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Product Labelling for Improved End-of-Life Management

An investigation to determine the feasibility of garment labelling to enable better end-of-life management of corporate clothing

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March 2009

Contents

1 Executive summary

This report considers product labelling to improve end-of-life (EoL) management of corporate clothing, taking into account the process of development, provision, retrieval and disposal. It is based on a study which was mainly desk research but, in order to gain accurate perspectives of each stage, face to face interviews were conducted to gain opinions from best practice stakeholders across the lifecycle. These included suppliers (companies that offer / create corporate clothing garments), providers (organisations that require staff members to wear clothing/uniform that presents a corporate image) and clothing recycler / re-processors. A review of policy documents, information on labelling, reports and web based material has revealed issues that are likely to influence the position and future practice of suppliers and providers of corporate clothing.

We present, first, an overview of the role of eco-labelling within the contexts of government policy, financial revenue and market opportunities. This is followed by a brief explanation of the categorisation of the eco-labelling systems as they occur in the textiles industry. Tables in the Appendix present all the textiles eco-labels that were found through the research and those eco-labels that stipulate EoL management as part of their criteria for award are further examined. A major issue regarding eco-labelling is the cost, and this is considered with regard to manufacturers and buyers of corporatewear. The report ends by considering the issues for all the stakeholders and conducts a stakeholder analysis.

The report concludes with following recommendations:

- **To corporate clothing providers:** to capture a market opportunity and use eco-labels to promote their eco-credentials and to devise more efficient methods of recovering corporatewear to put into the reuse/recycle/ remanufacture routes.

- **To raw material and corporatewear clothing manufacturers:** source and use materials that are eco-labelled.

- **To government (as *providers of uniforms / work wear*):** to lead by example and encourage local authorities to use products with recognisable reuse/recyclable properties such as janitorial products (e.g. wipers)

- **To government (in their role as *policy makers*):** to recommend and stipulate a preference for eco-labelled corporatewear/fabrics wherever possible, in green public procurement policies and consider abolishing the tax tab, replacing with eco-label and stipulate that a proportion of any uniforms/clothing provided have the capacity to be re-worn (standard items that are not heavily branded), or reused (encourage the use of preferred pure blend fabrics).

- **To corporatewear wearers**: to be encouraged to return corporatewear to firms when they no longer use to ensure that it is placed into the

companies' EoL management systems for corporatewear – companies or government may consider some form of tax or levy until the uniform is returned.

- **To textile recyclers:** to encourage developing relationships with companies that provide corporatewear, and with corporatewear manufacturers to ensure that EoL management issues are considered throughout the product development and use phases of the lifecycle of the corporatewear.

2 Introduction – stakeholder identification

Consideration of the corporate clothing sector has revealed that there are multiple stakeholders involved, directly related to the provision of garments, but also those that have influence at an earlier stage of the product lifecycle and also on the periphery of this industry. The eight main stakeholders have been identified as follows:

	Stakeholder	Function
1	Government (national)	Stipulate national policy of industry practice, main impact on corporatewear clothing relates to assessment of tax tabs /branding on uniforms / clothing
2	European Government	Generate policy at a European level that can influence industry practice
3	Providers	Organisations that provide employees with uniforms / clothing
4	Supplier	Companies that provide clothing / uniforms / PPE to organisations (Providers) that require garments that present a corporate image
5	Raw material supplier	National and international fibre/fabric suppliers that offer
6	Garment manufacturer	Produce garments for / to the Suppliers
7	Wearers	Employees of the Providers
8	Recyclers	Companies that process clothing and textile waste, they prioritise final destination: reuse, recycle, landfill

3 End of life management

End-of-life (EoL) management involves consideration of "activities required for retiring a product after the user discards it after its useful life" and raise the following issues[1]:

- Legislative drivers
  - o National and EU regulations
- Financial motives
  - o There is money to be made in efficient EoL management
  - o Multiple revenue streams from a single product
- New marketing opportunities
  - o "green" image.

3.1 Legislative drivers - National and EU legislations

3.1.1 Waste management

The new EU Waste Framework Directive was published in the Official Journal of the European Union in November 2008. The Directive 2008/98/EC now needs to be transposed into UK Law[2] by 12 December 2010. While the Directive does not single out textiles, a number of issues are pertinent to textiles and corporatewear in particular.

- *Encouragement to apply the 'waste hierarchy'* – the aim is to eliminate waste at source and then, if this is not possible or practicable, to reduce, reuse or recycle waste. Only when none of these options is available should there be any disposal, and then in a responsible manner.

- The EU Parliament voted for *minimum recycling rate of 70% industrial waste* (50% municipal) by 2020 by all EU Member States.

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[1] Parlikad and Macfarlane, 2004

[2] Defra 2008

- The *major principle that the Directive rests on is the 'polluter pays' principle*, where the costs of waste are borne by the holder of waste, the previous holders or by the producers of the product from which the waste arose.

- *Certain waste ceases to be waste* – certain waste materials could become the raw materials for further development to bring economic or environmental benefits and thus end of waste specifications and criteria have to be developed.

- *Separate collection is encouraged* to maximise any value that can be gained from recycling and recovery.

- Article 29 of the Directive discusses 'Waste Prevention Programmes' which it directs Member States to have established by no later than 12 December 2013. Moreover, this should work with Article 28 (waste management programmes) to analyse current waste management programmes situations in Member States. It recommends that *measures should be devised to improve reuse, recycling, recovery and disposal of waste.* For the Waste Prevention Programme, Member States should develop and describe measures and indicators for the waste prevention. The aim is to "break the link between economic growth and environmental impacts associated with the generation of waste". Annex IV of the Article lists a number of examples of these measures and *promotion of creditable eco-labels* is one such measure (that can affect the consumption and use phase).

For corporatewear buyers and companies issuing corporatewear the Directive raises issues that may have significant impact on their ability to achieve their CSR targets (which reflect government regulations) and also on sources of revenue generation. The drive is for increased recovery rates of corporatewear, for more efficient collection systems and for clearer measurement of these activities. The incentives for companies issuing uniforms to be proactive in achieving this are:

- Discarded uniforms can be a source of income: once collected and taken to textile recycling firms, the corporatewear may go through a number of different routes which lead to a stream of revenue.

- Increased efficiency in collection of uniforms would reduce payment for the 'polluter pays' principle (for example landfill charges).

3.1.2 Public procurement policies

Although not stipulated as yet, the 2005 EU Public Procurement of Textiles and Clothing policy document recommends seeking value for money rather than lost cost. It also indicates that eco-labelled purchasing may be used as a criterion for

awarding a tender, as it indicates a certain appropriate level of technical specification[3].

3.2 End-of-life management of textiles and corporatewear: financial motives.

As identified in the EU Directive, textile waste may become a source of revenue. Clothing can be resold through the second-hand markets, turned into wipers, shredded and turned into shoddy, pulled and re-knitted or 'upcycled' into new designs. Through interviews with textile recycler LMB in 2008, it was identified that textiles could undergo three routes in the process of recycling and reuse, illustrated in Table 1.

Table 1: EoL routes for textiles

	1 reuse (redesign/resell)	2 recycle/remanufacture			3 landfill
condition of textile	no tears or damage to the fabric	absorbency	fibre content	knitted	soiled/difficult to remanufacture
processes involved	transportation to market	cutting	flocking	pulling	
knowledge required	market understanding	absorbency	minimum of 40% wool	quality of knitted fibres	
result	resell	wipers	shoddy	yarn for knitting	

Reselling

Clothing for reselling is transported to overseas markets (the African continent, also Eastern Europe and Asia). Clothing can occasionally be reused and redesigned into new items of clothing.

Recycle/remanufacture

- Wipers: generally sold in markets or to industrial cleaning businesses.

- Shoddy: can be used in a range of other industries for their fire retardant properties, e.g. automotive, aircraft or bedding upholstery.

- Yarns: for knitting are used for reprocessing as knitted garments.

The main issues when considering the EoL management of corporatewear are:

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[3] PROMPTEX, EURATEX and ETUFTCL, 2005

- **Fabric properties:** mix of polyester/wool or pure polyester may increase the wear properties of the fabric but affect ability to recycle.

- **Logos:** subject to government taxation rules, company logos must be placed on the uniforms / clothing to ensure that the companies are not liable for any unnecessary taxation for giving their employees corporatewear[4]. Logos are a problem for EoL management as:

  o they present potential security risks,

  o heavily branded items are unpalatable to a potential destination market place that recognizes it for reselling, and

  o garments have little or no resale value if the logo is removed simply by cutting out, leaving a hole in the garment.

- **Low rate of return:** a problem associated with corporatewear is the minimal returns received by the employer for disposal if an employee leaves the company or needs to replace his/her garments.

According to Oakdene Hollins, currently only about 2% of corporatewear is escaping landfill annually[5]. This becomes a significant issue when considering the size of the corporatewear market. For a quarter of the developed world's population, the choice of what to wear to work is made by their employer either for necessity, personal protection (legal or moral obligations) and/or corporate image[6]. The worldwide wholesale value of this market has been estimated[7] to be US$9,513m for 2007 and is forecast to rise to US$9,918m by 2014.

The recent UK Corporate Clothing Market Report 2007-2012[8] estimates that the UK alone has 249 companies involved in the corporatewear market, and that this market is valued at £450 million, representing about 4% of all the clothing bought in the UK (men, women, children and infants). The report goes on to estimate that the number of corporatewear wearers in the UK is 11 million, and the unit volume of the UK corporatewear market is estimated to be 33.4 million garments (not including either footwear or safety products such as goggles or hard hats). The report divides the market into four areas with estimates of their values. Table 2 illustrates this and Figure 1 shows the market shares of each.

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[4] cc09

[5] Severs 09

[6] Research and Markets, 2009

[7] ibid

[8] Company Clothing, 2007

Table 2: UK Corporatewear Markets and their Value by £

workwear	140
protective wear	70
uniforms	45
careerwear	120
casual wear	71

Figure 1: Corporatewear Markets by % share
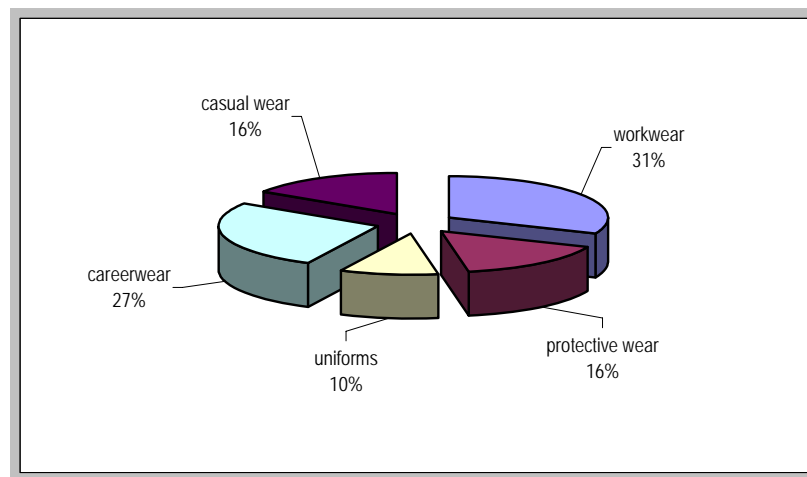
If the figure of 2% discarded corporatewear capture is correct, this suggests that there are an estimated 32.7 million garments that unnecessarily go to landfill annually. This is in stark contrast with the reuse and recovery rates that are possible for textiles in general. Textile recyclers LMB estimated that approximately 60% of the content of a collected bin could be re-used, 40% can be recycled and just under 1% is waste to landfill. The Royal Mail Group also estimates that they send just under 1% corporatewear to landfill (0.86%) and they are working towards lowering this further. This will be discussed further in Section 6.1.

3.3 End-of-life management of textiles and corporatewear: new marketing opportunities - "green" image.

The EU's Waste Prevention Programme refers to the promotion of respected eco-labels as an example of the measures that may be used to prevent waste. The eco-label has a role in the Integrated Product Policy (IPP) and can be regarded

as a "communication tool with the aim of providing professional and private consumers with information on the environmental characteristics of products and services…"[9]

The IPP aims to minimise the environmental degradation caused by any of the phases of a product's life cycle (tangible or intangible, such as service), e.g. manufacture, development, use or disposal[10]. The IPP, therefore, examines all phases of a products' life-cycle with the objective of motivating each individual phase to improve environmental performance. This approach requires all participants in this process to be engaged, such as designers, industry, marketers, retailers and consumers. The US EPA in 1994 defined five factors for measuring effectiveness of an eco-label, the first four of which serve to support the last:

1. Consumer awareness of labels

2. Consumer acceptance of labels (credibility and understanding)

3. Changes in consumer behaviour

4. Changes in manufacturer behaviour

5. Net environmental gains.

This approach can be seen to have been accepted elsewhere. Figure 2 illustrates the four levels of actors in the process for any eco-labelling programme to function throughout an industry as proposed by de Man et al, 1997[11]:

- Primary (direct) economic actors ~ decision-makers in the production / consumption context (producers, importers, consumers).

- Secondary (indirect) economic actors ~ influence the decision making of primary actors through their decisions.

- Governmental and administrative actors ~ set the framework within which the actors operate.

- Other actors ~ try to influence the behaviour of all actors to improve the status quo.

