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Inspection and risk assessment of chemical substances in children's products bought online

Mapping of chemical substances in
consumer products, no. 206

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Title: Inspection and risk assessment of chemical substances in children's products bought online

Purpose:

The purpose of this project was to assess compliance with regulations concerning certain regulated chemical substances in consumer products purchased online, and to examine whether there are differences in compliance between the three types of online shops. Secondly, the study examined whether consumers are exposed to a health risk due to the presence of potentially problematic non-regulated substances.

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Foreword

Inspection and risk assessment of chemical substances in children's products bought online

In this project, comparable children's fashion products were purchased from three types of online shops for the purpose of investigating differences in the content of both non-regulated substances of concern and regulated chemicals in products from the three types of web shops:

- Danish online shops with own inventory
- EU-based dropshipping online shops
- Large online marketplaces

This project was carried out by FORCE Technology (survey and chemical analyses) with the assistance of DHI as subcontractor for hazard assessment and risk assessment, and Medico Kemiske Laboratorium ApS as subcontractor for selected chemical analyses.

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Summary

According to statistics from Statistics Denmark and the Confederation of Danish Industry (DI), Danes are doing more and more of their shopping online. Products in the clothing, shoes and accessories category are bought online particularly often. A 2025 study by the Nordic Council of Ministers on dropshipping and other e-commerce in the Nordic region showed that 71% of products purchased online did not comply with the legal requirements of REACH, the POP Regulation, CLP and the Toy Safety Directive, among others.

Based on the results of this Nordic study on online shopping, the Danish Environmental Protection Agency (Danish EPA) launched this project, focusing exclusively on products for children in the categories of clothing, shoes and accessories (i.e., children's fashion) and compliance with legal requirements in the REACH and POP Regulations. However, the project also investigates whether non-regulated substances may constitute a health risk. In this project, "children's fashion" is defined as clothing, shoes and accessories for children (young people under the age of 15). This includes all kinds of children's clothing, shoes and sandals, as well as accessories, including jewellery, bags and similar fashion products.

Focus on children's fashion products

The products in focus in this project in the children's fashion category were:

- Textiles with plastic prints; that is, textile items such as T-shirts with soft plastic prints and socks with plastic grips
- Textiles with dirt- or water-resistant properties, such as snowsuits and bibs
- Metal jewellery or other metal accessories, such as hair clips
- Soft plastic articles, such as plastic clogs, bags, and similar items

The goals of this project are twofold: firstly, to inspect for compliance with certain regulated chemical substances when buying consumer products online and determine whether there are differences in compliance between the three types of online stores. Secondly, to investigate whether consumers face health risks due to the presence of problematic unregulated substances, if any.

Products were purchased from three types of online stores

A total of 83 products were purchased and received from three types of online stores that the Danish EPA wanted to focus on in this project:

- Large online marketplaces
- EU-based dropshipping online shops
- Danish online shops with their own inventory

EU dropshipping online shops are online shops based in the EU, but without any inventory of their own. Instead, a dropshipping shop acts as an intermediary that forwards orders to third parties, who then ship products directly to the shop's customers.

Products were deliberately purchased to form sets of comparable products from the three types of online stores. In the context of this report, "a set of comparable products" means a group of three products with comparable appearances, features, and properties, but where each product has been purchased from a different type of online platform. For example, pairs of very similar silver stud earrings (e.g., all heart-shaped) could constitute such a set. Ultimately, the following products were received from the originally ordered sets of three products:

- 10 sets of two products each (the third product did not arrive before the analyses), and
- 21 sets of three products each.

Upon delivery, it was discovered that three of the products did not originate from one of the three types of online stores. Consequently, these three products were not included in the regulatory compliance comparison amongst the three types of online stores. Thus, a total of 80 products were purchased and analysed from the three types of online stores.

Screening analyses and initial hazard assessment

For screening purposes, we performed a GC-MS screening for organic substances on non-metallic products, (i.e., plastic and textile products). For metallic products, a XRF screening (elemental analysis) was carried out, as well as a swab test that could give an indication of whether a product released nickel via a coloured patch.

The elemental screening analysis and the swab test for nickel release were used to select metal products for further analyses to measure lead content, cadmium content, and nickel release.

The purpose of the GC-MS screening was to identify any other problematic substances that may be present (aside from the restricted substances for which chemical analysis as part of the inspection/monitoring of compliance was carried out). An initial hazard assessment was performed based on the classification and presence of the identified substances in the products (quantities and number of products), and two substances were selected – both reprotoxic – for which migration testing were performed:

- CAS no. 137-89-3, Bis(2-ethylhexyl) isophthalate (BEHIP)
- CAS no. 5444-75-7, 2-ethylhexyl benzoate (EHB)

Migration testing and risk assessment of other problematic substances

Migration testing was performed for the two selected reprotoxic substances on a total of nine products that had shown content of one or both of these substances in the GC-MS screening. Only two of the nine products showed migration of one substance (EHB) above the limit of detection. The other substance (BEHIP) was not identified in the migration fluid at a concentration above the limit of detection.

A risk assessment of the two substances showed that they do not constitute a risk to health in worst-case situations for the products analysed, which were:

- Socks with plastic grips, which small children might suck on
- Plastic shoes, which children might run in without wearing socks
- Plastic handbags, which come into close contact with the palm of the hand

The analyses show that the products with the highest migration of these substances were products purchased from large online marketplaces or from dropshipping websites, respectively.

Chemical analyses as part of monitoring compliance

In the project, chemical analyses were performed as part of the inspection to determine compliance with current legislation for the following chemical substances/groups of substances restricted by the REACH or POPs regulation:

- Certain phthalates in soft plastic products (socks with plastic grips, textile with plastic print, beach sandals, plastic bibs, soft plastic handbags)
- Cadmium and lead in jewellery or other metal products (earrings, bracelets, hair clips, necklaces and handbags)
- Nickel in metal products with skin contact (bracelets, necklaces, handbags)
- SCCP (short-chain chlorinated paraffins) in soft plastic products (socks with plastic grips, beach sandals, textile with plastic print, plastic bibs, soft plastic handbags)
- Certain PFAS compounds in textiles (textile bibs, snowsuits, mittens)

The results of the chemical analyses carried out (as part of the monitoring of compliance) showed that 13 out of the 80 products, corresponding to 16% of the purchased products, contained one or more restricted substances. Violations of applicable legislation were identified for eight pieces of jewellery, four textile products and one plastic beach sandal. For textiles, there were exceedances among snowsuits (one product), bibs (one product) and mittens (two products).

The 13 violations cover the following chemical substances, where the limit values that were in force at the time of purchase were exceeded:

- Phthalates (here DBP) in a single plastic beach sandal.
- PFAS in textiles (one snowsuit, one bib and two different pairs of mittens). Violations were identified regarding the content of PFOA-related compounds, PFOS derivatives and C₉-C₁₄ PFCA-related compounds.
- Lead and cadmium exceeded the applicable limit values in two and seven cases, respectively (stud earrings, necklaces and bracelets). In one product, both the limit value for lead and cadmium were exceeded (bracelet).
- Nickel release was exceeded in a single product (a bracelet, where the limit value for lead and cadmium was also exceeded).

In addition, there was a further product that had a total fluorine content exceeding 50 mg/kg, indicating a presence of PFAS. The PFAS analyses showed that this product contained a PFAS (6:2 FTOH), which is not regulated today. Other specific PFAS that were not included in the chemical analyses may have been present.

Conclusion

The chemical analyses performed as part of the monitoring of compliance in this project showed that there are a number of products (16%) that do not comply with legislation requirements regarding the content of the regulated substances studied in this project (phthalates, PAHs, SCCPs, certain PFAS, lead and cadmium and nickel release). The chemical analyses also showed that there is a higher proportion of non-compliant products among items purchased on large online marketplaces (28%), whereas 6% of products purchased on dropshipping websites and 9% of products purchased on Danish websites with own inventory do not comply with legislation regarding the chemical substances studied in this project. It should be noted that dropshippers were difficult to identify, which is why only half the amount of this type of product was purchased compared to products from large online marketplaces and Danish websites with own inventory.

No health risk was identified from the use of the children's fashion products based on the content of the two non-regulated substances that were risk assessed in this project. However, the migration testing show that the products with the highest migration of these substances came from products purchased either from large online marketplaces or from dropshipping websites.

The project shows that there is a clear tendency that when products are received directly from countries outside the EU (via the large marketplaces), there are more non-compliances concerning the content of regulated chemical substances than if the products are purchased directly from Danish online stores. In this respect, the results of this study are in line with previous studies that have been conducted on online commerce.

1. Introduction

According to the Danish Industry (DI), 2024 was a record-breaking year for online shopping in Denmark. On average, 81% of Danish consumers shopped online every month, and they made 41% of all their purchases online. The largest group of products purchased online consists of clothing, shoes and accessories. Danes are doing more and more of their shopping online. Products in the clothing, shoes and accessories category are bought online particularly often. Studies from organisations including Greenpeace and the Danish Consumer Council show that many consumer products purchased from so-called "large online marketplaces" do not comply with EU regulations regarding the content of harmful chemical substances (Greenpeace, 2024; Danish Consumer Council, 2024; Danish Consumer Council, 2025a; Danish Consumer Council, 2025b).

Furthermore, a study by the Nordic Council of Ministers (Nordic Council of Ministers, 2025) on dropshipping and other e-commerce in the Nordic region has shown that 71% of products purchased online do not comply with legislative requirements regarding, among other things, labelling, safety, or the content of regulated chemical substances. Based on the results of this Nordic online shopping study, the Danish Environmental Protection Agency (Danish EPA) has launched this project, focusing exclusively on products for children within the clothing, shoes and accessories sector – that is, children's fashion.

Many previous studies regarding online commerce have focused on regulatory violations related to such matters as labelling and physical or mechanical safety, and only occasionally on violations regarding substances of concern. Thus, through this project, the Danish EPA aims to develop an overview of regulatory compliance with respect to chemical legislation, the presence of substances of concern in products from a variety of online shops, and the health risks Danish consumers face when purchasing children's fashion products (clothing, shoes and accessories) online.

The report from the Nordic Council of Ministers (Nordic Council of Ministers, 2025) also describes dropshipping as a fast-growing online business model, presented as an easy way to start a low-risk online business.

1.1 Purpose

The purpose of this project is twofold: first, to check for compliance with respect to certain regulated chemical substances when purchasing consumer products online; and second, to investigate whether consumers face health risks due to the presence of any non-regulated substances of concern.

Online shops operate under a variety of business models. In this project, the Danish EPA is interested in consumer products purchased online through one of the three business models listed below:

- Large online marketplaces
- EU-based dropshipping online shops
- Danish online shops with their own inventory

The purpose of this project is to both investigate regulatory compliance amongst the three online business models and compare the content of substances of concern amongst comparable products purchased from the three types of online shops. Thus, this project will provide

data on the extent to which consumers face health risks when purchasing products online, as well as on any differences between products purchased from the three types of online shops.

To that end, the project will explore a scenario in which a consumer wishes to buy a product and must choose from three identical or comparable products (e.g., pairs of sandals or articles of clothing) sold on a Danish website, a large online marketplace, or an EU-based dropshipping shop.

The focus of this project is on consumer products in the children's fashion category (clothes, shoes and accessories), which is the product category that Danish consumers shop for online most frequently.

Finally, the project aims to support regulatory enforcement with respect to the content of any prohibited chemical substances in children's products sold via online shops inside and outside the EU. In that sense, this is also an inspection project that seeks to investigate compliance with regulations at the time of purchase on the presence of phthalates, PAHs (polyaromatic hydrocarbons), heavy metals and other regulated substances amongst the products purchased.

1.2 Definition of children's fashion

In this project, "children's fashion" is defined as clothing, shoes and accessories for children; that is, young people under the age of 15. This includes all kinds of children's clothing, shoes and sandals, as well as accessories, including jewellery, bags and similar fashion products.

1.3 Products in focus in this project

For this project, a focus on children's fashion products was selected because this is the category of consumer products most commonly purchased online in Denmark. The products in focus in this project are products intended for children, and particularly those products which are in frequent, direct contact with children's skin during ordinary use.

It was also decided to focus on products that incorporate soft plastics, water- and/or dirt-resistant textiles, and metallic hair clips and jewellery, as the content of certain substances of concern in these types of products is subject to regulatory requirements.

The products in focus in this project in the children's fashion category are:

- Textiles with plastic prints; that is, textile items such as T-shirts with soft plastic prints
- Textiles with dirt- or water-resistant properties, such as snowsuits and bibs
- Metal jewellery or other metal accessories, such as hair clips
- Items made from soft plastic, such as plastic clogs, bags and similar items

1.4 Definitions of "comparable" products and "sets"

The main purpose of this project is to investigate differences in the content of substances of concern (both regulated and non-regulated) in products from different types of online shops/platforms, and to assess whether their presence could constitute a health risk to children. This comparison presumes that products purchased from different online shops/platforms are essentially the same. As it is not possible to buy fully identical products across the three types of online shops/platforms, we have instead sought to purchase comparable products – that is, products which are highly similar to one another.

Product purchases are meant to reflect a situation in which a consumer must purchase a product by choosing from a selection of relatively uniform products across the three online shop/platform types. In other words, by "comparable products", we mean products with (roughly) equivalent appearances, features and properties. For example, a set of silver or other metal bracelets with pendants may include bracelets whose designs differ slightly and whose pendants are not identical, provided the products have a similar overall look.

In this report, a "set of comparable products" is a group of three products comparable in appearance, features and properties, but with one product sourced from each of the three online platform types: a large marketplace, an EU-based dropshipper, and a Danish online shop with its own inventory.

1.5 Chemical substances in focus in this project

The chemical substances / groups of substances listed below were chosen to be the focus of the regulatory inspection component of this project, given that violations with respect to these substances have previously been observed in consumer products sold online or in this product category (see chapter 5 "Previous studies"):

- Phthalates, as there are restrictions on the content of certain phthalates in plastic products. Several phthalates are restricted, as they are classified as toxic to reproduction¹.
- Cadmium and lead, as there are restrictions on the content of these heavy metals in metal products, including jewellery. Both cadmium and lead are toxic heavy metals², which are both classified as amongst other things toxic to reproduction.
- Nickel, as there are limits on how much nickel that may be released from metal products in contact with skin due to the allergenic properties of nickel³.
- SCCPs (short-chain chlorinated paraffins), as there are general restrictions on the content of SCCPs in articles. SCCPs are regulated under the POP Regulation on persistent organic pollutants, as they are toxic, persistent and accumulate in the environment⁴.
- Certain PFAS compounds (per- and polyfluoroalkyl substances), as there are restrictions on the content of certain PFASs in textiles. Additionally, impending Danish regulatory requirements on the content of PFASs in clothing and shoes have already been adopted, and the EU is working towards setting limits on all PFASs in all applications. PFAS as a group is considered to be hazardous to the environment as they are non-degradable and can accumulate in the environment. Moreover, PFAS can produce health effects such as effects on the liver, the immune system and fertility. Finally, PFAS are considered to be endocrine disruptors and carcinogenic⁵.

The specific legal requirements for the above-mentioned substances are described in more detail in chapter 4 "Regulatory restrictions on certain substances".

Also included in this project is a chemical screening analysis of the purchased non-metallic products, to investigate whether these products contain substances of concern that are not currently regulated and which may constitute a health risk.

¹ [Phthalates - Danish EPA \(in Danish\)](#)

² [Facts: Cadmium - Danish EPA \(in Danish\)](#); [Lead - Danish EPA \(in Danish\)](#)

³ [Facts: Nickel - Danish EPA \(in Danish\)](#)

⁴ [Facts: Persistent organic pollutants \(POPs\) - Danish EPA \(in Danish\)](#)

⁵ [PFAS - Danish EPA \(in Danish\)](#)

2. The three types of online shops

This chapter sets out the characteristics of the three types of online shops, as well as the legislation that consumer products from these shops must comply with regarding the content and release/migration of chemical substances.

2.1 Description of the three types of online shops

The three online business models (or types of online shops) described in this report are:

- Danish online shops with their own inventory; abbreviated to "DK" in this report
- EU-based dropshipping online shops; abbreviated to "DS" in this report
- Large online marketplaces; abbreviated to "MP" in this report

2.1.1 Danish online shops with their own inventory (DK)

Danish online shops with their own inventory are businesses that often also operate physical stores in Denmark. Because they have their own local stock/inventory, delivery times can generally be kept to 1-3 days. These online shops follow a more traditional model of commerce. They import a range of products themselves from EU or non-EU countries (or have goods manufactured in either of these areas), store them in their own warehouses, and sell them to consumers online (or in physical stores). Products from these shops are thus packed and shipped directly to consumers by the Danish stores themselves.

2.1.2 EU-based dropshipping online shops (DS)

According to a recent report by the Nordic Council of Ministers from March 2025, EU-based dropshipping online shops are a fast-growing business model (Nordic Council of Ministers, 2025). Platforms like Shopify, Quickbutik, and BigCommerce offer ready-made concepts that include a domain name, design, payment system, product ordering system, and so on, making it possible to easily set up a dropshipping shop online.

EU dropshipping online shops are online shops based in the EU, but without any inventory of their own. Instead, a dropshipping shop acts as an intermediary that forwards orders to third parties, who then ship products directly to the shop's customers. Stock indications on the website may be directly linked to the inventories of the products' suppliers. In this way, the website creates the impression that the dropshipper maintains its own inventory (Nordic Council of Ministers, 2025).

Dropshipping online shops are distinguished by the following characteristics:

1. No locally held stock/inventory: Dropshipping stores do not have their own warehouses. When a customer orders a product, the store forwards the order to a third party who ships the product directly to the customer. (Danish EPA, 2025a)
2. Variable delivery times: Delivery times may be long, as products are often shipped from abroad. Dropshipping shops often do not specify exact delivery times on their websites (Danish EPA, 2025a).
3. Generic product images: The images of the products sold on the website are often generic, and the same images can be found on other websites using image-based searches (Danish EPA, 2025a).
4. Inadequate return terms: Return terms may be lacking or unclear, making it difficult for customers to return purchased goods (Danish EPA, 2025a).

5. Poorly translated text: The text on the website may be poorly translated. Errors in the text could be a sign that machine translation was used (Danish EPA, 2025a).
6. A derived effect of the above listed points can be lack of information on responsible parties: It can be difficult to find information about who is responsible for the website / online shop, as contact details, terms and conditions are often lacking.

In general, determining whether an online shop is a dropshipper or not is difficult, since the type of information that would suggest this is often missing from the site.

2.1.3 Large online marketplaces (MP)

Large online marketplaces (MP) are e-commerce platforms that serve as a link between buyers and sellers, similar to a virtual shopping centre or auction house (Danish EPA, 2025a). The largest online marketplaces are also named VLOP's (Very Large Online Platforms). Whether they are large or very large depend on the number of users. In this report the term large online marketplaces (abbreviated MP).

Large online marketplaces are distinguished by the following characteristics:

1. Large user base and transaction count: These platforms have millions of users and handle massive volumes of sales and purchases daily.
2. Mediating sales between third-party sellers and consumers: Platforms do not necessarily own all the goods for sale; rather, they provide digital infrastructure for other sellers. They facilitate sales between many different sellers and consumers (Nordic Council of Ministers, 2025).
3. Global reach: Many marketplaces operate across borders and offer products from all over the world.

In some cases, large online marketplaces also act like dropshippers, as products may be shipped to consumers directly from their sellers, rather than from the online marketplace. In other cases, large online marketplaces may sell their own products under their own names, causing consumers to perceive them as sellers (Nordic Council of Ministers, 2025).

2.2 Obligations under chemicals legislation for online stores

2.2.1 Chemicals legislation relevant to this project

Companies that market products to Danish consumers are responsible for compliance with applicable chemicals legislation. This responsibility applies regardless of whether the products are sold via physical stores, webshops, social media or other digital platforms. This means, among other things, that the requirements for ingredients, correct labelling, instructions for use and other mandatory information must be met.

The Danish EPA is the competent authority for the part of the chemicals legislation that is relevant to this project, and the Agency ensures that products sold online on the Danish market comply with the rules. The various pieces of chemicals legislation that online shops in the present project must comply with when selling the relevant products to Danish consumers, are described below.

REACH regulation (EU Regulation 1907/2006)

The purpose of the EU Regulation for "*Registration, Evaluation, Authorisation (and restriction) of Chemicals (REACH)*" is to ensure a high level of protection for human health and the environment. The regulation sets requirements for chemical substances and their manufacture, marketing, registration and use in different product types. REACH includes requirements for the absence of specific, particularly hazardous chemical substances and sets concentration limit values for certain product types. A fundamental principle of REACH is that it is the responsibility of companies to ensure that they manufacture, market and use substances in a way that does not harm human health or the environment. There are different obligations attached to the different roles a company may have in a supply chain. An online shop may have several different roles, including those of importer, manufacturer and supplier of articles.

POP Regulation (EU Regulation 2019/1021)

POP stands for Persistent Organic Pollutants. These are substances with toxic properties that degrade very slowly in nature. Several POPs are covered by the global Stockholm Convention on Persistent Organic Pollutants and the so-called POPs Regulation, which is the EU's implementation of the Convention. The POPs Regulation aims to protect human health and the environment from these substances by prohibiting their manufacture, marketing and use.

The Danish EPA is the supervisory authority for the parts of the above regulations that are relevant to this project.

2.2.2 Supplementary legislation relevant to this project

In addition to the above chemicals legislation, several other regulations are relevant to this project as they supplement the chemicals legislation by strengthening consumer protection and the authorities' opportunities for effective supervision and enforcement of, among other things, online shopping. These sets of rules formally fall under other areas of responsibility than that of the Danish EPA, and are administered by those authorities, but the Danish EPA may have a role under specific provisions.

The Digital Services Act (DSA) – the responsibility of marketplaces for online content and products (EU Regulation 2022/2065)

This regulation lays down rules for digital marketplaces' handling of illegal content and products, including that:

- they must remove illegal products when they are made aware of them,
- they must ensure transparency in marketing and protect consumers; and
- large platforms (with over 45 million users in the EU) are subject to particularly stringent requirements.

Responsible (competent) authority: Ministry of Science, Higher Education and Digital Affairs (Agency for Digital Government).

The role of the Danish EPA: The Danish EPA can report illegal products to a publicly available EU database, Safety Gate, and collaborate with the Agency for Digital Government to have the products removed from the market.

The Market Surveillance Regulation - the authorities' inspection of products on the market (EU Regulation 2019/1020)

This regulation allows authorities to carry out inspection of products whether they are sold physically or online. This means that:

- products must comply with applicable legislation in order to remain on the market,
- dangerous or illegal products may be subject to removal or a ban on sales, and
- the authorities may conduct anonymous checks of webshops.

Competent (responsible) authority: Market Surveillance, the Danish Business Authority (formerly the Danish Safety Technology Authority).

The role of the Danish EPA: The Danish EPA can supervise, test products and take action against products that violate chemicals legislation.

The General Product Safety Regulation - product safety requirements (EU Regulation 2023/988)

- This law requires that all products are safe under normal or foreseeable use – even if they are not covered by other specific legislation. This means that:
- products must not endanger the health or safety of consumers, and
- the law sets safety requirements, including chemical safety, for products or chemical substances that are not regulated by other legislation.

Competent authority: Market Surveillance, the Danish Business Authority (formerly the Danish Safety Technology Authority).

The role of the Danish EPA: The Danish EPA may require a product recall, prohibit sales, or impose other sanctions if a chemical substance in a product constitutes a risk and other chemicals legislation is insufficient to reduce this risk to an acceptable level.

2.2.3 Obligations for Danish online shops with own inventory (DK)

A Danish online shop with its own inventory will typically have a role as a supplier of articles if the shop's own supplier is located in the EU. However, an online shop will often have several roles, such as that of importer if the shop's supplier is located outside the EU, or manufacturer if the shop produces its own goods. Supplier of articles must ensure that the products they sell comply with the legal requirements for chemical ingredients. In addition, they may have obligations regarding information to customers or authorities if their products contain substances from the EU Candidate List. Importers and manufacturers of articles may also be required to register with the EU Chemicals Agency, ECHA, if the total content of Candidate List substances in the articles they import or manufacture exceeds 1 tonne/year or if the article contains substances, such as perfume, that are intended to be released from the article.

2.2.4 Obligations for EU-based dropshipping online shops (DS)

The EU dropshipping online shop does not have its own inventory, but often acts as an intermediary, receiving the order and payment for it, while forwarding the customer's order directly to a third party, which then sends the product directly to the customer. The dropshipper may have different obligations under the chemical legislation depending on their business model as either a distributor or importer. An EU dropshipper will generally have the same obligations as a Danish online shop with its own inventory, although the dropshipper will often not have physical handling of the product they resell. This means that they must ensure that the products sold in their online shop comply with EU chemicals legislation, which can be a challenge if their suppliers are located outside the EU and are not required to comply with the same legislation as the dropshipper. This could mean, for example, that the dropshipper is obliged to provide information to their Danish customers about the content of substances from the EU Candidate List, even though the dropshipper is not legally required to get this information from their own suppliers.

2.2.5 Obligations for large online marketplaces (MP)

Large online marketplaces located outside the EU are generally not bound by EU legislation. Instead, it is the operator selling its product through the marketplace to a European customer who is responsible for ensuring that the product complies with applicable EU legislation. In some cases, it can be difficult to determine whether it is the marketplace itself that is selling a product or whether it is a third party selling through the marketplace. Therefore, according to the Digital Services Regulation (EU 2022/2065), the identity of the seller must be clearly stated

on the online marketplace's website regardless of whether the online marketplace is located in the EU or outside the EU if it is aimed at consumers in the EU.

2.2.6 Inspection and enforcement

The Danish EPA's Chemical Inspection Service oversees inspection and enforcement in the cases covered by this project as part of the Inspection's participation in the thirteenth joint European project REF-13 (REACH EN-FORCE). REF-13 is an enforcement project focusing on products sold online and covers all of the regulatory frameworks within this project.

The Danish Chemical Inspection Service ensures compliance with the rules concerning the sale, possession, use, etc. of chemical substances and products containing chemical substances. The rules are laid down in the Danish Chemicals Act⁶ and executive orders issued pursuant to the Act as well as in several EU regulations, and the Danish Chemical Inspection Service's competence and jurisdiction follow from these sets of rules.

In addition, in certain cases concerning online platforms established outside the EU, the Danish Chemical Inspection Service can carry out enforcement with reference to the voluntary agreement "Product Safety Pledge +" and similar⁷.

"The Product Safety Pledge + constitutes an agreement whereby online intermediaries and other actors voluntarily agree to take specific measures regarding the safety of non-food consumer products sold online by third parties on their marketplaces⁸.

⁶ Chemicals Act, cf. Consolidated Act no. 6 of 4 January 2023 on chemicals.

⁷ [Danish Ministry of Environment - answer to question](#)

⁸ [Product Safety Pledge +](#)

3. Online shopping in Denmark

Since 2021, the Confederation of Danish Industry (DI) has conducted an annual review of Danes' online shopping (e-commerce). The trends that characterised Danish online shopping in 2024 are described in this chapter and are derived entirely from the Confederation of Danish Industry's most recent analysis, published in February 2025 (Danish Industry, 2025).

3.1 The volume of e-commerce in Denmark

The volume of e-commerce in Denmark in 2024 totalled DKK 133 billion, up by DKK 1 billion from the previous year. Of this amount, DKK 64 billion (i.e., 48%) is attributable to online shopping for physical products, while the remainder is attributable to travel, transport, digital subscriptions and online entertainment.

Averaged over the course of the year, 81% of the population over the age of 18 shops online every single month. Typically, December is the month when Danes do the most online shopping. In December 2024, 87% of the population shopped online at least once. Danish adults over the age of 18 shopped online an average of 3.8 times per month in 2024.

The average adult in Denmark spends about DKK 1,600 on online shopping every month. However, this figure masks the fact 31- to 55-year-old Danes (with and without children) are the biggest monthly spenders online (at about DKK 1,700), whereas 18- to 30-year-olds spend approximately DKK 1,400 online each month, and consumers over 55 years old spend approximately DKK 1,550 online each month.

3.2 The types of online shopping done in Denmark

Within the realm of physical products, the type of goods that Danes buy the most online is clothing, shoes and accessories. This product type is responsible for 33% of purchases made online in 2024. However, it is primarily young consumers without children (ages 18–30) who buy clothes, shoes and accessories online, with 44% of this group reporting this product type as their most recent online purchase.

In the survey, Danes were asked in which country they believe they made their last online purchase. The majority (69%) said they believe they placed their order with a Danish online shop. However, this is not necessarily reflective of reality; for instance, zalando.dk is the Danish version of Zalando.com, a German company that operates and sells in many European countries.

The Confederation of Danish Industry has listed the top ten most used sites when Danes shop online. These are listed in FIGURE 1 on the next page and are sourced from the Confederation of Danish Industry's annual e-commerce tracker for 2024 (Danish Industry, 2025). As shown in FIGURE 1, Zalando is by far the favourite online shop of Danes, followed closely by TEMU and Matas. Three large online marketplaces made it to the top ten: TEMU, SHEIN and Amazon. Little has changed in this respect since 2023, except TEMU, which was previously not in the top ten at all, rose to become Denmark's second favourite online shop in 2024.

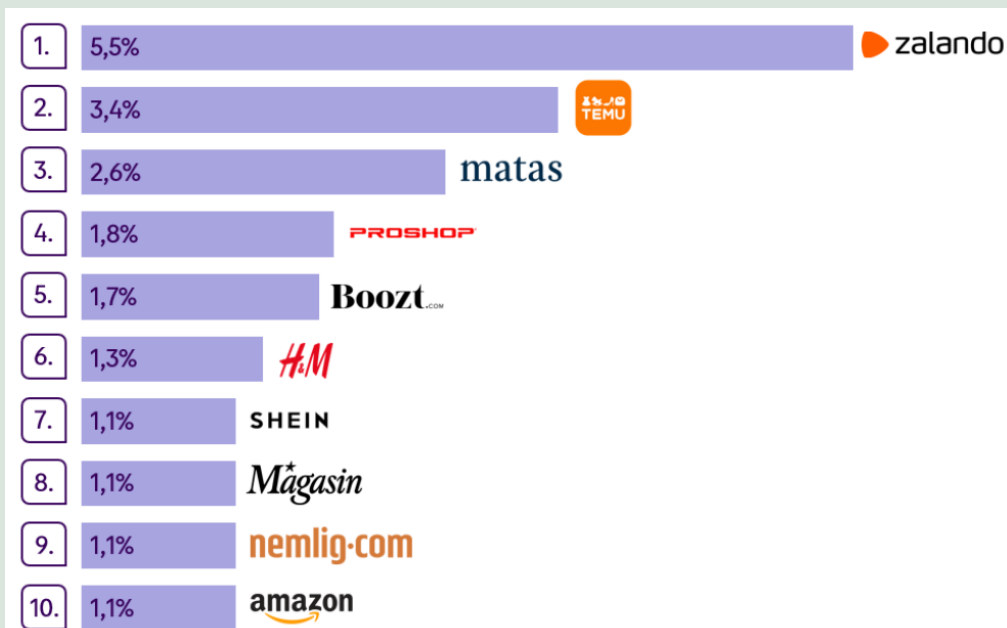


FIGURE 1. The top ten online shops where Danes made their most recent online purchase in 2024.

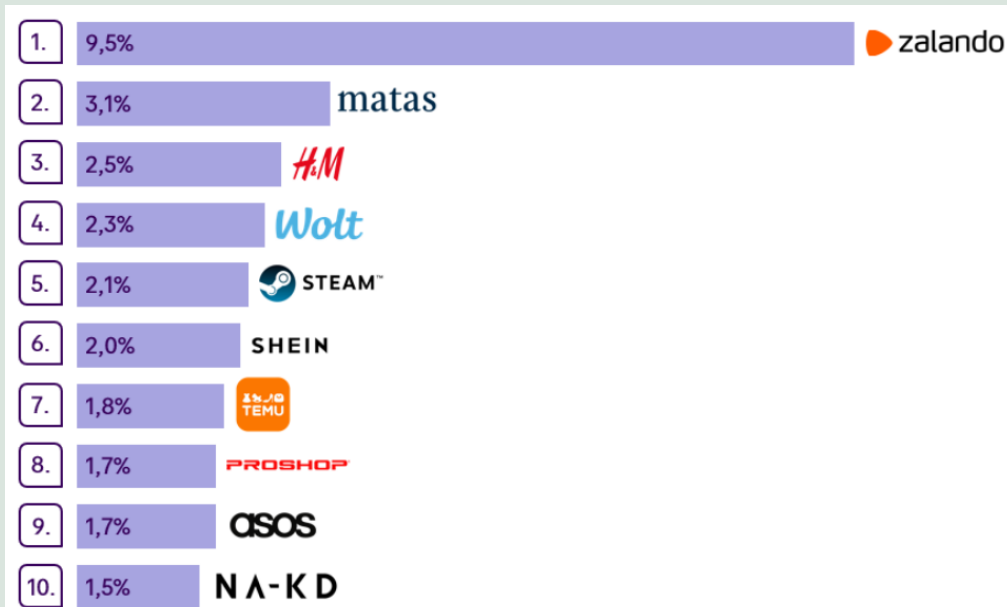


FIGURE 2. The top ten online shops where young consumers without children (ages 18-30) made their most recent online purchase in 2024.

The landscape is significantly different when focusing exclusively on young consumers without children (ages 18–30) (see FIGURE 2). Zalando remains the favourite among young consumers, but TEMU is down in seventh place. Matas and H&M are more popular with young people than with the average Dane. Only two of the top ten most popular online shops among young people are of Danish origin (Matas and Proshop).

4. Regulatory restrictions on certain substances

This chapter describes the statutory requirements that exist regarding the content of chemical substances for which the products purchased in this project have been tested. The listed substances and groups of substances have been selected for testing in this project because violations with respect to these substances have previously been observed in consumer products sold online or products of the same type (see chapter 5 "Previous studies").

4.1 Phthalates

As specified in Annex XVII, entry 51 of the REACH Regulation (EU Regulation 1907/2006), there are restrictions regarding the content of certain phthalates in childcare articles and all other types of articles. This prohibition applies to the four phthalates listed below with respect to their content in the plasticised material of the article. A limit value of 0.1% (by weight), corresponding to 1000 mg/kg, has been set. This limit applies "individually or in combination"; that is, the sum of the four phthalates must not exceed 0.1%:

- DEHP - Bis(2-ethylhexyl) phthalate (CAS no. 117-81-7)
- DBP - Dibutyl phthalate (CAS no. 84-74-2)
- BBP - Benzyl butyl phthalate (CAS no. 85-68-7)
- DIBP - Diisobutyl phthalate (CAS no. 84-69-5)

The prohibition applies to all articles, except for articles exclusively for outdoor use that do not come into contact with human mucous membranes or prolonged contact with human skin, as well as a range of other product types not relevant for this project. In the regulation, "prolonged contact" is defined as a minimum of 10 minutes of continuous contact, or intermittent contact over a period of 30 minutes per day. As all products purchased in this project are expected to be in prolonged contact with human skin (snowsuits, shoes), this exemption does not apply to the purchased products.

The regulation also specifies that "plasticised material" means PVC, PVDC, PVA, polyurethanes, or any other polymer (including polymer foam and rubber material), but not silicone rubber and natural latex coverings.

In addition, Annex XVII, entry 52 of the REACH Regulation (EU Regulation 1907/2006) establishes limits on the following three phthalates, which may not be used in concentrations exceeding 0.1% (w/w) of the plasticised material in toys and childcare articles that children may put in their mouths:

- DINP - di-isononyl phthalate (CAS nos. 28553-12-0 and 68515-48-0)
- DIDP - di-isodecyl phthalate (CAS nos. 26761-40-0 and 68515-49-1)
- DNOP - di-n-octyl phthalate (CAS no. 117-84-0)

In the text of the regulation, a childcare article is defined as "any product intended to facilitate sleep, relaxation, hygiene, the feeding of children or sucking on the part of children".

In this project, soft plastic products, such as plastic clogs and textiles with plastic prints, were analysed for their phthalate content.

