

Ecolabelling as a Confirmation of the Application of Sustainable Materials in Textiles

Abstract

The sustainable development idea has been -and still is-the principle activity of those who are aware of the importance of environmental protection. Realisation of this idea takes place, for example, by use of sustainable materials. They have a special meaning most of all in textiles because ecologically-friendly characteristics are usually the first to be mentioned as having a direct impact on the human body, (human-ecology) for example, not causing an allergy, non-carcinogenic, non-toxic etc. One of the forms of giving information about sustainable materials is the use of ecolabelling: making distinctions of products by means of given trade marks (eco-labels), which are an important marketing tool on today's more and more environmentally aware, boundary-less market. This paper presents popular eco-labels used in different countries all over the world. Examples of the criteria which must be fulfilled to claim that the textile was made from sustainable materials are presented. The requirements given by different institutions which have the right to grant eco-labels are compared. The level of understanding amongst Polish consumers with respect to information about sustainable materials from eco-labels for textiles was surveyed.

Key words: sustainable materials, ecolabelling, eco-criteria.

Introduction

The roots of ecolabelling can be found in the growing global concern for environmental protection on the part of governments, businesses and the public. The declaration of the sustainable development idea began 15 years ago through the efforts of representatives of different states taking part in a conference in Rio de Janeiro, which was then confirmed during a conference in Johannesburg (Rio + 10). As businesses have come to recognise that environmental concerns may be transformed into a market advantage for certain products and services, various environmental declarations / claims / labels have emerged on products and with respect to services in the marketplace (e.g. natural, recyclable, eco-friendly, low energy, recycled content, etc.) [1]. For textiles, such characteristics take on a special meaning as new technology, advanced textiles, new or modified raw materials appear. Information concerning sustainable features of products and materials become significant factors which allow environmentally-aware consumers to choose environmentally-friendly textiles.

One of the most popular forms of giving information about sustainable materials is the use of ecolabelling, which makes distinctions between products by means of special trade marks: eco-labels.

European Ecolabel - "EU Flower"

The European Ecolabel is part of a broad strategy aimed at promoting sustain-

able consumption and production [2]. This is a voluntary scheme designed to encourage businesses to market products and services that are kinder to the environment and European consumers - including public and private purchasers - making it easy to identify them.

The objective of the Community Ecolabel award scheme is to promote products which have the potential to reduce negative environmental impacts, as compared with other products (functional unit) in the same product group, thus contributing to the efficient use of resources and fostering a high level of environmental protection.

Environmental impact is identified on the basis of the examination of how a product interacts (and the material which it consists of) with the environment, including

the use of energy and natural resources during the life cycle of the product.

The criteria and relevant options for testing and methods are periodically revised (every 3 years) according to the development of science (especially as far as the environment and sustainable development are concerned), covering relevant environmental aspects related to the established 7 product groups. "Textile products" are taken into account in 2 groups: "Clothing" and "Home and garden" in the following categories: textile clothing and accessories, interior textiles, fibres, yarn and fabrics.

Since 1992, only 67 certificates have been awarded in Europe [3]: DK (27), IT (11), FR, SE (7), ES, EL (3), DE (2), UK, PT, NO, FI, CZ, BE (1) mainly for interior and clothing textiles, as well as

Table 1. New criteria under consideration [4].

Fibres criteria	Process and chemicals criteria
<ul style="list-style-type: none"> ■ Cotton and other natural cellulosic seed fibres (including kapok) - modification of pesticides and % of organic cotton ■ Elastane - criteria for organotin ■ Flax and other bast fibres - limit for COV ■ Greasy wool and other keratin fibres - list of pesticides, limit for COD, synergy with Oekotex criteria ■ Polyester - criteria for COV ■ Polypropylene - new criteria for existing new processes 	<ul style="list-style-type: none"> ■ Auxiliaries and finishing agents for fibres and yarns - biodegradability and elimination (ecolabel for lubricants) ■ Biocidal or biostatic products - use of biocide (with some hurdles) ■ Stripping or depigmentation ■ Auxiliary chemicals (can give odour to final products) ■ Detergents, fabric softeners and complexing agents ■ Bleaching agents ■ Impurities in dyes ■ Impurities in pigments ■ Metal complex dyes ■ Azo dyes - new investigation ■ Dyes that are carcinogenic, mutagenic or toxic to reproduction ■ Potentially sensitising dyes - update ■ Halogenated carriers for polyester ■ Formaldehyde - limits of Oeko-tex, check the tests ■ Waste water discharges from wet processing - limit ■ Flame retardants ■ Shrink resistant finishes - criteria more precision ■ Finishes - connecting criteria with the biocide directive ■ Coatings, laminates and membranes - polyester membrane without antimony ■ Energy and water use - some criteria are expected

some products for protective wear fabrics and other uses. This means that this label is not yet that successful in the textile industry. Revision of the European Ecolabel should help to increase its development and convince the textile industry to get more involved.

