

**The Chemicals in Products Project:
Case Study of the Textiles Sector**

**prepared by
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CiP textile case study

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CONTENTS

	Page
1. Summary	1
2. Introduction	5
2.1 Context of the Study	5
2.2 Methodology	6
3. Background on the textiles sector	6
3.1 Sector description	6
3.2 Chemicals used in the textiles sector	7
3.3 Legislative framework related to chemicals used in the textiles sector	8
4. Types of information systems for textiles	10
4.1 Labeling of fiber content	10
4.2 Restricted Substance Lists	11
4.3 Ecolabels	11
4.4 Environmental Product Declarations	13
4.5 Selected company systems	13
4.6 ChemicALL system	13
5. Stakeholders needs and uses of, access to and experience with CiP information and related information systems	16
5.1 Governments	16
5.2 Manufacturers	17
5.2.1 TrueTextiles	19
5.2.2 Interface Corporation	20
5.2.3 The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers (ETAD)	21
5.3 Distributors and Brand-name companies	22
5.3.1 Experience with Restricted Substance Lists (RSLs)	23
5.3.2 Activities which build upon Restricted Substance Lists	25
5.4 Consumers	26
6. Gaps and obstacles in information exchange	29
6.1 Resource gaps	30
6.2 Barriers to establishing information exchange	30
6.3 Keeping any information exchange system current	31
6.4 Gaps in expertise and knowledge	31
6.5 Cultural and linguistic gaps	31
6.6 Gaps in communication and coordination between governments	32
6.7 Developing countries / countries with economies in transition	32
7. Potential ways to addressing gaps and obstacles	32
7.1 Potential avenues towards improved CiP information exchange	33
7.1.1 Build upon existing RSL efforts	33
7.1.2 Ecolabels	34
7.1.3 Environmental product declarations	35
7.1.4 Forming a complete production chain CiP information system – a pilot project	35
7.2 Needs for assessing capacity building requirements	35
8. Conclusions and Recommendations	36
8.1 Conclusions on the status of information exchange in the textiles sector	36
8.1.1 The state of the art in chemicals information exchange	36
8.2 Recommendations	37
Annex 1: Acronyms and definitions	40

CiP textile case study

Annex 2: Interviews - Persons contacted for input to this study..... 43
Annex 3: References 44

1. Summary

The manufacturers of the textiles sector produce clothing and other textiles which enter into the lives of almost all persons on the planet. The sector is an important one for the global economy: in 2003 more than 140 economies produced clothing and textiles for export, and many are highly dependent on these exports for employment. The sector is also one of the most globalized: the series of steps in producing and selling a garment – fabric production, fabric treatment, cutting and final product assembly and transport to market - frequently involve international or intercontinental movements of products.

With the global movement of clothing and textiles comes the global movement of whatever they contain. In recent years increased attention has been given to the chemicals which are contained in textiles products. This could in part be explained by the existing knowledge of the intense use of chemicals by the sector – chemicals are used both for fiber production and during the manufacturing process.

This growing awareness and concern of real or potential safety issues related to chemicals in products, including those in textiles, has been driven by numerous factors; an increased knowledge of the hazards associated with chemicals used in the sector; legislation (such as REACH in the European Union and California Proposition 65 in the USA) which established requirements for disclosure on those placing items containing chemicals onto markets; and consumers' desire for greater product safety.

Through the global dialogue under the Strategic Approach to International Chemicals Management (SAICM), a Chemicals in Products (CiP) Project was initiated in 2009 to examine the information requirements for proper management of chemicals contained in products. SAICM has as its goal “that by 2020 chemicals are used and produced in ways that minimize significant adverse effects on human health and the environment”. In Paragraph 15(b) of the SAICM text it is recognized that information on chemicals, including chemicals contained in products, is essential if proper management of those chemicals is to be possible. In this context, the CiP Project is reviewing existing information systems pertaining to chemicals in products, assessing that information in relation to the needs of all relevant stakeholders and identifying gaps, and developing specific recommendations for actions to promote implementation of the SAICM goal. This report presents the results of the study carried out by UNEP on the textiles sector. The study focused predominately on clothing.

Information on chemicals as they relate to textile products

With respect to current methods of exchanging information on chemicals in textile products, this study found that except for fiber content essentially no information system exists for transmitting data on what chemicals are contained in individual products. There are efforts within the sector where companies require full disclosure of materials which are entering into production lines and which give full disclosure of the chemicals in the final products. This study found one or two companies where such activities are underway – which is encouraging in that full disclosure can be part of a viable manufacturing operation. However the sector as a whole does not practice full disclosure of its products' chemical composition.

What does exist within the sector is a rather well-developed set of activities aimed at ensuring that unwanted chemicals are *not* present in products. These activities generally grew out of

CiP textile case study

companies' efforts to meet legislative requirements for ensuring product safety for their target markets. The activities often take place within the framework of individual companies' restricted substance list (RSL) programs. Ecolabels were also found which specifically address chemicals in textile products and one of these (the Oeko-Tex® Standard 100) has been adopted for use by some 90,000 textile products.

A RSL is a list of chemical substances which a company wishes to eliminate or to keep below a required concentration in their products. Generally it is the company who puts the products on a market, frequently a brand name, which specifies the RSL program parameters and mode of functioning. Suppliers to the company must put in place measures to ensure their manufactured products comply with the RSL's requirements. These initiatives often entail training of suppliers, routine and random product testing, certification of compliance that suppliers further upstream are supplying appropriate chemicals and other measures designed to ensure the program's integrity are common features of an RSL program. It is notable that under an RSL program the information on what chemicals are not in the product – that is the product's "negative content" information – does not accompany the product itself, but is often made available through other channels (e.g. the company's web site).

Ecolabels can have many of the same features as a RSL program. Indeed, a chemicals-oriented textile ecolabel must derive the validity of its claim for 'safer products' from a rigorous set of requirements, including oversight and reliable testing. As ecolabels are generally attached to the finished article, the negative-content information does accompany the product.

Needs, uses and gaps for information on chemicals in textiles

The study investigated the wide range of needs of the numerous stakeholders involved in the life cycle of textiles and who would undertake management of the chemicals contained in textile products: it found the main driver for the great majority of these needs is product safety. Companies want to know the products they manufacture and sell are safe, consumers wish to be sure they are purchasing a safe article, governments require that only products achieving a prescribed level of safety are placed on the markets, etc. There are also needs related to technical requirements; e.g. a waste handler or recycler needs to know if his raw materials contain problematic substances. All these desires and requirements depend on information, yet the types of information needed vary widely: is it what is in the products or is not in the products; the level of expertise or knowledge of the person receiving the information affects how the information should be presented; in short, what chemicals content or negative-content information would best meet these varying needs, and what information exchange mechanism(s) would be effective?

Using the information on chemicals in (or not in) textile products for evaluating or assuring product safety was the common theme found amongst stakeholders. Their methods of achieving this and their priorities have led to some of the earlier mentioned systems (e.g. RSLs, ecolabels). These systems can be said to have achieved a number of significant gains: a global network of informed manufacturers and suppliers exists that is capable and practiced in ensuring that identified hazardous chemicals are not present in textile (primarily clothing) articles; the need for oversight on the identified hazardous substances has raised awareness of the hazards in the design phase and in some parts of the supply chain; and to a large extent these systems have achieved their goal of preventing hazardous substances from being present in the products.

CiP textile case study

The CiP project has as a part of its mandate to investigate chemicals in products information systems - that is systems which communicate information about what chemicals are present in products.

Conclusions

While systems communicating what chemicals are not in products (i.e. negative-content information systems) are not CiP information systems, negative-content type systems would be able to offer sector stakeholders (mainly within the production chain) the opportunity to improve their general awareness and specific knowledge of textile related chemicals issues. A widespread adoption of these types of efforts by stakeholders in the business and industry group could bring significant benefits by building up capacity to make informed decisions in the design and production part of the life cycle.

Without detracting from the significant gains brought about by negative-content methods of product chemicals controls, it must be recognized that one of the limitations of such an approach is rooted in its reactive nature. If manufacturers do not know what is in their products, they will need to investigate if a new substance of concern is identified. Looking at the example of a newly emerging chemical of concern (e.g. perfluorinated compounds used in textiles) the approach which a negative-content information system follows is to first investigate if the chemical is present in a product prior to considering suitable actions. It can take years until these controls are effective.

A CiP information system would help companies be prepared to take early action. Chemicals composition data would be available and could be used by e.g. manufacturers to practice substitution of less-desirable process or product chemistry on a planned basis, or by governments to assess the distribution paths and amounts of specific chemicals contained in products, or by researchers as a basic data source, or by consumers in purchasing decisions, or by waste handlers to identify products requiring special handling, etc.

Recommendations

There are several initiatives in the textile sector such as RSLs, ecolabels and Environmental Product Declarations (EPDs) that to a certain extent address issues around CiP information but which do not fully meet the needs for CiP information. Taken together they are also very diverse in terms of scope, criteria, design and method.

Based on this and other findings of the case study, for future actions it seems wise to take a step wise approach and, as far as possible, to build on existing systems and initiatives. In any cooperative effort aimed at building up CiP information exchange, it is important to gain experience along the way, allowing for more informed decisions regarding particular steps and actions to be taken. Such experience may be best harvested through activities with a limited initial scope and it is suggested that a pilot project be undertaken. This is in line with the discussions at the Sector-Expert Consultation held in December 2010 and involving other case study institutions and sector experts. It is also recommended that the pilot should address the CiP issues in a tiered approach, similar to the descriptions outlined in the 2010 CiP project report (Kogg & Thidell), whereby:

CiP textile case study

- Tier 1 would address the CiP information flow to the end-producer / brand owner or other actor responsible for the products' safety, i.e. primarily occurring within the production chain and,
- Tier 2 would address needs for CiP information by actors further down the products life cycle and usually outside the actual production chain.

The objective of Tier 1 would at first be to find solutions for meeting CiP information needs of the end-producers/ brand owners/ importers and other stakeholders associated with the production chain. It should explore ways of overcoming the “interruption of data transfer” that occurs between the information that chemical manufacturers provide and attempt to “push” down the production chain and the information that the end-producer / brand owner tries to “pull” from the up-stream actors. Solutions should as much as possible build on existing information systems and communication structures, in particular the globally harmonized system of classification and labelling of chemicals (GHS) and safety data sheets provided by chemical manufacturers.

The objective of Tier 2 would be to explore ways of tailoring the information to the needs of the stakeholders involved in the products' life cycle, i.e. who are using or otherwise handling the product, including distributors, consumers, authorities, recyclers and waste handlers. The possibilities for making use of existing systems such as RSLs, Ecolabels and EPDs should be investigated as well as potential contributions from eventual partners, IGOs or other international institutions on which a future system(s) could be built, e.g. through international standards or codes or labeling requirements.

Questions that the pilot also needs to address would include but not be limited to:

1. What scope would the CiP information system have – which chemicals or type of chemicals would be part of it for the sector(s) investigated and what information should be provided? In what format should the information be provided?
2. How to promote a broad uptake of a future CiP information system? What are the processes and drivers that can be built on?
3. How to raise the awareness and understanding among different stakeholders that would be required for creating an effective system?
4. What are the special needs in developing countries and countries with economies in transition that need to be considered in the design of CiP information system?
5. What are the resource requirements – both initial and long-term – among different types of stakeholders if a proposed system is to be adopted

2. Introduction

2.1 Context of the Study

This case study was carried out as part of the activities under the Chemicals in Products (CiP) Project. In May, 2009, the second session of the International Conference of Chemicals Management (ICCM2) adopted a resolution agreeing to implement a project on Chemicals in Products with the overall goal of promoting the implementation of paragraph 15 (b) of the Overall Policy Strategy of SAICM concerning the availability of information on chemicals throughout their life-cycle including, where appropriate, chemicals in products (CiP). With the view to take appropriate cooperative action, the Conference agreed to consider further needs to improve information on chemicals in products in the supply chain and throughout their life cycle, recognizing that further actions are needed to fulfill the goal that by 2020 chemicals are used and produced in ways that minimize significant adverse effects on human health and the environment.

The Conference invited UNEP to lead and facilitate the project and to constitute a Steering Group to advise on the project development and implementation. The Conference further agreed that the following tasks be undertaken:

- collect and review existing information on information systems pertaining to chemicals in products including but not limited to regulations, standards and industry practices;
- assess that information in relation to the needs of all relevant stakeholders and identify gaps;
- develop specific recommendations for actions to promote implementation of the SAICM with regard to such information, incorporating identified priorities and access and delivery mechanisms

In this context, the goal for the CiP project is to provide to ICCM3 an assessment of information needs that would allow stakeholders to practice sound management of the chemicals in products, a report on status of existing systems and the extent to which they meet the identified information needs. As well, recommendations will be made to ICCM3 in 2012 as to what further cooperative actions are needed to ensure that required information is available, accessible and appropriate to the needs of all stakeholders. UNEP will report on the project implementation and its outcomes, including draft recommendations, to the SAICM Open-Ended Working Group (in mid 2011) and to ICCM3 (in mid 2012).

An investigation into existing systems and stakeholder needs and gaps was carried out and the results published (see Kogg / Thidell¹). This provided a view to the status of chemicals information exchange generally and provided details and insights from experience in use of selected systems and in selected sectors.