4.2 Cadmium (Cd)

As indicated in Annex XVII, item 23 of the REACH Regulation (EU Regulation 1907/2006), the content of cadmium in plastic materials such as PVC, PUR, LDPE, PP and PET is restricted. The limit value is 0.01% (w/w), corresponding to 100 mg/kg of the plastic material. This limit applies to all articles containing plastic.

In addition, as indicated in Annex XVII, entry 23 of the REACH Regulation (EU Regulation 1907/2006), the content of cadmium in the metal of metal beads and other metal parts used in the manufacture of fine jewellery, metal portions of jewellery, costume jewellery and hair ornaments is restricted. Such items include bracelets, necklaces, rings, piercing jewellery, wrist watches, brooches and cufflinks. The limit value here is again 0.01% (w/w) of the metal.

As indicated in Annex XVII, entry 72 and Appendix 12 of the REACH Regulation (EU Regulation 1907/2006), the content of cadmium in clothing and accessories, other textiles and footwear is restricted. The limit value is set at 1 mg/kg Cd after extraction.

The focus for inspections within the scope of this project is on metal jewellery and other metal products (e.g., hair clips) and their cadmium content.

4.3 Lead (Pb)

As indicated in Annex XVII, entry 63 of the REACH Regulation (EU Regulation 1907/2006), the content of lead in individual parts of jewellery articles is restricted. The limit value is set at 0.05% (w/w), corresponding to 500 mg/kg Pb in an individual part. In this context, "jewellery articles" are defined as jewellery and imitation jewellery articles and hair accessories, including bracelets, necklaces, rings, piercing jewellery, wrist watches and wrist-wear, brooches, and cufflinks.

In addition, the same limit value for lead applies to all articles if they or their accessible parts can be placed in the mouth by children "under reasonably foreseeable conditions of use". The text of the regulation further specifies that for this purpose, an article or an accessible portion of it may be placed in the mouth by children "if it is smaller than 5 cm in one dimension or has a detachable or protruding part of that size".

Furthermore, as indicated in Annex XVII, entry 63 of the REACH Regulation (EU Regulation 1907/2006), lead may not be used in PVC articles if the concentration of lead exceeds 0.1% (w/w) of the PVC material.

As indicated in Annex XVII, entry 72, Appendix 12 of the REACH Regulation (EU Regulation 1907/2006), the content of lead in clothing and accessories, other textiles and footwear is restricted. The limit value is set at 1 mg/kg Pb after extraction.

The scope of this project is limited to testing metal jewellery and other metal products (e.g., hair clips) for lead content.

4.4 Nickel (Ni)

As indicated in Annex XVII, entry 27 of the REACH Regulation (EU Regulation 1907/2006), the use of nickel in the following products is restricted:

- Post assemblies which are inserted into pierced ears and other pierced parts of the human body
- Articles intended to come into direct and prolonged contact with the skin, such as earrings, necklaces, bracelets, buckles, zips, etc.

The limit value is set as a migration limit, at 0.2 µg nickel/cm²/week for post assemblies, and 0.5 µg nickel/cm²/week for other articles intended to come into direct and prolonged contact with the skin. A migration limit applies not to the content, but rather to the concentration of nickel that can be released from the product into an artificial liquid that simulates sweat.

In this project, jewellery made of metal and other metal products were analysed with respect to the release of nickel.

4.5 PAHs (polyaromatic hydrocarbons)

As indicated in Annex XVII, entry 50 of the REACH Regulation (EU Regulation 1907/2006), a total of eight PAH compounds are restricted in plastic and rubber components of articles for private use. The limit value is 1 mg/kg for the sum of the eight PAHs, but it only applies if the plastic or rubber components comes into "direct as well as prolonged or short-term repetitive contact with the human skin or the oral cavity, under normal or reasonably foreseeable conditions of use". Examples of products where the restriction applies are given in the text of the regulation and include sports equipment (such as bicycles, golf clubs, and rackets), household utensils, trolleys, walking frames and the like, tools for domestic use, clothing, footwear, gloves, sportswear, watch straps, wristbands, masks and headbands. For toys and childcare articles, the corresponding limit value is halved; that is, 0.5 mg/kg for the sum of the eight PAHs.

The eight PAHs covered by the above restriction are:

- Benzo[a]pyrene (BaP), CAS no. 50-32-8
- Benzo[e]pyrene (BeP), CAS no. 192-97-2
- Benzo[a]anthracene (BaA), CAS no. 56-55-3
- Chrysene (CHR), CAS no. 218-01-9
- Benzo[b]fluoranthene (BbFA), CAS no. 205-99-2
- Benzo[j]fluoranthene (BFA), CAS no. 205-82-3
- Benzo[k]fluoranthene (BkFA), CAS no. 207-08-9
- Dibenzo[a,h]anthracene (DBA_hA), CAS no. 53-70-3

Within this project, products analysed with respect to PAH content consist primarily of black products that incorporate plastics and rubber. This is due to the fact that softeners and process oils as well as carbon black are considered to be the largest source to PAHs in plastic and rubber materials (Lassen et al., 2011).

4.6 SCCPs (short-chain chlorinated paraffins)

SCCPs (short-chain chlorinated paraffins); that is, chlorinated alkanes C₁₀-C₁₃ (with CAS no. 85535-84-8 and others), are restricted by EU Regulation 1021/2019, also called the Persistent Organic Pollutants (POPs) Regulation (EU Regulation 1021/2019). SCCPs are restricted in all articles, and the limit value is set at 0.15% (w/w), corresponding to 1500 mg/kg.

As indicated in ECHA's information on Candidate List substances in articles (ECHA, 2025a), SCCPs can occur in materials such as plastics, rubber, leather, paper and textiles, and have been reported in such products as cables, electronics and various plastic consumer products.

Within this project, products analysed with respect to SCCP content consist primarily of products containing soft plastics or textiles with plastic prints.

4.7 Selected PFASs (per- and polyfluoroalkyl substances)

PFAS is an abbreviation for a large group of organic fluorinated substances. PFAS stands for "Per- and PolyFluoroAlkyl Substances". Selected PFAS compounds are regulated via either the POPs Regulation (EU Regulation 1021, 2019) or the REACH Regulation (EU Regulation 1907/2006). They are:

- PFOA (perfluorooctanoic acid), its salts and PFOA-related compounds (CAS no. 335-67-1 and others)
- PFHxS (perfluorohexanesulfonic acid), its salts and PFHxS-related compounds (CAS no. 355-46-4 and others)
- PFOS (perfluorooctanesulfonic acid) and its derivatives (CAS nos. 1763-23-1, 2795-39-3, 29457-72-5, 29081-56-9, 70225-14-8, 56773-42-3, 251099-16-8, 4151-50-2, 31506-32-8, 1691-99-2, 24448-09-7, 307-35-7 and others)
- PFCA (perfluorocarboxylic acids), linear and branched perfluorocarboxylic acids C₉-C₁₄

As indicated in the POPs Regulation, the manufacture, placing on the market and use of **PFOA, its salts and PFOA-related compounds** are prohibited in the EU (EU Regulation 1021/2019). A limit value of 0.025 mg/kg (25 µg/kg) has been set for non-intentionally added PFOA and its salts in articles, and a limit value for the sum of PFOA-related compounds has been set at 1 mg/kg.

The ban applies to perfluorooctanoic acid, including any of its branched isomers, as well as PFOA-related compounds. PFOA-related compounds are defined in the POPs Regulation as "substances that degrade to PFOA, including substances (including salts and polymers) having a linear or branched perfluoroheptyl group with the moiety (C₇F₁₅)-C as one of the structural elements".

As indicated in the POPs Regulation, the manufacture, placing on the market and use of **PFHxS, its salts and PFHxS-related compounds** are prohibited in the EU (EU Regulation 1021/2019). A limit value of 0.025 mg/kg (25 µg/kg) has been set for non-intentionally added PFHxS or its salts in articles, and a limit value for the sum of all PFHxS related compounds in articles has been set at 1 mg/kg.

The prohibition applies to perfluorohexanesulfonic acid, including any of its branched isomers, its salts and PFHxS-related compounds. PFHxS-related compounds are defined as substances that contain the chemical moiety C₆F₁₃S as one of their structural elements and which degrade to PFHxS.

As indicated in the POPs Regulation, the manufacture, placing on the market and use of **PFOS and its derivatives** are prohibited in the EU (EU Regulation 1021/2019). A limit value of 0.1% w/w, corresponding to 1000 mg/kg, has been set for non-intentionally added PFOS and its derivatives in articles. For textiles and other coated materials, the limit value is 1 µg/m² of the coated material. PFOS derivatives are defined as substances with the structure "C₈F₁₇SO₂X", where X can be "OH, metal salt (O-M+), halide, amide, and other derivatives including polymers". However, it should be emphasised that the regulation listed above, which was valid at the time of purchase of the products for inspection in this project, has been replaced by new rules in the POP Regulation as of December 3, 2025 (EU Regulation 2025/718): From this day forward, the limit value for non-intentionally added PFOS and its derivatives is 0.025 mg/kg (25 µg/kg) for PFOS and its salts, and a limit value of 1 mg/kg (1000 µg/kg) for PFOS-related compounds. This means that the limit value per area for textiles has been deleted, and in return a lower limit value for PFOS and its salts has been set.

As indicated in Annex XVII, entry 68 of the REACH Regulation (EU Regulation 1907/2006), the content of **linear and branched perfluorocarboxylic acids** with the formula C_nF_{2n+1}-COOH, where n = 8, 9, 10, 11, 12 or 13 (C₉-C₁₄ PFCA) is restricted in all articles. The limit

value is set at 25 µg/kg (ppb) for the sum of C₉-C₁₄ PFCA and its salts or 260 µg/kg (ppb) for the sum of C₉-C₁₄ PFCA-related substances.

C₉-C₁₄ PFCA-related substances are defined here as substances that, based on their molecular structure, are considered to have the potential to degrade or be transformed to C₉-C₁₄ PFCA.

In this project, textile products with water- or dirt-repellent properties were analysed first for total fluorine content, and then for content of the selected PFASs.

4.8 Upcoming regulation of PFASs

There are several PFAS regulations pending in both Denmark and the greater EU that are relevant to this project. They are:

- Danish regulation of PFASs in clothing, footwear and certain impregnating agents
- EU regulation (REACH) of PFHxA in articles including textiles/clothing
- EU regulation (REACH) of PFAS as substances per se, in mixtures and in articles (UPFAS)

In February 2025, Denmark adopted an executive order that will regulate the use of **PFASs in clothing, footwear and certain impregnating agents** beginning on 1 July 2026 (Statutory Order no. 464, 2025). All PFASs will be restricted in these product categories. The executive order entails a restriction of Danish business owners to sell and consumers to import products with PFAS above the limit value.

PFASs are defined here as "any substance containing at least one fully fluorinated methyl (CF₃) or methylene (CF₂) carbon atom, without any hydrogen, chlorine, bromine or iodine atoms attached to it".

The restriction applies to the import and sale of clothing and footwear with a total fluorine content of 50 mg/kg or more, as well as impregnating agents for clothing and footwear for personal use with a total fluorine content of 50 mg/kg or more. It is also specified that private individuals are not allowed to import these products for their own or others' use. These prohibitions will take effect on 1 July 2026, but sales from existing inventory will be allowed until 1 January 2027.

The Danish executive order specifies that it does not extend to the PFAS compounds that are already regulated either via the REACH Regulation or the POPs Regulation. The regulation further specifies that it does not extend to the following types of PFAS compounds: PFASs that "contain only the following structural elements: CF₃-X or X-CF₂-X', where X = -OR or -NRR' and X' = a methyl group (-CH₃), a methylene group (-CH₂-), an aromatic group, a carbonyl group (-C(O)-), -OR", -SR" or -NR"R"', and where R/R'/R"/R"' is a hydrogen atom (-H), a methyl group (-CH₃), a methylene group (-CH₂-), an aromatic group or a carbonyl group (-C(O)-)".

EU Regulation 2024/2462 has been adopted and is implemented in REACH annex XVII entry 79. It will apply to products placed on the market on or after 10 October 2026. Beginning on this date, undecafluorohexanoic acid (**PFHxA**), its salts and PFHxA-related substances may not be used at a concentration of 25 µg/kg (ppb) for the individual substances, or at a concentration of 1000 µg/kg (ppb) for the sum of these substances, in the following types of products (EU Regulation 2462/2024; EU Regulation 1907/2006):

- Textiles, leather, furs and skins in garments and related accessories for the general public
- Footwear for the general public
- Paper and cardboard used as food contact materials
- Mixtures for the general public
- Cosmetic products

PFHxA, its salts and PFHxA-related substances are defined as substances which have:

- a linear or branched perfluoropentyl group with the formula C_5F_{11} - directly linked to another carbon atom as one of their structural elements, or
- a linear or branched perfluorohexyl group with the formula C_6F_{13} -.

In addition, the EU is working on a so-called **uPFAS** ("universal PFAS") restriction – that is, a general ban on all PFAS compounds in all mixtures and articles in the EU. The restriction proposal (ECHA, 2025d) was submitted to ECHA in January 2023, and five European countries – Germany, the Netherlands, Sweden, Norway and Denmark – have taken on the task of preparing the restriction proposal. The proposal was opened for comments in the spring of 2023 and approximately 5,600 responses were received. The five countries have reviewed the consultation responses and have edited the background document for the restriction proposal. Each industry / usage area has been reviewed individually over the course of 2025. The updated background document was published in August 2025 (ECHA, 2025b). During 2026, ECHA is expected to deliver its proposal and the final ECHA assessment to the Commission (Danish EPA, 2025b).

For these reasons, total fluorine analyses have also been performed on the products purchased for this project which are marketed as water- or dirt-resistant.

5. Previous studies

Previous studies have been conducted on regulatory compliance amongst consumer products purchased from different types of online shops. Studies related to fashion, children's fashion and products for children are described in more detail below.

5.1 Greenpeace survey of products purchased from SHEIN

Greenpeace (Greenpeace, 2024) conducted a survey of textile products and shoes in late 2022 and 2023. For the survey, 47 products were purchased from SHEIN's online shop, including 5 products from SHEIN's Oktoberfest pop-up shop in Munich.

Greenpeace launched this study due to previous investigations showing problems with violations regarding restrictions on chemical substances in REACH Annex XVII, especially from SHEIN. The studies Greenpeace cites in its own study are:

- a Canadian study of 38 textile products purchased online, including from SHEIN and AliExpress (CBC, 2021), which found that approximately 20% of the products had elevated levels of lead, PFASs and/or phthalates
- a French documentary which demonstrated violations of REACH Annex XVII in clothing purchased from SHEIN, including with respect to the lead content of polyester products

The purchased products were divided into their component materials, which were then analysed for regulated chemical substances such as alkylphenol ethoxylates, formaldehyde, heavy metals (in metal and plastic parts), nickel release, PFASs, and a number of other substances. No violations were observed for the following regulated substances: alkylphenol ethoxylates (43 products), PFASs (8 products, swimwear), aromatic amines (43 products) and dimethylformamide (6 products). Violations were observed for the following regulated substances (REACH Annex XVII):

- Formaldehyde - one product out of 43 exceeded the limit for formaldehyde in textiles
- Cadmium - one product out of 22 exceeded the limit for cadmium in textiles
- Nickel - two out of six products exceeded the limit for nickel release from metal parts
- Phthalates - six out of 13 products exceeded the phthalate content limit
- PAHs - one out of one product exceeded the PAH content limit

In total, violations of the REACH Regulation's restrictions on chemical substances in articles (REACH Annex XVII) were observed in seven of the 47 products from SHEIN, meaning that 15% of the products purchased from SHEIN violated EU legislation.

5.2 Danish Consumer Council survey of children's products from TEMU

In 2024, the Danish Consumer Council [Forbrugerrådet TÆNK] purchased and analysed 38 products from the online platform TEMU (Danish Consumer Council, 2024). The products came from various categories, such as toys, baby equipment, electronics, cosmetics and cleaning products, with the common factor being that all the products were primarily for children. The products were primarily analysed for safety. In the cases of detergents and cosmetics, the ingredient lists were reviewed. No chemical analyses were performed.

The results showed that 30 out of the 38 products investigated (79%) failed, especially in terms of safety.

5.3 Danish Consumer Council study on PFASs in jackets

In 2025, the Danish Consumer Council conducted a study (Danish Consumer Council, 2025a) on certain PFAS compounds in cheap waterproof jackets (under DKK 350) from Amazon, SHEIN, TEMU and Danish websites. A total of 26 jackets were purchased, 17 of which came from either Amazon (5), SHEIN (5) or TEMU (7); the remaining nine products came from Danish websites.

All 26 jackets were initially tested for total organic fluorine (TOF)⁹. Products with organic fluorine levels above 50 mg/kg were then further tested for specific regulated PFAS compounds. The results showed that 12 of the tested products contained regulated PFAS compounds in excess of the permitted limits, and one other product contained regulated PFAS compounds in a concentration near the limit value. All 13 products were purchased from either Amazon (3), SHEIN (4) or TEMU (6).

None of the nine jackets from Danish stores / online shops contained regulated PFAS compounds. However, one of the nine jackets from the Danish stores did contain organic fluorine in excess of 50 mg/kg. The limit value for the upcoming ban on PFASs in clothing in Denmark is set at 50 mg/kg for total fluorine.

5.4 Nordic online shopping study

In March 2025, the Nordic Council of Ministers published a report on joint Nordic inspection of dropshipping and other e-commerce (Nordic Council of Ministers, 2025). The report describes the joint Nordic inspection project carried out in 2024. The Nordic partners involved in the project were the Nordic environmental ministries; specifically:

- KEMI (the Swedish Chemicals Agency) in Sweden
- Tukes (the Finnish Safety and Chemicals Agency) in Finland
- Miljødirektoratet (the Norwegian Environment Agency) in Norway
- Miljøstyrelsen (the Danish EPA) in Denmark

The project focused on purchasing products online from the same three types of websites as are highlighted in this project; namely, online platforms, online dropshipping shops, and regular retailers / online shops. Each of the four countries sourced products locally (from domestic online shops), from other EU member states, and from countries outside the EU. In total, 210 products from 88 unique websites were inspected. However, it is not stated how many of the products that were purchased from online platforms, dropshippers or ordinary webshops, respectively. The types of products that were purchased and inspected were:

- Jewellery (51 products)
- Electronics (50 products)
- Biocidal products (34 products)
- Electronic toys (16 products)
- Fashion/clothing (14 products)
- Toys (12 products)
- Sport and leisure products (8 products)
- Chemical products (8 products)
- Precious metal jewellery (8 products)

⁹ It should be noted that there is a difference between "total fluorine", the quantity referenced in the upcoming Danish legislation, and "total organic fluorine", the quantity analysed here. Total organic fluorine is obtained by subtracting the amount of inorganic fluorine from the total fluorine content.

- Other (5 products)
- Gardening products (4 products)

The products relevant to this project are those in the jewellery and fashion/clothing categories.

The European regulations that the products were tested against were:

- REACH Annex XVII (EU Regulation 1907/2006), which contains restrictions on a number of chemical substances in articles, including phthalates, PAHs, azo dyes, lead, cadmium and nickel.
- the POPs Regulation (EU Regulation 1021/2019), which covers SCCPs (short-chain chlorinated paraffins) and PFOA
- the RoHS Directive (EU Directive 65, 2011), which covers certain heavy metals and phthalates.
- the Toy Safety Directive (EU Directive 48, 2009), but only certain heavy metals
- various additional legislation relevant to the chemical and biocidal products inspected in the project

Overall, there was a large amount of products that did not comply with the legal requirements for the chemical substances inspected for in the project. In total, 147 of the 210 products, or 71%, were non-compliant, but there was a large difference in the proportion of non-compliant products from the three different types of websites:

- 81% of products from online dropshipping shops violated one or more of the tested regulatory requirements
- 72% of products from online platforms/marketplaces violated one or more of the tested regulatory requirements
- 59% of products from domestic online shops violated one or more of the tested regulatory requirements.

The product types with highest non-compliance rates were electronic toys (81% non-compliant), electronics (74%), jewellery (50%), sport and leisure products (38%) and fashion/clothing (25%).

The substances or substance groups with the most violations were:

- Lead – mainly violations in electronics, but also in jewellery
- Cadmium – mainly violations in jewellery, but also in electronics
- Phthalates – mainly violations in PVC products
- SCCPs – mainly violations in PVC products in electronics

In light of the results of this Nordic online shopping study, the Danish EPA launched the present project, which focuses exclusively on products for children and the category of clothing, shoes and accessories; that is, children's fashion.

5.5 Discussion of previous online shopping studies

Across the previously listed studies of online commerce and the content of regulated chemical substances in consumer products, we see a significant proportion of regulatory violations from the large online market platforms, and in the Nordic study, an especially high violation rate from dropshippers. Violations were also observed amongst domestic stores / online shops, but at a lower rate. It should be emphasised, however, that these regulatory violations are not limited to the chemical content, which is the sole focus of the present project, but extend to a wide range of other areas, such as labeling, physical or mechanical safety, etc.

In an article on its website (Danish Consumer Council, 2025b), the Danish Consumer Council summarised the results of a total of nine different tests it conducted between 2019 and 2025.

Their summary shows that out of a total of 148 products (toys, jewellery, clothing, tooth whitening products, etc.) purchased from such online marketplaces as Amazon, SHEIN, TEMU and Wish, 45% contain restricted substances, such as phthalates, nickel, cadmium and PFAS (and hydrogen peroxide, in tooth whiteners).

The joint Nordic survey showed that products such as electronics and jewellery in particular have very high violation rates. In this project, which focuses on children's fashion, the categories of jewellery and clothing, shoes and accessories have also been selected as the product groups under investigation.

The results of the previous studies are not included in the data processing or the summary of the results obtained in the present project.

6. Identification of products

As mentioned in the introduction, this project aims to compare sets of comparable products purchased from three types of online shops/platforms. Such a comparison only makes sense if the products are, in fact, comparable. In light of this, we used an image-based search approach to find maximum similarity of products across the three different types of online shops/platforms.

The types of products in focus within the broader category of children's fashion were determined in consultation with the Danish EPA. The selection of product types for the search and the search procedure itself are described in more detail below.

6.1 Selection of product types in focus

As described in the introduction, this project focuses on products that fall under the category of children's fashion; namely, clothing, shoes and accessories in the following general categories:

- Textiles with plastic prints
- Textiles with dirt- or water-repellent properties
- Metal jewellery or other metal accessories
- Articles made of soft plastic

Within these general categories, specific product types were selected in collaboration with the Danish EPA as focal points for the project. Products were selected on the basis of prolonged skin contact during use and/or violations previously identified by the Danish EPA in products of the same type. Examples are listed in TABLE 1 below.

TABLE 1. Types of products selected for inspection in this project

General category	Product examples / product type	Reason for selection
Textiles with plastic prints	Non-slip socks with plastic pads T-shirts with plastic prints Underwear/nightwear with plastic prints	Small children place socks in their mouths Direct skin contact
Textiles with dirt- or water-repellent properties	Fabric bibs Mittens Snowsuits Breeches/riding pants Wetsuits	Direct skin contact Toddlers place bibs and mittens in their mouths
Metal jewellery	Necklaces Wristbands Post assemblies/stud earrings Hair clips	Direct skin contact Pendants on necklaces can be placed in the mouth
Articles made of soft plastic	Beach sandals/clogs Soft plastic handbags Soft plastic bibs	Direct skin contact Small children place bibs in their mouths

6.2 Approach

As indicated in chapter 2 "The three types of online shops", one of the characteristics of online dropshipping shops is a lack of information on the website regarding (for example) shipping, returns, and who is responsible for the website. This means that it is typically extremely difficult to determine conclusively whether an online shop is a dropshipper or not: the missing information is the type of information that would suggest the shop is a dropshipper. On the other hand, some of this information may actually appear on dropshipping websites, which also makes it extremely difficult to identify these types of sites.

Thus, our approach was to look for online shops displaying several of the characteristics of dropshippers, such as poorly translated text, unusual prices, generic product images, a lack of information about who is responsible for the website, and so on. We searched for products within the category of children's fashion and reviewed various Google hits to look for characteristics suggestive of dropshippers. Websites clearly operated by Danish businesses, foreign manufacturers, and large marketplaces were discarded (or used as sources of comparable products from a Danish website and a large online marketplace, to complete a set). Both an ordinary Google search and an AI-based tool were used to search for foreign websites.

When a dropshipper was identified that appeared to be an EU-based online shop (which was not necessarily clear, due to a lack of information), a product in the children's fashion category was selected and a Google Lens image-based search was performed to identify comparable products on an online marketplace and on a Danish website with its own inventory (as indicated by a short delivery time).

Identifying which websites belonged to which of the three types of online business models was generally a very difficult task. For example, a website may appear to belong to a Danish business with its own inventory. Upon closer inspection, it may turn out to more likely be a large online marketplace selling products in many different countries, operating a website that appears Danish and with a URL possibly ending in '.dk', the top-level domain for Denmark. In many cases, it was not entirely clear at the point of purchase whether the buyer was a dropshipper, a large online marketplace, or a Danish online business with its own inventory. In collaboration with the Danish EPA, it was nonetheless decided that products would be purchased based on the type of online shop each website most closely resembled at the point of purchase. Subsequently, when the products were received, information on the parcel and packaging was used to record the place from which the product was actually shipped. This helped to confirm whether each product was, in fact, purchased from a dropshipper, an online marketplace, or a Danish online business with its own inventory. Thus, in the project, certain purchases were made based on an assumption and the best judgment available at the time of purchase regarding whether the seller was a dropshipper, a large online marketplace, or a Danish website with its own inventory. However, in some cases, this assumption was later reassessed based on information received subsequently (via emails, package details, etc.).

All of the products returned in these searches were recorded, including information about the general product category, product type, product name, product description, type of online business model, website name, price, link to the website, and so on. Each of the three comparable products from the three types of online shops/platforms (i.e., a set of comparable products) was recorded with the same identifying number. In total, 42 sets of comparable products were identified. For each set, more than three unique products could have initially been identified, as there was often doubt as to whether the products returned by the search actually came from a dropshipper or not. In total, there were:

- 9 sets of textiles with plastic prints
- 9 sets of textiles with water- or dirt-repellent properties
- 17 sets of metal articles
- 7 sets of soft plastic articles

6.3 Issues related to product identification

The most difficult task in the search for sets of comparable products was clearly identifying dropshipping websites. A lack of information and the fact that in many cases, these websites are designed to give the appearance of a domestic Danish business, as the web site text also was in Danish with Danish prices, made it difficult to identify products from this category conclusively. In several cases, multiple alternatives had to be found to be sure that a product from a dropshipper was included.

The purchase process was further delayed by the fact that both dropshippers and large online marketplaces often indicate that a product is out of stock or cannot be shipped to Denmark only after attempting to place an order. This information is typically not displayed anywhere when searching for products.

Finding sets of three comparable products was therefore a comprehensive process; for many of the selected sets, one or more products had to be found as alternatives during the purchasing process.

In general, our experience showed that it becomes clear that a product has been dropshipped only upon receipt, as the product has been shipped from abroad and not necessarily from a Danish store, as might otherwise appear to be the case when ordering the product. In some cases, the dropshipper turned out to be from another EU country and in other cases the company was established outside EU, even though most text on the website was in Danish.

7. Selection of products for analysis

This chapter presents which products were purchased for chemical analysis, as well as which products were subjected to which chemical analyses.

7.1 Selection of products for purchase

Based on the overview of the 42 different sets of comparable products, a total of 31 sets of comparable products from the three types of online business models were selected in collaboration with the Danish EPA. The aim of the project was to analyse a total of 30 different sets of comparable products, but an additional set was purchased in case of products having too long delivery times in relation to the schedule for commencing the chemical analyses.

As the products in this project were selected with a view to enabling the Danish Chemical Inspection Service to enforce any violations, the purchases were made by the Danish Chemical Inspection Service.

The 31 selected sets of comparable products consisted of:

- Three sets of metal wristbands
- Three sets of soft plastic beach sandals/clogs
- Three sets of snowsuits with water or dirt repellent properties
- One set of soft plastic bibs
- Two sets of textile bibs with water or dirt repellent properties
- Five sets of metal necklaces with pendants
- One set of soft plastic handbags
- Two sets of metal hair clips
- One set of mittens with water or dirt repellent properties
- Two pairs of anti-slip socks with soft plastic grips
- Three sets of T-shirts with plastic prints
- One set of wetsuits
- Four sets of metal stud earrings

7.2 Products delivered for analysis

Despite the fact that two full months were set aside for delivery of the ordered products, a large number of the products were not delivered before beginning the chemical analyses. The schedule for starting the chemical analyses was postponed for as long as possible in the hope that more of the ordered products would be delivered in time. However, the result was that only 83 of the 93 products (31 sets of three products each) were delivered before the deadline for beginning the chemical analyses.

Of the 93 products, there were a total of five products that never ended up being ordered, either because the order was rejected by the website or because it was not possible to have the product delivered to Denmark. For many products, attempts were made to find comparable alternatives from other websites, but for these five products, it was not possible to identify viable comparable alternatives within the project's deadline for ordering the products.

In addition to examining regulatory compliance for the three types of online business models, the overall purpose of the project was also to compare the content of problematic chemical substances in comparable products purchased from the three types of online business models. For this reason, it was decided in collaboration with the Danish EPA that chemical analyses would only be carried out on delivered products if a minimum of two of the three products in a set had been delivered. This meant that a total of 83 products were selected for the subsequent chemical analyses, of which there were

- 10 sets of two products (the third product was not delivered within the deadline), and
- 21 sets of three products each.

The next section describes which of the delivered and selected products were analysed for which chemical substances.

7.3 Selection of products and choice of chemical analyses

The delivered and selected products are listed in TABLE 2 on the following pages, where the following numbering of the products has been used: XX-YY-Z, where XX is a consecutive number from 01 to 31 for the individual sets, YY indicates whether it is a dropshipper (DS), online marketplace (MP) or a Danish website with own inventory (DK), and where Z indicates the type of material (T for textile, P for soft plastic (including textile with plastic print), M for metal and W for wet suit). Specifying a laboratory number (Lab. no.) with e.g. 01-DS-T means that it is set number 01, purchased from a dropshipper and that the product consists of textile with water or dirt-repellent properties.

As described in Chapter 6 it was not easy to identify products from the three types of online business models. The products were purchased and ordered based on which type the project group believed the product belonged to. It was the Danish Chemical Inspection Service that actually carried out the purchases. The purchased and delivered products are therefore marked with the letter code (DK, DS or MP) for which products they were believed to belong to. For some of the products, however, there was information on the package or elsewhere (e.g. subsequent dialogue with the companies) indicating that the products might rather belong to a different category. In these cases, the final category is indicated in brackets after the Lab. No. It should be noted that the final category is still not definitive in all cases, as the category is not completely clear unless there has been direct dialogue with the company afterwards, e.g. as a result of a non-compliance.

As described in chapter 4 “Regulatory restrictions on certain substances”, the delivered products were analysed for a wide range of regulated chemical substances. However, which products were analysed for which regulated substances depends on the materials the products consist of and the regulatory requirements. For example, heavy metals such as lead (Pb), cadmium (Cd) and nickel (Ni) are only analysed in products containing metals.

The following chemical analyses were performed as part of compliance monitoring (compliance analyses):

- Content analyses of certain phthalates in products containing soft plastics.
- Content analyses of PAHs in plastic products (primarily black plastic).
- Content analyses of short-chain chlorinated paraffins (SCCP) in products made of soft plastic. Since medium-chain chlorinated paraffins (MCCP) can be analysed by the same analytical method as the short-chain chlorinated paraffins, these were also analysed.
- Content analyses of certain PFAS in water-repellent products (primarily bibs, mittens and snowsuits). For comparison and for the purpose of gathering knowledge for the upcoming Danish regulation of PFAS in clothing, footwear and certain impregnating agents (Statutory Order no. 464, 2025), analyses were also carried out for total fluorine content.

- Content analyses of heavy metals in metal products. Initially, screening analyses were performed with a handheld XRF device, after which products were selected for subsequent compliance analyses.
- Nickel release for metal products. Initially, screening analyses were performed with a handheld XRF device, after which products with a nickel content were selected for subsequent compliance analyses.

In addition, a GC-MS¹⁰ screening was performed on all non-metal products to identify any other problematic substances for subsequent analyses.

An overview of which products were selected for which types of compliance analyses and GC-MS screening is given in TABLE 2 on the following pages. Selected analyses are marked with a "yes" in the table, whereas analyses not performed on the product in question are marked with a minus "-". Analysis methods and results are listed in the following chapters. If, after delivery of the products, it has been discovered that they belong to a different category than that for which they were purchased, this category is indicated in brackets after the Lab. No. For two products, "(none)" is indicated, which means that what appeared to be a dropshipper turned out to be an ordinary website based in the EU, for example a German or an Irish webshop. These two products thus fall outside the scope of the project in terms of only sourcing from either Danish webshops, dropshippers or large online marketplaces.

TABLE 2. Overview of the 83 delivered products and selected chemical analyses

Lab. no.	Product type	GC-MS screening	Phthalates	PAHs	SCCP and MCCP	Total fluorine and PFAS	Pb, Cd, Ni (XRF)
01-DK-P	Socks (textile)	Yes	Yes	-	Yes	-	-
01-DS-P	Socks (textile)	Yes	Yes	-	Yes	-	-
01-MP-P	Socks (textile)	Yes	Yes	-	Yes	-	-
02-DK-P	Beach sandals	Yes	Yes	-	Yes	-	-
02-DS-P	Beach sandals	Yes	Yes	-	Yes	-	-
02-MP-P	Beach sandals	Yes	Yes	-	Yes	-	-
03-DK-M	Necklaces (metal)	-	-	-	-	-	Yes
03-DS-M (none**)	Necklaces (metal)	-	-	-	-	-	Yes
03-MP-M	Necklaces (metal)	-	-	-	-	-	Yes
04-DK-M	Stud earrings (metal)	-	-	-	-	-	Yes
04-DS-M	Stud earrings (metal)	-	-	-	-	-	Yes
04-MP-M	Stud earrings (metal)	-	-	-	-	-	Yes
05-DK-M	Hair clips (metal)	-	-	-	-	-	Yes
05-DS-M (DK)	Hair clips (metal)	-	-	-	-	-	Yes
05-MP-M	Hair clips (metal)	-	-	-	-	-	Yes
06-DK-M	Bracelets (metal)	-	-	-	-	-	Yes

¹⁰ GC-MS stands for gas chromatography-mass spectrometry.