In the period 2006-2007 the European Ecolabel on textile products was under revision, AFNOR having been chosen by the European Commission to conduct this [3]. New criteria under consideration [4] are presented in **Table 1** (see page 21). The “old” ecological criteria for the product group “textile products”, as well as related assessment and verification requirements, shall be valid until 31 May 2008. (Commission Decision of 29 March 2007 notified under document number C(2007)532 amending previous Decisions in order to prolong the validity of the ecological criteria for the award of the Community ecolabel to certain products).

Comparison between Oeko-Tex Standard 100 and Ecolabel

Since 1992, about 50 000 Oeko-Tex certificates have been awarded to about 6500 companies in 68 countries. “Confidence in textiles”- the motto of the independent test (for harmful substances according to Oeko-Tex Standard 100) institutes of the International Oeko-Tex Association [5] – is an international synonym for responsible textile production – from the raw material to the finished product, for industry and retailers throughout the textile manufacturing chain as well as for users of textiles.

The Oeko-Tex label is focused on health criteria. In the European Ecolabel there are some criteria very close to those of the Oeko-Tex. But even if the product test is taken into account by the European Ecolabel and Oeko-Tex, they are different regarding the limit value or test method. Moreover, the European Textile Ecolabel takes into account a lot of criteria concerning fibres, processes and chemical parameters. A comparison of these two labels is presented in **Tables 2 & 3**.

European regulations concerning sustainable materials

The application of sustainable materials results from realisation of the policy of sustainable development. An additional determining factor is European law. Since 2000, some new regulations have

been published (**Table 4**), directly or indirectly linked with textile products.

The following requirements are presented in the European Standards series ISO 14020: Environmental labels and declarations, are elaborated by Technical Committee ISO/TC 207 “Environmental management” and approved by CEN in collaboration with CMC (CEN Management Centre).

The rules of establishing a voluntary, multiple-criteria-based third party programme that awards the use of environ-

mental labels on products indicating the overall environmental preferability of a product based on the life cycle are presented in Standard EN-ISO 14024: 2000. Examples of environmental criteria are energy (renewable/non-renewable), resource (renewable/non-renewable) and emissions: water, air, and soil.

The following terms are commonly used in self-declared environmental claims (EN-ISO 14021:2001): compostable, degradable, designed for disassembly, extended life product, recovered energy, recyclable, recycled content, pre- or pro-

Table 2. Comparison between Ecolabel and Oeko-Tex [3].

ECOLABEL		OEKO-TEX
INTEREST	Toxicological and environmental parameters	Toxicological parameters
APPLICATION FIELD	Textile clothing and accessories Home textiles Yarns, fibres Fabrics	4 products classes: I: babies II: direct contact with skin III: without direct contact with skin IV: decoration material

Table 3. Criteria - comparison between an Ecolabel and Oeko-Tex [3].

PRODUCT TESTS	ECOLABEL	OEKO-TEX
pH		X
Formaldehyde	X	X
Heavy metals / Organotin compounds	X	X
Pesticides	X	X
Chlorinated phenols		X
Phthalates		X
Arylamines (dyes)	X	X
Carcinogen dyes	X	
Allergen dyes	X	X
Chlorinated benzene and toluene (carrier)	X	X
Biological active products	X	X
Flame retardant products	X	X
Colour fastness	X	X
VOCs: Volatile organic components	X	X
Determination of odours		X

Table 4. European regulations linked with sustainable materials in textiles.