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[9] Rubik and Frankl, 2005, p.9

[10] European Commission, 2008

[11] in Rubik and Frankl, 2005

Figure 2: Actors within the Integrated Product Policy
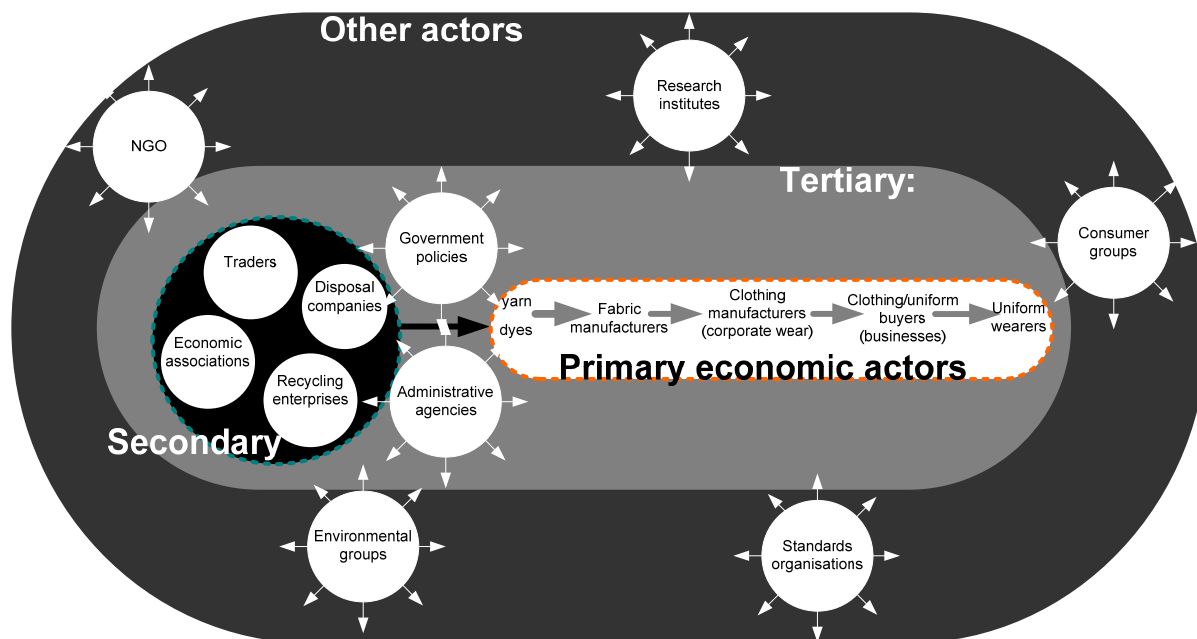
4 Product labels and eco-labels

4.1 Objectives of product labelling

Due to its comprehensive nature, an IPP has a variety of policies (tools) to achieve its objectives. These policies may be mandatory or voluntary, and include measures such as economic instruments, substance bans, voluntary agreements, environmental labelling and product design guidelines[12]. The specific tools in the EU's IPP are:

- State Aid

- Voluntary Agreements (for example on CO_2 emissions)

- Standardisation

- Environmental Management System

- Eco-design

- **Labelling and Product Declarations**

- Greening Public Procurement

- Green Technology and Legislation.

4.1.1 Benefits of using eco-labels

- Establish linkage between government policies and procurement policies.

- Encourage innovation in technology and production processes to minimise impact on the environment.

- Raise consumer (company as well as individual) awareness of environmentally benign products.

- Encourage preference for environmentally benign products in public and private procurement leading to:

  o A greening of the market

  o Competitive advantage for participants in eco-labelling schemes

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[12] European Commission, 2008

o   More eco-efficient use of products not labelled as such.

4.1.2 Problems of eco-labelling

Benefits gained from the use of eco-labels are counterbalanced by the problems of costs and time taken for award of the eco-label.   These fall particularly hard on SMEs as the use of eco-labels incurs charges for accreditation for the award, use of the logo/label and an annual contribution to maintain the use of the label/logo, often through a percentage share of the sales of the product[13].   This will be examined in Section 6.

4.2 Eco-labelling systems

Product labels may be mandatory or voluntary.   Mandatory labelling is always third party labelling (i.e. an independent body is required to attest that required standards have been achieved) whereas voluntary programmes may be established by firms or business associations as well as by third parties[14].

4.2.1 Mandatory labels for the textiles, clothing and footwear sectors

Also referred to as 'negative' or 'positive/neutral' information disclosure programs, these labels are legal requirements and prescribed by the governing legal framework.   The emphasis is on the consumer's right to know in order to make better informed purchasing and disposal choices.   Most compulsory product information refers to the health and safety aspects of products, giving details of chemical composition or proper usage and disposal of the product[15].   Examples of these are food labels which declare the nutritional content of processed[16] food, or batteries sold with the phrase "BATTERY MUST BE RECYCLED OR DISPOSED OF PROPERLY".

Within the textiles industry, mandatory labelling extends to declaring fibre content on a label that is easy to read and visible at the time of sale and the CE mark (for personal protective equipment) to indicate that it meets health and safety standards set by the EU.

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[13] Rubik and Frankl, 2005

[14] ibid

[15] Citizen's Information,2008

[16] unprocessed food labelling is voluntary

Fibre content:

The European Union (1996) Directive 96/74/EC sets out the rules of naming (using codes rather than language) and definitions of the textile fibres. It is prescriptive, as uncertainty regarding the fibres may affect trade. The legal requirements of this are set down in S.I. 245 European Communities (Names and Labelling of Textile Products) Regulations, 1998. These apply to products made up either entirely of textile fibres (e.g. in clothes, curtains or bed linen) and also where at least 80% is textile components (e.g. furniture, umbrella / sunshade coverings, floor coverings, mattresses and camping goods, the warm linings of footwear, gloves, mittens and mitts). S.I. 63 European Communities (Labelling of Footwear) Regulations, 1996, sets out rules regarding footwear labelling. These often appear as stickers on the base of the footwear, on the shoebox or inside the shoes. Labelling information must convey - through text, symbols or pictures - the materials making up the composition of the various areas of the footwear.

There is no legal obligation to show care labels: however, it is advised as the manufacturer may be held liable under the EU's Product Liability Directive if a problem occurs. Where care labels are shown, there are prescribed directions for their use, and they are not required for products that do not require care (e.g. those which cannot be washed or are disposable)[17].

Health, safety and the environment:

Award of the CE (Conformité Européene) label means that the product conforms to all health, safety and environmental protection standards of the European Union laid down in the relevant sectoral or vertical Directives. Example products covered by this range from electrical equipment, refrigerators and gas water heaters to helmets, toys and heart pacemakers. In the textiles and clothing sector, the CE label relates to products that are personal protective equipment (such as motor cycling clothes) and toys, low voltage and electromagnetic compatibility[18], i.e. household items such as lampshades. There is currently a discussion about bringing the CE mark and the Ecolabel ('the Flower') together for certain products to aid credibility of the logo[19].

4.3 Voluntary labels for the textiles, clothing and footwear sectors

Textile eco-labelling systems are voluntary labels with environmental information, with the decision to use them currently left to the market operators. Currently, a

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[17] fashion.informat., 2008

[18] Citizen's Information, 2008

[19] European Parliament 2008

website hosted by Vancouver-based Big Room Inc. has identified[20] at least 309 eco-labels on a world wide basis, of which 41 cover textiles. The website does not claim to display an exhaustive list, and (like the Wikipedia website) encourages visitors to upload information about eco-labels that they may have missed; the Appendix illustrates the textiles eco-labels and their main criteria.

A comprehensive account of the nature and proliferation of eco-labels may be found in reports by the US Environmental Protection Agency[21] and Environmental Resource Management[22]. The primary issues in eco-labelling are whether the programme relies on third-party or first party verification and the criteria by which the eco-label is awarded.

- First-party verification tends to promote positive environmental attributes of products and testing is performed by marketers from within the organisation.

- Third-party verification is carried out by an independent source that awards labels to products based on certain environmental criteria or standards. These can be either mandatory (e.g. hazard or warning labels, and information disclosure labels) or voluntary (typically positive or neutral report cards, seal-of-approval, or single-attribute certification programs).

Within textiles, third party verification tends to be a mix of seal-of-approval, or single-attribute certification programs.

4.3.1 Seal of approval programs

A logo is awarded or licensed to products judged to be less environmentally harmful than comparable products. Companies need to make an application to be awarded the label, the candidate products are examined and, if they meet the required standards, the award is granted. This is based on a specific set of award criteria which can be suggested by either manufacturers or program officials. There is often some form of life cycle analysis (LCA) but not necessarily a full LCA with a public review of the program.

Criteria for award (also known as technical reports) are set through consultation with the government, standards-setting organizations, consultants, expert panels, and/or *ad hoc* task forces established to work on specific product categories. They are administered through a central decision-making board - typically composed of academics and scientists, business and trade representatives, consumer groups, environmental groups, and government representatives such

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[20] Ecolabelling, 2008

[21] EPA, 1998

[22] ERM, 2000

as environment agencies. The criteria set take into account various factors such as environmental policy goals, consumer awareness of environmental issues, trade positioning, effects on imports and exports, and economic effects on domestic industry.

In general, criteria are reviewed about every three years, and contracts have to be renewed. The review process is designed to provide for continuous tightening of award criteria, such that only a small percentage of products will qualify for the label, thus providing an incentive for all other product manufacturers to improve the environmental attributes of their products.

Well-known seal-of-approval programs include Germany's Blue Angel, Canada's Eco-logo, and the US's Green Seal.

4.3.2 Single-attribute certification programs

Single-attribute certification programs certify that claims made for a single-attribute of a product meet a specified definition. Such programs define specific terms such as "recycled" or "biodegradable" and accept applications from marketers for verification that their product attributes meet the program definition. The primary single certification program in the US is the Scientific Certification System's (SCS) Single Claim Attribute Certification. Alternatively, programs can set definitions of claims and manufacturers must meet these requirements. This is the case with the US Energy Star program, which sets stringent energy-efficient standards that products must meet before being awarded the "Energy Star."

4.3.3 Report Cards

The report card label, one type of information disclosure label, uses a standardized format to categorize and quantify various impacts / burdens that a product has on the environment. Specific and consistent information (e.g. pounds of air emissions) is presented on the label, allowing a comparison across categories. By providing the consumer with standardized detailed information and little interpretation, the report card allows consumers to make judgments based on their particular environmental concerns.

In the US, SCS has prepared an eco-profile that can be applied to any product category. These eco-profiles are based on a LCA which is the first step in the more comprehensive Life Cycle Stressor Effects Assessment (LCSEA). The SCS eco-profile evaluation is a multi-step process involving the identification and

quantification of inputs and outputs for every stage of a product's life cycle including raw materials extraction, material processing, manufacturing, distribution, use, and disposal. Based on the assessment, three claims of achievement may be certified environmental state-of-the-art, improvements, or advantages. The UK's Carbon Footprint programme is a similar approach of LCA and estimating the carbon footprint of a product and its supply chain, with a commitment by the applicant firm to reduce the impact over a given period of time.

4.4 Standards and criteria used by eco-labels

The above programs are categorised into a system organised by the International Standards Organisation (ISO). The ISO, with origins in the union of International Federation of the National Standardizing Associations (ISA - established 1926) and the United Nations Standards Coordinating Committee (UNSCC – established 1944) came into being as a body in 1947. The aim at the outset was to *"create a new international organization, of which the object would be to facilitate the international coordination and unification of industrial standards".* Membership of the ISO is fee based, with varying levels of fees depending on whether the country is a developed, developing or small economy; there are currently 147 countries at all stages of economic development. As international trading has developed, they are now regarded as "International Standards", with the intention of *"facilitating the elimination of unnecessary barriers to trade, as a suitable basis for technical regulations and ensure that these International Standards are fully compliant with the requirements set by the Agreement on Technical Barriers to Trade of the WTO"*[23]. Each standard is discussed at workshops involving member representatives and published when agreed. The ISO standards are then interpreted for use within various labelling programmes. Within textiles, the most common in standards used are ISO, SA and Fair Trade.

4.4.1 The International Organisation for Standardisation (ISO)

The technical committee (ISO/TC 207) is responsible for developing environmental standards placed in the ISO 14000 series. Published documents and ongoing work address the following areas: environmental management systems (EMSs), environmental auditing and other related environmental investigations, environmental performance evaluation, environmental labelling, life-cycle assessment (LCA), environmental aspects in product standards and terms and definitions.

- ISO 14001 series - requirements for **Environmental Management Systems**

- ISO 9001 series - requirements for *quality management systems*

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[23] ISO 2009

- ISO 65 (EN 45011) – requirements for *certification bodies operating* a product certification system and is an indicator that a certification body is competent.

ISO has developed standards for three types of environmental product claims, termed ISO Type I, II and III[24]. The main elements of each claim type are described in Figure 3.

Figure 3: The main elements of ISO types I, II and III.

Type I (ISO 14024)	First edition 01/04/1999
	- based on criteria set by a third party and are multi issue, being based on the product's life cycle impacts
	- the awarding body may be either a governmental organisation or a private non-commercial entity
	- examples include the EC Ecolabel, Nordic Swan and German Blue Angel.
	Type I labels are further classified as:
	- 'Classical' ISO type I approaches: Third-party labels referring – explicitly or implicitly - to the standard, or
	- *Other third-party, ISO type I like labelling: Third-party labels containing not most, but major elements of the ISO type I standard (e.g. third party verification, multi criteria based).*
Type II (ISO 14021) First edition 1999	- based on self-declarations by manufacturers or retailers
	- there are numerous examples of such claims e.g. 'made from x% recycled material'.
Type III (ISO/Technical Report 14025) First edition 15/03/2000	- consist of quantified product information based on life cycle impacts
	- impacts are presented in a form that facilitates comparison between products e.g. a set of parameters
	- there is no comparing or weighting against other products inherent within the claim.
Single issue (partially covered by ISO 14020)	- labelling schemes such as the private Forest Stewardship Council (FSC) and organic food labels do not fall within any of these categories but are partially covered by ISO 14020 - General Guidelines for Environmental Claims and Declarations.

