



AskREACH

Fairy Lights-Test

Winter 2022



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INTRODUCTION

In Christmas season, streets, shops and homes have been sparkling with fairy lights – but the festive glow can be deceptive. Are those chains of fairy lights free of hazardous chemicals and are they safe for humans and the environment?

This winters' product test carried out as part of the EU project "[LIFE AskREACH](#)" shows that a number of sets of fairy lights on sale still contain harmful chemicals such as phthalates or chlorinated paraffins.

The Austrian environmental protection agency GLOBAL 2000 purchased eleven light chains from seven different stores and sent them to an independent accredited laboratory, where they were analysed for selected substances of very high concern (SVHCs). These substances are classified in the European Union chemicals regulation REACH and have been shown to be

- carcinogenic,
- toxic to reproduction,
- mutagenic,
- endocrine disruptive,
- persistent, bioaccumulative and toxic,
- very persistent and very bioaccumulative, or
- of similar concern

SVHCs can be present in all kinds of consumer products, such as toys, kitchen utensils, furniture, clothing, or Christmas lighting.

LEGAL BACKGROUND

REACH

The EU [REACH Regulation](#) on the Registration, Evaluation, Authorisation and Restriction of Chemicals (1907/2006/EU) first came into effect in 2007. Its aim is to ensure a high level of protection for human health and the environment, as well as the free circulation of chemical substances on the EU single market and the enhancement of competitiveness and innovation.

Candidate list

Certain chemical substances are defined in the REACH Regulation as SVHCs (substances of very high concern). The SVHCs are listed in the "[Candidate List](#)", which is updated twice a year and in December 2022 contained 224 substances. These substances are candidates for the authorisation process under REACH, i.e. their use might be limited to certain applications. In addition, REACH stipulates that these chemicals should progressively be replaced by suitable alternative substances or technologies where this is economically viable and technically feasible.

REACH Article 33

[Article 33](#) of REACH states that a manufacturer or seller is obliged, on request, to inform a consumer if a given article contains any SVHC at a concentration of more than 0.1% by weight. The information must be made available within 45 days and must include at least the name of the SVHC substance.

Article 33 applies to most solid objects such as clothing, furniture, toys or electronics offered for consumer use. In the case of food, medicines and "non-solid" articles such as cosmetics, cleaning agents, paints, or powders, the obligation to provide information applies only to the packaging.

HOW WE TESTED

A total of eleven sets of fairy lights were purchased in seven different shops. These were then sent to an independent accredited laboratory to be tested for selected SVHCs. The focus here was on the soft plastic of the cable sheathing and on metal components, as previous product tests showed that these have a high risk of containing SVHCs. Cable sheathing is often made of PVC, a plastic that requires many additives such as plasticisers in order to be suitable for its many applications.

A risk-based approach was chosen for the selection of the SVHCs to be analysed. This means that only certain substances with a high probability of being present in the materials were tested. Thus, it does not mean that if no substances could be detected in a product, this product is also completely harmless and safe to use.

The cable sheathing of all products was tested for phthalates, chlorinated paraffins, polycyclic aromatic hydrocarbons, lead, and cadmium. In some cases, other components made of soft plastic were analysed for the same substances. In three products, metal components were tested for lead, cadmium and mercury.

ANALYSED SUBSTANCES

| Substance group | Substances included |
|---|--|
| Phthalates | BBP; DBP; DEHP; DIBP; DIHP; DHNUP; DMEP; DPENP; DiPP; PiPP; DPP; DnHP; DCHP; DHxP; DIHxP; DPP; 1,2-Benzenedicarboxylic acid, di-C6-10-alkyl esters, mixed decyl and hexyl and octyl diesters |
| Chlorinated paraffins | Short-chain chlorinated paraffins (SCCPs); Medium-chain chlorinated paraffins (MCCPs) |
| PAH (Polycyclic aromatic hydrocarbons) | Benz[a]anthracene; Benzo[a]pyrene; Chrysene; Benzo[k]fluoranthene |
| Heavy metals | Lead; Cadmium; Mercury |