Also as part of the initial activities, the CiP project undertook to prioritize sectors for more in-depth studies. An extensive Scoping Phase was undertaken, including a survey among SAICM focal points and a Scoping Meeting, resulting in a focused set of case studies being carried out in the priority product sectors of toys, electronic goods, building materials and textiles.

Within the context of the three tasks which ICCM2 assigned to the CiP project, this textiles case study seeks to build upon previous work (see esp. Massey², et.al., Becker³ and

CiP textile case study

Kogg/Thidell¹) and to provide evidence for informed discussions and decisions on possible next steps to be taken under the activities of the CiP project.

Against this background, the current study aims to assess information needs and gaps among stakeholders, analyze existing systems in terms of information provided against the needs and also to serve as a reference for future CiP information exchange activities in the textiles sector. In consideration of the limited time available for the study, priority was given to concentrating on consumer textiles (as opposed to technical textiles).

2.2 Methodology

This study was carried out using primarily the results of the previous works cited above, literature reviews and telephone interviews. In total 22 telephone interviews were carried out, in October and November, 2010. All major stakeholder groups were contacted and interviewed, including stakeholders from developed and developing countries. The majority of companies who were contacted for the interviews had some activity in exchanging information about what chemicals were *not* in their products (what this study terms “negative-content information”). Given the size of the textiles sector and the time and resource limitations for this study, the aim was not to be exhaustive but to present a sector overview, highlighting the leading efforts while also identifying the areas where information exchange was less advanced or absent. The inputs to the current study include then some of the more advanced information exchange practices in the sector.

The study presents an overview of the sector in terms of its structure and product flows. Information is also given on the types and functions of chemicals which are or have been commonly used, concentrating on those which may be present in finished articles. Information exchange about chemicals both present in or absent from products, and through both legally required and voluntary mechanisms is then reviewed, along with stakeholder needs and gaps related to the exchange. Conclusions and some suggestions for potential ways forward to improved CiP information sharing are then presented.

3. Background on the textiles sector

3.1 Sector description

The textile industry is a term used for industries primarily concerned with the design or manufacture of clothing as well as the distribution and use of textiles. Textile industries includes fiber production (natural and synthetic), raw weaving, dyeing, finishing and printing and final make-up into garments (carpets, fabrics, etc.). Natural fibers include animal wools and cellulose products such as cotton and flax. Synthetic fibres include rayon, acrylic, polyester, polyurethane, polyamide and others. Leather articles are also included in the sector.

The global textiles and garments industry forms an important component of world trade flows, particularly for some developing countries where clothing accounts for a large proportion of total exports. In 2004, world exports of textiles were valued at US\$195 billion and of clothing at US\$258 billion, representing 2.2% and 2.9% respectively of total world merchandise trade (WTO, 2005).

CiP textile case study

Developing countries produce half the world's textile exports and nearly three-quarters of the world's clothing exports⁴ Trade patterns in textiles and garments are similar although textiles tend to be a capital-intensive business, while garment-making is labor-intensive and usually relies on a low-cost workforce.

India, Turkey, Pakistan, Indonesia, Thailand and Mexico all rank among the top 15 textile exporters, according to WTO trade statistics. Overall, Asia accounted for 45.1% of world textiles exports in 2004. The EU and the US are the biggest importers of textiles, followed by China, which needs fabric for its large garments industry. For clothing, the EU is again the biggest exporter (including intra-EU exports), followed by China with a 24% share of world garments exports. Although all other countries lag far behind, Turkey, Mexico, India, Indonesia, Bangladesh, Thailand, Vietnam, Tunisia and Pakistan all feature among the top 15 clothing exporters. Overall, Asia accounted for 46.8% of world clothing exports in 2004. The major importers of clothing are the EU and the US, with Japan in third place. A distinctive feature of the clothing industry is the number of countries highly dependent on garment exports, even though the absolute value of those exports from these countries is not high in terms of the overall level of global garment trade. In 2004 clothing provided more than 40% of total merchandise exports for Cambodia, El Salvador, Bangladesh, Sri Lanka, Mauritius and Lesotho⁴.

3.2 Chemicals used in the textiles sector

The variety of chemicals used in the production of textile raw materials and articles is also correspondingly complex and responds to a wide range of performance, aesthetic and functional requirements. Pesticides are frequently used in natural fiber production and dyes, processing chemicals, water or stain repellents, performance-enhancing coatings or treatments, flame retardants and other chemicals are commonly employed in producing a finished article. Many of these chemicals are designed to remain with the article; others may be present as a carry-over from the manufacturing steps which produced the article.

An overview of the chemicals that are or have been more commonly used for textile products (and which may be present in the finished products) and their function in the processing or performance of the finished products are listed in Table 1⁵. The data presented also shows the release pathway (media) from the textile article for the chemical.

Use category / function	Substance	Releases to
Detergents and auxiliaries	Nonyl phenol Ethoxylates (NPEs)	Water
Water-, oil-, stain- and wrinkle resistant coatings	Perfluorinated compounds (PFs, including PFOS, PFNA, FTOH)	Water
	Formaldehyde	Air
Fire retardant textiles	Poly-brominated diphenyl ethers (PBDEs), hexabromocyclododecane (HBCD)	Water
	Short chain chlorinated paraffins (SCCPs)	Water
	Asbestos	Air
Plastic coatings	Phthalates (e.g. DEHP)	Water
	Heavy metals (e.g. lead, cadmium, organotins)	Water
Antibacterial and anti-mould agents	Silver	Water
	Triclosan	Water
	Dimethylfumarate (DMF)	
Dyes and colourants	Heavy metals (e.g. mercury, cadmium and lead)	Water
	Azo-dyes (which can cleave into carcinogenic aromatic amines)	Water

CiP textile case study

Footwear and leather products	Chromium	Water
	Short chain chlorinated paraffins (SCCPs)	Water
Other	Heavy metals (e.g. lead, cadmium, organotins)	Water
	Nonyl phenol Ethoxylates (NPEs)	Water

Table 1. Use of different chemicals of concern in textile and leather products and their likely releases during the use phase.⁵

Measurements of levels of some of these chemicals in textile articles have been carried out in recent years. A Swedish study on nonyl phenol ethoxylates (NPE) content in towels found the chemicals present in every item. Similarly an investigation of water repellent sports clothing for perfluorinated compounds (PFCs) content found every article tested in that study contained PFOA or unbound fluorotelomers⁵.

The chemicals noted in Table 1 have already been identified as being of some concern (and in most cases are restricted or banned in their use). In addition to these, there are many chemicals used in the processing of textiles, including for spinning, fabric pre-treatment, dyeing, printing and finishing. These chemicals are frequently not by design intended to remain in the final textile product and will not be discussed at length in the study. It is however worth keeping in mind the high use of chemicals in textiles processing and that the absence of those chemicals not intended to be in the final products may depend on the proper processing conditions being maintained in the fabrication phase. Also, quality controls should be in place to alert the manufacturer to product impurities and of possible abnormal process conditions.

3.3 Legislative framework related to chemicals used in the textiles sector

The textiles sector may be characterized as among the more regulated of product sectors. This can be attributed at least in part to the sheer scale of the production and range of uses of textiles, the globalized nature of the sector and to the significant chemistry which is applied in the sector. This Study will present an overview of the major legislation applicable to textiles and concerned with chemicals contained (or potentially present) in the final products. Most of the legislation listed below apply to products generally, with the exception of the EU Ecolabel and various noted Directives, which are more targeted to the textiles sector.

REACH

With respect to chemicals contained in articles, the European legislation in REACH (Regulation (EC) No 1907/2006) contains information disclosure provisions in relation to specific substances which meet the criteria set for substances of very high concern (SVHC) and has been taken up on a list. This so-called candidate list at the time of writing contains 47 SVHC substances, though this number is increasing as more substances are identified - many of the listed substances are relevant to the textiles industry⁶. From the European Chemical Agency web site, the REACH provisions requiring information disclosure are below:

Substances in Articles

- **From the date of inclusion:**
EU or EEA suppliers of articles which contain substances on the Candidate List in a concentration above 0.1% (w/w) **have to provide sufficient information to allow safe use of the article to their customers or upon request, to a consumer within 45 days of the receipt of the request.** This information must contain as a minimum the name of the substance.

CiP textile case study

- **From 2011:**
EU and EEA producers or importers of articles have to **notify ECHA** if their article contains a substance on the Candidate List. This obligation applies if the substance is present in those articles in quantities totalling over one tonne per producer or importer per year and if the substance is present in those articles above a concentration of 0.1% (w/w).

Consumer Product Safety Improvement Act (CPSIA)⁷

The CPSIA is the U.S. federal law which set levels for lead in paint for goods made on or after August 14, 2009 and for children 12. The level is set at 90 ppm (effective 14 August, 2011). Third party testing of articles is required by the legislation.

California Proposition 65⁸

In 1986, California voters approved an initiative to address their growing concerns about exposure to toxic chemicals. That initiative became the Safe Drinking Water and Toxic Enforcement Act of 1986, better known by its original name of Proposition 65. Proposition 65 requires the State to publish a list of chemicals known to cause cancer or birth defects or other reproductive harm. This list, which must be updated at least once a year, has grown to include approximately 800 chemicals since it was first published in 1987.

Proposition 65 requires businesses to notify Californians about significant amounts of chemicals in the products they purchase, in their homes or workplaces, or that are released into the environment. By providing this information, Proposition 65 enables Californians to make informed decisions about protecting themselves from exposure to these chemicals.

Businesses are required to provide a "clear and reasonable" warning before knowingly and intentionally exposing anyone to a listed chemical. This warning can be given by a variety of means, such as by labeling a consumer product, posting signs at the workplace, distributing notices at a rental housing complex, or publishing notices in a newspaper. Once a chemical is listed, businesses have 12 months to comply with warning requirements.

Law for the Control of Household Products Containing Harmful Substances⁹

In Japan, the Law for the Control of Household Products Containing Harmful Substances provides for responsibilities of manufacturers and importers to secure safety of household products. They must study chemicals which are contained in household products and how they might affect human health, and take measures to prevent injury caused by such chemicals. Thus, the law prescribes that manufacturers and importers must have a full understanding of the manufacturing methods of household goods, chemicals contained therein and their toxicity.

Moreover, the law designates harmful chemicals from the view of human health and prescribes standards for allowable contents of chemicals and containers of the products. Surveillance officers in each city or prefecture strictly check and survey the household products which are sold in the departments, supermarkets and retail stores, for the above standards, and give instructions where appropriate.

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- *** Note:** A notification is not required when
 - i. the producer or importer of an article can exclude exposure of humans and the environment during the use and disposal of the article. In such cases, the producer or importer shall however supply appropriate instructions to the recipient of the article.
 - ii. The substance has already been registered for that use.

Act on the Evaluation of Chemical Substances and Regulation of Their Manufacture¹⁰

This Japanese law covers chemicals which are controlled or prohibited based on the hazards they pose to human health and/or the environment. It includes a labeling requirement for products which contain particular chemicals.

European eco-label

European Commission Decision 2002/371/EC¹¹ established in 2002 the European eco-label, also known as the EU Flower. The EU Flower is targeted towards textiles (primarily clothing) and contains stringent restrictions not only on chemicals that may be present in these articles, but also in what chemicals may be used in processing of textiles, or which may be present as residue or impurities in the raw textile feedstock (i.e. cotton, wool, polyester, etc.). Strict certification and testing requirements are also part of the legislation. Process parameters such as water use and effluent pollution are addressed to some extent.

The EU Flower has the interesting approach to chemical content control. Certain specific chemicals are prohibited from use or restricted to maximum levels (either in the final product or in the process chemicals). Other restrictions are by hazard class; no flame retardants may be present above 0.1% concentration that carry the “possible risk of impaired fertility”, as an example. The inclusion of hazard classes brings the feature that the label is up to date as new chemicals are found to have associated hazards and are restricted.

EC Regulations on flame retardants, Dimethylfumarate (DMF), and others

Numerous chemicals used in textiles processing are subject to EU regulations. Specific laws covering the prohibition in products include those on placing textiles articles containing over 0.1 mg/kg of DMF on the EU market (emergency Decision 2009/251/EC), over 1 microgram/kg of perfluorooctanesulfonic acid (PFOS) in the coated material (Decision 2006/122/EC), over 0.1% of the flame retardants penta- bromodiphenyl ether (pentaBDE) or octa-bromodiphenyl ether (octaBDE) (2003/11/EC) or the release of carcinogenic amines of more than 30ppm from certain azodyes (2002/61/EC).

4. Types of information systems for textiles

This section will review the types of mechanisms found for transmitting information about chemicals in products. Communication of information related to chemicals takes varied forms, including “CiP information exchange”, defined here as when some or all information on the chemical composition of a product is passed on through some stage of the product life-cycle, and “negative-content information” defined as when some information about the chemicals *not* in a product is passed on.

