



Chemicals of Future Concern

By Nicola Davies



Chemicals play a crucial role in the textile industry. Without chemicals, the production of yarn, fabric, garments, and other textile products would be close to impossible on an industrial basis. In addition, the available textile products would be whatever color the color the natural fiber was when it was harvested—since synthetic and manmade fibers require chemistry, and even “natural” dyes are also chemicals. And many of the high performance attributes beloved by both brands and consumers would simply not exist.

However, chemicals are a tool that must be used carefully. While a great many chemicals are useful in textile manufacturing, some of those chemicals are harmful to humans or the environment. The challenge is in identifying which chemicals are of concern, and in developing safer alternatives that are still effective.

REACH

REACH (the Registration, Evaluation, Authorization, and Restriction of Chemicals), a European Union (EU)-wide regulation for dangerous chemicals, is based on the principle that it is the industry's responsibility and duty to ensure that chemical substances placed on the EU market are used in a safe manner, says Mikko Väänänen, press officer at the European Chemicals Agency (ECHA). He explained that as part of REACH regulation, substances of very high concern (SVHCs) are identified and included in the Candidate List. When a substance is listed in the Candidate List, EU importers or manufacturers of articles containing these substances must notify ECHA within six months of its inclusion in the list.

ECHA has received notifications reporting the use of five SVHCs in fabrics or textiles:

- three phthalates—di(2-ethylhexyl)phthalate (DEHP), dibutyl phthalate (DBP) and diisobutyl phthalate (DiBP)
- decabromodiphenyl ether (decaBDE), and
- short-chain chlorinated paraffins (SCCPs)

Information from registration dossiers indicate the possible use of four other SVHCs in textiles: hexabromocyclododecane (HBCD), boric acid, disodium tetraborate anhydrous, and sodium dichromate.

As far as banned/restricted substances are concerned, Väänänen says, “The REACH Regulation already restricts the use of certain substances in textiles, due to their risk for human health (workers and/or consumers) and/or the environment. For example, this is the case for polybromobiphenyls and polybrominatedbiphenyls (PBB), some organostannic compounds, and azo colorants and azo dyes, which are restricted in textile articles via entries 8, 20, and 43 of Annex XVII to REACH, respectively (non-exhaustive list).”

Other chemicals like perfluorooctanesulfonic acid (PFOS), nickel, dimethylfumarate (DMFu), and some brominated flame retardants are also restricted under REACH. Denmark has sought a ban on hexavalent chromium in leather. Phthalates are included in the Authorization List published by ECHA. Lisa Anfält from ECHA has commented that the proposals are under consideration.

In 2005, the US Environmental Protection Agency (EPA) also issued a significant new use regulation regarding the use of six polybrominated diphenyl ethers (PBDEs) in textiles, and proposed a significant new use rule for decaBDE and HBCD in 2012.

Of Very High Concern

According to REACH article 57, SVHCs fall into one of the following categories:



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- they are either carcinogenic, mutagenic, or toxic to reproduction (CMR);
- they are persistent, bio-accumulative, and toxic (PBT), or very persistent and very bio-accumulative (vPvB); and/or
- they are “substances of equivalent level of concern,” such as endocrine disruptors.

The majority of these substances are unregulated, with no data available. In addition, of the known hazardous chemicals used in the textile industry, most are yet to be completely phased out and substituted with safer alternatives. Consequently, various government and private organizations, member states, companies, and non-governmental organizations (NGOs) have their own Restricted Substances Lists (RSL), which includes dangerous chemicals that are banned or restricted for use in products or manufacturing processes by regulation or law.

Restricted Substance Lists

Company and organization’s RSLs often also include non-legislated chemicals identified as hazardous. These RSLs are updated on a regular basis and are communicated throughout the supply chain. Danielle Iverson, government relations manager at American Apparel & Footwear Association (AAFA), says, “The AAFA Restricted Substances List is a valuable resource for identifying chemicals used in apparel, footwear, and home textiles that have been restricted or prohibited by regulation.”

Gloria Conti, regulatory assistance officer at the Department of Toxic Substances Control (DTSC) in California, USA, adds that their Safer Consumer Products regulations may touch on this. They have currently identified a “first-priority products” list, including tris (1,3-dichloro-2-propyl) phosphate (TDCP) that is often used in padded sleeping products for children. However, a global RSL isn’t possible due to several factors, including but not limited to: different products and target markets, country regulations, and testing methods. Nevertheless, many RSLs more or less contain the same chemicals.