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[24] ERM 2000

4.4.2 The Social Accountability 8000 (SA 8000)

First released in October 1997, this was the first global ethical standard developed to ensure ethical sourcing and production of goods and services. The SA 8000 is developed by Social Accountability International (SAI), an affiliate of the Council on Economic Priorities (CEP). CEP is a public service research organization in New York with a mission to provide accurate and impartial analysis of companies' social performance. Like the ISO, it has a body of experts drafted into its Advisory Board which is responsible for drafting the SA 8000 standard, as well as providing direction and recommendation regarding the function, operation and policy of SAI. The Advisory Board includes representatives from unions, organizations for human rights and children's rights, academia, retailers, manufacturers, contractors, non-governmental organizations, consultants, accounting firms, as well as certification bodies. The SA 8000 is managed and awarded by the Social Accountability Accreditation Services (SAAS). An SAAS-accredited auditing firm, known as a Certification Body, is assigned the job of auditing a corporatewear company for certification for the SA 8000. Based on the conventions of the International Labour Organization, the Universal Declaration of Human Rights, as well as the United Nations Convention on the Rights of a Child, the standard is applicable to all companies regardless of scale, industry and location. As with the ISO standards, the SA emerged through and is driven by market forces. It has a comprehensive system of auditing and a well defined set of procedures that must be followed to attain valid certification[25].

4.5 Fair trade

The Fairtrade label is a seal of approval that appears on products that meet internationally agreed Fairtrade standards, and is a guarantee to consumers that their purchases will benefit the producers, their families and the surrounding communities from the developing countries that they originate from. There is a national satellite system of administering the Fairtrade Certification and Labelling system and each national not-for-profit organisation is a full member of Fairtrade Labelling Organizations (FLO eV) internationally. This is done by a certification and trade audit system that applies to all companies in the supply chain, from origination to final packaging: from producers (who comply with Fairtrade standards), through to importers (who pay a Fairtrade premium, in addition to minimum prices, that supports social, economic and environmental development) and Fairtrade licensees, who are licensed to apply the Fairtrade label to packaged products and sell them in to the market[26].

The Fair Trade Labelling Organisation International is a Fairtrade Labelling Organizations International (FLO), which is a member of the ISEAL Alliance along with other members including Social Accountability International with its SA 8000 standard. The ISEAL (International Social and Environmental Accreditation and

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[25] SAI 2008

[26] fair-trade, 2008a

Labelling) Alliance is a formal collaboration of leading international standard-setting and conformity assessment organisations focused on social and environmental issues[27]. The standards that they refer to and interpret for their own purposes are:

- ISO/IEC Guide 2:2004. Standardisation and related activities - General vocabulary.

- ISO/IEC Guide 59:1994. Code of good practice for standardisation.

- ISO/IEC Guide 14024:1999. Environmental labels and declarations - Type 1 environmental labelling - Principles and procedures.

- OECD GD(97)137. Processes and Production Methods (PPMs): Conceptual Framework and Considerations on Use of PPM-based Trade Measures.

- WTO Agreement on the Application of Sanitary and Phytosanitary Measures (SPS).

- WTO Agreement on Technical Barriers to Trade (TBT) Annex 3: Code of good practice for the preparation, adoption and application of standards.

- WTO Agreement on Technical Barriers to Trade (TBT) Second Triennial Review Annex 4.

- Principles for the Development of International Standards, Guides and Recommendations with relation to Articles 2, 5 and Annex 3 of the Agreement.

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[27] fair-trade, 2008b

5 Product labels indicating EoL management

The tables in the Appendix display the general eco-labels used for textiles and textiles related products (the website contains a more detailed comparison between the eco-labels). Of the 42 eco-labels, six labels have been identified that indicate end-of-life management in the criteria for award. These are illustrated in Table 3 below. The standards referred to by each label were noted to be a mix of environmental, life cycle analysis and social welfare standards as described in Section 4. These standards are:

- ISO 9000

- ISO 14024

- ISO 14021

- SA 8000

- Greenhouse Gas Verification and Forestry Certification Services

- Fair Labour Organisation

- WRAP.

The eco-labels were further examined to identify textile / clothing companies and their products which had been awarded certification or licence; this is displayed in Table 4, from which it can be seen that three eco-labels have been awarded to companies involved in the manufacture of apparel or footwear: Cradle to Cradle (C2C), EcoMark (India) and Green Mark (Taiwan). Based on the criteria discussed in Section 2.3, EcoMark India has not yet achieved business confidence or consumer awareness while Green Mark is a type II (voluntary self declared) label. Due to its acceptance and credibility to date, the C2C label will be further examined with regards to its criteria. This will be compared with the Japanese eco-label EcoMate and the current EU Ecolabel (the Flower), an eco-label that is currently being proliferated across many product categories and appears to have had a good uptake by the textiles industry.

Table 3: Eco-labels referring to EoL management within their criteria

criteria indicates element of recycling							
eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III
Cradle to Cradle Certification	self assessment and third party: approved labs for ASTM or BIFMA standards of sustainability.	McDonough Braungart Design Chemistry	Dr. Braungart's Intelligent Product System (IPS) won Germany's prestigious Océ van der Grinten award: their "Hannover Principles" adopted by the World Congress of the International Union of Architects (UIA) in 1993. Frequently cited as a seminal expression of sustainability.	ISO 14001, ISO 9000, Greenhouse Gas verification and Forestry certification services. Tiered system of awards: basic, silver, gold and platinum. SA8000 (Social Accountability International), Fair Labor Association and WRAP (Worldwide Responsible Apparel Production) for social responsibility.	1	every 2 years	1
Ecomark: India	independent laboratory to verify standards of production comply with licence by Bureau of Indias Standards under Product Certification Marks Scheme	Consent/environmental clearance certificate from the concerned State Pollution Control Board; issued either by the office of the Development Commissioner, Small-scale Industries, or Industries Department of the concerned State Government.	Small-scale industries registration certificate if the application is from a small-scale unit who desires to avail the concessional rate of marking fee for the unit for the small-scale sector.	ISI [Indian Standards Institute] mark of quality: ISO 14000 series of standards: Environment Management System (EMS) Certification (IS / ISO : 14001).	1 year, renewable for two years after inspection		I
FairWertung	network organisation that verifies the compliance	FairWertung and third party accountants	criteria monitored by FairWertung and independent chartered accountants: a minimum set of ethical standards have to be met.	government policies: Recycling and Waste Management Act (KrW / AbfG), Waste Shipment Regulation (VVA) , tax regulations, environmental legislation, customs provisions and import restrictions, and – very importantly – transparent and truthful public relations work are the essential standards.	No limit: constant monitoring of the member's activities	according to the government's policies	II
Green Mark	EDF: Green Mark Specification Standard is developed and analyzed by the Institute of Environment and Resource	every 2 years by Green Mark Auditing Board	based on ISO 9000 service quality control and ISO 14024 specification	ISO 9000 service quality control and ISO 14024 specification	2 years		II
GUT	GUT	independent testing houses: TFI, Germany, ÖTI, Austria and Centexbel, Belgium	based on testing houses specifications		every year		I
SMaRT Consensus Sustainable Product Standards:	Accredited by The American National Standards Institute (ANSI)	Auditing is conducted by Ernst & Young Global Sustainability Auditing Group And Redstone Global Auditing	ISO compliant Life Cycle Assessment (LCA) or certification and has achieved the ISO 14000 Series (Criteria covered in the California Platinum Certification)		No limit: constant monitoring of the member's activities		I

Table 4: Textile companies and products having been awarded the criteria with EoL management.

criteria indicates element of recycling		
eco label	textile/clothing related companies	products
Cradle to Cradle Certification	Victor Innovatex	carpets/interiors
	Nike	considered range of athletic footwear
	Milliken	wall coverings
	designtex	wall coverings
	twitchell corporation	wall coverings
Ecomark: India	Tata International	finished leather goods
FairWertung	network to denote that anyone who earns money by collecting (and selling) used clothes – even if the proceeds are used for charity – is responsible for what happens later to these goods.	to date, 150 members of clothing collectors, recyclers and sorters.
Green Mark	named companies difficult to identify, however 2007 statistics from the Green Living Platform estimated the following product categories awarded	cloth diapers (2), reusable shopping bags (5), recycled fabric and products (66)
GUT	granted only to members of Gemeinschaft umweltfreundlicher Teppichboden e.V. (manufacturers of textile floorcoverings)	carpets and carpet tiles
SMaRT Consensus Sustainable Product Standards:	Milliken	carpet tiles
	Forbo Flooring Systems	floor coverings
	Knoll	Knoll Life Chair

5.1 Cradle to cradle (C2C)

Figure 4 is the summary chart of the criteria as published by MBDC, the company which awards the C2C label. Products are developed for closed-loop systems in which every ingredient is safe and beneficial – either to biodegrade naturally and restore the soil, or to be fully recycled into high-quality materials for subsequent product generations, again and again[28]. Criteria fall into the following five categories:

- Product / material transparency and human / environmental health characteristics of materials

- Product / material reutilization

- Production energy

- Water use at manufacturing facility

- Social fairness / corporate ethics.

Within the certification process, MBDC evaluates a material or product's ingredients and the complete formulation for human and environmental health impacts throughout their lifecycles, as well as the capacity for the product to be fully recycled or composted. Certification of a finished product also requires the evaluation of energy use quantity and quality (i.e. relative proportion of renewable energy), water use quantity, water effluent quality, and workplace ethics associated with manufacturing.

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[28] MBDC 2007

If a candidate material or product is found to achieve the necessary criteria, it will be certified as a Silver, Gold or Platinum product or as a Technical / Biological Nutrient (available for homogeneous materials or less complex products). MBDC is developing a system and guidelines by which companies who have certified products can license the use of the Cradle to Cradle brand for marketing.

A 'Platinum' product requires the most stringent of tests and verification procedures and for EoL management is of most interest to this study. The Gold and Platinum levels describe the recovery plan that the applicant has in place for the product in terms of logistics and recovery, including:

- Scope: how extensive the recovery effort will be

- Timeline: when the actual recovery will begin

- Budget: commitment of resources (e.g. dollars, labour, equipment, etc).

The plan can include partners outside the traditional supply chain (e.g. recycling partners, recovery / transportation partners, etc). This does not necessarily mean a product take-back program. That is one potential strategy for closing the loop on the materials / product, but there are also several other legitimate strategies. For example, utilizing design for disassembly (DfD) strategies along with third party regional recyclers may be more effective in recovering and reutilizing materials than a product take-back program that requires potentially highly dispersed products to be sent back to the manufacturer.

For award of Platinum level, the applicant needs to demonstrate that the plan developed for Gold award has been implemented. As each manufacturing system varies, the certifying body will judge the validity and efficacy of each applicant's program on a case-by-case basis.

Figure 4: Certification criteria for C2C

9 Certification Criteria Summary Matrix

CRADLE TO CRADLE CERTIFICATION[CM] CRITERIA	Basic	Silver	Gold	Platinum
1.0 Materials				
All material ingredients identified (down to the 100 ppm level)	●	●	●	●
Defined as biological or technical nutrient	●	●	●	●
All materials assessed based on their intended use and impact on Human/Environmental Health according to the following criteria: **Human Health:** — Carcinogenicity, Endocrine Disruption, Mutagenicity, Reproductive Toxicity, Teratogenicity, Acute Toxicity, Chronic Toxicity, Irritation, Sensitization **Environmental Health:** — Fish Toxicity, Algae Toxicity, Daphnia Toxicity, Persistence/Biodegradation, Bioaccumulation, Ozone Depletion/Climatic Relevance **Material Class Criteria:** Content of Organohalogens, Content of Heavy Metals	●	●	●	●
Strategy developed to optimize all remaining problematic ingredients/materials	●	●		
Product formulation optimized (i.e., all problematic inputs replaced/phased out)			●	●
No wood sourced from endangered forests			●	●
Meets Cradle to Cradle emission standards			●	●
All wood is FSC certified				●
Contains at least 25% GREEN assessed components				●
2.0 Material Reutilization/Design for Environment				
Defined the appropriate cycle (i.e., Technical or Biological) for the product and developing a plan for product recovery and reutilization	●	●	●	●
Well defined plan (including scope and budget) for developing the logistics and recovery systems for this class of product			●	●
Recovering, remanufacturing or recycling the product into new product of equal or higher value				●
Product has been designed/manufactured for the technical or biological cycle and has a nutrient (re)utilization score >= 50		●	●	●
Product has been designed/manufactured for the technical or biological cycle and has a nutrient (re)utilization score >= 65			●	●
Product has been designed/manufactured for the technical or biological cycle and has a nutrient (re)utilization score >= 80				●
3.0 Energy				
Characterized energy use and source(s) for product manufacture/assembly	●	●	●	●
Developed strategy for using current solar income for product manufacture/assembly		●	●	●
Using 50% current solar income for product final manufacture/assembly			●	●
Using 50% current solar income for entire product				●
4.0 Water				
Created or adopted water stewardship principles/guidelines		●	●	●
Characterized water flows associated with product manufacture			●	●
Implemented water conservation measures				●
Implemented innovative measures to improve quality of water discharges				●
5.0 Social Responsibility				
Publicly available corporate ethics and fair labor statement(s), adopted across entire company		●	●	●
Identified third party assessment system and begun to collect data for that system			●	●
Acceptable third party social responsibility assessment, accreditation, or certification				●

5.2 EcoMate

This logo from Japan is attached to a product certified by the Japan Apparel Industry Council as *"a commodity adopting design conducive to recycling"*[29], i.e. it identifies clothing that can be recycled. There are two elements to this logo: the fabric properties and the take-back system in place.