4.1 Labeling of fiber content

It is relevant to note that textiles already have an established labeling requirement in major import markets. In the USA, articles must be labeled as to their fiber content, country of origin and manufacturer (or other business responsible for marketing or handling the item)¹². In the EU, DIRECTIVE 96/74/EC (and amendments) cover the fiber content naming and labeling requirements for textile garments. As to care labeling, there is no mandatory care labeling at the EU level. However in practice, there is a system in Europe, namely the one based on the care symbols developed by the International Association for Textile Care Labelling (GINETEX) and incorporated into the ISO 3758 standard¹³. In the US, the Federal

Trade Commission enforces the mandatory care labeling system. Requirements are for written or pictogram instructions for garment washing, bleaching, drying, ironing and dry cleaning. The labels must be visible at the point of sale and remain permanently attached for the life of the garment¹³.

4.2 Restricted Substance Lists

A Restricted Substance List (RSL) is a company-specific list of chemicals that are restricted in the company's products and thus effectively banned or extremely limited for use by the company's suppliers. For the textiles sector, this study found that RSLs form the basis for the significant majority of efforts undertaken to control chemicals content of products. The RSLs are normally put in place by a company which places its textile products on the market: this company then requires its suppliers to conform to the technical and administrative management controls needed to ensure compliance with the RSL program.

Legislation in the market countries, consumer pressure and corporate philosophy towards chemicals use in their products were noted by brand name companies and distributors as among the drivers which shaped their RSL. As they typically do not pass information about what chemicals ARE contained in the products, RSLs are not truly CiP information system. However RSLs are in widespread use in the textiles industry and do in some cases have some of the characteristics of a CiP information system.

Interviews on companies' experience in implementing RSLs and with suppliers to companies with RSLs were a major input to this study. RSLs are here described generally; lessons learned from RSL-related activities are described in a later section.

Being company driven, there is a wide variety between individual RSLs as to chemicals covered, reporting requirements, strategies and level of engagement for supply-chain communications. Additionally, RSLs communicate the need for reporting on the absence of specific chemicals up the supply chain – we can say that companies with RSLs 'pull' the negative-content information they require from their manufacturers / suppliers further up the chain. Manufacturers who sell to companies with a RSL are required to inform themselves from their own suppliers (and their suppliers, etc.) so that they can then report to their customers that they meet the restricted substance requirements.

Verification through periodic product testing is a frequent method of checking that a RSL program is functioning properly. This may be performed at several steps of the supply chain.

4.3 Ecolabels

A brief review of the ecolabels available for use in the textiles sector reveals a broad and potentially confusing variety. Over 70 labels are available for the textiles sector,¹⁴ targeting all aspects of sustainability related to textiles production and use. Many of these are regional or aim to rate multiple facets of environmental impact. Few target as a major variable the chemical content (or lack of harmful chemicals) for the items receiving the label. Of the ones reviewed, the EU Flower (described in the above section) and the Oeko-Tex® Standard 100 are highlighted in this report due to their focus on chemicals and their relatively widespread geographical application.

CiP textile case study

Oeko-Tex® Standard 100

The International Oeko-Tex® Association is a private sector entity providing, among other services, testing and certification of textiles for environmental and safety performance. The Association is made up of “15 well-known textile research and test institutes in Europe and Japan”¹⁶. The product standard of direct relevance to the chemicals in products textiles study is the Oeko-Tex® Standard 100. From the company web site:

“The Oeko-Tex® Standard 100¹⁵ was introduced at the beginning of the 1990s as a response to the needs of the general public for textiles which posed no risk to health.”¹⁶

Products bearing the eco-label Oeko-Tex® Standard 100 are certified to not contain chemicals above the levels for concentration and colorfastness associated with the Standard and are permitted to bear a label attesting that they conform to its requirements. The Standard could be said to be a RSL applied by an external managing / certifying organization (as opposed to the typical RSL, which is company specific).

Some features of note of the Standard include:

- The Standard applies to the full production chain.
- There are differing limits of chemicals concentration depending on the intended user or use category. Thus there is a category for infant products (ages 0-3 years) and the limit levels generally are considerably lower than the limits for similar adult products.

Companies which desire to attach the Oeko-Tex® Standard 100 label to their products first apply to a certifying institute. These are located worldwide, with many developing country institutes being subsidiaries or Branch offices of major (typically Europe-based) parent certifying institutes.

Depending on the product being manufactured and the level of chemical / process information included with the application, a specific set of tests are developed to follow the proposed product through the production chain, and includes all stages of the cycle.

Generally, the more information a company can supply about the compositions of the chemicals that are used in the production processes (e.g. dyes, pesticides, etc.) the less actual product testing is required to verify that chemical levels throughout the production cycle are within the prescribed limits. So if a company has a well-functioning quality management system and can supply reliable, certified information on the chemicals *not* in their supplier's products, it is typically easier and less expensive for them to obtain certification.

Certifying institutes do not offer capacity building services to companies pursuing certification. While this may seem like a lost market opportunity, it does allow the institutes to maintain objectivity in the assessment process. Interestingly however, suppliers to textile manufacturers have found a market opportunity built around the Standard; dye manufacturers for example will certify their products and market them as “Oeko-Tex® Standard 100 compliant”, thus simplifying their customers' product certifications.

The Oeko-Tex® Standard 100 is based on a “negative list”; the specified substances in certified products must be below established limit values. The Oeko-Tex® Association has established an annual procedure to update the criteria and on what chemicals might be added to the restricted list, which includes a consultation of the stakeholders. No extensive discussions within the Association were noted on what chemicals might be added

preemptively to the restricted list (i.e. that would go beyond the current basis on substance restrictions for clothing in target markets) or what similar proactive actions might be appropriate to take.

4.4 Environmental Product Declarations

An Environmental Product Declaration (EPD) is a Life Cycle Assessment (LCA) based tool to communicate the environmental performance of a product or system. ISO 14025:2006 provides the framework for developing an EPD. The procedure builds upon other existing International Organization for Standardization (ISO) standards (e.g. ISO 14024 for third party verified ecolabels).

It provides information about the environmental impacts associated with a product or service, such as raw material acquisition, content of materials and chemical substances, energy use and efficiency, emissions to air, soil and water and waste generation. It also includes product and company information.

Certified EPDs are open for all products and services. There is no evaluation of the environmental information since no predetermined environmental performance levels are set. Instead ISO 14025 requires that the EPD builds on well-structured and quantitative data (such as LCA data from applying ISO standards 14040:2006 and 14044:2006) certified by an independent third party¹⁷. Environmental declarations as described in ISO 14025:2006 are primarily intended for use in business-to-business communication, but can also be used in business-to-consumer communication¹⁸.

This study found that in general EPDs are not currently used in the textiles sector.

4.5 Selected company systems

Some examples of company initiatives of chemical content declaration were found. The activities described here are mainly those which strive to make negative-list or positive-list information about a company's products available to the public.

The web site of Patagonia allows users to scan through the product line and review both positive and negative characteristics of the products. This includes noting the presence in their products of chemicals which are known to be controversial.

Another advanced level of product information disclosure was found in the Respect Code instituted and maintained by the Swiss-based clothing brand name Switcher¹⁹. Manufactured articles are labeled with a code which is unique to each production batch. The code may be entered into the dedicated web site and the user can then access data on the article from raw materials production through to shipping to the wholesale outlet. The data are in general broadly environmentally oriented, but do offer links to composition and content data and certificates of chemical content compliance for the individual manufacturing facilities (e.g. Oeko-Tex® Standard 100 certification).

4.6 ChemicALL system

The ChemicALL database and chemical information system was specifically designed to address needs of designers and purchasers of textile (and later other products). It is

CiP textile case study

highlighted here as a practical example of a tool designed to help designers and purchasers make informed decisions and carry on an informed dialogue with their suppliers on the subject of chemicals present in their final products.

ChemicALL provides information through an interface that allows data to be queried along various parameters, such as fiber type, chemical name or CAS number, chemical category or desired functionality (i.e. stain and water proofing, dyestuff, plasticizers, etc), manufacturing process steps, environmental or health hazard, restrictions (e.g. under REACH or through a voluntary eco-label) and others. Some 250 chemicals known to be in active use in the textile sector are included in the database. Snapshots of the ChemicALL user interfaces for the selection and the results windows are shown in Figures 1 and 2.

ChemicALL is an information system on what chemicals are used in textiles, the function they bring, what legislative restrictions and known hazards are associated with them and on possible substitutes. It is a tool targeted to retailers and designers of textile products and its relevance to the CiP project is twofold: first, it is an excellent example of a tool designed to provide relevant data to a target group at a critical decision-making stage in the textile product life cycle; second, the system grew out of the observation that, at this critical stage in the life cycle, a real need existed for awareness of the issues and capacity for informed decision within the enterprises that were specifying these (chemical) design parameters. Lessons learned from both these elements are elaborated below.

Figure 1: Selection screen in the ChemicALL system

In 2004, SWEREA began to speak with major retailers in Sweden and Europe on chemicals issues related to their textile (primarily clothing) products. It was soon observed that most companies did not have personnel who were deeply knowledgeable in these issues; there was good knowledge of what chemicals provided which function for the final product, but there was a definite gap in what the designers of textile articles understood of the environmental and health risks associated with chemicals commonly available in the manufacturing phase of the industry. At the same time there was a growing pressure from consumers and pending legislation (i.e. REACH) towards producing articles with low chemical environmental and health risk. ChemicALL grew out of these needs and gaps. Investigations on chemicals in actual use and research in peer-reviewed literature ensured inclusion of relevant chemicals into the database.

The screenshot shows the ChemicALL system interface. At the top right, the logo 'swerea|IVF' is displayed. Below it, the copyright notice reads: '© Copyright 2005-2009 Swerea IVF AB. See disclaimer below.' The main title of the page is 'Nonylphenoletoxilates (NPEO) (an example)'. Below the title, there is an 'Add to report' button and a link for 'information updated'. The main content is organized into a table with the following sections:

Swedish name	Nonylphenoletoxilater (NPEO) (ett exempel)	
CAS	9016-45-9	
Categories	Surfactants	2008-11-21
Synonyms	Alkylphenoletoxylates, APEO	
General information	National Chemicals Inspectorate Prio database European Chemical Bureau (ECB) chemicals information system (ESIS) U.S. EPA Substance list Chinese IECSC	
Available information		
Materials	Cotton and similar seed fibres Flax Leather Polyamide Polyester	2008-11-21
Processes	Fiber production Yarn/Fabric preparation Yarn/Fabric production	2008-11-21
Detailed function	Emulsification- and dispersive agents	2008-11-21
Occurrence	Cosmetics Dyes, pigments and printing pastes Emulsification- and dispersive agents in auxiliary textile chemical products. Impregnation chemicals	2008-12-02
Chemical grouping	Alkylphenoletoxylates (APEO) (organic)	2008-12-03
Human dangers	Irritating	2009-02-04
Environmental dangers	The degradation product p-nonylphenol is an environmental hazard	2008-11-21
Test methods	LC-MS, FTIR, LC-DAD	2008-11-21
Alternatives	Alcohol ethoxylates Alkyl glycosides in which the hydrophilic groups are sugars (polysaccharides). Fatty acid ethoxylates Fatty amine ethoxylates. Glyceride ethoxylates (soya bean oil and castor oil ethoxylates).	2010-05-31

At the bottom of the page, the text 'REACH' is visible.

Figure 2: ChemicALL results screen (partial results are visible) for NPEO

5. Stakeholders needs and uses of, access to and experience with CiP information and related information systems

This section refers mainly to information needs in terms of chemical content other than the fiber composition. Stakeholder interviews discussed the needs and uses of various chemicals in products related initiatives, how they are used and reflected on the experiences gained from these. As expected, different regions have different priorities, needs and uses for this information, based on their capacities, the national and stakeholder priorities, and the economic and social contexts. This section also identifies the drivers for providing CiP information.

5.1 Governments

Governments occupy a rather unique role in the chemicals in product spectrum of activities. They are not directly involved in the design, manufacturing, distribution or disposal phases of products and (in their role as policymaker and enforcer) neither as a consumer.

Governments are usually mandated to provide varying degrees of oversight or control to most of the above phases in the textile product life cycle which occur within their territories. Their needs and uses for receiving, processing and transmitting CiP information are therefore diverse and significant. These include:

- During manufacture: that proper occupational safety and health are maintained for the chemicals in use; that only permissible chemicals are employed in the manufacturing processes; that pollution control measures are applied for the chemicals in use, etc.
- For distribution: that traceability of the product origins and identification of the manufacturer or responsible party is maintained; that the proper labeling is maintained at the point of sale and that products offered for sale are properly controlled for allowable chemicals content.
- During use: a mechanism for gathering chemicals information from consumers (e.g. as a product complaint) or from the research community (e.g. in the event of emerging relevant scientific evidence).
- Exchange of information and experience on the above points with other governments.

All governments interviewed for this case study identified areas where significantly more CiP information exchange should take place. Some of the governments of countries with more developed economies felt that both for themselves and for elements of the business community there was clear need for improved textiles CiP information availability and exchange. Environment ministries and enforcement agencies themselves typically have no access to CiP information: it was noted that government personnel interviewed had neither access to negative list data (e.g. from suppliers) nor to data on actual chemical content of products. The alert system RAPEX²⁰ was noted as being useful and widely used in Europe, but this is a European system for rapid notification of problem products and even if the product is not in compliance based on its chemical content, then only that chemical noncompliance would be noted.