Phthalates

Phthalates are plasticisers used in plastics such as PVC to make them soft and flexible. Phthalates can affect our biological system because they mimic hormones. Some have proved to be harmful to reproduction, such as diethylhexyl phthalate (DEHP), dibutyl phthalate (DBP), benzyl butyl phthalate (BBP), and diisobutyl phthalate (DIBP). In children, they can interfere with sexual maturation. The exposure to hormone-like substances is also suspected to contribute to the declining fertility of men, which has been observed in Europe over decades. For example, the plasticisers mentioned above show anti-androgenic effects such as reduced testosterone production and can have a damaging effect on testicular function. A [study by the German Environment Agency](#) between 2003 and 2006 examined 1,790 children aged between 3 and 14 years and revealed alarming results, particularly for plasticisers. Metabolites of selected plasticisers were found in the urine of almost all children, in some cases at considerable concentrations.

Phthalates enter the body mainly through food, but also through the air children breathe or through direct contact with the skin. Because children often play on the floor, they take in plasticisers via dust. Infants and young children also frequently put things in their mouth. Through the saliva, phthalates can be absorbed into the body. Countless everyday objects such as clothing, shoes, tools, swimming gear, kitchen and bathroom items, or cables may contain phthalates. Since July 2020, products containing the phthalates DEHP,

DIBP, BBP and DBP may no longer be placed on the market if the concentration exceeds the limit of 0.1 percent by weight (with very few exceptions). Other phthalates (DNOP, DINP and DIDP) have been banned for use in children's products.

Short- and medium-chain chlorinated paraffins (SCCPs & MCCPs)

Chlorinated paraffins are divided into long-, medium- and short-chain chlorinated paraffins. They are used in many different ways, for example as plasticisers in plastics, as binding agents in paints, as flame retardants, or as oiling agents for leather and furs. Short- and medium-chain chlorinated paraffins are extremely persistent and very toxic to aquatic life. They pollute water and soil and can harm living organisms. SCCPs are classified as "possibly carcinogenic to humans" by the International Agency for Research on Cancer. They can also cause kidney, liver and thyroid damage. They accumulate in human fat tissue and are passed from mother to child through breast milk. SCCPs are distributed all over the world and can be detected in soil, water, plants, humans, and animals. They are regulated by the EU POPs Regulation for persistent organic pollutants, which sets a limit concentration of 0.15% in articles.

Polycyclic aromatic hydrocarbons (PAHs)

PAHs are formed during the incomplete combustion of biomass (e.g. wood, coal or oil) and are often carcinogenic, mutagenic, toxic to reproduction, persistent in nature and toxic to aquatic organisms. Due to their longevity, they are found almost everywhere. In everyday objects, PAHs are often found in bicycle handlebar grips or tool handles, where they can also be absorbed through the skin. Plasticiser oils that make plastics softer and more flexible often contain PAHs. PAH contamination is found in particular in cheap plastic and rubber products.

Heavy metals

Heavy metals such as copper, lead, cadmium or mercury are usually only found at low concentrations in nature. While many of them are vital for plants, animals and humans, even slightly elevated concentrations can have a harmful impact. Soil around the world is widely contaminated with heavy metal compounds, which can be leached into groundwater. They subsequently accumulate in plants, but also in the skeleton, liver, kidneys and red blood cells of animals and humans.

LIFE AskREACH product tests: Fairy lights, December 2022

Some heavy metals and/or their compounds are carcinogenic, harmful to reproduction or have negative effects on our nervous system and organs such as the kidneys and liver.

These include, for example, lead and cadmium.

Heavy metals can be found in household items, jewellery and even toys.



RESULTS

SVHCs were found in six out of eleven of the tested light chains. These six can be further subdivided, depending on the type and quantity of the detected substances:

- Two sets of fairy lights should not have been sold because they contain high levels of DEHP, a plasticiser that has been restricted for over two years in almost all products at concentrations above 0.1% by weight. DEHP can disrupt the sexual maturation of children and is held partly responsible for the observed decline in male fertility. Nevertheless, DEHP was found at concentrations of up to 8.4 percent by weight, which is 84 times higher than the limit value. Especially with hormonally active substances like DEHP, such concentrations are shocking, because even very small amounts are sufficient to cause great harm. Moreover, plasticisers can easily migrate out of the plastic. They constantly evaporate from products and can be absorbed by us through mouth, skin, or respiratory tract. In one of the two products, traces of DIBP were also found, another banned plasticiser, as well as traces of MCCPs.
- Two other sets of fairy lights contained MCCPs above the limit of 0.1 percent by weight. These are thus subject to disclosure on request, although they are still legally marketable. Nevertheless, they should rather be avoided, as MCCPs are toxic, persistent, and accumulate in humans and the environment.
- The remaining two of the six contaminated sets of fairy lights contained SVHCs below the limit value, in one case DEHP and in the other cadmium. They are therefore legal on the market and are not subject to disclosure, but this does not mean that they are completely harmless. As already mentioned, DEHP in particular can be harmful even at very low concentrations.

The results show that toxic chemicals are still widespread in everyday products, which can represent a serious risk to human health and the environment.

Furthermore, the results indicate that products from shops offering lower quality goods have a higher likelihood of containing SVHCs. For example, both sets of fairy lights that would not have been marketable were bought at discounter stores.

All analysed products

| Product | Price [€] | Detected SVHCs |
|---|-----------|------------------------------|
| Fairy lights, black and white | 13.49 | - |
| Fairy lights, white with knotted fabric | 12.99 | - |
| Fairy lights, plain, mini | 5.99 | - |
| Fairy lights with golden ornaments | 14.99 | Cadmium 0.00195 % |
| Fairy lights with golden ornaments | 19.99 | MCCPs 0.26 % |
| Fairy lights, white, large | 45.00 | DEHP 0.012 % |
| Fairy lights, black and orange | 16.00 | - |
| Fairy lights with moose figures | 3.00 | - |
| Fairy lights, green | 2.00 | DEHP 2.9 % |
| | | DEHP 8.4 % |
| Fairy lights, white, large | 22.99 | DIBP 0.009 % MCCPs 0.061% |
| Fairy lights, different colours with silver ornaments | 9.99 | MCCPs 0.17 % |

red = DEHP above 0.1% → not marketable

orange = SVHCs above 0.1% → marketable, but subject to disclosure

yellow = SVHCs below 0.1% → marketable and not subject to disclosure

LIFE AskREACH & Scan4Chem

LIFE AskREACH is a five-year project funded by the EU LIFE programme. Under the coordination of the German Environment Agency, 20 partner organisations in 13 EU member states are cooperating to make the REACH consumer rights more widely known.

As part of the project, a smartphone app (named "[Scan4Chem](#)" in most countries) allows consumers to scan the barcodes of articles to check if they contain SVHCs, and where necessary to send SVHC-requests directly to companies. The Scan4Chem app can be downloaded for free from the App Store and Google Play.

We also work with companies to make it easier for them to respond to SVHC requests. The project offers a [database](#) to which companies can upload their article information; this way individual consumer requests are answered directly in the app, automatically and right away. The project also facilitates communications along the supply chain for companies.

RECOMMENDATIONS

What needs to be done?

- SVHCs in everyday products should be replaced by safe alternatives as soon as possible.
- Substances for which no safe limits can be determined, e.g. chemicals that interfere with the hormone system or non-threshold carcinogens, should be replaced as a matter of priority.
- All potential substances of very high concern should rapidly be identified and evaluated and, where appropriate, added to the candidate list.
- For companies at every stage of the supply chain, passing on SVHC information in compliance with REACH Article 33 should become a matter of course. Information on SVHCs must be disseminated both along the supply chain and to the relevant authorities and ultimately made available to the public and consumers.
- Companies should be made more aware of REACH obligations so that these are correctly implemented.

- The 45-day response period should be shortened, and replies should be given to every SVHC request, even if no SVHCs are present, in order to avoid misunderstandings.

What can consumers do?

- Avoid articles made of plastic, especially soft PVC or cheap articles. Return strong smelling plastic articles to the retailer. Preferably buy products made of natural materials like wood.
- Look out for eco-labels, such as the EU Ecolabel or the Blue Angel.
- Scan products you want to buy in advance with the “Scan4Chem” app and send an SVHC request to the seller or manufacturer of the item. Scan as many products as possible with the Scan4Chem app to show companies that consumers want safe products!

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The information and views set out in this report are those of the author and do not necessarily reflect the official opinion of the European Union or the LIFE AskREACH project.