The fabric:

Networks of companies, which are part of a chain of firms, make use of a specific type of polyester fibres that can be broken down and remade back into polyester fibres. This is done by the Japanese fibre and apparel manufacturer Teijin; companies such as AEON and Uniqlo in Japan and Patagonia in the USA are making use of this technology. Only clothing that incorporates the specified appropriate fibres may be recycled in this way through Teijin. Teijin calls their network and the system using this process their *'EcoCircle'* system. They can develop a number of types of polyesters suitable for a range of different uses and garments, illustrated in Figure 5 taken from the Teijin website.

Figure 5: EcoCircle garment products

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[29] AEON, 2004, p 12

Take back:

The EcoMate logo is used by Japanese clothing retailer AEON who have also set up a take-back system for clothing that bears the EcoMate label. The clothing collected is taken back to Teijin. The US group Patagonia also takes back some clothing and transports back to Japan and Teijin as part of their Common Threads Garment Recycling programme[30]. Patagonia has a range of products in this recycling loop, though not every product that they sell is included. The AEON group has taken this a step further and have developed a stand-alone retail concept (Self+Service) that is based on an EoL management system for the clothes that they sell. The store partners up with Nakano Inc., the leading used clothing recycler in Japan, to collect and sort the clothing (Figure 6). Their initial idea has been to take back only clothes with the EcoMate logo but they are now developing a system to collect clothing not bearing the EcoMate logo.

Figure 6: The self+service retail signage and the recycle system for clothing take-back

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[30] Patagonia, 2009

5.3 The EU 'Flower' Ecolabel

According to the European Ecolabel catalogue[31], 75 companies have been awarded the EU Flower for textiles products, across 22 different countries within Europe as well as Australia, New Zealand, India, Egypt, Thailand and Hong Kong. Among the companies awarded the EU Flower are two corporatewear companies: Jyden Workwear and Kentaur A/S, both companies in Denmark. Figure 7 illustrates the various areas of examination, and it can be seen that it is a LCA approach to certification. The scope of the EU Flower criteria for award appears to be comprehensive: however, criteria for EoL management are not as well defined as in C2C (Figure 8). Given its apparent success, this may present an opportunity to expand the existing criteria.

5.3.1 Eco-labels with EoL management criteria: procedures for award

The method of application for an eco-label varies according to the certifying body, the criteria being assessed and the period for which the award is conferred.

Figure 9 illustrates the stages required for obtaining an EU Flower (the EU Ecolabel)[32]. As can be seen the process is 14 stages long, starting with the decision to apply. Once the company has applied for the eco-label, the chemicals that do not meet the criteria are identified and replaced by those that do. This takes place at each stage of production. A regular and honest quality control system is vital to ensure that products being tested meet the criteria at any time, as the awarding body is authorised to conduct random tests. The emphasis is on environmental, health and safety and product performance. Although the overview (Figure 7) indicates EoL management, there do not appear to be any criteria specifically for EoL (Figure 8).

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[31] Ecolabel catalogue 2009

[32] Atilgan 2007

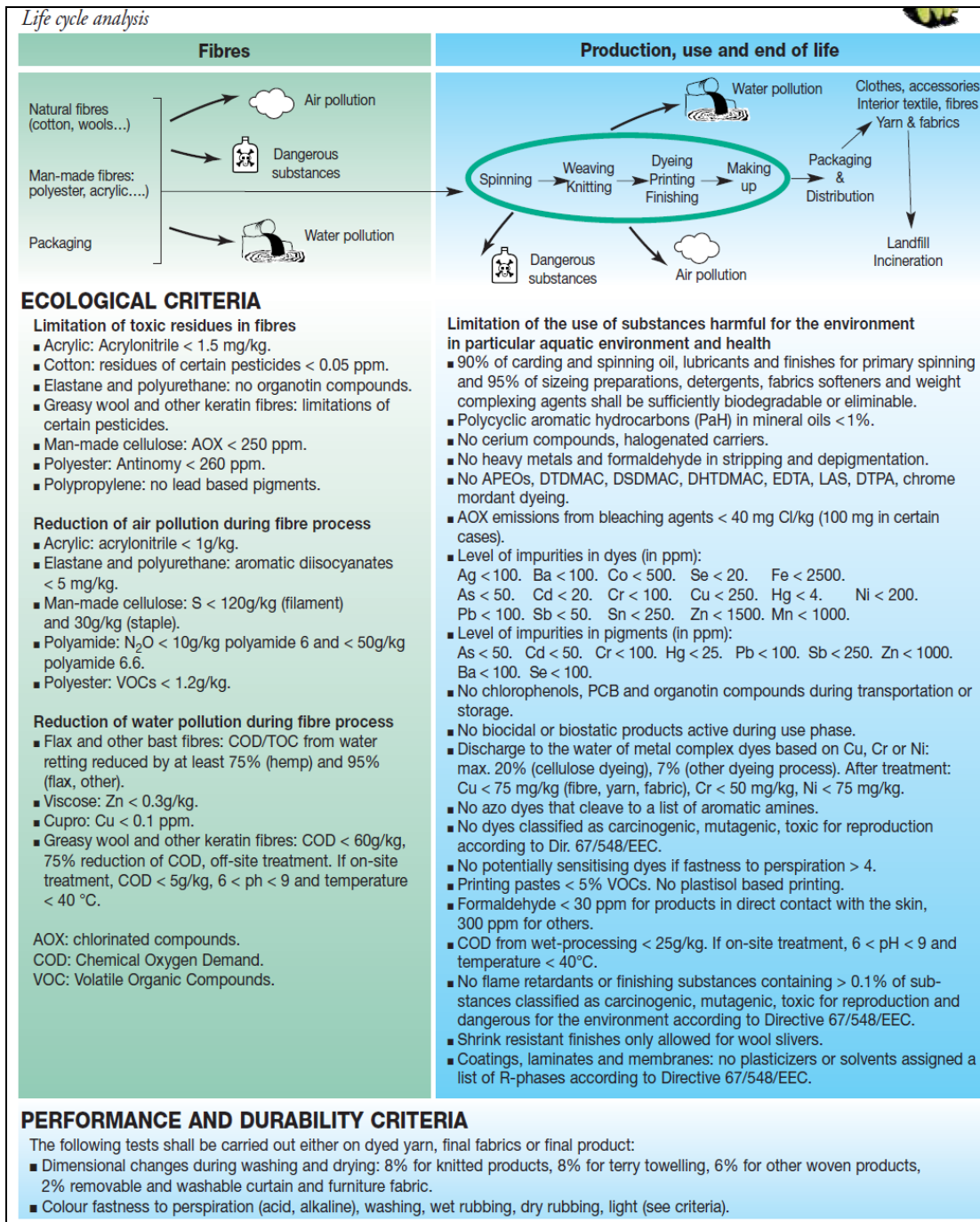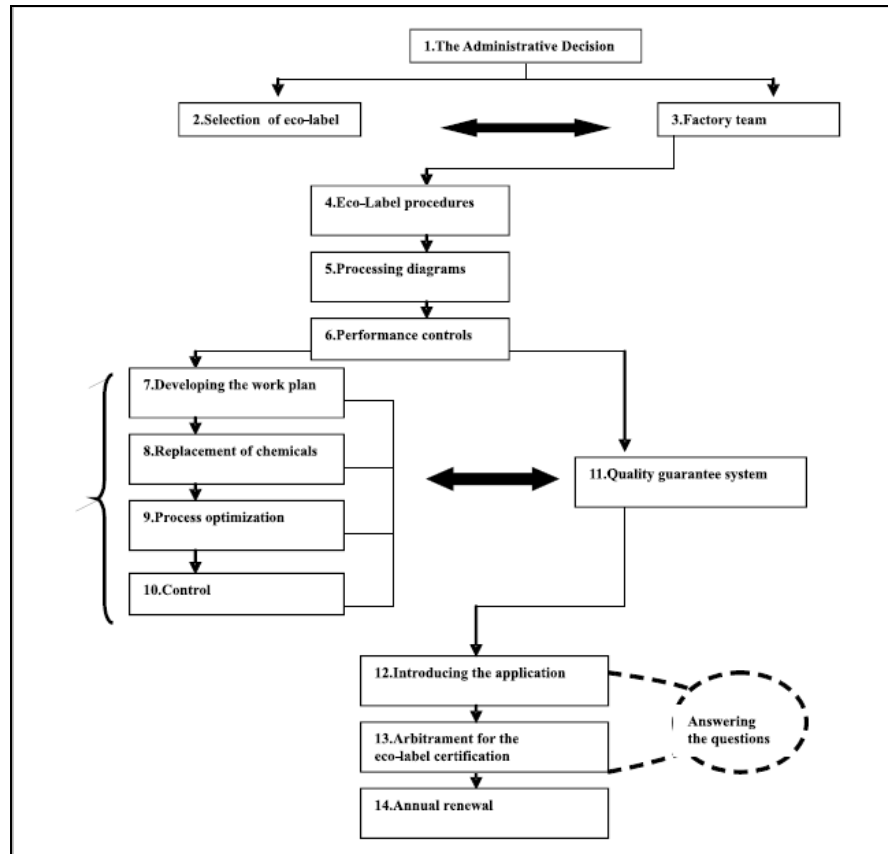Figure 7: The scope of the EU 'Flower' for textiles and textiles related products

Life cycle analysis

Fibres	Production, use and end of life

Natural fibres (cotton, wools...) → Air pollution

Man-made fibres: polyester, acrylic....) → Dangerous substances

Packaging → Water pollution

Spinning → Weaving Knitting → Dyeing Printing Finishing → Making up → Packaging & Distribution → Clothes, accessories Interior textile, fibres Yarn & fabrics

Water pollution

Dangerous substances → Air pollution

Landfill Incineration

ECOLOGICAL CRITERIA

Limitation of toxic residues in fibres
- Acrylic: Acrylonitrile < 1.5 mg/kg.
- Cotton: residues of certain pesticides < 0.05 ppm.
- Elastane and polyurethane: no organotin compounds.
- Greasy wool and other keratin fibres: limitations of certain pesticides.
- Man-made cellulose: AOX < 250 ppm.
- Polyester: Antinomy < 260 ppm.
- Polypropylene: no lead based pigments.

Reduction of air pollution during fibre process
- Acrylic: acrylonitrile < 1g/kg.
- Elastane and polyurethane: aromatic diisocyanates < 5 mg/kg.
- Man-made cellulose: S < 120g/kg (filament) and 30g/kg (staple).
- Polyamide: N_2O < 10g/kg polyamide 6 and < 50g/kg polyamide 6.6.
- Polyester: VOCs < 1.2g/kg.

Reduction of water pollution during fibre process
- Flax and other bast fibres: COD/TOC from water retting reduced by at least 75% (hemp) and 95% (flax, other).
- Viscose: Zn < 0.3g/kg.
- Cupro: Cu < 0.1 ppm.
- Greasy wool and other keratin fibres: COD < 60g/kg, 75% reduction of COD, off-site treatment. If on-site treatment, COD < 5g/kg, 6 < ph < 9 and temperature < 40 °C.

AOX: chlorinated compounds.
COD: Chemical Oxygen Demand.
VOC: Volatile Organic Compounds.

Limitation of the use of substances harmful for the environment in particular aquatic environment and health
- 90% of carding and spinning oil, lubricants and finishes for primary spinning and 95% of sizeing preparations, detergents, fabrics softeners and weight complexing agents shall be sufficiently biodegradable or eliminable.
- Polycyclic aromatic hydrocarbons (PaH) in mineral oils <1%.
- No cerium compounds, halogenated carriers.
- No heavy metals and formaldehyde in stripping and depigmentation.
- No APEOs, DTDMAC, DSDMAC, DHTDMAC, EDTA, LAS, DTPA, chrome mordant dyeing.
- AOX emissions from bleaching agents < 40 mg Cl/kg (100 mg in certain cases).
- Level of impurities in dyes (in ppm):
  Ag < 100. Ba < 100. Co < 500. Se < 20. Fe < 2500.
  As < 50. Cd < 20. Cr < 100. Cu < 250. Hg < 4. Ni < 200.
  Pb < 100. Sb < 50. Sn < 250. Zn < 1500. Mn < 1000.
- Level of impurities in pigments (in ppm):
  As < 50. Cd < 50. Cr < 100. Hg < 25. Pb < 100. Sb < 250. Zn < 1000.
  Ba < 100. Se < 100.
- No chlorophenols, PCB and organotin compounds during transportation or storage.
- No biocidal or biostatic products active during use phase.
- Discharge to the water of metal complex dyes based on Cu, Cr or Ni: max. 20% (cellulose dyeing), 7% (other dyeing process). After treatment: Cu < 75 mg/kg (fibre, yarn, fabric); Cr < 50 mg/kg, Ni < 75 mg/kg.
- No azo dyes that cleave to a list of aromatic amines.
- No dyes classified as carcinogenic, mutagenic, toxic for reproduction according to Dir. 67/548/EEC.
- No potentially sensitising dyes if fastness to perspiration > 4.
- Printing pastes < 5% VOCs. No plastisol based printing.
- Formaldehyde < 30 ppm for products in direct contact with the skin, 300 ppm for others.
- COD from wet-processing < 25g/kg. If on-site treatment, 6 < pH < 9 and temperature < 40°C.
- No flame retardants or finishing substances containing > 0.1% of substances classified as carcinogenic, mutagenic, toxic for reproduction and dangerous for the environment according to Directive 67/548/EEC.
- Shrink resistant finishes only allowed for wool slivers.
- Coatings, laminates and membranes: no plasticizers or solvents assigned a list of R-phases according to Directive 67/548/EEC.