DIRECTIVE/STANDARD	CONTENT
Directive 92/59	A general requirement on security
Directive 2001/95	This regulation requires a producer or a retailer to market reliable products. The basic intent of this text is to define a reliable product as a product that conforms to the relevant standards.
Directive 94/27	Regulates the quantity of nickel that could be released by products which are in direct contact with the skin
Directive 96/61 (IPPC)	The Integrated Pollution and Control directive deals with the reduction of pollution in industrial plants. Since October 1999, new plants have been subjected to these requirements. In October 2007, existing plants will be subjected too.
Directive 2002/61	Concerning the interdiction of dyes which are capable of releasing one of the 22 amines listed in the Directive and considered as carcinogenic.
standard EN 14682: 2004	Safety of children’s clothing - cords and drawstrings on children’s clothing – specifications.
standard EN 14872:2004	Burning behaviour of nightwear: requirements and specifications.
Directive 2005/84	Six kinds of phthalates have been prohibited for toys, child use and care articles that can be put in the mouth

Tables 5. Textile product category list by CODE according to Global Ecolabelling Network [7].

Code	Product Category	Code	Product Category
1400		1400	Clothing
		1401	Carpets, textiles for floors
		1402	Others

Table 6. Examples of eco-labelled textile products in Asia, Australia and Oceania.








Country	Eco-Label Program	Eco-Label	Product code	Eco-labelled products	Country	Eco-Label Program	Eco-Label	Product code	Eco-labelled products
India (IN)	Ecomark		1402	Textiles	Taiwan (TW)	Green Mark		1402 1402	Secondary fibres and their products Textiles from secondary polyester
Japan (JP)	Eco Mark		1400 1402 1402	Clothing Technical Textiles Household Textiles	Australia (AU)	The Australian Ecolabel Program		1401	Carpets (100% wool)
Korea (KR)	Kela		1400 1402 1402	Clothing Shoes Bags	New Zealand (NZ)	Environmental Choice		1401 1401	Woolen carpets with covering (100% wool) Woolen carpets with covering (min. 80% wool)
Thailand (TH)	Thai Green Label		1402	Textiles				—	

Table 7. Examples of eco-labelled textile products in Europe.











Country	Eco-Label Program	Eco-Label	Product code	Eco-labelled products	Country	Eco-Label Program	Eco-Label	Product code	Eco-labelled products
Czech Republic (CZ)	Ecological product		1402	Textiles	Poland (PL)	Eco-sign		1402	Textiles
Germany (DE)	Öko - Tex		1400	Products for children Products with direct contact with the skin Products with non-direct contact with the skin Decorations and accessories		Safe for infants			Products for children
European Union (EU)	EU-Flower		1402	Textiles Mattresses Shoes		Safe for children			Products for children
Croatia (HR)	Environmentally Friendly		1402	Towels	Human friendly		1400	Clothing	
Netherlands (NL)	Milieukeur		1402	Shoes Protective shoes	Slovakia (SL)	Slovak environmental friendly product		1402	Textiles

Table 8. Examples of ecolabels used in other countries:









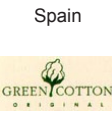












								
Spain	Spain-Catalonia	Sweden	France	Switzerland	Austria	Hungary	Lithuania	Bulgaria
								
Denmark	USA	Canada	Brazil	Philippines	Hong-Kong	Singapore	Israel	Zimbabwe

Table 9. Comparison of the requirements concerning processes & chemicals and fibres; FB - forbidden.