Governments in countries where the government and the general public have a relatively high degree of awareness of the potential dangers from chemicals remarked that the textile sector generally was receptive to advice and willing to comply with regulations on chemicals for textiles. They noted however a general lack of capacity in the sector's operators to fully comprehend the issues and thus to take informed action. Small importers were identified as a

CiP textile case study

link in the chain of product flows which frequently has difficulties to find the resources needed for monitoring or controlling the chemicals in textile products.

Through interviews and input with governments in developing countries and countries with economies in transition (DC/CET) it's clear there is a solid awareness that chemicals contained in products (including textiles) pose a potential risk. Examples of instances where chemicals issues were discovered in textiles were not available - as one government noted, there had been no textiles product recalls "because there is no control". Clothes are imported from numerous countries with, among others, new clothes from China and used clothes from Europe and the US. Domestic clothing manufacture was also noted.

Actions being taken or planned to monitor and control these risks in DC/CET include the establishment of norms and regulations to provide the legislative basis, monitoring by customs officials and establishment of laboratory facilities. One example is the establishment of a technical centre for the development of textile products by the authorities of Cameroon and Tunisia.

Most of these activities point to efforts aimed at identifying and controlling hazardous substances which might be contained in products. These efforts can be characterized as risk monitoring and control activities (i.e. one monitors for risks which are known to be possible and works to reduce them). Within the context of the CiP project, this approach works on the negative list perspective; the actions are oriented on preventing the presence in products of identified hazardous substances (typically at certain limit values). There were however no or quite limited activities identified where a dedicated monitoring and communication structure was in place to ensure and/or certify that specific unwanted chemicals were absent.

There were DC/CEIT activities identified where the government had made tangible headway in implementing negative list style regulations. These included a legislative framework of standards in Kenya which for specific products give limit values for controlled chemicals. The responsible government Bureau monitors both imported products and those domestically produced, and carries out as a part of its oversight random testing of both products bought on the open market and samples taken from manufacturers. The government also has a voluntary (requesting party pays) option for manufacturers to test their products for compliance or for a third party to submit a sample it wants tested.

Earlier we described the significant efforts which governments in developed countries apply to carrying out their efforts in chemicals in products regulation, oversight, monitoring and control. Most of these efforts currently follow the negative list approach. Governments in DC/CET also cited the need for increased resources to enable sufficient capacity to accomplish similar (negative list) monitoring and control measures. Looking beyond these, the governments further emphasized their desire and needs for close communication, capacity building and dedicated resources to allow them to participate for all product sectors in positive list oriented approaches to chemicals in products issues, including information exchange.

No efforts were discovered in DC/CET that were oriented towards positive list approaches to chemicals content management in textile products.

5.2 Manufacturers

CiP textile case study

Stakeholders in the manufacturing stage of the textile product life cycle are perhaps in the best position to affect change to the chemical composition of products. Manufacturers in general have considerable latitude in choosing their suppliers and thus influencing the eventual fabrication of textile articles and any chemicals they may contain. In this regard they are in many instances responding to legal requirements for the markets they are selling into or to their customers' demands, and there are numerous arrangements where manufacturers are working both with their downstream customers and with their upstream suppliers to implement a chemicals control system (with a formal chemical information exchange element).

It is important to bear in mind the complexity of textile manufacturing chains in a global production environment. Figure 4 illustrates a textile processing flow chart, showing the major steps of the transformations or treatments. This figure facilitates understanding the major steps in producing a product, while the complexity of the chain is better shown through the Kogg/Thidell diagram in Figure 5 showing more typical arrangements.

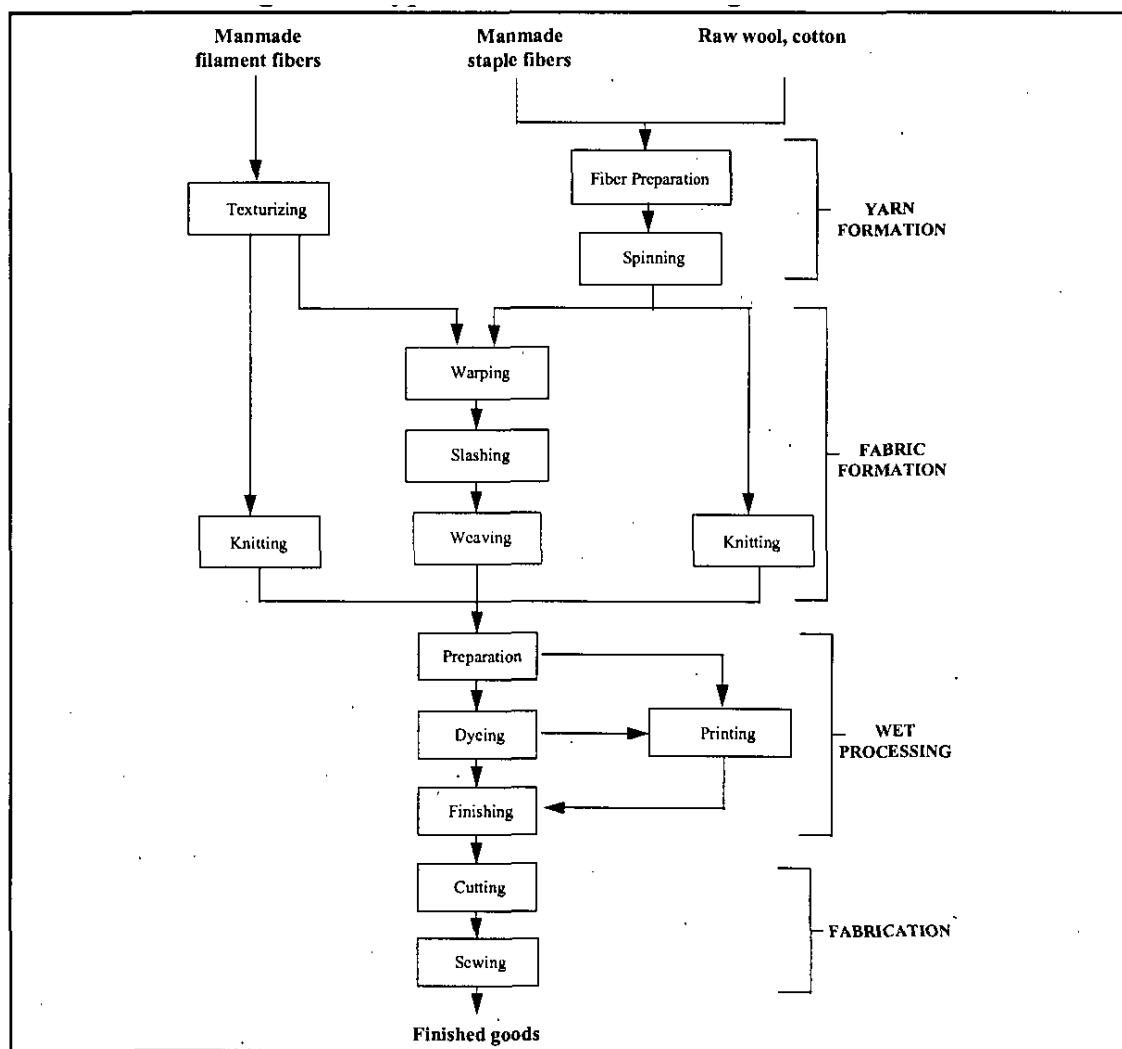


Figure 4: Typical Textile Processing Flowchart²¹

Needs for chemicals content information by manufacturers are broad.

CiP textile case study

- At the design phase, the choice of chemicals which give both desired product performance and also a desired level of environmental or health performance requires a highly informed decision. The means of supplying the needed information must be efficient and fit well with existing design processes.
- Chemicals information exchange amongst partners in the manufacturing phase must be clearly detailed (i.e. format, content, reliability, etc.); the need for this exchange must also be made. Complexity in the business relationships related to the manufacturing processes complicates establishing both the need and the exchange.
- The widespread use of chemicals within the manufacturing part of the textiles life cycle results in a continual need for information exchange over the entire manufacturing chain. While some chemicals used in the manufacture will not pass to subsequent steps, there is a need to know and to be able to transmit which chemicals *will* remain with the product.

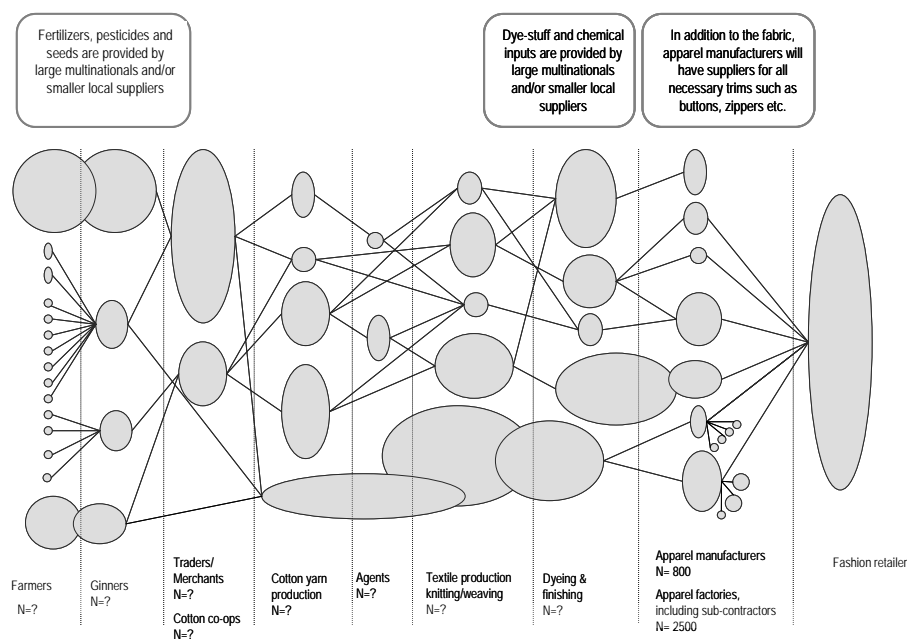


Figure 5: Textile production chain illustrating typical business relationships¹

Looking globally at the textiles market, the supply chain stakeholders who do have in place a negative-content information exchange mechanism account for a minor portion of the global textiles industry. While one might view this situation as a glass which is more empty than full, it is important to bear in mind that the accomplishments in the manufacturing sector have been made in many instances in recent years. Numerous persons contacted for this case study noted a general and accelerating trend towards increased knowledge of textiles chemicals issues and related information exchange. The driving forces behind the trend appear to be to some degree stricter legislation, but in large part there is increasing consumer demand which appears rooted in an greater awareness by consumers of the chemicals-textiles (and general chemical-products) issues.

5.2.1 TrueTextiles

CiP textile case study

TrueTextiles is a large US-based manufacturer whose main products include office panels, office furniture upholstery and hospital privacy curtains. In late-1990's they instituted an internal company policy of environmental performance for their products, which includes the requirement that all suppliers of raw materials disclose to TrueTextiles the composition of the materials.

The proprietary system TrueTextiles has in place, TERRACheck, is the basis for screening / inclusion of raw materials in their manufacturing processes. TERRACheck is an example of a positive list CiP information system – one of the few discovered during this case study. They compare the materials composition list received against a company list compiled from numerous sources and accept / reject the material. The information they require is that their suppliers tell them what is in the feedstock and also chemicals they have added. Laboratory analyses are not required and neither are actual chemical concentrations. By way of a quality check of the system goals, design and functions, TrueTextiles has had an independent external review performed of the TERRACheck system by the Lowell Center of the University of Massachusetts.

TrueTextiles described the significant effort needed to put TERRACheck in place: one notable point is that most of their suppliers did not have significant concerns with participating in the system as long as their proprietary information was protected. This was accomplished through a secure set-up for receiving and storing the information TrueTextiles receives. The data received is not shared with outside parties (in fact only one TrueTextiles employee has access to the locked data).

While the efforts described to put in place and run TERRACheck are significant, the author didn't see a huge gap between the efforts to establish TERRACheck and those of the more advanced RSL control systems*. In fact looking at some of the ways that the more advanced RSL programs are set up, one can say that they make a step towards the structure and goals of a positive system. A fully developed RSL will include robust negative list controls such as third party testing of raw materials, a chain of custody for information and supplier outreach. It will combine this with an internal company policy requiring staff informed on chemicals issues beyond the legislative requirements and engaged in improving chemical content of the company's products. Examples are noted in the next section of retailers using their RSLs as the framework for achieving improved product chemistry. TrueTextiles noted that their positive list system provided the information which led to their successful substitution efforts (of an authorized flame retardant to one the company felt was of less concern). That similar types and levels of efforts may be required to set up and administer both positive and negative lists for CiP information exchange should be an encouragement to those in the supply chain who desire to know more than only what is not in their products.

5.2.2 Interface Corporation

Another example of a positive list approach is found at Interface Corporation. Interface manufactures carpets in numerous facilities in North America, Europe and Asia. The company has a wide-ranging program towards environmental sustainability, including for chemicals in products. Interface estimates that overall they have around 12 staff (out of ~5000 total) committed to managing sustainability efforts.

* This observation comes with the caveat that within the context of a telephone interview one can not conduct thorough investigations, and the suppliers involved in TERRACheck were not interviewed.