PERFORMANCE AND DURABILITY CRITERIA
The following tests shall be carried out either on dyed yarn, final fabrics or final product:
- Dimensional changes during washing and drying: 8% for knitted products, 8% for terry towelling, 6% for other woven products, 2% removable and washable curtain and furniture fabric.
- Colour fastness to perspiration (acid, alkaline), washing, wet rubbing, dry rubbing, light (see criteria).

Figure 8: Summary of the criteria for the EU 'Flower'.

Life Cycle Step	Criterium	Expectations
Manufacturing (fibres)	Type of fibres	• All types of fibres can be used, with the exception of mineral fibres, glass fibres, metal fibres, carbon fibres and other inorganic fibres. • The criteria for a given-fibre type need not be met if that fibre contributes to less than 5% of the total weight of the textile fibres in the product, or if the fibres are of recycled origin.
Manufacturing (fibres)	Limitation of toxic residues in fibres	• Acrylic: Acrylonitrile < 1.5mg/kg • Cotton: residues of certain pesticides < 0.05ppm • Elastane and polyurethane: no organotin compounds • Greasy wool and other keratin fibres: limitations of certain pesticides • Man-made cellulose: AOX < 250ppm • Polyester: Antinomy < 260ppm • Polypropylene: no lead based pigments
Manufacturing (fibres)	Reduction of air pollution during fibre process	• Acrylic: acrylonitrile < 1g/kg • Elastane and polyurethane: aromatic diisocyanates < 5mg/kg • Man-made cellulose: S < 120g/kg (filament) and 30g/kg (staple) • Polyamide: N_2O < 10g/kg polyamide 6 and < 50g/kg polyamide 6.6 • Polyester: VOCs < 1.2g/kg
Manufacturing (fibres)	Reduction of water pollution during fibre process	• Flax and other bast fibres: COD/TOC from water retting reduced by at least 75% (hemp) and 95% (flax, other) • Viscose: Zn < 0.3g/kg • Cupro: Cu < 0.1ppm • Greasy wool and other keratin fibres: COD < 60 g/kg, 75% reduction of COD, off-site treatment. If on-site treatment, COD < 5 g/kg, 6 < pH < 9 and T < 40 °C
Manufacturing (processes and chemicals)	Limitation of the use of substances harmful for the environment (in particular aquatic environment) and health process	• 90% of carding and spinning oil, lubricants and finishes for primary spinning and 95% of sizeing preparations, detergents, fabrics softeners and weight complexing agents shall be sufficiently biodegradable or eliminable. • Polycyclic aromatic hydrocarbons (PaH) in mineral oils < 1% • No cerium compounds, halogenated carriers • No heavy metals and formaldehyde in stripping and depigmentation • No APEOs, DTDMAC, DSDMAC, DHTDMAC, EDTA, LAS, DTPA, chrome mordant dyeing • AOX emissions from bleaching agents < 40 mg Cl/kg (100mg in certain cases) • Level of impurities in dyes (in ppm): Ag < 100 Ba < 100 Co < 500 Se < 20 Fe < 2500 As < 50 Cd < 20 Cr < 100 Cu < 250 Hg < 4 Ni < 200 Pb < 100 Sb < 50 Sn < 250 Zn < 1500 Mn < 1000 • Level of impurities in pigments (in ppm): As < 50 Cd < 50 Cr < 100 Hg < 25 Pb < 100 Sb < 250 Zn < 1000 Ba < 100 Se < 100 • No chlorophenols, PCB and organotin compounds during transportation or storage • No biocidal or biostatic products active during use phase • Discharge to the water of metal complex dyes based on Cu, Cr or Ni: max 20% (cellulose dyeing), 7% (other dyeing process). After treatment: Cu < 75 mg/kg (fibre, yarn, fabric), Cr < 50 mg/kg, Ni < 75 mg/kg • No azo dyes that cleave to a list of aromatic amines • No dyes classified as carcinogenic, mutagenic, toxic for reproduction according to Directive 67/548/EEC. • No potentially sensitising dyes if fastness to perspiration > 4 • Printing pastes < 5% VOCs. No plastisol based printing • Formaldehyde < 30ppm for products in direct contact with the skin. 300ppm for others • COD from wet-processing < 25g/kg. If on-site treatment, 6 < pH < 9 and T < 40°C • No flame retardants or finishing substances containing > 0.1% of substances classified as carcinogenic, mutagenic, toxic for reproduction and dangerous for the environment according to Directive 67/548/EEC • Shrink resistant finishes only allowed for wool slivers • Coatings, laminates and membranes: no plasticizers or solvents assigned a list of R-phases according to Directive 67/548/EEC
Use	Performance and durability	The following tests shall be carried out either on dyed yarn, final fabrics or final product: • Dimensional changes during washing and drying: 8% for knitted products, 8% for terry towelling, 6% for other woven products, 2% removable and washable curtain and furniture fabric • Colour fastness to perspiration (acid, alkaline), washing, wet rubbing, dry rubbing, light (see criteria)

Figure 9: Application and verification procedure for award of the EU 'Flower'

5.4 Cradle to Cradle

The EoL management criteria for the C2C label are comprehensive, as the use of materials that will have a useful after-life either in recycling or 'upcycling'[33] is the founding principle for the Cradle to Cradle methodology. Figure 10 outlines the process for certification and Figure 11 outlines the documentation required for all levels from basic (Silver) to Gold and then Platinum awards. The process also comprises 14 stages and, like the EU Flower, it examines process as well as materials. It differs in that the label is awarded at levels which denote how close the product is to closed-loop system and makes use of renewable powered energy (Platinum award indicating use of 100% renewable energy to manufacture the product). The standard process as illustrated in Figure 10 may become more complex depending on the complexities of the product or supply chain[34].

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[33] EPEA, 2008a

[34] EPEA, 2008b

Figure 10: Cradle to Cradle process for certification
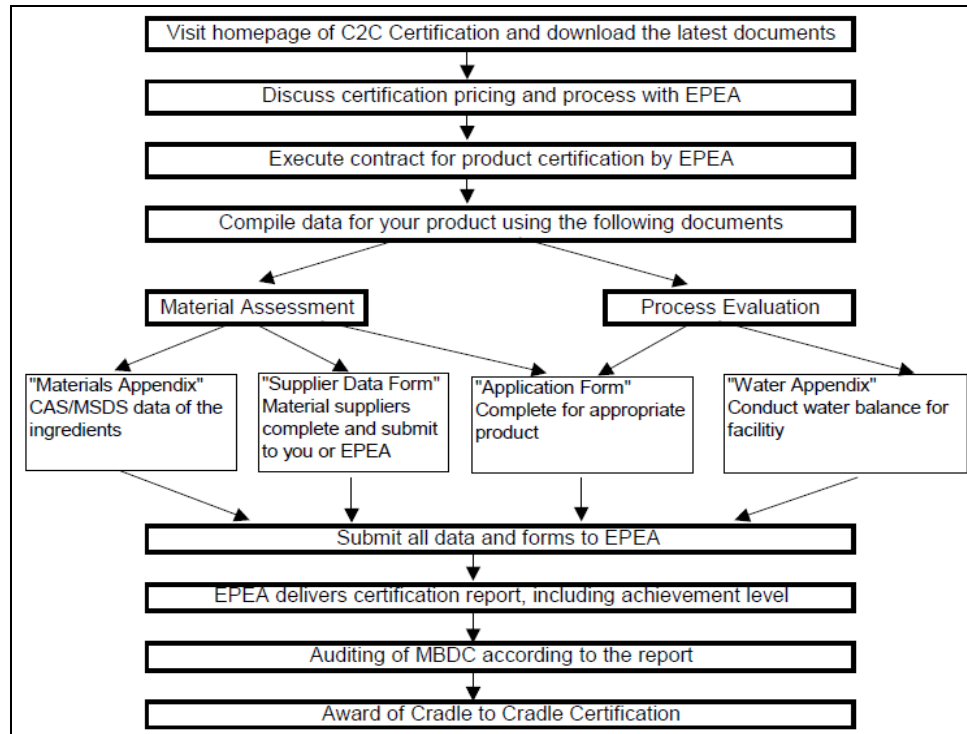
Figure 11: Cradle to Cradle application documentation required

5.5 Costs of eco-labelling

As noted in Section 2.4, benefits of eco-labelling have to be balanced against the costs. ISO type I eco-labelling programmes (such as the EU Flower and the C2C label) require all or some of the following sets of costs to be paid for:

- Annual fee to the awarding body for using the eco-label of between 0.001-0.2% of annual product turnover[35]

- Verification costs (money and time) of testing to be conducted by a third party (a laboratory)

- Audit by the awarding company

- Issuing of the certificate.

5.5.1 Cradle to Cradle

Costs involved with C2C certification are per product component. The prices quoted in the program are[36]:

- Material Assessment:

  - €500 for 1-10 product component per product component

  - €400 for 11-25 product component per product component

  - €300 for 25+ product component per product component

- Process Evaluation: €4,000 for one process

- Audit by MBDC: €1,500

- Cradle to Cradle Certificate by MBDC: €500.

5.5.2 The EU Flower

The cost for using the EU Ecolabel is set at 0.15% of the annual turnover of the Ecolabelled product[37], and can cost up to €1,300 for registration (i.e. to apply for the label), €25,000 per year for the use of the label, with a reduction of 25% for SMEs[38].

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[35] Rubik and Frankl, 2005

[36] EPEA 2008b

[37] Rubik and Frankl, 2005

[38] buyusa.gov 2009

Atilgan (2007) indicated that the costs of using eco-labelled production made the finished product between 12-15% more expensive to make (illustrated in Tables 5 and 6), therefore manufacturers and retailers were not very interested at that time. However, he suggested that these costs may be mitigated through the use of smaller amounts of high quality products, optimising the production techniques e.g. by controlling all recipes and procedures, and identifying problem areas.

Table 5: The comparison of costs of men's underwear produced with classical and environment-friendly methods (SF).

Process	Cost (Classic)	Extra Environment Cost	Extra Environment Cost, %	Total cost
Braiding	1.48	0.09	6.1	1.57
Dyeing	0.28	0.02	7.1	0.30
Bleaching	0.20	0.00	0.0	0.20
Production	1.80	0.33	18.3	2.13
Packaging	0.50	0.20	60.0	0.70
Total	**4.26**	**0.64**	**15.8**	**4.90**

Table 6: The cost comparison of environmental and classical production (DM).

Product	Production	
	Classic	Environmentalist
Bed-Sheet	15-100	50-160
Woman's sweatshirt	20-80	40-150
Woman's jean	25-160	90-200
Woman's cloth	35-180	90-290
Man's underwear	2-22	12-58
Man's pyjamas	20-70	50-100
Child's T-shirt	4-50	20-70

Regardless of the analysis of costs / benefits, Atilgan urged the Turkish government and industry to become engaged with eco-labelling as, after the WTO agreements on quotas have ceased, the next area of purchase and trading selection looks set to be based on the criteria set by the eco-labelling bodies.

5.5.3 Outline costs for 'standard' vs 'eco' corporate clothing

As can be inferred from the above costs, it would be extremely difficult to arrive at a cost analysis for every scenario. We therefore asked a UK corporatewear supplier, Incorporatewear, to estimate the costs to them of using eco-labelled fabrics. Incorporatewear suggested the use of Teijin fabrics, for its EcoCircle and closed loop system of fibre processing. Table 7 illustrates the cost differences between current fabric and that from Teijin. We then considered the cost in terms of a suit (Table 8), and the typical costs to a firm buying the eco-labelled items, to estimate the impact on the firm (Table 9).

Table 7: Comparison between corporate clothing made using regular or EcoCircle fabric

	Cost per meter	Cost to Supplier	Margin added	Premium for mfr of eco product	Price per item	Extra cost for eco product
Combat/Chino Trouser						£4.20
Poly/Cotton		£5.00	£2.00		£7.00	
Recycled Poly/Eco cotton		£8.00	£3.20		£11.20	
Polo shirt					(mid range)	£2.52
Basic Poly/Cotton		£1.70	£0.68		£2.38	
Mid range Poly/Cotton		£3.20	£1.28		£4.48	
Premium Poly/Cotton		£4.00	£1.60		£5.60	
Recycled Poly/Eco cotton		£5.00	£2.00		£7.00	
Suit (priced at fabric used)	3 meters per suit					£9.20
Teijin - 55% poly/45% new wool	£4.80	£14.40	£5.76	£5.00	£25.16	
Standard Poly/Wool	£3.80	£11.40	£4.56		£15.96	
Suit Jacket (priced at fabric used)	1.8 meters per suit					£5.52
Teijin - 55% poly/45% new wool	£4.80	£8.64	£3.46	£3.00	£15.10	
Standard Poly/Wool	£3.80	£6.84	£2.74		£9.58	
Suit Jacket (priced at fabric used)	1.2 meters per suit					£3.68
Teijin - 55% poly/45% new wool	£4.80	£5.76	£2.30	£2.00	£10.06	
Standard Poly/Wool	£3.80	£4.56	£1.82		£6.38	

Table 8: Comparison for a suit made of regular fabric vs EcoCircle

Approximate cost per outfit	Standard	Eco	Eco Premium
Casual - 2xTrouser 4xPolo shirt	£31.92	£50.40	£18.48
Smart - 1xJkt 2xTrs	£22.34	£35.22	£12.88

Table 9: Effect of the price differences on the company size

	No of emp.	Casual			Smart		
		Standard	Eco	Eco Premium	Standard	Eco	Eco Premium
Micro	10	£319	£504	£185	£223	£352	£129
Small	50	£1,596	£2,520	£924	£1,117	£1,761	£644
Medium	100	£3,192	£5,040	£1,848	£2,234	£3,522	£1,288
Large	500	£15,960	£25,200	£9,240	£11,172	£17,612	£6,440
Corporation	3000	£95,760	£151,200	£55,440	£67,032	£105,672	£38,640

6 Potential developments for eco-labels with EoL management criteria

We spoke to Royal Mail Group (RMG) to discover their approach to EoL management for their uniforms. Royal Mail are linked in with a textile recycler and are considering clear labelling to encourage employees to properly dispose of the uniform. This is an alternative approach to eco-labelling and is a similar approach to that of AEON and EcoMate, but is not driven by fabric property, rather de-logoing issues.