06-DS-M (none**)	Bracelets (metal)	-	-	-	-	-	Yes
06-MP-M	Bracelets (metal)	-	-	-	-	-	Yes
07-DK-T	Bibs (textile)	Yes	-	-	-	Yes	-
07-DS-T	Bibs (textile)	Yes	-	-	-	Yes	-
07-MP-T	Bibs (textile)	Yes	-	-	-	Yes	-
08-DK-P	T-shirts/nightwear (textile)	Yes	Yes	-	Yes	-	-
08-MP-P	T-shirts/nightwear (textile)	Yes	Yes	-	Yes	-	-
09-DK-W	Wetsuits	Yes	-	Yes	-	-	-
09-DS-W	Wetsuits	Yes	-	Yes	-	-	-
09-MP-W	Wetsuits	Yes	-	Yes	-	-	-
10-DK-M	Hair clips (metal)	-	-	-	-	-	Yes
10-DS-M	Hair clips (metal)	-	-	-	-	-	Yes
10-MP-M	Hair clips (metal)	-	-	-	-	-	Yes
11-DK-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
11-DS-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
11-MP-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
12-DK-P	Socks (textile)	Yes	Yes	-	Yes	-	-
12-DS-P	Socks (textile)	Yes	Yes	-	Yes	-	-
12-MP-P	Socks (textile)	Yes	Yes	-	Yes	-	-
13-DK-P	Beach sandals	Yes	Yes	-	Yes	-	-
13-DS-P	Beach sandals	Yes	Yes	-	Yes	-	-
13-MP-P	Beach sandals	Yes	Yes	-	Yes	-	-
14-DK-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
14-MP-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
15-DK-M	Necklaces (metal)	-	-	-	-	-	Yes
15-DS-M	Necklaces (metal)	-	-	-	-	-	Yes
15-MP-M	Necklaces (metal)	-	-	-	-	-	Yes
16-DK-M	Stud earrings (metal)	-	-	-	-	-	Yes
16-MP-M	Stud earrings (metal)	-	-	-	-	-	Yes
17-DS-PM	Plastic handbag	Yes	Yes	Yes	Yes	-	Yes*
17-MP-PM	Plastic handbag	Yes	Yes	Yes	Yes	-	Yes*
18-DK-M	Stud earrings (metal)	-	-	-	-	-	Yes
18-MP-M	Stud earrings (metal)	-	-	-	-	-	Yes
19-DK-T	Mittens (textile)	Yes	-	-	-	Yes	-
19-MP-T	Mittens (textile)	Yes	-	-	-	Yes	-
20-DK-M	Bracelets (metal)	-	-	-	-	-	Yes
20-DS-M	Bracelets (metal)	-	-	-	-	-	Yes
21-DK-M	Stud earrings (metal)	-	-	-	-	-	Yes

21-MP-M	Stud earrings (metal)	-	-	-	-	-	Yes
22-DK-P	T-shirts/nightwear (textile)	Yes	-	Yes	-	-	-
22-DS-P	T-shirts/nightwear (textile)	Yes	-	Yes	-	-	-
22-MP-P	T-shirts/nightwear/underwear (textile)	Yes	-	Yes	-	-	-
23-DK-M	Necklaces (metal)	-	-	-	-	-	Yes
23-DS-M	Necklaces (metal)	-	-	-	-	-	Yes
23-MP-M	Necklaces (metal)	-	-	-	-	-	Yes
24-DK-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
24-DS-T (MP)	Snowsuits (textile)	Yes	-	-	-	Yes	-
24-MP-T	Snowsuits (textile)	Yes	-	-	-	Yes	-
25-DK-T	Bibs (textile)	Yes	-	-	-	Yes	-
25-DS-T (MP)	Bibs (textile)	Yes	-	-	-	Yes	-
25-MP-T	Bibs (textile)	Yes	-	-	-	Yes	-
26-DK-P	Bibs (soft plastic)	Yes	Yes	-	Yes	-	-
26-DS-P	Bibs (soft plastic)	Yes	Yes	-	Yes	-	-
27-DK-M	Bracelets (metal)	-	-	-	-	-	Yes
27-DS-M (DK)	Bracelets (metal)	-	-	-	-	-	Yes
27-MP-M	Bracelets (metal)	-	-	-	-	-	Yes
28-DK-M	Necklaces (metal)	-	-	-	-	-	Yes
28-DS-M (DK)	Necklaces (metal)	-	-	-	-	-	Yes
28-MP-M	Necklaces (metal)	-	-	-	-	-	Yes
29-DK-M	Necklaces (metal)	-	-	-	-	-	Yes
29-DS-M (MP)	Necklaces (metal)	-	-	-	-	-	Yes
29-MP-M	Necklaces (metal)	-	-	-	-	-	Yes
30-DK-P	Beach sandals	Yes	Yes	Yes	Yes	-	-
30-MP-P	Beach sandals	Yes on three different materials	Yes	Yes	Yes	-	-
31-DK-P	T-shirts/nightwear (textile)	Yes	-	Yes	-	-	-
31-DS-P	T-shirts/nightwear (textile)	Yes	-	Yes	-	-	-
31-MP-P	T-shirts/nightwear (textile)	Yes	-	Yes	-	-	-
Total number of analyses	For all products	47	20	13	20	16	39

* It should be noted that for the handbags, the plastic material was taken for the analyses generally carried out on plastic materials, but the metal buckles and zippers were taken for XRF analyses on a similar basis as the other metal products.

** Means that what looked like a dropshipper has been a regular website located in the EU, such as a German or Irish webshop. These two products thus fall outside the scope of the project in terms of only sourcing from either Danish webshops, dropshippers or large online marketplaces.

8. Screening analyses

As described in chapter 7, the following screening analyses were performed in this project:

- GC-MS screening for organic substances for all non-metal products
- XRF screening for heavy metal content in the metal-containing products
- DMG¹¹ screening (swab test) for nickel release for the metal-containing products

The performance and results of these screening analyses are described below.

8.1 GC-MS screening for organic substances

For all non-metal products (i.e. all products other than jewellery and hair clips), a GC-MS screening was performed to identify any content of other substances of concern in the products. These other products consisted of textiles (snowsuits, mittens or bibs), plastics (shoes, handbags, bibs, plastic prints on textiles or socks) or mixed material wetsuits.

8.1.1 Sample preparation for GC-MS screening

All samples were cut into small pieces of approximately 5 x 5 mm and extracted with solvent (THF, tetrahydrofuran). The extracts were prepared by adding as little solvent as possible to the sample, after which the sample was treated with ultrasound and heat, and any dissolved plastic was then precipitated. A known amount of internal standards (fluorene and fluoronaphthalene) was added, and the sample was analysed directly on GC-MS. The solvent THF was used, as it is particularly effective at dissolving the plastic, thereby increasing the probability that more additives are extracted in larger quantities.

As the volume of solvent was adjusted as needed, for some samples it was necessary to use a relatively large volume of solvent to ensure that the sample was fully covered. The maximum volume used corresponds to up to three times the lowest volume used in the screening, leading to some degree of dilution for these samples. TABLE 24 in Appendix 1.1 indicates when a volume exceeding twice the minimum volume used was applied.

8.1.2 Results of GC-MS screening for organics

For the GC-MS screening, it generally applies that single determinations have been made, as it is a screening. Attempts were made to identify at least the five largest peaks in the chromatograms for each sample using the NIST (National Institute of Standards and Technology) library and our specialists' experience. Several of the largest peaks in each sample could not be uniquely identified and are therefore not reported, but the number of substances (peaks in the chromatogram) that were not identified is reported for all samples. If a substance was identified in one sample, the same substance was searched for in the other samples to the extent that this was possible, resulting in the identification of far more than five substances for some samples.

For some samples, there were a maximum of 3-4 different peaks (substances) in the sample in total and at low concentrations. For these samples, only one or two of the largest peaks were identified.

¹¹ DMG stands for dimethylglyoxime. Dimethylglyoxime is a reagent used to detect nickel by forming a red complex with nickel ions.

Appendix 1 is broken down by sample level, with an indication of which organic substances were identified in the total of 47 analysed samples. The 47 samples represent a total of 45 products, as one sample - a plastic shoe - consisted of three different materials, which is why a screening analysis was performed for each of the three materials for this product.

In addition, the same appendix (Appendix 1) contains a table listing the individual substances identified and the samples in which they were identified. In TABLE 5 below, as well as TABLE 24 and TABLE 25 provided in Appendix 1, the substances identified by the GC-MS screening are indicated by chemical name, CAS number and an estimated quantity. The estimated amount is determined based on the known amount of internal standard added. As the concentrations are estimated based on the content of the internal standard and not the specific substance, it must be emphasised that these are estimates. These estimates are therefore indicated by one to four plus signs (+), which correspond approximately to the concentrations listed below. The measured content in the extracts is also affected by how efficiently the individual substance is extracted from the samples. In a screening, an extraction solvent (here THF) is chosen that is suitable for many substances and the matrix, but does not target the individual substances. In the tables in Appendix 1, the maximum estimated "concentration" is indicated in the form of plus signs (+) across the samples in which the substance was found. Differences in dilution for the individual samples have been taken into account in the indication of the plus signs.

With respect to the above, the indication of plus signs should not be seen as a direct expression of the concentration of the substance in the sample, but at best an estimate that makes it possible to compare the content of the same substance across several samples.

< + corresponds approximately to an estimated concentration in the sample of less than 10 ppm

+ corresponds approximately to an estimated sample concentration of 10-100 ppm

++ corresponds approximately to an estimated sample concentration of 100-1,000 ppm

+++ corresponds approximately to an estimated sample concentration of 1,000-10,000 ppm or 0.1-1%

++++ corresponds approximately to an estimated sample concentration of 10,000-100,000 ppm or 1-10%

During the GC-MS screening, a total of > 1,900 unique peaks were seen in the chromatograms of the 47 samples, where each peak in a chromatogram represents an organic substance. These 1,900 peaks were identified after the chromatograms had been cleaned of any signals from the instrument and minor impurities in the solvents used and the internal standard. The 47 samples had between 0 and 100 different peaks (organic substances) in the chromatogram. The vast majority of the peaks in the chromatograms were small peaks (<+ and +) and are thus organic substances that are likely present at low levels in the samples. For a few samples, no substances or only very few substances were identified. For several of the samples with few or no substances identified, it was necessary to use a larger volume of liquid to cover the sample (up to three times the lowest volume used in the screening). This leads to a degree of dilution that may have contributed to the inability to identify more substances in the screening. In addition to the degree of dilution, the difference may be due to the fact that these samples do not contain many organic additives, that the additives used could not be extracted with the chosen technique or that they could not be analysed with the chosen GC-MS analysis technique (such as PFAS or various colourants).

For organic substances present in the highest "concentrations" in the samples, either "+++" or "++++" (i.e. around 0.1% and up to around 10%), the vast majority were identified. Only two individual substances in this category were not identified, one of which was a very broad peak, likely representing an isocyanate or a mixture of isocyanates, and which appeared in two

products that already contained, among other things, isocyanate. The other unidentified substance was measured in the nine different products and is probably a thiocyanate or an isothiocyanate, but this is uncertain, so it is not included in the results in the tables in Appendix 1. In addition, six of the products contained a mixture of a wide range of organic substances that gave rise to very broad, undefined peaks in the chromatogram where the individual substance could not necessarily be identified. These broad peaks are not necessarily identical across the six products and are each estimated to contain a minimum of 50+ different substances that collectively occur in the "concentration" '+++' or '++++'. Several of the broad peaks appear to consist primarily of mixtures of various hydrocarbons (alkanes, alkenes, perhaps aromatics or long-chain alcohols).

A total of approximately 130 substances were identified in the 47 samples, based on focusing on the identification of the five largest peaks in each chromatogram. However, for some of these substances, the identification is slightly uncertain. In addition, several substances were partially identified, meaning that, for example, the substance class is known. However, these are not listed.

The detailed tables with the chemical substances identified by the GC-MS screening for the 47 samples (Appendix 1) show that some of the same types of additives are generally observed, such as antioxidants and phthalates in plastic materials, and isocyanates in plastic products, textiles, or wetsuits.

8.1.2.1 Number of chemical substances in the samples

In TABLE 26 in Appendix 1.3, an overview is provided of the total number of substances in the extract from the GC-MS screening for the 47 samples, as well as how many of these substances were identified. In addition, it is indicated how many of the substances occur in the indicated amounts from <+ to +++.

It can be seen from TABLE 26 in Appendix 1.3 that, in general, the highest number of organic substances was observed in the product types: beach sandals, socks with plastic grips, and plastic handbags. This is followed by snowsuits, whereas generally not many different organic substances were observed in the textile bibs, but many were observed in the plastic bibs. For T-shirts with plastic prints, the picture is mixed; some contain many organic substances, while others contain few.

8.1.2.2 Product types and number of organic substances identified

This tendency of the highest number of organic substances in the extract from the GC-MS screening being found in the beach sandals, socks with plastic grips and handbags can also be seen from TABLE 3 below, where products of the same type are grouped together, and where the number of substances is given as an average for the samples that were analysed, and broken down by where the products were purchased (from a Danish website with its own inventory (DK), a dropshipping website (DS) or a large online marketplace (MP)). In this table, it has been taken into account that changes to the type of website (DK, DS or MP) were made in the assessment after the products were received. It is worth noting here that there are only a few products of the types wetsuits, bibs made of soft plastic, handbags and mittens, meaning that tendencies derived from these product types are subject to considerable uncertainty. TABLE 3 does, however, confirm the general picture that the highest number of organic substances is measured in plastic products (including socks with plastic grips) and the fewest organic substances in textile bibs.

TABLE 3. Number of substances in the extract from the GC-MS screening on average for products of the same type.

Product type	DK Danish web-site	DS Dropshipper	MP Large online marketplace	Average	Total number of samples
Beach sandals	43	80	61	60	10
Bibs (soft plastic)	37	80	None delivered	59	2
Plastic hand-bag	None delivered	80	62	71	2
Socks with plastic grips	64	74	90	76	6
T-shirt with plastic prints	25	37	20	26	8
Snowsuits (textile)	24	16	15	18	8
Bibs (textile)	13	0	7	8	6
Mittens (textile)	29	None delivered	10	20	2
Wetsuits	85	78	10	58	3
Average	36	58	36	41	47

8.1.2.3 Number of organic substances measured by type of online shop

In TABLE 4 below, the average number of substances measured in samples purchased from a Danish website (DK), a dropshipper (DS) or a large online marketplace (MP) is indicated. For the data in this table, it has been taken into account that changes to the type of website (DK, DS or MP) were made in the assessment after the products were received.

From both TABLE 3 and TABLE 4, it appears that there are generally slightly fewer chemical substances in products purchased from Danish websites with their own inventory than in products purchased from a dropshipper or a large online marketplace. However, this trend only applies to plastic products or products with plastic printing. For textiles, which generally contain fewer organic substances, the trend is not evident, or rather the opposite. There are too few wetsuits made from the same type of material (three in total) for the data to be used for this comparative purpose. In general, the number of samples is low, making it difficult to draw any unambiguous conclusions at the product-type level, but perhaps more so with regard to the overall picture.

TABLE 4. Average number of substances identified in the products by the GC-MS screening depending on material and where they were purchased

Where the products were purchased	Plastic	Plastic print	Textiles (water repellent)	Wetsuit
DK Danish website	42	41	21	85
DS Dropshipper	80	55	8	78
MP Large online marketplace	62	48	11	10
Average	61	48	15	58
Total number of samples	14	14	16	3

8.1.2.4 Organic substances identified in most products

The organic substances that are present in most of the 47 products are listed in TABLE 5 below. Only substances identified in more than 10 of the 47 samples are listed. The table does not indicate the hazardousness of the substances. However, this information is discussed in chapter 9 "Initial hazard assessment".

It can be seen from TABLE 5 that four phthalates are among the substances that recur in the highest number of products, including two of the regulated phthalates, DBP and DEHP. The results of the quantitative analyses of regulated phthalates are discussed in a later chapter. In addition, an isocyanate is found in 21 of the products, and for some products in high concentrations. Oleamide is a plasticiser for plastics and may be used as an alternative to the regulated phthalates.

Finally, a large number of alkanes are among the most common chemical substances in the 47 samples. The alkanes are typically found in the same products with a wide range of different alkanes added. This may be an indication of oils that have been added or possibly lubricating oils/abrasive oils used for e.g. plastic products.

The list of identified substances does not include the antioxidant BHT (butylated hydroxytoluene), which is a common additive for e.g. plastics and is also suspected of being an endocrine disruptor. It is considered likely that several of the samples contain BHT, but it has not been possible to investigate this, as the chosen solvent (THF) contains larger amounts of BHT to prevent the formation of explosive peroxides. Any BHT content in the samples is therefore masked by the BHT content in the solvent.

TABLE 5. The 25 chemical substances identified in most of the 47 samples by the GC-MS screening.

CAS no.	Name of substance	Highest quantity	In total number of products
84-74-2	Dibutyl phthalate (DBP)	++++	43
301-02-0	Oleamide	++	36
101-68-8	4,4'-Diphenylmethane diisocyanate	++++	21
112-40-3	n-Dodecane	++	18
629-50-5	n-Tridecane	++	18
6422-86-2	Bis(2-ethylhexyl) terephthalate	++++	18
111-84-2	n-Nonane	+	17
112-95-8	n-Eicosane	++	17
54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-one	++	17
629-62-9	n-Pentadecane	++	17
777-95-7	1,6-Dioxacyclododecane-7,12-dione	++	17
629-78-7	n-Heptadecane	++	16
629-92-5	n-Nonadecane	++	16
104-76-7	2-Ethylhexan-1-ol	++	15
544-76-3	n-Hexadecane	++	15
593-45-3	n-Octadecane	++	15
137-89-3	Bis(2-ethylhexyl) isophthalate	+++	14
629-94-7	n-Heneicosane	++	14
629-59-4	n-Tetradecane	++	13

CAS no.	Name of substance	Highest quantity	In total number of products
84-74-2	Dibutyl phthalate (DBP)	++++	43
301-02-0	Oleamide	++	36
101-68-8	4,4'-Diphenylmethane diisocyanate	++++	21
117-81-7	Bis(2-ethylhexyl) phthalate (DEHP)	++	12
123-05-7	2-Ethylhexanal	+	12
5444-75-7	2-ethylhexyl benzoate	++	12
629-99-2	n-Pentacosane	+	12
646-31-1	n-Tetracosane	+	12
654646-06-7	2-Ethylhexyl 4-cyanobenzoate	+	11

8.2 XRF screening analyses for heavy metals

An XRF screening was carried out for all metal products delivered in the project using a handheld XRF device (Hitachi High-Tech X-MET8000). The purpose was to analyse the content of heavy metals, including lead and cadmium, and whether these were above the limit value. In addition, DMG screening (swab test) was performed to indicate whether a product released nickel.

Based on the results of the XRF screening and DMG testing, prioritised products were selected for quantitative compliance analyses for lead and cadmium, respectively, as well as for nickel release. The products were prioritised based on screening results close to the limit value, where a quantitative analysis could confirm or disprove a possible violation of applicable limit values or if DMG screening indicated nickel release. If one of the products in the set was found relevant for quantitative analysis, the entire set was analysed.

8.2.1 Results of XRF screening analyses for heavy metals

The results of XRF screening analyses are listed below in TABLE 6. The results are given for the metals found relevant for this project: lead, cadmium, nickel, the result of the DMG test and whether the product was selected for quantitative analysis. The results are indicated by stating whether the content of lead and cadmium was above the respective limit value, or whether the product contains nickel. For a better visual overview, fields with a "Yes" are marked with a green background colour.

If the XRF screening showed a content of lead and/or cadmium that clearly exceeded the respective limit values, these were not prioritised for quantitative analysis, but are indicated as a violation of the legislation in connection with the reporting of this project (see summary in section 14.7 "Summary of the compliance analyses").

TABLE 6. Results of XRF screening analyses for lead (Pb), cadmium (Cd) and nickel (Ni) performed by the Danish Chemical Inspection Service.

Lab. no.	Product type	Pb content above the limit value of 0.05%	Cd content above the limit value of 0.01%	Release of Ni (DMG test)	Selected for quantitative analysis
03-DK-M	Necklaces (metal)	No	No	No	No
03-DS-M (none***)	Necklaces (metal)	No	No	No	No
03-MP-M	Necklaces (metal)	No	No	No	No

Lab. no.	Product type	Pb content above the limit value of 0.05%	Cd content above the limit value of 0.01%	Release of Ni (DMG test)	Selected for quantitative analysis
03-DK-M	Necklaces (metal)	No	No	No	No
04-DK-M	Stud earrings (metal)	No	Yes	No	No*
04-DS-M	Stud earrings (metal)	No	No	No	No
04-MP-M	Stud earrings (metal)	No	Yes	No	No*
05-DK-M	Hair clips (metal)	No	No	No	No
05-DS-M (DK)	Hair clips (metal)	**	**	No	No
05-MP-M	Hair clips (metal)	No	No	No	No
06-DK-M	Bracelets (metal)	No	No	No	No
06-DS-M (none***)	Bracelets (metal)	No	No	No	No
06-MP-M	Bracelets (metal)	No	No	No	No
10-DK-M	Hair clips (metal)	No	No	No	Yes
10-DS-M	Hair clips (metal)	Yes	No	No	Yes
10-MP-M	Hair clips (metal)	No	No	No	Yes
15-DK-M	Necklaces (metal)	No	No	No	No
15-DS-M	Necklaces (metal)	No	No	No	No
15-MP-M	Necklaces (metal)	No	No	No	No
16-DK-M	Stud earrings (metal)	No	No	No	No
16-MP-M	Stud earrings (metal)	No	No	No	No
17-DS-PM	Handbag plastic (metal zip)	**	**	**	Yes
17-MP-PM	Handbag plastic (metal zip)	**	**	**	Yes
18-DK-M	Stud earrings (metal)	No	No	No	No
18-MP-M	Stud earrings (metal)	Yes	No	No	No*
20-DK-M	Bracelets (metal)	No	No	No	Yes
20-DS-M	Bracelets (metal)	Yes	Yes	Yes	Yes
21-DK-M	Stud earrings (metal)	No	No	No	Yes
21-MP-M	Stud earrings (metal)	No	No	No	Yes
23-DK-M	Necklaces (metal)	No	No	No	Yes
23-DS-M	Necklaces (metal)	No	No	No	Yes
23-MP-M	Necklaces (metal)	No	No	Yes	Yes
27-DK-M	Bracelets (metal)	No	No	No	No
27-DS-M (DK)	Bracelets (metal)	No	No	No	No
27-MP-M	Bracelets (metal)	No	No	No	No

Lab. no.	Product type	Pb content above the limit value of 0.05%	Cd content above the limit value of 0.01%	Release of Ni (DMG test)	Selected for quantitative analysis
03-DK-M	Necklaces (metal)	No	No	No	No
28-DK-M	Necklaces (metal)	No	No	No	No
28-DS-M (DK)	Necklaces (metal)	No	Yes	No	No*
28-MP-M	Necklaces (metal)	No	Yes	No	No*
29-DK-M	Necklaces (metal)	No	No	No	No
29-DS-M (MP)	Necklaces (metal)	No	Yes	No	No*
29-MP-M	Necklaces (metal)	No	Yes	No	No*
Total	For all metal products	3	7	2	12

One asterisk (*) means that XRF screening showed such a large exceedance of the limit value that the product was not prioritised for quantitative analysis

Two asterisks (**) means that it was not possible to screen using the handheld device due to, for example, the physical design of the product.

Three asterisks (***) mean that what appeared to be a dropshipper turned out to be an ordinary website based in the EU, for example a German or an Irish webshop. These two products thus fall outside the scope of the project in terms of only sourcing from either Danish webshops, dropshippers or large online marketplaces.

The following remarks apply to the XRF screening results carried out by the Danish Chemical Inspection Service:

- For set no. 04, cadmium above the limit value was identified in two of the three products (04-DK-M and 04-MP-M). The screening showed a content of cadmium of such a magnitude that the Danish EPA assessed that there was no need for quantitative compliance analyses of these products.
- For set no. 05, it was not possible to obtain screening results for 05-DS-M (DK). However, this product was not selected for compliance analyses. For the other two products in the set, there was no content of lead, cadmium or nickel that gave reason to carry out compliance analyses on these.
- For set no. 10, a content close to the limit value of lead was identified for one of the products (on 10-DS-M), which is why the entire set was taken for compliance analysis for lead, which otherwise did not show an exceedance (see section 14.5.2).
- For set no. 17, it was not possible to obtain a result with the handheld XRF device, so the entire set (17-DS-M and 17-MP-M) was taken for quantitative compliance analyses for lead, cadmium and nickel release, respectively (see sections 14.5.2 and 14.6.2).
- For set no. 18, lead above the limit value was identified in one of the two products (18MP-M). The exceedance found by XRF screening was so large that there was deemed to be no need for quantitative compliance analyses of these products.
- For set no. 20, both lead and cadmium were identified above the limit value in one of the two products (20-DS-M). The exceedance was so large that there was deemed to be no need for quantitative compliance analyses of these products. In addition, there was nickel release according to the swab test (DMG test), which is why the product was selected for compliance analysis for nickel release together with the other product in this set (see section 14.6.2).
- For set no. 21, lead was identified close to the limit value in one of the two products, which is why the set was selected for compliance analyses. In addition, it was not possible to obtain screening values for the other product in the set, so the set was selected for compliance

analyses for both lead and cadmium content. The quantitative analyses showed no exceedances for lead and cadmium (see section 14.5.2).

- For set no. 23, a small difference was seen on the DMG in terms of nickel release, but no content of either lead or cadmium. However, due to the presence of nickel, all three products in the set were sampled for compliance analyses for nickel release, but no exceedance of the limit value was identified (see section 14.6.2).
- For set no. 28, cadmium above the limit of detection was identified in two of the three products (28-DS-M (DK) and 28-MP-M). The exceedance was so large that there was deemed to be no need for quantitative compliance analyses of these products.
- For set no. 29, cadmium was identified above the detection limit in two of the three products (29-DS-M (MP) and 29-MP-M). The exceedance was so large that there was deemed to be no need for quantitative compliance analyses of these products.

The initial XRF screenings showed that only two lead violations and seven cadmium violations were identified based on these screening analyses. All violations of the investigated chemical substances in the purchased products are summarised in chapter 14.7 "Summary of the compliance analyses".

8.2.2 Selection of products for compliance analyses for lead, cadmium and nickel

From TABLE 6 above, it appears that a total of seven products were selected for compliance analyses of lead and cadmium content (see section 14.5.2) and that a total of nine products were selected for compliance analyses of nickel release (see section 14.6.2). There was overlap between the products selected for compliance analyses of lead and cadmium and those selected for compliance analyses of nickel release, meaning that a total of 12 products were selected for subsequent compliance analyses. These were:

- 10-DK-M: Compliance analysis for lead and cadmium
- 10-DS-M: Compliance analysis for lead and cadmium
- 10-MP-M: Compliance analysis for lead and cadmium
- 17-DS-M: Compliance analysis for lead and cadmium and for nickel release
- 17-MP-M: Compliance analysis for lead and cadmium and for nickel release
- 20-DK-M: Compliance analysis for nickel release
- 20-DS-M: Compliance analysis for nickel release
- 21-DK-M: Compliance analysis for lead and cadmium
- 21-MP-M: Compliance analysis for lead and cadmium
- 23-DK-M: Compliance analysis for nickel release
- 23-DS-M: Compliance analysis for nickel release
- 23-MP-M: Compliance analysis for nickel release

9. Initial hazard assessment

Based on the total of approximately 130 different organic substances identified by the GC-MS screening, an initial hazard assessment was carried out in order to prioritise chemical substances for the subsequent migration testing.

In Appendix 1.2, the references to the substances' classifications that were used in this initial hazard assessment for prioritising the chemical substances identified in the products by the GC-MS screening are indicated. The following information is given in Appendix 1.2:

- The harmonised classification of the substances
- The notified classification of the substances
- The presence of the substances on the candidate list
- Any comments given about the substances on ECHA's website on the registered substances

9.1 Overall hazard assessment of the substances

TABLE 7 below shows selected substances identified during the screening analyses of the 47 different samples. The selected substances in TABLE 7 (relative to the full list in Appendix 1.2) are those substances that:

- Have the most problematic health classifications (i.e. carcinogenic (Carc.), reprotoxic (Repr.) or allergenic (Skin Sens.)),
- are identified in several of the 47 samples, or
- are identified in the highest quantities (+++ and ++++ corresponding to levels above 0.1% and above 1%, respectively).

The number of products in which the substances were detected is indicated. This information is compared against the classification of the substances. A total of 19 substances are listed in Table 7. Only substances identified in more than two of the 47 samples are listed, unless the substance has a particularly problematic health classification such as reprotoxic.

As not many of the approximately 130 identified substances have a harmonised classification, the classification according to the REACH classification dossier was also examined for all substances and was taken into account when prioritising substances for the subsequent migration testing.

The substances in TABLE 7 have been selected, among other things, on the basis of classifications considered problematic in relation to children's exposure: these may include carcinogenic effects, reproductive toxic effects (including endocrine-disrupting effects), and skin-sensitising effects. Skin-irritating effects are not considered relevant as these only appear at higher concentrations than those typically detected in the analysed products.

TABLE 7. Classification of selected substances identified by the GC-MS screening in the 47 samples. The classification of all identified substances can be seen in Appendix 1.

CAS no.	Name of substance	In number of samples	Highest quantity	Classification
584-84-9	2,4-Diisocyanato-1-methylbenzene	7	+++	Harmonised classification: Carc. 2, Acute Tox. 2, STOT SE 3, Skin Irrit. 2, Eye Irrit. 2, Resp. Sens. 1, Skin Sens. 1, Aquatic Chronic 3
101-68-8	4,4'-Diphenylmethane diisocyanate	21	++++	Harmonised classification: Carc. 2, Acute Tox. 4, STOT SE 3, STOT RE 2, Skin Irrit. 2, Eye Irrit. 2, Resp. Sens. 1, Skin Sens. 1
84-74-2	Dibutyl phthalate (DBP)	43	++++	Harmonised classification: Repr. 1B, Aquatic Acute 1 Is on the REACH candidate list and is regulated
84-69-5	Diisobutyl phthalate (DIBP)	1	++	Harmonised classification: Repr. 1B Is on the REACH candidate list and is regulated
117-81-7	Bis(2-ethylhexyl) phthalate (DEHP)	12	++	Harmonised classification: Repr. 1B Is on the REACH candidate list and is regulated
80-62-6	Methyl methacrylate	5	++	Harmonised classification: Flam. Liq. 2, STOT SE 3, Skin Irrit. 2, Skin Sens. 1
123-05-7	2-Ethylhexanal	12	+	Notified classification: Flam. Liq. 3, Repr. 2, Skin Sens. 1B
104-66-5	1,2-Diphenoxyethane	10	++	Notified classification: Aquatic Chronic 2 H411 (5 notifiers)
131-11-3	Dimethyl phthalate	9	++	Notified classification: Not classified (1994 notifiers)
149-57-5	2-Ethylhexanoic acid	2	+	Notified classification: Repr. 2

CAS no.	Name of substance	In number of samples	Highest quantity	Classification
584-84-9	2,4-Diisocyanato-1-methylbenzene	7	+++	Harmonised classification: Carc. 2, Acute Tox. 2, STOT SE 3, Skin Irrit. 2, Eye Irrit. 2, Resp. Sens. 1, Skin Sens. 1, Aquatic Chronic 3
301-02-0	Oleamide	36	++	Notified classification: Not classified (458 notifiers) Acute tox 4. (H332) (55 notifiers) Other hazards notified: Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, STOT SE 3 H335 (53+38 notifiers), STOT SE 2 (40 notifiers)
6422-86-2	Bis(2-ethylhexyl) terephthalate	18	++++	Notified classification: Not classified (376 notifiers) H301; H413 (1 notifier)
137-89-3	Bis(2-ethylhexyl) isophthalate	14	+++	Notified classification: Repr. 1B, Aquatic Acute 1 (38 notifiers)
5444-75-7	2-ethylhexyl benzoate	12	++	Notified classification: Repr. 1B (H360F) (104 notifiers) Not classified (44 notifiers) Aquatic chronic 4 (41 notifiers)
103-23-1	Bis(2-ethylhexyl) adipate	9	++++	Notified classification: Not classified (972 notifiers) Other hazards notified: Skin Irrit. 2., Eye Irrit. 2 (7 notifiers), Acute tox 4 (1 notifier), Carc.2, Repr. 2, Aquatic Chronic 4 (1 notifiers)
112-39-0	Methyl palmitate	5	+++	Notified classification: Skin Irrit. 2 (1341 notifiers), Skin Sens. 1 (188 notifiers), Other hazards notified Eye Dam 1 (1 notifiers)
36653-82-4	1-Hexadecanol	5	+++	Notified classification: Not classified (2710 notifiers) Eye Irrit. 2; Aquatic Acute 1; Aquatic Chronic 2 (143 notifiers) Other hazards notified: Flam. Liq. 2 (>71 notifiers), Acute Tox. 4 (H302/H312) (>71 notifiers), STOT SE 3 (H335/H336) (>71 notifiers), Aquatic Chronic 1 (H410), Skin Irrit. 2 (H315) (287 notifiers).

CAS no.	Name of substance	In number of samples	Highest quantity	Classification
584-84-9	2,4-Diisocyanato-1-methylbenzene	7	+++	Harmonised classification: Carc. 2, Acute Tox. 2, STOT SE 3, Skin Irrit. 2, Eye Irrit. 2, Resp. Sens. 1, Skin Sens. 1, Aquatic Chronic 3
77-94-1	Tributyl citrate	4	++++	Notified classification: Not classified (256 notifiers) Eye dam 1 (104 notifiers) Aquatic acute 1 (14 notifiers)
110-63-4	1,4-Butanediol	3	+++	Notified classification: Acute Tox. 4 (H302), STOT SE3 (H336) (145+260 notifiers) Other notifications: Eye Irrit. 2 (H319) (131 notifiers), STOT SE 1 (H370) (11 notifiers)

9.2 Discussion regarding the substances

The analyses in this project run in two tracks, where the following are carried out:

1. quantitative analyses of selected regulated substances (see chapter 14 "Compliance analyses"), and
2. migration testing and risk assessment of selected non-regulated substances.

This section thus selects which non-regulated substances to focus on for migration testing (chapter 10) and subsequent hazard and risk assessment (chapter 12 and 13). As compliance analyses are already performed for certain regulated substances, these substances are not selected for migration testing.

The isocyanates were excluded from the subsequent migration testing because they are likely to be relatively reactive and would normally disappear after a short period of product use, especially after the first wash. The isocyanates decompose in contact with water. When compared with the limit values for isocyanates in the legislation on plastic food contact materials, it also appears that these limit values are given as concentration in the finished product, and not as concentration in the migration medium, as they will presumably have reacted in that case. Finally, the limit values in the food contact materials legislation are not necessarily set based on a toxicological risk assessment, but rather on the lowest achievable value under good manufacturing practice¹² (EU Regulation 2023/915, preamble no. 2). This reflects that it can be difficult to perform a toxicological risk assessment of the materials.

The phthalates that are already regulated (i.e. DBP, DIBP and DEHP) are also excluded precisely because they are restricted under the legislation due to problematic properties in relation to health. The regulated phthalates are analysed quantitatively via compliance analyses – see chapter 14. However, one phthalate-like substance, CAS No. 137-89-3, bis(2-ethylhexyl) isophthalate, is not regulated but was found in 14 products and in relatively high

¹² Which is the so-called ALARA principle ("As Low As Reasonably Achievable")

concentrations. It is notified with a classification as reprotoxic. It is therefore interesting to investigate whether the substance constitutes an unacceptable risk, as it is an alternative to phthalates and is used instead of the regulated substances.

Another candidate for risk assessment could be CAS No. 103-23-1, bis(2-ethylhexyl) adipate, as it is a plasticiser that has been found in a relatively large number of products, namely nine products, and in relatively high concentration. At the same time, the notified classifications include carcinogenic and reprotoxic, however, these classifications have only been notified by a single registrant, while several hundred registrants (972) indicate 'no classification'.

The substance 2-ethylhexyl benzoate, CAS No. 5444-75-7, may also be of interest for the risk assessment, as the substance has been self-classified as Repr. 1B by approximately 100 registrants and because the substance was identified in extracts from 12 products.

The remaining substances are not considered relevant for selection for subsequent migration testing, as they do not have classifications of concern, occur in few of the 47 samples or are generally likely to occur in such low concentrations in the samples that it is uncertain whether they can be measured in the migration fluid during migration.

9.3 Conclusion regarding the prioritisation of substances for migration testing

In collaboration with the Danish EPA, it was decided to focus on the following two organic substances identified in the screening analyses:

- CAS no. 137-89-3, Bis(2-ethylhexyl) isophthalate (BEHIP)
- CAS no. 5444-75-7, 2-ethylhexyl benzoate (EHB)

The products where these two substances were identified in the screening analyses are listed below. However, only products with levels from ++ and above have been included, i.e. the nine products with the highest concentrations of the two substances according to the screening were selected:

- 01-DK-P (sock with plastic grips) due to a content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 01-DS-P (sock with plastic grips) due to content of +++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 01-MP-P (sock with plastic grips) due to a content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 02-DS-P (plastic shoes) due to a content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 12-DK-P (sock with plastic grips) due to content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 12-DS-P (sock with plastic grips) due to content of +++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 17-DS-PM (plastic handbag) due to a content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 17-MP-PM (plastic handbag) due to a content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate
- 30-MP-P (plastic shoes - the white sole that is stepped on) due to a content of ++ for bis(2-ethylhexyl) isophthalate and ++ for 2-ethylhexyl benzoate

As 30-MP-P consists of three different types of plastic, the plastic component in which the two substances were identified during the screening was analysed (the white inner sole that is stepped on when the shoe is worn).