Process & chemicals, fibres	Criteria ¹					
Carding and spinning oils, waxes, finishes, lubricants and sizing applied to fibres or yarns	Component substances of the preparations applied shall be sufficiently biodegradable or eliminable in waste water treatment plants	✓	✓	✓	✓	✓
Stripping or depigmentation	Heavy metal salts (except of iron) or formaldehyde	FB	FB	FB	FB*	FB
Weighting	Compounds of cerium	FB	FB	✓	FB	FB
Printing	Contain volatile organic compounds (VOCs): plastisol-based printing	✓	✓	✓	✓	✓
Waste water discharges from wet-processing	Minimalisation of COD	✓	✓	✓	✓	✓
Biocidal or biostatic products	Chlorophenols (their salts and esters).	FB	FB	FB	✓	FB
Auxiliary chemicals	Alkylphenoethoxylates (APEOs), bis (hydrogen-nated tallow alkyl) dimethyl ammonium chloride (DTDMAC), distearyl dimethyl ammonium chlori-de (DSDMAC), di (hardened tallow) dimethyl ammonium chloride (DHTDMAC) and ethylene diamine tetra acetate (EDTA)	FB	FB	FB	FB	FB
Detergents, fabric softeners and complexing agents	-	✓	✓	✓	✓	✓
Bleaching agents	Minimalization of AOX emission Chlorinate based chemicals	✓	✓	✓	✓	✓
Impurities in dyes, pigments	Content of As; Cd ; Cr ; Cu; Ni ; Pb; Sb; Sn; Zn. Hg	✓	✓	✓	✓	✓
Chrome mordant dyeing	Min. use for wools and other keratin fibres	FB	✓	FB	FB	FB
Metal complex dyes based on copper, chromium or nickel	Minimalisation of discharged to waste water treatment	✓	✓	✓	✓	✓
Azo dyes	Listed aromatic amines	FB	FB	FB	✓	FB
Halogenated carriers	-	FB	FB	FB	FB	FB
Formaldehyde	Minimalisation of contain	✓	✓	✓	✓	✓
Acrilic	Residual acrylonitrile Emissions of acrylonitrile to air	✓	✓	✓	✓	✓
Cotton	Containing the following substances: aldrin, captafol, chlordane, DDT, dieldrin, endrin, heptachlor, hexachlorobenzene, hexachlorocyclohexane (total isomers), 2,4,5-T, chlordimeform, chlorobenzilate, dinoseb and its salts, and monocrotophos.	✓	✓	✓	✓	✓
Elastane	Organotin compounds Emissions of aromatic diisocyanates to air diisocyanates	FB	-	FB	✓	FB
Flax and other bast fibres (including hemp, jute, and ramie)	The amount of COD or TOC in wastewater	✓	✓	✓	✓	✓
Greasy wool and other keratin fibres (including wool from sheep, camel, alpaca, and goat)	*α-, β-, γ-, δ -hexachlorocyclohexane, aldrin, dieldrin, endrin, p,p'-DDT, p,p'-DDD. * diazinon, propetamphos, fenchlorphos, ... *cyhalothrin, cypermethrin, deltamethrin, .. *diflubenzuron, triflumuron Level of COD discharged to surface waters Level of AOX	✓	✓	✓	✓	✓
Man-made cellulose fibres (including viscose, lyocell, acetate, cupro, and triacetate)	Emissions of sulphur compounds / for viscose fibres Emission of zinc to water /for viscose fibres Copper content of effluent water/ for cupro fibres	✓	✓	✓	✓	✓
Polyamide	Emissions of N ₂ O to air	✓	✓	✓	✓	✓
Polyester	Amount of antimony Emissions of VOCs	✓	✓	✓	✓	✓
Polypropylene	Lead- based pigments	FB	FB	✓	FB	FB

consumer material, recycled material, reduced energy, water consumption, reduced resource use.

- provide information, advice and technical assistance to organizations contemplating or developing programs;

GEN's actions not only relate to ecoblabelling but are also connected with sustainable development[6], e.g.

Sustainable materials in other ecolabelling programs for textiles in the world

The Global Ecolabelling Network (GEN) is a non-profit interest group composed of 26 third-party, environmental performance labelling organisations throughout the world [6]. It was established in 1994. The goal of the interest group is to further the exchange of information between national eco-label activities in order to improve, promote and develop the „ecolabelling” of products and services. In support of this mission, GEN members:

- set criteria for and certify products and services with lower environmental burdens and impacts than comparable products / services with the same function;

Table 10. Interpretation of information resulting from presented Eco-labels for textiles.

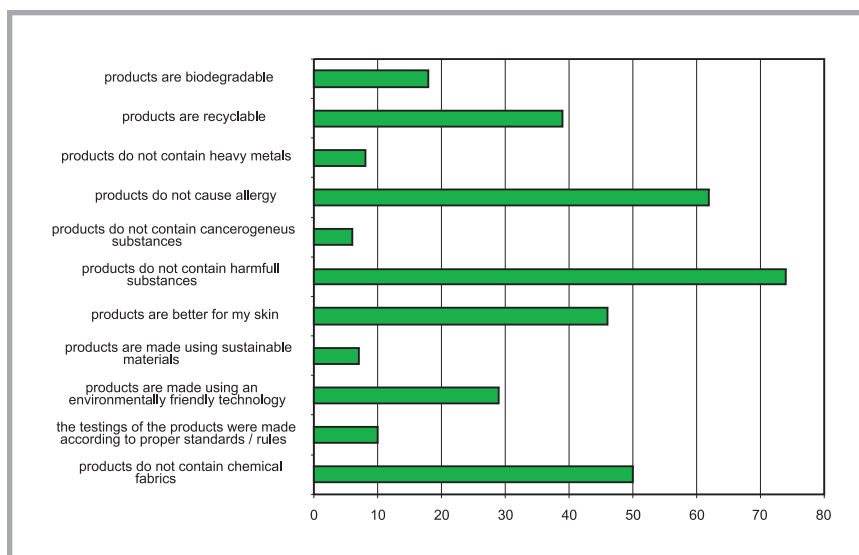








Table 11. Information regarding sustainable materials in textiles resulting from selected eco-labels, in opinion of those surveyed.