6.1 Royal Mail Group

The entire RMG spend on all products is about £2billion, the amount on uniforms for Royal Mail[39] is £11.4-12.4 million a year: i.e., between 150,000 and 255,000 uniform wearers with an additional 55,000 if sub-postmasters / mistresses buy uniforms to wear. RMG are subject to Public Procurement Law when organising contractors to supply them with products, as the orders are so large and could potentially cause too much reliance on the Group for the supplier's business. Contract approval takes a period of about two or three years and a contract will last for between three and five years with an option to extend by another five (thus making contracts last about 10 years).

Royal Mail had worked with recycler Field Textiles who also recycle materials for the Ministry of Defence. Field Textiles were working in close association with managing agent DSA, but they had not been able to track the destinations of their discarded uniforms and so could not assess performance against CSR goals/objectives. All corporatewear had been collected in one container for disposal; no sorting took place and so there was no understanding of where products were destined for (see Figure 12).

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[39] that Graham West and his colleague are responsible for

Figure 12: The flow of materials is between Field Textiles, Dimensions and RM.
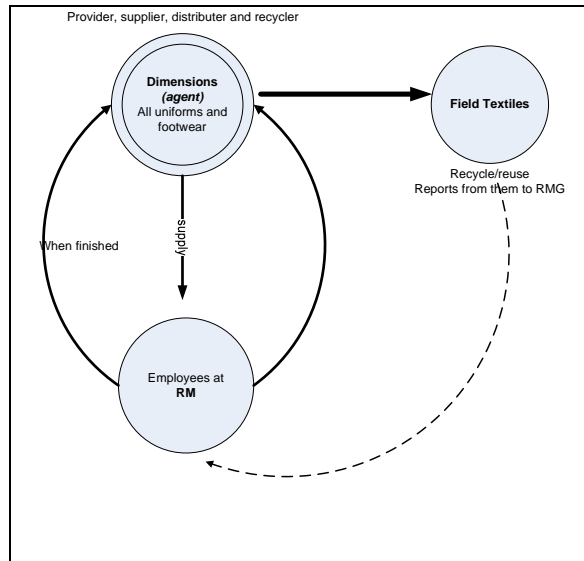
Royal Mail estimates that they currently have less than 1% corporatewear going to landfill (0.86%) and they are working towards lowering this further. They intend to designate each route (currently labelled A, B, C) with a colour code and incorporate their corporate products with these labels to enable appropriate disposal by each employee at their worksite. The labels will be colour coded to be the same as the bags into which the employees will place the items for disposal; there is also discussion about potential research into touch sensitive fabrics for employees that are vision impaired. The logos as envisioned by the Royal Mail spokesperson (Graham West) are illustrated in Figure 13.

Figure 13: Visuals used by Royal Mail to help their staff sort returned uniforms
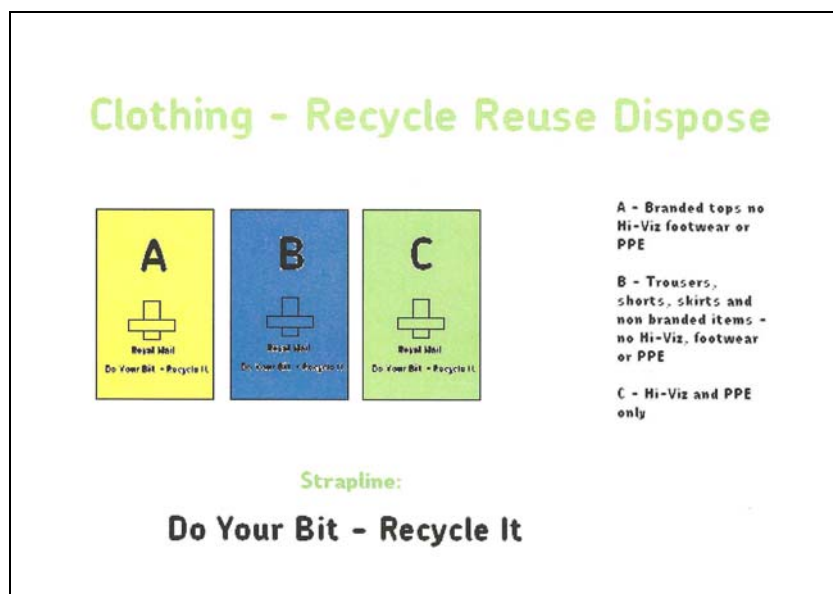
6.2 Stakeholder analysis ~ risks/benefits

Reflection on current practice within the corporate clothing/uniform sector led to the creation of a stakeholder analysis diagram to illustrate where stakeholders are positioned in terms of 'influence on practice' and 'importance of sustainability'.

The *Recycler (8)* in each scenario has been positioned in the top left hand quadrant of the diagram; i.e.:

- high level of influence on industry practice (they can opt to either accept, or refuse corporate clothing – due to the EoL implications of fibre composition of a garment) and,

- as their business links directly to sustainability, we assume that sustainable practice is their priority.

We considered the attitudes of the *Wearer (7)* to EoL management of clothes as they are the final link in the chain before EoL management considerations. We asked a sample of 404 shoppers in Manchester in January 2009 to answer the following questions:

- Do you look for environmental information on clothing items when buying them?

  11% of the sample of 404 people replied yes

- If there were environmental information put into or on clothing, would this affect your purchase?

  41% of the sample of 404 people replied yes.

This raises the issue about the amount of information or knowledge that the wearer has about eco-labelling for clothing, and suggests that a campaign to raise awareness may increase enthusiasm to dispose of clothing through more appropriate routes.

We considered three scenarios for each of the eight stakeholders within the contexts of their priorities and positioned them within the matrix relative to their impact on industry practice combined with their current stance on sustainability. The matrix in Figure 14 illustrates where each of the eight stakeholders are:

- currently,

- following the introduction of policy to support more stringent EoL policies, and

- following the introduction of a uniform policy on tax tabs.

Figure 14: Stakeholder analysis to show current and potential positions against influence on practice and importance of sustainability
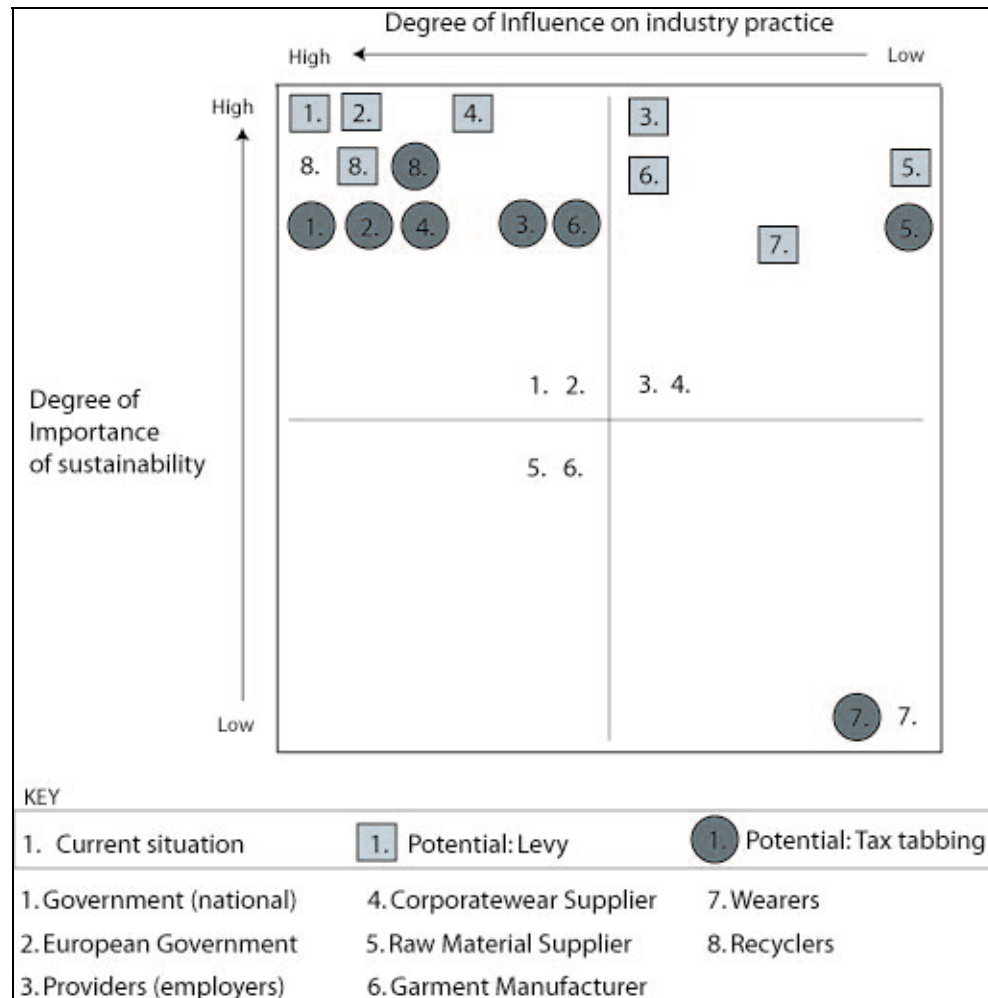
Scenario 1: Current situation (numbers with no shading)

Most stakeholders are in the centre of the matrix, with the exception of the wearer. In line with the lack of definitive policies, we felt that each stakeholder has equal influence on industry practice and regards sustainability issues with equal measure of importance, resulting in a lack of real direction:

- *Providers (3)* and *Suppliers (4)* currently have a relatively low level of influence on practice, in relation to a higher importance of sustainability.

- *National* and *European Government (1,2)* are fairly central within the matrix but have a slight lead on the providers and suppliers on influencing practice through current taxation rules on branding, and sustainability through policies encouraging ecological practice, but there is no enforcement currently in place.

- The *Wearer (7)* has little influence on industry practice (there are some exceptions, for instance the Royal Mail provide appropriate garments for vegan wearers) and in terms of their status they are in a position where they have low levels of influence both on industry practice or of their regard for sustainability.

Scenario 2: Introduction of levies (numbers in the lightly shaded squares)

The introduction of levies has the potential to empower a number of the stakeholders, notably the corporatewear *Wearer (7)*:

- The *Wearer (7)*: although their influence on industry practice is still low, it is increased from current situation and the importance with which sustainability is regarded is raised to a much higher level.

- The *Provider (3)* would be required to pay disposal fees of garments at the purchasing stage. Therefore, the purchasers are likely to forcibly enforce clothing/uniform returns, making the Wearer a more significant partner in the EoL process.

- The *Recycler (8)* and corporatewear *Supplier (4)* become much more influential regarding industry practice as they will be involved in sourcing raw materials and ensuring the appropriate EoL management treatments.

Scenario 3: Introduction of more formalised strategy on tax tab/branding guidelines (numbers in the circles with darker shading)

Tax tabs are the means by which the government monitors and approves / disapproves the corporate branding applied to garments and accessories worn to present the required corporate image*.* The process of applying a tax tab is complex and they are not uniformly applied. Were the tax tab applied uniformly, all stakeholders (except the wearer) will have a higher level of influence both on practice and their impact on sustainability. The largest issue that corporatewear providers face is the risk associated with retrospective assessments that have been known to result in tax demands being made after garments have been worn for a period of months. Increased clarity would aid decisions made at the conception and production stages.

We considered the impacts on each of the stakeholders upon introduction of eco-labelling of corporatewear; this is presented in Table 10.

Table 10: Impact on Stakeholders

	Benefits	**Problems**
Wearer	clear instructions for disposal	yet another label to become familiar with?
Government	increased efficiencies in setting and achieving waste management policies and targets	how to ensure transparency and avoid unfair trading negotiations (e.g. with small, developing economies)
Corporatewear providers	potential to increase source of revenue from increasing reuse/recycle and decrease landfill	bear the extra costs of buying an eco-labelled product
Manufacturers (of corporatewear and/or textiles)	extra source of competitive advantage	manufacturing costs increased due to licensing system of eco-label
Recyclers	increased input in the conception and design of raw materials with a view towards EoL management	the eco-label itself does not help the specific job of collection and sorting

7 Conclusions

This report illustrates the complex nature of the corporate clothing sector, and the issues that would affect the adoption of a labelling system to improve EoL management. As corporate clothing is used by organisations to present a visible message of their branding, there is the potential for this vehicle to be used to promote their ecological ethos toward, as the Danish corporatewear company Jyden does on their website[40] for their award of the EU Flower.

Given that the benefits of eco-labelling are hampered by the costs, we felt an initial measure that corporatewear suppliers could take to encourage take-back of the clothing and or appropriate disposal of clothing may be the use of the 'recycle' logo as either a label or part of the packaging. This could be followed up by application for the award of an eco-label.

We conclude this report by offering the recommendations as set out in Section 8.