10. Migration testing

As described in chapter 9 on selection of non-regulated substances for migration testing and subsequent risk assessment, it was decided in collaboration with the Danish EPA to focus on the two organic substances identified in the screening analyses, both of which have a notified classification as toxic for reproduction:

- CAS no. 137-89-3, Bis(2-ethylhexyl) isophthalate (BEHIP)
- CAS no. 5444-75-7, 2-ethylhexyl benzoate (EHB)

The two substances were measured in 14 and 12 products respectively at levels up to +++ for BEHIP and at levels up to ++ for EHB. In total, the nine products with the highest levels of the two substances in the GC-MS screening were selected. Both substances were present in all nine products in the GC-MS screening. These nine products were:

- 01-DK-P (sock with plastic grips)
- 01-DS-P (sock with plastic grips)
- 01-MP-P (sock with plastic grips)
- 02-DS-P (plastic shoe)
- 12-DK-P (sock with plastic grips)
- 12-DS-P (sock with plastic grips)
- 17-DS-PM (plastic handbag)
- 17-MP-PM (plastic handbag)
- 30-MP-P (plastic shoe - the white sole that is stepped on)

As 30-MP-P consists of three different types of plastic, the plastic component was selected in which, based on the screening results, the two substances were assessed to occur in the highest combined concentration and where the exposure was considered greatest (the white inner sole that is stepped on when the shoe is worn).

10.1 Conditions for the migration testing

The product categories selected for migration analyses were socks with plastic grips, plastic shoes or plastic handbags. This means that skin contact and migration to artificial sweat is relevant for all products in relation to the risk assessment of the products during use. For socks with plastic grips, it should be noted that the plastic grips are only placed on the outside of the socks, i.e. there is a layer of textile between the skin and the plastic when the socks are worn, but there will be direct contact when small children suck on the socks and put them in their mouth.

Therefore, the following migration conditions were used for the migration testing:

- Temperature: 37 °C due to body temperature.
- Time: 16 hours in total as worst-case for a single day.
- Use of a shaking table so that the sample does not just remain static. As when one rubs one's arm against a bag or walks in socks/shoes.
- The samples were cut into larger pieces and the surface area was measured and used directly in the risk assessment in relation to the area of exposed skin. For socks with grips, an area of e.g. 3 x 3 cm was cut out, however, most of the material will be textile and some will be plastic grips. This nevertheless provides a measure of what migrates from the sample per cm².
- As little migration fluid as possible was used while still ensuring the sample was fully covered, aiming for a ratio of no more than 100 ml migration fluid per 100 cm² of sample.

10.2 Method of analysis

A piece of plastic/textile with a known surface area was placed in artificial sweat under the specified migration conditions, i.e. at 37 °C for 16 hours with shaking. The plastic/textile is removed from the liquid with tweezers, and the migration fluid is extracted with a solvent and analysed by GC-MS after addition of an internal standard.

The artificial sweat solution was prepared just before the migration testing according to ISO 105:E04:2013.

The cut and measured sample is placed in a 100 ml Duran glass bottle with a lid and covered with 25 ml of artificial sweat. If this amount was not sufficient to cover the sample, an additional 1 ml of artificial sweat was added at a time until the sample was covered. True duplicate determinations were performed on all samples.

The limit of detection depends on the sample, both the total sample area used and any interfering substances in the sample. The relative expanded uncertainty of the method was measured to be 10% and 18% for EHB at the high and low control levels, respectively, and 13% and 23% for BEHIP at the high and low control levels, respectively.

The validity of the method was demonstrated through the use of controls containing a known quantity of the two substances. Controls were prepared at two concentrations, and both direct controls were analysed on the day of analysis and controls that followed the samples in the heating cabinet, etc. were included. Here, the average recovery ranged between 99% and 108% for BEHIP and between 83% and 106% for EHB, with the low recovery of 83% applying to the low-level controls that accompanied the samples. As only low concentrations of EHB were measured in the migration liquids, this low recovery of EHB for the low-level controls that accompanied the samples means that the concentration of EHB in the migration liquid may be underestimated for all samples.

10.3 Results from the migration testing

The results of the migration testing for the nine samples are listed in TABLE 8 below. The results are averages of the duplicate determinations and are given in µg of substance per cm² sample.

TABLE 8. Results of the migration testing for nine selected samples that were assessed to have the highest content of the two substances, EHB and BEHIP, based on GC-MS screening

Lab no.	EHB (µg/cm ²)	BEHIP (µg/cm ²)	Comments
01-DK-P	< 0.01	< 0.08	
01-DS-P	< 0.01	< 0.08	
01-MP-P	< 0.01	< 0.08	
02-DS-P	< 0.01	< 0.08	
12-DK-P	< 0.01	< 0.08	
12-DS-P	< 0.01	< 0.08	
17-DS-PM	0.09	< 0.5	Interference in the chromatogram resulting in an elevated detection limit
17-MP-PM	0.06	< 0.5	Interference in the chromatogram resulting in an elevated detection limit
30-MP-P sole	< 0.01	< 0.5	Interference in the chromatogram resulting in an elevated detection limit

As can be seen from the results, only EHB migrates into the migration fluid (artificial sweat) at levels above the limit of detection. For BEHIP, there was no migration above the limit of detection for any of the nine products, but the limit of detection was also elevated in three cases due to interferences in the chromatogram.

As previously indicated, recovery tests with controls showed that the recovery of EHB was at the low end (83%) at low concentrations. EHB was identified in the migration fluid for two of the samples at levels just above the limit of detection, but these may be underestimated.

For exposure calculations and the risk assessment, the measured concentrations in μg substance per cm^2 sample are used directly in the calculations. For the products in which no concentration above the detection limit was measured, the detection limit is used as a worst-case value in the exposure calculations.

11. Exposure scenarios

Migration conditions are described in Chapter 10.

The exposure assessment follows the principles stated in ECHA's guidance document "Guidance on Information Requirements and Chemical Safety Assessment, Chapter R.15: Consumer Exposure Assessment" (ECHA, 2016a). Here, worst-case realistic exposure scenarios are used as the basis for the exposure assessment.

Skin exposure from shoes and socks and bag handle is calculated from migration to artificial sweat as follows:

$$L_{\text{der}} = \text{Migr} \times T_{\text{contact}}$$

L_{der} is the dermal load in amount of substance relative to skin area, mg/cm²

Migr is the amount of substance migrating to artificial sweat in relation to skin area and contact time, mg/cm²/h

T_{contact} is the duration of skin contact, here set to 16 hours, and thus included in the concentration achieved in the migration fluid after 16 hours of skin contact.

The external dose on the skin, $D_{\text{der, external}}$, is then calculated:

$$D_{\text{der, external}} = \frac{L_{\text{der}} \times A_{\text{skin}} \times n}{BW}$$

A_{skin} is the surface area of the exposed skin in cm²

n is the frequency of use, which is assumed to be 1 time/day

BW is the body weight, which is assumed to be 10 kg for toddlers (1-2 years old) according to ECHA (2017).

For toddlers, the exposed skin area for socks and shoes is the soles of the feet, approximately half of the total foot area (ECHA, 2017), i.e. 288/2= 144 cm².

For handbags, it is assumed that the skin on one palm (ECHA, 2017) is exposed, i.e. 230 cm²/4 = 58 cm².

In addition, ingestion from the socks is calculated based on a scenario in which children suck on the socks. As a worst-case scenario, it is assumed that socks are sucked on to an extent corresponding to the entire sole of a single sock, i.e. 72 cm² corresponding to the 16 hours of contact with the migration fluid. In other words, for oral intake, this represents an overestimation, as the migration testing only involved a single migration over 16 hours, corresponding to skin contact (wearing the textiles for 16 hours in one day). This exposure time for sucking on the socks is thus a clear overestimation, and is subsequently adjusted if a risk is calculated for the scenarios.

12. Extended hazard assessment

As mentioned above, the focus here is on the two substances selected via the screening analyses:

- CAS no. 137-89-3, Bis(2-ethylhexyl) isophthalate (BEHIP)
- CAS no. 5444-75-7, 2-ethylhexyl benzoate (EHB)

For these two selected substances, a more in-depth hazard assessment is performed, identifying relevant N(L)OAEL values for the critical effects of the substances and calculating dermal DNEL values based on the REACH guidelines.

In the literature search for toxicological data, substance data are prioritised and searched in the following order:

1. Substance assessments from EU scientific committees, such as SCHEER, SCCS, RAC, EFSA, etc.
2. Substance assessments by other international and national expert committees, such as the WHO, IPCS, IARC, US EPA, RIVM, BfR, etc.
3. ECHA's data for the substances, including data from REACH registrations of the substances.
4. Previous assessments in the Danish EPA's project reports, if any.
5. Any available US FDA or EMA (European Medicines Agency) data on the substances in relation to their use in medical devices.
6. Web-based search on Google and PubMed.

12.1 CAS no. 137-89-3, Bis(2-ethylhexyl) isophthalate (BEHIP)

There are currently no registrants of the substance in the EU. Therefore, there are no data to obtain from dossiers at ECHA either. No substance assessments have been found from the EU scientific committees, the other international and national expert committees, the FDA or the EMA.

The substance has previously been found in, among other things, plastic sandals in project reports from the Danish EPA (Tønning et al., 2010), in bags (Tønning et al., 2010a), in a car mat and a phone charger (Kastbjerg et al., 2020), and in 3D pens made of UV-reactive resin (Torstrup et al., 2018), but it has not been hazard assessed.

12.1.1 Identification, classification and physicochemical parameters

BEHIP is a plasticiser used in a variety of industrial and cosmetic applications, including as a plasticiser in PVC, as an additive in lubricants and in cosmetics.

TABLE 9. Physicochemical data for bis(2-ethylhexyl) isophthalate (PubChem)

Chemical name	Bis(2-ethylhexyl) isophthalate
Synonyms	Diethyl isophthalate (DOIP); 1,3-bis(2-ethylhexyl) benzene-1,3-dicarboxylate (IUPAC name); Flexol Plasticizer 380
CAS no. / EC no.	137-89-3/ 205-308-0

Molecular formula	C ₂₄ H ₃₈ O ₄
Molecular mass	390.6 g/mol
Physical state (at 20 °C)	Clear, light yellow, viscous liquid
Density	Not found
Melting point	Not found
Boiling point (at 1013 hPa)	Not found
Steam pressure (at 20°C)	Not found
Octanol-water partition coefficient (log K _{OW}) (at 25°C)	Not found
Water solubility (at 20 °C)	Less than 1 mg/ml
Solubility in ethanol (at 30°C)	Not found

The substance has not a harmonised classification as hazardous. However, the majority (89%) of registrants (industry notifications) have classified it as Repr. 1B; H360 (May damage fertility or the unborn child).

12.1.2 Absorption, distribution, metabolism and excretion

No data found.

12.1.3 Acute and chronic effects

The genotoxic effect of the substance has been tested in the Ames test with negative results, both with and without metabolic activation (NTP, 2025).

Old handbook data refers to studies showing that BEHIP is mildly irritating and has low acute toxicity (LD₅₀ oral in rats is 17.3 ml/kg bw, LD₅₀ dermal in rats is 7.94 ml/kg bw and in guinea pigs more than 20 g/kg bw) (PubChem; DrugFuture, 2025).

12.1.4 Critical effect and indication of the NOAEL-value

As there is insufficient data to calculate a DNEL, the *threshold of toxicological concern* (TTC) is used instead. Cramer classification is used to categorise which TTC should be used in the risk assessment of substances with missing data.

The substance has previously been found in a Portuguese study of plastic bibs. On that occasion, a QSAR analysis was performed using ToxTree, which predicted that the substance would be non-mutagenic in the Ames test, but nonetheless carcinogenic and reprotoxic. On that basis, the substance was assigned to Cramer class I (Rajbux et al., 2020).

The TTC for Cramer class I substances is usually set at **30 µg/kg bw/day**. This value is used instead of the tolerable daily intake (TI) or DNEL, and not the NOAEL. For exposures below TTC, the probability of causing adverse health effects is low, even with lifelong daily exposure (EFSA, 2019).

12.2 CAS no. 5444-75-7, 2-ethylhexyl benzoate (EHB)

Data for this substance is mainly taken from PubChem, Cosmetic Ingredient Review (CIR) and industry REACH notifications. No substance assessments have been found from the EU scientific committees, the other international and national expert committees, the FDA or the EMA.

The substance has previously been found in e.g. PVC products imported over the internet (Kastbjerg et al., 2020) and in soft laminating film (Lejre et al., 2008) in project reports from the Danish EPA.

2-ethylhexyl benzoate (EHB) is used in cosmetics as an emollient ingredient in skin cream (CIR, 2012a).

12.2.1 Identification, classification and physicochemical parameters

Physicochemical data for EHB is listed in TABLE 10 below.

TABLE 10. Physicochemical data of 2-ethylhexyl benzoate (PubChem)

Chemical name	2-ethylhexyl benzoate
Synonyms	2-ethylhexyl benzoate (IUPAC); Benzoic acid, 2-ethylhexyl ester; 2-Ethyl-1-hexanol benzoate; Ethylhexyl Benzoate (INCI)
CAS no. / EC no.	5444-75-7 / 226-641-8
Molecular formula	C ₁₅ H ₂₂ O ₂
Molecular mass	234.33 g/mol
Physical state (at 20 °C)	Clear, colourless, oily liquid
Density	0.963-0.973 g/cm ³ ; 0.91 (CIR, 2012a)
Melting point	Not found
Boiling point (at 1013 hPa)	Not found
Steam pressure (at 20°C)	
Octanol-water partition coefficient (log K _{OW}) (at 25°C)	5.7 (calculated; CIR, 2012a), 6.21 (ECHA, 2025c), 8.6 (CIR, 2012a)
Water solubility (at 22 °C)	Insoluble
Solubility in ethanol (at 30°C)	Soluble

The substance has not a harmonised classification as hazardous. More than half (59%) of the registrants (industry notifications) have classified it as Repr. 1B; H360 (May damage fertility or the unborn child). At least one registrant has indicated that an impurity or an additive in the substance has given rise to this classification.

12.2.2 Absorption, distribution, metabolism and excretion

Studies on pigs and pig skin have shown that C12-15 alkyl benzoates (including 2-ethylhexyl benzoate) are not absorbed through the skin, but approximately 20-50% of the applied dose is absorbed into the skin (dermis and epidermis) (CIR, 2012a).

ECHA (2025c) assumes 10% absorption through the skin, 100% through the mouth and 10% by inhalation, but this does not seem to be based on concrete data.

QSAR calculation of skin permeability using EPIwebv4.1 showed a low dermal flux of 6.54 x 10⁻⁴ mg/cm² per hour (ECHA, 2025c).

No studies on the distribution of the substance have been found, but based on a logP of 6.21, it is assumed that the substance enters cells and that the intracellular concentration may be higher than the extracellular concentration, particularly in adipose tissue (ECHA, 2025c).

Similar substances, benzyl derivatives, have been shown to be degraded in the liver. The ester bond is expected to be enzymatically cleaved into the corresponding alcohol (here 2-ethylhexanol) and benzoic acid, and the metabolites are rapidly excreted in the urine (ECHA, 2025c).

12.2.3 Acute and chronic effects

Oral exposure

C12-15 alkyl benzoates orally administered to rats in single doses up to 5 g/kg body weight produced no symptoms during a 14-day observation period, except for an enlarged spleen found at autopsy (CIR, 2012a).

In the REACH dossier, the LD₅₀ (oral, rats) is more than 2,500 mg/kg body weight (OECD 423). No harmful effects were observed. Reference is also made to a 90-day oral study in rats, which gives a NOAEL of 300 mg/kg bw/day (based on irritation of the stomach, effects on the liver and thyroid, and changes in body weight and white blood cells in the higher dose groups) (ECHA, 2025c).

A study in female rats given 0, 100, 330 or 1,000 mg/kg bw/day during gestation days 9-16 gave a NOAEL of 330 mg/kg bw, with the critical effect being an increased incidence of foetal malformations (skeleton, thymus, lens of the eye) (ECHA, 2025c).

Dermal exposure

Dermal (intact skin but under occlusion) exposure of rabbits to 100% substance at a dose of 2 g/kg bw did not cause symptoms during an observation period of 14 days (CIR, 2012a).

In the REACH dossier, the dermal LD₅₀ in rats (OECD 402) is more than 5000 mg/kg bw. No adverse effects were observed (ECHA, 2025c).

3.5% in sunscreen has been tested on 212 people (human insult patch test, HRIPT) and was not found to be irritating nor sensitising. The substance is not phototoxic or irritating to the eyes (CIR, 2012a).

12.2.4 Critical effect and indication of the NOAEL-value

In the REACH dossier (ECHA, 2025c) the registrant has registered the following limit values for the general population:

DNEL, inhalation: 52.2 mg/m³ (based on oral NOAEL of 300 mg/kg bw, extrapolation from oral administration (100% absorption) to inhalation (10% absorption) and an overall uncertainty factor of 50).

DNEL, dermal exposure, long-term: 15 mg/kg bw/day (based on the same NOAEL as above, extrapolation from oral administration (100% absorption) to dermal exposure (10% absorption) and an overall uncertainty factor of 200.

NOAEL: 300 mg/kg bw/day. Critical effect in 90-day study in rats: local irritation of the stomach, effects on the liver and thyroid gland in combination with reduced body weight gain and a lower white blood cell count (ECHA, 2025c).

12.2.5 Other

The substance may contain impurities and additives (benzoic acid and 2-ethylhexan-1-ol) that give rise to classification as reprotoxic. ECHA also notes that: "This substance was previously registered under the REACH Regulation but the registration is no longer valid." (ECHA, 2025c).

13. Risk assessment

In this chapter, the calculated exposure for each of the two selected substances is compared to their DNEL values or equivalent.

The calculation for the risk characterisation ratio, RCR, is:

$$RCR = \frac{\text{calculated exposure (substance A)}}{DNEL \text{ (substance A)}}$$

If the RCR is 1 or above, this indicates an unacceptable risk.

13.1 Risk characterisation for the presence of bis(2-ethylhexyl) isophthalate (BEHIP)

Tolerable Daily Intake (TDI) is estimated to be 30 µg/kg bw/day, based on the *Threshold of Toxicological Concern* (TTC), as described above.

The exposures are calculated based on the scenarios described in chapter 10.

Example of calculation, here for 01-DK-P sock:

$$D_{\text{der, external}} = \frac{L_{\text{der}} \times A_{\text{skin}} \times n}{BW} = (0.08 \text{ µg/cm}^2 \times 144 \text{ cm}^2 \times 1) / 10 \text{ kg} = 1.152 \text{ µg/kg bw/day}.$$

$$RCR = 1.152 \text{ µg/kg} / 30 \text{ µg/kg} = 0.04$$

TABLE 11. Calculated risk characterisation ration (RCR) based on migration from the respective samples and their skin contact.

Sample no.	BEHIP (µg/cm ²)	Estimated exposure (µg/kg bw/day)	RCR
01-DK-P sock	< 0.08	1.152	0.04
01-DS-P sock	< 0.08	1.152	0.04
01-MP-P sock	< 0.08	1.152	0.04
02-DS-P plastic shoe	< 0.08	1.152	0.04
12-DK-P sock	< 0.08	1.152	0.04
12-DS-P sock	< 0.08	1.152	0.04
17-DS-PM handbag	< 0.5	2.9	0.1
17-MP-PM handbag	< 0.5	2.9	0.1

30-MP-P sole	< 0.5	7.2	0.2
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The table above shows that the dermal exposure is so low that the risk expressed as RCR is well below 1. Oral exposure via one sock would be about half (because it is assumed that the child only sucks on one sock) and would therefore not be problematic for this substance. 100% absorption is assumed as worst-case both orally and dermally.

There is no significant difference in exposure depending on whether comparable products are purchased from one type of online shop or another.

13.2 Risk characterisation for 2-ethylhexyl benzoate (EHB) findings

DNEL, dermal exposure, long term is: 15 mg/kg bw/day.

The exposures are calculated based on the scenarios described in chapter 10.

Example of calculation, here for 01-DK-P sock:

$$D_{\text{der, external}} = \frac{L_{\text{der}} \times A_{\text{skin}} \times n}{BW} = (0.01 \mu\text{g}/\text{cm}^2 \times 144 \text{ cm}^2 \times 1) / 10 \text{ kg} = 0.144 \mu\text{g}/\text{kg bw}$$

$$\text{RCR} = 0.144 \mu\text{g}/\text{kg bw} / 15000 \mu\text{g}/\text{kg bw} = 9.60\text{E-}06.$$

TABLE 12. Calculated risk characterisation ration (RCR) based on migration from the respective samples and their skin contact.

Sample no.	EHB ($\mu\text{g}/\text{cm}^2$)	Estimated exposure ($\mu\text{g}/\text{kg bw}/\text{day}$)	RCR
01-DK-P sock	< 0.01	0.144	9.60E-06
01-DS-P sock	< 0.01	0.144	9.60E-06
01-MP-P sock	< 0.01	0.144	9.60E-06
02-DS-P plastic shoe	< 0.01	0.144	9.60E-06
12-DK-P sock	< 0.01	0.144	9.60E-06
12-DS-P sock	< 0.01	0.144	9.60E-06
17-DS-PM handbag	0.09	0.522	3.48E-05
17-MP-PM handbag	0.06	0.348	2.32E-05

30-MP-P sole	< 0.01	0.144	9.60E-06
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As can be seen from the table above, the exposure is so low that the risk expressed by RCR is far below 1. There is therefore no reason to adjust the exposure scenarios. Oral exposure via one sock would be about half (because it is assumed that the child only sucks on one sock) and would therefore not be problematic for this substance.

There is no significant difference in exposure depending on whether comparable products are purchased from one type of online shop or another.

14. Compliance analyses

The following compliance analyses were performed for selected products in this project:

- Content analyses of certain phthalates in products containing soft plastics.
- Content analyses of PAHs in plastic products (primarily black plastic).
- Content analyses of short-chain chlorinated paraffins (SCCP) in products made of soft plastic. Since medium-chain chlorinated paraffins (MCCP) can be analysed by the same analytical method as the short-chain chlorinated paraffins, these were also analysed.
- Content analyses of certain PFAS in water-repellent products (primarily bibs, mittens and snowsuits). For comparison and for the purpose of gathering knowledge for the upcoming Danish regulation of PFAS in clothing, footwear and certain impregnating agents (Statutory Order no. 464, 2025), analyses were also carried out for total fluorine content.
- Content analyses of heavy metals in metal products. Initially, screening analyses were carried out by the Danish Chemical Inspection Service using a handheld XRF device, after which products were selected for subsequent quantitative analyses.
- Nickel release for metal products. Initially, screening was carried out using the DMG test¹³ by the Danish Chemical Inspection Service, after which products with indications of nickel release were selected for subsequent quantitative analyses for nickel release.

The results of the compliance analyses are listed in the respective sections below.

14.1 Compliance analyses for phthalates

Compliance analyses for phthalates were carried out on a total of 20 selected products made of soft plastic, as phthalates are used to soften plastic. The products selected for quantitative analysis for regulated phthalates were all eight plastic shoes, both plastic handbags, all six socks with plastic grips, all soft plastic bibs and a selected set of T-shirts with plastic print. The set with the most prominent plastic layer was selected.

14.1.1 Method of analysis for phthalates

The standard DS/EN ISO 14389:2022 was used for the determination of phthalates in textiles. A piece of textile with plastic print was cut into small pieces, and approx. 0.15 g was extracted with THF in an ultrasonic bath. THF dissolves PVC and few other polymers. The dissolved polymer is precipitated with precipitation liquid, after which the extraction liquid is filtered, diluted and analysed on GC-MS (gas chromatography with subsequent mass spectrometry).

For plastic samples, the same procedure as above is used, but a smaller sample quantity of approximately 0.05 g is used.

The amount of plastic print on the textile was determined where possible (for textile samples), whereby the phthalate content is given in relation to the amount of plastic. However, for some of the products, the plastic print on the textile was so thin that it was not possible to determine the amount of plastic in relation to textile. In these cases, the amount of phthalate per total amount of sample was calculated.

True duplicate determinations were performed and internal standards were used. The method was validated using controls containing a known amount of phthalate. The recovery of the

¹³ DMG stands for dimethylglyoxime. Dimethylglyoxime is a reagent used to detect nickel by forming a red complex with nickel ions.

controls using the method was generally between 88% and 105% for the seven phthalates, with the exception that the recovery of DEHP was as low as 81% at low concentration.

The uncertainty of the method was generally between approximately 15% and 20% at high concentration for the four phthalates (DIBP, DBP, BBP and DEHP) regulated in all products, and between approximately 30% and 40% at low concentration. The uncertainty for the three phthalates regulated in childcare articles (DNOP, DINP and DIDP) was generally somewhat higher (between 35% and 50%). The uncertainties for DINP and DIDP are higher due to the fact that they are mixtures of so-called isomers, consisting of several substances (i.e. they are not single substances).

The limit of detection varied for the four phthalates (DIBP, DBP, BBP and DEHP) regulated in all products between 15 to 50 mg/kg when weighing 50 mg samples but was lower when larger sample amounts were used. For the three phthalates regulated in childcare articles (DNOP, DINP and DIDP), the limit of detection was significantly higher, i.e. 320, 1,000 and 1,220 mg/kg respectively. The limit of detection is significantly higher for some products due to the small amount of plastic print on the sample compared to the amount of textile.

14.1.2 Results of compliance analyses for phthalates

The results of the compliance analyses for the regulated phthalates are given in TABLE 13 and TABLE 14 below. The four regulated phthalates (DIBP, DBP, BBP and DEHP) are listed in TABLE 13, and the three phthalates exclusively regulated in childcare articles (DNOP, DINP and DIDP) are listed in TABLE 14 below.

TABLE 13. Results of quantitative analyses for the four regulated phthalates in all products. The amount of phthalate per amount of plastic part is indicated, unless otherwise stated, and the amount is given in mg/kg (ppm), unless otherwise stated. Exceedances of the limit value of 0.1% for the sum of the four phthalates are indicated in bold.

Lab no.	Product type	DIBP (mg/kg)	DBP (mg/kg)	BBP (mg/kg)	DEHP (mg/kg)	Sum (%)
01-DK-P	Socks (textile)	< 15	112	< 150 ^b	< 60 ^a	< 0.02 %
01-MP-P	Socks (textile)	< 10	81	< 30	51	0.01%
01-DS-P	Socks (textile)	< 5	88	< 15	24	0.01%
02-MP-P	Beach sandals	< 15	112	< 50	< 20	0.01%
02-DS-P	Beach sandals	< 15	194	< 50	69	0.02%
02-DK-P	Beach sandals	< 15	64	< 50	< 20 ^d	0.01%
08-DK-P	T-shirts/nightwear (textile)	< 30	219	< 80	30-110	0.03%
08-MP-P	T-shirts/nightwear (textile)	< 75	224	< 225	75-300	0.05%
12-DK-P	Socks (textile)	< 15 ^a	224	< 30	42	0.03%
12-DS-P	Socks (textile)	< 5	92	< 50 ^a	5-20	0.01%
12-MP-P	Socks (textile)	< 50 ^a	577	< 30	10-35	0.06%
13-DS-P	Beach sandals	< 15	240	< 50	< 20	0.02%
13-MP-P	Beach sandals	< 15	34 % ^c	< 50	497	34%
13-DK-P	Beach sandals	< 15	158	< 50	< 20	0.02%
17-MP-PM	Plastic handbag	< 15	147	< 50	< 20 ^d	0.02%
17-DS-PM	Plastic handbag	15-50	497	< 50	84	0.06%
26-DS-P	Bibs (soft plastic)	< 15	339	< 50	< 150 ^a	0.03%
26-DK-P	Bibs (soft plastic)	< 5	228	< 15	< 20 ^a	0.02%

30-MP-P	Beach sandals	< 15	56	< 50	148	0.02%
30-DK-P	Beach sandals	< 15	64	< 50	< 20	0.01%

- a) The limit of detection is increased due to interferences in the chromatogram.
- b) A high content of bis(2-ethylhexyl) adipate in the sample interferes with the determination of some of the phthalates, therefore the detection limits are increased.
- c) Due to the high content of dibutyl phthalate in the sample, the concentration in the sample solution is slightly outside the measuring range despite dilution. This possibly means a slight underestimation of the content in the solution and that the actual content in the sample may therefore be higher.
- d) It looks like the sample contains small amounts of DEHP, just below the measured limit of detection.

It can be seen from TABLE 13 that DIBP was only determined above the detection limit in one of the 20 samples, DBP was identified in all samples but in small amounts except in beach sandal 13-MP-P, BBP was not determined above the detection limit in any of the samples, and DEHP was determined above the detection limit in 11 of the 20 samples.

The beach sandal 13-MP-P contains such large amounts of DBP, 34%, that it clearly exceeds the limit value in the legislation (0.1%). Apart from this one product, 13-MP-P, the sum of the four regulated phthalates is between 0.01% and 0.06%, where the limit value is 0.1%.

TABLE 14. Results of quantitative analyses for the three phthalates regulated in childcare articles. The amount of phthalate per amount of plastic part is indicated, unless otherwise stated, and the amount is given in mg/kg (ppm), unless otherwise stated.

Lab no.	Product type	DNOP (mg/kg)	DINP (mg/kg)	DIDP (mg/kg)
01-DK-P	Socks (textile)	< 1,800 ^e	< 1,000	< 1,220 ^g
01-MP-P	Socks (textile)	< 1,800 ^e	1,500-3,000 ^f	< 735
01-DS-P	Socks (textile)	< 1,200 ^e	1,500-3,000 ^f	< 405
02-MP-P	Beach sandals	< 320	< 1,000	< 1,220
02-DS-P	Beach sandals	< 1,800 ^e	< 1,000	< 1,220
02-DK-P	Beach sandals	< 320	< 1,000	< 1,220
08-DK-P	T-shirts/nightwear (textile)	< 600 ^e	< 1,800	< 2,300
08-MP-P	T-shirts/nightwear (textile)	< 600 ^e	< 9,000	< 11,000
12-DK-P	Socks (textile)	< 1,800 ^e	< 3,000 ^e	< 735
12-DS-P	Socks (textile)	< 1,200 ^e	< 3,000 ^e	< 405
12-MP-P	Socks (textile)	< 1,200 ^e	< 600	< 735
13-DS-P	Beach sandals	< 320	< 1,000	< 1,220
13-MP-P	Beach sandals	< 320	< 1,000	< 1,220
13-DK-P	Beach sandals	< 320	< 1,000	< 1,220
17-MP-PM	Plastic handbag	< 1,800 ^e	< 1,000	< 1,220
17-DS-PM	Plastic handbag	< 1,800 ^e	0.8-1.6 % ^f	< 1,220
26-DS-P	Bibs (soft plastic)	< 640	< 1,000	< 1,220
26-DK-P	Bibs (soft plastic)	< 600 ^e	< 335	< 405
30-MP-P	Beach sandals	< 1,800 ^e	< 1,000	< 1,220
30-DK-P	Beach sandals	< 1,800 ^e	< 1,000	< 1,220

- e) The high content of bis(2-ethylhexyl) terephthalate in the sample, or carry-over from previous samples, interferes with the chromatogram; therefore, the detection limit is elevated.

f) The sample appears to contain DINP, but this is difficult to confirm, and the precise content is difficult to measure because the chromatogram is disturbed by the sample's high content of bis(2-ethylhexyl) terephthalate.

g) The sample may contain DIDP, but below the limit of detection.

For the three phthalates listed in TABLE 14, only the plastic handbag (17-DS-PM) detected one of the three phthalates above the limit value of 0.1%. The handbag contains DINP, but this is difficult to confirm, and the precise content is difficult to measure because the chromatogram is disturbed by the sample's content of a terephthalate. However, the handbag is not considered to be a childcare article as defined in the REACH regulation: "any product intended to facilitate children's sleep or relaxation, used for children's hygiene, or intended for feeding children or for children to suck on". Thus, there is no exceedance of the limit value.

14.2 Compliance analyses for PAHs

PAHs are regulated in plastic and rubber products. Compliance analyses were therefore carried out on plastic products, and black plastic products were excluded. A total of 13 products were analysed for PAHs. The selected products were all three wetsuits, the two black plastic shoes, the two handbags and the two sets (three samples each) of T-shirts with black plastic print.

14.2.1 Method of analysis for PAHs

The analysis method is based on DS/EN ISO 16190:2021 for the determination of PAH in shoes and soles, and the German standard AfPS GS 2019:01 for the determination of PAH in rubber and plastic.

Approximately 0.5 g sample was weighed out and extracted with toluene at 60 °C in ultrasonic bath, and then analysed by GC-MS using internal standards.

True duplicate determinations were performed for all samples, and the method was validated using controls containing a known amount of the substances and by so-called standard addition, where known amounts of the substances are added to samples. The recovery of the eight PAHs was between 88 and 111%. The detection limit was determined to be 0.04 ppm for most of the eight PAHs, except 0.06 ppm for BeP and DBA_hA, respectively. The limit of quantification was 0.1 ppm, but 0.2 ppm for BeP and DBA_hA, respectively. The uncertainty of the method was between 5 and 21% depending on the PAH compound and concentration (high or low).

14.2.2 Results of compliance analyses for PAHs

The results of the compliance analyses for the eight regulated PAHs are listed in TABLE 15 below. Values are given in ppm (or mg/kg).

TABLE 15. Results of quantitative analyses for regulated PAHs

Lab no.	BaA (mg/kg)	CHR (mg/kg)	BbFA (mg/kg)	BkFa (mg/kg)	BjFA (mg/kg)	BaP (mg/kg)	BeP (mg/kg)	DBA _h A (mg/kg)	Sum PAH (mg/kg)
CAS no.	56-55-3	218-01-9	205-99-2	207-08-9	205-82-3	50-32-8	192-97-2	53-70-3	-
09-DS-W	< 3	< 11	< 1	< 3	< 0.2	< 4	< 1	< 1,5	< 11
09-DK-W	< 0.7	< 3	< 0.5	< 0.2	< 0.2	< 2	< 0.5	< 0.5	< 3
09-MP-W	< 0.2	< 0.2	< 0.05	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2
17-MP-PM	< 0.2	< 0.2	< 0.2	< 0.2	< 0.1	< 0.1	< 0.3	< 0.2	< 0.3
17-DS-PM	< 0.2	< 0.2	< 0.1	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.2
22-DS-P	< 0.2	< 0.2	< 0.5	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.5

Lab no.	BaA (mg/kg)	CHR (mg/kg)	BbFA (mg/kg)	BkFa (mg/kg)	BjFA (mg/kg)	BaP (mg/kg)	BeP (mg/kg)	DBAhA (mg/kg)	Sum PAH (mg/kg)
22-DK-P	< 0.2	< 0.2	< 0.5	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.5
22-MP-P	< 0.2	< 0.2	< 0.5	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.5
30-MP-P	< 0.2	< 0.5	< 0.6	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.6
30-DK-P	< 0.2	< 0.2	< 0.6	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.6
31-MP-P	< 0.2	< 0.2	< 0.5	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.5
31-DS-P	< 0.2	< 0.2	< 0.5	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.5
31-DK-P	< 0.2	< 0.2	< 0.5	< 0.2	< 0.1	< 0.1	< 0.2	< 0.2	< 0.5

It can be seen that none of the eight PAH compounds were detected in the samples above the limit of quantification. A few of the eight PAHs were observed in some of the samples, but not in amounts above the limit of quantification. For some of the samples and PAHs, the limit of quantification was elevated due to interferences caused by the presence of many extractable substances in the plastic. This means that other substances were close to or overlapping the peak of the individual PAH. This applies in particular to samples 09-DS-W and 09-DK-W.

According to the legislation in REACH Annex XVII, the sum of the eight PAHs may not exceed 1 ppm (1 mg/kg). The limit value is generally not considered to be exceeded for the products, but for two of the samples the quantification limits are increased due to the presence of many extractable substances in the plastic samples. The presence of PAHs in the samples cannot be excluded, but it is not possible to quantify them in such low concentrations due to interference from other substances.

14.3 Compliance analyses for SCCP

Compliance analyses for SCCP were performed by Medico Kemiske Laboratorium ApS. As MCCC can be analysed using the same analysis method, MCCC content was analysed at the same time, even though it is only SCCP that is currently restricted by legislation.

SCCP content was checked in products made of soft plastic or in textiles with plastic prints, as SCCP can occur in this type of material. A total of 20 products were analysed for SCCP (and MCCC) content.