Characteristic of products						
product does not contain heavy metals, %	2.0	0.7	7.2	15.7	10.4	3.5
product does not contain harmful substances, %	42.5	61.0	85.2	92.5	72.5	52.7
product does not contain chemical fibres, %	1.2	0.8	77.6	57.5	45.2	34.2
product does not contain cancerogeneous substances, %	3.1	2.7	15.5	8.5	4.5	6.2
product is biodegradable, %	16.0	9.3	2.4	12.6	15.8	38.4
product is recyclable, %	19.5	12.5	0.2	40.7	42.5	27.3

- in 2002 the current GEN chair attended and participated in the World Summit on Sustainable Development;
- in 2003 GEN attended the Eleventh Session of the United Nations Committee on Sustainable Development, in New York;
- during a conference held in Taiwan in 2005, a GEN member gave a presentation entitled: "Helping the good guys finish first: Canadian experience of sustainable procurement and how environmental labelling has supported sustainable procurement".

One of the GEN's members is the European Commission – DG ENVIRONMENT (G2).

A textile product category list by CODE according to the Global Ecolabelling Network [7] is presented in **Table 5** (see page 22). Examples of eco-labelled textile products from all over the world, with the name of the Eco-label Program, Product Code and country, are presented in **Tables 6, & 7** (see page 23). Other eco-labels are presented in **Table 8**.

Criteria related to the use of sustainable materials in textiles

In general, the criteria for textiles in different labelling programs are based on the EU Flower programme for eco-labelling textiles in accordance with the Commission's Decision 2002/371/EC of 15 May 2002 [8].

However, some programs have changed the limit value for established criteria or added supplementary requirements (e.g. Nordic Ecolabelling has added requirements for organic vegetable fibres, skins and leather, ethical production conditions as well as energy and water consumption [9]) to those contained in the EU criteria for the ecolabelling of textiles.

Tables 9 present the results of comparing requirements concerning selected

criteria related to the use of sustainable materials in textiles for certain Ecolabelling Programs.

Survey on understanding information derived from eco-labels

An investigation was carried out in April 2007 on a representative group of 130 students from different years studying at the Institute of Textile Engineering and Polymer Materials of the University of Bielsko - Biała. Women comprised 75% of the group questioned. The survey was conducted by means of specially prepared questionnaires containing selected eco-labels existing in the textile market (in central Europe). Propositions of information resulting from the eco-labels for textiles presented are given. The information was connected with the environment, materials, production and human-ecology. Those questioned were asked to select the three main types of information associated with each eco-label. The results of the survey on information resulting from eco-labels is presented in **Table 10**. Information regarding the criteria of sustainable materials in textiles resulting from selected eco-labels, in the opinion of those surveyed, is presented in **Table 11**. The results obtained did not differ too much in relation to the age of those questioned or their gender.

Conclusion

For all the eco-labels presented, the main information resulting from this were properties describing human-ecological qualities e.g. does not contain harmful substances (about 70% of answers), does not cause allergy (about 60%), is friendly for the skin (45%). Only 30% of participants identified eco-labels as a confirmation of environmentally friendly technology having been used. Information regarding sustainable materials in textiles, such as that they do not contain heavy

metals nor cancerogeneous substances and are made from environmentally friendly materials, was identified sporadically for all eco-labels presented. The deficiency of harmful substances in textiles, in the opinion of those questioned (from 40% to 90% of answers for different eco-labels), is the main criteria of sustainable materials in textiles, resulting from information given on eco-labels.

The analysis elaborated proves that it is necessary to increase the level of awareness of the sustainable materials used in textiles. The popularisation of eco-labels, which allows to distinguish one eco-textile from another on the open market, in the author's opinion, is the best way to achieve this.

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