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[40] www.jyden-workwear.com

7.1 Considered options – use of existing labelling

Eco-label	Pros:	Cons:
EU Flower	• Internationally recognised and growing acceptance (75 companies have been awarded the logo in 22 countries including India and Hong Kong) • If pursued, the criteria could be expanded to accommodate EoL management • The criteria could include that the provider would return items	• Criterion for EoL management does not currently exist (opportunity?) • Regarded as an extra expense by corporatewear providers due to the licensing fees and verification costs.
Recycle now (UK)	• Free to use so offers an inexpensive way for suppliers and providers of corporate clothing to encourage sustainable use / disposal of items by the wearers • Promotional documentation is available to support recycling • Use of the logo on label or garment would provide a consistent message to the wearers and would serve to encourage responsible disposal of corporate clothing in a similar way to paper waste. • Supplementary documentation could be included with items at the dispatch stage	• It does not define the routes of disposal and is not necessarily indicative of EoL management.

8 Recommendations

Having considered aspects of current corporate clothing provision, a number of recommendations have been formulated. These suggestions have been grouped dependent on the relevant stakeholder:

Corporate clothing suppliers:

- Source and make use of eco-labelled products.

- Encourage relationships with the textile recyclers.

Corporate clothing providers:

- Be mindful that corporate clothing / uniforms can be a vehicle to promote their eco-credentials: capture a market opportunity

- Devise more efficient methods of recovering corporatewear to put into reuse / recycle / remanufacture routes.

- Consider ways to increase the visibility of their eco-credentials.

- Encourage relationships with the textile recyclers.

Government (*providers of uniforms / workwear, also utilising reused textile products*):

- Opportunity to 'lead by example' and use models of best practice which require GA / Local Authorities to use products with recognisable reuse / recyclable properties.

- Encourage use of reused textile products for janitorial supply use, stipulating a minimum proportion of GA / authority order quantities.

Government (*to inform policy development*):

- Consider how policies could be applied that will encourage best practice: Green Public Procurement…

- Create a nationally recognised standard for requirements of tax tab / corporate embellishment for corporate clothing.

- Consider the viability of levies:

    - to the suppliers…

- o to the providers where they are required to pay a charge for the future disposal of the products they provide to their workforce, to encourage an increased level of take-back.

- Encourage best practice by acknowledging the value of ecological product selection, stipulating a list of preferred fabric options.

- Consider enforcement of the use of eco-labels.

- Stipulate that a proportion of any uniforms / clothing provided have the capacity to be re-worn (standard items that are not heavily branded), or reused (encourage the use of preferred pure blend fabrics).

- Consider ways that models for the tendering process can be amended to require reuse / recycling as a component of the product.

Corporatewear wearers:

- Employees to be encouraged to return corporatewear to firms when no longer used, to ensure that it is placed into the companies' EoL management systems for corporatewear – companies or government may consider some form of tax or levy until the uniform is returned.

Textile recyclers:

- Encourage developing relationships with companies that provide corporatewear, and with corporatewear manufacturers to ensure that EoL management issues are considered throughout the product development and use phases of the lifecycle of the corporatewear.

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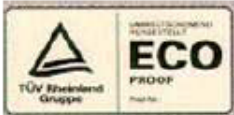
Appendix

Table A: Eco-labels awarded to textile related products

Table B: Eco-labels awarded to textile related products in detail

Table A: Eco-labels awarded to textile related products

	eco label		what does the certification cover	year established
1	AIAB Bio Fibre		Multiple environmental attributes for one portion of the product's life cycle: environmental target: avoid hazardous substances in fibres and textile products	1998
2	BASF Eco-Efficiency		International label for general products evaluated by an Eco-Efficiency Analysis. Multiple environmental attributes for the whole of the product's life cycle: dyeing techniques or fibre content	2004
3	Bluesign-standard		focus not on finished product testing but rather on all input streams – from raw materials, to chemical components, to resources – analyzed with a sophisticated "Input Stream Management" process. Prior to production, every component is assessed, receives a rating based on its ecotoxicological impact aiming to eliminate potentially harmful substances before production begins.	2000
4	Carbon Reduction Label		The Carbon Reduction Label communicates the lifecycle greenhouse gas emissions from goods & sevices. Companies displaying the label sign up to a 'reduce it or lose it' clause whereby if they fail to reduce the carbon footprint of the product over a two year period they will have the label withdrawn by the Carbon Trust.	2007
5	Certified Humane Raised and Handled		Single environmental attributes for one portion of the product's life cycle.	2003
6	Certified Wildlife Friendly™		Multiple environmental attributes for one portion of the product's life cycle.	2007

	eco label		what does the certification cover	year established
7	Coop Naturaline: Switzerland		Multiple environmental attributes for the whole of the product's life cycle: bio and organic: ie the textile is organically grown and fair trade.	1993
8	Cradle to Cradle Certification		demonstrate efforts in eco-intelligent design: a third-party sustainability label that requires achievement in multiple areas:	2005
9	eco-INSTITUT-Label		Multiple environmental attributes for one portion of the product's life cycle: mattresses, bedding goods, furniture and building products, which meet strictest pollutant and emission requirements	2007
10	EcoLogo / Environmental Choice		Multiple environmental attributes for the whole of the product's life cycle.	1988
11	Ecomark: India		Multiple environmental attributes for the whole of the product's life cycle: cradle-to-grave approach, i.e. from raw material extraction, to manufacturing, and to disposal.	1991
12	Ecoproof		Multiple environmental attributes for the whole of the product's life cycle.	1994
13	Environmental Choice New Zealand		Multiple environmental attributes for the whole of the product's life cycle.	1990

	eco label		what does the certification cover	year established
14	Environmentally Friendly Product: Czech Republic		Multiple environmental attributes for the whole of the product's life cycle.	1994
15	EU Flower		aim is to promote the reduction of water pollution related to the key processes throughout the textile manufacturing chain, including fibre production, spinning, weaving, knitting, bleaching, dyeing and finishing. The criteria are set at levels that promote the labelling of textile products which have a lower environmental impact.	1999 (2002 for Textiles)
16	Fairtrade Labelling Australia & New Zealand (FLANZ)		the mark audits for the environmental attributes for one portion of the product's life cycle. The Fairtrade Mark is an independent consumer label which appears on products as an independent guarantee that disadvantaged producers in the developing world are getting a better deal. For a product to display the Fairtrade Mark it must meet international Fairtrade standards. These standards are set by the international certification body Fairtrade Labelling Organisations International (FLO).	2005
17	FairWertung		Single environmental attributes for one portion of the product's life cycle: fair collection and marketing of second-hand clothes.	1994
18	Global Organic Textile Standard		Is developing an international textile standard for organically grown textile materials: organic textile processing standard	2008
19	Green Mark		promote the concept of recycling, pollution reduction and resource conservation.	1992
20	GUT		Enhances environmental friendliness through the entire life-cycle of carpet from production to installation and from usage to recycling.	1990

	eco label		what does the certification cover	year established
21	Healthy Child Healthy World		Multiple environmental attributes for one portion of the product's life cycle: Recommends products and services focused on children and family environmental health and non-toxic lifestyle solutions.	1991
22	Hungarian Ecolabel / Környezetbarát Termék Védjegy		Multiple environmental attributes for the whole of the product's life cycle.	1993
23	Label STEP		Fair trade) environmental attributes for one portion of the product's life cycle: The STEP label is awarded to handmade carpets that are produced according to fair trade standards, including ensuring fair conditions of production; paying fair prices to ensure fair wages; fighting abusive child labour; promoting ecologically viable production methods; and authorising independent verification.	1995
24	Max Havelaar: Belgium		Fair trade) environmental attributes for one portion of the product's life cycle: The STEP label is awarded to handmade carpets that are produced according to fair trade standards, including ensuring fair conditions of production; paying fair prices to ensure fair wages; fighting abusive child labour; promoting ecologically viable production methods; and authorising independent verification.	1989
25	Migros ECO		Multiple environmental attributes for the whole of the product's life cycle: Guarantees that no substance likely to cause allergies or irritation, or to be harmful to the environment has been used throughout the manufacturing chain. Also attests to environmental preservation and workforce health and safety.	1996

	eco label		what does the certification cover	year established
26	NATURTEXTIL		Multiple environmental attributes for one portion of the product's life cycle	2005
27	NSF-140-2007 Sustainable Carpet Assessment Standard		Multiple environmental attributes for the whole of the product's life cycle. This standard for carpet includes a rating system with established performance requirements and quantifiable metrics throughout the supply chain for: public health and environment; energy and energy efficiency; bio-based, recycled content materials; environmentally preferable materials; manufacturing; and reclamation and end-of-life management.	2005
28	OE-100		Multiple environmental attributes for one portion of the product's life cycle. Certifies products made with 100% organic fiber that have been tracked through the production chain and segregated to prevent commingling with other fibers.	2008 (first version 2004)
29	Oeko-Tex Standard 100		that the product has been tested for harmful substances	1992
30	Oeko-Tex Standard 1000		To complement the product-related Oeko-Tex Standard 100, the Oeko-Tex Standard 1000 is a testing, auditing and certification system for environmentally-friendly production sites throughout the textile processing chain.	1995
31	Oeko-Tex Standard 100plus		Oeko-Tex Standard 100plus is a product label providing textile and clothing manufacturers with the opportunity to highlight the human-ecological optimisation of their products as well as their efforts in production ecology to consumers.	1995

	eco label		what does the certification cover	year established
32	ÖkoControl		Air emissions, sustainable biological raw materials) environmental attributes for one portion of the product's life cycle	1994
33	Oregon Tilth		The purpose of organic certification is to ensure that the agreed upon conventions of organic agricultural systems are being practiced not only by growers, but also by all the people who handle and process organic food, feed and fiber on its journey to the consumer.	1974
34	Organic Farmers & Growers Certification		Organic Farmers & Growers label indicates product meets UK Department for Environment, Food and Rural Affairs (Defra) regulations for organic production and processing in the UK.	1990
35	Reilun kaupan edistämisyhdistys ry: Finland		Fair trade environmental attributes: fair conditions of production; paying fair prices to ensure fair wages; fighting abusive child labour; promoting ecologically viable production methods; and authorising independent verification.	1999
36	Rugmark		Working to end illegal child labour in the carpet industry and offer educational opportunities to children in South Asia. RugMark randomly inspects the looms of companies that agree to employ adults only. Through independent certification and rigorous inspections rugs are labelled as child-labor-free.	1994

	eco label		what does the certification cover	year established
37	SMaRT Consensus Sustainable Product Standards:		Multiple environmental attributes for the whole of the product's life cycle.	2001
38	Soil Association Organic Standard		Multiple environmental attributes for one portion of the product's life cycle.	1973 (textiles 2003)
39	Thai Green Label		Multiple environmental attributes for the whole of the product's life cycle: reduce environmental impacts which may occur during manufacturing, utilization, consumption and disposal of products	1994
40	TransFair: Canada		Other (Fair Trade) environmental attributes for one portion of the product's life cycle.	1997
41	Zque		Multiple environmental attributes for one portion of the product's life cycle.	2005
42	Ø-label: Norway		Multiple environmental attributes for one portion of the product's life cycle.	1986