14.3.1 Method of analysis for SCCP and MCCC

The analysis is divided into two parts. Initially, all samples were analysed by LC-MS, and samples with detected content of SCCP and/or MCCC were subsequently quantified by GC-FID. A catalytic active liner was used in the GC-FID analysis. The catalytic material in the liner consists of Pd-coated glass beads, which dechlorinate any presence of SCCP and/or MCCC to the corresponding alkanes. The quantification is based on an alkane standard, and toluene was used as an internal standard. Based on the laboratory's empirical knowledge of the substances' chromatographic characteristics and using the assumption of a chlorination degree of 55% for SCCP and 50% for MCCC, the content was quantified.

1 gram was weighed out per subsample, and true duplicate determinations were performed. The sample was extracted with cyclohexane and acetone, and the extraction was done in ultrasound for 2 hours.

The laboratory is accredited to analyse SCCP in construction waste, and the same method and quality assurance has been used in this project.

The detection limits are 200 mg/kg for both SCCP and MCCP. The expanded uncertainty (calculated from RSD with coverage factor 2) is 20%.

14.3.2 Results of compliance analyses for SCCP

Results of the compliance analyses for SCCP in the 20 analysed products, as well as the content of MCCP, are given in TABLE 16 below. Duplicate determinations were performed for all samples, and for all determinations, neither SCCP nor MCCP were identified above the limit of detection.

TABLE 16. Results of compliance analyses for SCCP and MCCP in 20 analysed products.

Lab. no.	Product type	SCCP	MCCP
01-DK-P	Socks (textile)	N.D.	N.D.
01-DS-P	Socks (textile)	N.D.	N.D.
01-MP-P	Socks (textile)	N.D.	N.D.
02-DK-P	Beach sandals	N.D.	N.D.
02-DS-P	Beach sandals	N.D.	N.D.
02-MP-P	Beach sandals	N.D.	N.D.
08-DK-P	T-shirts/nightwear/underwear (textile)	N.D.	N.D.
08-MP-P	T-shirts/nightwear/underwear (textile)	N.D.	N.D.
12-DK-P	Socks (textile)	N.D.	N.D.
12-DS-P	Socks (textile)	N.D.	N.D.
12-MP-P	Socks (textile)	N.D.	N.D.
13-DK-P	Beach sandals	N.D.	N.D.
13-DS-P	Beach sandals	N.D.	N.D.
13-MP-P	Beach sandals	N.D.	N.D.
17-DS-PM	Plastic handbag	N.D.	N.D.
17-MP-PM	Plastic handbag	N.D.	N.D.
26-DK-P	Bibs (soft plastic)	N.D.	N.D.
26-DS-P	Bibs (soft plastic)	N.D.	N.D.
30-DK-P	Beach sandals	N.D.	N.D.
30-MP-P	Beach sandals	N.D.	N.D.

N.D. = Not detected above the detection limit. The detection limit is 200 mg/kg for both SCCP and MCCP. The expanded measurement uncertainty is +/- 20% (coverage factor = 2).

As can be seen from the results in TABLE 16, neither SCCP nor MCCP was detected above the detection limit of 200 mg/kg in any of the 20 analysed products. This means that the limit value for SCCP of 0.15% (weight percent), corresponding to 1,500 mg/kg for all articles, is met.

14.4 Compliance analyses for specific PFAS

For the 16 purchased textile samples with water- and/or dirt-repellent properties, compliance analyses were performed for specific regulated PFAS. Given that the upcoming Danish ban on the use of PFAS in clothing, footwear and certain impregnation agents (Statutory Order No. 464, 2025) will apply to all PFAS and sets a limit value based on total fluorine of 50 mg/kg, rather than limit values for specific PFAS, a quantitative analysis of the total fluorine content was also carried out on the 16 purchased textile samples. However, the ban does not take effect

until 1 July 2026 and therefore does not apply to the products purchased for this project, which were purchased in May and June 2025.

14.4.1 Method of analysis for total fluoride

Quantitative determination of total fluorine was carried out on the 16 textile samples with water and/or dirt repellent textiles.

This analysis was carried out by weighing approximately 1 g of sample and burning it in a bomb calorimeter. After combustion, the bomb is rinsed, after which the water/rinsing water is transferred to a volumetric flask. Water in the bomb calorimeter captures the released fluoride, which can then be measured by ion chromatography (IC). The method is a combination of DS/EN ISO 18125 (2017) (combustion) and DS/EN ISO 10304-1 (2009) (measurement by IC). The detection limit is 2 mg/kg. The uncertainty is 10%, with a larger uncertainty around the detection limit at 2 mg/kg.

As a minimum, double determinations were performed on all samples. The results shown in TABLE 17 below are the average of the analyses performed for each sample.

14.4.2 Results for total fluorine

The results for total fluorine content in the 16 purchased textile samples are listed in TABLE 17 below. As described in chapter 7.3 "Selection of products and choice of chemical analyses", upon delivery of the products, it was discovered that some products belonged to a different category (DK, DS or MP) than the category assumed when ordering the product online. If, after delivery of the products, it has been discovered that they belong to a different category than that for which they were purchased, this category is indicated in brackets after the Lab. No. This applies to products 24-DS-T and 25-DS-T, which both turned out to belong to the category of a large marketplace instead.

TABLE 17. Results for total fluorine content in the 16 purchased textile samples.

Lab. no.	Product type	Total fluorine (mg/kg)
07-DK-T	Bibs (textile)	480
07-DS-T	Bibs (textile)	< 2
07-MP-T	Bibs (textile)	< 2
11-DK-T	Snowsuits (textile)	< 2
11-DS-T	Snowsuits (textile)	< 2
11-MP-T	Snowsuits (textile)	< 2
14-DK-T	Snowsuits (textile)	< 2
14-MP-T	Snowsuits (textile)	940
19-DK-T	Mittens (textile)	4.2
19-MP-T	Mittens (textile)	310
24-DK-T	Snowsuits (textile)	2.1
24-DS-T (MP)	Snowsuits (textile)	< 2
24-MP-T	Snowsuits (textile)	< 2
25-DK-T	Bibs (textile)	< 2
25-DS-T (MP)	Bibs (textile)	68
25-MP-T	Bibs (textile)	< 2

The results in TABLE 17, show that for 10 of the 16 samples analysed, the total fluoride content is below the detection limit of 2 mg F per kg. For two further samples, the total fluorine content is just above the detection limit, with values of 2.1 and 4.2 mg F per kg, respectively. For four of the samples, the total fluorine content is above 50 mg F per kg, which is the upcoming limit value for the Danish restriction on PFAS in textiles. The four samples have a total fluorine content of between 68 and 940 mg F per kg textile, which indicates a content of some form of PFAS. Three of the samples have values above 300 mg F per kg textile. The highest value of 940 mg F per kg textile comes from a product from a large online marketplace.

The four samples that exceed the upcoming Danish limit value for total fluoride in textiles are from the following types of online stores:

- One product is from a Danish website with its own inventory
- Three products are from a large online marketplace

14.4.3 Quantitative analysis for specific PFAS

According to the legislation (see section 4.7), the restrictions on specific groups of PFAS cover various 'related', 'derivatives', 'salts' and 'linear and branched' PFAS of the groups PFOA, PFOS, PFCA and PFHxS. In principle, this therefore involves many individual PFAS that are covered by the legislation. It is not possible to analyse for all individual regulated PFAS, as method development in this area is still lacking, and because, among other things, reference substances do not exist for all individual PFAS. The standard DS/EN 17681-1:2025 for the analysis of PFAS in textiles is based on the specific PFAS that occur most frequently in textiles, as well as the specific PFAS for which reference substances exist and where it has been confirmed that they can be analysed with the method in question. A sample preparation using alkaline hydrolysis with methanol and aqueous sodium hydroxide was used for extraction, which means that, among other things, side chains in branched PFAS are hydrolysed, i.e. it is the linear PFAS from any branched PFAS that is determined by the method, just as acrylates and esters are hydrolysed. By following the standard DS/EN 17681-1:2025, a selection has thus been made of the specific regulated PFAS for which a quantitative analysis is performed.

The standard DS/EN 17681-1:2025 lists a total of 60 different specific PFAS that can be measured with the standard. The individual PFAS (43 plus 10 salts, i.e. a total of 53 individual PFAS) are mainly measured by LC-MS/MS (indicated in this report as LC-MS²), which is the analytical equipment used for PFAS analyses in this project. Several of the compounds are measured indirectly, for example the potassium salt of PFOS is determined as PFOS, and certain acrylates are determined as the corresponding alcohols due to the sample preparation in the standard. Some of the PFAS that are measured indirectly can be measured separately by GC-MS with a different sample preparation. However, this only applies to the volatile PFAS. In this project, only the specific PFAS that can be analysed by LC-MS², using the sample preparation from DS/EN 17681-1:2025, have been analysed. Thus, it has not been investigated whether a measured content of PFOA originates from PFOA itself, a salt of PFOA or a PFOA derivative that degrades into PFOA during the analysis. The specific PFAS that have been quantitatively analysed are listed in Appendix 2, where it is also indicated whether they are measured directly or are included in the measured sum of another substance.

Of the 60 specific PFAS, several are not yet covered by regulation, but are either included in a proposal for addition to REACH Annex XVII or will become subject to regulation from October 2026 (see Appendix 2 for details, as well as section 4.8 concerning legislation). Some of these additional compounds are included in the measurement where practical, while others are not. Thus, 53 of the 60 PFAS listed in the standard DS/EN 17681-1:2025 have been measured, directly or indirectly.

14.4.4 Method of analysis for specific PFAS

All 16 textile samples with water and/or dirt repellent properties were quantitatively analysed for specific PFAS. FORCE Technology's method M2.255 was used for the determination. The method uses sample preparation according to the standard DS/EN 17681-1:2025, developed for the measurement of PFAS in textiles, while the measurement range and the analysis method are adapted to FORCE Technology's analysis equipment.

Samples are taken and extracted in a mixture of methanol and aqueous sodium hydroxide with heating in an ultrasonic bath. After a short treatment, including pH adjustment, samples are filtered and analysed by LC-MS². During sample preparation, certain PFAS (e.g. esters and acrylates) are hydrolysed, and the method can therefore be used to determine the content of several different PFAS without measuring the specific PFAS directly. Only PFAS that are included in DS/EN 17681-1:2025 are measured in the method, and only those that can be determined by LC-MS². The standard uses an isotope-labelled PFOA as an internal standard, but this is only used to control the analysis and not to calculate results. Along with the samples, standard series, controls, blanks, etc. are analysed, and double determinations are performed.

Detection limits and uncertainties vary depending on the individual substance. According to DS/EN 17681-1:2025, limits of quantification and limits of detection for sum parameters must be stated as the highest measured limit of quantification of the substances included in the sum.

The determined limits of detection (LOD) are between 0.1 and 5.4 µg/l for most of the substances and for the three fluorotelomer alcohols, which have a lower sensitivity on LC-MS², the detection limits are between 0.1 and 1.2 mg/l in liquids. Converted to per gram of sample, these detection limits lie between 0.002 and 0.1 µg/g for most PFAS (depending on the substance), but between 2 and 25 µg/g (ppm) of sample for the fluorotelomer alcohols. The limits of quantification (LOQ) in liquids are between 0.2 and 2.8 µg/l for most PFAS and between 0.2 and 3.5 mg/l for the three fluorotelomer alcohols. The limits of quantification converted per gram of sample are between 0.01 and 0.3 for most PFAS, but between 6 and 75 µg/g (ppm) for the fluorotelomer alcohols.

The relative uncertainty for the analysed PFAS is between 50 and 75% for low concentrations and between 20 and 50% for higher concentrations of the PFASs in liquid. For some substances, such as 6:2 FTOH, 8:2 FTOH, NMeFOSA, NEtFOSA and PF-3,7-DMOA, the concentration in the liquid was close to or lower than the detection limit, and therefore the relative uncertainty for the low concentrations is 100–220%.

Recovery of PFASs is between 70% and 130% at low concentration for most of the PFASs. For some of the substances, the concentrations chosen for the control were too low, lying too close to the detection limit, resulting in recoveries that were either very low or very high (from 30% up to 300%). The recovery of the substances by standard addition, where a known amount of the substances is added to a sample before sample pre-treatment, shows recoveries between 80% and 140% for most of the PFASs. However, for the fluorotelomer alcohols 8:2 FTOH and 10:2 FTOH, recoveries of between 120% and 240% are seen in the controls. It is presumed that this is because the substances in the calibration solutions had degraded and/or evaporated, and that an elevated content of these substances was therefore measured in both the controls and the standard addition. This also explains why the detection limits for these substances are much higher than expected.

It should be noted that high levels of some of the fluorotelomer alcohols were found in some of the samples, and the result reported is that which was measured without correction for recovery of the substances. However, it can be said that even though the recovery of these substances is up to 3 times higher than expected according to the determination of the

substances in both controls and standard addition, the limit values would still have been exceeded when the recovery of up to 3 times had been taken into account.

14.4.5 Results of compliance analyses for specific PFAS

Results of compliance analyses for selected PFAS in the 16 textile products are listed in TABLE 18 below. The table shows the sum of the individual groups of PFAS regulated by legislation. In addition to the groups below, PFHxS related compounds are also regulated, but neither the standard nor the POP legislation indicates which specific compounds are included in this sum. PFHxS has been measured directly. This thus includes salts of PFHxS and related substances that degrade to PFHxS, but does not include branched isomers of PFHxS.

According to DS/EN 17681-1:2025, the content of a given substance is not included in the sum in cases where the content is below the limit of quantification. According to the standard, the quantification limits specified in the standard must be used, and not the quantification limits measured in practice if these are lower than the quantification limits specified in the standard. However, the results given below indicate the measured limit of detection for this analysis. Results for each specific PFAS are shown in Appendix 2.

The compounds included in the totals for each group of PFAS are listed in the box below and the box on the next page.

Individual PFAS included in the totals

Sum of PFOA related compounds includes PFOA, 8:2 FTS and 8:2 FTOH, as well as Me-PFOA, Et-PFOA, F-PFO, (NH₄)PFO, Ag-PFO, K-PFO, Na-PFO, which are included in the result for PFOA, and 8:2 FTA and 8:2 FTMA, which are included in the result for 8:2 FTOH. In addition, other salts of PFOA, 8:2 FTS and 8:2 FTOH and similar compounds that degrade, hydrolyse to or are analysed as PFOA, 8:2 FTS or 8:2 FTOH under the given conditions are included.

Sum of PFOS includes PFOS, PFOSA, NMeFOSA, NEtFOSA, NMeFOSE and NEtFOSE, as well as NH₄-PFOS, Li-PFOS, K-PFOS, the three salts referred to as PFOS-X in Appendix 2, and PFOSF, which are included in the result for PFOS. In addition, other salts of PFOS and the measured PFOS derivatives, as well as similar compounds that degrade, hydrolyse to, or are analysed as PFOS or the measured PFOS derivatives under the given conditions, are included.

Individual PFAS included in the totals (continued)

Sum of PFCAs includes PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, PFTeDA and PF-3,7-DMOA, as well as Na-PFNA, which is included in the result for PFNA, and (NH₄)PFD and Na-PFD, which are included in the result for PFDA. In addition, other salts of PFCA or similar compounds that are degraded, hydrolysed to or analysed as PFCA under the given conditions, are included.

Sum of PFCA-related compounds includes 4HPFUnDA, 8:2 FTOH, 10:2 FTS, 10:2 FTOH, as well as 8:2 FTA and 8:2 FTMA, which are included in the result for 8:2 FTOH, and 10:2 FTA and 10:2 FTMA, which are included in the result for 10:2 FTOH. In addition, salts of the measured PFCA-related compounds or similar compounds that degrade, hydrolyse to, or are analysed as the measured PFCA-related compounds under the given conditions, are included.

Sum of PFHxS includes PFHxS and salts of PFHxS or similar compounds and including any of its branched isomers that decompose, hydrolyse to or are analysed as PFHxS under the given conditions.

TABLE 18. Results of compliance analyses for specific PFAS. Results marked in bold exceed the permitted limit values. Detection limits are reported if the substance could not be detected or if the detection limits of other substances included in the sum are higher than the content of individual substances.

Lab. no.	Sum of PFOA related compounds (ppm)	Sum of PFOS and its derivatives (µg/m ²)	Sum of C ₉ -C ₁₄ PFCA (ppm)	Sum of C ₉ -C ₁₄ PFCA related substances (ppm)	PFHxS related substances* (ppm)
Limit value	1 ppm	1 µg/m²	0.025 ppm	0.26 ppm	0.025 ppm
07-DK-T	< 9	< 2	< 0.1	< 9	< 0.003
07-DS-T	< 9	< 2	< 0.1	< 9	< 0.003
07-MP-T	< 9	< 4	< 0.1	< 9	< 0.003
11-DK-T	< 9	< 1	< 0.1	< 9	< 0.003
11-DS-T	< 9	< 1	< 0.1	< 9	< 0.003
11-MP-T	< 9	< 2	< 0.1	< 9	< 0.003
14-DK-T	< 9	< 2	< 0.1	< 9	< 0.003
14-MP-T	1365	< 2	< 0.1	1788	< 0.02
19-DK-T	< 9	2-6	< 0.1	< 9	< 0.003
19-MP-T	233	< 2	< 0.1	263	< 0.003
24-DK-T	< 9	< 2	< 0.1	< 9	< 0.003
24-DS-T (MP)	< 9	< 1	< 0.1	< 9	< 0.003
24-MP-T	< 9	< 1	< 0.1	< 9	< 0.003
25-DK-T	< 9	< 2	< 0.1	< 9	< 0.003

25-DS-T (MP)	174	< 1	< 0.1	208	< 0.003
25-MP-T	< 9	< 0.4	< 0.1	< 9	< 0.003

For which individual PFAS are included in the sums, see the descriptions in the green boxes on the preceding pages.

* PFHxS has been measured directly. This thus includes salts of PFHxS and related substances that degrade to PFHxS but does not include branched isomers of PFHxS.

It should be noted that, as mentioned in Appendix 2, there are elevated detection limits for the determination of 8:2 FTOH and 10:2 FTOH, which are included in the sum of PFOA-related compounds (8:2 FTOH) and the sum of C₉-C₁₄ PFCA-related substances (both 8:2 FTOH and 10:2 FTOH), respectively. This means that the limit of detection is far above the permitted limit value. This is because the determination of fluorotelomer alcohols by LC-MS² is not optimal for these substances. In addition, some analytical challenges occur as the substances are highly volatile and thus difficult to handle.

The above results show that there are a total of four products that exceed the limit values:

- 14-MP-T due to content of both PFOA and PFCA-related substances. As can be seen from Appendix 2, this is because the concentration of 8:2 FTOH, which is included in both the PFOA sum and the sum for PFCA-related substances, is high, and because the concentration of 10:2 FTOH, which is included in the sum for PFCA-related substances, is high.
- 19-DK-T due to the content of NETFOSE, which counts towards the total for PFOS and its derivatives, is just above the limit value. However, it should be noted that the limit value of 1 µg/m² per unit area that was exceeded was applicable at the time of purchase, but is no longer applicable today. Today, only a limit value per unit weight for PFOS-related compounds of 1 mg/kg applies, which has not been exceeded for the product (see TABLE 30 in Appendix 2). This change in legislation came into force on 3 December 2025, whereas the product was purchased in May 2025. If the product had instead been purchased after 3 December 2025, the limit value would not have been exceeded. Product 19-DK-T is mittens, which have a relatively high fabric weight per unit area compared to the other analysed products. Product 19-DK-T is indicated as a violation in the tables in this report, as it was a violation at the time of purchase, even though it would not be under the limit value in force today.
- 19-MP-T due to content of both PFOA and PFCA related substances. As can be seen from Appendix 2, this is because the concentration of 8:2 FTOH, which is included in both the PFOA sum and the sum for PFCA-related substances, is high, and because the concentration of 10:2 FTOH, which is included in the sum for PFCA-related substances, is high.
- 25-DS-T (MP) due to the content of both PFOA and PFCA-related substances. As can be seen from Appendix 2, this is because the concentration of 8:2 FTOH, which is included in both the PFOA sum and the sum for PFCA-related substances, is high, and because the concentration of 10:2 FTOH, which is included in the sum for PFCA-related substances, is high.

Three of the products clearly exceed the limit value, whereas product 19-DK-T has a content of PFAS that is just above the limit value (and, as mentioned above, would not violate the limit value as it stands today). However, all four products exceed the permitted limit values in force at the time of purchase.

It should be noted that, in addition to the above groups of PFAS, analyses were also carried out for the following specific PFAS, which are listed in the textile standard (DS/EN 17681-1:2025), due to future regulations or because they are on the Candidate List in REACH. However, they are not included in the above sum parameters. This means that these six other PFAS are not regulated today:

- PFBA (CAS No. 375-22-4)

- PFPeA (CAS no. 2706-90-3)
- PFHxA (CAS No. 307-24-4)
- PFHpA (CAS No. 375-85-9)
- HFPO-DA (also called Gen-X; CAS No. 13252-13-6)
- 6:2 FTOH (CAS No. 647-42-7)

The results for these other PFAS are presented in Table 28 in Appendix 2. It can be seen from the results that, of the six other PFAS, it is exclusively 6:2 FTOH that is determined at values above the detection limit, and only in two of the 16 analysed products. The detection limit for 6:2 FTOH is elevated (as for the other fluorotelomer alcohols), as these volatile compounds are best determined by GC-MS (and in this case LC-MS² was used, as this equipment is best for determining other PFAS). 6:2 FTOH is found in two products, 07-DK-T and 14-MP-T, i.e. in a bib and a wetsuit, respectively. The concentrations were determined to be 82 and 25-75 ppm, respectively; note that the limit of quantification for this substance is 75 ppm. However, this is not an exceedance of a limit value, as there is currently no legislation against the use of 6:2 FTOH. However, as described in the section 4.8, an upcoming limit value of 0.025 ppm has been set for PFHxA-related substances, which will apply from October 2026.

14.5 Compliance analyses for lead and cadmium

Based on the XRF results described in section 8.2, products were selected for quantitative compliance analyses for lead and cadmium. For some products, exceedances were found based on XRF screenings alone, due to values far above the limit values for lead and/or cadmium. For these products, no compliance analyses were performed. Only products for which the XRF screening showed levels close to the limit values were selected for compliance analyses of lead and cadmium content. A total of seven products were selected for compliance analyses for lead and cadmium content.

14.5.1 Method of analysis for lead and cadmium

The total content of lead and cadmium was determined by performing an acid digestion followed by analysis of the metals using ICP-MS (Inductively Coupled Plasma Mass Spectrometry). FORCE Technology's internal method M6.186 was used for the determination of elements in metal. The method is in accordance with DS/EN ISO 17294-2.

Double determinations were performed for all samples. The limits of detection for both lead and cadmium are 0.5 mg/kg with an analytical uncertainty of 20%.

Lead and cadmium content was measured at a single location or on a single part on/of the product. The same location or part of the product was chosen as analysed in the screening analyses.

14.5.2 Results of compliance analyses for lead and cadmium

The results for the lead and cadmium content for the selected samples are listed in TABLE 19 below.

TABLE 19. Compliance analyses for lead and cadmium content

Lab no.	Product type	Lead (mg/kg)	Cadmium (mg/kg)
10-DK-M	Hair clip (metal)	0.11	0.07
10-DS-M	Hair clip (metal)	46.5	0.02
10-MP-M	Hair clip (metal)	0.51	0.08

17-DS-PM	Bag, buckle (metal)	17.0	1.30
17-MP-PM	Bag, buckle (metal)	6.39	1.87
21-DK-M	Stud earring (metal)	1.75	0.03
21-MP-M	Stud earring (metal)	50.4	0.94

The limit values for lead and cadmium in jewellery are 500 mg/kg for lead and 100 mg/kg for cadmium according to the REACH regulation. None of the seven products analysed exceeded the limit value.

14.6 Compliance analyses for nickel release

Based on the DMG screening analyses (swab test) performed by the Danish Chemical Inspection Service, a selection was made of the products for which quantitative compliance analyses for nickel release should be performed. If the DMG screening revealed products with a nickel presence, all received comparable products (i.e. products with the same number) were selected for compliance analyses for nickel release. Compliance analyses were performed for nickel release, as there is a relatively large uncertainty associated with the results of the DMG screening.

The results of the XRF screening and the reason why the products were selected for compliance analyses for nickel release are described in chapter 8.2. A total of seven products were selected for compliance analyses regarding nickel release.

14.6.1 Method of analysis for nickel release

Nickel release was determined according to the standard DS/EN 1811:2023 using ICP-OES (Inductively Coupled Plasma Optical Emission Spectrometry).

Double determinations were performed for all samples. The detection limit depends on, among other things, the surface area of the sample, and will therefore vary from sample to sample. The uncertainty of analysis is 46%, as also stated in the standard.

The nickel release was measured at a single location or on a single part of the product. The same location or part of the product was chosen as analysed in the screening analyses.

14.6.2 Results of compliance analyses for nickel release

The nickel release results for the selected samples are given in TABLE 20 below. The results are the average of the double determinations performed.

TABLE 20. Compliance analyses for nickel release

Lab no.	Product type	Nickel release (µg/cm ² /week)
17-DS-PM	Bag, buckle (metal)	0.005
17-MP-PM	Bag, buckle (metal)	0.112
20-DK-M	Bracelets (metal)	0.002
20-DS-M	Bracelets (metal)	0.92
23-DK-M	Cross necklace (metal)	0.002
23-DS-M	Cross necklace (metal)	0.001
23-MP-M	Cross necklace (metal)	0.004

According to the REACH regulation, the limit value for nickel release from jewellery is 0.5 µg/cm²/week for jewellery other than stud earrings. According to the standard EN1811:2023, it is stated that due to the uncertainty of the method, the limit value of 0.5 µg nickel/cm²/week for jewellery other than stud earrings is only considered to be exceeded if the measured value is above 0.88 µg nickel/cm²/week. This means that product 20-DS-M exceeds the limit value.

14.7 Summary of the compliance analyses

The table below (TABLE 21) indicates for which products non-compliances were found of the regulatory requirements concerning chemical substances that have been inspected in this project (i.e., lead, cadmium, nickel release, PAHs, SCCP, phthalates, and certain PFAS). For a better visual overview, products with non-compliances (i.e. with a 'Yes') are marked with a green background colour. One product is marked with a 'No', but with a light green background colour. This is because a violation of an upcoming limit value has been observed. This means that the products will be banned in the future when the upcoming limit value comes into force, but there was no violation at the time of purchase.

If, after delivery of the products, it has been discovered that they belong to a different category than that for which they were purchased, this category is indicated in brackets after the Lab. No. For two products, "(none)" is indicated, which means that what appeared to be a dropshipper turned out to be an ordinary website based in the EU, for example a German or an Irish webshop.

TABLE 21. Overview of which of the purchased products fulfil the investigated legal requirements for chemical substances in this project

Lab. no.	Product type	Exceeds the investigated limit values for chemical substances	Reason for possible non-compliance
01-DK-P	Socks (textile)	No	None
01-DS-P	Socks (textile)	No	None
01-MP-P	Socks (textile)	No	None
02-DK-P	Beach sandals	No	None
02-DS-P	Beach sandals	No	None
02-MP-P	Beach sandals	No	None
03-DK-M	Necklaces (metal)	No	None
03-DS-M (none*)	Necklaces (metal)	No	None
03-MP-M	Necklaces (metal)	No	None
04-DK-M	Stud earrings (metal)	Yes	Cd content significantly exceeded according to XRF screening
04-DS-M	Stud earrings (metal)	No	None
04-MP-M	Stud earrings (metal)	Yes	Cd content significantly exceeded according to XRF screening
05-DK-M	Hair clips (metal)	No	None
05-DS-M (DK)	Hair clips (metal)	-	Was not investigated further
05-MP-M	Hair clips (metal)	No	None
06-DK-M	Bracelets (metal)	No	None

06-DS-M (none*)	Bracelets (metal)	No	None
06-MP-M	Bracelets (metal)	No	None
07-DK-T	Bibs (textile)	No	The total fluorine content is far above the upcoming limit value in the Danish executive order, which comes into force in 2026. However, the product was not illegal at the time of purchase.
07-DS-T	Bibs (textile)	No	None
07-MP-T	Bibs (textile)	No	None
08-DK-P	T-shirts/nightwear (textile)	No	None
08-MP-P	T-shirts/nightwear (textile)	No	None
09-DK-W	Wetsuits	No	None
09-DS-W	Wetsuits	No	None
09-MP-W	Wetsuits	No	None
10-DK-M	Hair clips (metal)	No	None
10-DS-M	Hair clips (metal)	No	None
10-MP-M	Hair clips (metal)	No	None
11-DK-T	Snowsuits (textile)	No	None
11-DS-T	Snowsuits (textile)	No	None
11-MP-T	Snowsuits (textile)	No	None
12-DK-P	Socks (textile)	No	None
12-DS-P	Socks (textile)	No	None
12-MP-P	Socks (textile)	No	None
13-DK-P	Beach sandals	No	None
13-DS-P	Beach sandals	No	None
13-MP-P	Beach sandals	Yes	Content of DBP significantly exceeded.
14-DK-T	Snowsuits (textile)	No	None
14-MP-T	Snowsuits (textile)	Yes	The product exceeds the limit value for PFOA-related compounds and the limit value for C ₉ -C ₁₄ PFCA-related substances. The total fluorine content is far above the upcoming limit value in the Danish executive order, which comes into force in 2026. Thus, the product was not illegal at the time of purchase with respect to the upcoming limit value.
15-DK-M	Necklaces (metal)	No	None
15-DS-M	Necklaces (metal)	No	None
15-MP-M	Necklaces (metal)	No	None
16-DK-M	Stud earrings (metal)	No	None
16-MP-M	Stud earrings (metal)	No	None

17-DS-PM	Plastic handbag (metal zip)	No	None
17-MP-PM	Plastic handbag (metal zip)	No	None
18-DK-M	Stud earrings (metal)	No	None
18-MP-M	Stud earrings (metal)	Yes	Pb content significantly exceeded according to XRF screening
19-DK-T	Mittens (textile)	Yes	Products exceed limit value for PFOS derivatives in µg/m².
19-MP-T	Mittens (textile)	Yes	The product exceeds the limit value for PFOA-related compounds and the limit value for C ₉ -C ₁₄ PFCA-related substances. The total fluorine content is far above the upcoming limit value in the Danish executive order, which comes into force in 2026. Thus, the product was not illegal at the time of purchase with respect to the upcoming limit value.
20-DK-M	Bracelets (metal)	No	None
20-DS-M	Bracelets (metal)	Yes	Content of Pb and Cd significantly exceeded according to XRF screening. In addition, nickel release was above the limit value.
21-DK-M	Stud earrings (metal)	No	None
21-MP-M	Stud earrings (metal)	No	None
22-DK-P	T-shirts/nightwear (textile)	No	None
22-DS-P	T-shirts/nightwear (textile)	No	None
22-MP-P	T-shirts/nightwear (textile)	No	None
23-DK-M	Necklaces (metal)	No	None
23-DS-M	Necklaces (metal)	No	None
23-MP-M	Necklaces (metal)	No	None
24-DK-T	Snowsuits (textile)	No	None
24-DS-T (MP)	Snowsuits (textile)	No	None
24-MP-T	Snowsuits (textile)	No	None
25-DK-T	Bibs (textile)	No	None
25-DS-T (MP)	Bibs (textile)	Yes	The product exceeds the limit value for PFOA-related compounds and the limit value for C ₉ -C ₁₄ PFCA-related substances. The total fluorine content is above the upcoming limit value in the Danish executive order, which comes into force in 2026. Thus, the product was not illegal at the

			time of purchase with respect to the upcoming limit value.
25-MP-T	Bibs (textile)	No	None
26-DK-P	Bibs (soft plastic)	No	None
26-DS-P	Bibs (soft plastic)	No	None
27-DK-M	Bracelets (metal)	No	None
27-DS-M (DK)	Bracelets (metal)	No	None
27-MP-M	Bracelets (metal)	No	None
28-DK-M	Necklaces (metal)	No	None
28-DS-M (DK)	Necklaces (metal)	Yes	Cd content significantly exceeded according to XRF screening
28-MP-M	Necklaces (metal)	Yes	Cd content significantly exceeded according to XRF screening
29-DK-M	Necklaces (metal)	No	None
29-DS-M (MP)	Necklaces (metal)	Yes	Cd content significantly exceeded according to XRF screening
29-MP-M	Necklaces (metal)	Yes	Cd content significantly exceeded according to XRF screening
30-DK-P	Beach sandals	No	None
30-MP-P	Beach sandals	No	None
31-DK-P	T-shirts/nightwear (textile)	No	None
31-DS-P	T-shirts/nightwear (textile)	No	None
31-MP-P	T-shirts/nightwear (textile)	No	None
Total	For all products	13 non-compliances	

* Mean that what appeared to be a dropshipper turned out to be an ordinary website based in the EU, for example a German or an Irish webshop. These two products thus fall outside the scope of the project in terms of only sourcing from either Danish webshops, dropshippers or large online marketplaces.

The results of the non-compliances are summarised in the table below (TABLE 22), where the results are broken down by product type and by the type of online store in which the products were purchased. The percentage-based non-compliances relate to the total number of samples purchased from Danish websites, dropshippers, or large online marketplaces, respectively, and therefore do not indicate non-compliance rates for any individual webshops.

TABLE 22. Number of products exceeding one or more limit values for the substances analysed in this project.

Product type	DK Danish web-site	DS Dropshipper	MP Large online marketplace	Total number of samples with non-compliances	Total number of samples
Beach sandals (plastic)			1	1	8
Bibs (soft plastic)					2

Handbag (plastic/metal)					2
Socks with plastic grips					6
T-shirt with plastic prints					8
Snowsuits (textile)			1	1	8
Bibs (textile)			1	1	6
Mittens (textile)	1		1	2	2
Wetsuits					3
Bracelets (metal)		1		1	6
Necklaces (metal)	1		3	4	13
Hair clips (metal)					4
Stud earrings (metal)	1		2	3	9
Total number of non-compliances	3 9%	1 6%	9 28%	13 16%	
Total number of products	32	16	32	13	80

It should be noted that this table totals 80 products, as the two products that were found to have been purchased from a German and an Irish webshop, respectively, are not included in the above count. Furthermore, the one product (05-DS-M) that was not investigated further has been removed from the above count.

In addition to the above non-compliances, for some of the textile products the total fluorine content was measured above 50 mg/kg, which is the upcoming limit value for PFAS in textiles (see section 4.8). This means that the products listed below in Table 23 will be banned in the future when the upcoming limit value comes into force, but there was no violation at the time of purchase. However, it should be noted that three of the four products with a total fluoride content above 50 mg/kg (the upcoming limit value) are already banned today, as they contain groups of PFAS that are already restricted today. One additional product (7-DK-T) contains none of the specific PFAS currently banned, but it will be banned when the upcoming limit value enters into force in July 2026.

TABLE 23. Number of textile products that exceed the upcoming limit value for total fluorine content (as a measure of PFAS content).

Product type	DK Danish web-site	DS Dropshipper	MP Large online marketplace	Total number of samples with non-compliances	Total number of samples
Snowsuits (textile)			1	1	8
Bibs (textile)	1		1	2	6
Mittens (textile)			1	1	2

Total number of non-compli- ances	1 3%	0 0%	3 9%	4 5%	
Total number of products	32	16	32	4	80

15. Discussion and conclusion

In this project, a total of 80 products belonging to the category of children's fashion, purchased from online websites, were examined, distributed as follows:

- 32 products from Danish websites with own inventory.
- 16 products from dropshipping websites, i.e., websites that are deceptively similar to Danish websites, but where the order is forwarded directly to a supplier, often located outside the EU.
- 32 products from so-called large marketplaces, where there are typically a multitude of suppliers selling through these 'online retail centres' (where the individual sellers lease platform space).

The purchased products were divided into product types such as plastic shoes/beach sandals, clothes with plastic prints, plastic handbags, snowsuits, mittens, bibs, wetsuits, hair clips and various jewellery.

