	Turkey	Mainland China	t- shirt	80% cotton, 15% nylon, 5% wool	62	-	-	-	-	-	-	-
TX13021	Burberry	Sweden	Thailand	baby body suit	97% cotton, 3% elestane	<1.0	<5	-	-	-	-	-	-
TX13022	Burberry	Spain	Mainland China	t-shirt	100% cotton	33	-	-	-	-	-	-	-
TX13023	Burberry	UK	Italy	swimsuit	80% polyamide, 20% elastane; lining 100% polyamide	<1.0	-	-	-	2.76	ND	-	-
TX13024	no article	-	-	-	-	-	-	-	-	-	-	-	-
TX13025	Burberry	UK	Tunisia	shirt	100% cotton	780	-	-	-	-	-	-	-
TX13026	C&A	Hungary	unknown	jacket	96% polyester, 4% elastane	46	-	-	-	7.40	380	91	94
TX13027	C&A	Poland	unknown	t-shirt	100% cotton	<1.0	<5	-	-	-	-	-	-
TX13028	C&A	Mainland China	India	baby onesie	100% cotton	<1.0	<5	15	-	-	-	-	-
TX13029	C&A	Turkey	unknown	t-shirt	100% cotton	<1.0	<5	15	<0.1	-	-	-	-
TX13030	C&A	Mexico	Mexico	shoes	Bovine leather, pig skin lining and synthetic outer soles	17 000	<5	-	<0.1	-	-	-	-
TX13031	C&A	Spain	unknown	t-shirt	100% cotton	<1.0	-	130	-	-	-	-	-
TX13032	C&A	Switzerland	unknown	baby t-shirt	100% organic cotton	2.9	-	72	-	-	-	-	-
TX13040	Disney	Mainland China	Mainland China	dress	94.4% cotton, 5.6% elastane	3900	-	63	<0.1	-	-	-	-
TX13041	Disney	Hong Kong	Mainland China	fleece jacket	100% polyester	30	<5	-	-	-	-	107	107
TX13042	Disney	Spain	Mainland China	swimsuit	100% polyester	70	-	-	-	4.26	ND	167	167
TX13043	Disney	Thailand	Thailand	t-shirt	100% cotton	<1.0	-	6.0	<0.1	-	-	-	-
TX13044	Disney	USA	Mainland China	t-shirt	100% organic cotton	1.6	-	27	<0.1	-	-	-	-
TX13048	GAP	Hong Kong	Mainland China	t-shirt	100% cotton	2.5	<5	14	<0.1	-	-	-	-
TX13049	GAP	Colombia	Indonesia	t-shirt	100% cotton	3.4	<5	-	-	-	-	-	-
TX13050	GAP	Greece	Vietnam	t-shirt	100% cotton	<1.0	-	<3.0	<0.1	-	-	-	-
TX13051	GAP	Indonesia	Phillippines	t-shirt	100% cotton	9.2	-	42	<0.1	-	-	-	-
TX13052	GAP	Japan	Indonesia	short pants	not specified	34	-	-	-	-	-	-	-

Appendix

Table A1. Details of all articles, including the concentrations of NPEs, carcinogenic amines, phthalates, organotins, PFCs and antimony.

For carcinogenic amines '<5 mg/kg' indicates that all quantified amines were below the detection limit (<5 mg/kg); For phthalates, organotins and PFCs, the total concentration of the quantified individual compounds in each group is given, with data for individual phthalates, organotins and PFCs provided in Appendices 2, 3 and 4 respectively; For organotins, a range of values is given for some articles where more than one type of fabric was analysed; ND – not detected; '-' indicates not tested. * Where fabric was composed of mixed fibres, the concentration of antimony in polyester was calculated from fabric composition information, on the basis that all antimony arose from the polyester fibre within the fabric blend