CiP textile case study

The main vehicle for communicating chemical information with Interface products is an Environmental Product Declaration (EPD). This document will accompany a product and contains extensive performance ratings and other information on facets related to the product's sustainability. Development of an EPD includes a life cycle assessment, and for this Interface relies on ISO standards.

CiP information which is required from Interface's suppliers includes a positive list of chemical ingredients for all materials entering Interface's production processes. This includes data on concentrations derived from laboratory testing. While the suppliers and Interface have non-disclosure agreements to protect supplier confidential information, this information on the compositions of the feedstocks is available within Interface. Additionally, chemical composition information of relevance is made available through the EPD documents.

Introduction of new dyes or chemicals into the manufacturing processes relies upon procedures that are set out in internal company protocols. These documents outline the procedures for screening new chemicals and contain the list of restricted substances which are excluded. Interface has different methodologies for varying production locations, due to local regulations that have differing requirements for reporting and thus for chemicals tracking.

Interface noted some of their uses for the data and the product changes brought about through having the data available. One is the phase-out of certain problematic chemicals. Stain resistance treatments are being phased out of Interface carpets. Flame retardants are (completely or almost) phased out.

Interface does not use CiP information to market their products, and this is similar to other manufacturers and distributors / retailers interviewed (i.e. with RSL systems). CiP information is not used for marketing purposes because Interface feels that 1) given that their products use chemicals and sometimes are fabricated completely from synthesized chemicals, there will always be some level of criticism that their controls and efforts are not sufficient, and 2) to effectively and reliably screen for all chemicals all the time is a difficult task, particularly due to the continuing changes in chemicals of concern. Considering these factors, it was judged that the risk of damage to the company's reputation (e.g. through a real or perceived lapse in chemicals control) outweighs the benefits of reporting their products' chemicals makeup. Nonetheless Interface is recognized as one of the most advanced carpet manufacturers with respect to their products' chemical control and information exchange.

A full EPD for a carpet product can run 20-30 pages long. A significant portion of the EPD is dedicated to CiP information. One of the challenges of making available EPD information is finding a suitable format and length so that it will be read and can be of use to a customer. Interface is experimenting with reduced digests of information and remarked on the difficulty of capturing the EPD data in a condensed document. The efforts and lessons learned here would be of interest to the CiP project. A point to note on this is that Interface's customers are typically more institutional buyers than individual consumers. These institutional buyers might be expected to have more capacity and desire to seek out and use CiP information than the 'average' general public consumer.

5.2.3 The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers (ETAD)

CiP textile case study

One large brand name apparel company noted that major dye manufacturers are among the companies which review and comment on the company's RSL: clearly there are good communications in place between some of the key actors in the manufacturing stage. Discussions with a dye manufacturers' association did in fact confirm this close supply chain communication.

The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers (ETAD) described their activities in this area, which reveal a high level of awareness of the need for their members to control the chemicals in their products. The drivers for this are both legislative (e.g. REACH), to comply with the restrictions of ecolabels and company RSLs and also activities related to the chemical industry's Responsible Care initiative. ETAD represents the dye industry on regulatory issues and is involved in risk assessments, cooperation with consumer organizations and various other activities.

ETAD's activities include both guidance to members and monitoring for compliance. The Association issues a mandatory code of ethics for its members, which includes a prohibition on marketing dyes which can release certain hazardous chemicals (e.g. azo-amines). By maintaining close working relationships with brand name manufacturers and authorities, ETAD follows legislative and other restrictions relative to the dye and pigments sector and can supply to its members the appropriate information. They also follow discussions around developments re: emerging issues such as nano-materials.

An important level of oversight is maintained through the requirement for product testing of members' products and transmission of the results to ETAD. The test results are maintained as confidential business information.

ETAD was founded in 1974 and is based in Switzerland. They now have operations in Japan and North America, as well as in Europe. Engagement of dye manufacturers in DC/CEIT has been a part of their activities in recent years, with Operating Committees established for China and India, though the focus in these regions is broader than in the developed countries. The Association's activities are, for example, directed towards assisting manufacturers in cleaner production.

5.3 Distributors and Brand-name companies

In this report we define distributors as those companies who are receiving final manufactured goods and delivering them to a point of sale. This category would then include many brand name companies, some of which also have major stakes in retailers or operate their own retail chains. It also includes importers and those involved in transport / shipping operations.

Needs of this group of stakeholders are often related to legislated requirements. When the product is put on the market, for example, the product safety laws described earlier might be the framework detailing product content restrictions, labeling requirements, testing, etc. At the point of import there are frequently similar restrictions on product content, what can be brought into the country and what information is required to show compliance. These legal responsibilities are for their respective stakeholders areas where the appropriate chemical content information may be needed or useful in meeting their obligations.

Additionally for companies which are known brands, the brand name and business risk (including to chemicals-related crises in brand products) must be assessed and a suitable risk

CiP textile case study

management strategy put into place. Looking beyond this risk, the image of the brand name can also be positively effected through access to and use of suitable product chemicals information. All these issues require formulating a corporate strategy, which itself has a need for knowledge on products' chemical content.

It was noted from a number of interviews with those in academic, research or government sectors that there is a widespread lack of awareness on textiles chemicals in products issues among the distributors. On the other hand, there was also noted a general desire within the sector to comply with regulations. Furthermore there are examples of companies who are very proactive in pursuing advanced levels of controls to assess, control and communicate the chemicals used and present in the products they distribute.

Within the textiles sector, distributors (and specifically brand name companies) have been leading the efforts to control chemicals in textile products. The great majority of these efforts center around negative lists, as companies seek control of the chemicals in their products and to protect their brand image from the negative publicity that a serious lapse in this control could bring.

There are also examples tending towards positive lists. The web site of Patagonia was noted earlier and includes both positive and negative characteristics – including in some instances chemicals content - of their products. The clear disclosure of a chemical which may have a (negative) influence on a consumer's choice was a rare find during the course of the Study and in the authors opinion is a commendable step by a company.

The Respect Code web site described in Section 4 contains information on many environmental performance indicators (CO2 produced, water used in production, etc.) and also on the various manufacturing steps along the production chain and the chemical certifications for the individual facilities. While the Respect Code site is not currently used to provide detailed CiP information, there is some chemicals related data given. To date, Switcher has tagged over 23 million articles with a traceable code that provides details on the production-batch level.

5.3.1 Experience with Restricted Substance Lists (RSLs)

Arguably the most widespread of the chemicals negative list efforts are those built around Restricted Substances Lists (RSLs). That there is not one common RSL reflects the facts that companies have different rationales for establishing a RSL and in choosing the chemicals which are on it. To note is that the companies interviewed (Puma, Levis Strauss, H&M and Nike) could be considered among the vanguard of large textile brand names with respect to the use of RSLs for chemical quality control and information exchange (with upstream suppliers). This is not to say other brand names are not at the level of the efforts described below but to bear in mind is that the efforts described below represent the state-of-the-art for activities within and built upon RSL efforts.

The American Apparel and Footwear Association (AAFA)²² is a major textile industry association and promotes the use of RSLs for its members. In September, 2010 it issued its 7th RSL. Notable passages from the AAFA RSL include:

- “This Restricted Substance List (RSL) was created by a special working group of the American Apparel & Footwear Association's (AAFA) Environmental Task Force.

CiP textile case study

The RSL is intended to provide apparel and footwear companies with information related to regulations and laws that restrict or ban certain chemicals and substances in finished home textile, apparel, and footwear products around the world.”; and

- “The RSL includes only those materials, chemicals, and substances that are restricted or banned in finished home textile, apparel, and footwear products because of a regulation or law. In each case, the RSL identifies the most restrictive regulation.”²³

Working closely with AAFA on RSL issues is the apparel industry retailers’ Apparel and Footwear International RSL Management Group (AFIRM)²⁴. Within this forum a number of the apparel industry’s well-known brand name companies exchange experience on restricted substances control in their products. Promotion by AFIRM of RSLs among its members includes the development of the RSL Toolkit (in English and Chinese).

From interviews with members of AFIRM, it is clear that there are major brand name companies of textile products who are active in chemical quality control for their products and that these companies have made significant and sustained investments to ensure their products do not contain unwanted chemicals. The efforts and investments involved around a company implementing a RSL on their supply chain may include staff following textile chemicals policy and issues, integrating this work into decisions around product design and interfacing with their supply chains to ensure their suppliers have sufficient capacity to comply with the company’s chemical restrictions. This last point typically requires considerable communications with the suppliers to ensure they are aware of the RSL requirements and can implement them.

Of particular note for the CiP project is that firms within AFIRM with RSL activities maintain their own internal list of restricted substances and efforts with their supply chains. The possibility of a combined effort has been discussed, but to date a common RSL, or a more positive-list oriented effort, has not been undertaken. It was noted that a common RSL would be desirable. This would ease suppliers efforts in responding to their customers’ demands and facilitate chemical quality assurance.

Different suppliers will have different guidance or capacity-building requirements. Some suppliers are ‘vertical’ in that they carry out many of the manufacturing steps. A supplier who is spinning, weaving and dyeing the cloth prior to then carrying out the actual article fabrication has a business structure which allows them to communicate through a large part of the manufacturing cycle. Such suppliers have typically less need for guidance on how to query up their supply chain for RSL information than one which is performing primarily cutting and sewing. Also linked to capacity requirements are the types of products being made. A simple white T-shirt will not require the same level of effort to provide oversight as a product with dyes, printing, buttons, etc.

This study found examples of a range of capacity building activities from companies with RSLs and their supply chains. Companies with a RSL programme may simply communicate the requirements to their finished article suppliers and the final suppliers are then responsible to ensure these requirements are met by their own suppliers. Others carry out training activities on the supplier’s premises, review and provide feedback on the supplier’s operations and make inspection tours and take samples to make spot check analyses. There were also examples of brand name companies with a RSL requirement engaged in fostering ‘vertical’ communication as a part of their supply chain capacity-building. Activities cited included

CiP textile case study

visits to dye houses (together with the suppliers performing the cutting and sewing) and sampling of materials prior to dyeing (e.g. for pesticide residues). As noted earlier, some companies have also established good communication with the dye manufacturers.

One large brand name company contacted has specific requirements for its manufacturers to provide product information sheets from the manufacturer's suppliers : these suppliers must provide details on which of the substances on the brand name's RSL might be present in the supplier's products. The sheets are provided to the manufacturer and must be forwarded to the brand name company. The brand name company will approve the list of ingredients before the manufacturer can start making products. According to the company the flow of information works well and the system can be used to screen out suppliers who do not or can not provide the required data.

Oversight and spot checking of the RSL that information suppliers provided did vary among the brand name companies interviewed. One required that every material that went into their products was tested. Another based their testing requirements on experience and use or user category: materials and dyes which were known to potentially contain unwanted chemicals were required to be tested with a higher frequency, as were materials destined to be incorporated into children's products. All the brand name companies interviewed for the study had rigorous and frequent testing as an integral part of their RSL work, and all had some level of spot checking and random tests as a part of their programs.

One brand name company noted that they have a rating system for their manufacturers based on the number of chemical content tests successfully passed. This rating provided both a metric for tracking the manufacturers as well as an incentive for the manufacturers to practice effective chemicals screening and control. Another notable example was where a company was able to respond to new legislative requirements on limits for lead in children's products: the company was able to query their RSL data repository and provide thousands of test results which showed that no lead was present.

5.3.2 Activities which build upon Restricted Substance Lists

An important point to note from the RSL programmes is that these activities can provide the framework to put in place more ambitious or proactive chemicals information exchange. Companies who are leading in the implementation of their RSLs were found to have a corporate culture towards chemicals in their products which went beyond meeting existing legislative requirements. These companies were concerned with preparing for pending legislation on chemicals (for example under REACH) and were using their RSL networks to communicate upcoming changes as well as to address them before they have become a legislative requirement.

More proactive measures were also noted, including use of the RSL network to review product chemistry generally and to target chemicals which could be substituted by alternatives with less hazardous characteristics. Knowledge on the effects of chemicals used in products is constantly evolving; companies have an advantage if they can anticipate required or desired changes to their future product chemistry, especially given the costs and long lead time frequently needed for effecting such changes within a large-company manufacturing chain.

An example of where a positive list based activity grew out of a negative list communication network is where a brand name company, using composition information of certain parts of

CiP textile case study

its products which it received through its normal RSL contacts, then worked to improve the formulation. The resulting component with improved chemistry (from the environmental standpoint) and fully acceptable product performance is encouraged among all its manufacturers. Similarly the company plans to start making available soon to their manufacturers the data they have received for certain critical supplies such as dyes or inks and the data for those suppliers with the most favorable chemistry.

While it is outside this Study's scope to investigate beyond chemicals in products information systems, a general trend seen was that the companies with the more advanced RSL efforts also had relatively advanced environmental and / or social programmes. The chemicals in products efforts would frequently be linked to these other efforts, be they in the form of sustainability initiatives, social compacts or extended producer responsibility.

One brand name described a means of marketing that their products did not contain undesired chemicals. They have put together an overall environmental index relating to their products performance and including elements like water efficiency, amount of waste generated and desired chemical use (e.g. avoidance of solvents, use of most preferred chemistry, etc.). The resulting index rating will serve as both an indicator to the public of the environmental performance of their products and an incentive to their manufacturers to achieve the higher ratings. Importantly, it will incorporate and communicate chemical performance data – something this Study found to be almost universally absent in public communication on chemicals in products.