15.1 Non-compliances with limit values for regulated substances

The overview of products exceeding the limit values for one or more of the chemical substances analysed in this project shows that a total of 13 out of 80 products, corresponding to 16% of the purchased products, had a content above the legal limit value according to the analysis used. Non-compliance of applicable legislation were identified for jewellery, textiles and a beach sandal. For textiles, there were non-compliances among snowsuits (one product), bibs (one product) and mittens (two products).

In addition, there was a further product that had a total fluorine content exceeding 50 mg/kg, indicating a presence of PFAS. The PFAS analyses showed that this product (07-DK-T) contained 6:2 FTOH, which is not regulated today. Other specific PFAS that were not analysed for may have been present. This product was not illegal at the time of purchase, as the Danish ban on the content of all PFAS in textiles and clothing sold by traders in Denmark or purchased by Danish consumers will not come into force until summer 2026. However, the product had a content of total fluorine that clearly exceeds the upcoming limit value for total fluorine of 50 mg/kg. At European level, a total ban on all PFAS in all products is also being processed but has not yet been adopted.

Compared with previous similar studies that tested for violations of applicable legislation (see chapter 5), it is the Greenpeace study of clothing and shoes purchased exclusively from SHEIN that most closely resembles the present study. Here, violations were found for 15% of 47 products. The most recent of the previous studies on products purchased online, the Nordic study published in 2025 (Nordic Council of Ministers, 2025) found that 71% of a total of 210 products did not comply with legislation. However, this was a survey of many different products, including various chemical products, toys, electronics, and sports and leisure products, in addition to the jewellery and clothing (children's fashion products) studied in this project. In the Nordic study, by comparison, 50% of jewellery and 25% of products in the fashion/clothing category contained illegal amounts of regulated chemical substances. In the Nordic study, purchases were also made from the three types of online platforms from which purchases were made in this project, i.e., large marketplaces, dropshippers, and national webshops. However, the breakdown of products purchased from the three types of online stores in the Nordic study

is not specified. Thus, it is not clear whether products from, for example, dropshippers and large marketplaces have been overrepresented in the study.

This study finds fewer violations of the legislation than the previous Nordic study. However, it should be pointed out that the previous studies did not focus exclusively on the content of regulated chemical substances, but also on violations in a wide range of other areas, such as labelling, physical or mechanical safety, etc. In addition, the proportion of products from different types of online platforms may differ in these studies. In the Greenpeace study, for example, 100% of the products were purchased from a large marketplace (SHEIN), and in the Nordic study, the distribution of purchases among the different types of online platforms is not specified.

In addition, previous studies have analysed for more regulated chemical substances than in this project (due to the budgetary constraints of the project). Thus, in this project, neither azo colourants nor formaldehyde have been analysed.

15.2 Non-compliances broken down by the three types of e-commerce platforms

The overview of non-compliances in the chapter 14.7 shows that the highest percentage exceedance of limit values for the investigated regulated substances was identified in products purchased from major online marketplace platforms (nine products, corresponding to 28% of the products purchased on marketplace platforms). This is followed by products purchased from Danish websites with their own inventory (three products, corresponding to 9%) and from dropshipping websites (one product, corresponding to 6%) that exceed the limit values for the investigated regulated substances. It should be noted that dropshippers were difficult to identify, which is why only half the amount of this type of products were purchased compared to products from large online marketplaces and Danish websites with own inventory.

Despite the limited number of products analysed (between 16 and 32 products from each of the three categories of e-commerce platforms), the results still give a clear picture that most of the non-compliances of regulated substances occur for products purchased from the large marketplaces, i.e. the vast majority of products are shipped from a country outside the EU.

In this respect, the results of this study are in line with previous studies that have been conducted on online commerce.

15.3 Non-regulated substances in textile and plastic products

A GC-MS screening of the textile and plastic products was carried out to investigate whether they contained problematic substances other than the regulated substances and whether there was a difference in the content of chemical substances depending on which online platform the products were purchased.

Here, the screening analyses showed that there was a significant difference in the number of chemical substances (peaks in the GC-MS chromatogram) in the extracts from the various textile and plastic products. There is a variation from zero substances to 100 different substances. The amount of peaks in the chromatogram can be seen as an expression of the number of additives, such as antioxidants, fillers, plasticisers, solvents, etc. used in the products, but few peaks can also indicate that the additives used in the products could not be extracted with the chosen solvent or could not be analysed with the chosen analysis technique (here GC-MS). For example, colourants and most PFAS typically cannot be identified using GC-MS. For a few samples (for some of the plastic shoes, snowsuits or bibs), it was necessary to use a

larger volume of extraction solvent, which has led to a degree of dilution that may have resulted in fewer substances being identified in the screening.

Notwithstanding the above reservations, there is, however, a tendency that the highest number of organic substances was observed in the product types: beach sandals, socks with plastic grips, and plastic handbags. This is followed by snowsuits, whereas generally not many different organic substances were observed in the textile bibs, but many were observed in the plastic bibs.

It was observed that, in general, products purchased from Danish websites with their own inventory contain slightly fewer organic chemical substances than products purchased from a dropshipper or a major online marketplace platform. However, this trend only applies to plastic products or products with plastic printing. For textiles, where the content of fewer organic substances was generally observed, the trend is not evident, or rather the opposite. In general, the sample size for the individual product types is statistically small, making it difficult to draw any unequivocal conclusions at the product-type level, but perhaps more feasible at the overall level.

Several isocyanates (nine in total) were identified, some of which are suspected of being carcinogenic. Isocyanates were identified primarily in plastic products or textile products with plastic, as well as in the wetsuits. Isocyanates were seen in products from all three e-commerce platforms, perhaps with a slight tendency that products purchased from Danish websites most often contained isocyanates and in the highest concentrations. However, it should be noted that isocyanates are relatively reactive and will normally disappear after a short period of use of the products.

Several phthalates (seven different types) were also identified in the textile and plastic products. Phthalates are used as plasticisers and are therefore typically found in softened plastics, i.e. plastic shoes, bags, socks with plastic grips, bibs and textiles with plastic printing. Four phthalates recur in many of the products, including two of the regulated ones, DBP and DEHP, but they generally occur in small concentrations. DBP, which is on the candidate list and regulated under REACH, was identified in 43 of the 47 products, but generally in low concentrations (i.e. also below the applicable limit value), except in one product (a plastic shoe purchased from a large online marketplace).

A terephthalate (bis(2-ethylhexyl) terephthalate) was identified in the highest concentrations, but as it is not classified as hazardous, the content was not assessed further. However, it appeared from the migration testing that this substance migrates into artificial sweat in high quantities. In general, there was not much difference in the content of phthalates depending on where the products were purchased. Many of the plastic products contained one or more phthalates, but in small amounts.

15.4 Risk assessment of non-regulated substances

Based on the GC-MS screening of the textile and plastic products, two substances, bis(2-ethylhexyl) isophthalate (BEHIP) and 2-ethylhexylbenzoate (EHB) were selected for further risk assessment due to:

- the amounts identified in the extract from the samples were relatively high,
- the substances were identified in several of the samples analysed (in 14 and 12 of the 47 samples analysed, respectively), and
- both substances were classified as reprotoxic by the majority of registrants (89% and 59% respectively).

The risk assessment was carried out on the basis of migration testing in artificial sweat for nine of the products in which the concentrations of the two substances in the sample extracts were

highest. It was therefore expected that the nine products would give the highest migration to artificial sweat for the two substances under the selected migration conditions. However, for bis(2-ethylhexyl) isophthalate there was no migration above the detection limit for any of the products, and for 2-ethylhexyl benzoate there was only migration of the substance just above the detection limit for two of the nine products. Therefore, in the exposure calculations and the risk assessment, the detection limit has been used if no migration of the substance occurred above the detection limit.

The risk assessment showed that the two substances do not constitute a risk to health in worst-case situations for the products analysed, which were:

- Socks with plastic grips, which small children might suck on
- Plastic shoes, which children might run in without wearing socks
- Plastic handbags, which come into close contact with the palm of the hand

However, the analyses show that the products with the highest migration of these substances came from products purchased either from large online marketplaces or from dropshipping websites.

15.5 Conclusion

The compliance analyses performed in this project show that there are a number of products (16%) that do not comply with legislation requirements regarding the content of the regulated substances studied in this project (phthalates, PAHs, SCCPs, certain PFAS, lead and cadmium and nickel release). The compliance analyses also show that there is a higher proportion of non-compliant products among items purchased on large online marketplaces (28%), whereas 6% of products purchased on dropshipping websites and 9% of products purchased on Danish websites with own inventory do not comply with legislation regarding the chemical substances studied in this project.

No health risk was identified from the use of the children's fashion products containing the two non-regulated substances that were subject to a risk assessment in this project. However, the migration testing show that the products with the highest migration of these substances came from products purchased either from large online marketplaces or from dropshipping websites.

The project does, however, show a clear tendency that when products are received directly from countries outside the EU (via the large marketplaces), there are more non-compliances concerning the content of regulated chemical substances than if the products are purchased directly from Danish online stores.

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Appendix 1. GC-MS screening

This appendix contains results from the GC-MS screening performed on the 47 different samples consisting of either textile or plastic. The 47 samples represent a total of 45 products, as a single sample – a plastic shoe – consisted of three different materials, meaning that for this product, three screening analyses were carried out for each of the three materials.

A total of two tables is provided in separate subsections below. One table shows substances identified in each individual sample, and one table shows the individual substances identified, as well as information on how many of the 47 samples each substance are identified and how the substances are classified.

In total, approximately 130 unique substances were identified. Only substances that have been identified or whose identification is slightly uncertain are listed.

In the tables, one to four + signs indicate the amount of the identified substances in relation to the content of the internal standard in the sample. Four + signs are indicated for the identified phthalates and isocyanates, where the content is presumably a few percent. The indication of the amount of + signs probably correspond roughly to the content concentrations listed below. However, these are only estimated quantities, as the amounts are calculated relative to an internal standard, but not to the individual substance, and because the measured content in the extracts is affected by, among other things, how efficiently the individual substance is extracted from the samples. In the tables in this appendix, the maximum estimated content concentration is indicated in the form of + signs.

< + corresponds to an estimated content of less than 10 ppm

+ corresponds to an estimated content of 10-100 ppm

++ corresponds to an estimated content of 100-1,000 ppm

+++ corresponds to an estimated content of 1,000-10,000 ppm or 0.1-1%.

++++ corresponds to an estimated content of 10,000-100,000 ppm or 1-10%

For some samples (marked with an * by the sample name in the table) it was necessary to use a larger volume of liquid to ensure that the sample was fully covered. The volume used corresponds to up to three times the lowest volume used in the screening, leading to a degree of dilution that may have contributed to the inability to identify more substances in the screening.

For some samples, there were either no or only a few (3-4 different) peaks (substances) in the sample in total and at low levels. For these samples, at best only one or two of the largest peaks have been identified.

Appendix 1.1 GC-MS screening results: Substances from individual samples

The substances identified in the 47 different samples are listed in TABLE 24 on the following pages.

TABLE 24. Results of GC-MS screening. Identified substances extracted from the samples.
An * means that up to three times the amount of liquid was used to cover the sample, indicating a degree of dilution.

Lab no.	CAS no.	Name of substance	Quantity	Total substances	Total substances and quantities
01-DK-P	1002-69-3	1-chlorodecane	+	71 Out of these, 30 were identified. The remainder were not identified.	30 (<+)
	101-02-0	Triphenyl phosphite	+		30 (+)
	103-23-1	Bis(2-ethylhexyl)adipate	++++		6 (++)
	104-66-5	1,2-Diphenoxyethane	<+		3 (+++)
	104-76-7	2-Ethylhexan-1-ol	++		2 (++++)
	111-84-2	n-Nonane	<+		
	112-40-3	n-Dodecane	<+		
	123-05-7	2-Ethylhexanal	+		
	123-79-5	Diethyl adipate	<+		
	131-11-3	Dimethyl phthalate	<+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	1801837-96-6, mixture:	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 2,2'-Oxybis-1-propanol dibenzoate	+++		
	27138-31-4				
	20109-39-1, mixture:	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 2-(2-benzoyloxypropoxy)propyl benzoate	+++		
	27138-31-4				
	20834-06-4	Palmityl laurate	+		
	301-02-0	Oleamid	+		
	36653-82-4	1-Hexadecanol	+		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	+		
	593-45-3	n-Octadecane	<+		
	593-49-7	n-Heptacosane	<+		
	629-50-5	n-Tridecane	<+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-94-7	n-Heneicosane	+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	<+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	<+		
	84-74-2	dibutylphthalat	<+		
	94-03-1, mixture: 27138-31-4	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 1,1'-Oxybis-2-propanol dibenzoate	+++		

01-DS-P	104-76-7	2-Ethylhexan-1-ol	+	72	32 (<+)
	111-84-2	n-Nonane	<+		35 (+)
	112-39-0	Methylpalmitat	+		3 (++)
	112-40-3	n-Dodecane	<+		1 (+++)
	112-61-8	Methylstearat	+		1 (++++)
	112-95-8	n-Eicosane	+		Out of these, 28 were identified. The remainder were not identified.
	117-81-7	Bis(2-ethylhexyl) phthalate	+		
	123-05-7	2-Ethylhexanal	+		
	131-11-3	Dimethyl phthalate	<+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	+++		
	301-02-0	Oleamid	+		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	+		
	593-49-7	n-Heptacosane	<+		
	6084-76-0 /2500-59-6	methyl 8-(3-octyloxiran-2-yl)octanoat (trans-isomeren?)	++		
	629-50-5	n-Tridecane	<+		
	629-62-9	n-Pentadecane	<+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	+		
	77-94-1	Tributylcitrat	+		
	84-73-1	Bis(2-hydroxyethyl) phthalate	+		
	84-74-2	Dibutylphthalat	<+		

01-MP-P	104-76-7	2-Ethylhexan-1-ol	<+	84	22 (<+)
	111-84-2	n-Nonane	+		46 (+)
	112-39-0	Methylpalmitat	<+		13 (++)
	112-40-3	n-Dodecane	+++		2 (+++)
	112-61-8	Methylstearat	+		1 (++++)
	112-95-8	n-Eicosane	++		
	123-05-7	2-Ethylhexanal	++		
	137-89-3	Bis(2-ethylhexyl) isophthalate	+		
	301-02-0	Oleamid	++		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	++		
	591-82-2 / 4426-79-3 /	Isobutyl isothiocyanate / sec-Butyl isothio- cyanate / Butyl isothiocyanate	+		
	592-82-5				
	593-49-7	n-Heptacosane	<+		
	6084-76-0	methyl 8-(3-octyloxiran-2-yl)octanoat	+		
	/2500-59-6	(trans-isomeren?)	+++		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	+		
	84-74-2	Dibutylphthalat	<+		

02-DK-P*	1009-61-6	1,4-Diacetylbenzene	++	50	24 (<+)
	111-84-2	n-Nonane	<+		22 (+)
	112-40-3	n-Dodecane	+		4 (++)
	112-95-8	n-Eicosane	+		0 (+++)
	1620-98-0	3,5-Di-tert-butyl-4-hydroxybenzaldehyd	<+		0 (++++)
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	+		Out of these, 24 were identified. The remainder were not identified.
	3748-13-8	1,3-Diisopropenylbenzene	+		
	4228-10-8	5-Acetylindane	++		
	544-76-3	n-Hexadecane	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	++		
	593-45-3	n-Octadecane	+		
	617-94-7	2-Phenyl-2-propanol	+		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-97-0	n-Docosane?	+		
	638-67-5	n-Tricosane	<+		
	646-31-1	n-Tetracosane	<+		
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	<+		
	84-74-2	Dibutylphthalat	+		
	98-86-2	Acetophenon	++		

02-DS-P	1002-69-3	1-chlorodecan	+	78	32 (<+)
	1009-61-6	1,4-Diacetylbenzene	<+		32 (+)
	101-68-8	4,4'-Diphenylmethandiisocyanat	<+		8 (++)
	102-76-1	triacetin	++		4 (+++)
	104-76-7	2-Ethylhexan-1-ol	+		2 (++++)
	105-75-9	Dibutyl fumarate	<+		Out of these, 33 were identified. The remainder were not identified.
	110-19-0	Isobutylacetat	+++		
	111-06-8	Butylpalmitat	+		
	111-84-2	n-Nonane	<+		
	117-81-7	Bis(2-ethylhexyl) phthalate	+		
	120-51-4	Benzylbenzoat	+		
	123-05-7	2-Ethylhexanal	+		
	123-86-4	Butylacetat	+++		
	131-11-3	Dimethyl phthalate	++		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	20279-44-1	Butyl pyruvate	++		
	301-02-0	Oleamid	+		
	5444-75-7	2-Ethylhexyl benzoate	++		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
	593-49-7	n-Heptacosane	+		
	617-94-7	2-Phenyl-2-propanol	<+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	+		
	630-02-4	n-Octacosane	<+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	<+		
	71-36-3	1-butanol	+++		
	7568-58-3	Tributylaconitat	+++		
	77-90-7	Acetyltributylcitrat	++		
	77-94-1	Tributylcitrat	++++		
	80-62-6	Methylmethacrylat	+		
	84-74-2	Dibutylphthalat	+		

02-MP-P*	1009-61-6	1,4-Diacetylbenzene	++	38	14 (<+)
	104-66-5	1,2-Diphenoxyethane	+		20(+)
	111-84-2	n-Nonane	+		4 (++)
	112-40-3	n-Dodecane	<+		0 (+++)
	112-95-8	n-Eicosane	+		0 (++++)
	131-11-3	Dimethyl phthalate	<+		Out of these, 25 were identified. The remainder were not identified.
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	+		
	36653-82-4	1-Hexadecanol	+		
	3748-13-8	1,3-Diisopropenylbenzene	+		
	4228-10-8	5-Acetylindane	+		
	544-76-3	n-Hexadecane	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	++		
	593-45-3	n-Octadecane	++		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	++		
	629-94-7	n-Heneicosane	+		
	629-97-0	n-Docosane?	+		
	629-99-2	n-Pentacosane	<+		
	638-67-5	n-Tricosane	+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	+		
	646-31-1	n-Tetracosane	+		
	84-74-2	Dibutylphthalat	+		
07-DK-T*	101-68-8	4,4'-Diphenylmethandiisocyanat	++	21	10 (<+)
	103-23-1	Bis(2-ethylhexyl)adipat	<+		9 (+)
	120-92-3	Cyclopentanone	+		2 (++)
	301-02-0	Oleamid	++		0 (+++)
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+		0 (++++)
	84-74-2	Dibutylphthalat	<+		The remainder were not identified.
07-DS-T*	None	No compounds were observed in the chromatogram in the screening. A larger liquid volume was required to fully cover the sample. The volume used was three times the minimum volume applied in the screening, resulting in a level of dilution that may have contributed to the non-detection of substances.		0	0 (<+)
				Out of these, 0 was identified. The remainder were not identified.	0 (+) 0 (++) 0 (+++) 0 (++++)
07-MP-T*	101-68-8	4,4'-Diphenylmethandiisocyanat	++	7	4 (<+)
	131-11-3	Dimethyl phthalate	<+		1 (+)
	584-84-9	2,4-Diisocyanato-1-methylbenzen	++		2 (++)
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	<+		0 (+++)
	84-73-1	Bis(2-hydroxyethyl) phthalate	+		0 (++++)
				The remainder were not identified.	

08-DK-P	112-95-8	n-Eicosane	+	18	10 (<+)
	126-30-7	Neopentyl glycol	+		7 (+)
	2094-99-7	3-Isopropenyl-alpha,alpha-dimethylbenzyl isocyanate	<+	Out of these, 8 were identified.	1 (++)
	301-02-0	Oleamid	+		0 (+++)
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+	The remainder were not identified.	0 (++++)
	6422-86-2	Bis(2-ethylhexyl)terephthalat	+		
	822-06-0	Hexamethylene diisocyanate	++		
	84-74-2	Dibutylphthalat	<+		
08-MP-P	6422-86-2	Bis(2-ethylhexyl)terephthalat	<+	2	2 (<+)
	84-74-2	Dibutylphthalat	<+	Out of these, 2 were identified. The remainder were not identified.	0 (+) 0 (++) 0 (+++) 0 (++++)
09-DK-W	101-67-7	Bis(4-octylphenyl)amine	<+	85	27 (<+)
	101-68-8	4,4'-Diphenylmethandiisocyanat	+		53 (+)
	112-95-8	n-Eicosane	+	Out of these, 19 were identified.	4 (++)
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		0 (+++)
	301-02-0	Oleamid	+	The remainder were not identified.	1 (++++)
	544-76-3	n-Hexadecane	+		
	593-45-3	n-Octadecane	++		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-97-0	n-Docosane?	+		
	629-99-2	n-Pentacosane	<+		
	630-01-3	n-Hexacosane	<+		
	638-67-5	n-Tricosane	+		
	646-31-1	n-Tetracosane	+		
	7158-25-0	Tricyclopentadiene	+		
	84-74-2	Dibutylphthalat	<+		

09-DS-W	101-67-7	Bis(4-octylphenyl)amine	++	78	24 (<+)
	112-40-3	n-Dodecane	<+		49 (+)
	112-95-8	n-Eicosane	++		4 (++)
	1620-98-0	3,5-Di-tert-butyl-4-hydroxybenzaldehyd	+		0 (+++)
	301-02-0	Oleamid	+		1 (++++)
	544-76-3	n-Hexadecane	+		
	593-45-3	n-Octadecane	++		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	++		
	629-94-7	n-Heneicosane	+		
	629-97-0	n-Docosane?	+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	+		
	638-67-5	n-Tricosane	+		
	646-31-1	n-Tetracosane	+		
	84-74-2	Dibutylphthalat	<+		
09-MP-W	101-68-8	4,4'-Diphenylmethandiisocyanat	+	10	7 (<+)
	13622-90-7, common	"trans,trans-RMDI" - Bis(4-isocyanatocyclohexyl)methane	+		3 (+)
	5124-30-1				0 (++)
	17901-48-3, common	cis,trans-RMDI - Bis(4-isocyanatocyclohexyl)methane	+		0 (+++)
	5124-30-1				0 (++++)
	18937-00-3, common	cis,cis-RMDI - Bis(4-isocyanatocyclohexyl)methane	<+		
	5124-30-1				
11-DK-T	101-68-8	4,4'-Diphenylmethandiisocyanat	++	18	13 (<+)
	103-23-1	Bis(2-ethylhexyl)adipat	<+		4 (+)
	126-30-7	Neopentyl glycol	<+		1 (++)
	301-02-0	Oleamid	+		0 (+++)
	584-84-9	2,4-Diisocyanato-1-methylbenzen	+		0 (++++)
11-DS-T	777-95-7	1,6-Dioxacyclododecane-7,12-dione	<+	16	
	84-74-2	Dibutylphthalat	<+		
11-MP-T	101-68-8	4,4'-Diphenylmethandiisocyanat	+++	42	24 (<+)
	103-23-1	Bis(2-ethylhexyl)adipat	<+		14 (+)
	104-76-7	2-Ethylhexan-1-ol	<+		1 (++)
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		3 (+++)
	120-92-3	Cyclopentanone	<+		0 (++++)
	126-30-7	Neopentyl glycol	+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	<+		

	1620-98-0	3,5-Di-tert-butyl-4-hydroxybenzaldehyd	<+		
	301-02-0	Oleamid	+		
	584-84-9	2,4-Diisocyanato-1-methylbenzen	+++		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	+++		
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+		
	84-73-1	Bis(2-hydroxyethyl) phthalate	+		
	84-74-2	Dibutylphthalat	<+		
12-DK-P	104-76-7	2-Ethylhexan-1-ol	+	57	29 (<+)
	111-84-2	n-Nonane	<+		17 (+)
	112-39-0	Methylpalmitat	+	Out of these, 27 were identified.	10 (++)
	112-40-3	n-Dodecane	<+		0 (+++)
	112-61-8	Methylstearat	+	The remainder were not identified.	1 (++++)
	112-95-8	n-Eicosane	++		
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		
	123-05-7	2-Ethylhexanal	+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	301-02-0	Oleamid	++		
	36653-82-4	1-Hexadecanol	++		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	+		
	593-45-3	n-Octadecane	++		
	629-50-5	n-Tridecane	<+		
	629-62-9	n-Pentadecane	<+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	++		
	629-94-7	n-Heneicosane	++		
	629-97-0	n-Docosane?	+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	+		
	638-67-5	n-Tricosane	+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	<+		
	84-74-2	Dibutylphthalat	+		

12-DS-P	101-68-8	4,4'-Diphenylmethandiisocyanat	+	76	24 (<+)
	104-76-7	2-Ethylhexan-1-ol	+		45 (+)
	111-84-2	n-Nonane	<+		4 (++)
	112-39-0	Methylpalmitat	+		2 (+++)
	112-40-3	n-Dodecane	+		1 (++++)
	112-61-8	Methylstearat	+		
	112-95-8	n-Eicosane	+		
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		
	123-05-7	2-Ethylhexanal	+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	+++		
	301-02-0	Oleamid	++		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	+		
	593-45-3	n-Octadecane	+		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	<+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-99-2	n-Pentacosane	<+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	<+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	<+		
	77-94-1	Tributylcitrat	+		
	84-74-2	Dibutylphthalat	+		

13-DK-P*	1009-61-6	1,4-Diacetylbenzene	++	52	21 (<+)
	101-68-8	4,4'-Diphenylmethandiisocyanat	+		27 (+)
	104-76-7	2-Ethylhexan-1-ol	<+		3 (++)
	111-84-2	n-Nonane	+		0 (+++)
	112-40-3	n-Dodecane	+		1 (++++)
	112-95-8	n-Eicosane	+		
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	+		
	301-02-0	Oleamid	++		
	3748-13-8	1,3-Diisopropenylbenzene	+		
	4228-10-8	5-Acetylindane	+		
	544-76-3	n-Hexadecane	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	++		
	593-45-3	n-Octadecane	+		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-97-0	n-Docosane?	+		
	638-67-5	n-Tricosane	<+		
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	<+		
	84-74-2	Dibutylphthalat	+		
13-DS-P*	1009-61-6	1,4-Diacetylbenzene	++	82	12 (<+)
	104-76-7	2-Ethylhexan-1-ol	+		61 (+)
	111-84-2	n-Nonane	+		8 (++)
	112-40-3	n-Dodecane	+		0 (+++)
	112-95-8	n-Eicosane	+		1 (++++)
	1605-18-1	1,4-Diisopropenylbenzene	+		
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	+		
	301-02-0	Oleamid	+		
	3748-13-8	1,3-Diisopropenylbenzene	+		
	4228-10-8	5-Acetylindane	+		
	544-76-3	n-Hexadecane	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	++		
	593-45-3	n-Octadecane	+		
	629-50-5	n-Tridecane	++		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	++		
	629-78-7	n-Heptadecane	++		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	638-67-5	n-Tricosane	<+		
	84-74-2	Dibutylphthalat	++		
13-MP-P	1002-69-3	1-chlorodecan	+	42	24 (<+)
	1009-61-6	1,4-Diacetylbenzene	<+		15 (+)
	111-06-8	Butylpalmitat	<+		2 (++)
	112-40-3	n-Dodecane	<+		0 (+++)
	117-81-7	Bis(2-ethylhexyl) phthalate	++		1 (++++)
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	+		

	6422-86-2	Bis(2-ethylhexyl)terephthalat	+		
	71-36-3	1-butanol	+		
	77-94-1	Tributylcitrat	+		
	80-62-6	Methylmethacrylat	+		
	84-69-5	Diisobutyl phthalate	++		
	84-74-2	Dibutylphthalat	++++		
	85-41-6	Phthalimide	+		
	97-86-9	Isobutyl methacrylate	+		
14-DK-T	101-68-8	4,4'-Diphenylmethandiisocyanat	+++	23	13 (<+)
	115-84-4	2-Butyl-2-ethyl-1,3-propanediol	++		6 (+)
	123-05-7	2-Ethylhexanal	+	Out of these,	2 (++)
	584-84-9	2,4-Diisocyanato-1-methylbenzen	+++	7 were identi-	2 (+++)
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+	fied.	0 (++++)
	822-06-0	Hexamethylene diisocyanate	+	The remain-	
	84-74-2	Dibutylphthalat	<+	der were not	
				identified.	
14-MP-T*	84-74-2	Dibutylphthalat	<+	1	1 (<+)
		A larger liquid volume was required to fully cover the sample. The volume used was three times the minimum volume applied in the screening, resulting in a level of dilution that may have contributed to the non-detection of substances.		Out of these,	0 (+)
				1 were identi-	0 (++)
				fied.	0 (+++)
				The remain-	0 (++++)
				der were not	
				identified.	

17-DS-PM	103-23-1	Bis(2-ethylhexyl)adipat	+	80	23 (<+)
	104-66-5	1,2-Diphenoxyethane	<+		48 (+)
	104-76-7	2-Ethylhexan-1-ol	+		7 (++)
	111-84-2	n-Nonane	<+		1 (+++)
	112-40-3	n-Dodecane	<+		1 (++++)
	112-95-8	n-Eicosane	+		Out of these, 29 were identified. The remainder were not identified.
	117-81-7	Bis(2-ethylhexyl) phthalate	+		
	123-05-7	2-Ethylhexanal	+		
	131-11-3	Dimethyl phthalate	<+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	301-02-0	Oleamid	++		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	<+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
	593-45-3	n-Octadecane	+		
	593-49-7	n-Heptacosane	+		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	629-99-2	n-Pentacosane	+		
	630-01-3	n-Hexacosane	+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	+		
	80-62-6	Methylmethacrylat	+		
	84-74-2	Dibutylphthalat	++		
	998160-80-1	di(4-octyl) adipat	+++		
17-MP-PM	101-02-0	Triphenyl phosphite	+	62	31 (<+)
	104-66-5	1,2-Diphenoxyethane	+		25 (+)
	104-76-7	2-Ethylhexan-1-ol	+		5 (++)
	111-06-8	Butylpalmitat	++		0 (+++)
	112-34-5	Diethylene Glycol Monobutyl Ether	<+		1 (++++)
	112-40-3	n-Dodecane	<+		Out of these, 22 were identified. The remainder were not identified.
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		
	123-05-7	2-Ethylhexanal	+		
	131-11-3	Dimethyl phthalate	<+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	301-02-0	Oleamid	+		
	5444-75-7	2-Ethylhexyl benzoate	++		
	5451-84-3	2-(2-butoxyethoxy)ethyl benzoate	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
	629-50-5	n-Tridecane	<+		
	629-62-9	n-Pentadecane	<+		
	629-99-2	n-Pentacosane	<+		
	630-01-3	n-Hexacosane	<+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	<+		
	80-62-6	Methylmethacrylat	+		
	84-74-2	Dibutylphthalat	+		

19-DK-T	101-68-8	4,4'-Diphenylmethandiisocyanat	+++	29	18 (<+)	
	103-23-1	Bis(2-ethylhexyl)adipat	<+		9 (+)	
	103-50-4	Benzyl ether	+		1 (++)	
	110-63-4	1,4-Butandiol	+		1 (+++)	
	126-30-7	Neopentyl glycol	<+		0 (++++)	
	301-02-0	Oleamid	++		The remainder were not identified.	
	57964-39-3	4-(1-cyanoethyl)-1,2,3,4-tetrahydronaphthalene-1-carbonitrile	<+			
	84-74-2	Dibutylphthalat	<+			
19-MP-T	103-50-4	Benzyl ether	<+	10	8 (<+)	
	104-66-5	1,2-Diphenoxyethane	<+		2 (+)	
	120-51-4	Benzylbenzoat	+		0 (++)	
	301-02-0	Oleamid	+		0 (+++)	
	84-74-2	Dibutylphthalat	<+		0 (++++)	
				The remainder were not identified.		
22-DK-P	101-84-8	Diphenylether	+	56	13 (<+)	
	120-51-4	Benzylbenzoat	<+		12 (+)	
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		17 (++)	
	166412-78-8 or similar with phenyl or other chain length	Dialkyl- or alkylphenyl-cyclohexane-1,2-dicarboxylate, looks like diisononyl cyclohexane-1,2-dicarboxylate named "DINCH"/Hexamoll	+++		14 (+++)	
	301-02-0	Oleamid		All peaks with the same probable CAS number are listed only once.	0 (++++)	
	5444-75-7	2-Ethylhexyl benzoate	++			
	6422-86-2	Bis(2-ethylhexyl)terephthalat	<+			
	84-74-2	Dibutylphthalat	+++			
	94-49-5	Ethylene dibenzoate	+			
	e.g. 35108-04-4	Alkyl phenyl carbonate, e.g. phenyl hexadecyl carbonate	+++			
			++			
		This product contains two major groups of substances, each comprising a mixture of numerous similar compounds (12 and 13 compounds, respectively) that could not be separated. These are likely a form of plasticizer.				
	22-DS-P	101-84-8	Diphenylether	+	49	6 (<+)
		120-51-4	Benzylbenzoat	+		12 (+)
		137-89-3	Bis(2-ethylhexyl) isophthalate	++		12 (++)
166412-78-8 or similar with phenyl or other chain legnth		Dialkyl- or alkylphenyl-cyclohexane-1,2-dicarboxylate, looks like diisononyl cyclohexane-1,2-dicarboxylate named "DINCH"/Hexamoll	+++	19 (+++)		
301-02-0		Oleamid	++	All peaks with the same probable CAS number are listed only once.	0 (++++)	
6422-86-2		Bis(2-ethylhexyl)terephthalat	++			
84-74-2		Dibutylphthalat	<+			
94-49-5		Ethylene dibenzoate	+++			
e.g. 35108-04-4		Alkyl phenyl carbonate, e.g. phenyl hexadecyl carbonate	+++			
		This product contains two major groups of substances. each comprising a mixture of				

		numerous similar compounds (12 and 13 compounds, respectively) that could not be separated. These are likely a form of plasticizer.			
22-MP-P	301-02-0 606-46-2 / 613-48-9 / 91- 67-8	Oleamid N,N-Diethyl-o-toluidine / N,N-Diethyl-p-to- luidine / N,N-Diethyl-m-toluidine	+ <+	3 Out of these, 2 were identi- fied. The remain- der were not identified.	2 (<+) 1 (+) 0 (++) 0 (+++) 0 (++++)
24-DK-T	101-68-8 115-84-4 123-05-7 126-30-7 301-02-0 584-84-9 777-95-7 822-06-0 84-74-2	4,4'-Diphenylmethandiisocyanat 2-Butyl-2-ethyl-1,3-propanediol 2-Ethylhexanal Neopentyl glycol Oleamid 2,4-Diisocyanato-1-methylbenzen 1,6-Dioxacyclododecane-7,12-dione Hexamethylene diisocyanate Dibutylphthalat	+++ ++ + <+ + +++ + + <+	30 Out of these, 9 were identi- fied. The remain- der were not identified.	19 (<+) 7 (+) 2 (++) 2 (+++) 0 (++++)
24-DS-T (MP)	101-68-8 103-23-1 301-02-0 57964-39-3 84-74-2	4,4'-Diphenylmethandiisocyanat Bis(2-ethylhexyl)adipat Oleamid 4-(1-cyanoethyl)-1,2,3,4-tetrahydronaph- thalene-1-carbonitrile Dibutylphthalat	++ <+ ++ <+ <+	17 Out of these, 5 were identi- fied. The remain- der were not identified.	13 (<+) 2 (+) 2 (++) 0 (+++) 0 (++++)
24-MP-T	None	No visible substances in the screening	-	0 Out of these, 0 were identi- fied. The remain- der were not identified.	0 (<+) 0 (+) 0 (++) 0 (+++) 0 (++++)
25-DK-T	1620-98-0 301-02-0 591-82-2 / 4426-79-3 / 592-82-5 777-95-7 84-74-2	3,5-Di-tert-butyl-4-hydroxybenzaldehyd Oleamid Isobutyl isothiocyanate / sec-Butyl isothio- cyanate / Butyl isothiocyanate 1,6-Dioxacyclododecane-7,12-dione Dibutylphthalat	<+ + <+ <+ <+	5 Out of these, 5 were identi- fied. The remain- der were not identified.	4 (<+) 1 (+) 0 (++) 0 (+++) 0 (++++)
25-DS-T (MP)	301-02-0 84-74-2	Oleamid Dibutylphthalat	+ <+	4 Out of these, 2 were identi- fied. The remain- der were not identified.	3 (<+) 1 (+) 0 (++) 0 (+++) 0 (++++)