Sample code	Brand	Place of sale	Place of manufacture	Kind of product	Fabric	NPEs (mg/kg)	amines (mg/kg)	phthalate total (mg/kg)	Organotin total (mg/kg)	Ionic PFCs (µg/kg)	volatile PFCs (µg/kg)	Antimony in fabric (mg/kg)	Antimony polyester (mg/kg)*
TX13053	GAP	Israel	Turkey	t-shirt	100% cotton	<1.0	-	26	<0.1	-	-	-	-
TX13054	GAP	Turkey	Mainland China	swimsuit	shell 80% nylon, 20% elastane; lining 100% polyester	<1.0	<5	-	-	-	-	128	128
TX13055	GAP	Mexico	Vietnam	t-shirt	100% cotton	<1.0	-	5.5	<0.1	-	-	-	-
TX13056	GAP	Philippines	Vietnam	t-shirt	100% cotton	<1.0	<5	5.6	<0.1	-	-	-	-
TX13057	GAP	Thailand	Philippines	t-shirt	60% cotton, 40% polyester	<1.0	-	<3.0	<0.1	-	-	59	147
TX13058	GAP	USA	unknown	t-shirt	100% cotton	<1.0	-	-	-	-	-	-	-
TX13063	H&M	Poland	Bangladesh	t-shirt	100% cotton	<1.0	<5	7.6	0.16-0.32	-	-	-	-
TX13064	H&M	Mainland China	Bangladesh	dress	100% cotton	12	-	45	-	-	-	-	-
TX13065	H&M	Germany	Mainland China	coat	Shell 100% polyester; coating 100% polyurethane	7.8	<5	-	-	32.7 - 314	ND	42	42
TX13066	H&M	Greece	Mainland China	t-shirt	100% polyester	38	<5	19	-	-	-	149	149
TX13067	H&M	Sweden	Mainland China	plastic pants	100% polyester	89	<5	-	-	26.4 - 2290	ND	71	71
TX13068	H&M	Spain	Mainland China	bodysuit	100% cotton	7.9	-	-	-	-	-	-	-
TX13069	H&M	Thailand	Mainland China	sweater	100% acrylic	1.7	<5	27	<0.1	-	-	-	-
TX13072	Li Ning	Germany	Mainland China	sports shirt	88% polyester, 12% elastane	2.1	<5	-	<0.1	-	-	70	80
TX13073	Li-Ning	Mainland China	Mainland China	sports top & shorts	100% polyester	3.3	<5	7.3	<0.1	-	-	121	121
TX13074	Li-Ning	Mainland China	Mainland China	t-shirt	100% cotton	<1.0	<5	9.5	-	-	-	-	-
TX13075	Li-Ning	Mainland China	Mainland China	dress	body lining 100% cotton; outershell 60% polyester, 40% nylon	5.1	-	-	-	-	-	-	-
TX13082	Nike	Argentina	Bangladesh	coat	body 100% polyester; lining 65% polyester, 35% cotton	2.4	-	15	-	29.7	6967	14	14
TX13083	Nike	Chile	Mainland China	t-shirt	100% cotton	<1.0	<5	31	<0.1	-	-	-	-
TX13084	Nike	Taiwan	Mainland China	t-shirt	100% cotton	<1.0	<5	-	<0.1	-	-	-	-
TX13085	Nike	Germany	Vietnam	shoes	Suede, leather and nubuck	6.3	<5	-	<0.1	2.83	ND	-	-
TX13086	Nike	Indonesia	Indonesia	t-shirt	100% polyester	<1.0	<5	-	-	-	-	119	119
TX13087	Nike	Israel	Vietnam	running top	100% polyester	2.5	<5	-	<0.1	-	-	64	64
TX13088	Nike	Turkey	Turkey	t-shirt	100% cotton	5.6	<5	65	-	-	-	-	-
TX13089	Nike	Sweden	Thailand	t-shirt	100% polyester	<1.0	-	-	-	-	-	73	73
TX13090	Nike	Switzerland	Vietnam	wind jacket	body 100% nylon; lining: 100% polyester	22	<5	-	-	-	-	104	104
TX13091	Primark	Austria	unknown	swimming trunks	Outer hhell 80% nylon, 20% elastane; lining 100% polyester	480	-	-	-	2.01	ND	134	134
TX13092	Primark	Austria	unknown	sweatshirt	Shell 80% cotton, 20% polyester; lining 65% polyester, 35% cotton	12	<5	11	<0.1	-	-	121	186
TX13093	Primark	Austria	unknown	coat	100% nylon; lining 100% nylon	<1.0	-	-	-	2.43	ND	-	-
TX13094	Primark	Germany	unknown	t-shirt	100% cotton	1.2	<5	110 000	<0.1	-	-	-	-
TX13095	Primark	Spain	unknown	shorts	100% cotton	48	-	-	-	-	-	-	-
TX13096	Primark	UK	unknown	sweatpants	100% polyster	58	<5	-	-	-	-	77	77
TX13097	Puma	Mainland China	Indonesia	shoes	leather and other materials; lining textile and other materials	7.3	<5	-	<0.1 - 401	25.2	ND	-	-
TX13098	Puma	Germany	Turkey	football shirt	100% polyester	25	-	-	<0.1	-	-	126	126
TX13099	Puma	Greece	Bangladesh	t-shirt	65% polyester, 35% cotton	5.5	-	-	-	-	-	95	147
TX13100	Puma	Indonesia	Mainland China	shoes	Upper leather and other materials; lining textile; sole rubber	340	<5	-	0.44 - 105	-	-	-	-
TX13101	Puma	Italy	Bangladesh	t-shirt	100% cotton	<1.0	<5	-	-	-	-	-	-
TX13102	Puma	Turkey	Bangladesh	t-shirt	65% polyester, 35% cotton	17	<5	120	<0.1 - 0.48	-	-	100	154
TX13106	Uniqlo	Japan	Mainland China	polo shirt	100% polyester	<1.0	-	-	<0.1	-	-	86	86
TX13107	Uniqlo	Japan	Mainland China	t-shirt	65% polyster, 35% cotton	26	-	96	<0.1	-	-	141	217
TX13108	Uniqlo	Philippines	Vietnam	Jacket	100% polyester	<1.0	<5	-	-	ND	2346	73	73

GREENPEACE

By Greenpeace East Asia Beijing Office

3/F, Julong Office Building, Block 7, Julong Garden, 68 Xinzhong Street, Dongcheng District, Beijing, China. 100027

Greenpeace is an independent global campaigning organisation that acts to change attitudes and behaviour, to protect and conserve the environment and to promote peace.

greenpeace.org