5.4 Consumers

The needs of consumers for chemicals in textile product information can be broken into two categories; those of general consumers and those of organizations representing consumers. Consumer-interest organizations generally have varying degrees of knowledge on issues surrounding chemicals in products, on the relevant legislative requirements and developments, of the manufacturing processes and of the knowledge base for identifying chemicals of concern. These organizations need knowledge on all of these topics: CiP information is then needed to be able to take appropriate actions.

One benefit which was generally not realized by any company interviewed was a marketplace advantage. This at first was rather surprising, given that consumers would be expected to respond actively and positively to a product with a 'safety assurance'. However all companies interviewed who spoke on the issue noted that the subject of chemicals (meaning here chemicals of concern) was judged to be too risky to discuss with consumers, and so no direct message related to chemicals was attached to the products. Some companies did however incorporate negative-content information into a broader message on environmental sustainability that went with the product. This points to a continuing need for finding effective ways of communicating chemicals (in products) messages to consumers, not only for purchasing decisions but also so that they are informed and can take the appropriate (e.g. care or disposal) actions with the products.

Consumer needs for information are also centered around the consumers' informed choice on which products to buy. Needs identified include chemicals content related to product safety (e.g. from harmful chemicals, irritants or allergens), consumer preferences for more ecologically-sound products or certain fiber content and relevant care and disposal instructions. Perhaps more than for any other stakeholder group, individual consumers

CiP textile case study

represent a challenge with respect to finding an efficient means of exchanging the needed information

The individual consumer's ability and desire to seek out CiP or negative-content information varies widely. One of the drivers to the improved control and disclosure of the chemicals in textile products has been demand from informed consumers. Typical direct consumer chemicals in products requests are not for specific chemicals information but rather for assurances of lack of risk. Direct customer feedback was noted as a specific avenue for one brand name company to assess its customers' demands. One large distributor / retailer noted that, though REACH legislation specifically provides for consumers to be able to ask if a specific Substance of Very High Concern (SVHC) is present in a product, they had received only five requests for such information in 2009.

Others drivers include pressure from NGOs representing consumers or active on chemicals-related issues and chemical-content reporting by consumer-oriented periodicals. NGO requests may be considerably different than those of consumers in the general public, reflecting both the NGO's agenda as well as the different levels of awareness and ability to handle chemicals information which a NGO may have.

While consumer demand is a major force for increasing the exchange of CiP information, it is not yet clear the level of detail which is appropriate and in what format the information should be available to the consumer. Public interest NGOs contacted for this study suggested that consumers should not be expected to have the background needed to make decisions based on product chemicals information. Yet when that same chemicals information is made available by the NGOs through media channels (and the chemical is thus placed in context and the background is provided) then consumers are indeed interested. In fact, interest in media articles on chemicals in products is among the highest of all environmental issues reported. A particular area of high interest for textile products is with children's clothing. All this evidence suggests that a general public which is aware of, but not necessarily educated on, the facts surrounding health and environment risks from textile chemicals in products has a keen interest to be informed.

It is clear that consumer awareness of issues around chemicals in products is a necessary driver to requests for CiP information, yet awareness alone does not create the context for an informed decision. The common mechanisms for creating that context or informing consumer decisions include outreach from government agencies and NGOs (e.g. newsletters, web sites), media articles and ecolabels. These are sometimes targeted to different parts of the consumer stakeholder group. For example, government web sites frequently provide information for the general public as well as post policy or research information more targeted to public interest NGOs, which have more capacity to utilize specialized information.

Ecolabels are a communication means which typically targets the general consumer. Consumers must actively seek the details that are 'behind' the label to have the full background on what the label signifies. Media articles are perhaps one of the most effective means of raising awareness overall. Targeted and topical articles and reports on chemicals in products issues appear in both mainstream and specialized media (e.g. newspapers, periodicals, alerts) and, given the feedback mechanism of public pressure, have proven potential to be effective in catalyzing action.

CiP textile case study

Of particular note, the above paragraphs are primarily applicable to developed countries. During the course of this study, little evidence was found of any of the cited mechanisms being used for providing CiP information in developing countries and countries with economies in transition, with the exception of some NGOs. There was reference to consumers in developing countries who would avoid hazards associated with specific products when they were made aware of them, even if the alternative products were more expensive. Clearly this points to a need for further discussion on mechanisms to raise awareness throughout the textiles sector stakeholder groups in developing countries and countries with economies in transition.

Within the developed countries, examples were noted in a number of product groups, including textiles, where a product was tested to contain a chemical of concern (CoC) and the resulting disclosure in public media and/or communication with the distributor or retailer led to reductions or elimination of the CoC in the product. While no analogous situations were reported by NGOs in developing countries, positive interactions on non-chemicals in products issues between local industry and NGOs were noted; such parallel examples were given of when NGOs produced evidence to media and to a company of the company's polluting processes and the company responded by reducing the environmental impact of their operations. Such a framework does offer possibilities to address chemicals in products issues in developing countries.

NGOs noted a number of ways which are used for obtaining chemicals in products data, including product tests, inquiries to companies directly (either as a voluntary disclosure or under REACH Article 33 provisions) and access through legally required disclosure mechanisms. The access to reliable data, test or otherwise, was noted as a key issue and bottleneck for public interest NGOs. Interestingly, no CiP information exchange system *per se* among public interest NGOs was discovered during this case study. Testing and reporting activities such as GoodGuide.com and HealthyStuff.org are designed to communicate to the public, but between NGOs CiP information seems to be transmitted via the usual communication channels between contacts in the NGO community.

The case study interviews confirmed the common life experience that the consumer's choice of products is made based on numerous factors, including price, design and perceived quality, and that when the consumer is aware of chemicals in products issues that this can become a factor as well. This suggests the need to discuss factors in the decision-making process, such as what weight chemicals in products issues have in purchasing decisions, how these correlate to level of awareness, socio-economic conditions, perceptions of risk (e.g. is the product for themselves or their child) and others.

Reflections in some of the NGO interviews were that although considerable progress had been made (in developed countries) on controlling harmful chemicals in products, there is a need for a comprehensive overall regulatory structure to address chemicals in products issues (in general, not just in textiles). Progress made is perceived to be spotty, sometimes temporary and on the whole quite slow. The opinion was that the current incentive structure is too weak for promoting sufficient chemicals in products controls, and that voluntary initiatives have not achieved the needed performance. Implicit to this perception is that information flow on chemicals in products must also be improved.

Interviews with developing countries revealed a limited awareness that chemicals in products have the potential to cause negative effects. Interviews with stakeholders in Africa identified

that knowledge on issues of chemicals in products is generally absent from the public at large and that efforts in governments are concentrated on eliminating the content of known hazardous chemicals in products (e.g. mercury in cosmetics). Within the manufacturing sector, examples of chemicals management were found which related to improving environmental performance, such as substitution of more harmful processing chemicals by less harmful ones.

5.5 Textile recycling and waste issues in relation to CiP information

A research report prepared for the UK Department for Environment, Food and Rural Affairs in 2007²⁵ states that reuse and recycling of all textiles provides environmental benefits partly due to high resource requirements of primary material production and that reuse and recycling of clothes is low despite excellent work of charity shops. A recent and not yet published study in Sweden looked at recycling of textiles, mainly clothing, and found that there is in principle no large-scale recycling of these textile materials in the country²⁵. Some but very limited recycling into other products were found, mainly in other countries, including stuffing of furniture and recycling of synthetic textiles into other plastic materials. A large portion of textile waste was collected and the majority thereof exported as charity or sold to other countries²⁵.

No study could be identified that addressed chemical content issues in relation to recycling options for consumer clothing, although there was awareness of potential problems.

One current investigation (WHO/UNEP) on long lasting insecticidal bed nets (LLINs) looks at a specific issue which illustrates some of the difficulties of ensuring proper content tracking and related consumer communication. LLINs are distributed in large number in malaria endemic regions as a means of personal protection from the mosquitoes which transmit malaria. The nets are made of plastic fiber and are treated with an insecticide to increase their effectiveness. A study is underway addressing the communication issues on handling and end-of-life options for LLINs. The investigations so far have identified a need for proper labeling of the nets and/or packaging and discussions are ongoing and looking at options (e.g. a harmonized set of pictograms to be used by all net manufacturers, tags that are legible for the life of the net, etc.).

6. Gaps and obstacles in information exchange

The previous section presented a number of cases where negative-content information is exchanged. At this point we would recall the distinction between negative-content information and chemicals in products information. “chemicals in products information exchange” is when some or all information on the chemical composition of a product is passed on through some stage of the product life-cycle. “Negative-content information” is when some information about the chemicals *not* in a product is passed on. Thus an RSL, being a negative list, is not CiP information but negative-content information. Positive lists are CiP information (and clearly can also be negative-content information). This distinction is not to imply a value judgment: discussions on what information is needed by which actors and in what format are ongoing within the CiP project. The two terms are defined to facilitate the future dialogue.

Looking historically at chemicals in textiles and associated information needs, access and gaps, the majority of efforts have been driven by the need to ensure that hazardous substances

CiP textile case study

were not present in a product. Regulators designed legislation and monitoring and control measures to minimize the presence of chemicals of concern in products. Consumers would learn of a harmful chemical being associated with a product and seek assurances that the products they bought did not contain it. Manufacturers would put in place measures to ensure the identified chemicals were not present in their products and take steps to eliminate it if necessary.

6.1 Resource gaps

The exchange of CiP or negative-content information in an efficient manner and integrating this into the business of a textiles manufacturer, supplier, brand owner, distributor, etc. demands a considerable investment. Firms must first determine that they need to be involved with an activity which is historically not a part of their core business and then to quantify what their objectives are for the information exchange activities. Expertise in chemicals issues may not be readily available or may require additional personnel or training.

Looking at the example of a single information tool, the ChemicALL system described earlier currently encompasses an on-line database and related support activities for the firms using the tool. These activities include six large multi-user meetings per year, an annual one-day visit to subscribed users and in-company workshops on an as-needed basis. Guidance and similar supporting documents were developed to assist companies with using the system internally and in interfacing with their suppliers (e.g. when requesting chemical content information). Companies using the system range from global leaders in their sector to mid-sized, with larger firms perhaps having one or more full-time employees using ChemicALL and smaller firms with someone working part-time with the system and on product chemicals issues. The ChemicALL system itself requires two to three full time employees.

Large companies with substantial RSLs or positive list activities noted staff levels of around a dozen persons to operate these activities. Other interviews cited efforts for small companies into chemicals information exchange and associated activities, such as investigating chemical restrictions and alternatives during product design, as requiring staff at least part-time. The costs associated with ecolabels was also noted as a barrier to adopting these measures. Clearly, there will be an initial investment and operating costs for a company to be knowledgeable on the chemicals contained, or not contained, in their products.

Capacity building needs related to information exchange would be expected for the spectrum of stakeholders becoming involved in chemicals in products issues. Related to this gap see also Section 6.4.

6.2 Barriers to establishing information exchange

Significant barriers found among the companies interviewed included confidential business information. An in-depth investigation of this topic was not carried out, but an industry-wide agreement of what should be considered CBI seems to not exist^{**}. Indeed, various companies

^{**} SAICM Overarching Policy Strategy, Chapter 15(c) states:

To ensure that, in making information available in accordance with paragraph 15 (b), confidential commercial and industrial information and knowledge are protected in accordance with national laws or regulations or, in the absence of such laws or and regulations, are protected in accordance with international provisions. In the context of this paragraph, information on chemicals relating to the health and safety of humans and the environment should not be regarded as confidential;

seem to have established differing levels of confidence – and differing levels of exchange of confidential information – with their suppliers. The topic is complex and may be difficult to address through standardized practices: it remains a significant obstacle to fulfilling requests for information.

Another barrier in starting information exchange is in establishing the need for the exchange with the business partner. This includes what information is required and why. Even *that* the information is needed is sometimes an issue - some companies mentioned that they had to sometimes make it clear to their partners that information exchange was a condition for doing business. So clearly there is a lack of an intrinsic driver in certain areas of the production chain and a lack awareness of the need to exchange information is an obstacle. This is especially true among the stakeholders without a clear legislative responsibility for ensuring proper chemical content in the finished textile products.

6.3 Keeping any information exchange system current

While in some instances linked to resource gaps, one notable obstacle for any system of chemical information exchange is to make sure it continues to fulfill its objectives*. The dynamic environment of evolving chemicals knowledge, legislation in development and changing suppliers and customers require a continual assessment of any established system to ensure it remains current with external requirements and with meeting its objective within the company. A high level of activity and communication is maintained by AFIRM Group members and also among the stakeholders using ChemicALL for example.

6.4 Gaps in expertise and knowledge

The gap in expertise and knowledge cuts across the entire life cycle of textiles.

Companies who wish to establish chemicals information exchange are operating in an area outside the traditional core functions of their business – knowledge and expertise need to be built. Even with dedicated staff, sources of information on chemicals issues are frequently not available or information is not tailored to the needs of the sector.

Consumers require a system of presenting chemicals or CiP information which is clear and understood in lay terms.