25-MP-T	101-68-8	4,4'-Diphenylmethandiisocyanat	++	10	6 (<+)
	301-02-0	Oleamid	+		3 (+)
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+		1 (++)
	84-74-2	Dibutylphthalat	<+		0 (+++) 0 (++++)
The remainder were not identified.					
26-DK-P	101-68-8	4,4'-Diphenylmethandiisocyanat	++++	37	13 (<+)
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	<+		17 (+)
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	+		5 (++)
	57964-39-3	4-(1-cyanoethyl)-1,2,3,4-tetrahydronaphthalene-1-carbonitrile	+		0 (+++)
	584-84-9	2,4-Diisocyanato-1-methylbenzen	<+		2 (++++)
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+		The remainder were not identified.
	84-74-2	Dibutylphthalat	+		
26-DS-P	1009-61-6	1,4-Diacetylbenzene	<+	80	52 (<+)
	101-68-8	4,4'-Diphenylmethandiisocyanat	+++		19 (+)
	107-50-6	Tetradecamethylcyclododecasiloxane	<+		7 (++)
	110-63-4	1,4-Butandiol	++		2 (+++)
	111-84-2	n-Nonane	<+		0 (++++)
	112-40-3	n-Dodecane	<+		The remainder were not identified.
	120-55-8	Diethylene glycol dibenzoate	++		
	131-11-3	Dimethyl phthalate	<+		
	1620-98-0	3,5-Di-tert-butyl-4-hydroxybenzaldehyd	<+		
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	<+		
	20109-39-1, mixture:	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 2-(2-benzoyloxypropoxy)propyl benzoate	+		
	27138-31-4				
	301-02-0	Oleamid	++		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
	57964-39-3	4-(1-cyanoethyl)-1,2,3,4-tetrahydronaphthalene-1-carbonitrile	<+		
	629-50-5	n-Tridecane	<+		
	77-68-9	Texanol	+		
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+		
	84-73-1	Bis(2-hydroxyethyl) phthalate	++		
	84-74-2	Dibutylphthalat	++		
30-DK-P*	1009-61-6	1,4-Diacetylbenzene	++	28	12 (<+)
	101-68-8	4,4'-Diphenylmethandiisocyanat	++		10 (+)
	111-84-2	n-Nonane	<+		6 (++)
	112-40-3	n-Dodecane	<+		0 (+++)
	112-95-8	n-Eicosane	<+		0 (++++)
	1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	++		The remainder were not identified.
	301-02-0	Oleamid	++		
	3748-13-8	1,3-Diisopropenylbenzene	+		
	4228-10-8	5-Acetyllindane	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	++		
	593-45-3	n-Octadecane	<+		
	629-50-5	n-Tridecane	+		
	629-62-9	n-Pentadecane	+		

	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	629-94-7	n-Heneicosane	+		
	638-67-5	n-Tricosane	<+		
	84-74-2	Dibutylphthalat	+		
30-MP-P – white sole	1002-69-3	1-chlorodecan	++	64	41 (<+)
	104-66-5	1,2-Diphenoxyethane	+		17 (+)
	104-76-7	2-Ethylhexan-1-ol	+	Out of these, 21 were identified.	5 (++)
	111-84-2	n-Nonane	<+		0 (+++)
	112-40-3	n-Dodecane	<+		1 (++++)
	112-95-8	n-Eicosane	<+	The remainder were not identified.	
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	149-57-5	2-ethylhexanoic acid	<+		
	301-02-0	Oleamid	++		
	36653-82-4	1-Hexadecanol	+		
	5444-75-7	2-Ethylhexyl benzoate	++		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
	593-45-3	n-Octadecane	<+		
	629-50-5	n-Tridecane	<+		
	629-62-9	n-Pentadecane	<+		
	629-92-5	n-Nonadecane	<+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	<+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	<+		
	84-74-2	Dibutylphthalat	+		
30-MP-P - bow	1002-69-3	1-chlorodecan	++	100	39 (<+)
	104-66-5	1,2-Diphenoxyethane	++		49 (+)
	104-76-7	2-Ethylhexan-1-ol	+	Out of these, 26 were identified.	10 (++)
	111-84-2	n-Nonane	<+		1 (+++)
	112-40-3	n-Dodecane	+		1 (++++)
	112-95-8	n-Eicosane	<+	The remainder were not identified.	
	117-81-7	Bis(2-ethylhexyl) phthalate	+		
	123-05-7	2-Ethylhexanal	+		
	131-11-3	Dimethyl phthalate	<+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	149-57-5	2-ethylhexanoic acid	+		
	301-02-0	Oleamid	++		
	36653-82-4	1-Hexadecanol	+++		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	+		
	593-45-3	n-Octadecane	<+		
	629-50-5	n-Tridecane	+		
	629-59-4	n-Tetradecane	+		
	629-62-9	n-Pentadecane	<+		
	629-78-7	n-Heptadecane	+		
	629-92-5	n-Nonadecane	+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	+		
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	+		
	822-06-0	Hexamethylene diisocyanate	+		
	84-74-2	Dibutylphthalat	+		

30-MP-P - shoe	1002-69-3	1-chlorodecan	<+	63	43 (<+)
	101-68-8	4,4'-Diphenylmethandiisocyanat	+		14 (+)
	104-66-5	1,2-Diphenoxyethane	<+		5 (++)
	104-76-7	2-Ethylhexan-1-ol	+		0 (+++)
	111-84-2	n-Nonane	<+		1 (++++)
	112-40-3	n-Dodecane	<+		Out of these, 29 were identified. The remainder were not identified.
	112-95-8	n-Eicosane	<+		
	117-81-7	Bis(2-ethylhexyl) phthalate	<+		
	123-05-7	2-Ethylhexanal	+		
	137-89-3	Bis(2-ethylhexyl) isophthalate	++		
	301-02-0	Oleamid	+		
	5444-75-7	2-Ethylhexyl benzoate	++		
	544-76-3	n-Hexadecane	<+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
	593-45-3	n-Octadecane	<+		
	593-49-7	n-Heptacosane	<+		
	629-50-5	n-Tridecane	<+		
	629-59-4	n-Tetradecane	<+		
	629-62-9	n-Pentadecane	<+		
	629-78-7	n-Heptadecane	<+		
	629-92-5	n-Nonadecane	<+		
	629-99-2	n-Pentacosane	<+		
	6422-86-2	Bis(2-ethylhexyl)terephthalat	++++		
	646-31-1	n-Tetracosane	<+		
	654646-06-7	2-Ethylhexyl 4-cyanobenzoate	+		
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	<+		
	80-62-6	Methylmethacrylat	++		
	84-74-2	Dibutylphthalat	++		
	97-86-9	Isobutyl methacrylate	+		
31-DK-P	301-02-0	Oleamid	+	2	1 (<+)
	84-74-2	Dibutylphthalat	<+		1 (+)
				Out of these, 2 were identified. The remainder were not identified.	0 (++) 0 (+++) 0 (++++)

31-DS-P	1009-61-6	1,4-Diacetylbenzene	<+	24	10 (<+) 14 (+) 0 (++) 0 (+++) 0 (++++) The remainder were not identified.
	13622-90-7, common	"trans,trans-RMDI" - Bis(4-isocyanatocyclohexyl)methane	+		
	5124-30-1				
	17901-48-3, common	cis,trans-RMDI - Bis(4-isocyanatocyclohexyl)methane	+		
	5124-30-1				
	18937-00-3, common	cis,cis-RMDI - Bis(4-isocyanatocyclohexyl)methane	+		
	5124-30-1				
	1999-85-5	α,α'-Dihydroxy-1,3-diisopropylbenzen	<+		
	301-02-0	Oleamid	+		
	4098-71-9	Isophorone diisocyanate	+		
31-MP-P	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	+	56	33 (<+) 13 (+) 7 (++) 2 (+++) 1 (++++) The remainder were not identified.
	777-95-7	1,6-Dioxacyclododecane-7,12-dione	<+		
	84-74-2	Dibutylphthalat	+		
	998383-63-7	Z-hex-4-enyl angelate	+		
	101-68-8	4,4'-Diphenylmethandiisocyanat	++++		
	103-23-1	Bis(2-ethylhexyl)adipat	+		
	104-66-5	1,2-Diphenoxyethane	+		
	104-76-7	2-Ethylhexan-1-ol	<+		
	110-63-4	1,4-Butandiol	+++		
	112-34-5	Diethylene Glycol Monobutyl Ether	++		
31-MP-P	120-92-3	Cyclopentanone	+	56	33 (<+) 13 (+) 7 (++) 2 (+++) 1 (++++) The remainder were not identified.
	13622-90-7, common	"trans,trans-RMDI" - Bis(4-isocyanatocyclohexyl)methane	+		
	5124-30-1				
	17901-48-3, common	cis,trans-RMDI - Bis(4-isocyanatocyclohexyl)methane	+		
	5124-30-1				
	18937-00-3, common	cis,cis-RMDI - Bis(4-isocyanatocyclohexyl)methane	+		
	5124-30-1				
	301-02-0	Oleamid	+		
	4098-71-9	Isophorone diisocyanate	+		
	54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	<+		
31-MP-P	777-95-7	1,6-Dioxacyclododecane-7,12-dione	++	56	33 (<+) 13 (+) 7 (++) 2 (+++) 1 (++++) The remainder were not identified.
	822-06-0	Hexamethylene diisocyanate	++		
	84-74-2	Dibutylphthalat	<+		

* means that up to three times as much liquid was used to cover the sample, which means that a degree of dilution has occurred.

Appendix 1.2 Results of GC-MS screening: Substances identified and their classifications

The individual substances identified in the 47 different samples are listed in TABLE 25 on the following pages. The table is sorted by CAS number. The substances found in the greatest number of products are also shown in TABLE 7 in the chapter on the GC-MS screening analyses.

In total, approximately 130 unique substances were identified. For some substances, however, the identification is not unambiguous. Substances marked with an * in the table mean that the identification is slightly uncertain.

TABLE 25. Overview of the substances identified via GC-MS screening. The number of products in which the substances occur, as well as their classification, etc., are indicated.

CAS no.	Name of substance	In number of products	In max. quantity	Harmonised classification	Notified classification	Comment (e.g., info from ECHA)
1002-69-3	1-chlorodecan	6	++	None	Carc. 2 (H351), Aquatic Acute 1 (H400), Aquatic Chronic 1(H410) 38 notifiers. Other hazards notified: Skin Irrit. 2 (H315) 2 notifiers.	According to the classification provided by companies to ECHA in CLP notifications this substance is very toxic to aquatic life, is very toxic to aquatic life with long lasting effects, is suspected of causing cancer and causes skin irritation.
1009-61-6	1,4-Diacetylbenzene	9	++	None	Not classified (1 notifier)	No information
101-02-0	Triphenyl phosphite	2	+	Skin Irrit. 2 Eye Irrit. 2 Aquatic Acute 1 Aquatic Chronic 1	-	A majority of data submitters agree this substance is skin sensitising
101-67-7	Bis(4-octylphenyl)amine	2	++	None	Aquatic Chronic 2 (H411) (104 notifiers) Not classified (26 notifiers) Other hazards notified: Aquatic chronic 4 (H413) (2 notifiers), Skin Irrit. 2 (H315), Skin. Sens. 1 (H317), Eye Irrit 2 (H319), Repr. 2. H361), Aquatic. Chronic 3 (H412) (1 notifier)	No information
101-68-8	4,4'-Diphenylmethandiisocyanat	21	++++	Carc. 2 Acute Tox. 4 STOT SE 3 STOT RE 2 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1	-	Suspected to be Carcinogenic Skin sensitising Respiratory sensitising

101-84-8	Diphenylether	2	+	None	Skin Sens. 1B (H317), Eye Irrit. 2 (H319). Repr. 1B (H360Fd), Aquatic Acute 1 (H400), Aquatic Chronic 3 (H412) (9 joint notifiers) Eye Irrit. 2 (H319), Aquatic Chronic 2 (H411) (1422 notifiers) Other hazards notified: STOT SE 3 H335 (3 notifiers), Aquatic Chronic 1 H410 (59 notifiers)	A majority of data submitters agree this substance is Toxic to Reproduction A majority of data submitters agree this substance is Skin sensitising
102-76-1	triacetin	1	++	None	Not classified	No information
103-23-1	Bis(2-ethylhexyl)adipat	9	++++	None	Not classified (972 notifiers) Aquatic acute 1 (H400), Aquatic Chronic 1 (H410) (12 notifiers). Other hazards notified: Skin Irrit. 2. (H315), Eye Irrit. 2 (H319) (7 notifiers), Acute tox 4 (H302) (1 notifier) Carc.2 (H351), Repr. 2(H361), Aquatic Chronic 4(H413) (1 notifiers)	No information
103-50-4	Benzyl ether	2	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
104-66-5	1,2-Diphenoxyethane	10	++	None	Aquatic Chronic 2 H411 (5 notifiers)	No information
104-76-7	2-Ethylhexan-1-ol	15	++	None	Skin Irrit. 2 H315 Eye Irrit. 2 H319 Acute Tox. 4 H332, STOT SE 3 H335; Aquatic Chronic 3 H412 (45 joint notifiers) Skin Irrit. 2 H315 Eye Irrit. 2 H319 Acute Tox. 4 H332, STOT SE 3 H335; (1106 notifiers)"	No information
105-75-9	Dibutyl fumarate	1	<+	None	STOT RE 2 H373 Skin Sens. 1 H317 Aquatic Acute 1 H400	Some data submitters indicate they consider this substance as Skin sensitising

					Aquatic Chronic 1 H410	
107-50-6	Tetradecamethylcycloheptasiloxane	2	++	None	Not classified	No information
107-53-9*	Tetracosamethylundecasiloxane	1	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
110-19-0	Isobutylacetat	1	+++	Flam. Liq. 2	-	No information
110-63-4	1,4-Butandiol	3	+++	None	Acute Tox. 4 (H302), STOT SE3 (H336) (145+260 notifiers) Other notifications: Eye Irrit. 2 (H319) (131 notifiers), STOT SE 1 (H370) (11 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance is harmful if swallowed and may cause drowsiness or dizziness.
111-06-8	Butylpalmitat	3	++	None	Not classified (11 notifiers)	No information
111-84-2	n-Nonane	17	+	None	Flam. Liq. 3 H226, Asp. Tox. 1 H304, Skin Irrit. 2 H315, STOT SE 3H336, Aquatic Acute 1 H400, Aquatic Chronic 1 H410 (2 joint notifiers) Eye Irrit. 2 H319 (444 notifiers) Flam. Liq. 3 H226, Asp. Tox. 1 H304, Skin Irrit. 2 H315, STOT SE 3H336, Aquatic Chronic 1 H410 (208 notifiers) Other hazards notified: Aquatic chronic 2 (H411), Acute tox 4 (H332) (177 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways, is very toxic to aquatic life, is very toxic to aquatic life with long lasting effects, is a flammable liquid and vapour, causes skin irritation and may cause drowsiness or dizziness
112-34-5	Diethylene Glycol Monobutyl Ether	2	++	Eye Irrit. 2, H319	-	No information
112-39-0	Methylpalmitat	5	+++	None	Skin Irrit. 2 H315 (1341 notifiers) Skin Sens. 1 H317 (188 notifiers) Other hazards notified Eye Dam- 1 (H318) (1 notifiers)"	According to the classification provided by companies to ECHA in CLP notifications this substance causes skin irritation and may cause an allergic skin reaction.

112-40-3	n-Dodecane	18	++	None	Asp. Tox. 1 H304 (183 joint notifiers + 390 notifiers) Eye Irrit. 2 H319 (441 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways
112-61-8	Methylstearat	5	++	None	Not classified (148 notifiers) Aquatic chronic 4 (H413) 1 (1 notifier)	According to the notifications provided by companies to ECHA in REACH registrations no hazards have been classified.
112-95-8	n-Eicosane	17	++	None	Asp. Tox. 1 H304 (165 joint notifiers) Not classified (116 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways.
115-84-4	2-Butyl-2-ethyl-1,3-propanediol	2	++	None	Eye Irrit. 2 (H319) (249 notifiers) Not classified (78 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance causes serious eye irritation.
117-81-7	Bis(2-ethylhexyl) phthalate (DEHP)	12	++	Repr. 1B	-	Substance of very high concern (SVHC) and included in the candidate list for authorisation. Substance of very high concern requiring authorisation before it is used (Annex XIV of REACH). Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (CLP) approved by the European Union, this substance may damage fertility and may damage the unborn child. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance may damage fertility or the unborn child and is very toxic to aquatic life.
120-51-4	Benzylbenzoat	4	+	Acute Tox. 4 (Oral) H302 Aquatic Chronic 2 H411	-	No information
120-55-8	Diethylene glycol dibenzoate	1	++	None	Not classified (239 notifiers) Other hazards notified: Aquatic Chronic 2 H411 (55 notifiers), Eye Irrit 2 (H319) (2 notifiers).	Substance included in the Community Rolling Action Plan (CoRAP).

120-92-3	Cyclopentanone	3	+	Flam. Liq. 3 H226 Skin Irrit. 2 H315 Eye Irrit. 2 H319	-	No information
123-05-7	2-Ethylhexanal	12	+	None	Flam. Liq. 3 H226 Repr. 2 H361 Skin Sens. 1B H317	A majority of data submitters agree this substance is Skin sensitizing.
123-79-5*	Diocetyl adipate	1	<+	None	Not classified (135 notifiers) Skin Irrit. 2 (H315), Eye Irrit. 2 (H319) (45 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance causes serious eye irritation and causes skin irritation.
123-86-4	Butylacetat	1	+++	Flam. Liq. 3 STOT SE 3	-	According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is a flammable liquid and vapour and may cause drowsiness or dizziness.
126-30-7	Neopentyl glycol	5	+	None	Eye Dam. 1 H318	No information
131-11-3	Dimethyl phthalate	9	++	None	Not classified (1994 notifiers)	No information
13622-90-7, common 5124-30-1	"trans,trans-RMDI" - Bis(4-isocyanatocyclohexyl)methane	3	+	Acute Tox. 3 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1	-	Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is toxic if inhaled, causes serious eye irritation, causes skin irritation, may cause an allergic skin reaction, may cause allergy or asthma symptoms or breathing difficulties if inhaled and may cause respiratory irritation. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance is fatal if inhaled.
137-89-3	Bis(2-ethylhexyl) isophthalate	14	+++	None	Repr. 1B H360, Aquatic Acute 1 H400 (38 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance is very toxic to aquatic life and may damage fertility or the unborn child.
149-57-5	2-ethylhexanoic acid	2	+	None	Repr. 2 H361	Substance included in the Community Rolling Action Plan (CoRAP).

						Toxic to reproduction.
1605-18-1	1,4-Diisopropenylbenzene	1	+	None	Skin Irrit. 2 (H315) (1 notifier) Eye Irrit. 2 (H319) (1 notifier) STOT SE 3 (H335) (1 notifier)	No information
1620-98-0*	3,5-Di-tert-butyl-4-hydroxybenzaldehyde	6	+	None	STOT SE 3 H335 Skin Irrit. 2 H315 Eye Irrit. 2 H319	No information
166412-78-8 or similar with phenyl or other chain length	dialkyl- or alkylphenyl-cyclohexane-1,2-dicarboxylate, looks like diisononyl cyclohexane-1,2-dicarboxylate named "DINCH"/Hexamol	2	+++	None	Not classified (124 notifiers)	No information
17901-48-3, common 5124-30-1	cis,trans-RMDI - Bis(4-isocyanatocyclohexyl)methane	3	+	Acute Tox. 3 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1	-	Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is toxic if inhaled, causes serious eye irritation, causes skin irritation, may cause an allergic skin reaction, may cause allergy or asthma symptoms or breathing difficulties if inhaled and may cause respiratory irritation. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance is fatal if inhaled.
1801837-96-6, mixture: 27138-31-4	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 2,2'-Oxybis-1-propanol dibenzoate	1	+++	None	Aquatic Chronic 3(H412)	According to the classification provided by companies to ECHA in CLP notifications this substance is harmful to aquatic life with long lasting effects.
18937-00-3, common 5124-30-1	cis,cis-RMDI - Bis(4-isocyanatocyclohexyl)methane	3	+	Acute Tox. 3 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1	-	Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is toxic if inhaled, causes serious eye irritation, causes skin irritation, may cause an allergic skin reaction, may cause allergy or asthma symptoms or breathing

						difficulties if inhaled and may cause respiratory irritation. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance is fatal if inhaled.
1999-85-5	α,α' -Dihydroxy-1,3-diisopropylbenzen	8	++	None	Not Classified (2 joint notifiers) Acute Tox. 4 H302, Skin Irrit. 2 H315, Eye Irrit. 2 H319, STOT SE 3 H335 (38 notifiers)	No information
20109-39-1, mixture: 27138-31-4	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 2-(2-benzoyloxypropoxy)propyl benzoate	2	+++	None	Aquatic Chronic 3 H412	According to the classification provided by companies to ECHA in CLP notifications this substance is harmful to aquatic life with long lasting effects.
20279-44-1	Butyl pyruvate	1	++	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
206750-29-0 / 112-96-9 / other similar	Thiocyanate or isothiocyanate, not fully identified, e.g.: Ethyl 3-isothiocyanatobutanoat, Octadecylisocyanate or similar	9	+++	None	Acute Tox. 3 (H301), Skin Irrit. 2 (H315), Eye Irrit. 2 (H319), STOT SE 3 H335 (1 notifier) Acute Tox. 4 H302, H312, H332, Skin Irrit. 2 H315, Eye Irrit. 2 H319, Resp. Sens. 1 H334, STOT SE 3, H335 (38 notifiers) Acute Tox. 3, H3331, Skin Irrit. 2 H315, Eye Irrit. 2 H319, Resp. Sens. 1 H334, STOT SE 3, H335 (37 notifiers) Other hazards notified: Aquatic Chronic 2 (8 notifiers), Aquatic chronic 4, Aquatic Acute 1 (1 notifier)	According to the classification provided by companies to ECHA in REACH registrations this substance is toxic if swallowed, is toxic if inhaled, causes serious eye irritation, may cause respiratory irritation, causes skin irritation, may cause allergy or asthma symptoms or breathing difficulties if inhaled and may cause an allergic skin reaction.
20834-06-4	Palmityl laurate	1	+	None	Not classified (1 notifier)	No information
2094-99-7	3-Isopropenyl-alpha,alpha-dimethylbenzyl isocyanate	1	<+	Acute Tox. 2 (Inhalation) H330 STOT RE 2 H373 Skin Corr. 1B H314 Resp. Sens. 1 H334 Skin Sens. 1 H317	-	Skin sensitising. Respiratory sensitising.

				Aquatic Acute 1 H400 Aquatic Chronic 1 H410		
2471-08-1*	Hexacosamethyldodecasiloxane,	1	+	Not available in ECHA data-base	Not available in ECHA data-base	Not available in ECHA database
2471-09-2*	Octacosamethyltridecasiloxane	1	+	Not available in ECHA data-base	Not available in ECHA data-base	Not available in ECHA database
2471-10-5*	Triacotamethyltetradecasiloxane	1	<+	Not available in ECHA data-base	Not available in ECHA data-base	Not available in ECHA database
2652-13-3*	Eicosamethylnonasiloxane	1	++	None	Not classified	No information
301-02-0	Oleamid	36	++	None	Not classified (458 notifiers) Aquatic Chronic 4 (H413) (443 notifiers) Acute tox 4. (H332) (55 notifiers) Other hazards notified: Skin Irrit. 2 H315, Skin Sens. 1 H317, Eye Irrit. 2 H319, STOT SE 3 H335 (53+38 notifiers), STOT SE 2(40 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance may cause long lasting harmful effects to aquatic life, causes serious eye irritation, causes skin irritation, may cause respiratory irritation and may cause an allergic skin reaction.
36653-82-4	1-Hexadecanol	5	+++	None	Not classified (2710 notifiers) Eye Irrit. 2 (H319); Aquatic Acute 1 (H400); Aquatic Chronic 2 (H411) (143 notifiers) Aquatic Chronic 3(H412) (108 notifiers) Other hazards notified: Flam. Liq. 2 (H225) (>71 notifiers), Acute Tox. 4 (H302/H312) (>71 notifiers), STOT SE 3 (H335/H336) (>71 notifiers), Aquatic Chronic 1 (H410), Skin Irrit. 2 (H315) (287 notifiers).	According to the classification provided by companies to ECHA in REACH registrations this substance is very toxic to aquatic life with long lasting effects, is very toxic to aquatic life, causes serious eye irritation, is a highly flammable liquid and vapour, is harmful if swallowed, is harmful in contact with skin, may cause respiratory irritation and may cause drowsiness or dizziness.
3748-13-8	1,3-Diisopropenylbenzene	5	+	None	Skin Sens. 1(B) (H317), Aquatic Chronic 2 (H411) (3 joint + 111 notifiers) Skin Sens. 1B (H317), Aquatic Chronic 2 (H411) Acute Tox. 3 (H331) (3 joint + 104 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance is toxic to aquatic life with long lasting effects and may cause an allergic skin reaction

					Other hazards notified: STOT SE 3 H335 (38 notifiers)	
4098-71-9	Isophorone diisocyanate	2	+	Acute Tox. 3 (Inhalation) H331 STOT SE 3 H335 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp. Sens. 1 H334 Skin Sens. 1 H317 Aquatic Chronic 2 H411	-	Some uses of this substance are restricted under Annex XVII of REACH. Skin sensitising. Respiratory sensitising.
4228-10-8	5-Acety lindane	5	++	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
468712-10-9 / 159939-87-4 / similar	Perhaps a phosphor ester of a thiophosphate with a tertiary amine functionality, not fully identified E.g. 2-(Butoxy(methyl)phosphoryl)sulfanyl-N,N-diethylethamine, N,N-diethyl-2-[methyl(2-methylpropoxy)phosphoryl]sulfanylethamine ("russian VX") or similar	3	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
502-44-3	ε-caprolactone	1	<+	None	Eye Irrit. 2 H319	No information
5444-75-7	2-Ethylhexyl benzoate	12	++	None	Repr. 1B (H360F) (104 notifiers) Not classified (44 notifiers) Aquatic chronic 4 (41 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance may damage fertility and may cause long lasting harmful effects to aquatic life.
544-76-3	n-Hexadecane	15	++	None	Asp. Tox. 1 H304 (70 joint + 1680 notifiers) Other hazards notified: Skin Irrit. 2 H315 Eye Irrit. 2 H319, STOT SE 3 H335 (476 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways.
5451-84-3	2-(2-butoxyethoxy)ethyl benzoate	1	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database

54549-72-3	1-[4-(2-hydroxypropan-2-yl)phenyl]ethan-1-on	17	++	None	Skin Irrit. 2 H315 Eye Irrit. 2 H319, STOT SE 3 H335 (1+1 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance causes serious eye irritation, causes skin irritation and may cause respiratory irritation.
556-68-3	Hexadecamethylcyclotrasiloxane	1	++	None	Not classified	No information
556-69-4	Octadecamethyloctasiloxane	1	++	None	Not classified	No information
556-70-7*	Docosamethyldecasiloxane	1	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
556-71-8	Octadecamethylcyclononasiloxane	1	++	None	Eye Irrit. 2 H319	No information
57964-39-3*	4-(1-cyanoethyl)-1,2,3,4-tetrahydronaphthalene-1-carbonitrile	4	+	None	Acute Tox. 4 (Inhalation) H332 Acute Tox. 4 (Dermal) H312 Acute Tox. 4 (Oral) H302 STOT SE 3 H335 Skin Irrit. 2 H315 Eye Irrit. 2A H319	No information
57964-40-6 ?	Styren-acrylonitril (SAN), perhaps 4-Cyano-1,2,3,4-tetrahydro-1-naphthaleneacetoneitrile?	4	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
584-84-9	2,4-Diisocyanato-1-methylbenzen	7	+++	Carc. 2 Acute Tox. 2 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1 Aquatic Chronic 3	-	Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is fatal if inhaled, causes serious eye irritation, is suspected of causing cancer, is harmful to aquatic life with long lasting effects, causes skin irritation, may cause an allergic skin reaction, may cause allergy or asthma symptoms or breathing difficulties if inhaled and may cause respiratory irritation.
591-82-2 / 4426-79-3 / 592-82-5*	Isobutyl isothiocyanate / sec-Butyl isothiocyanate / Butyl isothiocyanate	2	<+	None	Not classified	No information

593-45-3	n-Octadecane	15	++	None	Asp. Tox. 1 H304 (1417 joint + 52 notifiers) Not classified (163 notifiers) Other hazards notified: Skin Irrit. 2 H315, Eye Irrit. 2 H319, STOT SE 3 H335 (11 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways.
593-49-7	n-Heptacosane	6	+	None	Not classified (5 notifiers)	No information
606-46-2 / 613-48-9 / 91-67-8	N,N-Diethyl-o-toluidine / N,N-Diethyl-p-toluidine / N,N-Diethyl-m-toluidine	1	<+	None	Acute Tox. 4 (Inhalation) H332 Acute Tox. 4 (Dermal) H312 Acute Tox. 4 (Oral) H302 Skin Irrit. 2 H315 Eye Irrit. 2 H319	No information
6084-76-0 /2500-59-6	Methyl 8-(3-octyloxiran-2-yl)octanoat (trans-isomeren?)	2	+++	No information	No information	No information
617-94-7	2-Phenyl-2-propanol	2	+	None	Acute Tox. 4 (Oral) H302 Skin Irrit. 2 H315 Eye Irrit. 2 H319	No information
629-50-5	n-Tridecane	18	++	None	Asp. Tox. 1 H304 (251 joint + 251 notifiers) Other hazards notified: Skin Irrit. 2 H315, Eye Irrit. 2 H319, STOT SE 3 H335, Aquatic Chronic 4 H413.	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways.
629-59-4	n-Tetradecane	13	++	None	Asp. Tox. 1 H304 (1417 joint + 177 notifiers) Other hazards notified: Skin irrit. 2 H315 (47 notifiers), STOT SE 3 (H336) (38+22+6 notifiers), Eye irrit 2 H319 (2 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways.
629-62-9	n-Pentadecane	17	++	None	Asp. Tox. 1 H304 (183 joint + 178 notifiers) Other hazards notified: Skin Irrit. 2 H315 (6 notifiers), STOT SE 3 (H336) (8 notifiers), Eye Irrit. 2 H319 (6 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance may be fatal if swallowed and enters airways.
629-78-7	n-Heptadecane	16	++	None	Asp. Tox. 1 H304 (111 joint + 239 notifiers)	According to the classification provided by companies to ECHA in REACH

					Other hazards notified: STOT SE 3 (H335, H336) (8 notifiers), H315 (4 notifiers)	registrations this substance may be fatal if swallowed and enters airway
629-92-5	n-Nonadecane	16	++	None	Not classified (150 notifiers) Other hazards notified: Asp. Tox. 1 H304 (5+3 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance may be fatal if swallowed and enters airways.
629-94-7	n-Heneicosane	14	++	None	Not classified (94 notifiers) Other hazards notified: Asp. Tox. 1 H304 (2 notifiers)	No information
629-97-0	n-Docosane?	7	+	None	Not classified (198 notifiers) Other hazards notified: Skin Irrit. 2 H315 (38+2 notifiers) , STOT SE 3 (H335) (38+2 notifiers), Eye Irrit. 2 H319 (38+2 notifiers) Asp. Tox. 1 H304 (1 notifiers)	No information
629-99-2	n-Pentacosane	12	+	None	Not classified (4 notifiers) Asp. Tox. 1 H304 (2 notifiers)	According to the classification provided by companies to ECHA in CLP notifications this substance may be fatal if swallowed and enters airways.
630-01-3	n-Hexacosane	9	+	None	H315 (5 notifiers) Not classified (4 notifiers)	No information
630-02-4	n-Octacosane	1	<+	None	Not classified	No information
638-67-5	n-Tricosane	9	+	None	Not classified (94 notifiers)	No information
6422-86-2	Bis(2-ethylhexyl)terephthalat	18	++++	None	Not classified (376 notifiers) H301; H413 (1 notifier)	No information
646-31-1	n-Tetracosane	12	+	None	Not classified (8 notifiers)	No information
654646-06-7	2-Ethylhexyl 4-cyanobenzoate	11	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database

71-36-3	1-butanol	2	+++	Flam. Liq. 3 Acute Tox. 4 STOT SE 3 STOT SE 3 Skin Irrit. 2 Eye Dam. 1	-	Substance included in the Community Rolling Action Plan (CoRAP). According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is a flammable liquid and vapour, is harmful if swallowed, causes serious eye damage, causes skin irritation, may cause respiratory irritation and may cause drowsiness or dizziness.
7158-25-0	Tricyclopentadiene	2	+	None	Skin Sens. 1B H317 Aquatic Acute 1 H400	A majority of data submitters agree this substance is Skin sensitising
7568-58-3	Tributylacconitat	1	+++	None	Not classified (37 notifiers)	No information
774-65-2?	Ester of benzoesyre, e.g. tert-Butyl benzoate	2	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
77-68-9	Texanol	1	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
777-95-7	1,6-Dioxacyclododecane-7,12-dione	17	++	None	Acute Tox. 5 H303, Skin Irrit. 2 H315, Eye Irrit. 2A H319, STOT SE 3 H335 (1 notifier)	According to the classification provided by companies to ECHA in CLP notifications this substance may be harmful if swallowed, causes serious eye irritation, causes skin irritation and may cause respiratory irritation.
77-90-7	Acetyltributylcitrat	1	++	None	Not classified (2113 notifiers). Other hazards notifiers: Aquatic Chronic 3 (30 notifiers), Flam Gas 1, Muta 1 B. Carc 1B (7 notifiers), Eye Irrit. 2, Skin Irrit. 2 (5 notifiers), Aquatic chronic, 2 Aquatic chronic 4, Flam Liq. 3 (1 notifiers)	No information
77-94-1	Tributylcitrat	4	++++	None	Not classified (256 notifiers) Eye dam 1(H318) (104 notifiers) Aquatic acute 1 (H400) (14 notifiers)	No information
80-62-6	Methylmethacrylat	5	++	Flam. Liq. 2 STOT SE 3 Skin Irrit. 2	-	Substance included in the Community Rolling Action Plan (CoRAP).

				Skin Sens. 1		According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is a highly flammable liquid and vapour, causes skin irritation, may cause an allergic skin reaction and may cause respiratory irritation. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance may be harmful if inhaled and is harmful to aquatic life.
822-06-0	Hexamethylene diisocyanate	5	++	Acute Tox. 3 STOT SE 3 Skin Irrit. 2 Eye Irrit. 2 Resp. Sens. 1 Skin Sens. 1	-	Some uses of this substance are restricted under Annex XVII of REACH. Danger! According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is toxic if inhaled, causes serious eye irritation, causes skin irritation, may cause an allergic skin reaction, may cause allergy or asthma symptoms or breathing difficulties if inhaled and may cause respiratory irritation. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance is fatal if inhaled, causes severe skin burns and eye damage, causes serious eye damage and is harmful if swallowed.