Zero Discharge

On behalf of the Textile Exchange, a global non-profit working on textile sustainability, the Director of Corporate Responsibility at the Outdoor Industry Association, Beth Jensen, said that the two key collaborative working groups looking specifically at chemicals management in the apparel and footwear sector are the Chemicals Management Working Group (a partnership between Outdoor Industry Association and the Sustainable Apparel Coalition) and the Zero Discharge of Hazardous Chemicals effort. These groups are leveraging one another’s tools and efforts to minimize duplication of work wherever possible—particularly given the significant number of companies who are members of both groups.

The Zero Discharge of Hazardous Chemicals, an initiative of a non-profit organization known as International Chemical Secretariat ChemSe based in



Sweden, issues a Manufacturing Restricted Substances List for the apparel and footwear industry to prohibit or restrict the use of hazardous chemicals. The group includes big companies like Nike, Adidas, Puma, and H&M. Their RSL not only includes chemicals found in finished products, but also the ones used and discharged during manufacturing. Chlorobenzenes and chlorotoluenes, azo dyes (of carcinogenic or equivalent concern), flame retardants, glycols, halogenated solvents, and phthalates are included in the list. However, the mapping of the chemicals is non-exhaustive in nature.

Searching for Solutions

Now that these chemicals are banned or restricted to use, the industry must find safer alternatives to them. Väänänen recommends the SUBSPORT project for specific details about possible substitutes to chemicals of concern, including examples of replacements. SUBSPORT, a project of Kooperationsstelle Hamburg IFE GmbH, is a database of substitutions for hazardous chemicals in the textile sector. It also has a Restricted and Priority Substances Database containing 32 lists of substances. The lists can be categorized into five groups:

- International agreements
- EU regulatory lists
- Governmental lists
- NGOs
- Trade union lists
- Company lists

SUBSPORT lists the restricted substances along with each of the lists where they appear, to give a clear picture about what is banned and by whom.

Substitutions

One of the most common sources that lists chemicals of concern is the Substitute It Now! (SIN) list by ChemSec. The list carries SVHCs on the basis of the criteria set by REACH. The list is regularly updated and is recognized by such bodies as the European Commission and the United Nations Environment Programme. Various health, environmental, and consumer NGOs, companies, investors, and regulators use SIN lists for sustainable substitution work and informed decisions. As of February 2013, there were 626 substances termed as SVHCs by ChemSec.

The latest update of the SIN list includes bisphenol F and bisphenol S, which were once used to replace bisphenol A but were equally harmful. Similarly, PBTs were replaced by persistent organic pollutants (POPs).

ChemSec Director, Anne-Sofie Andersson, notes that, “The SIN List update focuses on sustainable innovation, on developing products that are truly safer in the long run.” It not only identifies the substances to be phased out but also conducts Substances Alternative Assessments to move towards safer alternatives to hazardous substances.

Alternatives

Design for the Environment (DfE) is a partnership program of the US EPA, which offers an Alternatives Assessment Program for stakeholders to choose safer alternatives. Iverson explains that alternatives assessment provides a basis for informed decision-making by developing an in-depth comparison of potential human health and environmental impacts. DfE applied this approach to find alternatives to substances including nonylphenol ethoxylate (NPE) surfactants, phthalates, decaBDE, HBCD, and bisphenol A. EPA releases the final reports on its website, after multiple assessment reports, including all the safer alternatives and their assessments to see if they are more or equally harmful.

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Recently, EU member states unanimously voted to amend REACH's Entry 46 of Annexure XVIII, relating to nonylphenol and nonylphenol ethoxylates (NPs and NPEs). These chemical compounds are toxic to aquatic life and biodegrade into endocrine disruptors. REACH already bans these chemicals' use in textile manufacturing within Europe. This new REACH amendment means that in the near future, the ban will extend to textile products imported into the EU that are manufactured using these chemicals. NPEs are very popular in textile auxiliary formulations and used widely across the entire textile manufacturing supply chain, from pesticide formulations used in growing cotton to spinning yarn, knitting and weaving, dyeing and printing, and even finishing and laundering. This legislation would mean, in effect, a broad ban against these chemicals across the entire textile supply chain if manufacturers wish to sell textile products in Europe.

Slowly but surely, the textile industry is working to clean up its act.