Table B: Eco-labels awarded to textile related products in detail

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
AIAB Bio Fibre	The certification body is ICEA (Istituto per la Certificazione Etica e Ambientale – Institute for the Ethical and Environmental Certification).	Awarding institution is AIAB (Associazione Italiana per l'Agricoltura Biologica – Italian Association for Biologic Agricolture) and Centrocot (Centro Tessile Cotoniero e Abbigliamento – Centre for Cotton)			5		I	no
BASF Eco-Efficiency	third party: German Association for Technical Inspection (TÜV).	none	Presidential Green Chemistry Challenge Award, USA , BP, Wuppertal Institute, Federation of German Industries (BDI) Environmental Award	ISO 14040 – 14043	3		III	no
Bluesign-standard	Bluesign systems developed by Bluesign Technologies, partnered by SGS Group (Société Générale de Surveillance - certification, inspection, outsourcing, risk managemen, testing, technical consultancy, training)	Bluesign Technologies ag		all 10 principles of the UN GLOBAL COMPACT in vision	2		I	no
Carbon Reduction Label	8th Floor, 3 Clement's Inn, London, WC2A 2AZ, United Kingdom. Tel: +44 800 085 2005 email: customercentre@carbontrust.co.uk	The Carbon Trust and third party verifiers	to certify product carbon footprint	PAS 2050, the Code of Good Practice and the Carbon Label Company's Comparability Rules and secondary data.	2	Other (Under revision in 2008. Future revision timetable not set. Potentially every 2 years.)	I	no
Certified Humane Raised and Handled	Other (HFAC staff or independent inspectors hired and trained by HFAC)	HFAC staff or independent inspectors hired and trained by HFAC	the only animal welfare certification organization to have achieved USDA-approved ISO Guide 65 accreditation.	ISO Guide 65 accreditation.	1	As necessary to remain consistent with research in the field	I	no
Certified Wildlife Friendly™	Wildlife Friendly Enterprise Network	WFEN evaluated certified products annually		NSF 140 certification	2	Ad Hoc	I	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
Coop Naturaline: Switzerland	SAI - Social Accountability International	Analysis of applicant's questionnaires by SGS or IMO and risk assessment of the enterprise.External control. bio.inspecta checks the farms, External laboratories and Coop's own Quality Assurance department also conduct contaminant tests to check compliance with the specified limits.Aim: SA 8000 certificate (the first global ethical standard - to ensure ethical sourcing and production of goods and services). Use of bioRe yarn: sustainable organic cotton	prize for sustainable products : "Legacy for the Future" Foundation of the Institute for Applied Ecology in Freiburg (Germany) in 2001, 2002 UN World Summit in Johannesburg.Public Eye Positive Award 2007	SA 8000, EU Regulation 2092/91 for organic cotton	3 years, surveillence audit every 6 months		I	no
Cradle to Cradle Certification	self assessment and third party: approved labs for ASTM or BIFMA standards of sustainability.	McDonough Braungart Design Chemistry	Dr. Braungart's Intelligent Product System (IPS) won Germany's prestigious Océ van der Grinten award for science in the service of environmental protection and their "Hannover Principles" adopted by the World Congress of the International Union of Architects (UIA) in 1993, and are frequently cited as a seminal expression of sustainability.	ISO 14001, ISO 9000, Greenhouse Gas verification and Forestry certification services. Tiered system of awards: basic, silver, gold and platinum. Also use SA8000 (Social Accountability International), Fair Labor Association and WRAP (Worldwide Responsible Apparel Production) for social responsibility.	1	every 2 years	1	yes
eco-INSTITUT-Label	eco-Institut testing laboratory is officially registered with the State Accreditation Office Hannover (Staatliche Akkreditierungsstelle Hannover). The testing laboratory fulfils the specified criteria as per the international standard ISO/IEC 17025-2005.	eco-Institut	eco-Institut testing laboratory is officially registered with the State Accreditation Office Hannover (Staatliche Akkreditierungsstelle Hannover). The testing laboratory fulfils the specified criteria as per the international standard ISO/IEC 17025-2005.	ISO/IEC 17025-2005 and emission measurements in the test chamber according to ISO 16000	2 years renewable, audited every year	every year	III	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
EcoLogo / Environmental Choice	Independent third party	founding member of the Global Ecolabelling Network (GEN) as meeting ISO 14024 standards for eco-labelling.		ISO 14024 standards for eco-labelling	1 year	3 years	Type I eco-label	no
Ecomark: India	independent laboratory to verify standards of production comply with licence by Bureau of Indias Standards under Product Certification Marks Scheme	Consent/environmental clearance certificate from the concerned State Pollution Control Board. Small-scale industries registration certificate if the application is from a small-scale unit who desires to avail the concessional rate of marking fee for the unit for the small-scale sector. This certificate may be issued either by the office of the Development Commissioner, Small-scale Industries, or Industries Department of the concerned State Government.		ISI [Indian Standards Institute] mark of quality: ISO 14000 series of standards: Environment Management System (EMS) Certification (IS / ISO : 14001).	1 year, renewable for two years after inspection		I	yes
Ecoproof	TÜV Rheinland Sicherheit and Umweltschutz GmbH	TÜV Rheinland Sicherheit and Umweltschutz GmbH		several standards apply: comply wit the UN Global Compact	Other (Certification lasts as long as holder complies with criteria, subject to regular review.)		III	no
Environmental Choice New Zealand	applicant company's CEO	Environmental Choice New Zealand, managed by New Zealand Ecolabelling Trust (the Trust)	member of Global Ecolabelling Network (GEN)	ISO 14024 standard for "Environmental labels and declarations - Guiding principles."	Certification lasts as long as holder complies with criteria, subject to regular review.	5 years	I	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
Environmentally Friendly Product: Czech Republic	Independent third party: member of Global Ecolabelling Network (GEN)	Every 5 years by own organisation		ČSN ISO 14024 and the Regulation (EC) No. 1980/2000 of the European Parliament and of the Council on a Community eco-label award scheme, "The Flower".	No limit		Type I	no
EU Flower	tests can be in-house (self assessment - requires evidence of compliance with criteria) or through third party	The award normally lasts until the criteria expire (between three and five years after the criteria are agreed). When criteria are revised, companies can renew the licence by demonstrating that the product complies with the new criteria.		take into account the implementation of recognised environmental management schemes, such as EMAS or ISO 14001, when assessing applications and monitoring compliance with the criteria	3-5 years	3-5 years	I	no
Fairtrade Labelling Australia & New Zealand (FLANZ)	member of Fairtrade Labelling Organisations (FLO) International	Working towards a 5 year cycle, with surveillance audits in between by an independent third party. Fairtrade Labelling Organisation (FLO) maintains ongoing review of Fairtrade standards for production and trade. FLANZ reviews its license agreements accordingly.)	The Fairtrade Labelling Organizations International (FLO) is a member of the ISEAL Alliance (International Social and Environmental Accreditation and Labelling Alliance) formed in 1999 by leading international social and environmental systems to support members standards and verification systems to attain a high level of quality and to gain public credibility, political recognition and market success (ISEAL 2002). Code of Good Practice for Setting Social and Environmental Standards	SEAL 2002. Code of Good Practice for Setting Social and Environmental Standards	No limit		I	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
FairWertung	network organisation that verifies the compliance	FairWertung and third party accountants	Compliance to rules and established criteria that are binding for all member organisations and is monitored by FairWertung and independent chartered accountants. commercial operations are involved in a non-profit organisation's activities, a minimum set of ethical standards have to be met. Anyone who earns money by collecting (and selling) used clothes – even if the proceeds are used for charity – is responsible for what happens later to these goods. Compliance with tax regulations and environmental legislation, customs provisions and import restrictions, and – very importantly – transparent and truthful public relations work are the essential standards to which the signatories of FairWertung have pledged themselves..	government policies: Recycling and Waste Management Act (KrW / AbfG) and Waste Shipment Regulation (VVA).	No limit: constant monitoring of the member's activities	according to the government's policies	type II	yes
Global Organic Textile Standard	International Working Group (international Association Natural Textile Industry IVN, Germany, the Soil Association, UK, Organic Trade Association, USA, Japan Organic Cotton Association) gaol to unify the organic cotton labels, initial meeting in 2002, published agreed labelling system in 2008.	annually by a number of certifying bodies based around USA, UK and Europe	a number of ISO standards depending on the part of process examining but in general: certification by Certification Bodies, accredited according to ISO 65 including textile certification and, in addition, approval by the International Working Group and conclusion of a contract with it.	IFOAM, ISO 65, and any one of: ANSI Z400.1-2004, ISO 11014-1, 1907/2006EEC (Reach), 2001/58/EEC or GHS (Global Harmonised System)	No limit: constant monitoring of the member's activities		I	no
Green Mark	EDF: Green Mark Specification Standard is developed and analyzed by the Institute of Environment and Resource	every 2 years by Green Mark Auditing Board	based on ISO 9000 service quality control and ISO 14024 specification	ISO 9000 service quality control and ISO 14024 specification	2 years		I	
GUT	GUT	independent testing houses: TFI, Germany, ÖTI, Austria and Centexbel, Belgium	based on testing houses specifications		every year		I	yes

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
Healthy Child Healthy World	Both Healthy Child Healthy World and third party, depending on the material	reviewed every year using third-party certification seals or logos	Final approval is based on products holding USDA Organic, Scientific Certification Systems (SCS), Green Seal, GreenGuard Environmental, Forest Stewardship Council (FSC), Cradle to Cradle, Leadership in Energy and Environmental Design (LEED), or JPMA certifications. Or, by manufacturer providing affidavit guaranteeing environmental attributes.		2 years		I	no
Hungarian Ecolabel / Környezetbarát Termék Védjegy	Minister of Environmental Protection and Trade with various specialists and Hungarian Eco-labelling Organisation	Random periods by our own organisation, every three years	criteria set by the assessment bodies and by comapring with other international standards set for the products.		3 years		I	no
Label STEP	Max Havelaar Foundation, member of the Fair Trade Labelling Organisation International, complies with the standards set by them for working and environment.	Certification lasts as long as holder complies with criteria, subject to regular review.	member of Fairtrade Labelling Organisation		No limit			no
Max Havelaar: Belgium	Max Havelaar Foundation, member of the Fair Trade Labelling Organisation International, complies with the standards set by them for working and environment.	Certification lasts as long as holder complies with criteria, subject to regular review.	member of Fairtrade Labelling Organisation: FLO-CERT Gmbh and ISO 65 (small scale farming)		No limit			no
Migros ECO	Migros Laboratories.	Migros audit with certification lasting as long as holder complies with criteria, subject to regular review. Uses risk orientated Business Social Compliance Initiative (BSCI)	criteria set by the assessment bodies and by comapring with other international standards set for the products.		No limit		II	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
NATURTEXTIL	Independent third party: two levels: IVN Certified BEST if products have maximum standard currently achievable and are 100% organic cotton or IVN Certified GOTS where technically superior natural textiles of a high ecological textile standard with minimum 70% certified organic and 90% natural fibres.	IVN quality labels is regulated in the IVN Stylequide.	IFOAM accredited or internationally recognised (according to ISO 65) certifier		No limit: constant monitoring of the member's activities		I	no
NSF-140-2007 Sustainable Carpet Assessment Standard	NSF: accredited by ANSI (American National Standards Institute), IAS (International Accreditation Service), and OSHA (Occupational Safety and Health Administration) in the US and the Standards Council of Canada (SCC) in Canada. These accreditations attest to the competency of services provided by NSF and compliance with established national and international standards for third-party certification.	NSF: early researcher in environment management systems (EMS) and helped to write the ISO 14000 series.	Sustainable Carpet Assessment Standard NSF/ANSI 140 was designed by industry group to establish a system with varying levels of certification to define sustainable carpet. Developed to meet criteria set by ISO 14001, ISO 9000 and Greenhouse Gas verification and Forestry certification services.		No limit: constant monitoring of the member's activities		I	no
OE-100	Independent third party	Organic Exhange	use the following accreditation standards: IFOAM, NOP, US Department of Agriculture, EU 2092/91 - h:p://europa.eu.int/eurlex/en/consleg/main/1991/en _1991R2092_index.html C1.4 Accepted Organic Standards		1 year plus unannounced visits by auditors		I	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
Oeko-Tex Standard 100	Independent third party	renewed annually with random periods of review by an independent third party.	A tested textile product is allocated to one of the four Oeko-Tex product classes based on its intended use. The more intensively a product comes into contact with the skin, the stricter the human ecological requirements it must fulfil. Oeko-Tex Standard 100 is found on millions of products around the world in (almost) all retail segments (based on more than 65,000 certificates issued to date).		1 year		I	no
Oeko-Tex Standard 1000	Independent third party	Every year for first 3 years, followed by 1.5 years by an independent third party.	Cross-sectoral environmental management systems such as ISO 14000 or the European Union's EMAS system are recognised when awarding certification under the Oeko-Tex® Standard 1000 and form an ideal basis for this. The same applies to quality assurance systems already in place using in-house methods or ISO 9000. Companies with several production sites must have their various sites checked individually.		3 years		I	no
Oeko-Tex Standard 100plus	Independent third party	Every year for first 3 years, followed by 1.5 years by an independent third party.	as above		1 year		I	no
ÖkoControl	Independent third party				1 year		I	no
Oregon Tilth	Independent third party	tird party and Oregon Tilth	As an accredited certifier, Oregon Tilth certifies to the USDA National Organic Program (NOP) standards. The NOP provides a system that combines strict production standards, on-site inspections, and legally binding contracts to protect the producers and buyers of organic products. The OTCO fiber program certifies to the Global Organic Textile Standard (GOTS), which is dedicated specifically for Fiber & Textile Handling and production.		1 year		I	no

eco label	verified by	audit by	awards/standards	compliant with	duration of cover (years)	review of criteria	Type I, II or III	criteria indicates element of recycling
Organic Farmers & Growers Certification	third party (Defra and United Kingddom Accreditation Services)	As a Defra-approved certification body OF&G has established its own Organic Assurance Scheme and is able to inspect and certify	The Regulation 2092/91 requires that all approved certification bodies inspecting and certifying organic products must operate to EN45011 or its international equivalent ISO65. This European Norm or International Standard has established 'Criteria for Bodies Operating Product Certification' and specifies the procedures by which they must operate. OF&G is fully accredited with the United Kingdom Accreditation Service (UKAS) to EN45011 and is audited annually by both UKAS and Defra to confirm equivalence with the standard and the organic regulations.		1 year and also annual inspection and spot or unannounced inspections		I	no
Reilun kaupan edistämisyhdistys ry: Finland	Independent third party	independent third party	member of Fairtrade Labeling Organisations (FLO) International		3 years and reviewed through on risk matrix, audit every 1-3 years by an independent third party.		I	no
Rugmark	Independent third party	carpet looms are monitored regularly by inspectors trained and supervised by RugMark.	ILO working practices		No limit: constant monitoring of the member's activities		I	no
SMaRT Consensus Sustainable Product Standards:	Accredited by The American National Standards Institute (ANSI)	Auditing is conducted by Ernst & Young Global Sustainability Auditing Group And Redstone Global Auditing	ISO compliant Life Cycle Assessment (LCA) or certification and has achieved the ISO 14000 Series (Criteria covered in the California Platinum Certification)		No limit: constant monitoring of the member's sctivities		I	yes

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Soil Association Organic Standard	Soil Association	Every year: Soil Association	Soil Association certificate: UK5. GOT5 and ILO compliance		1-5 years		I	no
Thai Green Label	Thailand Environmental Institute	3 years for certification re-assessment and review of criteria by Thailand Environmental Institute	member of Global Ecolabelling Network (GEN)		2-3 years	2	I	no
TransFair: Canada	TransFair Canada	TransFair Canada	Fairtrade Labelling Organizations International (FLO), established in 1997, is an umbrella organization that unites 20 Labelling Initiatives in 21 countries, and Producer Networks representing Fair Trade Certified Producer Organizations in Central and South America, Africa and Asia.		1 year (Licensees must file quarterly and annual reports to retain use of logo.)	Every year:	I	no
Zque	Independent third party	by AsureQuality, an internationally recognised assurance organisation	accredited with the Joint Accreditation System of Australia and New Zealand (JAS-ANZ).	ISO Guide 65 and ISO 9001		constant monitoring	I	no
Ø-label: Norway	The inspection services are based on an agreement with the Norwegian Food Safety Authority, and the regulation is based on the EU council regulation 2092/91	Deibo	Awarding of the standards ensure that farms and fish farms, processing and marketing enterprises, importers and others follow the regulations for organic production.		5 years (or until revoked by Debio)		I	no