84-69-5	Diisobutyl phthalate	1	++	Repr. 1B	-	Substance of very high concern (SVHC) and included in the candidate list for authorisation. Substance of very high concern requiring authorisation before it is used (Annex XIV of REACH). Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (ATP09) approved by the European Union, this substance may damage the unborn child and is suspected of damaging fertility. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance is toxic to aquatic life with long lasting effects and is toxic to aquatic life.
84-73-1*	Bis(2-hydroxyethyl) phthalate	5	++	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
84-74-2	Dibutylphthalat	43	++++	Repr. 1B Aquatic Acute 1	-	Substance of very high concern (SVHC) and included in the candidate list for authorisation. Substance of very high concern requiring authorisation before it is used (Annex XIV of REACH). Some uses of this substance are restricted under Annex XVII of REACH. According to the harmonised classification and labelling (CLP00) approved by the European Union, this substance may damage the unborn child and is suspected of damaging fertility and is very toxic to aquatic life. Additionally, the classification provided by companies to ECHA in REACH registrations identifies that this substance is toxic to aquatic life with long lasting effect"
85-41-6	Phthalimide	1	+	None	Not classified	No information

94-03-1, mixture: 27138-31-4	Dipropylene glycol dibenzoate (DPGDB), 1 of 3 isomerer: 1,1'-Oxybis-2-propanol dibenzoate	1	+++	None	Aquatic Chronic 3 (H412) (37 notifiers) Not classified (1 notifier)	According to the classification provided by companies to ECHA in CLP notifications this substance is harmful to aquatic life with long lasting effects.
94-49-5*	Ethylene dibenzoate	2	+++	None	Aquatic Chronic 2 H411 (14 notifiers) Aquatic Acute 1 H400 (1 notifiers)	According to the classification provided by companies to ECHA in REACH registrations this substance is toxic to aquatic life with long lasting effects
97-86-9	Isobutyl methacrylate	2	+	Flam. Liq. 3 H226 STOT SE 3 H335 Skin Irrit. 2 H315 Skin Sens. 1B H317	-	Skin sensitising
98-86-2	Acetophenon	1	++	Acute Tox. 4 Eye Irrit. 2	-	According to the harmonised classification and labelling (CLP) approved by the European Union, this substance is harmful if swallowed and causes serious eye irritation.
998160-80-1	di(4-octyl) adipat	1	+++	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
998324-09-8	Isobutyloctyladipat or similar	1	<+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
998383-63-7	Z-hex-4-enyl angelate	1	+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
998415-99-3	C4 og C8 ester of terephthalic acid or isophthalic acid, e.g. with isobutyl/butyl and 6-methylhept-2-yl/2-ethylhexyl/4-octyl	1	<+	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database
E.g. 35108-04-4	Alkyl phenyl carbonate, e.g. phenyl hexadecyl carbonate	2	+++	Not available in ECHA database	Not available in ECHA database	Not available in ECHA database

* means that the identification is slightly uncertain

Appendix 1.3 Number of substances in extracts from the GC-MS screening

This appendix presents the number of substances in the extracts from the GC-MS screening for the 47 samples. TABLE 26 provides an overview of the total number of substances in the extract from the GC-MS screening for the 47 samples, as well as how many of these substances that were identified. In addition, it is indicated how many of the substances that occur in the indicated amounts from <+ to +++.

TABLE 26. Overview of the number of substances in the extract from the GC-MS screening for the 47 samples and the amounts in which they occur.

Lab no.	Product type	Total number of substances in the chromatogram	Total substances <+	Total substances +	Total substances ++	Total substances +++	Total substances ++++	Number of substances identified
01-DK-P	Socks (textile)	71	30	30	6	3	2	30
01-DS-P	Socks (textile)	72	32	35	3	1	1	28
01-MP-P	Socks (textile)	84	22	46	13	2	1	27
02-DK-P*	Beach sandals (plastic)	50	24	22	4	0	0	24
02-DS-P	Beach sandals (plastic)	78	32	32	8	4	2	33
02-MP-P*	Beach sandals (plastic)	38	14	20	4	0	0	25
07-DK-T*	Bibs (textile)	21	10	9	2	0	0	6
07-DS-T*	Bibs (textile)	0	0	0	0	0	0	0
07-MP-T*	Bibs (textile)	7	4	1	2	0	0	5
08-DK-P	T-shirts/nightwear (textile)	18	10	7	1	0	0	8
08-MP-P	T-shirts/nightwear (textile)	2	2	0	0	0	0	2
09-DK-W	Wetsuits	85	27	53	4	0	1	19
09-DS-W	Wetsuits	78	24	49	4	0	1	19
09-MP-W	Wetsuits	10	7	3	0	0	0	6
11-DK-T	Snowsuits (textile)	18	13	4	1	0	0	7
11-DS-T	Snowsuits (textile)	16	9	4	2	1	0	7
11-MP-T	Snowsuits (textile)	42	24	14	1	3	0	14
12-DK-P	Socks (textile)	57	29	17	10	0	1	27
12-DS-P	Socks (textile)	76	24	45	4	2	1	26
12-MP-P	Socks (textile)	95	10	40	44	0	1	30
13-DK-P*	Beach sandals (plastic)	52	21	27	3	0	1	23
13-DS-P*	Beach sandals (plastic)	82	12	61	8	0	1	21

13-MP-P	Beach sandals (plastic)	42	24	15	2	0	1	14
14-DK-T	Snowsuits (textile)	23	13	6	2	2	0	7
14-MP-T*	Snowsuits (textile)	1	1	0	0	0	0	1
17-DS-PM	Plastic handbag	80	23	48	7	1	1	29
17-MP-PM	Plastic handbag	62	31	25	5	0	1	22
19-DK-T	Mittens (textile)	29	18	9	1	1	0	8
19-MP-T	Mittens (textile)	10	8	2	0	0	0	5
22-DK-P	T-shirts/nightwear (textile)	56	13	12	17	14	0	33
22-DS-P	T-shirts/nightwear (textile)	49	6	12	12	19	0	32
22-MP-P	T-shirts/nightwear (textile)	3	2	1	0	0	0	2
24-DK-T	Snowsuits (textile)	30	19	7	2	2	0	9
24-DS-T (MP)	Snowsuits (textile)	17	13	2	2	0	0	5
24-MP-T	Snowsuits (textile)	0	0	0	0	0	0	0
25-DK-T	Bibs (textile)	5	4	1	0	0	0	5
25-DS-T (MP)	Bibs (textile)	4	3	1	0	0	0	2
25-MP-T	Bibs (textile)	10	6	3	1	0	0	4
26-DK-P	Bibs (soft plastic)	37	13	17	5	0	2	7
26-DS-P	Bibs (soft plastic)	80	52	19	7	2	0	19
30-DK-P*	Beach sandals (plastic)	28	12	10	6	0	0	18
30-MP-P – white sole	Beach sandals (plastic)	64	41	17	5	0	1	21
30-MP-P – bow	Beach sandals (plastic)	100	39	49	10	1	1	26
30-MP-P – shoe	Beach sandals (plastic)	63	43	14	5	0	1	29
31-DK-P	T-shirts/nightwear (textile)	2	1	1	0	0	0	2
31-DS-P	T-shirts/nightwear (textile)	24	14	10	0	0	0	11
31-MP-P	T-shirts/nightwear (textile)	56	33	13	7	2	1	16

* Means that more than two and up to three times as much liquid was used to cover the sample compared to the minimum volume used. This means that a further degree of dilution has occurred in these extracts. The dilution may have influenced the number of peaks observed in the chromatogram.

Appendix 2. Specific selected PFAS analysed

This appendix contains an overview of the 60 specific PFAS (including specific salts) that can be analysed directly or indirectly according to the standard DS/EN 17681-1:2025 developed for measuring PFAS in textiles. Several of the substances are measured indirectly, meaning that, for example, the potassium salt of PFOS (K-PFOS) is not measured separately, but is included in the measured content of PFOS. It is indicated in TABLE 27 in the last column whether the specified PFAS from the standard has been measured in this project. If "not measured" is stated, it means that the PFAS in question has not been measured in this project. Please note that 8:2 fluorotelomer alcohol is measured as a single substance and is included in more than one sum parameter. 8:2 FTA can be formed by hydrolysis of both PFOA related compounds and PFCA related compounds.

In the column labelled "regulatory group/sum", the regulatory group to which the PFAS in question belongs is indicated. However, it should be noted that the standard DS/EN 17681-1:2025 also includes certain PFAS that are not yet regulated, but where legislation is pending. This is indicated by the relevant notes, which are also described in the standard:

- The substance is included as a proposal to extend restriction in REACH Annex XVII (indicated as "Proposal (a)" in the table below).
- Restricted via REACH Annex XVII, but only applicable from October 2026 (indicated as "From Oct. 2026 (b)" in the table below).
- Is included in the REACH Candidate List (SVHC), meaning it may be used subject to information duty (indicated as "SVHC (c)" in the table below).

TABLE 27. Specific PFAS covered by DS/EN 17681-1:2025

PFAS name	Acronym	CAS no.	Measured as/ hydrolysed to	Regulatory group/ sum	The substance is measured in this project?
4:2 Fluorotelomer alcohol	4:2 FTOH	2043-47-2	-	Proposal (a)	Not measured
1H,1H,2H,2H-Perfluorohexanesulfonic acid	4:2 FTS	757124-72-4	-	Proposal (a)	Not measured
6:2 Fluorotelomer acrylate	6:2 FTA	17527-29-6	6:2 FTOH	From Oct. 2026 (b)	Measured as 6:2 FTOH
10:2 Fluorotelomer acrylate	10:2 FTA	17741-60-5	10:2 FTOH	PFCA-related	Measured as 10:2 FTOH
10:2 Fluorotelomer methacrylate	10:2 FTMA	2144-54-9	10:2 FTOH	PFCA-related	Measured as 10:2 FTOH
Perfluorobutanoic acid	PFBA	375-22-4	-	Proposal (a)	PFBA
Perfluoropentanoic acid	PFPeA	2706-90-3	-	Proposal (a)	PFPeA
6:2 Fluorotelomer methacrylate	6:2 FTMA	2144-53-8	6:2 FTOH	Proposal (a)	Measured as 6:2 FTOH
1H,1H,2H,2H-Perfluorooctanesulfonic acid	6:2 FTS	27619-97-2	-	From Oct. 2026 (b)	Not measured
Perfluorohexanoic acid	PFHxA	307-24-4	-	From Oct. 2026 (b)	PFHxA
7H-Perfluorheptanoic acid	7HPFHpA	1546-95-8	-	Proposal (a)	Not measured

8:2 Fluorotelomer acrylate	8:2 FTA	27905-45-9	8:2 FTOH	PFOA-related and PFCA-related	Measured as 8:2 FTOH
Perfluorheptanoic acid	PFHpA	375-85-9	-	SVHC (c)	PFHpA
Perfluorooctanoic acid	PFOA	335-67-1	-	PFOA	PFOA
2,3,3,3-Tetrafluoro-2- (heptafluoropropoxy)propanoyl fluoride	HFPO-DA-F	2062-98-8	HFPO-DA	SVHC (c)	Measured as HFPO-DA
8:2 Fluorotelomer methacrylate	8:2 FTMA	1996-88-9	8:2 FTOH	PFOA-related and PFCA-related	Measured as 8:2 FTOH
Ethyl perfluorooctanoic acid	Et-PFOA	3108-24-5	PFOA	PFOA-related	Measured as PFOA
Methyl perfluorooctanoic acid	Me-PFOA	376-27-2	PFOA	PFOA-related	Measured as PFOA
Perfluorononanoic acid	PFNA	375-95-1	-	PFCA	PFNA
Perfluorodecanoic acid	PFDA	335-76-2	-	PFCA	PFDA
Perfluorobutanesulfonic acid	PFBS	375-73-5	-	SVHC (c)	Not measured
Perfluorooctanoyl fluoride	F-PFO	335-66-0	PFOA	PFOA-related	Measured as PFOA
Perfluorooctanesulfonyl fluoride	PFOSF	307-35-7	PFOS	PFOS-derivates	Measured as PFOS
Ammonium perfluoro(2-methyl-3-oxahexanoate)	(NH ₄)HFPO-D	62037-80-3	HFPO-DA	SVHC (c)	Measured as HFPO-DA
Perfluorodecanesulfonic acid	PFDS	335-77-3	-	Proposal (a)	Not measured
Perfluoroheptanesulfonic acid	PFHpS	375-92-8	-	Proposal (a)	Not measured
Potassium perfluoro(2-methyl-3-oxahexanoate)	K-HFPO-D	67118-55-2	HFPO-DA	SVHC (c)	Measured as HFPO-DA
Ammonium perfluorodecanoate	(NH ₄)PFD	3108-42-7	PFDA	PFCA	Measured as PFDA
Sodium perfluorodecanoate	Na-PFD	3830-45-3	PFDA	PFCA	Measured as PFDA
Ammonium perfluorhexanoate	(NH ₄)PFHx	21615-47-4	PFHxA	From Oct. 2026 (b)	Measured as PFHxA
Sodium perfluorononanoate	Na-PFNA	21049-39-8	PFNA	PFCA	Measured as PFNA
Ammonium perfluorooctanoate	(NH ₄)PFO	3825-26-1	PFOA	PFOA	Measured as PFOA
Silver perfluorooctanoate	Ag-PFO	335-93-3	PFOA	PFOA	Measured as PFOA
Potassium perfluorooctanoate	K-PFO	2395-00-8	PFOA	PFOA	Measured as PFOA
Sodium perfluorooctanoate	Na-PFO	335-95-5	PFOA	PFOA	Measured as PFOA
Potassium perfluorooctanesulfonate	K-PFOS	2795-39-3	PFOS	PFOS	Measured as PFOS
Perfluorundecanoic acid	PFUnDA	2058-94-8	-	PFCA	PFUnDA
2H,2H,3H,3H-Perfluorundecanoic acid	4HPFUnDA	34598-33-9	-	PFCA-related	4HPFUnDA
Lithium perfluorooctanesulfonate	Li-PFOS	29457-72-5	PFOS	PFOS	Measured as PFOS
Ammonium perfluorooctanesulfonate	NH ₄ -PFOS	29081-56-9	PFOS	PFOS	Measured as PFOS
Perfluordodecanoic acid	PFDoDA	307-55-1	-	PFCA	PFDoDA
Perfluorotridecanoic acid	PFTeDA	72629-94-8	-	PFCA	PFTeDA
Bis(2-hydroxyethyl)ammonium perfluorooctanesulfonate	PFOS-X	70225-14-8	PFOS	PFOS	Measured as PFOS
Tetraethylammonium perfluorooctanesulfonate	PFOS-X	56773-42-3	PFOS	PFOS	Measured as PFOS
Perfluorotetradecanoic acid	PFTeDA	376-06-7	-	PFCA	PFTeDA
Perfluorohexanesulfonic acid	PFHxS	355-46-4	-	PFHxS	PFHxS
Didecyl(dimethyl)azanium perfluorooctanesulfonate	PFOS-X	251099-16-8	PFOS	PFOS	Measured as PFOS

Perfluorooctanesulfonic acid	PFOS	1763-23-1	-	PFOS	PFOS
Perfluorooctane sulfonamide	PFOSA	754-91-6	-	PFOS-derivates	PFOSA
N-methyl-perfluorooctane sulfonamide	NMeFOSA	31506-32-8	-	PFOS-derivates	NMeFOSA
N-ethyl-perfluorooctane sulfonamide	NEtFOSA	4151-50-2	-	PFOS-derivates	NEtFOSA
N-methyl-perfluorooctane sulfonamide-ethanol	NMeFOSE	24448-09-7	-	PFOS-derivates	NMeFOSE
N-ethyl-perfluorooctane sulfonamide-ethanol	NEtFOSE	1691-99-2	-	PFOS-derivates	NEtFOSE
6:2 Fluortelomer alcohol	6:2 FTOH	647-42-7	-	From Oct. 2026 (b)	6:2 FTOH
8:2 Fluortelomer sulfonic acid	8:2 FTS	39108-34-4	-	PFOA-related	8:2 FTS
8:2 Fluortelomer alcohol	8:2 FTOH	678-39-7	-	PFOA-related and PFCA-related	8:2 FTOH
10:2 Fluortelomer sulfonic acid	10:2 FTS	120226-60-0	-	PFCA-related	10:2 FTS
10:2 Fluortelomer alcohol	10:2 FTOH	865-86-1	-	PFCA-related	10:2 FTOH
2,3,3,3-Tetrafluoro-2- (heptafluoropropoxy)propanoic acid / Perfluoro-2-propoxypropanoic acid	HFPO-DA	13252-13-6	-	SVHC (c)	HFPO-DA
Perfluoro-3,7-dimethyloctanoic acid	PF-3,7-DMOA	172155-07-6	-	PFCA	PF-3,7-DMOA

TABLE 28 to TABLE 34 below contain the results for the individual PFAS that were measured in this project for the 16 textile products. The tables are divided into the tables described below for presentation of the content of the total of 53 different PFAS:

- Specific PFAS not included in any of the regulated sums of PFAS - results are given in TABLE 28
- Sum of PFOA, its salts and PFOA-related substances (Legislation: the POP Regulation) – results are given in TABLE 29.
- Sum of PFOS and its derivatives (Legislation: POPs Regulation) - results are given in TABLE 30 in ppm and in TABLE 31 in µg/m².
- Sum of PFCA (C₉-C₁₄) and its salts (Legislation: REACH Annex XVII entry no. 68) - results are given in TABLE 32.
- Sum of C₉-C₁₄ PFCA related substances (Legislation: REACH Annex XVII entry no. 68) - results are given in TABLE 33.
- Sum of PFHxS, its salts and PFHxS related compounds including branched isomers of PFHxS (Legislation: POP Regulation) - results are given in TABLE 34.

TABLE 28. Results for the individual specific PFAS that have been analysed – and which do not belong to one of the PFAS sum parameters. Results marked in bold exceed the permitted limit values. Detection limits are given for the individual substances.

Lab.-no.	PFBA (ppm)	PFPeA (ppm)	PFHxA (ppm)	PFHpA (ppm)	HFPO-DA (ppm)	6:2 FTOH (ppm)
07-DK-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	82
07-DS-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
07-MP-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
11-DK-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
11-DS-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25

11-MP-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
14-DK-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
14-MP-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	25-75
19-DK-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
19-MP-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
24-DK-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
24-DS-T (MP)	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
24-MP-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
25-DK-T	0.02 - 0.06	< 0.01	< 0.004	< 0.004	< 0.007	< 25
25-DS-T (MP)	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25
25-MP-T	< 0.02	< 0.01	< 0.004	< 0.004	< 0.007	< 25

For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

None of the above PFAS are included in the regulated sum parameters of specific PFAS or are regulated as separate compounds at the time of purchase of the analysed products:

- PFBA and PFPeA are included in a future restriction proposal for REACH Annex XVII.
- PFHxA and 6:2 FTOH have been adopted as a restriction proposal for textiles in REACH Annex XVII but will not come into force until October 2026.
- PFHpA and HFPO-DA are included in the candidate list in REACH (SVHC) and can therefore be used, but under information duty (REACH Article 33).

It can be seen from TABLE 28 that only 6:2 FTOH has been determined in values above the limit of detection. The limit of detection for 6:2 FTOH is increased (as for the other fluorotelomer alcohols), as these compounds are best determined by GC-MS (and in this case LC-MS² was used, as this equipment is the best for determining other PFAS). 6:2 FTOH is found in two products 07-DK-T and 14-MP-T, i.e. in a bib and a snowsuit, respectively. The concentrations were determined to be 82 and 25-75 ppm, respectively; note that the limit of quantification for this substance is 75 ppm.

TABLE 29. Results for the individual specific PFAS that have been analysed – and which belong to the sum parameter of PFOA and PFOA-related substances. Results marked in bold exceed the permitted limit values. Detection limits are given for the individual substances in the table if the substance is not detected.

Lab.-no.	PFOA (ppm)	8:2 FTS (ppm)	8:2 FTOH (ppm)	Sum of PFOA-related substances (ppm)
07-DK-T	< 0.003	< 0.002	< 9	< 9
07-DS-T	< 0.003	< 0.002	< 9	< 9
07-MP-T	< 0.003	< 0.002	< 9	< 9
11-DK-T	< 0.003	< 0.002	< 9	< 9
11-DS-T	< 0.003	< 0.002	< 9	< 9
11-MP-T	< 0.003	< 0.002	< 9	< 9
14-DK-T	< 0.003	< 0.002	< 9	< 9
14-MP-T	0.008	< 0.002	1365	1365
19-DK-T	< 0.003	< 0.002	< 9	< 9
19-MP-T	< 0.003	< 0.002	233	233

24-DK-T	< 0.003	< 0.002	< 9	< 9
24-DS-T (MP)	< 0.003	< 0.002	< 9	< 9
24-MP-T	< 0.003	< 0.002	< 9	< 9
25-DK-T	< 0.003	< 0.002	< 9	< 9
25-DS-T (MP)	< 0.003	< 0.002	174	174
25-MP-T	< 0.003	< 0.002	< 9	< 9

For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

PFOA was detected in a snowsuit, sample 24 MP-T, at a concentration at the limit of quantification. 8:2 FTS was not determined above the limit of detection of 2 ppb. The limit of detection for 8:2 FTOH is elevated (as for the other fluorotelomer alcohols) as these compounds are best determined by GC-MS (and in this case LC-MS² was used as this equipment is the best for the determination of the other PFAS). The limit of detection for 8:2 FTOH is 9 ppm with the method used. 8:2 FTOH is found in three products 14-MP-T, 19-MP-T and 25-DS-T (MP), i.e. in a snowsuit, mittens and a bib, respectively. The content was determined to be 1365, 233 and 174 ppm, respectively.

According to the POPs regulation, the limit value for PFOA and salts of PFOA is 0.025 ppm (or 25 ppb), but 1 ppm for the sum of PFOA-related substances. The hydrolysis method used (DS/EN 17681-1:2025) means that PFOA-related substances are hydrolysed to PFOA, so it is not possible to identify whether the measured PFOA is PFOA or another PFAS that is hydrolysed to PFOA. PFOA and substances that hydrolyse to PFOA are, however, for all products except one, below the detection limit of 3 ppb. 8:2 FTOH, which is included in the sum of PFOA-related substances (see section 14.4.5), is responsible for exceeding the limit value of 1 ppm for the sum of PFOA-related substances. The three products 14-MP-T, 19-MP-T and 25-DS-T (MP), i.e. a snowsuit, mittens and a bib respectively, all clearly exceed the set limit value in the POP Regulation of 1 ppm. The three products are therefore marked in bold in the table.

For the other products, it should be noted that the determination of 8:2 FTOH has an elevated limit of detection that is above the permitted limit value. This is because, as mentioned, the LC-MS² measurement method is not optimal for fluorotelomer alcohols. These substances are better determined by GC-MS, but in this project only LC-MS² was used.

TABLE 30. Results for each specific PFAS analysed for - belonging to the sum of PFOS and its derivatives. Results are given in ppm. Results marked in bold exceed the permitted limit values. Detection limits are given in the table if the substance was not detected.

Lab.-no.	PFOS (ppm)	PFOSA (ppm)	NMeFOSA (ppm)	NEtFOSA (ppm)	NMeFOSE (ppm)	NEtFOSE (ppm)	Sum of PFOS and its deriva- tives (ppm)
07-DK-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
07-DS-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
07-MP-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
11-DK-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
11-DS-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
11-MP-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
14-DK-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
14-MP-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
19-DK-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01

19-MP-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
24-DK-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
24-DS-T (MP)	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
24-MP-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	0.01-0.03	0.01-0.03
25-DK-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
25-DS-T (MP)	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01
25-MP-T	< 0.004	< 0.004	< 0.007	< 0.005	< 0.005	< 0.01	< 0.01

For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

Only NEtFOSE was detected in a single product (24-MP-T) at a concentration between the limit of detection and the limit of quantification. The limit of detection is 10 ppb. For PFOS or the other PFOS derivatives, no content above the limit of detection of the respective compounds (between 4 and 7 ppb) was determined.

According to the POPs Regulation, a limit value of 0.1% (equivalent to 1,000 ppm) has been set for PFOS and its derivatives in articles. This limit value has not been exceeded. For textiles, however, there was a limit value of 1 µg/m² of the coated material applicable at the time the product was purchased. However, as described in the section 4.7 on legislation, this limit value no longer applies and has been replaced by a lower limit value for PFOS and its salts (0.025 mg/kg) and a limit value of 1 mg/kg for PFOS derivatives. Therefore, a calculation of the content of PFOS and its derivatives per m² of the analysed textile has also been made below in TABLE 31.

TABLE 31. Results for each specific PFAS analysed for - belonging to the sum of PFOS and its derivatives. Results given in µg/m². Results marked in bold exceed the permitted limit values.

Lab.-no.	PFOS (µg/m ²)	PFOSA (µg/m ²)	NMeFOSA (µg/m ²)	NEtFOSA (µg/m ²)	NMeFOSE (µg/m ²)	NEtFOSE (µg/m ²)	Sum of PFOS and its derivatives (µg/m ²)
07-DK-T	< 0.6	< 0.6	< 1.1	< 0.6	< 0.8	< 2	< 2
07-DS-T	< 0.6	< 0.6	< 1.1	0.6-1.7	< 0.8	< 2	< 2
07-MP-T	< 1.3	< 1.3	< 2.6	< 1.3	< 1.8	< 4	< 4
11-DK-T	< 0.5	< 0.5	< 1	< 0.5	< 0.7	< 1	< 1
11-DS-T	< 0.5	< 0.5	< 0.9	< 0.5	< 0.6	< 1	< 1
11-MP-T	< 0.5	< 0.5	< 1	< 0.5	< 0.7	< 2	< 2
14-DK-T	< 0.5	< 0.5	< 1.1	< 0.5	< 0.7	< 2	< 2
14-MP-T	< 0.7	< 0.7	< 1.4	< 0.7	< 1	< 2	< 2
19-DK-T	< 0.7	< 0.7	< 1.4	< 0.7	< 1	2-6	2-6
19-MP-T	< 0.7	< 0.7	< 1.4	< 0.7	< 0.9	< 2	< 2
24-DK-T	< 0.6	< 0.6	< 1.3	< 0.6	< 0.9	< 2	< 2
24-DS-T (MP)	< 0.3	< 0.3	< 0.6	0.3-0.9	< 0.4	< 1	< 1
24-MP-T	< 0.3	< 0.3	< 0.5	< 0.3	< 0.4	< 1	< 1
25-DK-T	< 0.6	< 0.6	< 1.1	< 0.6	< 0.8	< 2	< 2
25-DS-T (MP)	< 0.5	< 0.5	< 1	< 0.5	< 0.7	< 1	< 1

25-MP-T	< 0.1	< 0.1	< 0.3	0.1-0.4	< 0.2	< 0.4	< 0.4
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For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

For the results of PFOS and its derivatives calculated in the unit $\mu\text{g}/\text{m}^2$, NEtFOSA and NEtFOSE were detected in three products (07-DS-T, 19-DK-T, and 24-DS-T (MP), respectively) in concentrations around the detection limit or in a concentration between the detection limit of 0.3 and 2 $\mu\text{g}/\text{m}^2$, respectively, and the quantification limit of 2 and 6 $\mu\text{g}/\text{m}^2$, respectively. For PFOS or the other PFOS derivatives, no content above the detection limits of the respective compounds (between 0.1 and 4 $\mu\text{g}/\text{m}^2$) was determined. It should be noted that in some cases the detection limit is above the limit value of 1 $\mu\text{g}/\text{m}^2$, which is due to the combination of the detection limit for the individual PFAS and the area of textile fabric used for the analysis. However, the content in ppm (TABLE 30) is generally very low for the analysed products.

According to the POP Regulation, a limit value of 1 $\mu\text{g}/\text{m}^2$ of the coated material was set for textiles at the time of purchase of the products. However, this limit value per unit area of the textile is not currently in force; there is currently only a limit value for PFOS-related compounds per unit weight of 1 mg/kg (1 ppm), which none of the tested products exceed (see TABLE 30). The content of NEtFOSA in both 07-DS-T and 24-DS-T (MP) is, in both cases, considered to be below the permitted limit value at the time of purchase. For 07-DS-T, the content is determined to be in an interval just between the detection and quantification limit, and considering the uncertainty, it is not considered to be an exceedance of the limit value at the time. For 19-DK-T, the content of NEtFOSE was determined to be between 2 and 6 $\mu\text{g}/\text{m}^2$. This value is between the limit of detection of 2 $\mu\text{g}/\text{m}^2$ and the quantification limit of 6 $\mu\text{g}/\text{m}^2$ and is considered to constitute a minor exceedance of the limit value at the time of purchase – also taking the uncertainty into account. For NEtFOSE, the recovery in the controls was 98% (low concentration) and 94% (high concentration), respectively. It should be noted that product 19-DK-T is a pair of mittens, where the textile is heavy/thick. The analysed textiles had values between 40 and 360 g/m^2 , with these mittens having a weight per unit area of approximately 235 g/m^2 .

TABLE 32. Results for the individual specific PFAS that have been analysed – and which belong to the sum of PFCA C₉-C₁₄). Results marked in bold exceed the permitted limit values. Detection limits are indicated if the substance could not be detected.

Lab.-no.	PFNA (ppm)	PFDA (ppm)	PFUnDA (ppm)	PFDoDA (ppm)	PFTTrDA (ppm)	PFTeDA (ppm)	PF-3,7- DMOA (ppm)	Sum PFCA C ₉ -C ₁₄ (ppm)
07-DK-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
07-DS-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
07-MP-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
11-DK-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
11-DS-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
11-MP-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
14-DK-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
14-MP-T	< 0.002	0.005-0.015	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
19-DK-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
19-MP-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
24-DK-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
24-DS-T (MP)	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
24-MP-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
25-DK-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1

25-DS-T (MP)	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1
25-MP-T	< 0.002	< 0.005	< 0.04	< 0.002	< 0.002	< 0.005	< 0.1	< 0.1

For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

For PFCA C₉-C₁₄, only PFDA was determined at a concentration just above the limit of detection for 14-MP-T. The concentration was determined to be 0.005 to 0.015 ppm, corresponding to 5-15 ppb. The other PFCAs are below the limit of detection of 2 to 40 ppb, respectively. According to Annex XVII entry 68 of the REACH Regulation, the limit value for the sum of C₉-C₁₄ PFCAs is 25 ppb. However, the sum of C₉-C₁₄ PFCA was determined to be < 100 ppb for 14-MP-T, as the highest detection limit must be applied for all substances included in this sum. It should be noted that the limit of detection for PF-3,7-DMOA is elevated (100 ppb) due to unknown interferences. Thus, it has not been possible to determine whether the content of PF-3,7-DMOA is below the permitted limit value for C₉-C₁₄ PFCA.

TABLE 33. Results for the individual specific PFAS analysed for - belonging to the sum of C₉-C₁₄ PFCA-related substances. Results marked in bold exceed the permitted limit values. The limit of detection is indicated if the substance could not be detected.

Lab.-no.	4HPFUnDA (ppm)	10:2 FTS (ppm)	8:2 FTOH (ppm)	10:2 FTOH (ppm)	Sum C ₉ -C ₁₄ PFCA related substances (ppm)
07-DK-T	< 0.004	< 0.002	< 9	< 2	< 9
07-DS-T	< 0.004	< 0.002	< 9	< 2	< 9
07-MP-T	< 0.004	< 0.002	< 9	< 2	< 9
11-DK-T	< 0.004	< 0.002	< 9	< 2	< 9
11-DS-T	< 0.004	< 0.002	< 9	< 2	< 9
11-MP-T	< 0.004	< 0.002	< 9	< 2	< 9
14-DK-T	< 0.004	< 0.002	< 9	< 2	< 9
14-MP-T	< 0.004	< 0.002	1365	423	1788
19-DK-T	< 0.004	< 0.002	< 9	< 2	< 9
19-MP-T	< 0.004	< 0.002	233	30	263
24-DK-T	< 0.004	< 0.002	< 9	< 2	< 9
24-DS-T (MP)	< 0.004	< 0.002	< 9	< 2	< 9
24-MP-T	< 0.004	< 0.002	< 9	< 2	< 9
25-DK-T	< 0.004	< 0.002	< 9	< 2	< 9
25-DS-T (MP)	< 0.004	< 0.002	174	35	208
25-MP-T	< 0.004	< 0.002	< 9	< 2	< 9

For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

Of the PFCA-related substances, the two fluorotelomer alcohols 8:2 FTOH and 10:2 FTOH were the ones for which concentrations above the detection limit were determined. Neither 4HPFUnDA nor 10:2 FTS were detected at concentrations above their limit of detections of 4 and 2 ppb, respectively. The two fluorotelomer alcohols 8:2 FTOH and 10:2 FTOH were determined in concentrations from 174 and 30 ppm to 1365 and 425 ppm in the products 14-MP-T, 19-MP-T and 25-DS-T (MP) in a snowsuit, mittens and a bib, respectively.

According to Entry 68 of Annex XVII to the REACH Regulation, a limit value has been established for the sum of PFCA-related substances in all articles at 260 ppb or 0.26 ppm. The

levels in the three products 14-MP-T, 19-MP-T and 25-DS-T (MP) are thus far above the limit value of 0.26 ppm.

For the other products, it should be noted that the determination of 8:2 FTOH and 10:2 FTOH has an elevated limit of detection that is far above the permitted limit value. This is because, as mentioned, the determination of fluorotelomer alcohols by LC-MS² is not optimal for these substances. In addition, some analytical challenges occur as the substances are highly volatile and thus difficult to handle.

TABLE 34. Results for the determination of PFHxS*. Results marked in bold exceed the permitted limit values. Detection limits are indicated if the substance could not be detected.

Lab.-no.	PFHxS (ppm)	Sum of PFHxS-related substances * (ppm)
07-DK-T	< 0.003	< 0.003
07-DS-T	< 0.003	< 0.003
07-MP-T	< 0.003	< 0.003
11-DK-T	< 0.003	< 0.003
11-DS-T	< 0.003	< 0.003
11-MP-T	< 0.003	< 0.003
14-DK-T	< 0.003	< 0.003
14-MP-T	< 0.02	< 0.02
19-DK-T	< 0.003	< 0.003
19-MP-T	< 0.003	< 0.003
24-DK-T	< 0.003	< 0.003
24-DS-T (MP)	< 0.003	< 0.003
24-MP-T	< 0.003	< 0.003
25-DK-T	< 0.003	< 0.003
25-DS-T (MP)	< 0.003	< 0.003
25-MP-T	< 0.003	< 0.003

For the individual PFAS included in the sum, see description in the green box in chapter 14.4.5.

* PFHxS has been measured directly. This thus includes salts of PFHxS and related substances that degrade to PFHxS but does not include branched isomers of PFHxS.

Under the method described in DS/EN 17681-1:2025, only PFHxS is included as the sole compound, i.e. only PFHxS, substances that degrade into PFHxS, and salts thereof are determined. The branched isomers of PFHxS are not included in the sum parameter provided.

PFHxS was not detected above the detection limit of 0.025 ppm, corresponding to 25 ppb, in any of the analysed products. For sample 14-MP-T the limit of detection was increased to 20 ppb due to interferences. According to the POP Regulation, a limit value of 25 ppb has been established for PFHxS and its salts, as well as a limit value of 1 ppm for the sum of PFHxS-related substances.

Big difference between illegal chemical substances in children's fashion products bought in and outside the EU

According to statistics from Statistics Denmark and the Confederation of Danish Industry, Danes are doing more and more of their shopping online. A 2025 Nordic Council of Ministers study on dropshipping and other e-commerce in the Nordic region showed that 71% of products purchased online did not comply with legal requirements concerning the content of certain problematic chemical substances or the correct labelling of the products.

The purpose of this project was to assess compliance with regulations concerning certain regulated chemical substances in consumer products purchased online, and to examine whether there are differences in compliance between the three types of online shops. Secondly, the study examined whether consumers are exposed to a health risk due to the presence of potentially problematic non-regulated substances.

A total of 80 products were purchased from three types of online shops and as far as possible, a set of 'comparable' products was purchased from each of the three types of online shops:

- Large online marketplaces
- EU-based dropshipping online shops
- Danish online shops with their own inventory

EU dropshipping online shops are online shops based in the EU, but without any inventory of their own. Instead, a dropshipping shop acts as an intermediary that forwards orders to third parties, who then ship products directly to the shop's customers.

The compliance analyses performed in this project show that there are a number of products (13 out of 80, corresponding to 16%) that do not comply with legislation regarding the content of the regulated substances studied in this project (phthalates, PAHs, SCCPs, certain PFAS, lead and cadmium and nickel release). The compliance analyses also show that there is a higher proportion of non-compliant products among items purchased on large online marketplaces (28%), whereas 6% of products purchased on dropshipping websites and 9% of products purchased on Danish websites with own inventory do not comply with legislation regarding the chemical substances studied in this project.

No health risk was identified from the use of the children's fashion products containing the two non-regulated substances that were subject to a risk assessment in this project. However, the migration testing show that the products with the highest migration of these substances came from products purchased either from large online marketplaces or from dropshipping websites.

The project shows that there is a clear tendency that when products are received directly from countries outside the EU (via the large marketplaces), there are more violations concerning the content of regulated chemical substances than if the products are purchased directly from Danish online stores. In this respect, the results of this study are in line with previous studies that have been conducted on online commerce.



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