Governments require understanding of the issues around CiP information in the large and complex economic sector (as well as the expertise to effectively use this information to oversee activities).

6.5 Cultural and linguistic gaps

* For example the objectives specified in the SAICM Overarching Policy Strategy, Chapter 15: 15. The objectives of the Strategic Approach with regard to knowledge and information are:

- a. To ensure that knowledge and information on chemicals and chemicals management are sufficient to enable chemicals to be adequately assessed and managed safely throughout their life cycle;
- b. To ensure, for all stakeholders:
 - i. That information on chemicals throughout their life cycle, including, where appropriate, chemicals in products, is available, accessible, user friendly, adequate and appropriate to the needs of all stakeholders.

The textiles industry is highly globalized and just ensuring that the communicating partners understand each other and that the right information is coming from, arriving to and understood by the correct persons can pose great difficulties.

6.6 Gaps in communication and coordination between governments

Governments have few systematic mechanisms for communicating amongst themselves on matters of product chemical safety. The RAPEX system was the only one found in this study. Though it is being expanded to include countries outside of the original EU users, it is a reactive system and is not designed to transmit chemicals or CiP information. A common CiP information exchange or sharing system would be beneficial to governments in their efforts to incorporate product chemicals issues into their efforts to manage and control risks from chemicals contained in products.

6.7 Developing countries / countries with economies in transition

As a last point in the gaps and obstacles section, it should be pointed out that virtually all the obstacles identified above are frequently found in developing countries. This would suggest that activities to addressing the gaps and obstacles would need to be designed accordingly.

7. Potential ways to addressing gaps and obstacles

This case study has presented background information on RSLs, eco-labels and similar efforts in the textiles sector. These negative list-based activities have enabled enormous gains to be made in product safety and control of hazardous chemicals. Efforts aimed at eliminating harmful chemicals from products by banning them or setting content limits have shown that they can and will continue to be effective in reducing hazards and risks.

Although not fully meeting the definition of a full CiP information declaration, negative list type systems would be able to offer sector stakeholders (mainly within the production chain) the opportunity to improve their general awareness and specific knowledge of textile related chemicals issues.. Widespread adoption of these types of efforts already in use by stakeholders in the business and industry group could bring significant benefits by building up capacity to make informed decisions in the design and production part of the life cycle.

Without detracting from the significant gains brought about by negative list methods of product chemicals controls, it must be recognized that one of the limitations of a negative list approach is rooted in its reactive nature. If we look at a current example of a newly emerging chemical of concern (e.g. perfluorinated compounds used in textiles) the approach which a negative list follows is to first investigate if the chemical is present in a product prior to considering suitable actions. It can take years until these controls are effective: CiP information system would help companies in being prepared to take early action. Of note is that the European Chemicals Agency (ECHA) predicts that the Candidate list will increase to some hundred substances within the coming years. All of these will be CoC and will presumably need to be added to negative list systems. It is arguably preferable for manufacturers and distributors to know what is in their products than have to repeatedly ask their suppliers about the new substances.

One of the key questions to be addressed by the CiP project is how to facilitate information exchange on the chemicals that *are* present in products. While greater adoption of the mechanisms for information exchange on how to avoid risks from known chemical hazards in textiles is to be encouraged, the more ambitious goal of chemicals in products information exchange must be kept as the ultimate objective.

There are CiP information exchange activities underway. Both in the manufacturing and retailer-distributor phases of the life cycle and through consumer interest groups, relevant data on what is actually contained in textile products is sometimes available. This positive listing approach is however not widely used and has not been underway for as long as the negative list efforts. They are taking place typically on a voluntary basis and unlike many negative list activities do not have a legislative requirement which to some extent shaped the latter (i.e. RSLs). There are three positive list efforts discovered in this case study which could correspond to a CiP information system. Expansion of such activities would be very useful in advancing towards the goals of SAICM, however as discussed in more detail below, many facets need to be considered if a wider application of these systems is to take place. There would be an advantage of having a uniform set of objectives and operational parameters to help shape an eventual information exchange system. Many have also expressed positive aspects of having such a standardized system for the stakeholders in the production chain.

7.1 Potential avenues towards improved CiP information exchange

A goal of the CiP project under SAICM is to recommend possible cooperative actions that would lead to increasing CiP information exchange. While negative-content information exchange does not actually aim at transferring chemicals in products data, these extensive existing initiatives need to be considered and possible built on in any discussion of future CiP information transfer. Even more important would be to use the experience from today's systems which are providing a positive list style of data.

Some possible avenues for moving forward with textiles sector chemicals and/or CiP information exchange are outlined below and consider as appropriate these existing negative-content information efforts. These avenues will hopefully serve as starting points for the discussions aimed at identifying suitable future collaborative efforts.

7.1.1 Build upon existing RSL efforts

Of all the information activities in the textiles sector, the restricted substance controls and communication networks are clearly the most widely used. The potential to build upon these are:

- 1) To promote the further expansion of RSL efforts by those in the sector not currently involved in negative-content information exchange. As we have seen, the establishment of a robust RSL system by a distributor (and back up the supply chain) brings a large measure of awareness to the actors involved.
- 2) To utilize the existing capacity and communication infrastructures to begin communicating positive list types of data. There are already some RSLs which have test data related to their application. Given that some product testing is occurring, the question then becomes how to adapt the current efforts to transmit positive list data. Issues to be resolved here include which chemicals to be included (all?, some / which?), costs and reliability for the data, etc.

CiP textile case study

It's important to recognize with the latter option above that reporting positive list data requires a significant shift in disclosure of product information. As noted elsewhere in CiP project documents, this issue alone encompasses numerous topics requiring consideration (confidential data, differentiated use of and access to the information, etc.).

Earlier we described the personnel and activities in some of the larger brand name companies for administering their RSL systems. The efforts to put in place the control and communications infrastructures for negative-content information exchange represent major investments for the stakeholders involved.

A potential way of facilitating broader adoption of RSL efforts is to reduce the complexity and costs of setting up and running such a system. This idea has been discussed by the community of companies currently using RSLs and to date a standardized or baseline system has been developed on a national scale (e.g. by AAFA) but international efforts have not arrived to this point. The development of a textile-sector specific RSL would be a good step towards allowing more standardized application or roll-out procedures to be developed. Specialized expertise and services would naturally be expected to develop to assist companies in implementing such a standardized RSL. A sector wide approach to RSLs could also facilitate communication on product chemicals issues with governments and consumers, lessening the costs associated with those activities.

7.1.2 Ecolabels

Certain textile sector ecolabels in use today transmit product negative-content information. The ecolabels investigated for this study are generally aimed at capturing numerous performance indicators of a product, with chemicals having more or less importance in the product rating. Confidence in the label is also linked to the reliability of the data and the methods of assigning and evaluating indicators – “greenwashing” through the use of an ecolabel has been a problem in the past.

In this study the Oeko-Tex Standard 100 was the label found to be in extensive use, which focuses on chemicals in textiles and which had robust testing techniques associated with them.

An ecolabel which is properly designed and operated (i.e. an ISO 14000 Series standard, Type I label) can be used to achieve benefits similar to those outlined in point 1 above for expanded RSL efforts. Expanding the geographical range and level of use in the textiles sector is being actively promoted by the current labels' owners and this is part of a continuing and positive trend in chemicals information exchange.

As with RSLs, most chemicals-oriented ecolabels have their roots in legislative requirements: moving beyond the current basis aimed at compliance would offer a chance for companies to have an enhanced rating on their products. Investigating such an option would need to consider multiple facets (consumer attitudes, what new chemicals – or hazard classes - to cover, target markets / products, communication strategies, etc.) and balance the potential negative elements (e.g. adding another ecolabel to the market, potential dilution or perceived value lost for the standard ecolabel) with the positive aspects of a more encompassing ecolabel.

The application of ecolabels to transmit CiP information would require a major shift in how such a label would operate with respect to those in use today. Whether a new label was

developed or a modified one added to an existing system, the structures to ensure the reliable exchange of positive list information in the manufacturing chain would need to be built. Such a difference in the functioning of the label would represent a major shift in what information was gathered, how it was exchanged and the roles of the partners involved in implementing the label. Also to be considered in moving to a positive-list based label would be the eventual message transmitted to the consumer and how this would change.

7.1.3 Environmental product declarations

There are some companies which are actively promoting the development of a textile environmental product declaration (EPD) for their products. EPDs have the potential to carry CiP information and offer a possible mechanism for the textiles sector for future development. EPDs carry more information than negative list types of efforts (like RSLs) but have similarities to RSLs in their communication structures. With that in mind, the second option outlined above for building on RSL efforts could be a step towards transitioning an RSL to an EPD.

To recall is that within the ISO framework an EPD contains a variety of information about the composition and environmental characteristics of a product based on life-cycle assessment (LCA). The exact type of information is specific to a particular type of product group and is determined in “product specific requirements” (PSR). These are drawn up by industry in full consultation with stakeholders and competitors: this study found no PSR for the textiles sector. EPD information is presented in a common format and in a neutral way that enables evaluations and comparisons by the purchaser. The quality of the information is then verified by a third-party source²⁶.

Issues for potential discussion include standardization or sectoral harmonization of the procedures for including chemicals in products elements when formulating an EPD (i.e. specifying the textile chemicals PSR) and also the identified issues of confidentiality and data reliability.

7.1.4 Forming a complete production chain CiP information system – a pilot project

Most advances into a new way of carrying out business require that at a certain point someone simply tries to make it work. The state of CiP information exchange at this time presents many of the pieces that would be needed to put together a complete production chain information system (from raw material producer to finished product retailer). Chemical companies have highlighted their commitment to ensuring their products are suitably used: they have noted their efforts to ‘push’ chemical and risk-related information down along the supply chain with the chemical products they sell. Companies that market final products are trying to ‘pull’ data on chemicals content (or absence of chemicals in their products/components) from up the supply chain. To tie these two efforts together to achieve a complete line of information flow seems possible and would be an important first step of the CiP project. Such a demonstration would require commitments from some few companies who are leading on this issue.

7.2 Needs for assessing capacity building requirements

It is worthwhile to note here that avenues discussed are frequently built on systems available in developed countries. The capacity to access, exchange and process CiP information by

stakeholders will need to be considered for any of the expanded activities noted above. Of note are that institutional infrastructures and capacities in DC/CEIT are frequently not present, even where an awareness on chemicals and CiP information issues does exist. A similar situation is also found in small- and medium-sized businesses worldwide.

8. Conclusions and Recommendations

8.1 Conclusions on the status of information exchange in the textiles sector

The current review has shown that progress in the sector in recent years for the exchange and use of negative-content information has been positive and impressive. A significant level of activity by numerous large brand name companies has established a considerable number of global, well-designed and robust systems for controlling that unwanted chemicals are not present in these companies' products. These negative lists systems are predominantly programs built around a company RSL.

Similar to the RSLs are the chemicals-oriented ecolabels. The two major labels found in this study were Oeko-Tex® Standard 100 and the European eco-label. Both of these have similarities to the negative list systems put in place by many brand names, in that they are oriented towards ensuring the absence (or acceptably low concentration) of unwanted chemicals.

Chemicals or CiP information exchange requires a driver. Some chemicals, and with that chemicals information, is normally needed to ensure the core business of a textile production chain are maintained, such as product quality and worker safety. However of the basis for most of the RSL efforts and the major textile ecolabels (for chemicals) is a legislative driver which started the efforts.

Legislation typically puts the responsibilities on the company which puts a product on the market, so retailers and distributors are the drivers for information exchange in much of the production chain - these stakeholders "pull" the information out of their supply chains. Many of these companies have designed their RSL to meet the legislative requirements. This is a part of the due diligence and corporate risk management that accompany sound business practices.

As to the benefits gained from the activities seen in the course of this study, it seems clear that companies who have engaged considerable investments to set up chemical or CiP information exchange systems have largely achieved their goals. No person interviewed spoke of any significant failures of their systems. So the set goals of enhanced product chemicals safety and risk management appear to be met.

8.1.1 The state of the art in chemicals information exchange

A considerable number of companies – predominately large brand name owners - have decided for various reasons to go further than simply meeting legislative compliance. These are among the vanguard of the companies which are pushing the envelope of what is currently exchanged on product chemicals content, either by pushing their RSLs to include positive list types of data exchange or by putting in place actual content reporting requirements. The motivations for these efforts include a corporate culture which prioritizes product chemical

CiP textile case study

safety (and other environmental factors), that the company seeks to satisfy a growing consumer demand for safe product assurance and to address potential future legislative restrictions on chemicals.

The activities referred to in the above paragraph exchange CiP information exchange in a part of the production chain. The positive-list activities have as the target of their CiP information exchange all chemicals which enter the manufacturing process. The expanded RSLs are negative list activities that move beyond the legislative requirements for chemical content: they include chemicals of concern for the company. Chemicals of concern typically include substances which are suspected of having negative effects on the environment or human health. Both of these types of activities are a major step towards meeting the needs for CiP information within the production chain. Both allow the designers and manufacturers to produce articles whose chemicals effects can be known and controlled and whose negative chemicals impacts can be reduced.

The above activities and gains took place during a trend towards both more expansive legislative requirements and voluntary disclosure of information on the chemicals in (or not in) products. This trend is clearly continuing and this should be taken note of / made use of in future activities of the CiP project.

8.2 Recommendations

There are several initiatives in the textile sector such as RSLs, ecolabels and EPDs, that to a certain extent address issues around CiP information but they do not fully meet the needs for CiP information and are very diverse in terms of scope, criteria, design and functioning.

Based on these and other findings of the case study, it seems that for future actions it would be wise to take a step wise approach while, as far as possible, trying to build on existing systems and initiatives. It is important to gain experience along the way, allowing for more informed decisions regarding particular steps and actions to be taken. Such experience may be best harvested through a limited study and it is suggested that a pilot project be undertaken. It is also recommended that the pilot should address the CiP issues in a tiered approach, similar to the descriptions outlined in the 2010 CiP project report (Kogg & Thidell), whereby:

- Tier 1 would address the CiP information flow to the end-producer / brand owner or other actor responsible for the products' safety, i.e. primarily occurring within the production chain and,
- Tier 2 would address needs for CiP information by actors further down the products life cycle and usually outside the actual production chain.

The objective of Tier 1 would at first be to find solutions for meeting CiP information needs of the end-producers/ brand owners/ importers and other stakeholders associated with the production chain. It should explore ways of overcoming the "interruption of data transfer" that occurs between the information that chemical manufacturers provide and attempt to "push" down the production chain and the information that the end-producer / brand owner tries to "pull" from the up-stream actors. Solutions should as much as possible build on existing information systems and communication structures, in particular the globally harmonized system of classification and labelling of chemicals (GHS) and safety data sheets provided by chemical manufacturers.

CiP textile case study

The objective of Tier 2 would be to explore ways of tailoring the information to the needs of the stakeholders involved in the products' life cycle, i.e. who are using or otherwise handling the product, including distributors, consumers, authorities, recyclers and waste handlers. The possibilities for making use of existing systems such as RSLs, Ecolabels and EPDs should be investigated as well as potential contributions from eventual partners, IGOs or other international institutions on which a future system(s) could be built, e.g. through international standards or codes or labeling requirements.

Questions that the pilot also need to address would include but not be limited to:

6. What scope would the CiP information system have – which chemicals or type of chemicals would be part of it for the sector(s) investigated and what information should be provided? In what format should the information be provided?
7. How to promote a broad uptake of a future CiP information system? What are the processes and drivers that can be built on?
8. How to raise the awareness and understanding among different stakeholders that would be required for creating an effective system?
9. What are the special needs in developing countries and countries with economies in transition that need to be considered in the design of CiP information system?
10. What are the resource requirements – both initial and long-term – among different types of stakeholders if a proposed system is to be adopted

Further steps proposed to be taken in preparing for ICCM3 and potential work beyond should it be recommended that a pilot be undertaken:

- a. Engagement and commitment of champion companies and associations in the sector chosen
- b. Identification and engagement of other potential partners on the pilot, e.g. IGOs actively promoting GHS; ISO and similar standard organizations, consumer product safety organizations
- c. Identifying the form for /a process for the pilot to be carried out, including lead organisation
- d. Cost estimations for carrying out the pilot
- e. Identifying potential funding avenues

Advantages of carrying out a pilot in the textile sector would include the following:

- the sector already has a history of providing information on chemical content with regard to fibers along with handling instructions
- the sector has a global span for most products for the complete life-cycle, where both developed and developing countries are producers and users
- (the sector is somewhat cross-sectoral in that textiles is used in many products, such as clothing, home textiles, furniture, toys)
- the sector is quite well organized with different business associations in both developed and developing countries
- the sector has relatively extensive experience in the use of RSLs and Ecolabels
- the sector has an international cooperation on-going between brand-owners and actors in the production chain
- individual stakeholders have expressed that some sort of uniform standards would be useful for the sector and could facilitate their efforts to ensure product quality requirements in terms of chemical content and also other environmental performance

CiP textile case study

- recycling of textiles is only now starting to develop and relevant actors could be expected to be more easily engaged in CiP work

Annex 1: Acronyms and definitions

Acronyms:

AAFA - American Apparel and Footwear Association
AFIRM - Apparel and Footwear International RSL Management Group
RSL - Restricted Substances List
CiP - Chemicals in Product
CoC - chemical of concern (see definition below)
GHS - Globally Harmonized System of Classification and Labelling of Chemicals
DC/CET - developing countries and countries with economies in transition
EPD - Environmental Product Declaration
LCA – Life cycle analysis
ISO - International Organization for Standardization
DBP - dibutyl phthalate
DEHP - di(2-ethylhexyl) phthalate
HBCDD - hexabromocyclododecane
TBTO - bis(tributyltin)oxide
BBP - benzyl butyl phthalate
SCCP - Short Chain Chlorinated Paraffins
DMP – Dimethylfumarate
PFOS – Perfluorooctane sulfonate
pentaBDE - pentabromodiphenyl ether
octaBDE - octabromodiphenyl ether
LLIN – long-lasting insecticidal bed net

Definitions:

negative-content [information exchange] also

negative list [information exchange]

The term used to describe information exchange describing that certain chemicals are not contained in a product

positive list [information exchange]

The term describing when chemical composition data for a product is exchanged

Chemicals information

Chemicals information relevant to a product. This term is less narrowly defined than terms denoting specifically exchange of what is or is not in a product.

Chemicals in Product information

Some or all information on the chemical composition of a product

Systems for providing information on chemicals in products (information systems)

Information systems refers to any type of systematic information transfer that is formalized and recurring that provides information regarding:

- relevant chemicals contained in products/articles;
- health and/or environmental performance of a product/article based at least in part on chemical content (in contrast to for instance energy use, resource depletion);
- any or all chemicals in products/articles, potentially together with a tool or guidelines for the interpretation of the information. (Kogg/Thidell p 5)

Stakeholder

The term stakeholder, as used in this report, is anyone who have, or could have, an interest in knowing about chemicals in products. This includes, but is not limited to:

- Individuals, in their capacities as consumers, parents, employees and citizens
- Private enterprises, across all sectors
- Non governmental organisations, with an interest in consumer safety, labour rights and protection, environment, health, development and trade
- Governmental agencies, including agencies working with issues related to chemicals, environmental protection, consumer protection, health, trade and customs.
- Public sector organisations including health and emergency response services (Kogg/Thidell)

These stakeholders can be divided into two broad groups: actors engaged in the product along its life cycle (e.g. producers, distributors, users, recyclers and waste handlers), and stakeholders outside the product chain (e.g. government and NGOs).

Information needs

Information needs is defined as relevant information that the stakeholders require in order to minimize chemicals related risks to human health and the environment. Such risks include:

- occupational health and safety in the production, handling and end-of-life management;
- product safety in the use phase; and/or
- environmental protection throughout the product life cycle. (Kogg Thidell p. 4)

Important to emphasize is that stakeholders might not always have the knowledge required to judge what information that is needed in order to minimize risks. Nevertheless, such information is also considered as information needs.

Chemicals of Concern (CoCs)

The term CoCs as used in this report refers to those chemicals which, due to their inherent hazardous properties, present a known or reasonably suspected risk to human health and/or the environment.³

Products

In this report, the definition of articles provided in the EU chemicals regulation, REACH, is used to define the term products. REACH defines articles to be objects that are given a special shape, surface, or design during production, which determines their function to a greater degree than their chemical composition (REACH Article 3(3)).

The key distinguishing factor between chemical and non-chemical products/articles is thus whether or not the function of the product is delivered primarily by the content of chemical composition or by its shape and design.

Confidential Business Information (CBI)/ Proprietary Information

For purpose of this report proprietary information is used for information that companies choose to keep.....Not legally binding.

The United States Environmental Protection Agency (EPA) defines CBI²⁷ as:

1. any information that pertains to the interests of a business,
2. developed or acquired by that business

CiP textile case study

3. received from any person, firm, partnership, association or other public or private organization, or legal entity (including a foreign, State or local government)
4. which contains trade secrets or commercial or financial information that is privileged or confidential

Typically, companies declare certain information CBI if they believe that if it is disclosed, it may harm their business.

CiP textile case study

Annex 2: Interviews - Persons contacted for input to this study

Company or institute	Person contacted
SWEREA research institute - Sweden	Stefan Posner
Tester - an Okeo Institut - Switzerland	Jean-Pierre Haug
Hohenstein - an Okeo Institut - Bulgaria	Ms. Rayna Dobrinova
Hohenstein - an Okeo Institut - Bangladesh	Mr. Kemrul
Governments	
ANOR (Agence Nationale de Normes et de la Qualité) - Cameroun	Mr Mindjos
KEMI (Swedish Chemicals Agency) - Sweden	Amanda Rosen
Caroline Wamai - Kenya	Kenya Ministry of Environment and Mineral Resources
Douglas Arunga - Kenya	Kenya Bureau of Standards
NGOs	
CREPD- Research and Education Center for Development (Centre de Recherche et d'Education pour le Développement) - Cameroun	Samuel Tetsopgang
Swedish Society for Nature Conservation (SSNC)	Mikael Karlsson
Envirocare - Tanzania	Abdallah Ramadhani
Retailers	
H&M - Sweden	Mattias Bodin
Switcher - Switzerland	Gilles Dana
Nike - USA	John Frazier
Puma – Germany	Reiner Hengstmann
Levi Strauss - USA	Kitty Man
AAFA - USA	Rebecca Mond and Greg Yahr
Manufacturers	
InterfaceFLOR - USA	Erin Meezan
InterfaceFLOR - USA	Connie Hensler
TrueTex - USA	Alan Dean
ETAD - The Ecological and Toxicological Association of Dyes and Organic Pigments Manufacturers - Switzerland	Mr. Walther Hofherr
Garment Manufacturers Association of Cambodia	Mr. Kaing, Monika

Annex 3: References

- ¹ Kogg and Thidell, Chemicals in Products, 2010
URL: http://www.chem.unep.ch/unep/chem/cip/Documents/Kogg_Thidell_CiP%20report_final.pdf
- ² Massey et al., Toxic Substances in Articles: The Need for Information, Toxics Use Reduction Institute, University of Massachusetts Lowell, 2008
URL: <http://www.norden.org/da/publikationer/publikationer/2008-596/>
- ³ Becker, Survey of SAICM Focal Points on the Need for Information on Chemicals in Products, 2009
URL: http://www.chem.unep.ch/unep/chem/cip/Documents/CiP%20Survey%20Report_Final.pdf
- ⁴ http://www.unctad.org/en/docs/iteiia20051_en.pdf
- ⁵ Chapter 3.2 uses data from the Finnish Environment Institute publication, “RELEASES FROM THE USE PHASE OF TEXTILE AND LEATHER PRODUCTS”, prepared for the OECD in 2010
- ⁶ [http://reach-support.com/REACHtextilebrochur\(SSS\).pdf](http://reach-support.com/REACHtextilebrochur(SSS).pdf)
- ⁷ <http://www.cpsc.gov/ABOUT/Cpsia/sect101.html>
- ⁸ <http://oehha.ca.gov/prop65/background/p65plain.html>
- ⁹ http://dra4.nihs.go.jp/mhlw_data/home/safety.html
- ¹⁰ http://www.env.go.jp/en/laws/chemi/cscl/CSCL_law.pdf
- ¹¹ http://eur-lex.europa.eu/LexUriServ/site/en/oj/2002/l_133/l_13320020518en00290041.pdf
- ¹² The Textile Fiber Products Identification Act (Textile Act), 15 U.S.C. § 70, et seq., and the Wool Products Labeling Act of 1939 (Wool Act), 15 U.S.C. § 68, et seq. The Rules and Regulations under the Textile Fiber Products Identification Act (Textile Rules) are found at 16 C.F.R. Part 303 and the Rules and Regulations under the Wool Products Labeling Act (Wool Rules) are found at 16 C.F.R. Part 300.
- ¹³ <http://www.europarl.europa.eu/document/activities/cont/201003/20100323ATT71185/20100323ATT71185EN.pdf>
- ¹⁴ <http://www.ecolabelindex.com/ecolabels/?st=category,textiles>
- ¹⁵ http://www.oeko-tex.com/oekotex100_public/content5.asp?area=hauptmenue&site=oekotexstandard100&cls=02
- ¹⁶ <http://www.oeko-tex.com/>
- ¹⁷ <http://www.environmentalproductdeclarations.com/>
- ¹⁸ http://www.iso.org/iso/catalogue_detail.htm?csnumber=38131
- ¹⁹ <http://www.respect-code.org/Main.action>
- ²⁰ http://ec.europa.eu/consumers/dyna/rapex/rapex_archives_en.cfm
- ²¹ <http://www.epa.gov/compliance/resources/publications/assistance/sectors/notebooks/textiles.html>
- ²² http://www.apparelandfootwear.org/Events/event.asp?EVENT_ID=369&
- ²³ <https://www.apparelandfootwear.org/UserFiles/File/Restricted%20Substance%20List/AAFARSLFinalRelease7.pdf>
- ²⁴ <http://www.afirm-group.com/sponsor.html>
- ²⁵ personal communication
- ²⁶ <http://ec.europa.eu/environment/ipp/pdf/epd.pdf>
- ²⁷ http://www.epa.gov/region4/ris_training/p7.htm